



## River Characteristic: Gradient – Slow

### 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 slow gradient is defined as having a change in the vertical elevation of the water surface of a flowing stream ranging from 0.0-3.9 feet per mile.

### General Condition of Feature

No data available.

### Associated Species of Greatest Conservation Need

#### *CRAYFISH*

digger crayfish (*Fallicambarus fodiens*)

#### *INSECTS*

a sand minnow mayfly (*Siphloplecton basale*)

#### *FISH*

reeside dace (*Clinostomus elongatus*)

brassy minnow (*Hybognathus hankinsoni*)

bigmouth shiner (*Notropis dorsalis*)

finescale dace (*Phoxinus neogaeus*)

brown bullhead (*Ameiurus nebulosus*)

least darter (*Etheostoma microperca*)

#### *FISH cont.*

sauger (*Sander canadensis*)

#### *AMPHIBIANS*

four-toed salamander (*Hemidactylium scutatum*)

mudpuppy (*Necturus maculosus maculosus*)

#### *REPTILES*

Blanding's turtle (*Emydoidea blandingii*)

#### *MAMMALS*

water shrew (*Sorex palustris*)

### Associated Threats

#### *POLLUTION*

- Altered sediment loads: ORV crossings

#### *HABITAT CONVERSION*

- Dams: Beaver activity
- Riparian modifications: Alteration of riparian vegetation types

### Conservation Actions Needed (Threats addressed)

#### *LAND, WATER & SPECIES MANAGEMENT*

- Maintain and establish riparian buffers of at least 50 ft., 500 ft. or wider maximizes conservation benefits (altered sediment loads, riparian modifications)
- Manage beaver activity for a variety of natural resource uses (dams)
- Soften or remove hard river structures (riparian modifications)

#### *LAW & POLICY*

- Assess dam siting to ensure minimal affects (dams)
- 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)
- Manage or modify lake-level controls and water releases of dams to mimic natural river conditions (altered hydrologic regimes, dams)
- Remove dams to rehabilitate natural hydrology (dams)
- 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 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 slow gradient
- Effect ways of communicating with the public and enhancing their stewardship role
- Model hydrologic flow of slow gradient areas
- Survey loadings of sediments in watershed and develop strategies to reduce identified problems

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

Monitoring

- Erosion
- Riparian modifications
- Stream crossings
- Wetland and floodplain modification