Summary of Snake River Watershed

Stressor Identification Report

Why is it important?

The Snake River Watershed lies within Marshall, Polk, and Pennington Counties. The Snake River orginates six miles west of Newfolden and flows southwest through Warren and Alvarado before turning northwest and meeting up with the Middle River about five miles before the confluence with the Red River. The watershed drains 956 square miles and has 39 streams that are protected for designated beneficial uses.

Water bodies in the watershed provide habitat for fish and aquatic insects (aquatic life), vegetated corridors for wildlife, and recreation such as fishing and canoeing. Roughly 79% of the landscape is cropland, 7% wetlands, 3% rangeland, and 5% is developed (homes, roads, businesses, etc.); less than 1% is open water.

Main concerns are sediment from soil and instream erosion, nutrients, wetland protection/resoration, surface water quality, flood damage reduction, and connectivity (dams and other barriers to fish movement).

A stressor identification study was done to more clearly define "candidate causes" of biological impairments to fish and aquatic insect communities in the Snake River Watershed. A total of 11 reaches had impairments, including segments of the Snake River, Middle River, South Branch of the Snake River, Judicial Ditch 28, and Judicial Ditch 29.

Key issues

The five stressors that are the likely cause of the impairments are:

- Loss of connectivity (fish movement impeded by ditches, dams, other structures)
- Unstable flow regimes ("flashy" conditions, high flows after spring runoff and rain events, and very low, sometimes no flows at other times)
- Lack of instream habitat (lack of cover, high sediment in spawning areas, etc.)
- High suspended sediment levels can damage gills, cause fish to avoid certian areas, reduce visibility, and contribute to low oxygen conditions
- Low dissolved oxygen levels (worse in late summer due to low flows and higher temperatures).

Highlights of report

- Several potential connectivity barriers (dams and private road crossings) were identified along the reaches; however, there is no conclusive evidence these barriers are affecting fish communities. More investigation is needed to understand their effects, if any, on fish passage, as well as flow.
- All of the biologically impaired reaches are prone to high and quick peak flows and/or prolonged periods of low or no flow. Historical changes in land cover (native vegetation to cropland) and drainage patterns (ditching and channelization) are the primary, human-caused factors contributing to this flow instability.
- Additional runoff detention/retention is needed throughout the watershed to reduce peak flows and add to base flows. The central and eastern portions of the watershed generally offer the most diverse instream habitat, including coarse substrate and riffles. However, the effects of altered hydrology have degraded the habitat of several reaches in these areas.

- The habitat of the western portion of the watershed is inherently limited by the predominance of very fine sediments. Excess suspended sediment appears to be having a substantial negative effect on the biological communities of several impaired reaches.
- Soil and instream erosion are the primary sources of sediment. The implementation of additional soil conservation practices and reducing peak flows would reduce sediment loads.
- Lastly, low dissolved oxygen (DO) is a stressor for each of the impaired reaches. While the severity of low DO conditions varies among the reaches, the lowest concentrations generally coincide with low flow and stagnant conditions that occur during the late summer (July, August, and September). Increasing base flows and reducing nutrients (phosphorous and nitrogen) are the primary means to increase dissolved oxygen levels.

About this report

Watershed Approach

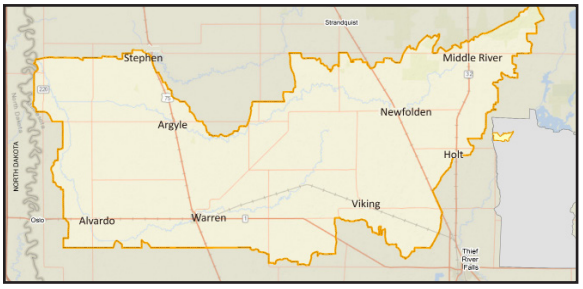
Phase 1: Monitor and assess health of waters

Phase 2: Identify conditions stressing biological life

Phase 3: Determine maximum pollutant loads

Phase 4: Determine Watershed Restoration and Protection Strategies
Start process over every 10 years

Minnesota has adopted a watershed approach to address the state's 80 major watersheds. This approach incorporates water quality assessment, watershed analysis, civic engagement, planning, implementation, and measuring results into a 10-year cycle that addresses both restoration and protection, a widespread effort we call the Watershed Restoration and Protection Strategy or WRAPS. The 10-year cycle for the Snake River Watershed began in 2013 with intensive monitoring and assessment.



Waters not meeting state standards are still listed as impaired and Total Maximum Daily Load studies are performed as they have been in the past. But in addition, WRAPS includes a more cost-effective and comprehensive assessment of the watershed's overall health. The second step in the WRAPS process, stressor identification, finds and evaluates factors, natural and human, which are likely responsible for the impaired condition of fish and macroinvertebrate (aquatic insect) communities. This is phase two of a four-phase process outlined at left.

Full report

To view the full report visit the Snake River Watershed page on our website.
Type "MPCA Snake River Watershed Red Basin" into your web browser search engine.

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