June, 1993

The Global Dataset

Background

The United States began to methodologically consider the environmental effects of its actions with the passage of the environmental protection laws in the late 1960s. Since then, the Environmental Impact Statement (EIS) has become the mode by which the U.S. government details in a comprehensive, standardized manner the potential effects of its actions on the environment. Many other countries throughout the world perform similar evaluations.

However, no agreement exists as to how the effects of actions should be documented for large areas that lie beyond territorial claims (normally the oceans) called the "Global Commons."

In 1978, a Presidential Executive order made the U.S. responsible for its actions in the Global Commons and ensuing regulations made this environmental responsibility official Department of Defense and Army policy.

Objective

The Army asked the Construction Engineering Research Laboratories (CERL) to implement a prototype capability to assist in the evaluation of potential environmental risks associated with proposed actions. The emphasis of the original work was in the Global Commons areas, though it has now expanded to include the entire earth. The evaluation capability was intended to support the generation of documents similar in format to an EIS.

Data

When work on the prototype began, no "standard" global dataset existed. CERL began developing one by translating the best existing digital data so that it could be used with the Geographic Resources Analysis Support System (GRASS). Hardcopy library sources were digitized and integrated into the dataset as well. (One of the strengths of GRASS is its ability to integrate data of different original resolutions.)

Types of geographically referenced data which are of interest include vegetation, soils, bioproductivity, threatened species, oceanography, topography, climatology, demographics, economics, cultural concerns, and fisheries. The sample global dataset contains the following eight files which provide users with data for the development of evaluative models and global analysis techniques.

NOTE: These files have not undergone any quality control review. They are for teaching and illustrative purposes only.

Filename: *eco*
Major world ecosystem complexes ranked by carbon in vegetation
File size: 41,627 bytes
The global ecology map shows the spatial distribution of major world ecosystem complexes estimated for 1980. Only the mass of green plants is considered here, because the amount of animal biomass is small in comparison. The mass of fungi and bacteria is not necessarily negligible, but evaluating it was beyond the scope of the 1983 report.
References:
1. Olson, J.S. 1982. Earth's Vegetation and Atmospheric Carbon Dioxide, pp.388-398. In W.C. Clark (ed.), *Carbon Dioxide Review: 1982*. Oxford University Press, New York.
2. Olson, J.S., Watts, J.A., Allison, L.J. 1983. Carbon in Live Vegetation of Major World Ecosystems, ORNL-5862, *Environmental Sciences Division Publication No. 1997*, Oak Ridge National Lab, Oak Ridge, TN.

File name: *edges*
0ne-meter elevation around the world
File size: 156,541 bytes
Generated by Gmapcalc, an early version of the current GRASS 4.1 release of *r.mapcalc*.

File name: *nations*
Political Boundaries
File size: 214,248 bytes
This file came from a digitized map of the political boundaries of the world as of January 1982. The scale of the map was 1:40,000,000 and the projection was a Miller Cylindrical projection. The error in this map could be greater than 1 cell. Some of the small island nations were too small to digitize and thus are not present. The boundaries on this map are not authoritative. Generated by VECT_TO_CELL, an early version of the current GRASS 4.1 release of *v.to.rastfR.*

File name: *soil.f*
UN Food & Agricultural Organization Soils
File Size: 16,973 bytes

File name: *soil.slp*
UN Food & Agricultural Organization Soil Slope Groups
File size: 14,049 bytes

File name: *soil.tex*
UN Food & Agricultural Organization Soils Texture
File size: 13,097 bytes
Based on the FAO 1974 Soil Map of the World and on the Matthews vegetation data set (1983; 1984). Methods and characteristics described by Zobler (1986). Zobler's data is resampled to a 1 degree grid size; fills in data missing from the original map, and reconciles certain discrepancies.
Reference:
NOAA/NCAR from NASA Goddard Space Flight Center, Institute for Space Studies, NASA Tech Mem #100685, B. Staub & C. Rosenzweig generated by Mimportcell.

File name: *veg.1deg*
File size: 199,049 bytes
NASA Goddard Space Flight Center Technical Memorandum #86107: Natural (Pre-agricultural) vegetation, E. Matthews, 1983 generated by Mimportcell. Natural (preagricultural) vegetation based on the UNESCO classification system. A complete discussion of the vegetation dataset is found in: E. Matthews, 1983, Global Vegetation and land Use: New High Resolution Data Bases for Climate Studies,"J. Climat. Appl. Meteor." 22, 474-487.
Reference: NASA Goddard Space Flight Center Technical Memorandum #86107: Natural (Pre-agricultural) vegetation, E. Matthews, 1983 generated by Mimportcell.

File name: *veg.prod*
Normal Vegetative Production
File size: 396,533 bytes
Derived from a set of 45 months of data acquired from NOAA Geophysical Data Center in Boulder, CO. The original data was cleaned of marine areas, clouds, barren soil, and rocks as much as possible. Then each data layer for all months was averaged over the period available (April 1984 to December 1988) into an expected value during a one month period of time. Valid data has a range of 4 to 60: 4 being desert, 20 being moderately high, 30 being high, and 40 being extremely high vegetative (green leaf chlorophyll) production. Generated by Gmapcalc, an early version of the current GRASS 4.1 *r.mapcalc*.