Rep. Lundy Field Soc. 45

A PRELIMINARY SURVEY OF WRECKS WITHIN THE LUNDY MARINE NATURE RESERVE AND THEIR IMPORTANCE TO THE NATURE CONSERVATION RESOURCE

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BACKGROUND TO RESEARCH

The coastal waters of the UK is an environment which is under ever increasing pressures of development through recreation and tourism, fishing, aggregate extraction and oil and gas exploration. Wrecks in the marine environment offer a valuable opportunity to study rates of colonisation of both commercial fish species and other attached and free swimming marine life forms. The impact of recreation on these sites, their opportunity for scientific study, and their ability to bring faculties and user groups together is important. Wrecks offer a monitorable community and population, a microcosm of the marine environment. An understanding of this microcosm can only aid in furthering our understanding of the macrocosm; the pressures which effect its productivity, its robustness and durability.

By studying those wrecks in the Lundy Marine Nature Reserve (MNR), conservation techniques to promote sustainability can be developed and assessed in relation to their success. If viable these techniques can be moulded into a national programme which would promote and develop a greater understanding of the marine environment in general.

SURVEY DESIGN

The study was undertaken by the author and Messrs. Philip Robertson, maritime archaeologist; Alan James, underwater photographer; and Andy Hibbert, marine video operator. Research took place during June and July 1994. The main aim of the research was to undertake an initial survey of a selection of wrecks within a range of marine habitats, energy environments, depths and substratum characteristics.

The wreck surveys were conducted from a RIB (ridged inflatable boat) with divers using SCUBA diving equipment. Awareness of the limitations of SCUBA at deeper depths combined with the standard policy of no decompression diving meant that short bottom times and longer surface intervals would have been necessary on some sites. Due to these limiting factors these sites were given a low urgency status in the timetable with other more easily accessible and 'workable' sites given a higher priority.

a TECHNIQUES

The following seven wrecks were primarily selected with a view to survey (Gibson 1993 for location; Langham 1994 for further details):

Earl of Jersey 1898
HMS Montagu 1906
MV Amstelstroom 1948
Seal Rock site (no recorded date available)
SS Salado 1897
MV Robert 1975
Carmine Filomena 1937

These wrecks were taken as a representative sample as the varying conditions in which they lie offer considerable contrasts of benthos, energy levels, depth, bottom type and wave action. The more heavily dived sites were selected over those which receive only marginal interest (ordinarily due to difficulty of access).

The South coast wreck of the Earl of Jersey, lying in the deepest water between 30-40m, beneath the wave action, and relatively inaccessible due to strong tidal

conditions, location and buoying difficulties, was given careful consideration.

Table 1. Habitat and site selection.

Depth Zone	Level rock or surface	Vertical rock or surface	Boulder	Cobble & Pebble	Gravel Sediment	Sand Sediment	Mud Sediment
Shallow	W2 W3 W7		W7	W7	W7	W7	
Medium	W2 W3	W4 W6	W4 W3	W3	W3		
Deep	W1	W6			W1 W6	W1	W6

Legend:
W1: Earl of Jersey W2: H.M.S. Montagu W3: Amstelstroom
W4: Seal Rock W5: SS Salado W6: M.V. Robert
W7: Carmine Filomena

A housed Hi-8 recorder was used to obtain visually recorded footage of the sites marine flora and fauna.

A range of Nikon underwater cameras were used to obtain wide angle and macro slide archives of the sites and their marine flora and fauna for later cataloguing and identification.

Dive into History recording forms (produced by The Royal Commission on the Historical Monuments of England [RCHME] and the Nautical Archaeological Society [NAS]) and Seasearch forms (produced by the Joint Nature Conservation Committee [JNCC] and the Marine Conservation Society [MCS]) were used to identify a programme of assessment and record the wreck structures, biota and substratum.

Literature and records from Lundy and mainland archives at Exeter were consulted.

Consultation took place with members of the Island community, local and visiting dive groups.

Underwater video footage and photographic slides are in the care of the author; a copy of this report and its findings will be lodged with English Nature.

WRECK SITE INVENTORIES AND DESCRIPTIONS

a EARL OF JERSEY 1898

The Earl of Jersey was a paddle tug which sank in 1898. The wreck lies to the south of the island in an area which is dominated by NE-SW steeply sloping (40°-80°) very broken rock gullies of fissured and creviced rocks in the region of 2-3m at their apex. These gullies support a variety of short hydroidal turf. Other marine fauna included Ross coral, Lesser-spotted Dogfish *Scyliorhinus canicula* and Edible Sea-urchin *Echinus esculentus.* The latter is a good indicator of the availability of turf and crusts upon which to graze. Between the gullies were sterile beds of stone gravel in waves ranging between 10-14cms in height.

The depth (35m), time restrictions, and location difficulties prevented a physical survey of the wreck. A survey of the biotope in close proximity of the wreck was undertaken and documented records enabled a site overview to be accomplished. It was established that the remains of the wreck include the anchor, ribs and paddle arches. Based on the surrounding biotope and communities and personal knowledge of other deeper water

wrecks it was assumed that the wreck itself could host fish such as Pollack *Pollachius pollachius*, Conger *Conger conger*, crustacea such as Lobster *Homarus gammarus*, filter feeders such as Hydroidal turfs and Plumose anemone *Metridium senile*.

This would make the wreck a contrasting feature in this area due to the very different environment it would offer to species in comparison to the surrounding gullies. Cover, shelter from scouring caused by high tidal flow, surfaces upon which organisms could anchor themselves are some of the suggested contrasts that may be in evidence. Further research must, however, be conducted *in situ* to ascertain the strength of these assumptions using a surface supply vessel and support.

b HMS MONTAGU 1906

The HMS Montagu was a 418 ft battleship of the Duncan Class, launched in Devonport in 1906. The wreck lies at the Southwestern corner of the island at the base of vertical granite cliffs in a depth of not more than 14m of water. The sea bed terrain consists of level (Horizontal-40°) very broken rock gullies with many crevices covered in dense vegetation and supporting a wind range of fauna. Small rounded uncolonised boulders were observed at the base of the gullies in a scattered array suggesting mobility and a high level of attrition.

The topography of the sea bed and the depth in which the wreck lies has considerably affected the impact that it has had on the area. The substratum, having a high natural surface area, was not appreciably different from the introduced wreck in terms of habitat space and thus lessened the impact the wreck had in terms of provision of habitat. The wreck surroundings are heavily colonised by kelp *Laminaria hyperborea* with red and brown sea algaes *Dilsea carnosa, Rhodymenia palmata, Ceramium rubrum, Chondrus crispus, Halopteris scoparia, Bugula turbinata* and *Halopteris filicina* dominating the lower light levels. Crustaceans such as Velvet Swimming Crabs *Macropipus puber* are in evidence although not abundant. Cuckoo Wrassse *Labrus mixtus* and Pollack *Pollachius pollachius* were also observed. Five armed star fish *Asterias rubens*, Nudibranchs *Facelina auriculata* and Edible Sea-urchins *Echinus esculentus* were also present making up a small part of the life at this site.

The HMS Montagu was introduced into a high energy system, with considerable attrition occurring, aiding in the accelerated break up of the wreck over time. The advantages that some wrecks bring to sites by artificially raising the seabed to a higher light zone and allowing the establishment of floral species was negated in this case as the surrounding water was shallow enough for flora to gain hold fasts and photosynthesise sufficiently to sustain growth.

The range and abundance of life at this site was unexpected as it lies in a high energy zone at the south western point of the island where a scoured crust covered substratum was predicted based on previous experience.

It was therefore deduced that the small cove, in which the wreck lies, provided enough shelter to reduce the very strong waves to moderately strong wave action which supply nutrient rich water at a velocity conducive to colonisation. This combined with the fact that the HMS Montagu site experiences considerable seasonal change, with the winter meteorological patterns bringing many south westerly storms, would cause considerable scouring of the site. However, during the summer months when the severity of the weather decreases there is a sufficient drop in wave energy levels to permit the growth of the kelp beds *Laminaria hyperborea* which in turn provide habitats for a wide variety of other marine life; this has resulted in the dense vegetation and abundant fauna recorded.

The wreckage and remaining structure could create additional shelter. However, the remains today are largely fragmented and scattered throughout the bay (the bay diameter at point of scatter is 250m). It was noted on studying the video footage that the structural steel plates and ordinance shells were not colonised, even when in direct contact or close proximity to rocks and substratum which sported prolific growth of flora and a large cross section of fauna, resulting in a low conservation status for the wreck.

c THE AMSTELSTROOM 1948

The Amstelstroom was a Dutch coaster of 395 tons which sank on 18th July 1948. The wreck lies on the West side of the island almost directly beneath Battery Point strewn along numerous rocky gullies, with surveying taking place to a depth of 18m.

The terrain consists of steeply sloping (40-80º) very broken rock gullies with many fissures, recesses and crevices. The base of the gullies were contrasting areas of large and small open boulders with areas of cobbles and sand. The stone gravel areas between the gullies where expanses of less than $2m^2$ were observed were raised into ripples (0-4 cm); areas greater than $2m^2$ were observed as having upper range ripples and lower range waves (3.5-11 cm).

The gullies in which the wreckage lies had sides that were less colonised than the gully heights where kelp beds of *Laminaria hyperborea* were the dominant species with red and browns at their base in similar fashion to those witnessed at the HMS Montagu site. A large volume of free floating algae was observed at the base of the gullies over the gravelled areas which contained reds and browns; green, possibly *Enteromorpha linza* or drifted grasses, was also present. The array of life witnessed consisted of Nudibranchs, Tompot Blennies *Blennius gattorugine*, Velvet swimming crabs, Lobster, Cuckoo Wrasse, Edible Sea-urchins, starfish, short turf, Devonshire Cup Corals *Caryophyllia smithi* and Jewel 'Anemones' *Corynactis viridis*, Basking Sharks *Cetorhinus mximus* and Grey seals *Halichoerus grypus.*

The wreckage lies strewn amongst the gullies with photographic records showing vivid evidence that this is a high energy environment; with the example of a piece of ship's steel at $60cm^2$ which had been moulded to the gully side. Copper was witnessed as having no colonisation upon it and was as if new.

It was also noted that the metals in the surroundings of the copper showed appreciably advanced states of chemical attack compared with steel at other locations which appeared to have a thin crust of colonisation, species unconfirmed. Although this did not prevent decay of the material it appeared to lessen or at least slow down the decomposition of the material.

The anchor and anchor chain form a pile which is uncolonised (see Plate 2, at rear) although surrounding areas are rich in biota. Other photographic evidence recorded the varying bottom types surrounding the site with one such type being solely composed of medium and small boulders which were rounded, scoured and a source of highly mobile attritional material. Embedded within these boulders was the eyelet of a cable/hawser suggesting that some parts of the wreckage may be periodically covered and uncovered and thus varying the degrees of exposure they may receive and the speed of their colonisation.

d SEAL ROCK SITE (DATE UNKNOWN)

This is an unknown vessel dating to mid nineteenth or early twentieth century; its class and date of sinking are unknown.

The Seal rock site lies to the North East of the island in an exposed location at a depth of 18m on a level (0-40º) slope, consisting of medium to large smooth boulders in an open layout. Visibility on the site was poor, at only 4m, with suspended sediments of fine silt. This silt also created a thin covering over the substratum and biota in sheltered areas amongst the boulders. The biota were mainly sparse mixed turf of sponges and sea squirts with Wrasse and Spiny Spider Crabs *Maia squinado* also present.

The wreck was a few scattered objects and no longer has any major impact on the site with regard to enhancing the local fauna communities. Wreckage and structure may possibly be found at the base of the drop-off which starts at 18m at the base of the slope and extends to 40m. Due to weather conditions and logistical concerns at the time of research this site was given a low priority status (limited video footage available).

e SS SALADO 1897

The SS Salado was a steel built steam cargo ship of 2188 tons which sank on 20th March 1897. The wreck lies in between 7-10m of water on the East side below an island feature known as the 'Mousehole and Trap' at the base of steep granite cliffs in visibility of 5m. The substratum is level (Horizontal-40°) of large and medium sized smooth granite boulders which are covered in grey silt and Kelp beds of *Laminaria Hyperborea* with associated reds, browns and turfs similar to those found on the west coast wrecks described earlier. The fauna of this site was similar to that of the west coast with the exception of Nudibranchs and Basking sharks; however, Basking sharks were observed 500m off shore from this location.

The wreck site showed evidence of being targeted for lobster potting with several pots within 150m. What remains of the wreck, adjudged to be approximately 20%, is heavily colonised and practically invisible to the observer. The contrast between the barren steel structure and the luxuriously colonised substratum found at the site of the HMS Montagu and the Amstelstroom was not observed.

This raises the question that it is not the metal that prevents colonisation but the level of attrition a site experiences; consequently if a site lies in shallow to medium depths (0-18m) with a perpetually high energy environment, which causes considerable attrition, then colonisation will be limited.

The SS Salado is practically identical to the HMS Montagu and Amstelstroom sites in terms of depth and remaining structure but receives seasonal shelter and was colonised, the important factor being the ability of the *Laminaria hyperborea* to establish itself. Once the Kelp has established growth on the wreck material then complete colonisation of the remaining structure is practically a certainty with the *Laminaria hyperborea* providing habitats for a range of other flora and fauna. Although winter storms may remove some of the vegetation and a loss will occur due to die back, the conditions throughout the spring and summer months allow a good recovery and continued colonisation.

f MV ROBERT 1975

The MV Robert was a single screw small coaster which sank in 1975. The wreck lies in a strong tidal location in 18m of water, at low tide, on the East coast of the island 1km east of Tibbet's Point. The substratum is coarse, firm level mud (Horizontal-40°) which was scattered with embedded pebbles and cobbles.

The MV Robert lies intact on its starboard side with the bow pointing East. Approximately 5% of the wreck was buried in coarse mud and fine silt with the remaining structure up to 9m proud of the seabed.

Colonisation

The obstruction of the wreck across the tidal flow has caused prolific growth of Plumose Anemones *Metridium senile* over the bow section, port side and protruding structures such as the winch wheels, funnels and capstan (see Plate 1, at rear). This upper port side area is subjected to greater turbulence as the tide floods and the water is forced over the hull after initially backing up over the decking and entrances to the holds which lie across the tidal flow. On an ebbing tide the curve of the hull may cause a certain degree of turbulence in the upper deck region but could also create a shadow for the lower regions.

Further differences that occurred on the MV Robert

The propeller was no longer present but the rudder was still relatively intact. It was observed at this point that growth on the underside compared with the top side of the rudder was not appreciably different. This is a reflection of the depth and the fact that the algaes witnessed on the shallower sites cannot survive at such low light levels therefore making all surfaces available to fauna capable of existing at lower light levels; some were also recorded in total darkness within the cargo holds themselves.

The last finding suggests that even in the holds there is sufficient water flow to provide nutrients at a level to sustain growth. The benthos and colonisers were predominantly hydroidal on the structure or siphon species on and in the surrounding sediments.

Colonisation has also occurred in the areas of the wreck where there is a stronger tidal flow due to the channelling of water through confined areas such as pipes, anchor chain ducts and porthole locations. The dominant species again being the Plumose Anemone *Metridium senile* along with Antenna Hydroids and common Hydroids.

The wreck had contrasting zones of colonisation with areas of shade or darkness being less colonised. The exception were the hold areas where colonisation occurred in almost total darkness on duck boarding and inner cargo hold structures.

The vertical sections of the wheel house at the stern were colonised by swathes of Jewel 'Anemones' *Corynactis viridis* and occasional Devonshire Cup Corals *Caryophyllia smithi*. It was noticed that Plumose Anemones *Metridium senile* were not present in areas colonised by Jewel 'Anemones' and occasional Devonshire Cup Corals. This is due, at least in part, to the Plumose Anemones observed preference for higher turbidity anchorages.

The wreck was host to abundant young Pollack *Pollachius pollachius* which were not observed when out of direct proximity of the wreck (<15m). Common Squid *Loligo forbesi* eggs were attached at various locations on the decking gear and cargo hold entrances. Some of these egg sacks had been eaten by fish.

A plastic pipe that ran from the port side rail over the entrances to the holds was densely colonised, but a steel frame parallel to this pipe was bare in comparison. The pipe may offer a softer colonisable surface than the steel frame and at the same time provide extra turbidity because of its movement in the current.

Lobsters of varying size and age were found beneath steel plating where it came into contact with the seabed and allowed for the excavation of a living space. Two such sites at the same depth offered direct comparisons as the angle of the plates to the seabed were very similar. The surrounding seabed and biota, however, were markedly different between the two locations. Site A had a gravel sea bed and Hydroidal colonisation on the plates' external upper surface. Site B had a silty mud sea bed and a large debris mound of discarded bivalve shells as a result of feeding. Site B was also colonised by Plumose Anemones *Metridium senile* both on the upper external surface and the underside of the plate, suggesting that the area is vacated by the lobster at regular intervals for periods of time long enough to enable the Plumose Anemones to feed.

Several areas of the hull on the port side of the MV Robert were devoid of life completely. It was thought that these areas were where ships antifouling remained. On later consultation with the Lundy Field Society it was found that these areas had been deliberately scraped clean (in the late 1980s) of organisms to assess colonisation rates. This highlighted the need for consultation between user groups and a co-ordination of efforts so that areas of study are not duplicated unnecessarily or that ongoing research programmes are not disturbed or accidentally misleading. Those areas of the wreck which were uncolonised were noticably sheltered areas of poor water movement and tidal flushing.

John Dory *Zeus faber* were present near or on the wreck, and on the coarse mud around the wreck juvenile Lesser-Spotted Dogfish *Scyliorhinus canicula* were observed; both species were present but only occasional in terms of numbers.

It was noted that up to a distance of 40m around the wreck Plumose anemones could be recorded in decreasing occurrence attached to debris from the wreck. Nearer the wreck it was noticed that the anemones colonised parts of the coarse mud sea bed where large enough pebbles and small boulders could be found upon which to gain secure anchorage. This small boulder and pebble colonisation was not however reflected at distances of greater than 10m from the wreck, in contrast to the wreckage.

Local divers from Appledore Sub Aqua Club reported that the masts lay 50m directly to the north of the site and were colonised to a lesser degree than the MV Robert. This

claim was investigated but not substantiated by the survey team who were unsuccessful in their attempts to locate the masts.

g SS CARMINE PHILOMENA 1937

The SS Carmine Philomena was a steam driven Italian coaster of 5287 tons which sank in 1937. The substratum in the area of the wreck consists of a level (Horizontal-40°) mixture of bedrock, medium sized boulders and large areas of cobble, gravel and sand. Vegetation was dense and consists of species already outlined for west coast sites (above). Large Pollock *Pollachius pollachius* and Ballan Wrasse *Labrus bergylta* were common, as were Tompot Blennies *Blennius gattorugine.*

The wreck lies to the south-eastern tip of the island between Rat Island and Surf Point in a depth of not more than 12m with visibilty at 8m. The site is moderately exposed with very strong tidal currents permitting slack water diving only. It is however a well dived site as it is relatively shallow, close to the Landing Bay and provides a good scenic dive.

The ship's structure is spread over a wide area and is heavily colonised by Kelp *Laminaria hyperborea*; reds and browns occupy the lower light levels around the holdfast. The contorted nature of the wreck and wreckage creates many vertical and overhanging locations which have contrasting colonisers. Exposed vertical surfaces were host to Jewel Anemones *Corynactis viridis*, whether shaded or illuminated. Overhanging areas and where steel plates formed artificial caves showed a lack of the expected hydroidal turf. These areas were mostly inhabited, if fleetingly, by shoals of young Pollock, solitary or pairs of mature Wrasse and independent Blennies.

Smaller crevices revealed a large cross section of crustaceans with Velvet Swimming Crabs *Macropipus puber*, Lobster *Homarus gammarus* and Prawn *Leander Squilla* being the most common. This observation was substantiated by the fact that Lobster pots were present on and around the site.

This site was the only one of the seven surveyed to support Dead Man's Fingers *Alcyonium digitatum* on its upstanding structures.

DISCUSSION

The importance of wrecks to the nature conservation resource ranges from the types of colonisers the wrecks attract, their relative rarity or abundance, how intact the wreck is, how upstanding and contrasting it is to the seabed on which it sits, the depth, light levels, current regimes and tidal flow.

a SHELTER, REPLENISHMENT AND BIODIVERSITY

Scientific assessment of colonisation rates in a relatively unpolluted area such as Lundy could perhaps be used as a grade to which others might be compared. The assessment of the impact of pollutants along other topographically similar stretches of coastline may reveal that some pollution-tolerant species may not be found on Lundy as there is too much competition from other life forms which can only survive in cleaner environments.

At a site 1000m south of Gannet's Rock, the same substratum exists as at the Seal Rock site, but shows a considerably wider range of benthos inferring that shelter plays a very important role in the colonisation of not only wrecks, but the substrate. The site also revealed that Gorgonian Sea-fan *Euntcella verrucosa* is used as an attachment point for Common Squid *Logio forbesi* eggs. Whether this harms the Sea-fan is unknown but the question of destruction of these slow growing soft corals is at the forefront of the diver interference argument. Whilst it is acknowledged that a stray fin or clumsy manoeuvre is likely to cause more damage than attached squid egg strands to the branches, it would make an interesting study to monitor and assess the effects the eggs have; the relationship may be symbiotic or detrimental. Reduced feeding ability may result because of the smothering effect of the egg sacks: the increased surface of the egg sacks may disrupt the nutrient flow through the fan structure and at the same time cause stress on the coral. If this increased surface area impedes the current and is pushed against the coral itself, the increased stress may conceivably snap the coral or some of

its branches. The eggs could attract predatory fish which may inadvertantly damage the coral in attempting to remove them.

As squid eggs were also found attached to the structure of the MV Robert this would enable a comparison of the survival rate of differently located eggs between a wreck site and a natural site.

Wrecks provide areas which act as fish nurseries which in turn replenish stocks whether indigenous to the reserve or migratory. They also provide sites for benthos and periphyton which otherwise may not be found in the vicinity. These in turn provide a broad food web.

In terms of biodiversity, wrecks provide a location for contrasting forms of marine flora and fauna, in particular differences between exposed and sheltered areas. The MV Robert interestingly revealed that the winch wheels and anchor chain ducts were far more heavily colonised than surfaces only a few centimetres away. It was concluded that these areas provided a greater opportunity for turbulence or tidal through flow. Other areas which were noticeably well colonised were pipes (Conger Eel *Conger conger*), steel plates (Lobster *Homarius gammarus*) and the upper port side (Plumose Anemone *Metridium senile*).

The MV Robert is an example of massive colonisation by species that are not normally found on the surrounding sea floor. The species found are however representative of what would be expected in other similar conditions, though here they exist in great abundance. It was suggested that the greater the distance from the wreck, the harder it was for the anemones to colonise rapidly, as the possibility of budded clones landing on secure well flushed upstanding material would decrease with distance from the wreck. Therefore scattered debris from wrecks are important as they increase the chances of current borne organism collision and attachment. This is an essential stage in many organism's life cycle and propagation. Ultimately such organisms will find attachment locations, die or be eaten.

b GEOGRAPHIC CONSIDERATIONS

The Lundy wrecks offer a great diversity within a relatively small geographical area, enabling a degree of study that can compare differing communities between or on sites, or concentrate on a specific biotope of a particular site without the need to travel long distances.

The wrecks provided an area where developed techniques, such as the Dive into History forms, could be tested and, if necessary, adapted. With a wide range of sites the recording forms became familiar to the divers and the more essential sections of the forms became more apparent along with preferred suggestions with regard to layout.

The wreck as an artificial reef (ie. a new area for colonisation and growth, shelter, spawning of stocks and creation of habitats) is a concept applicable to some of the wrecks around Lundy. Wrecks are subjected to the same stresses as the environment in which they are placed. If the wreck is placed in a high energy environment (eg. HMS Montagu) then its impact will be lessened by the very fact that this type of environment already has a high surface area and exerts considerable stress on the strctures that may be placed within it. However, when a wreck provides a massive upright structure with large surface areas in a high water flow volume but low attrition enviroment, and causes a stark difference between the topography of the sea-bed and the wreck, colonisation will occur at an accelarated rate. These additional surfaces which are upstanding from the sea-bed have considerable advantages through the provision of additional habitats, creation of areas of turbulence, shelter and shadow. These new biotopes provide colonisable sites for a diverse range of marine fauna at depth and a mixture of flora and fauna in shallower depths ($\leq$14m).

From studying the wrecks around the island it is suggested that the level to which a wreck can be termed an artifical reef must be based upon the contrasting habitats the wreck would provide and its ability to support a diverse range of life which would ordinarily be absent or in less abundance at that particular area of sea-bed where the

wreck eventually comes to rest.

The question then arises, what is deemed by the term 'eventually' in relation to the state of rest of the wreck, and can this be commuted to a time-scale? In the context of this paper, the term 'eventually' relates to the timespan needed for a ship's structure or components either in their entirety or distributed through natural or anthropogenic fragmentation to be in a sufficient state of stationary rest on or in the substratum, which would enable colonisation should prevailing light, depth and organisms be permitting. A structure or a fragment of it can therefore be said to be in a state of eventual rest during periods where colonisation can occur on the sea-bed. Recognition is given at this point to flotsam and jetsam by algaes and certain adapted organisms, but it was the stationary aspects of wreck structure and debris that were the focus of this research.

CONCLUSION

It was concluded that the wreck plays an important role in the environment in which it comes to rest. However, the level of importance can range from marginal to essential. A wreck's importance in terms of nature conservation is dependent upon its ability to enable the environent in which it resides to be enriched by its very presence; this relates specifically to increased biodiversity, provision of potential habitat spaces and suitable conditions for the proliferation of marine flora and fauna.

A wreck therefore which resides in a high energy, high surface area environment, such as the wrecks HMS Montagu and Amstelstroom, can be termed as having a lower importance rating in relation to nature conservation. This contrasts with wrecks which provide additional surfaces and habitat locations not ordinarily present in the vicinity. These locations, for example, have increased turbulence zones for filter feeders caused by the obstacle of the wreck in the tidal flow. Secure abodes such as pipes, collapsed steel plates, cargo holds and chain ducts are typically utilised by crustacea, anemones and fish. This type of wreck could be considered of high importance in relation to nature conservation, an example being the MV Robert.

REFERENCES

Gibson, C., 1993. *Lundy Shipwrecks Map.* Lundy.

Langham, A.F. 1994. *The Island of Lundy.* Stroud: Alan Sutton.