

Appendix F

Quality Control Procedures for Delivering ESI Data to NOAA

The following section describes Quality Assurances procedures that are performed on the ESI data before it is delivered to NOAA. Many of these processes are necessary due to the different data structures used for map production vs. the digital data product. Other checks simply verify the integrity of the digital geographic and attribute data. Once the data are delivered to NOAA, additional modification and QA procedures are performed. The culmination of these processes is delivery of the data on CD in all of the formats discussed in Section 5.

The QA/QC procedures, prior to delivery to NOAA, can be divided into four main tasks: 1) Creating/checking master coverages, 2) Converting regions to polygon *IDs*, 3) Importing/checking data tables, 4) Final delivery preparation. These procedures are performed by the GIS Manager or a senior GIS Analyst and follow a similar QA/QC procedure (emulating task1) performed by a GIS Technician.

1) Creating/checking master coverages. During atlas production, the various ESI data layers are produced and manipulated on an individual map basis corresponding to the tiles in the index coverage. For final delivery, these individual maps are joined into master coverages for the whole atlas with each data layer (e.g. birds, nests, socecon) listed separately.

The following general checks are performed for each data layer:

- Label Errors: Check that all polygons have a label (except for the universe polygon)
- Edge-matching: Check that polygon/region *RARNUMs* match across old index boundaries
- Slivers: Check that polygons below a certain area are legitimate polygons (e.g., small islands)
- Dangles: Check that lines with dangles (unconnected nodes) are legitimate (e.g., streams or breakwaters)
- Topology: Check that coverage has proper topology (is built for polygons)
- Tolerances: Check that precision = double, dangle = .000, and fuzzy = .002
- Projection: Check that coverage projection is defined
- Tics: Check that the number of tics in each coverage = number of tics in the index coverage

- Items: Check that the data layer has the proper items, item widths, and item order for its type (e.g. biology layer vs. socio-economic layer)
- Item Values: Check that items have legitimate values
- Duplicate points: For point coverages, check that there are no overlapping points
- Check that coverage names are correct (benthic, birds, esi, fish, habitats, hydro, index, invert, m_mammal, mgt, nests, reptiles, salinity, socecon, t_mammal, fishl, invertl, fishpt, habpt, invertpt, m_mampt, t_mampt, reptpt)

The HYDRO data layer should contain all arcs that define land and water polygons, as well as arcs for hydrographic features. The ESI data layer should only contain arcs that make up ESI-ranked shoreline or ESI ranked polygons. The following checks are performed specifically for the ESI data layer:

- Check for blank aat and pat items
- Check that shoreline bordering flats have double rankings (e.g. 10A/7 or 5/9A)
- Check other polys that might need double shoreline rankings (e.g. 10A,2A,8A)
- Check for proper line codes on land polys (i.e., no "F" on land polys)
- Check for proper line codes on water polys (no 'M' on water polys)
- Check only outline (study area boundary) codes = 'I' or 'E'
- Check that dangles are piers and breakwaters

2) Converting regions to polygon ids. During atlas production, Biology and Management *RARNUMs* are created and manipulated as region features. In this system, many polygons can constitute a single region with a single *RARNUM*. For final delivery, each polygon in a data layer receives a unique *ID* and region features are dropped. This unique *ID* relates the individual polygon to the *RARNUM* for that polygon (i.e., the *RARNUM* for the region to which that the polygon belonged during production). At this stage, it is possible for new *RARNUMs* to be created where two or more regions overlap (i.e., where a polygon is part of two different regions). The new *RARNUM* would contain the BIORES table information for all of the *RARNUMs* that the polygon was associated with in region format.

A series of AMLs (ARC Macro Language programs) are used to convert the region-formatted data layers to polygon based data layers, and to add *RARNUMs* created during this procedure to the database. Also produced are a series of look-up tables (LUTs),

which relate the polygon *ID* to its associated *RARNUM*. The newly created polygon data layers are then checked for the following:

- Label errors
- Items
- Topology
- General visual inspection

3) Importing/checking data tables. During atlas production, the data tables are stored and manipulated in separate database software. For final delivery, these tables are converted to INFO format.

The following checks are performed on the data tables:

- Items: Check that each table has the proper items, item widths, and item order
- Item Values: Check that items have legal values (as outlined in this document)
- Check that all *RARNUM*s in LUTs are also in BIORES and SOC_DAT (delete extras)
- Check that all records in BIORES and SOC_DAT have related records in SOURCES (delete extras in SOURCES)
- Check that all records in BIORES have related records in SPECIES, SEASONAL, STATUS and BREED
- Check table names

4) Final delivery preparation. In the final stage, the data is prepared for delivery to NOAA where further modifications and data checks will be performed and the data is distributed.

- The data layers are projected to geographic coordinates, and the projected coverages are checked for label errors, and correct topology
- Coverages and data tables are loaded into ArcMap and related to one another, then random checks are performed comparing the digital data with the hard-copy atlas maps and tables
- Export files for the projected and geographic coordinate data sets are created for the coverages and data tables
- Metadata documents are finalized
- Export files, metadata, and hardcopy atlas PDFs are written to CD