Developing a Plan for Trading or Adaptive Management

Proposed Phosphorus Legislation

- AB 680/SB 547 were recently passed by state senate and assembly to extend the timeline of adaptive management, allow adaptive management for TSS, and create a statewide variance process for phosphorus
- This webinar will solely address the water quality trading and adaptive management options
- If a statewide phosphorus variance option is established, this option will be discussed in other webinars/correspondence
- Questions on proposed legislation may be submitted to:

Russ Rasmussen
Deputy Water Division Administrator
russell.rasmussen@wisconsin.gov
(608) 267-7651

Training Opportunities

- Webinar 1. Overview
- Webinar 2. Finding and Quantifying Credits
- Webinar 3. Developing a Plan
- Webinar 4. Implementing and Verifying Offsets

ENVIRONMENTAL RESOURCES CENTER

WISCONSIN DEPT. OF NATURAL RESOURCES

UW Extension University of Wisconsin–Extension

Available Guidance

Adaptive Management Technical Handbook

Released: 01/07/2013

http://dnr.wi.gov/topic/SurfaceWater/AdaptiveManagement.html

(topic keyword: "adaptive management")

Implementing Water Quality Trading in WPDES Permits

Released: 08/21/2013

Water Quality Trading How-To Manual

Released: 09/09/2013

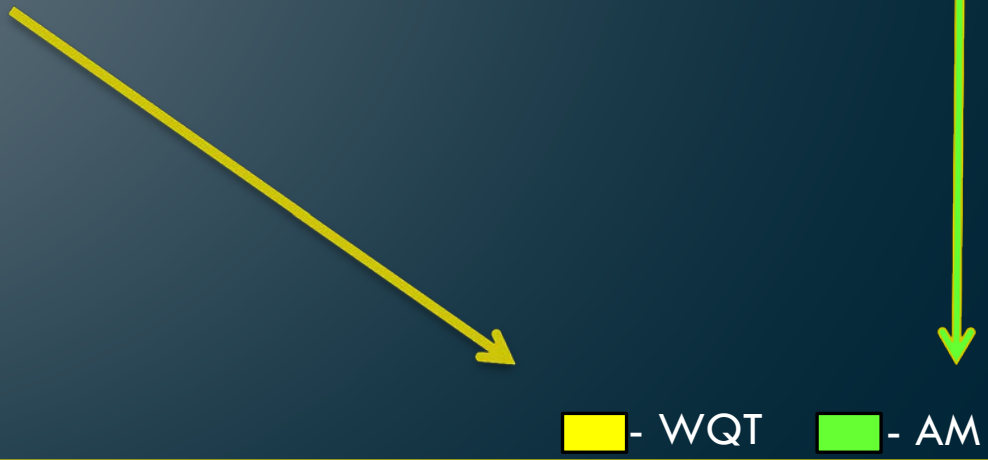
http://dnr.wi.gov/topic/SurfaceWater/WaterQualityTrading.html

(topic keyword: "water quality trading")

AM/WQT Plans Required by Permit

- AM Plan Purpose: Identify actions to be implemented that will achieve compliance with applicable in-stream phosphorus criteria.

- WQT Plan Purpose: Identify, calculate, and document credits to achieve compliance with water quality-based effluent limits.



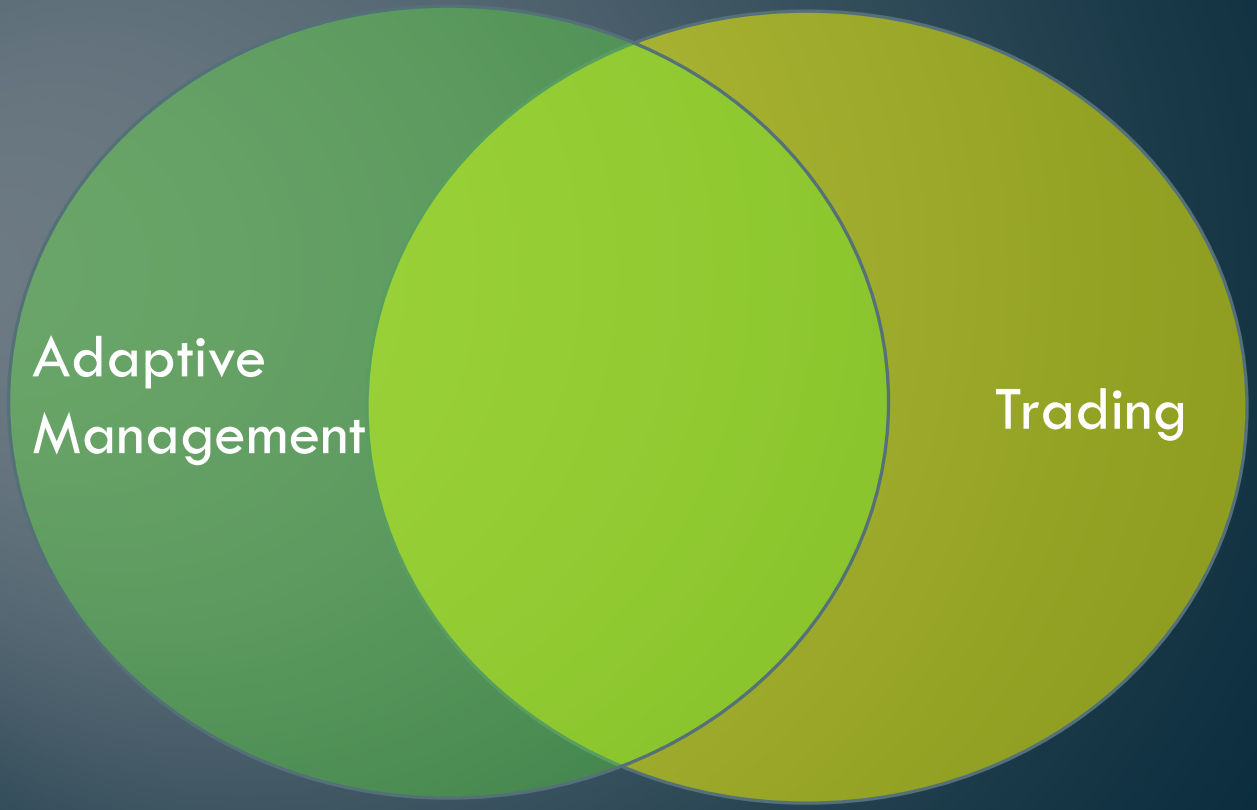
Comparing Adaptive Management & Trading

	Adaptive Management	Trading
Pollutants Covered	TP (and possibly TSS)	All pollutants except BCCs
End Goals	Attaining the water quality criteria	Compliance with WQBEL (offset load)
Calculated Reductions	No trade ratios	Trade ratios apply
Timing	Implemented throughout the permit term	Generating credits as they can be used
In-Stream Monitoring	Required	Not required
Level of Documentation Needed	General watershed information	Field-by-field documentation

See Webinars 1 & 2 for additional information.

- WQT - AM

Steps to Develop an Adaptive Management and Trading Plan are Not Mutually Exclusive



Responsibility

- Compliance Option for WPDES permit holder (i.e. 'Point Sources')

- WQT - AM

Timing

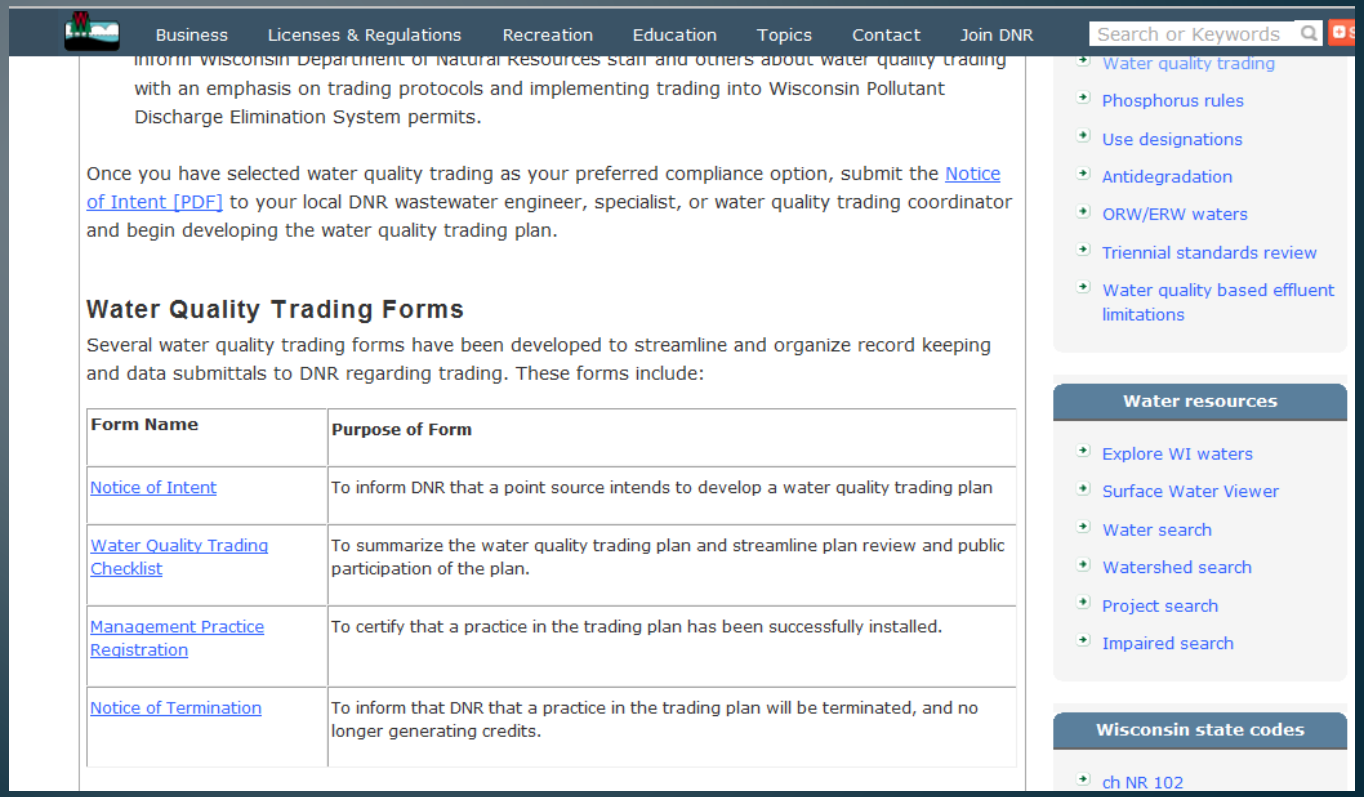
Permit Year	Step in Compliance Schedule
0	*Permit Reissued*
1	Operational Evaluation Report
2	Compliance alternatives, source reductions, and improvements status
3	Preliminary compliance alternatives plan
4	Final compliance alternatives plan
5	Progress report on plans & specifications
6+	Additional time to comply, if needed

← Submit NOI/ Preliminary Request Form

← Submit Plan & Checklist

Documentation

- Dnr.wi.gov, keyword “adaptive management” or “water quality trading”



Steps to Developing a Plan

1. Describe Point Source & Receiving Water
2. Calculate Reduction Needed
3. Identify Pollution Reduction Activities
4. Identify Where Reductions Will Occur
5. Quantify Expected Reductions
6. Creating Reasonable Assurances
7. Implementation Schedule & Milestones

Step 1: Describe the Point Source & Receiving Water

Plans should address:

1. Current effluent quality
2. Projected effluent quality, if optimization ongoing
3. Applicable effluent limits & stream criteria
4. Effluent variability
5. In-stream P concentration

Sources of Information:

- Limit memo/permit
- Surface Water Data Viewer
- Surface Water Integrated Monitoring System (SWIMS)
- Phosphorus Implementation Guidance

- WQT - AM

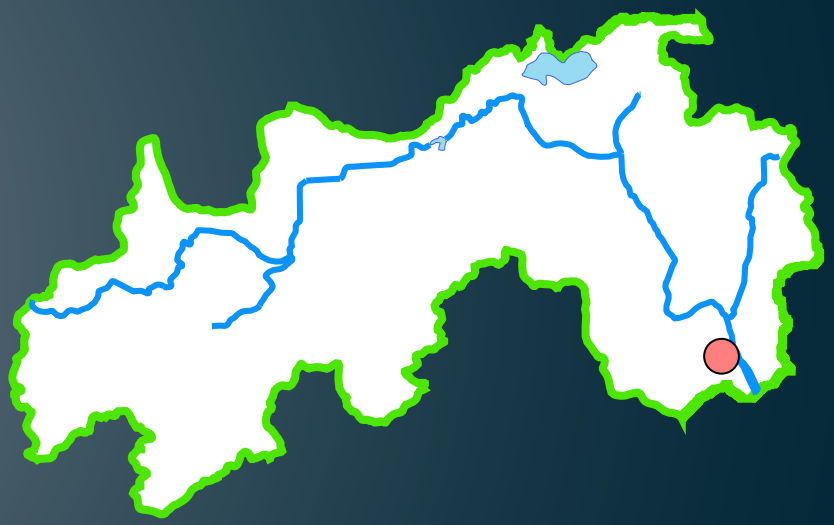
Things to Consider….

1. Identify the source of information used
2. Show your work, if necessary
3. Limit must be restrictive
   - Equal to criteria or TMDL-derived limits
4. Use median to calculate in-stream TP concentrations (NR 217.13)
5. Effluent variability may impact the number of credits that need to be generated monthly or seasonally

- WQT - AM

Example

- Point source 1 is located on Happy Creek
- Their current effluent quality is 0.4 mg/L (long-term average)
- Revised phosphorus WQBELs will take effect December 2021
  - 0.075 mg/L, expressed as a six-month average
  - 0.225 mg/L expressed as a monthly average
- Treatment optimization completed 2013
- The phosphorus concentration in Happy Creek is 0.131 mg/L



Step 2: Calculate Reduction Needed

Questions to address:

1. What is the P load to the receiving water from the point source?
2. What does the P load need to be to comply with the phosphorus criteria?
3. What is the difference between the effluent P load and the permit limit?

Sources of Information:

- TMDL report
- AM Handbook & WQT How-To Manual
- Limit memo/permit
- Surface Water Integrated Monitoring System (SWIMS)

- WQT - AM

Adaptive Management Example (Non-TMDL)

- Current P load (stream load + effluent load)
  - (Qs*Cs*8.34*365)+(Qe*Ce*8.34*365)
  - (3.5 MGD*0.131mg/L*8.34*365)+(0.5 MGD*0.4mg/L*8.34*365)
  - Current P load=~2000 lbs/yr
- Allowable P load
  - (Qs+Qe)*WQC*8.34*365
  - (3.5 MGD+0.5 MGD)*0.075 mg/L*8.34*365
  - Allowable load=~915 lbs/yr
- Compare the difference
  - **Needed Reduction= ~1,100 lbs/yr**

- WQT - AM

Trading Example (Non-TMDL)

- Calculate Current P Load
  - Qe*Ce*8.34*365
  - 0.5 MGD*0.4 mg/L*8.34*365
  - Current load= ~ 610 lbs/yr
- Calculate P Load Needed to Comply with WQBEL
  - Qe*WQBEL*8.34*365
  - 0.5 MGD*0.075mg/L*8.34*365
  - ~115 lbs/yr
- Compare the Difference
  - **Reduction Needed= ~500 lbs/yr**

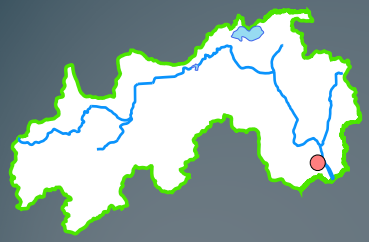
- WQT - AM

Step 3. Identify Pollution Reduction Activities

- Point sources
  - Applicable limits
    - 217.13 WQBEL, TMDL-derived WQBEL, both?
  - Proximity
- Agricultural sources
  - Conduct watershed inventory
  - Identify critical source areas
- Urban sources
  - Permitted vs. non-permitted MS4s
  - Current load vs. permit requirements

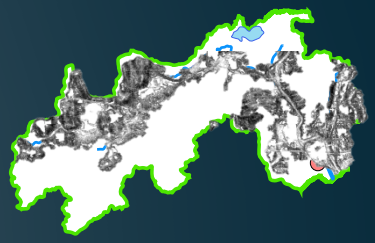
- WQT - AM

Finding Critical Source Areas



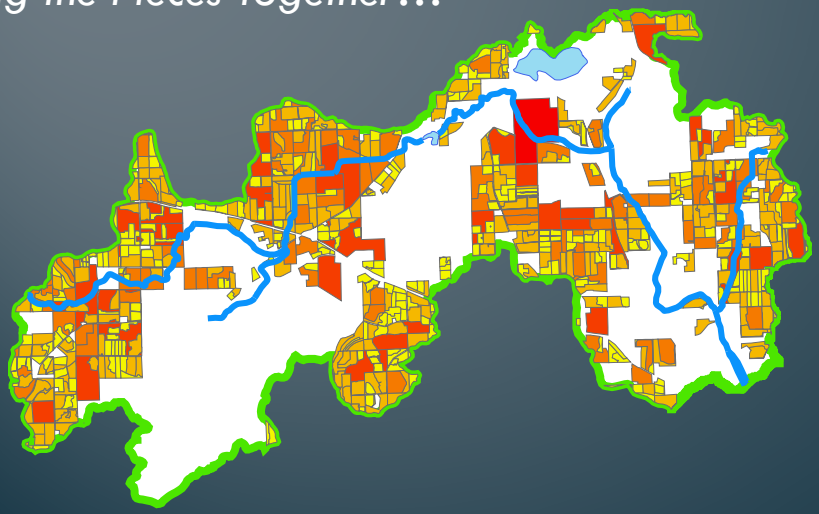
Define Contributing Area

Identify Highly Erodible Areas



Identify Areas of High Runoff Potential

Putting the Pieces Together…



- WQT - AM

Select Practices to Address Critical Source Areas

- Urban Practices
  - Examples: Wet detention pond, infiltration pond, porous pavement, etc.
- Cropping Practices
  - Examples: Residue management, contour stripcropping, cover crop, nutrient management
- Livestock Practices
  - Examples: Manure storage, barnyard runoff control, diversions, livestock fencing

- WQT - AM

Things to Consider…

1. Work with county LWCDs, landowners, municipal storm water staff, WWTF staff, etc. to select practices
2. Identify practices & their applicable technical standards
   - See Trade Ratio table
3. Describe how practices were selected
4. Verify assumptions made are reasonable
   - Field-scale verification, windshield surveys, other

Example: Barnyard Improvements

- WQT - AM

Creating Confidence & Flexibility

1. Create "margin of safety"
   - Install more practices than minimum requirement
   - Apply/increase trade ratio
   - Use P99 to calculate reduction instead of long-term average
2. Create back up plan if practice fails
3. Select practices with high degree of certainty
   - See trade ratio table
4. Other?

Where to specify:

- WQT & AM plan
- Agreements with landowner
  - Trade agreement

Example: Companion Crops

- WQT - AM

Available Resources

- County LWCDs
- TMDL reports
- Watershed plans
- Lake management plans
- WDNR potential index model (in development)
- Webinar 2- Finding and Quantifying Credits
- AM/WQT Guidance
- Other

- WQT - AM

Step 4: Identify Where Reductions Will Occur

Recommendation:

- Upstream of point of standards application
  - Either point of discharge or pour point of TMDL reach
- Within same HUC-12
- Willing participants
- Economically viability

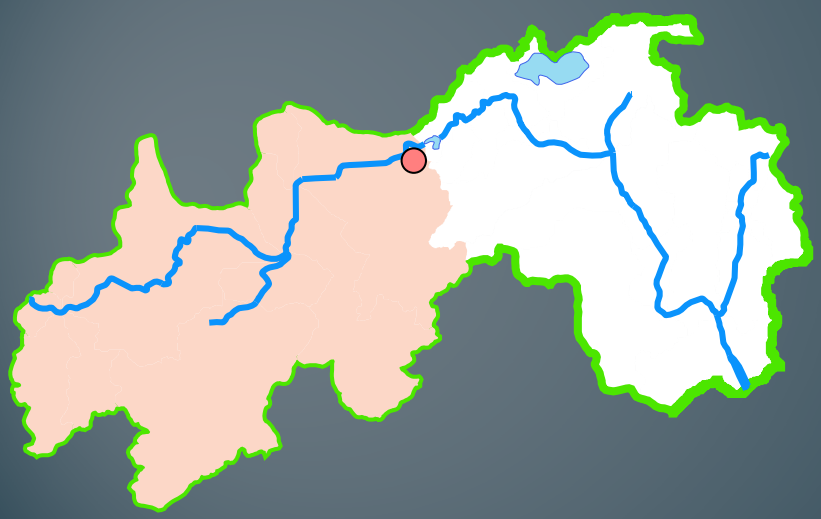
If recommendation not used:

1. Site-specific action area must be approved by WDNR
   - Should drain to TMDL reach or point of discharge
2. Downstream trade factor and/or delivery factor must be included in trade ratio calculation

- WQT - AM

Point of Standards Application

Non-TMDL Scenario



TMDL/Downstream Protection Scenario

- WQT - AM

Impacts to the trade ratio

Trade Ratio= (Delivery + Downstream + Equivalency + Uncertainty - Habitat Adjustment) : 1

- Delivery Factor = (1/SPARROW delivery fraction) – 1
- Downstream Factor:

Percent Difference between Buyer's Load and Total Load at Point of Discharge	Downstream Trade Ratio Factor
< 25%	0.1
25 - 50%	0.2
50 - 75%	0.4
75% >	0.8

- WQT - AM

Downstream Trading Example

- (Delivery + Downstream + Equivalency + Uncertainty - Habitat Adjustment):1

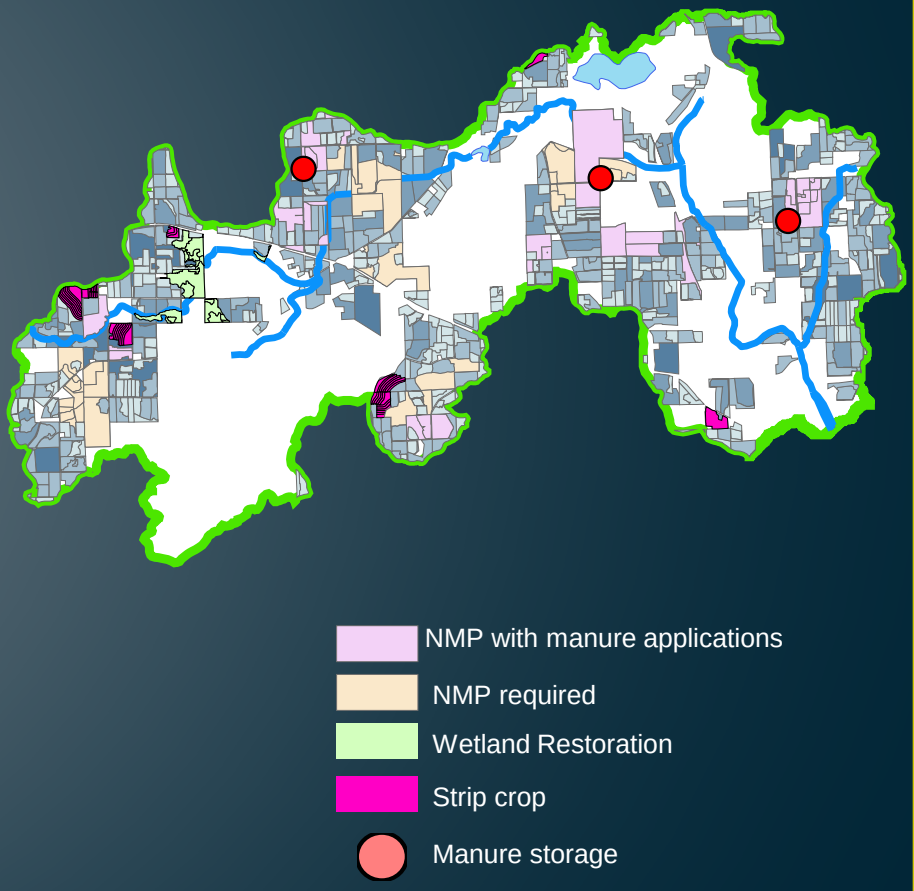
↓	↓	↓	↓	↓
0	0.2	0	1	0

Percent Difference Between Credit User's Load and Total Load	Downstream Trading Factor
< 25%	0.1
25 - 50%	0.2
50 - 75%	0.4
75% >	0.8

- WQT - AM

Plans should address…

- How were locations selected/how will locations be selected?
  - Critical source areas
  - Willing participants
  - Ease of practice installation/verification
  - Field-scale vs. field-scale or regional
- Management practice forms should be used
  - Land parcel ID required
  - Dnr.wi.gov, search "water quality trading"



Step 5. Quantifying Reductions

- Point sources:
  - Wastewater- effluent monitoring
  - Urban- modeling
- Nonpoint sources
  - Modeling
  - In-stream monitoring
- Sources of information:
  - TMDL reports
  - Webinar 2
  - Tools page
  - Trade ratio table
  - AM Handbook

- WQT - AM

Quantification Methods

Table 4. Management practices with recommended credit generation and use information.

Management Practice	Uncertainty Factor[1]	Applicable Technical Standard	Method for Calculating Pollutant Load Reductions	Notes
Agricultural Practices				
Whole Field Management: Requires an approved nutrient management plan, filter strips/buffer strips, grassed waterways, conservation or no till, and cover crops. Additional practices as deemed by NRCS or County Conservationist may be required to protect against mobilization and delivery of pollutants.	1	NRCS 590, 393, 332, 412, 345 329, 340 and 330	SNAP-Plus or equivalent model results compared to baseline	Requires an approved NRCS 590 nutrient management plan (NMP) that meets both the soil test-P and PI requirements. Requires a draw down strategy for nutrient concentrations that are above University of Wisconsin-Extension soil fertility recommendations. No application of manure, biosolids, or industrial wastes on snow covered or frozen ground or on fields with high groundwater or tile drainage. A crop or livestock producer engaged in a trade agreement must have all fields under an approved NMP, not just fields engaged in the trade.
Companion Crops (perennial vegetation)	1	NRCS 340	SNAP-Plus or equivalent model results compared to baseline Model as perennial cover	Companion crops must be established to provide continuous protection to soil surface and placed in support of Nutrient Management and supporting practices outlined below.
Conservation Easement	1	NRCS 327	SNAP-Plus or equivalent model results compared to baseline	Land in perennial vegetation.

Quantification Methods (cont.)

Model	Functional Scale	Calibration Recommended?	Types of BMPs	
APEX	Field to Watershed	Yes	• buffer strips • channel protection • cover crops • crop change • infiltration trench	• stream restoration • terraces • tillage • wetland creation
P-8	Urban Watersheds	Yes	• buffer strips • detention ponds • flow splitters	• infiltration basins • pipes • swale
SNAP-Plus	Field to Farm	No	• contour cropping • cover crop • crop change	• fertilizer • filter strips
STEPL	Field to Watershed	No	• alum treatment • bioretention • contour cropping • diversion • dry retention • fencing • filter strips • gully stabilization	• infiltration basin • swale • strip cropping • streambank stabilization • separation basin • terraces • waste storage facility
SWAT	Watershed	Yes	• contour cropping • cover crop • crop change • fertilizer	• filter strip • infiltration basin • land use conversion • tillage
WinSLAMM	Urban Watersheds	No	• catch basin cleaning • filter • impervious disconnection	• pond • street sweeping • swale

Example 1. Non-TMDL Scenario

- Buffer strip installed on a 40 acre field upstream of discharge within same HUC 12

- Current Load= 6 lbs/ac/yr
- Projected Load= 3 lbs/ac/yr
- Load Reduction= 3 lbs/ac/yr
- Total Load Reduction= 120 lbs/yr *(3 lbs/ac/yr * 40 ac)*

- Trade Ratio is 2:1
- Credit = 60 lbs/yr *(120/2)*

Note: Calculation must be made for each year in crop rotation.

- WQT - AM

Example 2. TMDL Scenario

- Buffer strip installed on a 40 acre field within same TMDL reach
- TMDL load reduction target is 30%
- Trade ratio is 2:1
- Credit threshold is 4.2 lbs/ac/yr *(6*(1-30%))*

Load Reduction = 120 lbs/yr

Credit for first 5 years ('interim credit')= 60 lbs/yr (120/2)

Current P Load — 240 lbs/yr *(Current PI=6lbs/a * 40 ac)*

Credit Threshold — 168 lbs/yr *(Threshold PI=4.2 * 40 ac)*

Long-term credit= 24 lbs/yr (48/2)

Projected P Load — 120 lbs/yr *(Projected PI=3 * 40 ac)*

Note: Calculation must be made for each year in crop rotation.

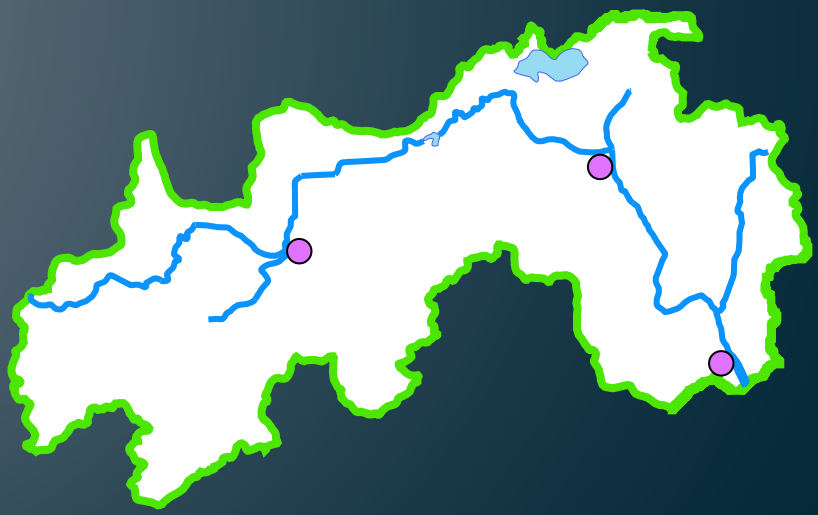
- WQT - AM

In-stream monitoring

- Who will collect TP data?
- Who will analyze these data?
- When and where will samples be collected?
- What quality assurance protocols will be followed?

- Minimum:
  - Biweekly, May-Oct
  - Pour point of action area

- Recommendation:
  - Biweekly, ice in-ice out
  - Multiple sample locations



Step 6. Provide Reasonable Assurances

- Water quality trading MUST result in water quality improvements
  - 283.84, Wis. State Stat.

- Adaptive management MUST achieve compliance with in-stream criteria after 10-15 years or shift to a different compliance option
  - NR 217.18, Wis. Adm. Code

- WQT - AM

Step 6. Reasonable Assurances

	Adaptive Management	Trading
Trade Ratio	Not required	Yes!
Credit Threshold	Not required	Yes!
In-Stream Monitoring	Yes!	Not required
Annual Reports	Yes!	Yes!
Minimum P Reduction	Yes!	Yes!
Level of Documentation Needed	General watershed information	Field-by-field documentation

- WQT - AM

Reasonable Assurances for AM

- Minimum P reduction by permit term

Example:

- Load reduction needed to achieve WQC= 1938 lbs/yr
- PS contribution=40%
- Minimum P reduction at end of permit term 1= 775 lbs/yr (1938 * 40%)
- Minimum P reduction at end of permit term 2= 1163 lbs/yr (1938– 775)

- In-stream monitoring

- Annual reports

- WQT - AM

Other Recommendations for AM

- Apply trade ratio, at least to minimum P reduction
- Apply credit threshold, at least to minimum P reduction
  - TMDL creates a plan to attain WQC
  - If PS does not meet TMDL-derived limits, NPS must reduce their load FURTHER than allocation
- Ensure reductions would "count" under trading
  - Utilize agreements and management practice registration forms

- WQT - AM

Reasonable Assurances for WQT

- Trade ratio
  - (Delivery + Downstream + Equivalency + Uncertainty - Habitat Adjustment) : 1
- Credit Threshold
- Creating an additional margin of safety
  - Install more practices than minimum requirement
  - Increase trade ratio
  - Use P99 in lieu of long-term average

- WQT - AM

Step 7. Implementation Schedule & Milestones

- Practice installation
- Verification
- Outreach & education, if applicable
- Compliance checks
- Annual reporting
- In-stream monitoring
- AM interim limit compliance

- WQT - AM

Keys for Trading

- Plan for permit term
- Limit must be offset at the end of the compliance schedule
  - 5+ years possible
- Credit must generated throughout the permit term to maintain compliance
  - Point source credits must be used in same month
  - Nonpoint credits must be used in same calendar year

- WQT - AM

Keys for Adaptive Management

- Plan for full project
  - 10-15 years
- Minimum P reductions must be attained
- In-stream monitoring timeline
- Reductions generated throughout the permit term towards water quality improvements & minimum P reduction goals

- WQT - AM

How to Make Plans Simpler

1. Reductions should be made upstream of point of standard application within HUC 12
2. Look for common-sense projects
   - Point source reductions
   - Nonpoint reductions on PS-owned land
   - Land spreading improvements
   - Already identified nonpoint projects
3. Select a small number of practices to create pollution reductions
4. Use cost-share agreement as a starting point
5. *In TMDL watershed-* long-term credits only?

- WQT - AM

Steps to Developing a Plan

1. Describe Point Source & Receiving Water
2. Calculate Reduction Needed
3. Identify Pollution Reduction Activities
4. Identify Where Reductions Will Occur
5. Quantify Expected Reductions
6. Creating Reasonable Assurances
7. Implementation Schedule & Milestones

Questions:

Adaptive Management Technical Handbook

Released: 01/07/2013

http://dnr.wi.gov/topic/SurfaceWater/AdaptiveManagement.html

(topic keyword: "adaptive management")

Implementing Water Quality Trading in WPDES Permits

Released: 08/21/2013

Water Quality Trading How-To Manual

Released: 09/09/2013

http://dnr.wi.gov/topic/SurfaceWater/WaterQualityTrading.html

(topic keyword: "water quality trading")