

Background

The Your Shore project, led by Cornwall Wildlife Trust and funded by the Heritage Lottery Fund, is working with the Voluntary Marine Conservation Areas (VMCAs) in Cornwall to facilitate access to the rich and diverse marine environment by way of inspiration and education. The project will work with the local community, visitors and schools within each VMCA to inform and engage them in the value of the marine environment and to improve awareness of our impacts upon it.

An objective of the project is to set up and support a volunteer group for each VMCA that will receive specialised training in marine identification and recording, together with practical experience of marine science. By training volunteers in marine identification and recording we will ensure better understanding of the state of the marine environment and in turn allow these local individuals to actively contribute towards protecting it. All data gathered as a result of surveys carried out through this project will be passed to the Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS). ERCCIS will then be able to disseminate data to other conservation organisations such as the Joint Nature Conservation Committee and Natural England.

The 'Monitoring the Strandline' training day was open to all volunteers from all VMCAs in the county. It was the first Cornwall Wildlife Trust organised training session funded through the Your Shore project. Over 30 volunteers attended. This report is written to inform all other volunteers who could not attend the training about what was discussed on the weekend and how volunteers would go about monitoring their local VMCA strandline.

Introduction - adapted from Steve Trehwella's, course leader, introductory presentation on day 1 of the training. All Photos are Steve's from the presentation. Some written content is taken from the fantastic Marine Conservation Society's leaflet on strandlines which is now out of print. Detail about some of the species has come from MarLIN's excellent marine life information pages.

Strandlines are the tide line of natural materials left behind on the beach at high tide. They are usually made up of organic matter, mainly seaweeds, drift wood and other debris. With each high tide, new life and materials are deposited which contribute towards creating and supporting these unique habitats.

Invertebrates: Strandlines play an important part in the ecology of the beach - many species depend upon them for their food, shelter and homes. They are a fringe habitat, neither fully marine nor completely terrestrial which support a surprising number of creatures.



The richest communities are found in the thickest, wettest, rotting material. These rotting seaweeds provide a rich food source for a great variety of both marine and terrestrial invertebrates including sandhoppers, beetles, small crabs and seaslaters. Large pieces of driftwood provide shelter on the shore for active



predators that emerge at night. There are a number of beetles who feed only on sea-soaked wood. Many flies such as the kelp fly lay their eggs in strandlines, and these maggots become food for predatory beetles and birds. *Photo left: Sand fly maggots. Photo right: Black-headed gull feeding on sand flies.*



Sandhoppers are small creatures, about the size of a jellybean. They are crustaceans (invertebrates related to crabs and lobsters). There are many species of sandhopper in the UK, the most common on sandy beaches is *Talitrus saltator*. Sand hoppers are

nocturnal; during the day they shelter under seaweed on the strandline or burrow into the sand. If seaweed is lifted and the sandhoppers disturbed, they will escape by hopping, hence the name. Sandhoppers occur in their millions on some beaches, they are so abundant in the strandline that they form a major source of food for shorebirds. They feed on dead and decaying material and thus recycle nutrients back into the beach

ecosystem. *Photo above left: Group of sandhoppers. Photo above right: Blackbird eating sandhoppers.*



It is not just the common species which you may find lurking amongst the seaweed. Rare finds such as the scaly cricket (*Pseudomogoplistes vicentae*) (*photo left*) may be discovered which could prove a new species record for that area of coastline.

Birds: There are a broad group of birds which feed along the shoreline including dunlins, oystercatchers, ringed plovers, sanderlings, and turnstones. Some are resident others are migratory, many of them feed off the strandline. These birds search for sandhoppers, other invertebrates and kelp fly eggs which are laid on seaweed. *Photo below: Wheatear feeding on sandhopper.*



Mammals:

In addition to invertebrates and birds, strandlines also support other animals, including bats which feed off the flies and foxes, shrews and voles which also feed off the strandline. The shrew pictured (*photo left*) was discovered

one night on a strandline search by Steve in amongst the seaweed. The bat also pictured (*photo below*) was discovered by Steve in a beach cave. It no doubt will have fed on the strandline that night. Even larger mammals like deer (*photo below right: deer print*) will visit the strandline to support their diet by feeding on the seaweed.



Habitats: Strandlines provides the main input of energy to sandy shore intertidal habitats. They are particularly important on exposed shores, where they can act as precursors to sand dunes (*photo right*). As seaweed breaks down it produces organic matter which provides nutrients for pioneer plants trying to establish themselves in exposed beach and sand dune areas. Without this initial impetus, sand dune formation is severely limited.

Washed up animals: When monitoring the strandline, you are not just looking at the living species. The presence of dead washed up organic material can be just as interesting and tell us important information about what is going on around our coastline. By the wind



sailor (*Velella velella*) (*photo left*) is an ocean dwelling species that is occasionally seen in the open sea and washed up around British and Irish coasts. The float, which is an oval disc, is deep blue in colour and can be up to 10 cm in length. Short tentacles hang down into the water from the float. A thin semicircular fin is set diagonally along the float acting as a sail. This sail gives the animal its scientific (i.e. from *velum*, a sail) and its common name, 'by-the-wind-sailor'. The direction of the sail along the float determines which way the by-the-

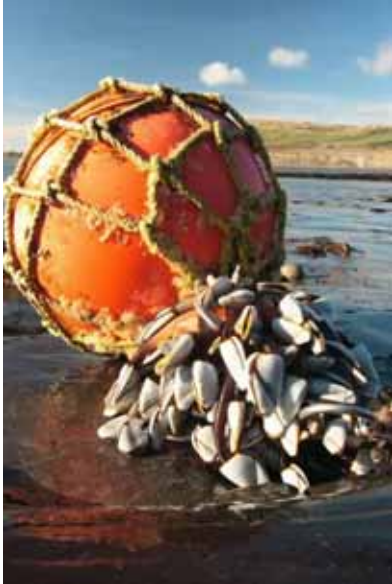
wind-sailor will travel (*MarLIN*).

Portuguese man-of-war (*Physalia physalis*) (*photo right*), is common in the warm waters of the Atlantic. However, individuals are sometimes driven by prevailing winds to the coasts of Britain and Ireland, especially southwest coasts. Each 'individual' Portuguese man-of-war is composed of a group of polyps specialised for movement, catching prey, feeding and breeding. The individual polyps are dependent on each other for survival, each having a distinct role. A large, purple, gas filled float (the pneumatophore) reaching up to 30 cm in height allows the Portuguese Man-of-War float acts as a sail when raised. The animal has many



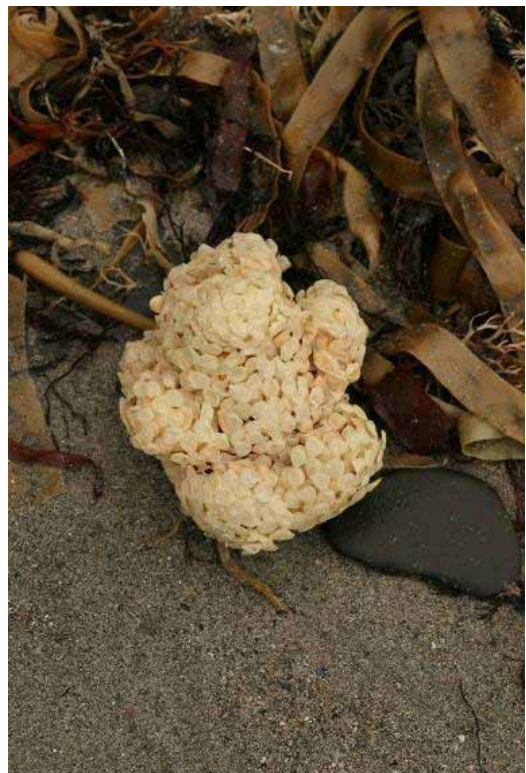
digestive polyps (gastrozooids), which hang down and secrete digestive juices onto the prey that has been caught and immobilised by the sting of the long, contractile tentacles (the dactylozooids). The tentacles may hang down several meters and have a bead-like appearance. Each 'bead' contains specialised stinging cells (nematocysts), which produces a debilitating sting (MarLIN).

The common goose barnacle (*Lepas anatifera*) is a pelagic species which attaches itself to hard floating objects such as logs. It is often found washed up on the shore on western coasts of Britain and Ireland especially after westerly gales, however it is rarely found on east coasts of Britain. *Photo below left: Collection of goose barnacles on washed up buoy.*



In amongst the goose barnacles you may come across the rare columbus crab (*Planes minutus*). The crab originates in the tropical Sargasso Sea near Florida however it lives on drifting objects such as seaweed which can easily be swept up by the Gulf Stream and carried thousands of miles to British shores. *Photo above right: Columbus crab in amongst goose barnacles*

Dead animals and shells: A common sight along the strandline are other objects such as the cuttlefish bones (*photo bottom left*), the whelk egg cases (*photo below right*) and perhaps even, sadly, the carcasses of dead marine mammals that are brought in from sea by the swell. The photo below left shows Steve measuring a severely malnourished Risso's dolphin washed up in Dorset.



Plants: Shingle plants can survive the harsh conditions of an exposed coastline because of special adaptations. These include waxy leaves that prevent moisture loss due to the drying effects of sun and wind. These also protect them against the salty sea spray. Many have a long tap root to reach freshwater deep beneath the shingle and can survive on the infertile soil trapped between the stones. Woody stems help prevent damage by the shingle. On exposed beaches specimens of some plants avoid the elements by staying small whilst others grow as a carpet.



Photo above left: Seakale at Kimmeridge

Photo above right: Sea rocket, a typical sandy shore strandline plant and very important for forming sand dunes.

Photo below left: Sea sandwort, a sandy shore plant with the similar ecology to sea rocket.

Photo below right: This large plant on the sand is sea stock, a very rare sandy beach plant which Steve found in 2010 at Studland, Dorset. It is the only one to be seen in Dorset for 80 years and is considered to be extinct in Cornwall according to research (Flora of Cornwall).



Problems: Many people consider the natural strandline as ‘rubbish’ which must be removed to improve their enjoyment of the beach. In addition, due to the presence of marine litter (*photo left*), strandlines are often seen as an environmental problem.

This leaves the beach owner with a dilemma, they have three options;

- leaving the strandline in place
- mechanical beach cleaning
- hand cleaning

If they leave the strandline this may affect the number of visitors to their beach and thereby impact the local economy. On many beaches strandlines are removed by mechanical beach cleaning. Mechanical beach cleaners are heavy and cause compaction of the sand. This form of cleaning also removes the top 10 - 15cm of beach which contains high numbers of invertebrates and significant quantities of organic matter, both important to the beach ecosystem. Mechanical beach cleaning;

- removes organic matter
- compacts the sand
- can cause beach erosion, and
- can cause a 90% reduction in strandline species



The strandline habitat can be destroyed, and the wildlife that relies upon it as a place of shelter or a source of food is lost from the beach. The local extinction of rare strandline invertebrates can result, as can the loss of more common species which form the base of the beach food chain supporting birds and small mammals.
Photo left: Beach tractor in Looe mechanically cleaning the beach.

In addition, mechanical beach cleaning is non-selective in targeting litter and often fails to remove smaller objects such as cotton bud sticks. Although mechanical cleaning is perhaps more cost effective, it is detrimental to wildlife and a significant negative impact on beach ecosystems.

Studies have been conducted on beaches to compare the effects of mechanical cleaning and hand cleaning. This work has shown that mechanical beach cleaning can significantly reduce the number of invertebrates such as sandhoppers, which then impacts the ecology of the beach including birds that feed off strandline invertebrates.

Daily hand cleaning to remove marine litter as opposed to daily mechanical beach cleaning can be just as effective, it also allows the natural strandline to remain and support the beach ecosystem. Hand cleaning can reduce the costs of disposing of large volumes of materials, can contribute to reducing our carbon footprint and can also provide opportunities for employment.



Monitoring your Strandline: Without evidence we cannot prove the importance of our strandlines and the need to protect them. People are therefore free to continue to make the choice of mechanical cleaning without realising the consequence of their actions. By monitoring our local strandlines and carrying out surveys, we can gather data to prove its importance as a habitat in maintaining Cornwall's biodiversity. We can also raise awareness within the local community as well as amongst local authorities to ensure all understand the need to consider alternative methods of beach cleaning and in turn protection of this fascinating environment.



Equipment:

- Pitfall traps – can be made or buy garden slug traps from garden centre or pound shop
- Marker sticks – wooden pole with colored top
- Bait (bit of old pasty, fishy stuff, anything smelly!)
- Bug catchers or 'pooters'
- Small specimen pots or bug pots (jam jars will do)
- Petri dishes or small shallow trays for identification
- Hand lenses or ideally microscope
- Trays to pour trap contents into
- ID books – both marine invertebrates and terrestrial insects
- Good quality digital camera
- Binoculars
- Telescope
- Bat detector
- Torch
- The contact for a good entomologist or the enquiry form for ERCCIS!



Photo above: Steve surveying at night with head torch and super duper camera!

Methodology

- Pitfall traps are to be left over night. Therefore it is best to do surveys on consecutive days of the lowering tide (i.e. day one high tide of 5.1metres, day two 4.8metres) so that traps are not flooded.
- Choose a fairly isolated beach with low human activity so traps are not disturbed or interfered with over night.
- Surveys will cover two days.
- Day 1:
 - Set pit fall traps as seen in image below right. Pit fall traps should be set flush with the sand, in amongst the seaweed. Bait should be placed in trap to help attract life.
 - Cover pitfall trap with weed and mark with stick or pole so you can return the next day. Leave for 24 hours.
 - Now walk along strandline and record any other interesting washed up organic material.
 - Bird watch on day one – record all bird species in survey area (general beach) and information about numbers and activity.
 - Day one night – go out with bat detector and record bat species.
 - Day one night – investigate strandline at night with torch to see if there is any other large mammal activity.



- Day 2:
 - Return to pit fall traps – remove from strandline and take samples to shore lab of microscope/hand lenses with ID books.
 - When returning to shore lab, collect any other invertebrate specimens along the way such as flies, maggots – bug catchers or 'pooters' work well.
 - Empty contents into trays to sort.
 - Try to identify species under microscopes or hand lenses using the identification guides.
 - Never guess! If you are unsure of your finds please keep a sample or take high quality photographs of specimens.

If you are 100% happy with your identification, please send complete records to;

- One off sightings to be sent to ERCCIS through the one off sightings record sheet at; http://www.ercis.co.uk/wildlife_recording/submit_one_record
- A full species list can be sent to ERCCIS and filled out through the following link; http://www.ercis.co.uk/wildlife_recording/electronic_recording_form

If you are uncertain with your finds but have high quality photos or samples, please email;

- If you have one or two photographs please contact the Wildlife Information Service on email wis@cornwallwildlifetrust.org.uk or send one or two samples into ERCCIS, Five Acres, Allet, Truro, TR4 9DJ.
- If you have a several photographs and specimen samples please send CD of photos and any samples into Abby Crosby at Cornwall Wildlife Trust, Five Acres, Allet, Truro, TR4 9DJ. Abby will then contact a county expert. It is essential that photos are kept high quality so that experts can zoom in – please do not reduce size and attach to email. Thank you.



In these photos you can see a pitfall trap filled with amphipods (top) a volunteer checking the pitfall traps but also holding a bug catcher or 'pooter' ready to trap any fast moving specimens (above left) and volunteers looking at species under the microscope (right).

Results and Summary of Training Day on 18th and 19th September 2010:

Location: Hannafore Beach, West Looe, PL13 2DJ. SX259524.

Species list for the weekend;

Middle shore rock crevices

Centipede *Hydroschencyla submarina*

Springtail *Anurida maritima*

Beetle *Aepus marinus* **New record**

Pseudoscorpion *Neobisium maritimum* **New record**

Molluscs *Lasaea rubra* and *Cingula cingillus*

Pulmonate mollusc *Leucophytia bidentat*

Strandline

Seaweed fly *Coelopa pilipes*

Beetle *Cercyon* sp. *Apteropeda orbiculata*

Staphylinidae (rove beetles) *Cafius xantholoma*, *Aleochara obscurella*

(Springtail) and *Anurida maritima*

Centipede *Strigamia maritima*

Isopods *Porcellio scaber* and *Ligia oceanica* (*sea slater*, *photo top right*)

Sandhoppers *Talitrus saltato* and *Orchestia gammarellus*

Birds

Ringed plover *Charadris hiaticula*

Turnstone *Arenaria interpres* (*Photo bottom right*)

Dunlin *Calidris alpina*

Swallow *Hirundo rustica*



All volunteers came away from the training surprised at just how interesting the strandline is and how important it is for us to recognize it and protect it. Strandline surveys do not need to be as complex as described in the methodology above – a simple scan of a strandline and sending in your findings (however common you think they are) can prove interesting and essential for the protection of a stretch of coastline. Our surveys in Looe uncovered a selection of rare and previously unrecorded species, exciting stuff!

Please also do not get put off by the worry of misidentification and inability to decide what animal is what – that is the beauty of digital photography! We have invertebrate experts that we can ask and send samples and photos to. We also have a fantastic team at the Environmental Records Centre here in Cornwall who are passionate about recording species within this county and are happy to receive queries and questions from you. Please see ERCCIS website www.ercis.co.uk for more information about them and what they do and follow the links above as explained.

These surveys can make a great event – you can set traps the day before then head out with the general public on a balmy evening to collect your samples, do some bat detection and watch the feeding birds.



For more information on strandlines... Well there is actually very little out there! We hope to put together a Cornish strandline identification chart for the main species that you will find on our strandline. If you or anyone you know is interesting in starting local strandline surveys please contact Abby Crosby at the Cornwall Wildlife Trust on abby.crosby@cornwallwildlifetrust.org.uk. CWT will hold a strandline survey kit which can be lent out to groups wishing to carry out a survey.

And finally, you do not need to buy or wear stupid glasses like these (*photo left*) to study the strandline!



Team shot taken during the VMCA strandline monitoring training day September 2010. Steve's the weird looking one in the middle front (wearing hat!) ©

Thanks to; Steve Trehwella for his time and dedication to strandline natural history and for coming hundreds of miles to share his knowledge with our volunteers, Marine Conservation Society Beachwatch team for their fantastic strandline leaflet and additional information sent for the training day (www.mcsuk.org), *MarLIN* for their incredibly interesting and useful information web pages (www.marlin.ac.uk), and all the VMCA volunteers for their interest, time and dedication to ensuring better protection for our coastline.

