

## Beyond Title IV: Perspectives on Additional Reductions

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I am going to touch on a couple of areas, in terms of Title IV and perspectives looking beyond Title IV. Then I am going to talk about some of the work that we have been doing to look at, evaluate, and project potential future scenarios and the implications of those. I am going to talk about using the existing mechanism and its continued and appropriate applicability for any future reductions.

Back in 1995, the EPA released the Acid Deposition Standard Feasibility Study report to Congress, where we for the first time introduced the notion that it looks like, based on improved models, we may not be able to see a recovery that we had hoped to see when the 1990 amendments were passed. This issue, this concept, hasn't just been created in the last year or two years.

Likewise, EPA issues other reports. The Great Waters report to Congress is another report that comes out every two years or three years, I believe. It is there, too, that we see among the issues associated with atmospheric depositions, the issue of nitrogen deposition and its impact on coastal eutrophication.

There are other numerous EPA documents that reinforce the need to continue to look at atmospheric deposition and project the impacts.

Other reports came out. The Ecological Society of America (ESA) report back in 1999, looking at the ecological response, documented many of the things that will be discussed here, basically that in some regions we are seeing recovery and in other regions we are not seeing recovery, and reductions under the Title IV program may not be sufficient.

Likewise, looking at the nitrogen deposition in coastal areas, ESA also released a report in 1997 that raised concerns whether further reductions in nitrogen might be necessary to address the coastal issue.

There is a General Accounting Office report that was recently mentioned, that came out just last year. It focused primarily on some of the most sensitive ecosystems, such as those in the Adirondacks, also pointing to the fact that the expectation for recovery may not be as apparent as we thought

it would be, and emphasizing nitrate levels in particular. Finally, you will hear about Hubbard Brook work that just was released.

So, we have here sort of an evolution of where we were and where we are right now. Basically, in 1990, the expectation was that a 50 percent reduction in SO<sub>2</sub> emissions from the utility sector was going to do something rather substantial, that the effect would be rather rapid in terms of surface water chemistry anyway, and it also documented, of course, that without doing anything, things would get worse.

In 1995, again, EPA and NAPAP started reflecting on the notion that actually our improved models are beginning to tell us that reductions may not be sufficient, but there are still some issues to be looked at. Now, by 2001, the results of long-term monitoring and the results of efforts like the Hubbard Brook work, as well as numerous other research studies that have been published are really solidifying the case that further reductions may, indeed, be necessary.

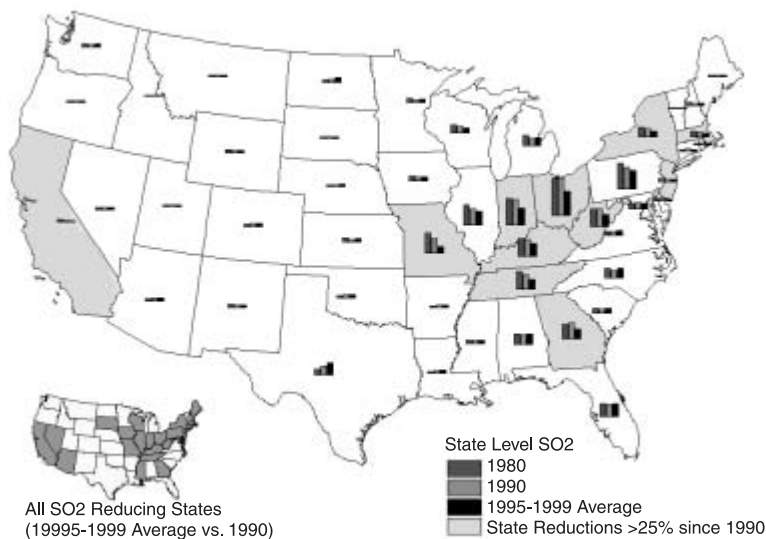
You heard from Brian McLean earlier today regarding the emissions reductions that we have seen under the acid rain program.

Basically, we have indeed seen significant emission reductions (Slide 1). We have not only seen them on the grand scale, but we have seen the largest reductions occur, in fact, in those highest emitting states. In the state of Ohio in particular, there was about a 40 percent reduction.

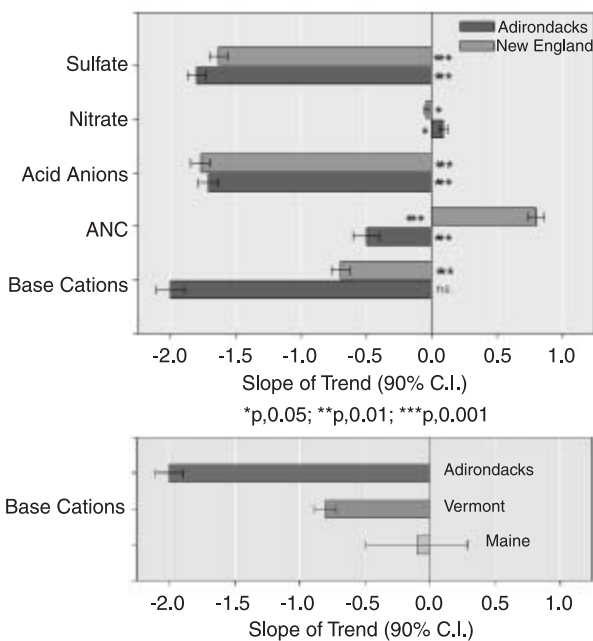
The documentation shows that recovery is, indeed, not happening yet in some of the most sensitive systems (Slide 2). It still reflects some of the older data from Maine. It also talks to the issue of the necessity for long-term surface water monitoring and, indeed, the agency is continuously looking at that issue. The office of research and development, that currently funds the surface water monitoring, is also involved.

We have looked at the issue of trading and the potential for hot spots. Obviously, this is a topic that was discussed and debated back in the 1980s. It comes up now and again during the 1990s and, indeed, most recently as well. Obviously, tracking

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Slide 1. Total utility SO<sub>2</sub>: 1980, 1990, 1995-1999 average.



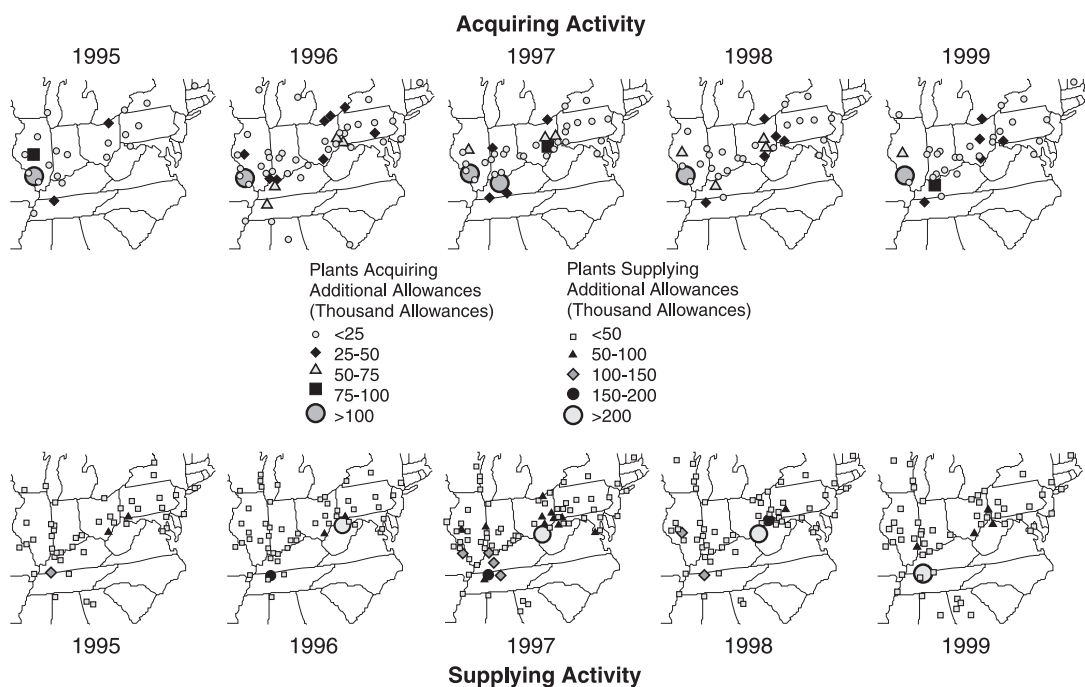
Slide 2. Regional acidification trend, LTM lakes in the Northeast.

this issue is critically important to us. If there are any hot spots, we want to know that and we want to understand why.

We have not seen any regional emission shifts based on trading; the overwhelming majority of allowances were retired in the same state in which they were allocated. There have not been any significant in-flows of emissions; indeed, the

greatest emission reductions have occurred in those high submitting states. Finally, most of the acquiring activity has been taking place in the Midwest, the same region that has seen the highest reductions (Slide 3).

This is basically the data that goes into those summary results, where we looked at the geographic mean center, sort of the epicenter, of



Slide 3. Geographic mean centers of SO<sub>2</sub> allowance trading activity 1995-1999; Plants acquiring allowances for compliance; beyond each year's allocation; plants supplying these allowances.

acquiring versus supplying. From 1995 through 1999 acquiring activity has remained fairly constant and, supplying activity has remained constant. They don't change a whole lot.

Let's move into looking beyond Title IV. What we have started to do is look at modeling projections, evaluating what would be potential impacts of further controls.

We have found significant benefits to human health and large-scale reductions in fine particles. We have looked at visibility improvements and we have seen some broad sulfur and nitrogen deposition reductions in sensitive ecosystems.

We have also looked back at what was done early on in NAPAP, looking at the source receptor maps. Indeed, they continue to show that transport is still important and broad regional large-scale implications are apparent. This is actually something that I begged our modelers to let me use today. It is not completed yet. Basically, if you look at just four of the acid sensitive regions in this country and you look at the air sheds that contribute NO<sub>x</sub> to the nitrogen deposition problem, the policy implication, of course, is that, while the goal

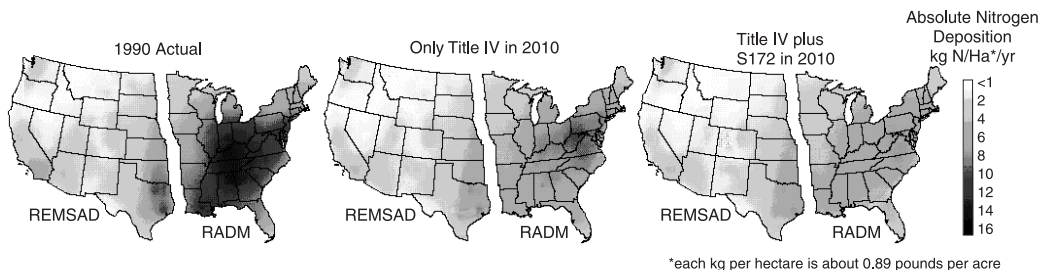
would be to protect a single ecosystem, it would more likely protect a series of ecosystems, not to mention improving visibility and other regional air pollution issues. You are looking at continued, broad, regional implications here.

Maps have been done for NO<sub>x</sub> air sheds for estuaries, in this case, Hudson River, Chesapeake, Pimlico and Altamaha.

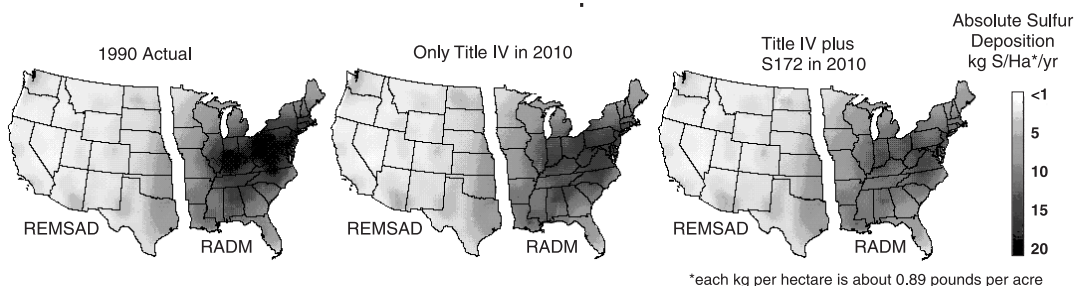
Again, the message here is this sort of dual utility, it documents the importance of nitrogen deposition to those particular estuaries, but on the broad level, the policy implication is that, if the design of any policy is to protect numerous sensitive areas and numerous environmental issues, you are looking at broad, regional issues.

In some of our analyses, we have gone beyond Title IV, what I am calling Title IV plus. An additional 50 percent reduction beyond Title IV and about a 60 percent reduction in NO<sub>x</sub> beyond Title IV shows some substantial improvement (Slide 4 and 5). Again, what is important here is not just that the reductions occur, but that the impact of the reductions are broad and not only affect sensitive ecosystems in the high elevation

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Slide 4. Absolute nitrogen deposition.



Slide 5. Absolute sulfur deposition.

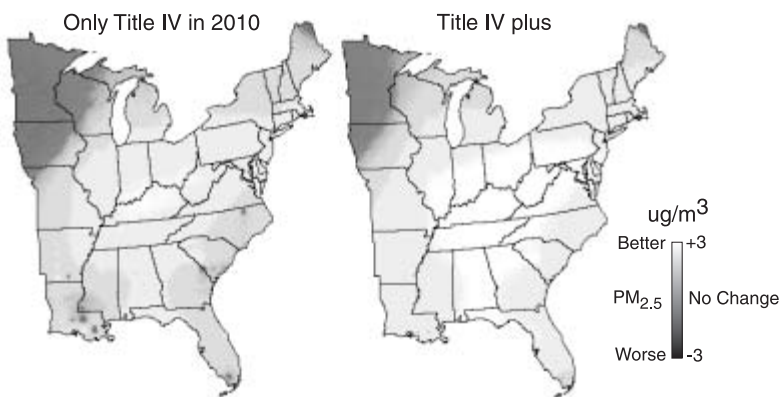
complex terrain but also the lower elevation coastal sensitive areas.

We are looking at improvements in annual PM, in visibility, and other areas (Slide 6). Again, there are broad implications in terms of changes that would come from further reductions.

We also have been looking at both the benefits as well as the costs of further reductions. What is interesting to note is total benefits broken out by state. The highest benefits come in the highest emitting states. States in the Ohio valley are, in

fact, achieving the greatest health benefits from the current program and will benefit from further reductions. In summary, as you have heard already and will continue to hear, there seems to be mounting evidence pointing in the direction that further reductions do seem to be necessary to get to the recovery stage envisioned by Title IV. There are substantial benefits, particularly when we look at PM and visibility, not to mention reduced sulfur deposition and nitrogen deposition.

As long as we are still dealing with an air



Slide 6. Improvements in annual  $PM_{2.5}$  provided by Title IV and further emissions reductions (from 1990 Base).

pollution problem that has long range implications and is regional in nature, it seems to be a good matter of faith to reconsider the goal, look at the cap, and continue to use a mechanism that seems to be addressing the problem in a fairly effective way. Thank you.

## QUESTIONS

MR. STACEY: Paul Stacey with the Connecticut Department of Environmental Protection. I think we have heard a common theme here of the need to be more comprehensive in our outlook particularly for nitrogen reductions.

You made a great case of why we have to look at multimedia approaches, air and water, to set these targets.

Yet, as I look at these various programs, they are really not providing a linkage to other programs that are also nitrogen reductions. Also, EPA's air/water interface plan really didn't gel in terms of setting direction.

What is the final end point? Do we need to manage for extra protection for ozone, for acid lakes? I wonder if you could respond to this by maybe giving the EPA's position on when this is going to gel, when we are going to get together and comprehensively come up with a solution as to what the final end point might be for nitrogen reduction to solve all these issues.

MS. BIRNBAUM: I think we are moving in that direction in terms of the EPA program and offices working in a joint manner, in ways that we have never worked before, the air program working with the water program, working with NOAA's estuary program, working with states.

We see the same thing happening in the states where they perhaps also suffer from the same sort of pipeline kind of approach with air people and water people.

I think both at the federal level and the state level perhaps as well, folks are starting to come together.

We are preparing reports and doing assessments that are more integrated in nature. I think you will hear from many people at EPA that there are reasons to reduce sulfur, and there are reasons to reduce nitrogen, a whole array of reasons.

While that is happening, I hope that we also then move into how can we look at strategies and emission reduction goals, collectively.

I think what is happening right now is that necessary first step. I think we are moving in the direction that you mentioned.

MR. WOODWORTH: Neil Woodworth, Adirondack Mountain Club. I was concerned earlier in this presentation when there was a statement that NAPAP is indicating that eastern forests outside New England were not showing quite the same level of damage.

I think the most recent studies indicate that forest soil changes are pretty serious and that, as more time goes on, we are going to find out that there will be a sharp increase in impact.

Have any of you changed your modeling or the method of assessment for forest soil chemistry changes?

MS. BIRNBAUM: Yes. One of the challenges, of course, is to keep up with the science and, as the science evolves, it is fundamentally important to make sure that the models that we use at EPA and anywhere in the government are really in step with where the science is.

We have made significant improvements and changes to both the surface water models as well as to the models that we have been using for analyses that look at forest soils.

That has been changing and it is primarily because one of our goals is to really keep up with the researchers and to ensure that new scientific evidence is conveyed into these estimates that we do at EPA.

We are certainly trying hard to make that happen. If you ever see that that is not happening, you should tell us.

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