California Ocean Uses Atlas – GIS Data Description
Southern California Region

Background:
The Southern California Ocean Uses Atlas GIS data are derived from the participatory mapping efforts conducted during the Southern California Region Workshop series in September 2008 by the National Marine Protected Areas Center and Marine Conservation Biology Institute as a part of the California Ocean Uses Atlas Project. The spatial data were collected in a three day workshop in which regional experts were asked to draw, based on expert knowledge and experience, maps of a 26 important ocean uses throughout the region. These uses were grouped into three categories or sectors: (i) industrial and military; (ii) non-consumptive; and, (iii) fishing.

Workshop participants were asked to map, to the extent possible, three aspects of each use:

- Maximum Footprint – the total area over which the use occurs at any level within the region
- Dominant Use Areas – those areas within the maximum footprint in which most of the use occurs most of the time
- Future Trends – those areas within the maximum footprint where, based on expert knowledge, participants might expect the use to expand significantly, either in extent or intensity

For each use category, participants were divided into 2-4 breakout groups for the participatory mapping exercise. Thus, each individual use was mapped multiple times, providing a more rigorous representation of the use patterns and requiring the aggregation of data across breakout groups. Outlined below are several key points and issues related to data structure, analysis and representation.

Important Considerations about Scale and Precision:
The CA Ocean Uses Atlas project is intended to inform many types of ocean and coastal planning management by providing an unprecedented picture of how and where people use the ocean off California. The Atlas products are necessarily broad-brush representations of expert knowledge by people who know the region and its uses well. As such, the analysis and resulting products are designed to be consistent with, and to not exceed, the underlying degree of precision inherent in any participatory mapping processes. Therefore, we recommend that these patterns be interpreted and applied as unique windows on the full range of human uses of the ocean, and that they be coupled with more localized, quantitative data where reliable information exists.

Data Structure:
The data are gridded using 1 nautical mile cells as requested by CA Department of Fish and Game. Three separate datasets are provided for each use as follows:

- Maximum Footprint (Count): Number of groups whose maximum use footprint depiction included the grid cell.
- Dominant Use Areas (Count): Number of groups whose dominant use depiction included the grid cell.
- Future Trends(Count): Total area of the future use polygons for all groups in the grid cell

Recommended Data Visualization:
The data comprise approximately 19,000 1 nautical mile grid cells. The data should be symbolized using a graduated color ramp, and should include a separate class reserved for grid cells with an

area or count of 0. Area fields should be normalized by Shape Area to convert the value to a calculated relative area of the cell, ranging from 0-1.

Data Processing

The following steps were followed to process and analyze the Southern California Ocean Atlas GIS data:

General Procedures:

1. Atlas team GIS Specialist and breakout group facilitators reviewed all data and notes
    a. Detailed any instructions from group members to add/remove areas in post-processing
    b. Reviewed staff notes for any relevant data-editing comments
    c. Discussed any areas that might be judgment calls for data editing
2. Removed all slivers from individual polygons that are obvious unintended artifacts of the live drawing process.
3. Filled in holes in polygons that have been overdrawn
4. Filled any gaps where participants intended to draw polygons to encompass nearshore areas but did not completely extend polygons over land
5. Clipped all uses to Southern California region polygon, removing all portions on land or outside the Exclusive Economic Zone.
6. Merged all individual polygons into one multipart polygon per group for each use and category.
7. Clipped each group's dominant use polygon using that group's use footprint polygon.
8. Applied any use-specific rules as defined below.
9. Used Hawth's Analysis Tools For ArcGIS v 3.27 (www.spatialecology.com), performed Polygon in Polygon Analysis to calculate the number of groups selecting the cell as containing the use ([use name]_CNT field), and calculate the total area of all polygons within the cell ([use_name]_AR).

Use-Specific Data Editing:

Certain uses, including fishing and shore-based recreation, are constrained by physical factors or regulatory restrictions. The matrix below describes how those factors are taken into account in the final spatial data.

Commercial Dive Fishing	Erase any areas deeper than 40m bathymetry
Recreational Dive Fishing	Erase any areas deeper than 40m bathymetry
Shore based fishing	Clip use areas to 200 yard shore buffer
Benthic Mobile Fishing	Exclude all areas within 1 nm of shore
Scuba Diving/Snorkeling	Erase any areas deeper than 40m bathymetry
Tidepooling	Clip to 50 m shoreline buffer
Beach Use	Clip to 50 m shoreline buffer
Swimming	Clip to 50 m shoreline buffer, re-added swim lanes to Catalina
ALL Fishing	Clip polygons to any existing area-based regulations/fishery closures

*Note: All bathymetry related additions/deletions were based on depths discussed during the workshop, with 500m buffered polygons to account for inaccuracies in bathymetry data

Rules for clipping MPAs for fishing closures:
Many types of fishing are regulated spatially by state and federal laws. This section describes how those spatial restrictions were categorized and applied to the data. In order to qualify as a fully closed area for a particular use, the MPA must prohibit ALL forms of take included in the use year round.

Prohibited	Extractive use is fully prohibited for the entire suite of included fishing methods. These MPA's will be used as a clip layer for the use.
Restricted	Restrictions exist on some included fishing methods, or the MPA includes a temporal component that allows the use to occur for at least part of the year. Restrictions may also target particular species.
Unrestricted	Use is not prohibited at any time for included fishing methods. These MPA's will not be included in the clip layer for the use.

Other Fishing-Related Issues:

- Commercial dive-fishing does not include lobster fishing
- Assume all kelp harvesting in commercial
- Squid is defined as an invertebrate for purposes of regulatory restrictions on invertebrate fishing.