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EXECUTIVE DEPARTMENT
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Department of
Environmental Protection

FAXED

DEC 7 1988

December 2, 1988

December 2, 1988

Mr. Arthur J. Newell
Principal Fish and Wildlife Ecologist
Bureau of Environmental Protection
Department of Environmental Conservation
Room 530
50 Wolf Road
Albany, NY 12233-4756

Dear Mr. Newell:

Re: Draft Generic Environmental Impact Statement on the
New York State Department of Environmental Conservation
Program of Liming Selected Acidified Waters

Enclosed are the Adirondack Park Agency staff comments on the Department's Draft Generic Environmental Impact Statement on the New York State Department of Environmental Conservation Program of Liming Selected Acidified Waters, dated September 1988.

On August 20, 1987, former Executive Director Thomas A. Ulasewicz wrote Jack Nasca of DEC commenting on the proposed scope of the Draft Generic Environmental Impact Statement. We again respectfully call your attention to that letter and again emphasize the various points noted therein, particularly the need to define clearly the scope of the liming program, to establish precise criteria for the preparation of supplemental site specific environmental impact statements, and to identify the specific criteria for determining what waterbodies will be limed. We respectfully submit that the Draft Generic Environmental Impact Statement does not adequately address these three central points. Its failure to do so raises serious questions as to whether the document complies with SEQR and Part 617. A

Our comments are set forth in detail in the enclosure. There are two additional critical points we wish to highlight here.

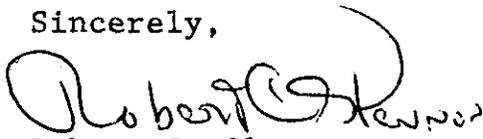
First, in the August 20 letter, we advised that in our opinion a significant issue existed with respect to liming State land classified Wilderness by the Adirondack Park State Land Master Plan. It was our understanding that this document would contain a detailed discussion of whether liming is consistent with the Master Plan provisions concerning Wilderness and the values protected by the Wilderness classification. We feel the Draft Generic Environmental Impact Statement has not addressed that issue, and instead simply assumes that liming, as proposed in the Draft Generic Environmental Impact Statement, is consistent with Master Plan guidelines for Wilderness. The Draft Generic Environmental Impact Statement does not accurately set forth Master Plan criteria and guidelines, and it makes assumptions with respect to the policy intent of the Master Plan which we strongly feel should be a matter for consultation with the Agency, the body responsible for interpreting the Master Plan, a procedure the Master Plan contemplates. B

In short, in order for this Draft Generic Environmental Impact Statement to be finalized, we feel the Agency will have to concur that liming is consistent with the provisions of the Master Plan with respect to Wilderness. I respectfully urge you initiate such discussions at your earliest convenience.

Second, we feel strongly that it is unreasonable to lime naturally acidic lakes. It is extremely expensive to do so, and the results are temporary, at best. Moreover, naturally acidic lakes have their own environmental value in that state. C

We very much appreciate your efforts to develop a comprehensive impact statement on liming acidified waters and the opportunity to participate in the process. In sum, assuming the Wilderness issue is successfully addressed, we feel that a liming program of limited scope would have definite environmental benefits, provided the lakes to be treated are chosen pursuant to carefully selected, definitive criteria relating to the purpose of the program and provided retreatments continue through the years as needed. We would be happy to discuss our comments with you.

Sincerely,


Robert C. Glennon
Executive Director

RCG:kdt

Enclosure cc: Herman F. Cole, Jr.
Elizabeth Thorndike
Peter S. Paine, Jr.

Adirondack Park Agency
Staff Comments
on
Department of Environmental Conservation
Draft Generic Environmental Impact Statement
on the
Program of Liming Selected Acidified Waters

Compliance with SEQR

1. A Generic Environmental Impact Statement, as any other Environmental Impact Statement, must contain a description of the proposed action and its purposes (6 NYCRR 617.14). In the case of a generic involving an entire program, as here, the description must be sufficient to identify the scope of the program. Unless the full scope and extent of the program are known, the effects of that program, especially the cumulative impacts, cannot be assessed. Nor is it possible to identify and assess reasonable alternatives or benefits of the program. D

The failure to specify the exact scope of the action involved and the purpose of the DEC liming program is extremely significant and makes it virtually impossible to evaluate the program. More specific comments follow:

- a. The goal is poorly defined, and a complete reading of the document reveals ambiguity. Page 1 states that "the purpose of the program is to reestablish and maintain valuable recreational fisheries in waters which would otherwise be too acidic to support a viable sport fishery." Such goal is without limitation and implies that sport fisheries will be created, not natural ecosystems, that ponds will be selected regardless of whether acidification is natural or man made and regardless of the history of the fishery of the site. Moreover, the "criteria" stated in the Draft Generic Environmental Impact Statement does not successfully refine, narrow or clarify the goal of the program. In fact, the criteria broaden the number of potential candidate lakes almost without limitation. E

Page 7 states the liming program on selected waters is "to protect fish populations or important fisheries in lakes and ponds threatened by acidification." However, on page 8, the goal of the program calls for the creation of fish populations and for the treatment of naturally acid waters. F

The creation of fish populations is not the same as reestablishing or maintaining a historical population. Further, the treatment of naturally acid waters has nothing to do with mitigating the affects of acid deposition. This ambiguity raises the question as to what extent the liming programing is intended solely to meet the recreational goals cited on pages 61-64. G

- b. The document implies that the scope of the liming program will be less than previously, but the criteria provides otherwise. Page vii describes the program intent as "not necessarily to expand the existing program but more importantly to refine and improve the program." Page 1 describes the current program as treating a limited number of carefully selected lakes and ponds (Table 1. "waters currently in the DEC liming program" lists 32 such lakes and ponds). It then goes on to state that the revised program will use new information to insure "that only the most suitable waters are included in the program." Additionally, page 8 states that the future scope of the program will be "comparable to that conducted in the past." All of these statements imply more selectivity; that fewer waters will be treated in the current program than in the past. Yet on page 68, this Generic states that approximately 90 ponds listed in Table 7 could be included in the program compared to 32 ponds in the "current" program. Moreover, Table 7 does not include ponds in the Mohawk, Hudson and Upper Hudson Watershed (This data is available and should be included.), which also could have ponds which meet the criteria. H

Further evidence of the broader scope of the program is that guideline 3 of the 1983 policy (page 124) has been omitted in the new policy document. Guideline 3 stated that the Division of Fish and Wildlife would not embark on a large-scale program. I

- c. If the primary objective of the program is to meet estimated recreational demand rather than to protect existing populations or to insure the survival of heritage strains or rare, threatened or endangered species from acid deposition, then there are other alternatives, including changes in the site selection criteria, which must be considered. Further, the cumulative impacts will be substantially different if this is the objective. Until the program is clearly defined, it is not possible to evaluate its impacts. J
2. A Generic must also set forth specific criteria under which the program actions will be undertaken (6 NYCRR 617.15[b]). It is impossible to determine from this draft which waters actually qualify for inclusion in the program because the site selection criteria (pages 30-35) are not, in all instances, clearly defined and because of the open-ended exception established in the policy document, page 144. Specifically:

a. Page 31 states that there must be "suitable levels of temperature and oxygen in the liming candidate waters throughout the year." The Draft Generic Environmental Impact Statement must have specific standards for both temperature and dissolved oxygen, as has been done for pH and flushing rates. Table 7 should present temperature and dissolved oxygen data so that it is possible to tell which ponds qualify.

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b. This Generic also does not define "unique," "important" or "historically excellent fishery" or what would represent a "serious decline" in such a fishery. Such terms are subject to broad interpretation and without a clear statement of what they are it is impossible to determine what ponds are eligible for the program. This very point is made in the discussion of alternative f on page 104.

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c. While not included as a site selection criteria in the revised policy, page 35 states the available funds and manpower are a required consideration in the selection process. The Generic does not provide guidelines as to what would constitute adequate funding and manpower. We also note that the estimated costs in Table 8 (page 77) are grossly understated. 6 NYCRR 617.14 requires a discussion of economic considerations in the impact statement.

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In addition, staff believes it is very important to discuss how the long-term commitment will be assured and what the annual funding requirements are to accomplish the long-term management of the entire program. The failure to continue liming, once initiated, does create potential for undue adverse environmental impacts. Since DEC has in the past discontinued or failed to continue the liming of particular lakes, it should demonstrate its capacity to avoid that potential in the future.

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d. The policy document attached as Exhibit B to the Draft Generic Environmental Impact Statement (page 144) provides an open-ended exception to any criteria noted in the document. Apparently, any lake is eligible for treatment on a case-by-case basis.

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3. The Generic does not, as required by 6 NYCRR 617.15, set forth criteria or procedures for supplemental site-specific impact assessments. It sets forth a series of potential site-specific impacts (i.e., wetlands, metal toxicity, increased public use) which can only be accurately assessed on a site-by-site basis. While the Generic cannot be expected to evaluate the impacts to a particular wetland or impacts of increased public use on a particular Forest Preserve unit, that does not negate the need for such an analysis. The level of site specific analysis required is beyond this document; such analysis is typical to supplemental statements.

P

Similarly, the requirement on page 4 of the revised policy (DGEIS page 144) that new ponds not meeting the site selection criteria may be included if justified does not adequately address SEQR requirements. Item 5 under Exceptions only calls for the completion of an EAF and publication in the Environmental Notice Bulletin. This is not the proper SEQR procedure. Q

4. The Generic cites to, but does not discuss in detail, its relationship to other Generic Environmental Impacts statements which apply to the management of fish populations. The Generic should discuss how the liming program conforms to the Final Environmental Impact Statement on Habitat Management Activities and the Final Environmental Impact Statement on Fish Species Management. R

Adirondack Park State Land Master Plan

1. The Draft Environmental Impact Statement description of the Adirondack Park State Land Master Plan requirements and guidelines contains a number of errors, omissions and, we think, unfounded assumptions. Specifically:
 - a. On page 4, the first paragraph under "2) Adirondack Park State Land Master Plan" needs to be amended to make it clear that §816 (formerly 807) of the Adirondack Park Agency Act requires the Department of Environmental Conservation to develop unit management plans in consultation with the Park Agency; that such unit management plans conform to the guidelines and criteria of the Adirondack Park State Land Master Plan, and that the Master Plan and unit management plans guide the Department of Environmental Conservation's management of State land. S
 - b. The Wilderness definition on page 4 is incomplete. The concept of "earth and its community of life ... untrammelled by man" is an integral part of the definition and most relevant to understanding Wilderness and what type of management is appropriate in Wilderness. We feel it should be included in this discussion. T
 - c. As written, the stated guideline for use of motorized equipment and aircraft (page 4) is incomplete. Such use is only allowed during off-peak periods and at intervals of 3-5 years, unless extraordinary conditions (fire, major blowdown or flood) mandate otherwise. Further, the only construction projects that qualify for such are those involving conforming structures or improvements, and the only research projects that are allowed under this provision are those essential to the preservation of Wilderness values and for which there are no alternative sites. U

- d. The guideline for use of motor vehicles, motorized equipment and aircraft (page 5) is incorrect. For the correct guideline, refer to the Adirondack Park State Land Master Plan page 24 in the 1979 edition. (It is unchanged by the 1987 revisions not yet published.) Again, the guideline places restriction on administrative use and requires such use be specified in a duly adopted unit management plan. V
- e. Under the guidelines for Wild Forest (page 5), the "other than ..." explanation of wildlife management structures is incorrect (third item in list). W
- f. The statement on page 6 that the "Adirondack Park State Land Master Plan also sanctions the use of fisheries management techniques in waters within the park" is, in our view, far too broad and far too vague. The Master Plan is, with two or three limited exceptions, silent on the issue of fisheries management by whatever technique. An underlying principle of the Master Plan is that all management actions, fisheries included, must be consistent with the definition and guidelines of the particular land classification involved. In our opinion, a Draft Generic Environmental Impact Statement should demonstrate compliance with other laws and that this would include the Adirondack Park State Land Master Plan. X
- g. The Master Plan and unit management plan simply do not support the very generalized conclusion reached on page 7 that "it is clear that liming is recognized by DEC as a legitimate and useful fisheries management activity when applied to carefully selected waters." Only eight unit management plans for units with ponded waters have been completed. Of those eight, four are Wilderness plans which do not call for liming any waters and four are for Wild Forest. Of the Wild Forest areas, two plans call for liming six ponds. The liming of these ponds was found to be consistent with the Master Plan based on the inventory and analyses of the individual unit management plan. Y

Further, there is no unit management plan for the West Canada Lakes Wilderness Area as stated on page 7. The application of lime to Horn Lake was undertaken without a unit management plan and without the knowledge of the Adirondack Park Agency.

- h. The statement on page 29, lines 12-15, that fish management activities, including liming, are conducted within the guidelines of the Adirondack Park State Land Master Plan and Department of Environmental Conservation policies is a conclusion not supported by the record. This Draft Generic Environmental Impact Statement indicates that some 74 treatments of Adirondack waters have occurred since 1973 and 16 since 1984. All were undertaken without a unit Z

management plan or consultation with the Agency pursuant to the Adirondack Park Agency/Department of Environmental Conservation Memorandum of Understanding. Further, the 1983 policy (Appendix A) requires liming to be an integral part of unit management planning and to reflect the management strategies of each plan. We note herein that the adopted Cranberry Lake unit management plan calls for liming a pond, other than those which the Agency found to be consistent with Master Plan. Prior to adoption of the plan and during staff consultation, the draft plan was amended to call for the liming of Dog, Hedgehog and Curtis Ponds, "if future data indicates a drop in pH to critical levels." Nick's Pond was only to be monitored. It was this amended draft that the Adirondack Park Agency reviewed and determined was consistent with the Master Plan. The adopted plan states (page 27) that Nick's, Dog, Hedgehog and Curtis Ponds "are in need of liming." It further states that "only Nick's Pond is scheduled for liming." This will need to be corrected.

- i. Page 29 of the Draft Generic Environmental Impact Statement states " that in addition to liming of acidified waters in Wilderness or other land categories within these parks, other acceptable fisheries management practices may include" As previously pointed out, the Master Plan does not state or imply that pond liming is consistent with the Wilderness classification, nor has the Agency interpreted the policy intent of the Master Plan to that effect. The mere fact that fishing is a compatible recreational use in Wilderness, as stated on page 29 (as is hunting), does not mean all fish management activities are automatically consistent with the Wilderness definition and guidelines. **AA**
- j. That portion of the definition cited on page 29 does not necessarily support the stated conclusion that liming is acceptable in Wilderness in that the definition sets limitations on management and there has been no discussion of those limitations. The Draft Generic Environmental Impact Statement should discuss the inherent limitations and why in DEC's view liming is consistent with the Wilderness definition and guidelines. **BB**
- k. The Pharaoh Lake unit management plan was not completed in 1988 as indicated in Table 5 (page 38). **CC**
- l. The liming proposed to be undertaken in this program is not a major research project, as indicated on page 76-78. As pointed out earlier, the liming of Horn Lake was undertaken without a unit management plan and without consultation pursuant to the Adirondack Park Agency/Department of Environmental Conservation Memorandum of Understanding. Therefore, the last sentence on page 76 and the first on page 78 do not justify the use of either motorized equipment or aircraft in Wilderness. This activity may require an amendment to the Adirondack Park State Land Master Plan. **DD**

This section should discuss the adverse impacts to Wilderness from the use of motorized equipment and aircraft to apply lime.

2. The Draft Generic Environmental Impact Statement does not recognize the full range of Wilderness values and fails to discuss the proposed program's impact on those values. Specifically:
 - a. The discussion of Wilderness on page 54 is limited to the ability to catch fish. This is oversimplified and does not consider the full range of Wilderness values recognized in the literature on the Wilderness (i.e., scientific, education, spiritual, aesthetic, mental and emotional rejuvenation and solitude). While page 54 asserts that acid deposition has impacted society's view of the natural environment and Wilderness, it does not discuss how society (Wilderness users and nonusers) perceives Wilderness and its values and how acid rain has changed those perceptions. It further does not discuss fisheries (as a resource or a recreational activity) relationship to Wilderness and the Wilderness experience. It could be argued, for example, that if one does not fish, one's Wilderness experience may have not been affected by acid deposition. **EE**

There also should be a discussion of wild forest and its role in backcountry recreation experience. **FF**
 - b. As on page 54, the discussion of liming Wilderness waters on page 78 is oversimplified and does not discuss the full range of Wilderness values. It is not simply a question of which is more natural, an acidified lake or a limed lake. The issue is whether the nature, extent and purpose of the program are consistent with Wilderness and to what extent the program impacts Wilderness values. How does the program protect, preserve or restore the system to its natural condition? How does the treatment of naturally acidic waters fit within the Wilderness definition? How does protecting intensively utilized fisheries fit within the Wilderness definition and guidelines? **GG**
 - c. The Draft Environmental Impact Statement (page 56) accurately characterizes the Adirondack region as unique physically, chemically, biologically, etc. from other physiographic regions of New York State. It goes on to say that "along with obvious differences in bedrock geology accompanying infertile soils, low solar radiation and a relatively short frost-free period, the nutrient poor Adirondack waters exhibit low natural ion content." Staff believes the Generic Environmental Impact Statement should discuss how the naturally low productivity of the area affects natural aquatic populations and the natural carrying capacity of Adirondack waters. We believe it should also discuss how and the extent to which the program will affect productivity. That is, compare the productivity resulting from the program to that naturally occurring in the Adirondacks so that impacts to successional sequences and trophic status of treated waters can be assessed. **HH**

- d. What is meant by the "so called Wilderness atmosphere" (page 95), and how will diminution be measured? At what point will mitigative action be initiated? II
3. Finally, the revised policy does not require, as the current policy does (#3 and #5 on page 124), that liming be undertaken in accordance with a unit management plan. This is a significant departure from policy not discussed in the Draft Generic Environmental Impact Statement and not concurred in by the Adirondack Park Agency. JJ

Contrary to the statements made on page 95, the eight unit management plans that have been completed have identified sites, including those in popular fishing ponds, that have been adversely impacted by public use. In fact, the Pharaoh Lake Wilderness plan identifies nine such ponds, including three ponds that have fishing use in excess of its estimated maximum capacity. Given the stated increases in public use occurring as a result of this program, liming is a significant action affecting the management of unit and can only be evaluated within the context of a unit management plan. Staff believes the implementation of this program is an activity for which the State Land Master Plan requires a unit management plan, and that the requirement should not be removed from the program without the concurrence of the Agency. KK

Freshwater Wetlands Act Jurisdiction

On page 30 of the Draft Generic Environmental Impact Statement, the language states that the Freshwater Wetlands Act permits may be necessary in the case of treatment of private waters containing wetlands. The Freshwater Wetlands Act applies to all jurisdictional freshwater wetlands in the State; there is no exclusion for State lands. The legal opinion cited on page 3 of the Draft Generic Environmental Impact Statement concurs in this view. LL

Agency staff has the following additional comments:

Site Selection

1. Total Number of Ponds

It is very difficult to tell from the draft how many ponds are proposed for treatment. Does Table 1 "Waters currently in the Department of Environmental Conservation liming program" on page 10 list all the candidate waterbodies (n = 32) proposed for this liming program, or are these priority or Phase I? Is Table 7 (pages 69-70), which lists an additional 83 waterbodies that meet some of the site selection criteria, more representative of the scope of the program? MM

2. Site Selection Factors

The Draft Environmental Impact Statement (pages 30-35) lists the following factors as being important in the selection of liming candidate waters: water quality, temperature and dissolved oxygen, bog characteristics, flushing rate, heritage fisheries, unique or important fisheries, and available funds and manpower. We comment on each in turn.

a. Water Quality

First, the discussion of water quality is limited to pH and acid neutralizing capacity. Important additional water quality criteria to consider are heavy metal concentration and organic acid content so that higher risk heavy metal lakes are not selected, as well as lakes with organically derived acid chemistry that are more difficult (and expensive) to neutralize successfully.

NN

Secondly, the "acceptable water quality goals" are targeted exclusively for brook trout (page 30) "since brook trout are the fish of greatest interest in most of these waters." How representative are brook trout with regard to water quality needs of other species that may or may not be targeted for protection? These other species ought to be given careful consideration. In our opinion, the water quality goal as stated is too narrowly focused.

Under what circumstances and what type of "more intensive sampling" will be conducted pre- and post-liming "whenever possible and considered necessary" (page 31)? Also, were these costs factored in Table 8, page 77?

b. Temperature and Dissolved Oxygen

The Draft Generic Environmental Impact Statement (page 31) states that "suitable levels of temperature and oxygen must be present in the liming candidate water throughout the year." This is too vague a definition of this important criteria to determine which lakes and ponds might qualify. The Environmental Impact Statement should specify (1) what the temperature and oxygen requirements are and (2) the criteria by which these data must be collected, that is, how recent do the data have to be, and when and where do these parameters have to be taken (significant changes occur between seasons and within different areas of the pond).

OO

c. Bog Characteristics

(see Bog Waters Comments following this section)

d. Flushing Rate

The proposed flushing rate criteria has been expanded from less than one time per year (Appendix A) to up to two times per year (Appendix B), thus increasing the number of potential candidate waters to include quicker flushing lakes. Some of the recent literature (Gloss, et al. 1988 and Schofield, et al. 1986) cited in support of this change also indicate that in addition to retention time "the mixing regime of a lake will also influence the rate of reacidification" (Gloss, et al. 1988). Basically, this means that a lake with a large epilimnion or upper layer will dilute the lime rich bottom water, thus enhancing reacidification.

PP

In our opinion, the flushing rate criteria, as it pertains to reacidification, is incomplete without the consideration of lake mixing regimes. This is particularly important in light of the recent policy revision to include faster flushing lakes that will reacidify more quickly and thus will require more frequent liming and perhaps more frequent monitoring.

e. Heritage Fisheries

Page 34, paragraph 2 states that "the DEC usually uses the term 'heritage strain' in reference to brook trout, but the term could also be used with round whitefish (an endangered species in New York) or other species of concern." It is essential to the description of this site selection criteria and to the understanding of the benefits of this program that all 'heritage strain' species be identified in this environmental impact statement. The document is also incomplete without listing "threatened or endangered fish species which require liming for maintenance" (page 34, paragraph 3). Furthermore, a list of ponds and their "heritage fisheries" species ought to be included. These listings are necessary to show how a candidate water meets or doesn't meet this particular criteria and to show how effective this program might be towards protecting heritage fisheries. **QQ**

f. Unique or Important Fisheries

According to page 35, "The criterion which lakes must meet if they do not possess heritage fisheries is as follows: the candidate lake must have shown a serious decline in a unique fishery or in an historically excellent fishery as a result of acidic deposition or have historically supported heavy angling pressure due to its location." While we might support the above criterion as a requirement for candidate waters, the Draft Generic Environmental Impact Statement is incomplete without at a minimum a definition of the following terms: serious decline, unique fishery, historically excellent fishery. Furthermore, a list showing how the lakes currently in the liming program meet this criterion should be included. **RR**

In our opinion, an additional fisheries criterion should be included in site selection of candidate waters: one that evaluates the physical capabilities of a pond to support naturally reproducing populations of the "heritage, unique or important" fisheries. One of the primary values of such an additional criterion would be to improve efficacy, by selecting out only those waters that are physically capable of supporting reproduction. The Draft Generic Environmental Impact Statement (page 27) states that "detailed studies of brook trout stocked in Woods Lake have shown that brook trout reproduction is limited

by a lack of suitable spawning substrate and near shore acidification." Therefore, the proposed 32 candidate waters or the additional listed waters should be evaluated for suitable spawning substrate or for the presence of nearshore acidification that would not be neutralized by the liming methods proposed in this program.

g. Available Funds and Manpower

It is unclear whether this is an actual site selection criterion or not, since it is not listed as such in the revised policy (Appendix B). It is our opinion that it **SS** should be included in order to assure an overall safe and effective liming program. The discussion is incomplete, however, without specifically describing what represents adequate available funds and manpower for any particular pond or groups of ponds. For example, at what point would a pond not be considered because it is simply too expensive?

Finally, to clarify how this site selection process was used, the Environmental Impact Statement should include at the end of this section (page 35), a list or a chart of all candidate waters currently in the program that shows how each criteria listed in this section (a. through g.) are met for each pond. **TT**

3. Private Liming Efforts

The Agency supports the position of the Draft Generic Environmental Impact Statement regarding cooperative ventures with sportsmen groups, as stated on page 36. DEC should maintain full responsibility for candidate selection, as well as for proper implementation of the liming activity, including long-term monitoring and record keeping. The primary risk to the environment of a less organized effort would be the improper selection of candidate waters or lack of attention to detail resulting in overliming or underliming or where lack of long-term commitment to monitoring and reliming may result in reacidification and consequently more damage to the aquatic ecosystem.

For the same reasons, it is our opinion that the same site selection criteria and reliming criteria should apply to all liming activities in New York State waters. The Department of Environmental Conservation should be responsible for consistently regulating all private liming activities. **UU**

Bog Waters

The Draft Environmental Impact Statement (page 33, paragraph 3) states that two factors will be used to identify bogs in the revised liming policy. Bogs will be identified as having no significant inlet or outlet and sphagnum mats that occupy more than 25% of the lake basin area. This paragraph says that "these factors will exclude true bogs from being limed, but will allow for certain seepage waters to enter the program." In our opinion, the narrowness of the definition of bog waters would exclude a significant portion of naturally acidic Adirondack waters, allowing them to be limed. **VV**

These two factors are not adequate to distinguish naturally acidic boggy lakes which should not be considered as optimal candidate waters. They should not be considered for two reasons: (1) past experience has shown that attempts to neutralize organically acidic ponds have been only marginally successful (Kretser and Colquhoun, 1984) and (2) that these naturally evolved acidic ecosystems have a high inherent value as they are, providing unique species assemblages. Therefore, it is our opinion that in order to protect natural ecosystems and to maximize the cost efficiency of this program, the identification of a potential bog water should be expanded to include (1) naturally occurring acidic condition, (2) color, (3) dissolved organic carbon, (4) presence of bog species (e.g., sphagnum, leatherleaf, sweetgale, sheep laurel and sundew), and (5) organic substrate, all of which are readily measured.

The identification of naturally acidic bog waters is not necessarily "difficult and may require an intensive study of the hydrology, chemistry and biology of the area," as stated on page 66 of the Draft Environmental Impact Statement. Natural bog ponds are distinguishable from acid rain acidified ponds by their bog vegetation. Furthermore, areas minerally acidified by rain would not be expected to have high color and high dissolved organic carbon like organically acid natural bogs. These data were collected by ALSC and could be easily obtained for other ponds not already surveyed. As a matter of fact, it is reported on page 58 that the Adirondack Lake Survey data were used to classify "bog ponds based on a broad definition using aquatic macrophyte data, shoreline and bathymetric map data and field notes," going on to say that "many of these waters are naturally acidic and relatively unproductive." It is our opinion that this approach, if it were more detailed here, might be acceptable as a site selection criteria.

Agency staff feels that the broader definition must be used in order to adequately protect naturally occurring acidic waters. This document is significantly deficient in its lack of discussion on the adverse impacts of liming to naturally evolved acidic ecosystems.

Cost/Benefit

The Program Costs and later the Benefits discussion of the Draft Environmental Impact Statement beginning on page 75 are, in our opinion, significantly flawed. Some of the costs appear vastly underestimated, as is shown below, and figures don't match throughout parts of the document. The Agency recognizes this is a critical element of the program. Initially, the analysis should **WW** serve to assure that not too many ponds are started, then have to be dropped from the program due to lack of funds, and, in the long term, it should provide guidance for making better decisions about expanding or reducing the number of ponds in the program.

The Environmental Impact Statement should provide greater detail on the estimated annual program costs, such as costs broken down on a lake-by-lake and a year-by-year basis. The program costs, as described on pages 75-77, describe only one year's projected expenditures for only 32 waters, for what is clearly a multi-year program involving significantly more ponds. Also, the estimated annual costs presented are not consistent with the rest of the document nor at times with estimates presented in the cited literature. For example, from Table 8 (page 77), we note:

- Treatment cost, for remote ponds (total 55 acres) is estimated at \$2,017 or approximately \$36.67 per acre. The Draft Environmental Impact Statement on page 88 cites Blake (1981) reporting liming costs of \$138 per acre for remote ponds." On that same page, data from Region 6 "indicate an average cost of \$110 per acre for remote ponds." By these estimates, the liming of 55 remote acres would range from \$6,050 to \$7,590 or more, to be adjusted up to 1988 dollars, not \$2,017, as estimated here. XX
- Treatment cost, for accessible ponds (total 640 acres) is estimated at \$5,120 or \$8 per acre. The same references as above indicate a more appropriate estimate between \$30,720 (\$48/acre) and \$33,920 (\$53/acre).
- Monitoring costs for remote ponds (n = 2) are estimated at a total of \$476 or \$238 per pond. With helicopter costs at \$250/hour (1980 dollars - page 88 DEIS), how can this possibly come close to being adequate to cover analytical costs and personnel, etc.? Also, we note that the Draft Environmental Impact Statement mentions in several places that some lakes may require more frequent monitoring than on an annual basis (DEIS page 94). These costs need to be included in order to make a fair estimate of the commitment of funds necessary for an environmentally responsible program.
- Monitoring costs for accessible ponds (n = 30) are estimated at \$142 per pond, a value we also find underestimated for the same reasons as stated above. Monitoring costs should be broken down on a lake-by-lake basis and estimated at current 1988 dollars to reflect a reasonable worse case scenario.

Furthermore, in our opinion, the estimated \$18 per pond (Table 9, page 90) to cover the total cost of analyzing the parameters listed on page 94, that is pH, alkalinity, conductivity, and color, are too low, especially since additional analysis for sulfate, calcium and monomeric aluminum may be necessary.

The Draft Environmental Impact Statement (page 88) cites Blake (1981) as reporting "a favorable cost benefit ratio for accessible ponds of 1 to 9.7." However, in that same paper, Blake (1981) reports an unfavorable cost benefit ratio for remote ponds (emphasis added) of 1:0.9. The Draft Generic Environmental Impact Statement should report both in its analysis. Finally, project economic benefits were estimated based on 900 acres of "productive limed waters" (page 88) while costs were based on 695 acres (page 77). Cost benefit comparisons must be based on the same level of effort in order to be meaningful.

Adverse Environmental Impacts

This is the most appropriate section of the document to detail environmental impact findings, and this is where they all belong. Some are scattered in other sections of the document, such as the discussion on page 98 about metal concentrations after liming and reacidification potentially being more toxic than before liming occurred.

YY

The summary of adverse impacts (page viii) should be expanded to include all issues discussed in the text, such as reacidification and the potential for metal toxicity to exceed pre-liming levels.

The section entitled "f. Other Biological Effects" (page 73) is incomplete and should be expanded to include macroinvertebrates, benthos, zooplankton. It is important to discuss the effect on the lower food web of the ecosystem and secondary effects on existing fisheries and/or stocked fisheries that might be expected.

ZZ

This section should include a discussion on the impact of liming on existing fish populations and on the invertebrate populations which support them because there are some questions raised in the literature as to whether and why existing or stocked species may have difficulty adjusting to whole lake liming (Gloss, et al. 1988, Schaffner 1987, Bukaveckas 1988). This may be a particularly critical issue in those ponds that are being selected for the specific purpose of protecting existing populations.

The discussion on page 78 (e. Concern that Water Chemistry Fluctuations Associated with Liming are Worse than Leaving the Waters Acidic) should not be under Section 3: Societal Concerns about Liming, but rather under Section 1: Ecosystem Impacts, because this is a biological/scientific phenomenon not a social one.

AAA

With regard to the liming action itself, we have the following comments:

Page 91 states that agricultural limestone is the "primary" neutralizing material of choice. List what other materials might be considered and what potential adverse impacts are associated with those other materials.

BBB

The report on page 92 that retreatment dosages require finer particle lime or else need a greater amount than the initial liming appears to contradict reliming amounts used in Region 6 (page 89). Also, it is important to discuss whether this means greater costs for reliming than for the initial liming.

The document does not adequately discuss the potential impacts of transportation, staging and actual application of lime to project sites.

There should be discussion of the lake liming experiences of the Swedish government, which have done some work evaluating the effects of lime diminishing sunlight through the ice during the late winter. They have also evaluated the practical difficulties of the loss of lime going out with the ice at springmelt. This should be discussed since it is the principal method of application for this program. CCC

With regard to the effects of liming on rare, threatened and endangered plants, when will the list of these plants be publically available? Page 72 of the Draft Generic Environmental Impact Statement states that "there are, however, certain plants which are found only in acidic environments and which may be adversely affected by liming. These plants would most likely also be found in acidic waters with high flushing rates, which will not be limed." Provide the basis for this conclusion. Basins with rare, threatened or endangered plants should be excluded from candidacy. DDD

The Economic Benefits section on page 88 (paragraph 2) states that "the benefits of pond liming can be based on increased angler use and their resulting financial expenditures. While data illustrating increased angler activity on limed waters is not available" The Agency understands that angler activity is now recorded on other DEC managed ponds, and we urge that angler survey be a monitoring requirement for all candidate waters. EEE

Page 91 of the Draft Environmental Impact Statement states that lake selection criteria "will be used to select a limited number of waters which show high potential for development of an important fisheries resource." This appears to exclude rare, threatened or endangered species which might never be expected to develop into an important fishery. Paragraph 2 needs to be rewritten to reflect that. FFF

Alternatives

Staff suggest there are two additional alternatives that are worth discussing. Both would, in our view, meet the apparent goals of the program and may in fact be at least as cost effective as the proposed program.

- A combination of alternatives D, E, and F: that is, lime only lakes critical to survival of a heritage strain of fish or critical to survival of threatened or endangered fish species and waters with potential for providing high use fisheries. GGG

This alternative is less than the proposed program, but targets the highest return waters. While this approach would involve fewer lakes, it would have a higher rate of return and it would be easier to assure appropriate funding levels for monitoring and retreatment.

- An alternative that includes stream liming and lake liming in potentially highly productive/high use waters so that self-sustaining brook trout populations are assured better success. Example: rather than lime 2 ponds and have to stock both of **HHH** them frequently because of too acidic tributary spawning areas, lime only one and lime its streams as well. Again, fewer waters would be involved, but the overall success of the program may be increased, and it would reduce the need for stocking to maintain the fish population.

Additional Literature Cited

Schaffner, William R., 1987. The Effects of Neutralization and Addition of Brook Trout (*salvelinus fontinalis*) on the Limnetic Zooplankton Communities of Two Acidic Lakes. Submitted to Canadian Journal of Fisheries and Aquatic Sciences.

Bukaveckas, Paul A., 1988. Effects of Calcite Treatment on Primary Producers in Acidified Adirondack Lakes. I. Short-term response to phytoplankton communities. Submitted to Canadian Journal of Fisheries and Aquatic Sciences.

OCTOBER 25, 1988

STATEMENT FOR HEARING ON GEIS CONCERNING THE DEC PROGRAM OF LIMING ACIDIFIED WATERS: Hearing to be held Tuesday, Nov. 1, 1988 at Room 334, 50 Wolf Road, Albany, N.Y.

Our aquatic system is delicate and should not be disturbed unless there is a reasonable chance of success or unless valuable information can be obtained.

The screening of the selected lakes can be improved if the following information is obtained in advance.

1. What is the organic acid content and the ratio of organic acid to sulfate in the lakes? A
2. Has a test been made of the pH to be obtained by adding powdered agricultural limestone to a sample of the lake waters? Unless the pH can be raised by limestone addition to 6.5 or higher, the ability of the lake to maintain adequate population of methane fermenting bacteria is doubtful. These bacteria are necessary to convert the organic acids formed from organic material into harmless carbon dioxide and hydrocarbons. These are the proven reactions that take place in an anaerobic digester to avoid a "sour" or acid condition, (caused by organic acids). B
3. In the case of a condition caused by organic acids in sewage treatment, neutralization is corrected by liming (in this usage, liming means the use of calcium oxide or calcium hydroxide rather than limestone).
4. In sewage treatment, aeration and mixing can convert the organic acids. The organic acids can react with oxygen to form carbon dioxide and water. Neither use of calcium oxide nor aeration are applicable to wilderness lakes.
5. Laboratory tests have been carried out by the writer at the laboratory facilities of the Rensselaer County Sewage Plant. These facilities were made available through the help of Mr. Fred Wurtemberger. These tests have shown that water containing a ratio higher than that of one part of acetic acid (a common organic acid in vinegar) to nine parts of sulfate will not be raised to a pH of 6.5 or above. The minimum pH at higher ratios can be as low as 3.8. Lakes at a high ratio of organic acid to sulfate will either be acid or will become so as organic matter in the lake decomposes.
6. Tests, made by suspending powdered agricultural limestone in a solution of acid rain, gave an equilibrium pH of about 7.5. Increasing the concentration of sulfuric acid to about 10 mg/l will still give a neutral pH.

7. Attached are graphs 1A, 1B and 1C showing the correlation of sulfate content with pH of three groups of lakes in the Adirondack Lake Survey. These curves are similar to graph of the data from the lakes in western Sweden from "Aquatic Chemistry" by Stumm and Morgan. C

In these curves, the lower pH (greater acidity) occurs at the lower values of sulfate content. The higher values of sulfate are associated with more neutral pH (6.5 and above). Unfortunately, the analyses for organic acids were not given in the published data.

8. Laboratory data show that limestone will not raise the pH of dilute acetic acid or of most acetic-sulfuric acid mixtures to a pH of 6.5. An exception may be found if limestone contains sufficient soluble oxides or carbonates of sodium, potassium and alkaline earth metals. Limestone from Ravenna N.Y. has about fifty pounds per ton of potassium salts. This is an advantage for agricultural use. There seems to be a limit to the ratio of organic to mineral acids that can be tolerated. In healthy lakes, if the pH is 6.5 or above, the growth of methane fermenting bacteria can convert the organic acids such as acetic to carbon dioxide and hydrocarbons. In the case of acetic acid, the hydrocarbon is methane. D
9. In graph H and the graph from the Swedish Lakes below it, are given the curves of the decrease in the sulfate and in the combined calcium and magnesium ions with the decrease in pH (increase in acidity). As these data are in meq. (milli-equivalents per liter). One meq. of base will neutralize one meq. of acid. These curves show that there is a greater decrease in calcium and magnesium than in the sulfate. Both the Swedish lakes and the Adirondack lakes show a similar pattern.

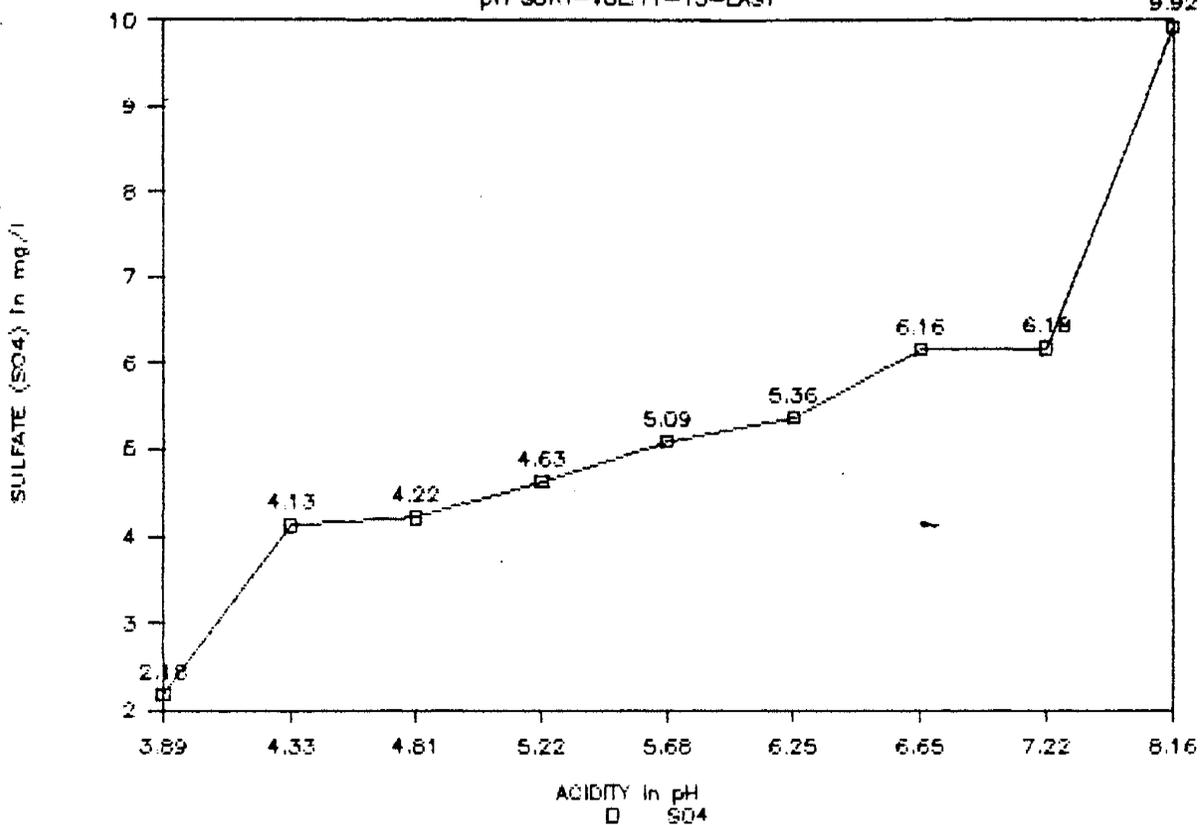
SUMMARY: Neutralization with limestone (either calcite or dolomite) is feasible if the acidity is caused by an excess of sulfate or of nitrate. If the acidity is caused by excessive amounts of organic acid or an excess of dissolved carbon dioxide (causing excessive bicarbonate formation), the addition of limestone will be expensive, non-productive of lasting improvement and of doubtful advantage to the acidic lakes. E

Research is being done to develop a treatment that can be added for a more permanent solution to the problem. First results are promising.

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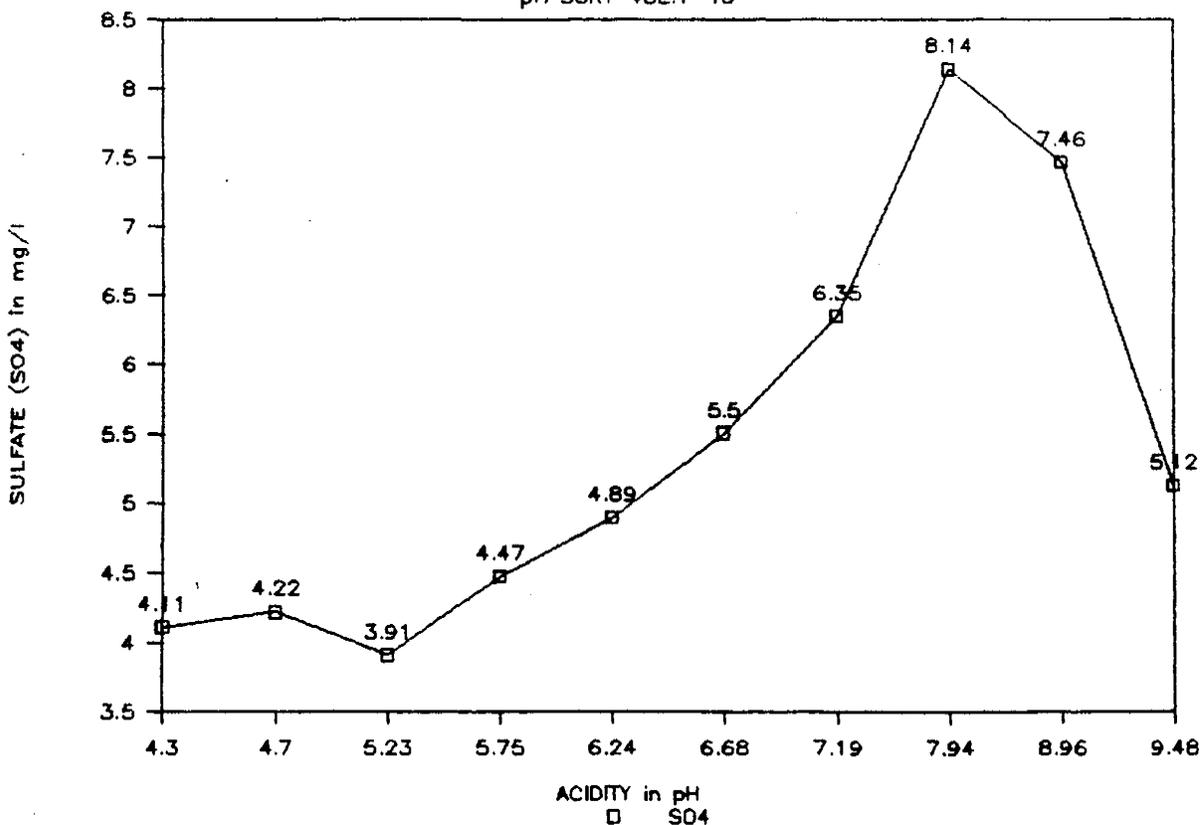
ADIRONDACK LAKE SURVEY GRAPH 1A

pH SORT-VOL.11-15-LAST



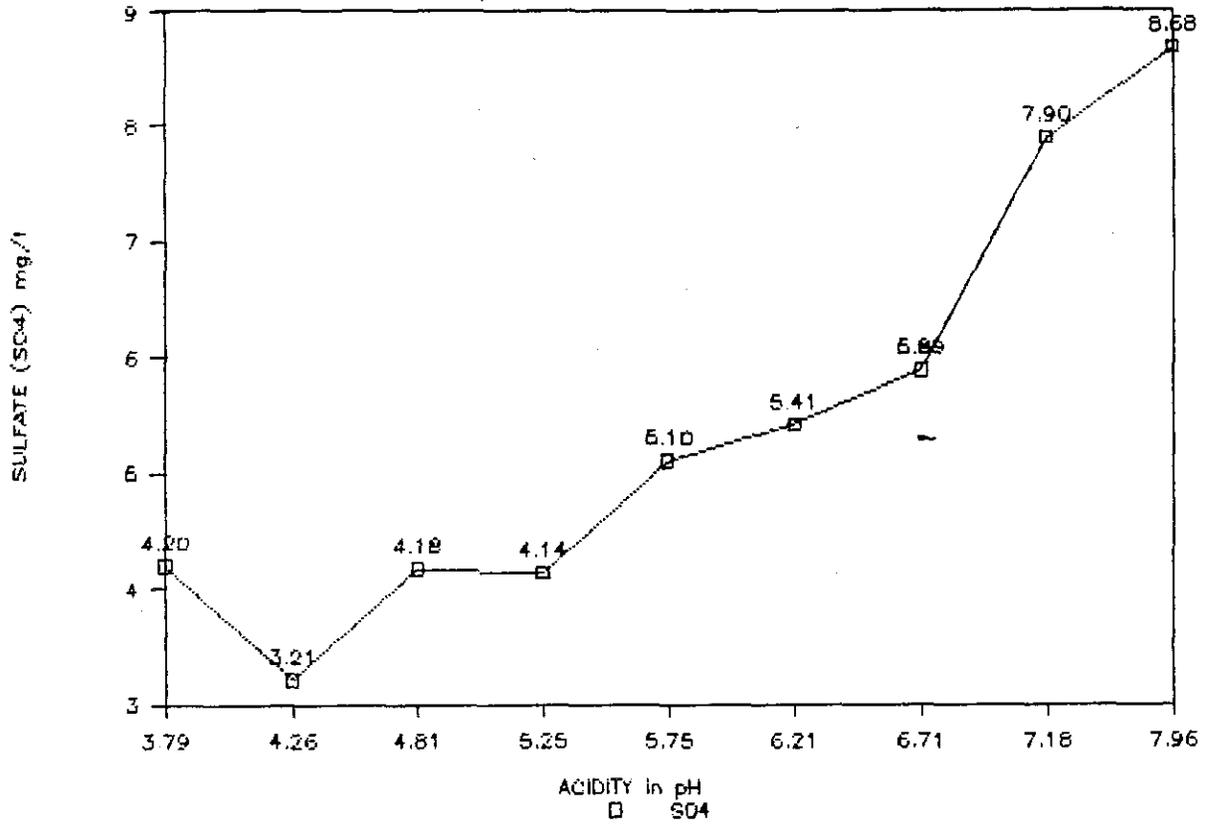
ADIRONDACK LAKE SURVEY GRAPH 1B

pH SORT-VOL.1-10



ADIRONDACK LAKE SURVEY GRAPH 1C

pH SORT-VOL.11-15 FIRST



SWEDISH LAKE DATA GRAPH 1C

pH VERSUS SO₄

