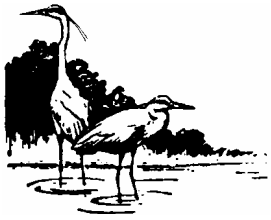

Sierra Club Woods & Wetlands Group

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Sequoit Creek Watershed Management Plan Review

Prepared by: James K. Bland
Director, Integrated Lakes Management

This review of the Sequoit Creek Management Plan is being prepared on behalf of the Sierra Club. Watershed planning is a type of systems analysis; as such, a wide variety of different types of information has to be consolidated, reviewed, evaluated, mapped and presented. Sustaining the biological integrity of aquatic systems across time requires that hydrology, habitat, energy relationships, water quality, and biological interactions be sustained within defined limits. Given the complexity of watershed planning there will almost certainly be: some elements which will be left out, some elements that receive less attention than others, and /or some elements that contain errors. The existing Sequoit plan was prepared in acknowledgement of state and federal guidance with respect to watershed planning. The report is one of a series of watershed technical analyses supporting flood control planning for the Lake County Stormwater Management Commission.

The Sequoit Creek Watershed Management Plan is well done with some qualifications. Material which is presented appears to be well researched. Significant elements however, are missing from the report and there is no discussion of existing or future plans for the development of such information. There is no hydrologic analysis or modeling. The tenure of the water quality sections of the report is one of assuring the general public: "*The good news is that the water quality of the watershed's lakes and streams is generally good*." Significant problems exist however, in the interpretation of water quality data (i.e. trend analysis) and in the completeness of monitoring data (no discussion of sediment or fish toxicity).

Lakes within the Sequoit Creek watershed represent some of the most important ecological sites in Lake County. Stephen Forbes, the first director of the Illinois History Survey, gives a description of both Cedar Lake and Deep Lake in a 1887 review of regional lake ecosystems (*The Lake as a Microcosm, 1887*). Notably he describes the importance of an integrated ecosystem (invertebrates, plants, fish etc.) and its significance for sustaining a balanced fishery. The Tetra Tech report alludes to the fact that 5% by number of the endangered and threatened plant and animal species in the state exist within this watershed.

The current review is being presented by issue. It is being done in this fashion because of a limited time-line for review. Some supporting documents have not been available on the SMC website until very late, and as we more carefully review them we might submit supplemental comments that we hope SMC will make every effort to accept.

We ask that the fundamental and crucial watershed issues that we raise here be fully addressed in the final Sequoit Creek Watershed Management Plan.

Lake Trends in Water Quality

A separate supplement (Supplement 3, Water Quality) was put on the SMC web page. The Supplement addresses detailed information concerning lake and stream water quality data within the Sequoit Creek watershed. Supplement 3 is important since many of the conclusions of the main report are based on this water quality data. Text figures indicate (c.f. Figure 3-11) that 5 to 6 water quality samples were taken by Illinois EPA/LCHD/NIPC across a sampling season for those years in which sampling was undertaken. Based on this data, conclusions are drawn to the effect that : "*2000 assessments indicate that the Lakes in Sequoit Creek have been improving since 1990*". However, no allusion is made within the Supplement to any formal statistical analysis of trends nor is a method described. The limited number of samples taken each year means that the lake data will be non-parametric (a fancy word meaning that they will not have a normal distribution ….they will not demonstrate a bell shaped curve). Because of the high variability in weather (droughts alternating with wet years) lake data can be highly variable. Good practice would *demand* that special types of analyses be undertaken to interpret whether or not a trend exists for the lakes. Assigning trends to the water quality data would be misleading and/or inaccurate unless non-parametric statistical analysis were undertaken.

We ask that an accurate and well supported statement of the water quality trends over the history of available water quality records be clearly presented in this Plan.

Salt as a Pollutant

Salt is highly soluble in water , it's impact is not easily mitigated, and it is a much more important pollutant than has typically been recognized. State of Illinois standards for ambient waters for salt is 500 mg/l (generally expressed as chloride concentration). This would represent approximately 1500 lbs of salt in an acre-ft (208ft.X208ftX 1 ft.) of water. The State Standard then is very high. Values coming off roadways can exceed 2000 mg/l. It is not uncommon for us to see values of 600 mg/l in urban detention ponds. Salt also promotes the release of heavy metals from stream bed sediments.

Most freshwater fish species respond positively to elevated concentrations of salt (it is used by aquarists for sick fish). Invertebrates, algal species and rooted aquatic plants however, are likely to be negatively impacted by increased salt concentration. For the Sequoit Creek watershed there is concern for endangered and threatened plant species as well as endangered and threatened fish. Lake County lakes currently show some evidence of the intrusion of salt tolerant rooted aquatic plant and algal species.

Street salting is not addressed in any detail in Supplement 3 nor the main report.

We request that salt concentration data be incorporated in the Plan.

Total Dissolved Solids and Conductivity

The ambient concentration of salt and other dissolved ions is typically tracked by monitoring the conductivity of waterways. Conductivity increases as the total dissolved solids increase (TDS =.6 conductivity). This is an extremely important parameter to measure since it is predictive of contamination by a broad range of pollutants and is comparatively simple to measure. Trends in conductivity for the streams and lakes in the watershed should be recorded and discussed in any discussion of trend data for water quality.

We request that conductivity data be incorporated in the Plan.

Sediment Samples

According to Supplement 3 *"sediment samples were occasionally analyzed for pesticides, polychlorinated biphenyls(PCBs), and metals but concentrations never exceeded IEPA guidelines…."* This phrase was repeated for every lake and stream segment within the watershed. Recent work undertaken by David Jenkins formally of the University of Illinois at Springfield found toxic contamination of sediments in 60% of the lakes that they looked at. IEPA guidelines are not based on any biologically based toxicity standard; rather they are based on normal distributions of sediment contaminates. More recent national guidelines for lake sediments have been available for over three years which are based on actual toxicity to bottom organisms. The discussion within the general report and in Supplement 3 are inadequate for profiling the presence of toxicity in both stream and lake sediments. We note for example that mercury was identified as a fish contaminant in a great many lakes in Illinois (generally as a consequence of airborne deposition).

We note that the lakes in the report are graded by means of IEPA use attainability standards. These standards will be very misleading if toxics data for sediments and fish tissue are not incorporated into the analysis. Currently, there exists a state wide fish advisory for mercury. Without data concerning this contaminant it is misleading to say that a lake will have achieved "full use".

According to the report " *Presently the degree of toxicity in the lakes is not known. Because of the projected population growth in the watershed, the potential for increased lake toxicity from urban runoff is high*"…p4.2

We request that existing sediment data be attached in a supplement that includes consensus based sediment guidelines, probable effects concentrations and probable effects quotients.

Hazardous Materials Facilities and Hazardous Waste Episodes

No data is presented either in the main report or in the Water Quality Supplement which addresses locations for facilities which handle hazardous materials and/or episodes where hazardous materials may have been spilled or leaked (i.e. Leaking Underground Storage Tanks for fuels, etc.). It is comparatively easy to obtain detailed reports from commercial services which profile these records and this type of information should have been a routine part of the watershed assessment. This information becomes valuable only if there is a significant follow-up (i.e. FOIA inquiries) and stream or lake monitoring which is focused on the contaminant of concern.

Please include available hazardous materials data for the watershed to enable future follow-up.

Presentation of Ammonia Nitrogen Data

Several charts in Supplement 3 allude to ammonia excursions above a "target" concentration given in Table 3-1 of the Water Quality Supplement. Ammonia is an extremely important water quality parameter because it is toxic to fish and wildlife. Analytic results are supposed to be summarized in Table D-1 in Appendix D. This Table was not included in the version of Supplement 3 which was posted to the SMC web site. As a consequence it is not possible to review individual ammonia excursions, their location, nor the magnitude of the excursion. Notably State of Illinois water quality standards are not used as a basis of comparison for this parameter. State of Illinois Standards include both pH and temperature in evaluating the ammonia concentration. The target concentrations may be more restrictive than the State Standard but you cannot tell from the data presented. Language should have been devoted the character of ammonia toxicity and its implication for in-stream fauna.

High ammonia concentrations are identified for “stink creek” but the source of the ammonia is not identified.

Please include pH and temperature with the ammonia nitrogen data in this Plan, and compare the data to the State of Illinois standards.

Influence of Lake Management on Water Quality

The Loon Lake Community has had , in the past, an extensive aquatic weed harvesting program in place. Harvesting of rooted aquatic plants and /or application of aquatic herbicides is a common practice for many of the lake communities in Lake County. The magnitude of these practices is significant since it will have a bearing on expressed values of Total Suspended Solids, water clarity, and even the expression of nutrients in the water column of regional lakes. Each of the lakes in the report should be profiled for the various types of management techniques that have been in place during the years in which water quality and biological data have been compiled.

Please include present management practices in a profile with the data for each lake.

Graphing of Dissimilar Parameters on the Same Graph

Total phosphorus and soluble reactive phosphorus are measured with chemical detection limits of 5 parts per billion. Ammonia is typically a fraction of a part per million, while nitrates can be orders of magnitude greater than either of these parameters. Phosphorus, however, is typically the most critical parameter of the three. Multiple Figures are included in Supplement 3 which graph all of these parameters together.

Please include separate graphs for the soluble reactive phosphorus and total phosphorus data.

Annualized Loading Assessments and Storm Water Monitoring

Taking grab samples in lakes and streams represents a “snapshot” in time. It’s a little like taking several individual frames of a movie and trying to tell what the whole movie is about. We note that much of the stream monitoring was grab sampling and was not accompanied by flow assessments. The downstream lake will “see” the annualized load of things like nutrients (i.e. sediment particles with nutrients will settle in the downstream lake and accumulate in a nutrient pool which will contribute to future algal growth) . Normally the largest fraction of the nutrient load (phosphorus and nitrogen) is delivered during storm events.

One of the critical goals of the plan was to: “*Reduce pollutant loads to Sequoit Creek from runoff and point sources*”. Loading data can be generated through the use of watershed models which calculate loads associated with different types of land uses. Suspended solids, metals, salt, and nutrient loading can be “estimated” through the use of these models. These loading models are exceptionally significant because they can be used to model the delivery of pollutants from existing land uses and from projected changes in land use which are to occur in the future. Additionally, and as formal Best Management Practices are implemented, the models can predict the magnitude of improvement which is assignable to that practice. Tetra Tech is eminently qualified to do this type of analysis and it is ironic that they have apparently not been asked to do so. We believe it to be one of the most important types of analyses to perform since it can demonstrate the impact of new development in the early planning stages.

We request that the watershed be modeled to characterize the impacts from existing and future loading, and included in this Plan.

Characterization of Percent Impervious Cover

The negative impact of impervious cover (streets, roofs, sidewalks) on stream fauna has been recognized for at least thirty years. Most recently however, this relationship has been systematically studied both across the country and in northeastern Illinois. A major monograph summarizing the results of 225 studies concerning the impacts of impervious cover on aquatic systems was published by The Center for Watershed Studies (2003). In brief, measures of stream quality including fish metrics (i.e. Index of Biotic Integrity) , and invertebrate metrics begin to degrade as the percentage of impervious cover on a watershed approaches 10%, become impaired between 10 and 25%, and are graded as "non-supporting' past 25%. Notably, traditional forms of hydrologic mitigation such as detention ponds are not sufficient to in contravene these trends.

Given a brief time to review Supplement 3 and the main report I could find no mention or enumeration of the percent of impervious surface within the watershed under existing or projected land uses.

We request that this Plan discuss the physical and chemical mechanisms that create the relationship between impervious surface and stream quality, and the implications of this relationship on future planning. Please include the existing percentage of impervious cover and future projections for impervious cover.

Endangered and Threatened Fish Species

Integrated Lakes Management in the late summer of 1998 did transplantation of endangered and threatened fish species from some of the Sequoit watershed lakes. The project was undertaken in conjunction with Loyola University and the Illinois Department of Natural Services, and included a careful evaluation of the consequences of introduction of fish from neighboring watersheds before it was performed. ILM was responsible for the creation of the first E/T fish sanctuary in the State of Illinois at lakes and ponds associated with Prairie Crossing in Grayslake. Life history studies and genetic studies are currently being carried out on these species at local area universities to evaluate the success of the project.

Several of the Sequoit watershed E/T fish species use the immediate shoreline as part of their principal habitat and still others use the "near" shore environment. All of the species involved are associated with high clarity waters, substantial rooted aquatic plant communities, and comparatively good water quality. Many of the Sequoit E/T species have been extirpated from other parts of the country. It is generally felt that sedimentation and loss of water clarity have been responsible for their disappearance. Very little is known concerning their spawning behavior and critical life history traits. ILM did note that the fish appear to "partition" the lake shore; some fish are found in some sectors of the lakeshore but not others. Factors responsible for this portioning are not completely clear.

Throughout the main report allusion is made to shoreline problems, bank stabilization and erosion control. While we agree that shoreline stabilization for regional lakes is desirable we also believe that it holds the possibility of negatively affecting resident E/T species. We strongly urge that spot seining be done in the vicinity of any potential shore stabilization project for purposes of screening for the presence of the E/T species. Well intentioned erosion control projects can "unknowingly" wipe out critical habitat for resident E/T fish species. We discourage the use of rip-rap as a shoreline treatment because it almost certainly will negatively impact these species.

We request that the Plan address shoreline stabilization in the full context of preserving, and wherever possible, restoring habitat for threatened and endangered fish species.

Stocking Policy and the Condition of Local Lake Fisheries

Part of the ILM project logistics to create a sanctuary for E/T fish species involved ridding the transplant pond of predators. Introduced native fish populations responded dramatically and currently there are substantial numbers of these species in the main lake and transplant pond at Prairie Crossing. In contrast, we note that active programs of game fish stocking exist for almost all of the lakes in which these species occur. These programs frequently proceed without acknowledgement of their potential impact on non-game native fish species including the resident E/T stocks. Stable and abundant populations of predator game fish are more likely to develop through promotion and protection of habitat for the E/T native fish upon which they feed than through regular stocking. There is great irony in focused attention on water quality to preserve E/T species without discussing the biology of directed predation.

We request a discussion of this issue and promotion of native fish conservation practices in the Sequoit Creek Watershed Plan.

Watershed Boundary

According to the report the watershed boundary was discerned by using year 2000 , 2 ft. contour maps. No mention is made of any effort to "ground truth" this boundary by checking culvert linkages to other land parcels. Watershed boundaries can be quite different from what is found on a topographic map, especially in low gradient topography. Have any efforts been directed toward confirming this boundary?

Staging Gauges, Flow Monitoring and Hydrologic Data

While zones of flooding are discussed in the report no mention is made of the existence of staging gauges and flow monitoring. Weather data is not summarized and runoff yield is not characterized. According to the executive summary "*Additional information collected included hydrologic studies …..*" Given the intention of the report to support flood management there is very limited technical data characterizing the hydrology of the area. If hydrologic data has been collected it is not characterized in the main report.

Hydrologic Modeling

The report has not been prepared in a manner that supports the development of hydrologic models. Toward that end the watershed should have been broken down into catchments, time of travel data developed, and topographic data converted to a digitized format that can be used with hydrologic models. *We presume that some of this information is developed elsewhere or there are plans to develop it as part of future technical studies.* If it has not been developed then this represents a major flaw in the watershed analysis. We encourage the use of continuous simulation models such as HSPF so that low flow conditions can be simulated as well as high flow events.

Please identify the status of other technical studies which characterize the hydrology of the Sequoit Creek watershed and/or future plans to model the hydrology.

We believe that SMC, a public agency, should make its GIS data available to the public, with appropriate attributions, to support better understanding and future use of this plan. We request that maps be included as a Supplement in the Plan, and that the GIS data be available upon request.

Resumes

James K. Bland

Director

Mr. Bland founded ILM in 1987 to address aquatic resource problems through diagnostic testing, management and consulting services. Mr. Bland is recipient of the 2002 Lake Guardian Award from the Illinois Lake Management Association in recognition of his exceptional contribution to the preservation of Illinois lakes.

Professional History

Project Officer / Environmental Protection Specialist
U.S. EPA, Chicago, IL 11/78 to 6/86
Mr. Bland held assignments in the U. S. EPA's Great Lakes National Program Office, the Waste Management Division, and the Water Division. As a Project Officer, Mr. Bland prepared and helped to negotiate a U.S./Canadian phosphorus control strategy for the lower Great Lakes and Saginaw Bay. Additionally, he administered and did technical reviews for a 1.5 million dollar mission contract characterizing 30 "Areas of Concern" on the Great Lakes. As an Environmental Protection Specialist, he was responsible for computerizing the State of Ohio water quality standards files and oversaw water quality management planning for the cities of Cincinnati, Youngstown, and Dayton. Mr. Bland also initiated and was responsible for the development of a research/management study to evaluate the use of ecoregions as a vehicle to generate ambient water quality standards for the State of Ohio. The Ohio ecoregion project has become a model for similar projects across the country.

Environmental Education Coordinator
Field Museum of Natural History, Chicago, IL 8/27 to 9/75
Mr. Bland's responsibilities included classroom teaching, conducting teacher workshops, drafting grant proposals, supervising and training volunteers, input into exhibit design, public speaking, and writing curricula and scripts for educational presentations. Special accomplishments included establishing a wilderness program for high school students, a stream monitoring program for gifted students, and a co-curriculum on Lake Michigan with Shedd Aquarium staff.

Educational Coordinator
Carnow, Conibear, and Associates, Chicago, IL 6/86 to 2/87
As educational coordinator, Mr. Bland marketed the education department, and organized and participated in Illinois Asbestos Worker Certification Training. He also prepared federal regulatory compliance reviews for RCRA, SARA, CERCLA, OSHA, and HMTA for selected clients.

Teaching Positions

College of Lake County, Biology Department 1988/1989
Environmental Biology: survey course of basic ecological principles and contemporary environmental issues
Oakton Community College, Biology Department 1/76 to 11/76
Environmental Biology: survey course of environmental issues
Loyola University, Natural Science Department 11/76 to 6/77
History of Scientific Inquiry: historical development of sciences
Science and Human Ethics: exploration of the relationship between ethical and scientific constructs and their impact on western culture
Moraine Valley Community College, Biology Dept. 9/77 to 10/78
Anatomy and Physiology: for prospective nurses and E.T. technicians
Introductory Biology: basic survey course
Physical Science: basic survey course

Education

University of Illinois, M.S. 1972
Biological Science / Environmental Affairs
Northwestern University, B.A. 1966
Biology / Pre-Med

Professional Development

Restoration Ecology, Chicago Botanic Gardens, 1996
GIS as a Lake Management Resource, ILMA, 1995
HSPF Aquatic Modeling Seminar, USGS, David Lum, 1994
Identification of Wetland Plants, Mohlenbrock, DuPage County Department of Environmental Concerns, 1994
PADI Diver Training
Aquatic Weed Control, NALMS Seattle Conf., P. Newroth, 1993
T by 2000 Lake Enhancement Meeting, West LaFayette, IN, 1991
Monitoring and Modeling Seminar, NALMS Cincinnati Conf., Reckhow and DiToro, 1991
TR-55 Hydrologic Modeling, SCS, 1988
New Directions in Stream Corridor Management, Chicago Botanic Gardens, 1987
Nonpoint Source Mgmt. Seminar, Marquette Univ. & U.S.EPA, 1985
Manhattan College Modeling Seminar, U.S.EPA, 1984
Small Lakes Seminar, Wisconsin DNR, 1982
Tetra Tech Section 208 Water Quality Modeling Seminar, U.S.EPA and Tetra Tech, 1981
Groundwater Seminar, American Ecology Services & U.S.EPA, 1980
River Ecology, Illinois Institute Of Technology, 1979
National Conference on Urban Erosion and Sediment, U.S. EPA, 1979

Associations

North American Lake Management Society
Illinois Lakes Management Association
American Assoc. for the Advancement of Science
Aquatic Plant Management Society
Lake County Chamber of Commerce
Former Chairman, Technical Advisory Committee for the Waukegan Harbor Area of Concern, Citizen Advisory Group

Certifications

Certified Lake Manager, NALMs, 1995
Certified Environmental Property Assessor, ERT, 1995
Chemical Applicator Certification, Illinois Dept. of Agriculture, 1987 to present
Federal Contract Project Officer Certification, U.S.EPA, 1983

Publications

Bland, J., 1996, "To Stock or Not to Stock", ILMA Newsletter

Bland, J., 1996, "A Gaggle of Geese....or Maybe a Glut", Lake Line, May 1996, Vol. 16, No. 1

Bland, J., 1991, "Aquatic Herbicides: Considerations for Their Safe Application", ILMA Newsletter, N.L.

Bland, J., 1988, " Increasing the Effectiveness of Aquatic Plant Harvesting", ILMA Newsletter, Vol.4, No.3

Bland, J. Urban, D., et al, 1985, U.S. Phosphorus Control Plan for Lake Erie, Lake Ontario, and Saginaw Bay, U.S.EPA, Great Lakes National Program Office

Bland, J., 1980. "Biotic Impact of Organic and Inorganic Sediments", Seminar on Water Quality Trade-offs, EPA 900/9-80-009

Bland, J., 1976, "Hickory Creek Revisited", Field Museum Bulletin

Bland, J., Reed, C., 1974. "Vertebrate Faunal Remains from Shell Midden Sites on Tongatapu Island in the Tongan Group of the Southwestern Pacific", *Manuscript completed but I am not aware of its final disposition.*

Bland, J., and Bardack, D. 1973. "A Pleistocene Pike, *Esox cf. Lucius*, from the Southern End of Lake Michigan", Amer. Mid. Nat., 80(1)