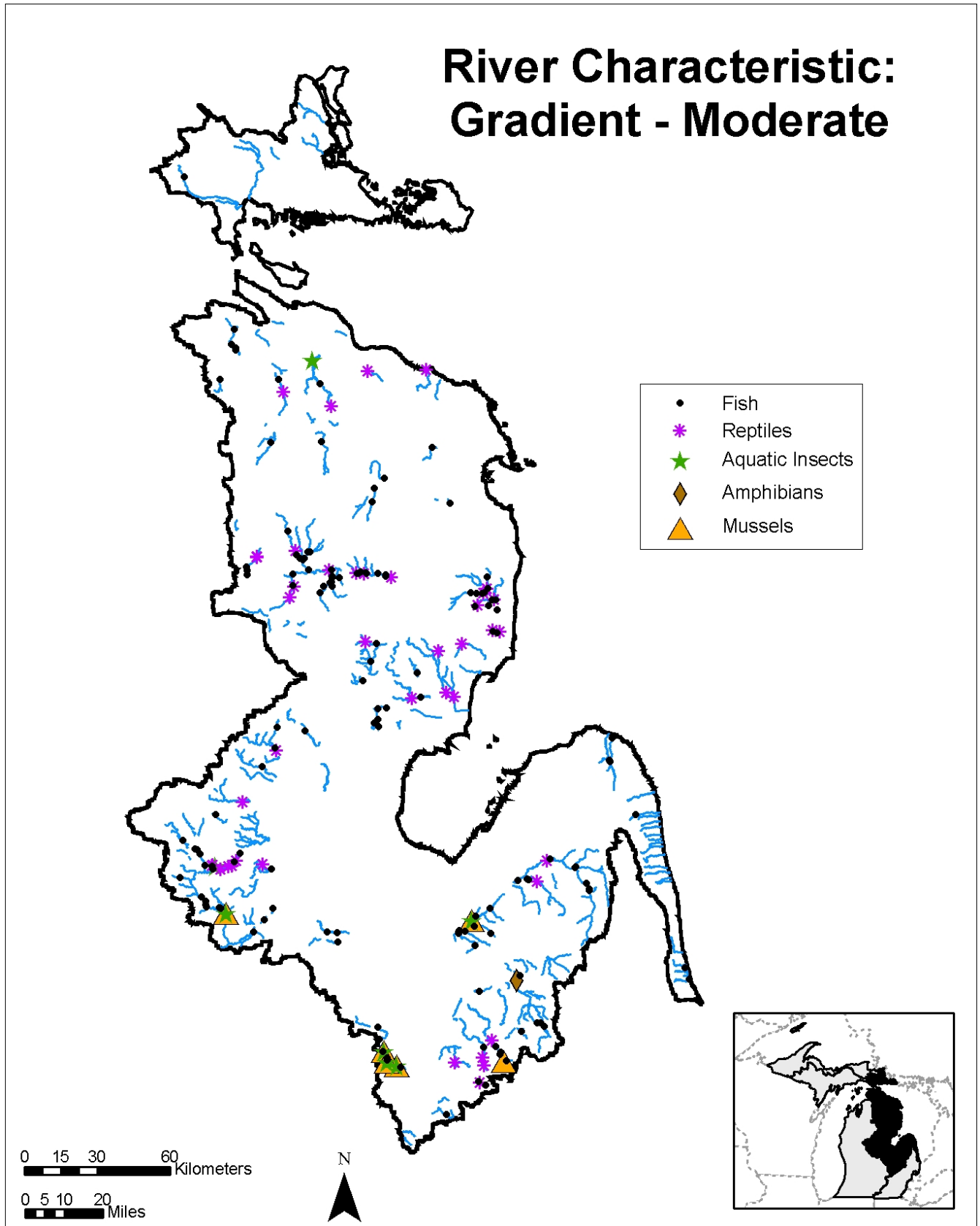


River Characteristic: Gradient - Moderate



River Characteristic: Gradient – Moderate

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. Moderate gradient is defined as having a change in the vertical elevation of the water surface of a flowing stream ranging from 4.0-9.9 feet per mile.

General Condition of Feature

This habitat is considered 35% in good to excellent condition, 25% in fair condition, and 40% in degraded to very degraded condition.

Associated Species of Greatest Conservation Need

MUSSELS

scaleshell (*Leptodea leptodon*)
round pigtoe (*Pleurobema coccineum*)
ellipse (*Venustaconcha ellipsiformis*)
rainbow (*Villosa iris*)
purple wartyback (*Cyclonaias tuberculata*)
creek heelsplitter (*Lasmigona compressa*)
snuffbox (*Epioblasma triquetra*)
black sandshell (*Ligumia recta*)
threehorn wartyback (*Obliquaria reflexa*)
hickorynut (*Obovaria olivaria*)
kidneyshell (*Ptychobranchus fasciolaris*)
purple lilliput (*Toxolasma lividus*)

INSECTS

rapids clubtail (*Gomphus quadricolor*)
riverine snaketail (*Stylurus amnicola*)
Laura's snaketail (*Stylurus laurae*)
stygian shadowdragon (*Neurocordulia yamaskanensis*)
Hungerford's crawling water be (*Brychius hungerfordi*)

FISH

mooneye (*Hiodon tergisus*)
brassy minnow (*Hybognathus hankinsoni*)
striped shiner (*Luxilus chrysocephalus*)
black buffalo (*Ictiobus niger*)
spotted sucker (*Minytrema melanops*)
black redbone (*Moxostoma duquesnei*)
stonecat (*Noturus flavus*)
slimy sculpin (*Cottus cognatus*)
fantail darter (*Etheostoma flabellare*)
river darter (*Percina shumardi*)

AMPHIBIANS

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

REPTILES

queen snake (*Regina septemvittata*)
wood turtle (*Glyptemys insculpta*)

MAMMALS

water shrew (*Sorex palustris*)

Associated Threats

MODIFICATION OF NATURAL PROCESSES

- Altered hydrologic regimes

POLLUTION

- Altered sediment loads: Sediment deposition; Sedimentation
- Thermal changes: (low threat)

HABITAT CONVERSION

- Dams
- Dredging and channelization: Channelization; Dredging
- Riparian modification: Riprap resulting in channel "fixation" (low threat)

Conservation Actions Needed (Threats addressed)

LAND, WATER & SPECIES MANAGEMENT

- Engineered drainage channels should mimic natural stream channel stability (channel dimension, pattern, and profile) (altered hydrologic regimes, altered sediment loads, dredging and channelization)
- Explore other options to dams (i.e., seasonal electric barriers) (dams)
- Maintain or rehabilitate rivers to their original flow paths and natural hydrology (altered hydrologic regimes, altered sediment loads)
- Maintain or rehabilitate vegetated riparian buffers (altered hydrologic regimes, altered sediment loads)
- Manage beaver population for a variety of natural resource uses (dams)
- Protect the natural seasonal flow patterns of the river by incorporating best management practices (altered hydrologic regimes)
- Rehabilitate channel diversity (dredging and channelization)
- Remove dams to rehabilitate natural hydrology and other natural processes (altered hydrologic regimes, altered sediment loads, dams)
- Survey erosion sites within watershed and conduct remediation activities at those sites (altered sediment loads)

- Work with road commissions and forest management agencies to fix perched culverts and rehabilitate eroding stream crossings (altered hydrologic regimes, altered sediment loads)
- Work with road commissions and forest management agencies to site and build effective new stream crossings (altered hydrologic regimes, altered sediment loads)

LAW & POLICY

- Continue regulation facilities that remove and discharge water into streams (altered hydrologic regimes)
- Continue working towards developing and refining planning and zoning regulations and ordinances (altered hydrologic regimes, altered sediment loads)
- Enforce the use of sediment barriers and Best Management Practice's during road siting, construction, and maintenance (altered sediment loads)
- Ensure that existing environmental laws are enforced (altered hydrologic regimes, altered sediment loads)
- Limit water withdrawals in groundwater fed systems (altered hydrologic regimes)
- Protect remaining natural wetlands and rehabilitate degraded wetlands (altered hydrologic regimes, altered sediment loads)
- Protect riparian greenbelts through adoption and enforcement of zoning standards (altered hydrologic regimes, altered sediment loads)
- Protect the natural hydrologic regime of streams by protecting existing wetlands, floodplains, and natural upland areas (altered hydrologic regimes, altered sediment loads)
- Redraft the Michigan drain code (altered hydrologic regimes, altered sediment loads)
- Require existing dams to operate mimicking natural flow conditions (altered hydrologic regimes, dams)
- Work with regulatory agencies to restrict dredging and channelization (dredging and channelization)

EDUCATION & AWARENESS

- Continue working with and educating Drain Commissioners (altered hydrologic regimes, altered sediment loads)
- Educate the public on the importance of natural riparian buffers (altered hydrologic regimes, altered sediment loads)

Research and Survey Needs

- Determine unknown life history requirements for SGCN associated with moderate gradient
- Develop alternatives to current drainage practices
- Model hydrologic flow of moderate gradient areas
- Survey sediment loadings to streams and develop strategies to reduce amount

Monitoring

- Dredging and channelization
- Erosion
- Riparian modification
- Stream crossings
- Wetland and floodplain modification