

EXECUTIVE SUMMARY

This document presents a Total Maximum Daily Load (TMDL) and framework water quality restoration plan for three impaired streams in the West Fork Gallatin River watershed: the West Fork Gallatin River, the Middle Fork West Fork Gallatin River and the South Fork West Fork Gallatin River. The West Fork Gallatin River watershed is located within the Gallatin Range south of Bozeman, Montana and encompasses the mountain community of Big Sky as well as several mountain resorts. This plan was developed by the Montana Department of Environmental Quality (DEQ) and submitted to the U.S. Environmental Protection Agency (U.S. EPA) for approval. The Montana Water Quality Act requires DEQ to develop TMDLs for streams and lakes that do not meet, or are not expected to meet, Montana water quality standards. A TMDL is the maximum amount of a pollutant a water body can receive and still meet water quality standards. The goal of TMDLs is to eventually attain and maintain water quality standards in all of Montana's streams and lakes, and to improve water quality to levels that support all state-designated beneficial water uses.

DEQ has performed assessments determining that the above streams do not meet the applicable water quality standards. The scope of the TMDLs in this document address sediment, nutrients, and e.coli related problems on the three aforementioned streams (See **Table 1-1**). The document provides an evaluation of existing water quality data, assesses pollutant sources contributing to impairment conditions and estimates pollutant loading reductions and allocations that will result in attainment of water quality standards. The document should be used as a guide to understanding water-quality related issues in the West Fork Gallatin River watershed and developing implementation plans to remedy known water quality problems related to sediment, nutrients and e.coli. Below is a brief synopsis of water quality issues addressed by the Plan.

Sediment

Sediment-related impacts were identified as a cause of impairment on the West Fork Gallatin River, the Middle Fork West Fork Gallatin River and the South Fork West Fork Gallatin River. Anthropogenic sources of sediment include upland and bank erosion associated with residential/resort development, ski areas, logging, and removal of riparian vegetation, stormwater from construction sites, and unpaved roads, culvert failure, and traction sand.

Recommended strategies for reducing sediment inputs include applying Best Management Practices (BMPs) to developed lands that will enhance and maintain riparian vegetation, improve ground protection in disturbed areas and construction sites, lessen the risk of culvert failure, and reduce the transport of traction sand and unpaved road sediment into streams.

Nutrients

Nutrient-related impacts were identified as a cause of impairment on the West Fork Gallatin River, the Middle Fork West Fork Gallatin River and the South Fork West Fork Gallatin River. Soluble nitrogen (NO₃+NO₂) has been identified as the primary pollutant affecting nutrient-related water quality impairments. Anthropogenic sources of NO₃+NO₂ include nitrogen released to groundwater from residential and recreational development, which includes ubiquitous land-clearing, maintenance and management activities within the watershed. In addition to residential and recreational sources of nitrogen, wastewater-derived nitrogen loads

were identified as a significant source of nitrogen contributing to the West Fork Gallatin River through the area of the Big Sky Golf Course: wastewater sources are believed to be related to spray-irrigation of wastewater and/or sewer infrastructure failures within the reach.

Recommended strategies for reducing residential and recreational nitrogen inputs include applying Best Management Practices (BMPs) to developed lands that will reduce groundwater infiltration of soluble nitrogen, and to encourage building and development practices that incorporate water quality planning and pollutant mitigation into development planning. Further investigation into wastewater-derived nitrogen sources in the West Fork and South Fork West Fork Gallatin Rivers is recommended in order to refine source assessment findings and inform restoration and mitigation planning.

E. Coli

E. coli-related impacts were identified as a cause of impairment on the Middle Fork West Fork Gallatin River. Anthropogenic sources of e. coli are primarily non-point sources related to residential and recreational development, and include pet waste, waterfowl, and various non-point sources associated with developed landscapes. Discrete e. coli point sources were not identified in sampling or source assessment activities.

Recommended strategies for reducing residential and recreational e. coli inputs include applying Best Management Practices (BMPs) to developed lands that will maintain riparian buffer zones, and limit overland flow to streams from parking lots, streets, and other impervious developed areas. Public education regarding e. coli impacts and how tourists and residents may limit e. coli inputs is also recommended.

Implementation of most water quality improvement measures described in this plan is based on voluntary actions of watershed stakeholders. Ideally, the TMDL and associated assessment and evaluation information within this document will be used by local watershed groups, stakeholders and regulatory agencies as a tool to guide and prioritize local water quality improvement activities. These implementation and mitigation activities should be addressed further within a detailed watershed restoration plan consistent with DEQ and EPA recommendations. Presently, the Blue Water Task Force, a local collaborative watershed group, is leading stakeholder involvement and development of a comprehensive watershed restoration plan for the West Fork Gallatin River watershed.

It is recognized that a flexible and adaptive approach to most TMDL implementation and mitigation activities may become necessary as additional information is gained through continued monitoring, assessment and restoration activities. The Plan includes a framework strategy for further monitoring and assessment activities that will assist in refining source assessments and allow tracking of progress toward meeting TMDL water quality goals.