Discovery of a molluscan hotspot on Jersey

Marine Biology Section of La Société Jersiaise

Around the year 1900 the conchologist James Thomas Marshall came to the Channel Island of Jersey to gather shells for his collection. He particularly wanted to get to a remote area of seashore on the southeast coast known for its bivalves and where, on big tides, it is possible to walk for over 3 km directly out from the coast. On reaching the low water mark Marshall recalled that:

> On looking back on Jersey the stranger is at first appalled at the apparent disappearance of the island and at the utter chaos of rocks which surround him. But it is safe enough while the tides are receding; it is when the tides return that the danger is great, as the incoming rush of waters gradually cuts off rock after rock with surprising suddenness. This dangerous coast frequently claims its victims from among seaweed cutters, conger hunters, and ormer gatherers. (Marshall, 1901)

The patch of coast that Marshall visited, known locally as 'Seymour' after a prominent sea fort, is rich in marine life, including beds of *Zostera marina*, and he was rewarded with many fine shell specimens. Two decades earlier the French marine biologist René Kohler had visited the same spot concluding that there were 'numerous shallow pools, offering a rich *Zostera* vegetation [seagrass] surrounded by rocks that are carpeted in a thick growth of seaweeds and which host small natural holes that bristle with interesting animals. it is also a very good place for researching molluscs' (Ansted and Latham, 1895).

Kohler believed Seymour to be 'the richest seashore area on the whole island'. The local biologist Joseph Sinel, writing at about the same time as Kohler, was just as effusive: 'In many respects this littoral area bears much analogy to the coral lagoons and pools of the Southern Seas' (Ansted and Latham, 1895).

It was in recognition of its biodiversity that Jersey's entire south–east coast was awarded RAMSAR status in 2000. However, being a RAMSAR site does not afford any formal protection to either species or habitats and in recent years Jersey's coastline (which currently has no marine protected areas) has seen a marked increase in anthropomorphic activity including the establishment of permanent aquaculture structures and boat moorings and such things as netting, vehicular use and a variety of watersports pursuits. As other easily accessible areas of Jersey's seashore have become over–utilised, so attention has started to turn towards hitherto ignored regions such as Seymour, placing the area under threat of over–exploitation.

Some years ago La Société Jersiaise (an amateur society for the study of local culture and natural history) expressed concern that Seymour was an unusually diverse area in need of protection from development but, with a total absence of any formal scientific studies, it was a difficult case to prove. Faced with this, the Société decided to put the principles of citizen science into action and, between 2011 and 2013, members of its Marine Biology Section undertook our own study of the remote area that James Marshall had visited over a century earlier. Our objective was to try and document the habitats found there and to attempt to quantify aspects of its marine life.

As Marshall outlined, Seymour is isolated and undertaking fieldwork there is far from straightforward. Our area of interest is large (170 hectares) and only fully accessible on a handful of tides per year. All our fieldwork was therefore undertaken during the large equinox spring tides in March and April when up to 30 of us would make the 45-minute trudge down to the lower shore and then work frantically for two to three hours before the incoming sea forced a hasty retreat. It was, as many remarked, simultaneously the most rewarding and exhausting fieldwork they had experienced.

A majority of our volunteers have no formal training in marine biology and so our methodology was purposefully simple. Along pre-determined transects (see figure 1), small teams (at least one of whom could identify local species) would stop at regular intervals to dig a $1m^2$ area of sediment to a depth of approximately 30 cm (figure 2). Burrowing animals larger than one centimetre were sorted, identified, counted and released again (although some annelids were taken for later identification). Basic field information was recorded including GPS position, sediment classification, depth of anoxia and associated flora and fauna. Periodically smaller sediment samples were taken for laboratory grain-size analyses and for sieving out the smaller (<1 cm) infauna. Care was taken to minimise disturbance to the local environment and within areas of seagrass (*Zostera marina*) holes were dug in clear patches between the plants.

figure 1: The general location and habitats of the Seymour area with the sample transects superimposed.

figure 2: Tray containing specimens taken from a 1m^2 hole during one of our surveys. (photo: Kevin Mcilwee)

Over three years we managed to dig 72 holes using this method from which we identified 1,823 large animal specimens belonging to 88 species. The most commonly encountered animals were molluscs, annelids and crustaceans but we also found sipunculids, echinoderms, nemerteans, fish and anemones. The commonest mollusc species we encountered are displayed in table 1; as might be expected, burrowing bivalves dominated the count with the 'palourde rose' (the local name for *Tapes rhomboides*) topping the poll.

Species name	Total count
Tapes rhomboides	186
Ensis magnus (arcuatus)	85
Glycymeris glycymeris	76
Hinia reticulata	57
Venerupis senegalensis	22
Venus verrucosa	20
Clausinella fasciata	19
Crepidula fornicata	15
Spisula solida	15
Lutraria angustior	13
Macra glauca	10
Solen marginatus	10
Ensis ensis	8

table 1: The most abundant mollusc species encountered during the survey.

Our data has yet to be fully analysed but a basic statistical exploration has revealed a couple of possible trends that we hope to explore further in the near future and which offer an insight into the ecological characteristics and status of this site.

The first trend we have observed is an apparent inverse correlation between the occurrence of large burrowing worms (such as *Nephtys* spp. and *Nereis* spp.) and the burrowing molluscs. The greatest diversity and abundance of worms occurs within the middle and upper lower shore areas while the molluscs are largely restricted to the lower shore. This is illustrated in Figures 3 and 4 which show changes in abundance and diversity of worms (annelids) and molluscs along a single transect of 1 km which began at the mid–tide level (6 m above Chart Datum) and finished 0.2 m above Chart Datum (see also Figure 1).

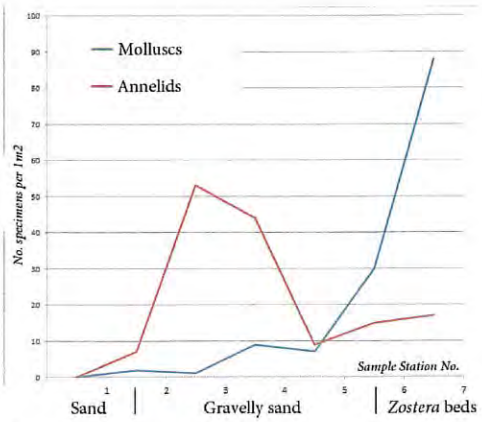

figure 3: The abundance of molluscs and annelids along a single transect (see figure 1)

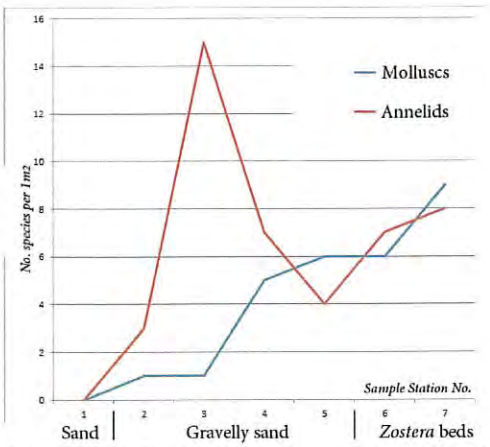

figure 4: The diversity of molluscs and annelids along a single transect (see figure 1).

A second even more obvious trend concerns the pattern of molluscan abundance across the study area. Figure 5 suggests that not only does the abundance of molluscs increase markedly towards the low water mark but that the highest concentrations of all are focused within a tight area to the southeast of the site. Here we found mollusc densities of up to 88 specimens (from 13 species) per 1 m^2.(e.g. figure 6). In fact, this area was not just good for molluscs but for burrowing marine life in general with our most diverse hole containing 139 animals from 25 different species.

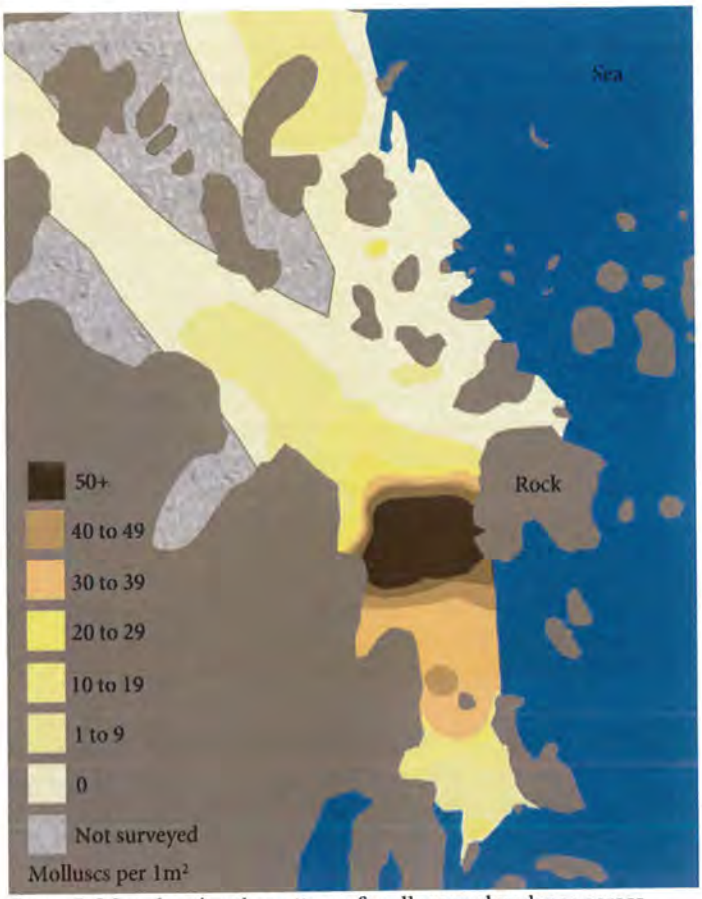

figure 5: Map showing the pattern of molluscan abundance across the study area.

It is probably not a coincidence that these high diversity and abundance areas all coincide with *Zostera marina* beds. This may help to highlight the importance of seagrass as a habitat for burrowing organisms and, according to our data, especially molluscs and crustaceans. Outside of the seagrass beds we found other areas of potential ecological importance including small beds of *Mactra glauca*, a species that is rare in the UK and not widespread even on Jersey (figure 7), and an extensive lower shore sandy habitat containing high densities of worms and razorfish. This latter habitat seems to be heavily frequented by seabirds and could be important avian feeding areas.

The biological productivity observed at Seymour far exceeds anything we have encountered elsewhere on the island. The nearest comparable area of seashore we have been able to find is in Chausey, about 30 km south of Jersey, but we would be keen to learn of any similar areas elsewhere in Britain and Europe (our e-mail is marinebiology@societe-jersiaise.org).

As previously stated, Jersey has no marine protected areas and Seymour, despite part of a RAMSAR site, is being eyed-up as a suitable location for future aquaculture development. It is our hope that the data we have gathered can be used to draw the Jersey's government's attention to the ecological importance and fragility of this unique area of seashore so that appropriate steps may be taken to keep it in the same condition as it has been since at least the times of Marshall, Kohler and Sinel.


figure 6: A dog cockle, *Glycymeris glycymeris*, and warty venuses, *Venus verrucosa* -what we respectively call a 'suchette' and a 'praire' locally. If you look carefully, there is sipunculid and a couple of slipper limpets hiding in the picture as well.


figure 7: *Mactra glauca* (length: 9–10 cm).

References

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Seagull absence devastates oyster farm

The *Daily Telegraph* of 3rd July featured the news that the closure of a landfill site near a Loch Fyne oyster farm meant that tens of thousands of seagulls, whose phosphate and nitrate rich droppings had encouraged the growth of algae on which the oysters feed, had departed for Barrow, leaving the farm with an estimated £1000 bill per week, to pay for nutrients once provided free by the gulls!

Thanks to Kevin Brown for spotting this item. Ed.