

Manual of Fisheries Survey Methods II: with periodic updates

Chapter 20: Michigan Stream Classification: 1967 System

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Chapter 20: Michigan Stream Classification: 1967 System

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[Editor's note: The 1967 classification served as the basis for the subsequent "Director's list of Designated Trout Streams". Very recently (see 2000 Michigan Fishing Guide) Michigan streams (and lakes) were classified on the basis of the most appropriate trout and salmon fishing regulations. A landscape-based ecological classification of rivers is currently in progress (see Seelbach et al. 1997, Research Report 2036).]

Michigan's 36,000 miles of streams occur in all degrees of size, quality, and development. A classification system is prerequisite to orderly and effective fish and recreation management programs.

A previous classification of trout streams proved valuable in adopting trout management policy and providing a basis for habitat protection. The new classification will involve a revision of the existing trout stream classification and an extension to include warmwater streams. It will serve as the means for identification of legally defined trout streams. The new system will also include additional inventories to provide a more comprehensive basis for establishing policy and action programs for the management of fisheries, streams, and related lands. Streams will be classified by: I-Type and quality, II-Size, and III-Extent of building development. The inventory will be applicable in the following situations: establishment of water quality standards; determination of recreation values; "wild" or "scenic" river designations; stream and stream frontage improvement and preservation; dam and impoundment problems; fishing and boating access programs; fishing regulations; research planning; fish planning and management; and stream land acquisition.

20.1 Part I—Stream type and quality

20.1.1 Non-anadromous

Top quality trout mainstream.—Contain good self-sustaining trout or salmon populations and are readily fishable; typically over 15 feet wide.

Top quality trout feeder stream.—Contain good self-sustaining trout or salmon populations but difficult to fish due to small size; typically less than 15 feet wide.

Second quality trout mainstream.—Contain significant trout or salmon populations but these populations are appreciably limited by such factors as inadequate natural reproduction, competition, siltation, or pollution. Readily fishable; typically 15 feet wide.

Second quality trout feeder stream.—Contain significant trout or salmon populations, but these populations are appreciably limited by such factors as inadequate natural reproduction, competition, siltation, or pollution. Difficult to fish because of small size; typically less than 15 feet wide.

Top quality warmwater mainstream.—Contain good self-sustaining populations of warmwater game fish and are readily fishable; typically over 15 feet wide.

Top quality warmwater feeder stream.—Contain good self-sustaining populations of warmwater game fish, but are difficult to fish because of small size; typically less than 15 feet wide.

Second quality warmwater mainstream.—Contain significant populations of warmwater fish, but game fish populations are appreciably limited by such factors as pollution, competition, or inadequate natural reproduction. Readily fishable; typically over 15 feet wide.

Second quality warmwater feeder stream.—Contain significant populations of warmwater fish, but game fish populations are appreciably limited by such factors as pollution, competition, or inadequate natural reproduction. Difficult to fish because of small size; typically less than 15 feet wide.

20.1.2 Designation of existing runs of anadromous trout and salmon, Director's designated trout streams

Streams, or stream sections, that currently receive significant runs of anadromous trout or salmon are also to be designated as trout streams, regardless of whether they are "trout" or "warmwater" according to the above classification. These streams, together with the additional streams classified as trout in Part I, will constitute our legally designated trout streams. This meets our obligation to designate those streams that, in the opinion of the Director of the Natural Resources Department, contain significant populations of trout or salmon.

In outline form this stream type and quality classification can be presented as follows:

- | | |
|-------------------|----------------------|
| I. Trout stream | II. Warmwater stream |
| A. Top quality | A. Top quality |
| 1. Mainstream | 1. Mainstream |
| 2. Feeder stream | 2. Feeder stream |
| B. Second quality | B. Second quality |
| 1. Mainstream | 1. Mainstream |
| 2. Feeder stream | 2. Feeder stream |

Anadromous designation: Additive to each of the above, when applicable.

20.1.3 Discussion

Usually, top quality trout streams will not require stocking as a management procedure. However, it will not be necessary to designate a stream second quality to justify stocking. All streams should be classified as your judgment dictates, and if for some reason you deem it advisable to stock a top quality trout stream, the matter will be resolved on its own merits, not entirely on the basis of this classification.

A value judgment will have to be made for streams that contain warmwater game fish populations year-round as well as anadromous runs of trout and salmon during certain parts of the year. If, in your opinion, the runs of anadromous fish are significant enough to warrant the protection provided by legal classification as a trout stream, the stream should be classified as anadromous. If, however, the warmwater fishery that would be made unavailable by trout stream classification outweighs in value expected losses of trout or salmon, then the stream should not be classified as anadromous.

In this classification system the term "feeder" can, on the basis of size, be applied to a stream that flows directly into one of the Great Lakes. Similarly, the term "mainstream" can be applied to a stream that does, in fact, feed another larger stream.

Two criteria—fishability and 15-foot width—are provided for differentiating between "mainstream" and "feeder stream." Usually, the two criteria will be complementary, but when this is not the case, fishability is to be the dominant criterion, with the 15-foot criterion used to help resolve difficult cases, or to handle abnormal situations such as recently ditched or extraordinarily brushy streams.

20.1.4 Mapping

Part I of the inventory will be recorded on one map; parts II and III on a second map. One-inch-to-the-mile maps showing public ownership are to be utilized. This will permit the subsequent measurement of stream classes by ownership category.

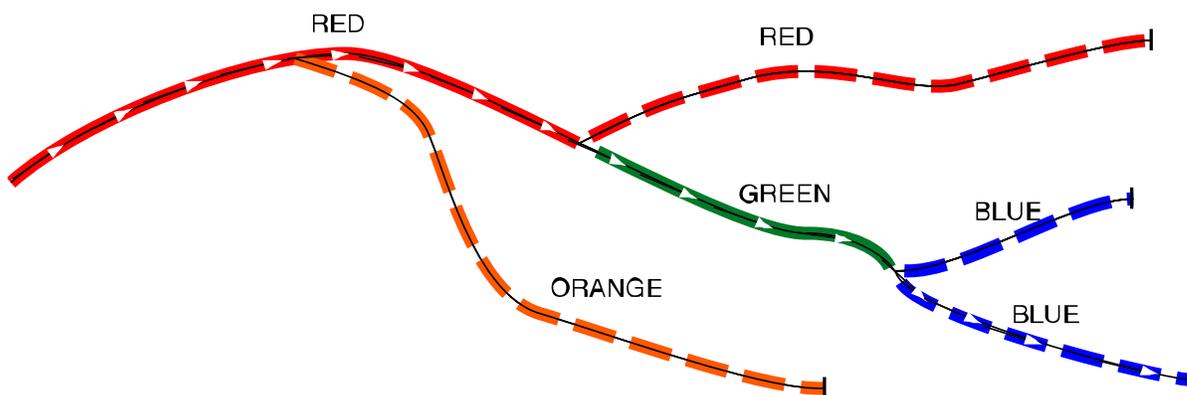
The classification will be indicated on maps by coloring the thread of the stream by color code and pattern. Trout streams will be indicated by a cold color, blue, and warmwater streams will be indicated by a warm color, red. Top quality waters will be indicated by the primary colors, blue or red, and second quality waters by the respective yellow modification, green or orange. Mainstreams will be indicated by a solid line, approximately 1/8 inch wide, and tributaries will be indicated by a broken or dashed line of the same width.

To signify runs of anadromous trout or salmon, superimpose upon the classifications in Part IA a series of arrows pointing upstream. The arrows should proceed upstream in each drainage to the point where the runs stop or become insignificant.

The following is a list of the categories and their proper colors and color patterns:

Top quality trout mainstream	
	BLUE
Top quality trout tributary	
Second quality trout mainstream	
	GREEN
Second quality trout tributary	
Top quality warmwater mainstream	
	RED
Top quality warmwater tributary	
Second quality warmwater mainstream	
	ORANGE
Second quality warmwater tributary	

Application of system, illustrating use of anadromous symbol:



20.2 Part II—Stream size

Stream size category definitions and criteria below are based on boatability. This classification provides information which will be useful not only to boating, but also for the following factors: Capacity of stream to provide fish and fishing; capacity to handle waste effluents; scenic attraction; scale of problems involved in impoundment and bridge construction; capacity of stream to attract development and to withstand impact of development; etc. It is realized that a size classification based only on boatability is less than ideal, but it has been selected as being the most feasible of the several alternative systems considered. (It is not intended that this size classification be based on "navigability" in its legal sense. The treatment of legal navigability and public status of waters is not within the purpose or scope of this inventory.)

20.2.1 Stream size categories

Very small stream.—With perennial flow (except that streams not flowing during infrequent short periods during dry summers are to be included), but too small for canoe travel. Temporary barriers to canoe travel, such as windfalls or fences, will not serve as criteria for applying this category.

Small stream.—Canoeable, with difficulty. Limitations imposed by amount of wading or lift-overs required, extended low water periods, rockiness, etc. Streams with removable windfall barriers can be considered as canoeable if volume, etc., is otherwise adequate.

Medium stream.—Readily canoeable, with not more than a limited number of lift-overs or portages; or requiring only occasional and short-stretch wading.

Large stream.—Of a size that will permit the use of small to medium-sized outboard motorboats, but too small to permit the use of large outboard or inboard motorboats.

Very large stream.—Of a size that will permit use of large outboard and inboard motorboats.

20.2.2 Fluctuating stream subclass

Streams having an extended high-flow period, during which its rating would be one size class larger than during the major part of the dominant fishing-recreation season, can be placed in a subclass.

Stream class should be based on size of the stream during the season of dominant fishing and recreation use, or the major part of the total fishing-recreation year. In most cases, the fact that a stream typically has a high flow during spring runoff and lower flow during some weeks in the summer can be ignored, since this is fairly typical for Michigan streams.

However, the pattern of flow fluctuation in some streams is of such character as to establish significantly different use patterns and use potential in different seasons. Therefore, a *seasonal high flow* subclass can be applied if the following criteria apply: (a) the flow is sufficiently high as to raise the class by *at least* one level; (b) the season is sufficiently protracted, sufficiently dependable, and desirably timed as to weather characteristics; and (c) all in all, the high flow period presents a distinct recreational or fishing use opportunity, present or potential. This subtype should be applied conservatively.

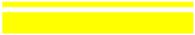
20.2.3 Part II—Mapping (Stream size)

Stream size will be indicated by coloring the thread of the stream one of five colors, progressing from largest to smallest: brown, violet (purple), red, orange, and yellow. The color line should be about 1/8 inch wide.

The purpose of the survey does not include the identification of individual riffles and pools. Therefore, you are not asked to indicate change in size class unless, usually, a stretch of at least 2 miles is involved.

Seasonal high flow subclass streams will be indicated by entering a narrow black line adjacent to the basic stream size symbol. (Basic color will refer to size during the major part of the fishing-recreation season.) This line should be entered on the left side, looking upstream.

These are the stream size symbols:

		<u>Standard Symbol</u>	<u>Seasonal high flow Subclass symbol</u>
Very small stream	Yellow		
Small stream	Orange		
Medium stream	Red		
Large stream	Violet		
Very large stream	Brown		

20.3 Part III—Stream zone development

A development is a building or set of buildings, of whatever kind, sufficiently close to the stream to influence the character or aesthetics of the stream setting; its use for fishing, boating or other recreational purposes; and its management or value. Ordinarily, buildings within view of those who are fishing or boating on the stream would be classed as developments, but this would not necessarily apply to distant farm buildings lying across open fields. Also, those developments should be counted which, though not readily evident from the stream, yet have definite influence on character of the streamside zone. The general objective of this classification is to establish the degree of presence or absence of human occupancy which influences the character of the stream and land within the streamside zone.

20.3.1 Classes

The following classes are established:

Undeveloped.—From 0 development, up to 1 development per 3 miles of stream.

Very light development.—From more than 1 development per 3 miles of stream, up to 3 developments per mile.

Light development.—From more than 3, up to 12 developments per mile.

Medium development.—From more than 12, up to 20 developments per mile.

Heavy development.—More than 20 developments per mile.

20.3.2 Mapping (Development)

Streambank development will be indicated on the size-development map by a circled Roman numeral in black appearing above (north) of stream sections occurring on an east-west axis, and to the right (east) of stream sections occurring on a north-south axis. The point of change from one classification to the next will be indicated by a black line drawn perpendicular to the stream.

(This line need not be placed at the downstream terminus of a tributary unless the mainstream has a different class.)

Use Roman numerals in accordance with the following system:

Numeral	Class	Degree of development	Usual minimum length to be mapped
I	Undeveloped	None up to 1 in 3 miles	2 ½ - 3 miles
II	Very light development	More than 1 in 3 miles, to 3 per mile	1 mile
III	Light development	More than 3, up to 12 per mile	¾ - 1 mile
IV	Medium development	More than 12, up to 20 per mile	½ - 1 mile
V	Heavy development	More than 21 per mile	¼ - 1 mile

20.4 General instructions and discussion—all parts

1. **Streams to be included:** All streams are to be included that have perennial flow, regardless of existence of public access or ditching. Stream type and stream size classifications should be based on flows and other conditions existing during the major fishing-recreation season.
2. **Base map correction:** Where the base map is in error, showing incorrect locations or courses for the streams, or showing incorrect upstream limits of perennial flow, the errors should be corrected by a thin black line and applicable color.
3. A short, prominent black line perpendicular to the stream should be placed at the point on each stream where it ceases to be identified as perennial, and upstream from which this inventory does not apply. This will assist in assuring there are no errors of omission in classifying or copying, and will also serve to "correct" the base map when the stream appears on that map as extending beyond the termination of its perennial flow.
4. **Dams and impoundments:** Locations of dams should be indicated by a solid black isosceles triangle with the baseline at the dam site and the apex pointing downstream. Impoundments over 5 acres in size should be outlined by a thin black line. The type quality of the impounded waters should be indicated by a line through the thread of the impoundment of the same color as used to indicate comparable stream type quality. Parts II and III, size and development, should not be entered on large impoundments which distinctly have the nature of lakes, such as the Fletcher Pond, Michigamme Reservoir, or Thornapple Lake. However, impoundments which retain significant riverine character in shape, size, use or development should be classified under Parts II and III.
5. When entered in color, erroneous entries will be difficult to remove. Therefore, simply cancel out by running a wavy black line through the erroneous entry, with adjacent entry of the correct color.
6. In estimating distances for Part III, make realistic generalizations as needed. For instance, see the example diagrams on the following page.

20.5 Procedure

It is recommended that field data be collected on two sets of 14-inch x 18-inch maps, one set for type quality and one set for size development.

In instances where streams cross District boundaries, the District Fish Biologist from the neighboring District should be consulted to insure uniformity.

After the field data have been collected, the information should be transferred to 1-inch-per 1-mile county maps for both the type quality and size development classifications. These maps should be made in triplicate so that District, Region and Lansing all have identical copies of both classifications. After completion of the set for each county, they should be forwarded to Region where they will be reviewed to insure completion and uniformity of approach. After satisfactory review at Region, maps

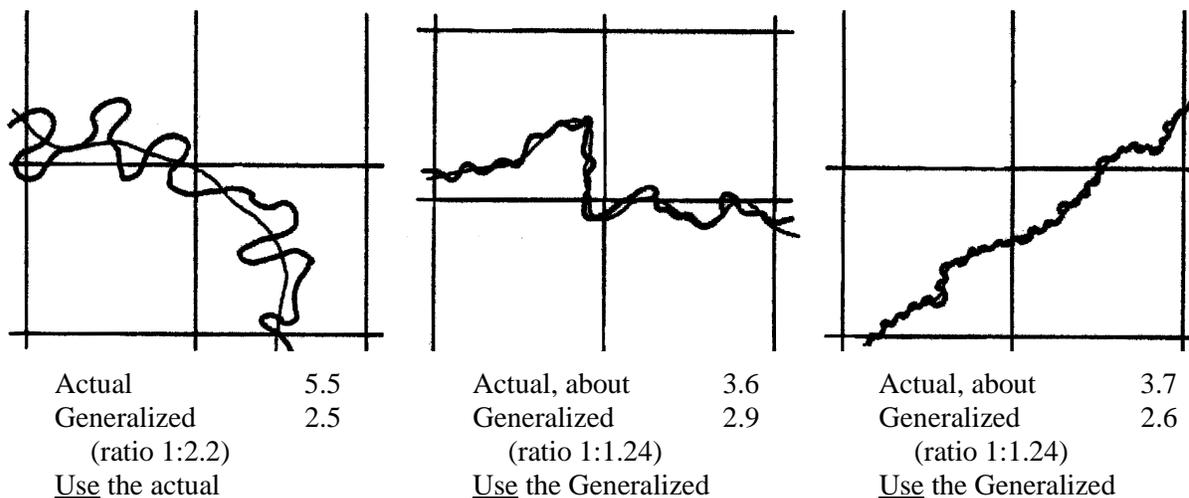
should be forwarded to Lansing for review and tabulation. After review at Lansing, the Regional and District copies will be returned.

The necessary 1-inch-per-1-mile maps and the colored felt pens will be provided by Lansing Fish and Recreational Resources Planning divisions.

Pens being supplied have felt tip about 3/16-inch wide. Trim to not over 1/8-inch with vertical razor blade cut.

To approach the task systematically and to avoid error of omission, it is suggested that classification work commence at the downstream end of the stream system and proceed upstream, completing each tributary in turn. All copies should be checked in this manner to assure there are no omissions.

Examples of generalizing distances for Part III:



Revised 3/1981 by J. W. Merna.
Slightly edited 1/2000 by J. C. Schneider

