Riparian Disturbance & Remote Sensing Technology: A Novel Method to Identify Vulnerabilities within Urban Areas of the Willamette River Basin

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Through the application of remote sensing technology and the utilization of ArcGIS mapping software, this study validates the importance of riparian vegetation, and extends this knowledge further by accurately identifying vulnerabilities within urban areas of the Willamette River Basin. Riparian vegetation provides shade crucial to the maintenance of cool temperature in the stream, as well as root structure and support that prevents the excess runoff of minerals such as phosphorous. Due to population growth, urban areas in Oregon have been expanding, leading to loss of riparian area and declines in stable water quality. This study helps to accurately identify crucial areas in need of restoration. To isolate vulnerabilities, riparian disturbance within urban growth boundaries was mapped over a ten year period using ArcGIS software and Landsat OLI data. Temperatures were then assessed through the application of Landsat TIRS data to determine the effects riparian vegetation on water temperature in the Willamette River Basin. Through this process, twenty vulnerabilities in the Willamette basin were pinpointed and then compared to six areas that maintained stable riparian over the ten year period. Data analysis revealed over two million square meters of riparian vegetation disturbance within urban areas between 1995 and 2005, as well as significantly higher water and land temperatures (by four and eight degrees Celsius respectively) along the river near vulnerable areas opposed to stable areas. Ideally these findings can assist in the restoration of current vulnerabilities, the identification of future vulnerabilities, and the prevention of further unanticipated riparian disturbance.

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