

North Devon Sabellaria alveolata Survey June 2008- August 2009



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1. Introduction

I. Executive Summary

Within the Devon Biodiversity Record Centre database there are very few records of *Sabellaria alveolata* previously recorded in North Devon.

Over the summers along 2008 and 2009 most of the North Devon coast was surveyed from Marsland Mouth to Croyde Bay by local volunteers. *Sabellaria alveolata* was found on 12 of North Devon beaches with the most extensive abundance at Marsland Mouth and Welcombe Mouth. Beaches that had no honeycomb worm have been recorded for future reference.

II. Background

During the summers of 2008 and 2009 beach NDCCS and Coastwise got local volunteers to carry out an intertidal survey of *Sabellaria alveolata* on the North Devon Coast. This complimented with the local Biodiversity Action Plan (BAP) for this species and gave record to the worm's present status and location on the North Devon coast.

III. *Sabellaria alveolata* (Honeycomb worm)

S. alveolata better known as honeycomb worm is a tube dwelling polychaete with a cylindrical body 4 cm long. It's a segmented worm that builds tubes from sand or shell fragments. Either individual tubes or large colonies forming a honeycomb pattern coral on lower shore rocks close to sand.

The honeycomb reef becomes alive with the tide rising and the worms ascends from their individual tubes and feed on the tiny particles of nutrients provided by the sea water. The honeycomb worm has a preference for exposed rocky shores with high wave action to which the South West is ideal. *Sabellaria alveolata* reefs are affected by extremely cold winters, after which they may die back for many years, particularly at higher shore levels. *S. alveolata* reefs are increasingly vulnerable to accumulations or losses of sand as a result of shoreline development, which is the major cause of loss in parts of Europe. They can tolerate burial for a period of days or even weeks, but prolonged burial will cause mortality. Most individuals have a life span of 3 to 5 years but there are records for individuals to reach up to 9 years. *S. alveolata* reefs undergo cycles of development and decay over a few years. Spawning occurs each July and larvae spend between 6 weeks and 6 months in the plankton. Although individual reefs come and go- areas that are good for *S. alveolata* tend to remain.

In Britain the distribution of the honeycombe worm is restricted to the South and West In Britain, *S. alveolata* reefs are found on shores with strong to moderate wave action in the south and west, between Lyme Bay on the south coast of England and the Scottish coast of the Solway Firth. The British Isles gives evidence to the northern extremity of the range in the north-east Atlantic. The reefs also occur in the Mediterranean and Northern Ireland coast.

S. alveolata is found on substrata on exposed, open coasts with moderate to considerable water movement but appears to be absent from many exposed peninsulas. They are typically on the bottom third of the shoreline but also in the shallow sub-tidal. A hard substratum is required for attachment, including adequate sand or small shell particles to construct their tubes. The reefs are hosts for a wide variety of flora and fauna in particular mussels, barnacles and ephemeral algae.

S. alveolata is a UK Biodiversity Action Plan (BAP) species with many factors affecting their habitat. A report summarising the dynamics and sensitivity of biogenic reefs, including *S. alveolata* reefs, was recently commissioned for the UK Marine SAC Project. Aerial photographs have also been used by the conservation agencies to map intertidal *S. alveolata* reefs and the MNCR Database holds information on the occurrence of *S. alveolata* habitats around the UK coast. There are three management action plan objects set out; to maintain the extent of *S. alveolata* reef habitats, increase the quality of *S. alveolata* reef habitats and within 15 years, attempt to re-establish *S. alveolata* reefs in five areas where they were formerly present.

IV. The significance of the presence of *Sabellaria alveolata*

Over time *S. alveolata* reefs attract other species and increase the biodiversity and the stability of sand abraded rocks and boulders. Sheet-like reefs may restrict drainage of the shore, creating rockpools where there would otherwise be none. This habitat is likely to colonise; types of seaweeds including family of the fucoids, *Palmaria palmata*, *Polysiphonia* spp, *Ceramium* spp, *Enteromorpha* spp and *Ulva lactuca*, and animals including barnacles, dogwhelks, winkles, mussels and other bivalves such as *Nucula nucleus*, *Sphenia binghami* and *Musculus discors*, small polychaetes such as *Fabricia stellaris*, *Golfingia* spp and syllidae predators. Blennies, small crabs (*Carcinus maenas*) and other crustacea (such as *Unicola crenatipalma*) can be found within crevices.

The long term effects of colonisation of honeycomb worm area bit uncertain, but in some habitats *S. alveolata* can be regarded as competition for space with common mussels *Mytilus edulis*, especially on boulder scars which maybe one of the causes of short term destabilisation and loss of habitat. Another significance of the presence of the honeycomb worm within the British Isles is that with the sea level and climate temperatures rising so does the abundance of the population which can now be found in parts of Scotland, the north coast and Northern Ireland. This gives *S. alveolata* a great potential for being a climate change indicator in the future.

2. Methodology

I. Field Work

Site surveys were carried out on all the exposed rocky beaches of North Devon which has suitable habitat for the basic needs of *Sabellaria alveolata*. All the beaches which fell into the right criteria were then targeted and surveyed for the presence of Honeycomb worm. Some of these sites especially around the Hartland area were not included in the survey due to difficult access down to the beaches.

The surveys were carried out over the summer months of 2008. They involved two surveyors walking the shoreline between two hours before and two hours after low tide, looking at any suitable habitat for *S. alveolata* especially in rock forms like crevices and gullies. Once the species had been identified the extent and distribution in the immediate area was assessed and recorded. A rough approximation of the area was then mapped on an Ordnance Survey map and grid references were written down.

A site survey was created and completed giving information on the site description, sediment type, geology, shore position, exposure and usages and impacts (shown in Index). At each site a photographic record was taken showing the characteristics of the site and its abundance.

II. Data Processing

The information of the site survey forms were then entered into an Excel table making the findings easier to read. The grid references to the sites that inhabited by *Sabellaria alveolata* were then entered into Mapinfo (Geographical Information System Software) which created points showing where the *Sabellaria* was found with a site note of the abundance and a short site description. A report showing all the information collected was also created with the programme more site details and records can be found in the appendix.

3. Survey Results

B. Croyde Bay:

A large popular beach with modest human impact but very exposed to weather and wave action.

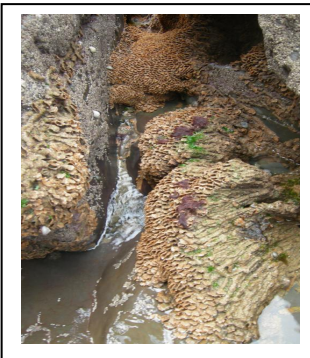
The area of greatest abundance was at the north side of the bay, with less than meter present. The colonisation of *S. alveolata* on Croyde Bay is mainly on the low shore position within rocky outcrops on 2-3 ridges of baggy slate a raised bedrock. The area is dominated by mussels, barnacles, dog whelks and pepper dulse. There are extreme south westerlies with Atlantic swells and rollers which makes the Bay very exposed.

C. Saunton Sands:

Large sandy beach very exposed to weather and wave action.

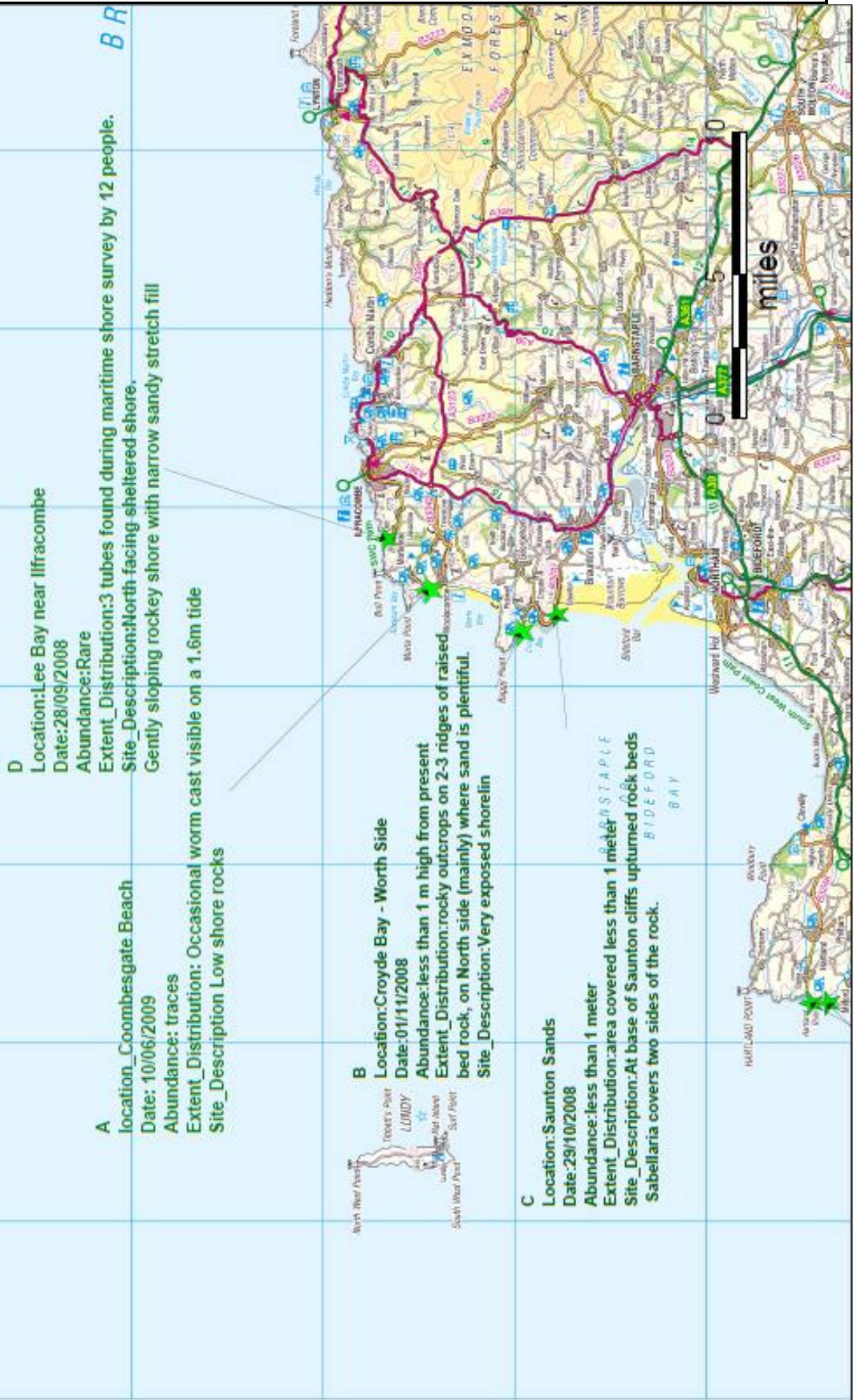
Sabellaria alveolata has a presence of less than a meter in length at the base of Saunton cliffs with occasional scattered tubes up to mid tidal position in upturned Pilton rock bed rock. There is an abundance of other species including keel worms, dulse, and dog whelks. The shore is very exposed to weather and strong wave action.

D. Lee Bay:



The bay is a popular rock pooling beach for tourists.

Evidence of three tubes found on a gently sloping rocky brittle slate within a narrow sandy stretch filling in an old fault line. There are more dominant species of *Fucus* a genus of brown alga in the Class Phaeophyceae, kelp, pepper dules, keel worms and bryodians. There is little exposure as Lee bay is a sheltered north facing beach.



F, E. Welcome Mouth: (Two areas found)



There is limited use of the beach due to poor accessibility and remote locations.

There is a large abundance of over a 20 m² colony loosely spread over bare rock within small gullies. *S. alveolata* is present within a mid shore position on culm sandstone with *Fucus* being the most abundant species.



The south side of Welcombe Mouth has a large abundance of *Sabellaria alveolata* on large boulders and outcrops on culm sandstone in medium and low shore positions. This side of the beach is very exposed to weather and strong wave action.

G. Spekes Mill:

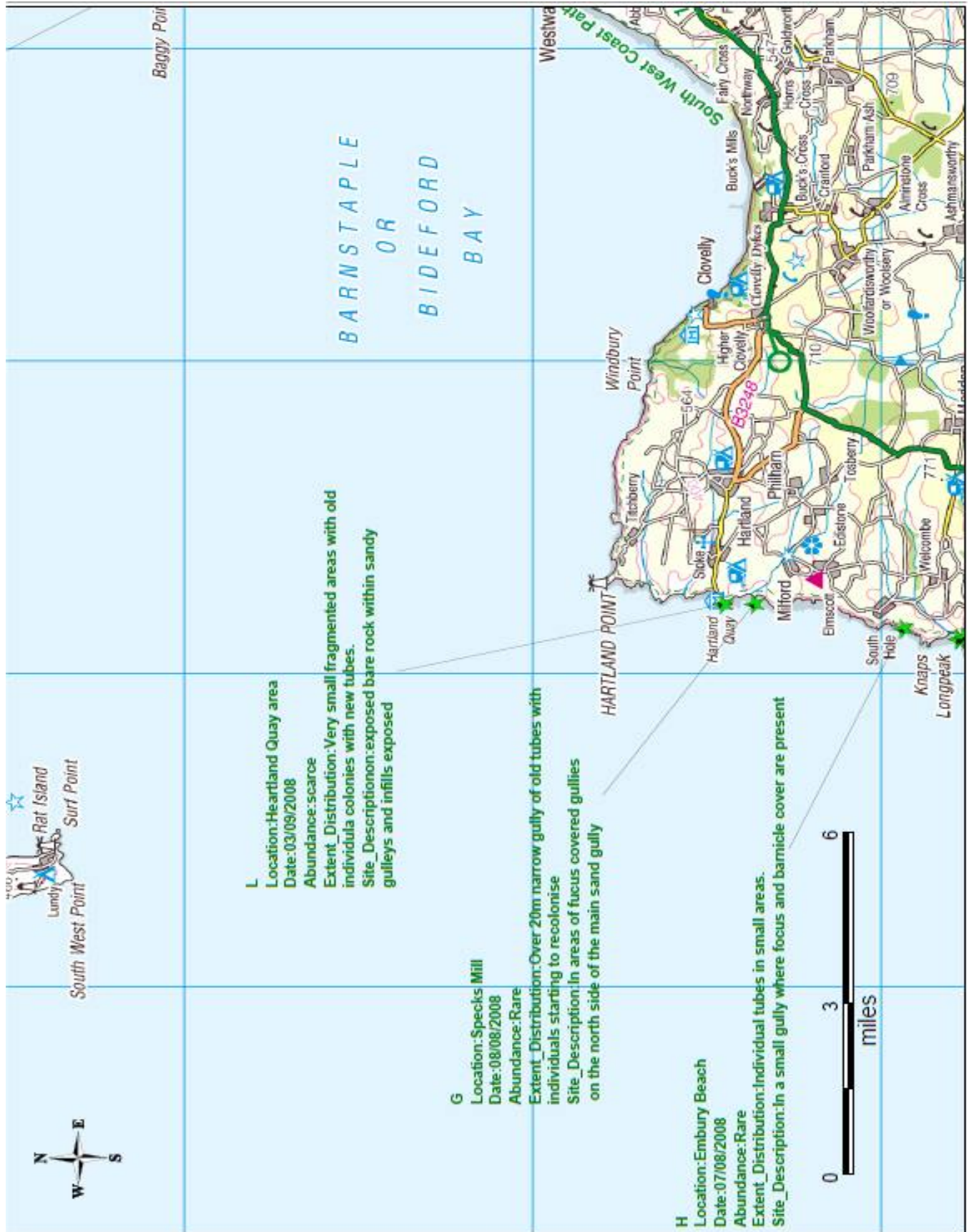
Is a rocky beach with some sand access to the beach very difficult.

The abundance of *S. alveolata* is scarce on the beach with evidence of individual old tubes found within twenty meters of narrow gullies within culm sandstone. The main recolonisation is focused on the north side of the main sand gully which has a large dominance of *Fucus* a genus of brown alga. The honeycomb worm is present on a low shore position which is exposed to high wave energy.

A. Combsgate:

A sandy, rocky cove, Atlantic facing and very exposed.

Traces of *S. alveolata* present on low shore rocks, the occasional worm cast visible on a 1.6m tide.



H. Embury Beach:

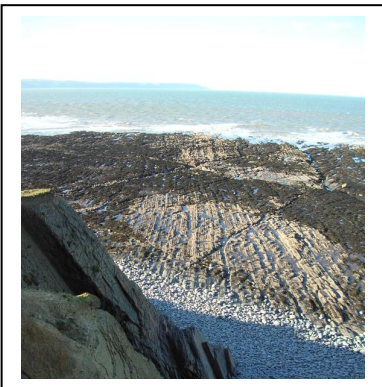


A coarse grain beach with low use and with little human impact.

S. alveolata is rarely found on this beach with individual tubes found in small areas on culm sandstone gullies placed within the mid shore position. There is a lot of Focus present and a low barnacle cover. There is a high exposure to wind and sea energy.

I, J, K. Marsland Mouth(3 sites)

Exposed rocky shore, Hartland area with low use and little human impact



S. alveolata is found in sparse to abundant areas' outside a large colony on the culm sandstone rock face along the rock gully south of the stream. There is a low percentage of barnacle cover with the dominant species being Focus, within small barnacle cover area and rock pools. The area is within a mid shore position and highly exposed to weather and sea conditions.

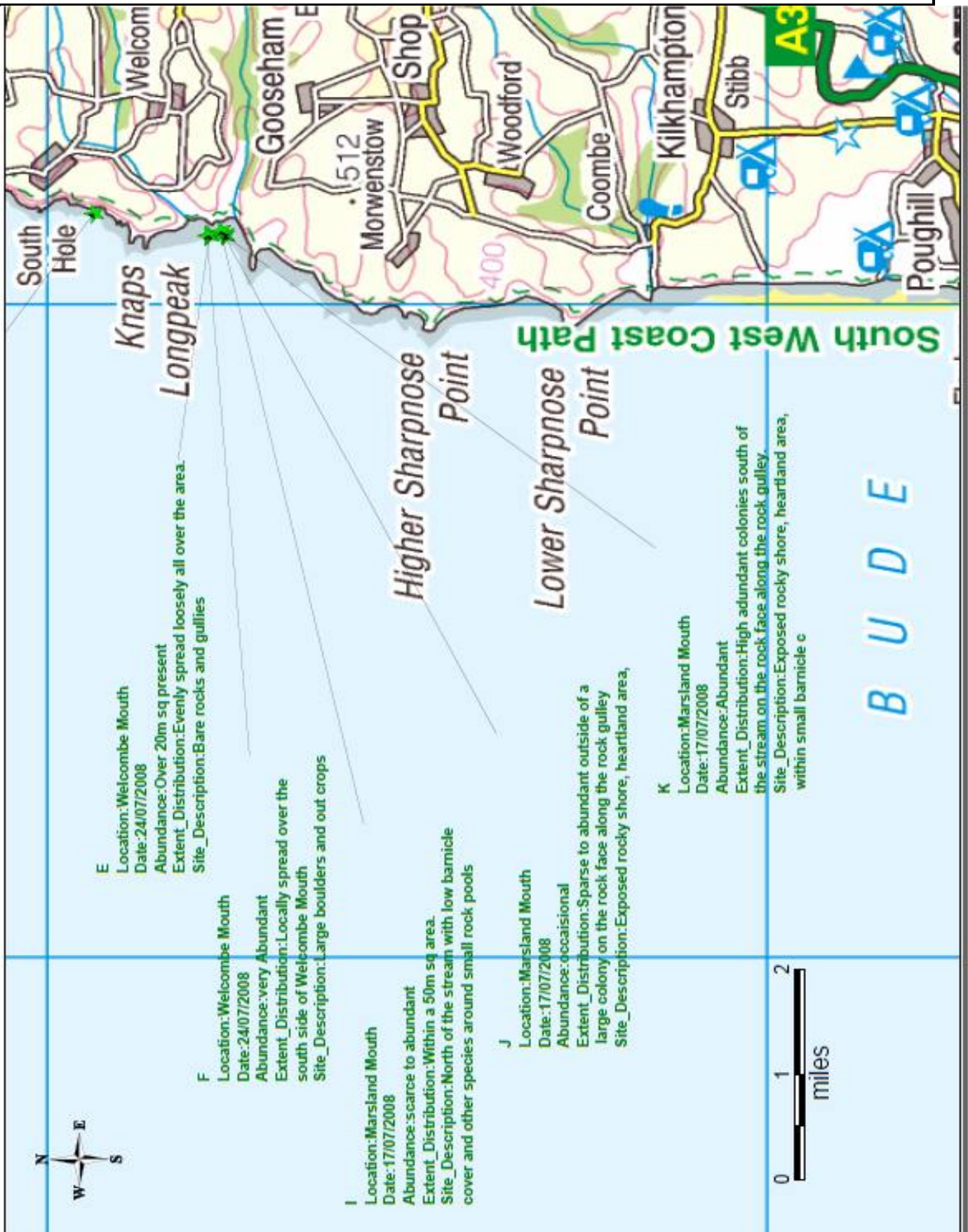
There is a scarce to abundant colony north of the stream within a fifty square meter area on rocky culm sandstone gullies on the upper and middle part of the shore. The most dominant species are Focus and sea lettuce within small rock pools and with a low barnacle cover. It is a highly exposed Atlantic shoreline.

L. Hartland Quay Area:

Large coarse beach with medium to low visitor usage impact.

There is a scarce abundance of *S. alveolata* in very small fragmented areas containing old individual tubes with evidence of new tubes recolonising. Found on exposed bare culm sandstone rocks with sandy gullies and infills. The main species are Focus, barnacles and mussels on low and medium shore level. Hartland Quay is highly exposed wind and waves.





M. GreenCliff

Rocky wave cut platform with pebble beach with medium exposure due to channel position

Very abundant present as almost every semimetal gully between mid wave to low wave water mark abundant with many other rock pool species including barnacles, sea weeds especially sea lettuce. Coarse sediment on a wave cut platform profile (slate). The main position of most of the *S. alveolata* was on a medium to low shore position but is not present at either extremities. The main impacts are sediment filtration human trampling due to fishermen and pollution.

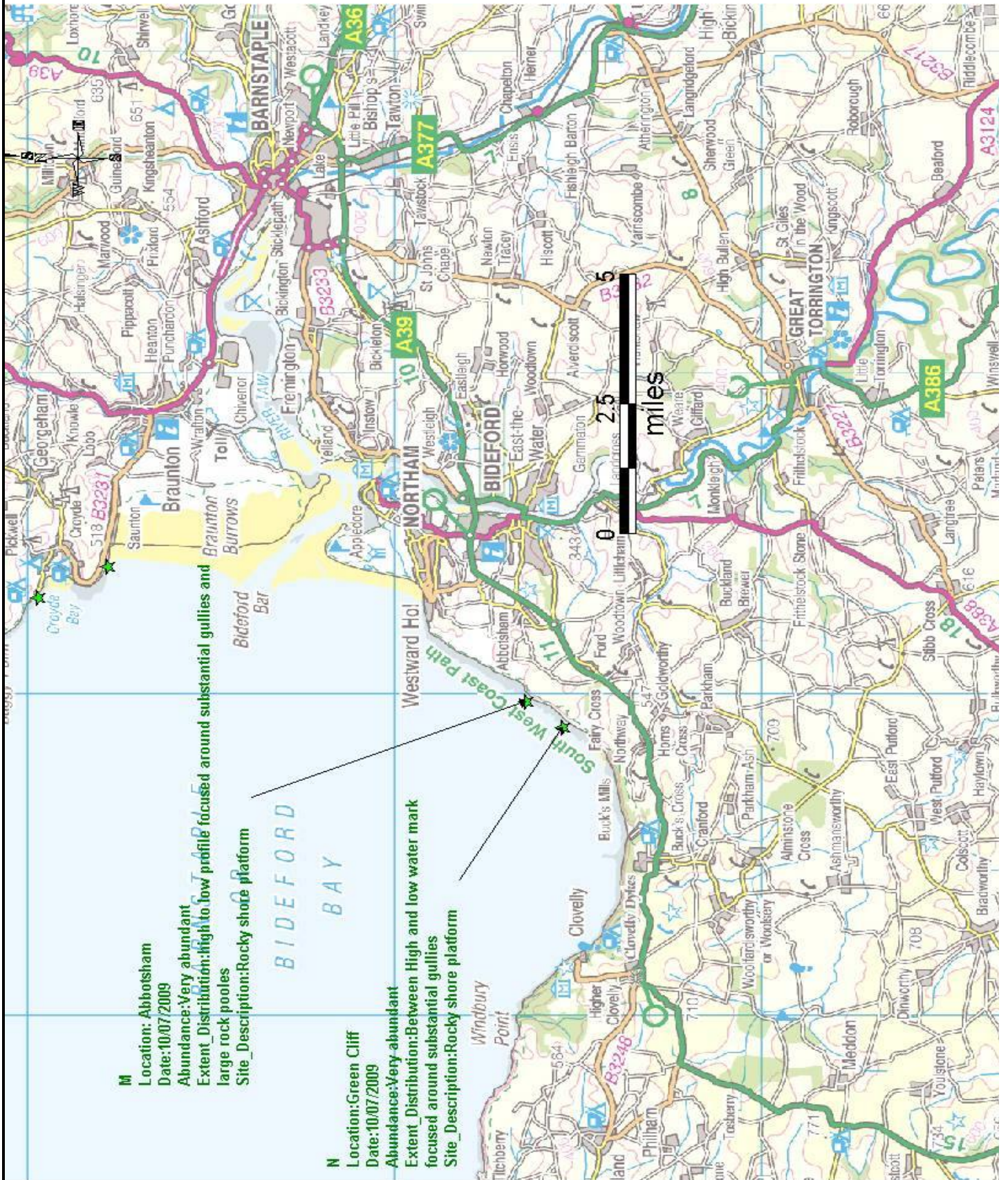


N. Abbotsham

Rocky wave cut platform and rocky pebble shore mildly exposed to the weather.

S. alveolata is very abundant, present mainly within sandy gullies and deep rock pools. There is a diverse mixture of species of sea weeds, barnacles and dog winkles. It's within the medium to low shore position and with coarse sediment from the retreated cliff line. The impacts are mainly due to sediment filtration and degradation with some human impact from trampling.





5. Conclusion

Although there have been no earlier survey results to compare, in general it is thought that there has been an increase in numbers of colonies along the North Devon Coast. With the evidence of seaweeds including fucoids, *Palmaria plamata*, *Polysiphonia* spp and animals including barnacles, dogwelks, mussels and other bivalves that have colonised the reefs showing that the settlement of *S. alveolata* has been there for some time.

The main three areas that *Sabellaria* was found most abundant was at Abbotsham, Green cliff and Welcome Mouth with two sites. Most were beaches that *Sabellaria* was present at had a low human use which hardly has any negative impact on the honeycomb worm habitat.

From the results collected it would seem that the majority of *Sabellaria alveolata* was found on highly exposed Atlantic beaches with exposed bare culm sandstone rocks within sandy gullies. This provides a strong and secure environment to build the honeycomb reef and there is a good supply of sand grains to form their tubes. However on the more exposed rocky headlands the strong wave action has stopped substantial honeycomb reefs from developing.

The developed reefs and individual tubes are mainly found on low and medium shore position which extends into the shallow sub tidal areas; but they seem not to penetrate too far into low salinity areas. In many of the locations where *Sabellaria alveolata* was found there were colonisations of many species of seaweeds the most dominant being *Fucus* with animals including barnacles and mussels. The results suggest that can increase the biodiversity on beaches and in rock pools.

Monitoring work should be carried out regularly In order to contribute further to the North Devon BAP for this species. This could then assess the long-term population changes of the species on the North Devon coasts and identify specific characteristics and indicators to *Sabellaria*'s population growth and decline. There are a few beaches that are yet to be surveyed including around Pepercombe and Portledge area. This would also help to identify whether *Sabellaria* is a climate indicator affected by the increase in warmer temperatures and stronger storms.

6. Appendix

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