Riparian Dilemma: Riverbank Cap Adaptations for Continued Resilience

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Background/Objectives. The Zidell riverbank and sediment cap in Portland, Oregon, was constructed on the Lower Willamette River in 2011 and 2012. The Zidell site required a cap over 12-acres of contaminated riverbank and sediment after 80 years of industrial operations left the property contaminated with PCBs, metals, PAHs, and asbestos. A self-mitigating riverbank cap design concept was constructed that relied heavily on bioengineering of the riverbank, though armoring concessions were made during the endangered species consultation to keep the project on schedule. After 7-years of establishment, the protective elements of the remedy are generally robust along this half-mile stretch of river.

An unusually long period of high water in 2017 pushed minor problem areas to become significantly degraded despite aggressive efforts at vegetation establishment. An understanding of the bank damage and a change in the river conditions has led to an adaptation of the bioengineering design to provide the long-term resilience that is required of the containment-based remedy.

Approach/Activities. Repair of minor erosion areas and vegetation reestablishment at the lowest elevations were a common “to do” on each year’s maintenance list.

The discovery of more significant damage prompted an evaluation of the engineering design basis and final design. The evaluation considered river dynamics, weather patterns, local recreation habits, even past court decisions. The evaluation found that:

- River conditions had changed since the development of the design, with more routine occurrences of extended high water coinciding with good boating weather.
- While successful in more than 95% of the site, there was a breakdown in the bioengineering strategy in an elevation zone where groundcover plants would not establish due to extended inundation in the spring and the coverage of the riparian shrubs, leaving no ground protection.

Results/Lessons Learned. During the evaluation to more fully understand the performance issues that were occurring at the waterline transition, the team realized that sacrifices that were made during permit negotiations likely contributed to the need for repair. The proposed design adaptation restores some of those original design features, most significantly several areas of supplemental riprap or modified bioengineering with cobble soil cover.

The original permit agreement allowed the initial remediation work to proceed on schedule. The adaptation of the design in these limited areas has resulted in an overall reduction in the amount of hard surfacing/river cobble that would have been applied to the riverbank, but the original armoring compromise now comes at a cost of renewed permitting effort and remobilization of contractors.

The presentation will review the results of the evaluation, repair concept development, renewed permit and mitigation requirements, and construction methods.