Technical Analysis of Water Quality Crediting Procedures for Manure Conversion: An Update

July 18, 2012

Project Objective

Review and synthesize the technical basis and uncertainties for quantifying the nutrient load change of manure conversion/treatment projects for use in a nutrient credit trading program

Process

Develop consensus report with a technical team.

K. Stephenson (VT), C. Abdalla (PSU), D. Beegle (PSU), G. Evanylo (VT), J. Ignosh (VT), J. McGrath (UMD), J.A. Ogejo (VT), J. Pease (VT), and T. Richard (PSU), A. Latane

Technical team will solicit feedback from Policy Advisory Group

B. Angstad, A. Brockenbrough, K. Hughes-Evans, B. McGee, S. Payne, H. Zygmont.

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Process: Update on Status

- Conceptual draft framework (Feb-March 2012)

- Feedback from policy advisory group (March 2012)

- Technical workgroup has been working past 4 months on a complete draft for advisory group's review.

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Overview

TMDL Consistent Baseline Load – Estimated Load w Manure Project

Load Reduction

where:

TMDL Consistent Baseline Load =
$PreAppLoad_b + FertLoad_b + ManureAppLoad_b$

Estimated Load w Manure Project =
$PreAppLoad_{mp} + FertLoad_{mp} + ManureAppLoad_{mp}$

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Overview

Report examines nutrient losses to the Bay from:

1) Storage, handling, and treatment of manure

2) Field application and runoff

Load Reduction =

$[(FertLoad_b - FertLoad_{mp}) + (ManureAppLoad_b - ManureAppLoad_{mp})]$

$+ (PreAppLoad_b - PreAppTLoad_{mp})$

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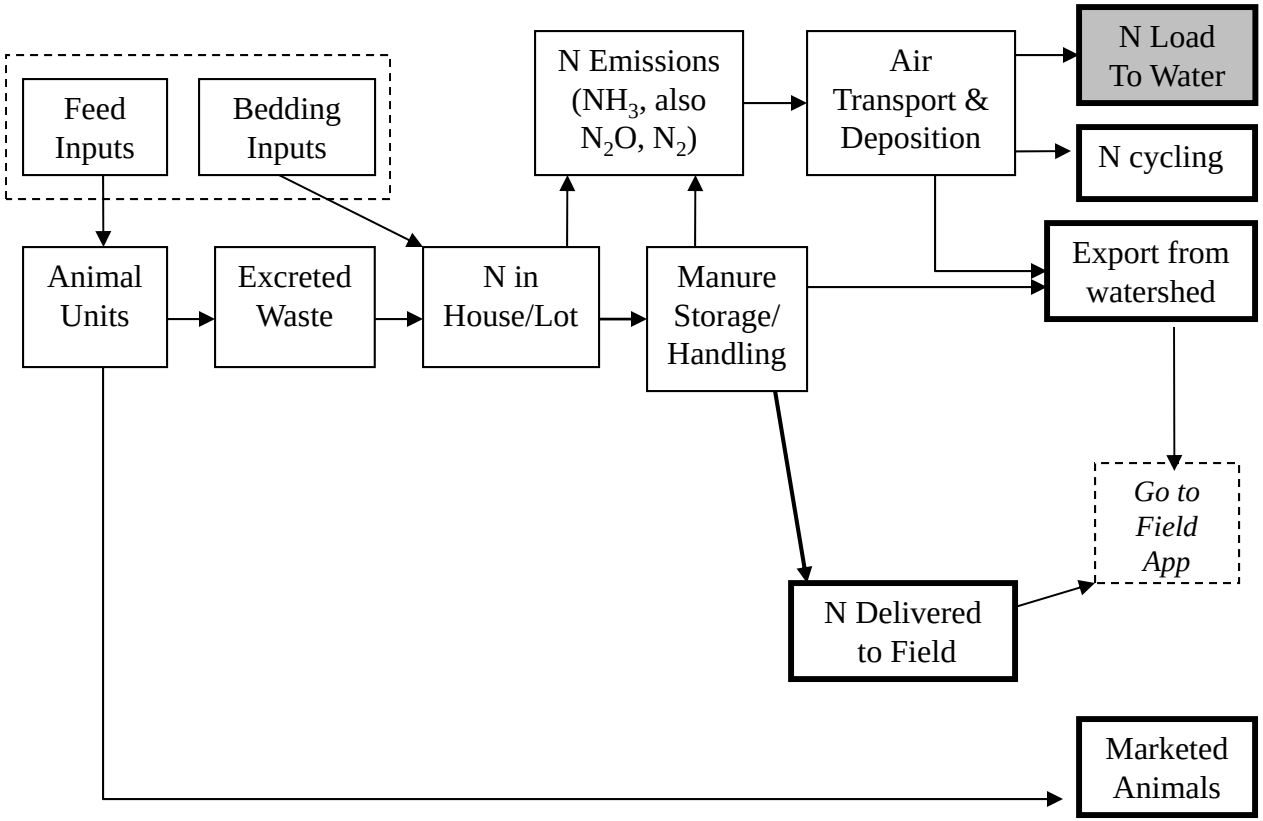
Nutrient Losses from Storage, Handling & Treatment (without project)



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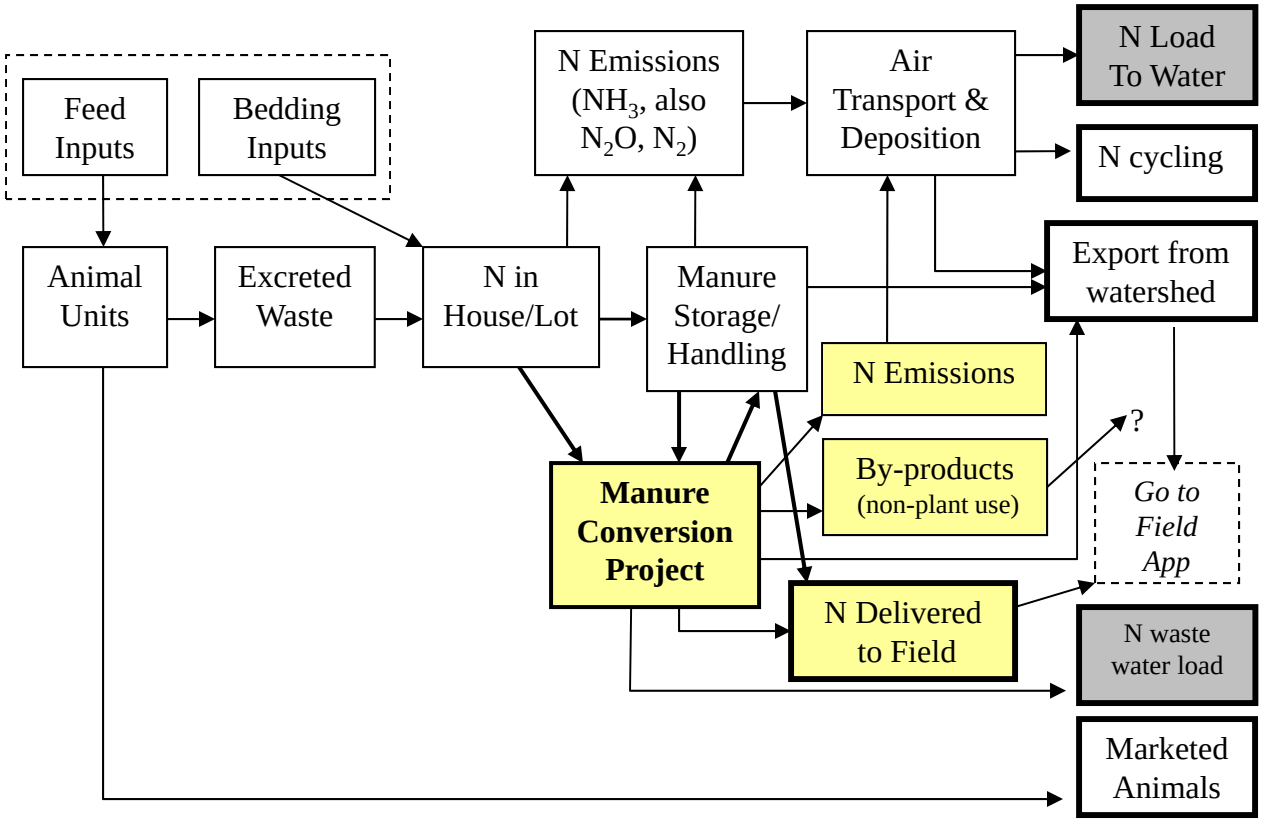
Nutrient Losses from Storage, Handling & Treatment (with project)



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Focus areas:
Storage, Handling & Treatment

Changes in NH_3 from handling and storage

Nitrogen emissions from thermal projects (combustion, gasification)

Changes in composition of nitrogen in manure from anaerobic digesters

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Field Application of Manure, Treated Manure, & Replacement Nutrients

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Overview of Field Application Nitrogen Losses

$(FertLoad_b - FertLoad_{mp}) + (ManureAppLoad_b – ManureAppLoad_{mp})$

(Change Manure Application, N lbs/ac) x (ac) x (N Manure Loss Rate, %)

\+ (Change Fert Application, N lbs/ac) x (ac) x (N Fert Loss Rate, %)

\+ (Change Biosolids Application, N lbs/ac) x (ac) x (N Biosolids Loss Rate, %)

Net Change in Nitrogen Losses

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Overview of Field Application Nitrogen Losses

(Change Manure Application, N lbs/ac) x (ac) x (N Manure Loss Rate, %)

+ (Change Fert Application, N lbs/ac) x (ac) x (N Fert Loss Rate, %)

+ (Change Biosolids Application, N lbs/ac) x (ac) x (N Biosolids Loss Rate, %)

Net Change in Nitrogen Losses

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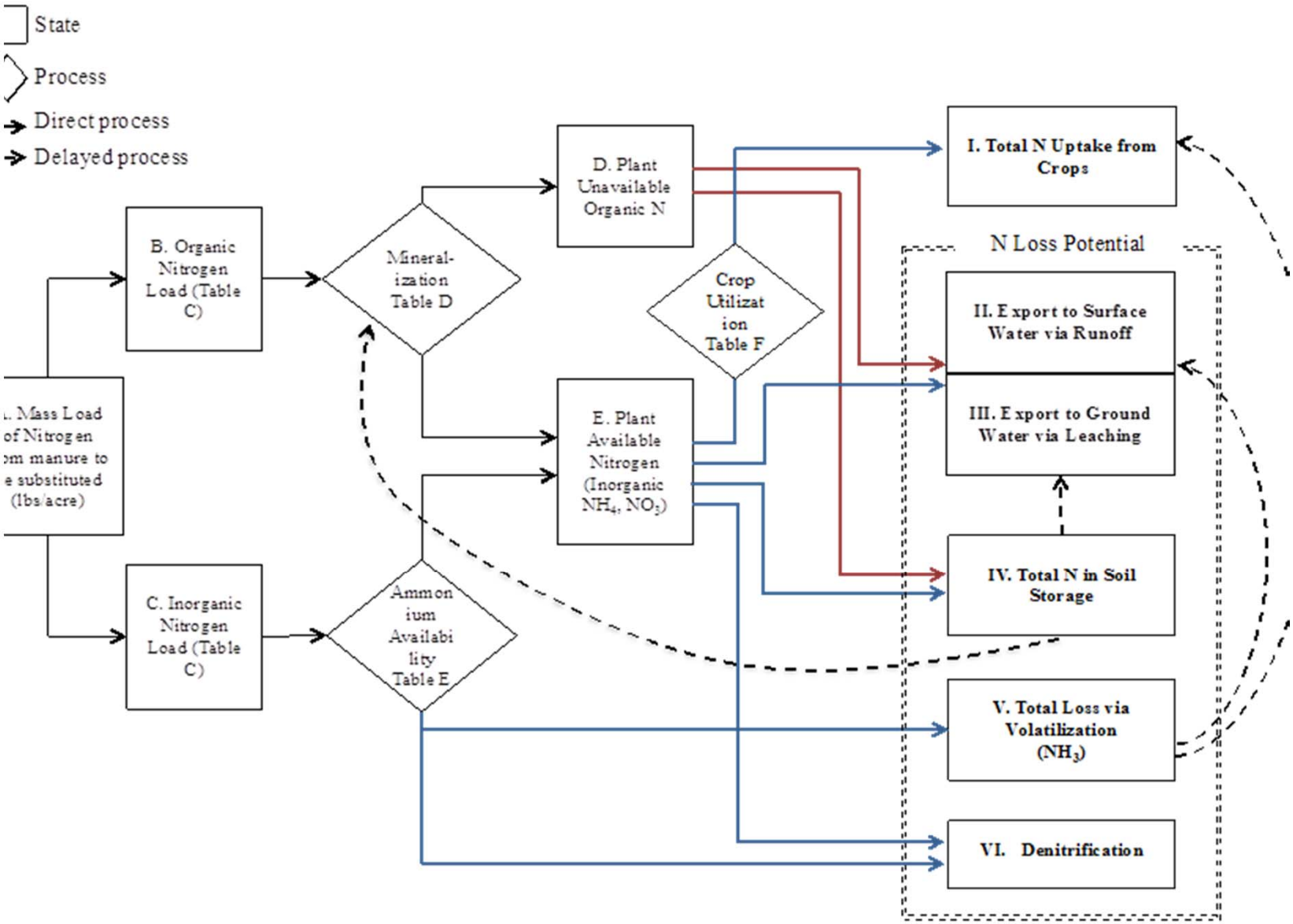
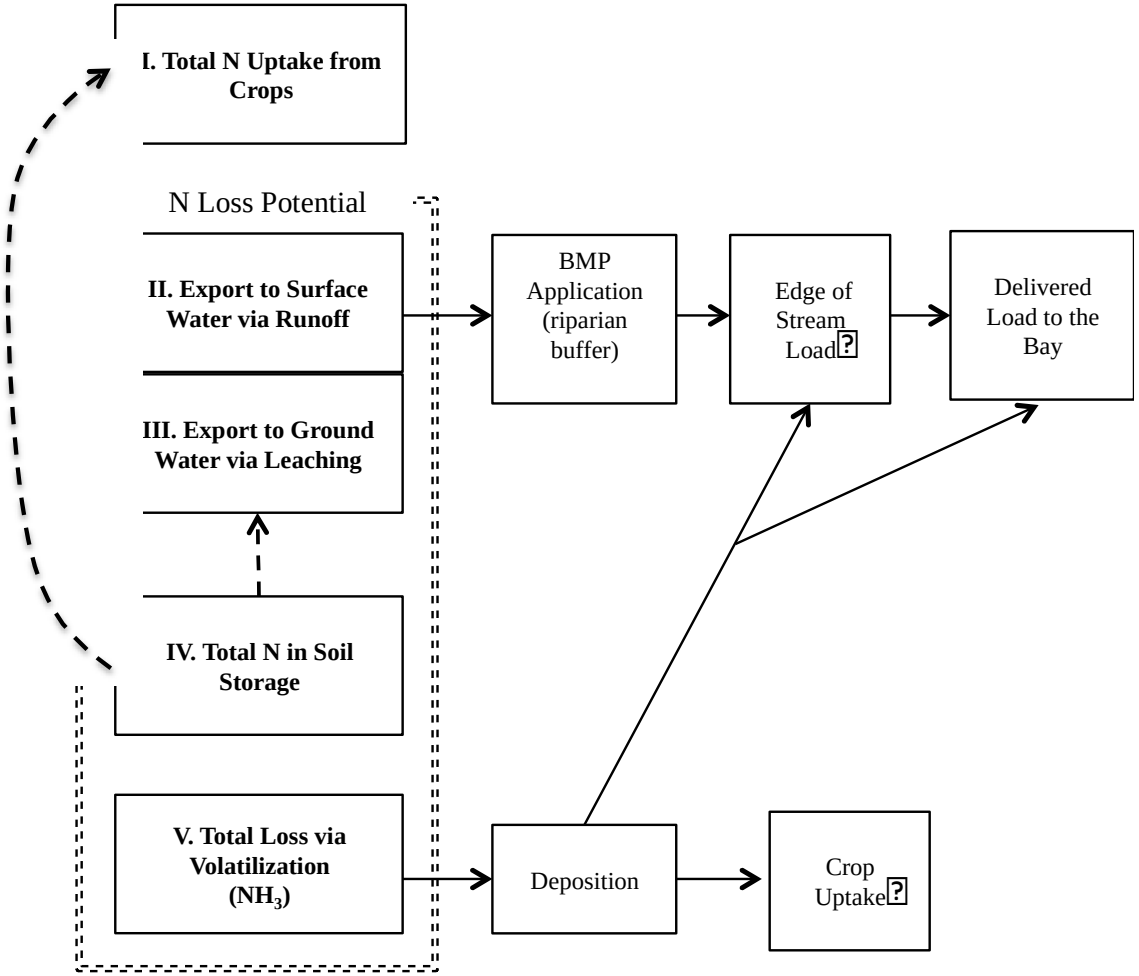
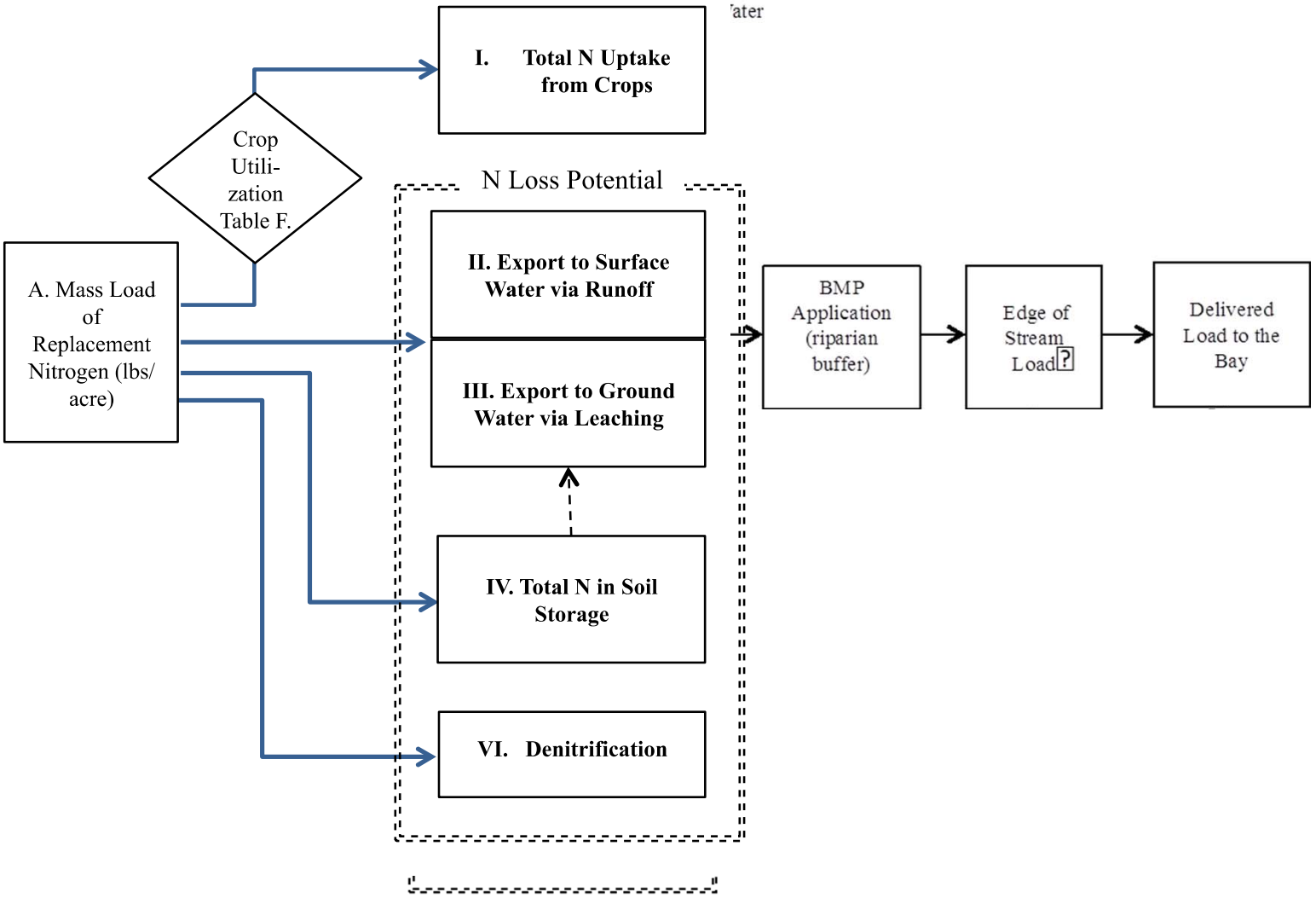
N Field Application: Conv Manure



N Field Application: Conv. Manure



N Field Application: Replacement Fertilizer



Focus Areas

Complex and differential loss rates:
Differential leaching, runoff, denitrification potentials across fertilizer types

Baselines and current management practices under nutrient management

Applications to thermal projects and anaerobic digesters

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Other Work in Progress

Analysis of field-level changes in P loads not as far along.

- Compared to N, changes in application rate more important
- An important policy issue will be timing (P less mobile than N). P load will often be relatively unresponsive in short term to application rates.

Revised Timeline

Draft document for policy advisory group review by mid-August.

Final report mid-September

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