

Alberta Phosphorus Management Tool Guide



Alberta Agriculture and Forestry, Government of Alberta

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Alberta Phosphorus Management Tool: User Guide

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Online at: <https://www.alberta.ca/phosphorous-management-tool.aspx> or

Alberta Agriculture and Forestry Website: <https://www.alberta.ca/agriculture.aspx>, Enter "Alberta Phosphorus Management Tool" in the search option or

Through the Ag-Info Centre at: 310-FARM (3276) or aginfocentre@gov.ab.ca

For more information regarding this content visit: <https://www.alberta.ca/phosphorous-management-tool.aspx>

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Overview: Alberta Phosphorus Management Tool

Welcome to the Alberta Phosphorus Management Tool (APMT).

The APMT is a risk assessment tool designed to help producers make livestock and nutrient management decisions that will minimize environmental risk associated with the management of phosphorus (P) and to maximize the benefits of manure and fertilizer nutrients. It also serves as an educational tool to explain how management practices and landscape features impact P loss and which beneficial management practices (BMPs) can mitigate that loss.

The tool takes you through a series of farm management and site questions to assess the risk of phosphorus loss. It looks at the site specific features of the operation, transport factors such as flooding, run-off and run-on water and the management of the livestock, manure, fertilizer, soil and crops. Based on the responses, the tool will identify the level of risk and suggests BMPs to reduce the risk of P loss.

The user starts the assessment with a general questionnaire and rapid operation assessment, which collects basic information about the operation. The information collected helps to identify facilities or fields on which a more detailed assessment is to be completed. Completing the more detailed assessment will improve the accuracy of the assessment and the relevancy of the information for your operation.

You may complete the assessment on your own or with an extension agent. Feel free to pause at any time. Give the files unique names so that you do not overwrite information when saving. The tool does contain links to more information and resources, which are available when you are connected to the internet.

Thank you for choosing to use the APMT. We hope that by completing this assessment, you will identify environmental risks and learn how to mitigate them with economical and practical solutions!

Your APMT development team.



System Requirements

In order to automate the questionnaire process, there is some complex coding embedded in the workbook in a language called Visual Basic for Applications. This does require some computing power, as does the assessment of the various components and weightings of the APMT itself.

We recommend that you use a computer system with the following minimum requirements:

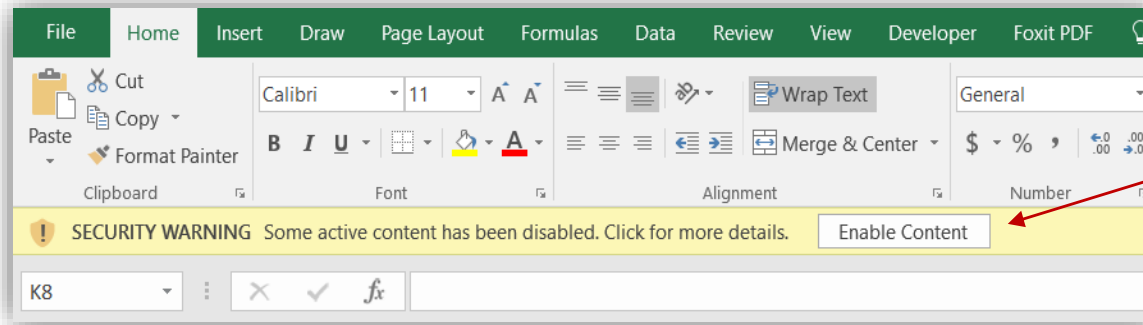
- Minimum of Windows XP
- 2GB of RAM or higher
- 2GB of disk space or higher
- 1 GHz processor or higher
- Excel 2010 or newer

Note: mobile versions of Excel designed for devices such as Android, Windows Mobile and iOS platforms, as well as Excel Online, do not have the necessary capacity for the tool to work properly.

Tip:

If you expect you will complete the APMT several times (multiple farms or multiple years), you might want to save an empty version. It is perfectly okay to rename a second copy as your working file.

The APMT works with any version of Microsoft Excel starting with Excel 2010. As of the writing of this manual, that includes Excel 2010, Excel 2013, and Excel 2016. **Please ensure you have macro support enabled in the Excel settings.** Normally, this is done when first opening a workbook:



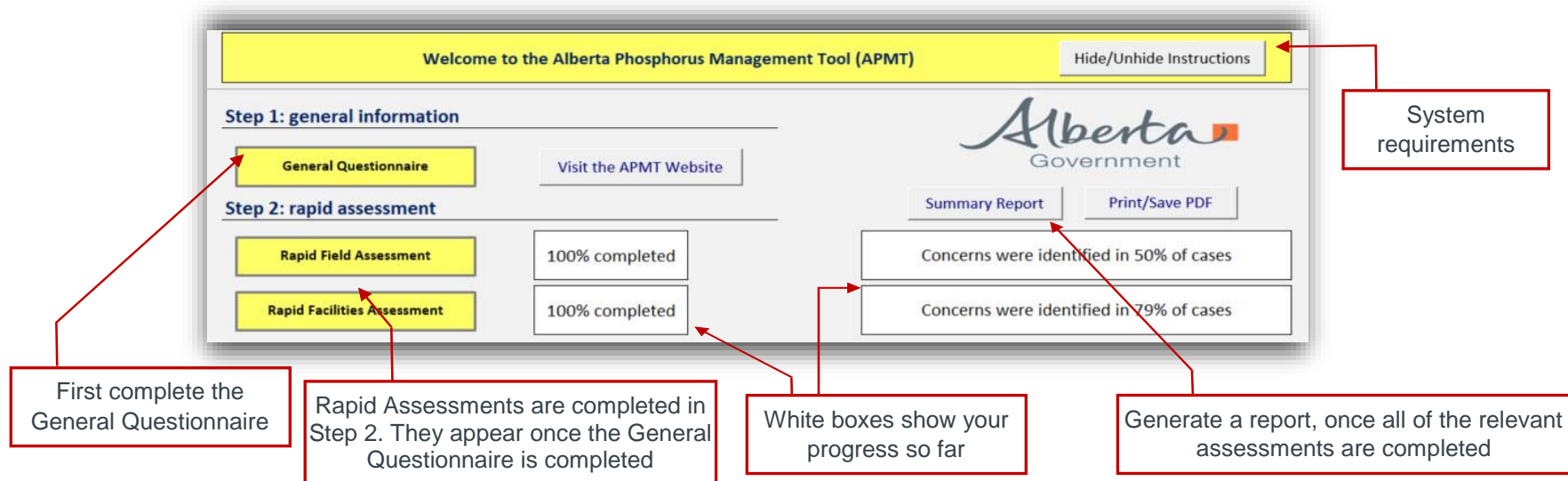
Select
“Enable Content” or
“Enable Macros”

If for some reason this option does not appear, there are several ways to fix this, but the best option may be to first choose "Disable all macros with notification", close the workbook, and then open it again. Upon its opening, a pop-up message will appear giving you the opportunity to enable macros in the APMT workbook. The exact method varies slightly for each of the three current versions of Excel compatible with the APMT: [Excel 2010](#), [Excel 2013](#), and [Excel 2016](#).

Introduction and General Questionnaire

Starting the APMT tool is as simple as opening the Excel workbook – regardless of whether you have received it on a USB stick, by downloading it from online, or by e-mail. When first opening the workbook, please remember to enable macros, as outlined on the previous page. The APMT will not work without enabling macros.

When the program opens, you will see the APMT's main menu. Throughout the tool, areas either requiring special attention or allowing input are highlighted in yellow. The diagram below explains all of the elements of the main menu.



Selecting the Hide/Unhide Instructions button, in the top bar, reveals the system requirements and a reminder to enable macros.

The General Questionnaire is the first steps in the APMT process. The worksheet will ask about the types of livestock, facilities and fields on your operation. All questions, with the exception of selecting up to eight types of livestock, require simple yes/no answers. The responses to these questions will determine which detailed assessments apply to the operation.

Confirm that the responses are correct; once saved, this worksheet and the layout of the tool cannot be changed.

When you have completed the General Questionnaire, simply click 'Complete and save in PDF'. Once complete, the rapid assessment tabs will appear.

Rapid Assessments

The purpose of the two rapid assessment worksheets is to help identify which fields and facilities should go through a detailed assessment first, to prioritize where to focus. The Rapid Field Assessment has 12 questions with the responses: Yes, No, Don't Know or Not applicable. Answer the questions by selecting the small arrow at the right of the drop-down box, and then clicking on your answer. The Rapid Facility Assessment has 9 questions, with the responses: Yes, No, or Don't Know. Below each question is a small table listing all the potential facilities and the three potential responses. Using the buttons in the table to select the appropriate response for each question and facility. The only buttons available for selection will be for those facilities identified by you in the General Questionnaire. **Confirm that the responses are correct; once saved, this worksheet and the layout of the tool cannot be changed.**

Save as PDF **Rapid Field Assessment (not started)** Close

For help please visit the website or press the button for instructions: [APMT Website](#) Hide/Unhide Instructions

Question 1
Could or have any of the fields (crop or pasture) been flooded by water flowing into them from a water body such as river, stream, creek or lake?

Yes
No
I do not know
Not applicable

Choose your answer by clicking here

Tip:

Excel does have an auto-save feature, if enabled, but we recommend saving your workbook occasionally to ensure you do not lose data and maintain progress. Saving your responses as a PDF is optional. Once you have answered all of the questions, simply click "Save as PDF" at the top right corner to return to the main menu.

Save as PDF **Rapid Facility Assessment (100% completed)** Close

For help please visit the website or press the button for instructions: [APMT Website](#) Hide/Unhide Instructions

Question 1
Could or has any portion of the facility ever flooded from water overflowing the banks of a water body such as a river, stream, creek or lake?
Please select the appropriate answer for each type of facility listed (those not applicable appear greyed-out):

| Facility type | Yes | No | I do not know |
|---------------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Barn/Livestock Housing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Catch Basin | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Corrals, loafing lot or a day pasture | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |
| Liquid Manure Storage | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Solid Manure Storage | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Temporary Manure Storage | <input checked="" type="radio"/> | <input checked="" type="radio"/> | <input checked="" type="radio"/> |

The greyed-out buttons without the surrounding green are not active and do not need to be answered

The buttons surrounded by green are active and do need to be answered

Detailed Assessments

The first two steps are quick and straightforward; they determine which detailed assessments are relevant to your operation. For example, if your operation does not have a barn or liquid manure storage facility, the APMT will omit those worksheets from the remainder of the assessment. The main menu will only present the detailed assessment worksheets relevant to you. You are encouraged to complete all of the detailed assessments presented.

Each of the detailed assessments are set up with “responsive designs”, meaning that some of the questions will appear or disappear in response to how you answer previous questions. This means that you are only going to be asked relevant questions, minimizing the amount of time required to complete the assessment.

Answers are provided in drop-down boxes, as illustrated by the example to the right, similar to the process used on the Rapid Assessment Sheets.

Each questions includes a ‘potential concern’ information box; simply click on the drop-down box and the potential concern appears. Potential concerns provide a short explanation of how the question relates to P accumulation and loss, why the question is asked, and more information on P loss.

Once all the questions have been answered, you can select the ‘Prepare a Report’ button at the top of the worksheet, to create and save a pdf version of the worksheet.

To be taken back to the main menu, on any worksheet, you select the “Assessment Status” tab at the bottom of the excel window.

The screenshot displays the 'Field Management' assessment interface. At the top, a yellow header bar contains a 'Prepare a Report' button, the title 'Field Management (4% completed)', and dropdown menus for 'Total Fields: 1' and 'Answering for: Field 1'. Below the header, a yellow bar provides help links: 'APMT Website', 'Hide/Unhide Instructions', and 'Rename'. The main content area is titled 'General Field Flooding Potential' and contains question 1a: 'Could or has any portion of the field been flooded by water from a water body such as river, stream, creek or lake?'. A dropdown menu is set to 'No', and a 'Potential Concern' box explains the risk of direct connection between surface water and the field. Below this is the 'Run-On and Run-off Potential' section with questions 3a, 3b, and 3c. Question 3a asks about upslope area contributing run-on water, 3b asks how run-off leaves the field, and 3c asks for the soil group. Each has a corresponding yellow input field. A link 'Soil Groups of Alberta' is provided for question 3c. At the bottom, a grey bar shows 'Assessment Status' and 'Field Management' tabs, along with 'Ready' and 'Calculate' buttons.

Assessing a Field: Choosing the Appropriate Field Assessment

(Field Management, Grazing and Riparian Pasture, and Seasonal Feeding and Bedding Site)

Fields can serve multiple functions within the production system. A field can be cropped, used for grazing and as a seasonal feeding site all within one year. The question arises as to which worksheet (assessment) should be used on a field that is providing several functions, since a field could be assessed by any of the three field assessment sheets (Grazing and Riparian Pasture, Seasonal Feeding and Bedding Site, or Field Management). The management within a specific field determines which detailed assessment is used; the more complicated the management of the field, the more detailed the assessment. The three assessment sheets complement each other and have been set up in a way to eliminate the need to put that field through all three assessments to capture the associated risks. The questions on the sheets are similar to each other. The main difference between the three sheets are the livestock management practices, if and when livestock are in the field.

The simplest worksheet, the Field Management Assessment, is for crop or hay fields that receive manure or fertilizer application but are **not** used for grazing or feeding livestock. This assessment does not ask any questions on livestock management, as it assumes no livestock are present in the field at any time of the year. This assessment will focus on soil, cropping, environmental, and topographical features in the field and how they impact the risk of manure and fertilizer application.

The Grazing and Riparian Pasture and Seasonal Feeding and Bedding Sites Assessments include all the content of the Field Management Assessment plus the layer of livestock management practices. The Grazing and Riparian Pasture Assessment focuses on pasture systems, fields in which livestock are grazed through the spring, summer and early fall months. The Seasonal Feeding and Bedding Site Assessment focuses on winter feeding systems, fields in which livestock are grazed or fed from late fall through to the spring. The Seasonal Feeding and Bedding Site Assessments consider more factors than the Grazing and Riparian Pasture Assessment as it includes factors such as bedding sites and imported feed. These worksheets assess potential contributors to the risk of P loss by asking questions about livestock management and feeding practices.

Use your livestock management practices to choose which assessment to complete on a field:

- If livestock are not fed or grazed in the field, use the Field Management Assessment.
- If livestock graze in the field during the growing season, and no bedding or supplemental feed is provided, use the Grazing and Riparian Pasture Assessment.
- If livestock are fed or graze (i.e., swath grazing or bale grazing) during the non-growing season, use the Seasonal Feeding and Bedding Site Assessment.
- If livestock graze in the field during the growing season and are fed in the field, i.e., feed is brought on site over the winter, use the Seasonal Feeding and Bedding Site Assessment.

Multiple Fields or Facilities

At the top right of each detailed assessment page are two drop-down boxes. Use the top box to select how many different fields or facilities you want to assess. Use the bottom box to select the field or facility to assess.

In the example below, this producer has a total of 10 barns and is currently entering the details for the 7th barn. Below the 'Answering for:' options is a 'Rename' button, which allows the user to designate specific or unique names for each field or facility.

Barns/Livestock Housing
(not started)

Total Barns: 10
Answering for: Barn 1

For help please visit the website or press the button for instructions: [Website](#) Hide/Unhide Instruction

Flooding Potential
1 a) Could or has any part of the barn or livestock housing facility ever been flooded from water flowing in the facility from a common body of water such as a river, stream or lake?

Run-Off Potential
2 a) Does up-slope surface water flow into the facility?

To assess multiple fields or facilities, change the number

... and then choose which field or facility you are currently working on here

Possible Detailed Assessments

Not every farm will need to go through each type of assessment. You will only see the assessments that are relevant to your operation. Below is a list of all the possible detailed assessment sections that are available in the APMT.

| Crops & Pastures | Facilities | Manure Storage |
|--|--|---|
| <ul style="list-style-type: none">• Cropping System Management• Field Management• Grazing and Riparian Pasture• Seasonal Feeding & Bedding Site | <ul style="list-style-type: none">• Corrals, Loafing or Day Pastures• Barns or Housing• Catch Basin Management | <ul style="list-style-type: none">• Solid Manure Storage• Temporary Manure Storage• Liquid Manure Storage |

Reporting

You are able to keep a printed record of all of your responses and information generated by the APMT by clicking on “Save as PDF” on the rapid assessments, or “Prepare a Report” on any of the detailed assessments. Clicking these buttons will generate an Adobe PDF report which can be easily printed or shared. Many computers will already have PDF-reading software installed. If yours does not, you can obtain a free version of the Adobe Reader software at <https://get.adobe.com/reader/>.

The APMT generates two different types of reports:

- **Detailed Reports:** Detailed reports are worksheet summaries, which contain the responses you gave to each question, the identified risks associated with each field or facility assessed, as well as a list of potential beneficial management practices (BMPs) that could address identified risks.
- **Summary Report:** This report is generated once all the identified detailed assessments have been completed. This report provides a summary of all the risks identified for the fields and facilities assessed.

Each worksheet has the option to print a **detailed report**. The detailed report contains a summary of all the information, from all the fields or facilities assessed with that particular worksheet. The report contains the questions and answers associated with the various transport factors such as: flooding, run-on/runoff, nutrient accumulation, facility operation, direct livestock access, site and environmental conditions, as well as facility or field management practice being used.

Each field or facility will receive a relative risk rating based on the answers provided and question weighting factors. These weighting factors were developed through scientific analysis and expert opinion on the risks and benefits of various management practices. These calculations occur in the background so as to rank the different sites or practices based on the associated risk of completing that practice at that site. The estimation of risk looks at the potential nutrients available for transport and the potential for those nutrients to be carried to a surface water body by various transport methods, site and environmental conditions, as well as facility or field management practices.

The flooding of a liquid manure storage, for example, receives a higher risk ranking than the flooding of an un-manured crop field, as the potential for nutrient and manure exposure and movement from the site will be greatest for the liquid manure storage as compared to the crop field. When all the assessments are completed, the relative risk ranking helps to target BMP adoption at the areas with the highest potential for P and soil loss.

Beneficial Management Practices

In addition to highlighting the risks identified, and the severity of those risks, the detailed report provides BMP suggestions for how the operation could mitigate those risks. The BMPs list is generated based on the responses to the questions asked. BMPs are presented with an approximate financial cost and environmental benefit, which is illustrated in the tool with symbols. The '\$' symbol is used to illustrate the relative economic impact of the practices and the 'E' is used to symbolize the relative environmental effectiveness of the practice. Each BMP is assigned a relative impact, which allows for comparison to the other BMPs in the list. The relative cost and environmental impact of any practice is provided a range, depending on where the practice is implemented; this is illustrated as '\$-\$\$' or 'EE- EEE'.

Cost ratings will range from a low cost '\$' to a high cost '\$\$\$\$' and an environmental benefit rating ranges from low environmental benefit 'E' to high environmental benefit 'EEEE'.

The specific circumstances of your farm will of course dictate how practical, costly and effective a specific management practice might be. The suggested BMPs inform the discussion on options and practice adoption. The individual reports vary somewhat, but the example report on the right is an example of what they look like.

Tip:

Each of the BMPs has an indicator of how difficult or costly it would be to implement (from \$ being low cost/time to \$\$\$\$ being the highest cost/time).

As well as an indicator on how environmentally beneficial the management practice would be (from E for some benefit to EEEE for high environmental benefit).

[Save as a PDF](#)[Close the Report](#)

Cropping System Report

Risks profile:

Based on the rapid and detailed assessments, 1 field/pasture is at risk. The detailed questionnaire is 100% completed.

Detailed answers with tailored best management practices recommendations:

Field 1

| Risk of run-off: | Low to Moderate Risk |
|--|--|
| 1a) What type of tillage system is being used? | Minimum or reduced tillage system (leaving |
| 1b) How many fall tillage passes are usually completed? | One |
| 1c) How frequently is summer fallow part of the rotation? | Once every 5 or more years. |
| 1d) How is post harvest residue managed? | Crop stubble is anchored going into winter and crop residue is spread evenly with between 51% and 75% of ground is covered by residue. |
| 1e) How frequently is crop residue (straw) removed from the field? | Crop residue (straw) is removed once every three |

Tailored recommendations to cover the risk of run-off for Field 1:

- Change to a conservation tillage (\$\$\$ - EE-EEE)
- Establishment of forages to eliminate tillage (\$\$ - EE-EEE)
- Chem fallow as an option (\$\$, EE)
- Spot tillage (\$, EE)
- Continuous Cropping
- Green Manure Crops
- Cover Crops
- Chem fallow in years of summer fallow
- Stubble is not burnt (\$, EEE)
- Stubble is harrowed (\$\$, EE)
- Combine straw spreader is improved to get better straw spread (\$\$, EE)
- Reduced frequency of straw removal (\$\$, EEE)

Summary Report

The **summary report**, accessed from the main menu of the APMT, provides you with the P loss risk for all facilities and fields assessed. The report provides a quick overview of the operation and all the facilities and fields assessed; an example of the summary report is below. Unlike the detailed reports, the summary report does not contain the questions asked, answers provided or the potential BMP options; it only provides the relative risk ranking (i.e., High, Moderate to High, Low to Moderate and Low) for each facility and field assessed for each risk factor, i.e., flooding, nutrient accumulation, etc.. The information is in a table that lists all the fields and facilities in the rows and the risks across the columns. The relative risk information is presented in a coloured box to highlight the various risk levels, i.e., High risk – red box. The colours and associated risk levels are in the example below. If, for the particular field or facility, an assessment for a specific risk was not applicable, then the box remains grey.

The summary report example below indicates that Field 1 should receive the most attention, compared to the other fields and facilities, as it has high risk ranking for flooding and nutrient accumulation and a moderate to high rating for run-on/run-off.

Save as PDF
APMT Summary Report
Close the Report

For help please visit the website or press the button for instructions:
 [APMT Website](#)
Hide/Unhide Instructions

| | | | | | |
|------------------|------------|------------------------|--------------|--|--|
| Operation's Name | 0 | Contact's name | J Farmer | | |
| | 2020-02-05 | Contact's phone number | 555 555 5588 | | |
| | TD Wall | Agents's phone number | 555 555 5555 | | |

| | Run-On / Run-Off | Flood Potential | Nutrient Accumulation | Riparian Area/Surface Water | Facility Capacity | Facility Operations Management | Flood Area Potential |
|-------------------|-----------------------|-----------------|-----------------------|-----------------------------|----------------------|--------------------------------|----------------------|
| Cropping system 1 | Low Risk | | | | | | |
| Field 1 | Moderate to High Risk | High Risk | High Risk | | | | High Risk |
| Field 2 | Low Risk | Low Risk | Low Risk | | | | Low Risk |
| Barn 1 | Low Risk | Low Risk | | | | | |
| Liquid 1 | Low Risk | Low Risk | | | Low to Moderate Risk | Low to Moderate Risk | |

In the Rapid Field Assessment, concerns were identified in 33% of cases.

In the Rapid Facility Assessment, concerns were identified in 33% of cases.

The workbook allows you to complete an assessment for only one farm. If you want to complete assessments for more than one farm, or if you exceed the maximum number of fields/facilities for one farm, save the workbook under several different names, using the “Save As...” command in Excel.

Contact Information

For more information on the APMT, potential BMPs, links to regulations and potential provincial funding opportunities and programs visit our website at <https://www.alberta.ca/phosphorous-management-tool.aspx>.

Alternatively, search for “Alberta Phosphorus Management Tool” on the Alberta Agriculture and Forestry website (<https://www.alberta.ca/agriculture.aspx>).

To discuss the results of your assessment, BMP adoption and their impacts on the management of your operation, you can contact:

- your local Municipality office to talk to your Ag Fieldmen or Conservation Ag Specialist, or
- your local Applied Research or Forage association, or
- your provincial commodity association, or
- Alberta Agriculture and Forestry at 310-FARM (3276) or aginfocentre@gov.ab.ca.

These Provincial, Municipal and Industry staff can assist you with learning more about risk assessment and sustainable agricultural programs, help you with the adoption of BMPs and source local or provincial funding support.