ENGLISH NATURE

No. 183

Lundy littoral survey

11-15 March 1996

A Marine Biological Surveys Report to English Nature

Colin Munro

Maritime Team

English Nature Research Reports

English Nature Research Reports

Number

Lundy Littoral Survey
11-15 March 1996

A Marine Biological Surveys Report
to
English Nature

Colin Munro

Marine Biological Surveys
1 Orchard Cottages
Coombe Barton
Shobrooke
Crediton, Devon
Tel/Fax 01363 775278
E-mail: mbscm@eclipse.co.uk

ISSN 0967-876X

Contents

1. Introduction

The grounding, early in 1996, of the oil tanker *Sea Empress*, outside Milford Haven in South Wales, released large amounts of oil into the coastal waters around Pembrokeshire and the outer areas of the Bristol Channel. Following reports from the island warden of oil having come ashore at the south eastern tip of Lundy Island, off North Devon, a survey of the shore was commissioned by English Nature as part of their statutory duty towards the protection of the Lundy marine nature reserve (English Nature, 1995). This survey was conducted as soon as weather conditions allowed. The prime aims of this survey were as follows.

- To survey, using standard Marine Nature Conservation Review (MNCR) methods, the upper shore rockpools reported to have been oiled, recording species present and their abundances for future reference. To record whether oil persisted and record any indications of deterioration in species present.

- To survey, to phase 1 level, caves used by seals and record any signs of oil contamination within the caves.

The second part of this survey was to be conducted in conjunction with John Heath, who was conducting on-going studies of Lundy's seal population and during this survey was responsible for mapping the caves and checking for oil contamination on seals (detailed in Appendix 4) .

Given that the weather forecast for the period of the survey was not good, it was decided that, should adverse conditions prevent surveying of the seal caves, then additional shore work would be undertaken. The rock pools along the Devil's Kitchen monitoring transect, previously surveyed by Hiscock (Hiscock, 1984; 1986a and 1986b) and Eno (Eno, 1991) would be re-surveyed using standard MNCR methodology. Secondly, reports had been received that slates were accumulating in the rock pools to the west of the landing beach, possibly to the detriment of the communities they supported. The road leading from the landing beach had been undercut by waves and collapsed during the winter; this may have exacerbated the problem. Therefore pools within the rocks west of the Landing Beach would also be surveyed and the amount of slates within them recorded.

2. Methods

Species abundances were recorded using the MNCR Abundance Scales, November 1990 version (see Appendix 1). Taxonomic nomenclature followed that of Howson (1987) except where more recent changes have become widely accepted. Photographs were taken using a *Nikon* SLR camera and 24mm lens or a *Nikonos* rangefinder camera and 35mm lens. Fuji iso 50 (*Velvia*) film was used throughout.

The rock pools along the Devil's Kitchen monitoring transect were identified using the drawings contained in the Report on the Lundy and Isles of Scilly marine monitoring programmes 1984 to 1991: Volume II; Site relocation sheets (Fowler and Pilley, 1992) and the colour plates proved by English Nature.

Checking of seal caves was conducted from a *Zodiac* inflatable provided by John Heath.

3. Oiled Rock Pools

Upon arrival on Lundy, the Landmark Trust agent (from information given to him by the island warden who was then on holiday) reported only two rock pools were believed to have been contaminated by oil. These were identified as littoral fringe pools situated immediately behind the building used by visiting divers, east of the Landing Bay (see figure 1).

The higher pool, Pool 1, (figure 2; slides 1 and 2, appendix 3) was approximately 7.5m long, with a maximum width of 1.5m and a maximum depth of approximately 0.6m. Pool 2 (figure 2; slides 3 and 4, appendix 3) was approximately 3m long, with a maximum width of 1.8m and a maximum depth of approximately 1m. The deeper sections of both pools were lined with smooth slates that supported no epibiota. Virtually all the algae recorded occurred in a band extending from the waterline to about 25cm down. No animals were recorded. Species recorded in these pools, and their abundances are given in tables 1 and 2, Appendix 2. No oil was found in or around either pool, nor could any be seen on the surrounding rock. No signs of deterioration in the condition of the algae present was observed. Given the paucity of epibiota within these pools and the lack of any indication of persisting oil, it is considered unlikely that oil in these pools has caused significant impact. It is, however, suggested that they are monitored by the warden and any significant changes noted.

A third, upper eulittoral, pool (pool 3; slide 5, appendix 3) was surveyed within Devil's Kitchen. This lay south west from the narrow path connecting the Landing Beach and Devil's Kitchen, away from Rat Island (slide 6, appendix 3). Species recorded within this pool are given in table 3, Appendix 2. Again no sign of oil or deterioration in condition of species present was detected.

Bleaching of some species of algae, mainly red algae, in rock pools has been recorded around Pembrokeshire following the *Sea Empress* spill (Jon Moore pers. comm.). In particular, coralline species, *Gelidium* spp. and the brown algae *Bifurcaria*. Red algae were not recorded in the two pools in which oil had been reported and no bleaching of green or brown algae present was recorded. No bleaching of the algae (red or otherwise) in pool 3 was seen.

4. Rock Pools West of Landing Beach

A number of small rockpools exist within the bedrock platform on the western side of the Landing Beach. The two largest pools (pools 4 and 5), each approximately 1m across, and two smaller pools (6 and 7), each around 50cm across, were surveyed (figure 3).

Pool 4

Pool 4 (slide 5) was found to have numerous smooth slates and a few larger rock fragments completely covering the bottom. An extremely corroded iron object (a pin or shaft?) was firmly embedded in this debris. Patches of filamentous brown weed covered approximately 10% of the visible bedrock around the sides of the pool. A diatom film was also present on less than 5% of the bedrock, while *Enteromorpha/Bligingia* sp. covered about 1%. No animals were seen.

Pool 5

Pool 5 (slide 7, appendix 3) was completely full of smooth slate fragments. The water depth above these was no greater than 10cm; digging in the slates showed that they formed a layer over 10cm thick. No life was seen in this pool.

Pools 6 & 7

The bottom in both these pools was covered by smooth slates. No life was seen in either.

5. Devil's Kitchen Monitoring Transect Rock Pools

As weather conditions limited surveying of the seal caves to the afternoon of arrival, the available time was used to survey some of the rock pools along the Devil's Kitchen transect. Conditions also severely limited this work. The survey period was some days after spring tides, so the lowest pools (pools F and G) were not fully uncovered and daylight was fading at times of low water. Additionally, south to south-easterly winds force 6-8 prevailed. As the Devil's Kitchen shore faces the south, this lifted surf and spray further up the transect, while wind and rain prevented clear views into the pools. Consequently, only pools B,C (slide 8, appendix 3), D (slide 9, appendix 3) and E (slide 10, appendix 3) were fully surveyed. Pools B and C, within the entrance to Rat Island cave, are now contiguous and so were surveyed as one pool. The species recorded in each pool, and their abundances, are given in tables 4-7, Appendix 2. No sign of bleaching of algae, including red algal species and *Bifurcaria*, was observed in any of the rock pools.

6. Seal Caves

Due to strong south easterly winds which persisted throughout the survey period, it was only possible to reach the caves on the afternoon of arrival (11th). The cave within Seal's Hole, off the southern end of the island was entered. The floor of the cave at the entrance was underwater by more than 2m at low water; however this shelved quite steeply and dried approximately 20m in. The floor consisted of boulders and patches of coarse, shelly sand. The walls were near vertical granite. Caves No.9 (north of Brazen Ward, in Frenchman's Landing) and 17 (south of Gull Rock), on the eastern side of the island, were also entered. These caves were similar to Seal's Hole except that they did not extend as far and the entrances were dry. No sign of oil was found in any of these caves. A fuller account of the caves is given in Appendix 3, the cave survey by John Heath. Diagrams produced by John Heath of Seal's Hole Cave, Cave No. 9 and Cave No. 17 are given in Appendix 4. Species recorded in Seal's Hole Cave, Cave No 9 and Cave No. 17, and their abundances, are given in tables 8-10, Appendix 2. Few species were recorded within the caves, although each survey was necessarily brief.

Pale green or white *Actinia equina* individuals (slide 13, appendix 3) were found within these caves, generally near the entrance. These all appeared to be green morph individuals lacking pigmentation. Interestingly, fully pigmented red morph *A. equina* were found much deeper within the caves. It has recently been determined that red and green morphs are genetically isolated and should be reclassified as distinct species: *Actinia equina* and *Actinia prasina* respectively (Haylor *et al*, 1984; Sole-Cava and Thorpe, 1987). It may be that these genetic differences render green beadlets more sensitive to reductions in light levels.

The only uncommon species that may have been recorded was the sponge *Thymosia guernei*. Identification of this species was tentative only, as a sample was not collected for microscopic examination. However it is reported as preferring overhangs and caves and as having been recorded on Lundy previously (Ackers *et al*, 1992). It is considered to be nationally scarce (B. Saunderson, JNCC, pers. comm.).

7. Conclusion and Recommendations

7.1 Oiled rock pools

No persisting oil was found in or around either pool where oiling was reported to have occurred, nor could any be seen on the surrounding rock. No signs of deterioration in the condition of the algae present was observed. Given the paucity of epibiota within these pools and the lack of any indication of persisting oil, it is considered unlikely that oil in these pools has caused significant impact. A third, upper littoral pool within Devil's Kitchen was also surveyed. No signs of oil or deterioration in species present were recorded in this pool either. It is, however, suggested that all three pools are monitored by the warden and any significant changes noted. Given the reported bleaching of red algae around South Wales, it is suggested that particular attention be paid to checking for similar deterioration amongst red algae present in pool 3.

7.2 Rock pools west of Landing Beach

The pools surveyed were found to contain large amounts of smooth slates and to support very little epibiota. Whether natural erosion has always resulted a high degree of abrasion by slates and thus prevented all but ephemeral species from colonising, or whether this condition has developed recently due to increased erosion from the road above, is not known. Once the road above is stabilised it may be worth initiating periodic monitoring to detect any decrease in slates and/or increase in epibiota.

7.3 Devil's Kitchen monitoring transect rock pools

This transect was monitored as part of a continuing monitoring strategy and other than to list the species and abundances given in appendix 2, there is little to be concluded. It is, however, worth noting that no bleached red algae (that if present could have been attributed to oil toxicity) were recorded.

7.4 Seal caves and seals

Three caves were briefly surveyed; the cave within Seal's Hole, cave no.9 and no. 17. No sign of oil contamination was found in any. Three seals were encountered in Seal's Hole cav; the two cows which were observed closely did not appear to be oiled. Additional observations of seals were made by John Heath (appendix 4) along the west coast, with no oiled individuals detected.

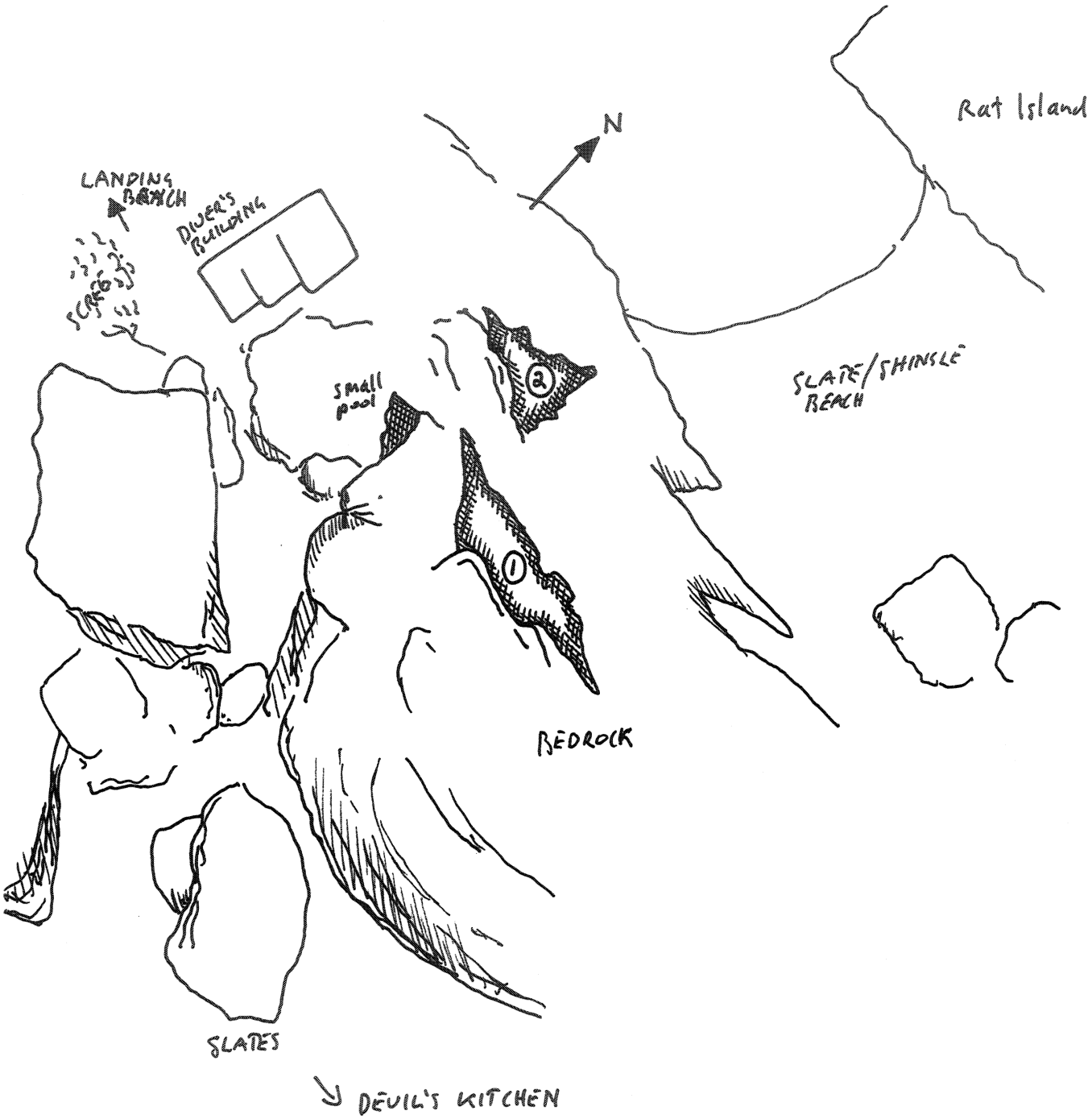
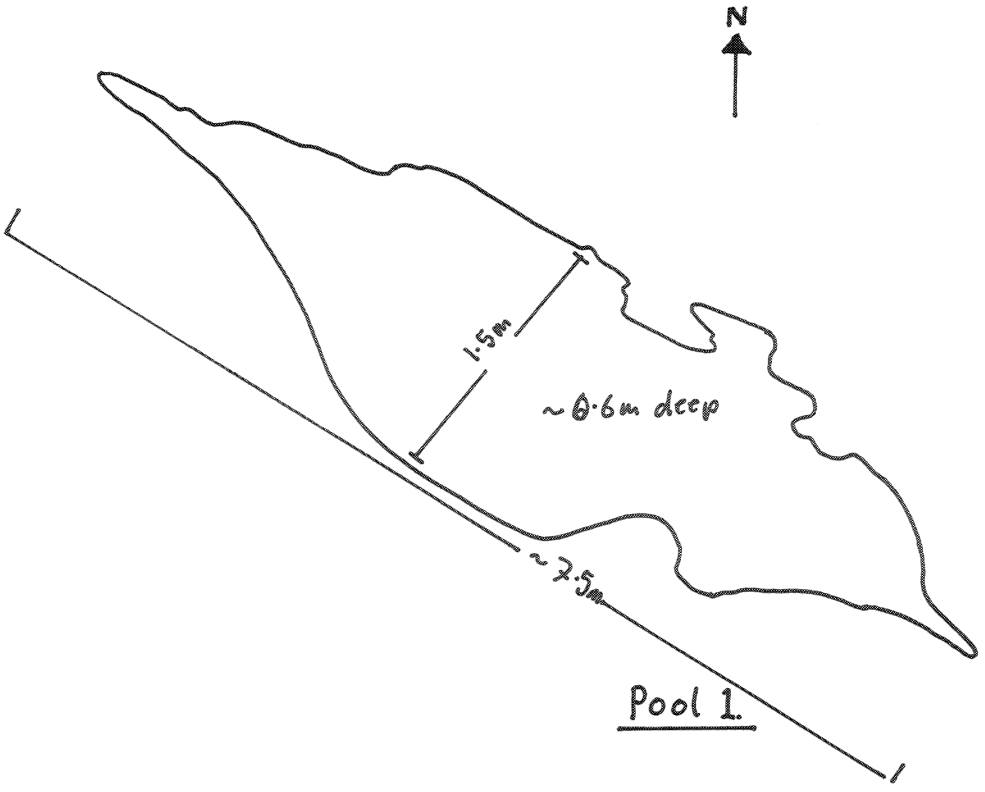


Figure 1 Location of oiled pools



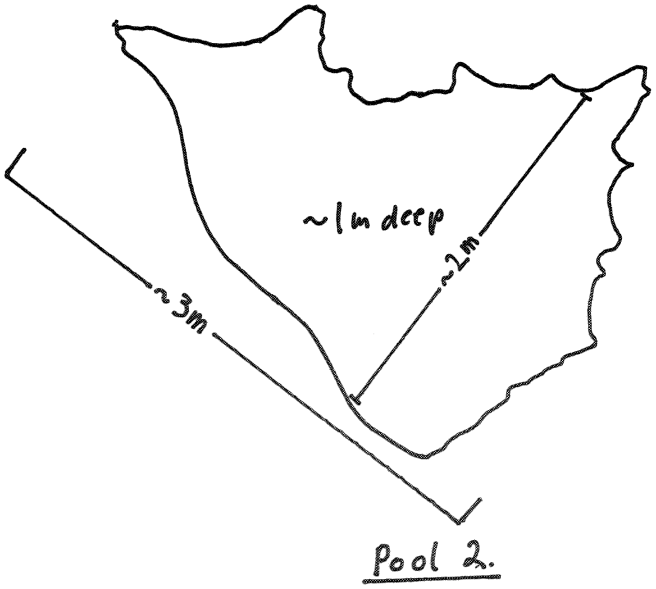


Figure 2. Oiled Pools

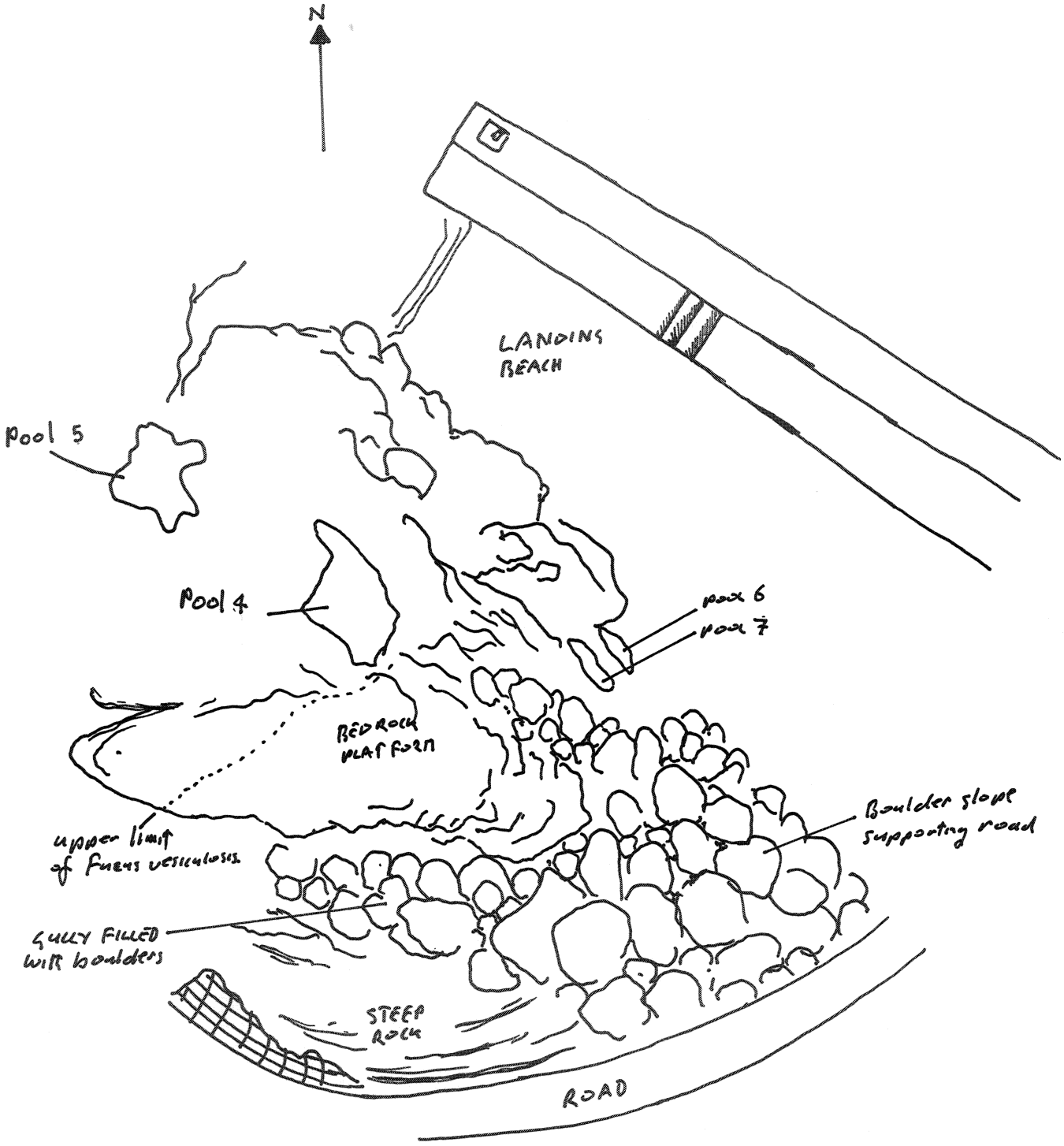


Figure 3 Location of rock pools west of Landing Beach

References

ACKERS, R.G., MOSS, D. AND PICTON, B.E., 1992. *Sponges of the British Isles ("Sponge V"). A colour guide and working document.* Marine Conservation Society.

ENGLISH NATURE, 1995. *Managing Lundy's wildlife. A management plan for the Marine nature Reserve and Site of Special Scientific Interest.* Peterborough: English Nature.

ENO, N. C., 1992. *Lundy marine nature reserve littoral monitoring report 5th -9th October 1991.* Peterborough: English Nature.

FOWLER, S.L. AND PILLEY, G.M., 1992. *Report on the Lundy and Isles of Scilly marine monitoring programmes 1984 to 1991. Volume II Site relocation sheets.* Report to English Nature from The Nature Conservation Bureau Ltd.

HAYLOR, G.S., THORPE, P.J. AND CARTER, M.A., 1984. *Genetic and ecological differentiation between sympatric colour morphs of the common intertidal sea anemone Actinia equina.* Mar. Ecol., **16**: 281-289.

HISCOCK, K., 1984a. *Littoral surveys and monitoring at Lundy. April 14th to 19th, 1984.* Nature Conservancy Council, Peterborough.

HISCOCK, K., 1986a. *Marine biological monitoring at Lundy July 27th to August 3rd, 1985.* Nature Conservancy Council, Peterborough.

HISCOCK, K., 1986b. *Marine biological monitoring at Lundy March 26th to 29th July 26th to August 2nd 1986.* Nature Conservancy Council, Peterborough.

HOWSON, C.M., (ed) 1987. *Directory of the British marine fauna and flora. A coded checklist of the marine fauna and flora of the British Isles and its surrounding seas.* Marine Conservation Society.

Sole-Cava, A.M. and Thorpe, J.P., 1987. *Further genetic evidence for the reproductive isolation of green sea anemone Actinia prasina (Gosse) from common intertidal beadlet anemone Actinia equina (L.).* Mar. Ecol., 38:225-229.

APPENDIX 1 ABUNDANCE SCALE

MARINE NATURE CONSERVATION REVIEW - ABUNDANCE SCALES

S=Superabundant, A=Abundant, C=Common, F=Frequent, O=Occasional, R=Rare

	GROWTH FORM		SIZE OF INDIVIDUALS / COLONIES				
% COVER	A	B	<1cm	1-3cm	3-15cm	>15cm	DENSITY
			S				>1 / 0.0001 m^2 >10,000 m^2 (1x1cm)
>80%		S	A	S			1-9 / 0.001 m^2 1000-9999 m^2
40-79%	S	A	C	A	S		1-9 / 0.01 m^2 100-999 m^2 (10x10cm)
20-39%	A	C	F	C	A	S	1-9 / 0.1 m^2 10-99 m^2
5-19%	C	F	O	F	C	A	1-9 / m^2
1-5% (or density)	F	O	R	O	F	C	1-9 / 10 m^2 (3.16x3.16m)
<1% (or density)	O	R		R	O	F	1-9 / 100 m^2 (10x10m)
(use density)	R				R	O	1-9 / 1000 m^2 (31.6x31.6m)
						R	>1 / 10,000 m^2 <1/1000m^2 (100x100m)

EXAMPLES OF SPECIES/GROUPS INCLUDED

PORIFERA	Crusts Massive spp.			Sml solitary Grantia	Lge solitary Stelligera	
HYDROZOA	Turf species Tubularia Abietinaria			Small clumps Sarsia Aglaophenia	Solitary Corymorpha Nemertesia	
ANTHOZOA	Corynactis Alcyonium			Sml solitary Epizoanthus Caryophyllia	Med solitary Virgularia Cerianthus Urticina	Large solitary Eunicella Funiculina Pachycerianthus
ANNELIDA	Sabellaria		Spirorbis	Scale worms Nephtys Pomatoceros	Chaetopterus Aqenicola Sabella	
CRUSTACEA	Tubiculous amphipods	Barnacles	Semibalanus Amphipods	B. balanus Anapagurus Pisidia	Pagurus Galathea Small crabs	Homarus Nephrops Hyas araneus
MOLLUSCA			Sml gastropod L. neritoides Sml bivalves Nucula	Chitons Med gastropod L. littorea Turritella Med bivalves Mytilus Pododesmus	Lge gastropod Patella Buccinum Lge bivalves Mya Pecten Arctica	
		Mytilus Modiolus				
BRACHIOPODA				Neocrania		
BRYOZOA	Crusts, turf & erect spp.				Alcyonidium Porella	
ECHINODERMATA				Echinocyamus Ocnus	Antedon Sml starfish Brittlestars Echinocardium Asiia Thyone	Large starfish Echinus Holothuria
ASCIDIACEA	Colonial Dendrodoa			Sml solitary Dendrodoa	Lge solitary Ascidia Ciona	Diazona
PISCES					Gobies Blennies	Dog fish Wrasse
ALGAE, PLANTS	Foliose Filamentous	Crusts Maerl Fucoids Kelp Lichens			Zostera	Kelp Chorda Halidrys Himanthalia

November 1990

Appendix 2 Species Lists and Abundances

Table 1. Species recorded in oiled pool 1.

ALGAE	ABUNDANCE
CHLOROPHYTA	
Blidingia minima/Enteromorpha sp.	C
Spongomorpha arcta	F
PHAEOPHYTA	
filamentous brown	O
Pelatonia sp	C

Table 2. Species recorded in oiled pool 2.

ALGAE	ABUNDANCE
CHLOROPHYTA	
Blidingia minima/Enteromorpha sp.	O
PHAEOPHYTA	
Pelatonia sp	C
filamentous brown	O

Table 3. Species recorded in pool 3

FLORA	ABUNDANCE
CHLOROPHYCOTA	
Enteromorpha/Ulva sp.	F
Cladophera rupestris	O
RHODOPHYCOTA	
Anfeltia plicata	P
Ceramium sp.	F
Chondrus crispus	F
Corallina officinalis	C
Corallinaceae (crusts)	C
Griffithsia sp.	O
Hildenbrandia sp.	O
Lomentaria articulata	R
Mastocarpus stellatus	F
Polyides rotundus	O
PHAEOPHYCOTA	
filamentous brown turf	O
Laminaria digitata	R (one v. small)
FAUNA	
ANTHOZOA	
Actinia fragracea	R
Anemonia viridis	R

POLYCHAETA	
Spirorbidae	O
MOLLUSCA	
Gibbula cineraria	F
Gibbula umbilicalis	F
Patella sp.	C

Table 4. Species recorded in pool A (not fully surveyed)

FLORA	ABUNDANCE
RHODOPHYCOTA	
Audouinella sp.	O (near outer edge of pool)
Corallininaceae (crusts)	F

Table 5. Species recorded in pool B-C

FLORA	
CHLOROPHYCOTA	
Cladophera rupestris	O
Enteromorpha/Ulva sp.	O
RHODOPHYCOTA	
Ceramium sp.	R (on *Chondrus crispus*)
Chondrus crispus	R
Corallina officinalis	A
Corallinaceae (crusts)	O
PHAEOPHYCOTA	
filamentous brown turf	C
Fucus serratus	R
Laminaria digitata	R (one small plant)
FAUNA	
POLYCHAETA	
Spirorbidae	O
MOLLUSCA	
Gibbula cineraria	R

Table 6. Species recorded in pool D

FLORA	ABUNDANCE
CHLOROPHYCOTA	
Enteromorpha/Ulva sp.	O
RHODOPHYCOTA	
Calliblepharis jubata	P
Ceramium sp.	R (on *Chondrus crispus*)
Corallina officinalis	A

Corallinaceae (crusts)	A
Mastocarpus stellatus	F
PHAEOPHYCOTA	
filamentous brown turf	O
FAUNA	
ANTHOZOA	
Actinia equina	O
Actinia fragracea	R
CRUSTACEA	
Carcinus maenus	P (juvenile)
gammaridae indet.	P
MOLLUSCA	
Gibbula cineraria	O
Gibbula umbilicalis	R
Patella sp.	C

Table 7. Species recorded in pool E

FLORA	ABUNDANCE
CHLOROPHYCOTA	
Cladophera rupestris	P
Codium tormentosum	R
Enteromorpha/Ulva sp.	O
RHODOPHYCOTA	
Ceramium sp.	O
Chondrus crispus	O
Corallina officinalis	A
Corallinaceae (crusts)	A
Dumontia contorta	P
Furcellaria lumbricalis	O
Gastroclonium ovatum	O
Gelidium latifolium	F
Hildenbrandia sp.	O
Laurencia sp.	R
Mastocarpus stellatus	F
Mesophyllum lichenoides	F
Palmaria palmata	R
Polyides rotundus	F
PHAEOPHYCOTA	
Bifurcaria bifurcata	F
filamentous brown turf	O
Fucus serratus	O
Halidrys siliquosa	P
Himanthalia elongata	C (mainly holdfasts only)
Laminaria digitata	C (small)

FAUNA	
ANTHOZOA	
Actinia equina	R
Anemonia viridis	F
POLYCHAETA	
Spirorbidae	F (on *Chondrus* and *Corallina*)
MOLLUSCA	
Patella sp.	C
Gibbula cineraria	R
ECHINODERMATA	
Amphipholis squamata	P
Asterina gibbosa	R

Table 8. Species recorded in Seal's Hole Cave

FLORA	ABUNDANCE
CHRYSOPHYCOTA	
Diatom film	C-A
RHODOPHYTA	
Corallinaceae indet (crusts)	C (near mouth of cave), F-O (further in)
FAUNA	
PORIFERA	
Hymeniacidon perleve	O (near mouth of cave)
POLYCHAETA	
Pomatoceros sp.	O
Spirorbidae	A-S (most abundant near mouth of cave)
ANTHOZOA	
Actinia equina	O
CRUSTACEA	
Chthamalus stellatus	O
MOLLUSCA	
Patella depressa	F
BRYOZOA	
Bryozoa indet. (crusts)	R

Three seals (two cows and a bull) were also in the cave.

Table 9. Species recorded in Cave No. 9

FLORA	ABUNDANCE
CHRYSOPHYCOTA	
Algal film	F

CHLOROPHYTA	
Cladophera rupestris	R (near mouth of cave)
RHODOPHYTA	
Corallinaceae indet (crusts)	R (near mouth of cave only)
FAUNA	
PORIFERA	
Hymeniacidon perleve	O (near mouth of cave)
POLYCHAETA	
Pomatoceros sp.	R
Spirorbidae	F
CRUSTACEA	
Balanus perforatus	F (near mouth of cave) R (further in)
Carcinus maenus	R (two in pool)
Chthamalus stellatus	O
MOLLUSCA	
Mytilus edulis	R (near mouth of cave)
Patella depressa	F
Patella vulgata	O (near mouth of cave)

Table 10. Species recorded in Cave No. 17

FLORA	ABUNDANCE
CHRYSOPHYCOTA	
Algal film	C
RHODOPHYTA	
Corallinaceae indet (crusts)	R (near mouth of cave only)
FAUNA	
PORIFERA	
white encrusting sponge**	R
yellow, channelled, encrusting sponge*	R
ANTHOZOA	
Actinia equina	O
*Actinothoe sphyrodeta****	R-O
POLYCHAETA	
Pomatoceros sp.	R
Spirorbidae	A*****
CRUSTACEA	
Chthamalus stellatus	R
Elminius modestus	R-O

MOLLUSCA	
Mytilus edulis	R (near mouth of cave)
Patella depressa	F (near mouth of cave)
BRYOZOA	
Bryozoa indet. (crusts)	R

* most probably *Prosuberites epiphytum.*
** suspected to be *Thymosia guernei.*
*** not definately confirmed as all were tightly closed; but considered unlikely to be anything else.
**** 100% cover in patches up to 900 cm^2 (30cm by 30cm).

Appendix 3

Slide 1	Pool 1, higher oiled pool.
Slide 2	Pool 1, higher oiled pool.
Slide 3	Pool 2, Lower oiled pool.
Slide 4	Pool 2, Lower oiled pool.
Slide 5	Pool 3, Devil's Kitchen
Slide 6	Location of pool 3, upper shore, Devil's Kitchen (viewed from north).
Slide 7	Pool 5, rock pools west of Landing Beach.
Slide 8	Devil's Kitchen transect, pools B and C
Slide 9	Devil's Kitchen transect, pool D
Slide 10	Devil's Kitchen transect, pool E
Slide 11	Rat Island Cave (location of pools A, B and C)
Slide 12	View along Devil's Kitchen Transect from Rat Island Cave
Slide 13	White *Actinia equina*

Appendix 4

Lundy Cave Survey, 11 -15 March 1996

John Heath

Seal's Hole (map 1), at the south end of the island, was surveyed at low water on the 11March. Access to the cave was by inflatable launched from the Landing Beach. The cave was entered by swimming the last few metres (an inflatable can enter the cave only when the sea state is slight).

A strong smell of seal and a seal track in the sand was noted immediately the cave was entered. Shortly before the final chamber was reached (see map 1), the heads of two female seals were illuminated by the torch light. Upon being disturbed, they immediately headed for the entrance. The surveyors retreated to a raised ledge and allowed the seals to pass underneath. They were closely observed as they passed; no oil was seen on their pelts and they appeared to be in good condition. The surveyors then attempted to penetrate further into the cave, but the final chamber occupied by a bull seal. The bull blew noisily and refused to move, consequently the final chamber was not inspected. The cave walls between the entrance and the final chamber appeared free of oil. A small pit was dug by hand into the sand lining the bottom of the cave; this revealed to trace of oil. The epibiota on the cave walls surveyed. Albino and lightly coloured beadlet anemones were noted.

It was then attempted to survey the cave below the old Pilots Steps, on the south west corner of the island. However the deteriorating sea state forced this to be abandoned. The surveyors then headed around to the north east end of the island, where the sea was calmer in the lee of the island. Three caves on the northern half on the eastern shore were inspected: caves 4, 9 and 17 (numbering following that ascribed by Clark and Baillie). Cave number 4 is not actually a cave. The back has collapsed leaving a land bridge in the same way the Devil's Lime Kiln was formed and consists of a gully approximately 20 metres long by 7 metres wide, opening out to form a square chamber. The back of the chamber is above the high tide mark and was thought to be a good observation point to find any evidence of oil on the east coast. None was found.

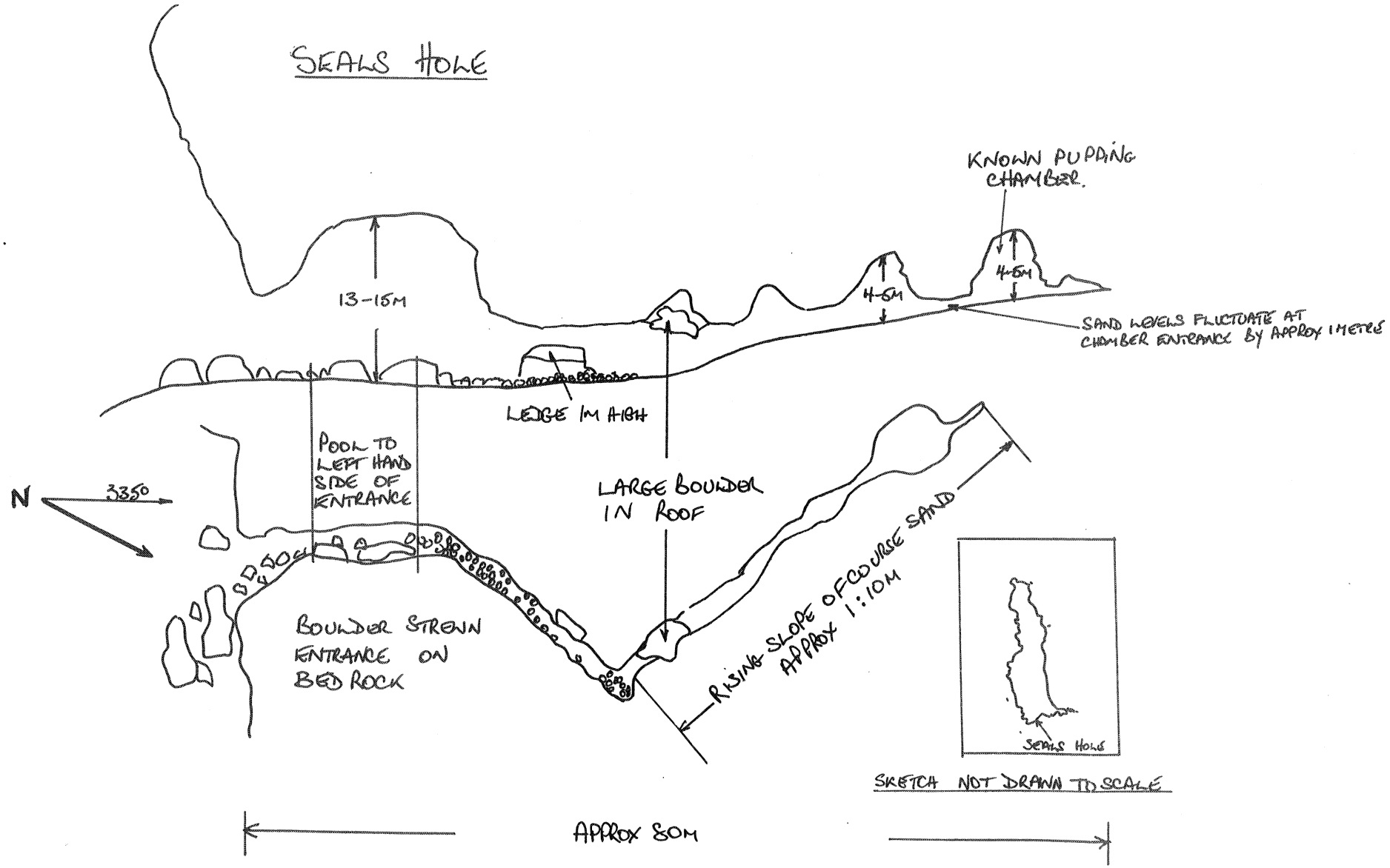
From cave 4 , cave 9 in Frenchmen's Landing and cave 17 south of Gull Rock (see map 2) and 3) were investigated. Entry was straightforward, no seals were present, no oil found and marine life apparently unaffected although the beds of the caves had altered considerably since the previous summer. The light was disappearing so the surveyors returned to the Landing Beach. Thirty five seals were counted on the trip from the south to the north end, one slightly oiled Guillimot was seen up on Gannets Rock.

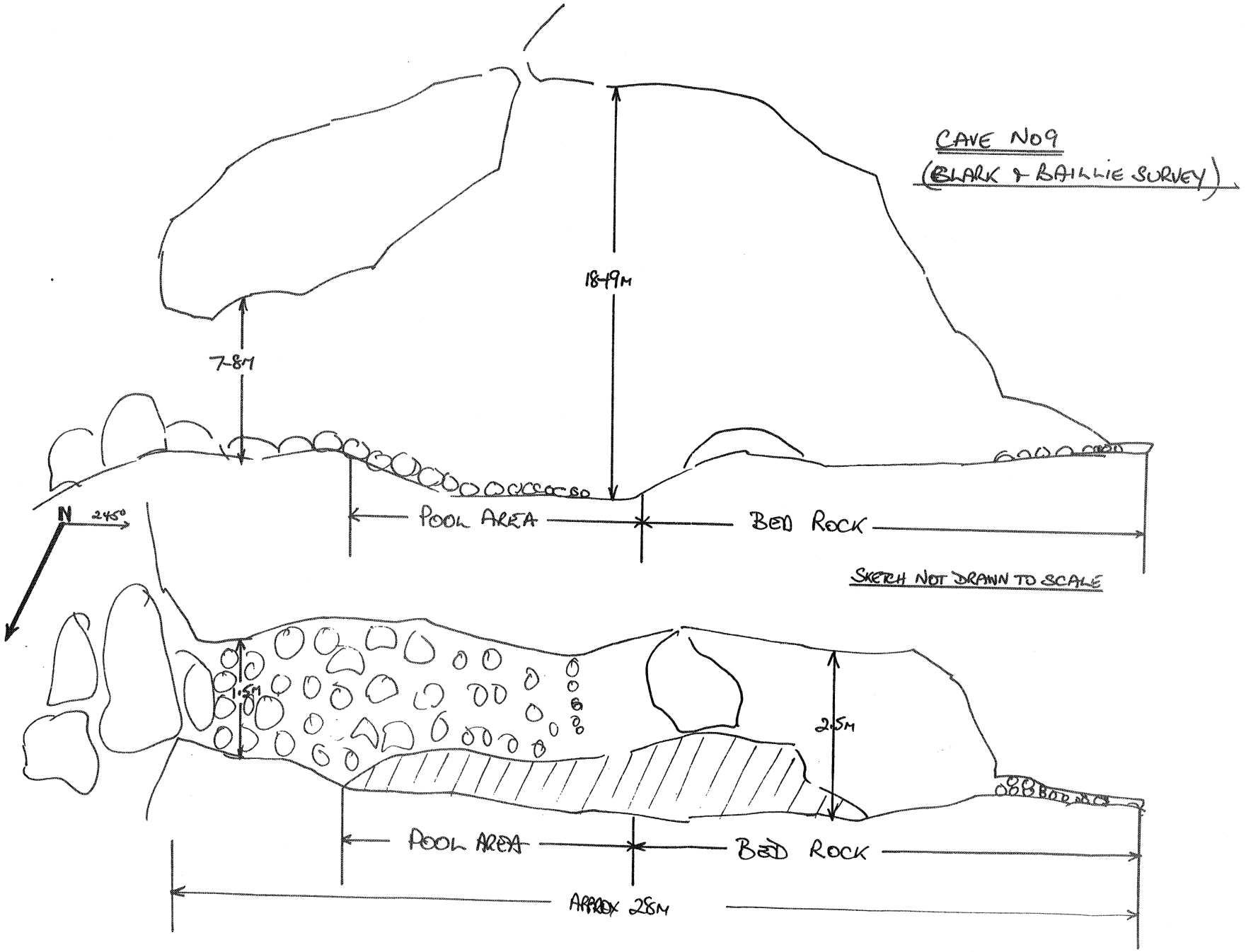
Gale force easterly winds prevailed through the 12th and 13th, making it impossible to launch the inflatable. A walk up the calmer west coast to find any seals affected by oil revealed none. Five were sighted, all looked in good condition.

Observed colonies of kittiwakes, herring gulls and lesser black-backed gulls along the west coast. No evidence of oiling could be seen amongst them.

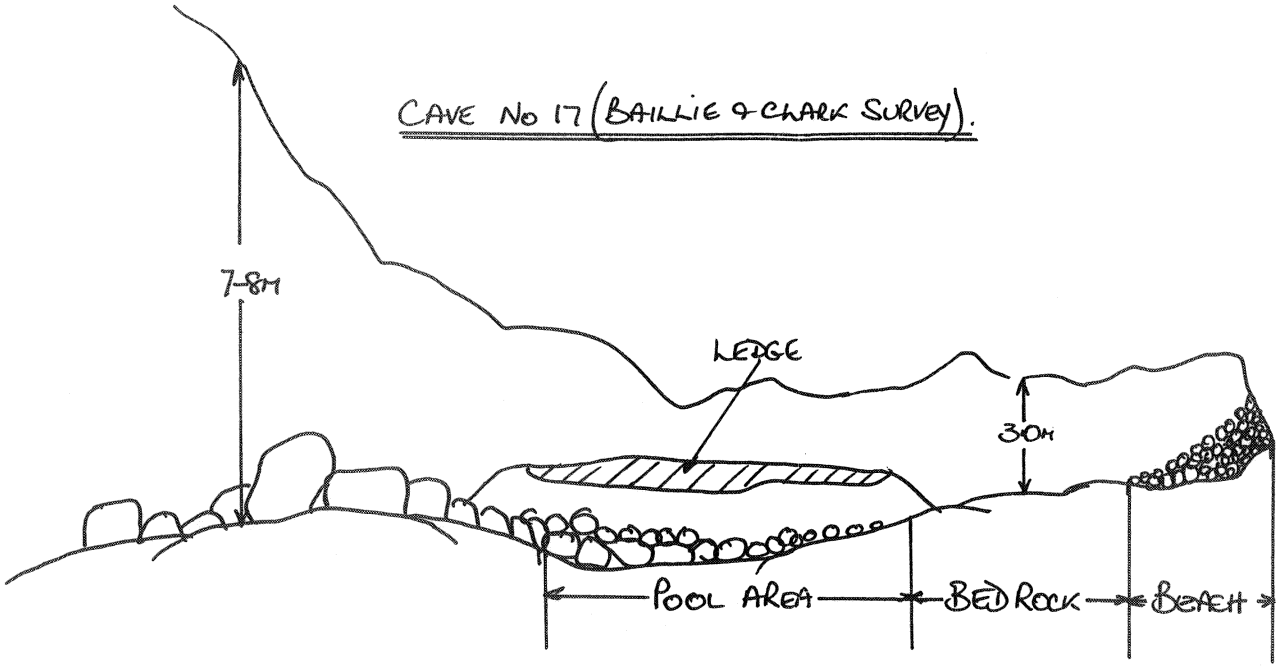
The wind eased during the morning of the 15th, allowing a caves 9 and 17 to be mapped before the inflatable had to be loaded aboard the *Oldenberg* for the return sailing to Bideford.

In conclusion, it appears that little oil reached the shores of Lundy. No oiled seals were encountered.


SEALS HOLE
KNOWN PUPPING CHAMBER.
13-15M
4-5M
4-5M
SAND LEVELS FLUCTUATE AT CHAMBER ENTRANCE BY APPROX 1 METRE
LEDGE 1M HIGH
POOL TO LEFT HAND SIDE OF ENTRANCE
N
335°
LARGE BOULDER IN ROOF
BOULDER STREWN ENTRANCE ON BED ROCK
RISING SLOPE OF COURSE SAND APPROX 1:10M
SEALS HOLE
SKETCH NOT DRAWN TO SCALE
APPROX 80M


CAVE No 9
(CLARK & BAILLIE SURVEY)
18·9M
7·8M
N
245°
POOL AREA
BED ROCK
SKETCH NOT DRAWN TO SCALE
1·5M
2·5M
POOL AREA
BED ROCK
APPROX 28M

CAVE No 17 (BAILLIE & CHARK SURVEY).



SKETCH NOT DRAWN TO SCALE.