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FEDERAL ENERGY
REGULATORY
COMMISSION

February 7, 1996

Ms. Lois D. Cashell, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Subject: Article 411 - Order Issuing License - Minor Project
Issued October 18, 1995
City of Crystal Falls Hydroelectric Project; FERC Project No. 11402
City of Crystal Falls, Michigan -004

Dear Ms. Cashell:

On behalf of the city of Crystal Falls, Michigan, we are hereby filing one original and eight copies of the city's plan for the monitoring and control of exotic wetland species at the Crystal Falls Hydroelectric Project. The plan is being submitted in accordance with Article 411 (copy attached) of the above-mentioned minor project license.

Copies have been sent to those entities that were consulted on matters related to this filing. Proof of service is also included.

Thank you for your consideration in this matter. If you have any questions, please contact Mr. Perry Rossa of Mead & Hunt, Inc.

Sincerely,

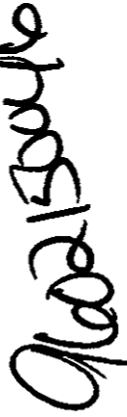
MEAD & HUNT, Inc.



Arie DeWaal
Senior Project Scientist

Enclosures

cc: See attached list



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FERC DOCUMENT

FEB 12 1996



Certificate of Service

I hereby certify that I, on behalf of the City of Crystal Falls, Michigan, have this day served the foregoing document upon each person designated on the attached distribution list.

Dated this 7th day of February, 1996.



Arie DeWaal
MEAD & HUNT, Inc.

Distribution List

Crystal Falls Hydroelectric Project (FERC Project No. 11402)

Article 411

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Federal Energy Regulatory Commission
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Washington, DC 20426

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Office of Hydropower Licensing
Federal Energy Regulatory Commission
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Washington, DC 20426

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Lansing, MI 48933

Mr. Mark Coscarelli
Office of Great Lakes
Michigan Department of Natural Resources
Executive Division
P.O. Box 30473
Lansing, MI 48909-7973

Article 411. Within 6 months of license issuance, the Licensee shall file with the Commission, for approval, a plan for the control of exotic wetland species to protect wetlands from invasive species including purple loosestrife and Eurasian water milfoil. The plan shall include, at a minimum, measures to inform and educate the public about the spread of invasive species through the placement of signage/bulletin boards in strategic locations within the project area. If at any time during the period of the license, the Michigan Department of Natural Resources (MDNR) deems it necessary to control or eliminate purple loosestrife and/or Eurasian water milfoil, the Licensee shall cooperate in this measure.

The Licensee shall prepare the plan after consultation with the U.S. Fish and Wildlife Service and MDNR.

The Licensee shall include with the plan documentation of agency consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The Licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the Licensee does not adopt a recommendation, the filing shall include the Licensee's reasons, based on site-specific information.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the Licensee shall implement the plan, including any changes required by the Commission.

**City of Crystal Falls
Crystal Falls Dam
FERC Project No. 11402-000**

Minor Project License - Article 411

**Informational Measures and Annual Monitoring Plan for
Purple Loosestrife and Eurasian Water Milfoil**

Informational Measures

Public education regarding the threat of purple loosestrife (*Lythrum salicaria*) and Eurasian water milfoil (*Myriophyllum spicatum*) will be conducted through the posting of weather-proof informational signs and educational brochures for each species at the public boat landing on the east shore of the impoundment. Each sign will be posted on 4-inch by 4-inch wooden posts immediately adjacent to the boat ramp and shall conform to technical standards established through coordination with the Michigan Department of Natural Resources (MDNR), Office of Great Lakes. The brochure used will be "A Field Guide to Aquatic Exotic Plants and Animals," available through the regional Sea Grant office or the MDNR Office of Great Lakes, and will be posted in a weather-proof container below or adjacent to the informational signs. The address of the MDNR Office of Great Lakes will be added to the back of the brochure as an additional regional contact for more information.

The two weather-proof signs will contain basic information describing the habits and ecological threat posed by each species, a species illustration, and measures which facility users can undertake to prevent the spread of the species to project waters. Telephone contacts in the MDNR for more information or to report sightings will also be provided. The signs will be installed during the 1996 growing season and will be inspected yearly by the Licensee, and repaired or replaced as their condition warrants.

If at any time during the license period the MDNR deems it necessary to control or eliminate purple loosestrife and/or Eurasian water milfoil, the Licensee will cooperate in this measure. The Licensee will meet with technical advisory staff of MDNR and/or the U.S. Fish and Wildlife service to determine appropriate and cost-effective removal techniques.

Annual Monitoring

A. General

Annual monitoring for purple loosestrife and Eurasian water milfoil will be performed during the last week of July through the first week of August of each year. The monitored area will consist of the stretch of river from the bridge at Fairbanks Road below the tailwater upstream to a point one mile north of the dam. This area will be toured by boat and each occurrence of either species will be mapped using the hydrographic map developed for the project license application to record the extent and location of occurrences. Species cover will also

be recorded and voucher specimens collected for verification of identity. Monitoring results will be compiled and submitted to the FERC, MDNR Fisheries, MDNR FERC Coordination Unit and USFWS by November 30 of each year.

B. Equipment

The field survey will be supported by the hydrographic map, the river bottom substrate map and the aquatic macrophyte bed map developed for the initial license application (Volume 2, Appendix A) and included herein. If available, United States Department of Agriculture color photographs may be used to identify stands of purple loosestrife. Together, the maps and photographs will assist in defining those areas of project waters most likely to harbor populations of the invasive species. Wet soil habitats in shoreline areas will be important for purple loosestrife, while silt and sand substrates in bays, slack water, and shoreline areas will be important areas for the Eurasian water milfoil.

The survey will be conducted using a motorboat or canoe, with data recorded in a field notebook and boundaries and locations of populations mapped on field copies of the hydrographic map. Voucher specimens will be collected by hand or with a garden rake and bagged for verification. A hand lens or binocular microscope will be used to verify the correct leaflet count for specimens of *Myriophyllum*, with any specimen having 12 or more leaflets considered as *Myriophyllum spicatum*. The identity of *Lythrum salicaria* will be confirmed using standard references such as Newcomb (1977) or Gleason and Cronquist (1963). White cotton string stretched between hardwood lathe will be used for species cover assessments of purple loosestrife using the line-intercept method, with distances measured in English units by retractable measuring tape. Species cover and density of Eurasian water milfoil will be assessed using a garden rake, and mat thickness will be measured using a collapsible survey rod. Metal stakes or iron rebar will be used to mark the locations of population of both species and will also be used to mark line-intercept transect endpoints for purple loosestrife populations larger than 20 individuals. The stakes or rebar will be left as permanent markers, with GPS coordinates taken using a portable field positioning system. The perimeter of milfoil mats will be marked for measurement using plastic bottles as floats tied to a sinker weight.

C. Methods

The annual survey will be conducted by motorboat or canoe and will include all project waters within the Paint River channel from the project dam to a point one mile upstream. The survey will be conducted each year during the second and third week of August and will consist of a low-speed boat tour of the river channel area to locate and map occurrences of either species on field copies of the hydrographic map.

Cover estimates of Eurasian water milfoil populations will be assessed via the rake sampling method, with four casts with the rake taken on compass quadrants from the center point of each population. Cover will be reported as follows:

Rake Recovery of Species	Cover Rating
Rake teeth full on all four casts	5
Plants taken on all four casts	4
Plants taken on three casts	3
Plants taken on two casts	2
Plants taken on one cast	1

Cover ratings will be recorded in a field notebook, with the locations of any populations marked by field notes relative to landmarks and by a metal stake driven into the bank above the mean high water mark on the nearest shore. The perimeter of each matted area (that area of highest density with plants growing to the surface) will be measured after marking with floats and the area calculated in square meters. At several locations in each matted area, the thickness of the mat in meters will be measured using a collapsible survey rod. The extent of Eurasian water milfoil populations, including matted areas with their thickness measurements, will be drawn on the field copy of the hydrographic map, with the cover rating noted, and later transferred to a file copy for distribution with the yearly report. After field measurements are taken, the floats will be removed.

Cover of purple loosestrife populations will be assessed by the line-intercept method, excepting those areas where populations of less than 20 individual plants occur, which populations shall be subject to direct count. For the line-intercept method, transects bisecting each population into approximately equal halves will be established with a metal stake and one six-foot sampling segment perpendicular to the transect will be established for every 25 feet of transect length. Cover will be determined for purple loosestrife for the portion of the plant intercepting the line from an overhead perspective. Cover will be calculated by dividing the sum of the intercepts by the total length of the intercept line and multiplying by 100.

Stem densities of each purple loosestrife stand will be measured using a square-meter quadrat, with at least 10 percent of each stand or three quadrats sampled for density, whichever is less. The total area of each stand will be estimated using metric length and width measurements.

After the purple loosestrife data is collected, small stands comprising less than three square meters in area will be physically removed by pulling up the plants, bagging them securely, and disposing of them offsite in an appropriate manner.

Cover data, stem densities, stand areas, transect location, and the location of intercept lines on each transect will be recorded in the field notebook. The extent and number or cover values of purple loosestrife populations will be drawn on the field copy of the hydrographic map and transferred later to a file copy for distribution with the yearly report. Removed populations will also be noted on the map.

C. Results

Results will be reported annually to MDNR Fisheries, MDNR FERC Coordination Unit, and USFWS. The report will include a narrative summary of findings, data (if any populations of the two species are found), and a copy of the hydrographic map showing the locations, boundaries, and cover ratings of any populations found during the survey. If the results of field surveys are negative for the first two years of monitoring, the timing and extent of further surveys will be coordinated with the FERC after consultation with the MDNR FERC Coordination Unit and the USFWS.

References

Newcomb, Lawrence, 1977. *Newcomb's wildflower guide*. Boston: Little, Brown and Company.

Gleason, Henry A. and Arthur Cronquist, 1963. *Manual of vascular plants of Northeastern United States and adjacent Canada*. New York: Van Nostrand Reinhold Company.



A FIELD GUIDE
TO
AQUATIC EXOTIC
PLANTS
AND ANIMALS



Exotic Introductions

"Exotic" species — organisms introduced into habitats where they are not native — are severe world-wide agents of habitat alteration and degradation. A major cause of biological diversity loss throughout the world, they are considered "biological pollutants."

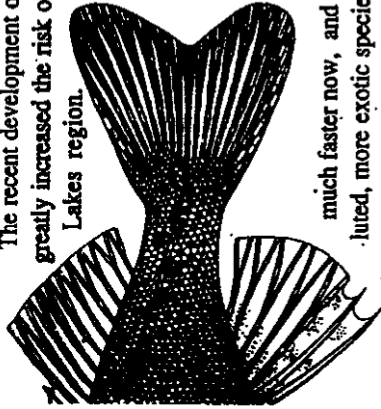
Introducing species accidentally or intentionally, from one habitat into another, is risky business. Freed from the predators, parasites, pathogens, and competitors that have kept their numbers in check, species introduced into new habitats often overrun their new home and crowd out native species. In the presence of enough food and a favorable environment, their numbers will explode. Once established, exotics rarely can be eliminated.

Most species introductions are the work of humans. Some introductions, such as carp and purple loosestrife, are intentional and do unexpected damage. But many exotic introductions are accidental. The species are carried in on animals, vehicles, ships, commercial goods, produce, and even clothing. Some exotic introductions are ecologically harmless and some are beneficial. But other exotic introductions are harmful to recreation and ecosystems. They have even caused the extinction of native species — especially those of confined habitats such as islands and aquatic ecosystems.

The recent development of fast ocean freighters has greatly increased the risk of new exotics in the Great Lakes region.

Ships take on ballast water in Europe for stability during the ocean crossing. This water is pumped out when the ships pick up their loads in Great Lakes ports. Because the ships make the crossing so much faster now, and harbors are often less polluted, more exotic species are likely to survive the journey and thrive in the new waters.

Many of the plants and animals described in this guide arrived in the Great Lakes this way. But they are now being spread throughout the continent's interior in and on boats and other recreational watercraft and equipment. This guide is designed to help water recreationalists recognize these exotics and help stop their further spread.



Midwest Aquatic Exotics



Round goby (*Neogobius melanostomus*) is a bottom-dwelling fish, native to eastern Europe, that entered the eastern Great Lakes in ballast water. They can spawn several times per year, grow to about 10 inches, are aggressive, and compete with native bottom-dwellers like sculpins and log perch. They are expected to be harmful to Great Lakes and inland fisheries.



Sea lamprey (*Petromyzon marinus*) are predaceous, eel-like fish native to the coastal regions of both sides of the Atlantic Ocean. They entered the Great Lakes through the Welland Canal about 1921. They contributed greatly to the decline of whitefish and lake trout in the Great Lakes.



Rusty crayfish (*Orconectes rusticus*) are native to streams in the Ohio, Kentucky, and Tennessee region. Spread by anglers who use them as bait, rusty crayfish are prolific and can severely reduce lake and stream vegetation, depriving native fish and their prey of cover and food. They also reduce native crayfish populations.



White perch (*Morone americana*) are native to Atlantic coastal regions and invaded the Great Lakes through the Erie and Welland canals. Prolific competitors of native fish species, white perch have the potential to cause declines of Great Lakes walleye populations.



Flowering rush (*Boturus umbellatus*) is a perennial plant from Europe and Asia that was introduced in the Midwest as an ornamental plant. It grows in shallow areas of lakes as an emergent, and as a submersed form in water up to 10 feet deep. Its dense stands crowd out native species like bulrush. The emergent form has pink, umbellate-shaped flowers, and is 3 feet tall with triangular-shaped stems.



Curly-leaf pondweed (*Potamogeton crispus*) is an exotic plant that forms surface mats that interfere with aquatic recreation. The plant usually drops to the lake bottom by early July. Curly-leaf pondweed was the most severe nuisance aquatic plant in the Midwest until Eurasian watermilfoil appeared. It was accidentally introduced along with the common carp.

Many zebra mussels attached to a native clam.



Adult life size: 1 to 1 inch

Zebra Mussel

Dreissena polymorpha

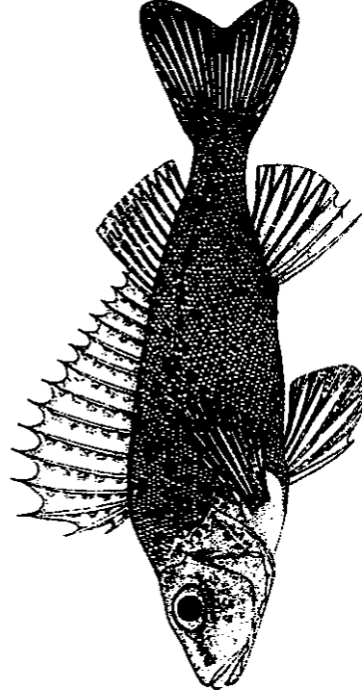
Zebra mussels and a related species, the Quagga mussel, are small, fingernail-sized mussels native to the Caspian Sea region of Asia. They were discovered in Lake St. Clair near Detroit in 1988. A variety of a wide range of environmental conditions, zebra mussels have now spread to parts of all the Great Lakes and the Mississippi River and are showing up in inland lakes. Zebra mussels clog water systems and power plants and water treatment facilities, as well as irrigation systems. They have severely reduced and eliminated native mussel species.

Female zebra mussels can produce as many as 1 million eggs per year. These develop into microscopic, free-living larvae (called veligers) that begin to form shells. At about three weeks, the sand grain-sized larvae start to settle and attach to any firm surface using "byssal threads". They will cover rock, metal, rubber, wood, docks, hulls, native mussels, and even aquatic plants.

Zebra mussels filter plankton from the surrounding water. Each mussel can filter about one quart of lake water per day. However, all of what they remove is eaten. What they don't eat is combined with mucus as "pseudofeces" and discharged onto the lake bottom where it accumulates. This material may benefit bottom feeders while reducing the plankton food chain for upper water species.

Diving ducks, the freshwater drum, and other fish eat zebra mussels, but will not significantly control them.

Likely means of spread: Microscopic larvae may be carried in livewells or bilge water. Adults can attach to boats or boating equipment that sit in the water.



Adult life size: 3 to 5 inches

Ruffe

Gymnocephalus cernuus

The ruffe is a small European member of the perch family that is native to central and eastern Europe. It was introduced to Duluth harbor, probably in tanker ballast water, around 1985, and is spreading to other rivers and bays around Lake Superior.

In Europe, the ruffe is a pest species in waters it has invaded. Ruffe have shown explosive population growth and have had harmful impacts on native species and functions of aquatic ecosystems.

In the St. Louis River near Duluth, populations of yellow perch, emerald shiners, and other forage fish caught in survey trawls have declined dramatically as numbers of ruffe have increased.

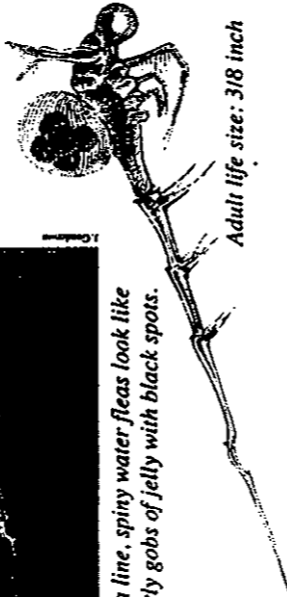
The ruffe's ability to displace other species in newly invaded areas is due to: (1) its high reproductive rate, (2) its feeding efficiency across a wide range of environmental conditions, and (3) characteristics that may discourage would-be predators such as walleye and pike.

Ruffe grow rapidly and can reproduce in their first year. In the St. Louis River, females can lay between 45,000 and 90,000 eggs a year. Ruffe are primarily bottom feeders, preferring dark environments where they can hide from predators. Ruffe rarely grow bigger than 5 inches, although the sharp spines on their gill covers, dorsal and anal fins make them difficult for larger fish to eat.

Likely means of spread: Ruffe could be accidentally transported in livewells, bilge water, bait buckets, and in the ballast water of Great Lakes freighters.



On a line, spiny water fleas look like bristly gobs of jelly with black spots.



Adult life size: 3/18 inch

Spiny Water Flea

Bythotrephes cederstroemi

The spiny water flea, or "B.C.", is not an insect at all, but a tiny (less than half an inch long) crustacean with a long, sharp, barbed tail spine. A native of Great Britain and northern Europe east to the Caspian Sea, the animal was first found in Lake Huron in 1984 — probably imported in the ballast water of a trans-oceanic freighter. Since then, populations have exploded and the animal can now be found throughout the Great Lakes and in some inland lakes.

The effects spiny water fleas will have on the ecosystems of the Great Lakes region are unclear. The animals may compete directly with young perch and other small fish for food, such as *Daphnia* zooplankton. They also may provide a food source for larger fish.

Spiny water fleas also reproduce rapidly. During warm summer conditions each female can produce up to 10 offspring every two weeks. As temperatures drop in the fall, eggs are produced that can lie dormant all winter.

While the impacts of the spiny water flea seem to be minimal in some areas of the Great Lakes, it is not known if this exotic will have larger impacts on inland lake ecosystems.

Likely means of spread: Spiny water flea eggs and adults may wind up unseen in bilge water, bait buckets, and livewells. Also, fishing lines and downriggers will often be coated with both eggs and adults.



Eurasian watermilfoil typically has 12 to 21 pairs of leaflets. The native northern watermilfoil, with which it is often confused, usually has 5 to 9 pairs.



Leaflet is 1/2 life size

Eurasian watermilfoil

Myriophyllum spicatum

Mature plant

Eurasian watermilfoil was accidentally introduced to North America from Europe. Spread westward into inland lakes primarily by boats and also by waterbirds, it reached midwestern states between the 1950s and 1980s.

In nutrient-rich lakes it can form thick underwater stands of tangled stems and vast mats of vegetation at the water's surface. In shallow areas the plant can interfere with water recreation such as boating, fishing, and swimming. The plant's floating canopy can also crowd out important native water plants.

A key factor in the plant's success is its ability to reproduce through stem fragmentation and runners. A single segment of stem and leaves can take root and form a new colony. Fragments clinging to boats and trailers can spread the plant from lake to lake. The mechanical clearing of aquatic plants for beaches, docks, and landings creates thousands of new stem fragments. Removing native vegetation creates perfect habitat for invading Eurasian watermilfoil.

Eurasian watermilfoil has difficulty becoming established in lakes with well established populations of native plants. In some lakes the plant appears to coexist with native flora and has little impact on fish and other aquatic animals.

Likely means of spread: Milfoil may become entangled in boat propellers, or may attach to keels and rudders of sailboats. Stems can become lodged among any watercraft apparatus or sports equipment that moves through the water, especially boat trailers.



Purple loosestrife

Lythrum salicaria

Adult height:
2 to 7 feet

Purple loosestrife is a wetland plant from Europe and Asia. It was introduced into the east coast of North America in the 1800s. First spreading along roads, canals, and drainage ditches, then later distributed as an ornamental, this exotic plant is in 40 states and all Canadian border provinces.

Purple loosestrife invades marshes and lakeshores, replacing cattails and other wetland plants. The plant can form dense, impenetrable stands which are unsuitable as cover, food, or nesting sites for a wide range of native wetland animals including ducks, geese, rails, bitterns, muskrats, frogs, toads, and turtles. Many rare and endangered wetland plants and animals are also at risk.

Purple loosestrife thrives on disturbed, moist soils, often invading after some type of construction activity. Eradicating an established stand is difficult because of an enormous number of seeds in the soil. One adult plant can disperse 2 million seeds annually. The plant is able to resprout from roots and broken stems that fall to the ground or into the water.

A major reason for purple loosestrife's expansion is a lack of effective predators in North America. Several European insects that only attack purple loosestrife are being tested as a possible long-term biological control of purple loosestrife in North America.

Likely means of spread: Seeds escape from gardens and nurseries into wetlands, lakes, and rivers. Once in aquatic systems, seeds are easily spread by moving water and wetland animals.

Illustrations by: Don Lave, Jim Meevy, Donna Francis and M. Barallui.

CHECKLIST

Clean boats, clean waters...

If you are a water recreationist — boater, angler, water-skier, scuba-diver, sailor, or canoeist — there are some important things you can do to prevent the transport of harmful exotic species from one lake or river to another. In some states and provinces it is illegal to transport harmful exotic species.

- ✓ Inspect your boat, trailer, and boating equipment (anchors, centerboards, rollers, axles) and remove any plants and animals that are visible *before* leaving any waterbody.
- ✓ Drain water from the motor, livewell, bilge, and transom wells while on land *before* leaving any waterbody.
- ✓ Empty your bait bucket on land *before* leaving the waterbody. Never release live bait into a waterbody, or release aquatic animals from one waterbody into another.
- ✓ Wash/dry your boat, tackle, downriggers, trailer, and other boating equipment to kill harmful species that were not visible at the boat launch. This can be done on your way home or once you have returned home. Some aquatic nuisance species can survive more than 2 weeks out of water, so it is important to:
 - rinse your boat and equipment that normally get wet with *hot* (at least 40° C or 104° F) tap water; or
 - spray your boat and trailer with high-pressure water; or
 - dry your boat and equipment for at least 5 days, before transporting to another waterbody.

✓ Learn what these organisms look like (at least those you can see). If you suspect a new infestation of an exotic plant or animal, report it to your natural resource agency.

✓ Consult your natural resource agency for recommendations and permits before you try to control or eradicate an exotic "pest." Remember, exotic "pests" can thrive on disturbance. Do-it-yourself control treatments can make matters worse and can harm native species.

For more information...

If you would like more information about aquatic exotic species, the problems they cause, regulations to prevent their spread, or methods and permits for their control, contact one of the following offices:



Minnesota Department of Natural Resources
Exotic Species Programs
500 Lafayette Road
St. Paul, MN 55155-4025
(612) 296-2835



Minnesota Sea Grant
University of Minnesota
Exotic Species Information Center
2305 East Fifth Street
Duluth, MN 55812-1445
(218) 726-8712



This publication is also sponsored by:

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Corps of
Engineers

If you would like information about booking a traveling exhibit or educational trunk on aquatic exotic species, contact:



The Bell Museum of Natural History
10 Church St. SE
University of Minnesota
Minneapolis, MN 55455
(612) 624-2090

You may also contact:

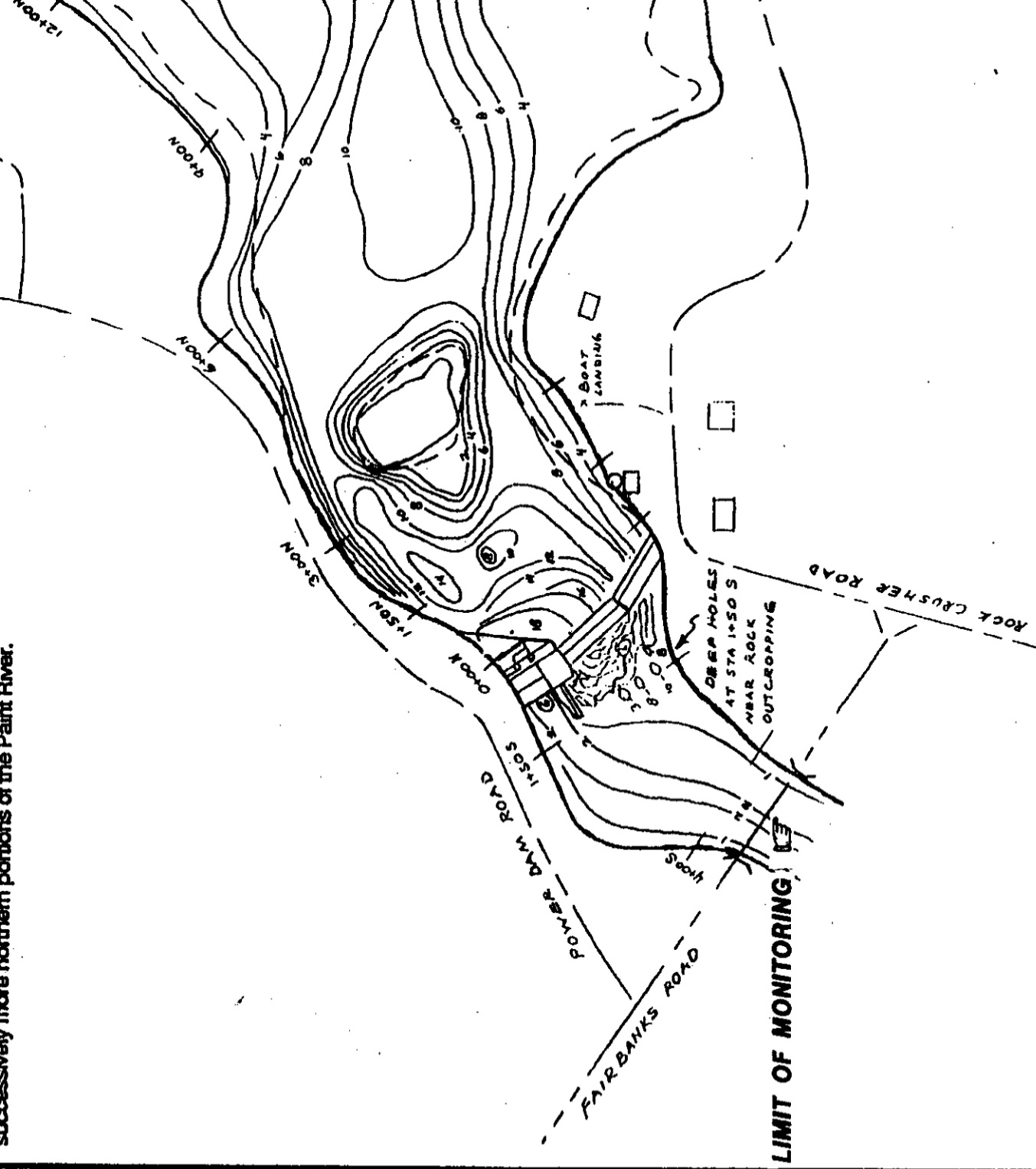
This information is available in an alternative format upon request.

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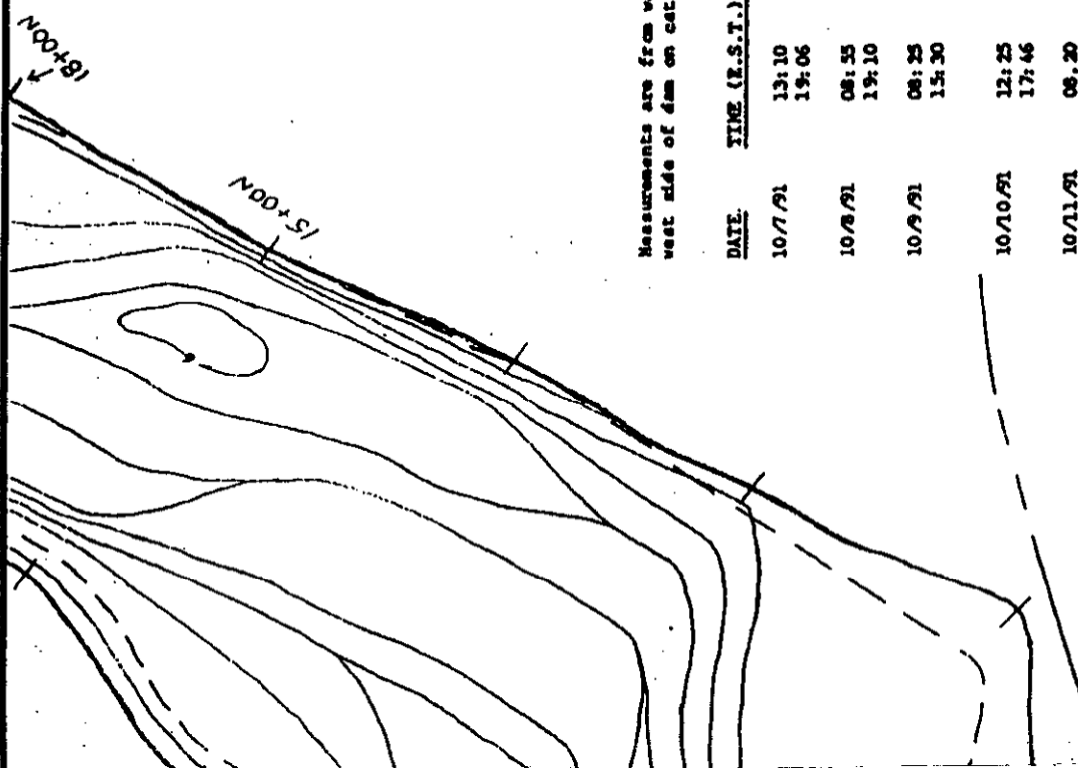
This map is number 1 of 4 detail maps of the Paint River in the vicinity of the Crystal Falls Hydroelectric Dam. Map 1 is the southern-most map and consecutive numbers (1-4) show successively more northern portions of the Paint River.



Taken from

BITTNER ENGINEERING, INC
 113 SOUTH 10th STREET
 ESCANABA, MICHIGAN 49829
 906-789-1511

Map 1. Hydrographic Map of the Paint River Study Area.



SCALE: 1inch = 200 feet

WATER SURFACE FLUCTUATIONS

Measurements are from water surface up to reference point, which is located at west side of dam on catwalk over first swing gate.

<u>DATE</u>	<u>TIME (E.S.T.)</u>	<u>DISTANCE (IN FT.)</u>	<u>RATE OF DROP (FT./HR.)</u>
10/7/91	13:10	4.28	0.06
	19:06	4.66	
10/8/91	08:35	4.10	0.06
	19:10	4.73	
10/9/91	08:25	4.12	0.05
	15:30	4.47	
10/10/91	12:25	4.40	0.07
	17:46	4.80	
10/11/91	08:20	4.26	0.08
	15:00	4.79	
10/16/91	09:40	4.20	0.08
	14:50	4.59	
9/15/92	09:00	4.19	—

LEGEND

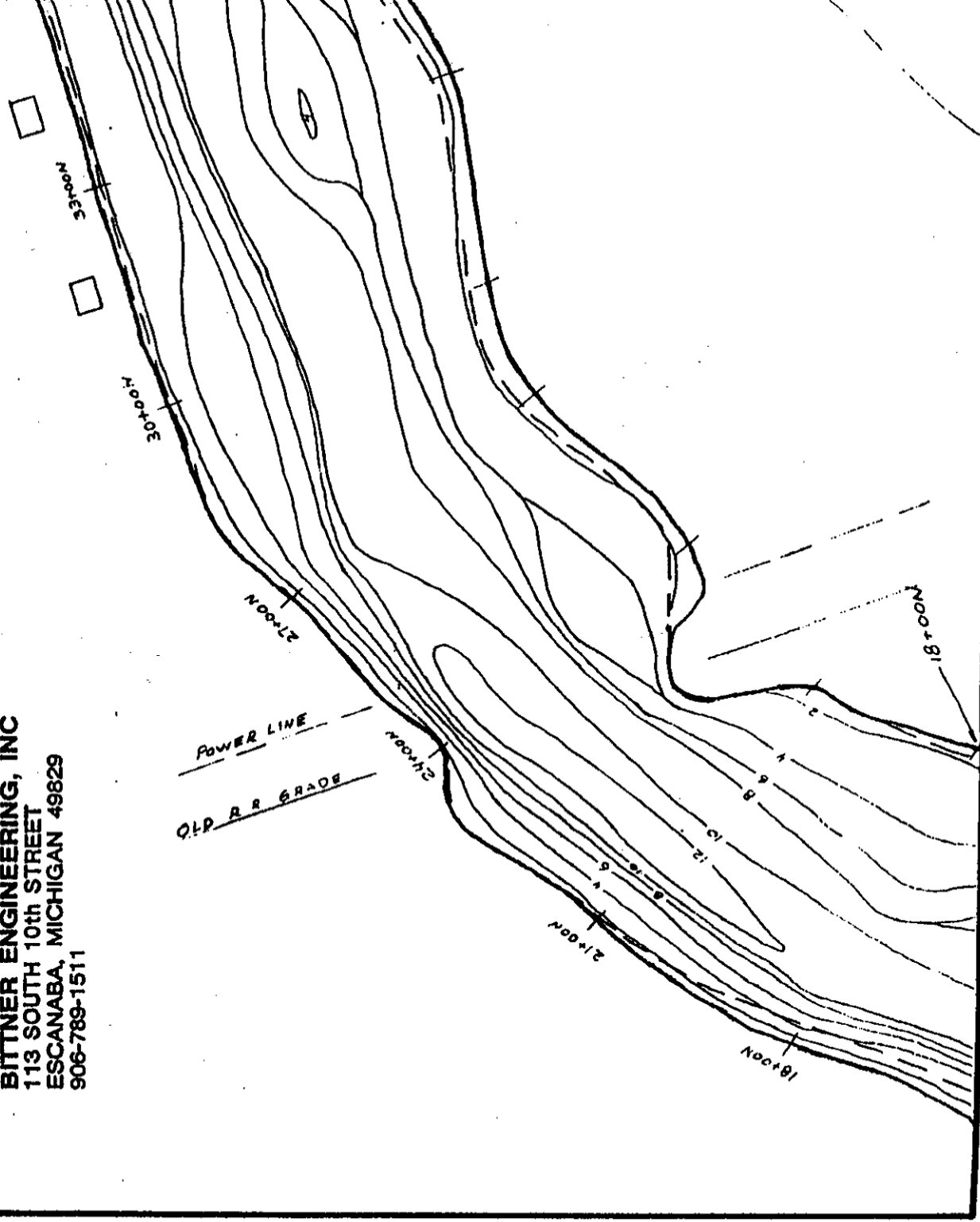
- SHORELINE AS SHOWN ON 1945 USGS MAP
- CURRENT SHORELINE AS MEASURED (SLOUGHS NOT INCLUDED)
- 20' — CONTOUR LINES
- ROADS
- STRUCTURES

SCALE: 1inch = 200 feet

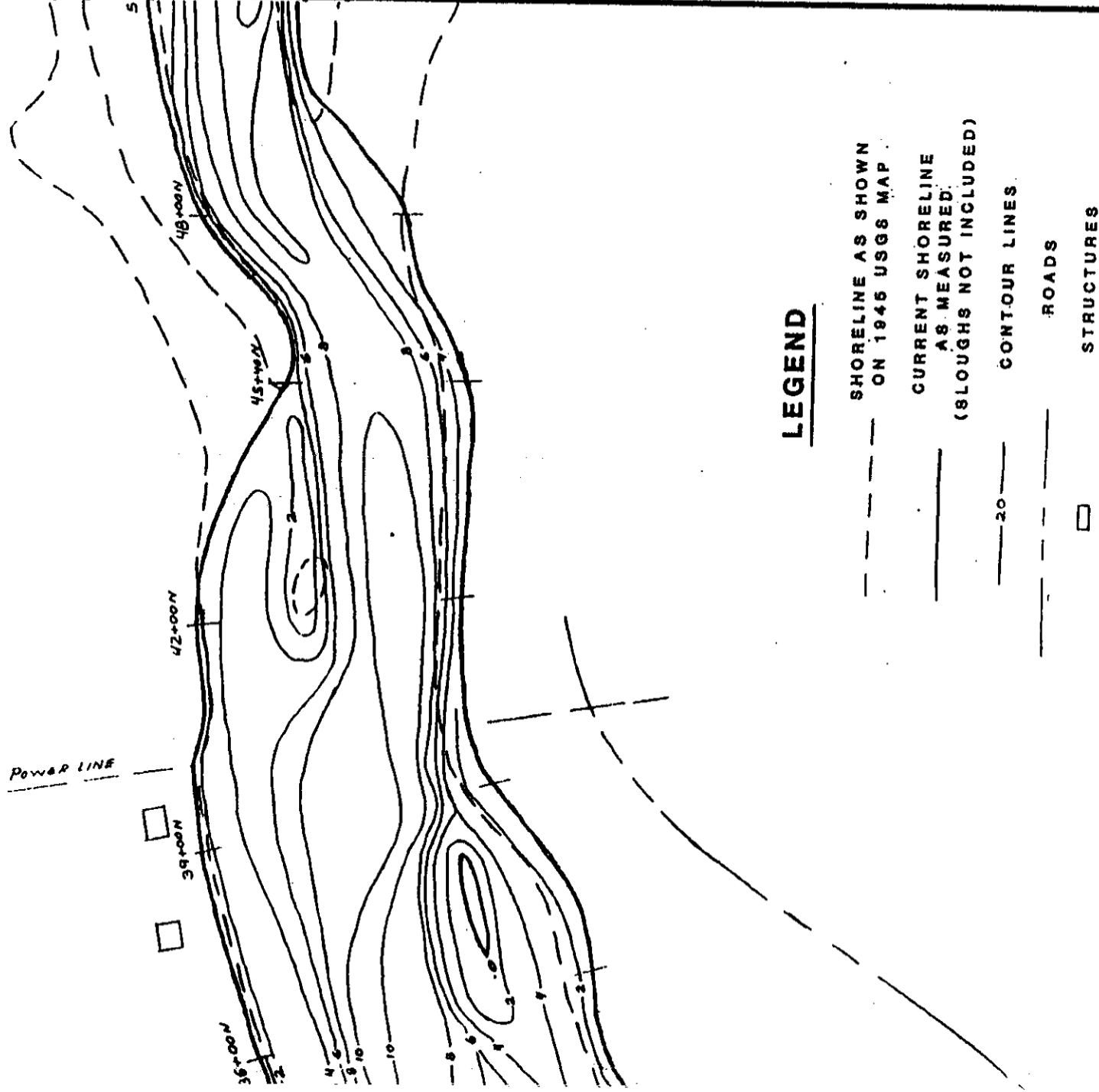
This map is number 2 of 4 detail maps of the Paint River in the vicinity of the Crystal Falls Hydroelectric Dam. Map 1 is the southern-most map and consecutive numbers (1-4) show successively more northern portions of the Paint River.

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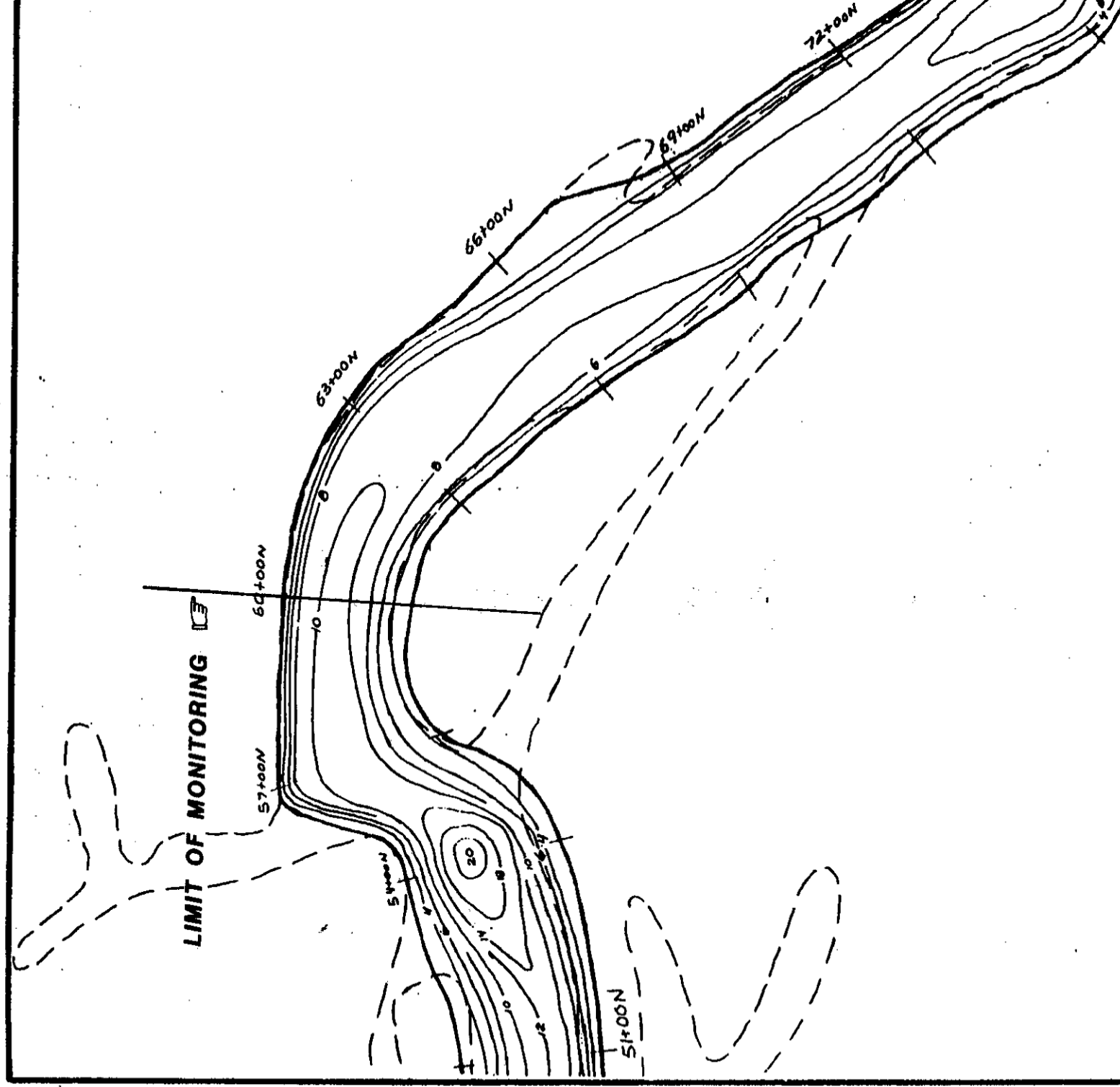


Map 2. Hydrographic Map of the Paint River Study Area.



LEGEND

- SHORELINE AS SHOWN ON 1945 USGS MAP
- CURRENT SHORELINE AS MEASURED (SLOUGHS NOT INCLUDED)
- 20— CONTOUR LINES
- ROADS
- STRUCTURES



This map is number 3 of 4 detail maps of the Paint River in the vicinity of the Crystal Falls Hydroelectric Dam. Map 1 is the southern-most map and consecutive numbers (1-4) show successively more northern portions of the Paint River.

Map 3. Hydrographic Map of the Paint River Study Area.



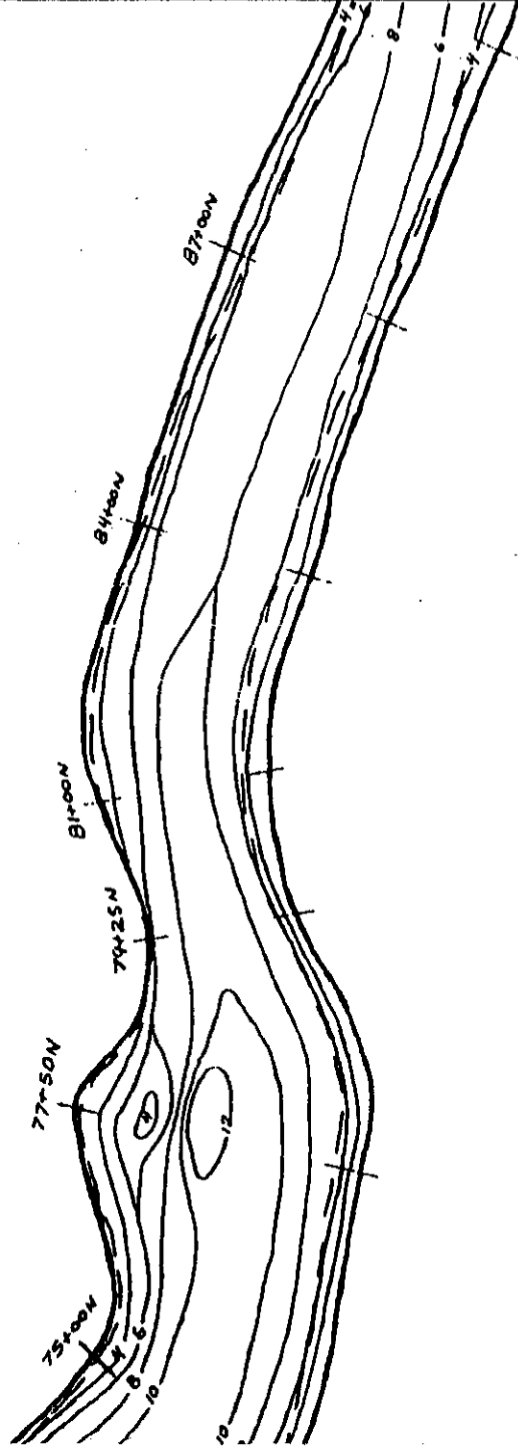
SCALE: 1 inch = 200 feet

LEGEND

- SHORELINE AS SHOWN ON 1946 USGS MAP
- CURRENT SHORELINE AS MEASURED (SLOUGHS NOT INCLUDED)
- 20--- CONTOUR LINES
- ROADS
- STRUCTURES

Taken from

BITTNER ENGINEERING, INC
113 SOUTH 10th STREET
ESCANABA, MICHIGAN 49829
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Crystal Falls Hydroelectric Project
Paint River
Iron County, Michigan

EURASIAN MILFOIL ALERT!

PLEASE REMOVE ALL AQUATIC PLANTS FROM BOATS AND TRAILERS

Eurasian water milfoil is an aquatic plant that interferes with boating, swimming, water skiing and fishing on many *Michigan* lakes.



a fragment

top leaves have a reddish cast



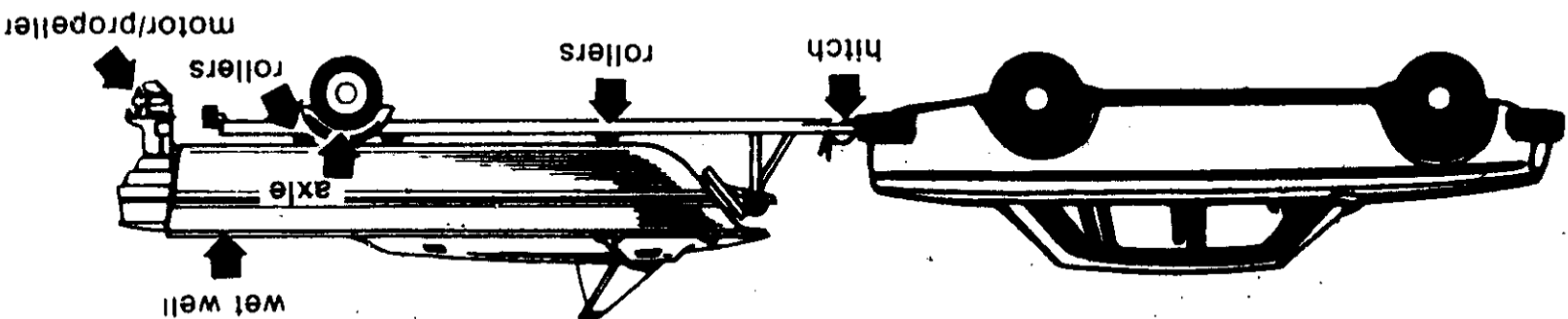
a leaf

12 or more pairs of leaflets on each leaf

Fragments of Eurasian water milfoil are transported from lake to lake on boats and trailers. New plants grow from these small pieces and, although milfoil has a hard time getting established in lakes with a healthy population

of native plants, it can quickly infest disturbed sites.

You can help prevent the spread of Eurasian water milfoil in **Michigan** and neighboring states by removing all aquatic plants from your trailer, boat, motor/propeller and anchor before launching and after leaving the water. Please take special care to thoroughly drain all live wells and transom wells before leaving any water access site and remove plants from the board boxes of sailboats and interiors of car-top boats and canoes.



Places to look for aquatic plants. ▾

Thank you!

Michigan Department of Natural Resources Parks and Recreation Division