

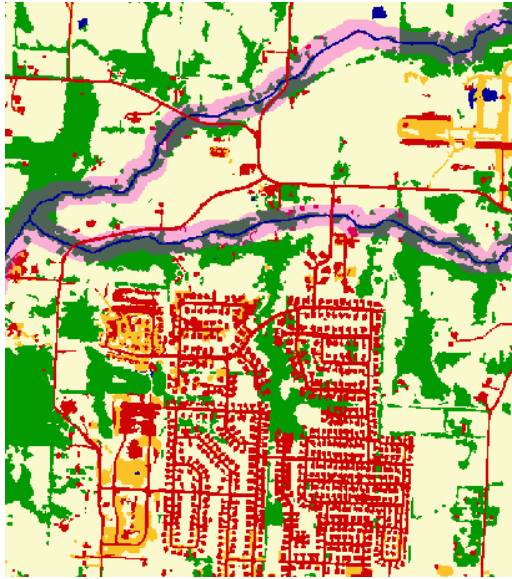
## **ArkansasView Research Topics:**

### **Riparian Corridor Delineation**

The purpose of this study was to identify land-use and land-cover types existing along stream channels within the City of Fayetteville, Arkansas' utility planning area for the expressed purpose of identifying riparian corridor. Riparian habitat comprises the zone adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems that mutually influence each other. Therefore, a riparian corridor is area composed of continuous riparian habitat, like the land on either side of a river bank or the area around a lake. Protecting riparian corridors improves water quality, provides wildlife habitat and prevents flood damage, and is, therefore, a critical part of any watershed management plan.

The first step in protecting riparian corridors is to identify them. These areas, however, pose some unique problems to traditional remote sensing and image processing techniques. Riparian corridors, especially in areas impacted by human activity such as urban or agricultural landscapes, are quite narrow and not easily identifiable with medium resolution sensors. Additionally, because riparian habitat can be comprised of various land-cover types, from forest to gravel bars, they are not neatly classified using spectral classification techniques, especially using satellite imagery from high spatial resolution, yet low spectral resolution, sensors. Clearly, if satellite imagery alone is to be used, non-spectral characteristics inherent in the satellite imagery must be utilized.

Some specific solutions to the problems mentioned above were solved through the utilization of image segmentation and object oriented classification techniques made possible with eCognition software. High spatial resolution satellite imagery from the QuickBird satellite was segmented at a number of scales with equal emphasis on the "color" and "shape" parameters. This segmented image was used, along with a five-category land-cover map, and a buffered river channel map, in a customized nearest-neighbor classification that also took a number of spatial characteristics into account: proximity to streambed, segment size, segment shape, and proximity to modified landscapes all played a part in the final output map. The overall results are still under investigation, but the techniques being developed offer much promise.



Riparian Corridor Map

Map Legend

- |   |                       |   |                   |
|---|-----------------------|---|-------------------|
|    | Impervious Surface    |  | Non-Riparian      |
|    | Forest & Woodland     |  | Riparian Corridor |
|   | Grasses & Pastureland |   |                   |
|  | Exposed Soils         |   |                   |
|  | Water Bodies          |   |                   |