CNMP and the Planning Process

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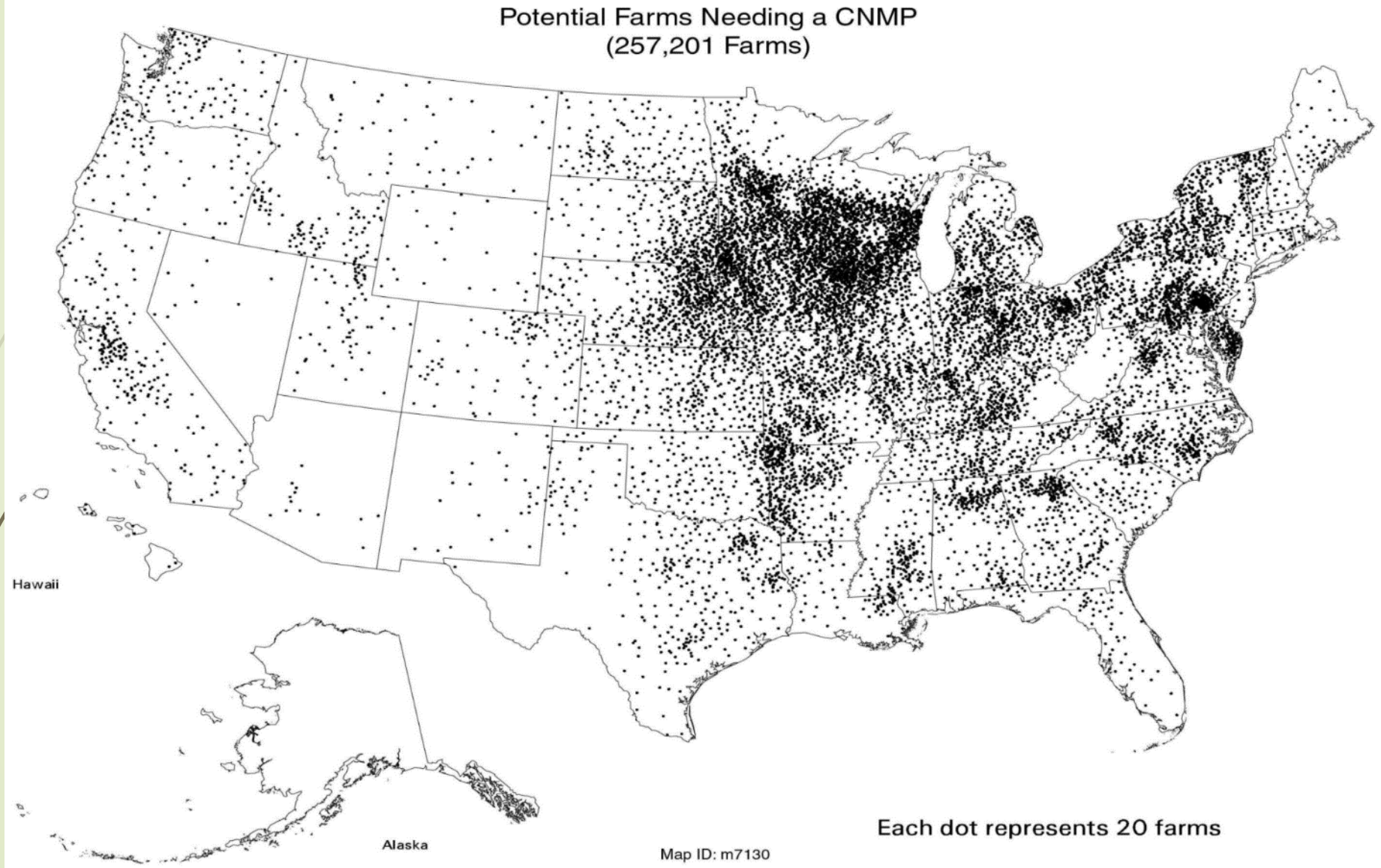
Animal Manure and Nutrient Management Team Leader

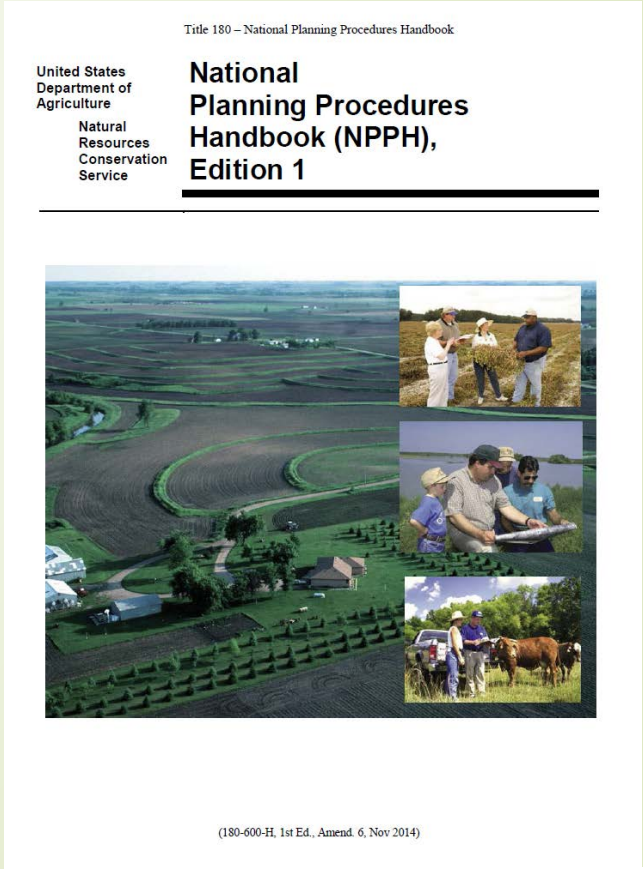
What Will Be Covered

- Why is a CNMP necessary
- CNMP and Planning
- Components of a CNMP
- Other issues related to CNMP development


Potential Farms Needing a CNMP
(257,201 Farms)
Hawaii
Alaska
Each dot represents 20 farms
Map ID: m7130

CNMP and Planning

- Conservation Planning
  - CNMP is a Component Conservation Plan
  - Plan development follows conservation planning process
  - National Planning Procedures Handbook
  - GM190 Part 405 – CNMP Policy



When Is A CNMP Required

- EQIP Manual (M_440_515_I, Amend. 92, February 2015)
  - "If an EQIP schedule of operations includes animal waste storage or treatment facility on an animal feeding operation (AFO), the participant must develop and provide a copy of a NRCS approved CNMP **prior** to implementation of any waste storage and handling facility or nutrient management activities."
- CNMP Policy (GM_190_405_B, Amend. 31, October 19, 2015)
  - "Prepare a CNMP when NRCS or NRCS-designated agents are providing technical **or** financial assistance to an AFO/CAFO to address manure or wastewater handling and storage, treatment and nutrient management that involves the application of manure and wastewater associated with the AFO/CAFO."

Resource Concerns

- Soil Erosion
- Water Quality
- Air Quality

Policy and Reference Documents

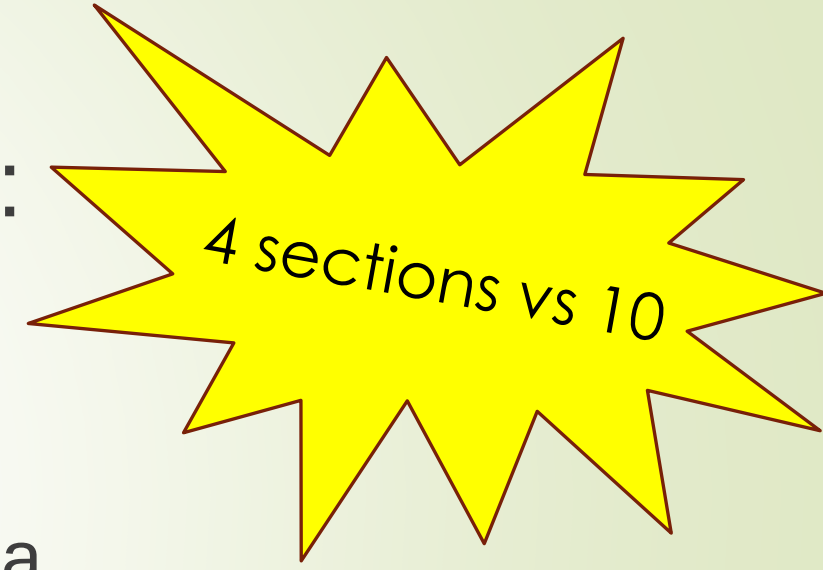
- A CNMP is a component conservation plan
  - “The format for the CNMP will generally follow the same content and format used for normal conservation plan per the NPPH (Title 180, Part 600.31).”
- Retired Documents
  - National Instruction NI_190_304 (CNMP Technical Criteria)
  - National Instruction NI_190_308 (Manure Management, the EQIP Program and Requirements for CNMP)
  - CNMP Handbook (H_190_620)

Policy Changes

- State Conservationist Discretion Update
  - Small animal operations – removed
  - Quality criteria for soil erosion - removed
  - Planning criteria for soil's with "T" less than 5 ton/ac/yr – added
- Producer Activity Document (PAD) – no longer required

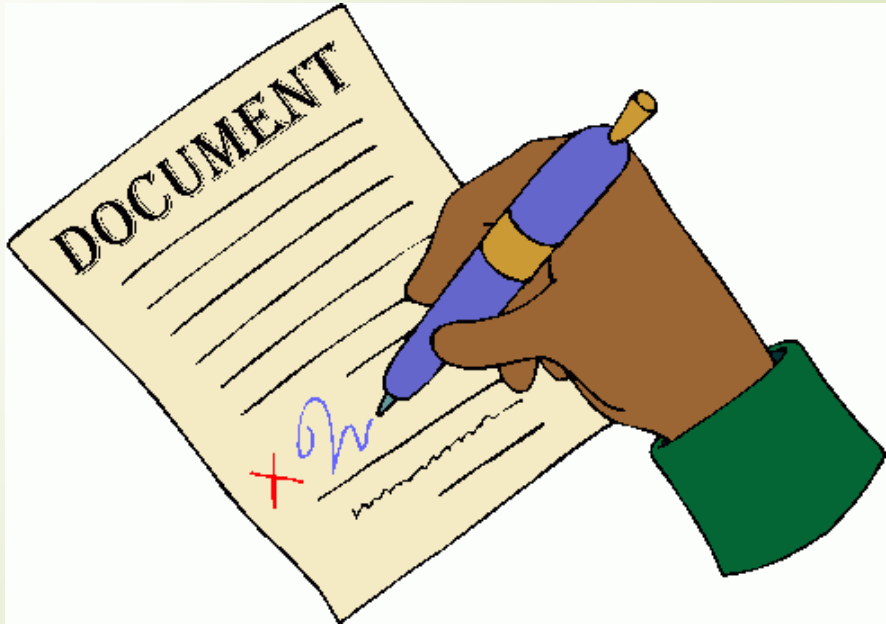
CNMP Format

- The client copy will now look like:
  - 4 sections vs. 10 sections
    - Section 1, Signature Page
    - Section 2, Farmstead/Production Area
    - Section 3, Crop, Forest, Range, and Pasture Lands/Land Treatment Area
    - Section 4, Nutrient Management (590)



CNMP Format

- Signature Page to include:
  - Contains basic information about the farm
    - Name, Address, Plan Period
  - National has set minimum requirements for signatures
    - Certified CNMP Planner
    - Conservation District (optional)
    - Owner/Operator



CNMP Farmstead (Section 2)

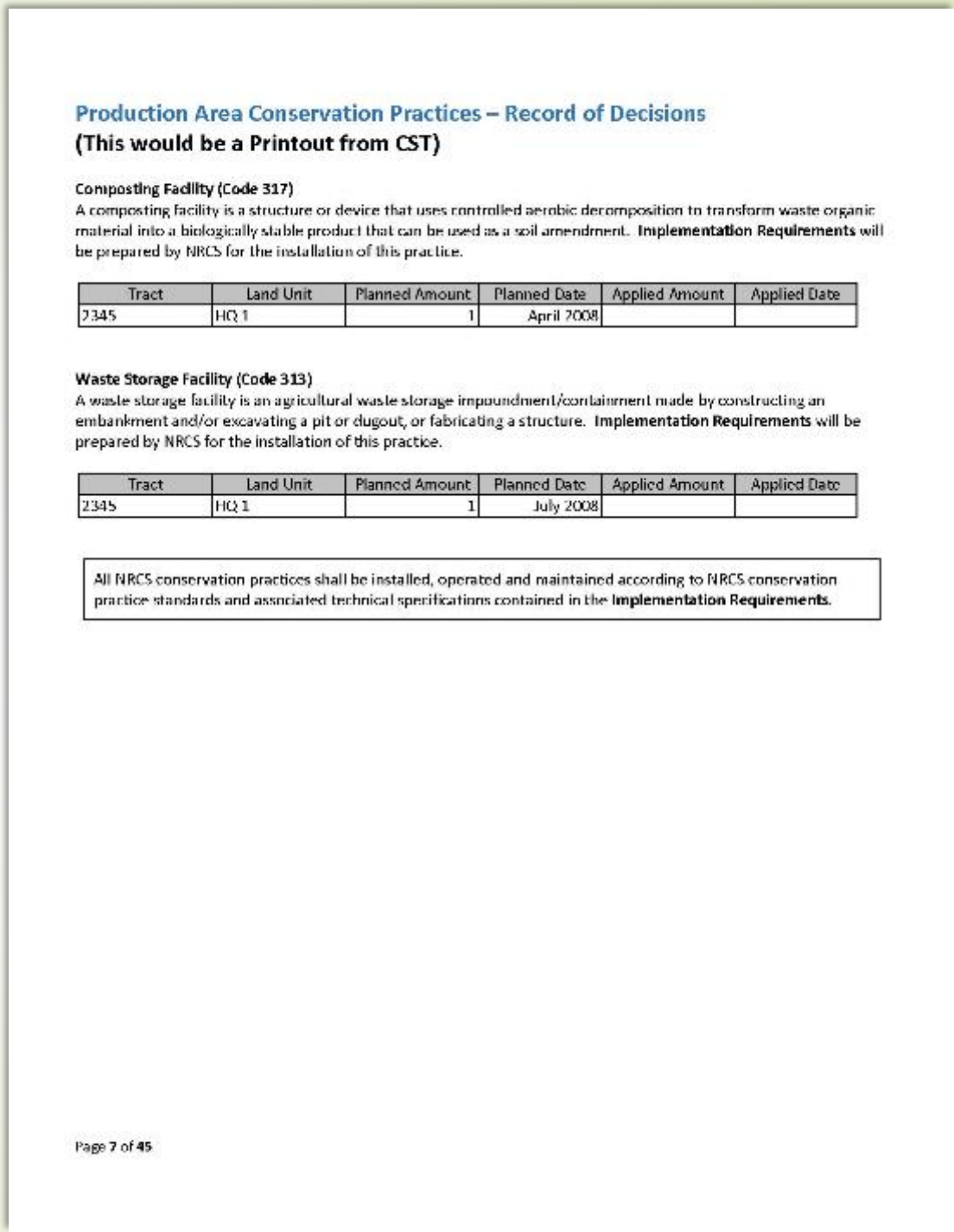
- Record of Decisions
- Conservation Plan Map
- Soils Map(s) and Descriptions
- Brief Description of the AFO
  - Animal Inventory
  - Manure Storage
- Planned Imports, Exports, and On-Farm Transfers
- Reference Implementation Requirements / Engineering Plans

CNMP Farmstead

- CNMP Plan Development - Manure and Wastewater Handling and Storage certification **eliminated**
- “Ensure that all necessary engineering work is properly documented with necessary signatures.”
- Know your state licensing policy on certification and/or signatures for planning of engineering practices.

CNMP Farmstead

- Record of Decisions
  - Let's come back to this later!



Production Area Conservation Practices – Record of Decisions

(This would be a Printout from CST)

Composting Facility (Code 317)

A composting facility is a structure or device that uses controlled aerobic decomposition to transform waste organic material into a biologically stable product that can be used as a soil amendment. **Implementation Requirements** will be prepared by NRCS for the installation of this practice.

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
2345	HQ 1	1	April 2008		

Waste Storage Facility (Code 313)

A waste storage facility is an agricultural waste storage impoundment/containment made by constructing an embankment and/or excavating a pit or dugout, or fabricating a structure. **Implementation Requirements** will be prepared by NRCS for the installation of this practice.

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
2345	HQ 1	1	July 2008		

All NRCS conservation practices shall be installed, operated and maintained according to NRCS conservation practice standards and associated technical specifications contained in the **Implementation Requirements**.

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CNMP Farmstead

- Conservation Plan Map
  - One map covering all CNMP components or multiple maps covering land use areas separately
  - May include a supporting farmstead map with livestock support facilities and features to complement description of AFO (this example)
- Soils Map(s) and Descriptions
  - One map covering all CNMP components or multiple maps covering land use areas separately

CNMP Farmstead

- Brief Description of the AFO
  - Narrative
  - Table Format
- Planned Imports, Exports, and On-Farm Transfers
  - If Applicable (Not Shown)

Animal Inventory

Animal Group	Type or Production Phase	Number of Animals	Average Weight (Lbs)	Confinement Period	Manure Collected (%)	Storage Where Manure Will Be Stored
Lactating cows	Milk cow (dairy)	175	1,300	Jan Early - Dec Late	50	Holding pond
Dry cows & close ups	Dry cow (dairy)	60	1,300	Jan Early - Dec Late	0	
Heifers	Growing heifer/steer (dairy)	75	1,000	Jan Early - Dec Late	0	
New calves	Calf (dairy)	75	200	Jan Early - Dec Late	100	Calf shed
Young heifers	Weaned heifer/steer (dairy)	75	500	Jan Early - Dec Late	0	

(1) Number of Animals is the average number of animals that are present in the production facility at any one time.
(2) If Manure Collected is less than 100%, this indicates that the animals spend a portion of the day outside of the production facility or that the production facility is unoccupied one or more times during the confinement period.

Manure Storage

Waste Management System.
The current earthen storage facility (holding pond) has the capacity to store 50 percent of the manure and 100 percent of the runoff from the lot during the wettest period of winter. The other 50 percent of the manure is presumed to be deposited in the calving lots by the cattle. The existing earthen storage structure top dimensions are 136 ft. x 121 ft. with a total depth of 9 ft. The system must be operated with two storage periods during the year, however, during these periods waste levels may enter into emergency storm storage depending on weather conditions.

Storage ID	Type of Storage	Pumpable or Spreadable Capacity	Annual Manure Collected	Maximum Days of Storage
Holding pond	Holding pond	503,800 Ga	1,244,000 Gal	147
Calf shed	Manure pack	300 Tons	264 Tons	415

Waste Storage Pond

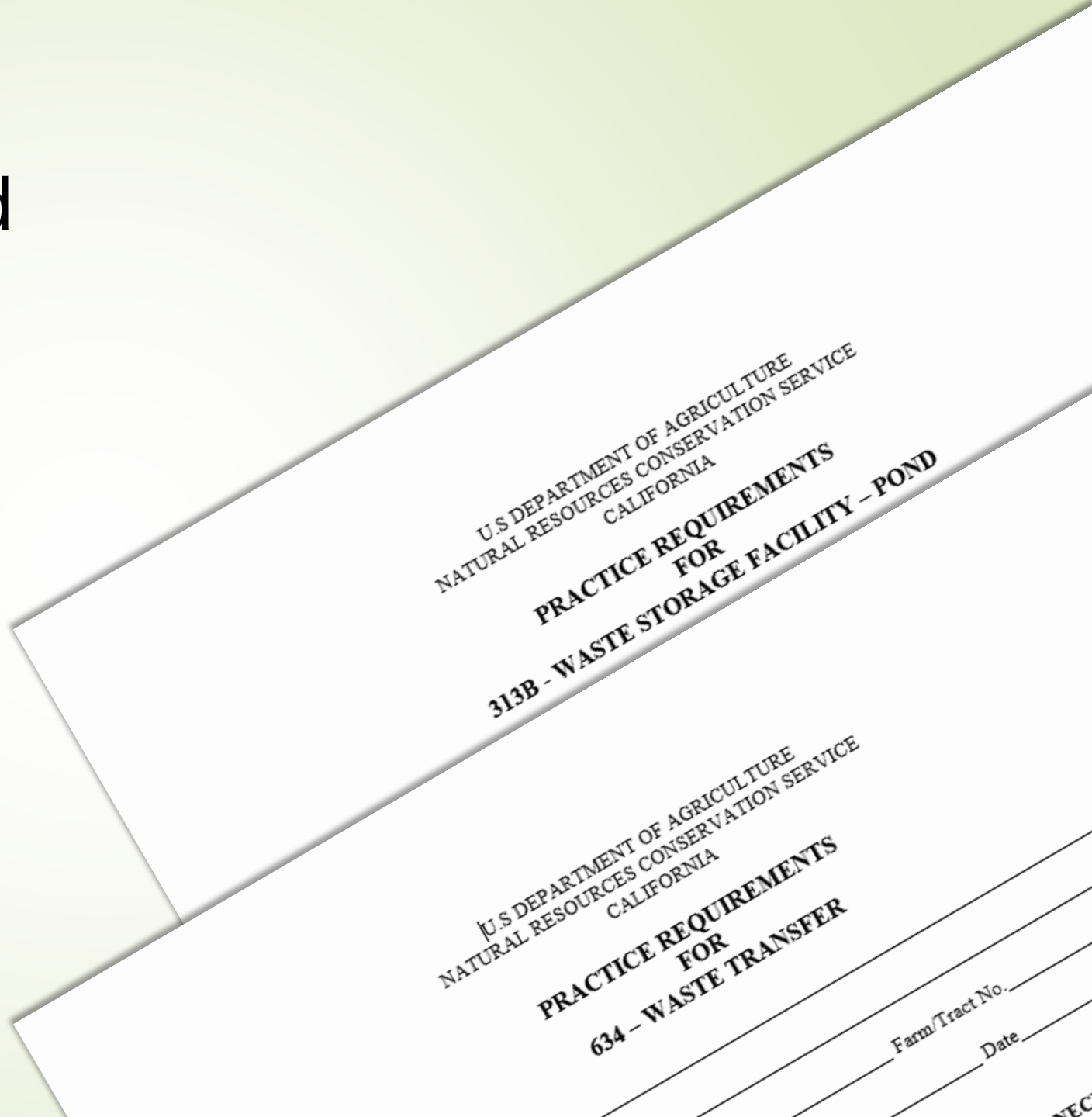
Storage Type	Storage Volume (gallon)
Freeboard	118,400
25-yr 24-hr	121,600
Available Storage	503,800
Permanent	74,600
Total	818,500

	Storage Period 1 November – March (151 Days)	Storage Period 2 April – October (214 Days)	Yearly Storage Totals
	Gallons	Gallons	Gallons
Manure (50% of 175 lactating cows)	167,062	236,765	403,827
Bedding (Sawdust)	18,600	26,736	45,600
Wash water (248 gal /day)	37,724	53,470	91,194
Silage leachate	7,830	7,830	15,260
Runoff From silage bunker and 13,000 ft² concrete lot	260,280	312,984	582,264
Direct rainfall (precip-evap)	142,494	-39,414	103,080
Total	~ 644,000	~ 598,000	~ 1,244,000

** Table does not include permanent storage, 25yr-24hr storm storage, or freeboard volume.

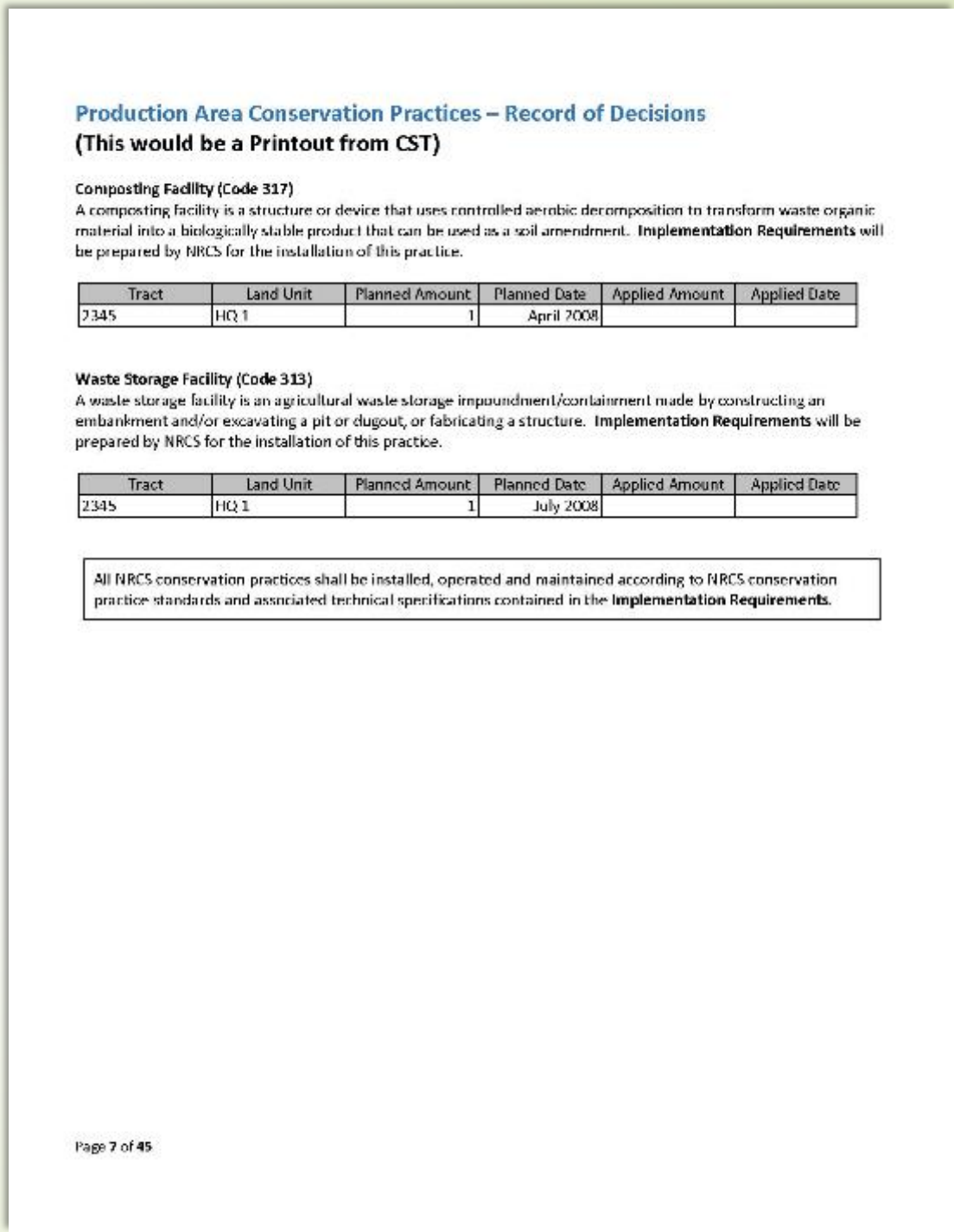
CNMP Farmstead

- Reference Implementation Requirements or Engineering Plans
  - Practices Already Implemented



CNMP Farmstead

- Record of Decisions
  - How were these decisions made?



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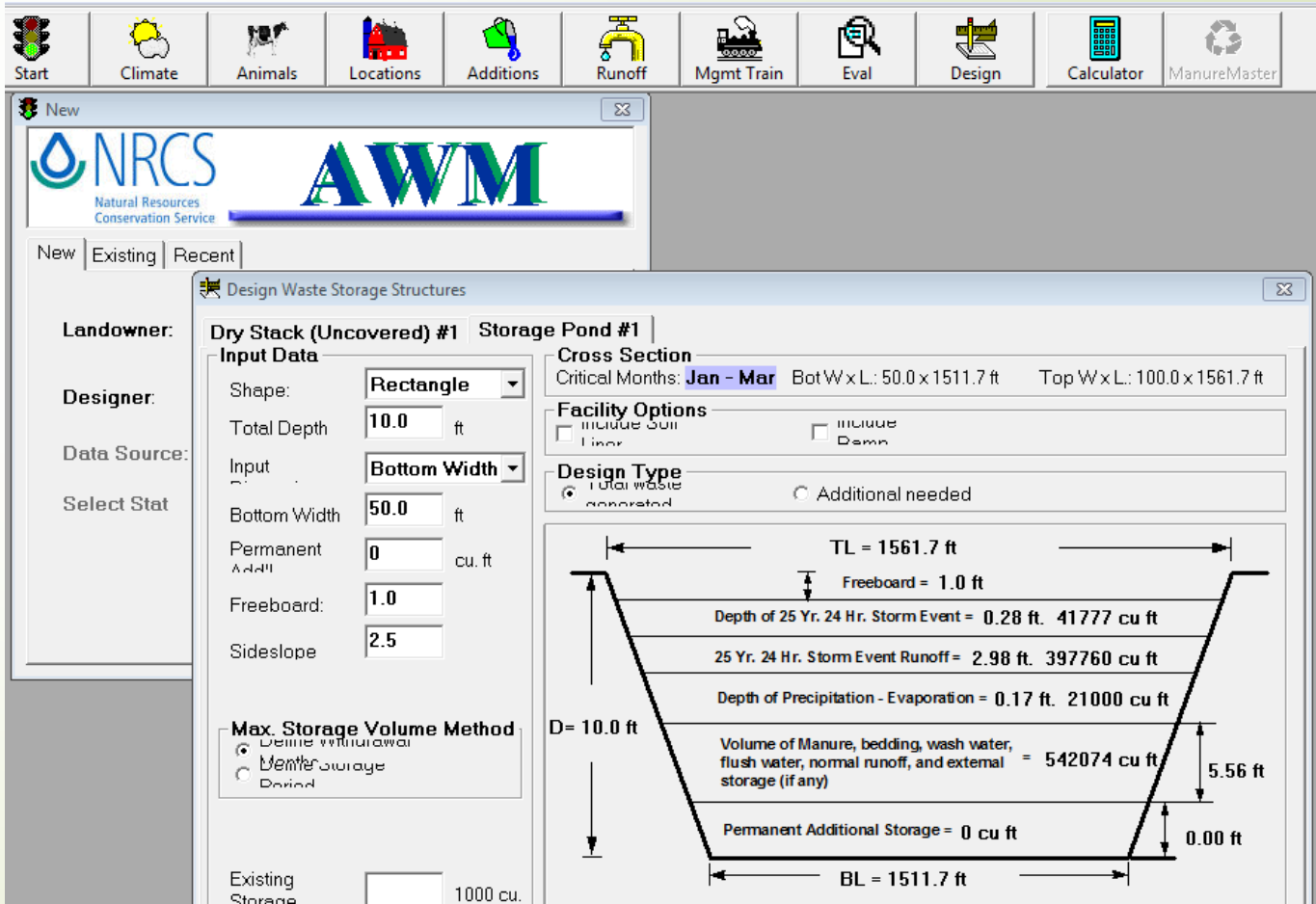
CNMP Farmstead

- The Conservation Planning Process
  - It's not all in the plan document
  - Plan should only contain meaningful and useful information to the client – Everything else in Case File including
    - Forms and Worksheets
    - Inventory and Analysis
      - Assessments

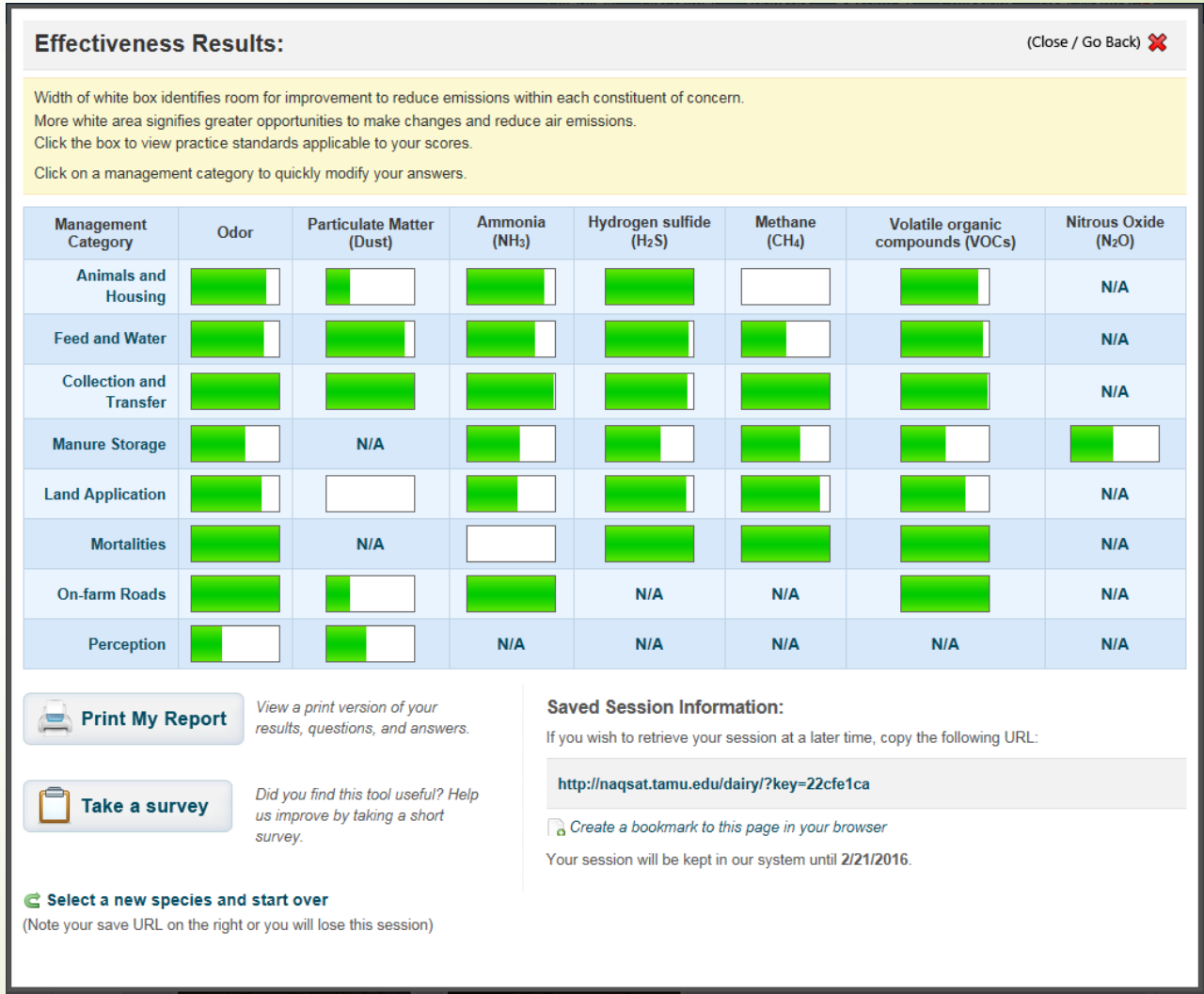
CNMP Farmstead

- Assessment Tools
  - Animal Waste Management (AWM)
    - Waste Storage Structure Design



CNMP Farmstead

- Assessment Tools
  - National Air Quality Site Assessment Tool (NAQSAT)
    - NI_190_309, 2nd Ed., July 2015
    - Required for confined animal operations 300+ AU
    - Encouraged for confined animal operations <300 AU
    - Develop baseline and plan mitigation measures



Effectiveness Results: (Close / Go Back)

Width of white box identifies room for improvement to reduce emissions within each constituent of concern.
More white area signifies greater opportunities to make changes and reduce air emissions.
Click the box to view practice standards applicable to your scores.

Click on a management category to quickly modify your answers.

Management Category	Odor	Particulate Matter (Dust)	Ammonia (NH_3)	Hydrogen sulfide (H_2S)	Methane (CH_4)	Volatile organic compounds (VOCs)	Nitrous Oxide (N_2O)
Animals and Housing							N/A
Feed and Water							N/A
Collection and Transfer							N/A
Manure Storage		N/A					
Land Application							N/A
Mortalities		N/A					N/A
On-farm Roads				N/A	N/A		N/A
Perception			N/A	N/A	N/A	N/A	N/A

Print My Report — *View a print version of your results, questions, and answers.*

Take a survey — *Did you find this tool useful? Help us improve by taking a short survey.*

Saved Session Information:

If you wish to retrieve your session at a later time, copy the following URL:

http://naqsat.tamu.edu/dairy/?key=22cfe1ca

Create a bookmark to this page in your browser

Your session will be kept in our system until **2/21/2016**.

Select a new species and start over

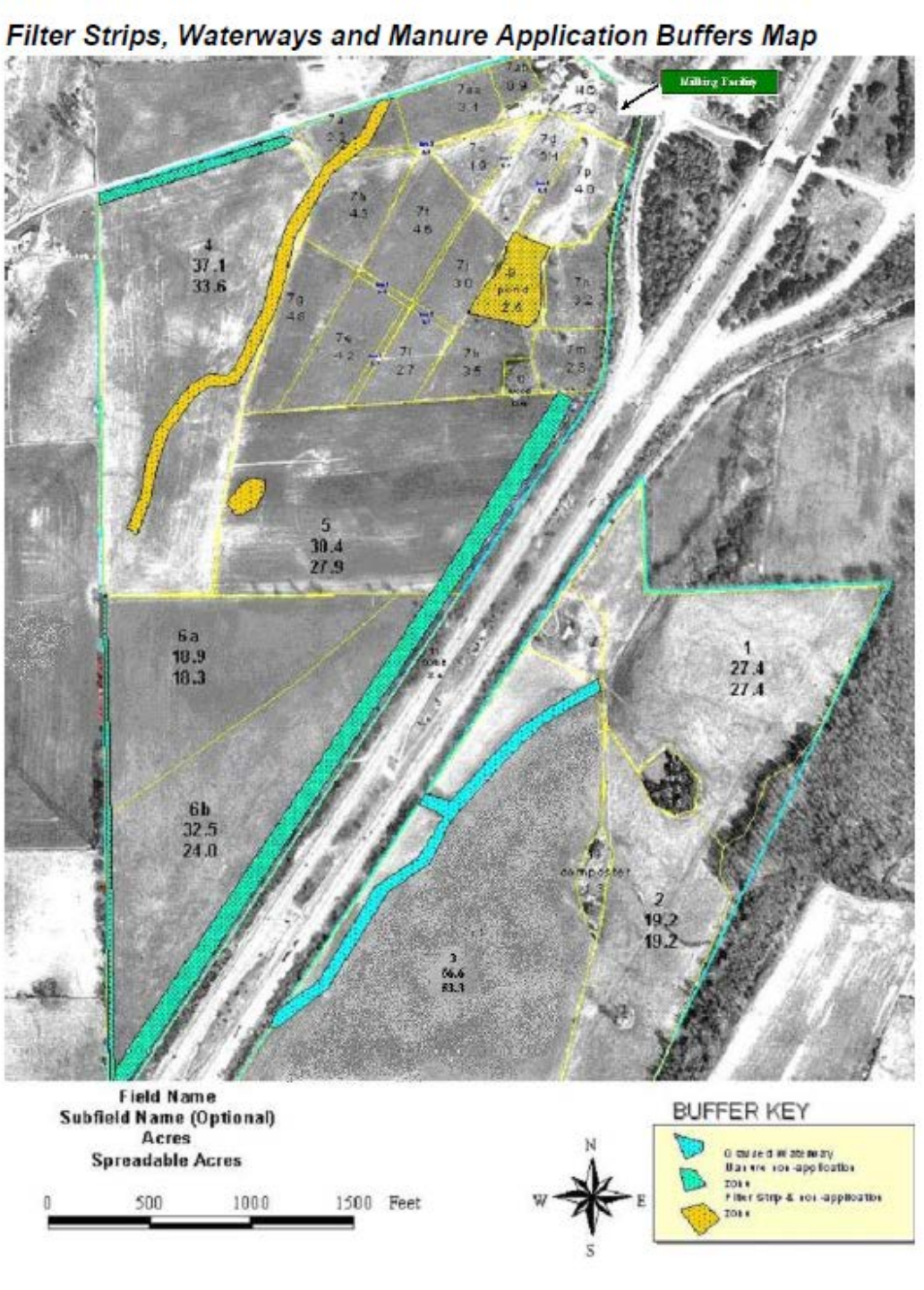
(Note your save URL on the right or you will lose this session)

Section 3 Crop, Pasture, Range, other Lands (Land Treatment)

- Plan Map(s)
- Soil Map(s)
- Record of Decisions
- Assessments
  - Predicted Soil Erosion
  - Air Quality
  - Other
- Implementation Requirements

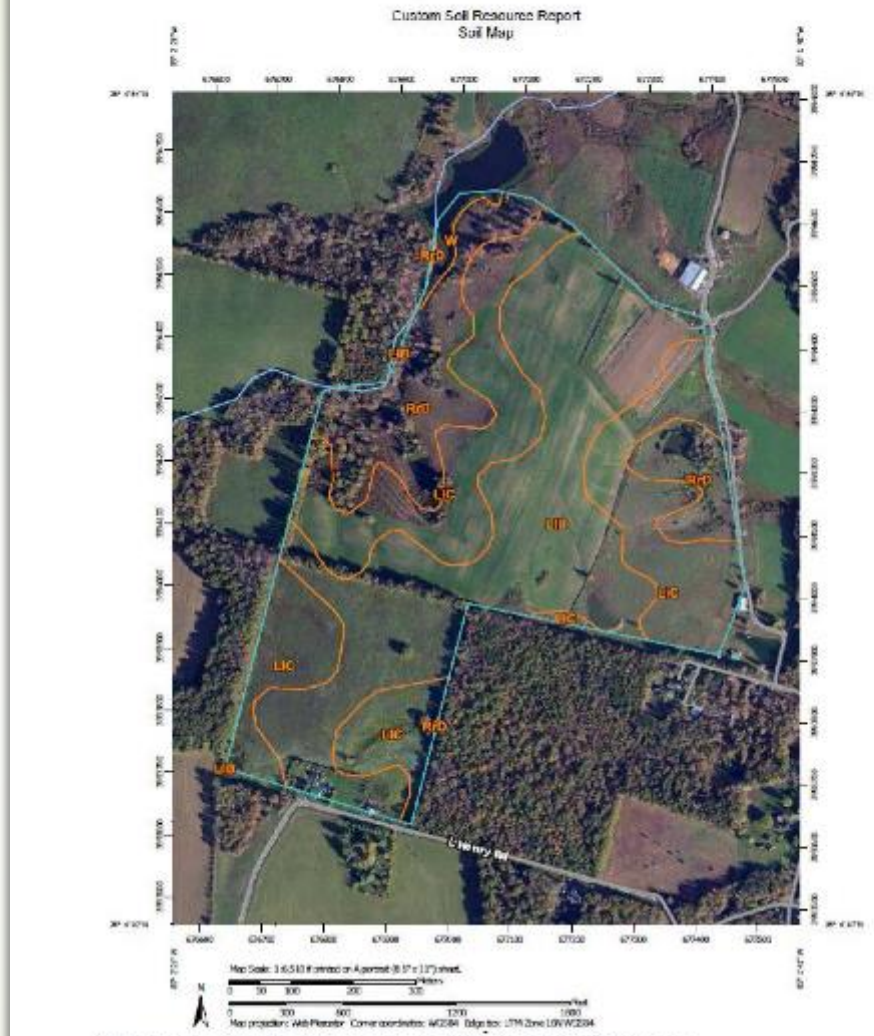
Crop, Pasture, Range, other Lands (Land Treatment)

- Plan Map(s)
  - Show existing and proposed practices
  - Shows all of the planning area
- Not necessary to duplicate if already addressed



Crop, Pasture, Range, other Lands (Land Treatment)

- Soil Map(s)
  - Soil Descriptions
- Other Resource Maps (as needed)
  - Wetlands
  - Karst
- Not necessary to duplicate if already addressed



1 Sample Soils Map from Web Soil Survey

Crop, Pasture, Range, other Lands (Land Treatment)

- Record of Decisions
  - Planning Land Unit (PLU)
  - NRCS Practice
  - Planned amount and date
  - Brief description
  - Applied amount and date (when completed)

Residue and Tillage Management, No Till (Code 329)
The residue and tillage management no till/strip till/direct seed practice addresses the amount, orientation, and distribution of crop and other plant residue on the soil surface year round. Crops are planted and grown in narrow slots or tilled strips established in the untilled seedbed of the previous crop. See the attached Implementation Requirements document for 345 Residue and Tillage Management (reduced till) for the planned rotation and tillage system.

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
1234	1	28.5 ac	2007-09-01		
1234	2	20.5 ac	2007-09-01		
1234	3	64.2 ac	2007-09-01		
1234	4	33.9 ac	2007-09-01		
1234	5	26.5 ac	2007-09-01		
1234	6	22.5 ac	2007-09-01		
1234	6	17.5 ac	2007-09-01		

Filter Strip (Code 393)
A filter strip is an area of vegetation established for removing sediment, organic material, and other pollutants from runoff and wastewater. See the attached Implementation Requirements for the Field Border.

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
1234	1	1.3 Acres	May 2009		
1234	7	1.9 Acres	May 2009		

Grassed Waterway (Code 412)
A grassed waterway is a shaped or graded channel that is established with suitable vegetation to convey surface water at a non-erosive velocity using a broad and shallow cross section to a stable outlet. Maintain the Grassed Waterway per Operation and Maintenance specified in the Implementation Requirements attached.

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
1234	3			3.1 ac	May 2003

Nutrient Management (Code 590)
Nutrient management involves managing the amount, placement, and timing of plant nutrients to obtain optimum yields and minimize the risk of surface and groundwater pollution. See the attached Nutrient Management Implementation Requirements for application and maintenance.

Tract	Land Unit	Planned Amount	Planned Date	Applied Amount	Applied Date
1234	1	28.5 ac	2007-09-01		
1234	2	20.5 ac	2007-09-01		
1234	3	64.2 ac	2007-09-01		
1234	4	33.9 ac	2007-09-01		
1234	5	26.5 ac	2007-09-01		
1234	6a	22.5 ac	2007-09-01		
1234	6b	17.5 ac	2007-09-01		
1234	7	49.4 ac	2007-09-01		

All NRCS conservation practices shall be installed, operated and maintained according to NRCS conservation practice standards and associated technical specifications contained in the **Implementation Requirements**.

Crop, Pasture, Range, other Lands (Land Treatment)

- Record of Decisions
  - What to include and not to include in the CNMP, that is the question?
  - 7 CFR 1466.7(d) - If an EQIP plan of operations includes an animal waste storage or treatment facility to be implemented on an AFO, the participant must agree to develop and implement a CNMP by the end of the **contract period**.

Crop, Pasture, Range, other Lands (Land Treatment)

- Assessment Tools
  - **RUSLE2**

USDA NRCS Natural Resources Conservation Service

RUSLE2 Profile Erosion Calculation Record

Info:

File: profiles\default

Access Group: R2_NRCS_Fld_Office

Inputs:

Location	Soil	Slope length (horiz)	Avg. slope steepness, %
USA\North Carolina\Guilford County	Guilford County, North Carolina\ApB Appling sandy loam, 2 to 6 percent slopes\Appling Sandy loam 92%	150	6.0

Management	Vegetation	Yield units	# yield units, #/ac
managements\CMZ 66\b Mullti-year Rotation Templates\A01. GRAIN or COTTON\01. CORN + SOYBEAN\A01. 2YR. CORN / SOYBEAN (w fall covers)	vegetations\Corn, grain	bushels	125.00
managements\CMZ 66\b Mullti-year Rotation Templates\A01. GRAIN or COTTON\01. CORN + SOYBEAN\A01. 2YR. CORN / SOYBEAN (w fall covers)	vegetations\Rye, winter cover, mid south	pounds	5000.0
managements\CMZ 66\b Mullti-year Rotation Templates\A01. GRAIN or COTTON\01. CORN + SOYBEAN\A01. 2YR. CORN / SOYBEAN (w fall covers)	vegetations\Soybean, southern 7in rows	bu	40.000
managements\CMZ 66\b Mullti-year Rotation Templates\A01. GRAIN or COTTON\01. CORN + SOYBEAN\A01. 2YR. CORN / SOYBEAN (w fall covers)	vegetations\Rye, winter cover, mid south	pounds	4500.0

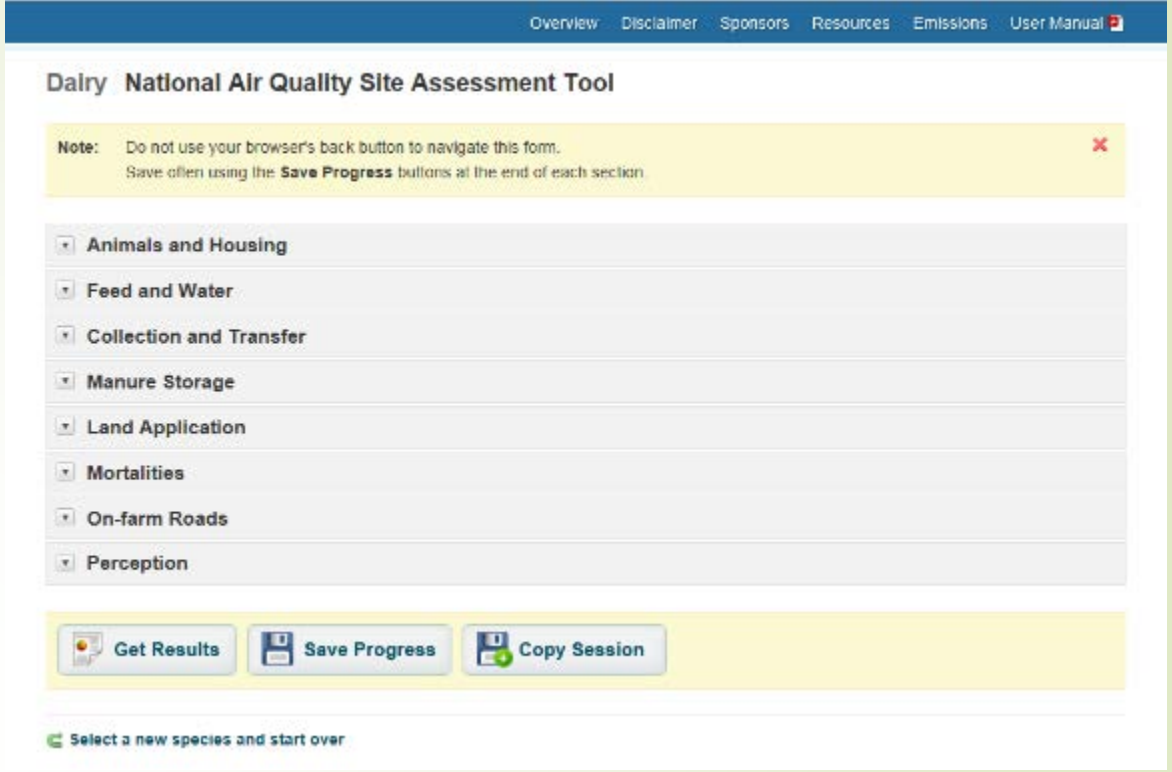
Contouring	Strips/barriers	Diversion/terrace, sediment basin	Subsurface drainage	Adjust res. burial level	General yield level	Rock cover, %
a. rows up-and-down hill	(none)	(none)	(none)	Normal res. burial	Base yield	0

Outputs:

T value	Soil loss erod. portion	Detachment on slope	Soil loss for cons. plan	Sediment delivery	Net C factor	Net K factor	Crit. slope length	Surf. cover after planting, %
5.0	0.54	0.54	0.54	0.54	0.018	0.20	150	

Crop, Pasture, Range, other Lands (Land Treatment)

- Assessment Tools
  - RUSLE2
  - **National Air Quality Site Assessment Tool (NAQSAT)**
  - Other (as needed)



	Odor	Particulate Matter	Ammonia	Hydrogen sulfide	Methane	Volatile organic compounds (VOCs)	Nitrous Oxide (N_2O)
Animals and Housing							N/A
Feed and Water	*Sheet not completed.*						
Collection and Transfer							N/A
Manure Storage		N/A					
Land Application		N/A					N/A
Mortalities		N/A					N/A
On-farm Roads				N/A	N/A		N/A
Perception			N/A	N/A	N/A	N/A	N/A

Crop, Pasture, Range, other Lands (Land Treatment)

- Implementation Requirements
  - Include if part of the assessment process

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

340 - Cover Crop
Implementation Requirements

Producer: John Doe
Location: Holstein, TN
Farm Name: _____
Project or Contract: _____
County: Morgan
Tract Number: 1234

Practice Location Map

(showing detailed aerial view of where practice is to be installed on farm/site, showing all major components, stationing, relative location to any landmarks, and survey benchmarks)

Index

- ✓ Cover Sheet
- ✓ Specifications
- ___ Cost Estimate and Project Bid Form
- ✓ Operation & Maintenance

Utility Safety / One-Call System Information

Description of work:
Establish cover Crops after Corn Silage on all crop fields

NRCS Review Only

Designed By:	Norman Widman	Date: 2/26/2015
Checked By:	J Roberts	Date: 2/26/2015
Approved By:	Norman Widman	Date: 2/26/2015

NRCS
February 2013

Page 1 of 3

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340 - Cover Crop
Implementation Requirements

The Practice Purpose(s):

✓ Reduce erosion from wind and water.
___ Increase soil organic matter content.
✓ Capture and recycle or redistribute nutrients in the soil profile.
___ Promote biological nitrogen fixation and reduce energy use.
___ Increase biodiversity.
___ Suppress weeds.
___ Manage soil moisture.
___ Minimize and reduce soil compaction.

Seeding and Management: *Fill in the following table with the appropriate cover crop information for each field.*

Field #	Acres	Species	Seeding rate (lbs/ac PLS*)	Seeding date range	Seeding method	Termination date or stage	Termination method
1, 2, 6b	66.9	Rye	80	Sept	No Till Drill	Harvest Silage April	Chemical Kill
3, 4, 5, 6a	137.7	Rye	80	Sept	No Till Drill	1 Wk Prior to Plant Corn	Chemical Kill

** To figure Pure Live Seed (PLS) rates, multiply the percent purity by the percent germination. Divide the seeding rate by the percent PLS to find the bulk seed needed per acre. For example: 98% purity X 60% germination = 0.588% PLS 10 lbs/acre X 0.588% PLS = 17 lbs/acre.*

340 - Cover Crop
Implementation Requirements

Soil Amendments, if needed. *Apply soil amendments prior to seedbed preparation or before seeding if a no-till drill is used.*

Field	N fertilizer needed (lbs/acre)	K20 fertilizer needed (lbs/acre)	P2O5 fertilizer needed (lbs/acre)
	NA	NA	NA

Additional specifications:

OPERATION AND MAINTENANCE

✓ Control growth of the cover crop to reduce competition from volunteer plants and shading.

___ Control weeds in cover crops by mowing or by using other pest management techniques.

___ Control soil moisture depletion by selecting water efficient plant species and terminating the cover crop before excessive transpiration.

✓ Evaluate the cover crop to determine if the cover crop is meeting the planned purpose(s). If the cover crop is not meeting the purpose(s) adjust the management, change the species of cover crop, or choose a different technology.

Crop, Pasture, Range, other Lands (Land Treatment) Implementation Requirements

- Implementation Requirements for inclusion in plan
  - Cover practices
  - Tillage practices

- Implementation Requirements not generally included in plan
  - Engineering practices

Crop, Pasture, Range, other Lands (Land Treatment) Implementation Requirements

- Where to find Implementation Requirements
- http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/technical/cp/ncps/?cid=nrcs143_026849

Conservation Practices

Alphabetical Index

A-C, D-F, G-I, K-M, N-P, Q-R, S-T, U-Z

Conservation Practice Name (Units) (Code) (Date Issued)	Standard PDF	Standard Word	Info Sheet/ Practice Overview	CPPE	Job Sheet/ Implement Require	National Statement of Work Template	Network Effects Diagram
Access Control (Ac.) (472) (9/10)	PDF	DOC	PDF	PDF	DOC	DOC	PDF
Access Road (Ft.) (560) (9/14)	PDF	DOC	PDF	PDF		DOC	PDF
Agrichemical Handling Facility (No.) (309) (9/14)	PDF	DOC	PDF	PDF		DOC	PDF
Air Filtration and Scrubbing (No.) (371) (4/10)	PDF	DOC	PDF	PDF		DOC	PDF
Alley Cropping (Ac.) (311) (5/11)	PDF	DOC	PDF	PDF	DOC	DOC	PDF

CNMP - Nutrient Management Plan

- Effective, understandable and helpful plans
- Fair balance of production and environmental interests

Photo credit Steven Wayne

CNMP - Nutrient Management Plan

- Risk Analyses (Soil Erosion, Nitrogen, and Phosphorous)
- Manure Application Setback Distances
- Soil Test Data
- Manure Nutrient Analyses
- Planned Crops, Fertilizer Recommendations, Nutrient Applications
- Field Nutrient Balance
- Annual Summary – Manure Inventory
- Annual Summary – Fertilizer Material
- Plan Nutrient Balance

CNMP-Nutrient Management Plan

- Risk Analyses Results
  - Soil Erosion
  - Nitrogen
  - Phosphorous

Implementation Requirements

Nutrient Management (Code 590)

Nitrogen and Phosphorus Risk Analyses

Tennessee Phosphorus Index

Field	Crop Year	Site and Transport Factor	Mgmt. and Source Factor	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
1	2008	13	2	26	26	Low
1	2009	13	2	26	26	Low
1	2010	13	2	26	26	Low
2	2008	13	2	26	26	Low
2	2009	13	2	26	26	Low
2	2010	13	2	26	26	Low
3	2008	6	4	24	24	Low
3	2009	6	4	24	24	Low
3	2010	6	4	24	24	Low
4	2008	6	20	24	120	Medium
4	2009	6	20	24	120	Medium
4	2010	6	20	24	120	Medium
5	2008	15	27	120	405	Very High
5	2009	15	27	120	405	Very High
5	2010	15	27	120	405	Very High
6a	2008	15	18	60	270	High
6a	2009	15	18	60	270	High
6a	2010	15	18	60	270	High

CNMP-Nutrient Management Plan

- Risk Analyses Results
  - Soil Erosion
  - Nitrogen
  - Phosphorous

Implementation Requirements

Nutrient Management (Code 590)

Nitrogen and Phosphorus Risk Analyses

Tennessee Phosphorus Index

Field	Crop Year	Site and Transport Factor	Mgmt. and Source Factor	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
1	2008	13	2	26	26	Low
1	2009	13	2	26	26	Low
1	2010	13	2	26	26	Low
2	2008	13	2	26	26	Low
2	2009	13	2	26	26	Low
2	2010	13	2	26	26	Low
3	2008	6	4	24	24	Low
3	2009	6	4	24	24	Low
3	2010	6	4	24	24	Low
4	2008	6	20	24	120	Medium
4	2009	6	20	24	120	Medium
4	2010	6	20	24	120	Medium
5	2008	15	27	120	405	Very High
5	2009	15	27	120	405	Very High
5	2010	15	27	120	405	Very High
6a	2008	15	18	60	270	High
6a	2009	15	18	60	270	High
6a	2010	15	18	60	270	High

CNMP-Nutrient Management Plan

- Manure Application Setback Distances

Manure Application Setback Distances and Buffers

Field	Distance to Water (Feet)	Slope Length (Feet)	Buffer Width (Feet)	Tillage/Cover Type
1	31	50	None	Pasture/Hay
2	101	50	None	Pasture/Hay
3	32	100	30	No-till w/ heavy residues
4	33	100	30	No-till w/ heavy residues
5	212	50	None	No-till w/ heavy residues
6a	350	50	None	No-till w/ heavy residues
6b	1,068	50	None	Pasture/Hay
7	31	100	30	Pasture/Hay

CNMP-Nutrient Management Plan

- Soil Test Data
- Manure Nutrient Analyses

Soil Test Data

Field	Test Year	OM (%)	P Test Used	P	K	Mg	Ca	Units	Soil pH	Buffer pH	CEC (meq/ 100g)
1	2003		Mehlich-1	40	128			lbs/a	6.3		
2	2003		Mehlich-1	40	128			lbs/a	6.3		
3	2003		Mehlich-1	76	196			lbs/a	7.0		
4	2003		Mehlich-1	220	340			lbs/a	6.4		
5	2003		Mehlich-1	250	488			lbs/a	5.6		
6a	2003		Mehlich-1	86	208			lbs/a	6.0		
6b	2003		Mehlich-1	86	208			lbs/a	6.0		
7	2003		Mehlich-1	362	688			lbs/a	6.0		

Manure Nutrient Analyses

Manure Source	Dry Matter (%)	Total N	NH_3-N	Total P_2O_5	Total K_2O	Avail. P_2O_5	Avail. K_2O	Units	Analysis Source and Date
Holding pond		10.0	5.0	3.0	12.5	3.0	12.5	Lb/1000Gal	Lab analysis 11/08/2003; no NH4-N so assume 50%.
Calf shed		6.1	1.2	2.3	2.7	2.3	2.7	Lb/Ton	MMP Estimate

(1) Entered analysis may be the average of several individual analyses.
(2) Tennessee assumes that 100% of manure phosphorus and 100% of manure potassium is crop available. First-year per-acre nitrogen availability for individual manure applications is given in the Planned Nutrient Applications table. For more information about nitrogen availability in Tennessee, see "Manure Application Management," Tables 3 and 4, Tennessee Extension, PB1510, 2/94 (http://wastemgmt.ag.utk.edu/Pubs/PB1510.pdf).

CNMP-Nutrient Management Plan

- Planned Crops
- Realistic Yield Goals
- Fertilizer Recommendations

Planned Crops and Fertilizer Recommendations

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P_2O_5 Rec (Lbs/A)	K_2O Rec (Lbs/A)	N Removed (Lbs/A)	P_2O_5 Removed (Lbs/A)	K_2O Removed (Lbs/A)	Custom Fert. Rec. Source
1	2008	Corn silage	22.0 Ton	150	0	160	183	79	183	
1	2009	Grass-clover hay new	4.0 Ton	30	0	60	200	60	240	
1	2010	Grass-clover hay maint	6.0 Ton	60	0	30	300	90	360	
2	2008	Grass-clover hay maint	6.0 Ton	60	0	30	300	90	360	
2	2009	Corn silage	22.0 Ton	150	0	160	183	79	183	
2	2010	Grass-clover hay new	4.0 Ton	30	0	60	200	60	240	
3	2008	Small grain cover*		0	0	0	0	0	0	
3	2008	Corn silage	22.0 Ton	150	0	0	183	79	183	
3	2009	Small grain cover*		0	0	0	0	0	0	
3	2009	Corn silage	22.0 Ton	150	0	0	183	79	183	
3	2010	Small grain cover*		0	0	0	0	0	0	
3	2010	Corn silage	22.0 Ton	150	0	0	183	79	183	
4	2008	Small grain cover*		0	0	0	0	0	0	
4	2008	Corn silage	22.0 Ton	150	0	0	183	79	183	
4	2009	Small grain cover*		0	0	0	0	0	0	
4	2009	Corn silage	22.0 Ton	150	0	0	183	79	183	
4	2010	Small grain cover*		0	0	0	0	0	0	
4	2010	Corn silage	22.0 Ton	150	0	0	183	79	183	
5	2008	Small grain cover*		0	0	0	0	0	0	
5	2008	Corn silage	22.0 Ton	150	0	0	183	79	183	
5	2009	Small grain cover*		0	0	0	0	0	0	
5	2009	Corn silage	22.0 Ton	150	0	0	183	79	183	
5	2010	Small grain cover*		0	0	0	0	0	0	
5	2010	Corn silage	22.0 Ton	150	0	0	183	79	183	

CNMP-Nutrient Management Plan

- Planned Nutrient Applications
- Manure-spreadable fields

Planned Nutrient Applications (Manure-spreadable Area)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/ Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P_2O_5 (Lbs/A)	Avail K_2O (Lbs/A)
1	Oct 2007	Corn silage	0-0-60	Surface broadcast	1-yr K	266 Lbs		0 Lbs	0.0	0	0	160
1	Jun 2008	Corn silage	28-0-0	Surface band	1-yr N	51 Gal		0 Gal	0.0	152	0	0
1	Oct 2008	Grass-clover hay new	0-0-60	Surface broadcast	1-yr K	100 Lbs		0 Lbs	0.0	0	0	60
5	Mar 2009	Corn silage	Holding pond	Aerway unit, Not incorporated	Custom	22,000 Gal	1.1 mph	539,900 Gal	24.5	99	66	275
5	Apr 2009	Corn silage	Holding pond	Aerway unit, Not incorporated	Custom	22,000 Gal	1.1 mph	50,600 Gal	2.3	99	66	275
6a	Oct 2007	Corn silage	Calf shed	Flail spreader, Not incorporated	Custom	15 Ton	84.5 Lds	253.5 Ton	16.9	36	35	41
6a	Jun 2008	Corn silage	28-0-0	Surface band	Supp. N	39 Gal		659 Gal	16.9	116	0	0
6a	Oct 2008	Corn silage	Calf shed	Flail spreader, Not incorporated	Custom	15 Ton	84.5 Lds	253.5 Ton	16.9	36	35	41
6a	Jun 2009	Corn silage	28-0-0	Surface band	Supp. N	36 Gal		608 Gal	16.9	107	0	0

CNMP-Nutrient Management Plan

- Planned Nutrient Applications
- Fields not receiving manure

Planned Nutrient Applications (Non-manure-spreadable Area)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P_2O_5 (Lbs/A)	Avail K_2O (Lbs/A)
1	Oct 2007	Corn silage	0-0-60	Surface broadcast	1-yr K	266 Lbs	7,608 Lbs	28.6	0	0	160
1	Jun 2008	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	1,459 Gal	28.6	152	0	0
1	Oct 2008	Grass-clover hay new	0-0-60	Surface broadcast	1-yr K	100 Lbs	2,860 Lbs	28.6	0	0	60
1	Jun 2009	Grass-clover hay new	33-0-0	Surface broadcast	1-yr N	90 Lbs	2,574 Lbs	28.6	30	0	0
1	Oct 2009	Grass-clover hay maint	0-0-60	Surface broadcast	1-yr K	50 Lbs	1,430 Lbs	28.6	0	0	30
1	May 2010	Grass-clover hay maint	33-0-0	Surface broadcast	1-yr N	181 Lbs	5,177 Lbs	28.6	60	0	0
2	Oct 2007	Grass-clover hay maint	0-0-60	Surface broadcast	1-yr K	50 Lbs	1,040 Lbs	20.8	0	0	30
2	May 2008	Grass-clover hay maint	33-0-0	Surface broadcast	1-yr N	181 Lbs	3,765 Lbs	20.8	60	0	0
2	Oct 2008	Corn silage	0-0-60	Surface broadcast	1-yr K	266 Lbs	5,533 Lbs	20.8	0	0	160
2	Jun 2009	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	1,061 Gal	20.8	152	0	0
2	Oct 2009	Grass-clover hay new	0-0-60	Surface broadcast	1-yr K	100 Lbs	2,080 Lbs	20.8	0	0	60
2	Jun 2010	Grass-clover hay new	33-0-0	Surface broadcast	1-yr N	90 Lbs	1,872 Lbs	20.8	30	0	0
3	Jun 2008	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	2,764 Gal	54.2	152	0	0
3	Jun 2009	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	2,764 Gal	54.2	152	0	0
3	Jun 2010	Corn silage	28-0-0	Surface band	1-yr N	51 Gal	2,764 Gal	54.2	152	0	0

CNMP-Nutrient Management Plan

- Field Nutrient Balance
- Manure-spreadable fields
- Fields not receiving manure

Field Nutrient Balance (Manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[1]			Nutrients Applied[2]			Balance After Recs[3]			Balance After Removal[4]	
		Acres		/Acre	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	P_2O_5 Lb/A	K_2O Lb/A
2008	4	33.9	Small grain cover		0	0	0								
2008	4	33.9	Corn silage	22	150	0	0	152	57	238	2	57	238	-22	55
2009	4	33.9	Small grain cover		0	0	0								
2009	4	33.9	Corn silage	22	150	0	0	137	57	238	0†	114	476	-22	110
2010	4	33.9	Small grain cover		0	0	0								
2010	4	33.9	Corn silage	22	150	0	0	131	57	238	0†	171	714	-22	165

Field Nutrient Balance (Non-manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[1]			Nutrients Applied[2]			Balance After Recs[3]			Balance After Removal[4]	
		Acres		/Acre	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	N Lb/A	P_2O_5 Lb/A	K_2O Lb/A	P_2O_5 Lb/A	K_2O Lb/A
2008	1	28.6	Corn silage	22	150	0	160	152	0	160	2	0	0	-79	-23
2009	1	28.6	Grass-clover hay new	4	30	0	60	30	0	60	0	0	0	-60	-180
2010	1	28.6	Grass-clover hay maint	6	60	0	30	60	0	30	0	0	0	-90	-330
Total	**1**				**240**	**0**	**250**	**242**	**0**	**250**					
2008	2	20.8	Grass-clover hay maint	6	60	0	30	60	0	30	0	0	0	-90	-330
2009	2	20.8	Corn silage	22	150	0	160	152	0	160	2	0	0	-79	-23
2010	2	20.8	Grass-clover hay new	4	30	0	60	30	0	60	0	0	0	-60	-180
Total	**2**				**240**	**0**	**250**	**242**	**0**	**250**					
2008	3	54.2	Small grain cover		0	0	0								
2008	3	54.2	Corn silage	22	150	0	0	152	0	0	2	0	0	-79	-183
2009	3	54.2	Small grain cover		0	0	0								
2009	3	54.2	Corn silage	22	150	0	0	152	0	0	2	0	0	-79	-183
2010	3	54.2	Small grain cover		0	0	0								
2010	3	54.2	Corn silage	22	150	0	0	152	0	0	2	0	0	-79	-183
Total	**3**				**450**	**0**	**0**	**456**	**0**	**0**					

CNMP-Nutrient Management Plan

- Annual Summary – Manure Inventory

Manure Inventory Annual Summary

Manure Source	Plan Period	On Hand at Start of Period	Total Generated	Total Imported	Total Trans-ferred In	Total Applied	Total Exported	Total Trans-ferred Out	On Hand at End of Period	Units
Holding pond	Sep '07 - Aug '08	450,000	1,244,000	0	0	1,234,600	0	0	459,400	Gal
Calf shed	Sep '07 - Aug '08	220	264	0	0	254	0	0	231	Ton
Holding pond	Sep '08 - Aug '09	459,400	1,244,000	0	0	1,234,400	0	0	469,000	Gal
Calf shed	Sep '08 - Aug '09	231	264	0	0	254	0	0	241	Ton
Holding pond	Sep '09 - Aug '10	469,000	1,244,000	0	0	1,232,200	0	0	480,800	Gal
Calf shed	Sep '09 - Aug '10	241	264	0	0	254	0	0	252	Ton

CNMP-Nutrient Management Plan

- Annual Summary – Fertilizer Material

Fertilizer Material Annual Summary

Product Analysis	Plan Period	Product Needed Sep - Dec	Product Needed Jan - Aug	Total Product Needed	Units
0-0-60	Sep '07 - Aug '08	8,648	0	8,648	Lbs
28-0-0	Sep '07 - Aug '08	0	6,115	6,115	Gal
33-0-0	Sep '07 - Aug '08	4,446	35,753	40,199	Lbs
0-0-60	Sep '08 - Aug '09	8,393	0	8,393	Lbs
28-0-0	Sep '08 - Aug '09	0	5,362	5,362	Gal
33-0-0	Sep '08 - Aug '09	4,446	36,637	41,083	Lbs
0-0-60	Sep '09 - Aug '10	3,510	0	3,510	Lbs
28-0-0	Sep '09 - Aug '10	0	5,326	5,326	Gal
33-0-0	Sep '09 - Aug '10	4,446	36,985	41,431	Lbs

CNMP-Nutrient Management Plan

- Plan Nutrient Balance
- Manure-spreadable fields

Plan Nutrient Balance (Manure-spreadable Area)

	N (Lbs)	P_2O_5 (Lbs)	K_2O (Lbs)
Total Manure Nutrients on Hand at Start of Plan[1]	5,842	1,856	6,219
Total Manure Nutrients Collected[2]	42,151	13,018	48,788
Total Manure Nutrients Imported[3]	0	0	0
Total Manure Nutrients Exported[4]	0	0	0
Total Manure Nutrients Gained/Lost In Transfer[5]	0	0	0
Total Manure Nutrients on Hand at End of Plan[6]	6,342	2,021	6,689
Total Manure Nutrients Applied[7]	41,675	12,878	48,393
Available Manure Nutrients Applied (Utilized by plan's crops)[8]	20,962	12,878	48,393
Available Manure Nutrients Applied (Not utilized by plan's crops)[9]	1,878	0	0
Commercial Fertilizer Nutrients Applied (Utilized by plan's crops)[10]	14,154	0	0
Commercial Fertilizer Nutrients Applied (Not utilized by plan's crops)[11]	0	0	0
Available Nutrients Applied (Manure and fertilizer; utilized by plan's crops)[12]	35,116	12,878	48,393
Nutrient Utilization Potential[13]	34,920	18,391	42,602
Nutrient Balance of Spreadable Acres[14*]	196	-5,513	5,791
Average Nutrient Balance per Spreadable Acre per Year[15*]	1	-24	25

1. Values indicate total manure nutrients present in storage(s) at the beginning of the plan.
2. Values indicate total manure nutrients collected on the farm.
3. Values indicate total manure nutrients imported onto the farm.
4. Values indicate total manure nutrients exported from the farm to an external operation.
5. Values indicate changes in total manure nutrients due to internal transfers between storage units with differing analyses.
6. Values indicate total manure nutrients present in storage(s) at the end of plan.
7. Values indicate total nutrients present in land-applied manure. Losses due to rate, timing and method of application are not included in these values.
8. Values indicate available manure nutrients applied on the farm based on rate, time and method of application. These values are based on the total manure nutrients applied (row 7) after accounting for state-specific nutrient losses due to rate, time and method of application. Nutrients which will not be utilized by crops in the plan (row 9) are excluded from these values.
9. Values indicate manure nutrients applied that will be utilized by crops outside the plan.
10. Values indicate nutrients applied as commercial fertilizers and nitrates contained in irrigation water. Nutrients that will not be utilized by crops in the plan (row 11) are excluded from these values.
11. Values indicate nutrients applied as commercial fertilizer which will be utilized by crops outside the plan.
12. Values are the sum of available manure nutrients applied (row 8) and commercial fertilizer nutrients applied (row 10).

CNMP-Nutrient Management Plan

- Plan Nutrient Balance
- Fields not receiving manure

Plan Nutrient Balance (Non-manure-spreadable Area)

	N (Lbs)	P_2O_5 (Lbs)	K_2O (Lbs)
Commercial Fertilizer Nutrients Applied[1]	76,547	0	12,350
Nutrient Utilization Potential[2]	76,074	0	12,350
Nutrient Balance of Non-spreadable Acres[3*]	473	0	0
Average Nutrient Balance per Non-spreadable Acre per Year[4*]	1	0	0

1. Values indicate nutrients applied as commercial fertilizers and nitrates contained in irrigation water.
2. Values indicate nutrient utilization potential of crops grown based on crop fertilizer recommendations.
3. Values indicate commercial fertilizer nutrients applied (row 1) minus crop nutrient utilization potential (row 2). Negative values indicate additional nutrient utilization potential and positive values indicate over-application.
4. Values indicate average per acre nutrient balance. Values are calculated by dividing nutrient balance of non-spreadable acres (row 3) by number of non-spreadable acres in plan. Negative values indicate additional average per acre nutrient utilization potential and positive values indicate average per acre over-application.

* Non-trivial, positive values for N indicate that the plan was not properly developed. Negative values for N indicate additional nutrient utilization potential which may or may not be intentional. Positive values for P_2O_5 and/or K_2O do not necessarily indicate that the plan was not developed properly. For example, multiple year applications may have been planned during the final plan year(s) and these nutrients will not be utilized by crops in the current plan. Negative values for P_2O_5 and K_2O indicate that applications to some fields may have been delayed to allow the producer to apply the nutrients in accordance with their fertilization schedule.

CNMP - Nutrient Management Plan

- Effective, understandable and helpful plans
- Fair balance of production and environmental interests

Contents – Case File

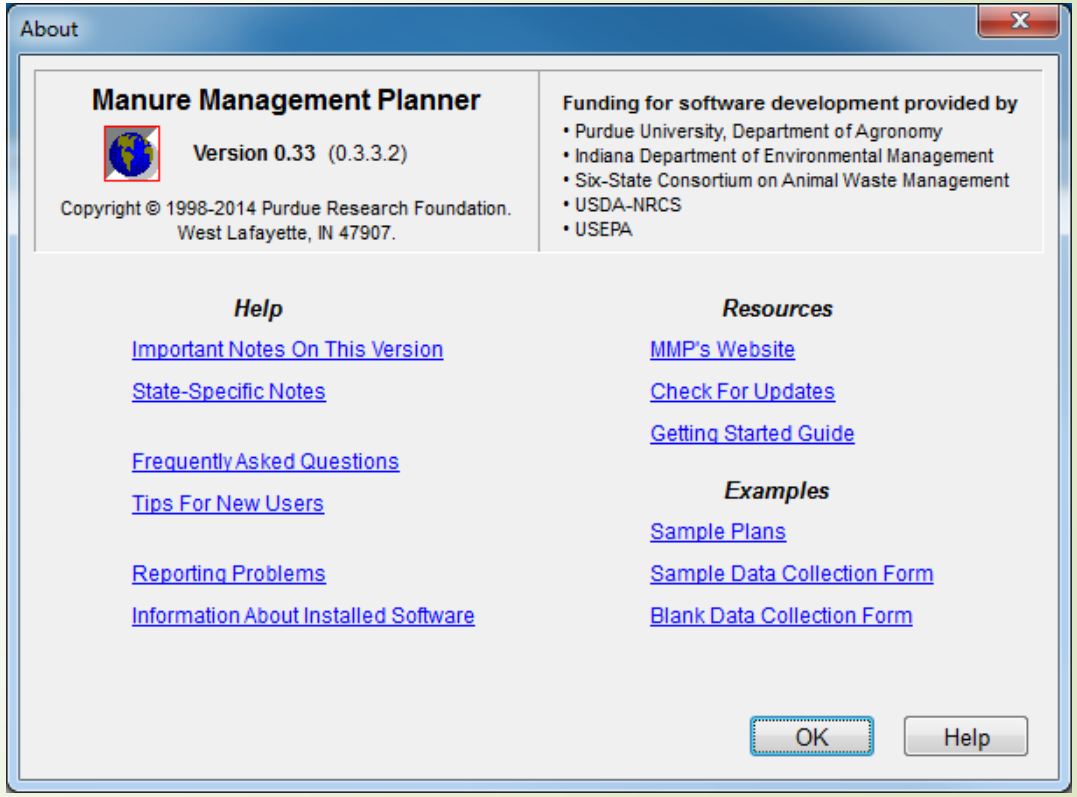
- Supporting Information kept in the case file:
  - In addition to NPPH Title 180 part 600.31 Section C include:
    - Conservation Plan and record of decisions (practice schedule) with planner, decision maker and other required signatures
    - Maps used in the CNMP development process—e.g. soils, map of farmstead, land treatment maps and any other maps needed to communicate existing and planned practices
    - Forms and worksheets used in developing and evaluating alternatives, notes and computations to support all practice design documentation

Contents – Case File

- Supporting Information kept in the case file:
  - In addition to NPPH Title 180 part 600.31 Section C include:
    - Inventory and analysis information (includes all resource concern assessments (e.g. erosion, N leaching index, P index, water quality assessments, livestock inventory, manure/waste estimated production, manure imports/exports, irrigation assessments, manure storage and evaluation of their integrity/capacity, site feasibility data if needed such as topographic survey, soil boring or flood zone info)
    - All completed implementation requirements/engineering plans
    - All electronic files used for design and nutrient management planning
    - Record keeping as appropriate

How about the software?

- Updates to Manure Management Planner based on input from states
- Development of templates for states
- Webinars or other on-line helps for utilizing technology tools
- TBA



Communication is Key

- Site Visits are essential for a good quality CNMP
- Communication between involved parties

The End

Questions

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