

# Infosheet #13 Water Efficiency

This infosheet provides background to Worksheet #13 of the *Environmental Farm Plan Workbook*. It outlines options you could adopt to address problem areas in your operation. In most cases you'll need more information before implementation: please refer to the resource materials listed in the infosheet, and consult OMAF EFP Technical Advisors.

Most of the options are either Actions or Compensating Factors. Actions address the areas of concern identified, and will change the EFP rating to (3) or Best (4). Compensating Factors are alternatives that will adequately address the concerns, but will not change the rating in the EFP worksheets. Monitoring is an alternative only in special circumstances and is explained in the worksheet when and how it can be used.

## Management

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### ISSUE

#### 13-1 Knowledge of water use and supply system

Water is a precious and limited resource. Water should be used efficiently to reduce: volume used, energy used, wastewater generated and potential for contaminants to move off your operation in surface or groundwater. Monitoring water use will allow you to pinpoint activities that use the most water and comparing it to industry standards can help you make informed decisions about where water use can be reduced. Understanding peak water uses and times can be helpful in the event of a water shortage. Priority water uses can be identified and emergency plans developed to handle any potential water shortages.

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### WHAT CAN YOU DO?

#### OPTION #1 – ACTION

##### Regularly monitor water usage and compare to industry standards:

- evaluate volume of water used by your operation by monitoring pump capacity and running time or by installing a water meter
- log (record) volumes of water used for future comparisons/detection of leaks in the system
- log volumes of water used for comparisons against industry standards
- have general knowledge of where water lines are located.

#### OPTION #2 – ACTION

##### Meter and log water use:

- know location of water lines and record on a sketch

#### FOR MORE INFORMATION:

Best Management Practices Books: *Water Management*, Order No. BMP 07, pp. 10, 21-23, 48; *Irrigation Management*, Order No. BMP 08

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### 13-2 Impacts of water use on other water users

Water is a shared resource and it is important that we manage it to respect future users and the natural systems. If you use more than your fair share of a water resource you will be diminishing the quantity of water available for water users downstream or in the immediate area.

Using water inefficiently in your household or barn may also affect water quality for other users, since more wastewater would be generated.

Verify that your water taking is not having an impact on other water sources. Monitor water levels in local creeks, ponds or wetlands and wells (yours or neighbours). Test your pumping over a long period (e.g. 72 hrs) and periodically measure the water levels in the nearby water sources. You may also consider hiring a hydrologist or hydro-geologist to study the impact of your taking. In this way you will understand what impact your water taking is having.

### OPTION – ACTION

**Ensure your operation's use of water is not adversely affecting other water users including natural systems such as fish habitat, by a reduction in water quantity or quality:**

- verify if your pumping ever reduces the ground water supply to the point that it affects water levels in neighbouring wells, etc.
- verify if your pumping ever reduces the surface water supply to the point that it affects water levels in creeks, rivers or ponds
- solutions include changing to a more sustainable water source and/or creating farm water storage in order to take water when supply is abundant
- use a pond (not connected to a stream) to store water for use when conditions are dry and usual water source is low or unavailable.

### FOR MORE INFORMATION:

Best Management Practices Books: *Water Management*, Order No. BMP 07, pg. 3; *Irrigation Management*, Order No. BMP 08; *Water Wells*, Order No. BMP 12, p 67-72

*Common Law Aspects of Water*, OMAF Factsheet

*How to Prepare for Irrigation during Water Shortages*, OMAF Factsheet Order No. 99-023

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## Livestock Watering Equipment

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### 13-3 Maintenance of livestock watering equipment

A constant supply of water is one of the most essential components in a livestock feeding program. Livestock demand for water will vary depending on many factors including time of day, temperature, species of animal, etc. As the distribution system will tend to be the limiting factor, it is important to ensure the watering equipment has no leaks. Regular monitoring and maintenance of livestock watering equipment will lead to early detection of leaks in the system. If there are leaks, not only will you be wasting money and water, you will be creating more wastewater (potentially contaminated) and reducing available water for livestock. By preventing leaks you can also avoid wet and muddy yards as well as foot diseases caused by livestock standing in wet conditions.

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### 13-4 Permit to take water

In order to withdraw more than 50,000 litres a day (for irrigation or to fill a pond), you need to have a 'Permit To Take Water' under the *Ontario Water Resources Act*. You must meet certain requirements in order to obtain and keep a permit. You will be required to know

#### OPTION– ACTION

##### Regular maintenance and repair of leaks:

- inspect system regularly and repair any leaks as soon as they are discovered
- ensure watering equipment is in good working order (floats and seals prevent spillage and overflows).

##### FOR MORE INFORMATION:

Best Management Practices Book: *Water Management*, Order No. BMP 07, pg. 48

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#### OPTION– ACTION

##### Obtain all required permits and keep a record of all water use:

- for all water taking exceeding 50,000 litres/day, the *Ontario Water Resources Act* requires you to obtain a 'Permit To Take Water' from the Ministry of Environment. Consult the blue pages in your telephone book for the nearest location
- a 'Permit To Take Water' information sheet is available from the Ministry of Environment
- a record of all water use can be used to verify against any permit issued

the estimated daily rate of water used, and the volume required for irrigation, in order to obtain a 'Permit To Take Water'. If you are involved in surface water takings, you will be required to know the flow rate of the river, stream or creek.

It is also important to keep detailed records of your irrigation water use so that you are not under or over applying water according to crop needs and to ensure you are operating within the parameters of your permit.

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### 13-5 Low water condition readiness

Ontario Low Water Response (OLWR) is a strategy for local water users and those with an interest in water use to have input into the well being of their community. Water Response Teams are established in areas experiencing low water conditions so the local community can carry out actions to reduce and better manage water use. All water users are requested to share the limited water.

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### 13-6 Irrigation Scheduling

Irrigation may be a cost-effective technique to ensure sufficient available water to meet crop needs when natural rainfall is inadequate. To best meet the requirements of your crop, water application should be based on specific crop recommendations as well as personal knowledge and experience. Water

### FOR MORE INFORMATION:

Best Management Practices Book: *Water Management*, Order No. BMP 07, pg. 49;  
*Irrigation Management*, Order No. BMP 08  
*How to Prepare for Irrigation During Water Shortages*, OMAF  
*Ontario Low Water Response*, MNR/OMAF brochure

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### OPTION 1 – ACTION

#### Consider how to deal with potential periods of low water:

- be knowledgeable of Low Water Response Program.

### OPTION 2 – ACTION

#### Prepare a contingency plan to deal with potential periods of low water:

- a written plan for reducing water use will help during times of shortage
- follow recommendations of your local Low Water Response Team to reduce (or improve management) of water during shortages.

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### OPTION– ACTION

#### Schedule irrigation to maximize benefits to crop, taking into consideration rainfall, and crop needs:

- using recommendations for crop water needs develop a plan for irrigating and implement your plan taking into account factors such as rainfall, evapotranspiration, stage of crop development and soil moisture.

application to crops should also be adjusted according to climate, soil texture and daily weather. Adjusting irrigation to fit your individual crop needs will ensure that water is not wasted and that crops will be of the highest possible quality and quantity. All crop irrigation should be scheduled.

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### 13-7 Water Application

Water gauges should be used to measure volume of water applied. Watch irrigation application to ensure there is no ponding, runoff or tile drain flow as a result of the irrigation. If runoff or ponding are occurring, reduce the application rate to match the infiltration capacity of the soil.

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### 13-8 Type of equipment

Irrigation systems vary in efficiency of volume of water used, energy required to operate, potential for contaminated runoff and potential for water erosion. In order to use water most efficiently, wherever possible water should be placed directly where a plant absorbs water – the roots. The goal is to maintain plant transpiration (natural plant water use) and to decrease evaporation from

#### **FOR MORE INFORMATION:**

Best Management Practices Books: *Water Management*, Order No. BMP 07, pg. 59;

*Irrigation Management*, Order No. 08

*Irrigation Scheduling for Tomatoes – Water Budget Approach*, OMAF Factsheet Order No 90-049

*Irrigation Scheduling for Fruit Crops*, OMAF Factsheet Order No. 90-069

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#### **OPTION– ACTION**

**Verify that irrigation system is delivering the volume of water needed at the appropriate rate. Adjust system and system operation to match water needs:**

- use water gauges located strategically across the field to measure and log actual volume of water applied to crop and the evenness of the application
- improve the uniformity of water application by changing the type of equipment, choosing to irrigate when winds are low, modifying operating pressure or by improving maintenance
- reduce water volume applied or frequency of irrigation if tile drains flow as a result of irrigation applications
- reduce application rate to avoid ponding and/or runoff.

#### **FOR MORE INFORMATION:**

Best Management Practices Books: *Water Management*, Order No. BMP 07, pg. 59;

*Irrigation Management*, Order no. BMP 08

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#### **OPTION: ACTION**

**Select the most water efficient irrigation system possible:**

- replace fixed gun, mid-level and travelling gun systems with low level sprinklers, travelling boom systems with low-pressure spray nozzles or centre pivot (lateral move) systems with drop tubes and low pressure spray nozzles. Low level sprinklers apply the water more directly to the plant and therefore less water is used over the field (reducing the pumping required)
- another advantage is that since there is little excess water, contaminated runoff and water erosion are eliminated
- if possible, depending on the crop grown, select drip irrigation systems to further reduce volume of water used.

plant and soil surfaces. When fertilizers or pesticides are added to the irrigation system, they will be used more efficiently if they are applied directly to the roots of a plant. The end result is that less water (and fertilizer/pesticide) is needed to meet the runoff (including loss of fertilizer or pesticides) from the crop will be lower.

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### 13-9 Timing of overhead irrigation

Wind will reduce the uniformity of an irrigation application. Some of the water applied in a non-uniform way is wasted. Some sections of the crop may receive too little water, leading to poor crop yields. Other sections of the crop may receive more water than can be used; this excess water may percolate below the root zone reducing the nutrients in the soil and potentially contaminating groundwater. Water, which is allowed to evaporate into the air, is wasted. Similarly, the expense of pumping cannot be recovered as the water is not going to benefit the crop. Avoiding irrigation on hot sunny days or windy days may significantly improve the efficiency of an overhead irrigation application.

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### 13-10 Design of system

It is important that the irrigation system is well suited to the specific crop's water needs and the area in production. If an irrigation system is too large for the crop area, you will be wasting water and energy.

#### **FOR MORE INFORMATION:**

Best Management Practices Books: *Water Management*, Order No. BMP 07, pg. 49; *Irrigation Management*, Order No. BMP 08

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#### **OPTION: ACTION**

##### **Choose to irrigate when the wind is calm and the sun is not shining brightly:**

- the best times to irrigate are overnight or in the early morning to reduce evaporation from sunshine
- avoid irrigating when winds are more than 10 km/hr.

#### **FOR MORE INFORMATION:**

Best Management Practices Book: *Irrigation Management*, Order No. BMP 08  
*How to Prepare for Irrigation During Water Shortages*, OMAF Factsheet Order No. 99-023

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#### **OPTION: ACTION**

##### **Use an irrigation system that is the suitable size for your operation. Avoid watering non-cropped areas:**

- use low-pressure systems (<50 psi) wherever possible to reduce risks associated with blown lines and guns flipping in high pressure systems (>80 psi)
- consult with a qualified irrigation designer on system design
- water should be applied to the target crop only.

**FOR MORE INFORMATION:**

Best Management Practices Book: *Irrigation Management*, Order No. BMP 08

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**13-11 Maintenance of system**

The system needs to be visually inspected regularly to ensure that there are no leaks and water is not being wasted.

**OPTION: ACTION**

**Check regularly for leaks by doing a visual inspection:**

- repair leaks as soon as they are discovered to ensure efficiency of system operation and minimize loss of water and runoff potential
- inspect sprinkler nozzles (measure if the opening of the nozzle has been worn larger, use calipers or a drill bit) and replace if worn.

**FOR MORE INFORMATION:**

Best Management Practices Book: *Irrigation Management*, Order No. BMP 08

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*At the request of the **Ontario Farm Environmental Coalition**, consisting of AGCare, Ontario Federation of Agriculture, Christian Farmers' Federation of Ontario and the Ontario Farm Animal Council, the following people contributed to the Development of Infosheet #13:*

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