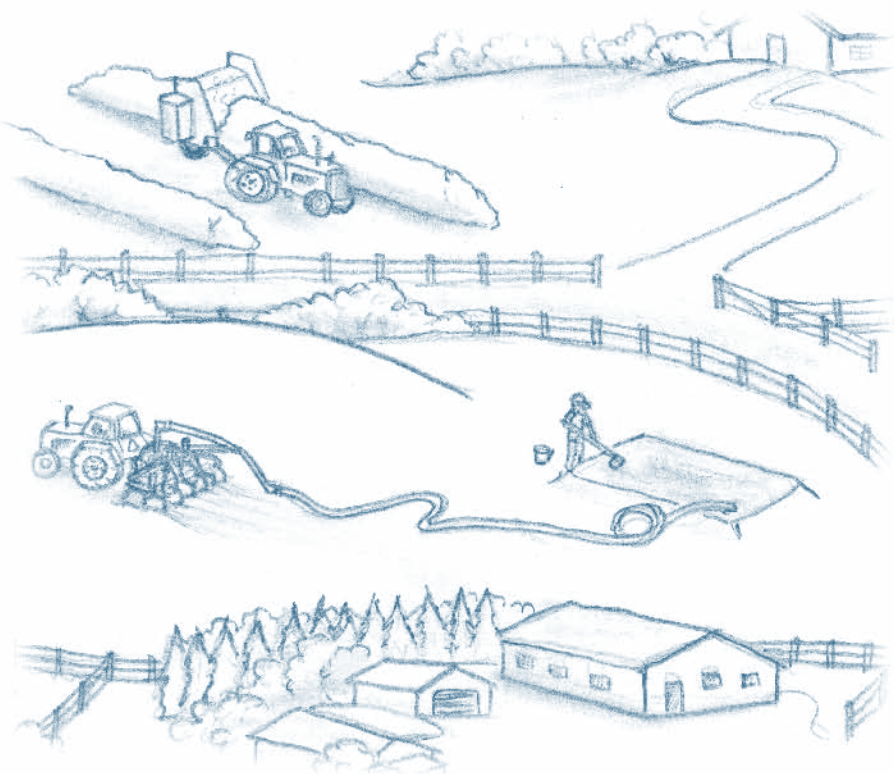


Chapter 4.4

Manure Application and Alberta's Agricultural Operation Practices Act (AOPA)



➔ learning objectives

- Identify manure incorporation requirements required by AOPA.
- Identify minimum setback distances for manure application required by AOPA.
- Identify soil nitrate-nitrogen limits prescribed by AOPA that may restrict manure application.
- Identify soil salinity restrictions on manure application prescribed by AOPA.

more info



You can get more information on AOPA or answers to specific

questions, by calling the nearest NRCB office (see below) or at www.nrcb.gov.ab.ca.

NRCB: Toll-free 24-hour response line 1-866-383-6722. Dial 310-000 first for toll-free connection

Lethbridge (403) 381-5166

Red Deer (403) 340-5241

Morinville (780) 939-1212

Fairview (780) 835-7111

side bar

Manure can only be applied to arable land.

Important Terms

Table 4.4.1 Key Terms and Definitions

Term	Definition
Common Body of Water	Is considered in the legislation (AOPA) as the bed and shore of a water body that is common to or shared by more than one landowner.
Manure	Under AOPA manure includes the livestock excreta, straw, other bedding material, litter, soil, wash water and feed in the manure. Composted manure has the same requirements as manure.
Natural Resources Conservation Board	(NRCB) It is a regulatory agency of the Government of Alberta. It is responsible for regulating Alberta's confined feeding operations.

AOPA contains the majority of regulations that impact livestock production in Alberta. AOPA is maintained and updated by AF, and the administration and enforcement of the Act resides with the NRCB.

AOPA includes several rules pertaining to manure application with particular reference to:

- Incorporation requirements
- Minimum setback distances for manure that is applied and incorporated
- Minimum setback distances for manure applied on forage, direct-seeded crops, and frozen or snow-covered land
- Nitrate-nitrogen limits
- Salinity constraints
- Nutrient management plans
- Manure handling plans

Incorporation Requirements

Under AOPA, manure applied to land under traditional cultivation must be incorporated within 48 hours of application. The exception to this rule is when manure is applied to forages, direct-seeded crops, frozen or snow-covered land or when an operation has a permit that specifies a different incorporation requirement. Liquid manure injection is considered to be the same as incorporation.

Incorporating manure soon after it has been applied will reduce odour. From an agronomic perspective, incorporation reduces losses of manure nutrients through volatilization or runoff; thereby retaining a greater proportion of applied nutrients for crop uptake. Incorporation can be accomplished satisfactorily using typical tillage implements (e.g., cultivator).

Minimum Setback Distances for Manure that is Applied and Incorporated

Individuals who apply manure are required to comply with application setback distances set by AOPA (Figure 4.4.1). These setback distances are designed to reduce nuisance impacts on neighbours and minimize the risk of manure entering a common body of water. Specifically, manure is not to be applied:

- Within 30 metres of a water well, regardless of whether it is injected or surface applied and incorporated.
- Within 10 metres of a common body of water if subsurface injection is used.
- Within 30 metres of a common body of water if manure is surface-applied and incorporated within 48 hours.

Note: There is no setback requirement from neighbouring residences if manure is spread on cultivated land and incorporated with in 48 hours.

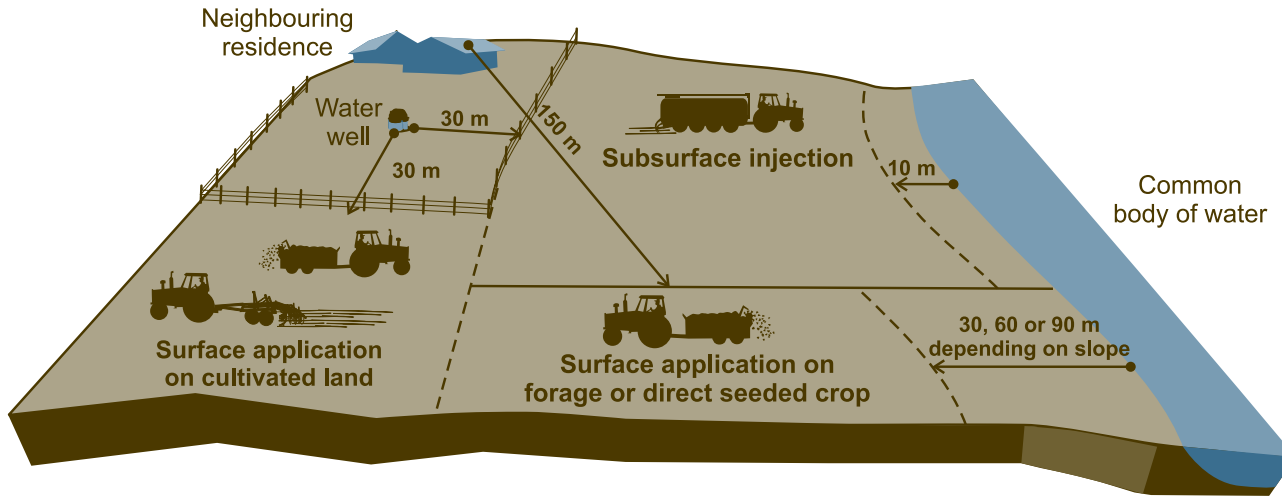


Figure 4.4.1 Summary of Manure Application Setback Distances Prescribed Under AOPA

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Grazing livestock are not subject to setback requirements.



What is a “Common Body of Water”?

The term “common body of water” in the legislation includes the bed and shore of a water body that is common to or shared by more than one landowner. A “common body of water” can include a river, stream, creek, lake, slough, marsh, reservoir, irrigation or drainage canal.

As a general rule, features not considered to be a “common body of water” under AOPA are:

- An irrigation or drainage canal that is completely surrounded by private land controlled by the owner or operator and has no outflow going beyond the private land.
- A reservoir, lake, marsh, or slough that is completely surrounded by private land controlled by the owner or operator and has no outflow going directly beyond the private land

to a drainage canal, reservoir, river, permanent stream or creek, lake or potable water source that is being used for human or livestock consumption.

- A temporary stream on private land controlled by the owner or operator that has no outflow going beyond the private land directly to a drainage canal, reservoir, river, permanent stream or creek, lake or potable water source that is being used for human or livestock consumption.
- A roadside ditch.
- A wastewater or storm drainage system as defined in the *Environmental Protection and Enhancement Act (EPEA)*.

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Manure application on frozen or snow-covered land is not a recommended beneficial management practice.

tip



As a courtesy, producers are encouraged to notify their neighbours before

spreading manure to reduce complaints and conflict associated with manure application.

tip



Even if setbacks are met, reasonable care and attention should

be taken to reduce the amount of manure that may enter common bodies of water as a result of snowmelt runoff.



Minimum Setback Distances for Manure applied on Forage, Direct-Seeded Crops, and Frozen or Snow-Covered Land

An operator whose Confined Feeding Operation (CFO) has at least nine months of manure storage is prohibited from applying manure to frozen or snow-covered ground. The legislation recognizes that there may be exceptional circumstances that create the need for operators to spread manure on snow or frozen ground. This practice may be allowed with permission from an NRCB inspector, or if the Board publishes a notice permitting the application of manure on frozen and snow-covered land. Livestock operations and CFOs constructed before January 1, 2002, that do not have nine months of storage can continue to spread on frozen and snow-covered ground, **but** they must comply with the various setbacks and soil nutrient limits in the regulations.

Manure application on frozen or snow-covered land is not a recommended beneficial management practice. In Alberta more than 85% of the runoff comes from snowmelt. Application of manure on snow-covered or frozen ground increases the risk of nutrient transport from the field to neighbouring water bodies.

If manure must be applied to frozen or snow-covered land, from a beneficial management point of view, there are several considerations that can be made to reduce the risk of nutrient runoff:

- Have an emergency plan in place, as part of the operation, to deal with the development of situations that would require the application of manure on snow-covered or frozen ground.
- As part of the operation plan, assess the risks associated with various fields or parts of fields to determine their suitability for the application and to minimize the risk of nutrient loss through runoff.

- On selected fields establish structural controls (i.e., berm or catch basin) or management practices (i.e., standing stubble) to reduce the risk of runoff.
- Choose a field that does not border or drain into a common body of water
- Apply manure to the centre areas of the field that do not drain off of the field
- Limit the frequency and rate of application to a minimum.

Manure application on forage, direct-seeded, and frozen or snow-covered land has specific setback requirements. Manure that is spread and not incorporated must be spread at least 150 metres from any residence, other building or occupied structure that is not owned by the operator (including churches and schools). An example of buildings or structures not occupied by people includes granaries and hay storage sheds.

A person who applies manure on forage, direct-seeded and frozen or snow-covered land must meet minimum application setback distances, keeping mind the average slope of the land near the common body of water, if the land slopes toward the common body of water (Table 4.4.2 and Figure 4.4.2). When planning manure applications, setback distances impact the available area in a field, and therefore limits the amount of manure that can be applied to that field. Specific practices and controls to reduce nutrient losses from runoff are discussed in Module 8.0.

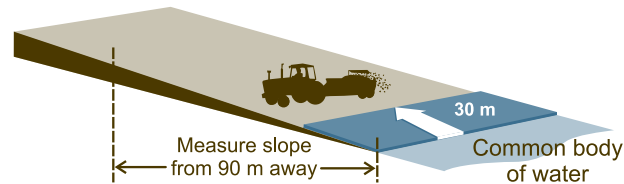
Slopes in a field, particularly those adjacent to a common body of water, should have been characterized during the site assessment. For the purposes of AOPA, measuring the slope over the first 90 metres from the edge of the water body is sufficient.

Table 4.4.2 Setback Distances from a Common Body of Water for Manure Application on Forage, Direct-seeded and Frozen or Snow-covered Land

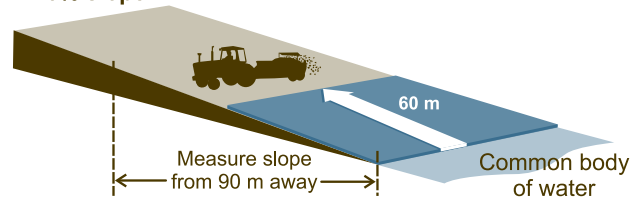
Average slope within 90 meters of a common body of water	Setback distance required from the common body of water
4% or less	30 m
Greater than 4% to less than 6%	60 m
6% or greater, but less than 12 %	90 m
If the slope is 12% or greater, do not apply manure on the land. Once the slope is less than 12% manure can be applied.	

Setbacks for manure application on land with less than 12% slope (on forage, direct-seeded crops, frozen or snow-covered land)

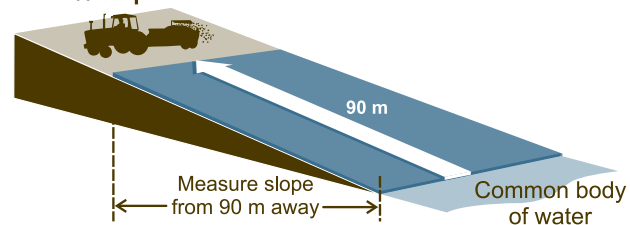
4% slope or less



4 - 6% slope



6 - 12% slope



Setbacks for manure application on land with 12% slope or greater (on forage, direct-seeded crops, frozen or snow-covered land)

✓ Manure can only be applied once the slope is less than 12%.

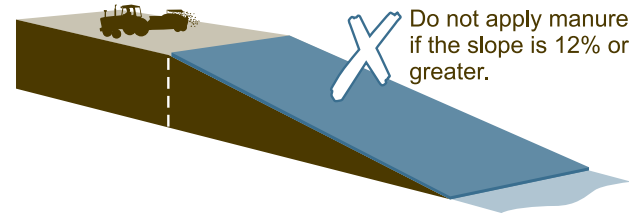


Figure 4.4.2 Slope-based manure application setback distances from common bodies of water on forage or direct seeded land.

Soil Nitrate-Nitrogen Limits

Under AOPA, soil NO₃-N limits have been set for the top 60 cm of soil. The maximum allowable level depends on productive potential of the soil group, soil texture, depth to water table and soil type (Table 4.4.3).

Table 4.4.3 Soil Nitrate-N Limits for Agricultural Soils in Alberta

Soil	Soil Texture		
	Coarse Textured Soils (i.e., > 45% sand)		Medium and Fine Textured Soils
	Depth to Water Table < 4m	Depth to Water Table > 4m	
Brown	80 kg/ha	140 kg/ha	140 kg/ha
Dark Brown	110 kg/ha	140 kg/ha	170 kg/ha
Black	1-40 kg/ha	170 kg/ha	225 kg/ha
Gray Wooded (Gray Luvisol)	110 kg/ha	140 kg/ha	170 kg/ha
Irrigated	180 kg/ha	225 kg/ha	270 kg/ha

Adapted from: Schedule 3, Standards and Administration Regulation, 2006

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To convert the values from Table 4.4.3 from kg/ha to lb/ac, multiply by 0.89.

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The following examples may help as a guide in determining the slope of the land:

- 4% slope is equal to a 3.6 m rise over a 90 m horizontal distance
- 6% slope is equal to a 5.4 m rise over a 90 m horizontal distance
- 12% slope is equal to a 10.8 m rise over a 90 m horizontal distance

more info



For more information on the record keeping requirements and forms can be found in the following resources:

www.agric.gov.ab.ca

www.nrcb.gov.ab.ca

- **AF. 2004. Wintering sites and livestock corrals, Agdex 096-4.**
- **AF. 2005. Manure management regulations for cow/calf producers, Agdex 096-6.**
- **AF. 2005. Manure spreading regulations, Agdex 096-5.**
- **AF. 2006. Permits and regulations for existing operations, Agdex 096-2.**
- **AF. 2007. AOPA: 2004 Reference Guide, Agdex# 096-1.**

Salinity Constraints

AOPA also sets limitations on manure application based on soil salinity, to ensure the salts in manure do not affect plant growth. Manure may not be applied at rates that, if after application, would result in a one decisiemens/metre (dS/m) increase in EC in the top 15 cm (6 in) of the soil. Manure application is prohibited on soils, if the EC of the soil in the top 15 cm is greater than four dS/m.

Currently, there is no simple and reliable way of predicting the extent to which a one-time application of manure is likely to impact soil EC at a given site. Regular soil sampling is the most reliable way to assess and monitor changes in soil salinity. It is important to identify saline areas during the site assessment since these areas may reduce the total area available for manure application.

NMPs Under AOPA

NMPs are **not mandatory for every person who applies manure**. Under AOPA, an approved NMP is required if a person wants to exceed the soil nitrate-nitrogen or salinity limits when applying manure. The NRCB can approve a NMP for applying manure in excess of the limits if the NRCB is satisfied that implementing the NMP will not adversely affect the soil or the environment.

Manure Handling Plans under AOPA

A person applying for a CFO permit can submit a manure handling plan to the NRCB for approval to reduce or eliminate the need to meet the manure application and storage requirements under AOPA. The NRCB may approve a manure handling plan that provides an alternative to complying with the manure application and storage requirements. For example, an operation may submit a manure handling plan where an agreement is in place with others who will be accepting the manure from the operation. Manure production and transfer records must also be kept in these situations.



summary

- AOPA requires that manure be incorporated within 48 hours of application, unless manure is applied to forages, direct-seeded, frozen or snow covered land.
- Manure may not be applied within 30 metres of a well.
- Manure application adjacent to common bodies of water requires a setback distance of 10 metres if injected and 30 metres if surface applied and incorporated within 48 hours.
- In situations where manure cannot be incorporated, manure may not be applied within 150 metres of a residence or other building or structure occupied by people, and the application setback distances from water bodies increases with slope grade (minimum 30 m).
- Under AOPA, manure application rates are restricted based on $\text{NO}_3\text{-N}$ in the top 60 cm of soil. The maximum allowable level depends on soil texture, depth to water table and soil type.
- Manure may not be applied if its application would result in a one dS/m increase in EC in the top 15 cm (6 in) of the soil.
- Manure may not be applied to soil if the soil EC, prior to application, is more than four dS/m. Regular soil sampling as part of a nutrient management plan is the most reliable way to assess and monitor changes in soil salinity.