

## **ABSTRACT**

### **THE TIER APPROACH: AGRICULTURAL TMDL PRIORITIZATION IN THE LOWER BOISE RIVER WATERSHED**

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The Lower Boise River flows sixty-four river miles west from Lucky Peak Reservoir to its confluence with the Snake River at the Idaho/Oregon border. Its watershed encompasses over 1300 square miles including some of the most productive and diverse agricultural land in the state of Idaho. Irrigation is intensive and consists primarily of surface applied water with siphon tubes into corrugated furrows. The rapidly urbanizing Treasure Valley within the watershed includes three of the five largest cities in Idaho and supports a population of 460,000 (over one-third of the states total population). In January of 2000 the US Environmental Protection Agency approved a total maximum daily load (TMDL) in the Lower Boise River for sediment (TSS) and bacteria (*E. coli*), while a proposed nutrient (total phosphorus) TMDL for the river is currently under review. Water quality monitoring conducted throughout the TMDL process indicates that agricultural land uses contribute significantly to pollutant loading in the Boise River. As a result of urbanization, agricultural acreage within the watershed is rapidly decreasing. In order to maximize limited funding opportunities and focus Best Management Practice (BMP) implementation on critical acreage projected to remain in agriculture, the Idaho Soil Conservation Commission developed a GIS-based tier approach that is now being used in watersheds throughout Idaho.

Hard copy Farm Service Agency (FSA) aerial photography was used to digitize every farm field within the Lower Boise River using ArcView GIS 3.2 and X-tools Extension software. The digitized fields were subsequently grouped into tributary subwatersheds. In order to capture the rapid conversion of agricultural land to urban and suburban uses, the digitized field maps were used throughout the watershed for intensive field truthing and modification. Additionally, sub-categories of agricultural land including method of irrigation, cropland, pastureland, Confined Animal Feeding Operation/Animal Feeding Operation, and proximity to 303(d) listed stream were identified for each individual farm field.

As a result of irrigation water re-use within each of the tributary subwatersheds, siphon irrigated farm fields directly adjacent to impaired streams typically have the most significant influence on water quality. These fields were identified as “Tier 1: high priority for BMP implementation” and typically had a pipe discharging directly into a stream of concern. Siphon irrigated farm fields where irrigation tailwater re-use was likely to occur on at least one field before entering a stream of concern were identified as “Tier 2: medium priority for BMP implementation.” Tailwater from Tier 3 fields was used multiple times on Tier 1 and Tier 2 fields before discharging into a stream segment of concern, and were identified as “low priority for BMP implementation.”

Over 200,000 acres of agricultural fields were digitized, field truthed, and prioritized for BMP implementation. Of this acreage, 163,270 acres within twelve tributary subwatersheds were identified as potentially contributing pollutants to the Lower Boise River. This was narrowed down to 27, 519 acres of Tier 1 agricultural land where funding and BMP implementation is currently focused. Water quality monitoring within the watershed since the incorporation of this strategy indicates a positive trend and reduced pollutant loading.