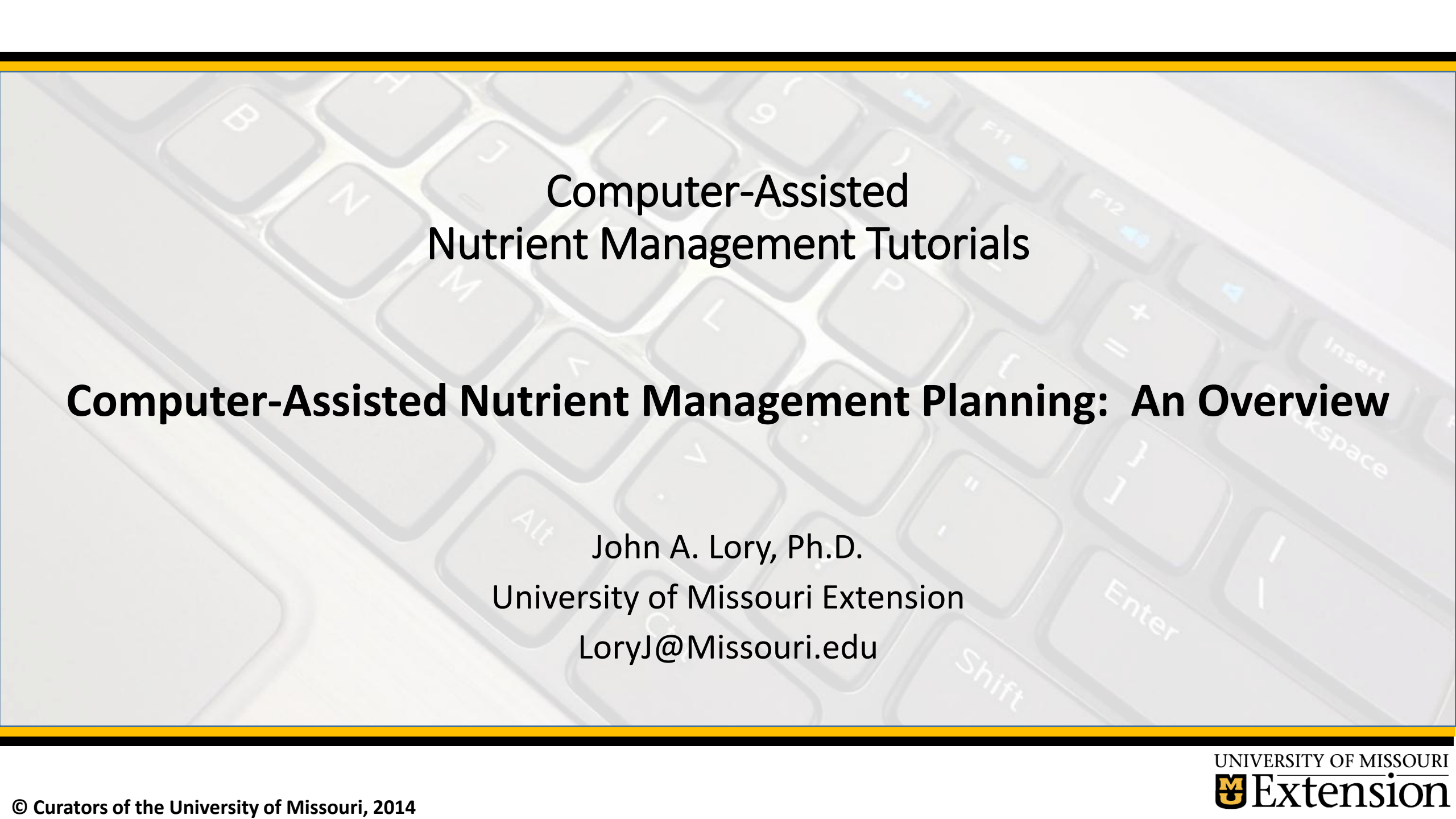


A close-up, slightly angled photograph of a computer keyboard, showing keys like 'B', 'N', 'M', 'L', 'P', 'F11', 'F12', 'Insert', 'Backspace', 'Enter', and 'Shift'. The image is in grayscale with a soft focus, serving as a background for the text.

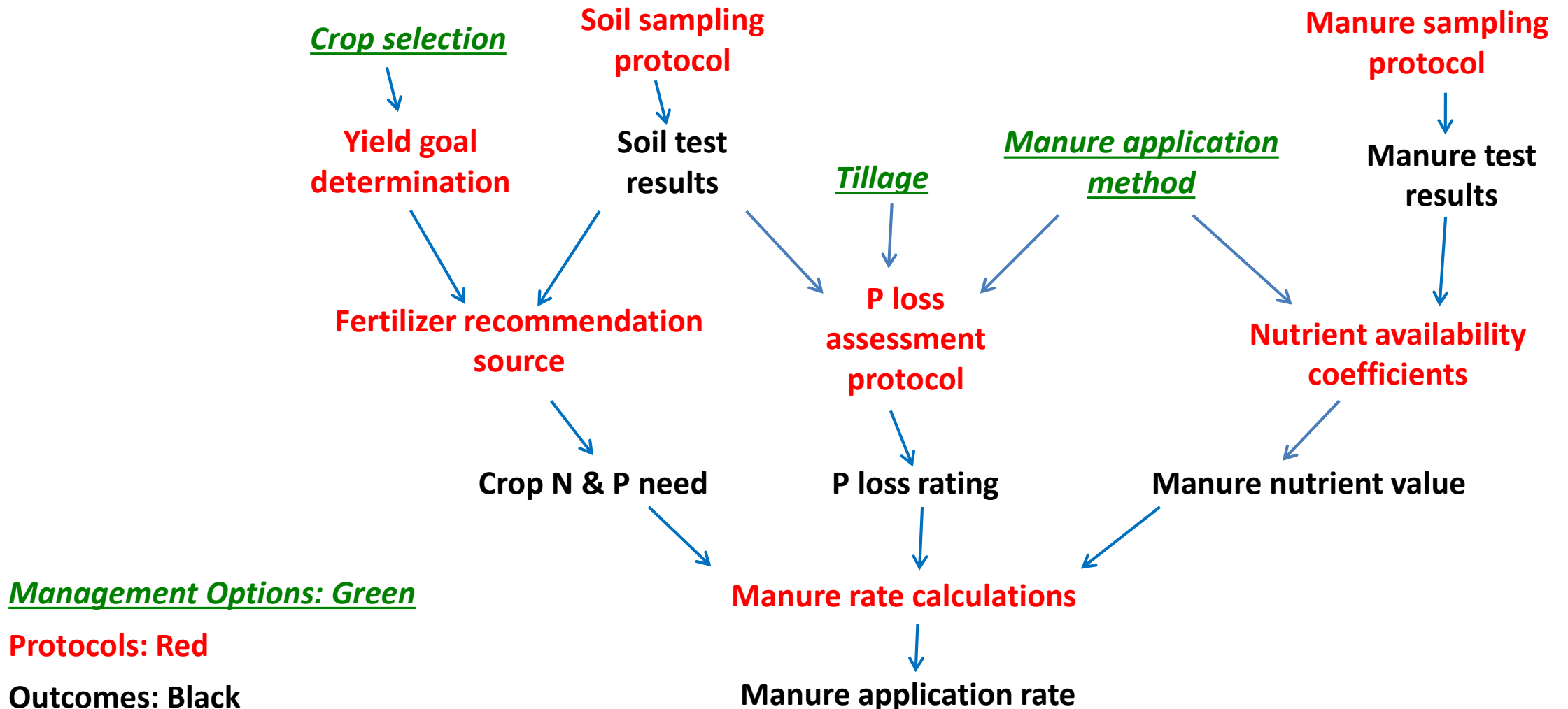
Computer-Assisted Nutrient Management Tutorials

Computer-Assisted Nutrient Management Planning: An Overview

John A. Lory, Ph.D.
University of Missouri Extension
LoryJ@Missouri.edu

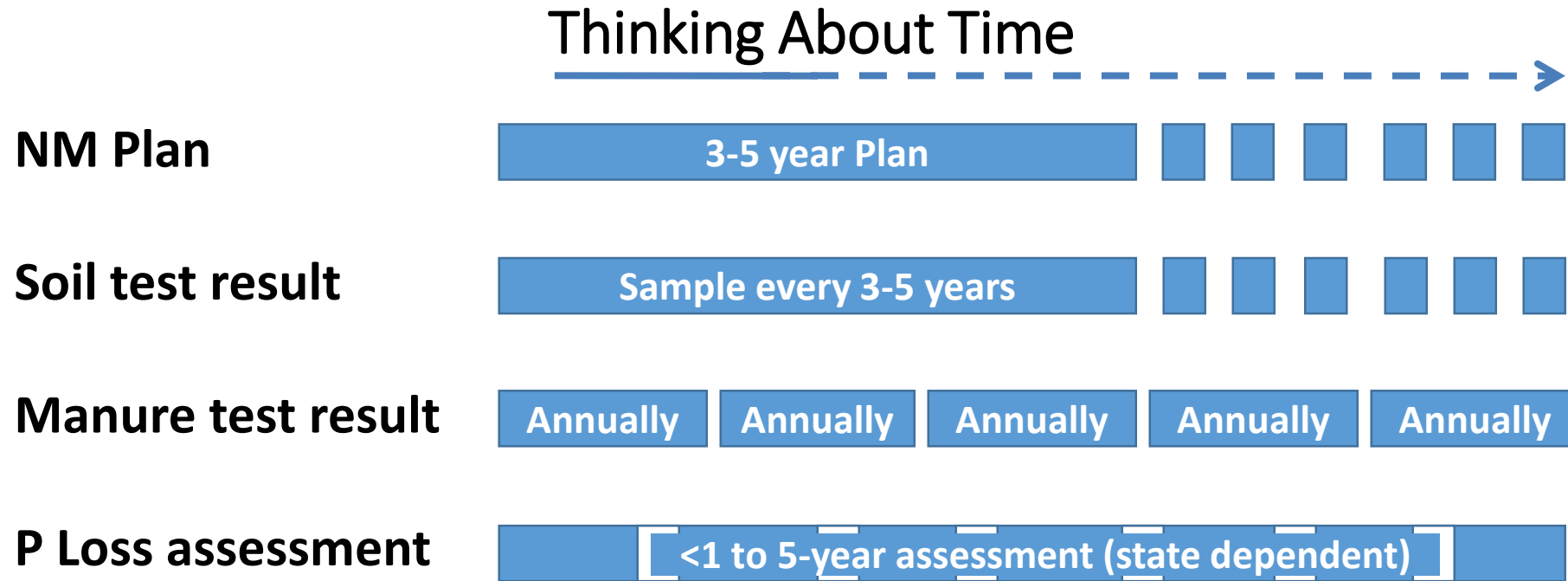
Nutrient Management *Philosophy*:

A process, not a result.



Nutrient Management *Philosophy*:

A process, not a result.



Future application rate cannot be known...

Based on time sensitive information.

Therefore – Planning is a strategic process: what is feasible?

Nutrient Management *Philosophy*: A process, not a result.

Nutrient Management Process

Planning Phase

Target User: Consultant

Activities:

- Collecting data
- Whole-farm Assessment
- Strategic Planning
- Fertilizer recommendations
- Manure application rates
- Plan feasibility assessment

Implementation Phase

Target User: Farmer/Consultant

Activities:

- Record keeping/verification
- Tactical assessments
- Plan adjustments/updates
- Regulatory compliance reporting

Nutrient Management *Philosophy*: Some MO Resources.

- The Missouri NRCS Nutrient Management 590 Standard (March 2013)
 - http://efotg.sc.egov.usda.gov/references/public/MO/590_std_313.pdf
- The MDNR CAFO Nutrient Management Standard (March 2009)
 - http://nmplanner.missouri.edu/regulations/Nutrient_Management_Tech_Standard-FINAL_3-4-09.pdf
- MU NMPlanner website
 - <http://nmplanner.missouri.edu/>



Home Page

[What's new](#)

[Contact](#)

Nutrient Management Planning Software and Support

The Missouri Clipper:
National Nutrient Management Data Download

NMTracker (replaces SNMP)

Purdue's Manure Management Planner (MMP) [\[PDF\]](#)

Manure Management Planner (MMP) Tutorials

National Setbacks Database

Missouri Nutrient Management Tools

Animal Feeding Site Assessment Tool (AFOSITE)

Business Environmental Risk Manager (BERM) [\[PDF\]](#)

Missouri Phosphorus Index

University of Missouri Soil Test Recommendations

Missouri Nutrient Management Plan Document Generators

Missouri Commercial Fertilizer Plan-Map Supplement

Missouri Stalk Nitrate Test Challenge

Manure Plant Available Nutrients (PAN) Calculator

Missouri Manure Management Resources

[Manure Testing Labs](#)

Nutrient Management Home Page

Welcome to nmplanner.missouri.edu - the Nutrient Management home page. This website provides information and resources in the following areas:

- Nutrient management planning
- Manure management
- Regulations affecting animal feeding operations

Please contact [John Lory](#) if you have problems with this web resource, have suggestions for new resources you would like to see on the site, or cannot find something you used to use on our old site.

What's New:

[NMTracker](#): Use the NMTracker to collect and analyze spatial information and create maps needed for completing a nutrient management plan. This replaces SNMP 2.1

[Computer-Assisted Nutrient Management Course open for registration](#): A one-day (8:30 AM to 3:30 PM) refresher course. Topic covered include using WebSNMP to draw fields and setbacks and make required maps, an overview of Purdue's Manure Management Planner, using our document generators to create fertilizer and manure plans, and introduction to MMPTracker for updating an existing plan for new information. Follow this link for more details and to register.

[CAFO Construction Permit no longer required for most permitted operations](#) [\[PDF\]](#): House Bill 28 (effective 8/2013) eliminated the requirement for construction permits for new concentrated animal feeding operations except for earthen storages such as lagoons. MDNR has released guidance on how to permit operations without a construction permit until Missouri rules are amended for the new legislative requirements.

[New Pork Board Fact Sheet on PEDV and manure handling](#) [\[PDF\]](#): New guidelines have been released to minimize spread of Porcine Epidemic Disease Virus (PEDV) through manure handling activities. PEDV can survive for extended periods in manure. These guidelines minimize risk from manure applicators spreading this costly disease.

[The New NOAA Atlas 14 Volume 8 Precipitation Frequency Atlas for Midwestern States](#) including Missouri. This new resource allow you to find the probability of a range of design storms. Included is information on Missouri manure storage design storms such as 24-hour, 25-year storm and the wettest year in ten 365-day storm.

[New Missouri Web-Based Document Generator](#): This tool allows you to generate the plans you need when writing a nutrient management plan in Missouri using Purdue's Manure Management Planner. Follow the link for more information.

[The Missouri Clipper Updated](#): The Missouri Clipper provides data files needed to run SNMP, MMP and RUSLE2 as part of developing a nutrient management plan for any farm in the US depending on data availability. Files provided in the download include aerial photos, topographic maps, soils data and the new version includes digital elevations (DEM layer).

[Missouri CAFO Nutrient Management Technical Standard](#) [\[PDF\]](#): This standard defines how manure nutrients are managed on Missouri CAFOs. This standard will affect existing CAFOs when their permit is renewed.

[Supporting tutorial for using the MO P Index](#): The Missouri P Index is one method of assessing phosphorus loss from a field. This web page includes links to download the Missouri P index and a tutorial on how to obtain RUSLE2 values needed for the P Index from Purdue's Manure Management Planner. This is

Regulatory Issues

[Renewing your CAFO General Permit in Missouri in 2012](#)

[State of Missouri Regulations and Permits](#)

[Missouri County and Township Restrictions on AFOs](#)

[History of USEPA CAFO Rules](#)

[Proposed Updates to Missouri CAFO Rules](#)

[Impact of Exclusion Zones on Land For CAFOs](#)

[EPA Greenhouse Gas Reporting Rule](#)

[EPCRA Reporting](#)

Training Opportunities

[Nutrient Management Planning Course](#)

[Advanced Nutrient Management Planning Workshop](#)

[Computer-assisted Nutrient Management Planning Training](#)

[PE Short Course - Design and Construction of Livestock Manure Systems to Meet MDNR Regulations](#)

Weather Resources

[Weather News](#)

[Horizon Point - Weather via Email](#)

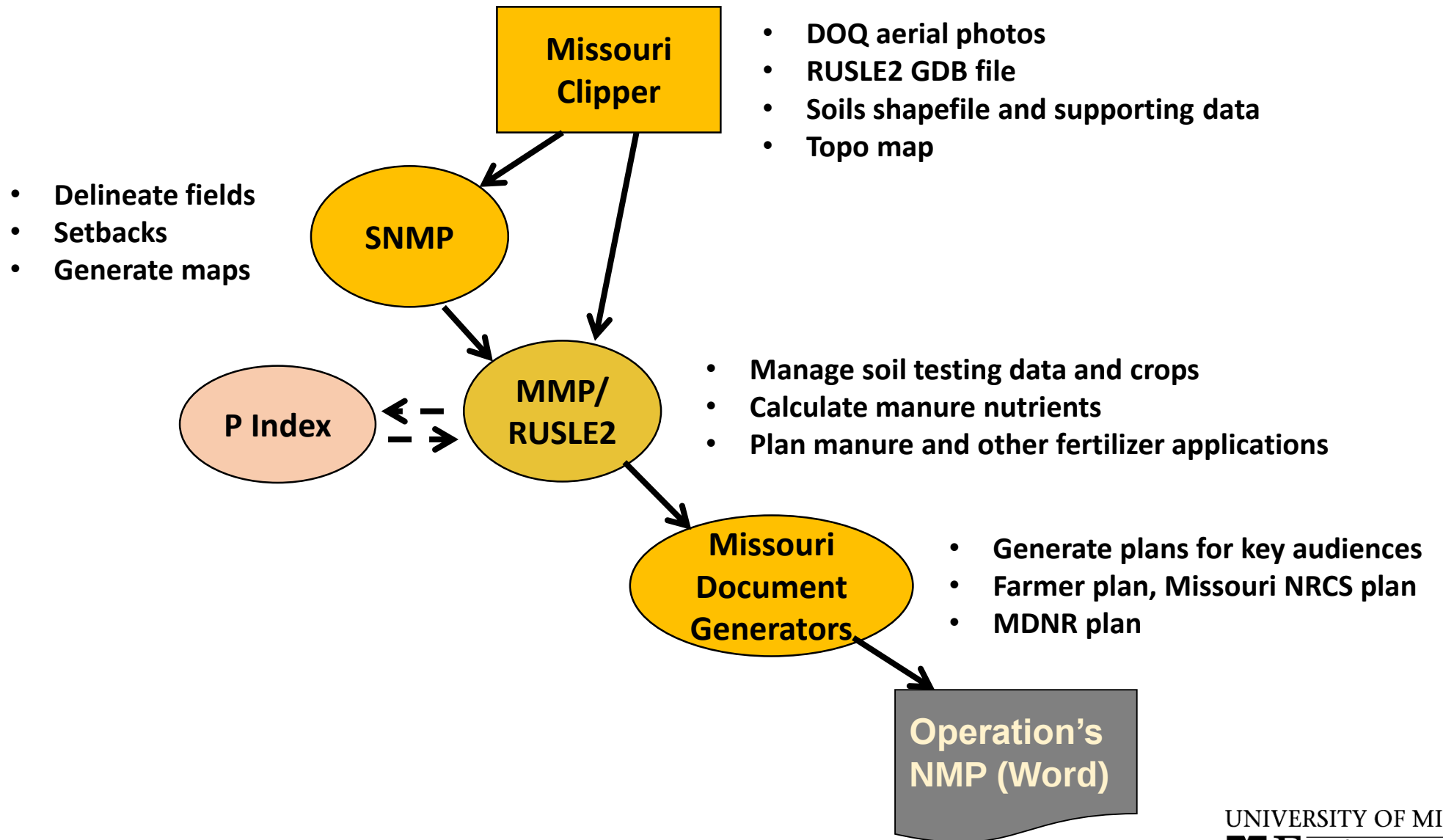
[CAFO Wet Weather Event Management](#)

[Missouri Automated Weather Station Network](#) [\[PDF\]](#)

[Missouri Weather Data Database](#) [\[PDF\]](#)

[NWS Advanced Hydrologic Precipitation Service](#) [\[PDF\]](#)

The Strategic Planning Process: The past



The Strategic Planning Process: Now

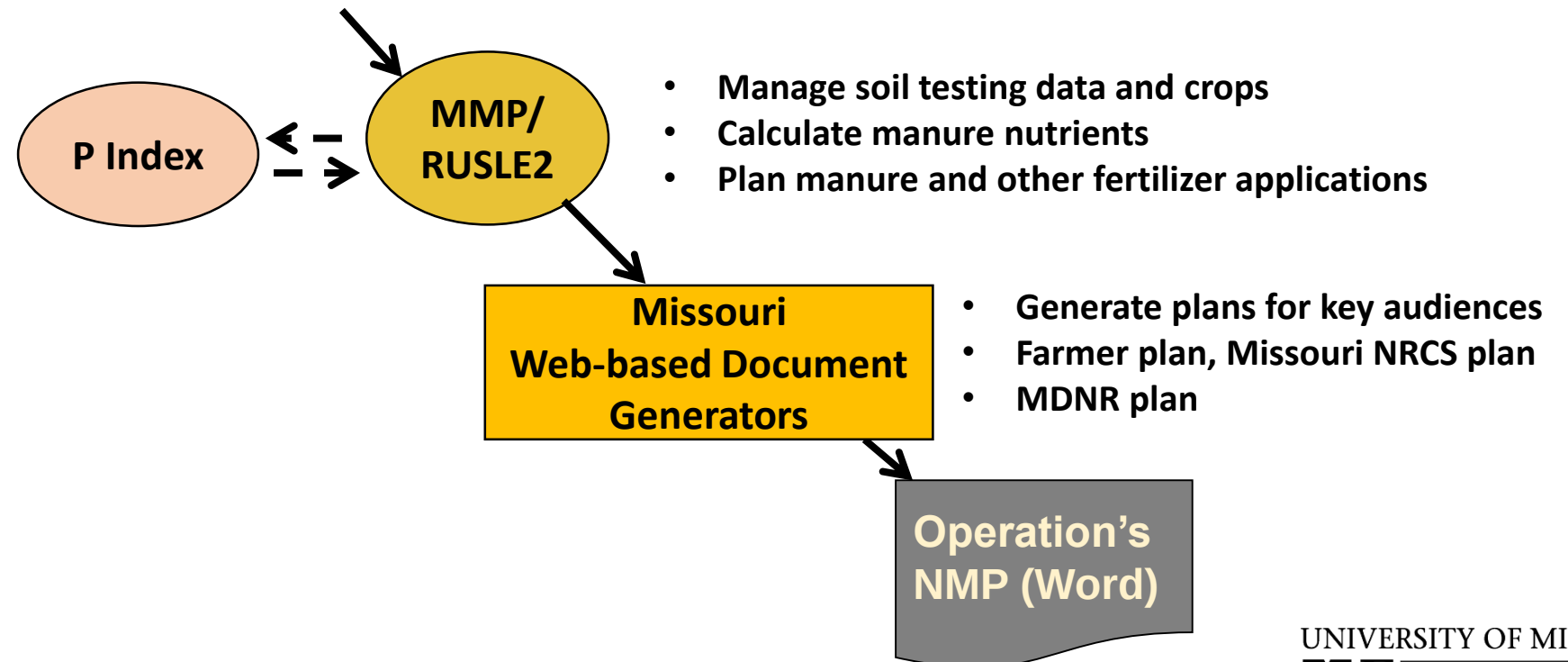
Web-based NMTracker

- Delineate fields
- Setbacks
- Generate maps

SNMP

Missouri
Clipper

- DOQ aerial photos
- RUSLE2 GDB file
- Soils shapefile and supporting data
- Topo map





What does NMTracker currently do?

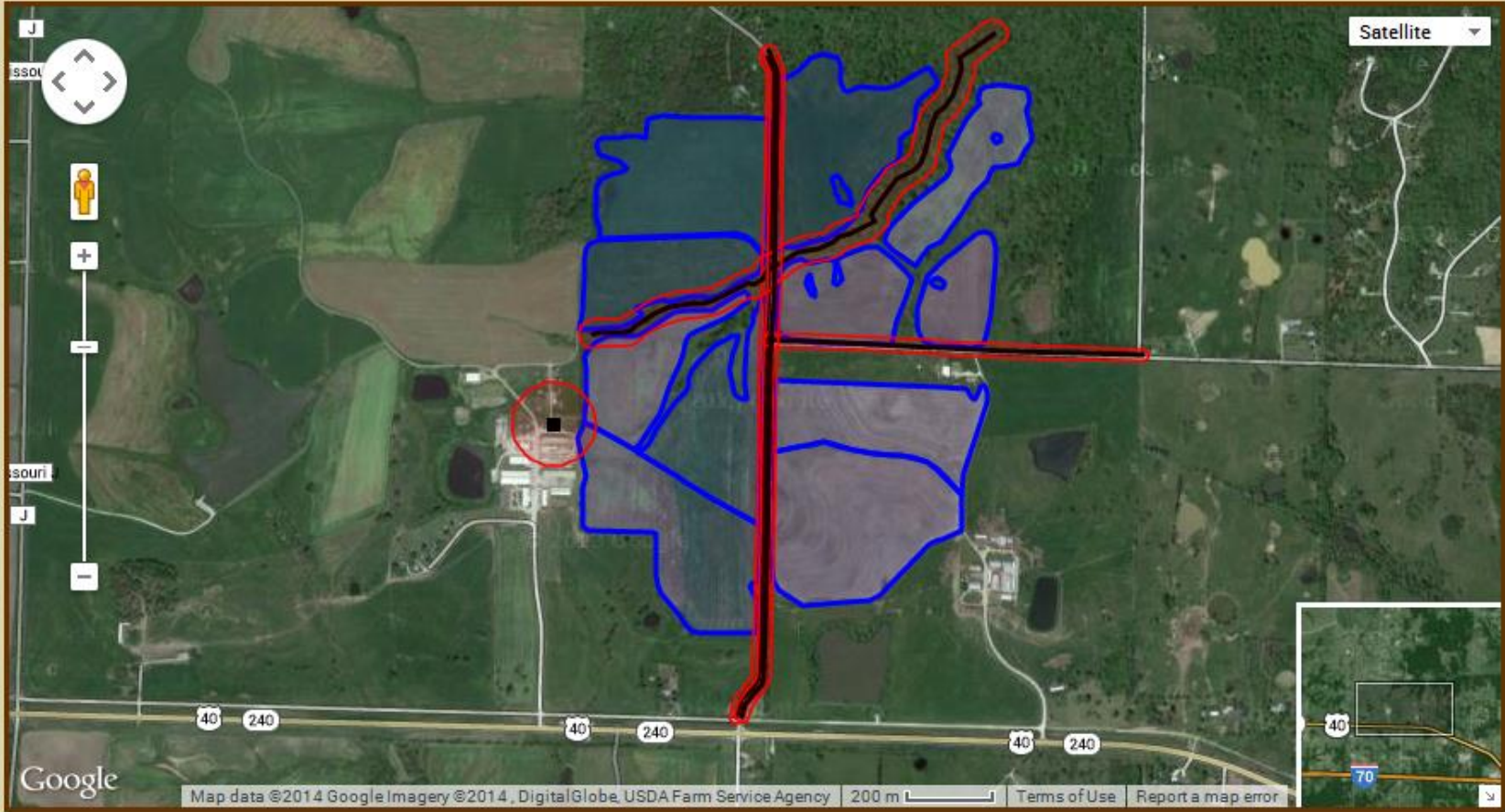
- Web-based program accessed through your web browser.
- Password protected account for managing multiple projects.
- Replaces SNMP activities.
 - Delineating fields.
 - Collect soil survey data.
 - Delineate setback features.
 - Create needed maps.
- Export data to MMP.
 - Can include Missouri Clipper data as part of the download.
 - Can also export shapefiles of field and setbacks.
- Available for all US farms though setback distances are not available for NY, NC, SC, LA, TX, NV, AK and HI.

What does NMTracker do?

[PROJECT MGMT] [MAPPING] [NUTRIENT MGMT] [NEWS] [ABOUT] Welcome **Training_Account** ! [Log Out](#)

Location of MU_Example_Farm: MO, Boone County

Map View:



MAP CONTROLS

<input checked="" type="button" value="On"/>	Off	Mouse wheel zoom
On	<input checked="" type="button" value="Off"/>	Labels
<input checked="" type="button" value="On"/>	Off	Setbacks
On	<input checked="" type="button" value="Off"/>	Administrative Boundaries ⓘ
On	<input checked="" type="button" value="Off"/>	Soils ⓘ

FIELD TOOLS

SETBACK TOOLS

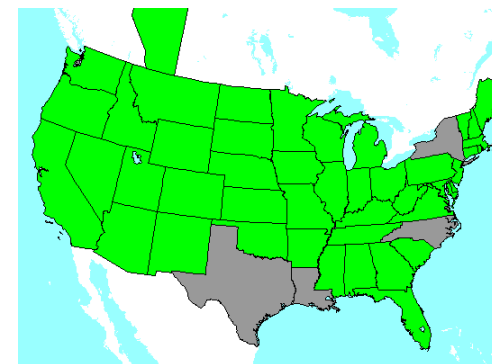
Click a setback in the map to select it.

Map data ©2014 Google Imagery ©2014, DigitalGlobe, USDA Farm Service Agency 200 m Terms of Use Report a map error

- Free access at nmtracker.missouri.edu.

Purdue's Manure Management Planner

- Work horse of strategic nutrient management planning.
 - Enter current soil tests and current manure tests.
 - Enter crop rotations and determine fertilizer needs.
 - Calculate erosion losses with RUSLE2, if needed.
 - Plan imports and exports of manure.
 - Plan fertilizer and manure applications, both timing and rates.
- Available for all states except NY, NC, TX, LA, AK and HI.



Status of MMP development (as of Dec. 2013)

State or province supported by MMP (calculates fert recs, manure N availability, etc.)

Purdue's Manure Management Planner

- Available free at <http://www.purdue.edu/agsoftware/mmp/>.

Manure Management Planner - MO-Pig2.mmp

General Fields Assessment Soil Tests Crops Storage Animals Rations Analysis Equipment Nutrient Mgmt

Plan Month: Sep 2002 Oct 2002 Nov 2002 Dec 2002 Jan 2003 Feb 2003 Mar 2003 Apr 2003 May 2003 Jun 2003 Jul 2003

Storage Status

Farrow pit	80,700	86,400	4,100	9,800	15,500	21,200	26,900	32,600	38,300	44,000	
Nursery pit	58,200	400	8,600	16,800	25,000	33,200	41,400	49,600	50	8,250	
» Grow-finish pit	565,000	511,500	396,500	411,750	355,500	299,250	372,250	296,750	141,500	214,500	2
Breeding pit	85,400	90,800	96,200	2,600	8,000	13,400	18,800	24,200	29,600	35,000	

Field Status

Home 60 N20			F						F	F	
Home 60 C20			F						F	F	
Home 60 S20									F	F	
» Johnson 80 NW20			20 / 20						F		
Johnson 80 N20	20 / 20								F		

Manure Applications

What Is Application's Manure Source?	Application Equipment	Days To Incorp.	Rate (/Acre)	Loads	Amount Applied	Area Covered (Acres)	Apply At Or For	Units	Avail N As Applied (Lb/A)	N Need Or Excess (Lb/A)	Avail P2O5 As Applied (Lb/A)	P2O5 Need Or Excess (Lb/A)
» Grow-finish pit	Tanker inject		4,300	32	88,000	20.5	2,790	Feet/Load	123	-27	142	72

New Open Reopen Close Save Save As Tools ? Help About Exit

Area of field that has been manured after this month's applications (bottom grid) and whether fertilized (press F2 to apply fertilizer).



Missouri Web-based Document Generators

- Includes key plans for Missouri farms.
 - Farmer plan with year-by-year explanation of applications plus record keeping forms.
 - NRCS reviewer document for documenting compliance with NRCS 590 standard.
 - NRCS reviewer document for fertilizer only plans, for documentation on farms that do not manage manure.
 - MDNR reviewer document for CAFOs submitting or documenting a plan for MDNR.

Missouri Web-based Document Generators

Select which Farmer Plans to run:

☐ 09/2002 - 08/2003

☐ 09/2003 - 08/2004

☐ 09/2004 - 08/2005

Select to create NRCS Reviewer's Document:

☐ 09/2002 - 08/2005

Select to create NRCS Reviewer's Document for Fertilizer Only Operations: (Please note this is a beta-test version. Please let us know if you have any issues.)

☐ 09/2002 - 08/2005

Select to create Missouri DNR Reviewer's Document: (Please note this is a beta-test version. Please let us know if you have any issues.)

☐ 09/2002 - 08/2005

Run Selected Plans

Before closing the window, please
delete your files by clicking on the
Delete Files and Exit button:

Delete Files and Exit

Uploaded Plan File: C:\Program Files (x86)\MMP 0.32\Samples\MO-Pig2.mmp
Operation: Hogs-R-Us Sample Plan
Contact:
County: Benton, MO
Exported from MMP: 4/1/2014 10:41:48 PM



For more information on NMTracker.

- NMTracker website at nmtracker.missouri.edu.
- NMTracker tutorials at <http://nmplanner.missouri.edu/software/nmtracker.asp>.
- For information on program development contact [John Lory](#).
- For information on software implementation contact [Kevin Atherton](#)
- Other Nutrient Management resources at nmplanner.missouri.edu.