

How does the MN P index relate to MPCA policies?

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We (MPCA) don't have very many instances where there is a direct regulatory connection with the P index. And we don't foresee moving to incorporate the P index further into regulations in the near future.

However, there are a couple of ways that the P index can be used in programs administered by the MPCA.

MPCA programs

A. Feedlot regulations

- 7020 rules
- Federal NPDES permits for CAFOs

B. Total Maximum Daily Loads (TMDLs)

- Impaired waters
- Federal regulations require TMDLs

The two main programs where the P index can be used are the feedlot regulations as described in the 7020 rules and the NPDES permit for CAFOs, and the TMDL program for impaired waters.

A. Feedlot rules and regulations

Where can the P index help meet rules?

1. Over 300 animal units with high soil test P
2. CAFOs applying manure in the winter

In the next 14 slides I will describe how the P index can be used in associated with the feedlot rules and regulations.

The two parts of the feedlot regulations where the P index is pertinent include..... (1 and 2 above)

I will first talk about the extremely high soil test P soils, and then move into a discussion of the winter application at CAFOs.

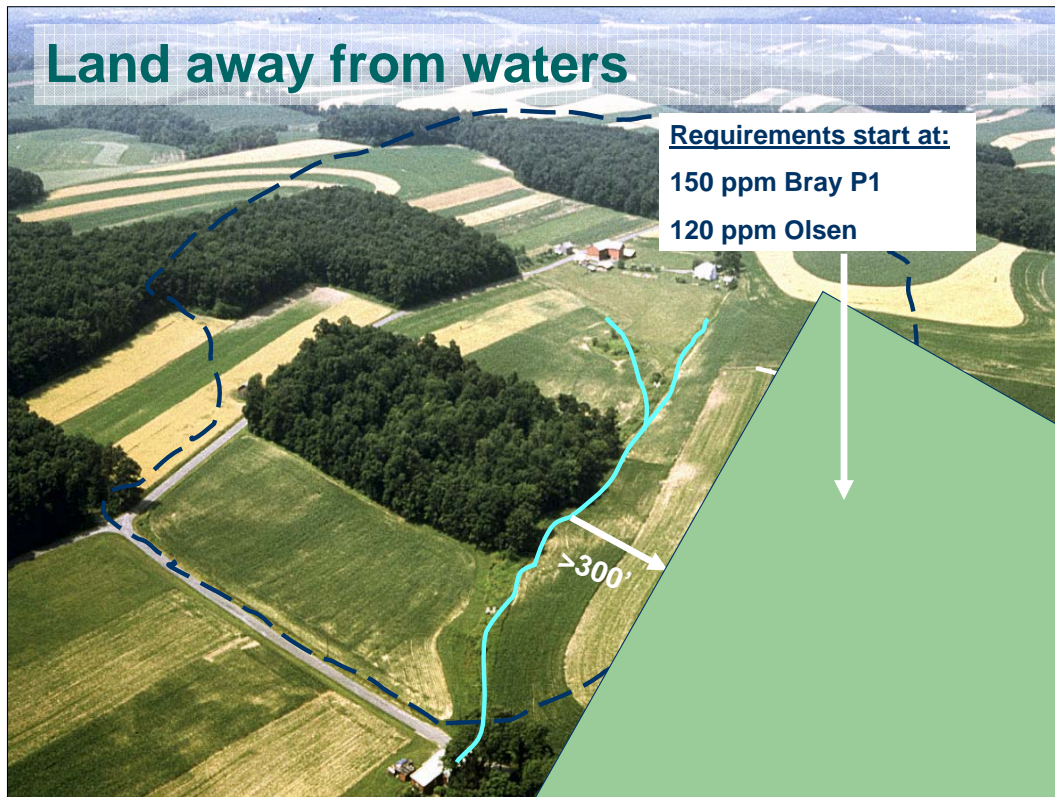
Feedlot regulations topic A.1

- **Over 300 Animal Units and high soil test P**

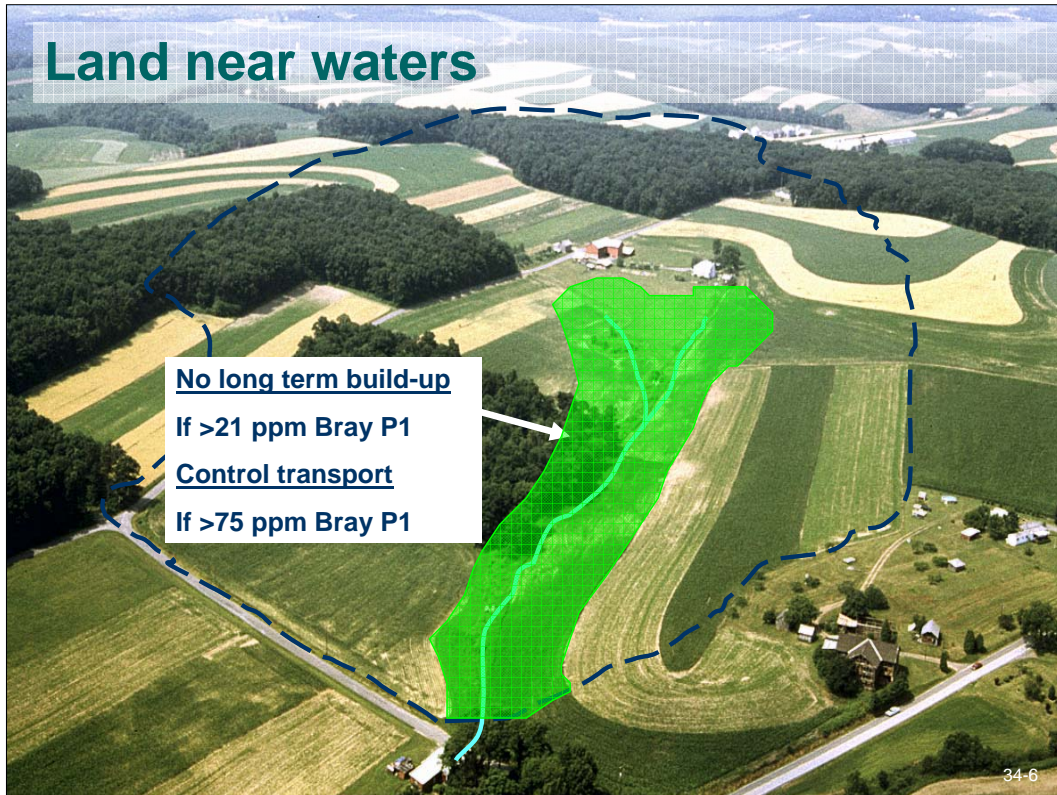


At farms with over 300 AU, manure can not be applied onto extremely high soil test P soils unless the producer can demonstrate that continued land application will not result in phosphorus transport to waters.

In the next few slides, I will discuss what we mean by extremely high soil test P soils, and the requirements for these high soil P test soils.

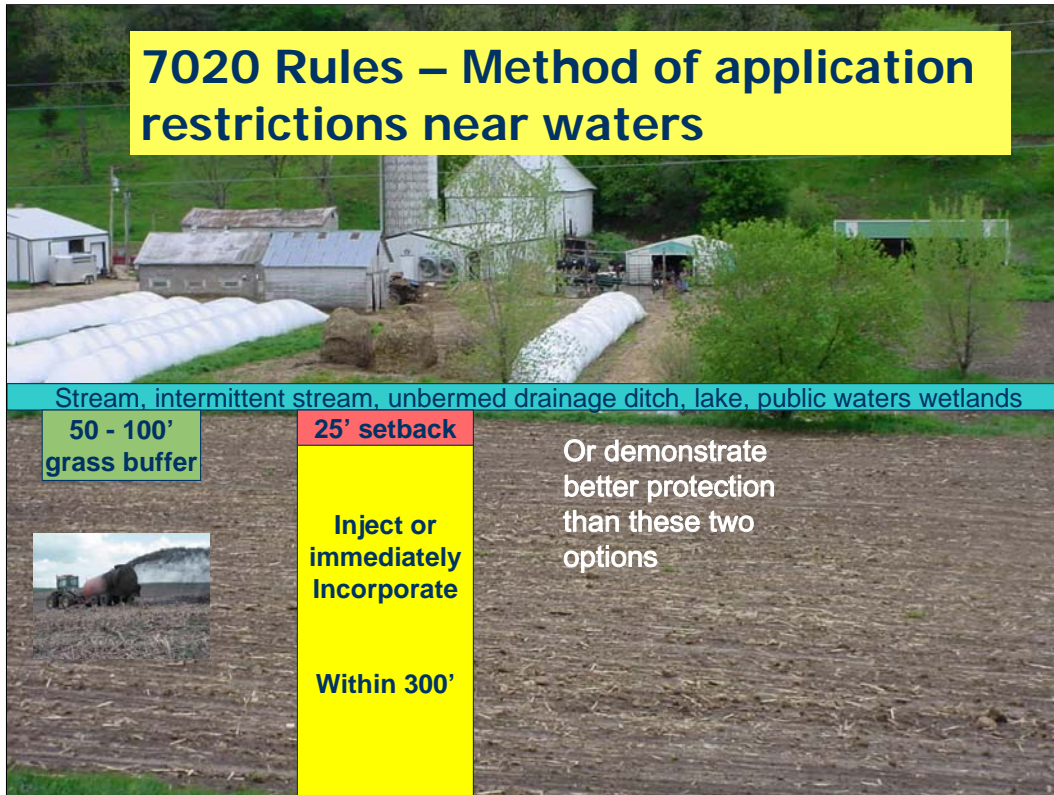


The thresholds shown on this slide show where regulations start on land away from waters (more than 300 feet from lakes, streams, intermittent streams, open tile intakes, public waters wetlands and drainage ditches without protective berms). This does **NOT** mean that manure is prohibited in all areas with soil test values exceeding these values. [It may be tempting for the audience to jump to that erroneous conclusion]



The green area highlights land within 300 feet of the intermittent stream. The thresholds for regulatory action begin at lower levels near waters.

7020 Rules – Method of application restrictions near waters



In addition to the phosphorus build-up restrictions, along waters there are some other manure application requirements for all manure spreading.

These are the setback options we currently have in 7020 rules for NONWINTER conditions. They pertain to all feedlots, not just CAFOs and permitted facilities.

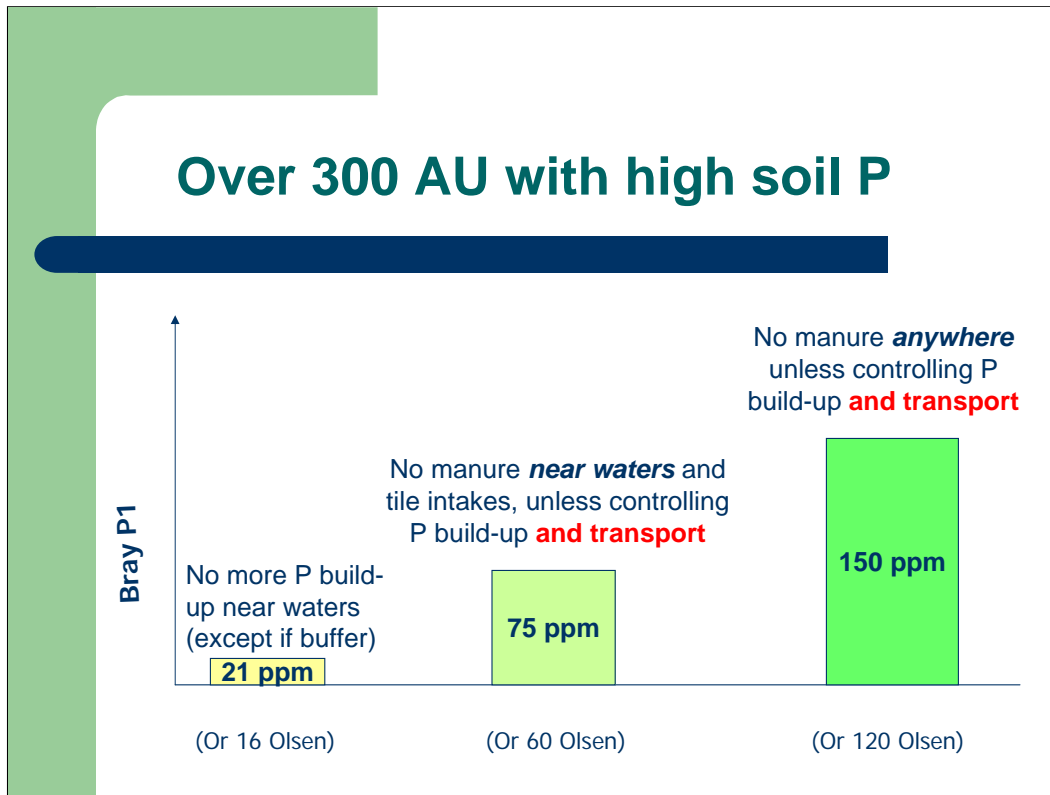
The grassed buffer can be used – 50 feet if an intermittent stream, wetland or drainage ditch. 100 feet if a lake or perennial stream.

25' setback and incorporate in the remaining 275 feet of the 300 foot special protection area (incorporate within 24 hours and prior to rainfall).

Whenever the term “setback” is used, we are referring to land that can not receive manure applications. However, it can be cropped and commercial fertilizers can be used, if needed. (note that manure has the potential to build soil P much faster than typical applications of commercial fertilizer; Also manure applied for the nitrogen nutrient, will additionally contribute to soil P, whether soil P is needed or not).

A third possibility is to use other measures proven through research or modeling based on research to provide equivalent or better protection to water quality.

Over 300 AU with high soil P



The requirements in the last couple of slides can be summarized in this slide. Where the red letters “and transport” are used, the P index can be one tool to show that transport is indeed being controlled.

Dealing with extremely high P soils

- Control soil P build-up
 - Reduced frequency/rate of application
 - Dietary controls to reduce P in manure
- Control off-site transport
 - Meet NRCS 590 standards**OR**
 - Low rating with phosphorus index



Extremely high P soils are those with over 75 ppm Bray P1 within 300 feet of waters or tile intakes and over 150 ppm Bray P1 away from waters (or the Olsen test equivalents).

Note that there are options to both control soil P build-up and to verify controlling off-site transport. The P index is one option to demonstrate that off site transport is being controlled.

MN NRCS 590 standard erosion limits

Land away from waters

Erosion limits (sheet and rill in tons/acre/year)
in order for manure to be applied

Soil Test P levels (ppm)	Grass buffer	Erosion limits
>150 Bray P1 >120 Olsen	Less than 100 feet	4 tons
>150 Bray P1 >120 Olsen	More than 100 feet	6 tons

Note: even if erosion limits are met, continued soil P build-up is not allowed

For those producers choosing to use NRCS standards, they can use this table for land away from waters. E.g. producers would need to demonstrate sheet and rill erosion rates less than 4 tons/acre if they are going to apply manure on soils with those P levels and less than 100 feet of a grassed buffer.

NRCS 590 standard erosion limits within 300 feet of waters

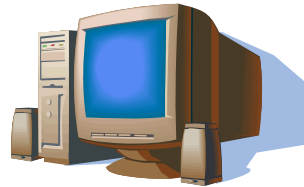
Soil Test P levels (ppm)	Grassed buffer	Erosion Limits
76-150 Bray P1 61-120 Olsen	More than 100 feet	6 tons
76-150 Bray P1 61-120 Olsen	Less than 100 feet	4 tons
>150 Bray P1 >120 Olsen	More than 100 feet	2 tons
>150 Bray P1 >120 Olsen	Less than 100 feet	0 tons (no manure)

Note: even if erosion limits are met, continued soil P build-up is not allowed

Here are the NRCS standards for within 300 feet of waters. Note that with a grass buffer of less than 100 feet, no manure is allowed within 300 feet if soil P exceeds 150 ppm Bray. However, if the feedlot is not involved as an NRCS cost share project, they could potentially apply manure and still meet MPCA requirements if they can get a low rating using the P index (next slide).

If not using NRCS tables, then use P index (when extremely high soil P)

- Obtain a **low** rating using the Minnesota Phosphorus Index



For those who prefer to use the P index rather than the NRCS 590 standards, they have that option (except for NRCS cost share projects). Again, this is for the Extremely high P soils and more than 300 AU.

As you can see, this P index is only one option, and it is really only a tool to demonstrate that continued applications can be continued in areas where applications would otherwise be prohibited.

Feedlot regulations – topic A-2

- **Winter-time manure spreading at CAFOs**



This is just a transition slide to move into a discussion of the second topic related to the feedlot regulations.

What if manure is to be applied during the winter at a CAFO?

- If **CAFO**, new Federal policy requires MPCA technical site evaluations
 - Low rating on **P index**
 - Approved sites are typically those with:
 - Very low rates
 - No nearby waters
 - Exceptional runoff control
 - Contour tillage



Many fields will not be approved for winter application at CAFOs.

The fields must meet two sets of criteria:

MPCA must conduct field evaluations on all fields where manure is to be spread during the winter. We can use EPA's equations to predict when BOD settles out to low enough levels to meet standards. In the short term, we are also approved for using the Phosphorus index. Fields with a low rating on the P index may also be approved. This evaluation is not needed if the fields are only used occasionally for winter spreading (e.g. emergencies), but it is required when manure application is planned on a regular basis in Dec., Jan., Feb., or March.

The more specific slope and setback requirements are described on the following slide.

Other winter-time application restrictions

- CAFOs must avoid:
 - Slopes >2% for liquids
 - Slopes >6% for solids
- No application within 300' of:
 - Lakes & public wetlands
 - Streams & intermit streams
 - Drainage ditches w/o berms
 - Open tile intakes
 - Sinkholes (upslope)



Nothing new regarding the setbacks since rules were revised in 2000. However, the slope restrictions are new and were incorporated into our NPDES permits for CAFOs in response to the change in regulations at the federal level.

One exception is that the slope restrictions do not apply for manure applications made prior to November 21. The purpose for this caveat is to prevent producers from getting in a bind, when an early freeze occurs.

People may ask about the future – do we intend to further restrict winter applications in the future.

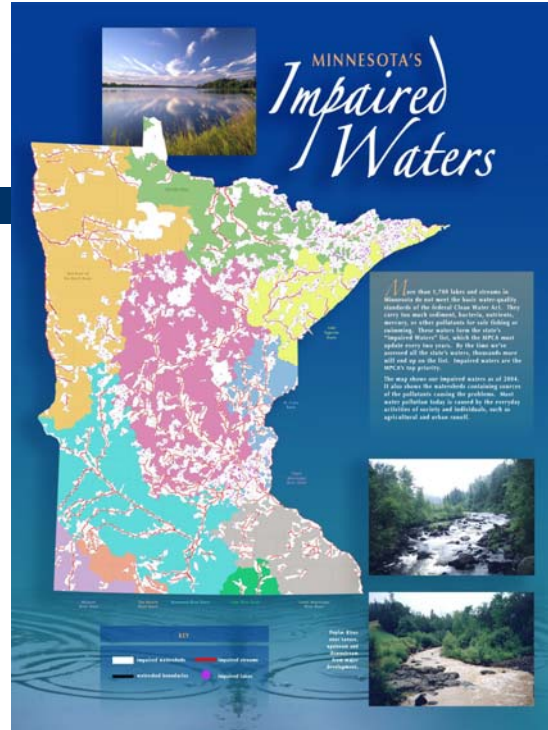
We do not have any plans for further restrictions – but we will be evaluating effects from winter application in the upper midwest. Last year, Wisconsin had over 40 reported problems from winter application, including fish kills, contaminated wells and sick families. At this time, we encourage producers to avoid winter application whenever possible.

Summary – Feedlot rules and P index

- Feedlot rules include many of the same key variables as P index
 - Method of application
 - Proximity to waters
 - Soil P levels
 - Timing (winter setbacks and restrictions)
- The P index can be used as a tool to determine where manure can still be applied, even if:
 - Extremely high soil test P levels
 - Winter applications at CAFOs

Topic B

TMDLS

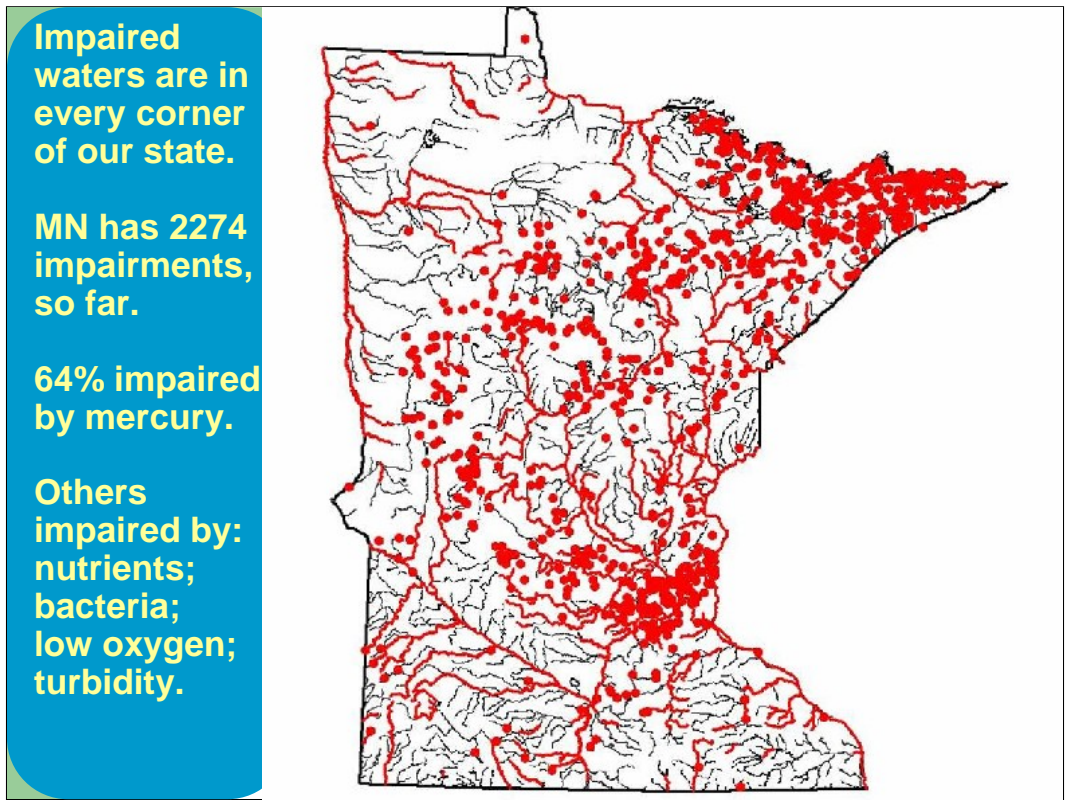


Transition slide into a discussion about potential use of the P index in TMDLs.

What is an impaired water?

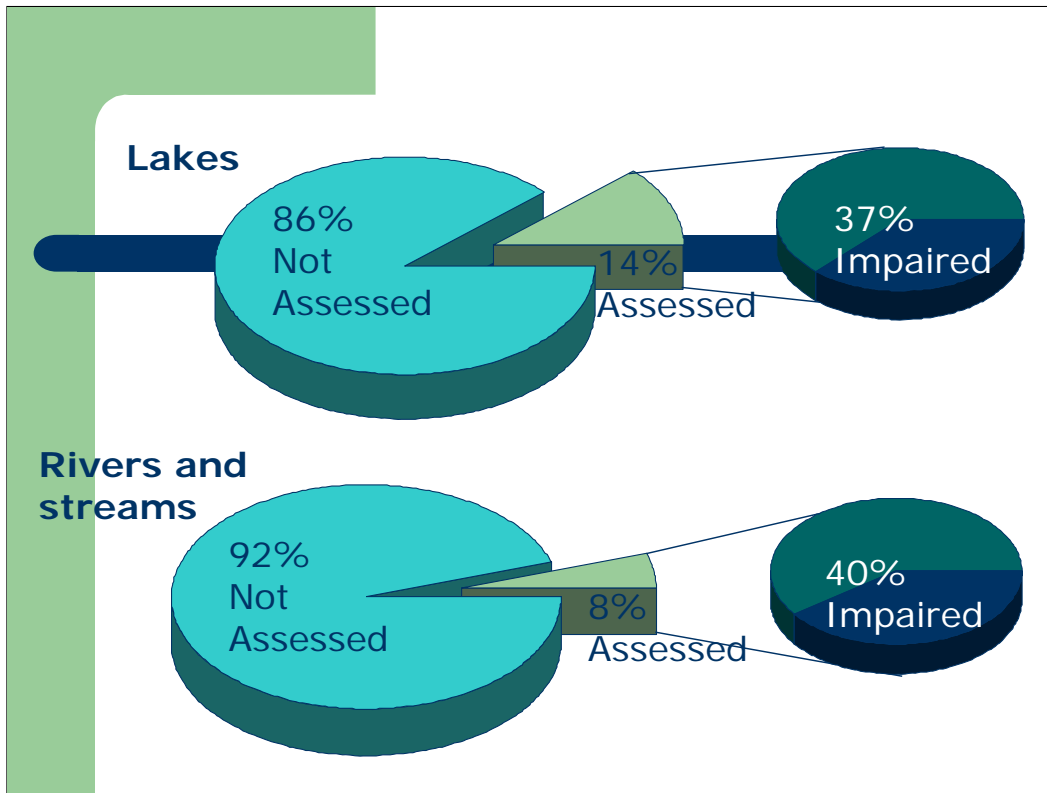
- Waters that do not meet water quality standards set to protect people, fish, other aquatic life, and recreation/aesthetics.





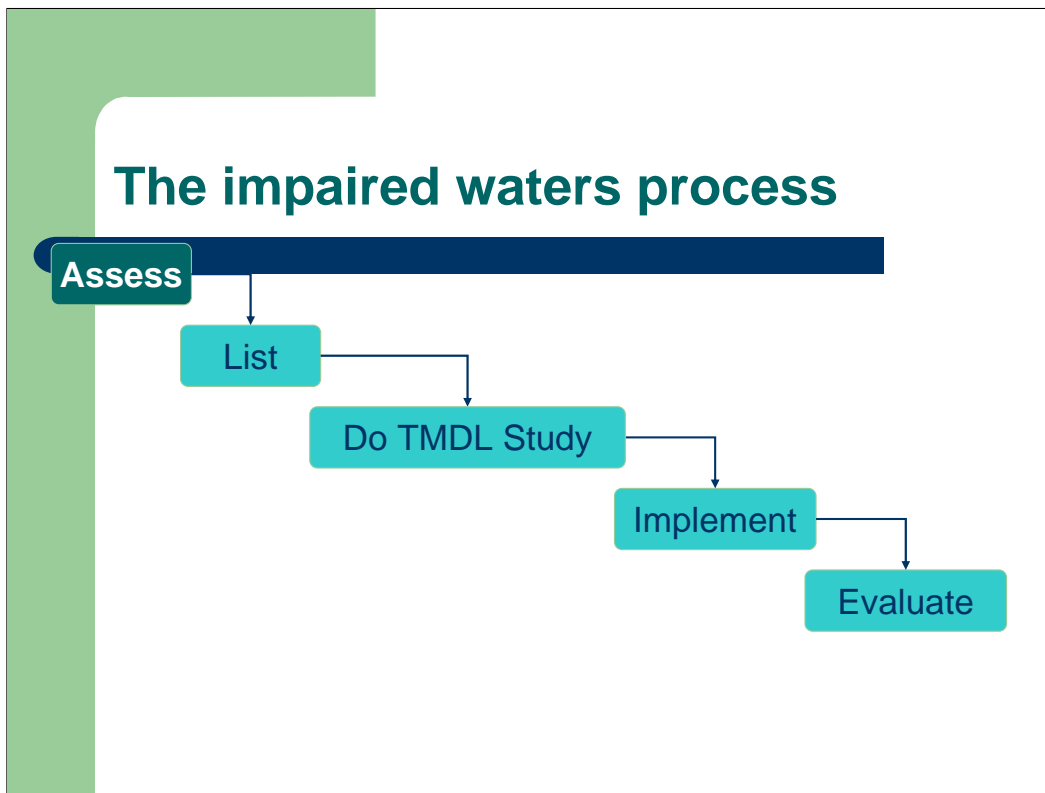
Note that many of the impairments are mercury.

We also have several low oxygen impairments, where phosphorus is a primary contributor to the low oxygen levels.



We are continuing to assess more and more waters. The majority have not yet been assessed for impairment status.

The impaired waters process



How do we identify and restore impaired waters?

1. Collect data and assess whether standards are being met to protect designated uses
2. List impaired waters
3. Conduct TMDL studies
4. Write implementation plan and conduct restoration activities
5. Re-assess water and de-list or develop new plan

What's a TMDL?

Total Maximum Daily Load process determines:

- Why waters are impaired
- Amount by which pollution must be reduced to meet water-quality standards
- Allocations (limits) for all contributing sources plus future growth

Potential uses of P index in impaired watersheds with cropland

1. Identify primary cropland management practices affecting phosphorus transport to waters
2. Compare relative effects of different management changes
3. Know where to focus efforts
 - Regulated practices – ensure rules are followed
 - Non-regulated – Incentives, education, etc.
4. Use as an education tool that stresses the importance of field management

Note that these are potential uses. We do not have definite plans for the use of the P index in impaired watersheds. It will likely have a role in both the TMDL plan development, and in the implementation of practices to reduce phosphorus transport.

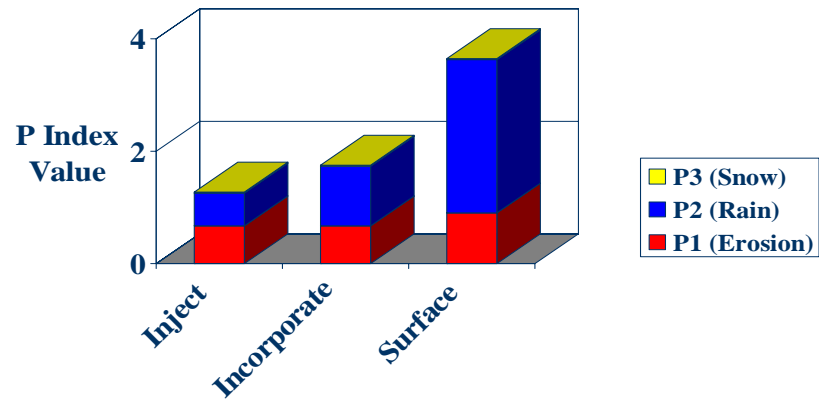
However, the P index will not be used in a regulatory way, except where already built into regulatory policy, as is minimally done in the feedlot policies.

Overall P Index Risk Levels

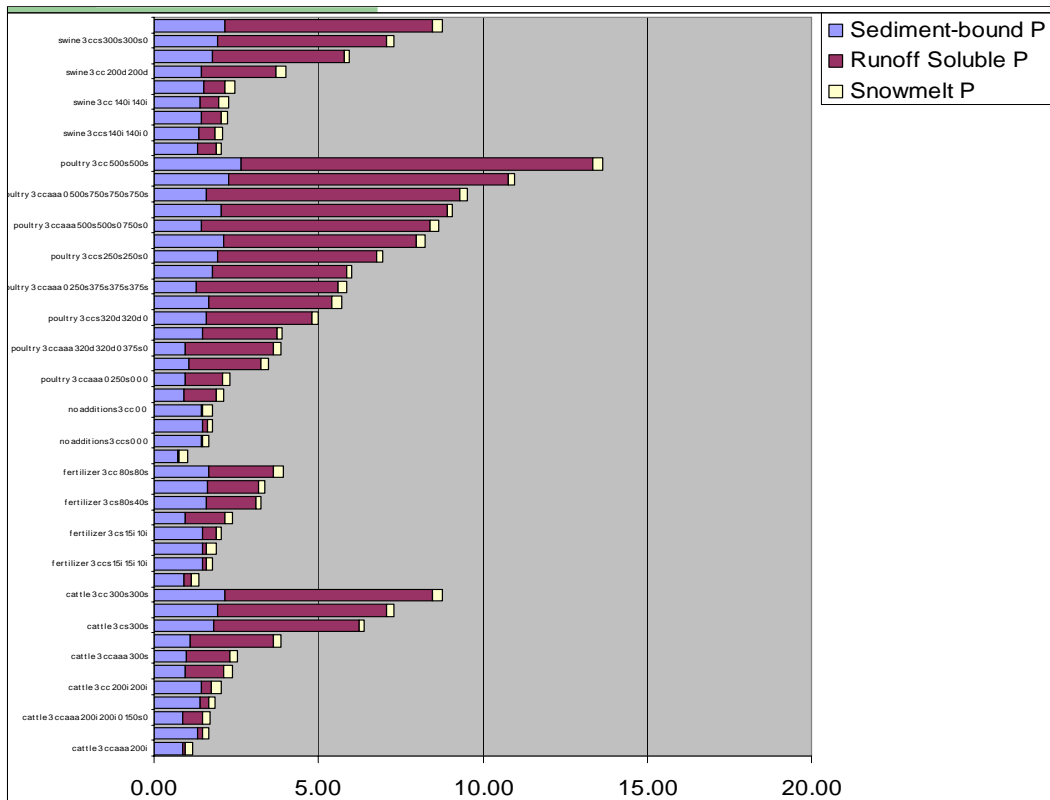
P Index Score	Relative Risk	Management Recommendations
0-1	Very Low	None
1-2	Low	Minor improvements
2-4	Medium	Small Improvements
4-6	High	Moderate Improvements
>6	Very High	Large Improvements

In the upcoming couple of slides, it will be helpful to review how the P index score relates to the relative risk and management recommendations. Note that anything over a 6 has a very high relative risk and large improvements will be recommended.

**Method of Manure Application:
(200 lb/ac P₂O₅ fall manure, 10 ppm Olsen,
3.71 t/ac/yr erosion)**

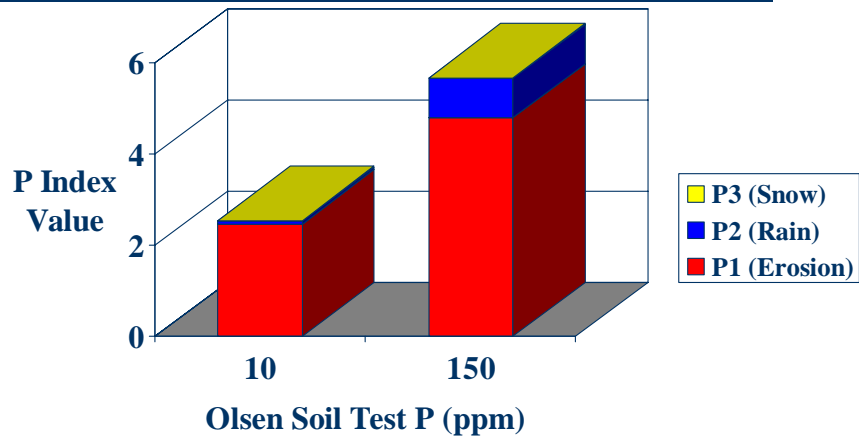


Here is one slide showing the effect of surface application vs. incorporation and injection.



This slide shows the relative effect of typical management of different types of manures. The long bars (e.g. above 5) are situations when manure was surface applied and not incorporated. These types of analyses can help the TMDL project manager identify types of practices that can make the most difference in reducing P losses in a given watershed.

Effect of Soil Test P Level: (no applied P, 10.41 t/ac/yr erosion)



While surface applications have a potential to have an effect, the long term build up of soil P also can have an effect.

Here is a slide that shows the relative effect of soil test P in a soil that has a high erosion rate.

Summary

- P index can be used with feedlot rules:
 - To justify continued manure spreading on soils with extremely high soil test P
 - To justify winter spreading at CAFOs
- P index has potential applications with TMDLs:
 - Support TMDL assessment (types of fields to focus modeling efforts)
 - Tool during implementation to evaluate which changes will reduce phosphorus the most
 - Still no definite plans for use with TMDLs