

INVESTIGATOR'S ANNUAL REPORT
(Natural Sciences Research)

Bibkey JS* 67200
ISRO- 0378
IndCat Y2004

December 1

This form is to be completed by the researcher and returned to the Superintendent of the Park by ~~January 1~~. See reverse for additional instructions.

TO SUPERINTENDENT	PARK Isle Royale National Park	REGION Midwest
----------------------	-----------------------------------	-------------------

1. Project Title

Assessment of Conditions for Conducting Aquatic Research at Isle Royale National Park. Mission Report MSGE-89-02

2. Name(s) of Researcher(s) and Institution(s)

Dr. Ted R. Batterson
Department of Fisheries & Wildlife
Michigan State University

Kenneth J. Vrana
Michigan Sea Grant Extension
Michigan State University

3. Source(s) and Amount(s) of Funds Other Than NPS, if Any

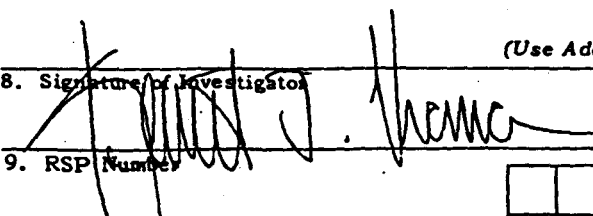
Private Donation to Michigan Sea Grant College Program

4. Starting Date of Project Monday July 17, 1989	5. Percent Completion of Project to Date: 50%	6. Est. Additional Time Required for Completion Beyond January 1st: XXXXXXXXXX Dec. 1 1 1/2 (Jan. 15, 1990) Years Months
---	--	--

7. Summary: (a) of progress; (b) of significant findings, if any, to date; (c) recommendations regarding future course, i.e., on basis of work so far, should it proceed as planned, be reoriented, expanded, reduced, time schedule and support level adjusted, etc.;

(See Attached Pages)

(Use Additional Sheets if Necessary)

8. Signature of Investigator 	Date December 7, 1989								
9. RSP Number <table border="1"><tr><td></td><td></td><td></td><td></td><td>N</td><td></td><td></td><td></td></tr></table>						N			
				N					

INVESTIGATOR'S ANNUAL REPORT

Isle Royale National Park

Project Title:

Assessment of Conditions for Conducting Aquatic Research at Isle Royale National Park. Mission Report MSGE-89-02.

Name of Researchers and Institutions:

Ted R. Batterson, Associate Professor
Department of Fisheries & Wildlife, Michigan State University
East Lansing, Michigan 48824

Kenneth J. Vrana, Bottomland Preserve Specialist
Michigan Sea Grant Extension, Michigan State University
East Lansing, Michigan 48824

Sources of Funds:

Private Donation to Michigan Sea Grant College Program

Starting Date of Project:

Monday July 17, 1989

Ending Date of Project:

Friday July 21, 1989

Percent Completion of Project to Date: 50%

Est. Additional Time Required for Completion Beyond December 1:

6 weeks (January 15, 1990)

Summary:

The prime objective of this project was to familiarize Dr. Ted R. Batterson, an aquatic ecologist, with the operational requirements for conducting research at Isle Royale National Park. An overview of aquatic environments was one aspect of this assessment. Scuba dives were completed in the following locations.

- 1) A Protected Harbor: Washington Harbor, near Washington Creek
- 2) A Channel Between Islands: Site of AMERICA in Thompson Channel.
- 3) A Protected Cove Near Open Lake: First cove to the northeast after entering McCargo Cove
- 4) An Unprotected, Open Water Reef: CONGDON Shoal

Still and/or video photography were taken at all sites. Specimens of aquatic vegetation, hydra, alga and unknown "scum" were taken for purposes of identification. A visit was made with Dr. Robert Janke, a biologist based at Johnson Island, to discuss previous efforts to identify aquatic vegetation at Isle Royale. Dr. Janke had not encountered any record of collections and identifications being completed for aquatic vegetation deeper than approximately 3 feet in inland lakes or Lake Superior.

Specimens identified by Dr. Batterson are mentioned in the attached trip report. These specimens will be preserved at the Department of Fisheries & Wildlife, Michigan State University. "A Field Guide to Valuable Underwater Aquatic Plants of the Great Lakes" by Donald W. Schloesser and "The St. Marys River, Michigan: An Ecological Profile" by Duffy, Batterson and McNabb are included for the park library, courtesy of Michigan Sea Grant Extension and Dr. Batterson. Other references are provided in the trip report and publications. Hopeful identification of "scum" samples through electron microscopy should be completed by January 15, 1990. Thick growth of this "scum" has been noted on shipwreck sites in other Lake Superior locations. In addition, Dr. Batterson will provide recommendations for future research.

Ken Vrana of Michigan Sea Grant Extension and Gerald Buchanan will donate a summary videotape and stills of Isle Royale aquatic resources to the park by January 15, 1990. These include visual recordings of collection efforts, and flora and fauna. Brochures outlining the Michigan Sea Grant College Program and other Great Lakes research programs are attached for your information. If you have further questions, please contact Ron Kinnunen, District Sea Grant Extension Agent for Michigan's Upper Peninsula. His phone number is (906) 228-4830. With interest from Isle Royale National Park, cooperative research is possible.

Prepared By:

Ken Vrana
Michigan Sea Grant Extension
334 Natural Resources Building
Michigan State University
East Lansing, MI 48824

Ted Batterson
Department of Fisheries & Wildlife
13 Natural Resources Building
Michigan State University
East Lansing, MI 48824

TRIP REPORT TO ISLE ROYALE NATIONAL PARK JULY 17-21, 1989
by Ted R. Batterson

Arrived Tobin Harbor by seaplane (landing near Rock Harbor information center, lodge, and marina) at 9:15 A.M. on Monday July 17, 1989 and was met by Ken Vrana. Ken, Gerry Buchanan (owner and captain of the *Madeline Goodrush*, a 33 ft Silverton out of Duluth, Minnesota), and Jerry Livingston (a National Park Service scientific illustrator out of Albuquerque, New Mexico) had overnighted at the Rock Harbor marina. We traveled by boat from Rock Harbor to Grand Portage, Minnesota to drop off Jerry Livingston and to take on supplies. From there we went to Windigo in Washington Harbor arriving in the early evening. Tuesday, July 18 was spent diving on the *America*. It was my first dive on shipwrecks of Isle Royale and I had no idea what to expect in regard to flora and fauna. We noticed a number of sculpins and other small fish near or on the wreck. The only other fauna I observed were purple-colored hydra growing on the shady side of structures in fairly dense colonies when present. Observed a single patch of a filamentous alga growing on the top surface of a wooden rail and a single charophyte in a small depression on one of the deck surfaces. The most visually abundant growth was white, feathery material that was growing profusely on most of the ship's larger external surfaces. I was told that this non-pigmented material was what the divers called "scum." Speculations is that it is a fungus or filamentous bacteria. During the evening of July 18, Ken and I did a night dive in the shallow embayment by Windigo. The vegetation types and distribution were very similar to the submersed plant community of the St. Mary's River. Only observed four species of macrophytes: *Potamogeton*, *Myriophyllum*, *Isoetes*, and a charophyte. On the morning of Wednesday, July 19, Ken and Gerry Buchanan dove on the *America* to collect specimens of hydra, the filamentous alga, "scum" and the charophyte. They were preserved in FAA (formalin-aceto-alcohol solution) for later transport to the campus of Michigan State University. From Washington Harbor we boated to the entrance of McCargo Cove, finally anchoring in Brady Cove. Ken dove, took video footage and collected submersed macrophytes from water depths ranging from 8 to 12 ft. Plants were identified on shipboard. None were sexually mature which made speciation difficult for some or not possible for others. The plants collected were identified according to Fassett (1957) or Voss (1972, 1985) as *Elodea canadensis* Michaux, *Myriophyllum exalbscens* Fernald, *Isoetes* sp. and three *Potamogeton* species - one narrow-leaved and two broad-leaved one of which was thought to be *Potamogeton praelongus* Wulfen. There was one other plant that was thought to be a *Ranunculus* species. We left Brady Cove and boated to Rock Harbor to spend the evening at the marina. Thursday, July 20 was spent diving on the *Congdon* and the nearby shoals. Flora and fauna were similar to what had been observed at the *America*. We saw hydra, sculpins, and a filamentous alga. Rocks in the shoal area were covered with what appeared to be a denser abundance of "scum" than what we had observed at the *America*. Samples of it were collected and preserved in FAA. I departed Isle Royale by seaplane from Tobin Harbor on Friday, July 21 at 11:00 A.M.

TRIP REPORT TO ISLE ROYALE NATIONAL PARK JULY 17-21, 1989
by Ted R. Batterson

Since returning to the campus of Michigan State University I have microscopically examined the collected specimens. Since we tried to minimize the amount of material collected and since most was not in a sexual stage I could not positively identify the filamentous alga or speciate the charophyte. Using light microscopy, differentiation of structures of the "scum" were impossible. The preserved samples of the "scum" are being prepared for electron microscopy by MSU's Center for Electron Optics. Photomicrographs will be taken. Hopefully, from these positive identification can be made.

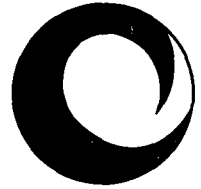
References

- Fassett, Norman C. 1957. A Manual of Aquatic Plants, Revised Edition. The University of Wisconsin Press, Madison, Wisconsin. 405pp.
- Voss, Edward G. 1972. Michigan Flora. Part I: Gymnosperms and Monocots. Cranbrook Institute of Science, Bloomfield Hills, Michigan. 488pp.
- Voss, Edward G. 1985. Michigan Flora. Part II: Dicots (Saururaceae-Cornaceae). Cranbrook Institute of Science, Bloomfield Hills, Michigan. 724pp.

*NOTE: Location noted as Brady Cove was actually the first cove to the northeast after entering McCargo Cove. It is unnamed and just north of Brady Cove.

cc John Schwartz, Program Leader, Michigan Sea Grant Extension
Ron Kinnunen, District Sea Grant Extension Agent
Dr. Robert Janke

Michigan Sea Grant College Program



June 12, 1991

Robert J. Krumenaker
Resource Management Specialist
Isle Royale National Park
87 N. Ripley Street
Houghton, MI 49931

Dear Bob:

Enclosed are twenty-seven slides and other information relating to collection permit ISRO-N-008-0049. Algae and aquatic vegetation were identified by Dr. Ted Batterson of the Michigan State University Department of Fisheries and Wildlife. Underwater photography was taken by myself using a Nikonos camera with a 35mm lens.

The identification of what sport divers affectionately call "scum" was made by Dr. Eugene F. Stoermer and Dr. Batterson. This material is predominately diatom stalks and appears as patches of feathery, whitish growth on the shipwreck AMERICA. The diatom stalks covered large areas of Congdon Shoal with a carpet-like appearance. Two of the enclosed slides were duplicated from electron microscope photos taken by the Michigan State University Center for Electron Optics. One slide shows a centric diatom surrounded by diatom stalks. These stalks are what divers consider "scum." This photo was recently published in Water Impacts by the Institute of Water Research at Michigan State University (I've enclosed some copies of the publication for you). You can be placed on the Water Impacts mailing list by contacting the editor. The other slide shows diatom stalks and algae, which adhere to the stalks. Please review the attached correspondence with the Center for Great Lakes and Aquatic Sciences at the University of Michigan, and the report entitled, "Periphyton Accumulation at Remote Reefs and Shoals in Lake Superior" by Edsall, Stoermer and Kociolek for additional information on diatoms.

Because Lake Superior aquatic ecosystems comprise such a large percentage of Isle Royale National Park's jurisdictional area, it is important that some level of inventory and documentation of these ecosystems is initiated. Inventory and documentation (to accumulate baseline data) are important so that changes to and impacts on the Lake Superior aquatic ecosystems can be monitored and evaluated over time. If you have an interest in

Cooperative Program

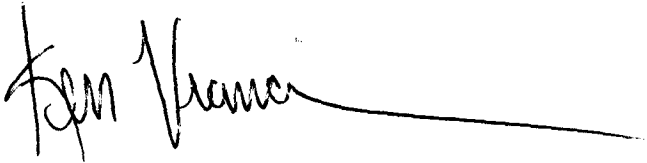
University of Michigan • 4107 I.S.T. Building • 2200 Bonisteel Boulevard • Ann Arbor, Michigan 48109 • (313) 763-1437

Michigan State University • 334 Natural Resources Building • East Lansing, Michigan 48824-1222 • (517) 353-9568

initiating this research, please contact Dr. Batterson, or Dr. Stoermer. Dr. Stoermer has specific expertise in diatoms and other periphytons. Unedited videotape of the July 1989 dives involving observation and collection of algae and aquatic vegetation at Isle Royale National Park is on file at Michigan Sea Grant Extension.

We hope this information (and information previously transmitted) is useful to you and other park employees, for interpretation of Lake Superior aquatic ecology to park visitors. The plans to produce underwater interpretive guides (for sport divers) on selected Isle Royale National Park shipwrecks have been cancelled by Lake Superior Magazine of Duluth, Minnesota because of an estimated lack of market demand. All costs of this project were donated to Isle Royale National Park by Gerry Buchanan of Duluth, Minnesota, Dr. Batterson, Michigan Sea Grant Extension, and myself. Please call me if you have any questions.

Sincerely,

A handwritten signature in black ink, reading "Ken Vrana", followed by a long horizontal line extending to the right.

Ken Vrana
Underwater Preserve Specialist
Michigan Sea Grant Extension

cc John Schwartz, Program Leader
Ron Kinnunen, District Sea Grant Extension Agent
Bill Fink, Superintendent, Isle Royale National Park
Ted Batterson
Eugene Stoermer
Gerry Buchanan

CENTER FOR GREAT LAKES AND AQUATIC SCIENCES

THE UNIVERSITY OF MICHIGAN
2200 BONISTEEL BOULEVARD
ANN ARBOR, MICHIGAN 48109-2099

December 22, 1989

Dr. Ted Batterson
Department of Fisheries and Wildlife
Natural Resources Building
Michigan State University
East Lansing, MI 48824-1222

Dear Ted,

Thanks for sending the material. It is really not definitive, but I will stick with my first guess, namely that the strange filaments are diatom stalks, probably from one or more of the large Cymbella species which are common in the collection. This is indicated by the fact that the stalks are grooved (sort of like a U beam) in the SEM shots. This seems to be characteristic of Cymbella. Other diatoms which make large stalks (Gomphoneis, Didymosphenia) usually make them in a tubular configuration. It is a little strange that more of them did not remain attached. Was the material preserved? If not, that would probably explain it.

I have enclosed a little notice-type paper that we just submitted to J. Great Lakes Res., which reports similar observations. The similarity of material is interesting. The Cymbella in both collections (different species however) are apparently happy with conditions, since they are having sex, the community structure is quite similar.

Lake Superior periphyton is a sort of a hobby of mine, since it is mostly diatoms and very abundant. I have been trying for years to get someone to give me some money to study such communities, so far without success. If you ever have the opportunity to collect similar communities, I would appreciate getting samples.

Best regards,

Sincerely,


Eugene F. Stoermer
Research Algologist

encl: mss & pictures