WVU Extension Crop Fertilization Recommendation Software and Databases

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This document provides future WVU Crop Fertilization Recommendation Software and Database administrators an outline to understand input functions, recommendations, database structure and output produced by this tool.

In 2017, WVU faculty started revising the WVU fertilizer recommendations and report software to update recommendations based on Mehlich 3 soil extraction, crop yield response to soil type, and include commercial vegetable crop recommendations. This new system was implemented in 2018. This document outlines the software used to generate the recommendation report with recommendation, report and customer databases.

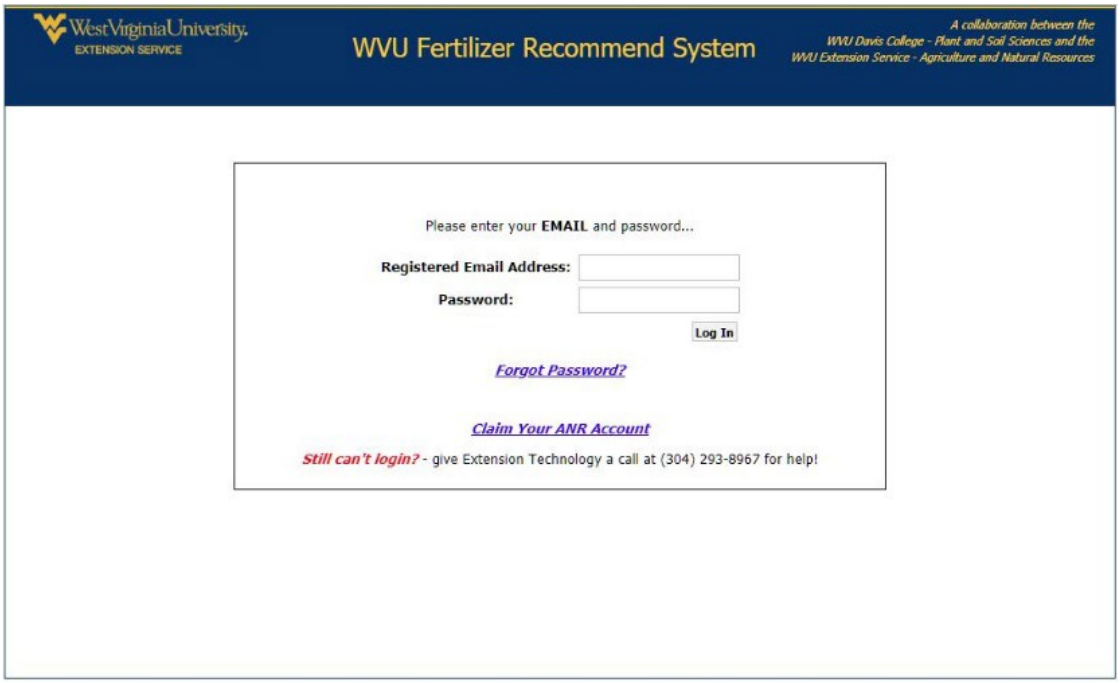
Software Interface

The software used for developing the WVU Fertilizer Recommendation System (FRS) is the Cold Fusion Mark-Up Language (CFML) by Adobe Software. The FRS interface has been constructed to be as self-directing as possible. One software constraint that may cause confusion is that some pages will initially have a single dialog box, while other dialog boxes only show up as needed once initial and earlier boxes are filled in.

Login Page

To use the Fertilizer Recommendation System, use the following web address to log in: http://w1p-extprod000.wvu-ad.wvu.edu/soiltesting/login.cfm (Figure 1).

Figure 1. WVU Fertilizer Recommend System login page.



Enter the WVU email address and password that was used to create an account. If the user does not have an account, they need to click on the *Claim Your ANR Account* link and enter their WVU email address, case sensitive password and confirm the password. Only authorized WVU Extension staff and faculty and Davis College faculty are authorized to have administrative accounts.

Those using the system must be registered by the system administrator and assigned a level of authority. County faculty have authority to look up sample submissions, update and save the soil series on a submission, generate alternative crop fertilizer recommendations for a submission, and generate summary reports from the submission database. Alternative crop code recommendations are not saved in the submission database but are saved as a note in an alternative crop code file. County faculty have authority to view data tables, but not to edit data tables. System administrators have authority to edit data tables and submissions.

Home Page

The home page is the system's center of operation and is divided into five working sections (Figure 2):

- Download and save a soil sample submission form
- Customer accounts
- Sample submission
- Data tables
- Tools

Access to Soil Sample Submission Form

A link at the top of the page provides access to the most current version of the soil sample submission form. This is a PDF form that uses drop-down menus to make filling out the form easier. Using this submission form on a computer, rather than by hand, provides legible information that is less likely to be entered incorrectly at the lab. The system works best when customers provide current and accurate email addresses and phone numbers. Customers should download the submission form and save it to their computer or have county WVU Extension staff fill in the customer information. Multiple copies can then be made for the customer to fill in the sample information as needed.

Figure 2. WVU Fertilizer Recommend System home page.

Customer Accounts

In the customer accounts section, the user can access three activities:

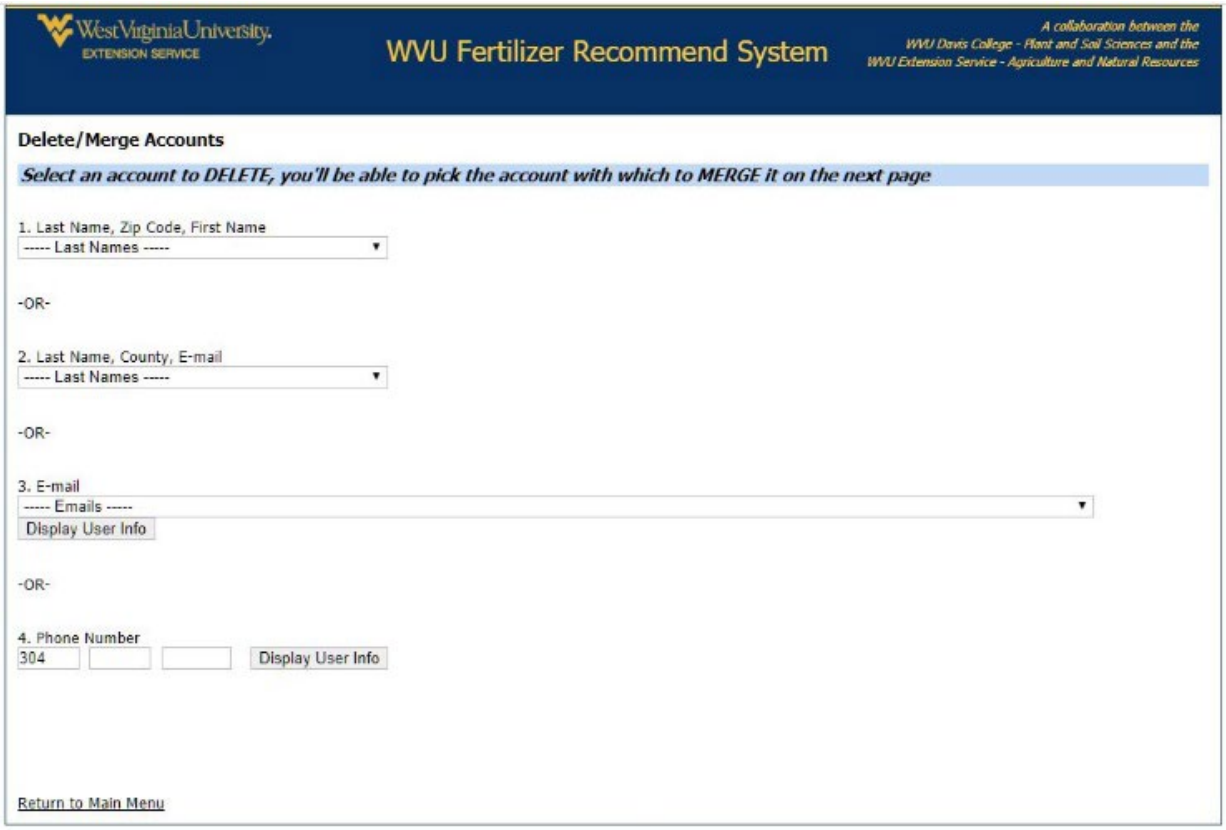
- Add a new customer account (Figure 3)
- Edit a customer account (Figure 4)
- Delete/merge customer accounts (Figure 5)

Customer accounts can be accessed using their phone number, a combination of last name/zip code/first name, a combination of last name/county/first name, or their e-mail address. When using one of these methods, follow-up drop-down menu boxes will open to allow continued selection of information for the individual. The sample submission section also provides a link to the “Add a New Customer Account” section when first entering a sample submission for new customers. The delete/merge customer account feature has been used when multiple database customers are actually a single customer. Open the page and follow the directions highlighted in blue to merge accounts and delete the faulty or unneeded account.

Figure 3. Add a new customer account.

Figure 4. Edit a customer account.

Figure 5. Delete/merge customer accounts.



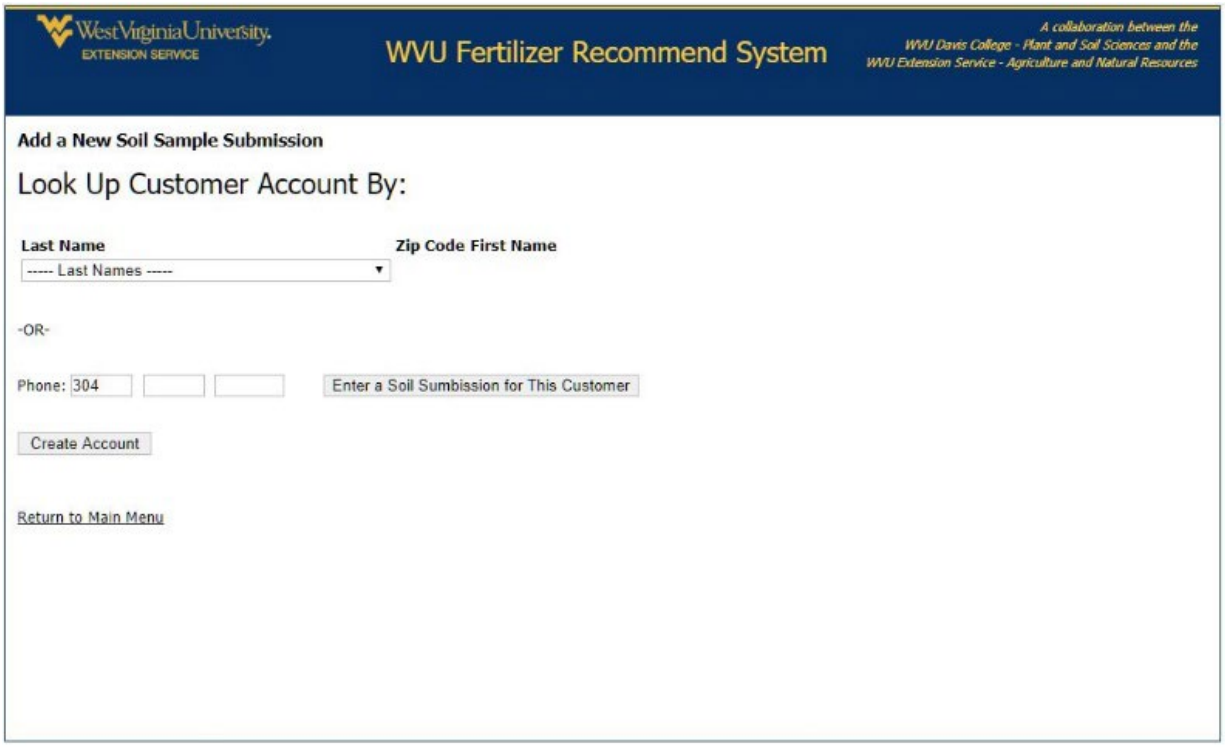
Sample Submission

The sample submission section of the home page allows the user to accomplish five actions:

- Add a new soil sample submission (Figure 6)
- Update a soil sample submission (Figure 7)
- View an existing soil sample report (Figure 8)
- E-mail an existing soil sample report (Figure 9)
- Generate an alternative crop code report (Figure 10)

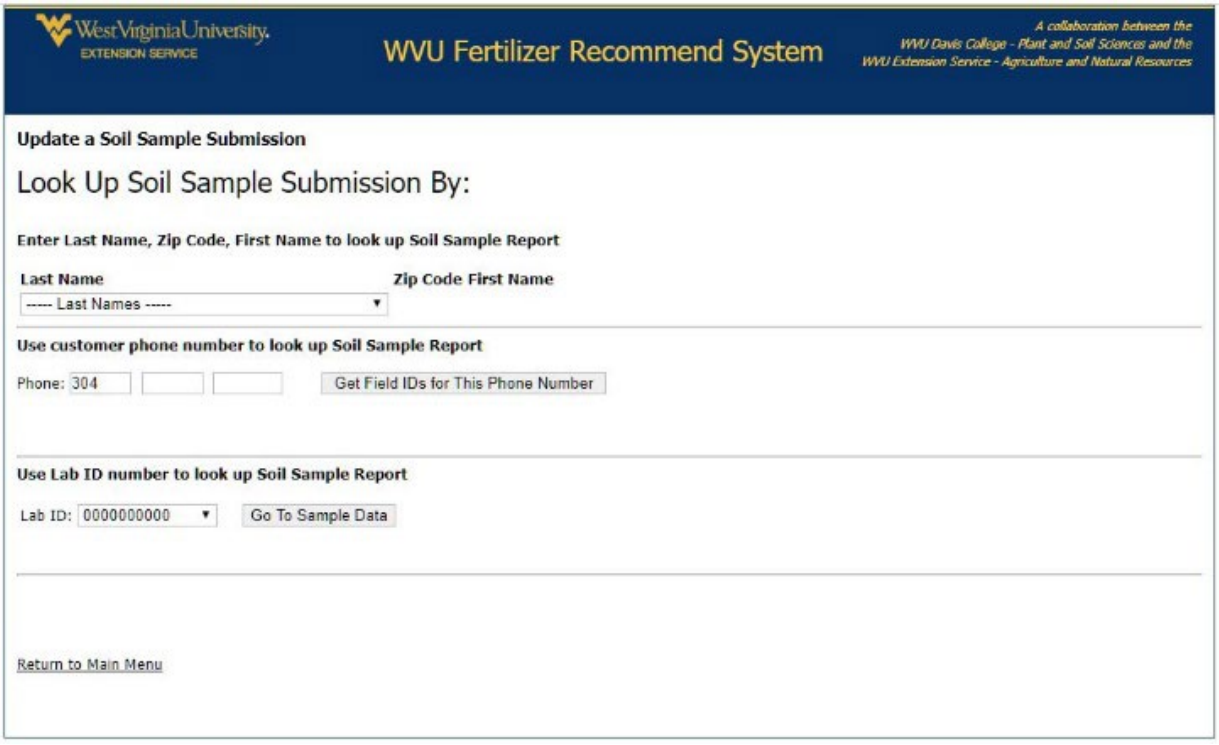
When entering a new soil sample submission, the customer account can be accessed using their phone number or by using the last name/zip code/first name lookup method. When using the latter method, input boxes open up as information is added. If the customer does not have an account, there is a link to create a new account.

Figure 6. Add a new soil sample submission.



When updating a soil sample submission, the fastest method is to use the lab ID number for the submission. If the lab ID number is not available, the submission can be looked up using the customer's phone number or the last name/zip code/first name approach.

Figure 7. Update a soil sample submission.

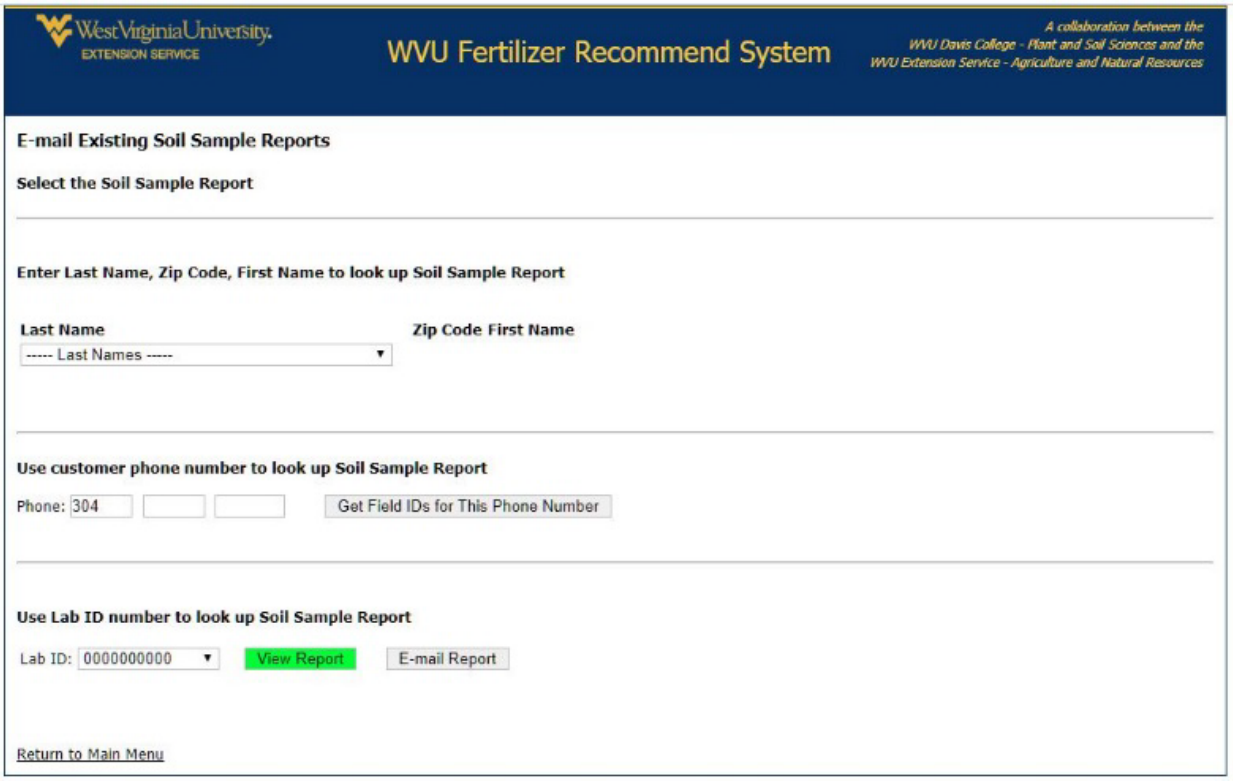


When viewing a soil sample submission, the fastest methods are to use the submission lab ID number or the customer's phone number. If these are not available, the submission can be looked up using the last name/zip code/first name approach. This page provides a link to the page for creating an alternative crop code report.

Figure 8. View existing soil sample reports.

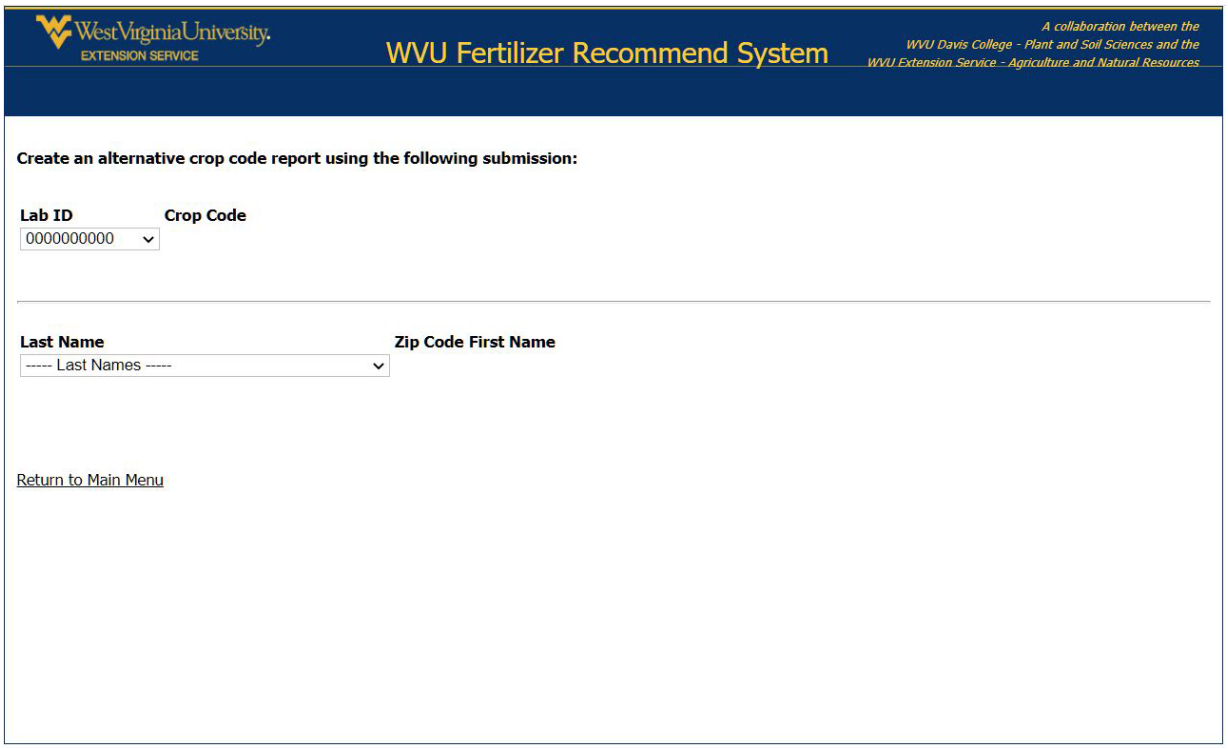
When emailing a report, the report will be sent to the customer and any others the customer has noted on the submission form, as well as to the WVU Extension agent responsible for answering questions regarding crop fertilization recommendations for the county the customer resides in. When preparing to email a report, the user can first view the report to ensure it is ready to go, then page back using the left arrow on the web page. This page will then repopulate the lab ID number, and the report can be sent.

Figure 9. E-mail existing soil sample reports.



A soil test submission can be used to generate fertilizer recommendations for alternative crops using the “Create an alternative crop code report” page. New reports can be saved as a PDF document, but the original crop code will be maintained in the submission database and a short note will be saved telling the administrators what alternative reports were produced and who produced them.

Figure 10. Create an alternative crop code report.



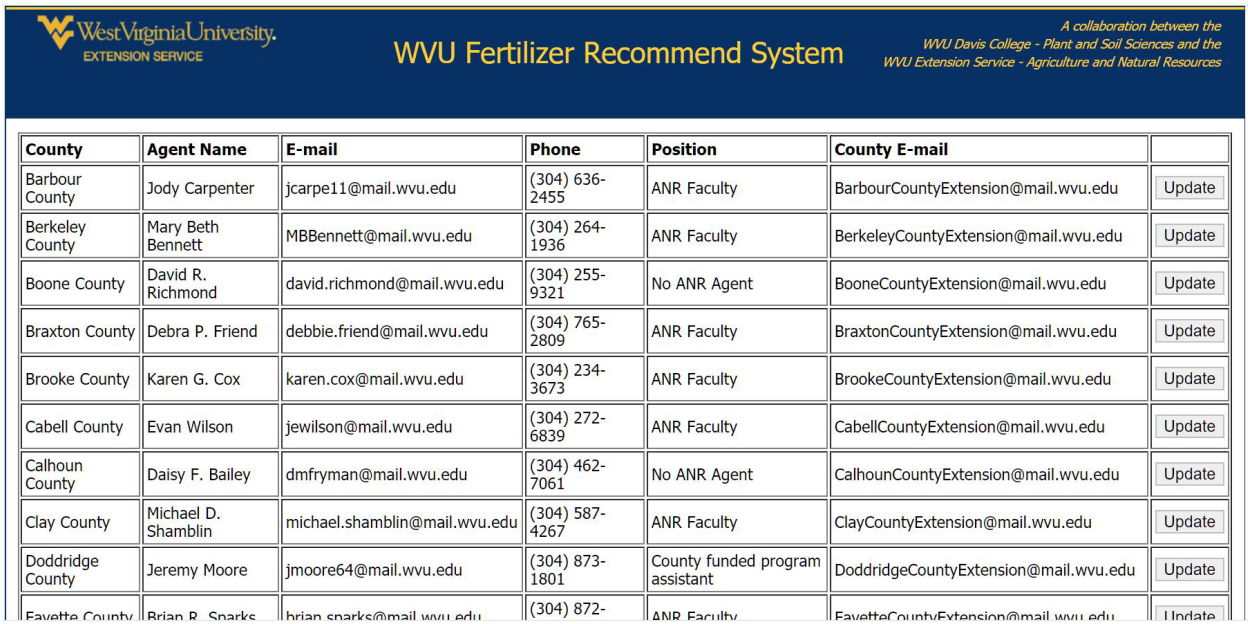
Data Tables

The data tables section of the home page provides links to nine sections used to manage the system, view data tables in spreadsheet form, edit the data tables used for making fertilizer recommendations and download data tables for use outside of the recommendation software.

The nine sections are:

- Edit ANR contacts (Figure 11)
- Edit fertilization recommend data tables (Figure 12)
- View customer accounts
- View soil sample submissions
- View alternative crop report list
- Download fertilizer recommendation data tables (Figure 13)
- Download customer accounts
- Download soil sample submissions
- Download alternative crop report list

Figure 11. An example of part of the Edit ANR contacts *data table.*



County	Agent Name	E-mail	Phone	Position	County E-mail	
Barbour County	Jody Carpenter	jcarpe11@mail.wvu.edu	(304) 636-2455	ANR Faculty	BarbourCountyExtension@mail.wvu.edu	Update
Berkeley County	Mary Beth Bennett	MBBennett@mail.wvu.edu	(304) 264-1936	ANR Faculty	BerkeleyCountyExtension@mail.wvu.edu	Update
Boone County	David R. Richmond	david.richmond@mail.wvu.edu	(304) 255-9321	No ANR Agent	BooneCountyExtension@mail.wvu.edu	Update
Braxton County	Debra P. Friend	debbie.friend@mail.wvu.edu	(304) 765-2809	ANR Faculty	BraxtonCountyExtension@mail.wvu.edu	Update
Brooke County	Karen G. Cox	karen.cox@mail.wvu.edu	(304) 234-3673	ANR Faculty	BrookeCountyExtension@mail.wvu.edu	Update
Cabell County	Evan Wilson	jewilson@mail.wvu.edu	(304) 272-6839	ANR Faculty	CabellCountyExtension@mail.wvu.edu	Update
Calhoun County	Daisy F. Bailey	dmfryman@mail.wvu.edu	(304) 462-7061	No ANR Agent	CalhounCountyExtension@mail.wvu.edu	Update
Clay County	Michael D. Shamblin	michael.shamblin@mail.wvu.edu	(304) 587-4267	ANR Faculty	ClayCountyExtension@mail.wvu.edu	Update
Doddridge County	Jeremy Moore	jmoore64@mail.wvu.edu	(304) 873-1801	County funded program assistant	DoddridgeCountyExtension@mail.wvu.edu	Update
Fayette County	Brian R. Sparks	brian.sparks@mail.wvu.edu	(304) 872-	ANR Faculty	FayetteCountyExtension@mail.wvu.edu	Update

The “Edit fertilizer recommendation data table” section allows for updating of crop code notes, fertilizer recommendations and the other data tables that control the production of the recommendation report.

Figure 12. Edit fertilization recommend data tables.

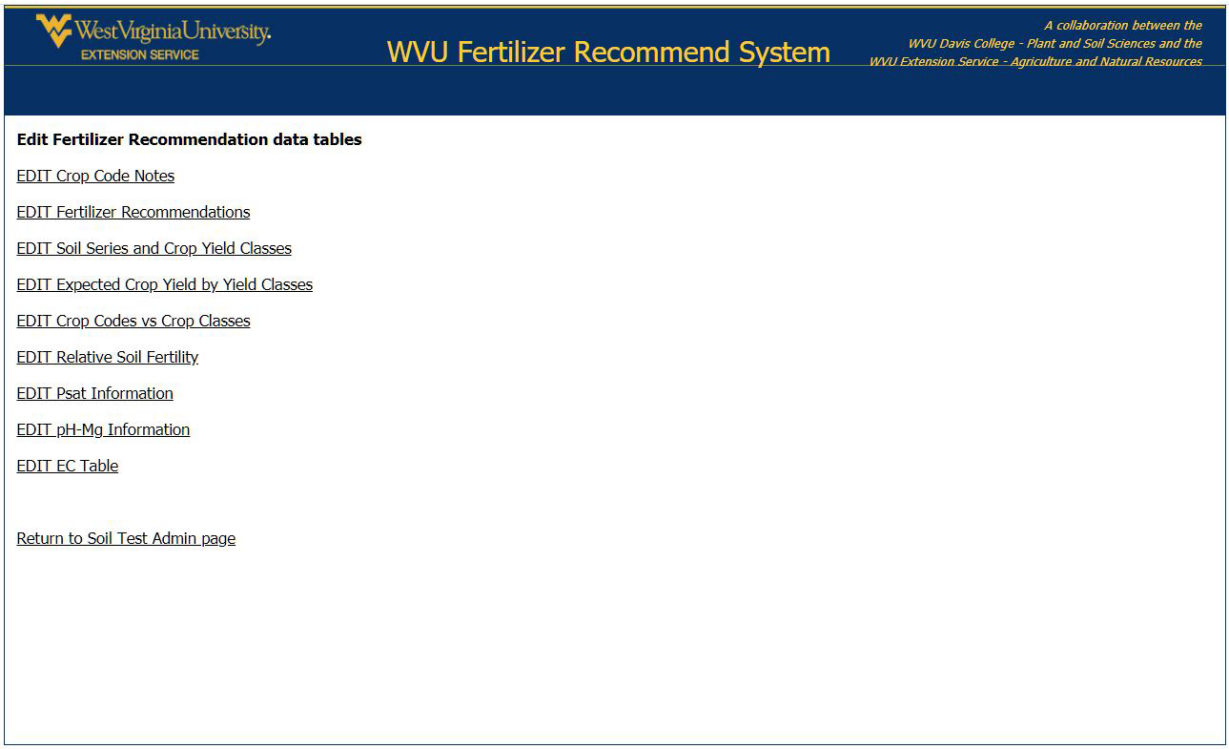
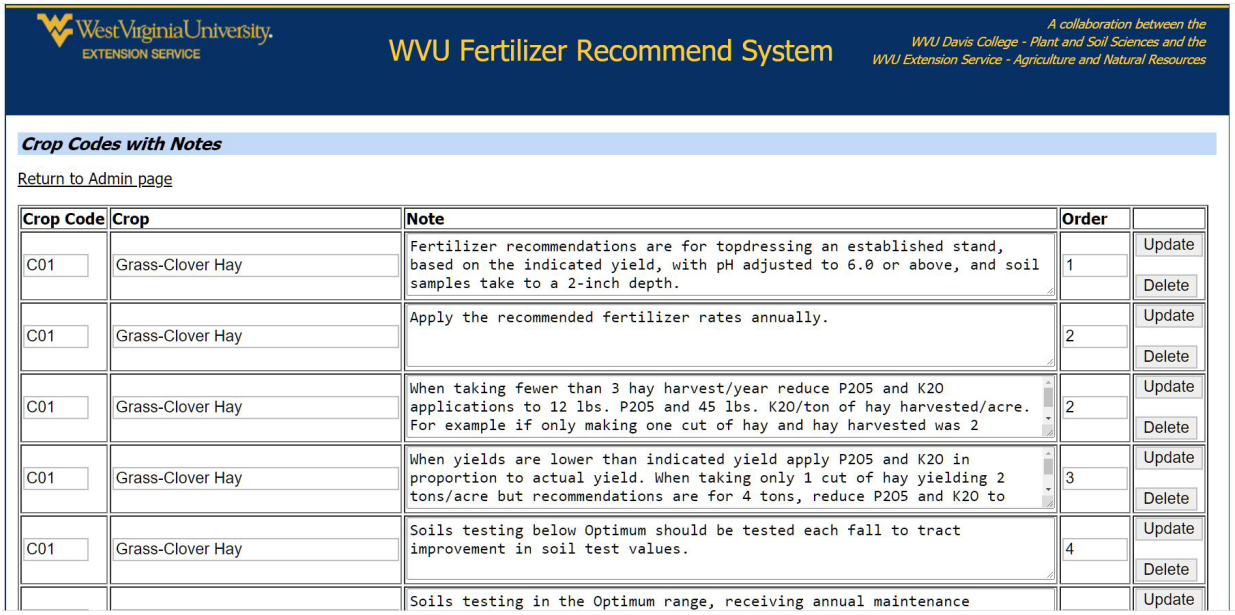


Figure 12 A. Edit crop code notes (example at the top of the table).



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WVU Fertilizer Recommend System

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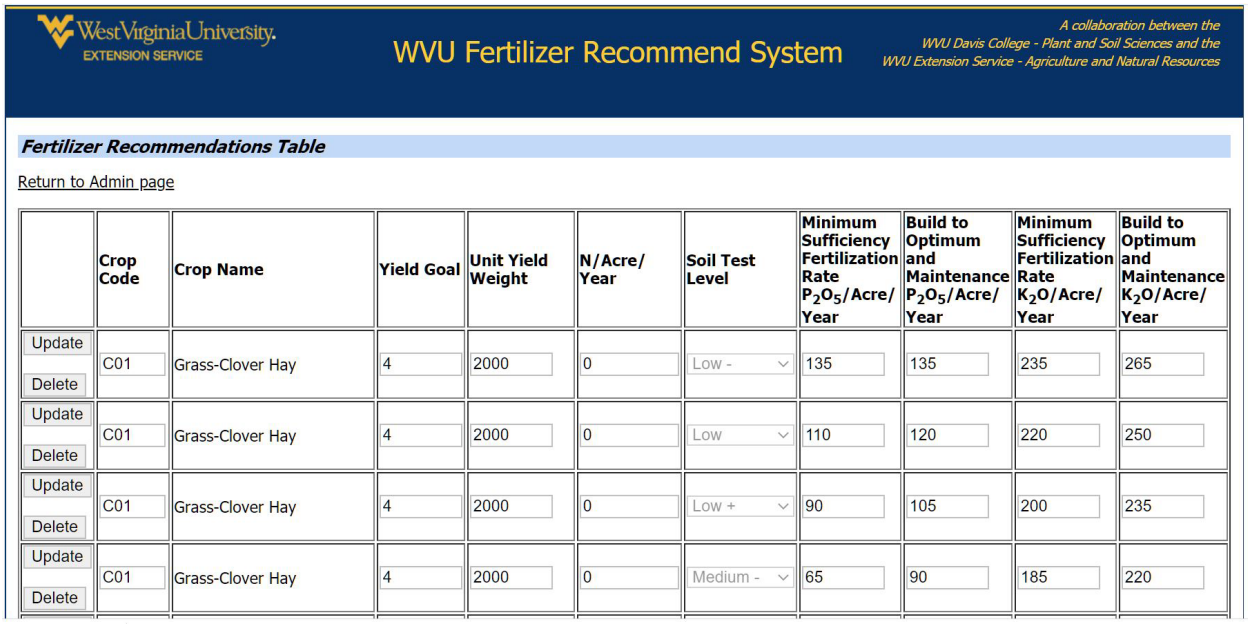
Crop Codes with Notes

Return to Admin page

Crop Code	Crop	Note	Order	
C01	Grass-Clover Hay	Fertilizer recommendations are for topdressing an established stand, based on the indicated yield, with pH adjusted to 6.0 or above, and soil samples take to a 2-inch depth.	1	Update Delete
C01	Grass-Clover Hay	Apply the recommended fertilizer rates annually.	2	Update Delete
C01	Grass-Clover Hay	When taking fewer than 3 hay harvest/year reduce P2O5 and K2O applications to 12 lbs. P2O5 and 45 lbs. K2O/ton of hay harvested/acre. For example if only making one cut of hay and hay harvested was 2	2	Update Delete
C01	Grass-Clover Hay	When yields are lower than indicated yield apply P2O5 and K2O in proportion to actual yield. When taking only 1 cut of hay yielding 2 tons/acre but recommendations are for 4 tons, reduce P2O5 and K2O to	3	Update Delete
C01	Grass-Clover Hay	Soils testing below Optimum should be tested each fall to tract improvement in soil test values.	4	Update Delete
		Soils testing in the Optimum range, receiving annual maintenance		Update

Figure 12 B. Edit fertilizer recommendations (example at the top of the table).



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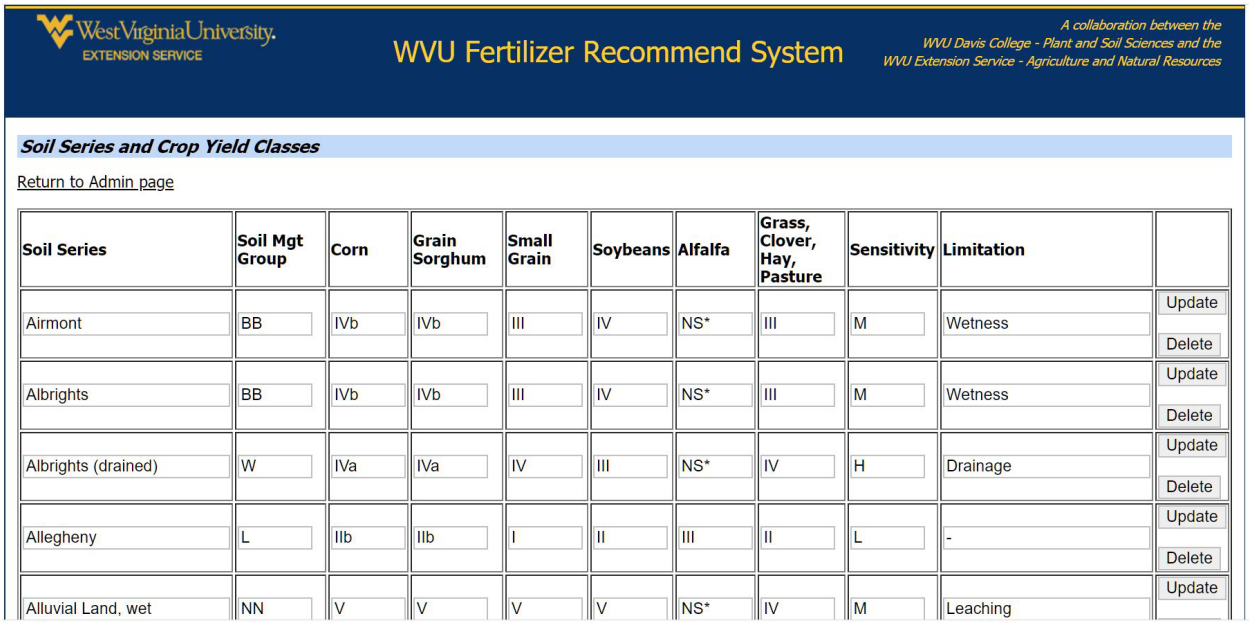
Fertilizer Recommendations Table

Return to Admin page

	Crop Code	Crop Name	Yield Goal	Unit Yield Weight	N/Acre/ Year	Soil Test Level	Minimum Sufficiency Fertilization Rate P_2O_5/Acre/ Year	Build to Optimum and Maintenance P_2O_5/Acre/ Year	Minimum Sufficiency Fertilization Rate K_2O/Acre/ Year	Build to Optimum and Maintenance K_2O/Acre/ Year
Update Delete	C01	Grass-Clover Hay	4	2000	0	Low -	135	135	235	265
Update Delete	C01	Grass-Clover Hay	4	2000	0	Low	110	120	220	250
Update Delete	C01	Grass-Clover Hay	4	2000	0	Low +	90	105	200	235
Update Delete	C01	Grass-Clover Hay	4	2000	0	Medium -	65	90	185	220

Figure 12 C. Edit soil series and crop yield classes (example at the top of the table).



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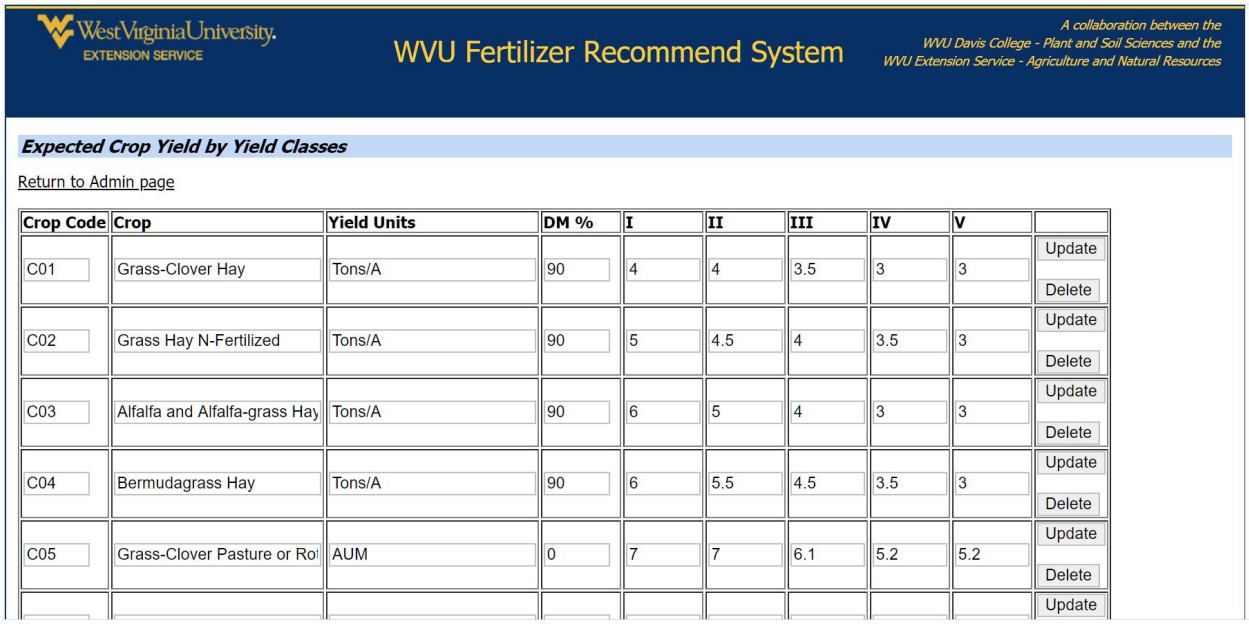
Soil Series and Crop Yield Classes

Return to Admin page

Soil Series	Soil Mgt Group	Corn	Grain Sorghum	Small Grain	Soybeans	Alfalfa	Grass, Clover, Hay, Pasture	Sensitivity	Limitation	
Airmont	BB	IVb	IVb	III	IV	NS*	III	M	Wetness	Update Delete
Albrights	BB	IVb	IVb	III	IV	NS*	III	M	Wetness	Update Delete
Albrights (drained)	W	IVa	IVa	IV	III	NS*	IV	H	Drainage	Update Delete
Allegheny	L	IIb	IIb	I	II	III	II	L	-	Update Delete
Alluvial Land, wet	NN	V	V	V	V	NS*	IV	M	Leaching	Update

Figure 12 D. Edit expected crop yield by yield class (example of the top of the table).



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Expected Crop Yield by Yield Classes

Return to Admin page

Crop Code	Crop	Yield Units	DM %	I	II	III	IV	V	
C01	Grass-Clover Hay	Tons/A	90	4	4	3.5	3	3	Update Delete
C02	Grass Hay N-Fertilized	Tons/A	90	5	4.5	4	3.5	3	Update Delete
C03	Alfalfa and Alfalfa-grass Hay	Tons/A	90	6	5	4	3	3	Update Delete
C04	Bermudagrass Hay	Tons/A	90	6	5.5	4.5	3.5	3	Update Delete
C05	Grass-Clover Pasture or Ro	AUM	0	7	7	6.1	5.2	5.2	Update Delete
									Update

Figure 12 E. Edit crop codes vs crop classes (example at the top of the table).

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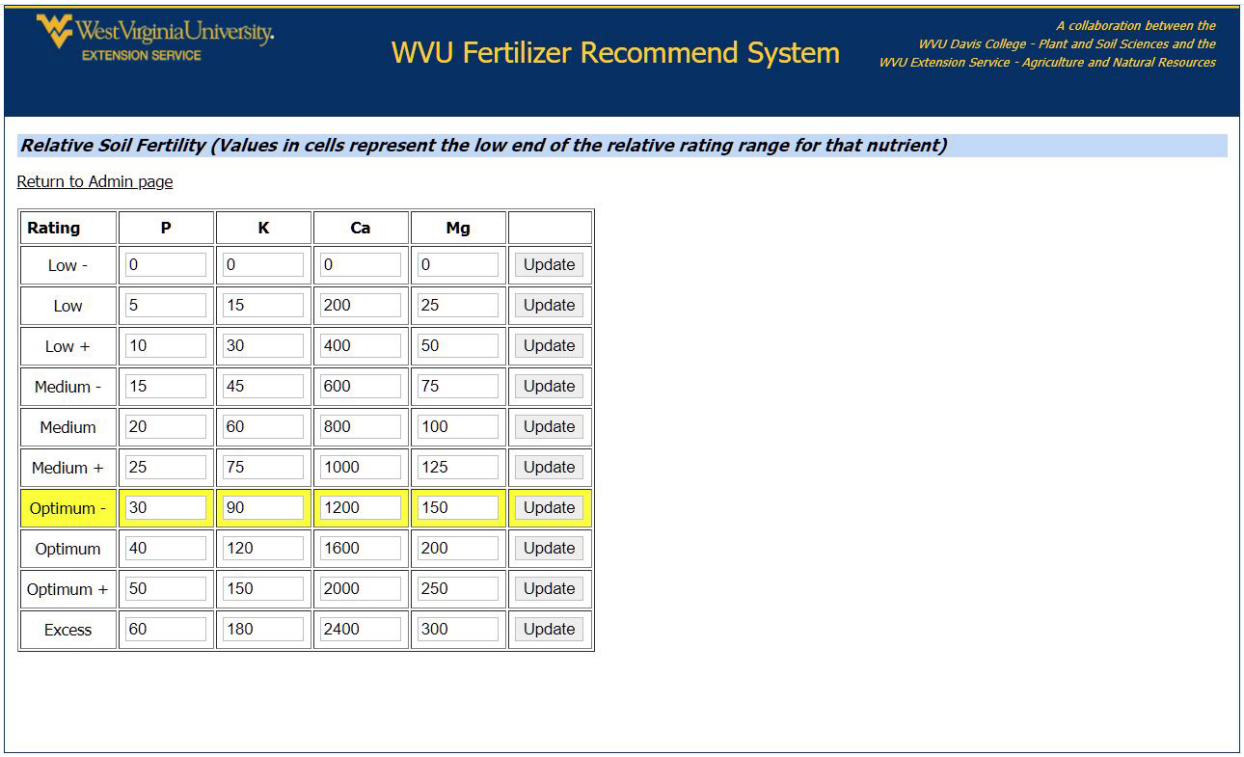
Crop Codes vs Crop Classes

Return to Admin page

Crop Code	Crop	Crop Class	
C01	Grass-Clover Hay	Grass_Clover_Hay_Pasture	Update Delete
C02	Grass Hay N-Fertilized	Grass_Clover_Hay_Pasture	Update Delete
C03	Alfalfa and Alfalfa-grass Hay	Alfalfa	Update Delete
C04	Bermudagrass Hay	Grass_Clover_Hay_Pasture	Update Delete
C05	Grass-Clover Pasture	Grass_Clover_Hay_Pasture	Update Delete
			Update

Figure 12 F. Edit relative soil fertility.



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Relative Soil Fertility (Values in cells represent the low end of the relative rating range for that nutrient)

Return to Admin page

Rating	P	K	Ca	Mg	
Low -	0	0	0	0	Update
Low	5	15	200	25	Update
Low +	10	30	400	50	Update
Medium -	15	45	600	75	Update
Medium	20	60	800	100	Update
Medium +	25	75	1000	125	Update
Optimum -	30	90	1200	150	Update
Optimum	40	120	1600	200	Update
Optimum +	50	150	2000	250	Update
Excess	60	180	2400	300	Update

Figure 12 G. Edit Psat information.

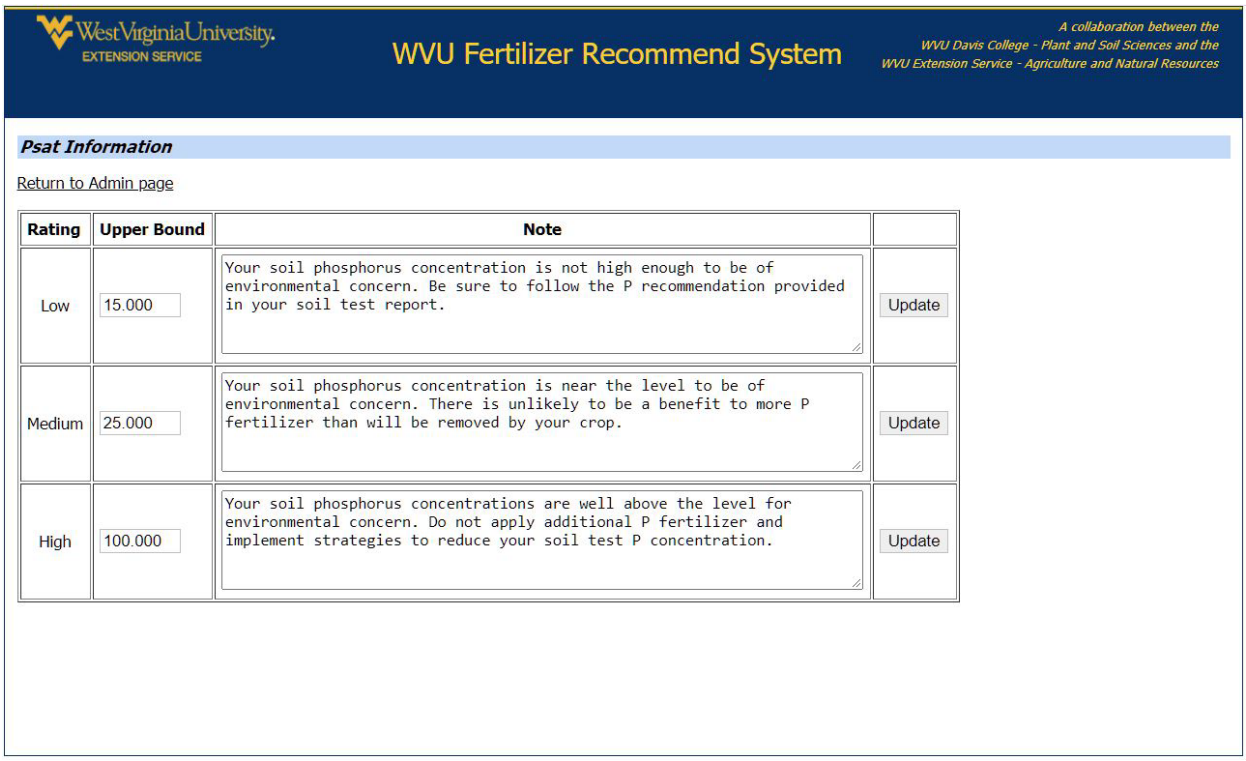


Figure 12 H. Edit pH-Mg information.

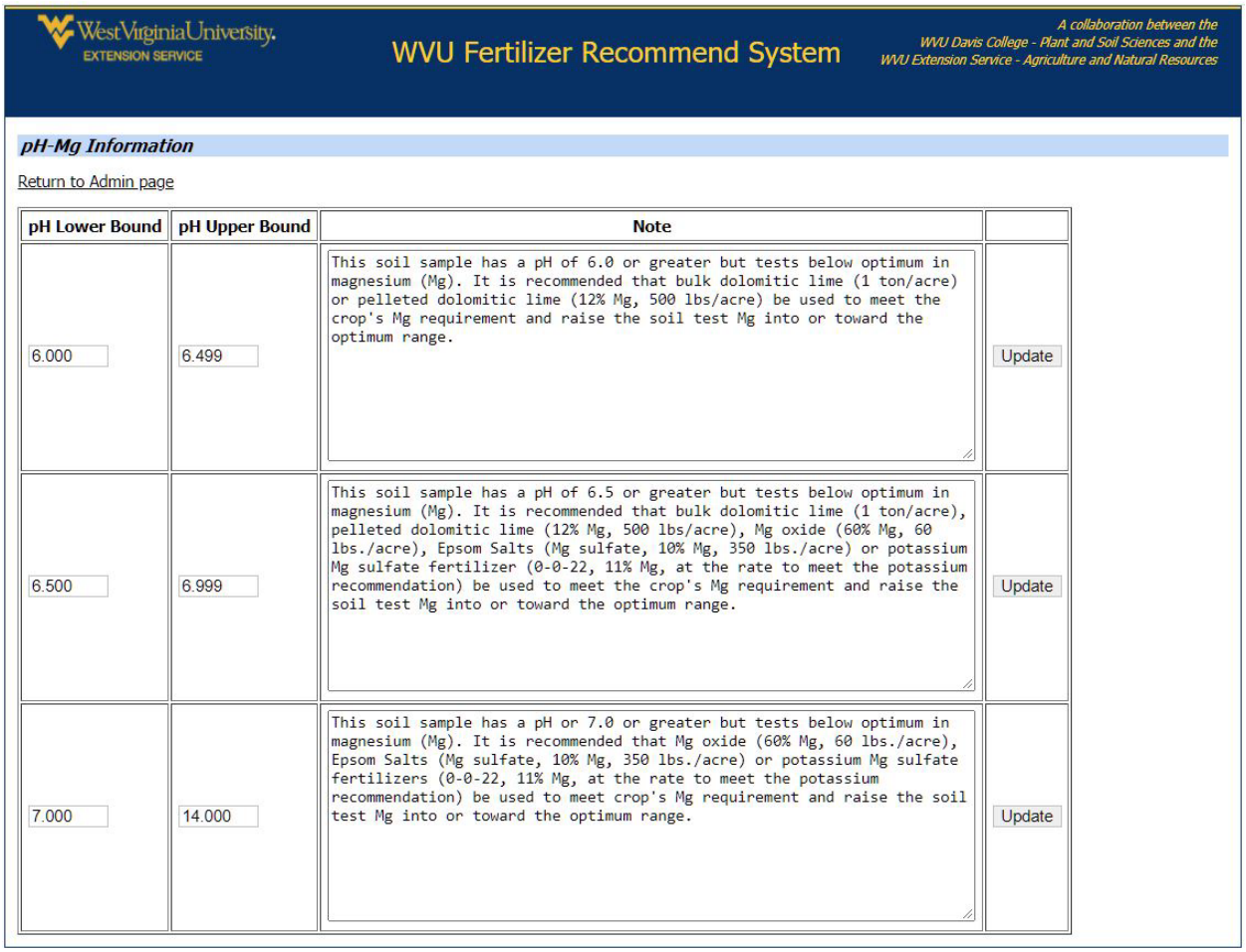


Figure 12 I. Electrical conductivity (EC) notes table.

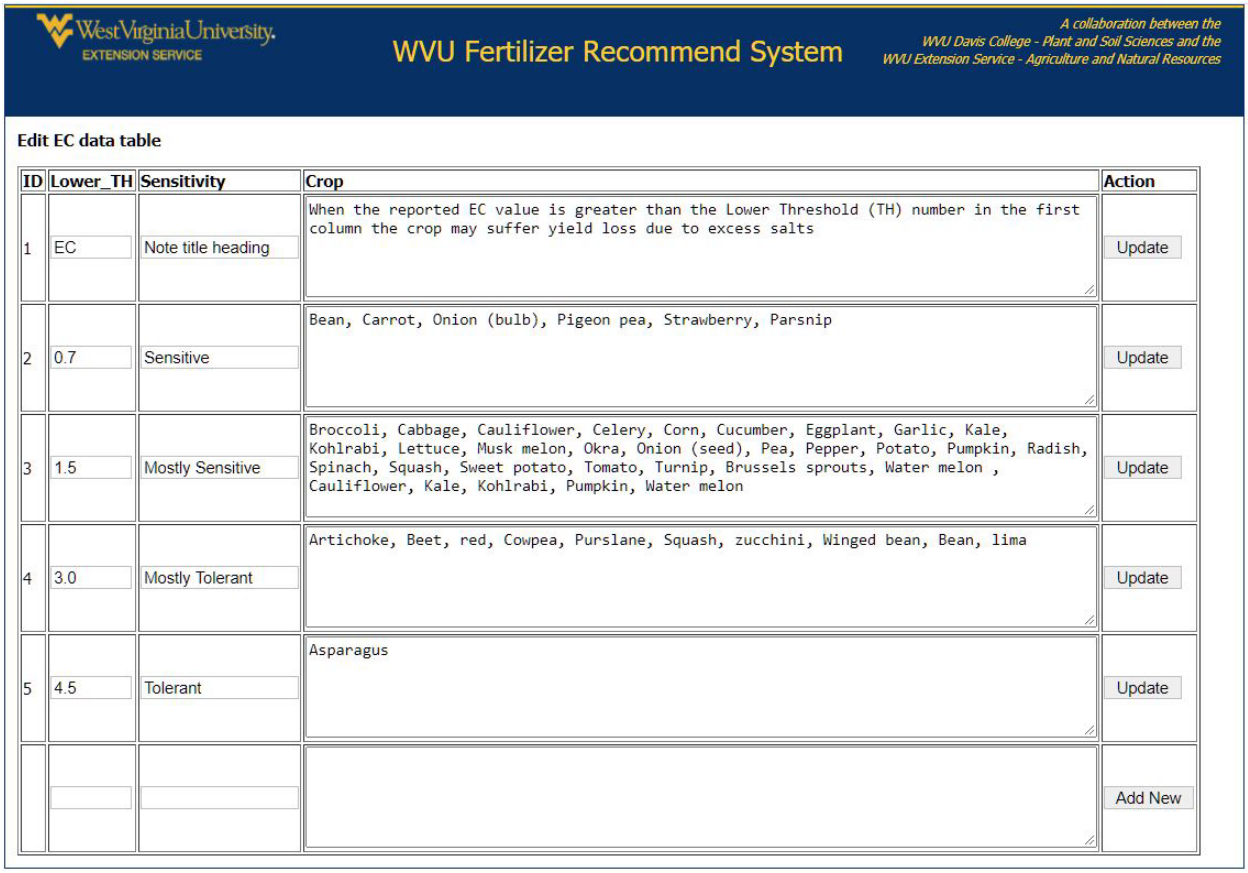
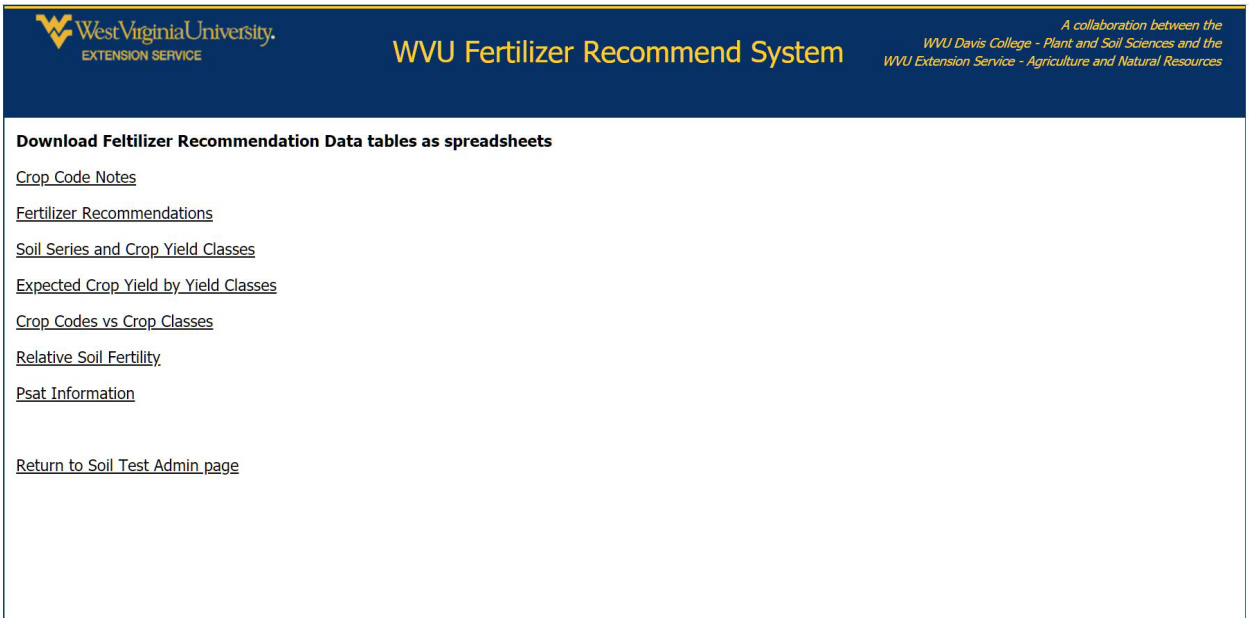


Figure 13. Download fertilizer recommendation data tables.



The data tables can be downloaded as Excel spreadsheets for use outside of the system (Figure 13). Following the links on this page will allow the user to download the individual tables and be saved to the user's computer.

Appendix tables at the end of this document provide all the data tables other than those containing customer information for viewing offline. Downloading customer accounts, soil sample submissions and alternative crop reports is accomplished by following the links and assigning where your computer is to save the spreadsheets.

Tools

The Tools section of the home page provides access to web-based tools useful for summarizing soil test values and for implementing fertilizer recommendations. These include:

- Soil test summary report
- Value of ag limestone tool
- Blended fertilizer calculator
- University of California, Davis SoilWeb
- University of Georgia Extension fertilizer calculator

Figure 14 A. Soil test summary report input page and an example of a summary report.

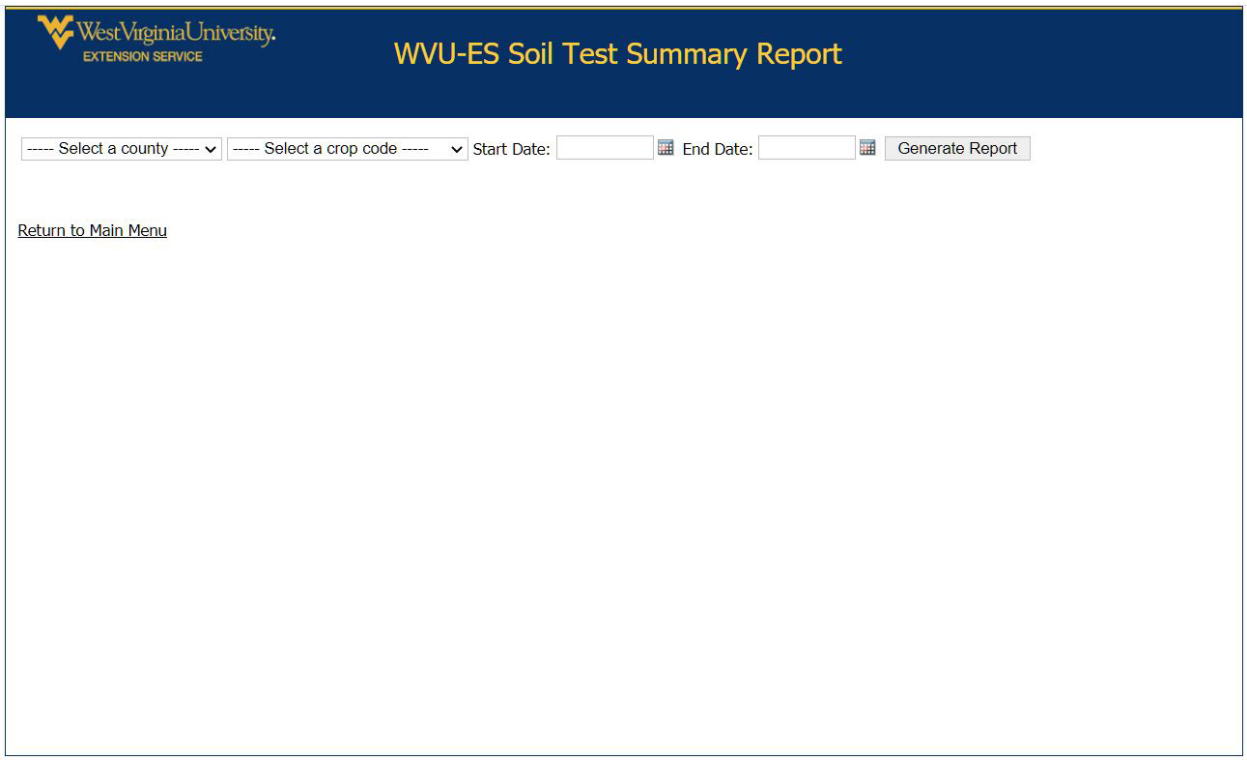
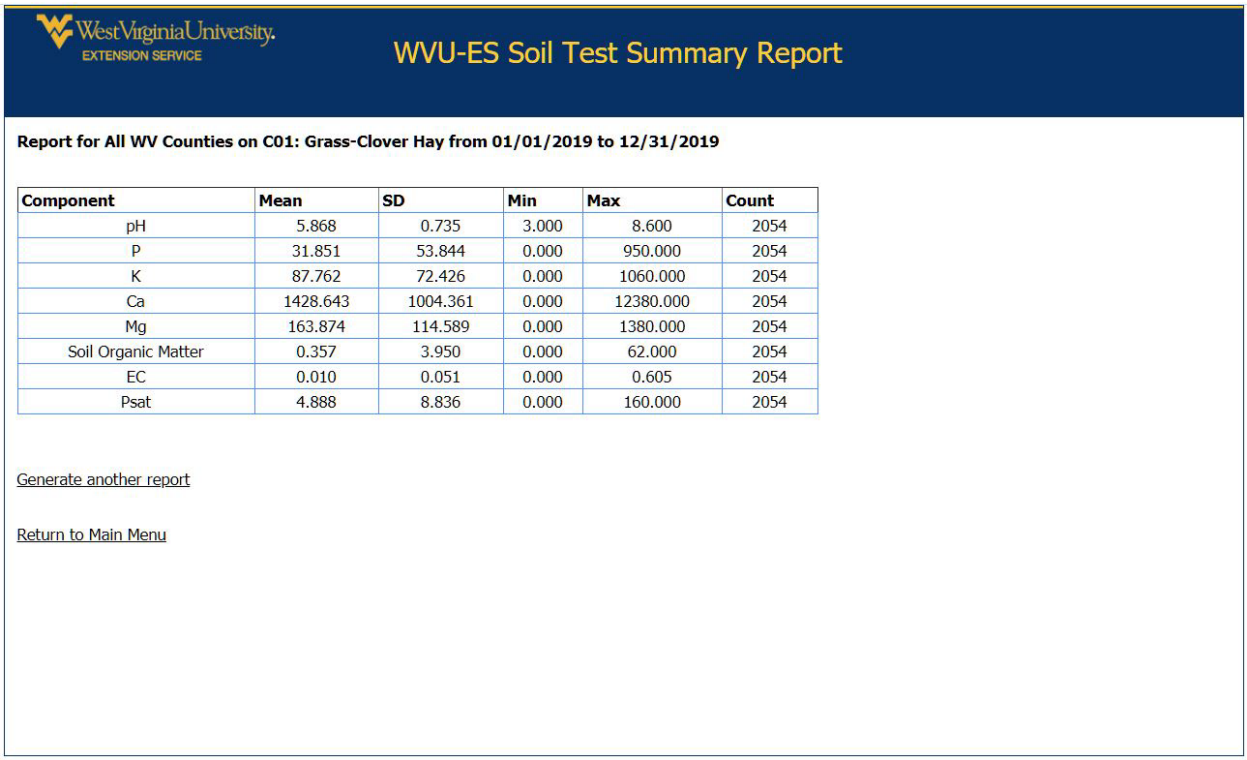


Figure 14 B. Soil test summary report output.



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WVU-ES Soil Test Summary Report

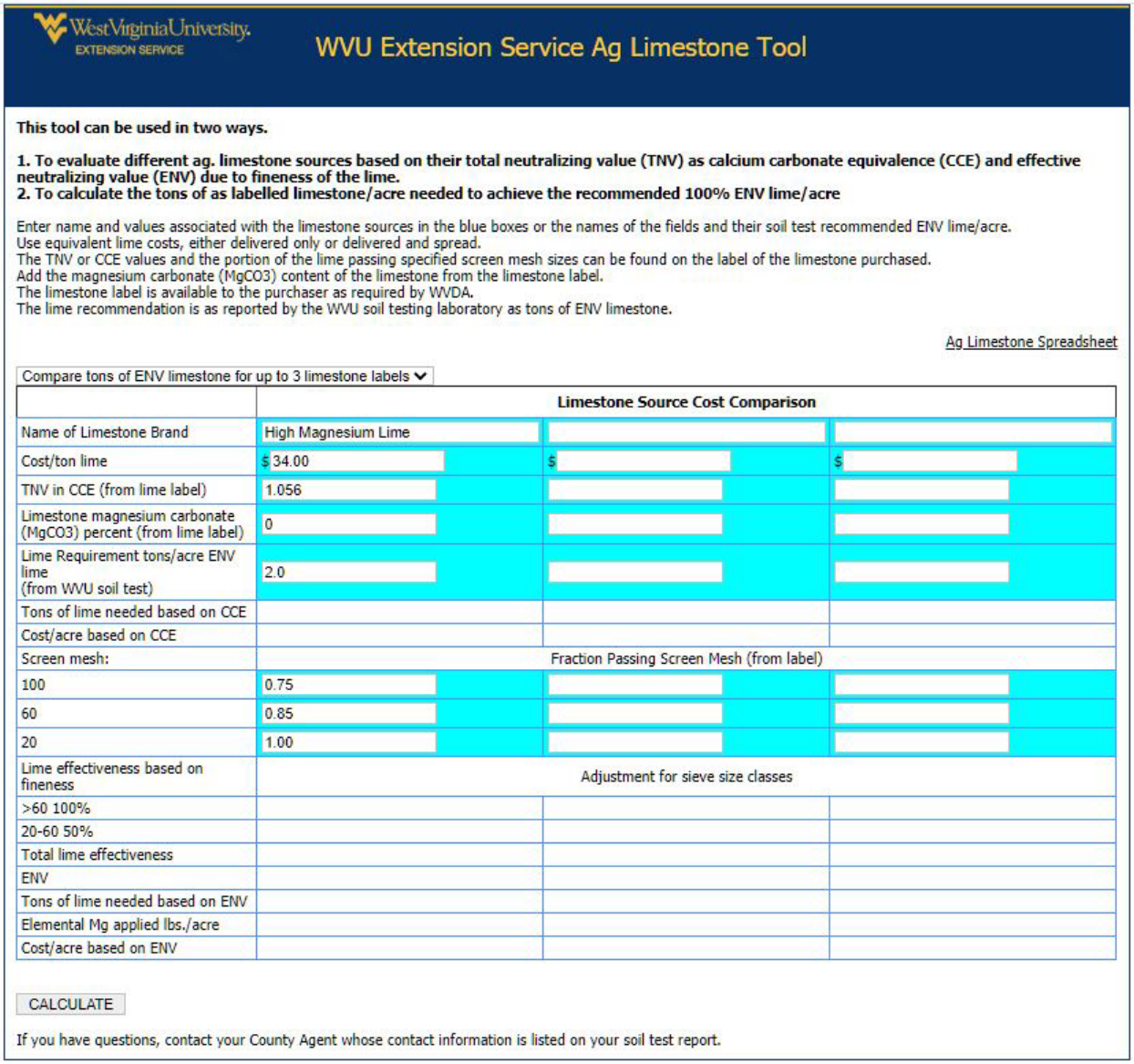
Report for All WV Counties on C01: Grass-Clover Hay from 01/01/2019 to 12/31/2019

Component	Mean	SD	Min	Max	Count
pH	5.868	0.735	3.000	8.600	2054
P	31.851	53.844	0.000	950.000	2054
K	87.762	72.426	0.000	1060.000	2054
Ca	1428.643	1004.361	0.000	12380.000	2054
Mg	163.874	114.589	0.000	1380.000	2054
Soil Organic Matter	0.357	3.950	0.000	62.000	2054
EC	0.010	0.051	0.000	0.605	2054
Psat	4.888	8.836	0.000	160.000	2054

Generate another report

Return to Main Menu

Figure 15. Value of ag limestone worksheet allows comparing the value of up to three limestone products at one time.



WVU Extension Service Ag Limestone Tool

This tool can be used in two ways.

1. To evaluate different ag. limestone sources based on their total neutralizing value (TNV) as calcium carbonate equivalence (CCE) and effective neutralizing value (ENV) due to fineness of the lime.
2. To calculate the tons of as labelled limestone/acre needed to achieve the recommended 100% ENV lime/acre

Enter name and values associated with the limestone sources in the blue boxes or the names of the fields and their soil test recommended ENV lime/acre.
Use equivalent lime costs, either delivered only or delivered and spread.
The TNV or CCE values and the portion of the lime passing specified screen mesh sizes can be found on the label of the limestone purchased.
Add the magnesium carbonate (MgCO3) content of the limestone from the limestone label.
The limestone label is available to the purchaser as required by WVDA.
The lime recommendation is as reported by the WVU soil testing laboratory as tons of ENV limestone.

Ag Limestone Spreadsheet

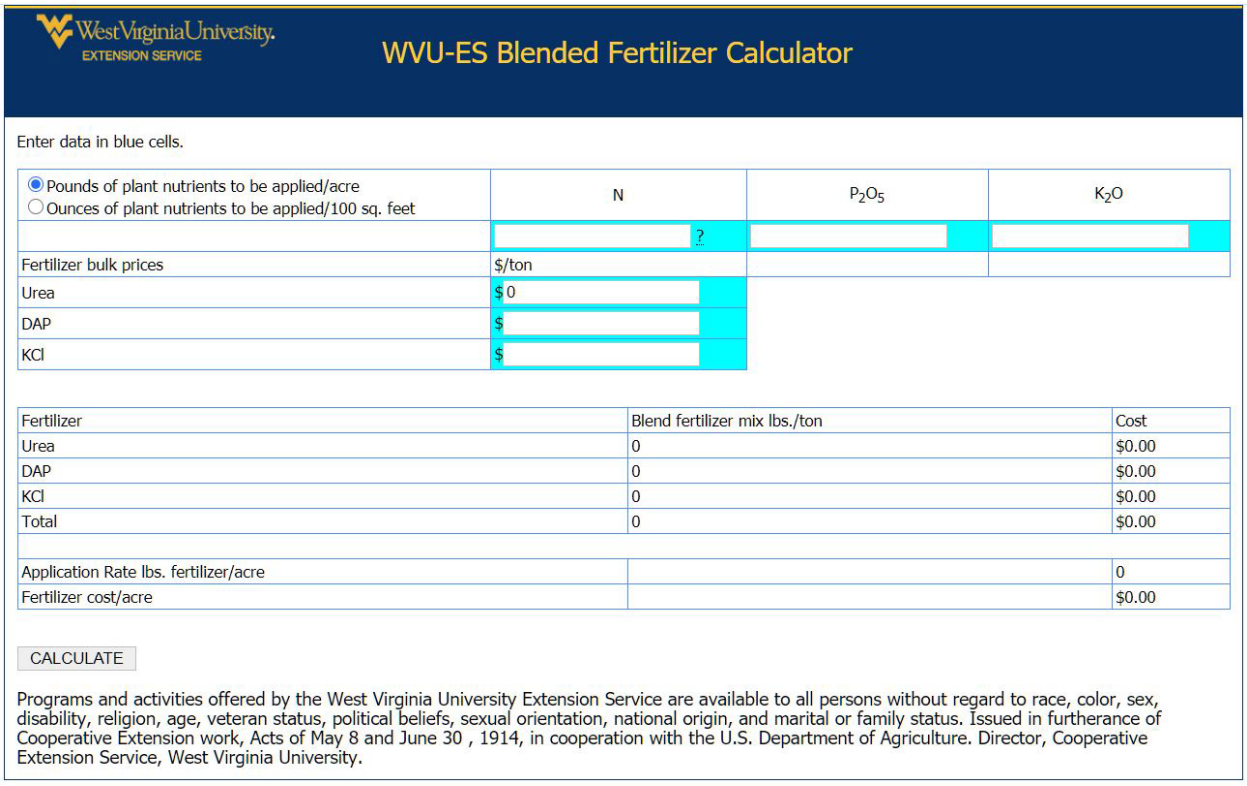
Compare tons of ENV limestone for up to 3 limestone labels

	Limestone Source Cost Comparison		
Name of Limestone Brand	High Magnesium Lime		
Cost/ton lime	$ 34.00	$	$
TNV in CCE (from lime label)	1.056		
Limestone magnesium carbonate (MgCO3) percent (from lime label)	0		
Lime Requirement tons/acre ENV lime (from WVU soil test)	2.0		
Tons of lime needed based on CCE			
Cost/acre based on CCE			
Screen mesh:	Fraction Passing Screen Mesh (from label)		
100	0.75		
60	0.85		
20	1.00		
Lime effectiveness based on fineness	Adjustment for sieve size classes		
>60 100%			
20-60 50%			
Total lime effectiveness			
ENV			
Tons of lime needed based on ENV			
Elemental Mg applied lbs./acre			
Cost/acre based on ENV			

CALCULATE

If you have questions, contact your County Agent whose contact information is listed on your soil test report.

Figure 16. Blended fertilizer calculator worksheet allows calculating the amount of basic fertilizer to use per acre or per 100 square feet based on a soil test report.



WVU-ES Blended Fertilizer Calculator

Enter data in blue cells.

◉ Pounds of plant nutrients to be applied/acre ○ Ounces of plant nutrients to be applied/100 sq. feet	N	P_2O_5	K_2O
	?		
Fertilizer bulk prices	$/ton		
Urea	$ 0		
DAP	$		
KCl	$		

Fertilizer	Blend fertilizer mix lbs./ton	Cost
Urea	0	$0.00
DAP	0	$0.00
KCl	0	$0.00
Total	0	$0.00
Application Rate lbs. fertilizer/acre		0
Fertilizer cost/acre		$0.00

CALCULATE

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Figure 17. University of California, Davis SoilWeb home page.

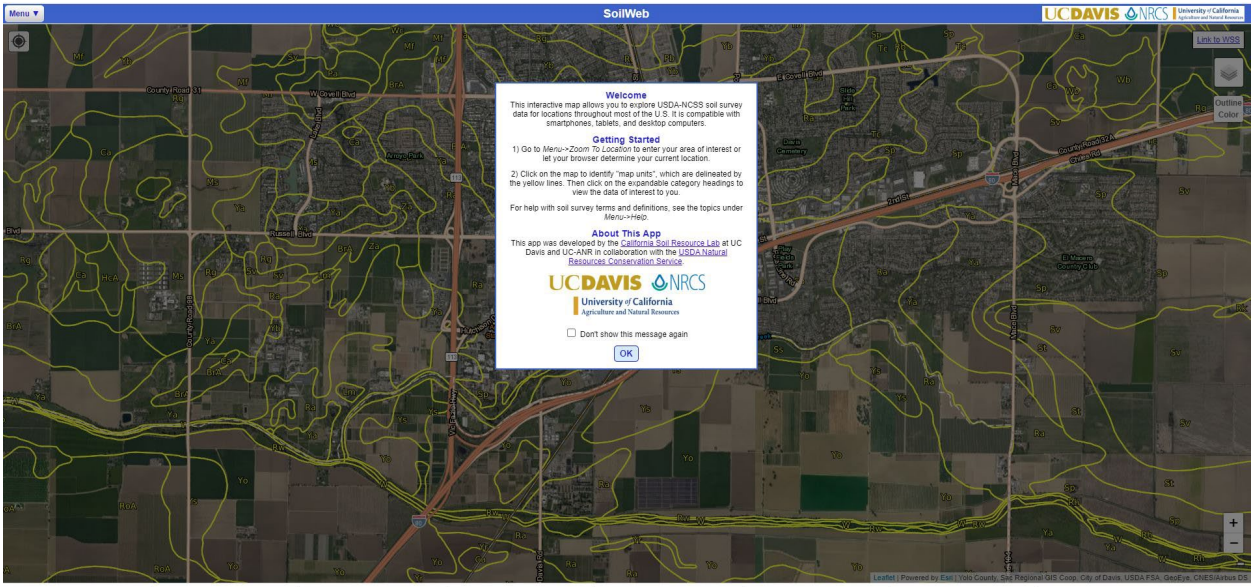
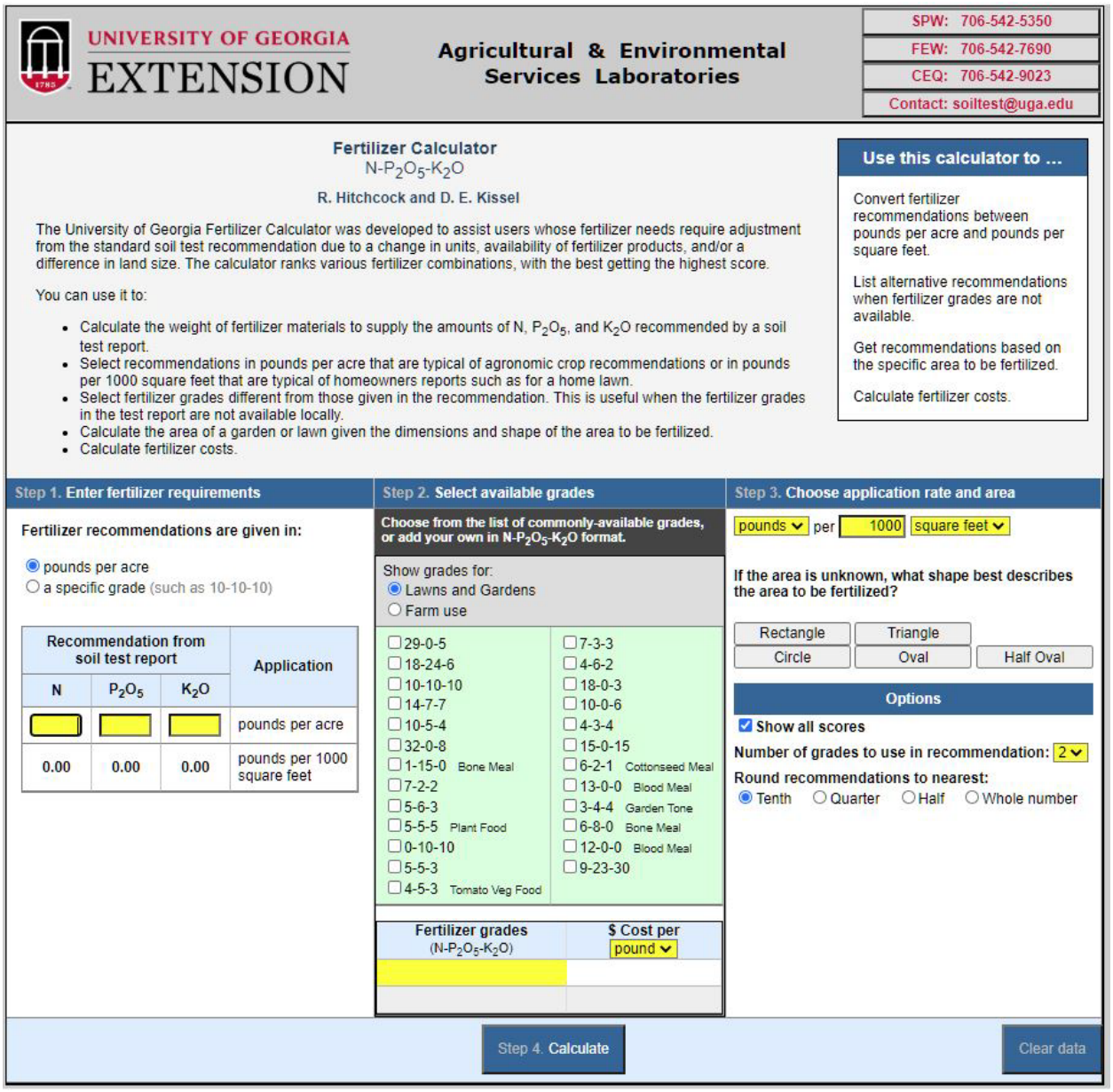


Figure 18. University of Georgia Extension Fertilizer Calculator is a more detailed tool for blending or comparing fertilizer options.



How a crop fertilizer recommendation is made

To describe how the fertilizer recommendation system works, the example of a new customer submitting their first soil sample will be used.

The customer downloads the sample submission form and uses the drop-down menus to fill out the form for their soil sample. They attach the submission form to the plastic bag holding the soil sample with a rubber band (not a staple) and submit the sample to soil testing laboratory as instructed on the submission form.

The soil testing lab processes the soil sample according to the laboratory protocol and starts to enter the laboratory values into the submission data base. The technician goes to the “Sample Submission” section of the home page and clicks on “Add a new soil sample submission.” In looking up the customer’s account, they find that this is a new customer who does not have an account. They then click on the “Create Account” button to go to the “Add a New Customer Account” page and create the account.

After creating the new customer account, the technician clicks on the “Create Account & Go to Sample Submission” button. In the sample submission section, the laboratory data is entered in the appropriate boxes. Data for extracted minerals are entered as elemental nutrients in milligrams per liter of Mehlich 3 extract, measured using the ICP output units. These values are multiplied by 10 to convert mg/L to parts per million (ppm) of soil when the report is generated and reported as elemental ppm on the soil test report sent to the customer. The technician then has three option buttons:

- Save & Add Another Sample for this Customer
- Save & Choose Another Customer
- Save & Return to Main Menu

At this point, the soil sample has been analyzed and data entered into the system database. If the submission data needs to be updated or viewed, those options are provided under “Sample Submission” on the homepage.

Once everything is in order the report can be emailed to the customer, if they provided an email address. The report is also emailed to the county agent responsible for fertilizer recommendations for the county where the customer resides. If the customer did not provide an email address, county staff will mail a printed copy of the soil test report to the customer.

Fertilizer Recommendation

The fertilizer recommendation is generated by the computer at the time the report is being emailed to the customer. For agronomic crops (crop codes C01 to C21), the computer takes the crop code and reported soil series and uses the soil series and crop yield classes data table to determine the crop yield class for this crop on this soil. If no soil series is provided, the default crop yield will be a class 2 yield. Using the crop code and the crop yield class, the expected yield is looked up in the expected crop yield by yield classes data table. The data tables used in producing the soil test report can be viewed in and downloaded from the fertilizer recommendation system.

Using the relative soil fertility data table, the extracted P and K in elemental ppm are converted to the relative soil test levels: low-, low, low+, medium-, medium, medium+, optimum-, optimum, optimum+, and excess.

Using crop code and relative soil fertility level, the N, P and K fertilizer recommendations are looked up for the default yield in the fertilizer recommendations data table. Two recommended fertilization rates are provided: minimum sufficiency, and build to optimum and maintenance.

The minimum sufficiency rate is the lowest amount of P and K fertilizer needed by this crop to achieve the indicated yield, plus a little extra to raise the soil test for this nutrient into the medium range. If this fertilizer is not applied, yields will be below the indicated yield due to the lack of the fertilizer nutrient. This recommendation is provided for use on rental property that is governed by an annual rental agreement or for years when fertilizer prices are excessively high.

The build to optimum and maintenance rate is provided for use on property that is owned or held with a long-term lease. Use of this recommendation will build soil fertility into the optimum

range, where soil fertility on livestock farms can be maintained primarily by cycling nutrients in manures produced on the farm. In years when fertilizer prices are high, no added P or K fertilizer is needed when nutrients are properly managed.

When a soil series is provided and the crop yield class for the soil series differs from the default yield, P and K fertilizer recommendations are adjusted in proportion to the yield difference. If the expected yield is 10% higher, P and K recommendations are increased by 10%. If the expected yield is 20% lower, P and K recommendations are decreased by 20%. This rule is applied to N fertilization recommendations for corn and small grain crops. For hay crops, the N fertilization rule is 50 to 60 pounds of actual N per acre per hay harvest for a total of 50 to 200 pounds of N per acre per year. For grass-legume hay and pasture, no N is recommended since the desired management is to have legumes provide the N to the crop.

For non-agronomic crops, only one expected yield class is used and only one fertilizer recommendation is provided. This recommendation is based on the crop and relative soil fertility. For home horticultural crops and wildlife food plots, updated WVU recommendations are used. For commercial vegetable crops (crop codes V01 to V46), the Mid-Atlantic Commercial Vegetable crop recommendations are used. The single recommendation is provided in both fertilizer recommendation sections of the report.

Crop code is used to attach crop code notes to page two of the soil test report. These notes are maintained in and retrieved from the crop code notes table.

Lime recommendations are divided into two classes. For alfalfa crop codes, the lime recommendation is based on soil test buffer pH and the amount of effective neutralizing value (ENV) lime required to bring the pH to 6.6. A maximum recommendation of 3 tons of ENV lime per acre is made. For all other crops, except blueberries and brambles, no lime is recommended if the pH is 6.0 or greater. When the pH drops below 6.0 for agronomic crops other than alfalfa, the lime recommendation is 2 tons ENV lime per acre. A lime evaluation tool is provided on the web for county agents and farmers to use to calculate the ENV of a liming product: https://extapps.wvu.edu/soiltesting/ag_limestone_value.cfm

When soil test Mg is below optimum and soil pH calls for the application of lime, high Mg (dolomitic) lime is recommended. For soils not needing an adjustment in pH, alternative recommendations for Mg management are provided as notes from the pH-Mg information table.

When electrical conductivity (EC) measurement is requested and reported, an EC note is attached to the report as maintained in the EC data table.

For each soil sample submission, a Psat ratio is calculated, and a note is applied to the report from the Psat Information data table describing the potential environmental impact of this value.

Figure 19. Example of a new sample submission automatically populated with the customer's information.

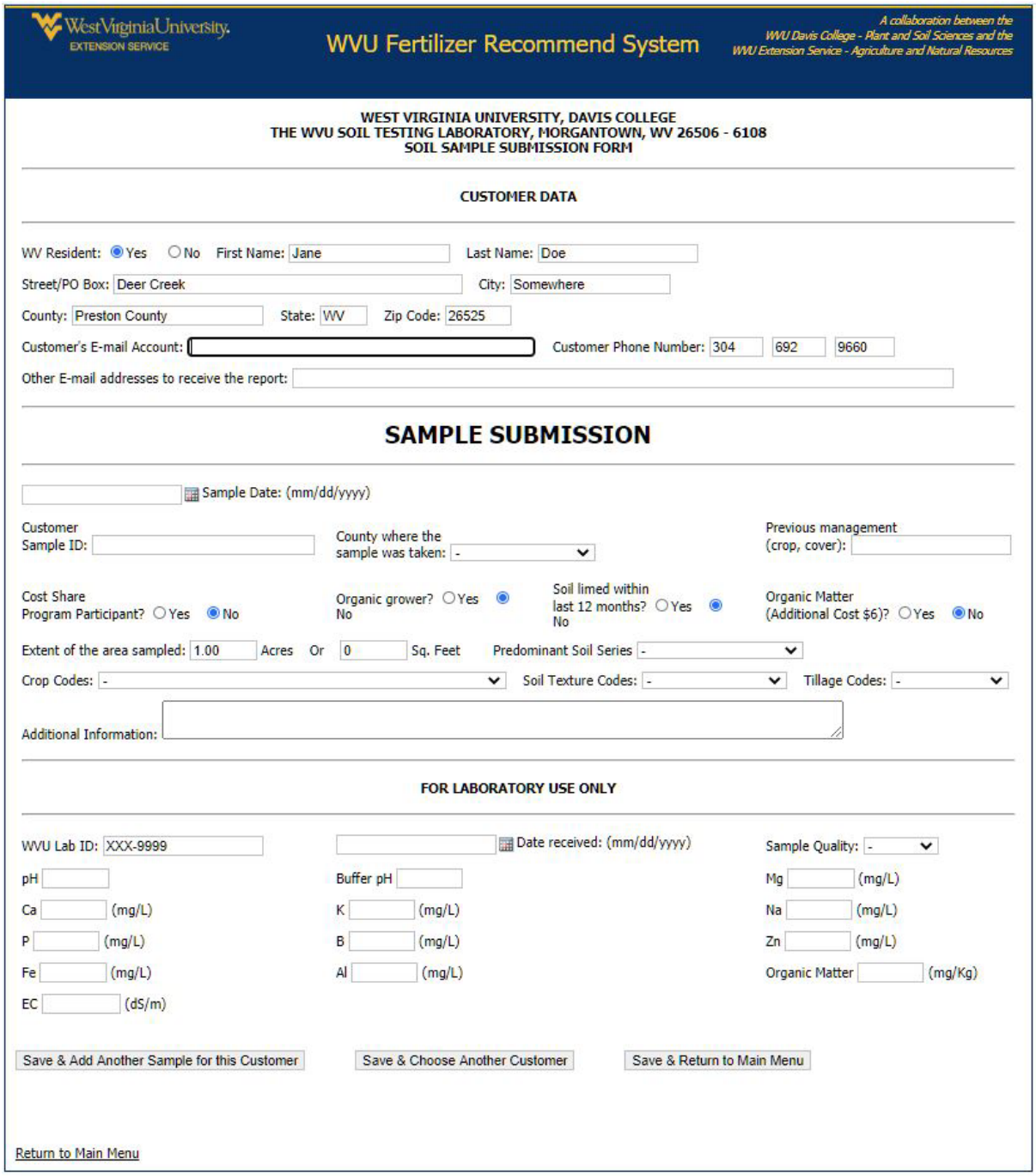
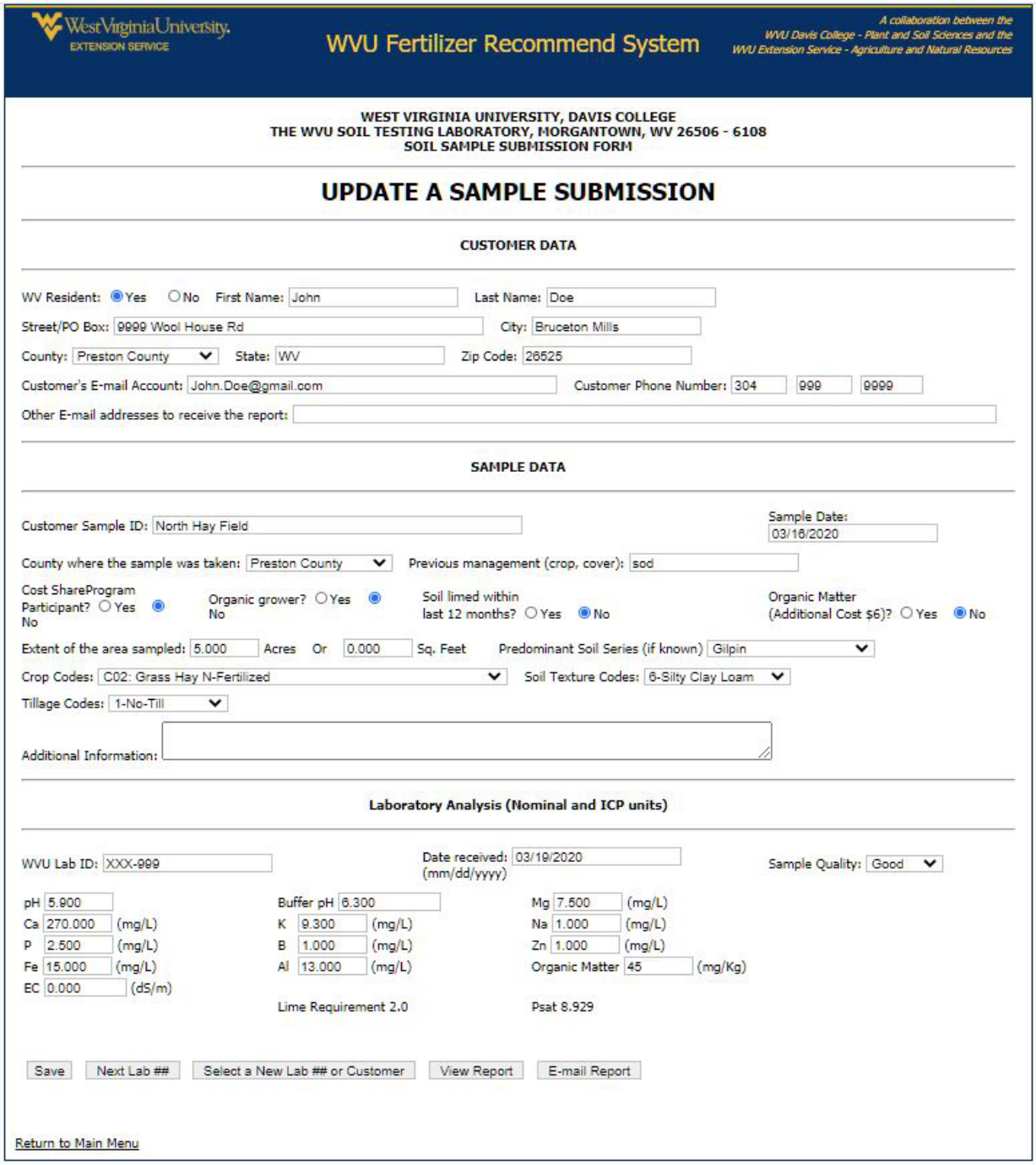


Figure 20. Example of an updated sample submission showing customer, sample and laboratory data.



WVU Extension Service

WVU Fertilizer Recommend System

A collaboration between the WVU Davis College - Plant and Soil Sciences and the WVU Extension Service - Agriculture and Natural Resources

WEST VIRGINIA UNIVERSITY, DAVIS COLLEGE
THE WVU SOIL TESTING LABORATORY, MORGANTOWN, WV 26506 - 6108
SOIL SAMPLE SUBMISSION FORM

UPDATE A SAMPLE SUBMISSION

CUSTOMER DATA

WV Resident: (•) Yes ( ) No First Name: John Last Name: Doe

Street/PO Box: 9999 Wool House Rd City: Bruceton Mills

County: Preston County State: WV Zip Code: 26525

Customer's E-mail Account: John.Doe@gmail.com Customer Phone Number: 304 999 9999

Other E-mail addresses to receive the report:

SAMPLE DATA

Customer Sample ID: North Hay Field Sample Date: 03/16/2020

County where the sample was taken: Preston County Previous management (crop, cover): sod

Cost ShareProgram Participant? ( ) Yes (•) No Organic grower? ( ) Yes (•) No Soil limed within last 12 months? ( ) Yes (•) No Organic Matter (Additional Cost $6)? ( ) Yes (•) No

Extent of the area sampled: 5.000 Acres Or 0.000 Sq. Feet Predominant Soil Series (if known) Gilpin

Crop Codes: C02: Grass Hay N-Fertilized Soil Texture Codes: 6-Silty Clay Loam

Tillage Codes: 1-No-Till

Additional Information:

Laboratory Analysis (Nominal and ICP units)

WVU Lab ID: XXX-999 Date received: 03/19/2020 (mm/dd/yyyy) Sample Quality: Good

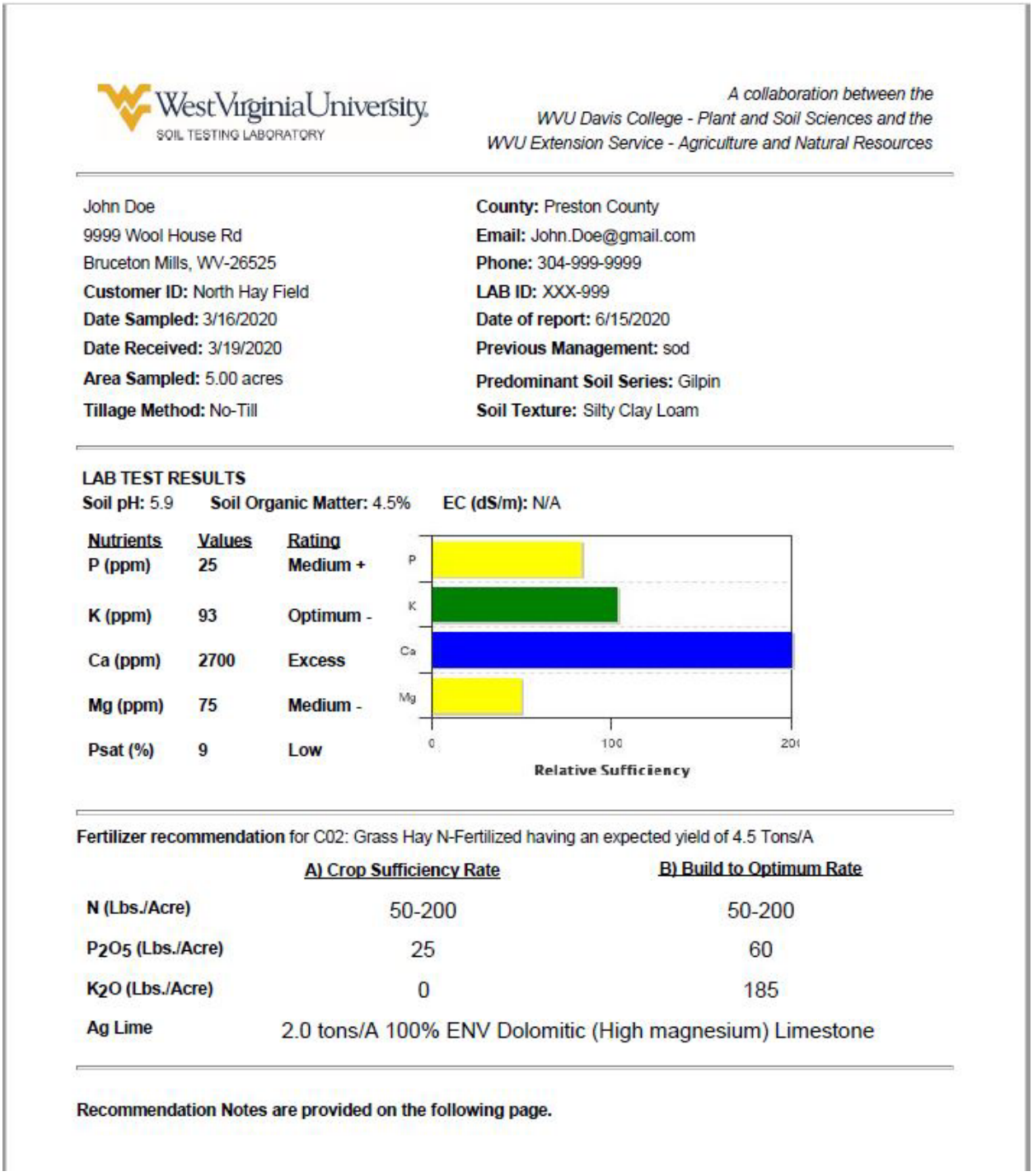
pH	5.900		Buffer pH	6.300		Mg	7.500 (mg/L)
Ca	270.000	(mg/L)	K	9.300	(mg/L)	Na	1.000 (mg/L)
P	2.500	(mg/L)	B	1.000	(mg/L)	Zn	1.000 (mg/L)
Fe	15.000	(mg/L)	Al	13.000	(mg/L)	Organic Matter	45 (mg/Kg)
EC	0.000	(dS/m)					

Lime Requirement 2.0 Psat 8.929

Save | Next Lab ## | Select a New Lab ## or Customer | View Report | E-mail Report

Return to Main Menu

Figure 21. Example of the front page of the WVU soil test report using data from Figure 20.



WestVirginiaUniversity.
SOIL TESTING LABORATORY

A collaboration between the
WVU Davis College - Plant and Soil Sciences and the
WVU Extension Service - Agriculture and Natural Resources

John Doe
9999 Wool House Rd
Bruceton Mills, WV-26525
Customer ID: North Hay Field
Date Sampled: 3/16/2020
Date Received: 3/19/2020
Area Sampled: 5.00 acres
Tillage Method: No-Till

County: Preston County
Email: John.Doe@gmail.com
Phone: 304-999-9999
LAB ID: XXX-999
Date of report: 6/15/2020
Previous Management: sod
Predominant Soil Series: Gilpin
Soil Texture: Silty Clay Loam

LAB TEST RESULTS
Soil pH: 5.9 **Soil Organic Matter:** 4.5% **EC (dS/m):** N/A

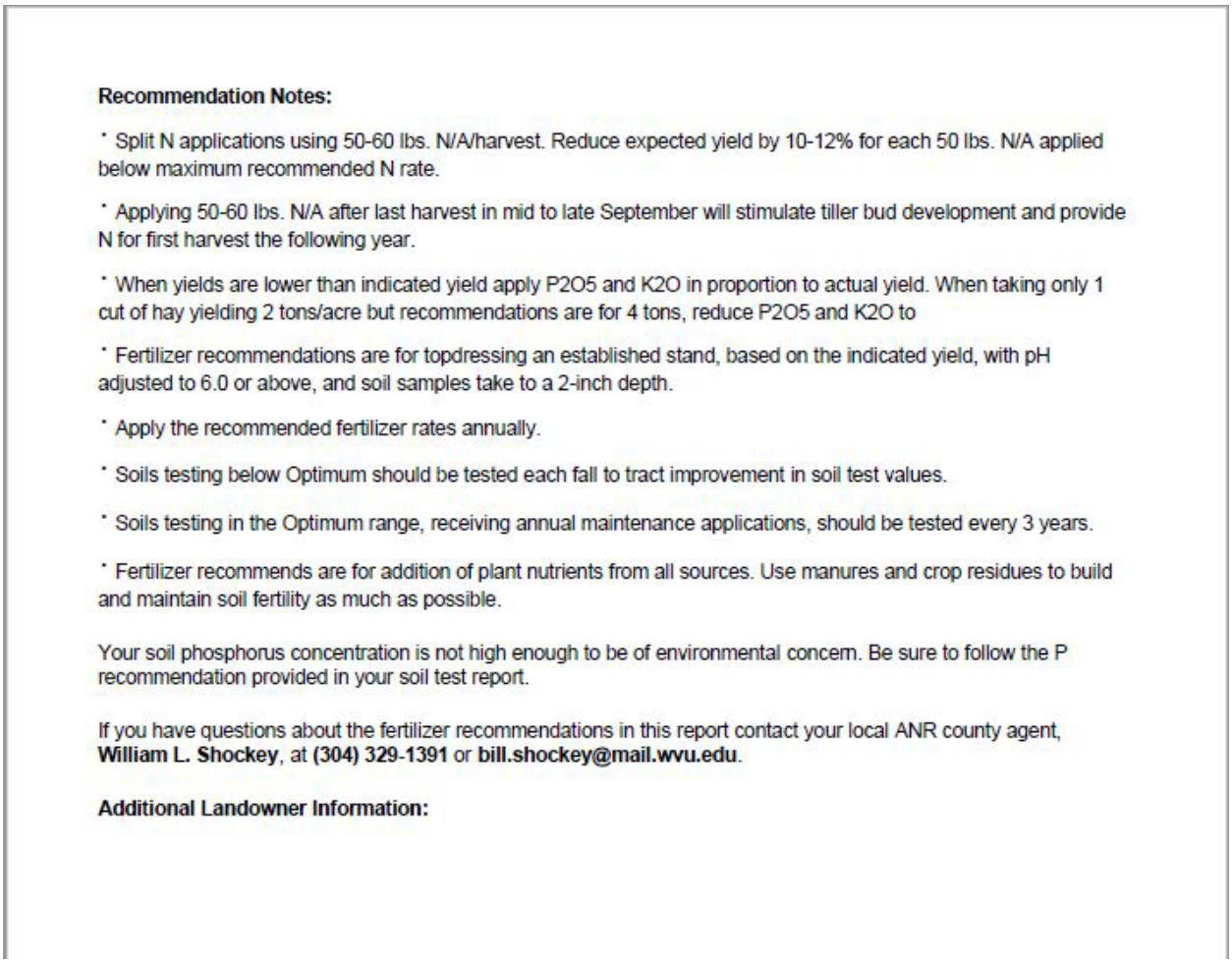
Nutrients	Values	Rating
P (ppm)	25	Medium +
K (ppm)	93	Optimum -
Ca (ppm)	2700	Excess
Mg (ppm)	75	Medium -
Psat (%)	9	Low

Fertilizer recommendation for C02: Grass Hay N-Fertilized having an expected yield of 4.5 Tons/A

	A) Crop Sufficiency Rate	B) Build to Optimum Rate
N (Lbs./Acre)	50-200	50-200
P_2O_5 (Lbs./Acre)	25	60
K_2O (Lbs./Acre)	0	185
Ag Lime	2.0 tons/A 100% ENV Dolomitic (High magnesium) Limestone	

Recommendation Notes are provided on the following page.

Figure 22. Example of the back page of the WVU soil test report using data from Figure 20.



Recommendation Notes:

* Split N applications using 50-60 lbs. N/A/harvest. Reduce expected yield by 10-12% for each 50 lbs. N/A applied below maximum recommended N rate.

* Applying 50-60 lbs. N/A after last harvest in mid to late September will stimulate tiller bud development and provide N for first harvest the following year.

* When yields are lower than indicated yield apply P2O5 and K2O in proportion to actual yield. When taking only 1 cut of hay yielding 2 tons/acre but recommendations are for 4 tons, reduce P2O5 and K2O to

* Fertilizer recommendations are for topdressing an established stand, based on the indicated yield, with pH adjusted to 6.0 or above, and soil samples take to a 2-inch depth.

* Apply the recommended fertilizer rates annually.

* Soils testing below Optimum should be tested each fall to tract improvement in soil test values.

* Soils testing in the Optimum range, receiving annual maintenance applications, should be tested every 3 years.

* Fertilizer recommends are for addition of plant nutrients from all sources. Use manures and crop residues to build and maintain soil fertility as much as possible.

Your soil phosphorus concentration is not high enough to be of environmental concern. Be sure to follow the P recommendation provided in your soil test report.

If you have questions about the fertilizer recommendations in this report contact your local ANR county agent, **William L. Shockey**, at **(304) 329-1391** or **bill.shockey@mail.wvu.edu**.

Additional Landowner Information: