Inventory and Mapping of Urban Forest Canopy, Land Cover and Natural Areas

client:
Metro Regional Parks and Greenspaces

+ *Ecotrust* used satellite imagery to create a map of the urban forest canopy of the greater Portland metropolitan area.

+ *Ecotrust* created a 17-class map of land cover using image change analysis techniques to update a previous map and image processing to map previously unmapped areas.

+ *Ecotrust* developed a comprehensive GIS model to identify potential natural areas and mapped natural area characteristics using integrated GIS models.

ECOTRUST

The Metro Regional Parks and Greenspaces Department contracted *Ecotrust* to inventory and map urban forest canopy, land cover, and natural area vegetation in the three county metropolitan area of Portland, Oregon. Metro's primary objectives were to monitor the rate of loss of cover and natural areas and to identify regionally significant natural areas and wildlife corridors in the Portland metropolitan area and its vicinity in order to protect them. The project area included over 1,000 square miles.

Ecotrust's project team used a combination of image processing and geographic information system (GIS) modeling techniques to create three unique data layers of forest canopy cover, land cover, and natural area characteristics. Landsat Thematic Mapper (TM) satellite imagery was used as the primary source data, and was supplemented with digital photography and a suite of other existing GIS data.

Unsupervised image classification techniques were used to discriminate and map urban forest canopy cover using an August 1998 Landsat TM digital satellite scene. The image was separated into approximately 150 spectral classes based solely on spectral information. Spectral responses in the imagery, interpretation of digital aerial orthophotography, and ancillary GIS data were utilized to categorize each spectral class into one of four forest canopy cover classes: 0 - 25%; 26 - 50%; 51 - 75%; and 76 - 100% forest canopy cover.

A 17-class land cover map was developed by updating and utilizing a 1992 land cover map and classifying areas not previously classified, using the 1998 Landsat imagery. A comparison between the 1998 Landsat scene and a July 1991 Landsat scene used to create the 1992 map was used to update and reclassify the 1992 land cover map. Once the areas of change were identified their current land cover and land use status was classified through manual photo-interpretation. Classification of new areas that were not previously mapped was accomplished using a combination of the 1998 Landsat TM imagery, aerial photography, and digital orthophotos.

Potential natural areas were identified based on the land cover classification and other ancillary data. A GIS model was developed to identify natural areas based on vegetation type and relative proximity to roads, water, wetlands and other vegetation types. Standard GIS modeling techniques were used to classify each natural area according to a range of attributes including patch size, water availability, vegetation community, spatial heterogeneity, adjacent land uses, width of riparian corridor, and average slope and aspect.

Ecotrust delivered three fully documented digital data layers to Metro: (1) a raster GRID of urban forest canopy cover, (2) a raster GRID of land cover, and (3) a polygon coverage of natural areas with an associated characterization database. Hardcopy maps were also created for each layer.

Metro is a regional government serving 1.3 million people living in the Portland metropolitan region, encompassing 24 cities in Multnomah, Clackamas and Washington counties.

An Ecotrust Project Profile

Sample Maps: Urban Forest Canopy, Land Cover, and Natural Areas in the Portland Metro Area

An Ecotrust Project Profile: Inventory and Mapping of Urban Forest Canopy, Land Cover, & Natural Areas