

Today's

Tire Industry

The educational resource for tire dealers, retreaders and rubber recyclers.

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Mapping Waste Tire Piles with Satellite Imagery

by Mary Sikora
TIA Tire Recycling Director

San Francisco, California-based Endpoint Environmental (2E) is the first in the United States to use satellite imagery to create maps of waste tire piles. The method, called the Tire Identification from Reflectance (TIRE) Model, is a computer-assisted image

processing algorithm. The output from the TIRe Model, when used in conjunction with manual image interpretation techniques, will produce a map of tire piles from commercially available, high-resolution satellite imagery. 2E currently holds a two-year subcontract with San Francisco State University to map waste tire piles in California and along the California/Mexico border for the California Environmental Protection Agency's Integrated Waste Management Board (CIWMB). 2E Founder and CEO, Catherine Huybrechts, and her colleague Becky Quinlan, developed the TIRe Model while employed with the DEVELOP Program at NASA's Ames Research Center, during a pilot project funded by CIWMB in 2005. Four study areas, each approximately 62 square miles, were mapped in both northern and southern California. CIWMB withheld information on at least three tire pile sites in each study area to test the TIRe Model. All test sites were identified along with two previously unknown tire pile sites in two different study areas.

The TIRe Model is able to identify piles as small as 100 densely-grouped tires, which covers approximately 36 square feet on the ground. The TIRe Model identifies the darkest objects in the image, including tire piles, shadows, water, debris piles, and objects with tire material content such as black tarps, polyethylene tubing, and parking lots. A trained image analyst compares the TIRe Model output with the original satellite image and separates tire piles from other dark subjects to create a map. Maps produced at 2E feature the following information: pile location (longitude, latitude coordinates); street, city, county data;

and additionally requested information such as census data, topography, or parcel maps. Maps are provided to clients as: hard-copy form, a 2E Workbook (workbook/atlas for field managers), a Web-GIS site, or 3D Visualization.

High-resolution satellite imagery is great for locating scrap tire piles that can otherwise be hidden from plain view. Imagery also serves as physical evidence and can be used in court proceedings, which is valuable when an unfortunate incident has incurred with a noncompliant citizen. Mapping tire piles with satellite imagery reduces long-term costs and time required by field inspectors to identify sites. The model can also be used to locate and map other environmental nuisances such as debris piles, landfills, or other waste-related issues.

2E is a geospatial technology products and services company, which sells sophisticated yet accessible maps to government clients throughout the United States. "The added value of our products is what we call Quick-Response Mapping, which is essentially a proprietary method for creating maps from satellite imagery," Catherine Huybrechts said. "Quick-Response Mapping reduces the time traditionally required to create maps, enabling our clients to make faster policy, environmental, and/or economic decisions," Huybrechts said. Endpoint Environmental is a woman-owned small business with work experience at NASA's Ames Research Center, DARPA Grand Challenge, and the University of California, Berkeley. For more information please call 415-292-5068 or visit www.endpointenvironmental.com. ■



These samples of 2E hard copy maps (above left) reveal waste tire piles in the field (above right).