Definitions of 'Rock' and 'Hard Substrate'

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The classic concept of marine 'rock'

In the general literature and data collections 'hard substrate' is a classification of seabed and texture and strength. In dbSEABED it equates with the geotechnically defined material 'rock', based on strength, dimensions and integrity. It is material that would not be classed as loose-textured mud, sand, gravel or boulders.

At Input

For importing data having this classification into dbSEABED, extra detail on the seabed type is always sought, for instance whether what is meant is geological rock, boulders or cobbles, a thin pavement, solidified volcanic ash, reef rock from coral or oysters, hydrothermal crusts, etc. Then the detailed entry can be made, represented by a token such as "hrd_substrt(indet)", hrd_substrt(geol), "hrd_substrt(biognc)", or "hrd_substrt_INST". They represent an unidentified type, geological rock type, a cemented biogenic accumulation, or hard substrate according to the source "INST". In the dbSEABED dictionary they are given details, but the texture/strength is denoted by code "H", hard.

Thus, dbSEABED employs a geotechnical view of what is rock, not a geological view. The USDA quantifies the unconfined compressive strength of the softest class of rock as 0.6-1.25 MPa. 'Rock' has a significant areal extent and is distinguished from 'rocks' which are rock pieces. Rock does not signify bedrock; it can be a pavement or crust which is only centimetres thick provided integrity is retained (not in pieces).

On output

The same guidance applies. The output for 'percent rock presence' represents presence of significantly areally extensive consolidated earth material, no matter what composition - lithogenic or biogenic, even man-made. Thus, in an extreme example, dumped sections of highway (e.g., https://www.clarknexsen.com/blog-bridge-reef-repurposing-concrete-marine-environment/; ftp://ftp.dot.state.tx.us/pub/txdot-info/library/newsltr/cit/envision28.pdf) would classify as 'rock presence' for dbSEABED outputs, though the material would also be flagged as artificial.

Two unusual examples of materials that will be classed as 'rock':

Serpulid tube framework – harbor bottom, Italy

Concrete counts as artificial 'rock'; here, Hawaii