

P Appendix P - Irrigation Certification and the Irrigation Act





Saskatchewan
Ministry of
Agriculture

Irrigation Certification

*... developing a prosperous and sustainable
irrigation industry ...*



(Revised March 2008)

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Abbreviations

(for reference while reading this book)

AEU.....	Agro Environmental Unit of Saskatchewan Agriculture
DGPS.....	Differential Global Positioning System
EC	Electrical Conductivity
GIS.....	Geographic Information System
LF.....	Leaching Fraction
SA	Saskatchewan Agriculture
SWA.....	Saskatchewan Watershed Authority
SPARC.....	Semi-arid Prairie Agricultural Research Centre
SAR.....	Sodium Adsorption Ratio
TDS.....	Total Dissolved Solids

Irrigation in Saskatchewan

From the first irrigation projects in the late 1800s, irrigation development has been a tool for rural development, diversification and crop production stabilization. Saskatchewan now has more than 200,000 acres of intensive irrigation and more than 100,000 acres of controlled spring flood irrigation.

The province has invested more than \$200 million in irrigation infrastructure not including the main diversion structures scattered throughout the province. This infrastructure has long ceased to focus solely on irrigation, but has led to the development of provincial and regional parks, recreation sites, municipal and commercial water supplies and a host of other uses.



Figure 1: Irrigation development projects in Saskatchewan.

The Irrigation Act, 1996

Irrigation development and operation is administered by Saskatchewan Agriculture (SA) through *The Irrigation Act, 1996*. The *Act* states that all individuals wishing to develop a new irrigation project must obtain an Irrigation Certificate, which confirms that the land to be developed is suitable for irrigation from a specified water source. Since Jan. 2, 1997, individuals cannot receive irrigation services from an Irrigation District or SA without an Irrigation Certificate. This certificate is required for any land to be developed for irrigation.

Projects which were constructed prior to Jan. 1, 1997, have been grandfathered and do not need an Irrigation Certificate.

Continued operation of these projects is at the sole risk of the irrigator. It is, however, recognized that even though the project may not meet today's certification criteria, it still may be profitable for the owner to continue to irrigate. Projects are exempt from requiring certification if they require fewer than 12,000 cubic metres of water.

Irrigation Certificate

The Irrigation Certificate demonstrates that SA strives for environmental sustainability of irrigation projects. Certification protects the province's water and related land resources, as well as protecting the irrigator's significant investment in irrigation and related cropping equipment.

The person who wishes to irrigate applies to SA to have the land certified for irrigation. SA determines whether or not the land proposed meets the current certification criteria.

If SA is satisfied that the certification criteria have been met, an Irrigation Certificate will be issued. SA can impose various terms on the Certificate, and the irrigator must comply with those terms.



The Irrigation Certificate may be suspended or cancelled if the holder fails to comply with the imposed terms or if, in the opinion of SA, it is no longer in the public interest for the land to continue to be irrigated. A certificate cannot be cancelled before the irrigator has had an opportunity to be heard.

Agro Environmental Unit

The Agro Environmental Unit (AEU), which is located in SA's Irrigation Development Branch, is responsible for Irrigation Certification. The following information outlines the process the AEU undertakes to investigate soil-water compatibility.

Inquiry/Application: Upon receiving an inquiry, SA will discuss the irrigation development process with the client. The client will be informed of the various steps in the process. The Saskatchewan Watershed Authority (SWA) handles water rights and allocation. The client needs to check with SWA to ensure an adequate quantity of water is available. If a client wishes to proceed with irrigation development, site inspection and preliminary design will take place by engineering staff. A water sample is usually taken at this point to determine the suitability. If the water quality is suitable, and engineering deems the project feasible, the client may move to the certification process.

Background Review: Prior to the AEU's on-site visit, information is collected about the client's land including air photos, soil survey data, rural land assessment, water quality data and underground utilities.

Field Investigation: The AEU uses a **Differential Global Positioning System (DGPS)** to pin-point locations for salinity readings or soil sample sites within fields. The DGPS system is comprised of two components: a mobile unit on the vehicle mapping the field and a base station set up over a known point used to correct satellite signals. The end result is very accurate determination of location (<20 cm).



A quad or truck pulls a sled housing dual **EM38 salinity meters**. The EM38 reads the apparent electrical conductivity (EC) of the soil, which indicates salt levels. The higher the EM38 reading, the more salinity there is in the soil. EC readings may also be affected by soil temperature, texture, and moisture; therefore, soil samples are collected and analyzed. The EC from the soil samples is then correlated to the apparent EC of the EM38.



A truck-mounted **coring machine** is used to take soil samples in the field. Samples are taken every foot to a total depth of four feet. When field access is a problem or the soils are difficult to work with, a hand auger is used.



The quad or truck and attached DGPS system are driven along the perimeter of the field in question to define a boundary. The EM38 is pulled within this boundary in lines spaced from 10 to 100 meters apart.

In the vertical mode, the EM38 reads apparent salt levels to a 1.5-meter depth, whereas horizontal mode reads salts only to a 0.75-meter depth.

This allows the AEU to interpret salinity patterns at the surface and at depth. Comparison of these salinity patterns may indicate upward or downward movement of water, an important consideration for drainage decisions.



During the course of gathering EM38 readings, sites are selected for soil samples to be taken. Between three and six holes will be sampled per quarter section of land in order to accurately calibrate the EM38 readings.

Lab Analysis: Soil samples taken are hand-textured and sent to ALS Laboratory Group in Saskatoon for detailed salinity analysis, which includes determination of EC, Sodium Adsorption Ratio (SAR), pH, and concentrations of other major ions including sodium and sulphate. Salinity (salt) and sodicity (sodium) levels are the most important factors determining irrigation suitability.



Data Analysis and Map Creation: When the analytical results are returned to SA, they are entered into the computer and statistical analysis is carried out. The computer data collected in the field is downloaded and used to create salinity and elevation maps. These salinity maps do not indicate sodium levels in the soil. These maps are made with the use of a Geographic Information System (GIS).

An example of a salinity map is on page five.

Salinity maps depict areas that are non-saline (white areas), slightly saline (yellow areas), moderately saline (blue areas), severely saline (red areas) and very severely saline (black areas). The regression found at the bottom of the map is used to determine how the EM38 readings fit into these salinity categories.

Generally, both horizontal and vertical salinity maps are provided to show movement of salts with depth in the soil. All maps include the locations of soil sampling sites. Hole numbers can be cross-referenced with the analytical results.

Decision Making Criteria

Once all the information is put together, an Agro Environment Report is written by the AEU. This report rates the soil and/or water as either “Suitable” or “Unsuitable for

Irrigation.” Where warranted, an Irrigation Certificate is issued.

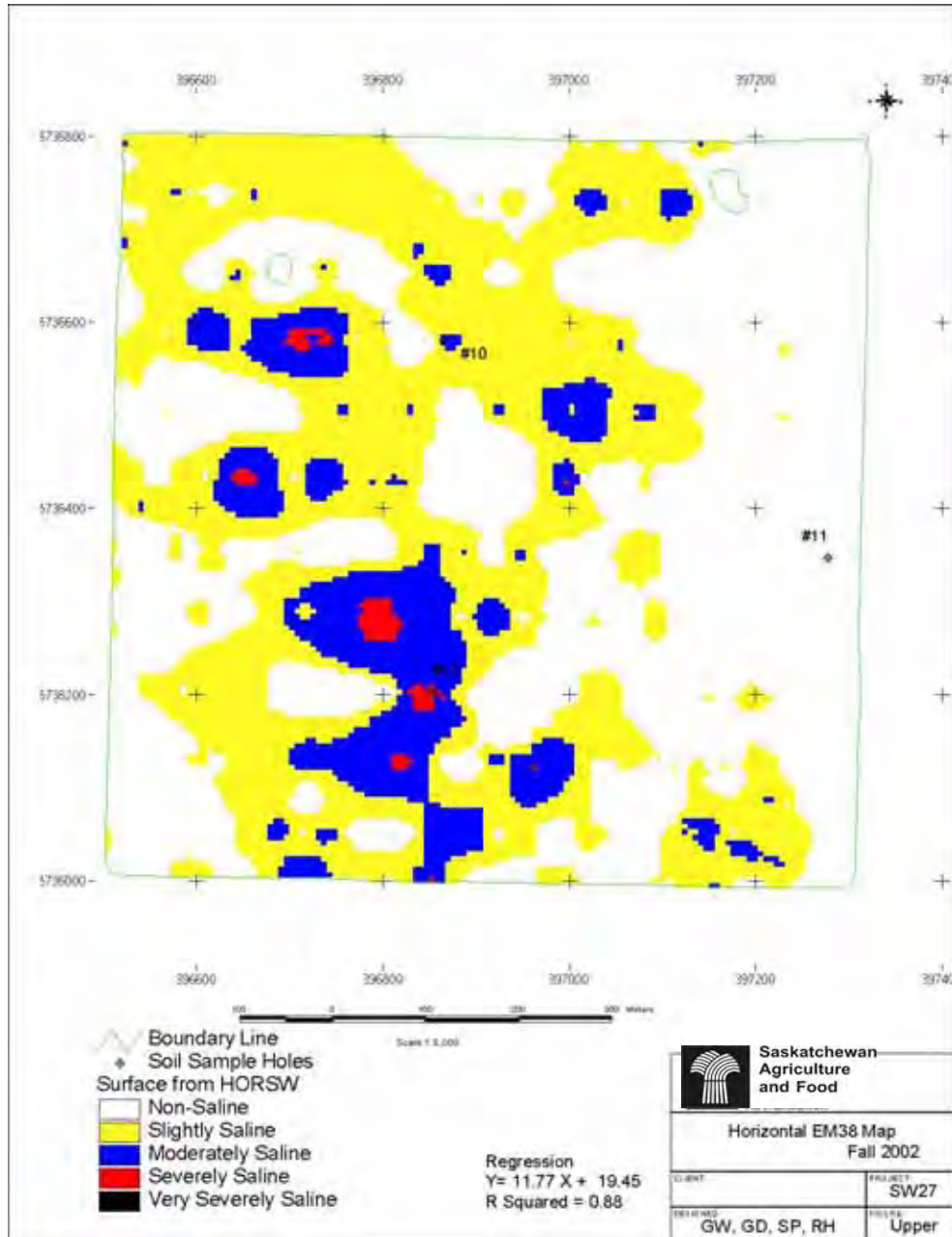


Figure 2: Surface salinity map created through use of horizontal EM38 readings, GIS and statistical analysis.

Certification Criteria

Soil

SA bases its recommendations on the document entitled *An Irrigation Suitability Classification System for the Canadian Prairies* (1987), which was developed by a group of soil experts, including members from universities, and provincial and federal agencies.

A number of physical and chemical characteristics are evaluated to determine soil suitability for irrigation. These characteristics include texture, structure and geological unconformity; infiltration rate, hydraulic conductivity and moisture holding capacity; salinity and sodicity; and drainage and depth to water table.

Texture, Structure and Geological Unconformity

Soil texture refers to the relative proportion of sand, silt, and clay size particles in a given soil. Soil texture influences the rate at which water infiltrates or enters the soil, the

amount of moisture it can hold, and has a great effect on the natural fertility and nutrient supplying ability.

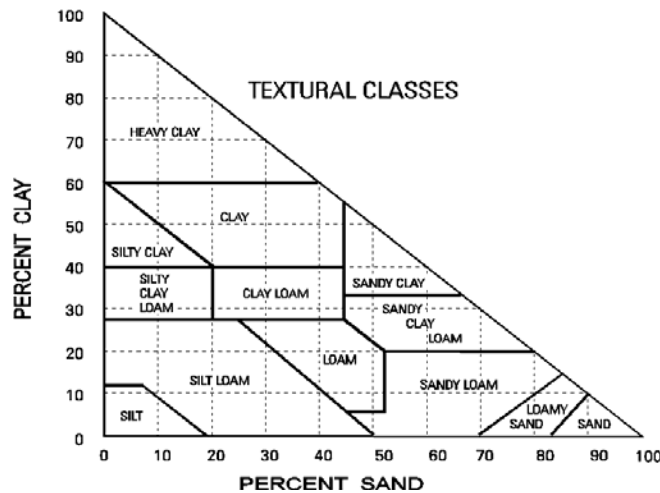


Figure 3: Chart showing percentages of sand, silt, and clay-sized particles that determine soil textural classes.

Soil textures alone cannot disqualify a soil from irrigation. However, very coarse (sand) or very fine (clay) textured materials are a severe limitation to development. Soil

texture may change dramatically from one portion of the field to another and will require a sprinkler design that takes this into account.

Textural changes with depth, otherwise known as geological unconformity, also affect the drainage capacity of the area. Coarse material at depth, although seen as a benefit for development, can also lead to offsite impacts and may restrict development opportunities. Soils that get finer with depth can have restricted internal drainage and are at higher risk for developing a water table build-up (perched water table).

Structure refers to the degree of aggregation of soil particles. Structure in combination with texture is very important in determining permeability, infiltration and hydraulic conductivity, as will be discussed below. Solonchic soils with strong B horizons and massive clay soils are two examples where structure can reduce soil permeability. Soil tillage, however, is not the same as structure. Tillage can be changed through management practices and is not a criterion for suitability.

Infiltration Rate, Hydraulic Conductivity and Moisture Holding Capacity

Infiltration rate is an expression of the soil's ability to take in water and is related to the soil structure and the soil texture.

Generally, coarse-textured soils have higher infiltration rates and lower moisture holding capacity than finer textures. Except for soil of very coarse textures, the infiltration rate usually decreases with time. Saturated hydraulic conductivity (K_{sat}) refers to the rate at which water will move through a saturated soil (mm/hr). It is an important factor in evaluating soil water regimes for irrigation, particularly for the engineering design of systems. It may be reflected in

texture, drainability and depth to the water table.

Water is held between and on soil particles. Soil moisture available to plants is within a range known as available moisture. This is the amount of moisture between field capacity and permanent wilting point. The moisture held at lower tension is most easily used by the plant and is called readily available moisture. As can be seen in Figure 4, available moisture increases as soil textures become finer.

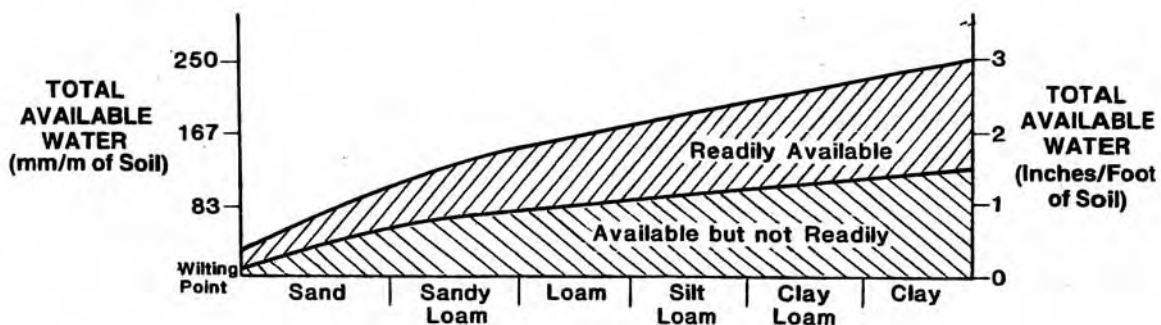


Figure 4: Estimated available soil moisture for various soil textures. (Source: Irrigation Development field studies throughout the Dark Brown Soil Zone).

The irrigation system best suited for a particular parcel of land is influenced by the soil's infiltration rate and moisture holding capacity. Also, lower moisture holding capacity soils require more frequent irrigation to maintain plant available moisture levels, which may result in higher

operating costs. Finer textured soils generally require that a given volume of water be spread over a larger area to allow for irrigation without creating runoff problems. Low pressure systems should be matched with soils that have higher infiltration rates.

Texture	% Field Capacity*	% Wilting Point*	% Available Moisture Holding Capacity*	Available Moisture inches/foot	Infiltration Rate**	
					mm/hr	in/hr
Loamy Sand (LS)	10	5	5	0.84	25	1.00
Sandy Loam (SL)	18	8	10	1.68	18	0.70
Fine Sandy Loam (FL)	20	9	11	1.85	15	0.60
Very Fine Sandy Loam (VL)	22	10	12	2.02	13	0.50
Silt Loam (SiL)	22	10	12	2.02	9	0.35
Loam (L)	24	12	12	2.01	8	0.30
Clay Loam (CL)	26	13	13	2.23	6	0.25
Clay (C)	40	22	18	3.02	4	0.15

Table 1: Soil texture, infiltration rate, and moisture holding capacity.

* From studies done randomly throughout the Dark Brown Soil Zone.

** Field experience and testing done by O.P. Bristol. % expressed by weight.

Salinity and Sodicity

Salinity is a measure of the relative concentration of soluble salts in the soil that may affect the growth of intended crops.

High levels of salinity cause physiological drought: that is, soil salts change the osmotic pressure of the soil solution, reducing the amount of water available to plants.

Crops vary in their tolerance to soil salinity

(see Table 2). Research at the Semi-arid Prairie Agricultural Research Centre (SPARC) in Swift Current has shown there are differences between spring-sown wheat classes in their salt sensitivities.

Figure 4 depicts the variance in response to salinity in wheat types. For example, at an EC of 7 dS/m, there is almost a 40 per cent difference in yield between the classes.

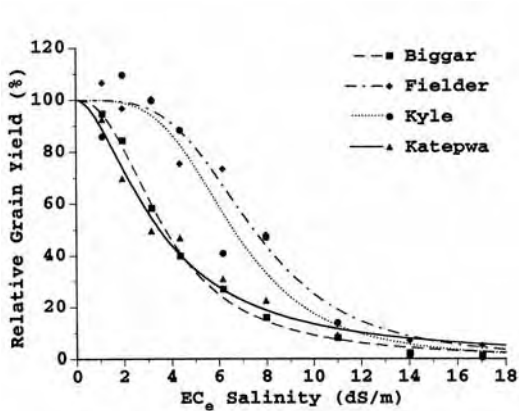


Figure 4: Responses in relative grain yield to salinity (Steppuhn and Wall, 1996).

The following photos show the stark differences in crop growth as salinity increases.

This study was conducted by Dr. Harold Steppuhn of Agriculture and Agri-Food Canada's Semi-arid Prairie Agriculture Research Centre (SPARC) in Swift Current, Sask.



**Figure 5: Carneval peas, EC 2 mS/cm
Day 78**



**Figure 6: Carneval peas, EC 10 mS/cm
Day 78**



Figure 7: Carneval peas, EC 20 mS/cm, Day 78

Table 2: Salt tolerance of various types of plants. (McKenzie, 1988; Maas, 1986)

Salt Tolerance* EC (dS/m)	Field Crops	Forages	Vegetables	Trees, Shrubs
Very High 20		Beardless wildrye Bulks altai grass Levonns alkaligrass Alkali sucatan		
High 16	Kochia Sugar beets	Altai wildrye Tall wheatgrass Russian wildrye Slender wheat grass		Siberian salt tree Sea buckthorn Silver buffaloberry
8	6 – row barley Safflower Sunflower 2 – row barley Fall rye Winter wheat Spring wheat	Birdsfoot trefoil Sweetclover Alfalfa Bromegrass	Garden beets Asparagus Spinach	Hawthorn Russian olive American elm Siberian elm Villosa lilac Laurel leaf willow
Moderate	Oats Yellow mustard	Crested wheatgrass Intermediate wheatgrass	Tomatoes Broccoli	Spreading juniper Poplar
	Meadow fescue Flax Canola	Reed canary grass	Cabbage	Ponderosa pine Apple Mountain ash
4	Corn		Sweet corn Potatoes	Common lilac Siberian crab apple Manitoba maple Viburnum
Low	Timothy Peas Field beans	White dutch clover Alsike clover Red clover	Carrots Onions Strawberries Peas Beans	Colorado blue spruce Rose Douglas fir Balsam fir Cottonwood Aspen, birch Raspberry
0				Black walnut Dogwood Little-leaved linden Winged euonymus Spirea Larch

*These crops tolerances were developed for chloride-dominated soils, such as those in California, and may not be applicable to crops grown on the sulphate-dominated soils typically found in Western Canada.

Irrigation can improve some saline areas by leaching these excess salts from the root zone, provided that sufficient internal drainage is present in the soil profile and impermeable layers do not restrict the downward movement of water. Practically, the only way to decrease the EC, that is to say reduce salts, in a soil is to apply more water than the crop will utilize. The extra water applied is called the Leaching Fraction (LF).

Rainfall out of the growing season, or snowmelt infiltration, may provide a sufficient LF. The higher the mineral content of the irrigation water, the higher the leaching fraction required to maintain a given soil salinity value. With proper irrigation management, the weighted mean

salinity of the soil solution in the soil profile will be about three times the irrigation water salinity at a LF of 0.15 and about two times for a LF of 0.3. Therefore, an irrigation water quality of EC 1.0 mS/cm creates a soil solution EC of 3.0 mS/cm at a LF of 0.15.

A salt profile such as that depicted in Figure 4, Line C, would indicate that the leaching process is occurring but possibly at a reduced rate. This may be due to an insufficient LF or a constricting subsoil layer. A large number of soils in Saskatchewan are referred to as downward fining. This means the soil textures get finer with depth. Water and salts may have more difficulty draining below the active root zone in such situations. Such salinity profiles are not uncommon. The magnitude of the salt level at depth may impact on the productivity of the site, its irrigation suitability and also crop selection.

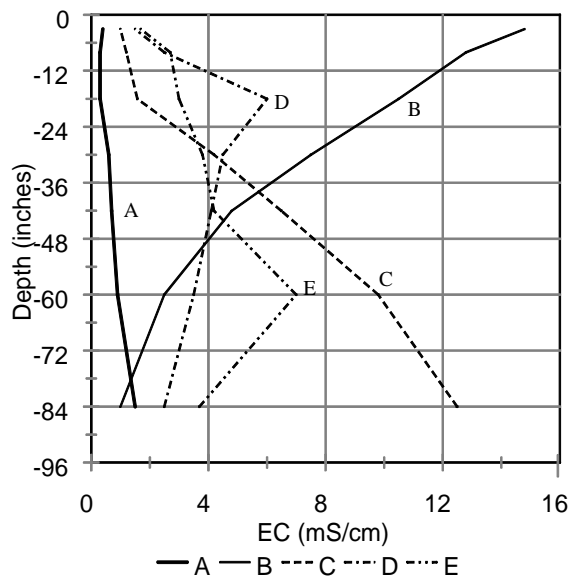


Figure 8: Theoretical salinity profiles.

In the field, it is more common to find salinity profiles represented by Line D. This profile suggests that a salt front is moving downward, but is accumulating in the root zone. Such accumulations can be detrimental to production if the LF is not increased to move salts deeper in the profile. Line E depicts a profile where the salt front has been removed from the active root zone.

Sodicity

Sodic soils contain sufficient sodium salt so that the Sodium Adsorption Ratio (SAR) exceeds six. A high sodicity value can adversely affect soil structure and soil permeability. This is typical of solonchic soils and the problems they cause for irrigation. High sodium levels can be toxic to certain crops as well. Table 3 provides the soil salinity and sodicity levels that are considered to be a limitation for irrigation development.

Table 3: Soil salinity and sodicity ratings.

Soil Limiting Factor		Degree of Limitation			
		1	2	3	4
		None	Slight	Moderate	Severe
Salinity (mS/cm)	0 – 0.6 m depth	< 2	2 – 4	4 – 8	> 8
	0.6 – 1.2 m	< 4	4 – 8	8 – 16	>16
	1.2 – 3 m	< 8	8 – 16	> 16	>16
Sodicity (SAR)	0 – 1.2 m depth	< 6	6 – 9	9 – 12	>12
	1.2 – 3 m	< 6	6 – 9	9 – 12	>12

Drainage and Depth to Water Table

Occasionally, artesian pressures create saline conditions by raising the water table. Soluble salts may then be brought to the surface by capillary action. Irrigation of such areas generally would not be recommended. The growing of more salt tolerant crops, such as barley or forages, may also be recommended on saline or high water table areas.

Surface drainage of any areas which collect spring runoff is recommended prior to irrigation development. Subsurface drainage may also be recommended in specific cases. Without adequate drainage,

waterlogging, salt accumulation and eventual salinization can become a problem.

The water table should remain more than two metres below ground. If the water table is between 1.2 and two metres below ground, a higher limitation exists towards irrigation development. In such cases it may be necessary to install subsurface drainage, limit water application and install piezometers in order to closely monitor the water table levels. Water tables less than 1.2 metres below ground are not typically suitable for irrigation.

Landscape

Landscape features are often limitations to irrigation design and engineering, but they may also be limitations to the soil's compatibility with irrigation. Topography refers to the frequency and steepness of slopes. Topography can influence the method of irrigation, but is intricately connected to groundwater regimes. On a rolling topography, application rates have to closely match soil infiltration rates to prevent runoff and collection. Very complex topography can lead to drainage issues and local water table build-up. Other "landscape" factors to consider include

inundation or flooding frequency, and stoniness.

Off-site and on-site impacts are two of the greatest landscape limitations. Although irrigation on one quarter may not negatively impact the developed land, consideration must be given to any potential "off-site" impacts on surrounding and/or downslope lands. Saskatchewan Agriculture seeks to ensure development is sustainable not only for the irrigator, but for surrounding producers and the province as a whole.

Water

Irrigation water sources in Saskatchewan involve surface water, such as rivers, sloughs, and lakes, or groundwater. Numerous communities across the province use irrigation systems to dispose of municipal effluent.

Water quality varies from source to source. Stagnant water bodies which are not flushed by a runoff event, and low flowing streams fed by groundwater, have a greater chance of being of poor quality. Each source should be sampled and analyzed to ensure it is compatible with the land to be irrigated.

Factors affecting water quality are the concentration and type of salts. These factors are expressed as EC, in milliSiemens per centimeter (mS/cm), or as total dissolved solids (TDS), in milligrams per litre (mg/l).



Generally, 1 mS/cm of EC is equivalent to 640 mg/l of TDS, but can be as high as 1,000 mg/l. All waters add salt to the soil. Waters with high ECs will salinize the soil and require irrigation beyond crop demand. The leaching of salts by better quality waters usually occurs during spring runoff or post growing season irrigation/precipitation.

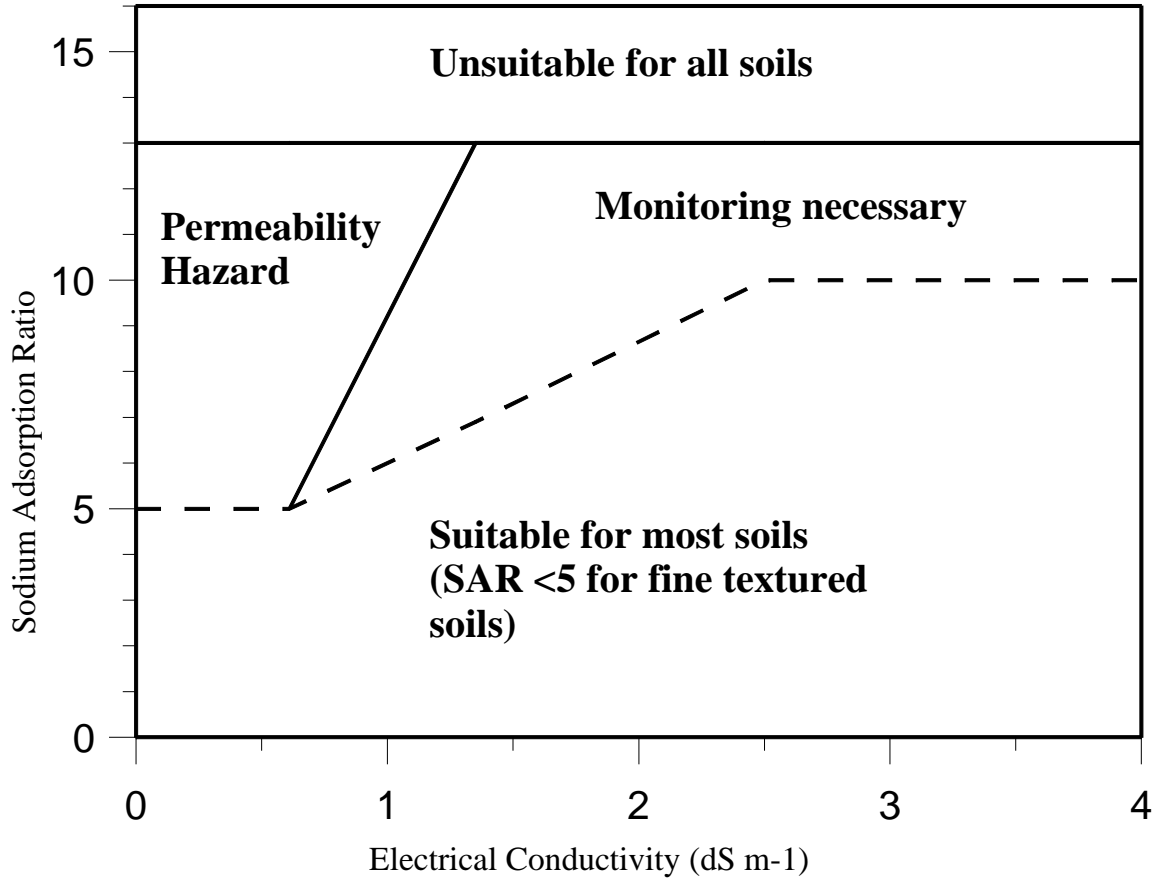


Figure 9: Recommended guidelines for use of sodic waters in irrigation applicable to 95 per cent of the soils in Saskatchewan (Steppuhn and Curtin, 1993).

The two parameters of greatest importance are EC and Sodium Adsorption Ratio (SAR). Irrigation with waters high in sodium results in the breakdown or dispersion of the soil structure. This leads to surface sealing and crusting conditions which can inhibit crop establishment. The permeability of the soil may also be reduced,

resulting in runoff. Figure 9 is the guideline used in Saskatchewan, based on in-province research, to determine the suitability of the water for irrigation. Although the water may be compatible with the soil for irrigation, the producer must also ensure crop selections (i.e. salt tolerances) match water quality.

Photo left: Surface lining of a canal for prevention of seepage.



Table 4: Water quality ranges of selected sources in Saskatchewan.

Water Source*	EC (mS/cm)	TDS (mg/L)	SAR
Lake Diefenbaker	0.4	275	0.6
North Saskatchewan River	0.4	250	0.6
Battle River	0.9	566	3.5
Frenchman River	0.9	561	2.1
Qu'Appelle River (average)	1.3	853	3.5
downstream of Eyebrow Lake	0.5	285	0.9
Lumsden	0.8	510	2.3
Wolseley Bridge	1.3	823	3.6
Souris River (average)	1.8	1164	7.3
Rafferty Reservoir	1.1	699	3.9
Downstream of Estevan	2.0	1277	8.6

*Values are June and July averages taken from SA's water quality database.

*Water quality values will vary due to location of sampling along water course and time of year.

In general, the quality of major water courses in Saskatchewan is usually suitable for irrigation.

Rivers and lakes which have their headwaters in the mountains are of the best quality. Rivers and creeks not having the benefit of mountain origin are generally of poorer quality, due to salt loading from the lands over which they pass.

Table 4 provides examples of different water sources across the province. Some water quality varies considerably even within the same water course. The Qu'Appelle River water quality, for example, is known to degrade as it moves east.

Irrigators need to be aware of the quality of their water source, and any fluctuations, seasonal or otherwise, that occur. This is especially true when growing any crops whose yield is particularly sensitive to salt, such as vegetables, fruits, and trees.

Table 5 outlines the tolerance of selected crops to water salinity levels.

Other elements may have to be considered in the assessment of irrigation water quality. **Boron**, found largely in groundwater, can limit water's suitability when concentrations exceed 0.5 mg/l.

The presence of **bicarbonate** can cause precipitation of calcium and magnesium carbonates, which can increase the sodium hazard and decrease the soil's permeability.

Other ions, such as **chloride** and **sodium**, can harm certain plants if found in higher concentrations. The latter two ions are not problems typically encountered in Saskatchewan water supplies.

Table 5: Salt tolerance of selected crops (Canadian Water Quality Guidelines, 1995).

*Assumptions and definitions on next page.

Degree of Tolerance	Fruits & Berries	Vegetables	Crops	Forages
Not Tolerant EC _w <0.7	Strawberry Raspberry	Beans Carrots	Beans	
Slightly Tolerant EC _w <1.2	Boysenberry Currants Blackberry Gooseberry Plum Grape Apricot Peach Pear Cherry Apple	Onion Parsnips Radish Pea Pumpkin Lettuce Pepper Muskmelon Sweet Potato Sweet Corn Potato Cabbage	Cowpea Broadbean Flax Sunflower Corn	Clover (alsike, ladino, red & strawberry) Berseem clover Corn (forage)
Moderately Tolerant EC _w <2.2		Spinach Cantaloupe Cucumber Tomato Squash Brussels Sprouts Broccoli	Rice (paddy)	Brome (smooth) Alfalfa Big Trefoil Beardless wildrye Vetch Timothy Crested Wheatgrass
Tolerant EC _w <3.6		Beets Zucchini	Canola Sorghum	Oat Hay Wheat Hay Mountain brome Tall Fescue Sweet Clover Red canarygrass Birdsfoot Trefoil
Very Tolerant EC _w <5.0		Asparagus	Soybean Safflower Rye Wheat Sugarbeet Barley	Barley Hay Altai Wildryegrass Tall Wheatgrass

***Table 5: Assumptions and definitions:**

1. The crops within each “tolerant” grouping are listed from least to most tolerant. Actual tolerances will be modified by management, climate and soil conditions.
2. EC_e means electrical conductivity of saturation extract (mS/cm). EC_w is the electrical conductivity of the irrigation water.
3. A leaching fraction of approximately 15 per cent is maintained. The tolerance tables can be adjusted by increasing or decreasing the leaching fraction.
4. Soil texture ranges from sandy loam to clay with good internal drainage and no uncontrolled shallow water table.
5. Rainfall is low and does not play a significant role in meeting crop demands. The guidelines may be too restrictive for wetter areas.
6. Assume the use of gravity or sprinkler irrigation where water is applied infrequently as needed. The crop utilizes 50 per cent or more of the stored available water before the next irrigation. Guidelines are too restrictive for frequent or drip irrigation systems.
7. Each irrigation leaches the upper root zone, and salt accumulation increases with depth. The crop responds to the average salinity in the root zone, and the salt content of the soil solution is about three times that of the irrigation water because of evapotranspiration.

Water Quality Considerations

- The guidelines are approximate and can be modified by management of the water application, climate and soil conditions: for example, the addition of manure to maintain soil permeability.
- Hydrogeologic investigations may be required in special circumstances. These are usually associated with off-site impact and drainage concerns.
- The texture of the least permeable soil horizon within the root zone should be considered the “critical” texture for each category.
- The minimum required leaching fraction can be altered by irrigation management.

Decision Making Criteria

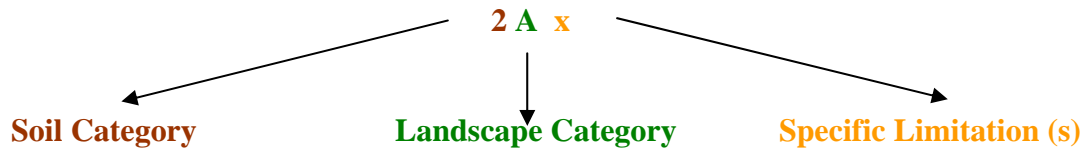
An excellent irrigation soil is one that has no salt, is well drained, and holds water well.

Most of our soils contain a mixture of parameters that limit their potential for irrigation. Certification deals with these less-than-perfect situations to ensure a prosperous and sustainable irrigation industry.

The major soil factors affecting irrigation suitability are those control the intake, transmission, and retention of water in the soil.

The soil and landscape factors are evaluated as to their estimated effect on sustaining land quality under irrigation. They are ranked as having no, slight, moderate or severe limitations (Working Group, 1987).

The soil factor symbols are given numbers 1 to 4 and the landscape symbols are A to D. The general structure of the symbols is in the chart below:



Examples of possible ratings include:

- | | |
|-------------------|---|
| 2Ad | Level to very gently sloping lands with slight soil limitations (2) for irrigation because of the adverse soil structural conditions (d). Landscape (A) presents no significant limitation. |
| 4Dmt ₂ | Strongly sloping lands with severe soil limitations (4) due to low water holding capacity (m) and severe landscape limitations (D) due to steep complex slopes (t ₂). |

A final irrigation suitability rating of Excellent, Good, Fair or Poor is made by combining both soil and landscape limitations.

A parcel of land will also be considered non-irrigable if more than 30 per cent of it has salinity or sodicity problems. This follows from the document entitled *Standards for the Classification of Land for Irrigation in the Province of Alberta* (1999), in which a non-irrigable rating is given to soil units that are mapped as having 30 per cent (±10 per cent) non-irrigable soils, due to being saline, solonetzic, gleyed or gleysolic.

Water criterion is more easily defined. SAR and EC are usually the prime factors examined when determining water quality for irrigation. In general terms, waters with ECs greater than 4.0 mS/cm and SARs greater than 13 are unsuitable for irrigation use. This is dependent, however, on crop selection.

The land will finally be rated as Suitable or Unsuitable for Irrigation.

Minor limitations that can be overcome with proper management will be explained in the **Agro Environmental Report**. For example, improvements in surface drainage to prevent the formation of slough areas may be recommended. Recommendations on crop selection may be given based on the water quality.

An **Irrigation Certificate** will be issued only to land that is deemed suitable. It may impose legal requirements that must be fulfilled before a certificate is issued. For example, installation and monitoring of piezometers across the parcel of land could be required to monitor water table levels. If the groundwater consistently rose to 1.2 m from ground level, the development would be re-evaluated and the Irrigation Certificate could be cancelled.

The Value of the Irrigation Certificate

Why do you need an Irrigation Certificate?

- ✓ **To protect long term investment.** Land can be degraded rapidly due to salinity or sodicity. Understanding more about your soil and water before you irrigate is essential to maintaining this valuable asset.
- ✓ **To identify measures you should take to ensure sustainability.** If there are limitations to your soil or water, there might be measures that can be used to improve the resource. SA's Agro Environmental Unit is available to advise on such measures.
- ✓ **To ensure your profitability.** Many crops, such as potatoes, beans and saskatoon berries, are not salt tolerant. Even low levels of salinity, which may not be visible to the naked eye, can lead to yield reductions. Having your land and water assessed prior to irrigation can allow you to make better management decisions. *Lower yields means lower returns.*
- ✓ **To comply with *The Irrigation Act, 1996.***
The *Act* protects the water and soil resources of Saskatchewan.



Conclusion

Irrigation is one of agriculture's oldest practices. For centuries, people around the world have been improving crop growth by supplementing and regulating the water supply. Although only 17 per cent of the world's cultivated land is irrigated, irrigated land produces 40 per cent of the total world food production (Plusquellec, 2002; Technical Advisory Committee, 1992).

Irrigation continues to play a crucial role in the economic development of many areas in Saskatchewan. SA follows the irrigation certification process to ensure that irrigation remains a viable practice economically, socially and environmentally for the people of this province.

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The Irrigation Regulations

being

Chapter I-14.1 Reg 1 (effective March 26, 1997) as amended
by Saskatchewan Regulations 7/2001 and 78/2006.

NOTE:

This consolidation is not official. Amendments have been incorporated for convenience of reference and the original statutes and regulations should be consulted for all purposes of interpretation and application of the law. In order to preserve the integrity of the original statutes and regulations, errors that may have appeared are reproduced in this consolidation.

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CHAPTER I-14.1 REG 1

The Irrigation Act, 1996

Title

1 These regulations may be cited as *The Irrigation Regulations*.

Interpretation

2 In these regulations, “**Act**” means *The Irrigation Act, 1996*.

4 Apr 97 cI-14.1 Reg 1 s2.

Borrowing powers

2.1 For the purposes of subsection 16(3) of the Act, all government agencies are prescribed as entities from which an irrigation district may borrow money.

25 Aug 2006 SR 78/2006 s3.

Appointment of district board member

2.2(1) For the purposes of clause 24(1.1)(a) of the Act, any appointment made by the minister shall be made by minister’s order.

(2) Any member appointed pursuant to subsection (1) shall be appointed for a one-year term and is eligible for reappointment.

25 Aug 2006 SR 78/2006 s3.

Amalgamation proposal

3 For the purposes of section 22 of the Act, irrigation districts proposing to amalgamate shall prepare a detailed proposal setting out the terms and means of effecting the amalgamation and, in particular, setting out:

- (a) the names of the amalgamating irrigation districts;
- (b) the names of the district consumers of each amalgamating irrigation district;
- (c) the number of acres receiving irrigation services in each amalgamating irrigation district;
- (d) the reasons for the amalgamation and the benefits that the district board of each amalgamating irrigation district believes will be achieved by the amalgamation;
- (e) the proposed date of the amalgamation; and
- (f) the proposed name and number of the amalgamated irrigation district.

4 Apr 97 cI-14.1 Reg 1 s3.

Adoption of amalgamation proposal by district consumers

4(1) The district board of each amalgamating irrigation district shall submit the amalgamation proposal for approval to a meeting of the district consumers of the amalgamating irrigation district.

(2) A notice of a meeting of the district consumers shall be sent to each district consumer of each amalgamating irrigation district in accordance with subsection (3), together with a copy of the amalgamation proposal.

(3) The notice mentioned in subsection (2) must set out the time and place of the meeting and the text of any special resolution to be submitted to the meeting, and shall be sent to each district consumer by personal service or registered mail not less than 30 days nor more than 50 days before the meeting.

(4) An amalgamation proposal is adopted by an irrigation district when the district consumers of the irrigation district have approved the amalgamation by a resolution passed by more than 50% of the district consumers controlling more than 50% of the irrigated area of the irrigation district, stating that:

- (a) they received and understood the amalgamation proposal;
- (b) they support the proposed amalgamation; and
- (c) if an irrigation district cannot or does not proceed with the proposed amalgamation, they wish to continue the amalgamation with the remaining amalgamating irrigation districts.

4 Apr 97 cI-14.1 Reg 1 s4.

Application for amalgamation

5(1) After an amalgamation has been adopted pursuant to section 4, the amalgamating irrigation districts shall provide to the minister:

- (a) an application to amalgamate, in a form satisfactory to the minister, containing:
 - (i) the names and addresses of the district consumers of each amalgamating irrigation district;
 - (ii) the legal description of the lands receiving irrigation services in each amalgamating irrigation district; and
 - (iii) the number of acres receiving irrigation services in each amalgamating irrigation district;
- (b) a copy of the amalgamation proposal;
- (c) a certified copy of the resolution mentioned in subsection 4(4) for each amalgamating irrigation district;
- (d) a statement for each amalgamating irrigation district of the assets, liabilities and works owned or controlled by the irrigation district, in a form satisfactory to the minister; and

- (e) a written declaration of a director or an officer of the district board of each amalgamating irrigation district stating that there are reasonable grounds for believing that the amalgamated irrigation district will be able to pay its liabilities as they become due.
- (2) A statement to be provided pursuant to clause (1)(d):
- (a) is to be sworn by the chairperson, the vice-chairperson and a majority of the remaining members of the district board of the amalgamating irrigation district to which the statement pertains; and
- (b) is to state that the information provided in the statement accurately and fairly represents the financial and contractual circumstances of the amalgamating irrigation district.

4 Apr 97 cI-14.1 Reg 1 s5; 25 Aug 2006 SR 78/
2006 s4.

Approval of amalgamation by Corporation

6(1) Before approving the amalgamation, the minister must be satisfied that the amalgamation is in the best interests of each amalgamating irrigation district and the district consumers of each amalgamating irrigation district.

(2) In the event that more than two irrigation districts wish to amalgamate, the failure of an irrigation district to meet the requirements for amalgamation does not prevent the remaining irrigation districts from proceeding with the amalgamation in accordance with the Act and these regulations.

4 Apr 97 cI-14.1 Reg 1 s6; 25 Aug 2006 SR 78/
2006 s5.

Notice of amalgamation

7 If the amalgamation is approved by the minister, each amalgamating irrigation district shall immediately notify its district consumers of the effective date of the amalgamation, which date is to be no more than 90 days after the approval of the amalgamation by the minister.

4 Apr 97 cI-14.1 Reg 1 s7; 25 Aug 2006 SR 78/
2006 s6.

Effective date of amalgamation

8 Provided notice is given to the district consumers pursuant to section 7, the amalgamating irrigation districts continue as one irrigation district on the effective date of the amalgamation and cease to exist as separate irrigation districts on that date.

4 Apr 97 cI-14.1 Reg 1 s8.

Voluntary winding up of irrigation district

9(1) For the purposes of subsection 23(1) of the Act, an irrigation district that applies to the minister to be voluntarily wound up shall provide the following to the minister:

- (a) an application for voluntary winding up, in a form satisfactory to the minister, containing:
 - (i) the names and addresses of the district consumers of the irrigation district;
 - (ii) the legal description of the lands receiving irrigation services in the irrigation district; and
 - (iii) the number of acres receiving irrigation services in the irrigation district;
 - (b) a certified copy of a resolution to wind up approved at a meeting of the district consumers by more than 50% of the district consumers of the irrigation district controlling more than 50% of the irrigated area of the irrigation district;
 - (c) a statement of the assets, liabilities and works owned or controlled by the irrigation district, in a form satisfactory to the minister;
 - (d) a copy of all water service agreements and contracts to which the irrigation district is a party;
 - (e) **Repealed.** 25 Aug 2006 SR 78/2006 s7.
- (2) **Repealed.** 25 Aug 2006 SR 78/2006 s7.
- (3) The statement to be provided pursuant to clause (1)(c):
- (a) is to be sworn by the chairperson, the vice-chairperson and a majority of the remaining members of the district board; and
 - (b) is to state that the information provided in the statement accurately and fairly represents the financial and contractual circumstances of the irrigation district.

4 Apr 97 cI-14.1 Reg 1 s9; 25 Aug 2006 SR 78/2006 s7.

Corporation winding up of irrigation district

10(1) For the purposes of subsections 23(1) and (2) of the Act, to wind up an irrigation district, the minister shall appoint an administrator for the irrigation district, who shall have the powers of a duly constituted district board and shall replace any district board in office at the time of the administrator's appointment.

- (2) An administrator appointed pursuant to subsection (1) shall:
 - (a) to the best of the administrator's ability based on the records of the irrigation district, prepare and submit to the minister a statement of assets, liabilities, works, water services agreements and contracts of the irrigation district;

- (b) prepare and submit to the minister a plan to fairly, equitably and promptly deal with the assets, liabilities, works, water services agreements and contracts of the irrigation district; and
 - (c) mail to each district consumer of the irrigation district a letter informing the district consumer of the contents of the plan mentioned in clause (b).
- (3) On completion of the administrator's duties pursuant to subsection (2), the administrator shall recommend to the minister that the irrigation district be wound up in accordance with the plan mentioned in clause (2)(b).
- (4) If the minister accepts the recommendation of the administrator pursuant to subsection (3), the minister may order that the irrigation district be wound up.
- (5) An order made pursuant to subsection (4) is final and binding on the irrigation district and its district consumers.
- (6) The irrigation district shall cease to operate and exist from the date of the order made pursuant to subsection (4).
- (7) Subject to subsection (8), the costs of winding up the irrigation district in accordance with this section, including the costs of any decommissioning works associated with the winding up, shall be paid out of the irrigation district funds and the proceeds of sale of the assets and works of the irrigation district, where the assets and works of the irrigation district are sold.
- (8) Where the costs of winding up exceed the amount of irrigation district funds and proceeds of sale available pursuant to subsection (7), the minister shall pay the excess costs.
- (9) Any assets of the irrigation district, including any irrigation district funds or proceeds of sale available pursuant to subsection (7), that have not been disposed of when the irrigation district is wound up vest in the minister.

4 Apr 97 cI-14.1 Reg 1 s10; 25 Aug 2006 SR 78/2006 s8.

11 Repealed. 25 Aug 2006 SR 78/2006 s9.

Fee for issuance of irrigation certificate

12(1) In this section, "**parcel of land**" means a parcel or parcels of land to a maximum of 64.75 hectares or 160 acres.

- (2) For the purposes of section 30 of the Act, a person who applies to the minister for an irrigation certificate shall pay to the minister:
- (a) an application and soils investigation fee in the amount of:
 - (i) \$1,300 for the first parcel of land that is the subject of the application; and
 - (ii) \$1,100 for every subsequent parcel of land that is the subject of the application; and
 - (b) any additional fee set by the minister against the applicant based on the minister's estimate of the costs for any additional scientific studies to be conducted pursuant to subsection 30(2) of the Act.

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(3) The minister may retain any technical or professional advisers as he or she considers appropriate to assist with any of the scientific studies conducted pursuant to subsection 30(2) of the Act.

(4) The applicant shall pay to the minister all fees mentioned in this section in advance of any work done by the minister.

(5) All fees paid to the minister by an applicant pursuant to this section are non-refundable whether or not the minister determines that it is appropriate to issue an irrigation certificate for the land that is the subject of the application.

(6) **Repealed.** 2 Mar 2001 SR 7/2001 s4.

(7) **Repealed.** 2 Mar 2001 SR 7/2001 s4.

4 Apr 97 cI-14.1 Reg 1 s12; 2 Mar 2001
SR 7/2001 s4; 25 Aug 2006 SR 78/2006 s10.

Exemption from requirement to hold irrigation certificate

12.1 In accordance with subsection 30(4) of the Act, the minister may exempt a person from the requirement to hold an irrigation certificate for irrigation services if the irrigation services will use less than 12,300 cubic metres or 10 acre feet of water on an annual basis.

2 Mar 2001 SR 7/2001 s5; 25 Aug 2006 SR 78/
2006 s11.

13 Repealed. 25 Aug 2006 SR 78/2006 s12.

14 Repealed. 25 Aug 2006 SR 78/2006 s13.

Information for public inspection

15 An irrigation district shall make the following information available for public inspection during normal office hours of the irrigation district:

- (a) the names of the members of the district board;
- (b) the names of the members for each committee appointed by the district board;
- (c) the duties of each committee mentioned in clause (b).

4 Apr 97 cI-14.1 Reg 1 s15.

15.1 Repealed. 25 Aug 2006 SR 78/2006 s14.

Election and appointment of ICDC board members

16(1) For the purposes of clause 46(1.1)(c) of the Act, members of the ICDC board are to be elected or appointed in accordance with this section.

(2) At each annual meeting of ICDC, an election shall be held to elect the following members:

(a) irrigation districts are to elect in the case of members for the following areas whose term will expire in that year:

(i) two members for the Lake Diefenbaker Development Area;

(ii) two members for the Southwest Development Area;

(iii) one member for the Southeast Development Area;

(iv) one member for the Northern Development Area;

(b) in the case of the member elected by individual consumer delegates whose term will expire in that year, one member.

(3) For the purposes of clause (2)(a):

(a) each irrigation district may have a delegate for each 5,000 irrigated acres or any portion of that area who is entitled to vote for that district's ICDC board member; and

(b) the development areas mentioned in subclauses (i) to (iv) are the areas indicated on the map attached as schedule B to the bylaws of ICDC.

(4) Members elected pursuant to subsection (2) are elected for three-year terms.

(5) The board of Saskatchewan Irrigation Projects Association shall annually appoint two members to the ICDC board.

(6) The members of the board may appoint additional members as may be necessary to satisfy subsection 46(1.2) of the Act.

25 Aug 2006 SR 78/2006 s15.

Refund of annual charges

16.1 For the purposes of subsection 55.1(1) of the Act, a written request for a refund of an annual charge levied by ICDC must contain the following particulars:

(a) the name and mailing address of the person requesting the refund;

(b) the description of the parcel of land that is the subject of the annual charge;

(c) where applicable, the name of the irrigation district to which the person belongs;

(d) the amount of the annual charge sought to be refunded;

(e) the reason for requesting the refund.

(2) For the purposes of subsection 55.1(2) of the Act, on receipt of a request for a refund that complies with the Act and these regulations, ICDC shall verify that the person requesting the refund has paid the annual charge in full to ICDC.

(3) Where ICDC verifies that the person requesting the refund has paid the annual charge in full to ICDC and that the request complies with the Act and these regulations, ICDC shall refund the annual charge by way of cheque:

- (a) made payable to the person requesting the refund; and
- (b) mailed to that person's mailing address as set out in the request for the refund.

2 Mar 2001 SR 7/2001 s7.

R.R.S. c.S-56 Reg 1 repealed

17 *The South Saskatchewan River Irrigation Administration and Election Regulations* are repealed.

4 Apr 97 cI-14.1 Reg 1 s17.

Appendix

Repealed. 25 Aug 2006 SR 78/2006 16.