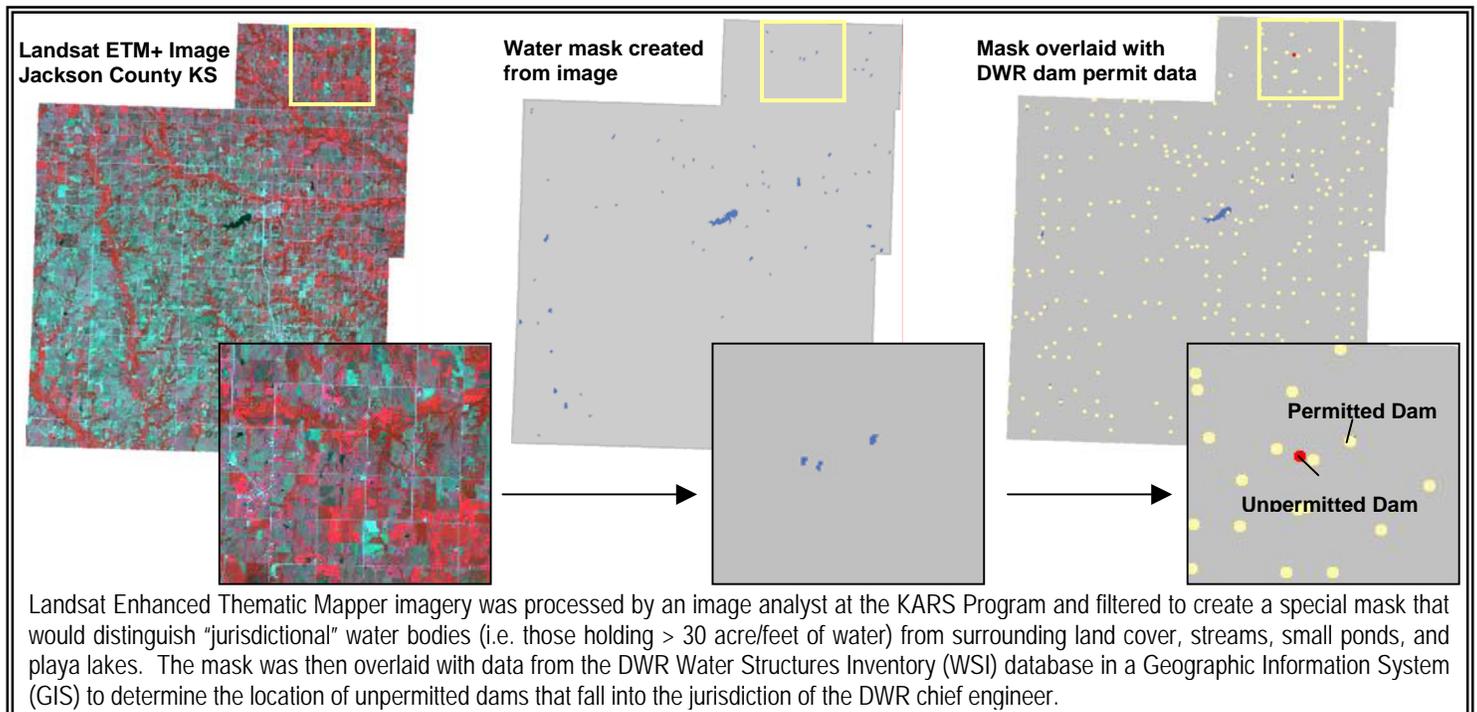


## Using Landsat ETM+ Data to Inventory & Monitor Unpermitted Dams in Kansas

**Dr. Stephen L. Egbert**, Kansas Applied Remote Sensing Program, University of Kansas (segbert@ku.edu); Jerry Whistler, Kansas Applied Remote Sensing Program, Brianna Mosiman, Kansas Applied Remote Sensing Program



Kansas law requires that all dams impounding more than 30-acre feet of water (at the top of the dam) must be inspected and permitted by the chief engineer of the Division of Water Resources (DWR), KS Department of Agriculture. There are many unpermitted structures scattered across each of the state's counties and these unregulated structures impact downstream water flow and can, if constructed improperly, result in significant public safety issues. The job of locating unpermitted structures is made difficult and expensive by the sheer extent of the area to be monitored relative to the staffing resources available for the job. Recently, DWR teamed with the Kansas Applied Remote Sensing Program to develop a cost-effective solution.

### Project Goal

The objective of the project was to create a statewide inventory of water bodies impounded by dams for the purpose of identifying dams that were constructed without permits. Landsat Enhanced Thematic Mapper (ETM+) satellite images were used with ancillary data to map impounded water bodies to determine which

dams currently have permits; and ultimately, to target for follow up unpermitted dams that may pose a threat to public safety. Over 600 impounded water bodies across the state were identified as potentially having unpermitted dams. Water bodies not flagged for further evaluation, but visible on the water mask include natural lakes (such as oxbow lakes), cooling ponds, and sewage treatment ponds. Fewer dams were recorded as we moved west - this trend mirrors the precipitation trend in Kansas and was expected, as western Kansas is much dryer. The statewide inventory was delivered to the DWR and they have followed up by assigning engineers to inspect each potentially unpermitted dam.

### Significance

The primary benefit of using a remote sensing approach to statewide dam inventory is the tremendous savings realized in terms of staff time and expense in creating the inventory. Costs for developing the baseline inventory were kept down by leveraging the availability of statewide Landsat data through the **Kansas Satellite Image Database**, funded by the KS GIS Policy Board and the USGS AmericaView<sup>SM</sup> Consortium.

