Great Lakes Fishery Commission

ESTABLISHED BY CONVENTION BETWEEN CANADA AND THE UNITED STATES TO IMPROVE AND PERPETUATE FISHERY RESOURCES

Minutes of the

LAKE SUPERIOR TECHNICAL COMMITTEE

Hampton Inn
Duluth, Minnesota
January 16-17, 2001

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List of Attendees:
Ron Kinnunen - Michigan Sea Grant
Bill Mattes - Great Lakes Indian Fish and Wildlife Commission
Mike Donofrio - Keweenaw Bay Indian Community
Rick Huber - Bad River Band of Lake Superior Chippewas
Tom Fratt, Greg Fischer - Red Cliff Band of Lake Superior Chippewas
Mike Hoff, Owen Gorman - U. S. Geological Survey
Henry Quinlan, Dale Bast, Mike Fodale, Jessica Doemel, Mark Dryer, Lee Newman - United States Fish and Wildlife Service
Don Schreiner, Ted Halpern, Steve Gevings, Molly Negus - Minnesota Dept. of Natural Resources
Stephen Schram, Dennis Pratt - Wisconsin Dept. of Natural Resources
Doug Cuddy - Canadian Dept. of Fisheries and Oceans
Chris Harvey - University of Wisconsin Madison
Mike Hansen, Kevin Kapuscinski, Brian Linton, Jennifer Devine, Mark Rogers - University of Wisconsin Stevens Point
Mike Petzold , Jeff Black, Marilee Chase - Ontario Ministry of Natural Resources
Ken Gebhardt - Bay Mills Indian Community

Mark Ebener - Chippewa Ottawa Resource Authority
Alan Cibuzar - A.W. Research Laboratories, Inc.
Jeff Slade - Great Lakes Fishery Commission

Agenda Item 1 - Negotiated Settlement Between CORA and MDNR in 1836 Waters

Mark Ebener updated the LSTC on the recently completed negotiated settlement between the tribes that are members of the Chippewa Ottawa Resource Authority (CORA) and the State of Michigan. The settlement became effective in September of 2000 and will last for 20 yr. The settlement is primarily based on a 50/50 split of the available fishery resources in the 1836 ceded waters. The tribes 50% allocation includes mainly commercial species such as whitefish, chubs, lake herring, round whitefish, and siscowets, while the State's 50% allocation includes primarily sport fishes such as rainbow trout, brown trout, yellow perch, walleye, and chinook salmon. Lake trout is an exception to the allocation rule as each party will receive about 50% of the lake trout resource. The Consent Decree eliminated deferred lake trout rehabilitation areas so that all areas are now classified as primary lake trout rehabilitation areas except Whitefish Bay in Lake Superior. Lake trout in all the primary areas will be managed based on modified TACs that are now called Harvest Regulating Guidelines (HRG). As part of the agreement the State was seeking a 14 million ft. reduction in large mesh gill net effort from the tribes. In order to accomplish this reduction in large mesh effort, the State bought-out most of the state-licensed commercial trap net fishery in northern Green Bay waters and converted it to a CORA fishery. Four additional CORA trap net fisheries were moved into northern Lake Huron near Alpena as part of the settlement. A copy of the Consent Decree is available from the CORA offices in Sault Ste. Marie.

Agenda Item 2 - ECOSIM and Food Web Interactions

Chris Harvey from UW-Madison updated the LSTC on the ECOSIM and ECOPATH models being applied to Lake Superior by researchers from the University of Wisconsin Madison. Sean Cox has been modifying ECOSIM so that it is not operating in an equilibrium condition. These changes include sea lamprey, fewer pools of data, and fitting the model to historical data. The simulations will start with the basic ECOPATH model, but are hard-coding fishing mortality using harvest rates during 1950-1995. This creates a system where they can reduce the difference between the sums of squares of the predicted and observed biomass values. Sean is currently adjusting parameters (e.g. vulnerability, recruitment parameters) within the model to improve the fit between predicted and observed biomass values. The model is currently having trouble finding biomass estimates for burbot and chubs. Future direction of the ECOPATH/ECOSIM work is to reexamine some of the management questions we asked in the first manuscript by adding the historical data and asking new questions. For example, how big of an effect have exotics had on the system. Sean will also be trying to include spatial differences in the lake into the model predictions.

Chris Harvey summarized his stable isotope research of the food web of Lake Superior. The isotope research is being use to validate predator diet information being collected because growth and diet are reflected in the stable isotope analysis. Chris is using the bioenergetics analysis and stable isotope analysis to estimate what the isotope readings would be in the fish flesh. Chris is trying to estimate the diet overlap between leans and siscowets, the importance of each form of lake trout in the diet of lamprey, and determining if ether of the above differs spatially. Lastly he is reconstructing the diet of fishes in the western Lake Superior food web. Chris will need the seasonal diet information from the agencies.

Agenda Item 3 - Lake Herring Stock and Recruitment

Mike Hoff updated the committee on his continuing analysis to determine factors influencing lake herring recruitment in Lake Superior. Variation in herring recruitment in Lake Superior was greater during 1978-1998 than any other time in Lake Superior, or than any other lake in the world. Mike's objectives are to describe the past dynamics of recruitment and predict recruitment for future year classes. Stock size explained 28% of the variation in recruitment and showed a density dependent response. Mike added other variables such as lake trout stock size and slimy sculpin abundance to the model in an attempt to explain recruitment. He found a positive relation between sculpin density and biomass and herring recruitment, but a negative relationship with lake trout stock size. Mean air temperature and wind speed were both positively related to lake herring recruitment. Predicted and observed recruitment were in fairly good agreement except for two year-classes.

Conclusions: The model did a good job predicting the boom or bust years of lake herring recruitment. Optimum stock size is about 5 fish per hectare, but strong year classes increased density to >22 fish per ha. Lake trout stock size is inhibiting strong year classes of lake herring. Mike is going to continue and enhance the model in the future.

At this point in time, the LSTC has not adopted the conclusions of this modeling exercise, but the LSTC does encourage Mike to continue enhancing the model.

Agenda Item 4 - Status of the Shortjaw Cisco

Mike Hoff updated the committee on the research project he is conducting to evaluate the status of the shortjaw cisco in Lake Superior. Mike conducted gill net surveys at, as close as possible, the same sites at Koelz did in 1921-22 in order to assess current abundance of the shortjaw cisco. The data showed a highly significant decline in abundance of the shortjaw from the 1921-22 baseline period to the present day. Mike is suggesting that the shortjaw cisco could be used as an indicator of progress toward rehabilitation of the offshore fish community. Mysis are an important food item of the shortjaw cisco based on this present data.

The LSTC indicated that we would like to see some comparison of the shortjaw cisco caught in 1999-2000 with the historic fish classified as shortjaw and now found only in museum collections. At least, the LSTC would like to have the fish present at the summer 2001 meeting that will deal with fish identification.

Agenda Item 5 - Telemetry of Coaster Brook Trout in the Nipigon Bay

Marilee Chase from OMNR gave a presentation on movement and habitat use of coaster brook trout in the Nipigon Bay area of Lake Superior based on a radio telemetry study. OMNR wants to know what habitat the brook trout use in the tributary streams and the lake itself. Marilee reported that when placing the tags in the fish they made sure that the tag did not exceed 2% by weight of the fish the tag was inserted into. A total of 40 fish were tagged and followed from June to December of 1999 and May to October of 2000. OMNR defined the home range of a fish as that area where a fish was captured five or more times, or, to which a fish returned.

Most fish did maintain a small home range and some fish exhibited strong homing behavior. Migratory fish were defined as those that moved more than 25 km and the maximum migratory range was about 55 km, whereas non-migratory fish had a home range of 25 km or less. All fish found during spawning season (September and October) were caught in the tributaries. Based on this research OMNR has inferred that the current regulations protect brook trout only in Nipigon Bay and Nipigon River.

Agenda Item 6 -Aerial Thermograph to Detect Groundwater Intrusion

Lee Newman and Alan Cibuzar described the work being conducted along the Wisconsin shoreline of Lake Superior to identify areas of groundwater intrusion based on aerial surveys and analysis. They surveyed 115 miles of shoreline and tributary stream corridors. Imaging included 35 mm photography for both visible and near infrared and hyperspectral video data collection of near infrared, thermal, chlorophyll *a*, and water penetrating. The standard flight distance above land was about 500 ft. Lee and Alan have submitted a proposal seeking funding of $19K for a project to survey groundwater intrusions to Lake Superior where point and non-point pollution or runoff problems occur.

Agenda Item 7 - Brook Trout Genetics in Minnesota

Don Schreiner updated the LSTC regarding the genetic profile of brook trout that was studied in Minnesota tributaries. Don reported that historically brook trout were not found above barriers in Minnesota tributaries. Objectives of the study were to determine if remnant stocks were present, to evaluate if there was an influence of stocked fish on the genetics of wild fish, to determine if there were genetic differences both among streams and below and above barriers, and potential use of genetic strains for stocking or rehabilitation.

Generally the fish below barriers were larger than fish above barriers, but not substantially larger and Don reported that they did not capture really large fish, the largest fish captured was 14 inches long. Mortality rates both above and below barriers were high and greater than 84%. Minnesota found substantial genetic diversity was still present among wild population, with much variation within populations. Significant genetic differences were found above and below barriers, between wild and hatchery, and in 4 of 6 individual rivers above vs. below. Also, significant differences were found in 60 of 64 Chi-square comparisons between hatchery only and wild populations. Minnesota plans to repeat the below barrier survey to evaluate effects ofrestrictive regulations implemented in 1997. Future direction for the project would be to compare the Minnesota data to lake-wide collections, compare lake-wide collections using micro-satellite analysis, and micro-satellite analysis of Lake Superior brood stocks.

Action Item: The LSTC will add an agenda item on brook trout to the summer 2001 meeting.

Agenda Item 8 - Fish Aging Workshop

Stephen Schram and Don Schreiner provided handouts from the fish-aging workshop held during September 2000 in Marquette, Michigan. Each agency was encouraged to develop their own aging error matrices.

Agenda Item 9 - Lake Trout Diet Information

At the summer meeting the LSTC agreed that each agency should provide predator diet information in the format maintained at the Ashland Biological Station before the winter meeting so we could review the data.

The Red Cliff diet database is already housed at the Ashland Biological Station and complete from 1984 through 1998. Tom Fratt is processing the 2000 diet data and having the 1999 data being entered at Ashland. Tom reported that the percent by weight of smelt has been declining while the proportion of coregonines has been increasing from 1984-1994. Coregonines most important in summer, zooplankton and sculpins most important to smaller lake trout, while coregonines and smelt primarily important in larger lake trout.

USGS does not routinely collect diet information from predatory fish. GLIWC has summarized their diet information, but has yet to provide the data to USGS. CORA has provided their diet information in electronic format to USGS. Keweenaw Bay is done processing their 2000 data and will provide the electronic data to USGS within a month. Mike Petzold distributed a handout summarizing the OMNR diet information collected in 2000. The diet information varies considerably among the spatial units and is primarily smelt in western management units and coregonines in eastern waters. Mike will provide his data in electronic format to USGS, but needs the database format from USGS.
Ken Gebhardt also has five years worth of diet information from MI-8. CORA has also been collecting diet information from eastern Lake Superior since 1991 and has winter, spring, and summer information as well as nearshore vs. offshore. WI has provided all their diet information to USGS already and Bryan Henderson has all WI information from the 2000 siscowet surveys.
Minnesota DNR has been concentrating their efforts at collecting seasonal diet information since 1998. Every five years they plan to survey the diet of fish caught in the sport fishery. Don expressed a need to consolidate all data from the various agencies that will update the Conner et al. paper.
The LSTC agrees that a publication of this type would be very useful and we will discuss a strategy for completing this paper during our summer 2001 LSTC meeting.

Each agency also needs to provide their cisco database to USGS. Mike Hoff reported that USGS hasn't received much in recent years. Ebener agreed to add the cisco and diet database to the LSTC protocol document. The cisco database structure will be in past minutes. Tom Fratt and Mike Hoff will present the lakewide diet information at the LSC meeting in March.

Agenda Item 10 - State of the Lake Report

The LSTC needs to begin organizing the state of the Lake Report for 2000. The following sections and each sections lead author are listed below.

Executive Summary – Ebener
Introduction and Background - Hansen
Sea Lamprey Objective – Fodale and Cuddy
Lake Trout – Ebener and Sitar
Whitefish – Petzold
Walleye – Schram
Salmon - Schreiner
Prey species – Hoff
Sturgeon – Quinlan
Nuisance Species – Dryer
Species diversity – Mattes and Donofrio
Habitat – Schreiner and Ebener
Brook trout – Ashland FRO office
Ecological Interactions – UW-Madison
Community Structure – Hoff (report at summer meeting)
Lower trophic levels – Marc Tuchman and USGS

Authors should review the last draft of the state of the lake report for structure and content. Each section should contain recommendations for management to the LSC.

Agenda Item 11 - Sea Lamprey Stream Selection Model

Jeff Slade of the GLFC gave a presentation describing the stream selection process and model used to prioritize streams for chemical treatment on Lake Superior. Jeff illustrated trends in abundance of spawning-phase lampreys in each of the Great Lakes. Superior show no trend over the last 20 years, but there has been an increase in abundance in the lake since 1994. The reasons for the increase have been:

- A decrease in control effort over the last 20 years
- A 20% reduction in the size of the control program in 1995
- The control agents have been using lower TFM concentrations in recent years as a result of going from an alkalinity based to pH based minimum lethal concentration (MLCs)
- Implementation of the sturgeon protocol which further reduces the MLC so that there is a very small margin of error in the concentration needed to kill larval lampreys.
- Selection of streams for treatment may also be part of the reason for the increase in abundance of lampreys. In the past, if a stream was not surveyed in the year prior to treatment, it was not included in the stream selection model.

The control agents estimated that there were 107,000 spawning-phase lampreys in Lake Superior in 2000 based on the stream discharge model.

Stream selection model: Objectives are to rank streams using a basin wide approach of cost/transformer killed, use empiric data to rank streams with ESTR, use historic data to rank streams with ESTR, direct import from DFO and FWS databases to common database, develop preliminary list for SLIC. The model predicts abundance based on total useable habitat and larval density, standardizes size structure to end of year based on growth at date of capture, forecasts production of transformers, updates treatment cost with empiric data, calculates cost/kill based on estimates of abundance and treatment cost, and streams are selected based on dollars available for treatment in the Great Lakes basin.

New Stream Selection Technique: Apply treatment efficiencies to streams treated in 1999-2000 using 1998 and 1999 larval assessment data, then grow residuals throughout growing season for 1-2 years, apply over-winter mortality rates, forecast production of transformers, calculate cost/kill based on estimates of abundance and treatment cost, select streams based on available resources. Based on the one year review the average marginal cost is $67 per lamprey in 120 streams, while the 3-yr review produces a marginal cost $35 per lamprey on 228 streams. Under the 3-year review the agents identified 108 sources of residuals, while eight of these streams were ranked within the 2000 budget level.

Results: The 3-year list indicates a need to increase control and the GLFC approved additional control costs which means 8-streams will be added in 2001 that would not have been added to the treatment list with the 1-year stream selection process. The agents will scrutinize model predictions and modifications to the treatment list will be made based on confidence in assessment surveys and treatment capabilities. The treatment of streams based on the 3 year predictions will be contingent upon larval surveys being conducted in these streams in 2001.

Agenda Item 12 - Sea Lamprey Control Activities

Mike Fodale distributed a summary of the Lake Superior case history paper being published as part of SLISII. Mike reported that four streams in U. S. waters were chemically treated in 2000 that were originally part of the sterile-male study. Two of these streams were treated with the sturgeon protocol and the other two were treated with the regular treatment protocol. Doug Cuddy distributed a handout of 2000 activities in Canada and proposed treatment schedules in 2001. Doug discussed the potential effects of a Canadian federal endangered species law on the control program. Last spring such a bill was introduced in Parliament, but died, but will be introduced again. The northern brook lamprey will be one of those species on the list and it is found in Canadian tributaries. Doug reported that the larval northern brook lamprey is difficult to identify from sea lamprey, and Doug is currently unsure as to what affect the law will have on the control program.

Agenda Item 13 - Lake Trout Movement in Lake Superior

Kevin Kapuscinski from UW-Stevens Point summarized his work to date to analyze lake trout movements in Lake Superior that the LSTC will use to determine the appropriate spatial scales for modeling lean lake trout. The objectives of his work is to determine the rate at which lake trout move across management unit boundaries and to assess if there are differences in movement among sexes and size of fish. Kevin first needs to standardized recoveries by effort and to accomplish this task he needs commercial and sport fishing effort data from each agency for each statistical grid within the lake.

The mark-recapture data being used in the analysis consists of WiDNR tagging in spring, summer, and fall in WI-2, GLIFWS tagging in fall in Michigan waters, MiDNR tagging in summer and fall, and KBIC tagging in summer and fall. Kevin is placing the data into a vector based GIS database in order to calculate movement. Kevin currently has 2,053 WI fall tag recoveries, 747 WI spring- tagged recoveries, 683 GLIFWC fall tagged recoveries, and 59 MiDNR fall tagged recoveries in the database. Right now there are 3,690 useful recoveries. His initial analysis suggests that lake trout move across jurisdictional boundaries at substantial rates, large lake trout move further than small lake trout, and female lake trout move further than males.

Kevin needs all the Red Cliff tag recovery data as well as WI being held by USGS for Gull Island Shoal. Each agency should ensure that Kevin receives all their mark and recapture data as soon as possible.

Agenda Item 14 - Lake Trout Stock-Recruitment Relationships in Michigan waters

Jessica Doemel presented the final results from her graduate thesis on stock-recruitment relationships of lake trout in Michigan waters of Lake Superior. The objectives of Jessica's analysis were to estimate the contribution of wild and stocked lake trout to contemporary recruitment of wild lake trout in Michigan, and to quantify the effects of large-mesh gill net fishing effort on wild lake trout recruitment. The contribution of wild and stocked lake trout to recruitment of wild fish was tested using the Ricker stock-recruitment model. Five different models were fit to the data depending upon the parameters being evaluated. Model 1 evaluated the contribution of wild parents only, Model 2 evaluated the contribution of stocked parents only, and Models 3 through 5 evaluated the relative contribution of wild and stocked parents. Models 3 and 4 included a parameter k that allowed fish to be modeled as constant equivalents of wild fish and as a way to describe the relative efficiency of wild and stocked parents. The best model describing recruitment was selected from Models 1-5, then modified to include gill net effort.

Model 3 in which stocked parents represented as a constant fraction of wild parents best described changes in recruitment of wild age-7 lake trout. Recruitment rates were significantly greater for wild lake trout than stocked lake trout, and changed with density of both wild and stocked parents. Recruitment rates of wild lake trout changed from 0.7 recruits per parent in MI-3 to 3.8 recruits per parent in MI-6. Stocked parents were half a productive as wild parents (k=0.52), so recruitment rates of stocked parents ranged from 0.4 recruits per parent in MI-3 to 1.9 recruits per parent in MI-6. Recruitment rates declined with increased density of parents in all units, though density dependence of stocked parents was only half of that of wild parents in all units.

Stock-recruitment curves for wild and stocked fish were shaped differently in each unit. The level of parental stock size that would produce peak recruitment was achieved in all units. Peak recruitment was similar for both wild and stock fish, but the parental density to reach the peak for stocked fish was twice that of wild parents. Peak recruitment was lowest in MI-3 and highest in MI-5. Peak recruitment ranged from 5.9 to 26 recruits per spawner.

Large mesh gill net effort did not explain significant variation in recruitment, beyond that explained by wild and stocked parents.

Based on Jessica's finding, it is possible to determine the optimum level of CPUE of age-8 and older fish caught in spring surveys necessary to produce maximum recruitment of lake trout. These target CPUE's could be incorporated into FCOs.

Agenda Item 15 - Statistical Catch at Age in Wisconsin Waters

Brian Linton from UW-Stevens Point summarized his progress at developing a statistical catch-at-age model for lake trout in WI-2. Brian is separating out the refuge from the non-refuge areas. He hopes to have the wild model completed by the end of February and stocked model finished by the beginning in June. Brian still needs age-length keys for stocked fish from the large mesh spring survey.

Agenda Item 16 - Fish Bioenergetics in Chequamegon Bay

Jennifer Devine from UW-Stevens Point outlined her graduate work to develop a bioenergetics model for fishes in Chequamegon Bay, Lake Superior. Jennifer's research questions are how do fish predators affect their prey, how would predators affect prey if feeding at their maximum consumption, what is constraining growth of predators, is predator consumption limiting prey size, and are predators optimizing prey size. Jennifer's research is evaluating two management questions; are current fishery management strategies effective, and how would changing regulations for one predator likely affect the system? Initial results from looking a predator diets indicates smelt are the primary food source in Chequamegon Bay. Jennifer is looking for comments and suggestions from the LSTC for improving or conducting the research.

Agenda Item 17- LSTC Protocols

Ebener distributed the latest draft of a document that describes the various sampling and reporting protocols of the LSTC. LSTC members and participants should provide either written or oral comments to Ebener on the protocol before the summer 2001 meeting.

Agenda Item 18 - Optical Plankton Counter

Dr. Meng Zhou of the Large Lakes Observatory in Minnesota made a presentation to the LSTC on the use of an optimal plankton counter to determine spatial and temporal distribution of zooplankton in Lake Superior. He currently is involved in various research projects around the world that are designed to evaluate zooplankton populations. In July 1999 he conducted an initial survey of current patterns as they relate to zooplankton production and found very complex current patterns in the offshore area of the eastern basin of Lake Superior. Dr. Zhou found no correlation between temperature and zooplankton density in the July 1999 survey, and he found that Lake Superior had the highest biomass of large sized zooplankton than any other place in the world that he has surveyed.

Dr. Zhou conducted a four-day cruise in the western arm Lake Superior in late September and early October of 2000. On the cruise he measured temperature, salinity, and depth and phytoplankton and zooplankton biomass. Optical plankton counter Dr. Zhou used is one of the first to be built. The plankton counter is towed at 2-15 knots, has a maximum counting rate of <100, sizing error is 5%. The size range that he can count ranges from 0.25 to 20 mm spherical diameter organisms. Get real-time readout from plankton counter by directly tying into a PC and also add a GPS directly the PC. Seven transects were conducted in the western basin in 2000. The Chlorophyll *a* layer was found to be deep and directly below warm water areas of the lake. Zooplankton stayed deep and did not come to the surface. It appeared that the zooplankton was avoiding the Chlorophyll *a* layer. Dr. Zhou did not find the Chlorophyll *a* layer in association with upwelling. Dr. Zhou will need a time series of Chlorophyll *a* concentrations and zooplankton densities to understand the relationship between upwelling and production of Chlorophyll *a*.

Results of the study were:

- Both the physical and biological fields are determined by mesoscale features
- There was no correlation between phytoplankton biomass maxima and upwelling
- Phytoplankton maxima occur beneath the surface fronts
- There is a larger zooplankton pool in the western basin than in the central basin
- Zooplankton stay in deep cold water

Agenda Item 19 - GLFC Habitat Committee

Don Schreiner updated the LSTC on activities of the GLFC new Habitat Committee. Part of the reasoning behind reconstruction of the old HAB Committee was to get new people involved in the committee and to work Great Lakes wide. They are looking at Lake Superior FCOs as a model of how to relate habitat to FCO in the Great Lakes. They are interested in funding some habitat related projects on Lake Superior.

Agenda Item 20 - Funding Sources for Research

Ebener provided the LSTC with a document that describes the various sources of funding and their associated protocols that could be accessed for money to conduct research activities on Lake Superior. Some funding sources include the GLFC coordination funds, the Great Lakes Fish and Wildlife Restoration Act, Sea Grant, Great Lakes Protection Fund, Stallston-Kennedy Grants, Wisconsin Great Lakes Protection Funds, USEPA Great Lakes National Program Office, and USEPA Coastal Environmental Management Funds. Ebener also distributed handouts of the RFP's for some of the funding sources. Mark Dryer reported that the USFWS also has funding for the Great Lakes Coastal Program that commits $200,000 toward habitat restoration, research, planning, outreach projects, and watershed work primarily associated with shorelines of the Great Lakes. Deadline is February 1st for the USFWS Great Lakes Coastal proposals.

Agenda Item 21 - Research Priorities of the LSTC

At the summer meeting of the LSTC six research projects were identified that the committee felt should be funded and were important for Lake Superior. After some discussions at the winter 2001 meeting, the projects that the LSTC supports are:

- Analysis of mark-recapture information for estimating survival of lake trout from Gull Island Shoal - PI is Mary Fabrizio. There is a written proposal for this study and it is being submitted to the GLFC coordination funds, asking for roughly $26 for two years.
- Thermal tagging of Lake Superior fishes - PI is Bill Mattes. A group of interested people met at the Midwest Fish and Wildlife Conference to outline the proposal for placing temperature sensors in lake trout from Traverse Island. There is a written proposal for this study. Money obtained from the USFWS Restoration Act will be used to purchase the tags. They are asking for $50k.
- Processing of zooplankton and benthic collections – PI is Mike Hoff of USGS. Mike would consider hiring interns to process data for $5-10K. Mike may also apply for the CEM funds.

- Trophic structure of lake trout forms in Lake Superior - PI is Bryan Henderson. Bryan submitted a proposal to the USFWS in 2000 for $10K that was not funded. The LSTC encourages Bryan to rewrite the proposal and submit it again.
- Analysis of fish diet information from Lake Superior – There is no written proposal for this project or a budget, but Don Schreiner will try to enlist the help of Dr. Hrabik at UMD.
- Genetic identification of the northern brook lamprey – There currently is no written proposal for this project, but Doug Cuddy from DFO will lead the task of finding a PI for a $10-20K project..
- Complete lakewide brook trout mico-satellite DNA analysis of existing collections – There is no written proposal for this project, but Don Schreiner and Henry Quinlan will lead this effort and ask for a minimum of $50K
- Mapping of tributary habitat related to lake sturgeon spawning - There has been no PI identified and there is no written proposal for this project Approximate cost would be $50K per tributary.

Action Item: The LSTC agreed to, for now, support only projects that have written proposals; analysis of mark-recapture data, thermal tagging of lake trout, processing zooplankton and phytoplankton samples, and lake trout trophic structure. The Hoff, Fabrizio, and Henderson proposal should go to the GLFC coordination funds, while Bill Mattes's proposal should go to the USFWS Restoration Act. The LSTC also agreed that proposals for funding and research projects that are high priority to the LSTC but do not have written proposals are the analysis of fish diet and genetic analysis of sea lamprey.

Agenda Item 22 - Presentations at the Annual LSC Meeting

The LSTC discussed the oral and written presentations and their content that are to be made at the annual LSC meeting in Sault Ste. Marie, Ontario in March 2001.

LSTC report – Ebener
Sea lamprey marking – Ebener
Siscowet survey – Ebener et al.
Forage report – Hoff
Bill Mattes – extractions
Lake trout stock recruitment – Jessica Doemel
Ontario spring lake trout surveys – Petzold
Sea lamprey report – USFWS
Brook trout telemetry – Marilee Chase
Movement and habitat use by brook trout in Ontario – Jamie Mucha
Lake sturgeon surveys in U. S. waters – Quinlan
Food Habits of Lake Superior predators - Fratt and Hoff

Agenda Item 23 - Identification of Lake Trout and Ciscoes

The LSTC has agreed to hold a workshop on identification of the various forms of lake trout and ciscoes in conjunction with our summer 2001 meeting. The workshop and meeting are to be held in Grand Marais, Michigan. Each agency should be prepared to bring their technicians to the workshop. Ebener and Sitar will coordinate the workshop.

Agenda Item 24 - Time and Place of Next Meeting

The summer meeting of the LSTC is scheduled to be held in Grand Marais, Michigan on July 31 and August 1-2, 2001. Ebener will make arrangements.