



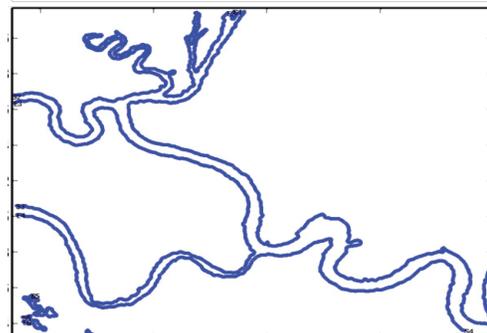
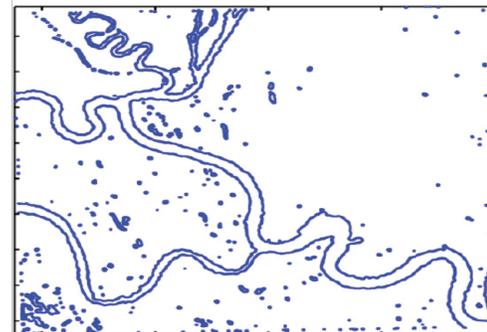
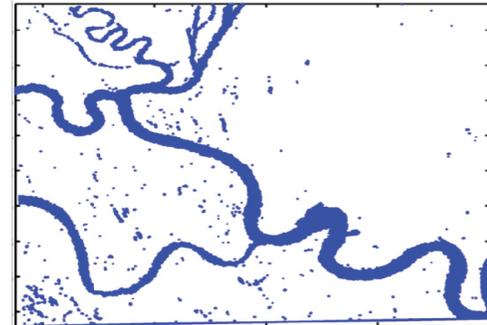
NAVAL RESEARCH LABORATORY

The Corporate Laboratory for the Navy and Marine Corps

Shoreline Extraction Algorithm

The US Naval Research Laboratory detachment at Stennis Space Center has developed an algorithm and software to quickly and easily extract shoreline data from remotely sensed imagery. The Navy's innovative approach extracts water and non-water point pixels, and employs a unique interrelation between the two in order to generate highly accurate boundaries that are properly ordered and oriented for GIS applications. The system determines water/non-water points by calculating the entropy or roughness in the image. This approach requires only a single-channel image of sufficiently high resolution and positional accuracy for the desired result—there are no a priori requirements of image format, size, color space, or sensor used.

Edge points identified at the water/land interface are then properly ordered and oriented by creating three-point segments with normal vectors pointing into the center of the river. Proper order is then calculated, resulting in open



Benefits

- **Accurate:** The innovative combination of edge and water pixels determined by entropy and using those points together to properly orient each edge point typically results in a root-mean-square deviation less than twice as large as the ground sample distance of the imagery
- **Image Agnostic:** Requires only a single-channel image in any georeferenced format and from any sensor source with sufficient resolution for the desired output
- **Simple and Tunable:** The technique does not require pre- or post-processing but the user can specify up to three parameters to refine the sensitivity and resolution of the output

Status and Opportunity

- Issued US patent 8,238,658 and published US patent application 2013/0330010 are available for license
- Potential for collaboration with NRL Stennis Space Center researchers
- Additional information available at techlinkcenter.org/boundaryextraction

The US Navy has developed an innovative combination of water pixels (top) and water edge pixels (middle) to create accurate water boundaries (bottom) from a wide range of imagery sources.