



River Characteristic: Gradient – Fast

Description

Gradient is the general slope, or the change in vertical elevation per unit of horizontal distance, of the water surface in a flowing stream. The fast gradient category is defined as having a change in the vertical elevation of the water surface of a flowing stream ranging from 10.0-69.9 feet per mile.

General Condition of Feature

This habitat is considered 60% in good to excellent condition, 20% in fair condition, and 20% in degraded to very degraded condition.

Associated Species of Greatest Conservation Need

INSECTS

a sand minnow mayfly (*Siphloplecton basale*)
ocellated damer (*Boyeria grafiana*)
splendid clubtail (*Gomphus lineatifrons*)
rapids clubtail (*Gomphus quadricolor*)
stygian shadowdragon (*Neurocordulia yamaskanensis*)

FISH

lake sturgeon (*Acipenser fulvescens*)

FISH cont.

slimy sculpin (*Cottus cognatus*)
spoonhead sculpin (*Cottus ricei*)

REPTILES

Specific associations with this landscape feature were not found in the literature

MAMMALS

water shrew (*Sorex palustris*)

Associated Threats

MODIFICATION OF NATURAL PROCESSES

- Altered hydrologic regimes: "Flashy" streams in WLSMU more susceptible to bank erosion & spring runoff; Perched culverts at county road crossings
- Fragmentation: Perched culverts can act as barriers to movements

POLLUTION

- Altered sediment loads: "Flashy" streams in WLSMU more susceptible to bank erosion & spring runoff (low threat)

HABITAT CONVERSION

- Dams: Beaver dams in eastern end of basin; man-made dams in western end of basin
- Dredging and channelization: (low threat)
- Riparian modifications: Hydraulic changes due to riparian alterations; Roads
- Wetland modifications: Hydropower (low threat)

Conservation Actions Needed (Threats addressed)

LAND, WATER & SPECIES MANAGEMENT

- Maintain and establish riparian buffers of at least 50 ft., but 500 ft. or wider maximizes conservation benefits (altered hydrologic regimes, altered sediment loads, riparian modifications)
- Maintain and rehabilitate river to original flow paths and hydrologic functions, i.e., seasonal flooding, connect meanders, throughflow, wetlands (altered hydrologic regimes, wetland modification)
- Manage beaver activity for a variety of natural resource uses (dams)
- Soften or remove hard river structures (riparian modifications)
- Survey loadings of sediments in watershed and develop strategies to reduce identified problems (altered sediment loads)
- Work with road commissions and forest management agencies to fix perched and other problem culverts (altered hydrologic regimes, fragmentation)

LAW & POLICY

- Assess dam siting to ensure minimal affects (dams)
- Encourage sound water withdrawal practices that take into account species needs (altered hydrologic regimes)
- Encourage use of natural materials or soft engineering techniques for any river modification (riparian modifications)
- Enforce the use of sediment and best management practices during road siting, construction, and maintenance (altered sediment loads)
- Limit water withdrawals in flow limited and groundwater fed systems (altered hydrologic regimes)
- Manage or modify lake-level controls and water releases of dams to mimic natural river conditions (altered hydrologic regimes, dams)
- Protect and rehabilitate groundwater recharge by requiring that all development-related runoff be captured by infiltration basins (altered hydrologic regimes)
- Remove dams to rehabilitate natural hydrology (altered hydrologic regimes, dams, fragmentation)
- Restrict dredging and channelization activities, especially during spawning/breeding and migration seasons and around mussel beds (dredging and channelization)

**MICHIGAN'S WILDLIFE ACTION PLAN
AQUATIC SYSTEMS: LAKE SUPERIOR BASIN**

- Work with local governments to develop and refine planning and zoning regulations and ordinances that consider natural processes (variety of threats)
- Work with local officials on setback and buffer ordinances (riparian modifications)
- Work with road commissions and forest management agencies on the placement and maintenance of new stream crossings (altered hydrologic regimes, altered sediment loads)

EDUCATION & AWARENESS

- Continue educating legislators, other policy makers, and the public on the natural processes of rivers, the value of macrophytes and riparian areas, and stewardship issues (variety of threats)
- Work with and educate ORV groups to provide environmentally friendly stream crossings (altered sediment loads)

Research and Survey Needs

- Determine unknown life history requirements for SGCN associated with fast gradient
- Inventory the number of dams and stream enclosures and determine those no longer necessary
- Inventory road and stream crossings and repair those that are interfering with stream flows
- Model hydrologic flow of fast gradient areas
- Survey existing dams and ensure that they operate as run-of-the-river

Monitoring

- Dam operations
- Riparian modifications
- Stream crossings