“The first step toward getting somewhere is to decide that you are not going to stay where you are”

Unknown

“The only man who never makes a mistake is the man who never does anything.”

Theodore Roosevelt
Nutrient Management Tools!
Trevor Wallace
Len Kryzanowski, Geoff Montgomery, Laura Thygesen
Manure Management Update
Lethbridge, Jan 16, 2017

ENVIRONMENTAL STEWARDSHIP DIVISION
Objectives:

• To **outline** what the various tools can do for you

• To provide an **update / introduction** to each tool

• Briefly **describe** what each tool can do.
So What can these ‘tools’ do for my operation / me??
What do they do for me?

- Risk assessment
- Planning & Communication
  - Manure & fertilizer to be applied
  - Crops to be grown
• Decision Making & Analysis
  ○ Scenario testing
  ○ Analysis of a plan
  ○ Testing assumptions
  ○ Risk assessment

Field Nutrient Balance

<table>
<thead>
<tr>
<th>Year</th>
<th>Field ID</th>
<th>Site ID</th>
<th>Size</th>
<th>Crop</th>
<th>Yield</th>
<th>Fertilizer Rec</th>
<th>N Fertilizer Rec</th>
<th>N Actual</th>
<th>P Fertilizer Rec</th>
<th>P Actual</th>
<th>K Fertilizer Rec</th>
<th>K Actual</th>
<th>Balance After Rec</th>
<th>Balance After Revised</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>Home 60</td>
<td>N20</td>
<td>20</td>
<td>Corn</td>
<td>160</td>
<td>190</td>
<td>0</td>
<td>163</td>
<td>159 131</td>
<td>-27</td>
<td>159 131</td>
<td>190 88</td>
<td>159 131</td>
<td>190 88</td>
</tr>
<tr>
<td>2004</td>
<td>Home 60</td>
<td>N20</td>
<td>20</td>
<td>Corn</td>
<td>160</td>
<td>159</td>
<td>0</td>
<td>163</td>
<td>159 131</td>
<td>-27</td>
<td>159 131</td>
<td>190 88</td>
<td>159 131</td>
<td>190 88</td>
</tr>
<tr>
<td>2005</td>
<td>Home 60</td>
<td>N20</td>
<td>20</td>
<td>Corn</td>
<td>160</td>
<td>159</td>
<td>0</td>
<td>163</td>
<td>159 131</td>
<td>-27</td>
<td>159 131</td>
<td>190 88</td>
<td>159 131</td>
<td>190 88</td>
</tr>
<tr>
<td>Total</td>
<td>Home 60</td>
<td>N20</td>
<td>20</td>
<td></td>
<td>578</td>
<td>0</td>
<td>0</td>
<td>543 159 131</td>
<td>131</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>543 159 131</td>
<td>131</td>
</tr>
</tbody>
</table>
What do they do for me?

- **Calculators**
  - Fertilizer application rates
  - Manure application rates
  - Nutrients applied by an application
  - Calibration of equipment
What do they do for me?

- Record keeping
  - Succession planning
  - Sharing between family & staff
  - Reporting
  - Sustainability initiatives
  - Market access
What do they do for me?

- **Tips and Information**
  - Some embedded
  - Links for online

- **Automation of some tasks**
  - Geolocating
  - Collection of weather data
  - Emergency information
In the end!

- Make the work easier.
- Reduce risk
- Save you money
- End save you time

“Spend too much time working in the business, and not enough time working on the business.”
Stan Parsons
MMP
Manure Management Planner

MMP

- Planning and managing manure applications
- Decision support / scenario
- Planner / analysis
- Calculator
- Communication
- Record keeping tool
MMP

• Input:
  ○ fields, soil, crop, animals, storage, equipment

• Output:
  ○ Manure & fertilizer application plan/recommendation
  ○ Manure volumes, transfers
# Alberta Fertilizer Applicator Report

**Operation:** Alberta Beef Example 1, Metric  
**Address:** 123 Rural Route  
**Anytown, AB T6H 5T6**  
**Phone:** 555-555-5555  
**Plan File:** C:\MMP\TstPlans\Alberta_Test.mmp  
**Plan Years:** 3  
**Last Saved:** 4/25/05  
**Author:** Mr. A. Planer

## Yearly Application

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Field</th>
<th>Subfield</th>
<th>App. Area</th>
<th>Application Coverage</th>
<th>Per Crop</th>
<th>Yield Goal</th>
<th>Yield Units</th>
<th>1-Year N</th>
<th>Type Of Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>Oct</td>
<td>M2</td>
<td></td>
<td>85.00</td>
<td>Entire Field</td>
<td>Wheat, Winter</td>
<td>3360 Kg/ha</td>
<td>Kg/ha</td>
<td>1-Year N</td>
<td>Fertilizer</td>
</tr>
<tr>
<td>2004</td>
<td>Apr</td>
<td>B</td>
<td></td>
<td>0.40</td>
<td>Non-Manure Spreadable</td>
<td>Forage Grass</td>
<td>4.5 Tonne/ha</td>
<td>Tonne/ha</td>
<td>1-Year N</td>
<td>Fertilizer</td>
</tr>
<tr>
<td>2004</td>
<td>Apr</td>
<td>G</td>
<td></td>
<td>19.00</td>
<td>Manure Spreadable</td>
<td>Forage Grass</td>
<td>4.5 Tonne/ha</td>
<td>Tonne/ha</td>
<td>1-Year N</td>
<td>Fertilizer</td>
</tr>
<tr>
<td>2004</td>
<td>Apr</td>
<td>J. K. L</td>
<td></td>
<td>161.90</td>
<td>Manure Spreadable</td>
<td>Forage Grass</td>
<td>4.5 Tonne/ha</td>
<td>Tonne/ha</td>
<td>1-Year N</td>
<td>Fertilizer</td>
</tr>
<tr>
<td>2004</td>
<td>Oct</td>
<td>M2</td>
<td></td>
<td>85.00</td>
<td>Entire Field</td>
<td>Wheat, Winter</td>
<td>3360 Kg/ha</td>
<td>Kg/ha</td>
<td>1-Year N</td>
<td>Fertilizer</td>
</tr>
</tbody>
</table>

## Analysis

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Field</th>
<th>Subfield</th>
<th>Analysis</th>
<th>Rate</th>
<th>Rate Units</th>
<th>N Applied</th>
<th>PZ05 Applied</th>
<th>KZ0 Applied</th>
<th>Nutrient Units</th>
<th>Application Method</th>
<th>Total Material Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>Oct</td>
<td>M2</td>
<td></td>
<td>20-0-0</td>
<td>195</td>
<td>Litre/Ha</td>
<td>70</td>
<td>0</td>
<td>0</td>
<td>Kg/ha</td>
<td>Surface broadcast</td>
<td>16,575</td>
</tr>
<tr>
<td>2004</td>
<td>Apr</td>
<td>B</td>
<td></td>
<td>28-0-0</td>
<td>195</td>
<td>Litre/Ha</td>
<td>70</td>
<td>0</td>
<td>0</td>
<td>Kg/ha</td>
<td>Surface broadcast</td>
<td>76</td>
</tr>
<tr>
<td>2004</td>
<td>Apr</td>
<td>G</td>
<td></td>
<td>28-0-0</td>
<td>265</td>
<td>Litre/Ha</td>
<td>95</td>
<td>0</td>
<td>0</td>
<td>Kg/ha</td>
<td>Surface broadcast</td>
<td>5,035</td>
</tr>
<tr>
<td>2004</td>
<td>Apr</td>
<td>J. K. L</td>
<td></td>
<td>29-0-0</td>
<td>139</td>
<td>Litre/Ha</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>Kg/ha</td>
<td>Surface broadcast</td>
<td>22,004</td>
</tr>
<tr>
<td>2004</td>
<td>Oct</td>
<td>M2</td>
<td></td>
<td>20-0-0</td>
<td>195</td>
<td>Litre/Ha</td>
<td>70</td>
<td>0</td>
<td>0</td>
<td>Kg/ha</td>
<td>Surface broadcast</td>
<td>16,575</td>
</tr>
</tbody>
</table>

---

# Alberta Manure Applicator Report

**Operation:** Alberta Beef Example 1, Metric  
**Address:** 123 Rural Route  
**Anytown, AB T6H 5T6**  
**Phone:** 555-555-5555  
**Plan File:** C:\MMP\TstPlans\Alberta_Test.mmp  
**Plan Years:** 3  
**Last Saved:** 4/25/05  
**Author:** Mr. A. Planer

## Manure Application

<table>
<thead>
<tr>
<th>Month</th>
<th>Field</th>
<th>Spread. Area</th>
<th>Application Date</th>
<th>Manure Source</th>
<th>Equipment</th>
<th>Rate</th>
<th>Units</th>
<th>Loads</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>Sep</td>
<td>A</td>
<td>28.3</td>
<td>Feedlot pile</td>
<td>McKee Spreader</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>64</td>
</tr>
<tr>
<td>2003</td>
<td>Sep</td>
<td>D</td>
<td>33.2</td>
<td>Feedlot pile</td>
<td>McKee Spreader</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>75</td>
</tr>
<tr>
<td>2003</td>
<td>Sep</td>
<td>H</td>
<td>47.3</td>
<td>Feedlot pile</td>
<td>McKee Spreader</td>
<td>34</td>
<td>Tonne/Ha</td>
<td>202</td>
</tr>
<tr>
<td>2004</td>
<td>May</td>
<td>B</td>
<td>42.5</td>
<td>Feedlot pile</td>
<td>JD 830</td>
<td>25</td>
<td>Tonne/Ha</td>
<td>367</td>
</tr>
<tr>
<td>2004</td>
<td>May</td>
<td>E</td>
<td>78.9</td>
<td>Field pile</td>
<td>JD 830</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>168</td>
</tr>
<tr>
<td>2004</td>
<td>May</td>
<td>E</td>
<td>78.9</td>
<td>Feedlot pile</td>
<td>JD 830</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>322</td>
</tr>
<tr>
<td>2004</td>
<td>Sep</td>
<td>A</td>
<td>28.3</td>
<td>Feedlot pile</td>
<td>McKee Spreader</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>64</td>
</tr>
<tr>
<td>2004</td>
<td>Sep</td>
<td>D</td>
<td>33.2</td>
<td>Feedlot pile</td>
<td>McKee Spreader</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>75</td>
</tr>
<tr>
<td>2004</td>
<td>Sep</td>
<td>H</td>
<td>47.3</td>
<td>Feedlot pile</td>
<td>McKee Spreader</td>
<td>24.5</td>
<td>Tonne/Ha</td>
<td>145</td>
</tr>
<tr>
<td>2005</td>
<td>May</td>
<td>B</td>
<td>42.5</td>
<td>Feedlot pile</td>
<td>JD 830</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>264</td>
</tr>
<tr>
<td>2005</td>
<td>May</td>
<td>E</td>
<td>78.9</td>
<td>Field pile</td>
<td>JD 830</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>169</td>
</tr>
<tr>
<td>2005</td>
<td>May</td>
<td>E</td>
<td>78.9</td>
<td>Feedlot pile</td>
<td>JD 830</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>321</td>
</tr>
<tr>
<td>2005</td>
<td>Sep</td>
<td>D</td>
<td>33.2</td>
<td>Feedlot pile</td>
<td>McKee Spreader</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>75</td>
</tr>
<tr>
<td>2005</td>
<td>Sep</td>
<td>H</td>
<td>47.3</td>
<td>Feedlot pile</td>
<td>McKee Spreader</td>
<td>22</td>
<td>Tonne/Ha</td>
<td>131</td>
</tr>
<tr>
<td>2005</td>
<td>Oct</td>
<td>M2</td>
<td>85</td>
<td>Feedlot pile</td>
<td>McKee Spreader</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>192</td>
</tr>
<tr>
<td>2006</td>
<td>May</td>
<td>B</td>
<td>42.5</td>
<td>Field pile</td>
<td>JD 830</td>
<td>10</td>
<td>Tonne/Ha</td>
<td>168</td>
</tr>
<tr>
<td>2006</td>
<td>May</td>
<td>B</td>
<td>42.5</td>
<td>Feedlot pile</td>
<td>JD 830</td>
<td>18</td>
<td>Tonne/Ha</td>
<td>96</td>
</tr>
</tbody>
</table>

---

# Alberta AOPA Report

**Operation:** Alberta Beef Example 1, Metric  
**Address:** 123 Rural Route  
**Anytown, AB T6H 5T6**  
**Phone:** 555-555-5555  
**Plan File:** C:\MMP\TstPlans\Alberta_Test.mmp  
**Plan Years:** 3  
**Last Saved:** 4/25/05  
**Author:** Mr. A. Planer

## Animal Production

<table>
<thead>
<tr>
<th>Animal ID</th>
<th>Animal Type</th>
<th>Count</th>
<th>Ave. Wt</th>
<th>Units</th>
<th>Confinement Period</th>
<th>% Of Manure Collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finishes</td>
<td>Beef finisher</td>
<td>1,300</td>
<td>544 Kg</td>
<td>Jan Early - Dec Late</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Growers</td>
<td>Beef feeder/background</td>
<td>1,700</td>
<td>517 Kg</td>
<td>Jan Early - Dec Late</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Cows on pasture</td>
<td>Beef cow/bull/bred heifer</td>
<td>300</td>
<td>590 Kg</td>
<td>Jan Early - Dec Late</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

## Manure Production

<table>
<thead>
<tr>
<th>Storage ID</th>
<th>Storage Type</th>
<th>Estimated Production</th>
<th>Units</th>
<th>Total N</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedlot pile</td>
<td>Open lot (no straw)</td>
<td>517</td>
<td>Tonne/Year</td>
<td>10 Kg/Tonne</td>
<td></td>
</tr>
</tbody>
</table>
MTC
Manure Transportation Calculator

MTC

- Excel based tool
- Decision support / calculator
  - Net cost of applying manure or fertilizer
  - Estimates nutrient use / availability
  - Estimate application cost versus benefit
MTC

• Inputs:
  ○ Manure nutrient content, fertilizer recommendation, rotation & yield goal, transportation/application info/cost

• Output:
  ○ Manure production
  ○ Manure application rate
  ○ Nutrient contributions
  ○ Cost/benefit of manure application
Summary of 5 Year Cost Analysis

Select Units
- Imperial
- Metric

Select Manure
- Solid
- Liquid

Spreadable Size
- Acres
- Gallons

Planned Crop (year 1)
- Spring Wheat
- 55.0 bu/acre

Manure Application Rate - Currently Set At
- 3,500.0 gal/acre

Do you wish to apply a different amount of manure?
- Yes

Warning: A minimum practical application rate (3,000 gal/ac) cannot be met with the volume of liquid manure available.

You have chosen to apply 3,500 gal/acre to this field. Based on this, the following nutrients are available & utilized:

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Recommendation from Lab</th>
<th>Available from Manure</th>
<th>Utilized from Manure</th>
<th>Shortfall/Excess (based on N optimization)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>110</td>
<td>134</td>
<td>110</td>
<td>24</td>
</tr>
<tr>
<td>P2O5</td>
<td>44</td>
<td>81</td>
<td>44</td>
<td>37</td>
</tr>
<tr>
<td>K2O</td>
<td>36</td>
<td>267</td>
<td>99</td>
<td>168</td>
</tr>
<tr>
<td>S</td>
<td>16</td>
<td>11</td>
<td>11</td>
<td>5</td>
</tr>
</tbody>
</table>

This nutrient is over-applied and its value at risk of being lost.

Economic Cost/Benefit

<table>
<thead>
<tr>
<th></th>
<th>In Year 1</th>
<th>Over 5 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost to Apply Manure</td>
<td>Total $ 12,667</td>
<td>Total $ 12,667</td>
</tr>
<tr>
<td></td>
<td>$40/acre</td>
<td>$40/acre</td>
</tr>
<tr>
<td>Value of Manure Nutrients Utilized:</td>
<td>Total</td>
<td>$/acre</td>
</tr>
<tr>
<td>N</td>
<td>$20,522 $65</td>
<td>$31,029 $97</td>
</tr>
<tr>
<td>P2O5</td>
<td>$7,694 $24</td>
<td>$21,466 $67</td>
</tr>
<tr>
<td>K2O</td>
<td>$22,509 $70</td>
<td>$60,633 $183</td>
</tr>
<tr>
<td>S</td>
<td>$1,511 $5</td>
<td>$1,511 $5</td>
</tr>
<tr>
<td>Total</td>
<td>$52,536 $104</td>
<td>$114,639 $356</td>
</tr>
<tr>
<td>Net Economic Benefit</td>
<td>$35,863</td>
<td>$101,973</td>
</tr>
</tbody>
</table>
Wintering Site Assessment and Design Tool

WSADT

- Risk assessment tool
- Assess risk of wintering sites & nutrient loss
- Assess at an field/site level
  - Management practices
  - Landscape conditions
- Suggests BMPs to reduce losses
Format

• Series of questions.

• Question layout:
  ○ **Green**: low concerns
  ○ **Orange**: medium concerns
  ○ **Red**: high concerns

  ○ Potential Concerns
    • i.e., Why does this question matter

  ○ BMP suggestions to address concerns
1. In each WSADT chart, identify your current situation in the left-hand portion of the chart.

2. Consider the level of environmental risk associated with your current situation.

3. Consider the potential concerns.

4. Consider the options for BMPs to address the concerns.

5. Go to the Resources section of this publication to find detailed information to help you decide which particular BMPs would best meet the needs of your own operation.

**Example:**

<table>
<thead>
<tr>
<th>Site Characteristic</th>
<th>Environmental Risk Factor and Risk Level</th>
<th>Potential Concerns</th>
<th>Beneficial Management Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope length of wintering site</td>
<td>Less than 300 ft</td>
<td>300 ft to 1300 ft (1/4 mile)</td>
<td>Greater than 1300 ft</td>
</tr>
<tr>
<td>Depth to groundwater</td>
<td>Greater than 100 ft</td>
<td>25 ft to 100 ft</td>
<td>Less than 26 ft</td>
</tr>
<tr>
<td>Amount of bare ground on Perennial forage or annual cropland</td>
<td>Perennial pasture with &lt;25% bare ground</td>
<td>Annual cropland with stubble and aftermath with 25 to 50% bare ground or perennial pasture with &gt;25% bare ground</td>
<td>Annual cropland with &gt;75% bare ground</td>
</tr>
</tbody>
</table>

- If possible, place feeding areas on slopes less than 300 ft in length. For longer slopes, add berms or other barriers to slow runoff.
- Move site to high ground or a location that is at least 25 ft above the water table.
- Select a site with good groundcover or establish groundcover so that at least 75% of the surface is covered with plant material prior to winter feeding.
- For annual cropland, do not use fall tillage prior to winter feeding.
Nutrient Loading Calculator

http://www1.agric.gov.ab.ca/$Department/softdown.nsf/main?openform&type=NLC&page=information
NLC

• Excel based tool
• Decision support / calculator
  ○ Calculated feed requirements
  ○ Estimates nutrient additions from extensive livestock winter feeding
  ○ Help make in field feeding/siting decisions
• Risk Assessment
NLC

• Inputs:
  o Livestock, feed types, feeding plan

• Output:
  o Amount feed required
  o Estimated nutrient additions
  o Warning on nutrient loading

<table>
<thead>
<tr>
<th>Whole Bale Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed density (tons dry matter/acre)</td>
</tr>
<tr>
<td>Bale density (#/acre)</td>
</tr>
<tr>
<td>Number of bales needed</td>
</tr>
<tr>
<td>Sales fed per day</td>
</tr>
<tr>
<td>Bale spacing</td>
</tr>
</tbody>
</table>
  - within row (feet) | 36 |
  - between row (feet) | 36 |

<table>
<thead>
<tr>
<th>Nutrient Deposits on Land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Nutrient loading from imported feed</td>
</tr>
<tr>
<td>Nutrients removed by cattle weight gain</td>
</tr>
<tr>
<td>% of time cattle spend outside of feeding area</td>
</tr>
<tr>
<td>Net nutrient loading in feeding area from manure and waste feed</td>
</tr>
</tbody>
</table>
### 1. Cow Management
- **Number of cows**: 100 (My Own Value)
- **Average cow weight (lbs)**: 1300
- **Daily feed requirement of cow (lb dry matter/day)**: 33.8
- **Area of land used for feeding (acres)**: 10.7
- **Number of feeding days**: 120
- **Cow Days per Acre**: 1121
- **Animal Unit Days per Acre**: 1458
- **Net feed density (tons dry matter/acre)**: 18.9

### 4. Supplementary Feed Type
- **Grain**
  - **Barley**
  - **Dry matter content of feed (%)**: 89
  - **Protein content of feed (% dry matter basis)**: 12.5
  - **Nitrogen content of feed (% dry matter basis)**: 2.00
  - **Phosphorus content of feed (% dry matter basis)**: 0.38
  - **Potassium content of feed (% dry matter basis)**: 0.54
  - **Sulfur content of feed (% dry matter basis)**: 0.14

### 5. Supplementary Feed Management
- **Amount of feed provided at one time (lbs)**: 300
- **Number of feedings per day (eg. 2 = twice per day)**: 1
- **Contribution to daily feed requirement of cow (lbs dry matter/day)**: 2.66
- **Total supplementary feed needed (actual tons)**: 18.0
- **Supplementary feed density (tons dry matter/acre)**: 1.49

### 2. Primary Bale Type
- **Hay Perennials**  
  - **Brome**  
  - **Dry matter content of feed (%)**: 90
  - **Protein content of feed (% dry matter basis)**: 10.6
  - **Nitrogen content of feed (% dry matter basis)**: 1.70
  - **Phosphorus content of feed (% dry matter basis)**: 0.17
  - **Potassium content of feed (% dry matter basis)**: 1.50
  - **Sulfur content of feed (% dry matter basis)**: 0.14
  - **Percent of total bales provided by primary type**: 75
  - **Average bale weight (actual lbs)**: 1300
  - **Percentage of primary feed on a dry matter basis**: 76.6
  - **Feed wastage of primary bale type (%)**: 10

### 3. Secondary Bale Type
- **Straw**
  - **Wheat**
  - **Dry matter content of feed (%)**: 89
  - **Protein content of feed (% dry matter basis)**: 3.9
  - **Nitrogen content of feed (% dry matter basis)**: 0.62
  - **Phosphorus content of feed (% dry matter basis)**: 0.08
  - **Potassium content of feed (% dry matter basis)**: 1.40
  - **Sulfur content of feed (% dry matter basis)**: 0.12
  - **Percent of total bales provided by secondary type**: 25
  - **Average bale weight (actual lbs)**: 1200
  - **Percentage of secondary feed on a dry matter basis**: 23.4

### 6. Whole Bale Management
- **Feed density (tons dry matter/acre)**: 19.2
- **Bale density (#/acre)**: 33.6
- **Number of bales needed**: 360
- **Bales fed per day**: 3.0
- **Bale spacing**
  - **within row (feet)**: 36
  - **between row (feet)**: 36

### 7. Nutrient Deposits on Land
- **Nitrogen**
- **Phosphorus**
- **Potassium**
- **Sulfur**
  - **Nutrient loading from imported feed (lb/acre)**
    - **Nitrogen**: 615
    - **Phosphorus**: 68.5
    - **Potassium**: 583
    - **Sulfur**: 56.1
  - **Nutrients removed by cattle weight gain**:
    - **Nitrogen**: 8.4
    - **Phosphorus**: 2.0
    - **Potassium**: 1.2
    - **Sulfur**: 0.56
  - **% of time cattle spend outside of feeding area**: 15
- **Net nutrient loading in feeding area**
  - **Nitrogen**: 515
  - **Phosphorus**: 56.5
  - **Potassium**: 495
  - **Sulfur**: 47.2
APMT
Alberta Phosphorus Management Tool
Coming to a Computer near you soon!
• Excel-based risk assessment tool
• Assesses the risk of phosphorus loss
• Focus on surface water
• Risk is based on a variety of environmental and management factors
APMT

• Site specific
  ○ Can split into sub-fields or areas.
• Series of worksheet

• Series of question in each
  ○ Yes/no or practice based

• Questions are tailored based on answers
Welcome to the Alberta Phosphorus Management Tool (APMT)

Step 1: general information
- General Questionnaire
- Visit the APMT website

Step 2: rapid assessment
- Rapid Field Assessment: 100% completed
- Rapid Facility Assessment: 100% completed

Concerns were identified in 33% of cases
Concerns were identified in 100% of cases
Welcome to the Alberta Phosphorus Management Tool (APMT)

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<th>Concerns</th>
<th>33% of cases</th>
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Welcome to the Alberta Phosphorus Management Tool (APMT)

Step 1: general information
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Step 2: rapid assessment
- Rapid Field Assessment: 100% completed
- Rapid Facility Assessment: 100% completed

Step 3: detailed assessments
- Cropping System Management: not started
- Field Management: not started
- Grazing and Riparian Pasture: not started
- Seasonal Feedings & Beddings: not started
- Corrals, Loafing or Day Pastures: not started
- Barns/Livestock Housing: not started
- Catch Basin Management: not started
- Solid Manure Storage: not started
- Temporary Manure Storage: 46% completed
- Liquid Manure Storage: not started

Concerns were identified in 33% of cases
Concerns were identified in 100% of cases

Developed by serecon
• Includes potential concern descriptions

• Ranking of risk
  ○ low, low/medium, medium/high and high

• BMP suggestions to address loss
  ○ Each BMP has a relative financial cost environmental benefit
APMT

Seasonal Sites Report

Risks profile:

Based on the rapid and detailed assessments, 2 seasonal feedings/beddings are at risk. The detailed questionnaire is 93% completed.

The most attention may be required for the Site 1, Site 2:

- **Site 1** (high run-off risk, high site management and nutrients accumulation risk)
- **Site 2** (high flood risk, high site management and nutrients accumulation risk)

The high risk of flood was identified for the Site 2.

The high risk of run-off was identified for the Site 1.

The high risk in sites management and nutrients accumulation was identified for the Site 1, Site 2.
Summary of questions & responses

<table>
<thead>
<tr>
<th>Risk of flood:</th>
<th>Low to Moderate Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a) Could or has any part of the pasture ever been flooded from water flowing on to the field from a waterbody such as a river, stream, creek or lake?</td>
<td>Yes</td>
</tr>
<tr>
<td>Note: Do not consider water, from the field itself, accumulating or pooling on site in a low spot of the field as flooding.</td>
<td></td>
</tr>
<tr>
<td>2b) Does either the watering site or the area where the animals shelter/ruminate ever impacted by the flood water coming from the river, stream, creek or lake?</td>
<td>Yes</td>
</tr>
<tr>
<td>Note: Do not consider water, from the field itself, accumulating or pooling on site in a low spot of the field as flooding.</td>
<td></td>
</tr>
<tr>
<td>2c) How frequently does the watering area or shelter area flood?</td>
<td>At least part of the site floods once every 16 to 30 years</td>
</tr>
<tr>
<td>2d) What percentage of the watering area or shelter area is impacted by the flooding?</td>
<td>Between 26% and 50% of the field floods</td>
</tr>
</tbody>
</table>

Tailored recommendations to cover the Risk of flood: for the Pasture 1

Evaluate and map the site to determine the flooding risk potential of the field (S, E).
Complete soil testing over time to monitor soil nutrient levels in the area that floods (S, EE).
Do not fall or winter broadcast fertilizer or manure in the area that floods (S, EEE).
Delay livestock access to the field/site until after flooding and run-off events have occurred and riparian soils are no longer saturated. This will reduce livestock impacts on the area, nutrient accumulation and nutrient loss (S, EE).
Monitor the site during spring melt to manage any flooding, run-on or run-off issues, have an emergency plan in place (S, EE).
Enhance environmental management through training of staff and farm managers (S-$S$, EE).
Do not feed or bed livestock over the winter in the area adjacent to or in the area that floods (S-$S$, EEE).
Decommission and relocate the portion of the shelter area (if present) from the area that floods, to a new location ($-S$, EEE).
Adopt manure application setbacks from the area that floods (based on slope, environmental conditions, time of year and method of application) to reduce losses of nutrients and manure (S-$S$, EE).
Locate the any shelter areas 200 m from the area that floods (S-$S$, EE EEE).
Provide the livestock an alternative shelter or lounging area outside of the area that floods so that manure and nutrients no longer accumulate in the flood zone (S-$S$, EE EEE).
AFFIRM

Alberta Farm Fertilizer Information & Recommendation Manager

http://www1.agric.gov.ab.ca/$department/softdown.nsf/main?openform&type=AFFIRM&page=information
AFFIRM

- Fertilizer decision support tool
- Calculator & planner
- Scenario running
- Analytics
- Record keeping
• Input: fields, crops, soil info
- Output nutrient recommendations
- Evaluation of fertilizer decisions
- Farm optimization of fertilizer
AFFIRM

• Enhancing functionality
  ○ Newer operating systems

• New research data

• 4-R nutrient stewardship principles

• Manure management features!!
Coming to a Smart Phone near you soon!
Manure Calculator

• Smart phone application
• Manure decision support tool
• Calculator & planner
Manure Calculator

• Input:
  ○ Applicator size and spread, type of manure, application rate, fertilizer cost

• Output:
  ○ Calibration of applicator
  ○ Estimation of nutrients applied
  ○ Value of nutrients applied
Manure Calculator
Manure Record Keeping App
Coming to a Smart Phone near you soon!
Record Keeping App

• Smart phone application
  ○ Computer portal
  ○ Cloud syncing

• Record Keeping
  ○ Automation

• Emergency Response
  ○ Features & information
Record Keeping App

• Inputs:
  ○ Manure application, soil, field
  ○ Emergency info
  ○ Geolocating

• Automation:
  ○ Weather data

• Outputs:
  ○ Information and tips
  ○ Collected data
Key Take Away

• Several tools available today... more are on the way
• Advanced capabilities
• Know the assumptions behind them
• Only as good as the information that goes into them
Key Take Away

• Tools help with:
  ○ Risk assessment
  ○ Planning operations
  ○ Communication !!!
  ○ Decision making
    • scenarios / testing ideas / risk assessment
  ○ Record keeping
    • Reporting for sustainability programs or mkts
  ○ Automation of some work
Thank You

And that’s Just One point of View!!

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Trevor.Wallace@gov.ab.ca
780.980.7587