

Appendix C - Guidelines for Good Practice when working on beaches with Vegetated Shingle



Guidelines for Good Practice when working on beaches with Vegetated Shingle

Introduction to the guidelines

These guidelines are aimed at coastal defence engineers and others planning to carry out works on shingle beaches which host native shingle vegetation or have the potential to do so. Highly mobile beaches with no stable shingle would not be able to support vegetation. The guidelines indicate the various ways that vegetated shingle can be damaged during the works and suggest ways in which this damage can be avoided, or at least limited.

It is recognised that it will not always be possible to incorporate all the suggestions, for example during emergency works. There are also substantial cost implications involved with some of the measures. The guidelines should therefore be viewed as suggestions to be seriously considered and implemented where costs, time and resources allow. However, some of the suggestions take the minimum of time and effort, such as limiting the number of access points to the beach, and therefore may still be possible.

It is hoped that the guidelines will be used during the planning stage so that contractors can be given clear instructions as to the measures they are required to take to protect areas of vegetated shingle.

Introduction to vegetated shingle

Vegetated shingle is recognised as an internationally important habitat. It is scarce in Europe with the UK supporting a high proportion of the European resource. Elsewhere, coastal shingle has few occurrences outside Japan and New Zealand. Coastal vegetated shingle is listed as a priority habitat in the UK Biodiversity Action Plan (BAP) and supports at least nine priority BAP species.

It is characterised by specialised plants that have adapted to survive in harsh coastal conditions where lack of fresh water and nutrients are compounded by fierce winds and impact by waves. Shingle habitats are also particularly important for invertebrates and for some breeding and roosting birds.

Much has already been lost to housing

Both projects would like to acknowledge the support of the Arun District Council, Chichester District Council, East Sussex County Council, English Nature, the Environment Agency, Hastings Borough Council, Heritage Lottery Fund, Lewes District Council, Pevensey Coastal Defence Ltd, SCOPAC, Seven Sisters Voluntary Marine Conservation Area, South Downs Coastal Group, Sussex Seasearch, Sussex Wildlife Trust, Wealden District Council and West Sussex County Council.

developments, agriculture and coastal defence while the remaining areas face a number of threats including trampling and un-natural enrichment of the shingle substrate. One of the main long-term threats to vegetated shingle is as a result of man's intervention in natural coastal processes, with coast protection work changing the accretion rate of shingle to coastal areas. Trapped between urban development on the landward side and rising sea levels on the seaward side, vegetated shingle is also threatened by "coastal squeeze".

Shingle banks form a natural coastal defence, which may require replenishment in order to maintain the bank crest height and width. With coastal protection techniques moving towards a more integrated approach allowing natural processes to work where possible and relying more on "soft" defences rather than "hard" structures such as sea walls, there is an opportunity to create new, stable areas of shingle. If planned with care, these could be used to create new areas of shingle vegetation.

Vegetated Shingle Communities

Pioneer communities of vegetated shingle can begin to recover naturally from damage within a few years, as long as the seed bank remains intact and further damaging activities are halted. However, the more established communities, such as moss and lichen communities and closed-turf communities are unlikely to recover as they develop over many decades. Some can take hundreds of years to establish. It is important that these types of vegetated shingle communities are not damaged, as they are extremely rare.

Threats from coastal defence engineering works

Vegetated shingle can be damaged in a number of ways when coastal defence and other works are being carried out on the beach. It should be noted that damage could be done not only by vehicles and machinery but also by trampling, especially on the older communities.

Damage can be in a variety of forms:

- ***Physical damage to plants***
- ***Physical damage to communities (pioneer, intermediate, closed-turf, moss and lichen etc)***
- ***Disturbance to breeding birds***
- ***Movement and/or compaction of shingle***
- ***Destruction of the seed bank***
- ***Imported marine-dredged shingle causing nutrient enrichment***
- ***Imported shingle of unsuitable type/size¹***
- ***Nutrient enrichment through mixing of the shingle and soil layers***

Measures to prevent damage or to offset unavoidable damage

There are a number of measures that can be taken, both before the commencement of coastal defence operations and while the work is being carried out. It is important that all contractors are informed

in advance of the procedures they must follow to limit any impact on the vegetated shingle.

Note: *English Nature's consent must be sought before any work is carried out within a statutory designated site.*

Preventative measures that can be taken include:

- ***Brief the works unit/contractors before commencement of work to ensure that each individual is clear about the measures being taken;***
- ***Limit the number of beach access points for vehicles;***
- ***Clearly define beach access points avoiding any vegetated areas where possible. If the loss of some vegetation is unavoidable, ensure that it is limited to the pioneer community and not the established, closed-turf communities that will not recover;***
- ***Demarcate any particularly valuable or important areas of vegetation prior to commencement of operations to ensure its protection. Use old groyne timber, tape or any other highly visible barrier laid around the perimeter. Keep all vehicles, machinery and people out of the marked area;***
- ***If possible, wash imported marine-dredged shingle to prevent nutrient enrichment;***
- ***If possible, use imported shingle of a suitable type/size¹ for vegetation, at least in those more stable areas where plants are likely to re/colonise;***
- ***If possible, limit vehicle movement along the beach to below High Water Mark to prevent impact to vegetation or compaction of shingle on the ridge;***
- ***Limit work to the period outside the bird nesting season. Shingle nesting birds generally nest between March and August;***
- ***Include information about the shingle vegetation protection measures that are being taken, in any interpretation on the site;***

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- **Seek advice from the East Sussex Coastal Biodiversity Project (ESCBP), West Sussex Nature Coast Project (WSNCP) or other coastal conservation body.**

¹ Land-sourced shingle tends to have sharp edges and be more angular than marine-sourced shingle, making it less suitable for coastal shingle vegetation. Pebble size is very important in determining which plants can grow. Pebbles with an average size greater than 8cm diameter are normally unsuitable for vegetation. Shingle species generally prefer an average diameter of up to 4cm. Patches of different sized pebbles are the most desirable as they allow a mosaic of vegetated and bare shingle areas to develop. A variety of pebble sizes will also allow a greater variety of species to colonise.

Measures that can be taken to offset unavoidable damage:

- ***If the loss of an area of vegetated shingle is unavoidable it may be possible to incorporate the creation of a new area elsewhere along the coast to ensure no net loss of this rare habitat. Opportunities for creation of vegetated shingle habitat should be sought during all planning stages of coastal defence.***
- ***If unavoidable damage to an area of vegetated shingle is foreseen, liaise with the ESCBP or WSVSP about seed collection prior to work in order that restoration can be attempted after the work is complete. (Up to 12 months notice may be required for this, depending on the time of year).***

Information and advice

The East Sussex Coastal Biodiversity Project Officer can be contacted at:

*c/o Transport & Environment, County Hall, St Anne's Crescent, Lewes, East Sussex BN7 1UE
Telephone: 01273 481677*

The West Sussex Nature Coast Project Officer can be contacted at:

*Bognor Regis Town Hall, Clarence Road, West Sussex PO21 1LD
Telephone: 01903 737949*

Plant ID cards for contractors

A guide for identifying vegetated shingle communities is available from both the ESCBP and the WSNCP.

Survey data

Vegetated shingle along the West Sussex coast from East Head to Shoreham has been mapped and the information is available on CD ROM in both MapInfo and Arc View formats. To obtain a copy please apply to:
Sussex Biodiversity Record Centre, Woods Mill, Henfield, West Sussex BN5 9SD.

Survey data for the East Sussex coast is available in the report *Techniques for Assessing Shingle Communities*, downloadable from the publications section of the Beaches at Risk website: www.geog.sussex.ac.uk/BAR. Additional survey information can be obtained from the Sussex Biodiversity Record Centre.

Glossary of terms

Coastal defence	a combination of both Coast Protection (generally to prevent erosion – where the land is higher than sea level) and Sea Defence (to prevent flooding – where the land is lower than sea level).
Coastal squeeze	the shrinking of coastal habitats caught between rising sea level and fixed coastal defences.
Interpretation	means of displaying explanatory information for example in the form of a leaflet or notice board.
Nutrient enrichment	increase in nutrient content of shingle.
Vegetated shingle	shingle supporting a community of flora and fauna.
Pioneer communities	plant and animal communities that establish within a relatively short time and are usually the first to colonise a new area.
Intermediate communities	plant and animal communities that are intermediate between pioneer and established, closed-turf communities.
Closed-turf communities	species rich plant and animal communities that develop over a relatively long time, gradually building up a layer of soil and humus over the shingle, eventually completely covering it with vegetation, with no bare shingle visible.

Appendix D - Shingle beach “Cab Cards”

Communication is a vital component in the successful completion of any project, particularly when such projects involve working in partnership with other organisations. Correctly setting out project requirements, goals, and any site restrictions before work is initiated is essential.

Agreements on working practises should be made with each organisation involved in a project, and conveyed fully to all parties. It is important to explain the reasoning behind these decisions and educate other parties to the habitats importance. This can be achieved by giving talks and/or guided walks to the organisations/workers involved with the project. Site managers can also put together information packs to be used as reference materials. These packs can include, habitat and species descriptions, advice on most likely locations of shingle communities, and information regarding seasonal changes to shingle habitats.

It is crucial that site managers oversee works and regularly consult with partner organisations throughout a projects lifecycle, thereby helping to insure that agreed practises are being carried out.

Below (see figures D1.1 and D1.2) are examples of the habitat identification information currently being used across Sussex. These identification sheets or ‘cab cards’ can be handed out to workers and used to protect areas of shingle which display important geomorphologic and/or ecologic features. Originally produced in collaboration between East & West Sussex County Councils, these sheets are an extremely useful tool.



Figure D1.1 Summer information sheet (cab card) for shingle contractors.



Figure D1.2 Winter information sheet (cab card) for shingle contractors.

Appendix E - Site evaluation data (graphical representation)

West Beach



Figure E1.1 Shows the locations of the 2008 transect surveys carried out at West Beach, Newhaven.

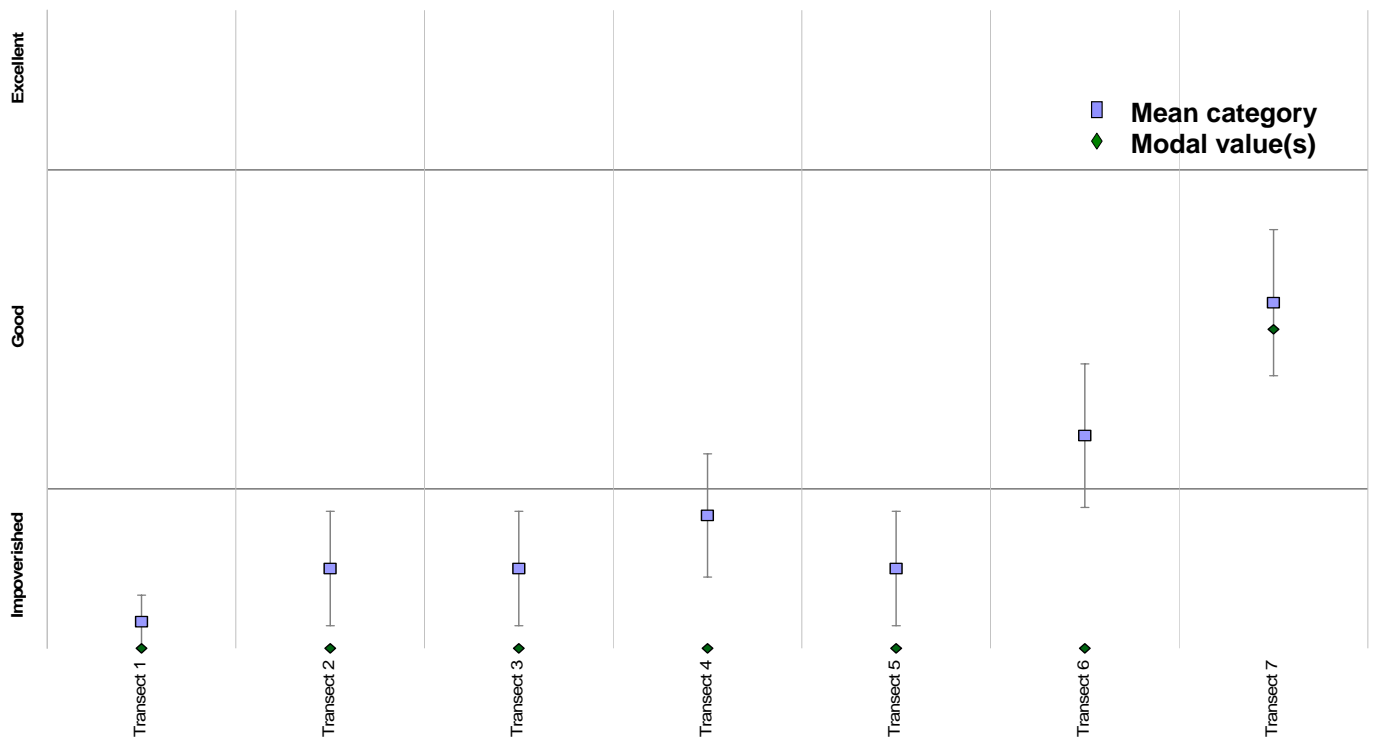


Figure E1.2 Biodiversity values for West Beach (Newhaven) including mean category \pm SEM and modal value(s).

West Beach

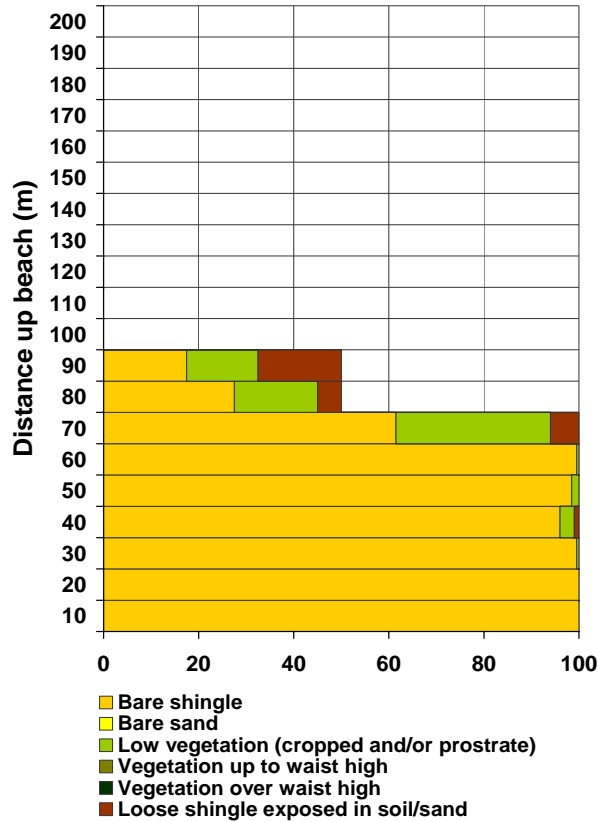


Figure E1.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

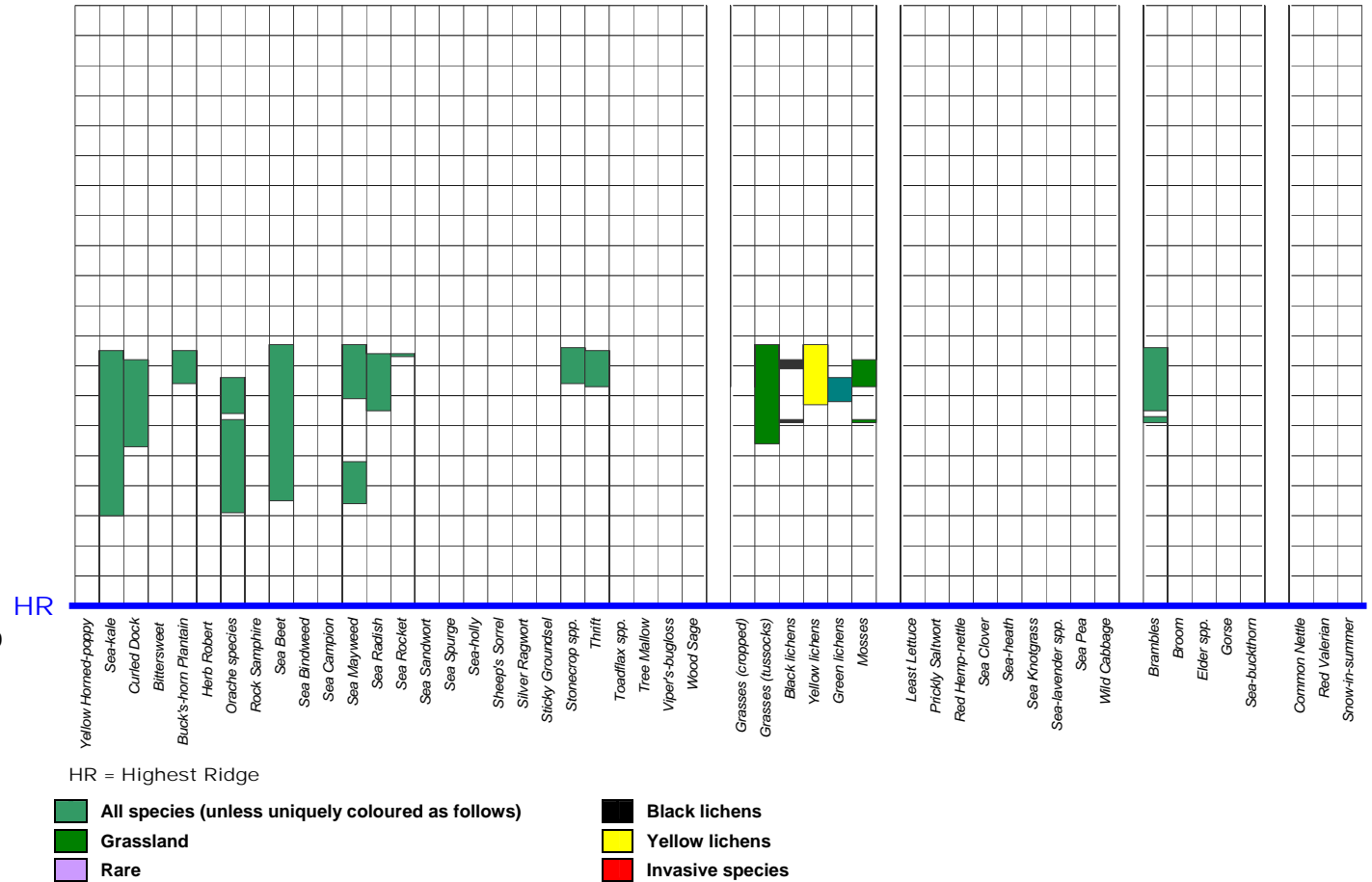


Figure E1.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 11/06/2008).

Tide Mills (west)



Figure E2.1 Shows the locations of the 2008 transect surveys carried out on Tide Mills (west beach).

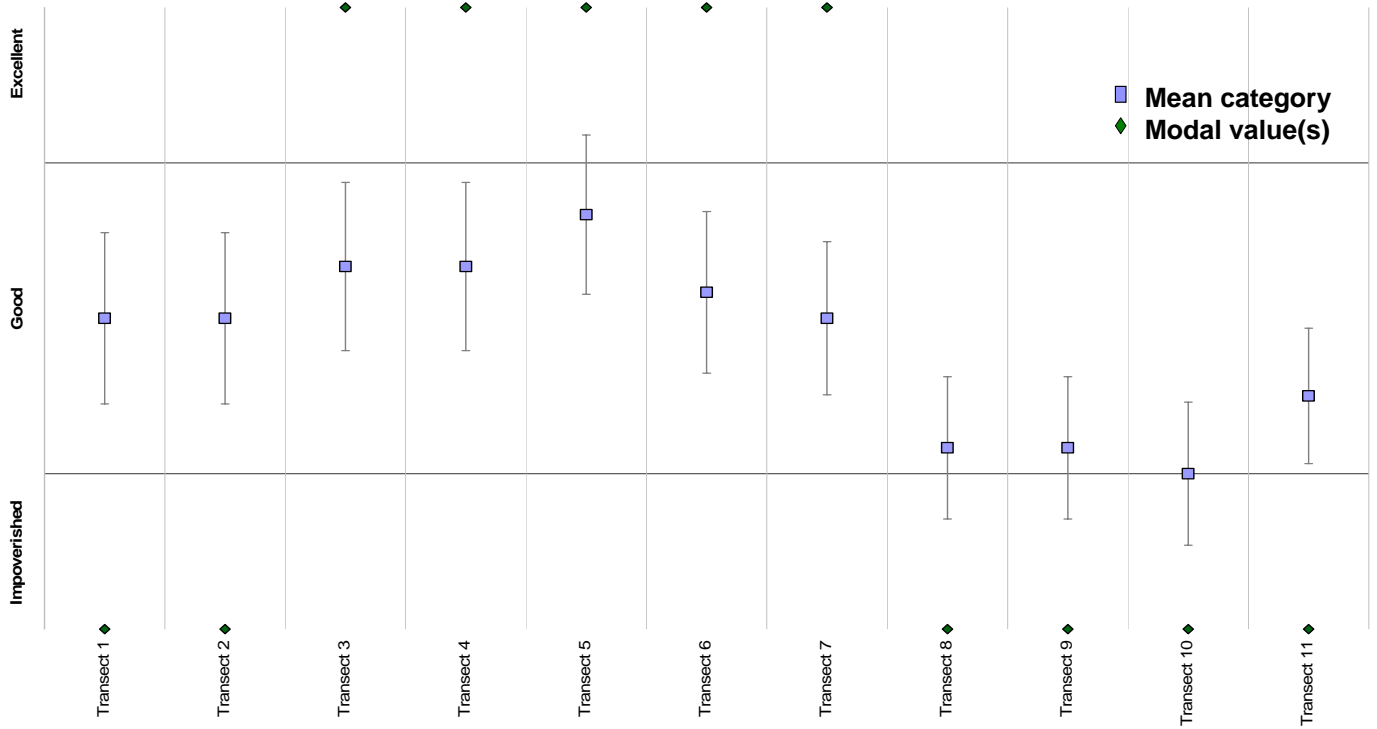


Figure E2.2 Biodiversity values for Tide Mills west shingle beach (Newhaven) including mean category \pm SEM and modal value(s).

Tide Mills west (western end)

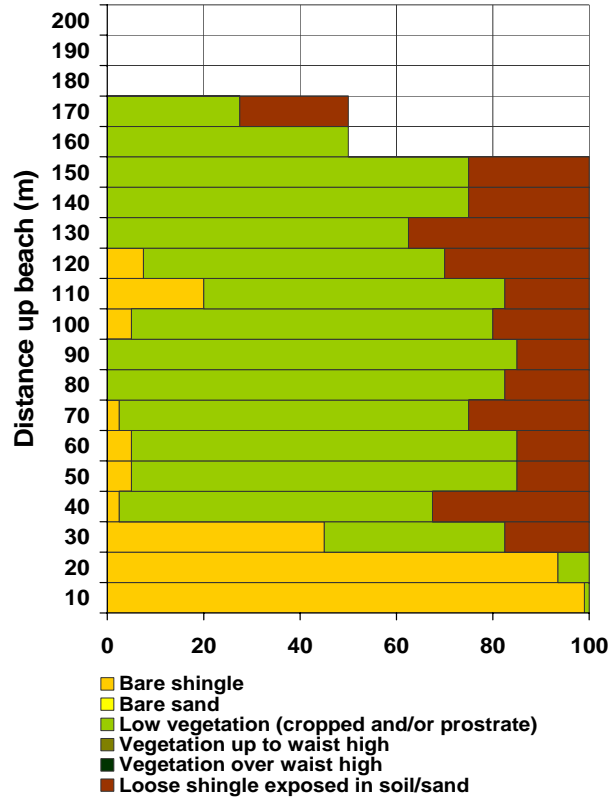


Figure E2.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

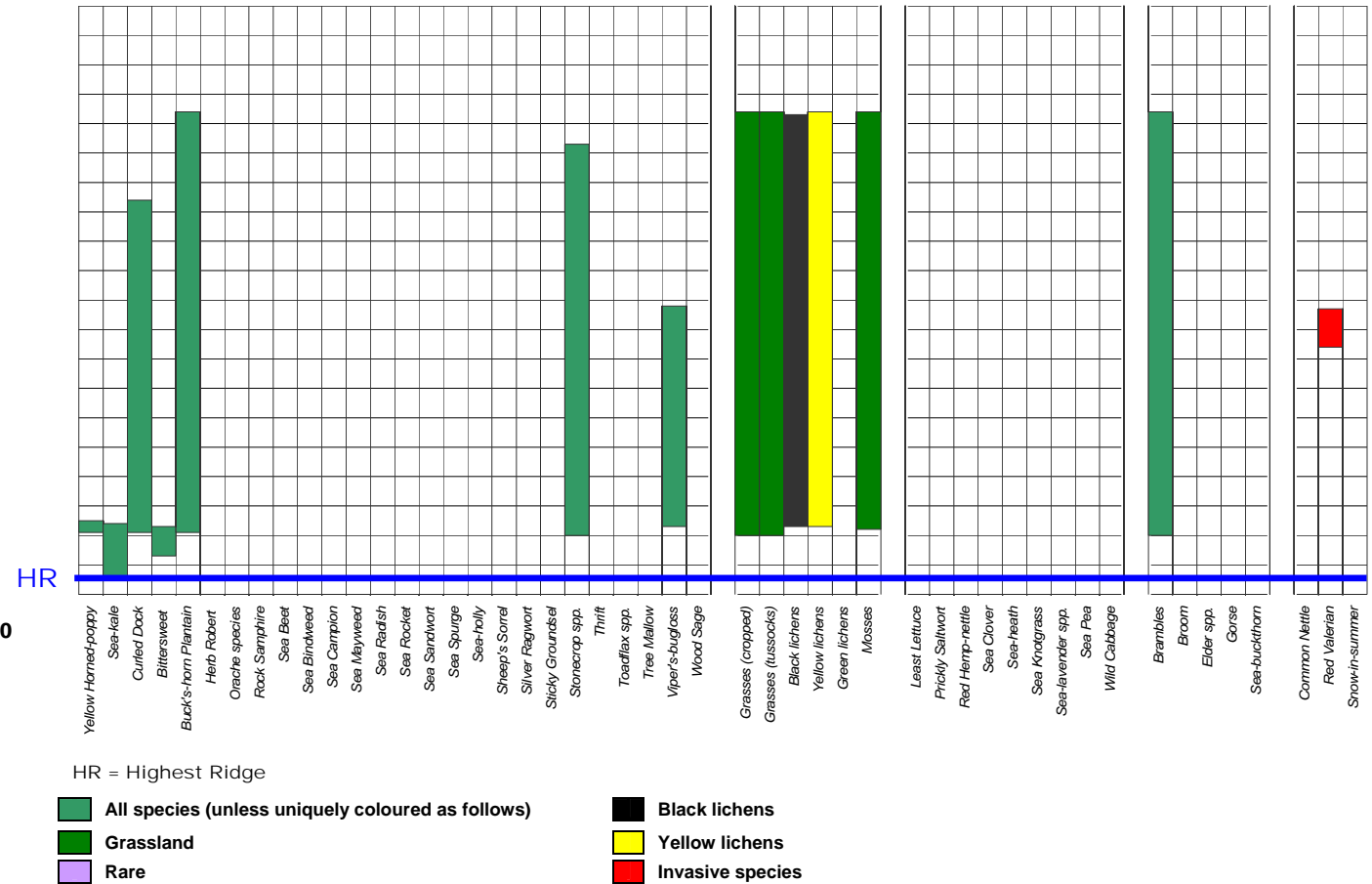


Figure E2.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 11/07/2008).

Tide Mills west (eastern end)

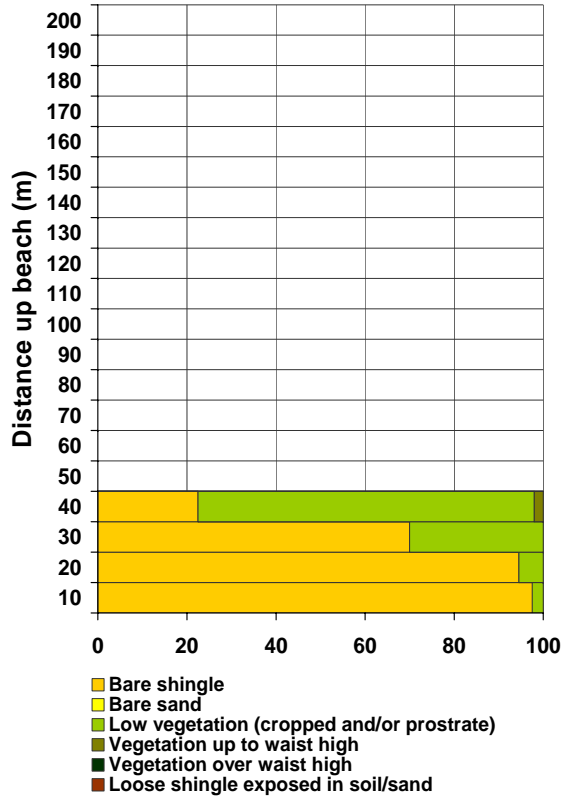


Figure E2.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

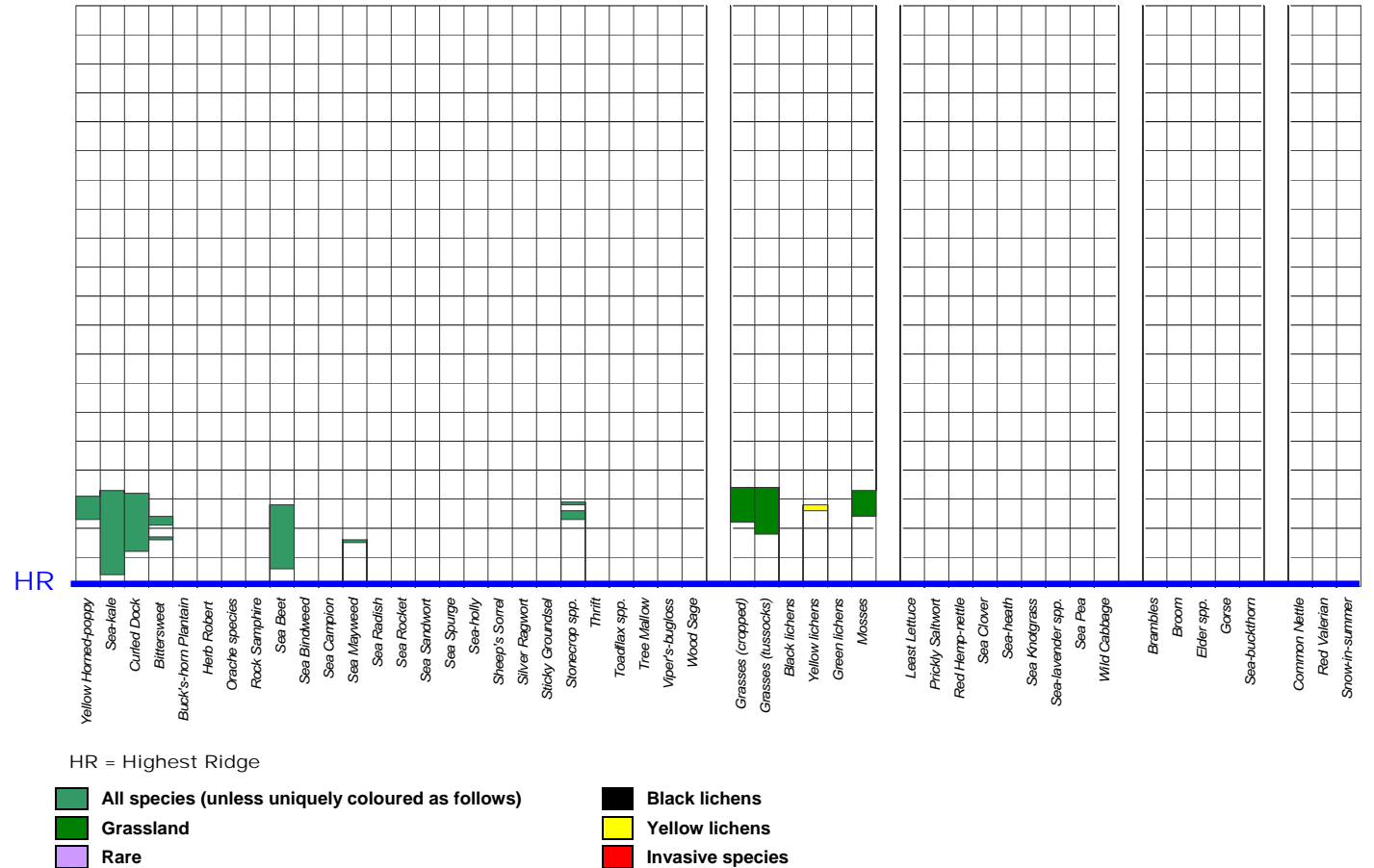


Figure E2.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 16/04/2008).

Tide Mills (east)



Figure E3.1 Shows the locations of the 2008 transect surveys carried out on Tide Mills (east beach).

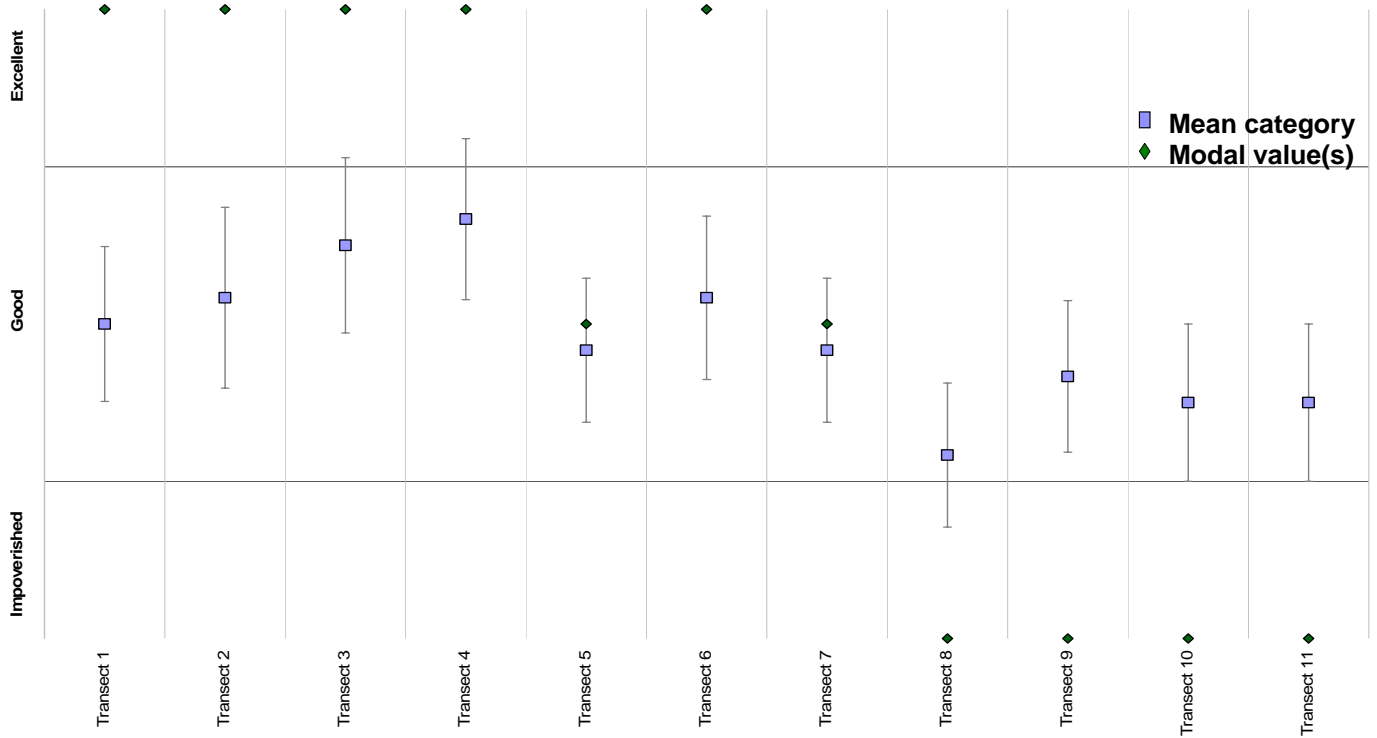


Figure E3.2 Biodiversity values for Tide Mills east shingle beach (Seaford) including mean category \pm SEM and modal value(s).

Tide Mills east (western end)

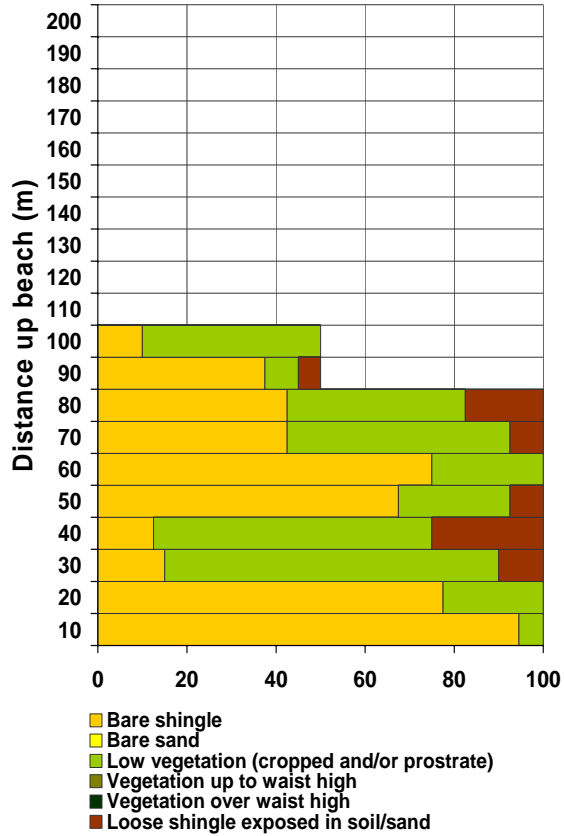


Figure E3.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

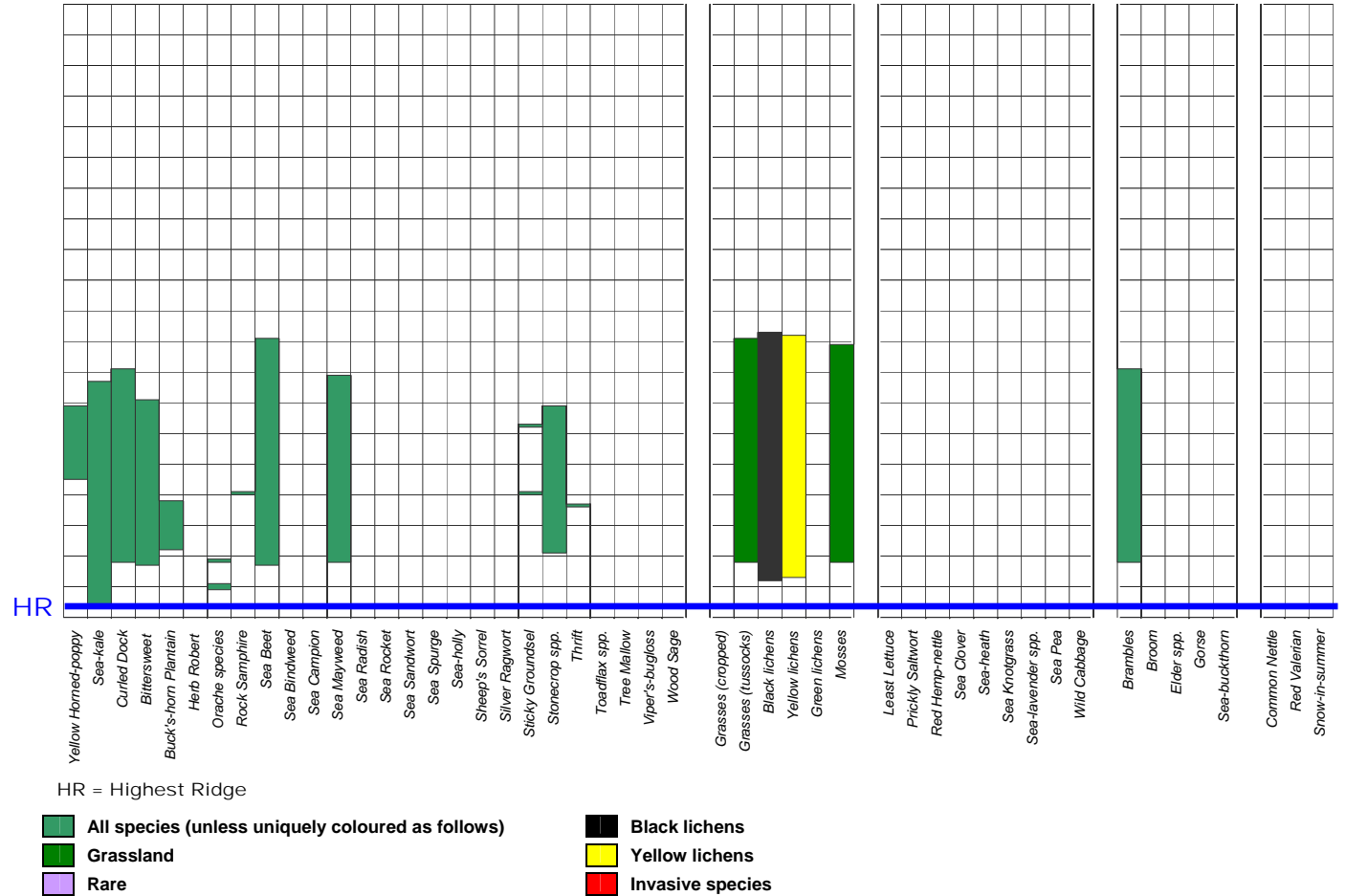


Figure E3.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 02/07/2008).

Tide Mills east (eastern end)

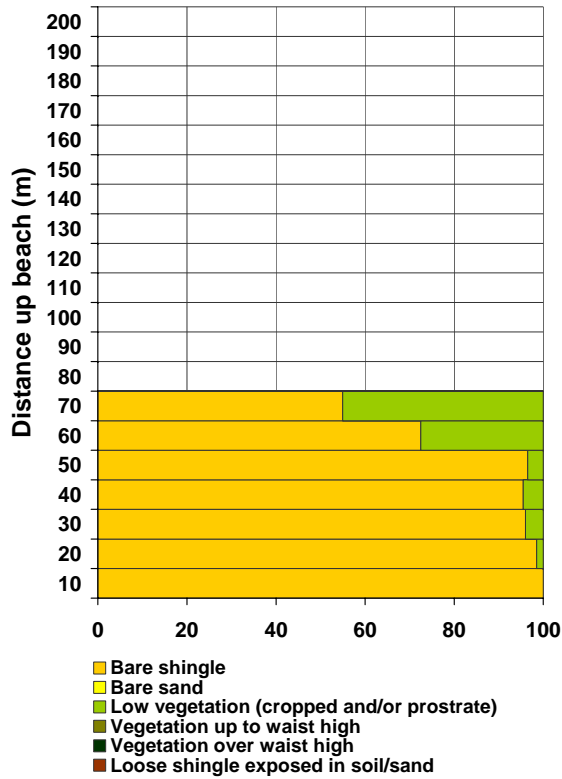


Figure E3.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

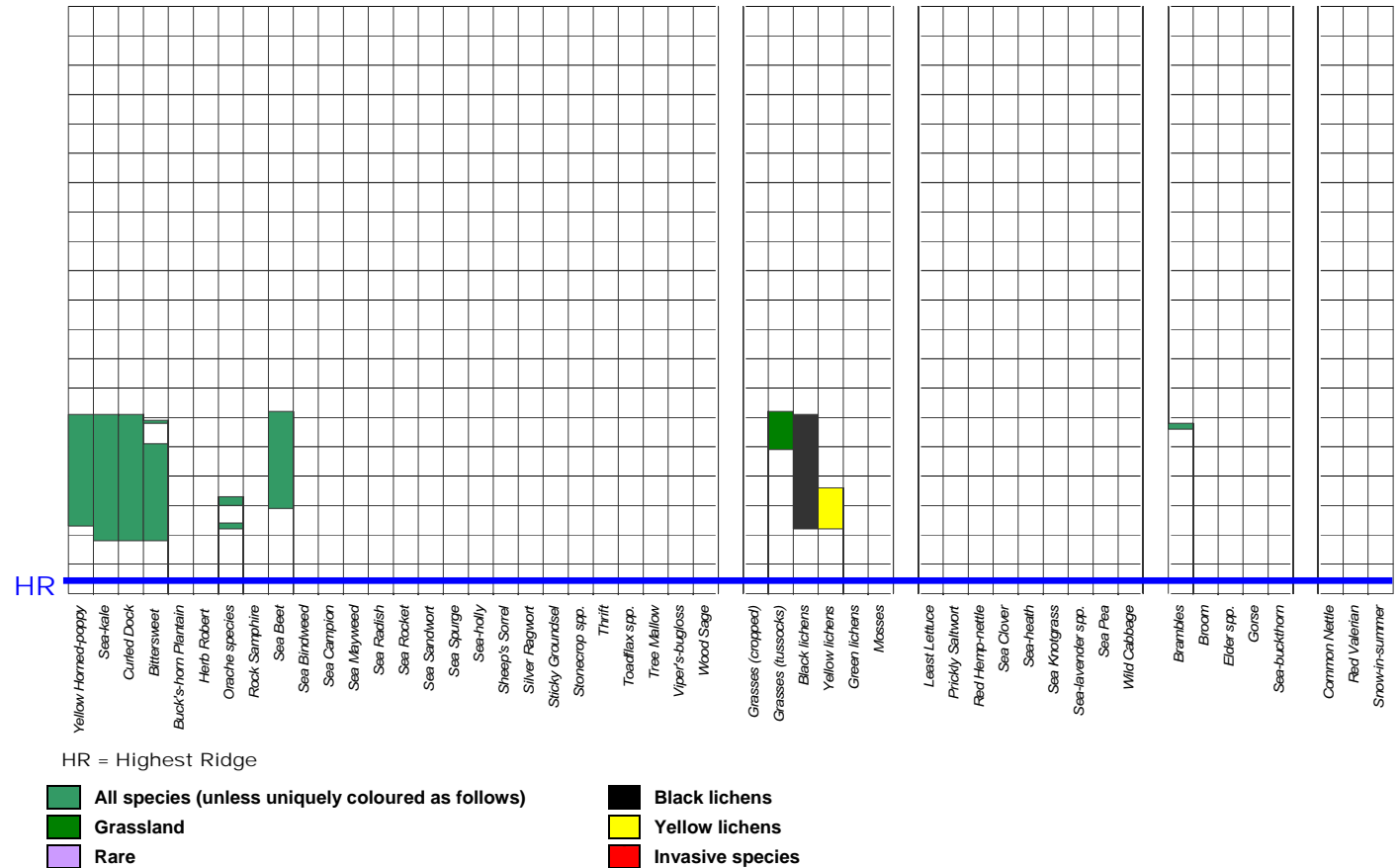


Figure E3.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 14/07/2008).

Bishopstone



Figure E4.1 Shows the locations of the 2008 transect surveys carried out on Bishopstone beach.

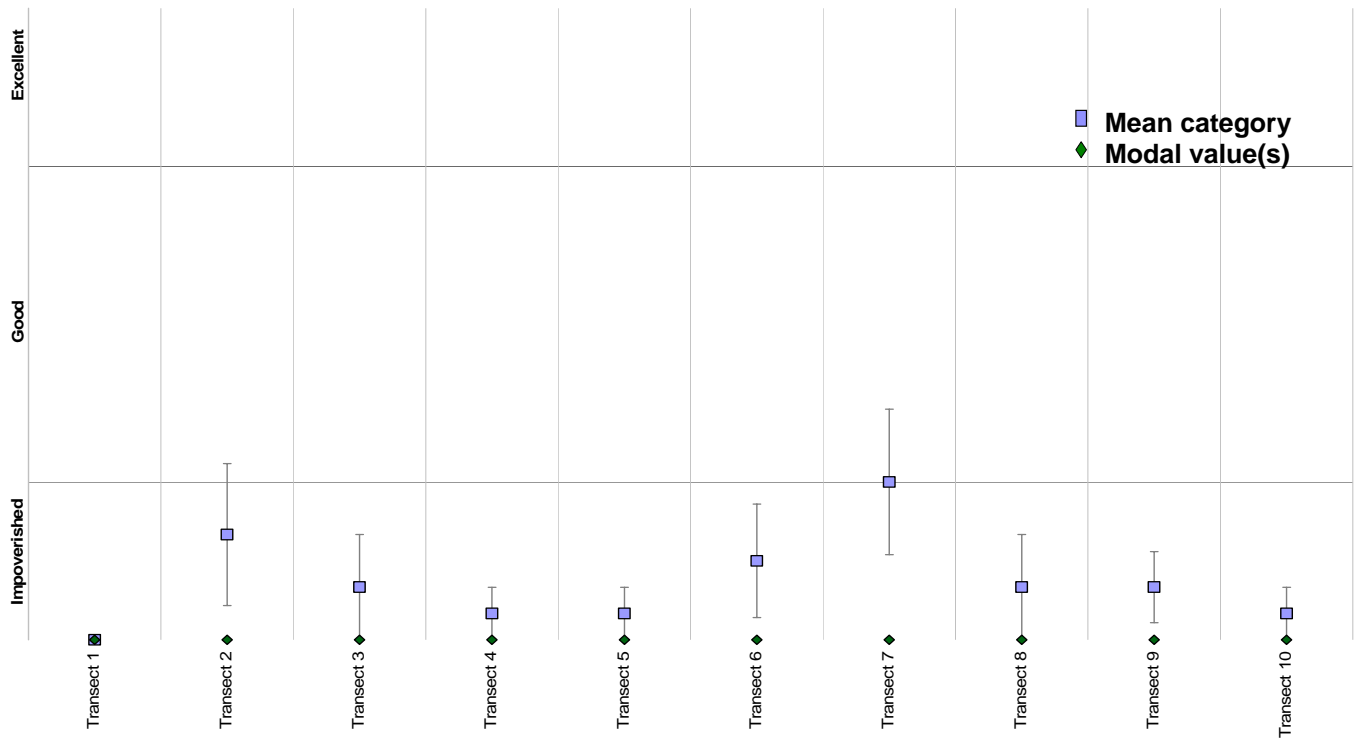


Figure E4.2 Biodiversity values for Bishopstone shingle beach (Seaford) including mean category \pm SEM and modal value(s).

Bishopstone

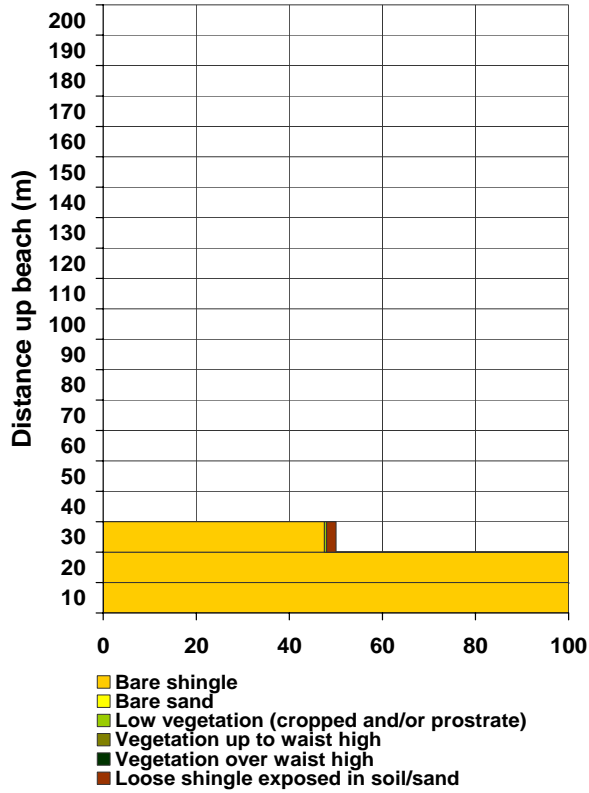


Figure E4.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

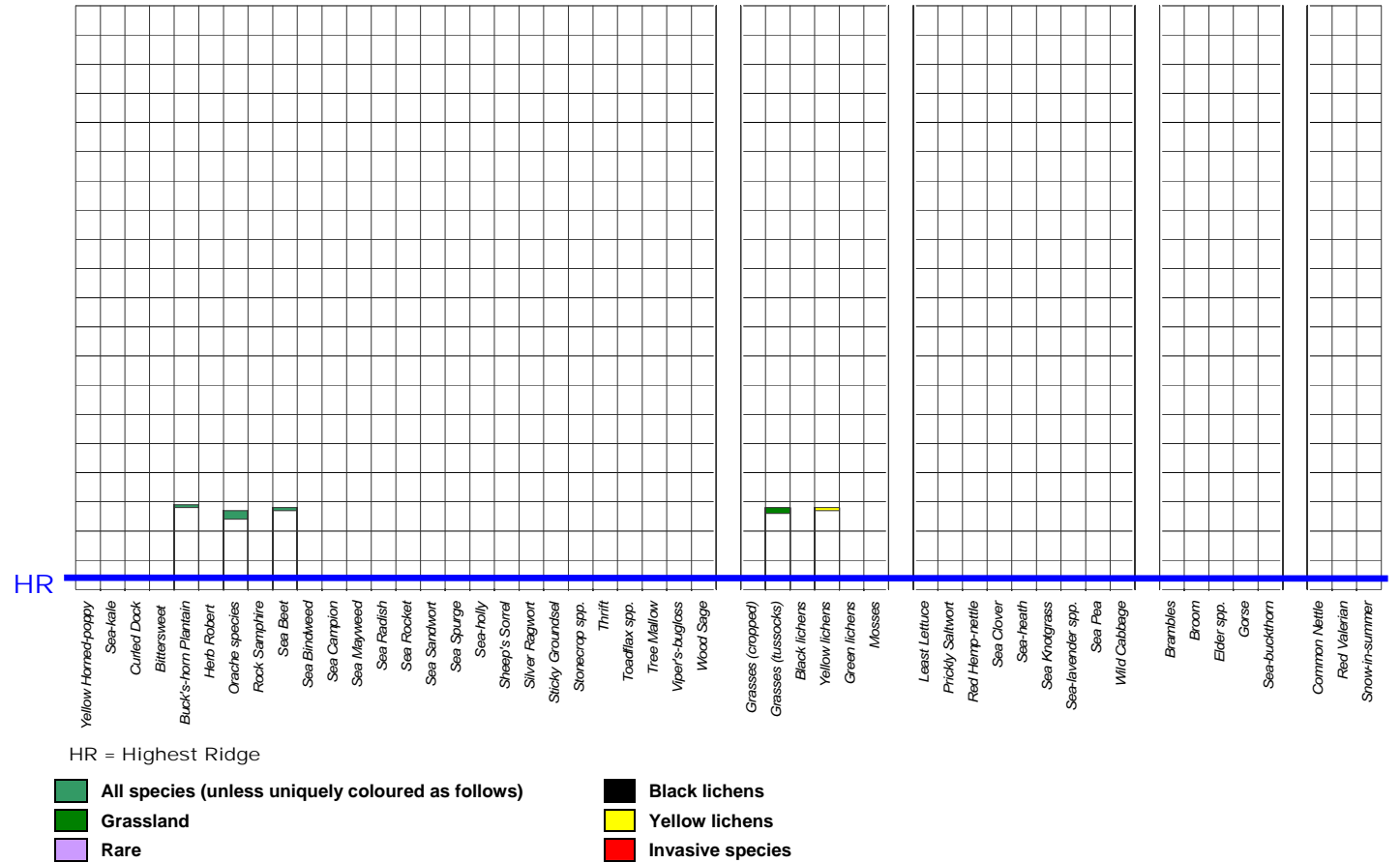


Figure E4.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 22/05/2008).

Seaford



Figure E5.1 Shows the locations of the 2008 transect surveys carried out on Seaford beach.

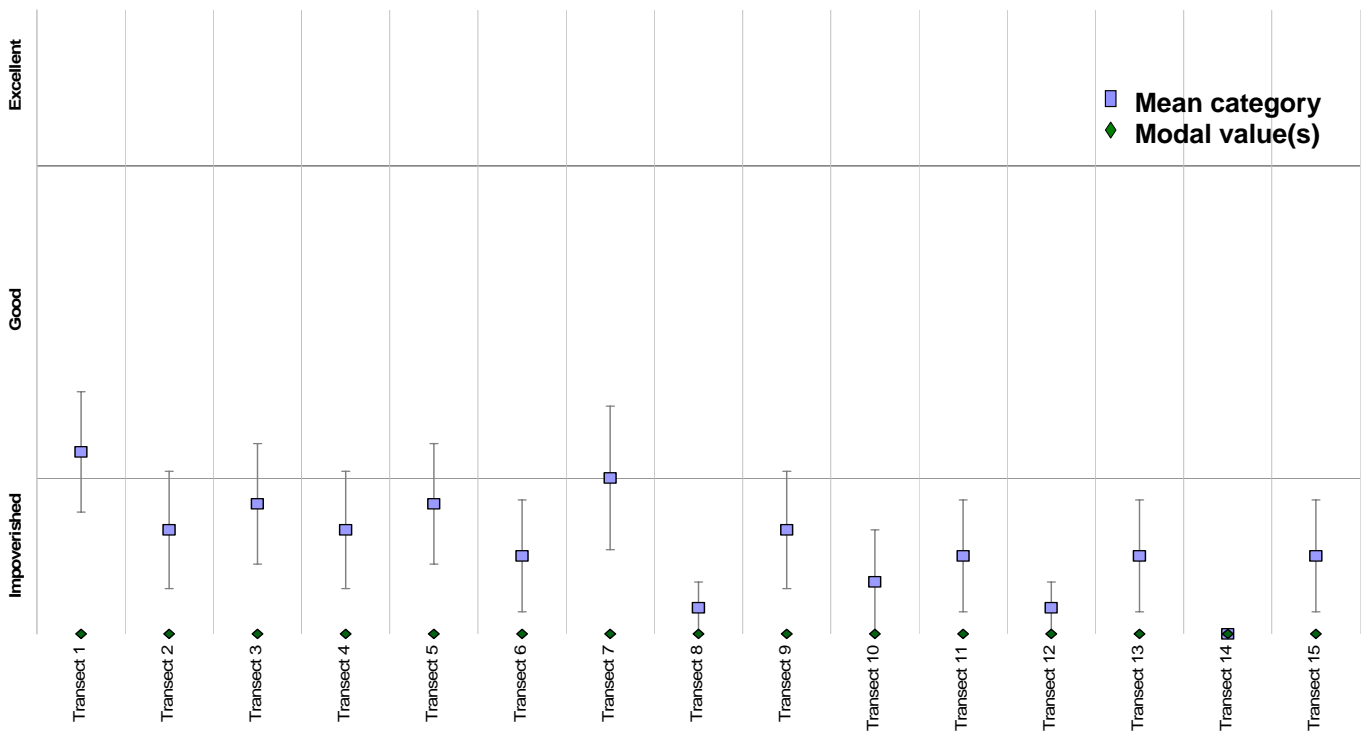


Figure E5.2 Biodiversity values for Seaford shingle beach including mean category \pm SEM and modal value(s).

Seaford

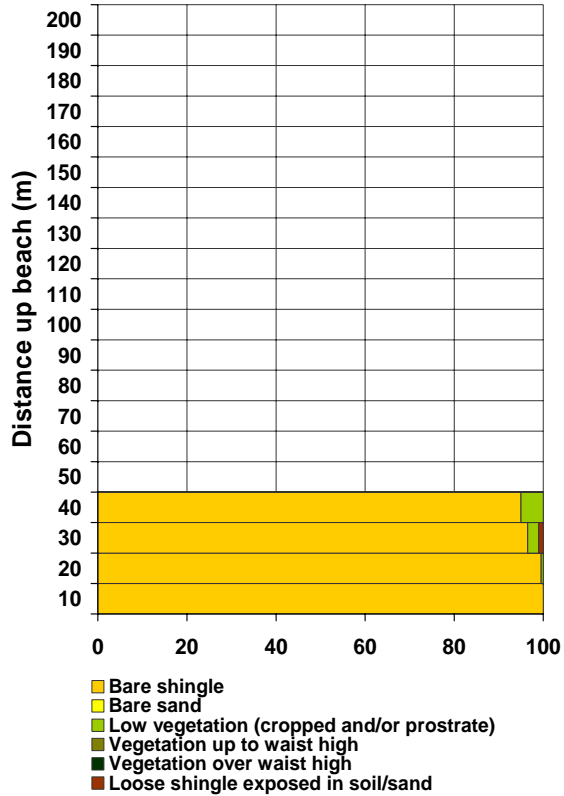


Figure E5.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

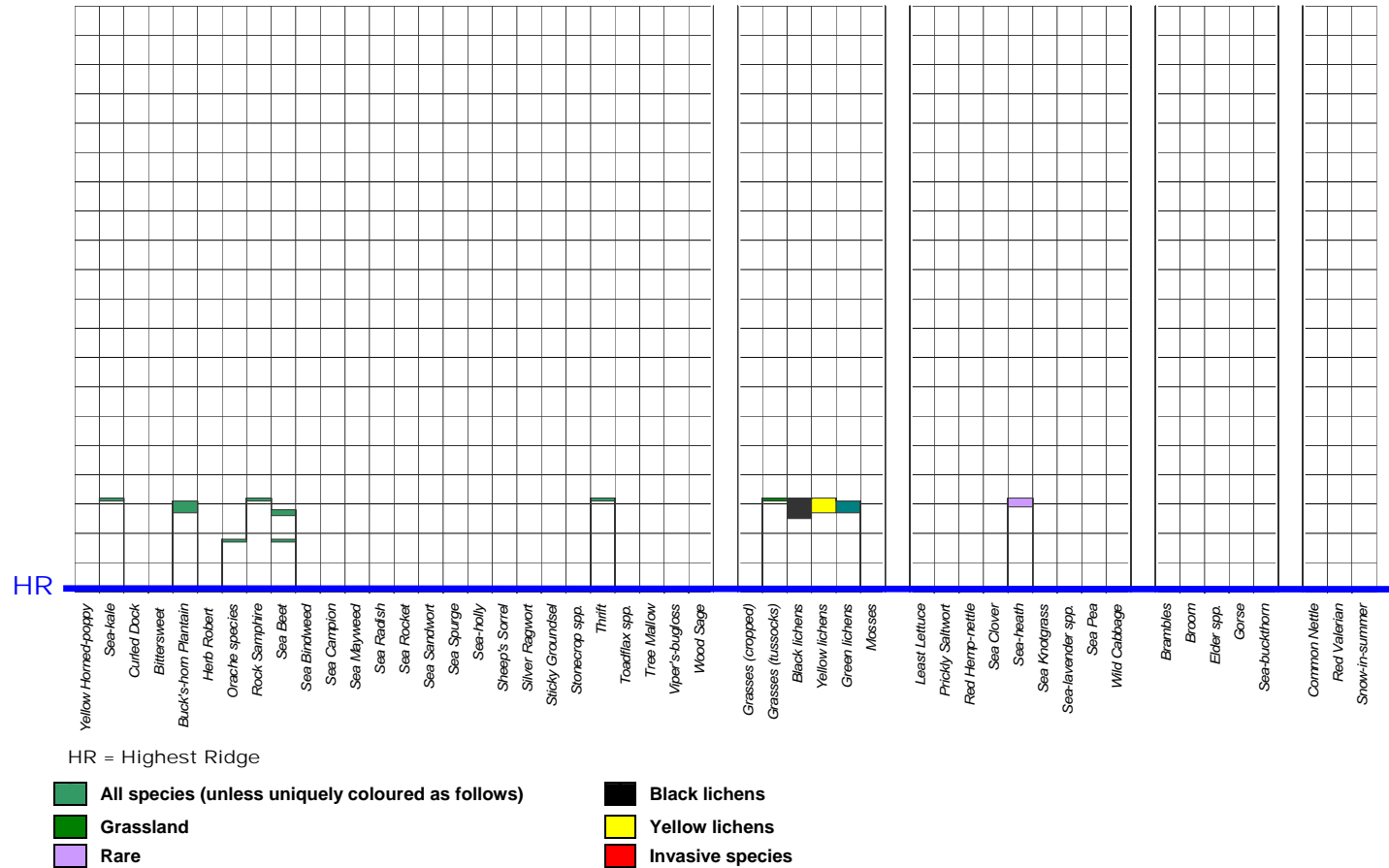


Figure E5.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 12/05/2008).

Cuckmere Haven (west beach)



Figure E6.1 Shows the locations of the 2008 transect surveys carried out on Cuckmere Haven (west beach).

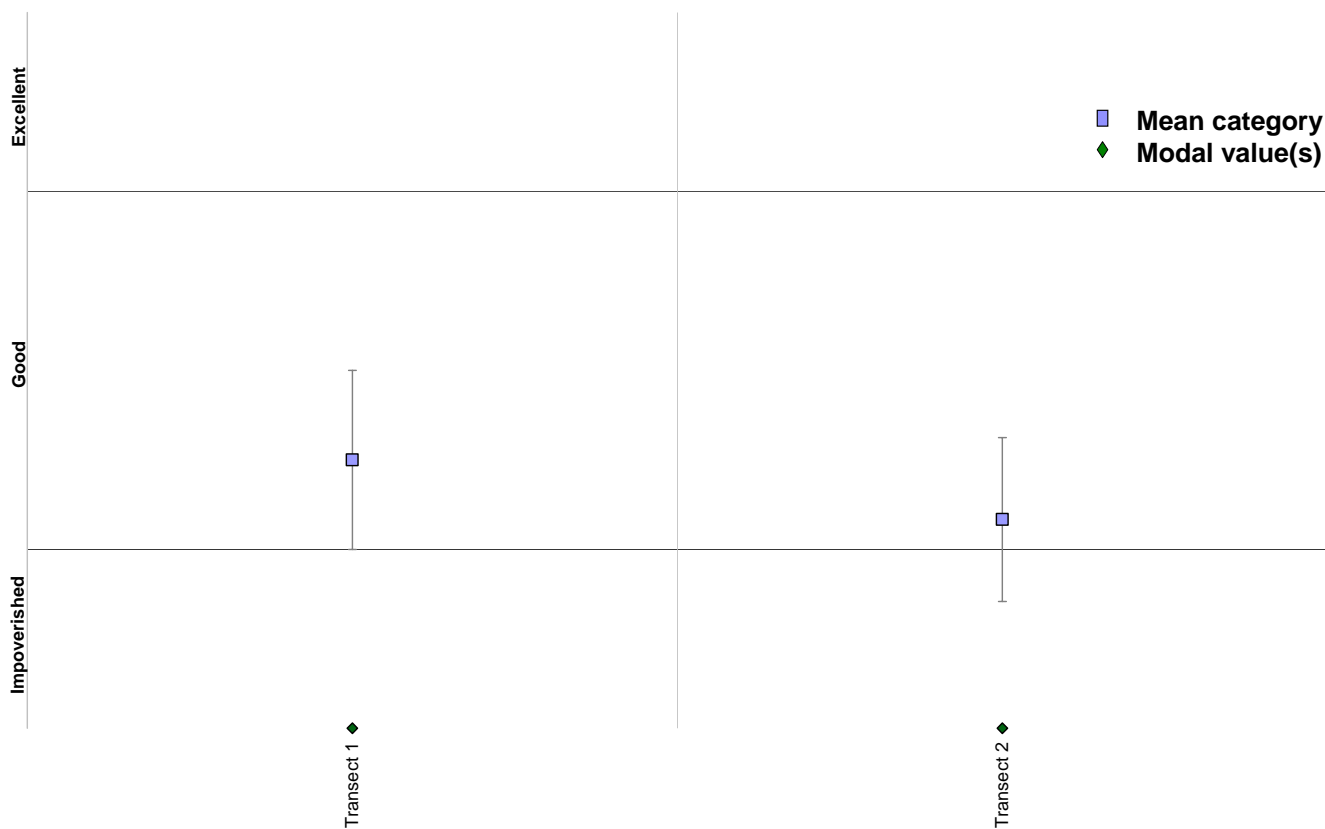


Figure E6.2 Biodiversity values for Cuckmere Haven’s western shingle beach (Seaford) including mean category ± SEM and modal value(s).

Cuckmere Haven (west beach)

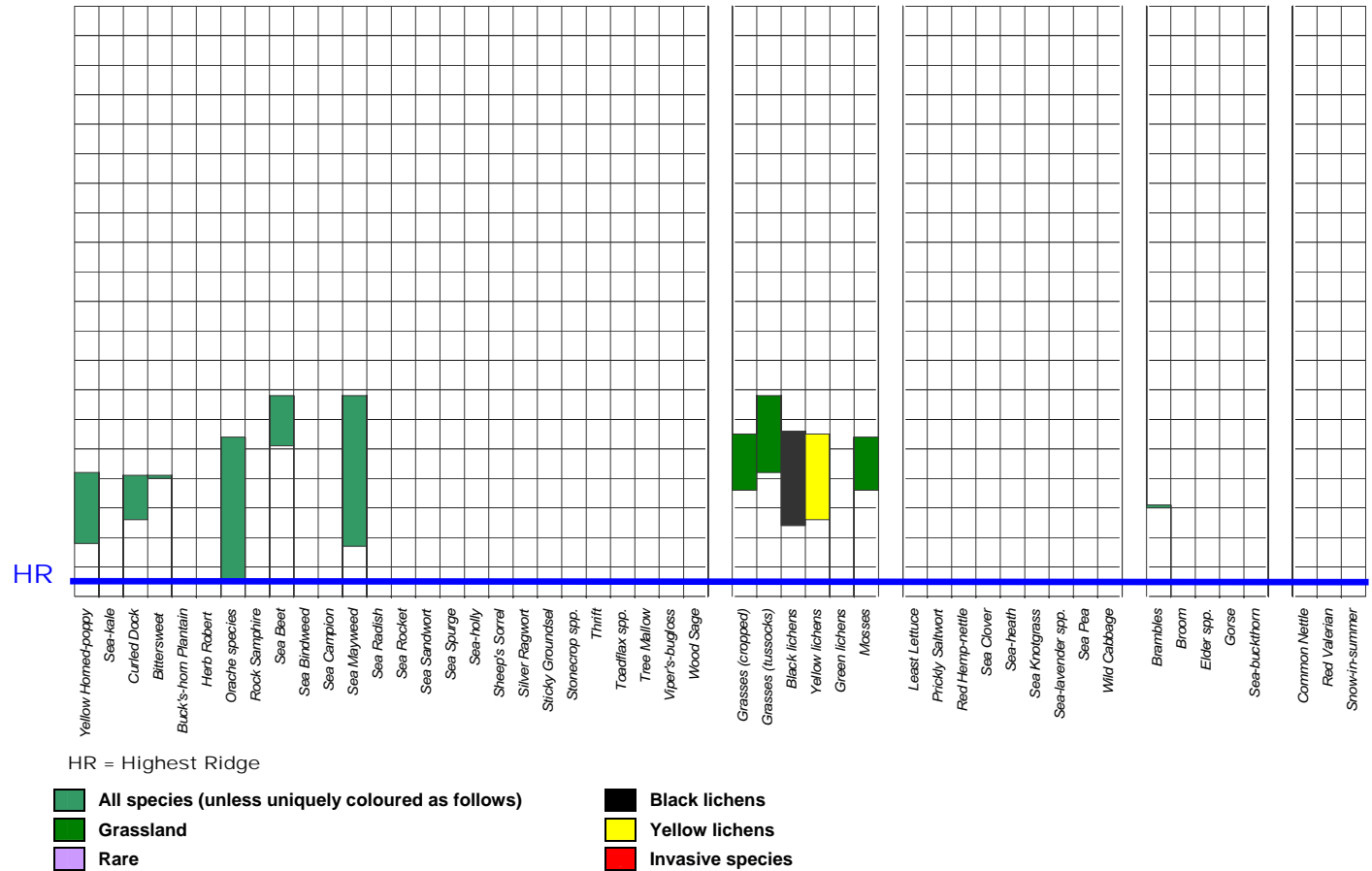
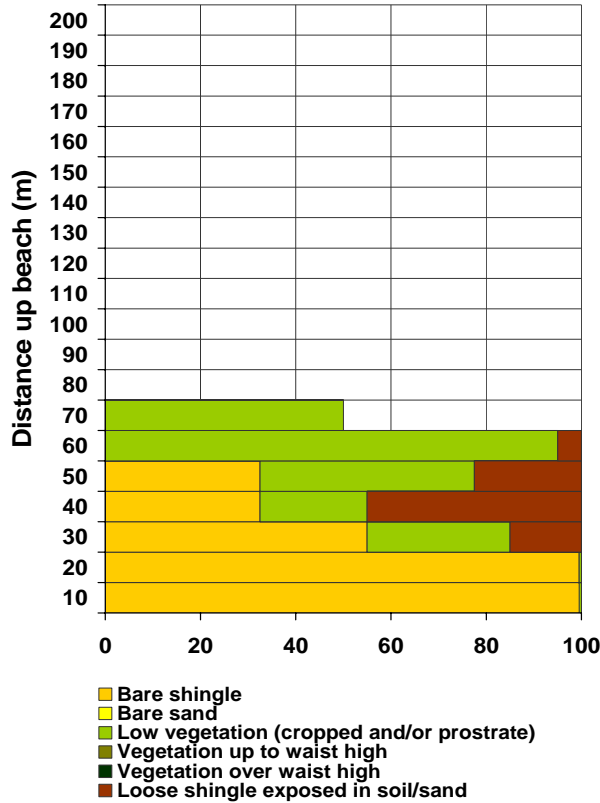


Figure E6.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

Figure E6.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 16/07/2008).

Cuckmere Haven (east beach)

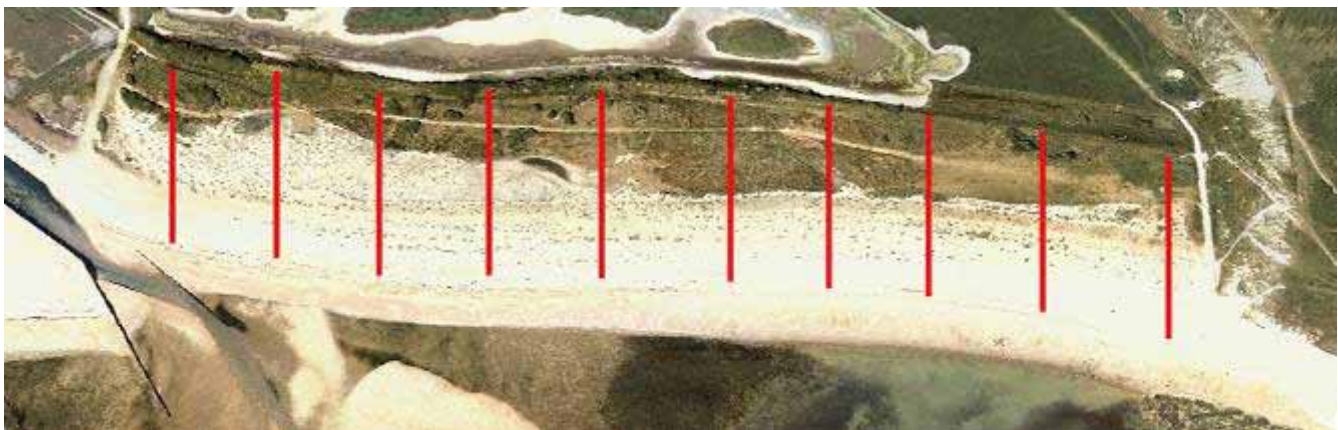


Figure E7.1 Shows the locations of the 2008 transect surveys carried out on Cuckmere Haven (east beach).

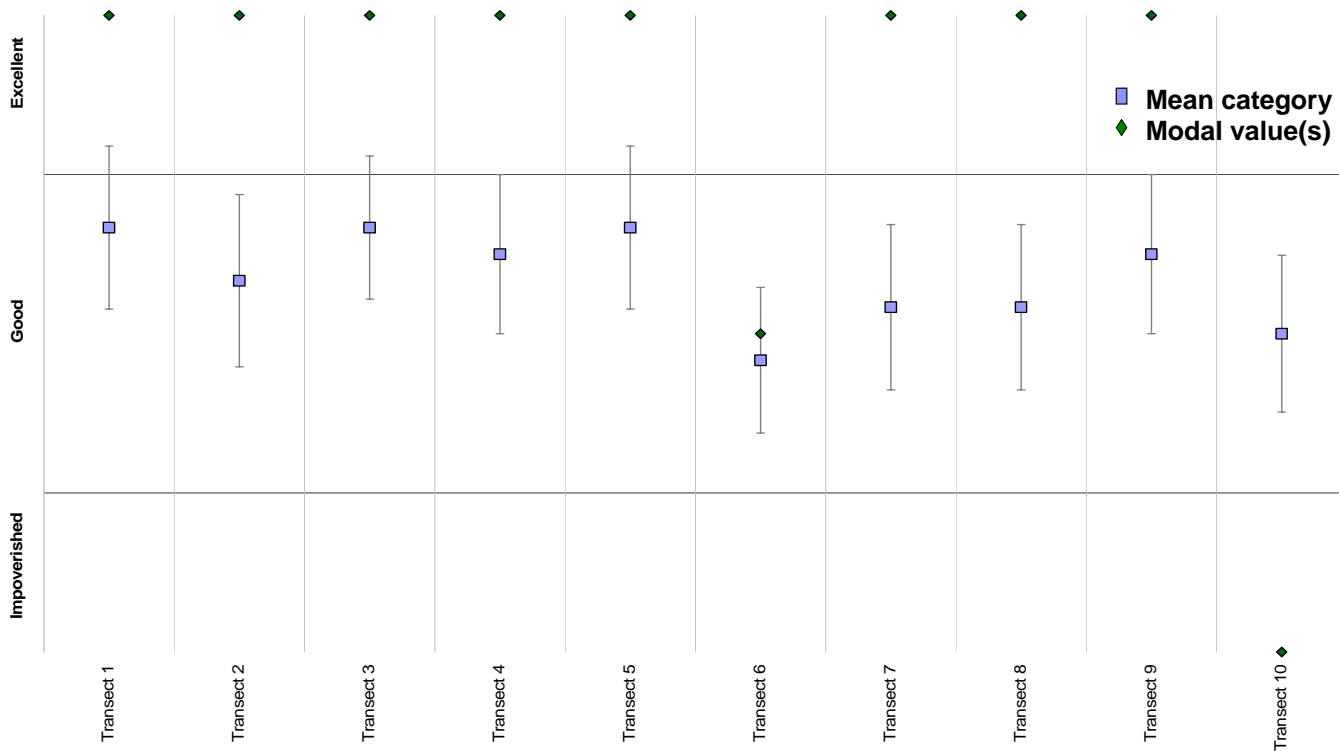


Figure E7.2 Biodiversity values for Cuckmere Haven’s eastern shingle beach (Cuckmere Valley) including mean category ± SEM and modal value(s).

Cuckmere Haven (east beach - western end)

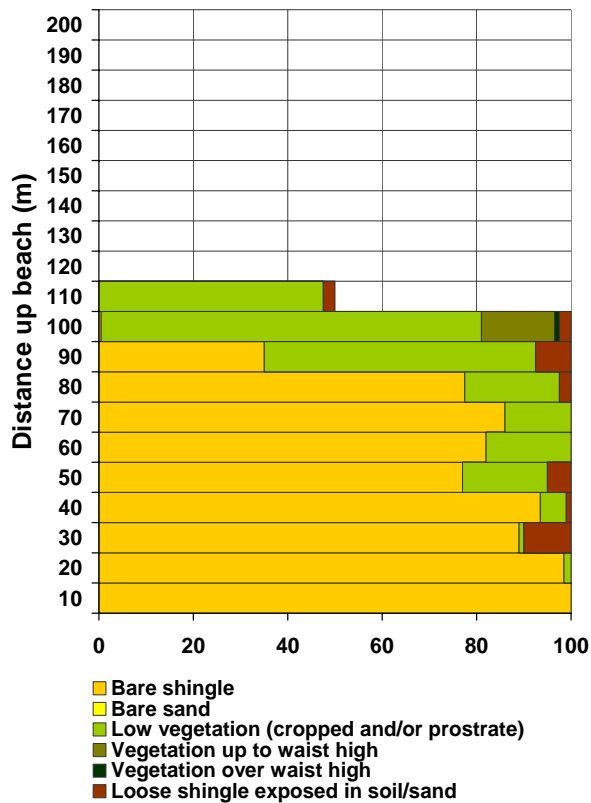


Figure E7.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

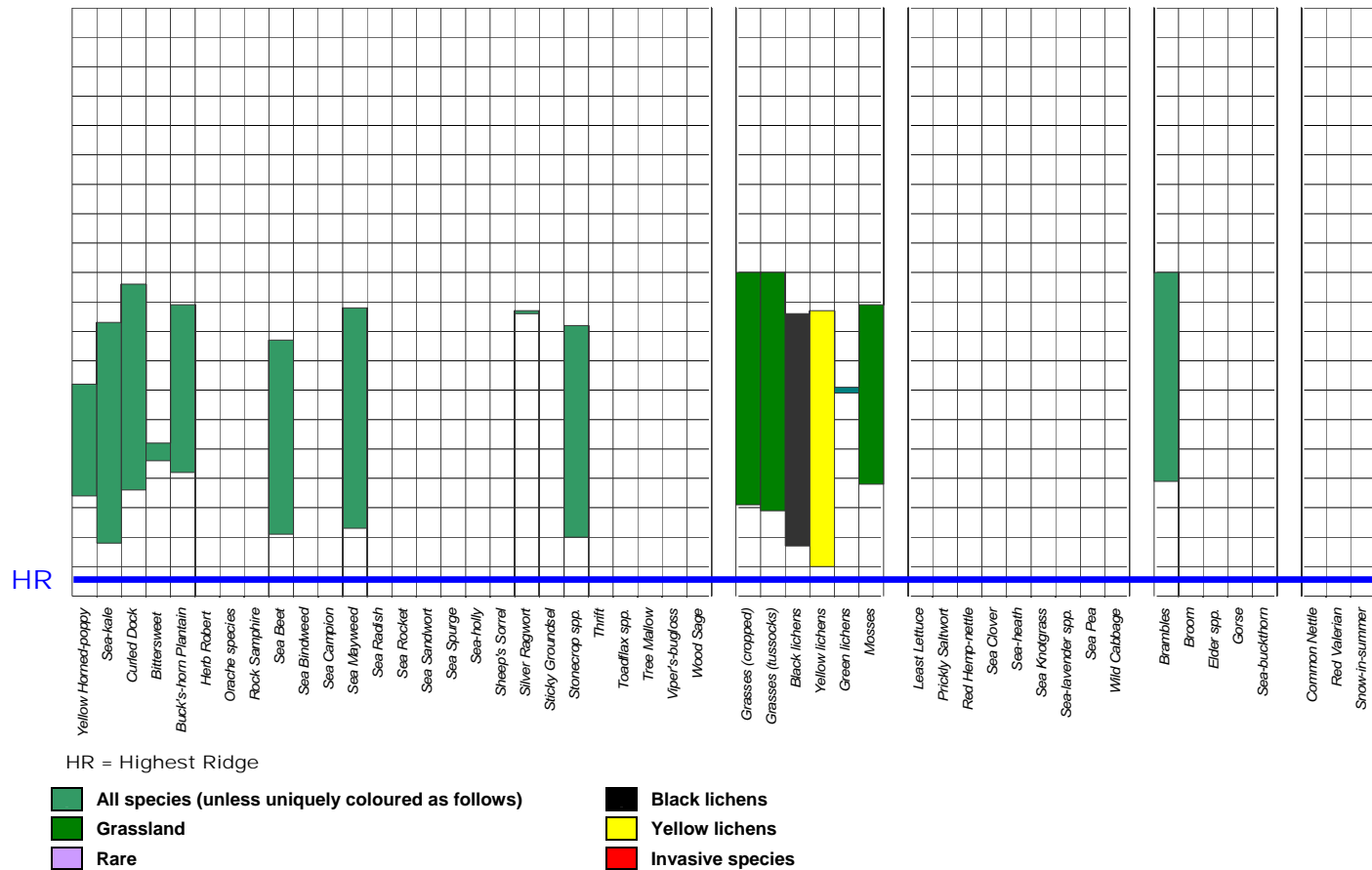


Figure E7.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 14/07/2008).

Cuckmere Haven (east beach - eastern end)

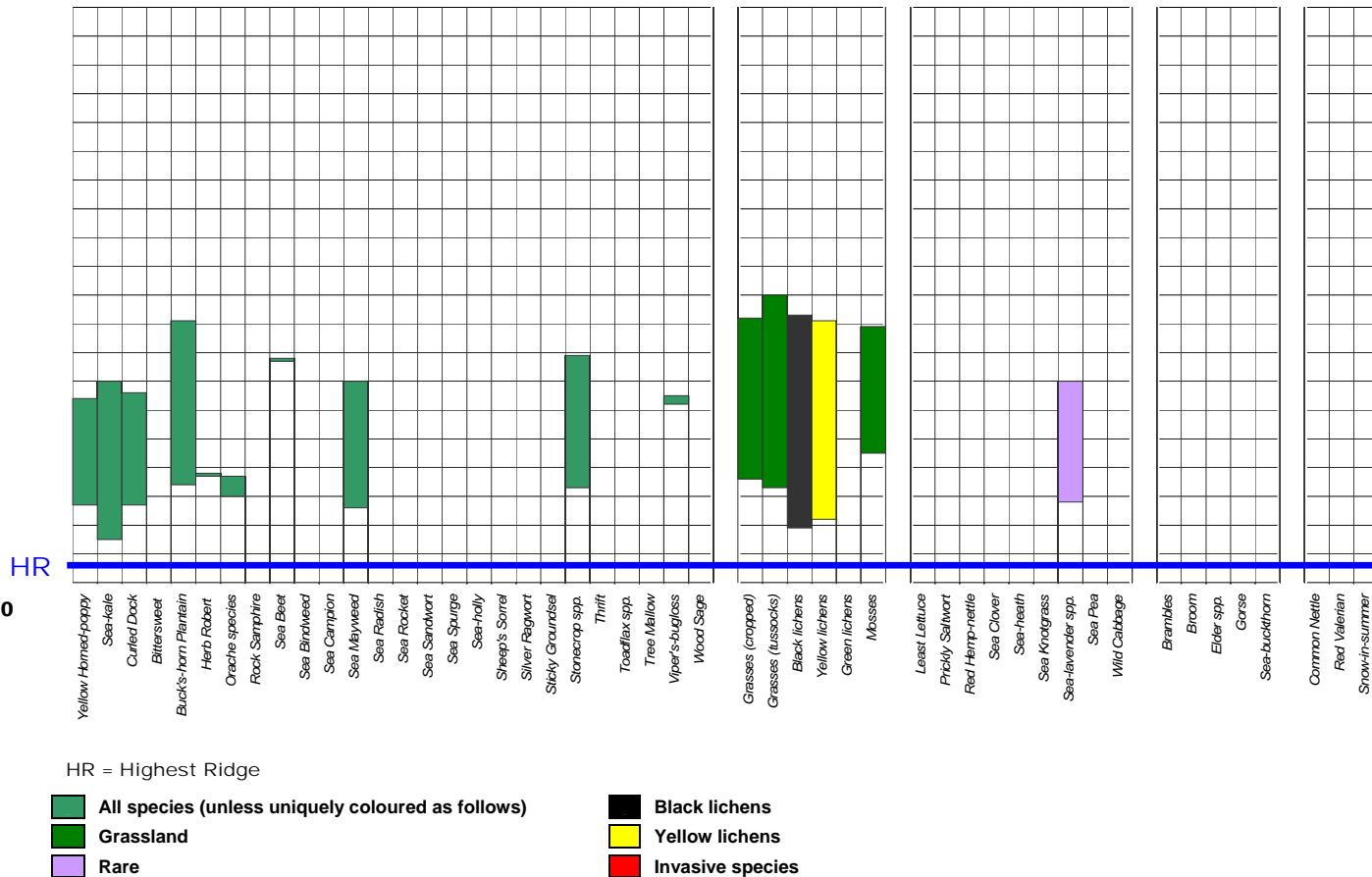
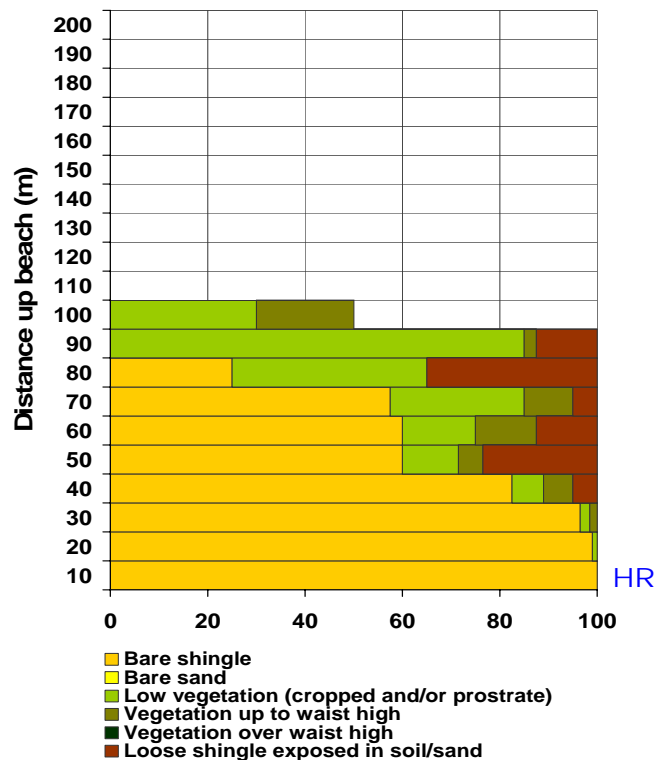


Figure E7.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

Figure E7.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 20/07/2008).

Birlinging Gap



Figure E8.1 Shows the locations of the 2008 transect surveys carried out at Birling Gap beach.

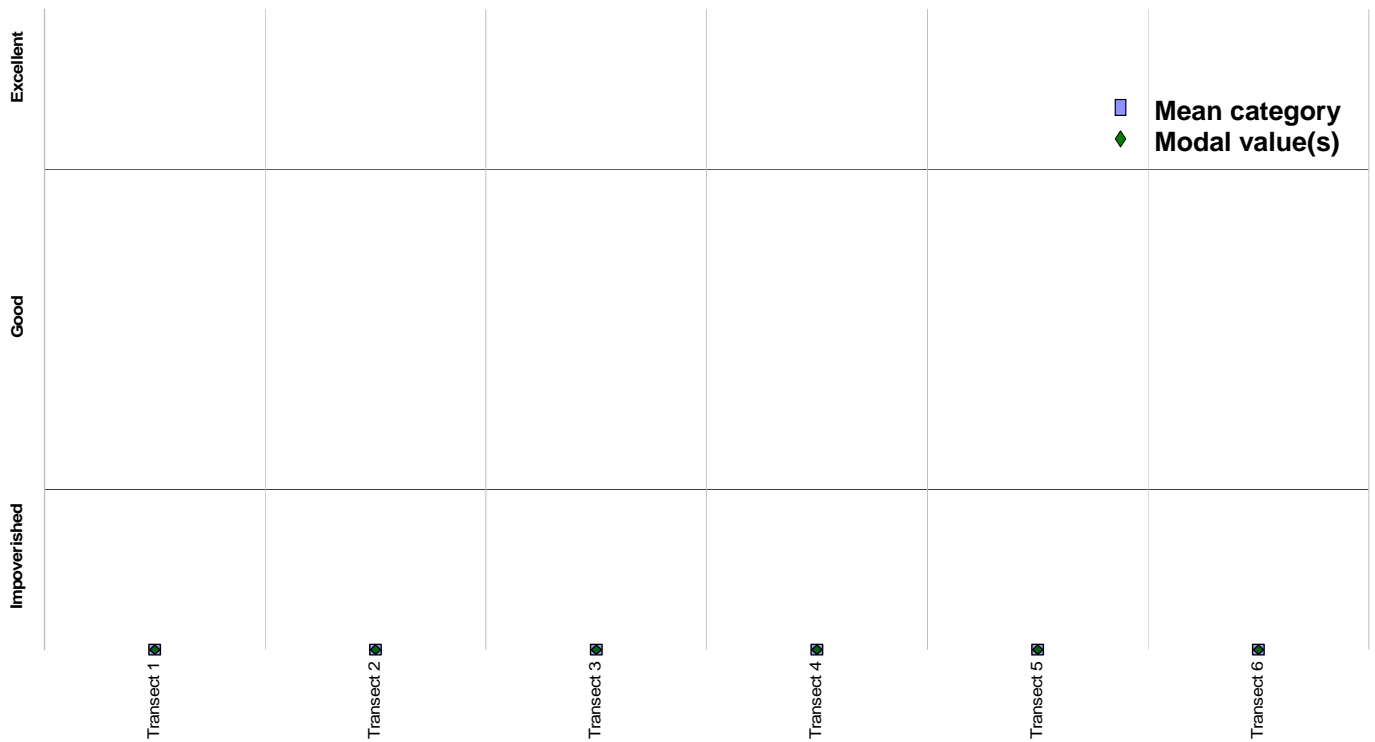


Figure E8.2 Biodiversity values for Birling Gap shingle beach (East Dean & Friston) including mean category \pm SEM and modal value(s).

Birling Gap

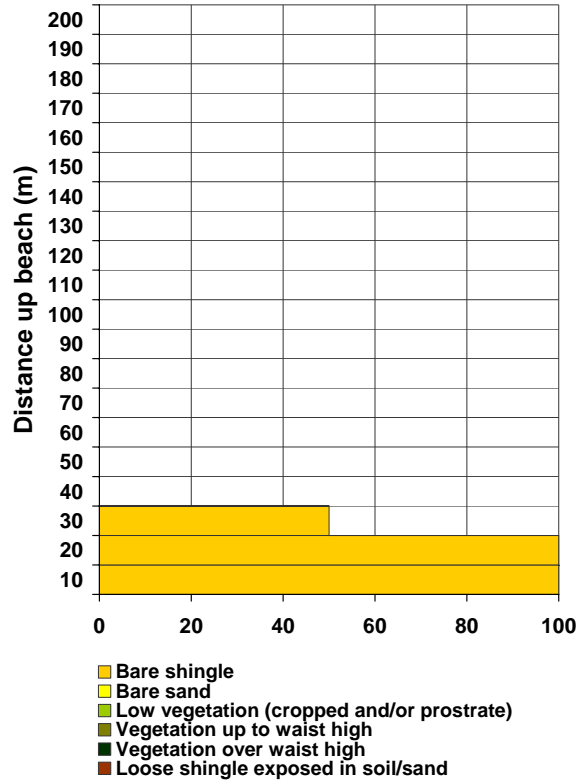


Figure E8.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

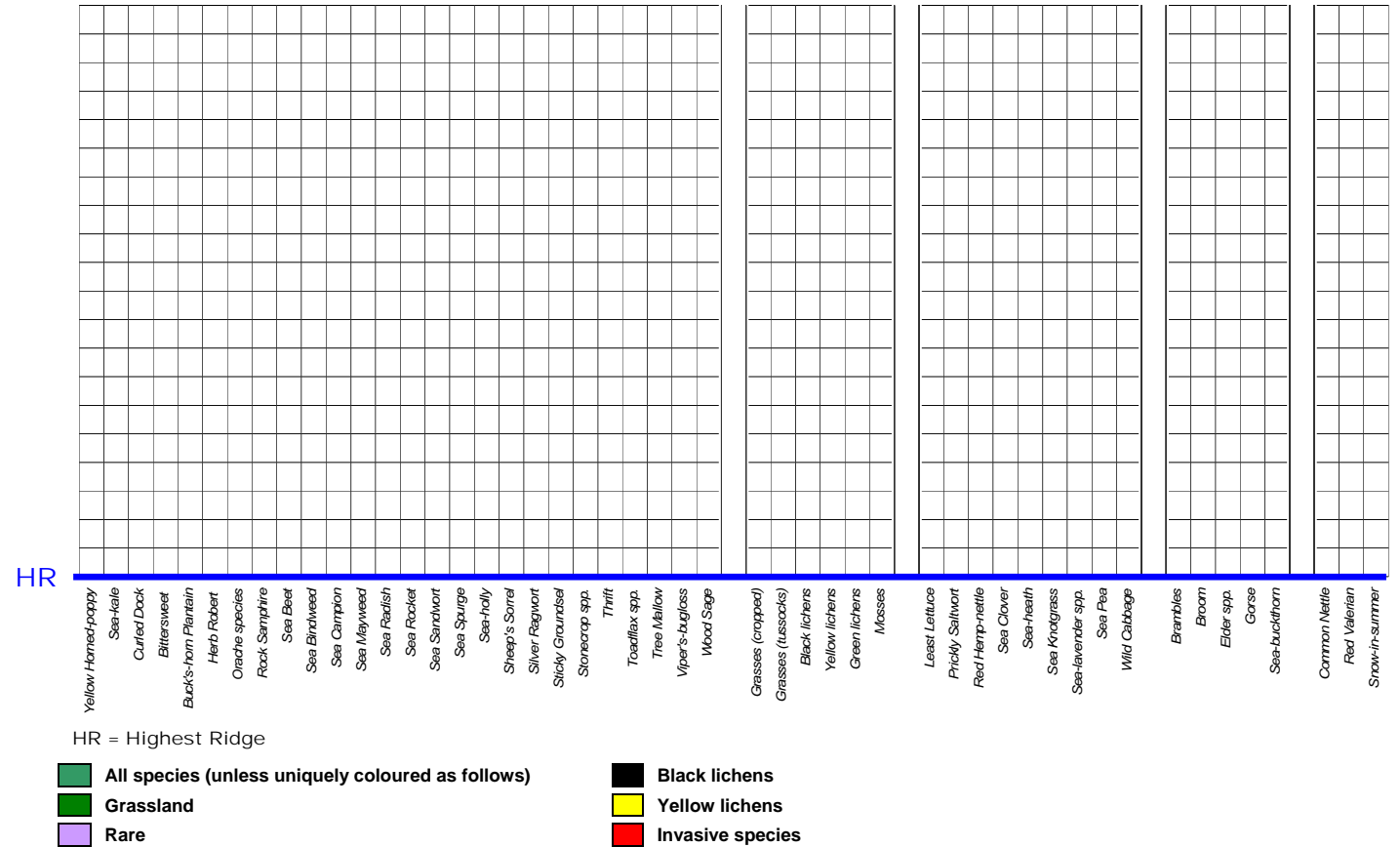


Figure E8.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 29/07/2008).

Eastbourne



Figure E9.1 Shows the locations of the 2008 transect surveys carried out on Eastbourne beach.

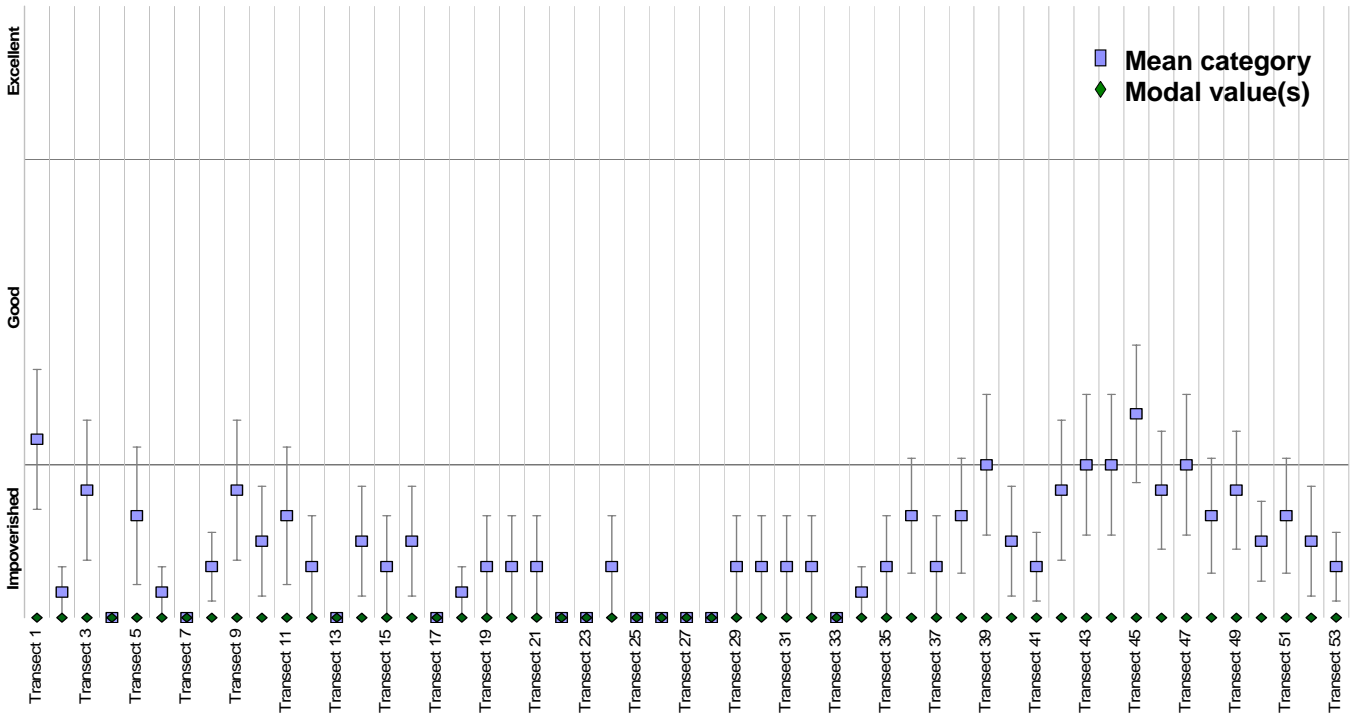


Figure E9.2 Biodiversity values for the shingle beach at Eastbourne including mean category \pm SEM and modal value(s).

Eastbourne (western end)

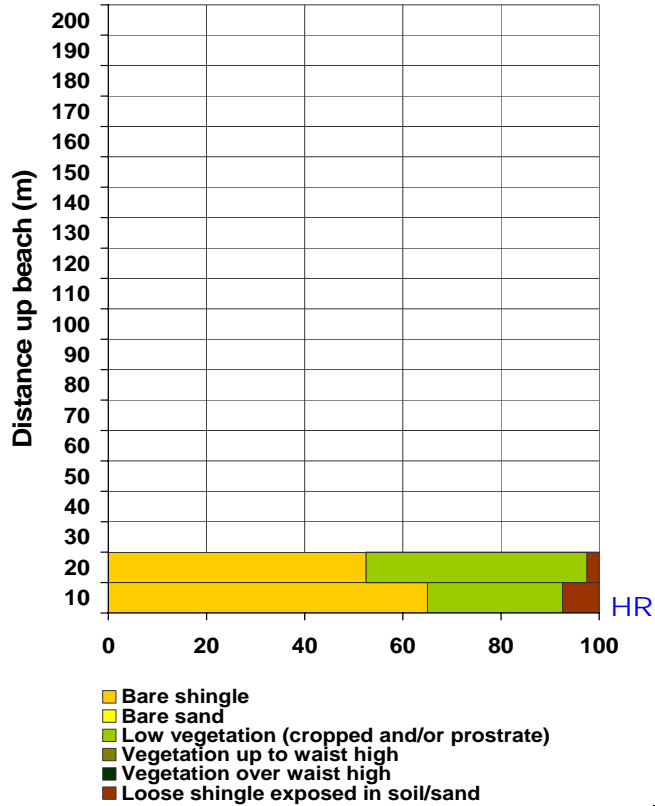


Figure E9.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

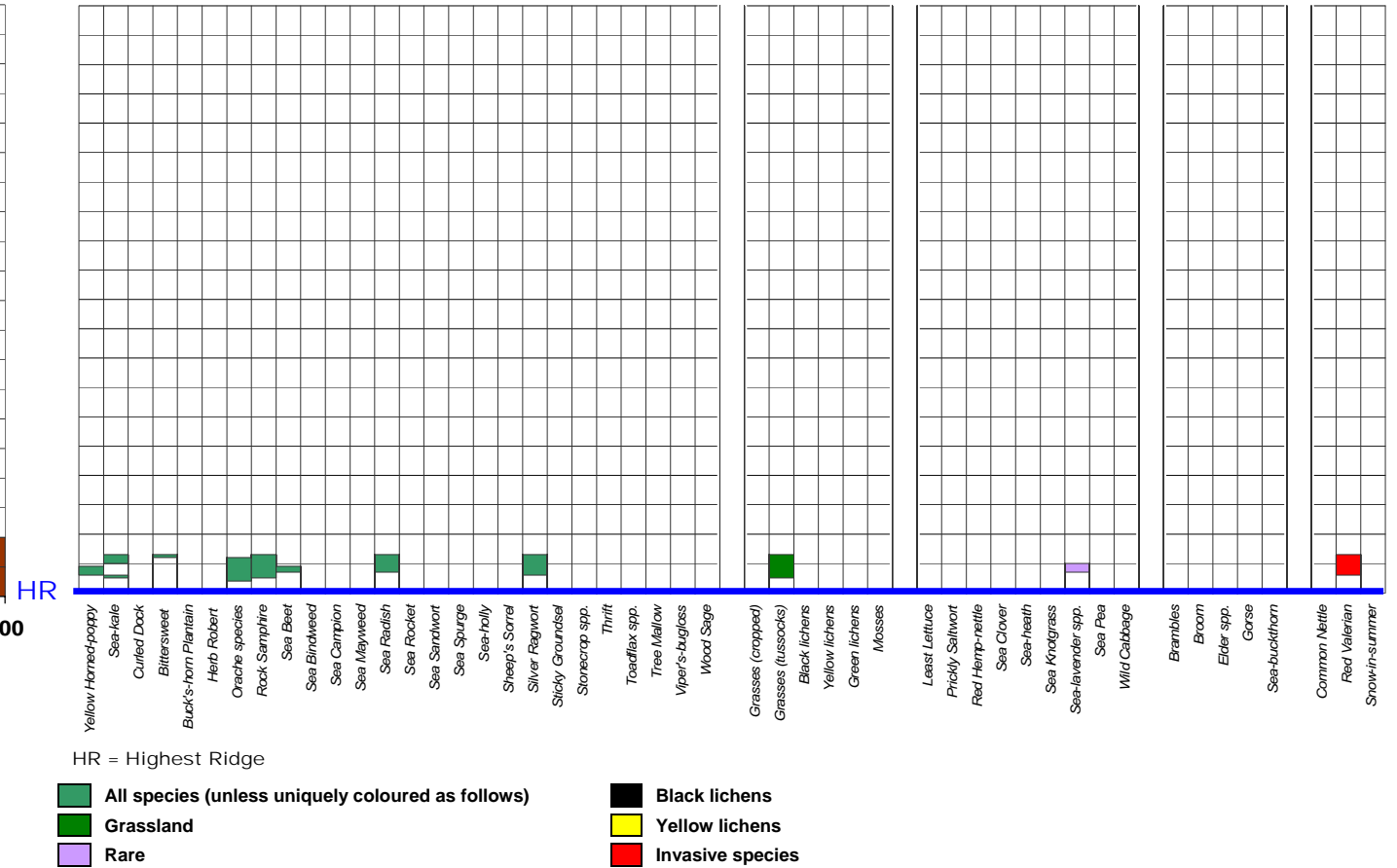


Figure E9.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 30/06/2008, and 28/07/2008).

Eastbourne (eastern end)

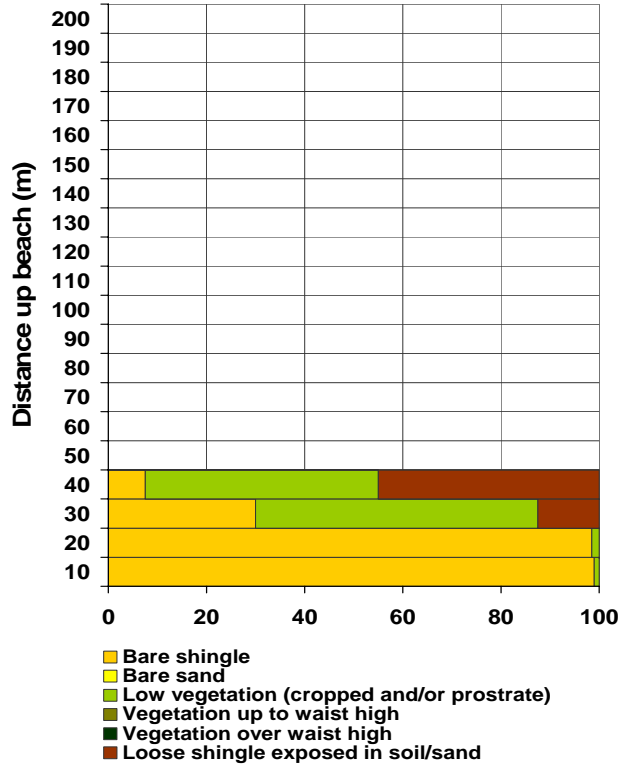


Figure E9.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

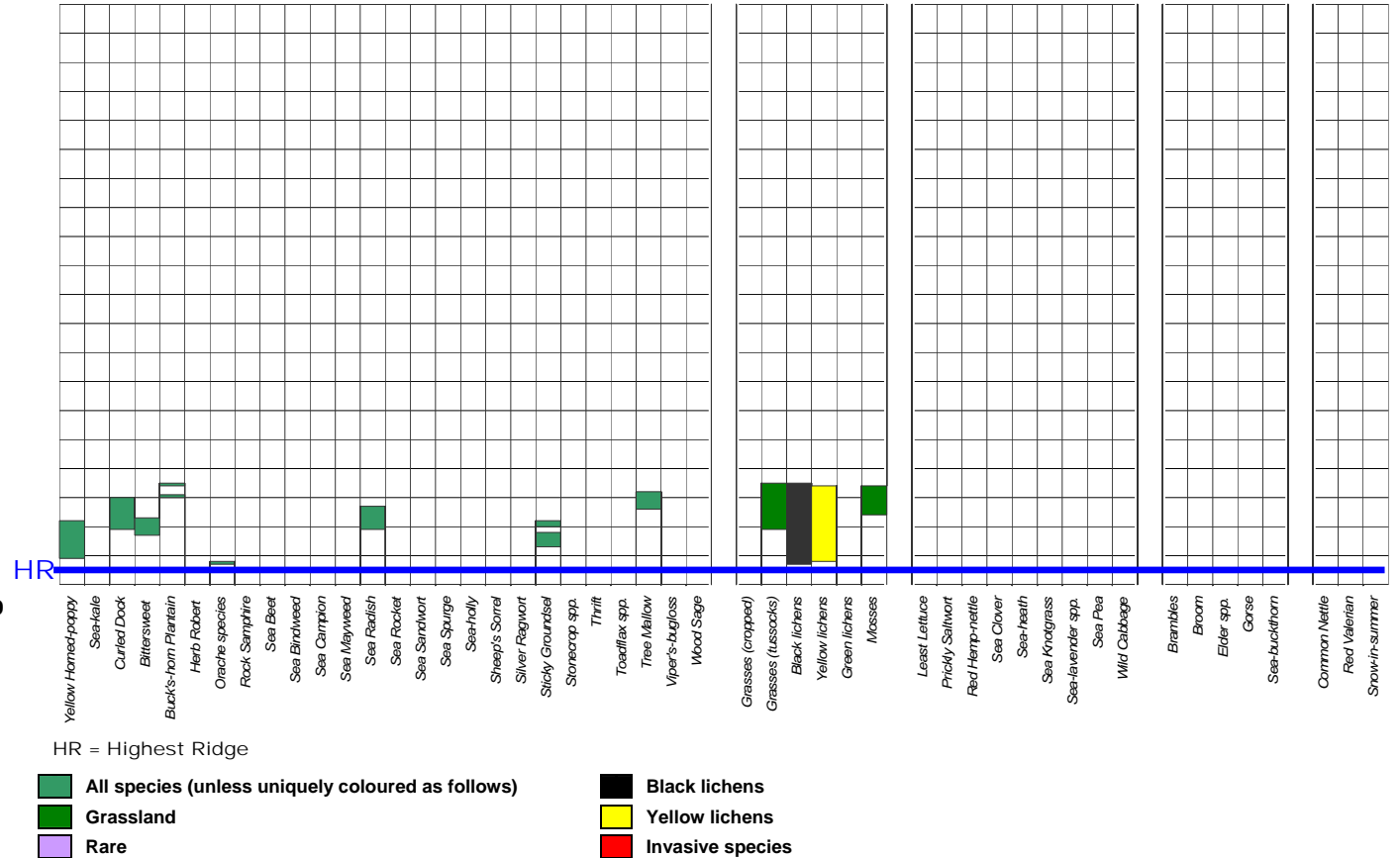


Figure E9.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 15/07/2008).

Sovereign Park



Figure E10.1 Shows the locations of the 2008 transect surveys carried out at Sovereign Park, Eastbourne.

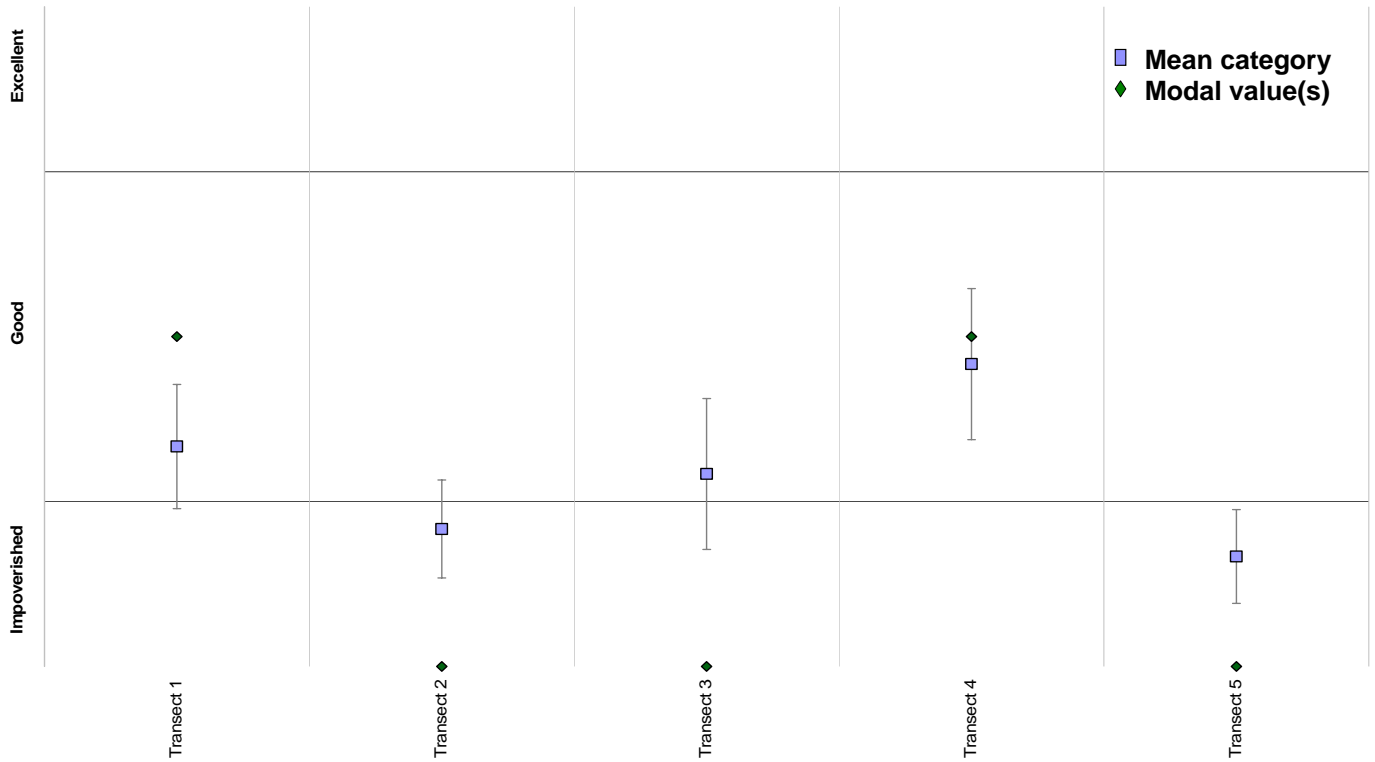


Figure E10.2 Biodiversity values for Sovereign Park shingle site (Eastbourne) including mean category \pm SEM and modal value(s).

Sovereign Park

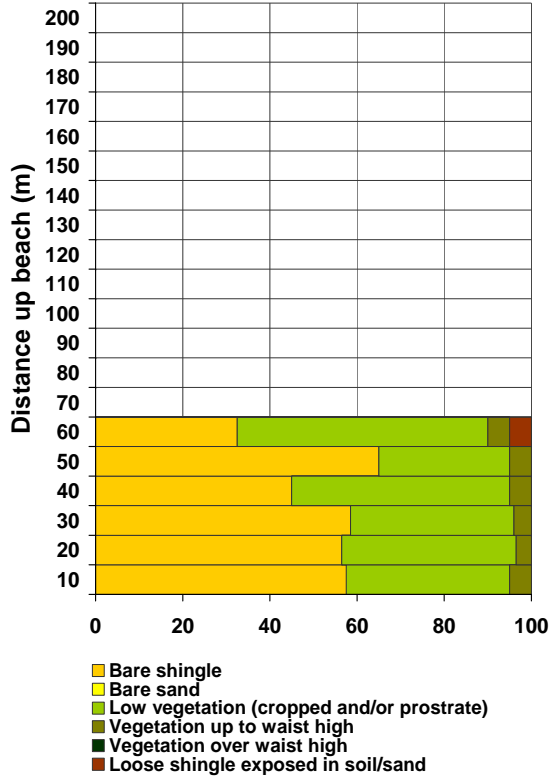


Figure E10.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

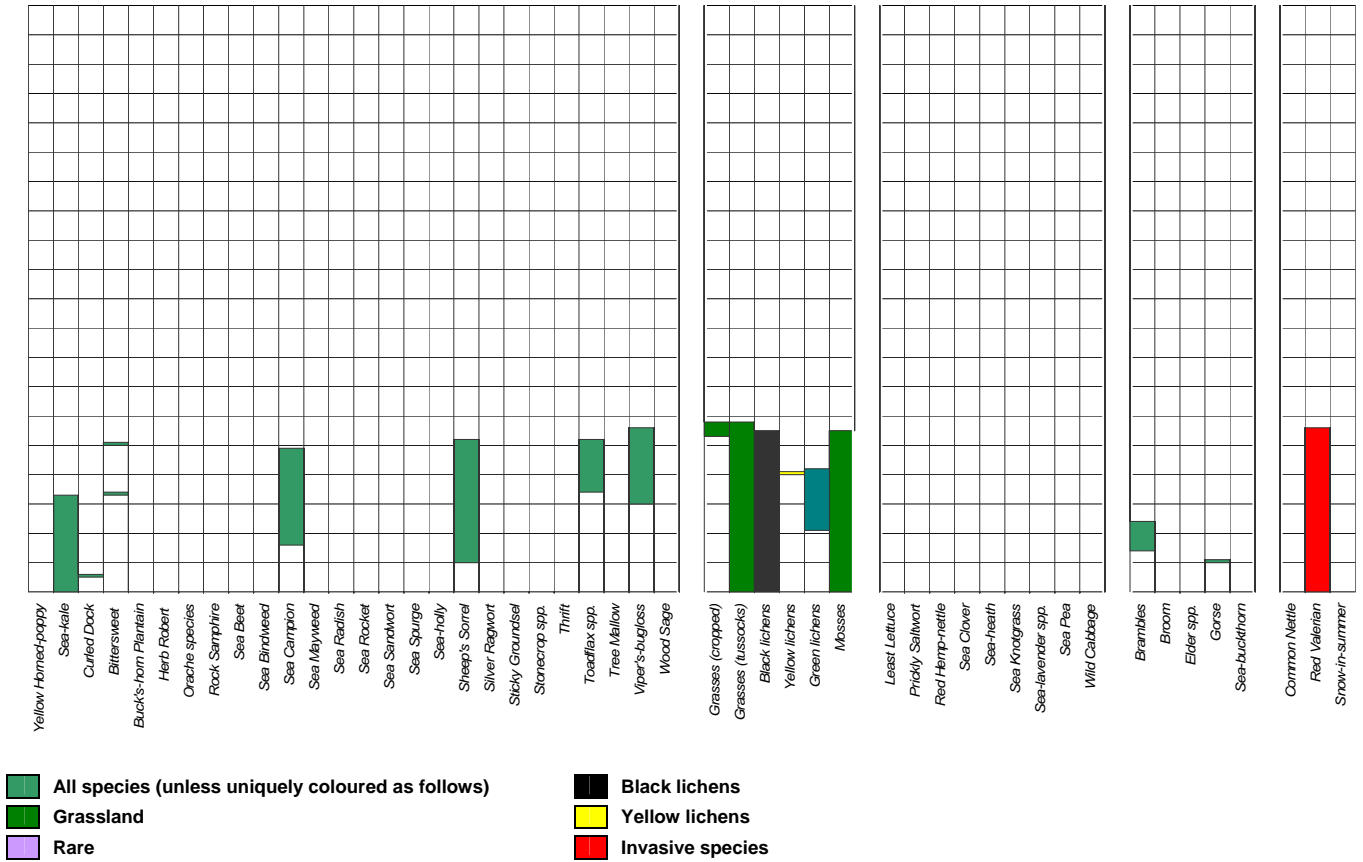


Figure E10.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 17/07/2008).

Sovereign Harbour



Figure E11.1 Shows the locations of the 2008 transect surveys carried out at Sovereign Harbour, Eastbourne.

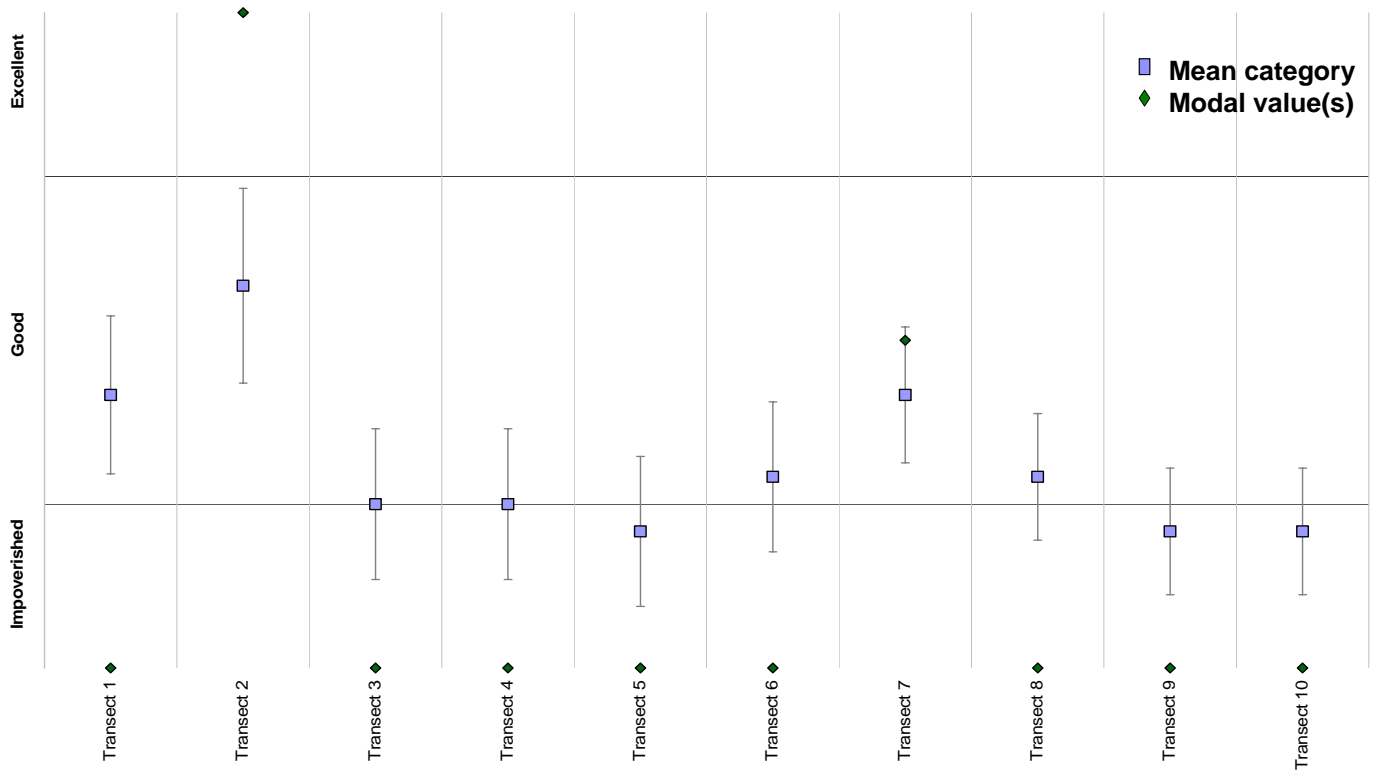


Figure E11.2 Biodiversity values for Sovereign Harbour shingle beach (Eastbourne) including mean category \pm SEM and modal value(s).

Sovereign Harbour (western end)

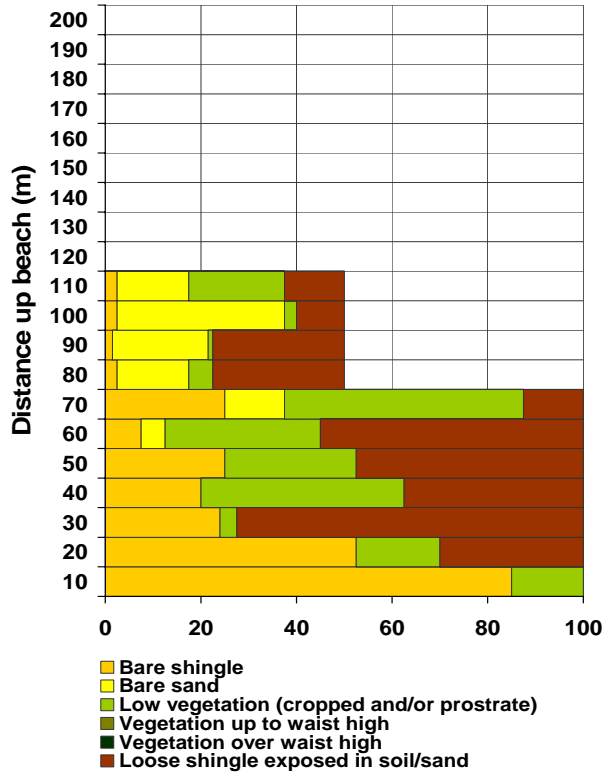


Figure E11.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

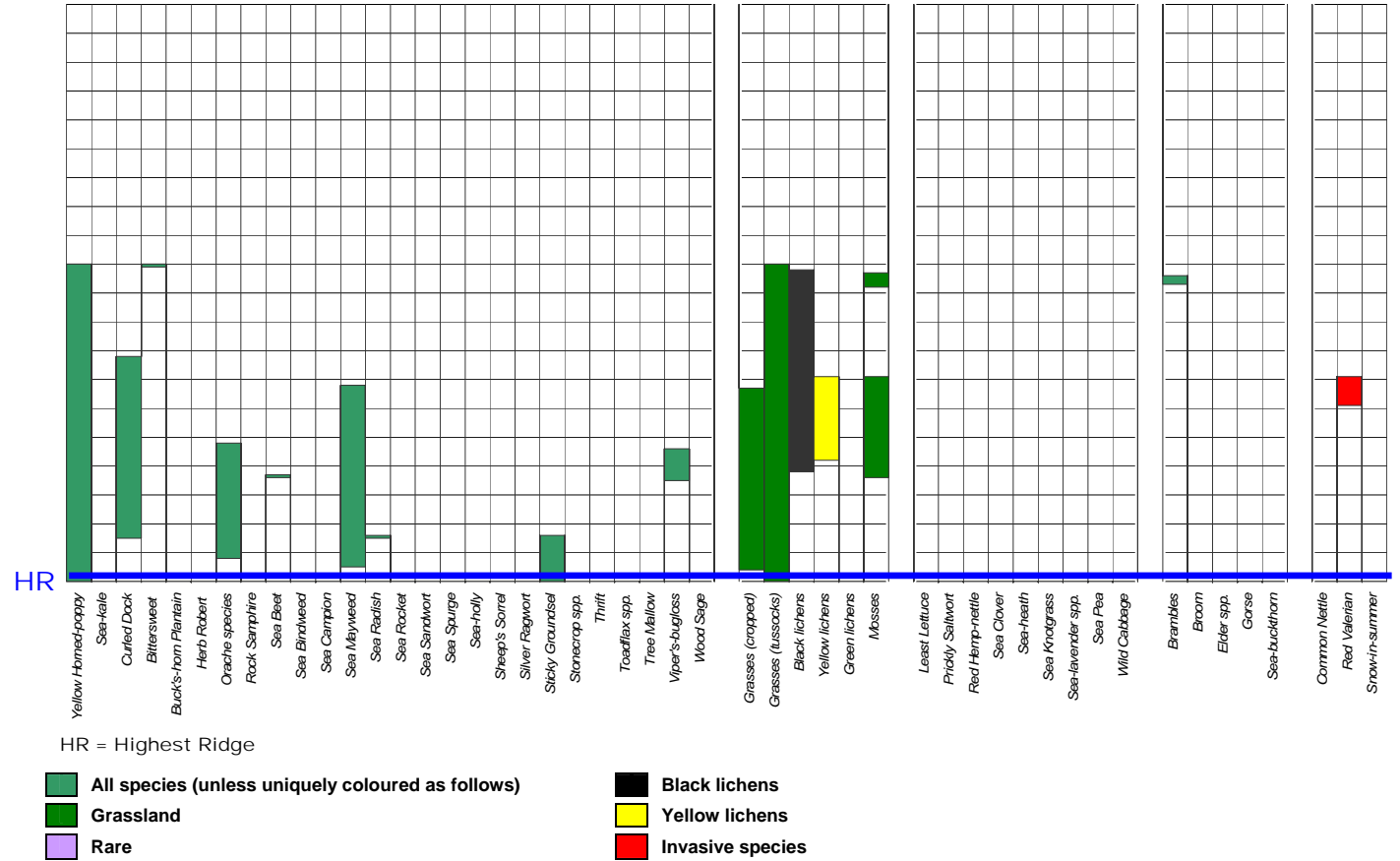


Figure E11.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 21/07/2008).

Sovereign Harbour (eastern end)

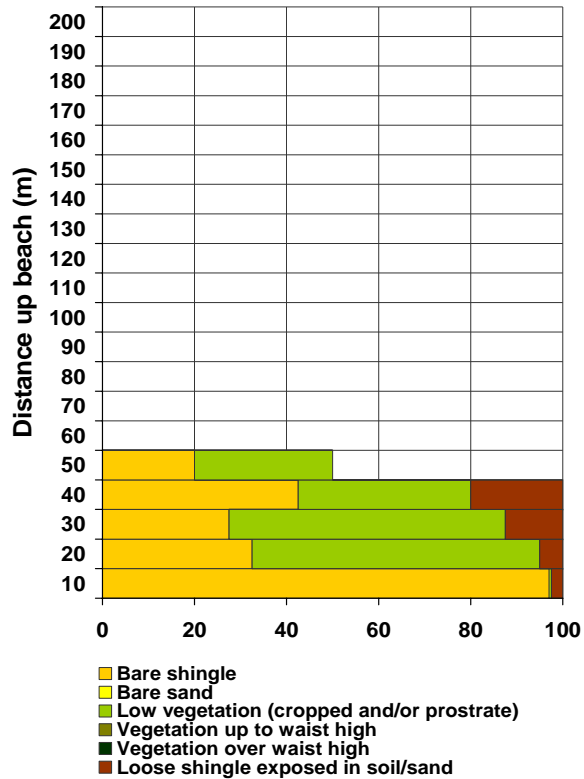


Figure E11.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

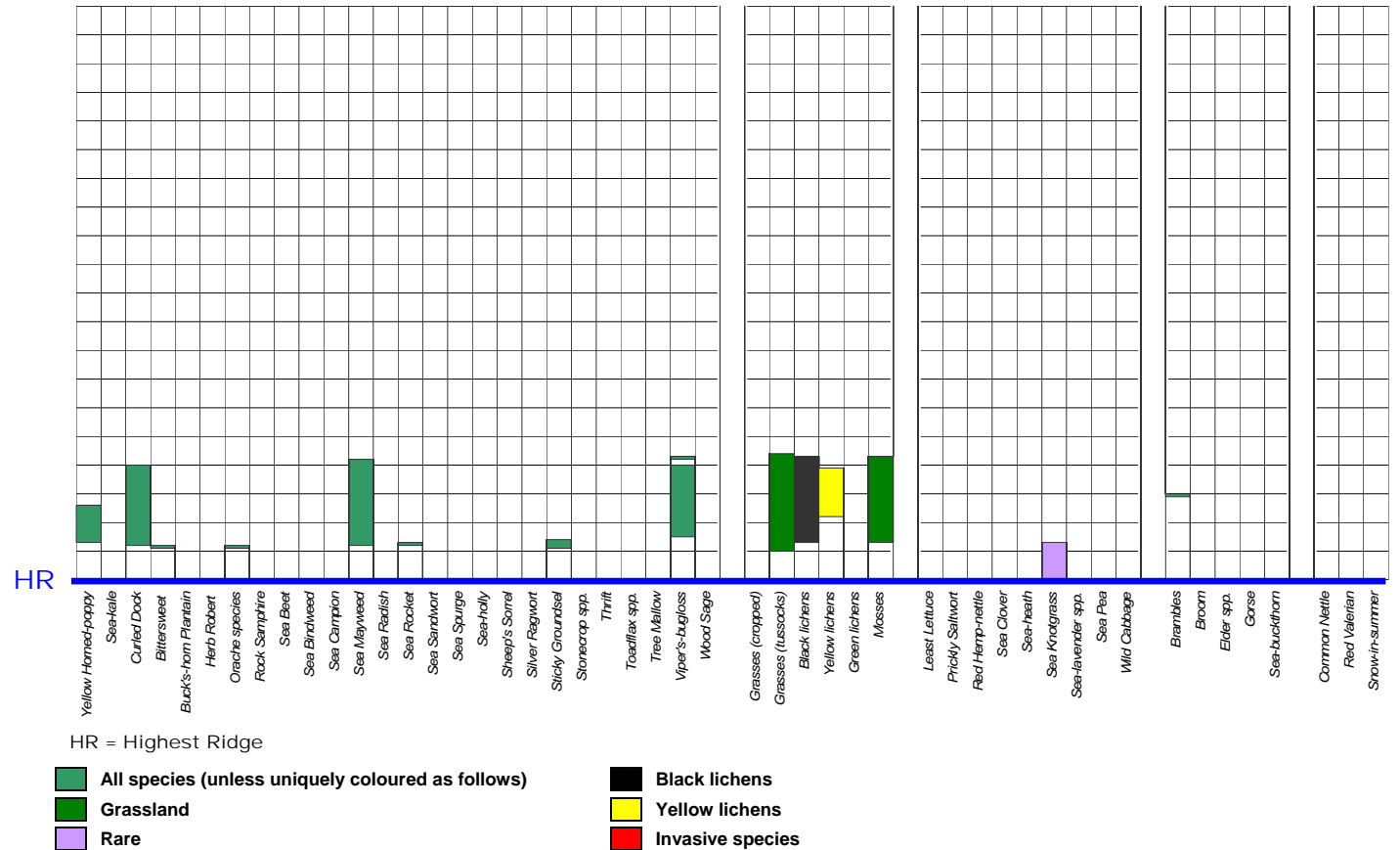


Figure E11.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 20/08/2008).

Westham



Figure E12.1 Shows the locations of the 2008 transect surveys carried out on Westham beach

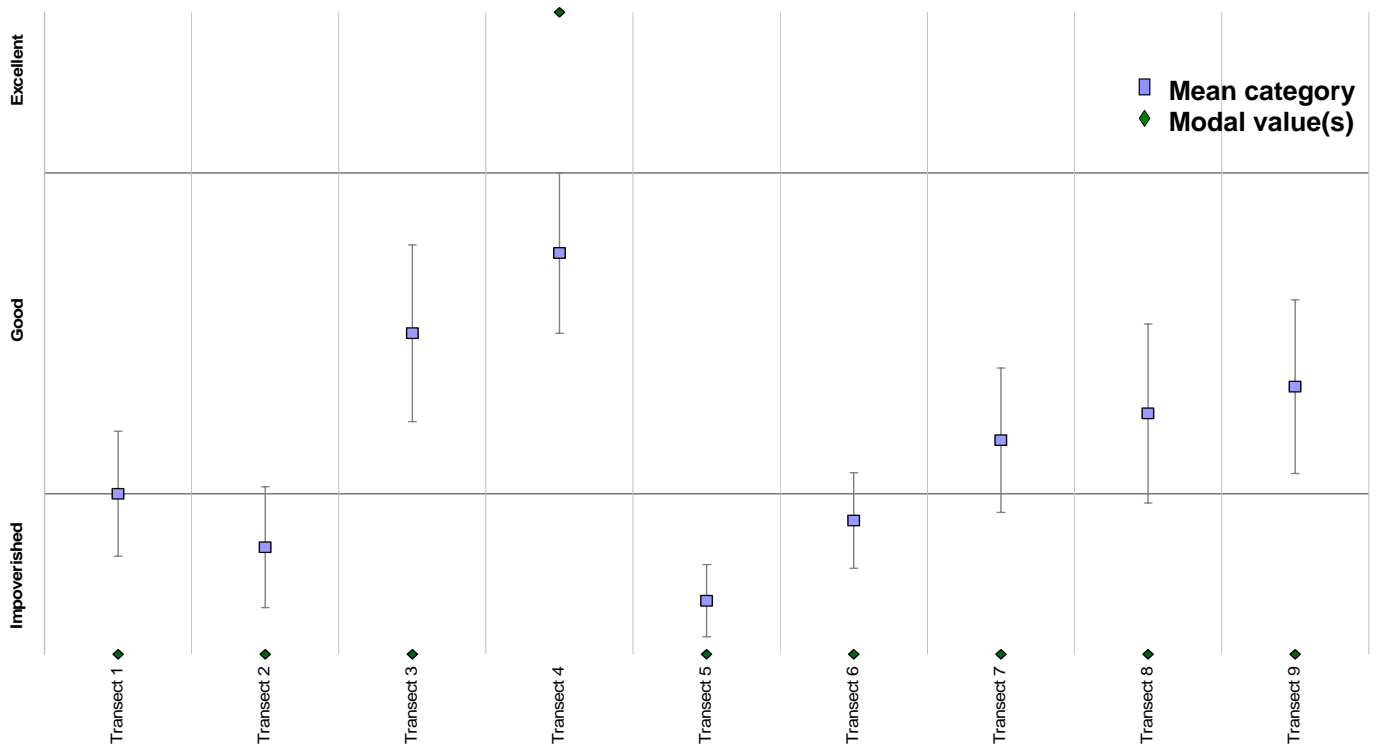


Figure E12.2 Biodiversity values for Westham shingle beach including mean category \pm SEM and modal value(s).

Westham (western end)

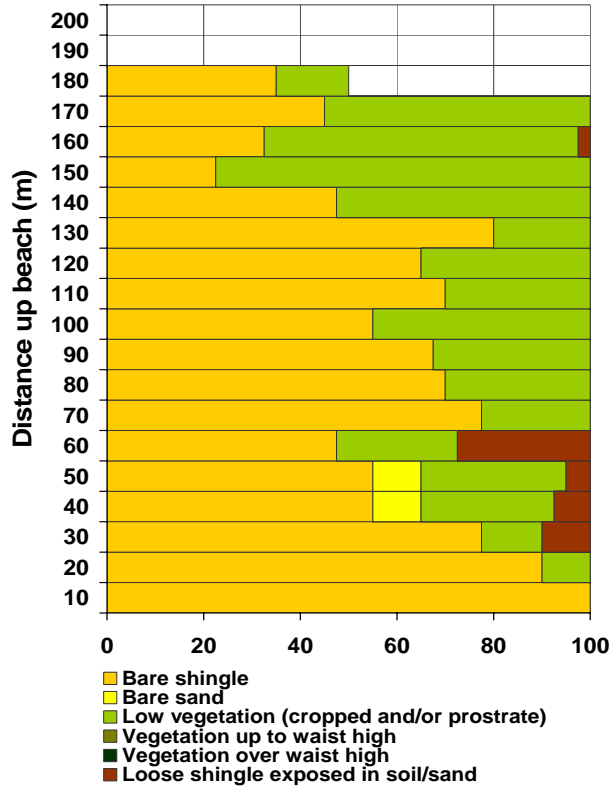


Figure E12.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

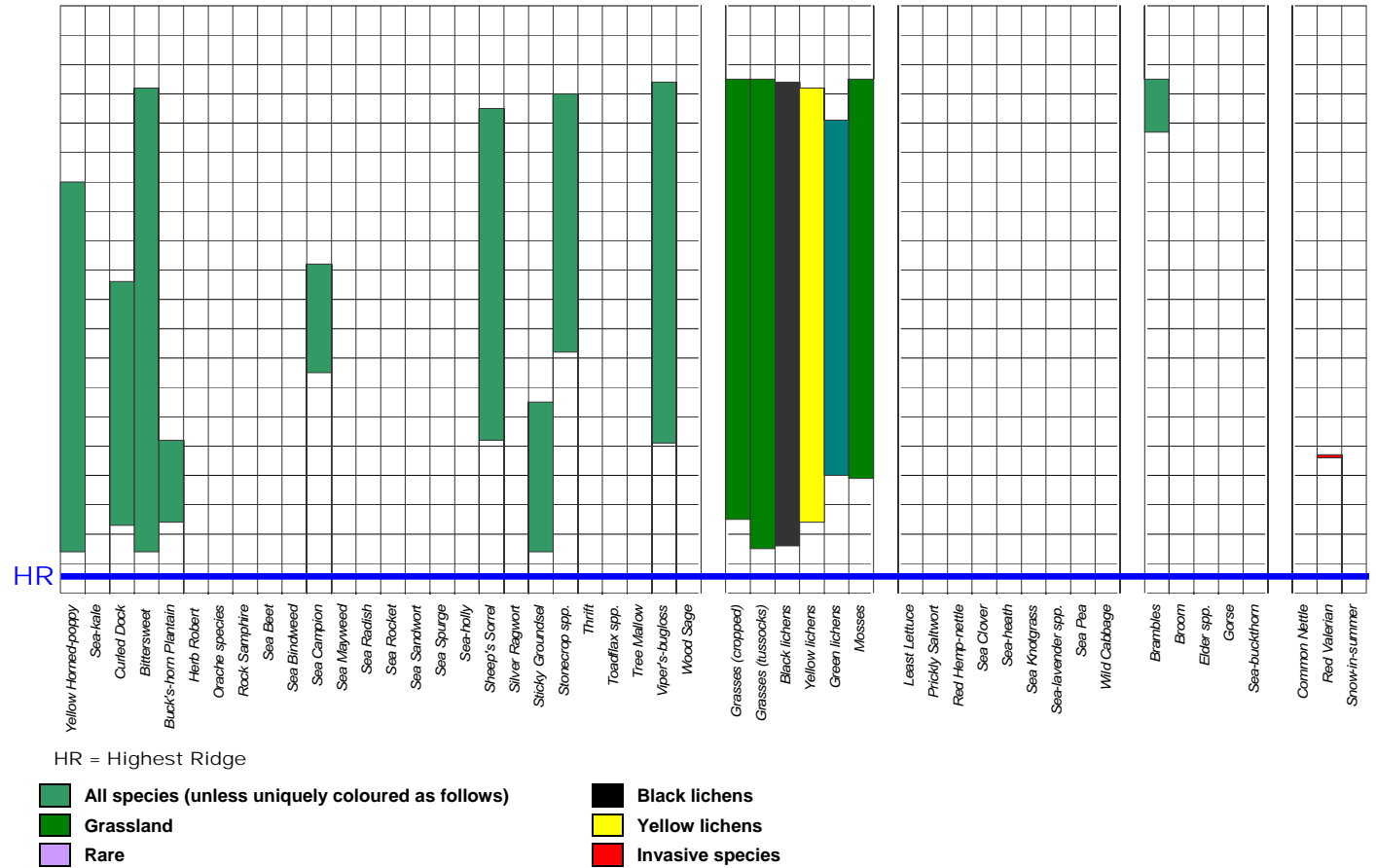


Figure E12.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 28/07/2008).

Westham (eastern end)

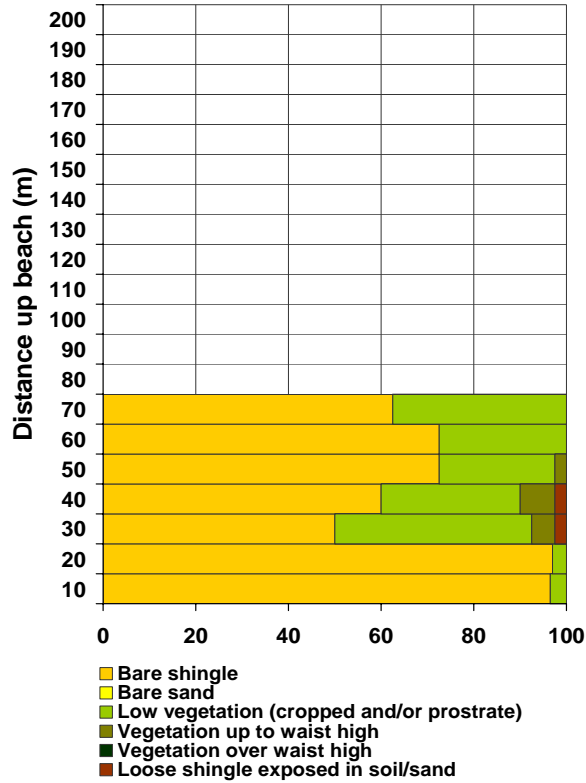


Figure E12.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

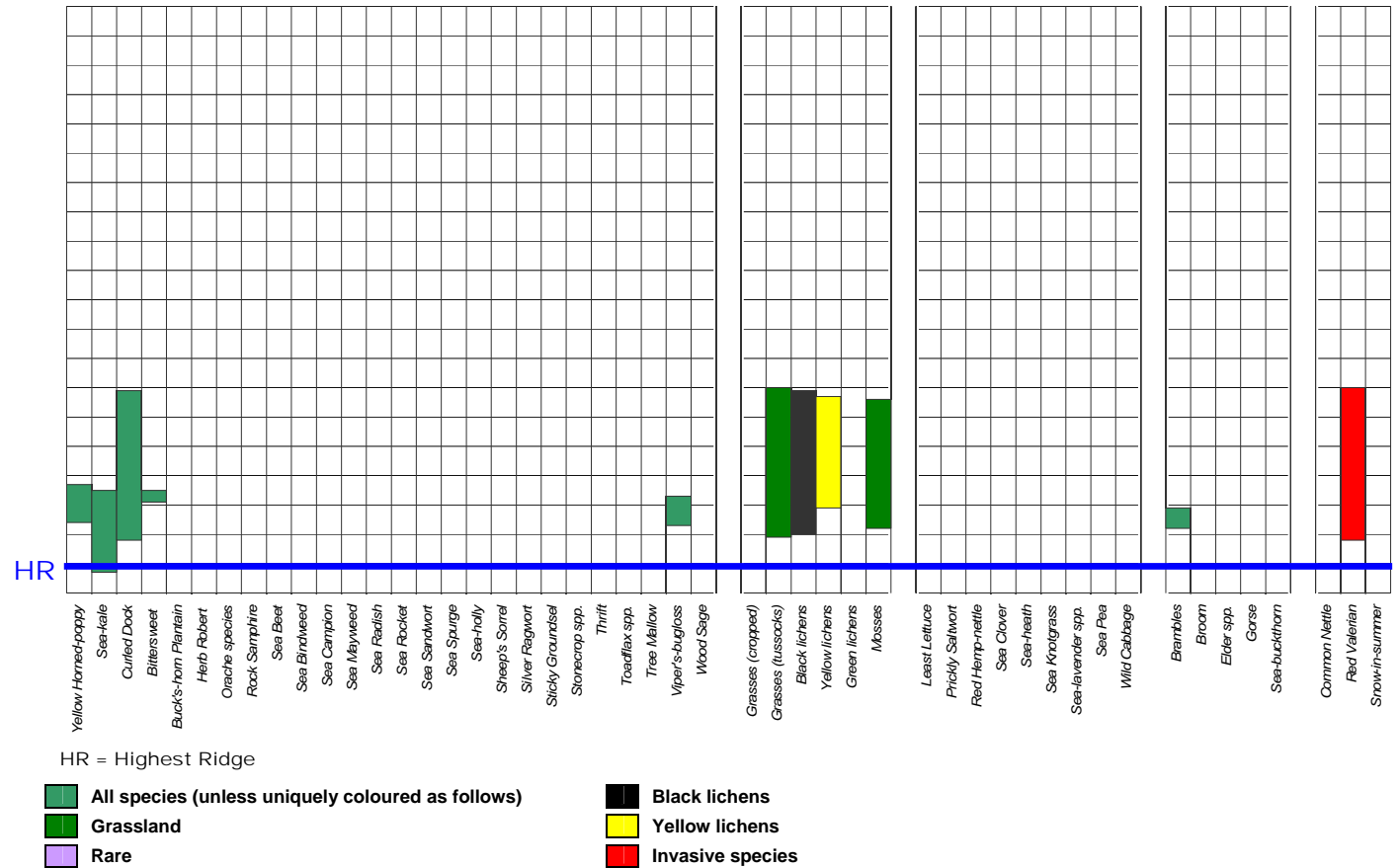


Figure E12.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 16/06/2008).

Pevensey Bay



Figure E13.1 Shows the locations of the 2008 transect surveys carried out on Pevensey Bay beach.

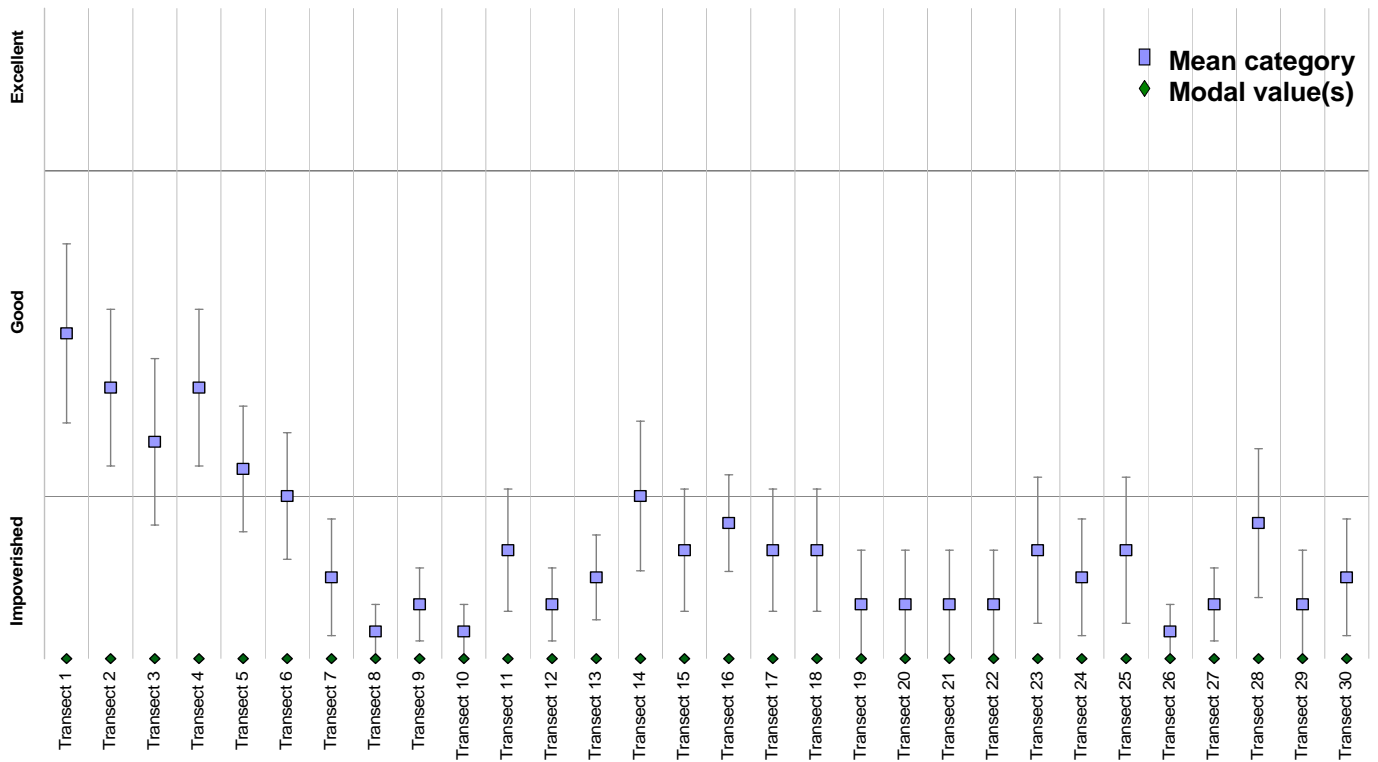


Figure E13.2 Biodiversity values for Pevensey shingle beach (Pevensey Bay) including mean category \pm SEM and modal value(s).

Pevensey Bay (western end)

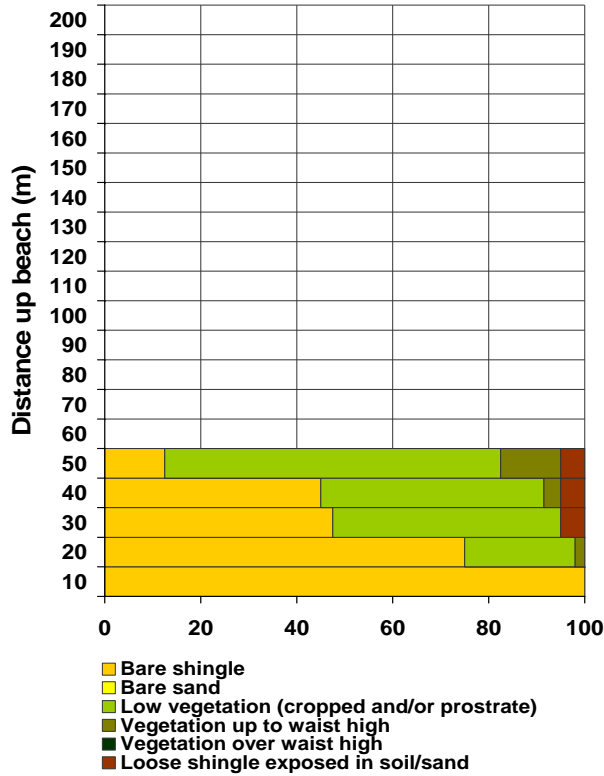


Figure E13.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

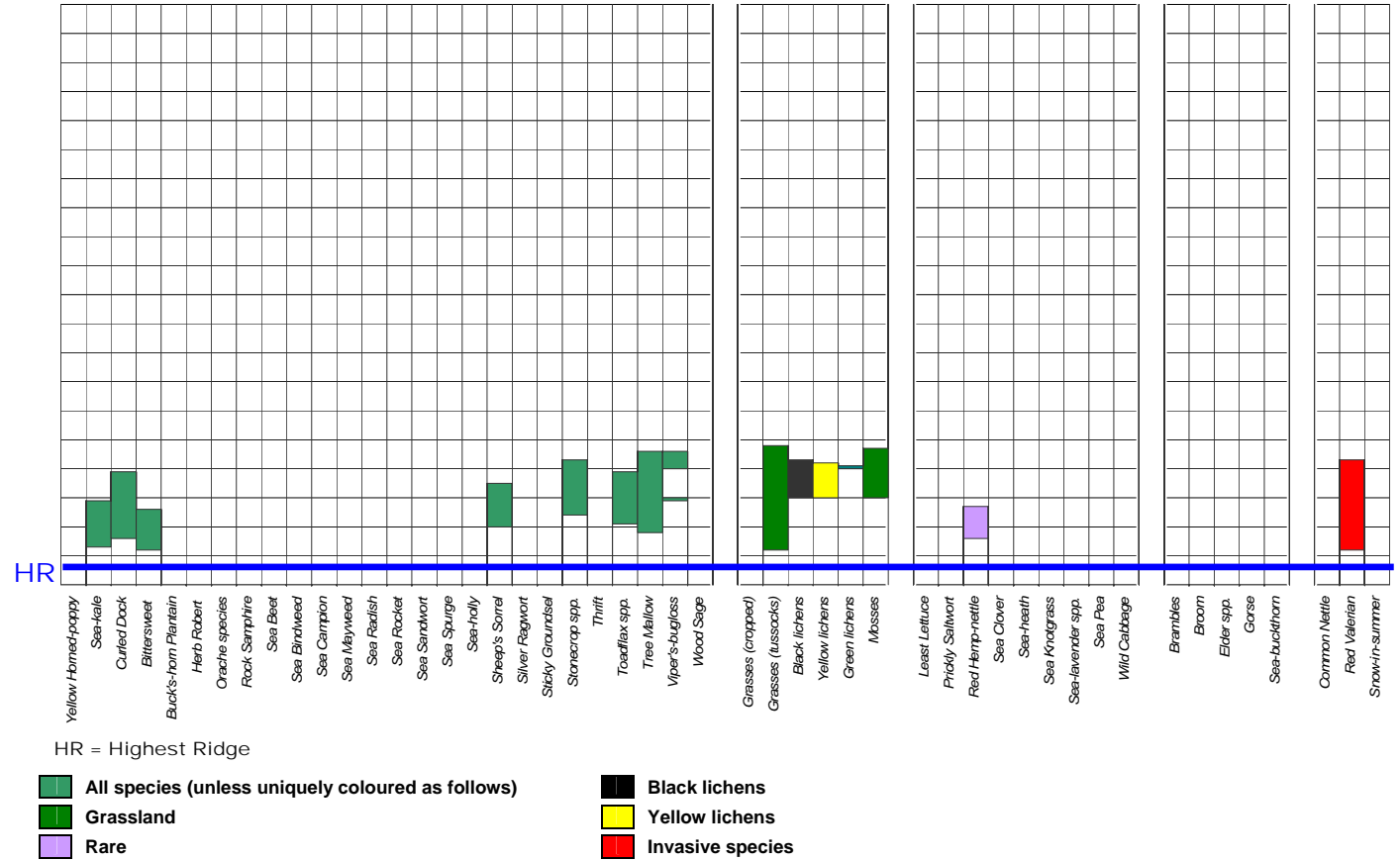


Figure E13.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 16/06/2008).

Pevensey Bay (central)

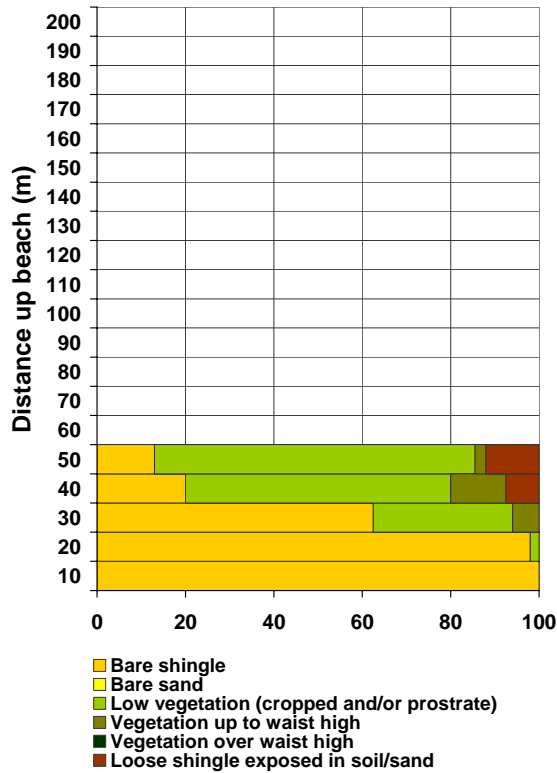


Figure E13.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

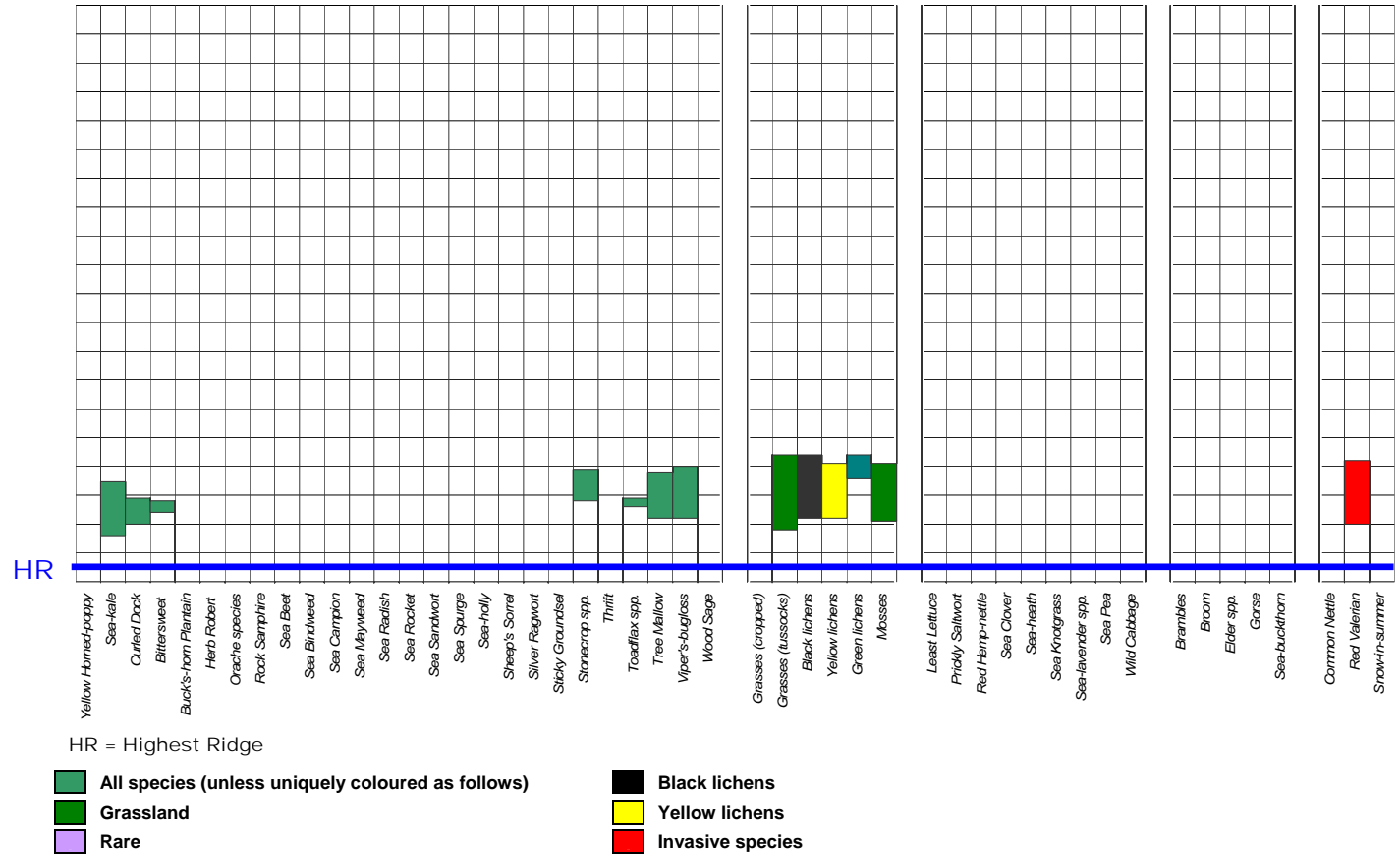


Figure E13.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 05/06/2008).

Pevensey Bay (eastern end)

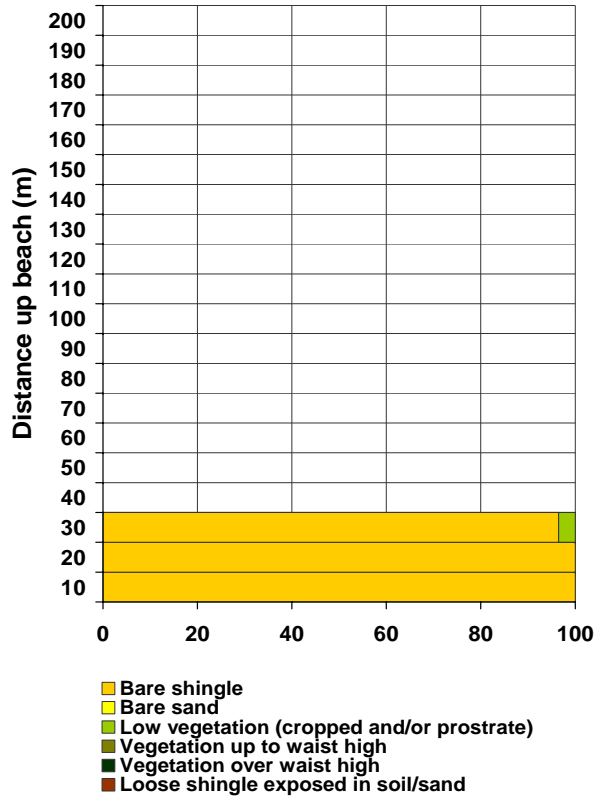


Figure E13.7 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

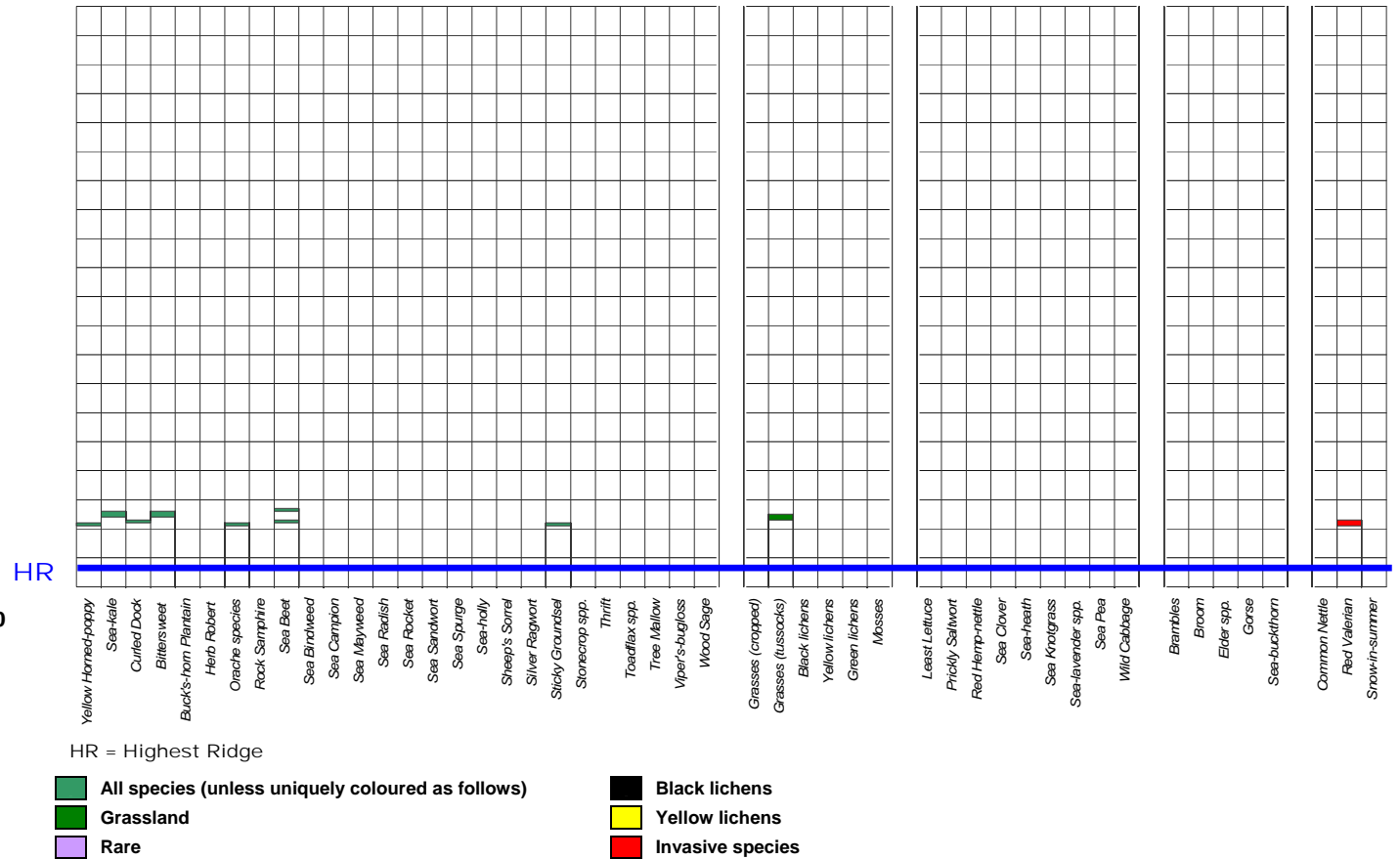


Figure E13.8 Distribution of species in 10m sections from seaward to landward side (transect information collected on 13/06/2008).

Normans Bay



Figure E14.1 Shows the locations of the 2008 transect surveys carried out on Normans Bay beach.

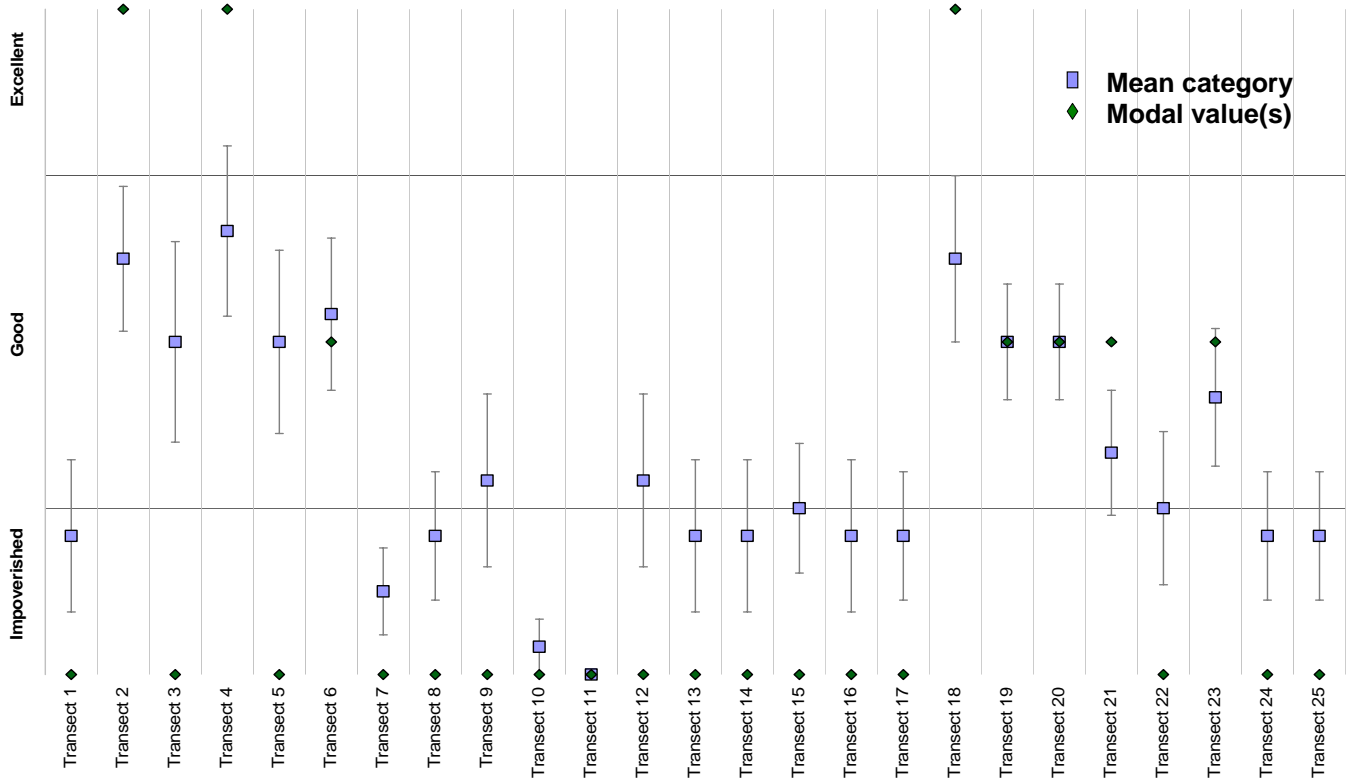


Figure E14.2 Biodiversity values for Normans Bay shingle beach (Bexhill) including mean category \pm SEM and modal value(s).

Normans Bay (western end)

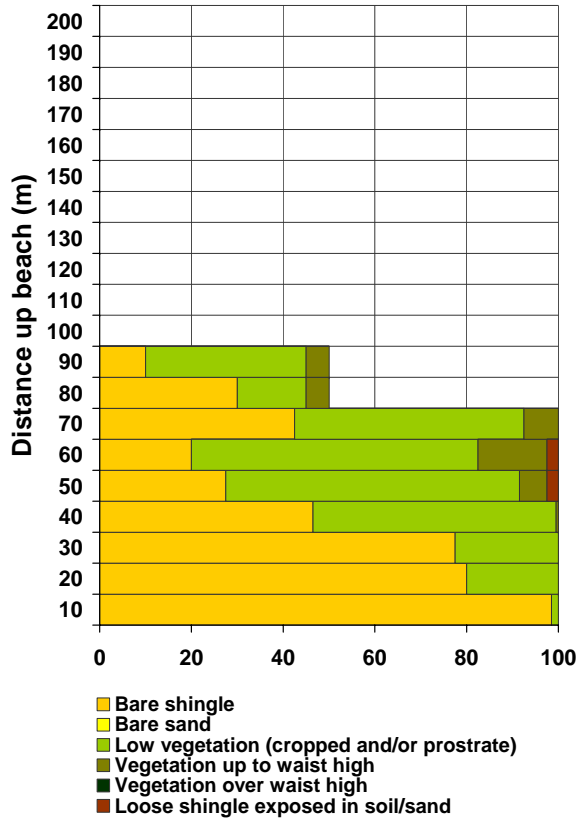


Figure E14.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

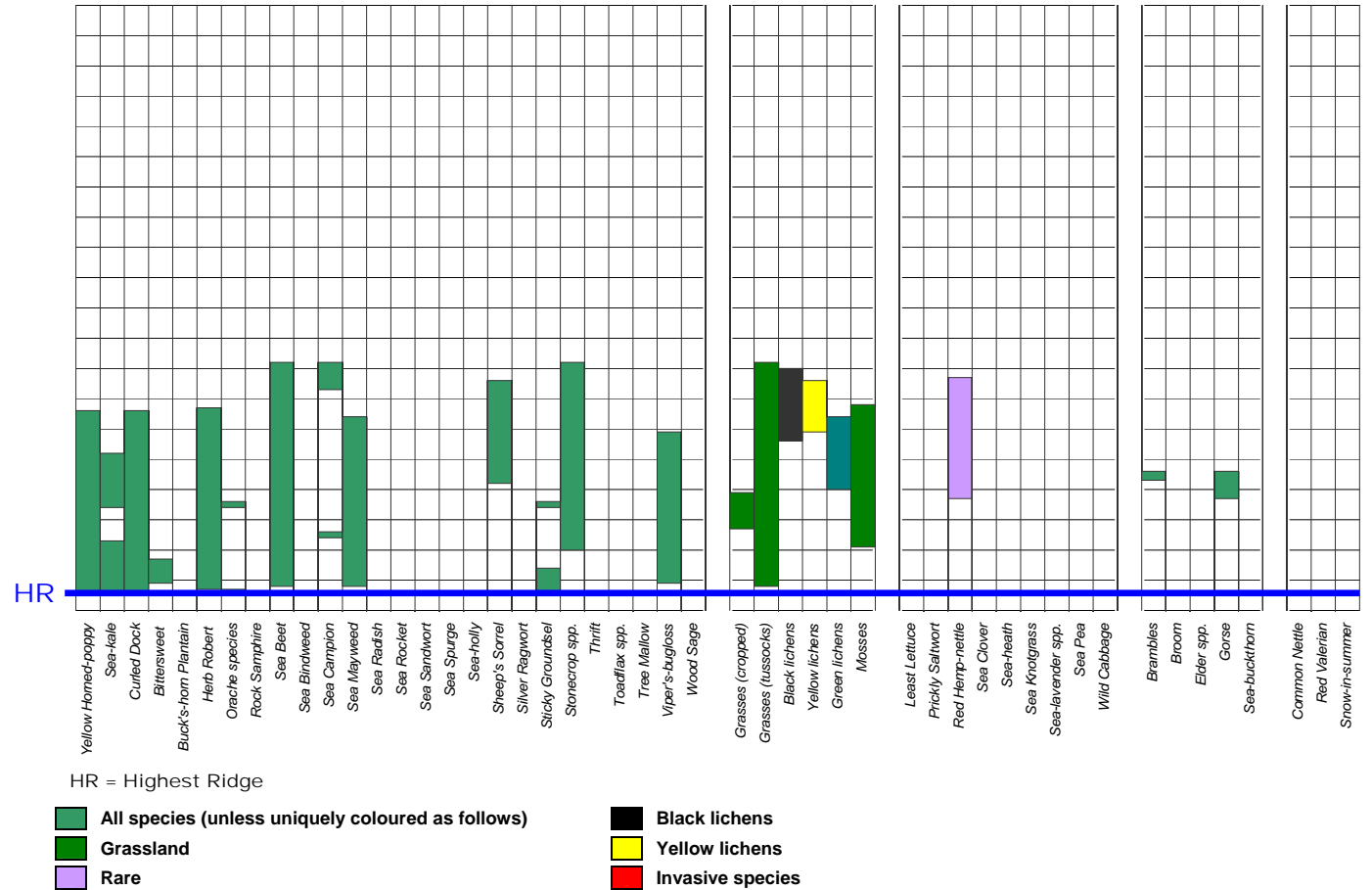


Figure E14.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 07/07/2008).

Normans Bay (eastern end)

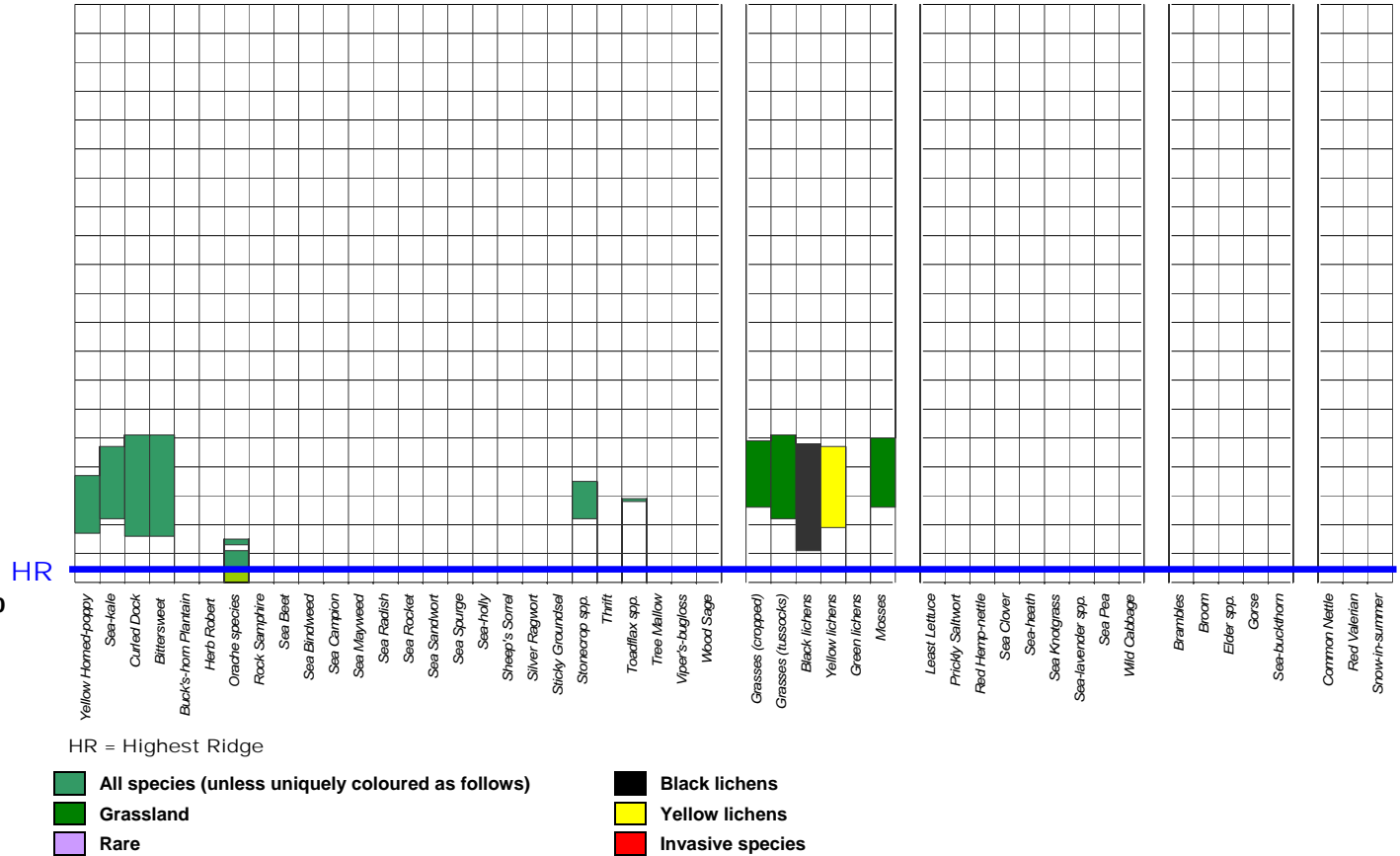
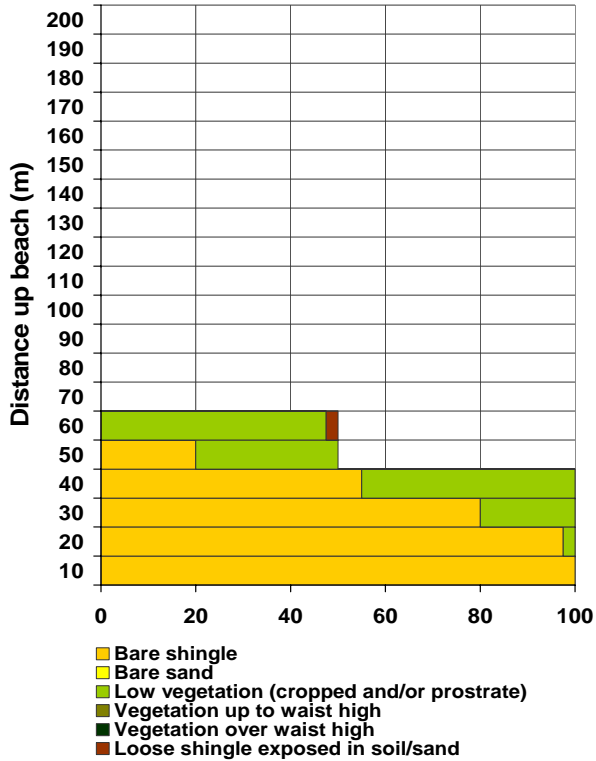


Figure E14.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

Figure E14.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 04/07/2008).

Cooden Beach



Figure E15.1 Shows the locations of the 2008 transect surveys carried out at Cooden Beach.

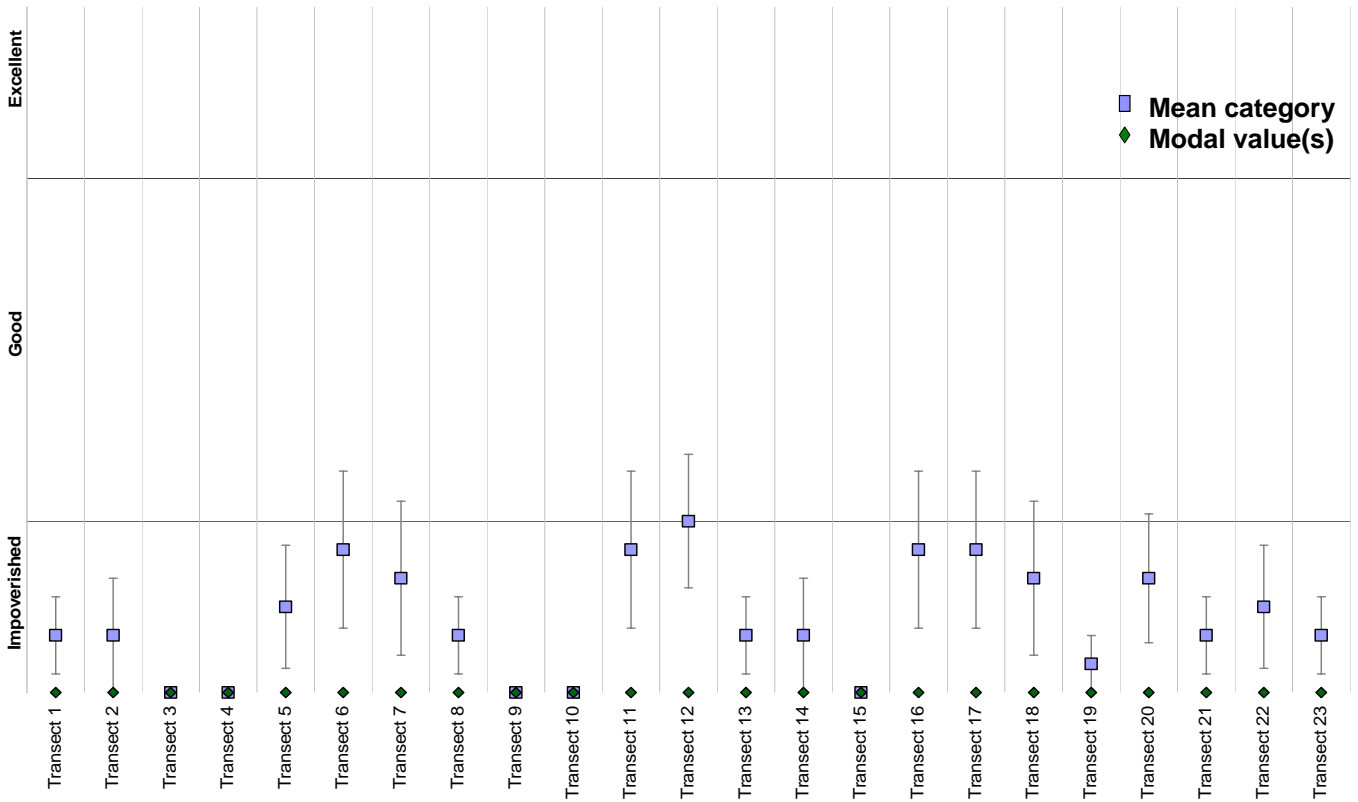


Figure E15.2 Biodiversity values for Cooden Beach shingle beach (Bexhill) including mean category \pm SEM and modal value(s).

Cooden Beach (western end)

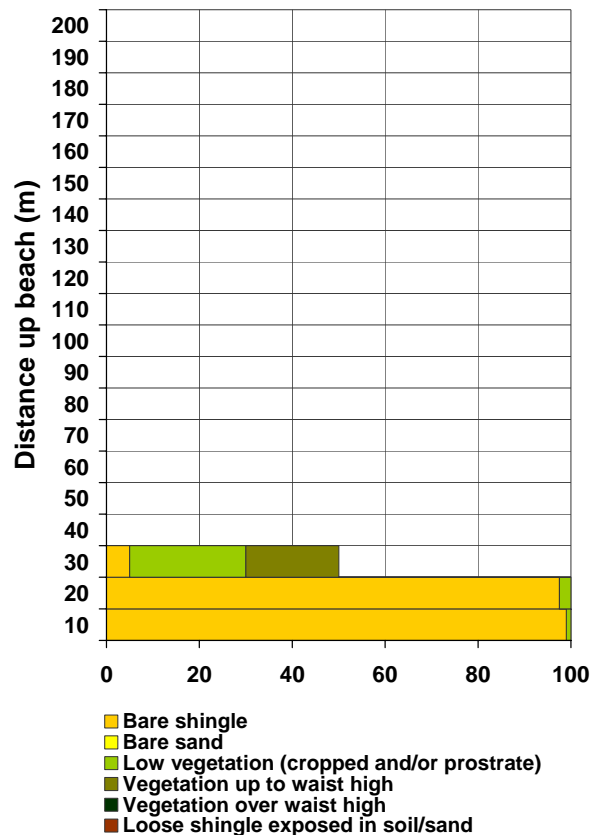


Figure E15.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

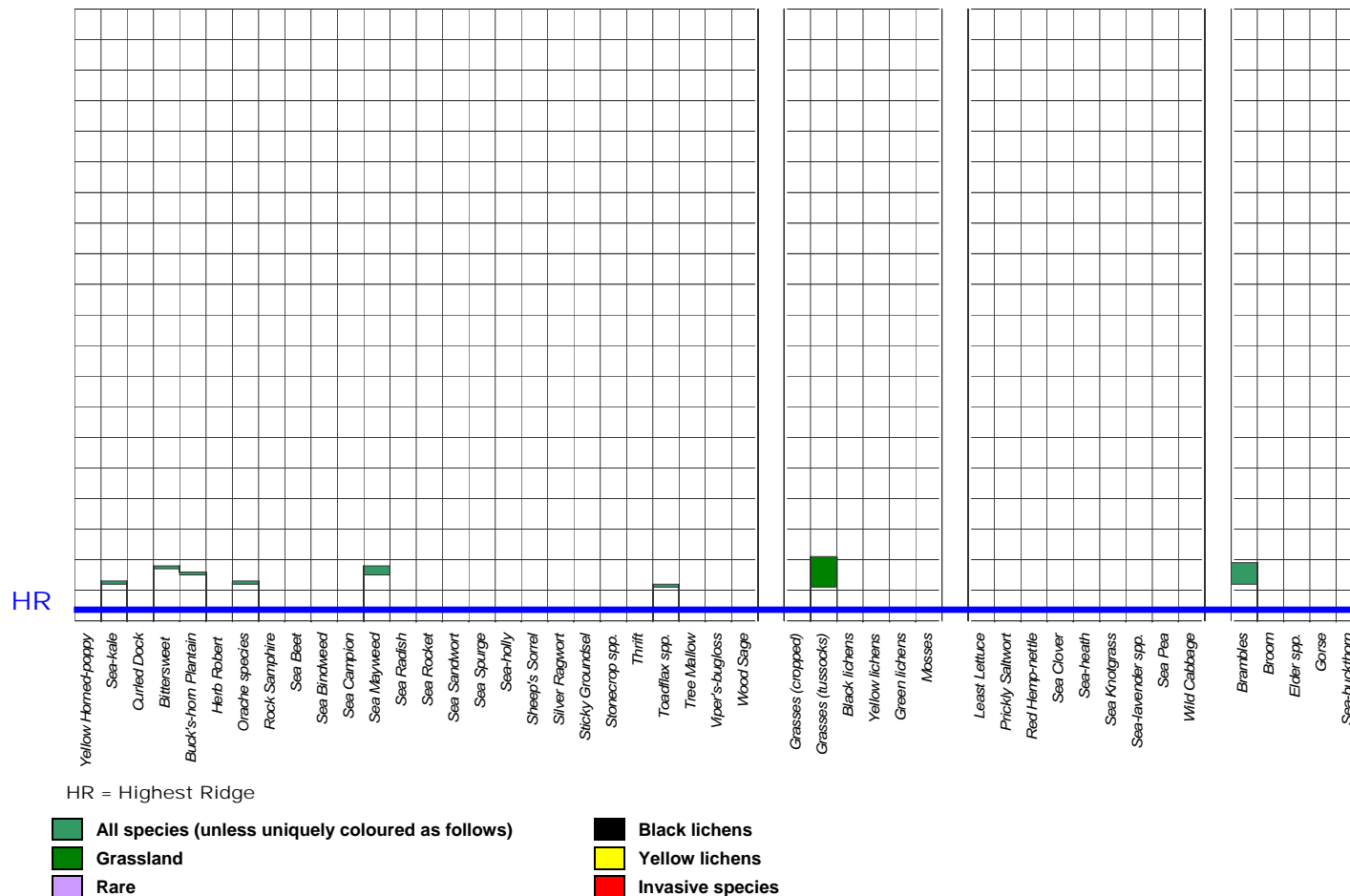


Figure E15.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 02/05/2008).

Cooden Beach (eastern end)

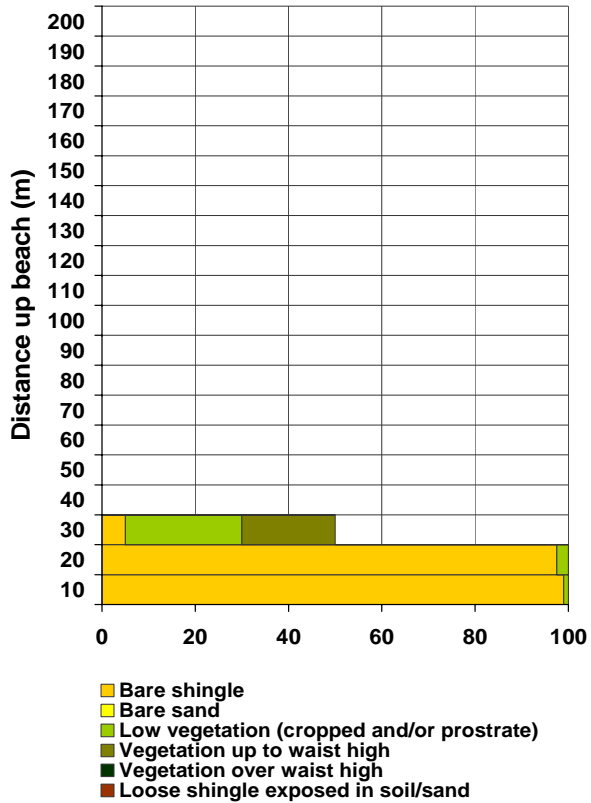


Figure E15.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

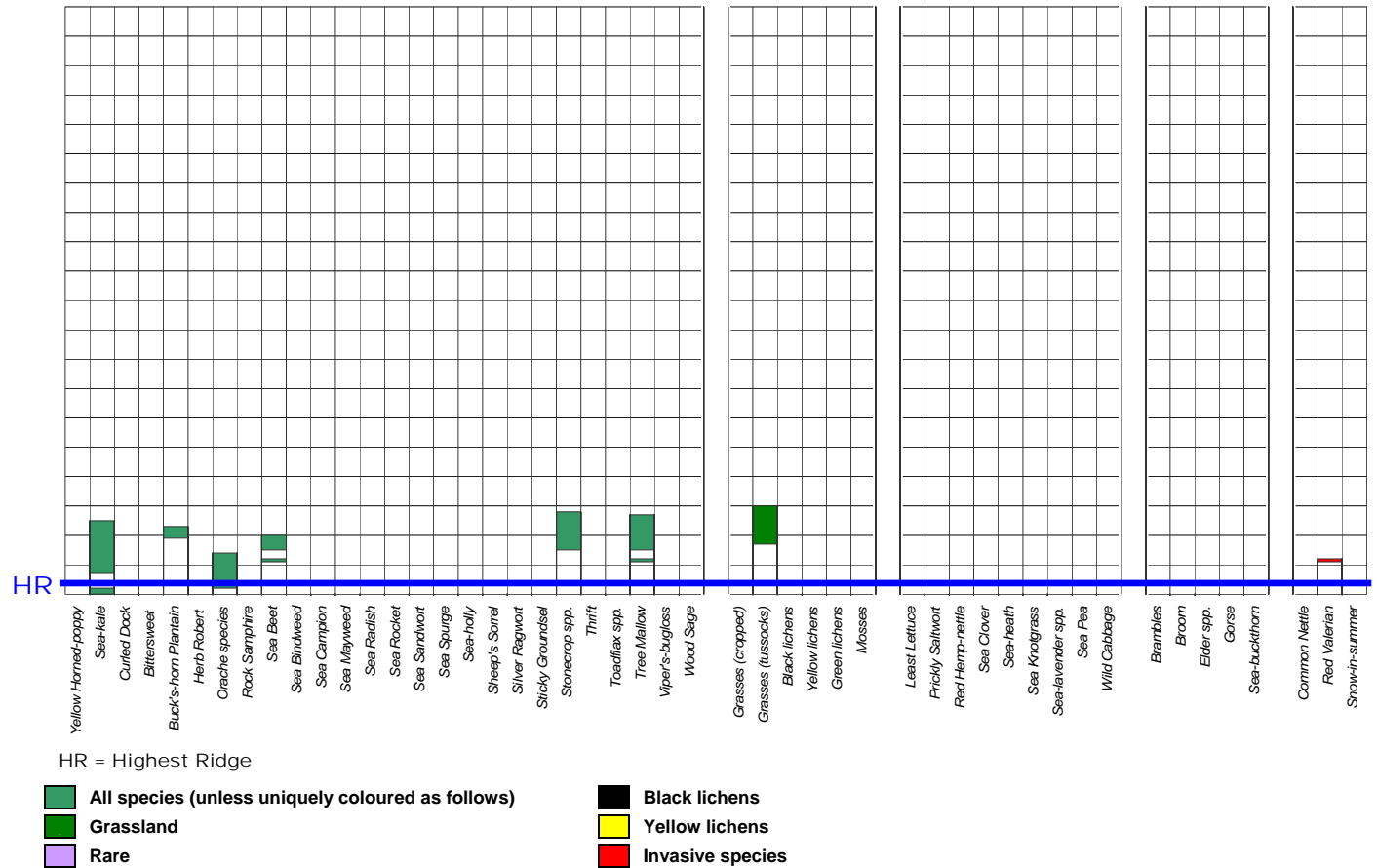


Figure E15.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 09/04/2008).

Veness Gap



Figure E16.1 Shows the locations of the 2008 transect surveys carried out on Veness Gap beach.

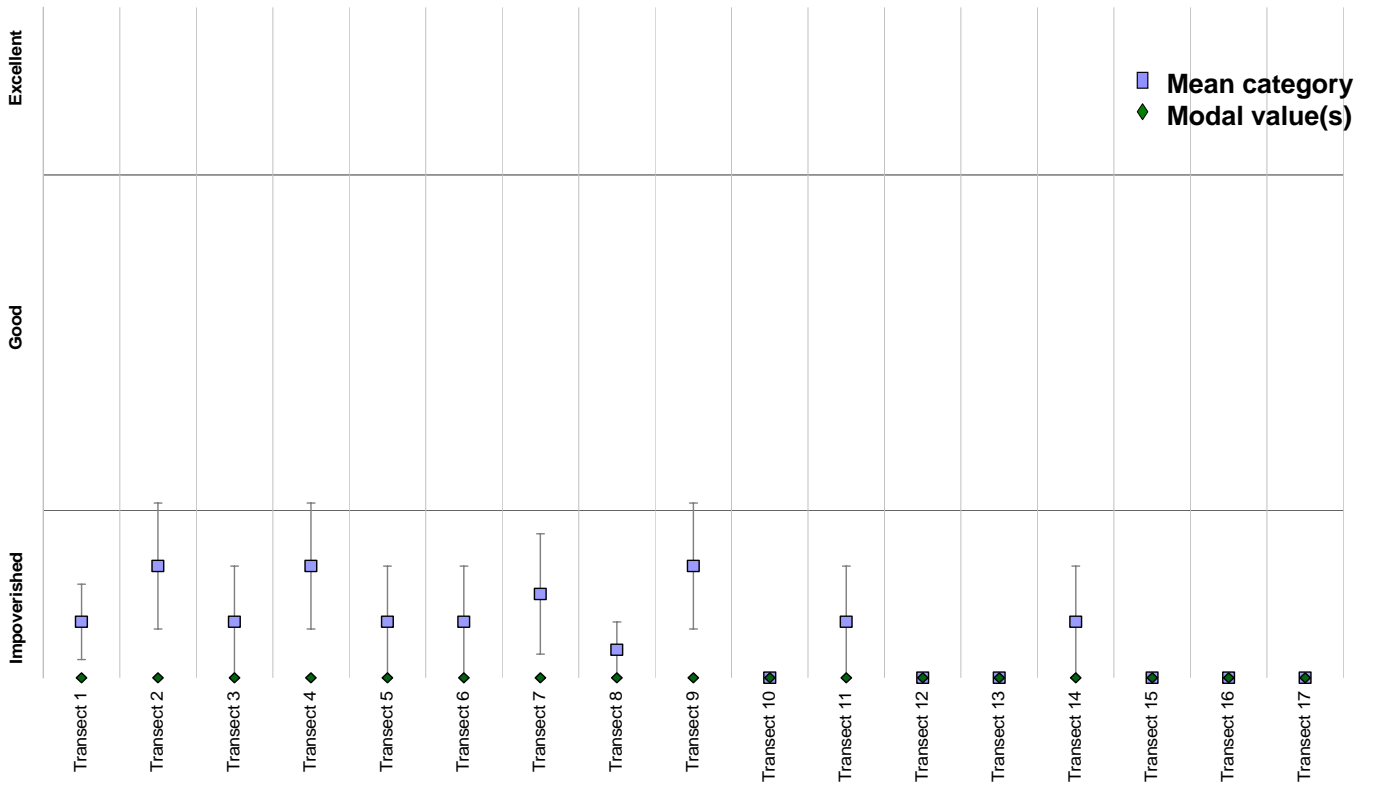


Figure E16.2 Biodiversity values for Veness Gap shingle beach (Bexhill) including mean category \pm SEM and modal value(s).

Veness Gap (western end)

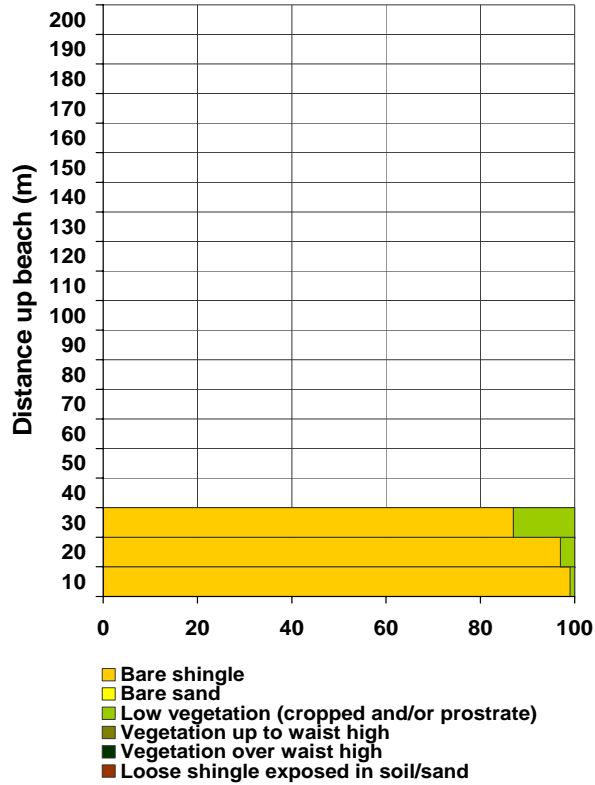


Figure E16.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

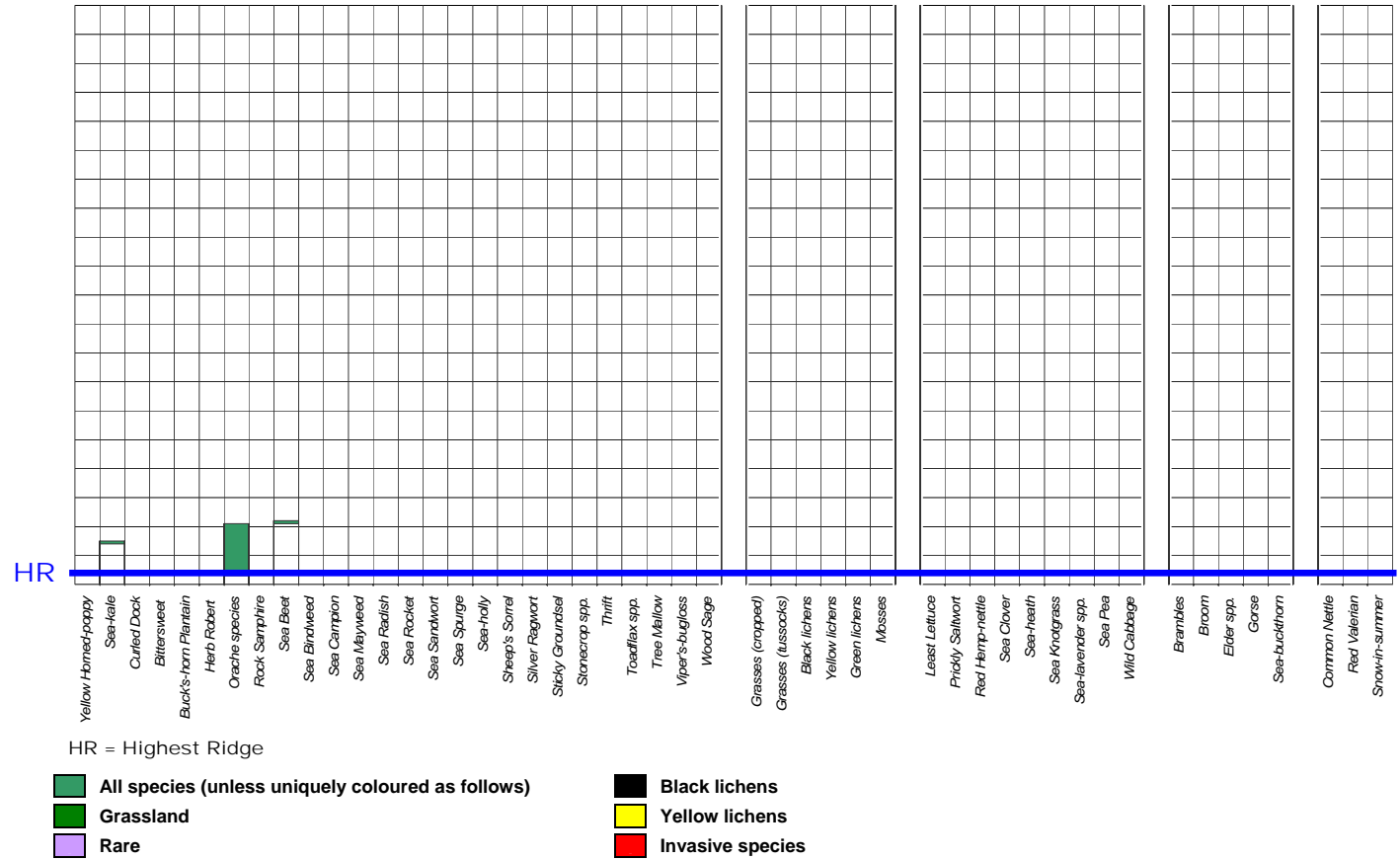


Figure E16.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 03/06/2008).

Bexhill-on-Sea



Figure E17.1 Shows the locations of the 2008 transect surveys carried out on Bexhill-on-Sea beach.

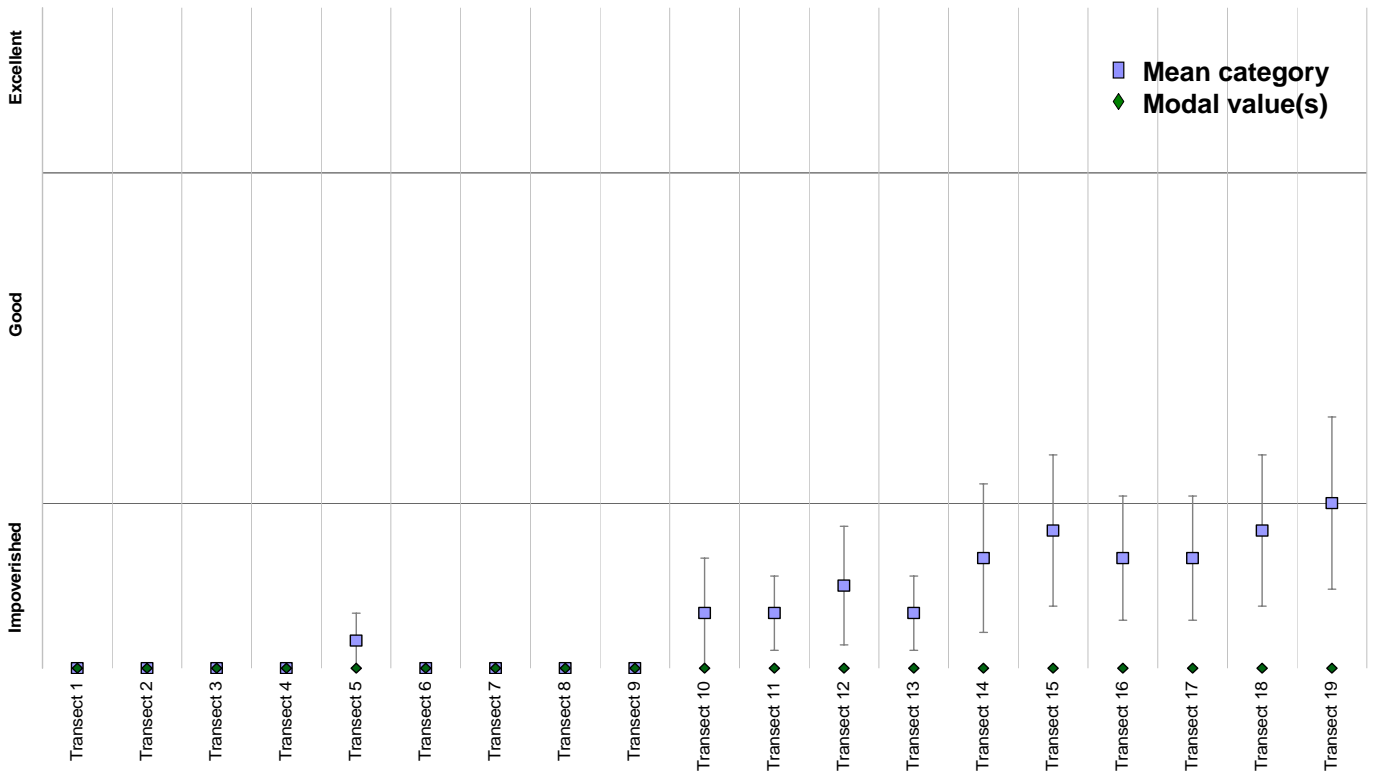


Figure E17.2 Biodiversity values for Bexhill-on-Sea shingle beach (Bexhill) including mean category \pm SEM and modal value(s).

Bexhill-on-Sea (eastern end)

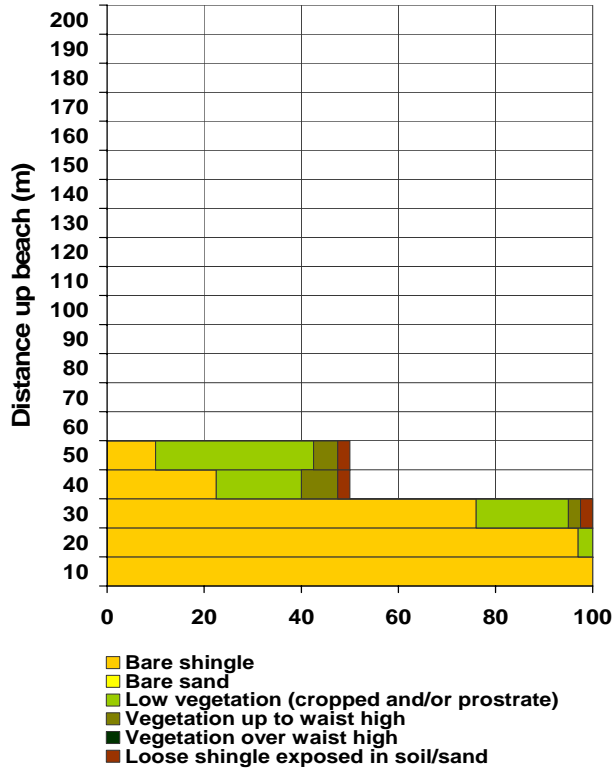


Figure E17.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

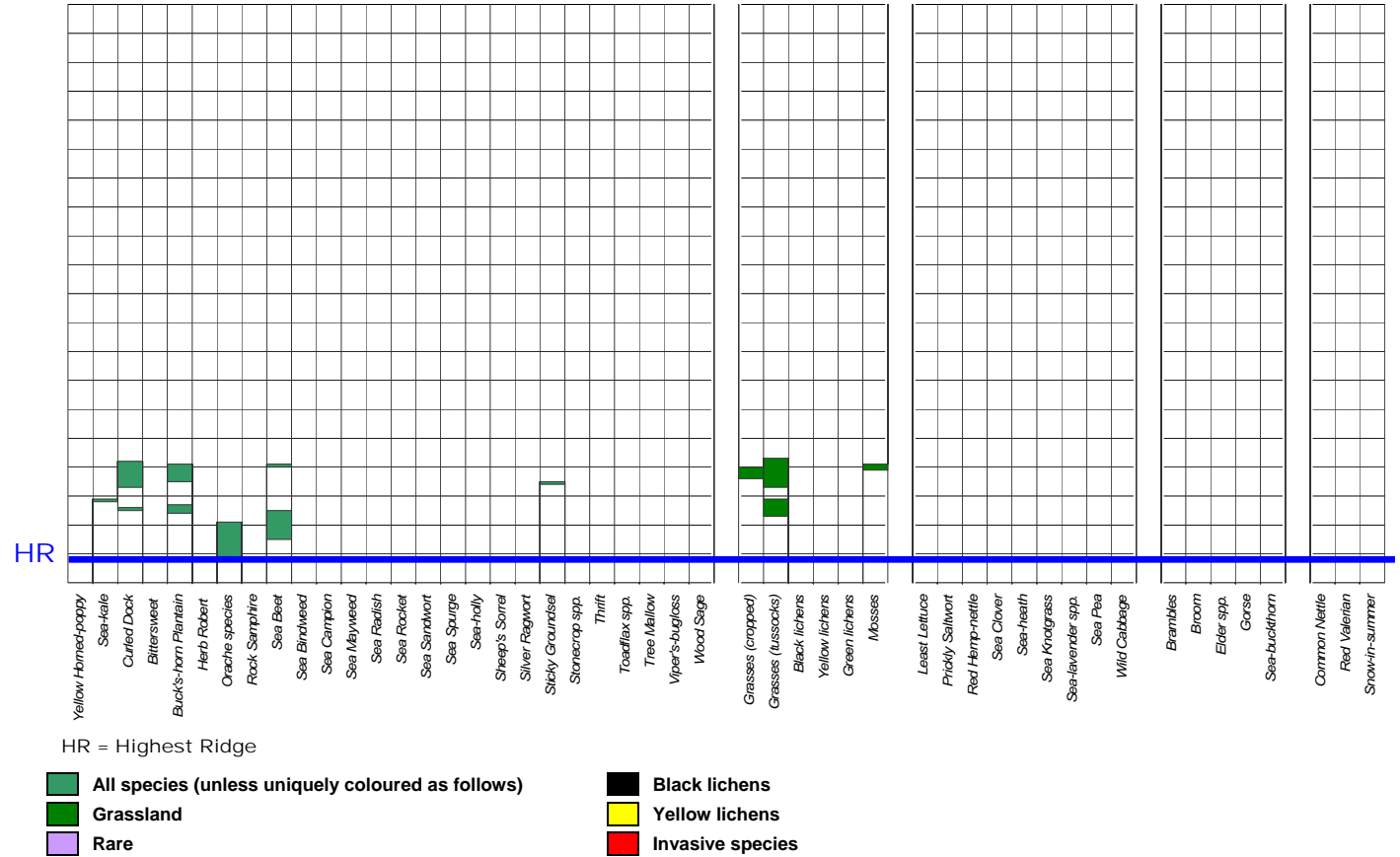


Figure E17.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 16/05/2008).

Bulverhythe



Figure E18.1 Shows the locations of the 2008 transect surveys carried out on Bulverhythe beach.

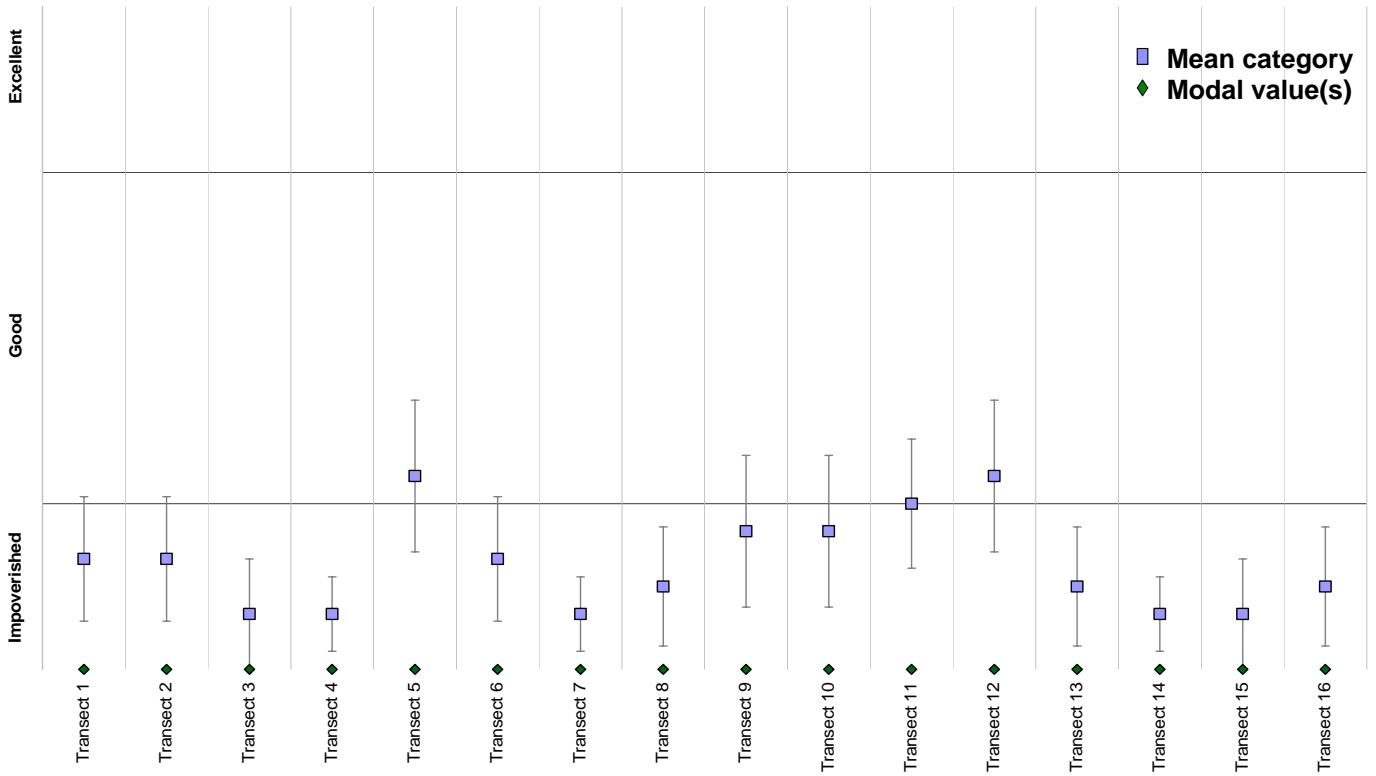


Figure E18.2 Biodiversity values for Bulverhythe shingle beach (Hastings) including mean category \pm SEM and modal value(s).

Bulverhythe (western end)

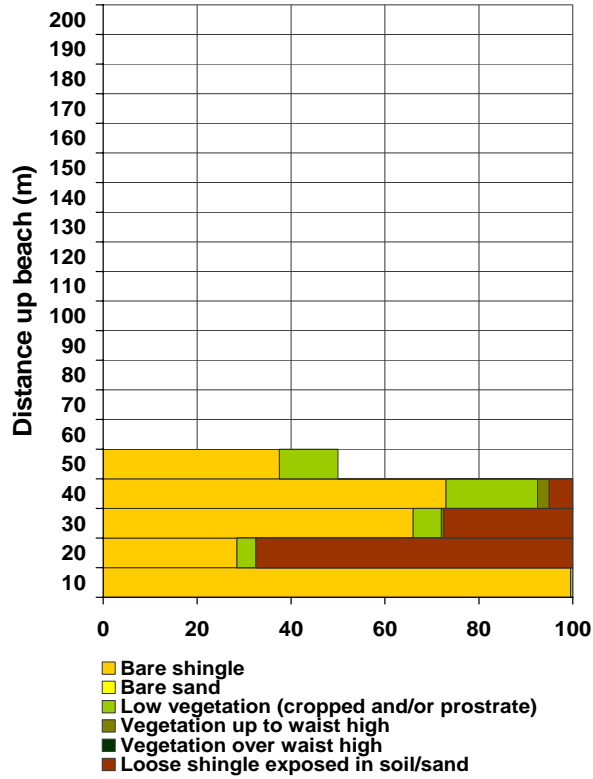


Figure E18.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

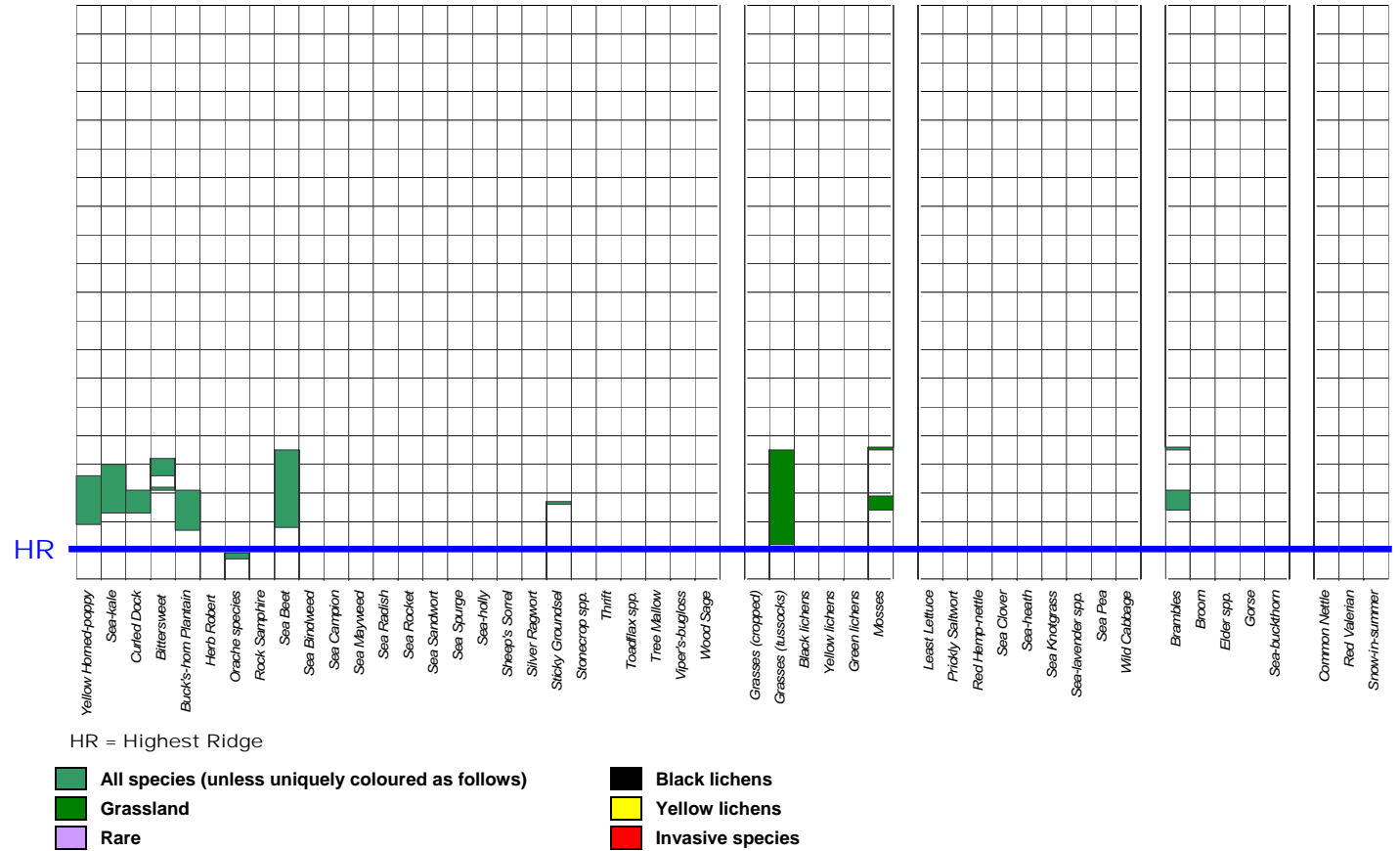


Figure E18.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 29/05/2008).

Bulverhythe (eastern end)

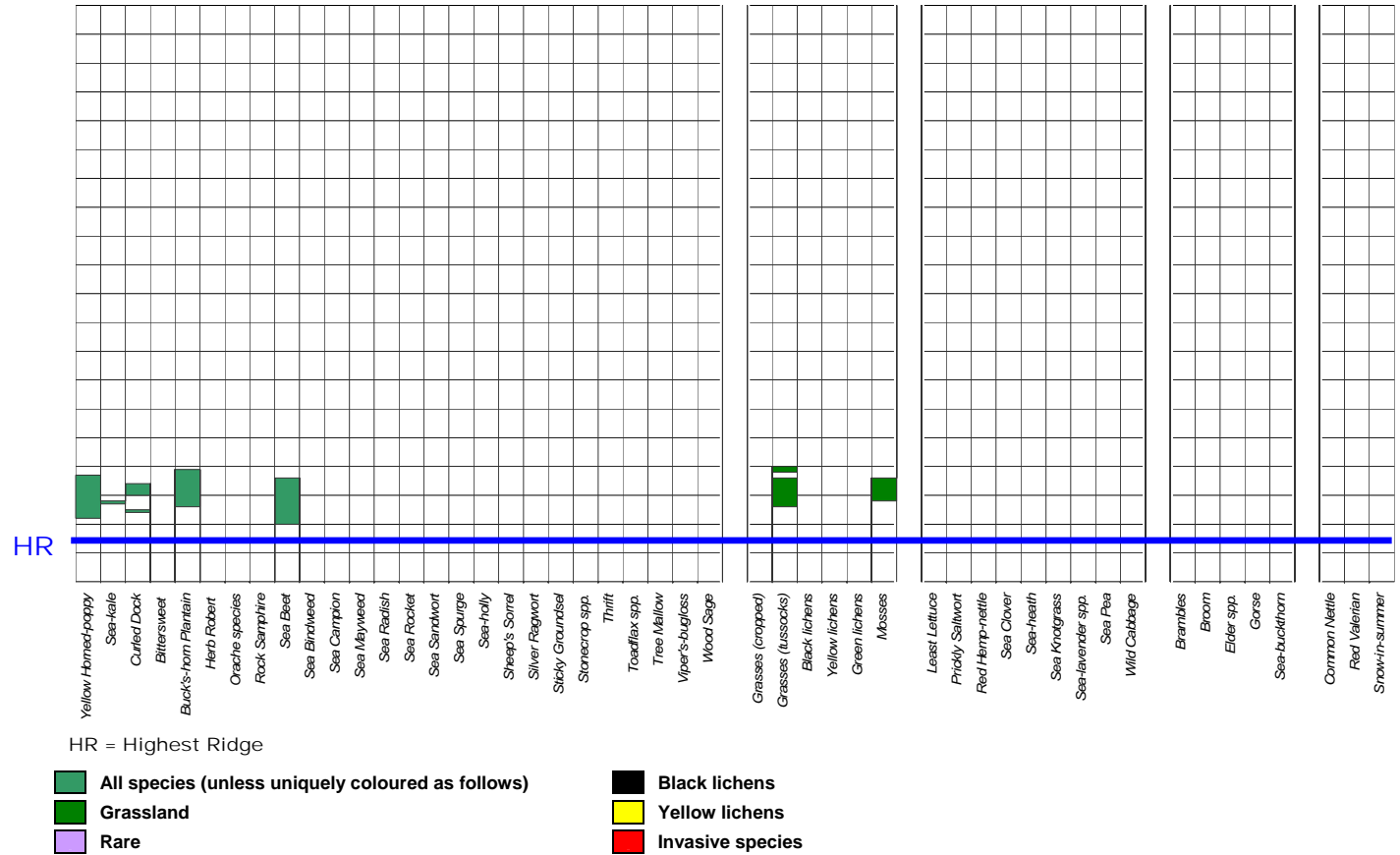
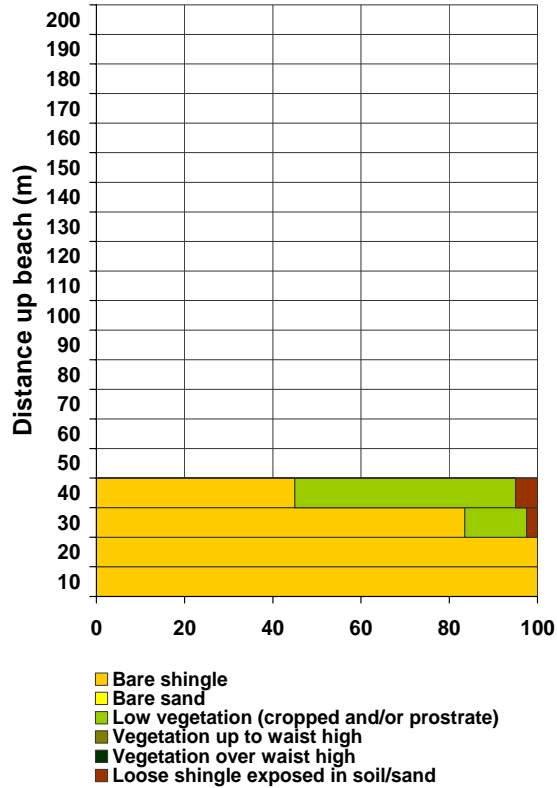


Figure E18.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

Figure E18.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 04/06/2008).

Hastings



Figure E19.1 Shows the locations of the 2008 transect surveys carried out on Hastings main beach.

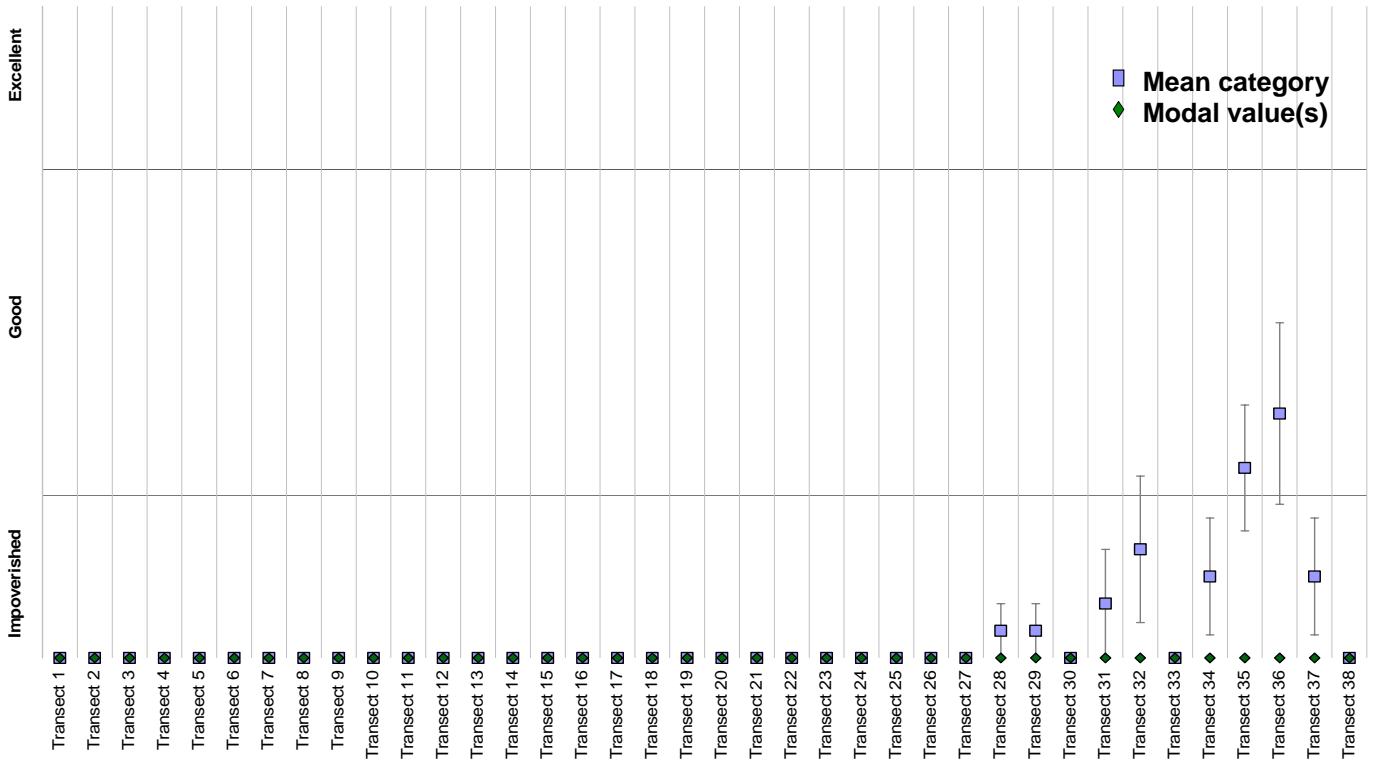


Figure E19.2 Biodiversity values for Hastings shingle beach including mean category ± SEM and modal value(s).

Hastings (western end)

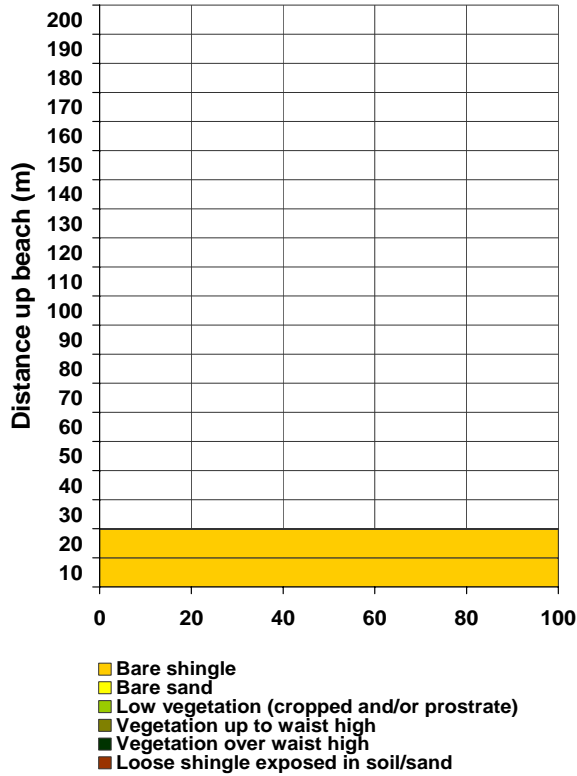


Figure E19.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

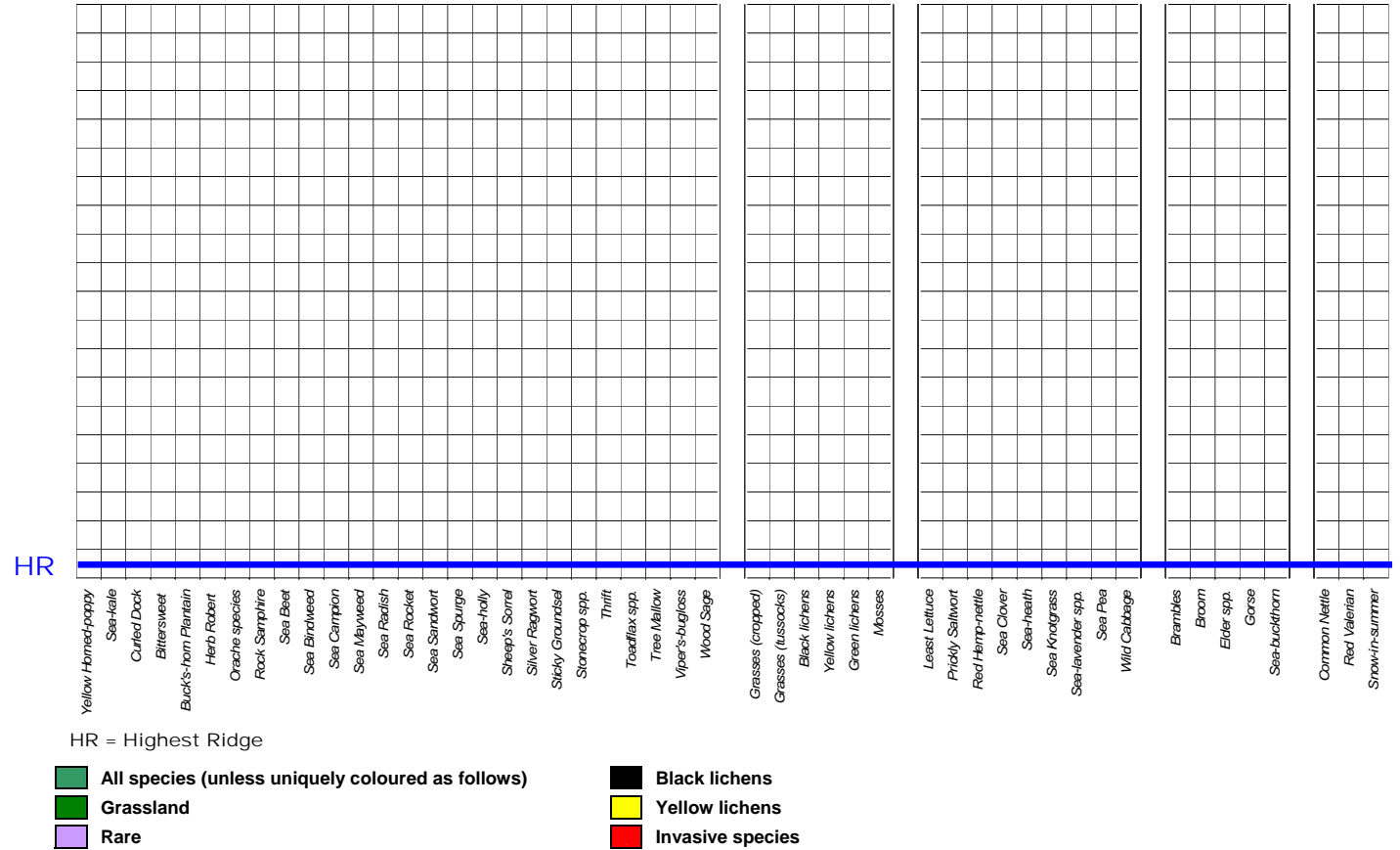


Figure E19.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 04/06/2008).

Hastings (eastern end)

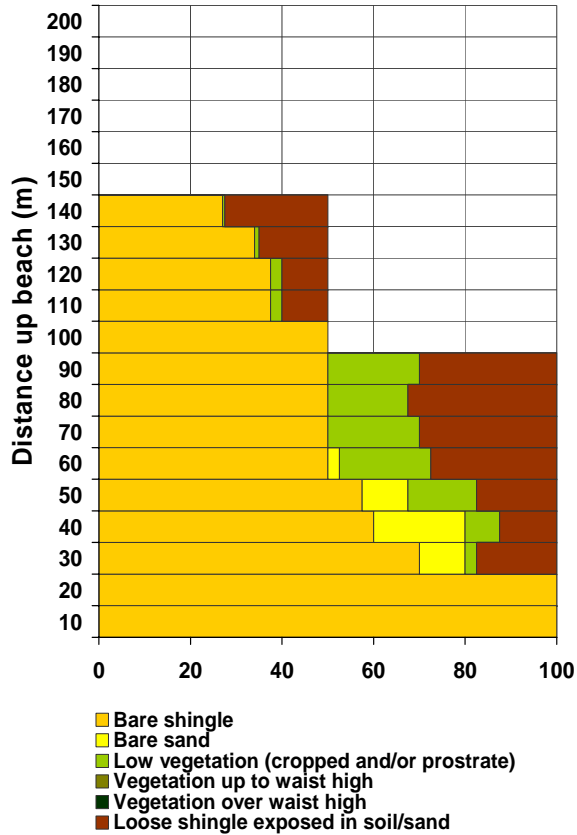


Figure E19.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

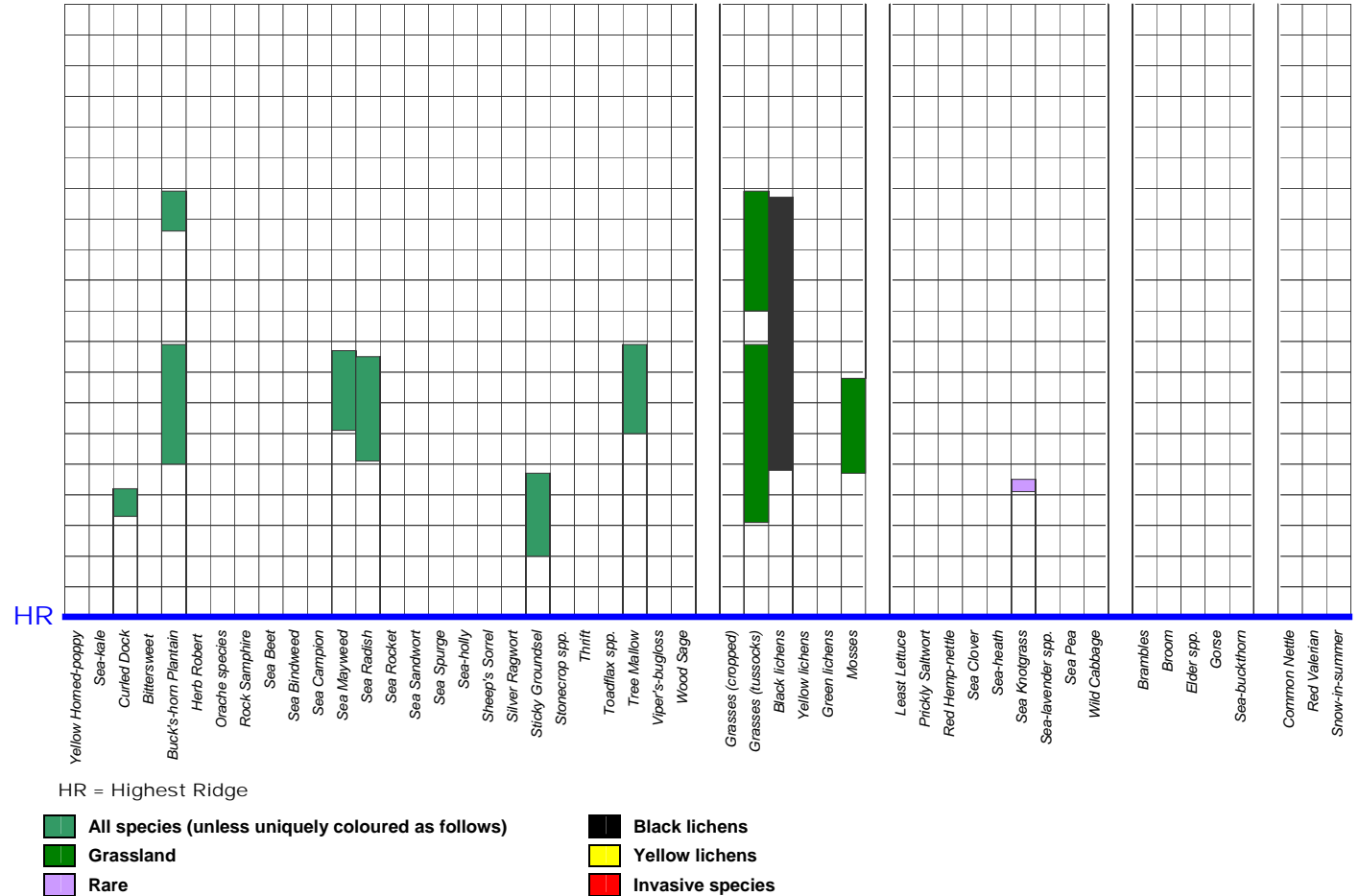


Figure E19.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 25/07/2008).

Fairlight Cove



Figure E20.1 Shows the locations of the 2008 transect surveys carried out on Fairlight Cove beach.

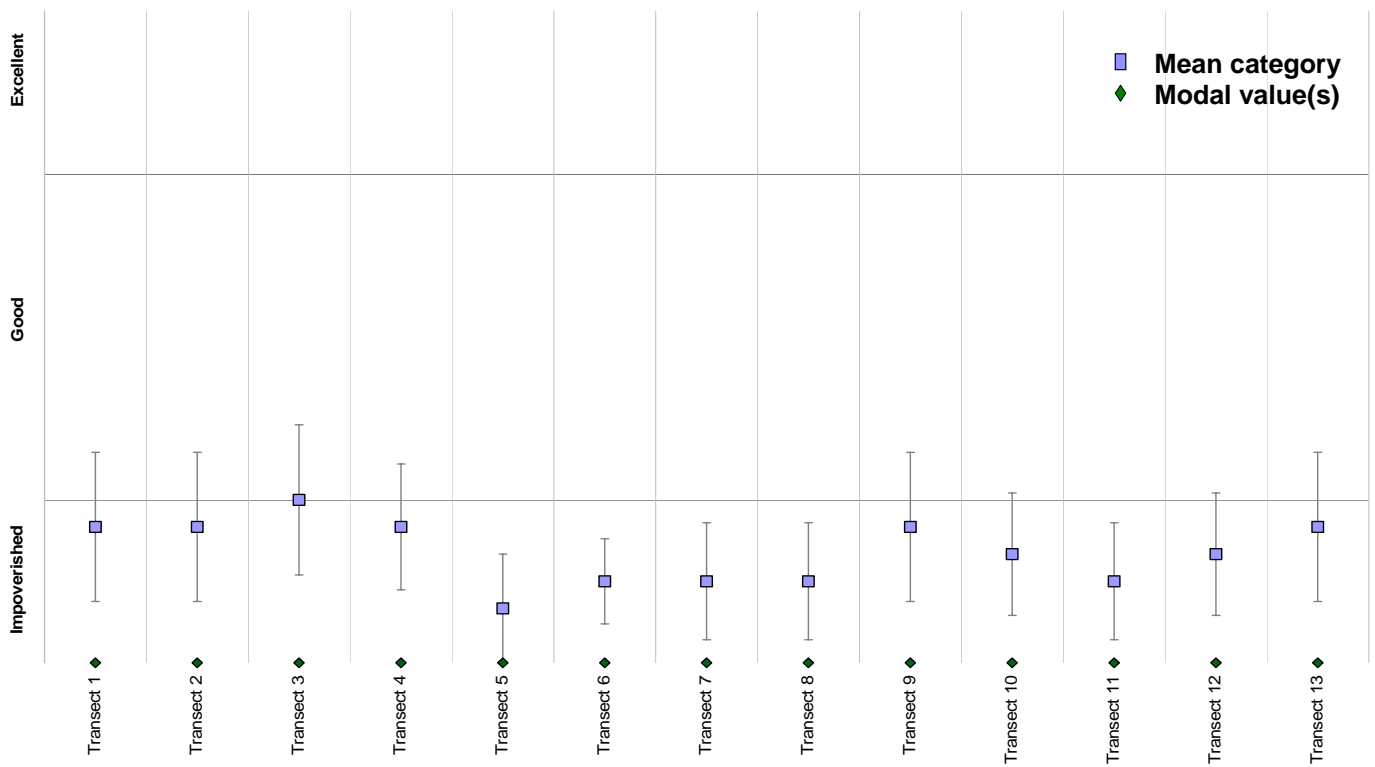


Figure E20.2 Biodiversity values for Fairlight shingle beach including mean category \pm SEM and modal value(s).

Fairlight Cove

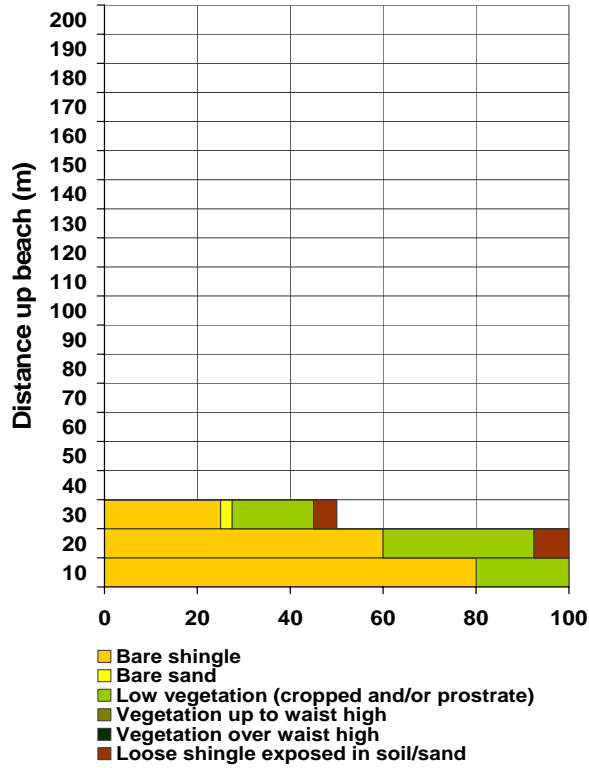


Figure E20.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

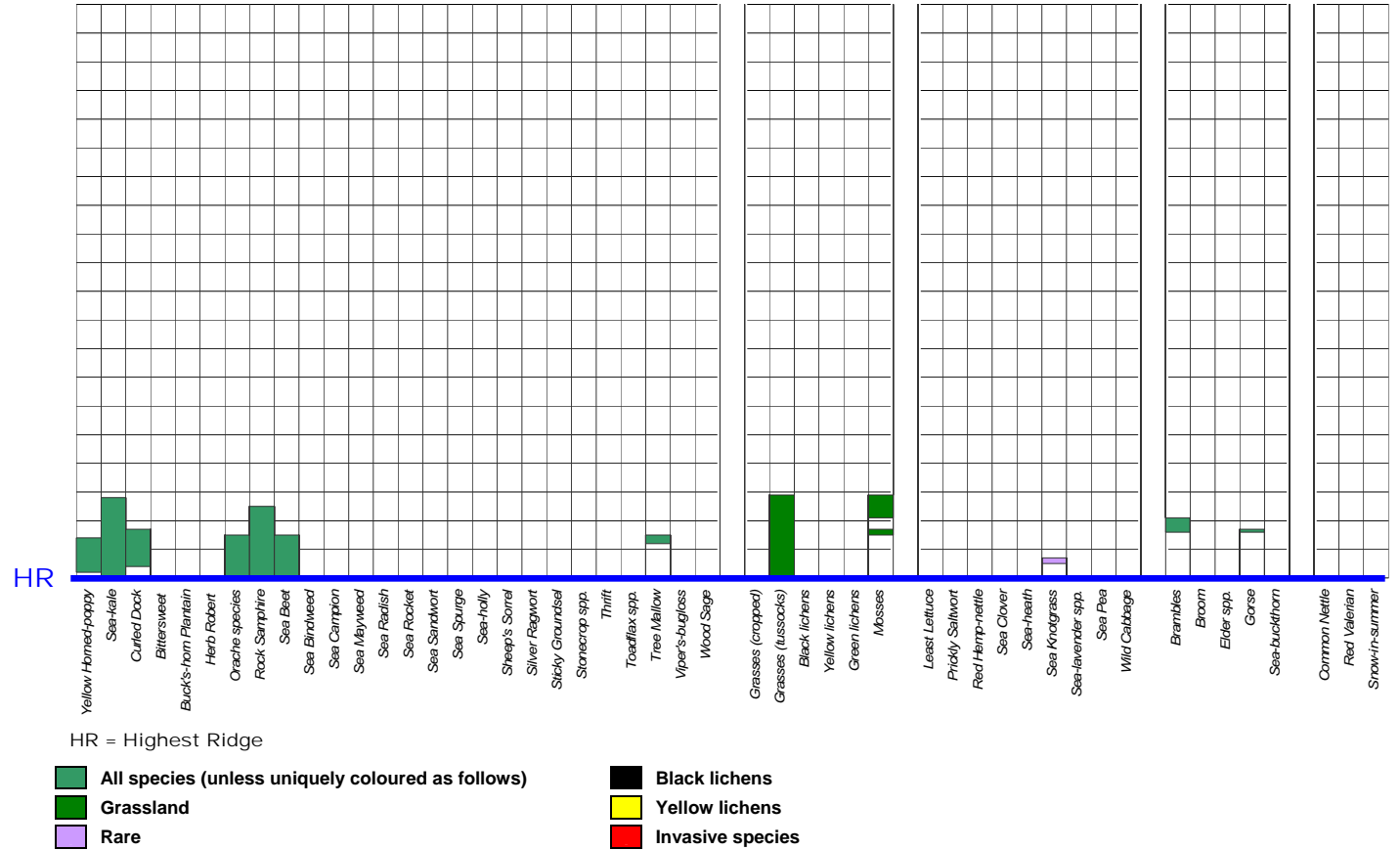


Figure E20.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 18/08/2008).

Pett beach



Figure E21.1 Shows the locations of the 2008 transect surveys carried out on Pett beach.

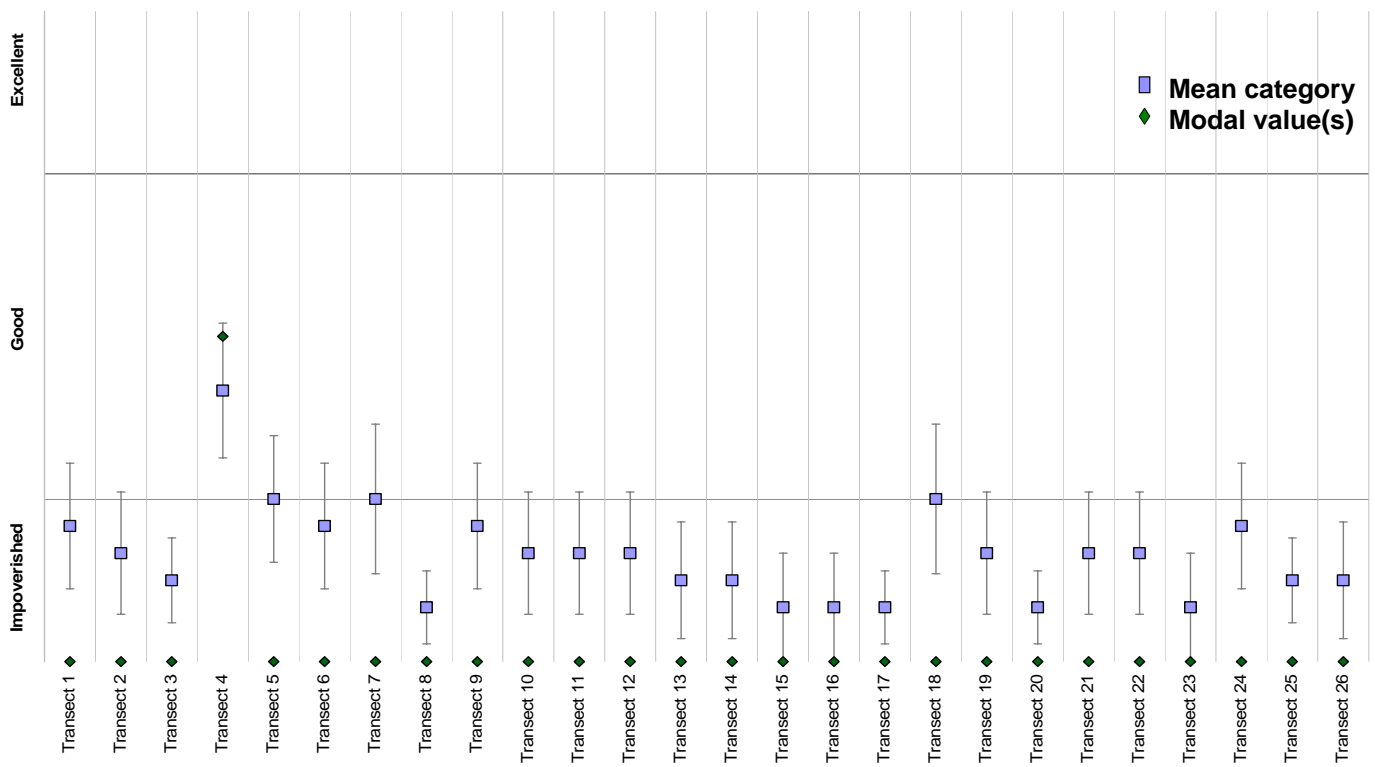


Figure E21.2 Biodiversity values for Pett shingle beach including mean category ± SEM and modal value(s).

Pett beach (western end)

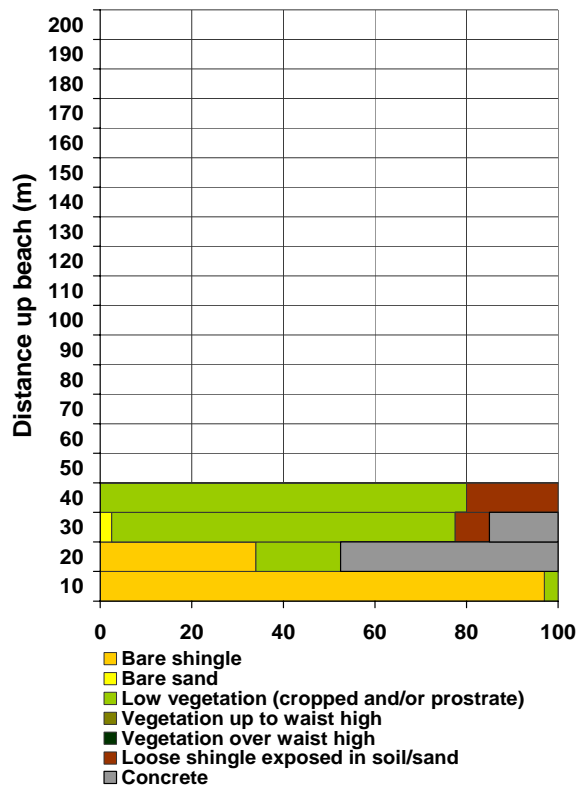


Figure E21.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

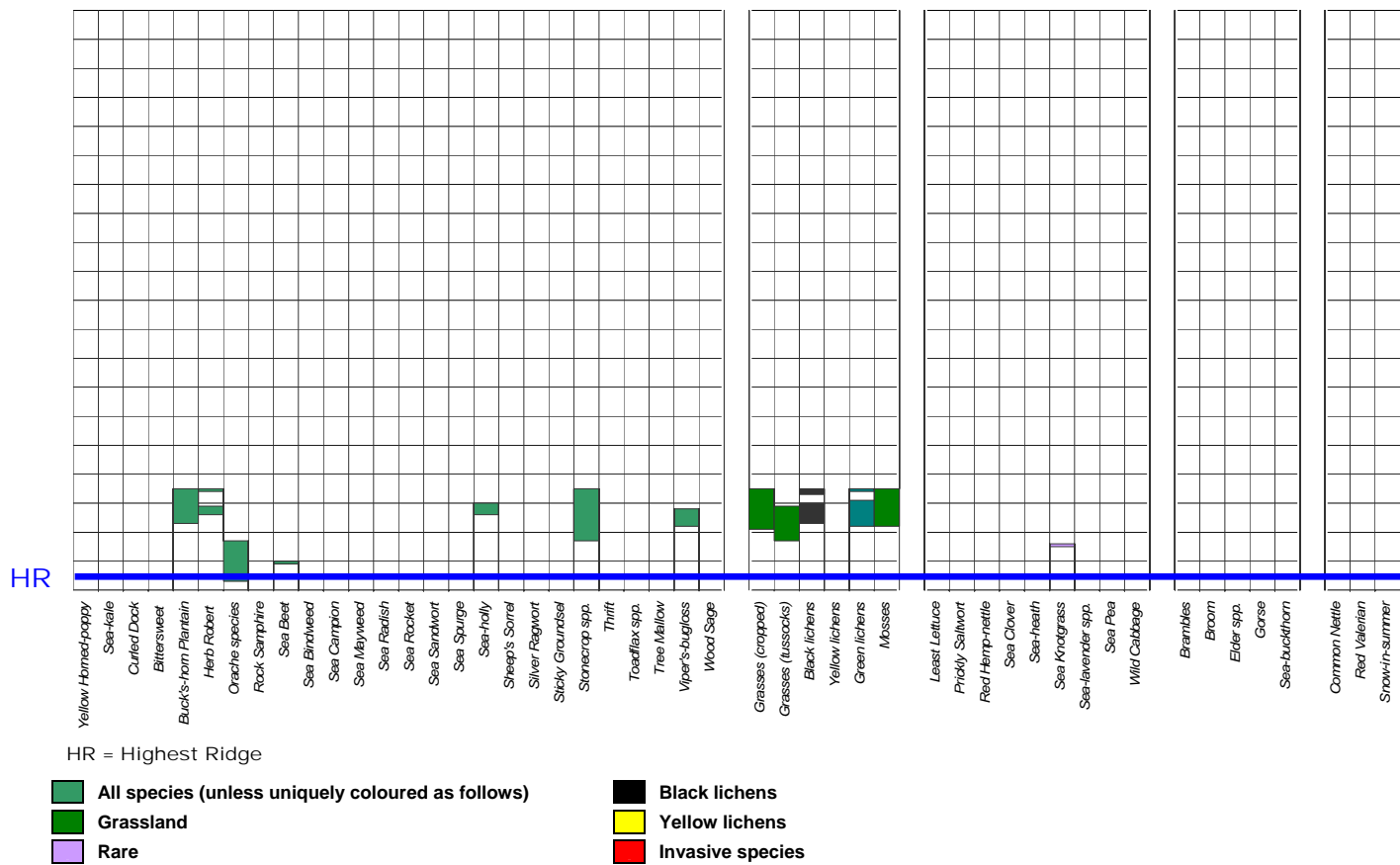


Figure E21.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 22/07/2008).

Pett beach (eastern end)

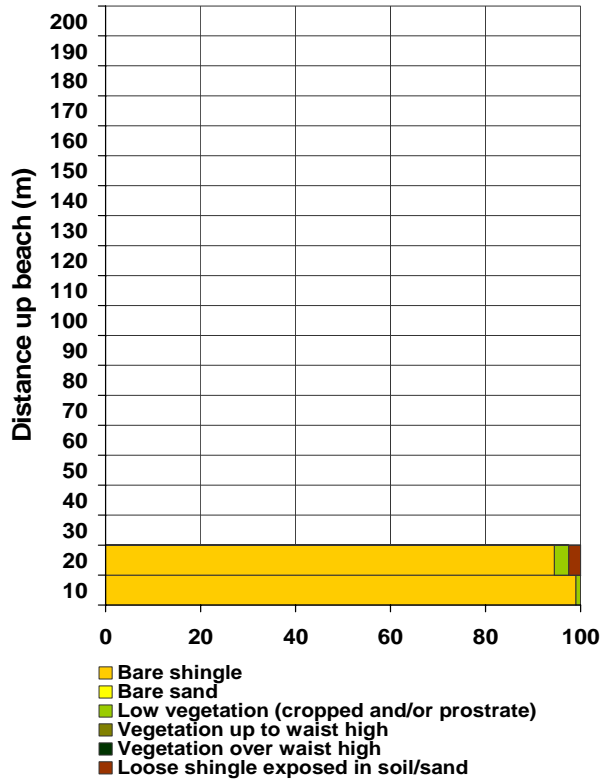


Figure E21.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

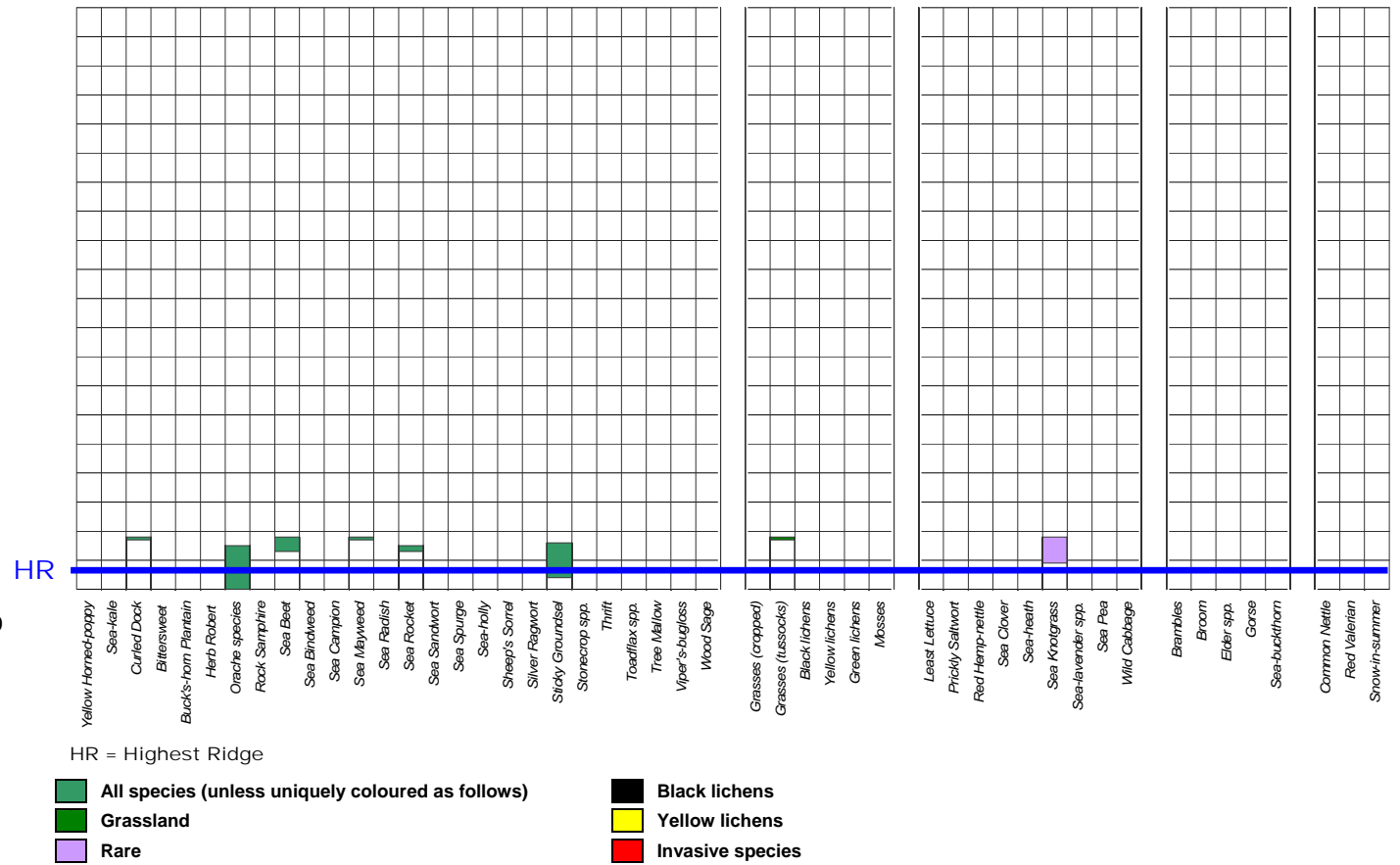


Figure E21.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 04/08/2008).

Winchelsea beach



Figure E22.1 Shows the locations of the 2008 transect surveys carried out on Winchelsea beach.

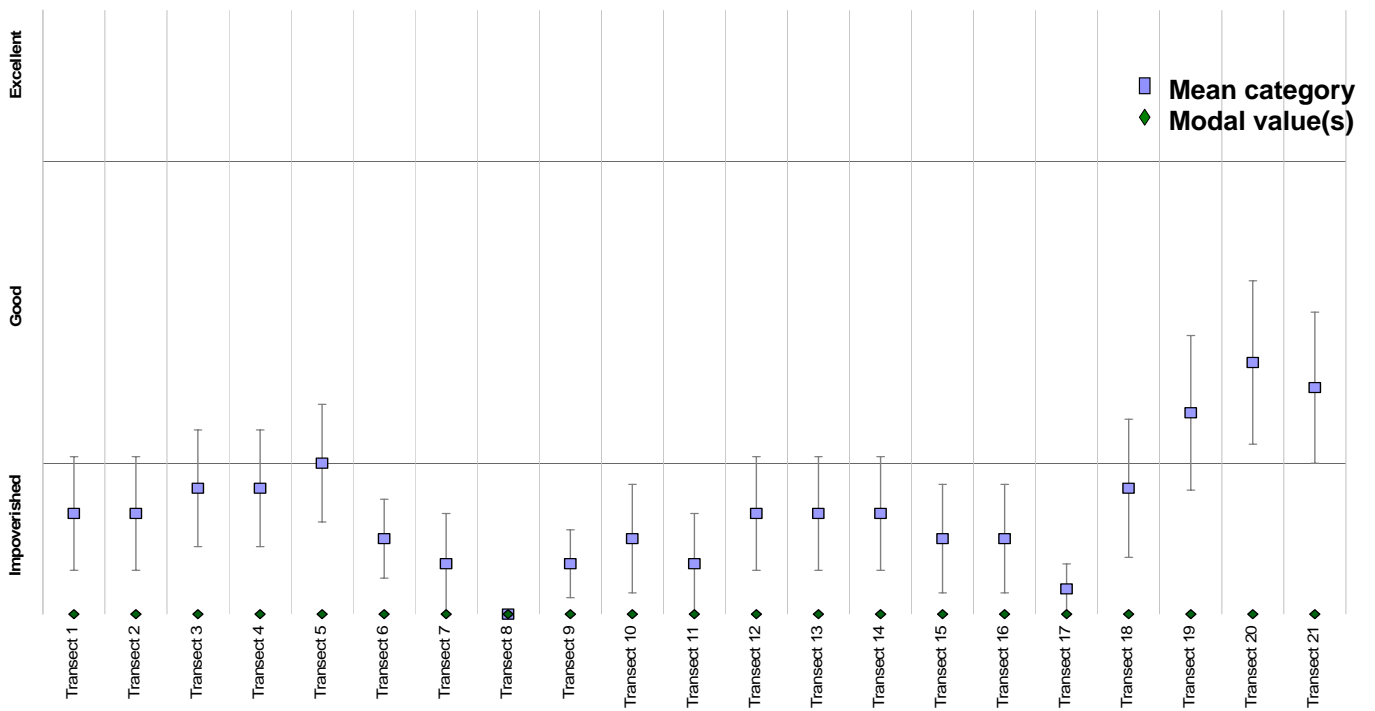


Figure E22.2 Biodiversity values for Winchelsea shingle beach including mean category \pm SEM and modal value(s).

Winchelsea (western end)

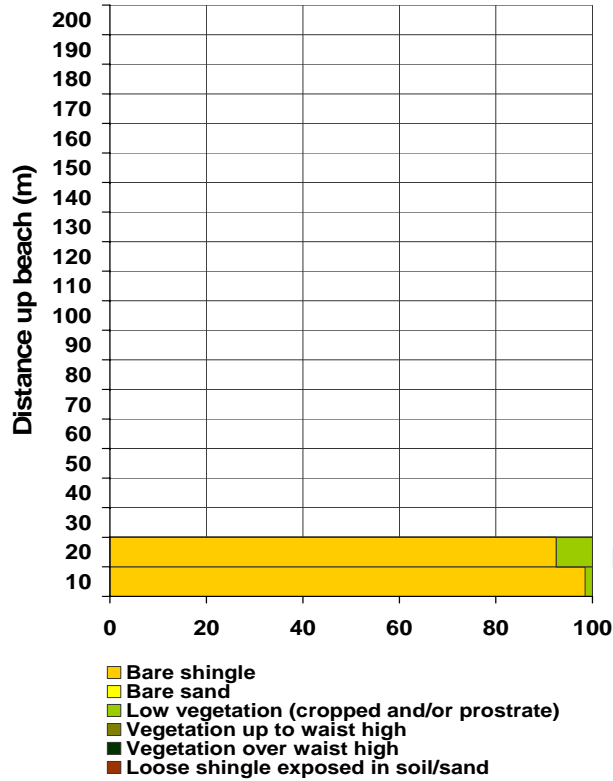


Figure E22.3 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

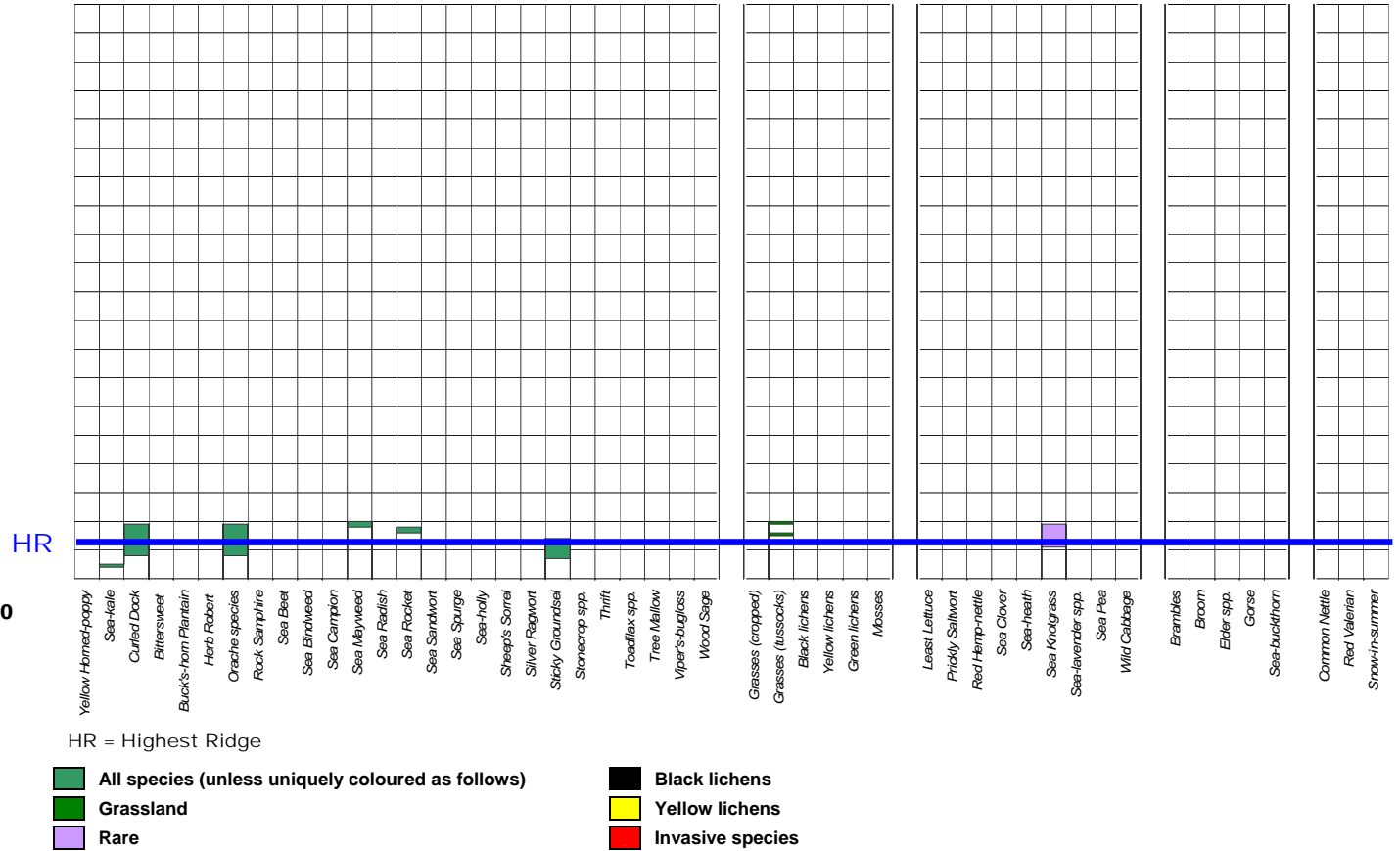


Figure E22.4 Distribution of species in 10m sections from seaward to landward side (transect information collected on 05/08/2008).

Winchelsea (central)

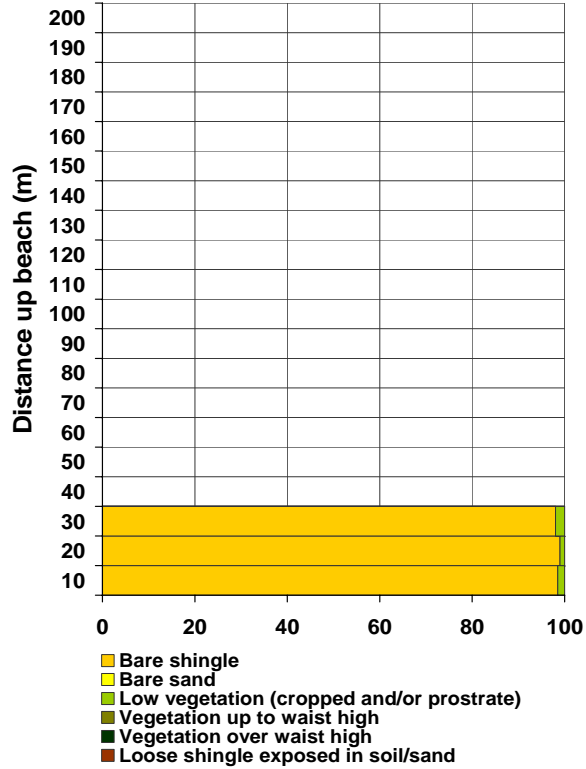


Figure E22.5 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

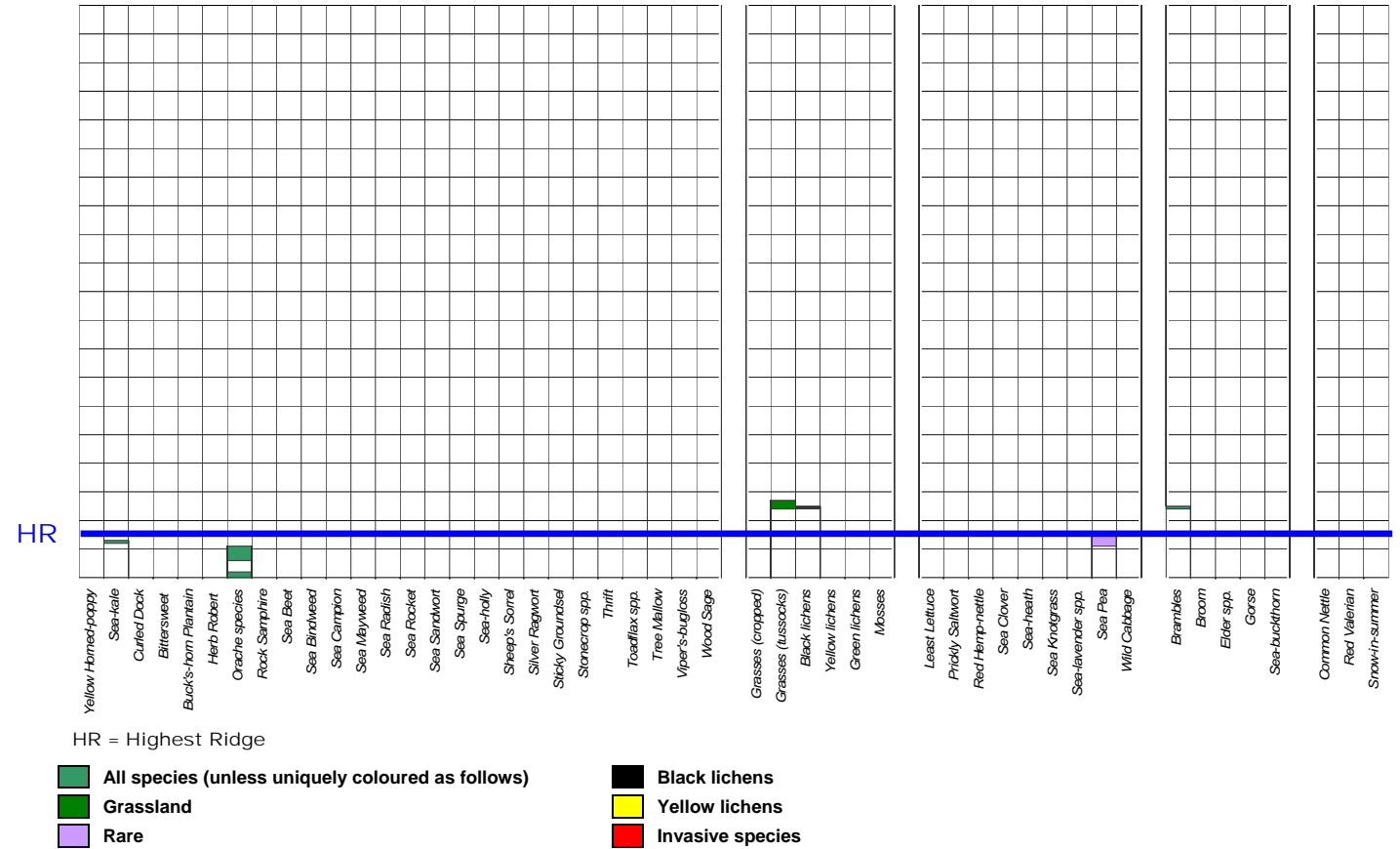


Figure E22.6 Distribution of species in 10m sections from seaward to landward side (transect information collected on 12/08/2008).

Winchelsea (eastern end)

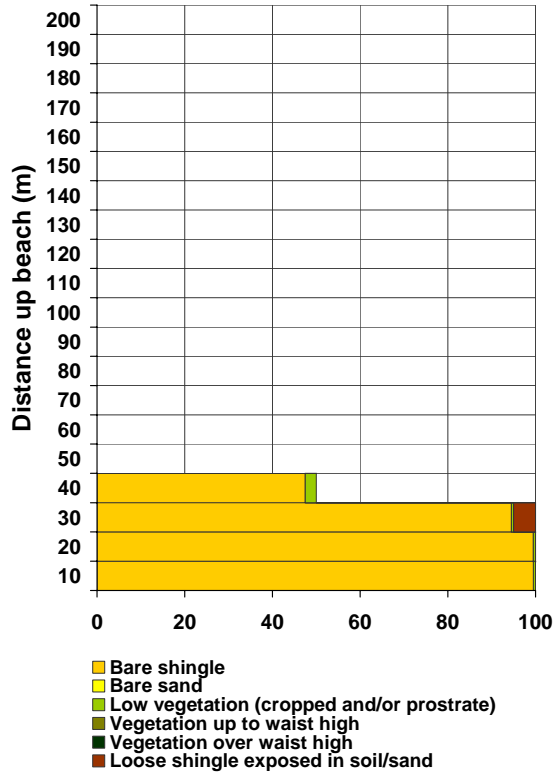


Figure E22.7 Percentage of shingle, sand and vegetation cover in 10m sections from seaward to landward side.

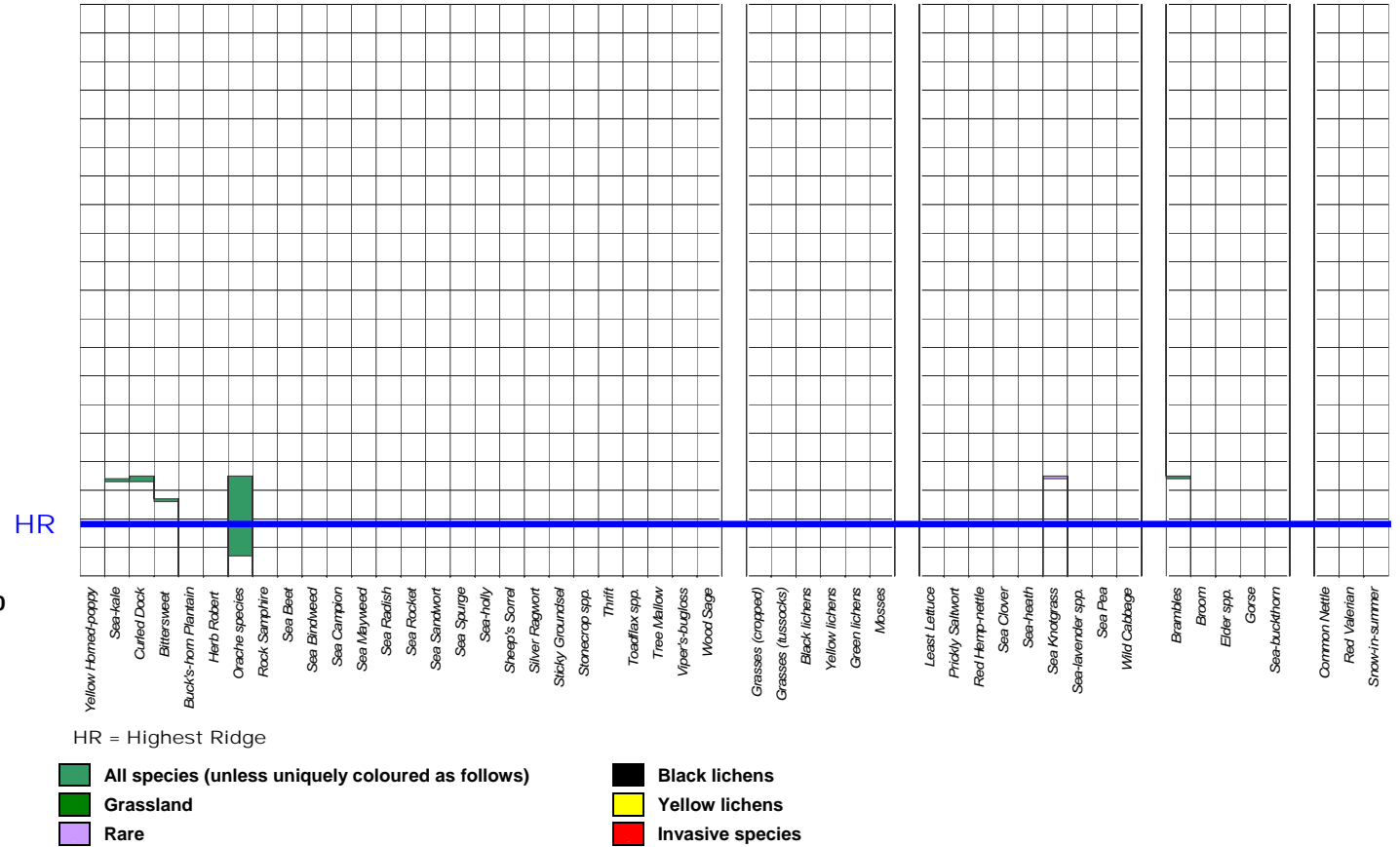


Figure E22.8 Distribution of species in 10m sections from seaward to landward side (transect information collected on 12/08/2008).