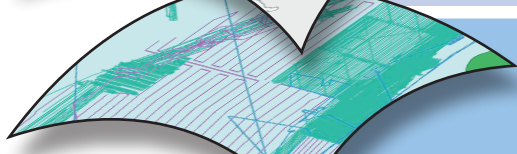
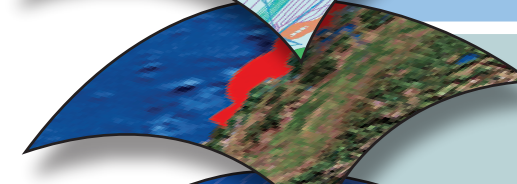




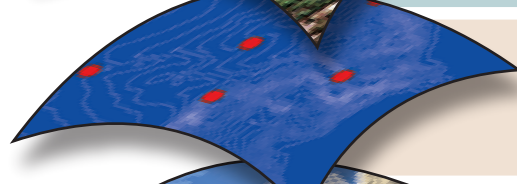
Layer Shorelines
Map Use Interface between land and water, shoreline change analyses for erosion/accretion, hazards, planning
Data Source Derived from coastal survey maps, nautical charts, aerial photos, LIDAR
Representation Linear features
Spatial Relationships Can be animated/ modeled based on map units to represent tidal variance
Map Scale and Accuracy Typical map scales range from 1:5000 to 1:20,000; locational accuracy typically 10 m
Symbology and Annotation Line symbology drawn with varying weights annotated with VDatum; national cartographic standards often used



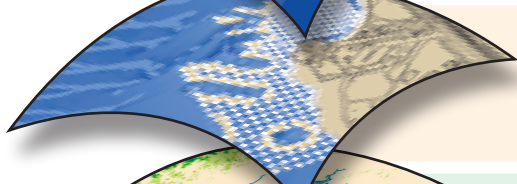
Layer Tracks and Cruises
Map Use Shiptracks during a cruise, tracks of vehicles towed from a ship or deployed from a ship untethered, autonomous
Data Source Shipboard or vehicle GPS logs storing time, date, and position
Representation Linear features
Spatial Relationships Tracks have a direction with time stamps along route, particularly keep sampling stations
Map Scale and Accuracy Typical map scales range from 1:24,000 to 1:50,000; locational accuracy ~10 m
Symbology and Annotation Line symbology drawn with varying weights and patterns, annotated with date/time and ship/vehicle



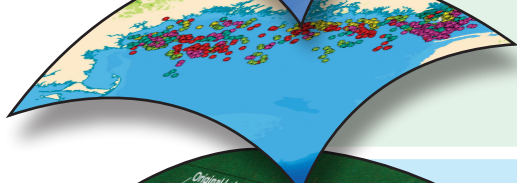
Layer Time Duration Features
Map Use Fisheries or algal bloom trawls, marine protected area boundaries, habitats, drifter tracks, oil spills
Data Source Derived from survey maps/charts, legal definitions, clipping/masking; various measuring devices
Representation Linear and polygonal features
Spatial Relationships Size, shape, area and direction change over time; may be animated
Map Scale and Accuracy Typical map scale is 1:24,000; locational accuracy ~10 m
Symbology and Annotation Line and polygon symbology with varying weights, patterns and fills



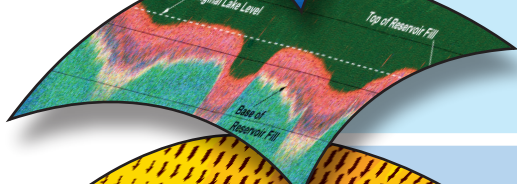
Layer TimeSeries Locations
Map Use Variations in time of variables measured at fixed observations stations at sea and onshore
Data Source Fixed or moored measuring devices such as hydrophones, acoustic doppler current profilers (ADCP), ocean bottom seismometers (OBS), tide gauges
Representation Point features
Spatial Relationships Points can be related to center of a grid cell or associated to a time series calculation or numerical model
Map Scale and Accuracy Typical map scales range from 1:10,000 to 1:24,000; locational accuracy ~10 m
Symbology and Annotation Point marker symbology with associated instrument attributes



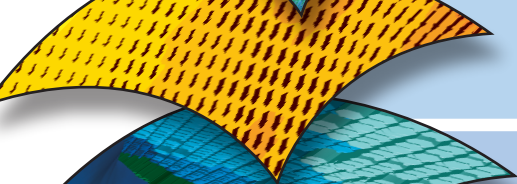
Layer Instantaneous Measured Points
Map Use Variations in space of variables measured at a given moment in time through the water column
Data Source Instrument casts such as conductivity-temp-depth (CTD), expandable bathythermograph (XBT), sound velocity profile (SVP), fish density, etc.
Representation Point features, vertical profiles
Spatial Relationships Points can have varying depths associated to a single location, as well as multiple measurements
Map Scale and Accuracy Typical map scales range from 1:10,000 to 1:24,000; locational accuracy ~10-50 m
Symbology and Annotation Point marker and linear symbology annotated with associated instrument attributes



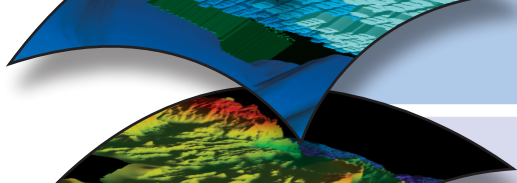
Layer Location Series Observations
Map Use Tracking a series of recorded instances of a given animal with varying time intervals
Data Source Telemetry recorders and transmitters, animal/bird sightings, ship-mounted ADCP
Representation Multipoint features, often with line symbols to establish animal track
Spatial Relationships Multipoints can have varying depths associated to multiple locations, grouped into a series based upon ID
Map Scale and Accuracy Typical map scales range from 1:10,000 to 1:24,000; locational accuracy ~10-50 m
Symbology and Annotation Point and line symbology annotated with animal/bird type



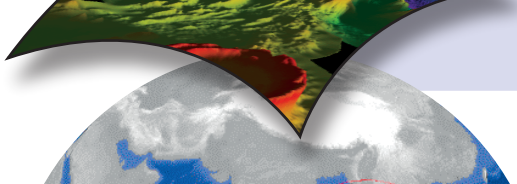
Layer Survey Transects
Map Use Geomorphic, sediment transport, or hydrodynamic analyses along profiles or cross-sections, subsurface profiling
Data Source Derived from bathymetry, scientific mesh, one-dimensional hydrological models; measured by sub bottom profilers
Representation Interpolated, linear profile view of a surface or subsurface
Spatial Relationships Cross-sections perpendicular to shoreline or flowline; profiles at varying azimuths to align with surface or control point
Map Scale and Accuracy Typical map scale is 1:24,000; locational accuracy ~10 m
Symbology and Annotation Line symbology for surface; often for subsurface tone, contrast and balance of grayscale according to data values



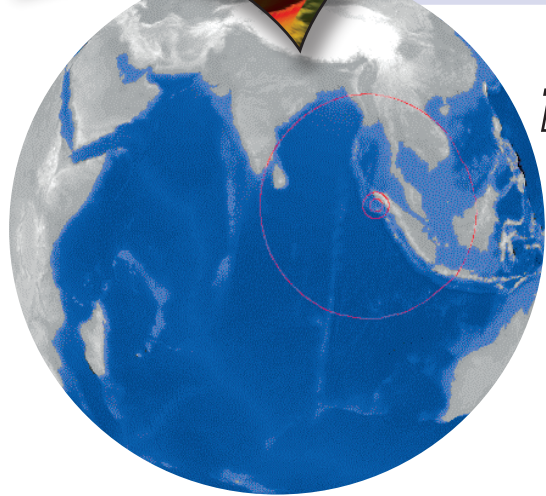
Layer Scientific Mesh
Map Use Mapping output of finite element models, hydrodynamic and hydrologic models, sea surface temperatures
Data Source Above models and satellite data sets
Representation Regularly or irregular spaced point features, scalars; raster, TIN model
Spatial Relationships Attribute values can be used to create interpolated surfaces
Map Scale and Accuracy Map scale varies and locational accuracy can range from 1 m to 1 km depending on data
Symbology and Annotation Rendered with graduated point symbols to reflect magnitude, rotated to represent direction; may be animate



Layer Mesh Volumes
Map Use Pelagic or open water environment
Data Source Derived features from scientific meshes, point data from stationary, fixed, suspended, or floating devices
Representation Extended cube or hexagonal pillars stacked to represent volumetric areas
Spatial Relationships Volumes can be related to mesh points between varying depths, or from bathymetry to sea surface
Map Scale and Accuracy Map scale varies and locational accuracy depends on data type and resulting volume calculation
Symbology and Annotation May be polygonal with varying 3D base heights; applied transparency



Layer Bathymetry and Backscatter
Map Use Terrain analysis, benthic habitat classification, morpho-tectonic interpretation, cartographic background
Data Source Interpolation of irregularly- or regularly-spaced single or multibeam soundings, LIDAR
Representation Raster with depth or backscatter intensity, TIN surface model
Spatial Relationships Coincident with point from which it was derived, or interpolated; if raster, each cell has a depth, if TIN each face joins to form surface
Map Scale and Accuracy Typical map scales and locational accuracies for shallow regions are 1:2400/1 m, or 1:20,000-1:50,000/100 m for deep ocean
Symbology and Annotation Usually shown with graduated colors; may be overlain with contours



The Thematic Layers