

Department of Natural Resources

INTRA-DEPARTMENT

MEMORANDUM

..... Spooner

Station

Date November 4, 1976

IN REPLY REFER TO: 3200

TO: Anthony S. Earl

FROM: L. G. Hansen

SUBJECT: Surface Water Classification
(NR 104) - Hayward, Sawyer County

The City of Hayward has a secondary sewage treatment plant consisting of a primary clarifier, trickling filter, secondary clarifier, and chlorine contact chamber. The treated effluent is discharged to Bradley Brook 100 yards above its confluence with the Namekagon River.

Bradley Brook is a small cold water stream. Flow, throughout the summer of 1976, was approximately one cubic foot per second. An unbalanced aquatic community exists in Bradley Brook, the probable result of a naturally high iron content and heavy growths of iron reducing bacteria. In a survey by fish management personnel, on August 20, 1976, few fish were found other than brook sticklebacks and small white suckers. The limited benthic community primarily consists of Isopods. Aquatic vegetation is scarce.

The Namekagon River is a very valuable recreation and aesthetic resource and is included in the National Scenic Waterways program. The river receives heavy recreation use. The Namekagon River, below Hayward, supports an excellent warm water fishery comprised of muskellunge, northern pike, walleyes, largemouth bass, smallmouth bass and pan fish.

A map and photographs are attached.

RECOMMENDATION

Bradley Brook, a "continuous stream" (NR 104.02(1)(f)) not supporting a balanced aquatic community, shall be placed in the "intermediate aquatic life" variance category (NR 104.02(3)(a)).

The Namekagon River shall meet recreation and fish and aquatic life standards (NR 102.02). In addition, effluent criteria will be evaluated to protect these "surface waters significant to the environmental integrity of the state" (NR 104.02(4)(a)).

By

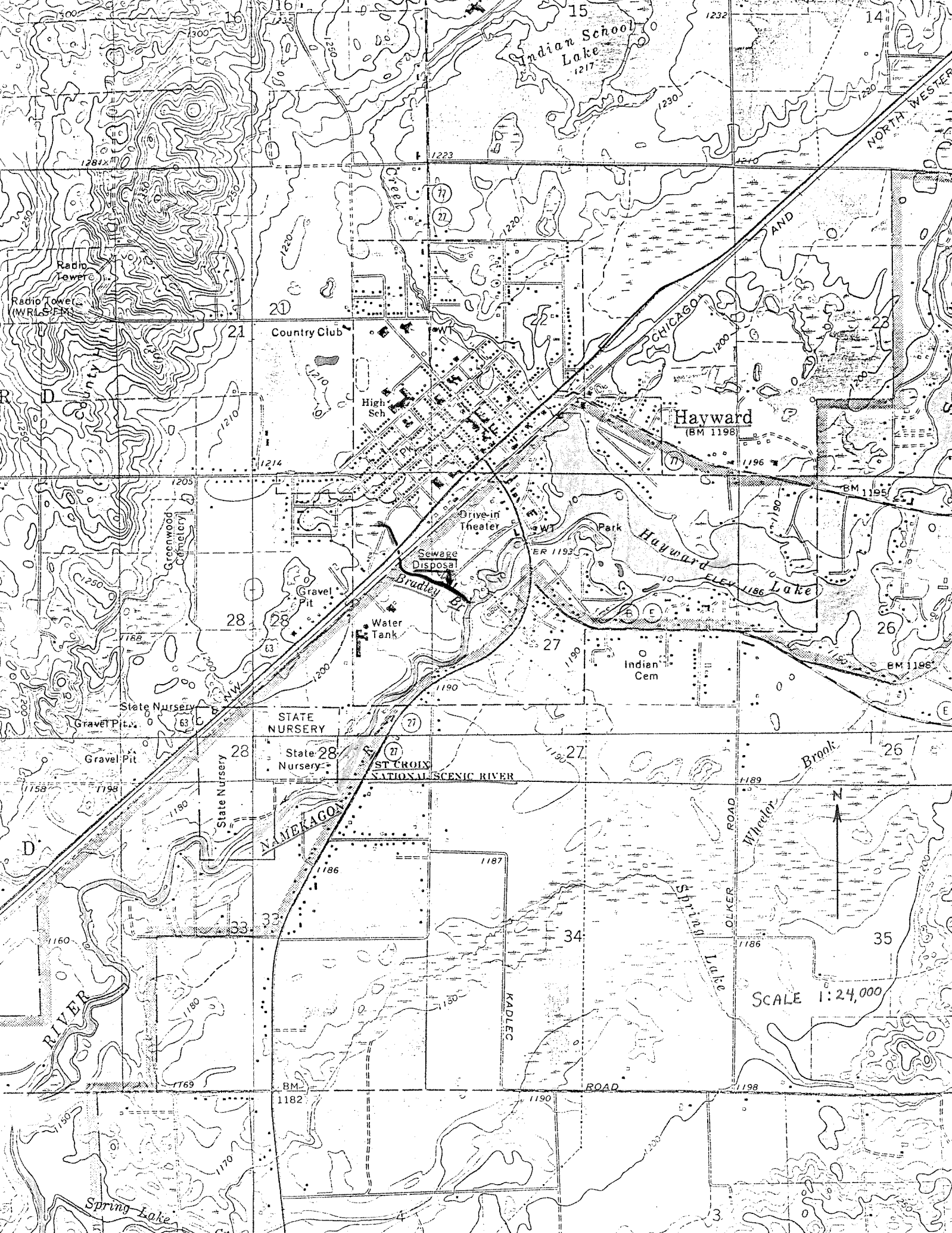

Ted R. Smith

TRS:mm

Attachments

NOTED:

Date





BRADLEY BROOK
ABOVE HAYWARD STP



HAYWARD TREATED EFFLUENT
ENTERING BRADLEY BROOK

Rejustification of the Stream Classification for Bradley Brook

Bradley Brook is a small stream; it is less than 0.4 miles long and the normally observed flow is approximately 1 cfs below the Hayward sewage treatment plant. The headwater is a shrub marsh spring area that is relatively unaffected by cultural modifications. This area contributes 0-6% of the flow to Bradley Brook. Most of the flow is contributed by urban runoff from two storm sewers and the Hayward sewage treatment plant discharge.

Bradley Brook, above the Hayward sewage treatment plant was surveyed several times by water pollution biologists and by the area fish manager. The most striking feature of this stream is the apparent very high iron content exhibited by an iron oxide coating on all the substrate and by growths of iron reducing bacteria. The very limited benthic community was sampled in 1971, 1976 and 1978. The 1978 benthic sample has not been enumerated at this date, but field observation and sorting of the sample reveal a dominance of the aquatic community by isopods. Earlier sampling revealed the same situation. Aquatic vegetation is sparse above the sewage treatment plant. With electrofishing gear, the fish manager was able to capture only three small brook sticklebacks and three small white suckers in Bradley Brook.

Bradley Brook, above the Hayward sewage treatment plant, does not support a balanced aquatic community. The causes may be poor water quality, the result of cultural modification to the watershed and land uses in the watershed and/or natural conditions that limit the development of a diversified aquatic community. The absence of a diversified aquatic community is not caused by the Hayward sewage treatment plant. With or without the discharge from the Hayward sewage treatment plant, Bradley Brook does not have the size, length, or other characteristics to support or potentially support a balanced fish and aquatic life population.

Stream Classification Worksheet

Receiving Watercourse: Bradley Brook

District: Northwest

Location: Section 28 and Section 27, T41N, R9W

Drainage Basin: St. Croix River

Discharger: Hayward STP

Classification Recommendation:

It is recommended that Bradley Brook be classified as continuous, intermediate fish and aquatic life.

References Used

1. Stream Survey Station Report by F. Pratt (9/20/76)
2. St. Croix River Pollution Investigation Survey (9/72)
3. Surface Water Classification - Hayward, Sawyer County (11/4/76)
4. Hayward Sewage Treatment Plant Permit, Permit No.: WI-0021121

Physical Characteristics:

Bottom Type	Mainly Sand (60-95%) with some detritus, gravel, silt and clay.
Instream Cover	Undercut banks - Common and unstable Debris - common and unstable Rock and boulders - scarce Logs and trees - scarce Aquatic vegetation - Upper reach - common Lower reach - scarce
Stream Cover	Lower reach - partly open Upper reach - open
Stream Bank Vegetation	80% Swamp Hardwood, 10% Shrub Marsh, 10% Open Fill
Stream Bank Heights	0.5 - 3.0 feet

Hydrological
Features

STP Discharge: 0.385 mgd (Design) = 0.596 cfs
Color: Clear and rust stained
Width: 3.5 - 8.0 feet
Depth: 0.1 - 1.5 feet
Velocity: Sluggish to moderate
Flow: 1 cfs (Summer 1976)
Pool-Riffle Ratio: 40% Pool - 60% Riffle

Control Structures
Obstructions and
Alterations

1 man-made dam with a height of less than 1 foot
with a pool area of 0.05 acres above the dam.
Stream has been channelized above STH 63

Chemical Characteristics:

Survey Date: September 22-23, 1971

Parameter	Location	
	0.5 miles above the STP	0.1 miles below the STP
D.O. (mg/l)	7.5	5.5
BOD ₅ (mg/l)	0.3	24
pH (s.u.)	6.9	7.0
Temperature (°C)	11	16
Fecal Coliform (MFFCC/100 ml)	15	320

Comments: The limiting factor for fish in this stream may be the water chemistry. There is an inordinate amount of iron oxide in the stream. (Comments from the area fish manager on 9/20/76).

Biological Characteristics:

Bank Vegetation Swamp Hardwood with some Shrub Marsh and Open Fill

Macroinvertebrates 9/8/71 Above STP Outfall*

Intolerant	Spp. - 0	No. - 0
Tolerant	Spp. - 2	No. -18
Very Tolerant	Spp. - 2	No. -35

9/8/71 Downstream of STP Outfall*

Intolerant	Spp. - 0	No. - 0
Tolerant	Spp. - 1	No. -30
Very Tolerant	Spp. - 1	No. -2,519

9/20/76 Above STP Outfall

Sonfly - None seen
 Mayfly - None seen
 Caddisfly - 1 spp.
 Shrimp - Amphipods: present
 Isopods: common
 Crayfish - None seen
 Chironomids - 2-3 spp.: common

Fish Observed

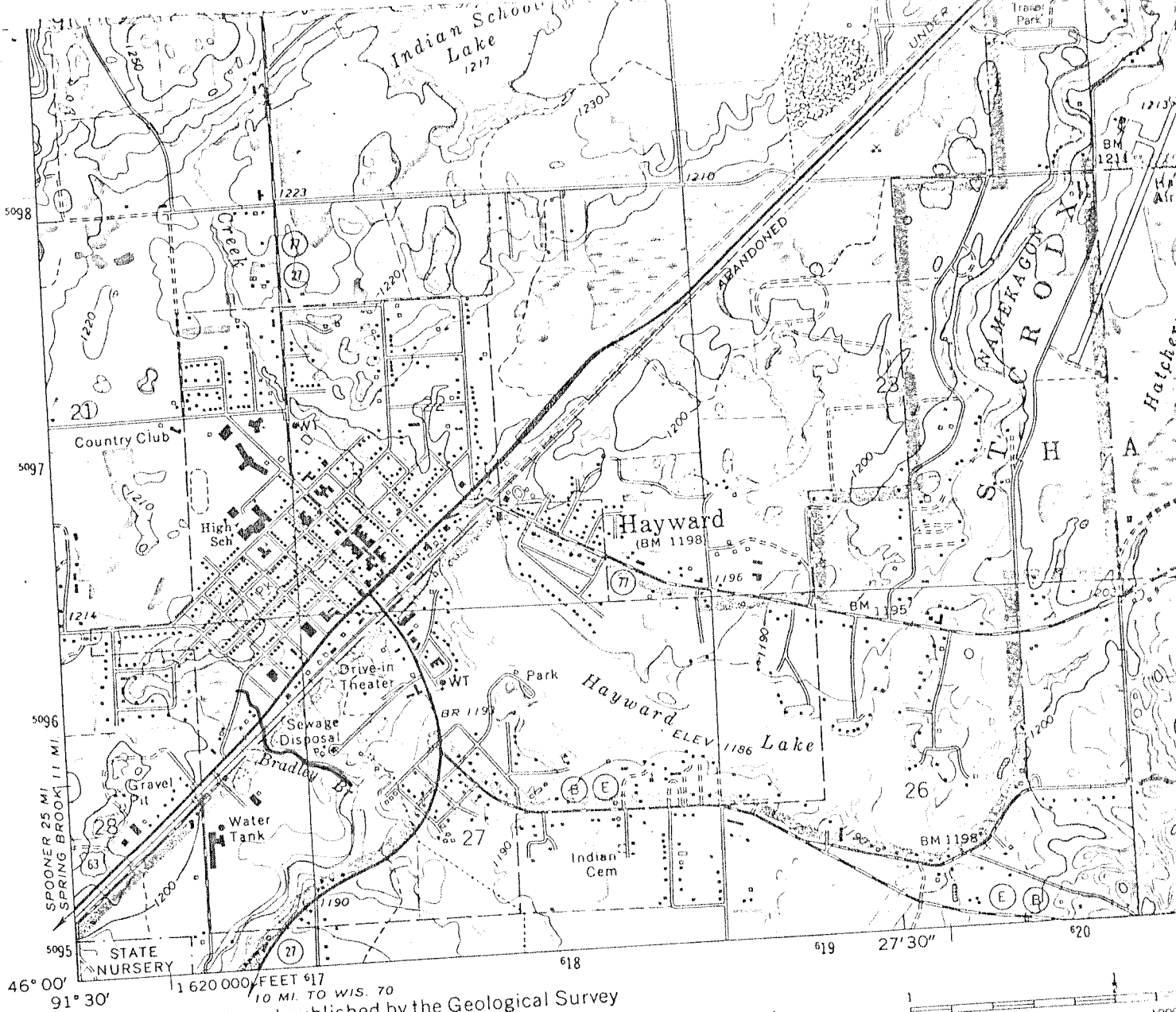
Sampled 9/20/76:
 3 brook sticklebacks: 2.0", 1.9", 1.9"
 3 white suckers: 3.5", 5.7", 6.5"
 No other fish seen or sampled (Conductance appeared to be good, shocker worked well)

Special Note

Growths of iron bacteria were found and suggest an environmental hazard (probably naturally occurring) which is inhibiting the development of a normal benethic community.

*Value measured in organisms/sq.ft.

(BEAN LAKE)
2675 1 NE



Mapped, edited, and published by the Geological Survey
in cooperation with the Wisconsin Highway Commission
and Wisconsin Geological and Natural History Survey

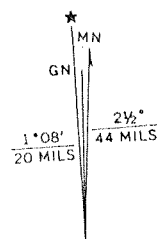
Control by USGS and USC&GS

Topography by photogrammetric methods from aerial
photographs taken 1970. Field checked 1971

Depth curves and soundings compiled from charts furnished by
Wisconsin Department of Natural Resources

Polyconic projection. 1927 North American datum
10,000-foot grid based on Wisconsin coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks,
zone 15, shown in blue

Fine red dashed lines indicate selected fence and field lines where
generally visible on aerial photographs. This information is unchecked



UTM GRID AND 1979 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

THIS MAP COM
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A FOLDER DESCRIBING