

Remote sensing – GIS based mapping of channel migration in parts of the Colville River, Alaska.

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Active sedimentologic and geomorphologic processes have played an important role in guiding the channel migration in the Colville River in Alaska. Analysis of the spatio-temporal pattern and extent of this migration is important in understanding the evolution of the river system, and in extrapolating migration trends for the near future. This information is also critical in planning strategies for river management.

Remote sensing images provide a 'snap-shot' in time of large terrains, making it possible to map the channel extents retrospectively, and in near real-time. The new generation of high resolution satellite images makes it possible to extract information on a scale which was impossible to imagine a decade ago. Using remote sensing images spanning over several years, it is now possible to reconstruct the channel migration pattern reliably for large river systems. Combined with geologic, topographic, anthropogenic and other ancillary information in a geographic information system (GIS), an integrated analysis of the complex phenomenon can be performed.

This work presents a pilot remote sensing - GIS based study of parts of the Colville River. Remote sensing images acquired in the optical and microwave part of the electromagnetic spectrum have been used to map the channel extents. Satellite images for selected regions of the river, covering a ten year period from 1991 to 2001, indicate a lateral channel migration ranging from approximately 32 meters/year to 46 meters/year.

The present study needs to be extended to cover the entire Colville River. The quantitative estimates of migration need to be validated using field based information. Further research is required to automate the monitoring and quantification of channel migration. It would also be interesting to carry out such a study on other rivers and compare the evolution of large river systems.