

## ***NuMan Pro 5.0: Using the Phosphorus Management Tool (PMT) to assess risks of P loss from high P fields***

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### **Introduction**

According to Maryland State Regulations, under certain circumstances you will need to assess whether phosphorus-bearing materials can be applied to agricultural fields. These circumstances include applying materials containing phosphorus (P):

- to fields with soil test FIV-P greater than or equal to 150
- when an operator wishes to apply starter P on fields with soil test FIV-P >100 for crops that have no starter recommendation
  - The stand-alone version of *Phosphorus Management Tool (PMT) updated edition 2015* must be utilized for this situation
- when the operator wishes to apply more chemical fertilizer P than is recommended, regardless of the soil test FIV-P score.
  - If an operator wishes to apply more P than is recommended, the P-removal for the crop may not be exceeded. *NuMan Pro 5.0* can calculate the P-removal rate.

The Phosphorus Management Tool (PMT) is designed to evaluate the relative risk of P transport from agricultural fields and is incorporated into *NuMan Pro 5.0*. It is currently being phased into use in MD while the Phosphorus Site Index (PSI) has been phased out. For more information on the transition process to PMT, check out the [Plan Writing Tools PMT section](#) on the ANMP website. If you'd like to learn more about how to properly calculate the PMT, watch [this recorded webinar](#) on the topic. Finally, your go-to resource for calculating the PMT is the [PMT Technical User's Guide](#).

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### **Contents**

In this document, you will find instructions for:

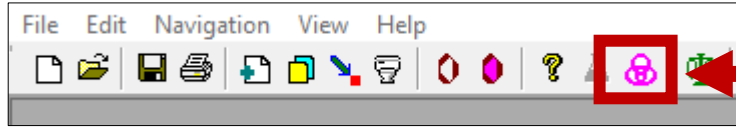
- [Getting started with the PMT](#)
  - [Entering information in the "Particulate" tab](#)
  - [Entering information in the "Runoff" tab](#)
  - [Entering information in the "Subsurface" tab](#)
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Getting started with the PMT

Instructions

Step	Action
1	<p>First, confirm that you have entered all information in the “Farmer &amp; Consultant”, “Field”, “Soil”, “Scenarios” and “History” tabs in <i>NuMan Pro 5.0</i> (if applicable). Each tab should have a green check next to it (except possibly the “History” and “Recommendations” tabs).</p> <div style="border: 1px solid gray; padding: 5px; margin: 10px 0;"> <span style="display: inline-block; border: 1px solid gray; padding: 2px 5px;">✓ Farmer &amp; Cons</span> <span style="display: inline-block; border: 1px solid gray; padding: 2px 5px;">✓ Field</span> <span style="display: inline-block; border: 1px solid gray; padding: 2px 5px; color: blue;">✓ Soil</span> <span style="display: inline-block; border: 1px solid gray; padding: 2px 5px;">✓ Scen</span> <span style="display: inline-block; border: 1px solid gray; padding: 2px 5px;">✓ Rec</span> <span style="display: inline-block; border: 1px solid gray; padding: 2px 5px;">✓ History</span> </div> <p>If a field’s FIV-P value is equal to or greater than 150, you will see a warning on the “Soil” tab for that field, indicating that a PMT calculation may be required.</p> <div style="border: 1px solid gray; padding: 10px; margin: 10px 0;"> </div>
2	<p>On the “Soils” tab, make sure you have clicked <b>Use lab DPS</b> if your soil test reports either:</p> <ol style="list-style-type: none"> <li>1. the Degree of Phosphorus Saturation (DPS) <b>or</b></li> <li>2. the Al and Fe values.</li> </ol> <div style="border: 1px solid gray; padding: 10px; margin: 10px 0;"> </div> <p>If this information is not available, advise the farmer to ask for this information in the next test, and click “Use est DPS”.</p> <div style="border: 1px solid gray; padding: 10px; margin: 10px 0;"> </div>

To switch to the PMT View of the software, click the three pink interlocking circles icon on the **Tool Bar**.

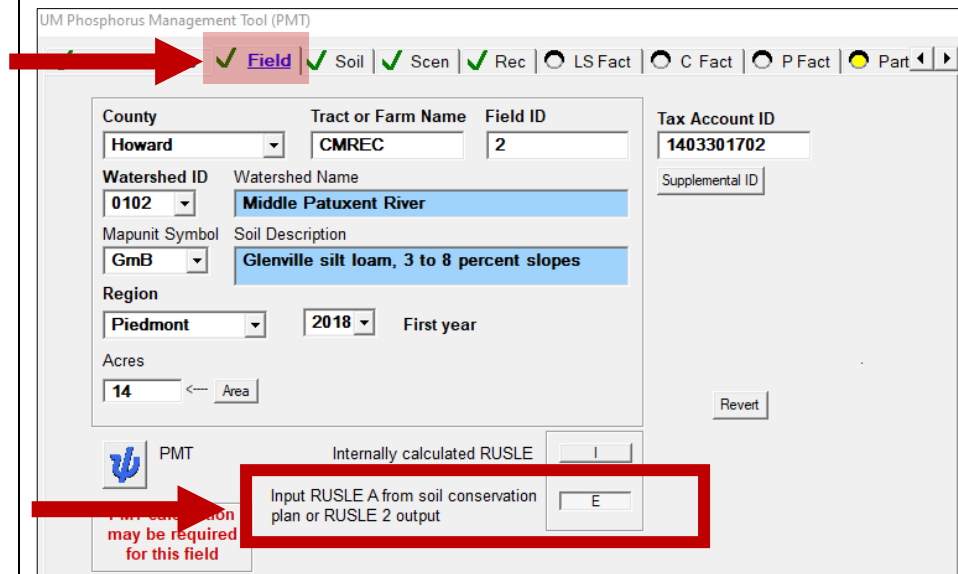


4 You will now see specific tabs for the calculation of the PMT. Use the arrows to show additional tabs as necessary.



5 On the bottom of the "Field" tab, you will see two options for entering RUSLE erosion calculations. Make sure "Input RUSLE A from soil conservation plan or RUSLE 2 output" is chosen (the button should be indented).

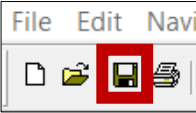
\*\*RUSLE2 includes updated information on components, such as conservation tillage implements, and therefore produces more accurate soil erosion estimates for most farming situations. "Internally calculated RUSLE" should not be used.



With the second RUSLE option selected, you will not have access to the tabs for calculating individual RUSLE values.




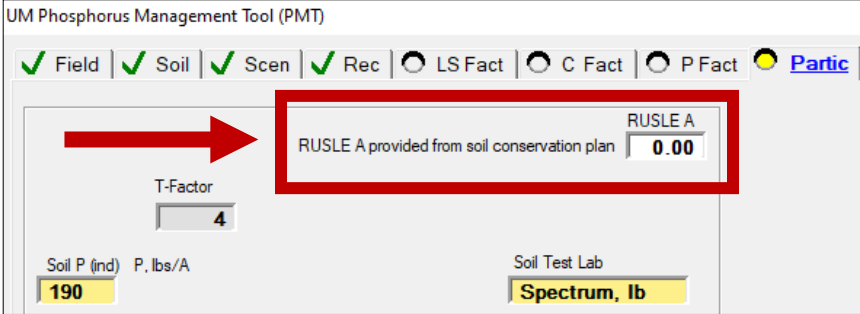
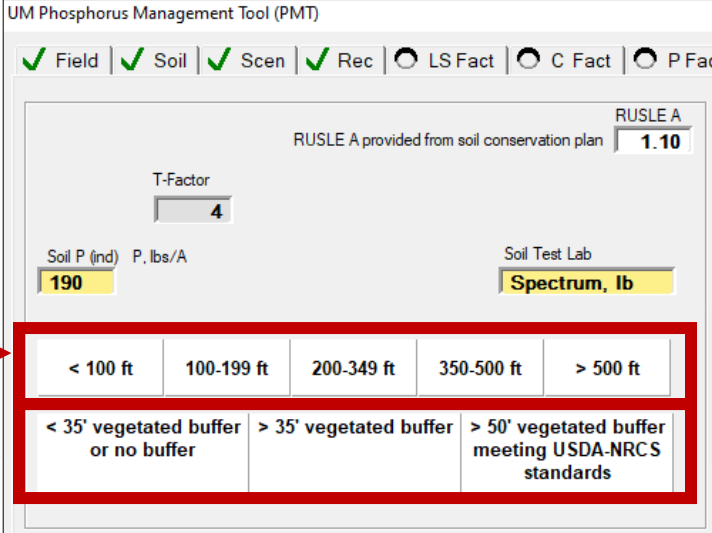
**Will not use these tabs**

6	Remember to save your work! There is <b>no autosave feature</b> in <i>NuMan Pro</i> .	
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**The “Particulate” tab**

**Instructions**

You only have to enter information into the fields with white backgrounds. Fields with yellow backgrounds are populated using information you have entered on previous tabs, and fields with blue backgrounds are calculated within the program based on user inputs.

Step	Action
1	Click on the “Particulate” tab. 
2	Enter the RUSLE A value (or “soil loss for cons. plans” value) from the RUSLE2 report. 
3	Next, indicate the appropriate values for Distance to Surface water and width of permanent vegetative buffer. 

Your choices will be shown in green.

< 100 ft	100-199 ft	200-349 ft	350-500 ft	> 500 ft
< 35' vegetated buffer or no buffer	> 35' vegetated buffer	> 50' vegetated buffer meeting USDA-NRCS standards		

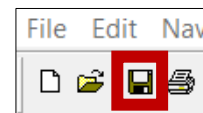
4 The Particulate **P** Transport Risk box should populate.

SED Value: 4  
X  
Soil P FIV: 152  
X  
Distance Factor (DF): 0.6  
X  
Buffer Factor (BF): 0.9  
Distance-Buffer Factor: 0.54  
DBF: 0.54  
x 0.1  
Particulate P Transport Risk: 32.9

If it does not populate, and the box is filled with asterisks, go back and check your work to make sure all necessary information has been entered.

SED Value: 4  
X  
Soil P FIV: 152  
X  
Distance Factor (DF): \* \* \* \*  
X  
Buffer Factor (BF): \* \* \* \*  
Distance-Buffer Factor: \* \* \* \*  
DBF: \* \* \* \*  
x 0.1  
Particulate P Transport Risk: \* \* \*



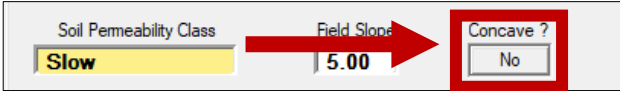
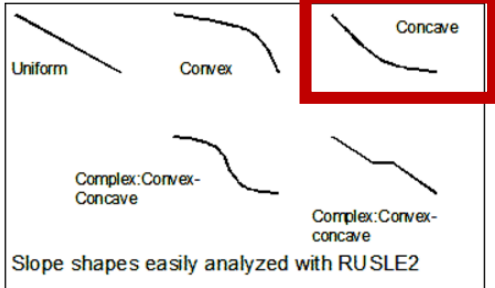
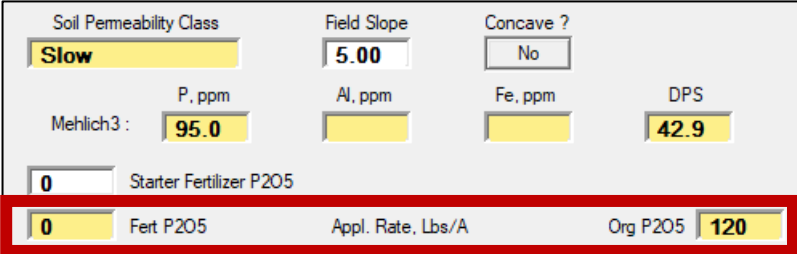
5 Remember to save your work! There is **no autosave feature** in *NuMan Pro*.



**The “Runoff”  
tab**

**Instructions**

You only have to enter information into the fields with white backgrounds.

Step	Action
1	<p>Click on the “Runoff” tab.</p> 
2	<p>Enter the field slope.</p> 
3	<p>Indicate whether the field is concave by clicking the button. A concave field will have little to no surface runoff leave the field.</p>  <p>*Examples of “slope shapes”, according to the USDA-ARS (2016):</p>  <p><small><a href="https://www.ars.usda.gov/southeast-area/oxford-ms/national-sedimentation-laboratory/watershed-physical-processes-research/research/rusle2/revise-universal-soil-loss-equation-2-rusle2-definitions/">https://www.ars.usda.gov/southeast-area/oxford-ms/national-sedimentation-laboratory/watershed-physical-processes-research/research/rusle2/revise-universal-soil-loss-equation-2-rusle2-definitions/</a></small></p>
4	<p>The recommended fertilizer (<b>Fert P205</b>) that was generated by <i>NuMan Pro</i> or manure P (<b>Org P205</b>) you entered for the field is already present in the yellow fields above the table.</p>  <p>If starter fertilizer will be used and if the crop has a starter recommendation, enter the rate in the <b>Starter Fertilizer P205</b> box. Note that starter fertilizer is only recommended for certain crops, including corn grain, corn silage, and some fruits and vegetables.</p>

- If an operator wishes to apply starter P on fields with FIV-P >100 for a crop that has no starter recommendation, the stand-alone version of *Phosphorus Management Tool (PMT) updated edition 2015* must be utilized for calculating the PMT.

Soil Pemeability Class	Field Slope	Concave ?	
<b>Slow</b>	<b>5.00</b>	No	
Mehlich3 :	P, ppm	Al, ppm	Fe, ppm
	<b>95.0</b>		<b>42.9</b>
<b>0</b>	Starter Fertilizer P2O5		
<b>0</b>	Fert P2O5	Appl. Rate, Lbs/A	Org P2O5 <b>120</b>



5 In the table, you can enter information for split applications (if applicable) by editing the boxes along the shaded green bar at the top of the table.

<b>0</b>	Fert P2O5	Appl. Rate, Lbs/A			Org P2O5	<b>120</b>
<b>1st app</b>	<b>2nd app</b>	<b>3rd app</b>	<b>Surface runoff method + timing</b>			<b>1st app</b>
						<b>2nd app</b>
						<b>3rd app</b>
<b>Fert &lt;- Totals -&gt; Org</b>						<b>120</b>
Subsurface placement or immediate full incorporation (>90% residue)						
Incorporated within 5 days of application (>= 50% residue)						



Manually enter the amount that will be put down in a 1<sup>st</sup> application, and the remaining amount will be shifted to the 2<sup>nd</sup> application column. This can be done again to the 2<sup>nd</sup> application total to shift any remaining amount to the 3<sup>rd</sup> application column.

Org P2O5 <b>120</b>	Org P2O5 <b>120</b>	Org P2O5 <b>120</b>	Org P2O5 <b>120</b>
<b>1st app</b>	<b>2nd app</b>	<b>3rd app</b>	<b>1st app</b>
<b>120</b>			
	<b>60</b>		
		<b>30</b>	
			<b>60</b>
			<b>30</b>
			<b>30</b>

6 For each application and P source, indicate the method and timing of incorporation (see the descriptions in the table) by clicking on the appropriate box in the corresponding application column.

0 Starter Fertilizer P205			Fert P205			Appl. Rate, Lbs/A	Org P205	120
1st app	2nd app	3rd app	Surface runoff method + timing			1st app	2nd app	3rd app
			Fert <- Totals -> Org			120		
			Subsurface placement or immediate full incorporation (>90% residue)			X		
			Incorporated within 5 days of application (>= 50% residue)					
			Surface applied March-Nov or incorp. after 5 days or < 50% residue					
			Surface applied or incorporated after 5 days Dec.-Feb.					
Application Method Index Values						0.20		



\*Note: Anytime you switch from the PMT View to the Planning View and back again, make sure to check the tables. Occasionally the tables reset.

7 At this point, the **P transport Risk** via runoff should be displayed on the bottom, right of the screen.

If no value appears, go back and make sure you have entered all the necessary information on the "Runoff" tab.

SR Factor: 6.3

2x DPS: 85.9  
 +  
 FP \* PSC: 0.0  
 X  
 AMr (f): 0.00  
 +  
 OP \* PSC: 60.0  
 X  
 AMr (o): 0.20  
 → DPRr: 97.9  
 X  
 DBF: 0.54  
 x 0.1  
 ↓  
 Runoff: 33.3  
 P Transport Risk: 33.3

8 Remember to save your work! There is **no autosave feature** in *NuMan Pro*.


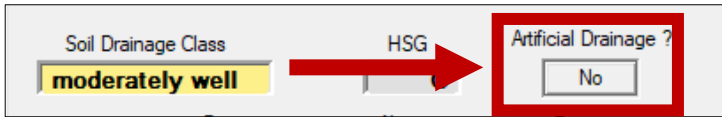
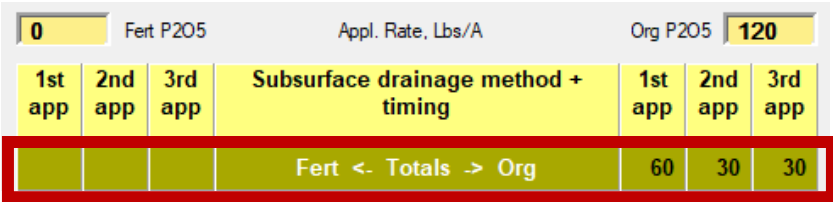
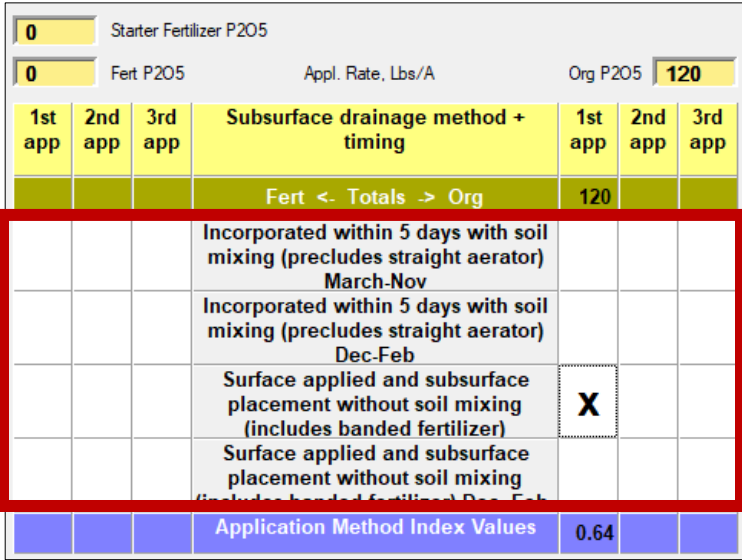
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The  
"Subsurface"  
tab

Instructions

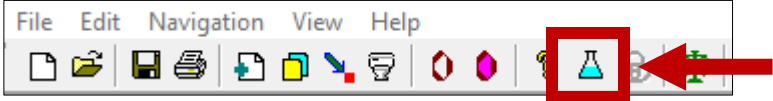
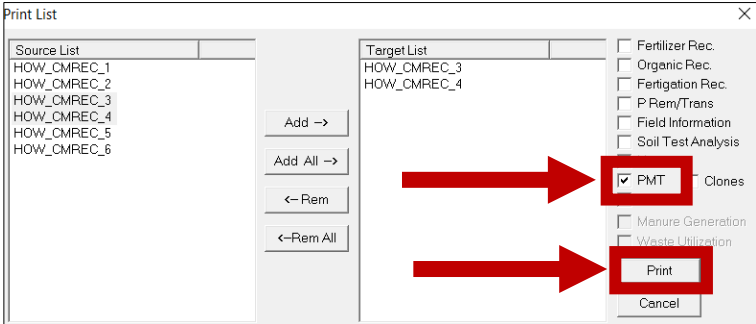
You only have to enter information into the fields with white backgrounds.

Step	Action																																																																																		
1	<p>Click on the "Subsurface" tab.</p> 																																																																																		
2	<p>Click the button under <b>Artificial Drainage</b> to indicate whether the field is drained artificially by ditches, tile drains, or mole drains.</p> <ul style="list-style-type: none"> <li>If no artificial drainage is present in a field, no further action is necessary. Jump to Step 5 in this section.</li> </ul> 																																																																																		
3	<p>If applicable, check that the split applications along the shaded green bar at the top of the table were entered correctly. If not, return to the "Runoff" tab and see Step 5 in the previous section.</p>  <table border="1"> <thead> <tr> <th colspan="3">0</th> <th>Fert P205</th> <th>Appl. Rate, Lbs/A</th> <th>Org P205</th> <th colspan="3">120</th> </tr> <tr> <th>1st app</th> <th>2nd app</th> <th>3rd app</th> <th colspan="3">Subsurface drainage method + timing</th> <th>1st app</th> <th>2nd app</th> <th>3rd app</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td colspan="3">Fert &lt;- Totals -&gt; Org</td> <td>60</td> <td>30</td> <td>30</td> </tr> </tbody> </table>	0			Fert P205	Appl. Rate, Lbs/A	Org P205	120			1st app	2nd app	3rd app	Subsurface drainage method + timing			1st app	2nd app	3rd app				Fert <- Totals -> Org			60	30	30																																																							
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4	<p>In the table, choose the fertilizer and/or organic P incorporation category that matches the farm practice.</p>  <table border="1"> <thead> <tr> <th colspan="3">0</th> <th>Starter Fertilizer P205</th> <th colspan="3"></th> <th colspan="3"></th> </tr> <tr> <th colspan="3">0</th> <th>Fert P205</th> <th>Appl. Rate, Lbs/A</th> <th>Org P205</th> <th colspan="3">120</th> </tr> <tr> <th>1st app</th> <th>2nd app</th> <th>3rd app</th> <th colspan="3">Subsurface drainage method + timing</th> <th>1st app</th> <th>2nd app</th> <th>3rd app</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td colspan="3">Fert &lt;- Totals -&gt; Org</td> <td>120</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td colspan="3">Incorporated within 5 days with soil mixing (precludes straight aerator) March-Nov</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td colspan="3">Incorporated within 5 days with soil mixing (precludes straight aerator) Dec-Feb</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td colspan="3">Surface applied and subsurface placement without soil mixing (includes banded fertilizer)</td> <td>X</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td colspan="3">Surface applied and subsurface placement without soil mixing (includes banded fertilizer) Dec-Feb</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="6">Application Method Index Values</td> <td>0.64</td> <td></td> <td></td> </tr> </tbody> </table>	0			Starter Fertilizer P205							0			Fert P205	Appl. Rate, Lbs/A	Org P205	120			1st app	2nd app	3rd app	Subsurface drainage method + timing			1st app	2nd app	3rd app				Fert <- Totals -> Org			120						Incorporated within 5 days with soil mixing (precludes straight aerator) March-Nov									Incorporated within 5 days with soil mixing (precludes straight aerator) Dec-Feb									Surface applied and subsurface placement without soil mixing (includes banded fertilizer)			X						Surface applied and subsurface placement without soil mixing (includes banded fertilizer) Dec-Feb						Application Method Index Values						0.64		
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	<p>*Note: Read these categories carefully as they are not the same as the options on the "Runoff" tab.</p>																																																																																		

<p>5</p>	<p>With this information entered, the following should populate:</p> <ul style="list-style-type: none"> <li>• your <b>Subsurface P loss risk</b>,</li> <li>• the overall <b>P loss rating</b> for the field, and</li> <li>• an explanation of the corresponding low, medium, or high category.</li> </ul>	
<p>If not and the boxes are filled with asterisks, review the page to make sure all information has been entered.</p> <p>*Note: The <b>P loss rating</b> is based on the information that has been entered into the program, so if a manure application rate or other practice changes, you must re-run the PMT to determine the score under the new management plans.</p>		
<p>6</p>	<p>Remember to save your work! There is <b>no autosave feature</b> in <i>NuMan Pro</i>.</p>	

**Finishing up the PMT Instructions**

Step	Action
<p>1</p>	<p>If you have multiple fields that require a PMT, you can navigate from one to the other the same way you navigate through fields in <i>NuMan Pro 5.0</i>. Just use the arrows on the <b>Navigation Bar</b> at the top of the screen.</p> <p>Click on arrows to move through the list of fields      <b>OR</b>      Use drop-down menu to choose which field is displayed</p>

2	<p>To return to the Planning View in <i>NuMan Pro</i>, click on the beaker icon on the <b>Tool bar</b>.</p> 
3	<p>Printing the PMT report is similar to printing other reports in <i>NuMan Pro</i>. See full instructions on the ANMP website under the “Software” tab and in the <i>NuMan Pro 5.0</i> section -&gt; NuMan Pro Help Guides -&gt; Introduction to the NuMan Pro software.</p> <p><a href="http://www.extension.umd.edu/anmp/software/">http://www.extension.umd.edu/anmp/software/</a></p> <p>After moving the required fields to the “Target List”, click on the <b>check box</b> next to PMT, then click “Print”.</p>  <p><b>*Note:</b> You can print from either the PMT View or the Planning View of the software.</p>
4	<p>Remember to save your work! There is <b>no autosave feature</b> in <i>NuMan Pro</i>.</p> 