

TECHNICAL REPORT DOCUMENTATION PAGE

|   |   |  |  |
|---|---|--|--|
| 1. Report No.<br>FHWA/07(06), vol. II of V  | 2. Government<br>Accession No.                              | 3. Recipient's Catalog No.   |  |
| 4. Title and Subtitle<br>Channel-Bed Degradation in Major Oklahoma Streams<br>Cimarron River  |   | 5. Report Date<br>December 2007  | 6. Performing Organization Code        |
| 7. Authors<br>Avdhesh K. Tyagi and Moti KC  |   | 8. Performing Organization Report No.  |  |
| 9. Performing Organization Name and Address<br>Avdhesh K. Tyagi<br>School of Civil and Environmental Engineering<br>Oklahoma State University<br>Stillwater, OK 74078   |   | 10. Work Unit No.  | 11. Contract or Grant No.<br>Item 2191 |
| 12. Sponsoring Agency Name and Address<br>Oklahoma Department of Transportation<br>Planning & Research Division<br>200 N.E. 21 <sup>st</sup> Street, Room 3A7<br>Oklahoma City, OK 73105  |   | 13. Type of Report and Period Covered<br>Final Report  | 14. Sponsoring Agency Code<br>HTFS-16  |
| Supplementary Notes   |   |  |  |
| <p>15. Abstract</p> <p>The purpose of this research is to analyze the flowline data and relate it to the degradation of the river bed at bridge locations in the river. This information may then be used to replace or rehabilitate those bridges that experienced severe degradation.</p> <p>Natural alluvial rivers are seldom in a state of equilibrium. Streams are not inherently unstable but they are often out of equilibrium due to imposed conditions. When the sediment transport is interrupted by a dam, the flow may become sediment-starved and prone to erode the channel bed and banks, producing channel incision, and coarsening of bed material. A determination of magnitude and rate of channel-bed degradation is important to understand the geomorphic response of the channel to the alterations imposed by reservoirs and other possible implications.</p> <p>The river stations 10 (Bridge key b14518) and 11 (Bridge Key b14517) at I-35 have experienced 10.99 feet and 15.31 feet of channel-bed degradation, respectively in 46 years. When these bridges are reconstructed in the replacement cycle, it is recommended that a detailed hydraulic and geotechnical analysis should be performed.</p> <p>It is recommended that degradation of tributaries is evaluated to determine the structures where flowline is severely degrading in Cimarron River basin.</p> |   |  |  |
| 17. Key Words<br>Degradation, Cimarron River, and flowlines   |   | 18. Distribution Statement<br>No restriction. This publication is available from the office of Planning & Research Division, Oklahoma DOT. |  |
| 19. Security Classification. (of this report)<br>Unclassified   | 20. Security Classification. (of this page)<br>Unclassified | 21. No. of Pages<br>83   | 22. Price                              |