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Marine geologic maps used in benthic habitat characterization: A fusion of habitat metadata and geologic nominclature

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Historical marine geologic maps contain considerable information useful to the identification of marine benthic habitats. Existing maps are currently being updated with geophysical information from high-resolution bathymetry and backscatter data and groundtruthed with submersible or ROV observation and sampling. These revised maps are being used along the west coast of North America to define marine groundfish habitats. With the support of the Alaska and the California Departments of Fish and Game, and NOAA (NMFS and National Sea Grant Program), we are compiling existing seafloor geologic data with recently released industry proprietary information into a GIS (ArcView) format to produce habitat maps useful in the management of groundfish fisheries. We use a geological-based, biologically-supported, deep-water habitat scheme to distinguish the various groundfish habitats. In addition, we are developing metadata to facilitate comparisons of habitat types and geologic units within the GIS database. Fisheries information such as catch-per-unit-effort data and fish tag release and re-capture information have also been included.

Five major megahabitats, which are based on size (kilometers to 10's of kilometers, mapped at scales of 1:100,000 or larger) and depth, are defined in our metadata as continental and island shelves (0-150 m); continental slope, basin and island flanks (150-2500 m); continental rise, aprons and fans (1500-3500 m); basin floors, borderland types (1000-2500 m); and ridges and seamounts (200-2500 m). The induration of the seafloor is used to distinguish soft (sediment-covered) or hard (rock outcrop or cobble/pebble pavement) bottom types. Mesohabitats, which are based on sizes of tens of meters to kilometers (mapped at scales of 1:150,000 to 1:100,000) and macrohabitats, which are based on one to ten's of meters (mapped at scales of 1:10,000 to 1:100,000) are also distinguished in our metadata. Descriptors of bottom textures, physical processes and biology are used as modifiers. These metadata distinguish habitat type with a series of upper case, lower case and subscript letters that are associated with standard United States Geological Survey nomenclature for rock types, ages, and formation names. The intent is to develop a deep-water marine benthic habitat scheme that is intuitive and universal.