Minutes of the
Lake Superior Technical Committee
January 13-14, 2004
Hotel Chequamegon
Ashland, Wisconsin

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Attendees:

Mark Ebener - Chippewa/Ottawa Resource Authority
Doug Cuddy - Fisheries and Oceans Canada
Tom Pratt - Fisheries and Oceans Canada
Al Rowlinson – Fisheries and Oceans Canada
Neville Ward - Fisheries and Oceans Canada
Lisa Corradin - Univ. of Wisconsin-Stevens Point
Mike Fodale - U.S. Fish and Wildlife Service
Henry Quinlan - U.S. Fish and Wildlife Service
Mark Dryer - U.S. Fish and Wildlife Service
Glen Miller - U.S. Fish and Wildlife Service
Jonathan Pyatskowit, U.S. Fish and Wildlife Service
Owen Gorman - U.S. Geological Survey
Jason Stockwell - U.S. Geological Survey
Dan Yule - U.S. Geological Survey
Seth Moore - U.S. Geological Survey
Jean Adams - U.S. Geological Survey
Bill Mattes - Great Lakes Indian Fish and Wildlife Commission

Shawn Sitar- Michigan Dept. of Natural Resources
Don Shreiner - Minnesota Dept. of Natural Resources
Stephen Schram - Wisconsin Dept. of Natural Resources
Nancy Larson - Wisconsin Dept. of Natural Resources
Sue Greenwood - Ontario Ministry of Natural Resources
Stephen Chong - Ontario Ministry of Natural Resources
Jeff Black - Ontario Ministry of Natural Resources
Gavin Christie - Great Lakes Fishery Commission
Marc Gaden -Great Lakes Fishery Commission
Tom Hrabik -Univ. of Minnesota –Duluth
Matt Symbal - Red Cliff Fisheries Dept.
Gene Mensch – Keweenaw Bay Natural Resources Dept.
Ben Whiting – Grand Portage Band
Tom Doolittle - Band River Band Natural Resource Dept.
Paul Ripple - Bay Mills Indian Community
Ron Kinnunen - Michigan Sea Grant
John Pagel - Ottawa National Forest
Jerry Edde - Ottawa National Forest
Shawn Boyer - Batchewana First Nation
Jeff Jorgenson - Univ. of Wisconsin-Madison
Matt Balge - Univ. of Minnesota-Duluth
Tom Hrabik - Univ. of Minnesota-Duluth

Agenda Item 1 – State of Lake Report

Mark Ebener led a discussion on the present status of the State of Lake Superior Report. Mark reported that the report is in good shape except for some final editing by the lead authors of each section. Mark said that he needs to edit and improve the whitefish figures and that the references needed some improvement. Some references are incomplete or missing and these are:

Colby and Nepszy 1981 from the walleye section
Hoff, M.H. in review from the prey fish section.
Johnson et al. reference from zooplankton section.
Reid et al. 2002 reference from nuisance species section.

Agenda Item 2 – Lake Trout Photo ID

Shawn Sitar led a discussion on identification of the various forms of lake trout. MiDNR has established a five- tier classification system for lake trout: leans, lean? (greater than siscowet), siscowet? (siscowet greater than lean), and siscowet. Shawn is looking to establish a good key for classifying the lake trout forms. The identification system stems from differences in management directed at each form. Michigan DNR has basic description of siscowet and lean form of:

Siscowet – angled snout and large eye, tend to have larger stomach
Lean – straight snout and regular eye

Shawn has found distinctive growth differences between the forms in that siscowets grow slower than leans. The lean? also appeared to have slightly different growth rates than leans.

Shawn distributed to each agency a CD with photos of roughly 70 lake trout forms collected in 2002 by MiDNR. Shawn summarized the results from having nine individuals from several agencies identify the lake trout forms on the CD. Generally found poor agreement among the nine observers that classified lake trout forms on the CD. Only three instances were there a significant level of agreement at 0.4.

Shawn will provide to each agency a copy of the CD. Shawn will make another CD for distribution this time of mainly of adult fish. Bill Mattes suggests that doing lipid analysis on these fish will help distinguish the forms since this metric is very form specific.

There real world issue here is that people catching these fish (sport, commercial, or agency) should know what the forms are and be able to ID these fish.

Tom Pratt reported that he and Ken Cullis have a proposal in to work on development and collection of deepwater ciscoes in the proposed Marine Protected Areas of Lake Superior.

Action Item: LSTC agreed to continue to have each agency classify fish on Shawn's CD as well as the adult fish, then make some recommendations.

Agenda Item 3 – Sea Lamprey Target Setting

Gavin Christie provided an overview of the proposed method for setting sea lamprey targets. As well, Gavin wanted some feedback on the direction of sea lamprey management from the LSTC and a recommendation of that process to the LSC.

Target Setting: GLFC Vision is that FCOs for each Great Lake serve as the basis for setting sea lamprey management goals. The suggested overall goal for setting sea lamprey targets is obtaining a marking rate of 5 marks/100 fish and determining the level of spawning sea lamprey abundance associated with marking rates of 5 marks/100 fish. The target sea lamprey abundance in Lake Superior is roughly 39,000 spawning adults and Gavin reported that we have not been there since 1994. Releases of marked recently metamorphosed sea lamprey with coded-wire tags has indicated that transformer abundance is 2-6 times greater than estimates made from spawners.

Stream Selection and Patterns of Control: Control agents and GLFC have improved estimates of gear efficiency and the size dependent relationship used to predict metamorphosis in the stream selection model. They have also have begun applying a weighting factor to the stream ranking process. The weighting factor is the difference between current sea lamprey marking on lake trout and the target marking rate of 5 marks/100 fish. Gavin reported that the GLFC increased the base level of control in the Great Lakes from $5.3 to $6.1 million dollars annually. Gavin reported that there has

been an overall declining trend in treatment effort on Lake Superior from the early 1980s. Treatment effort increased 18% this year (2004) to deal with the increasing trends in abundance on the Great Lakes. Considerable control effort was added to Lake Superior in 2004.

Agenda Item 4 – Sea Lamprey Update

Doug Cuddy briefly discussed control actions for 2004. The control agents plan to treat 22 streams in 2004 compared to 14 streams in 2003. Treatments are based on expected recruitment from streams as well as preventing escapement from streams to lentic areas. Field trials of the pheromone study will begin this year. Doug reported that one proposal being floated by DLZ engineering company for controlling sea lampreys on the Bad River is to place an inflatable barrier on Elm Hoist Bridge. Several other alternative control options besides the barrier are also being discussed for the Bad River.

Gavin asked LSTC for comments on the control strategies, target setting, and specific concerns. The LSTC's primary concerns were the sturgeon treatment protocol, contribution of lentic populations, and effects of barriers that we expressed at the 2003 LSC meeting. Gavin and Doug stated that the control agents have created a Lentic Areas Task Group to assess the contribution of these areas to the parasitic populations in Lake Superior. Right now the LSTC is concerned about the potential contribution of larval lamprey from the St. Louis estuary to the lakewide population.

Agenda Item 5 – Research Proposals

Individuals in attendance that have submitted proposals to the USFWS Restoration Act or the Great Lakes Fishery Commission Fishery Research Program described their proposals.

Shawn Sitar stated that he submitted three proposals that are:

1. Identifying lake trout morphotypes with Seth Moore. The proposal was sent to the GLFC Fishery Research program under the restoration of native fishes theme area.
2. Mapping lake trout spawning habitat in the Marquette area. The proposal seeks to link habitat information with catch-at-age abundance information and CPUE data. The proposal was sent to the GLFC Fishery Research Program under the lake committee theme area.
3. Hooking mortality of lake trout. The proposal aims to compare hooking mortality of lake trout in Lake Superior with estimates from the Loftus study conducted in Lake Michigan. The proposal was submitted to the USFWS Restoration Act.

Owen Gorman reported that his USGS staff submitted seven proposals that are:

1. Study deepwater fish community by combining trawls survey data with lakewide siscowet study. Submitted to USFWS Restoration Act.
2. Develop habitat model for St. Louis River as related to ruffe. The proposal intends to look at watershed characteristics that might be susceptible to invasion by ruffe. The proposal was submitted to GLFC Fishery Research Program under Lake Committee theme.

3. Lakewide assessment of coaster brook trout. The proposal was submitted to the GLFC Fishery Research Program under the Lake Committee theme.
4. Relating fish communities to habitat in waters <15 meters deep. Goal to create assessment and monitoring program for this shallow water fish community. The proposal was submitted to the GLFC Fishery Research Program under Lake Committee theme.
5. Develop detailed bathymetric map of deepwater lake trout spawning habitat around Isle Royale. The proposal was submitted to the GLFC Fishery Research Program under the Lake Committee theme.
6. Develop models to estimate sustainable harvest. The proposal aims to apply hydroacoustics data to population models. The proposal was submitted to the GLFC Fishery Research Program under Lake Committee theme
7. Habitat supply and mapping. The proposal aims to develop two-dimensional maps of habitat across the lake for developing predator-prey production models. The proposal was submitted to the GLFC Fishery Research Program under Lake Committee theme.

Owen provided copies of the proposals to LSTC members.

Jim Bence and Bill Mattes submitted on proposal to analyze GLIFWC siscowet data from collected from MI-2 and MI-3 and to identify appropriate models for analysis. Bill reported that the proposal was submitted to the USFWS Restoration Act.

Tom Pratt reported that he is part of a proposal submitted to the USFWS Restoration Act to study the affects of changes in flow on the Magpie River fish community.

Marc Gaden informed the LSTC about the water Resources Development Act that has authorized expenditures of $100 million that will be done through the Lake Committee process and used to improve habitat and addressing invasive species. The process for funding studies with this money will be similar to the USFWS Restoration Act and GLFC Fishery Research Program processes and handled through the Army Corps of Engineers. The money will be used for habitat construction and restoration projects as well as stopping invasive species. The money to be made available only for U.S. projects.

Action Item: The LSTC agreed that at our August 2004 LSTC meeting we would review research priorities and identify and outline future research needs and direction. We recognize that we will probably miss out on some proposals that do not go through the LSTC process and that we will have little or no input on these proposals.

Agenda Item 6 – Diporeia Update

Stephen Schram and Nancy Larson from Wisconsin DNR described the *Diporeia* sampling program they initiated in the Apostle Islands in 2003. The objective of the study is to develop a long-term sampling program of *Diporeia* in Wisconsin waters.

Nancy reported that *Diporeia* can be made up of up to 50% lipids, therefore it is a primary source of lipids that are transferred up the food chain, particularly to whitefish

and other benthivores. WiDNR is tying to establish a sampling program that addresses how often to sample, what substrates to sample, and what depths to sample. In 2003 WiDNR sampled at four sites around the Apostle Islands in both spring and fall. In the fall 2003 the sampled down the bank from <30 m deep to > 90 m deep.

Nancy summarized the fall 2003 preliminary results. Ponar grabs sampled well in sandy or sand/clay substrates, but not in rocky or hard clay areas. Samples contained *Diporeia*, oligochaetes, sphaerid clams, chironomids, and *Mysis*. Limiting factor was analyzing samples. Densities of *Diporeia* increased from shallow to deeper waters. Densities were up to 2,700 per square meter and the average density was greater than called for in the IJC Water Quality Protocol. WiDNR estimated densities were similar to that found in other studies.

Nancy and Stephen want to finish processing spring samples and compare spring and fall data before deciding upon a future sampling program.

Agenda Item 7 – Environmental Objectives

Tom Pratt described progress being made at developing environmental objectives for Lake Superior. They developed three overarching objectives that were to:

1. Maintain, protect and rehabilitate habitats to ensure habitat diversity is conserved.
2. Maintain, protect and restore native community function, and
3. Maintain, protect and restore water quality.

Tom reported that the next steps are to get input from LSTC and LSC, meet with interested parties, and develop a final document. The LSTC was fairly happy with objectives. Tom suggested that environmental objectives be an agenda item at our summer 2004 meeting. E

Action Item: Mark Ebener will include these objectives in his report of the LSTC at the March 2004 Annual LSC meeting and make sure that environmental objectives are an agenda item during the LSC executive session in March.

Agenda Item 9 – Lake Trout Bathymetry Study

Bill Mattes summarized the USFWS Restoration Act funded lake trout archival tag study conducted in 2001 to 2003 on lean lake trout tagged and released at Buffalo Reef and Marquette. Bill distributed his report on the study and provided interested parties with a CD that contained all the data.

Fourteen of 124 lake trout implanted with depth and temperature archival tags were recaptured after an average of 372 days at large. The average temperature encountered by 14 recaptured lake trout was 4.7 ^{o}C (40.4 ^{o}F), while the average depth was 28.4 meters (93.1 feet). Temperature ranged from -0.2 ^{o}C (31.6 ^{o}F) to 17.2 ^{o}C (63.0 ^{o}F), while depth ranged from +1.2 meters (+4.0 feet) to -167.1 meters (-548.1 feet). Hatchery fish lived slightly shallower than wild fish and fish released at Buffalo Reef in MI-4 lived slightly

shallower than those released at Marquette in MI-5. In earlier reports to the LSTC Bill noted that in one lake trout with depth measurements averaged every 4 minutes the fish changed depth rapidly. For instance, at 4:12 PM on 12/06/01 the fish was at 250 feet, ascended to 51 feet eight minutes later at 4:20 PM, and seven minutes later descended to 261 feet at 4:27 PM.

Bill noted that the data indicates that lake trout are at an average temperature of about 5^{o}C (4.7^{o}C) annually and that the current SCAA models in Michigan are parameterized with an average temperature of 5^{o}C. Bill also noted that Molly Negus of MnDNR has requested the data for bioenergetics modeling. The USGS mentioned that they would like to examine the data to see if it is possible to determine lake trout orientation in the water column as this may affect how lake trout hydroacoustic signals are interpreted.

Agenda Item 10 – Activities of the Aquatic Community

Henry Quinlan and Sue Greenwood reported on activities of the Aquatic Committee of the Lake Superior Work Group. The AC has not met lately so they used some time during the LSTC to address AC issues.

Sue and Henry reviewed the AC work plan. Priority projects include acoustic monitoring, habitat mapping, and sturgeon rehabilitation. Tom Hrabik reported that he has a Minnesota Sea Grant funded project to map bottom substrates and relate these to habitat used by spawning lake trout and age-0 lake trout on Gull Island Shoal in the Apostle Islands. The LSTC is concerned about the compatibility of various habitat mapping projects with the USFWS Restoration Act funded GIS project on Lake Superior, Michigan, and Erie.

LSTC discussed research questions related to understanding lower trophic level monitoring in Lake Superior. The EPA Lake Guardian and Environment Canada Limnos research vessels will be available for conducting lakewide monitoring of lower trophic levels in Lake Superior and Henry and Sue are looking for suggestions from the LSTC on what these vessels can do for us. Sue and Henry have identified hydroacoustic sampling, mapping the offshore spawning grounds for lake trout, and lower trophic monitoring. The LSTC endorsed these projects.

The LSTC briefly discussed research questions that need to be answered about lower trophic levels in Lake Superior. Three questions were identified:

1) What is the status and production of lower trophic levels, i.e. plankton, zooplankton, and benthos within the broad habitat types of Lake Superior; offshore, nearshore and embayments?

2) What is an appropriate sampling design for long-term monitoring of lower trophic levels, particularly benthos? The LSTC generally believes that sampling is not needed on an annual basis.

3) Is there more efficient technologies or equipment than currently exist to map and sample lower trophic levels in Lake Superior?

Henry and Sue reported that LaMP 2004 will be released in April 2004. The AC needs to identify examples of ongoing projects, accomplishments, impediments, etc. LSTC members should feel free to provide Henry and Sue with ideas for this. Henry and Sue would like a block of time at the LSC meeting to present the AC portion of the LaMP 2004.

Action Item: The LSTC agreed to establish a working group that will help design a cruise for the Limnos and Lake Guardian. For example they should use existing sampling designs. The group will include Don Schreiner, Jason Stockwell, Tom Pratt, Stephen Schram, Bill Mattes, and Tom Hrabik. They will contact and work with other individuals such as Marty Auer, Charlie Kerrfoot, and Marc Tuchman. Sue Greenwood will make the initial contacts for the group with EPA and Environment Canada.

Agenda Item 11 – Estimating Kappa Statistics

Jean Adams gave a brief statistical review of the Kappa Statistic and how to interpret the statistics because of questions raised about the statistic during Shawn Sitar's presentation on identification of lake trout. Jean stated that the Kappa statistic does not represent a probability in itself, but rather is a scale that can vary from –1.0 to 1.0. The statistic depends upon the number of variables being looked at.

Agenda Item 12 – Lake Trout Models MI-2 and MI-3

Bill Mattes and Shawn Sitar provided a brief update on the status of lake trout models being developed for Michigan. A statistical catch-at-age model has been built for MI-2 and a model is being currently constructed for MI-3 and later MI-4. Jim Bence has evaluated the model for MI-2 already.

Agenda Item 13 – Hydroacoustics Studies

Jason Stockwell discussed phase I of the acoustic study on Lake Superior. Objectives of the study were to develop target strength relationships for each species, look at fish habitat species relationships, and to develop a model for remote species identification.

Jason reported that each fish species has a specific size and temperature characteristic. At 4-8^{o}C bloaters are most abundant, whereas at 16-18^{o}C are smelt are most abundant. Basically they are using the size and temperature profiles to create a probability distribution model for determining composition of the acoustic targets in each transect. The procedure will allow for species-specific population estimate and break this estimate down into size structure of the population. Jason reported that they will draft a manuscript to address objective 2 and another one to address objectives 1 and 3.

Tom Hrabik discussed phase II of the acoustics project that was funded with COA money obtained through OMNR and additional money provided by Minnesota DNR. This phase is essentially a research project to define how best to implement an acoustics project on Lake Superior. Objectives were to identify appropriate transect lengths and to select appropriate methods to assign species ID to targets. The project was run in northwestern Ontario waters and Minnesota waters. The lake was organized into four areas for the

project. Survey in Ontario was designed to sample deepwater, shallow water, and embayments. Open water zone was not sampled as effectively as the nearshore areas in Ontario. A total of 43 transects were run in Ontario and 17 in Minnesota. Most of the scattering of targets was located high in the water column. In Black Bay Tom reported that they found 250 fish/ha. In outer Thunder Bay fish density was only 20 fish/ha. They found extremely dense concentrations of fish in the open lake. In Minnesota almost all fish density in nearshore areas was in waters less than 50 m. In open waters of Minnesota most fish were located in <100 m of water. Tom reported that midwater trawl catches were composed primarily of large year class of coregonids that were mostly lake herring, bloaters, and K*iyi* in both Ontario and Minnesota. In waters <40 m deep trawls caught mainly lake herring, while in waters >40 m deep they caught mainly *Kiyi* in both nearshore and offshore waters of Ontario.

Tom identifies several potential issues related to future acoustic projects on Lake Superior:

1. Costs of sampling (overtime) prohibits reducing high certainty in estimates of biomass.
2. Acoustics and trawling simultaneously with the same vessel limits coverage.
3. Scale of resolution may influence accuracy.

The second year of the project will hopefully cover waters from the tip of the Keweenaw Peninsula to Whitefish Bay, although Ken Cullis is contracting with USGS for only 20 cruise days in northeastern nearshore waters of Ontario south to Whitefish Bay. The only place not be covered by an acoustic survey will be the area west of the Keweenaw Peninsula to the Apostle Islands. Tom estimated that to sampling the last area along the Keweenaw Peninsula cost $36,000 for the processing and other costs associated with boat time.

Action Item: The task group established to define a role for the Limno will also try to design and scope out an acoustics study along the west side of the Keweenaw Peninsula.

Agenda Item 14 – Fish-way Study

Tom Pratt gave a presentation illustrating the results of studies he has conducted on fish passage at sea lamprey barriers. The research question being addressed by Tom's study was if fishways built into sea lamprey barriers actually work. Objectives of the study were to determine fishway attraction efficiency, passage efficiency, and how long fish remain in the fishway slot. PIT tags were used to assess fish movement through the fishway.

Tom reported that 82% of fish approached the barrier. On the Big Carp River 93% of fish found the trap entrance, but only 27% of fish passed the barrier. Only passed 6% of the fish passed the barrier on Cobourg Brook. White suckers used the fishway much more than rock bass on the Big Carp. On Cobourg Br. brown trout passed the fishway much better than other species and rainbow trout did not. Barriers were, on average, holding the fish back from their migration about eight days. The traps retained 98% and 57% of the sea lampreys at the Big Carp and Cobourg Br., respectively. Tom reported

that there was little to no attraction flow on the trap at Cobourg Brook and this may have affect fish movement and trap catches. Tom concluded that fishway attraction was high but it was difficult to keep fish in the fishway. Tom suggested that the traps in the fishways needed to be larger and funnel size probably reduced. Tom also recommended more frequent trap operations in order to remove fish.

Agenda Item 15 – Brook Trout Conference

Don Schreiner updated the LSTC on the Lake Superior brook trout initiative. A synthesis workshop was held in October 2003 in Cloquet, Minnesota. They invited 40-45 people to share current research results. From the workshop they will develop several theme synthesis papers. A symposium on brook trout will be held at the 2004 Annual AFS Conference in Madison, Wisconsin. Don reported that they already have 25 speakers for the symposium. The last part of the Brook Initiative is an outreach project with Minnesota Sea Grant.

Agenda Item 16 – Food Habits Study

Tom Hrabik briefly summarized Brad Ray's work to analyze predator diets in Lake Superior. Brad will finish shortly. He has summarized diets and is in the process of relating diet to prey abundance and determining prey selectivity.

Agenda Item 17 – Lake Herring Report

The LSTC discussed the status of data consolidation for the lake herring report. Owen Gorman stated that he talked with Tom Todd and Tom agreed to write the section on description of lake herring. Owen reported that he has nothing organized at this point beyond what he reported at the last LSTC meeting.

Action Item: Owen Gorman should include a section on stock descriptions in the description of the fish section.

Bill Mattes summarized lakewide commercial fishery harvest information on lake herring. Bill produced a graphic of fishing effort and harvest by statistical grid for Michigan waters. The LSTC recommend that Bill consolidate all the harvest information by grid across the lake by as yet undetermined time periods.

Action Item: Each agency should provide Bill commercial catch and effort data organized by month and grid. Agencies should identify fishing effort and harvest that is either floating or bottom set.

Mark Ebener provided a handout summarizing lake herring diets and interactions of lake herring with other species.

Action Item: The LSTC recommended that Mark should include interactions of lake herring with sea lamprey and predators. Mark should iunclude consumption estimates from bioenergetics studies and explain why lake herring are important. Tom Hrabik will provide Mark with a copy of paper a paper he wrote on lake herring interactions in Inland lakes.

Shawn Sitar sent out a template for survey data to each agency and had nothing to report at this time.

Don Schreiner agreed to write an chronological history of fish management actions taken by each agency to protect lake herring.

Action Item: Each agency should provide Don Schreiner with a chronology of changes in management and regulations of the fishery in their jurisdiction.

Action Item: At the summer 2004 LSTC meeting every one should come prepared to discuss and describe their data.

Agenda Item 18 – Task Force of Technical Committee

Mark Ebener briefly stated that the Task Force of Technical Committee Chairs would be providing the CLC with a series of presentations on basin-wide issues. Mark hopes to have a summary SCOL2 presentations made at the next CLC meeting.

Agenda Item 19 – Mass Marking Task Group

Mark Ebener briefly discussed the mass marking technology of Northwest Marine Technology. The CLC has charged a group of individuals, with Mark as chair, to setup a demonstration project of the NMT mass marking trailers in the Great Lakes basin during July 2004. The task group is also charged with developing a plan for implementing mass marking of salmonids in the Great Lakes.

Agenda Item 20 – Presentations for 2004 Lake Committee Meeting

The LSTC agreed to add several more presentation to the LSC open session in addition to those already identified in the minutes of the winter 2003 meeting of the LSTC. The additional presentation are:

1. A report of the Aquatic Committee.
2. A report on the archival tag study by Bill Mattes.

Agenda Item 21 – Time Place of Next Meeting

The summer meeting of the LSTC will be in Copper Harbor on August 3 and 4, 2004. Bill Mattes will make arrangements. Some agenda items for the meeting will be:

- Brook trout presentations
- Lake trout morphology
- Herring summaries
- Invite Auer and Kerrfoot to talk about kites or other research projects
- Invite Bronte or Hansen to talk about SCOL2
- Nearshore sampling by USGS
- Lisa will present her thesis results
- Final report on diet by Brad Ray
- Report of task group on implementing acoustic study