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Non-Point Pollution: The Remaining Challenges

by

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and

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Introduction

Mesdames, ladies and gentlemen. This morning, we have been asked to discuss what we see as the major misuses and challenges related to non-point pollution. Our remarks will hopefully serve as a starting point for your round table discussions later this morning. They are offered in a spirit of respect for the work completed by the Non-Point Task Force and by the many professionals active in the field.

We accept our assignment enthusiastically, though humbly. Neither of us is a full-time combatant in the non-point wars. We come to this assignment unencumbered by in-depth knowledge of the technical details of non-point pollution. Neither have we been intimately involved in previous

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control efforts. We suggest that perhaps these are advantages in this case--we are natural resources professionals who have a strong commitment to improved solutions to water quality problems of the Lakes but without any residual agency-inspired defensiveness about what has or has not happened in the past. We offer you a fresh perspective, and invite your contributions through discussions later this morning.

Phil Hale's experience is as an administrator of a regional government agency with a variety of resource management responsibilities, one of which is the reduction of soil erosion and subsequent non-point pollution loadings. Larry Libby is a resource economist who has worked on various resource policy issues, including non-point pollution, at the national, state and local levels.

As you know, non-point pollution remains a major stumbling block to achieving any enduring improvement in the quality of water in the Great Lakes and their feeding tributaries on both sides of the border. Responsible parties in both nations have acknowledged that. The PLUARG study, discussed later, is an effort to respond to that reality.

The bi-national non-point source task force has recently completed its appraisal of post-PLUARG developments. It is an impressive and substantive piece of work that deserves your careful reading. Copies are available

at this conference. We have studied the report and its supporting documents to help us today. We do not intend, however, to present a detailed review or critique of that effort. You can do that yourselves. Co-Chairmen of the project were Mr. Kent Fuller of the US EPA Great Lakes National Program Office, and Mr. Garth Bangay of the Ontario Region of Environment Canada, Technical leadership to the Task Force was provided by Husain Sadar from the IJC Regional Office in Windsor. They, and their dedicated Task Force members, deserve our sincere gratitude.

The purposes of this discussion are presented below. They are to:

1. Offer our assessment of the current situation with non-point abatement, based on our brief review of past actions and recent documents.

2. Identify what we see as the most significant issues and remaining problems, based on our interpretation of the evidence.

3. Offer recommendations and directions and actions for improving the situation.

As a final introductory comment, we applaud the Commission and staff for the structure of this year's annual meeting. A deliberate and genuine effort has been made to encourage interaction among participants. This is a

refreshing change from recent years. The heart of real policy involves this exchange of ideas in a supportive environment, going beyond any formal laws or rule changes that mark policy change. This significant policy contribution by the Commission should not be underestimated.

Recent Action

The issue of non-point pollution of the Great Lakes system became clearly identified to many resource managers in the basin with the signing of the Canada-United States Agreement on Water Quality on April 15, 1972. The agreement requested the International Joint Commission (IJC) to "conduct a study of pollution of the boundary waters of the Great Lakes system from agricultural, forestry and other land use activities."

Subsequently, the IJC established the International Reference Group on Pollution of the Great Lakes from Land Use Activities (PLUARG) to conduct the study. PLUARG undertook the most extensive study of the basin ever completed and following a six year exercise, drew several conclusions relating to the non point pollution of the Great Lakes.

PLUARG determined that one of the most serious lake wide pollutants affecting the southern Great Lakes was phosphorus and associated sediment. Intensive agriculture was identified as the major diffuse source contributor of phosphorus, and erosion stemming from crop production on fine textured soils and from large scale land developments were the main contributors of sediment.

On reflection, the PLUARG work still stands as the major milestone in identifying the non-point or diffuse source problems within the Great Lakes basin and more importantly, in setting out a strategy for dealing with these problems. The conclusions established and the proposed management strategy as contained in The Environmental Strategy for the Great Lakes System served to both establish priorities and management objectives, and in retrospect to establish a benchmark to measure the evolution of systems to identify and correct specific non-point problems. Any of us involved in this work could do well to refer back to this document and gauge our own activities against its challenge.

A few of the matters contained in the final PLUARG Report are worth repeating here. The task force noted that proper planning, appropriate institutional and fiscal arrangements, information transfer and education mechanisms, and possible regulations are critical to success of non-point abatement. As we will note later, these are questions which are still worthy of asking and answering.

Following the submission of the PLUARG final report, much discussion took place regarding appropriate future levels of phosphorus loads. In addition, Annex 3 to the Water Ouality Agreement was drafted by the parties in 1978 and was signed finally in late 1983.

In addition, in 1982 the Water Quality Board of the IJC established a Task Force to evaluate the progress of the jurisdications in controlling nutrients and other pollutants from non-point sources to meet the terms of the Great Lakes Water Quality Agreement of 1978.

The specific terms of reference for the task force were set out by the Water Quality Board and can be found in the Task Force Report to which we have already referred. Generally, it was charged with evaluating the effectiveness of non-point source control programs in reducing sediment and nutrient loads, identifying areas of the basin and contributing watersheds where there are significant non-point pollution contributions and identifying criteria for establishing priority management areas where remedial measures will achieve the highest benefit-cost ratios. In addition, the task force was charged with priortizing matters which should be addressed in improving non-point source management including bio-availability, tributary monitoring, watershed modelling, sediment delivery and transport, and changes in agriculture which might effect non-point source loadings.

The tabling of the Task Force Report entitled Non-Point Source Pollution Abatement in the Great Lakes Basin, An Overview of Post-PLUARG Developments and the four consultant reports completed under the direction of the task force clearly demonstrate that the original PLUARG

recommendations have remained sound and that significant achievements have been accomplished in the eleven years since the signing of the first Water Quality Agreement.

The task force report is particularly useful in that it consciously follows the original PLUARG format and draws conclusions which relate directly to the equivalent PLUARG sections.

Specifically, the task force has provided a compendium of possible agricultural remedial measures assembled in a consistant readable and comparable format, a similar assessment of possible urban measures, an evaluation of both American and Canadian remedial programs and an assessment and reidentification of the PLUARG call for management strategies and appropriate institutional and financial arrangements. This is a formidable amount of information to be produced in a fourteen month period. The Task Force is to be complimented for this contribution. It is worthy of note that although posed from a different vantage, the Task Force recommendations clearly reiterate the notions originally espoused by PLUARG.

The completion of the task force report has set the stage for a series of decisions regarding non-point pollution and its controls. The need has again been established, the appropriate remedial measures evaluated and the benchmarks identified for both parties at the Federal and State/Provincial levels. What is now left is to assess implementation of many of the recommendations of the Task Force Report in the local government unit context. It is necessary to spend some time pursuing some of the issues

which will effect future direction in non-point pollution control in the local context for it is here that the work will be completed, credibility established or destroyed and the battle won or lost. Where are we now in terms of implementation and more importantly, where should we be heading in the next few years?

Remaining Issues

To this point in the presentation we have attempted to identify the work completed at the research and policy level, which has been completed. It is of high quality, well thought out and by and large very implementable. But, so what? What is happening to this work when attempts are made to apply it at the local or farm level? Research is important, but it is not action. Following are a series of comments and perceptions as to the state of implementation of non-point source abatement in the basin. Each of these perceptions is arguable and we recognize that individual examples can be found to refute the points being made, but in general we hold the view that they are valid and worthy of discussion at your round table sessions later this morning. We concentrate on agricultural sources. Reports suggest that urban sources of non-point pollution are relatively unimportant in the Great Lakes Basin.

1. At present there exists a vast amount of technical information collected by a variety of agencies, related to a whole series of inter-related questions spread all over the Great Lakes Basin. It relates to the severity of the problems, its locations and the array of remedial measures available to combat it. The difficulty is that there is no systematic approach, as was developed through PLUARG, to generate consistent

research or provide technical information to the myriad actors involved with non-point source pollution abatement in the basin. Although a Conservation Tillage Information Centre has been formed as an information clearing house this is but a first step in organizing information dissemination on non-point. The issue here is one of improved technology transfer to promote greater efficiency in expenditure of both public and private dollars. It is also of worthy note that this initiative was first undertaken by the National Association of Soil and Water Conservation Districts comprised of locally motivated political institutions. This problem is further aggravated by the number and complexity of agencies involved in trying to implement a non-point abatement program. The Task Force Report clearly identifies some of the problems this creates. Competition among delivery agents can be confusing to the client group and is inefficient use and wasteful of public funds.

Here lies the conundrum. There is both a need to better organize the attack on the problem and at the same time ensure that the diversity of agency roles, perspectives and expertise is continued. This is a formidable task.

Currently agricultural production managers, water quality managers, soil conservationists and dredging agencies are all interested in either sediment or phosphorus pollution abatement. This competition both for attention and funds is counter-productive and confusing to the landowner and can influence the success of program delivery.

2. Most programs operating in the basin currently provide on demand subsidies to rural landowners who wish to modify their farming practices. As a result, funds are spread over a wide land area, but so thinly that it is very difficult to monitor any success rates in achieving program goals. The notable exception to this is the Accelerated Conservation Tillage Project funded by the U.S. Environmental Protection Agency in cooperation with USDA and state and local agencies.

In this case, a high priority area was identified as the result of extensive empirical evidence, funding was made available, cooperative efforts worked out between agencies, local political units, and individual landowners involved. The result is a concentrated program in thirty-one counties and anticipated expansion of the program in the future.

3. Because there are many different agencies involved in non-point abatement in the basin, there are several different criteria being used to measure the problem. Using one example, whereas PLUARG identified high priority contributing areas on the basis of impact on the Great Lakes, the Ontario Ministry of Agriculture and Food identified priority areas on the basis of the soils relationship to sustained crop production. Obviously the identified areas were quite different. Neither approach is incorrect, but one must feel some sympathy for the local agency administrator or landowner who wonders who to believe or whether all government programs are suspect anyway.

On-farm production and off-farm pollution are distinct consequences of erosion. But they result from the same farmer actions, and are mitigated by the same conservation practices. The issue, noted in the Task Force report, is that targeting of conservation funding differs depending on which goal has priority. The Soil Conservation Service has given little priority to non-point pollution in their preferred plan prepared under the Soil and Water Resource Conservation Act of 1977 (RCA). Spending priorities are supposed to be based on production impacts, with any water quality gains thrown in as a bonus. There are some special non-point targeting exercises (joint USDA-EPA efforts), but no real priority systems exist in accomplishing greatest possible non-point pollution reduction for dollars spent stopping erosion.

4. Although most non-point programs have been universally available emphasis has been on working with "innovators" or that small sector of the rural community which is willing to experiment with new land management practices. While this does provide obvious benefits in demonstrating new practices in rural areas, it is to some degree "preaching to the converted" on at least the very receptive. This group will adapt to new practices naturally, or more quickly than average managers and are often more affluent than the average and therefore more likely to take a risk. It is far easier for a well-to-do farmer to be a conserving farmer, than one who has little economic flexibility.

Traditionally it is assumed that the innovator's visibility in the community will result in transfer of altered management practices to neighbours and associates. A case can be made, though, that the information transfer in this manner is haphazard and slower than it might be if extension personnel were to concentrate on priority management areas and then work with all managers within it. Results could also be more fairly evaluated in that the new technology is being employed by those with a variety of management skills. The final point on this is that the innovator will likely adapt on his own anyway through his or her exposure to a variety of secondary sources. The one to one contact should come between the advisor and those who still need to be influenced.

5. Much of the discussion of non-point source pollution revolves around the question who should pay? As discussed previously, the issue is important to local landowners, water quality and quantity managers, agriculturalists and soil scientists, and the general public. This concept of multiple interest when applied to point source abatement resulted in extensive cost sharing programs wherein funds from a variety of levels and agencies of government were used to either subsidize or replace private sector contributions. The benefits derived were clearly seen to apply to society at large.

Similar cost-sharing has not taken place extensively to address non-point concerns. True, many demonstration programs have been jointly funded, but seldom has this resulted in long term program committments. Government agencies are at the very earliest stages of trying to sort out cost sharing. Until this happens at the state/provincial and federal levels, it will be very difficult to move beyond individual demonstration efforts. Several individual States have adopted their own sediment control ordinances, with guidance and moral support by federal agencies. A model State ordinance was prepared. The central issue here is what will happen to these inititives in the long run.

It is clear to us that one of the major conflicts in any discussion of cost sharing for diffuse source abatement programs will be attempting to apply programs universally to landowners at taxpayer expense. It seems reasonable that if the taxpayer is expected to fund such programs, then he or she is entitled to expect that these public funds are directed to the priority management areas where the expenditure will do the most good.

Related to this question is the matter of Who should do the targetting of priority areas? Obviously the criteria will have to be set at the senior government level and all of the effected agencies will have to negotiate the amount and their share of the subsidy. Without this, the several demonstration projects based on special purpose one shot funding mechanisms will wither on the vine. The impacts on the Great Lakes we are aware of and need say no more about here.

6. Another aspect of the present state of implementation is the large number of non-point abatement programs continuing at the local program or demonstration level. All of them are doing good work in educating rural landowners, providing research data and proving at the local level that a variety of agencies can cooperate in program delivery. But, many are duplicative and are providing the same answers to questions previously asked and previously answered. The need here is for greater leadership in the non-point program area. The effort of the Non-Point Task Force to give some attention to the range of management options in both the United States and Canada is a very important first stage of a more rationale basin wide delivery system. We submit that the present system, although well meaning and effective in some local jurisdictions, can be inefficient and duplicative, while results gained for the public dollars spent are dispursed and unmeasured. If we can leave you with only one point in all of this discussion, let it be this one. Local agencies are doing the best they can but are receiving inadequate and undirected funds, lack a clearing house for previous research and are often unaware of other programs further advanced, which might result in less need for their own research program. There is a need to bring order out of the present organizational chaos. We should at least facilitate exchange of success stories among those local units that are struggling to do an honest job.

7. At this point, we offer a few general thoughts as to the nature of the non-point problem.

Non-point pollution happens because of what farmers and other land users do or fail to do on the land. It seems obvious, then, that if we want less pollution, farmers have to do something differently. There is no mystery in that. Biological and chemical research can help clarify the consequences of failing to get the farmer to do things differently, but won't change the basic nature of the problem or its solution.

Why do farmers do what they do? Because they are reasonably rational, like the rest of us. They respond to the incentives they face, within the structure of rights and obligations that define land ownership. Their goals include making a living off the farm, maintaining some stability in their business and responding to the needs of their neighbors and community, in some combination. These goals are familiar to all of us. Farmers are no less sensitive or greedy or stubborn than are other people. But, it is their actions that affect non-point pollution, our reason for being here today.

Given that situation, there is no particular reason to expect farmers to act contrary to their own interests, at least not for long. And our experience has been that farmers learn more quickly than most people.

Thus, we are particularly unimpressed with the suggestion that appears throughout the non-point literature, including reports referred to today that education and demonstration will reduce non-point pollution. The implication is that we need to overcome the farmer's innate stubbornness and show him the way. If anything, education and demonstration will discourage private action, as farmers see that most of the measurable impacts occur off the farm and that their remedial actions are virtually indistinguishable from those of their neighbours. They have little separable or distinct stake in reducing non-point pollution beyond their sense of community or sense of responsibility. Sure, we can try to shame them into concern for non-point pollution, but real policy can't be sustained by guilt. Our point is that farmers and other land users are behaving logically and predictably when they permit erosion that has non-point impacts.

We have reasonably good information on the technology of erosion abatement. Practices are well tested. The real challenge is getting the farmer's attention. That is what implementation is all about. Getting his or her attention means adjusting the choices, opportunities, rights or obligations that define agricultural practice. Nothing short of that will reduce non-point pollution.

8. Governmental Organization. Fragmentation of government effort has been discussed in several documents, and in our presentation today. It is certainly true that we should reduce the public cost of delivering non-point policy and a greater amount of national level structure is needed to give real coherence to non-point programs. But there is also strength in diversity of effort. It is probably fortunate that on the American side neither EPA nor USDA has had total control of the agenda. Neither can succeed in this area without the other. USDA knows farmers and agriculture; EPA knows water pollution. There will never be a completely comprehensive non-point abatement program with unanimity of purpose and clear lines of authority. Thank goodness for that. Perhaps non-point pollution requires non-point government.

Soil Conservation Districts are critical support links for erosion reduction in the U.S. A similar local delivery system such as might be offered by Conservation Authorities would be useful on the Canadian side. Districts are supported by local people in part because they keep their distance and independence from the Federal. Recent speeches in Washington suggested that the distinctions between Federal and local agencies are being sharpened even further.

The Extension Services has always been the step-child of the federal policy structure in the U.S., a point noted in the Task Force report. Extension is an education organization, funded by federal, state and local sources. It has no direct line responsibility within the USDA beaurocracy, a source of some frustration to many in the system. It has never responded particularly well to directives from policy makers at the top. Extension people are more likely to be the ones helping farmers see the full implications of reduced tillage agriculture rather than those trying to sell a particular tillage system to all farmers. It is important to recognize the different missions of parts of the delivery system and let each maintain its own identity.

9. There has been great enthusiasm--approaching euphoria--over conservation tillage. It seems to benefit everyone--farmer, downstream water user, consumer, taxpayer. Anything that good deserves to be canonized. While the benefits of reduced tillage are substantial, they do <u>not</u> go to everyone. Some soils and farm enterprise do not respond well to conservation tillage, as noted in PLUARG and Task Force reports. It is time for straight talk about conservation tillage -- to separate fact from hype. We <u>must</u> be candid with farmers about the potential for <u>them</u>.

Recommendations

The preceeding discussion has suggested that there are several tasks yet to be done. At this point in the discussion we offer our suggestions as to the most important remaining tasks. The points to be raised here are not revolutionary. They are very similar to those raised by PLUARG in 1978 and again by the Non-Point Task Force. Their order here does not suggest priority nor should it be considered exhaustive.

1. Targeted Research - There has been much research done at the very local and also at the field plot experimental level. This should be expanded to at least include small watershed basins and should be designed to measure the physical and economic performance of delivery programs--the techniques rather than practices of erosion reductions. Further public funds should support research into specific unanswered questions rather than addressing those questions which merely pique the curiosity of the researcher. Our goal is not full employment for researchers but answers to specific problem questions.

There is some ad hoc experimentation going on. Variable cost sharing and other ways to get the farmers attention are being tested but documentation necesary to really learn something beyond the immediate test farms. We should not be swayed by the old saw that all erosion money should be spent on practices, to "get it on the ground". Some ground is simply not worth protecting or unprotectable. And while erosion abatement is good, it must stand in line with other valid uses of public dollars.

2. Decisions on public financing of diffuse source pollution abatement should depend on the distribution of off farm impacts. Should the impacts be predominantely off-farm and regional in scope, then the responsibility for resolving the problem should be elevated to at least the regional and probably the basin level for policy formulation. Benefits of abatement are widely dispersed, so should be the cost of achieving it.

3. The question of marginal return to additional research spending should be addressed. Do we know enough about the erosion problem and its physical treatment? If so, priority should be given to funding implementation. If not, only those areas to which current answers are not available should be funded. Have we reached the point where it is now time to stop thinking about the problem, even in elaborate computer models, and time to start dealing with it in a large scale manner?

4. We need targeted education as well. The whole issue of education and consensus building should be addressed. Clearly, the more exposure the abatement problem receives, the more likely it will be addressed. Key target groups should be identified and major efforts made to impact on this subset of the community. This notion is consistent with the priority management area concept. Acknowledgement that the problem is more serious in some areas than others is the first step in ensuring that funds are directed to the priority area on an accelerated basis.

Within the priority management area, specific groups should be targetted for receiving education programs to ensure that those who are most involved get the message. To a large extent reducing erosion is a political process. Like yard work and house work, erosion abatement is not a one-shot deal. It is never over. PLUARG emphasized the process aspects of non-point pollution. This is an appropriate stance for the future.

Further, there must be genuine commitment to negotiating definable and achievable water quality standards. We know that this suggestion is anathema to many in the environmental community. The non-degradation language of water quality legislation is simply unachievable and even tough to define. We have to acknowledge this reality and accommodate by <u>facilitating</u> negotiation on acceptable water quality.

To a large extent, we are still stuck with the rhetoric of the non-degradation days. Regulatory agencies are going to be unable to take the heat--totally clean water is too costly, in dollars and in terms of what those dollars could have purchased elsewhere. The sad fact is that many of the 208 plans, geared to non-degradation, have no hope of implementation.

5. Finally we should not ignore policy options that require the farmer to reduce erosion and the pollutions it causes. Voluntarism is a prominent theme throughout PLUARG and the other reports. There is frequent reference to the need to increase the subsidy for good citizenship to facilitate abatement that is "economically feasible" to the farmer. That may not be good enough for non-point policy of the future. We suspect that there will be increasing pressure for government to recall the "right to erode" which farmers currently own. States have done so already. There are adequate precedents for more mandatory approaches that include both regulation and cross compliance which makes eligibility for income support programs contingent on reducing erosion.

Conclusion

The parties and the many agencies within their jurisdictions have made considerable progress in setting the stage for a well organized attack on the non-point source pollution problem. What is now needed is an appropriate policy framework assigning responsibilities, establishing targets, setting out adequate funds and developing appropriate monitoring and public education mechanisms. The technology is there as is the will to undertake the program. Leadership is critical. We conclude by reiterating, recommendation 1 from the Non-Point Source Task Force Report.

> The International Joint Commission must renew its request to immediately ask the Governments to respond to the PLUARG recommendations. Further, agencies and governments should develop and implement policies and funding mechanisms in support of an accelerated non-point program e.g. Ontario's Urban Drainage Policy and Guidelines and funding or the 10-year accelerated conservation tillage program identified in the LEWMS 1982. The Commission is also asked to act independently to plan and fund a greater effort to make governmental agencies and the public aware of the PLUARG recommendations and their individual responsibility in the management of the Great Lakes ecosystem.

We think this is sound advise no to be taken lightly.

SELECTED REFERENCES

1. Great Lakes Water Quality Agreement, 1978, Governments of Canada (Ottawa) and the United States of America, Washington.

2. Halcrow, Harold G, Heady, Earl O.L. and others, Melin L. ed. Soil Conservation Policies Institutions and Incentives Soil Conservation Society of America, Ankery, Iowa, 1982.

3. Holmes, Beatrice, Institutional Bases for Control of Non-Point Source Pollution Under the Clean Water Act: With Emphasis on Agricultural Non-Point Sources. Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, November 1979.

4. Hinkle, Maureen, "Problems with Conservation Tillage," Journal of Soil and Water Conservation, May-June 1983, Vol. 38, No. 3, pp. 201-206.

5. Miranowski, John, Michael J. Monson, James Shortle and Lee Zinser. Effect of Agricultural Land Use Practices on Stream Water Quality: Economic Analysis, Athens, Georgia: Environmental Research Laboratory, Environmental Protection Agency, September 1983.

6. Mueller, D., T.C. Daniel, R.C. Wendt, "Conservation Tillage: Best Management Practices for Non-point Runoff, "Environmental Management, Vol. 5, No. 1, pp.33-53.

7. Non-Point Source Control Task Force, Non-Point Source Pollution Abatement in the Great Lakes Basin: An Overrun of Post-PLUARG Developments. International Joint Commission, Windsor, Ontario, 1983.