

# AgWG Meeting

## NutMan 4.0

Status Update  
Nick Stone, Virginia Tech  
December 2013

# NutMan Project Background

- NutMan was developed in the late 1990's to help VA DCR develop Nutrient Management Plans
- Spin-off from a whole-farm planning system developed at Virginia Tech
- Simple concept:
  - ▣ Help Nutrient Management Specialists write plans in accordance with Virginia Standards & Criteria
  - ▣ Provide a means to expand the number of planners



# NutMan Background, cont'd

- NutMan 2.0 was a PC-based program
  - ▣ Plans were files shared on disk or by email
  - ▣ Program reporting depended on...
    - Individual planners generating reports
    - Collecting and combining reports centrally
- PC laptop delivery system
  - ▣ Easy to share and deliver on disk or via web
  - ▣ Hard to upgrade in a coordinated way
  - ▣ Difficult to track planning activity

# NutMan Background, cont'd

- Initially purely voluntary program
- By the 2000's
  - ▣ Increased complexity
  - ▣ Increased regulation
  - ▣ Increased importance of quality control
  - ▣ Increased emphasis on reporting
  - ▣ Dependence on spatial information

**Nutrient Applications**

View: ☒ By Field Tract: Tract 1 Field: Field 1 ☐ By Season Year: 2003 Season: Fall

Tract/Field/Year/Season	Crop	5-(30)-(90)	9 k gal	5-0-0
Fa-2003	Barley (grain)	5-(30)-(90)	*	0-0-0
Wi-2003	Barley (grain)	5-(30)-(90)	*	0-0-0
Sp-2004	Barley (grain)	5-(30)-(90)	*	0-0-0
Su-2004	Corn (silage)	150-50-70	*	0-0-0
Fa-2004	Barley (grain)	95-130-150	*	0-0-0
Wi-2004	Barley (grain)	95-130-150	*	0-0-0
Sp-2005	Barley (grain)	95-130-150	*	0-0-0

**Manure/Biosolid** Commercial Fertilizer Lime

Manure/Biosolid Method: lagoon BC >= 7 day amt: 9 units: kgals Application Method: Incorporated after 7 days or no incorporation

Manure/Biosolid: Excess 5161.64 kgals Allowed/acre N/A kgals Available/acre 4103.54 kgals

Per Acre Amt to allocate: 9 kgals Calculate based on N

Manure/Biosolid nutrient value - lbs/ton or kgal: PAN: 8.87 P205: 12.07 K20: 18.92

P205 Allocation: to Meet Rotation Need: 17.51 kgals to Meet Crop Need: -2.37 kgals to Match Rotation Removal: 9.32 kgals to Match Crop Removal: -6.08 kgals

Usable Acres: 10

Balance	Before Comm.	After Comm.
N	5	1
P	(30)	(29)
K	(90)	(90)

Cancel OK

Tract: tract1 Location: Montgomery  
(H = H based, 1P = P based, 1.5P = P based at 1.5 removal, 0P = P removal ignored)

Field CFSA No. /Name	Size (ac) Total/ Used	Yr.	Crop	Needs H-P-K (lbs/ac)	Leg Man Resid	Manure/Biosol Rate & Type (season)	IT (d)	Man Bios H-P-K (lbs/ac)	Het = Needs - applied H-P-K (lbs/ac)	Sum P rem cred	Commercial H-P-K (lbs/ac)	Notes
1/field1(1P)	7/7	2005	Corn (grain)	130-120-120	0/0	10.k dairy(Sp)	>7	66-108-192	65-10-(70)	50	65-10-0(td)	
			Rye (cover)	0-0-0	0/0				0-0-(70)	50		
		2006	Corn (grain)	130-120-120	0/15	10.k dairy(Sp)	>7	66-108-192	50-10-(140)	99	50-10-0(td)	
			Rye (cover)	0-0-0	0/0				0-0-(140)	99		

Commercial Application Methods:  
br - Broadcast ba - Banded sd - Sidedress

Notes:

# NutMan 4 Project

- Overall Goals:
  - ▣ Improve centralized reporting capability, security
  - ▣ Work toward NEIEN compliance
  - ▣ Retain backward compatibility with earlier versions
- Solution: Client-Server Model for NutMan
  - ▣ Planning on the Client
  - ▣ Reporting on the Server
- Big Changes:
  - ▣ NutMan files go away → web services replace email
  - ▣ Web-based reporting and coordination
  - ▣ GIS/Map integration



# NutMan 4 Project

- Limited Changes for Planners
  - ▣ Planners won't have to learn a new system
  - ▣ Planning process largely unaffected
- Incremental Process
  - ▣ Mapping integration opens doors for improvements
  - ▣ Web-based, client-server model opens doors for app-based approaches

# Client-Server Model

- The Client = NutMan 3.5 with some changes
  - ▣ “Plan” menu replaces the “File” menu ✓
  - ▣ Plan lists replace File Directories on the PC ✓
  - ▣ NutMan will connect to the Server by the Internet ✓
  - ▣ Some data entry changes to structure data better ?
- The Server is Web-based and New
  - ▣ RDBM System includes Plans, VALUES, Standards ✓
  - ▣ Source for future Program Updates, including Soils
    - Client automatically downloads changed DB tables ✓
    - Behind-the-scenes updating of Standards and Criteria ✗

# Changes/Benefits/Costs

## □ Synchronization Requirements

- ▣ Plans must be uniquely identified across Virginia ✓
- ▣ Functionality when there is no connection to the server?
- ▣ Viewing appropriate data by role ✓

## □ Synchronization Benefits

- ▣ Web access to plan information for Planners and Administrators ✓
- ▣ Real time record keeping ✓
- ▣ Central record of each plan's history (submission, review, revision, approval, etc.) ✓

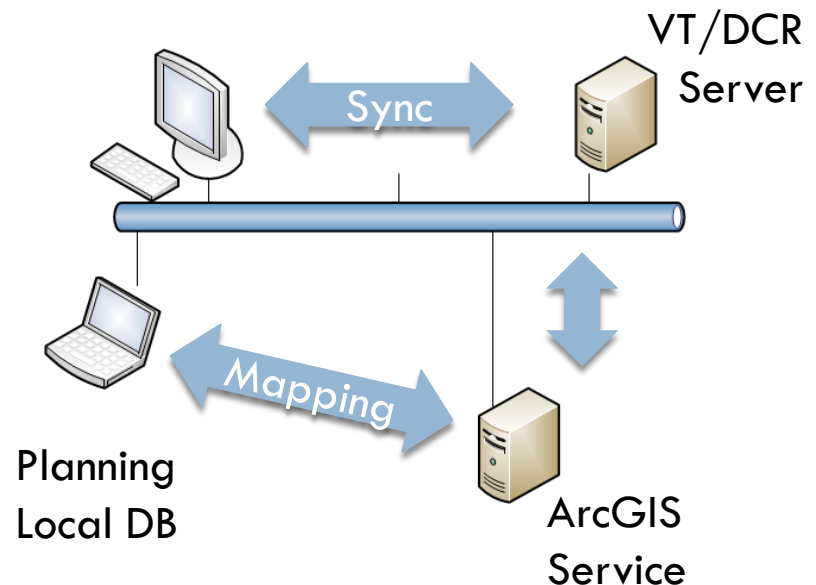


# New Database Structure

- Relational data model for NutMan plan data added 40 tables to the VALUES soils data and manure/biosolid information – now 111 tables
- All accessible to SQL queries, but not an enterprise database system. Maybe a BI solution is in DCR's future

# Communications Structure

- Use Web Services
  - ▣ SOAP & WSDL
  - ▣ Handles Authentication, Synchronization, Communication, Plan services, Table services
- Servers & Services
  - ▣ LAMP (Linux, Apache2,...)
  - ▣ ArcGIS 10.1
  - ▣ Redundant Servers
    - Development
    - Production



# GIS Integration

- Field Mapping
  - ▣ Window within NutMan client connects to ArcGIS ✓
  - ▣ Launched from Edit Field Features Tab ✓
  - ▣ Polygon returned and stored with plan ?
  - ▣ Field location, soils, acreage, from map ✓ ?
- Plan Duplication Check
  - ▣ Server maintains map of all fields in active plans ✓
- Mapping Services on Web

NutMan 3 - Build Date: 10/16/2011

File Edit

Farm Edit Window

Farm Tracts Fields

Field Names

- Diehl/Sauley Farm D-1
- Diehl/Sauley Farm D-2
- Diehl/Sauley Farm D-3
- Diehl/Sauley Farm S-1
- Diehl/Sauley Farm S-2
- Diehl/Sauley Farm S-3
- Diehl/Sauley Farm S-4
- Harrison Farm 1
- Harrison Farm 2
- Harrison Farm 3
- Home/Bader Farm B-1
- Home/Bader Farm B-2
- Home/Bader Farm B-3
- Home/Bader Farm B-4
- Home/Bader Farm B-5
- Home/Bader Farm B-6
- Hoover Farm 1
- Pence Farm P-3-7
- Pence Farm P-1
- Pence Farm P-2
- Pence Farm P-8
- Smith Farm Hay
- Smith Farm Pasture

Features

Name: D-1

FSA No.: 1

Tract: Diehl/Sauley Farm

Location: Rockingham

Acres: 10.6

Usable Acres: 10.6

Tile Drain ☐

Flood Plain ☐

Adjacent to waterways ☐

Irrigated ☐

Sink Holes ☐

Narrative... Update

CBLAD Buffers

Previous Manure

Type: Poultry

Biosolid History ☐

frequency in 5 yrs: frequent (2-3x)

Avg. Rate: 2 wet tons or kgals / acre

lbs per ton or kgal

TKN	62.58
NH4-N	11.75
P205	62.12
K2O	28.57

New Field Remove

Purge

OK Cancel



# Status

- System Components all Functional
  - ▣ Incremental changes still occurring ?
  - ▣ Web Services Completed to Design 1.0 ✓ ?
  - ▣ Central Database is implemented ✓
- Secure Web Access ✓
- Functionality from NutMan client to Web Server is being tested ✓ ?
- GIS Mapping service developed in Blacksburg
  - ▣ Mirrored on Development GIS Server in NVa ?