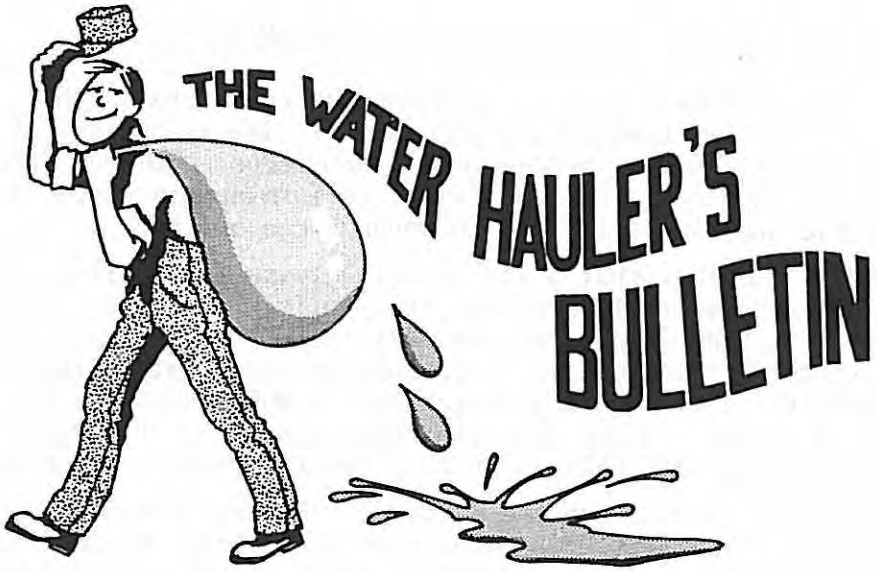

VOLUME 5, FALL 1981

IN THIS ISSUE

Hydroseeding Update	*p. 1*	*Big 'O' Culverts*	*p. 6*
Wildlife & Irrigation	*p. 2-3*	*Research News*	*p. 7*
Pressure Gauges	*p. 4-5*	*Metering Service*	*p. 8*

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WILL HYDROSEEDING BE USED IN IRRIGATION DISTRICTS?

In the January 1981 issue of The Water Hauler's Bulletin, hydroseeding was mentioned as an effective means of controlling wind and water erosion and weed growth. Since that time, the Evaluation and Management Section has been monitoring several sites near Lethbridge that were hydroseeded last fall. The tackified mulch cover effectively reduced erosion before and during germination, and all sites showed a good grass catch by early summer.

Some Irrigation Districts have expressed interest in using hydroseeding as a regrassing technique on their rehabilitation projects. Several hydroseeding contractors are available out of Lethbridge and Calgary to do the job. Rapid re-establishment of a protective vegetative cover on barren areas along irrigation canals and structures can be more easily achieved using the hydroseeding method.

The accompanying photograph shows a site that was hydroseeded late last fall. Germination did not occur until spring, but luxurient growth is now evident.

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WILDLIFE & IRRIGATION MADE COMPATIBLE BY "DUCKS UNLIMITED"

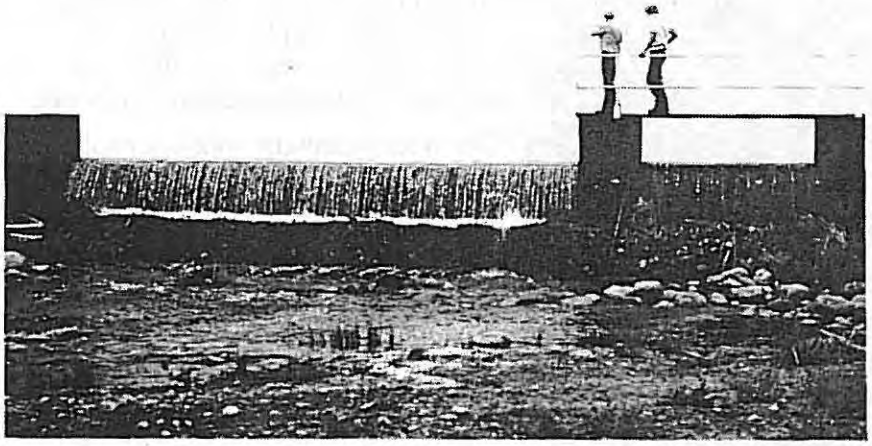
In the field of Agriculture much is said about the conflicts which periodically exist between Agriculture and our wildlife resources. Very seldom does their compatibility become public knowledge. However, there are many and varied instances where wildlife and farming practices are completely amicable and, in fact, tend to enhance one another.

We are all aware of the fact that a vast grazing lease is of little use without the presence of suitable fresh water supplies liberally dispersed throughout the entire range. Little value exists in an ample supply of good grassland if the cattle must lose valuable pounds simply walking to a fresh water supply. Yet that fresh water supply which supports a healthy, profitable herd of cattle also is the life support system for several species of waterfowl and many other marshland related mammals and birds.

In the Eastern Irrigation District the Tilley "B" Reservoir cost-shared by the E.I.D. and Ducks Unlimited, serves as inland storage to feed the Tilley canal which irrigates many and varied cereal and specialty crops in the Tilley area. That same reservoir supplies the Bantry canal which carries stock water eastward over the vast short-grass plains for some 20 miles and nurtures 33 lakes and potholes allowing 6,000 head of cattle to utilize an otherwise dry rangeland. This same canal distributes water to the Minor canal carrying water southward under the Trans Canada Highway and the main line of the C.P.R. to Kininvie Flats from whence it is pumped 7,600 feet through a 12 inch pipeline to overtop a ridge and flow by gravity into the dry Kininvie South Projects. Again an otherwise dry range is transformed into active cattle country.

These lakes and potholes constructed by Ducks Unlimited and supplied with stock water on this vast rangeland are immediately transformed into a veritable oasis. Bulrush, cattail, spike rush, smart weed, pondweeds and marsh grasses respond instantly to the supply of fresh water and the intense heat to create a haven for marshland oriented wildlife. Sixteen species of ducks, Canada geese, four species of grebes, coots, cormorants, gulls, an assortment of shorebirds, marsh wrens and many other songsters are quick to join the muskrats and mink in calling these areas "home" and transforming an otherwise drab region into a center of lively activity. Whitetail and mule deer join antelope to gently approach these projects for their watering needs. Fishermen angle for pike and whitefish on the reservoir.

Across the Bow River in the B.R.I.D. the Century I and II Projects constructed by Ducks Unlimited and consisting of two dams with steel piling weirs, contain some of the spillwater returning to the River. Again these areas supply stock water to several regrassed pastures while serving as the life support system for another marshland community.



Water control structure on Ducks Unlimited Century II Project in B.R.I.D.

In the Lethbridge area, the Raymond Irrigation District supplies surplus tail waters to Stirling Lake, 17 miles south of the city. This area, supported by the District, the Provincial Government and Ducks Unlimited creates a home for a varied population of marshland mammals and birds far too numerous to mention, while supplying endless hours of outdoor recreation and relaxation to hunters, trappers and birdwatchers who welcome a peaceful respite from the hectic city pace. As well, the Community College utilizes this area as an outdoor interpretive center for their classes in wildlife.

In the Western Irrigation District a new "Reservoir #2" near Langdon has just been completed to present irrigators with inland storage on their main "A" canal and thus prevent some of the lag time previously experienced. This reservoir has immediately been adopted by the marshland community and already wildlife abounds in the area. Ducks Unlimited has fenced the perimeter of the right of way and seeded down the enclosed acreage to create secure nesting habitat for both wetland and upland birds. In this intensive farming area, nests, which otherwise would be destroyed by agricultural activities or depredation, will now experience success and incubate safely.

Throughout many of the Irrigation Districts, Ducks Unlimited projects serve as minor inland storage reservoirs from which small supplies of water can be fed back into the canal systems in times of short supply. As well, many DU Projects are the supply reservoirs for center pivots and side roll sprinkler systems, yet they still serve as marshland habitat and support an assortment of wildlife.

Irrigation District rights of way serve a very valuable function as wildlife habitat. Not only do these canals and laterals supply ideal nesting cover for waterfowl and upland game, they also are one of the major wintering areas for the pheasant population in Southern Alberta. Winter mortality, a major cause of pheasant declines, would be greatly increased if this secure cover was not available along the many miles of supply canals. At the same time, these supply canals function as travel routes for broods of waterfowl incubated along their banks and for broods produced on adjacent small lakes and potholes which later dry up and would otherwise leave the broods stranded.

Though, at first appearance, wildlife and irrigation would appear to be strange bedfellows, a short trip through virtually any of the Irrigation Districts will soon bring to one's attention the fact that irrigation and wildlife are, indeed, compatible and generally enhance one another.

Aerial view of Ducks Unlimited Century I Project in B.R.I.D.

Article & pictures by George Freeman, Ducks Unlimited.

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INSTALLATION AND OPERATION OF PRESSURE GAUGES

More and more pressurized irrigation systems are being installed in the Irrigation Districts, and this requires the use of pressure gauges. Several factors should be considered when selecting a suitable gauge.

1. Operating Pressure
   Do not continuously operate the gauge at more than 75% of the span. Bourdon tubes are necessarily highly stressed, and continuous operation at full scale will result in early fatigue failure and subsequent rupture. Select a gauge with a span suited to the installation.

2. Materials
   Be certain the materials of the pressure containing portions of the gauge are compatible with the pressurized medium. Gauges are commonly made of copper alloys (brass, bronze, etc.) and may be subject to stress corrosion or chemical attack. Gauges specially constructed for corrosion service are available.

3. Cyclic Pressure and Vibration
   Continuous, rapid pointer motion will result in excessive wear of the internal mechanism and cause gross errors in the pressure indicated and possible early fatigue failure of the bourdon. If the pointer motion is due to mechanical vibration, the gauge must be remotely mounted on a non-vibrating surface and connected to the apparatus by flexible tubing. If the pointer motion is due to pressure pulsations, a suitable damper must be used between the pressure source and the gauge.

4. Accuracy at Low Pressure End of Span
   Pressure gauges should not be used to measure pressures less than 10% of the span. The accuracy of commercial Grade B gauges is ±3% of span over the first quarter of the scale. If, for example, a 0-100 psi Grade B gauge is used to measure 6 psi, the accuracy of measurement will be ±3 psi or ±50% of the applied pressure. In addition, the scale of pressure gauges is often laid out with a "start" (take-up) which can result in further inaccuracies when measuring pressures which are a small percentage of the gauge span.

5. Fatigue
   As with any spring, the bourdon will fail after extended use and release the pressurized medium. The larger the number of applied pressure cycles and the greater the extent of the pressure cycle, the earlier failure will occur. The fatigue failure may be explosive.

6. Frequency of Accuracy Evaluation
   Where the pressure measurement is critical and gauge failure or gross inaccuracy will result in hazard to personnel or property, the gauge should be checked for accuracy and proper operation on a periodic basis.

7. Venting of Case
   Vents provided in the pressure gauge case (clearance around pressure connection, rubber grommets, pressure relief back, etc.) must not be closed or restricted from operating. There is always the possibility that the pressure medium will be admitted to the case interior as a result of a leaking joint or bourdon tube failure. If this occurs, the pressure medium must be vented from the case so as not to build up sufficient pressure to rupture the case or window.

8. Liquid Filled Gauges

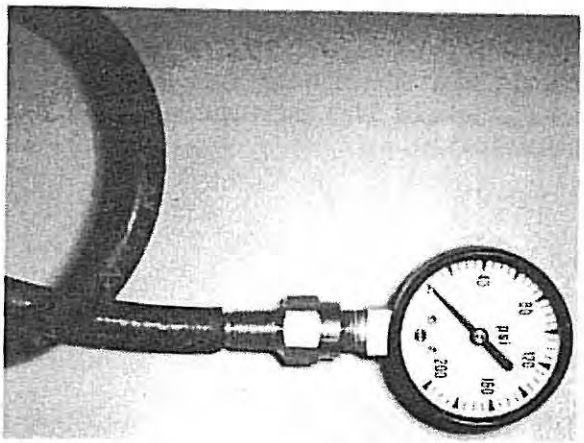
Performance of pressure gauges used in severe vibration or pulsating pressure service, can be improved by filling the gauge case with a viscous liquid. The liquid filling most commonly used is a mixture of glycerin and water.

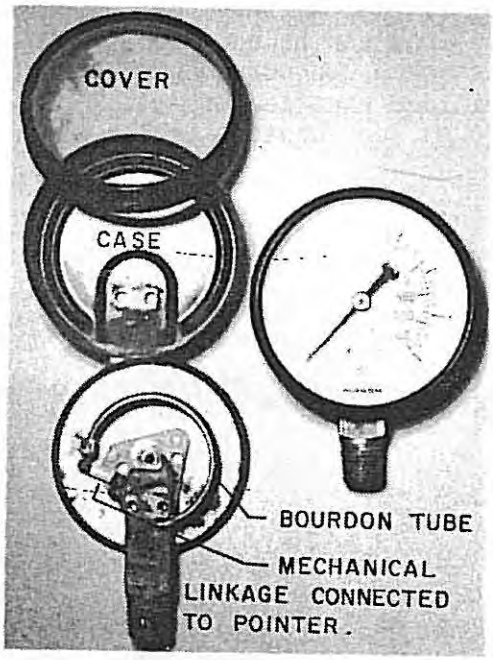
9. Freezeproofing of Gauges

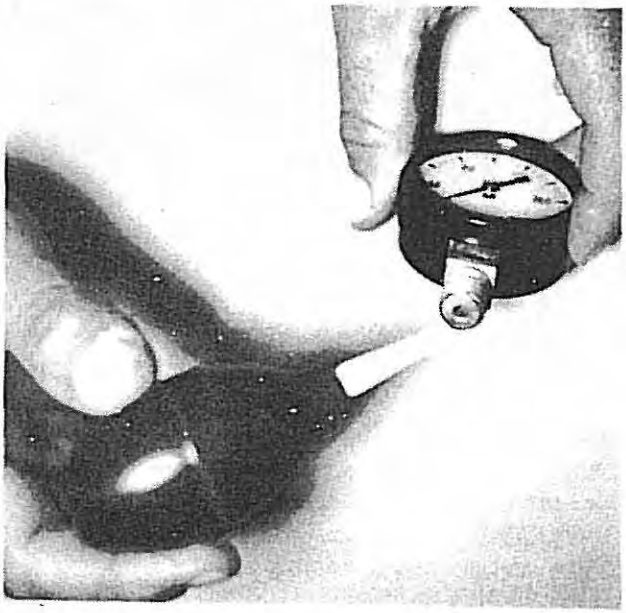
Any bourdon tube type gauge will retain water after draining of the supply line and will suffer freezing damage if left unprotected through the winter. The gauge can be made freezeproof by installing a diaphragm type protector just ahead of the gauge, and filling the pressure element above the diaphragm with a suitable antifreeze solution such as a glycerin mixture.

10. Pricing of Gauges

A very simple gauge with no pulsation, vibration, or freezing protection costs about $5.00. Pulsation dampers are available for $2.00 to $3.00. A liquid filled gauge complete with freezeproofed diaphragm protector costs about $60.00, but should outlast the unprotected gauge by 10 times.







Top Left: Standard pressure gauge with pulsation damper and flexible tubing.

Top Right: Internal workings of typical pressure gauge. Due to its curvature, the bourdon tube will not drain.

Left: Filling the gauge with an antifreeze solution and installation of a diaphragm protector (not shown), will make it freezeproof.

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POLYETHYLENE CULVERT USED FOR PIPELINE NEAR BOW ISLAND

In the January 1981 issue of The Water Hauler's Bulletin, Big 'O' Polyethylene Culverts were described as an alternative to corrugated steel culverts. Since that time several successful installations have been completed and some independent testing has been done.

One interesting application took place north of Bow Island on the Bow Island Grazing Reserve where a 300 mm diameter Big 'O' pipeline, approximately 500 m long, drops irrigation water about 60 m over the bank of the South Saskatchewan River to supply water to sprinklers on the river flat. The pipeline is on a very steep grade and follows the curvature of a natural draw. The Big 'O' polyethylene culvert was installed in 10 m lengths using spin-on couplers sealed with Kentseal on the inside and a butyl calk on the outside. The pipeline has a concrete inlet headwall and outlet tailwall, and a few intermediate cutoff collars. There is no evidence of any leakage.

The Big 'O' culverts have been enthusiastically endorsed by a number of provincial highways departments. For design purposes, a coefficient of n=0.024 can be used for the Manning Formula. Load and flexural testing has been conducted under normal and cold weather conditions and has yielded excellent results. The price is basically the same as that of 16 ga. corrugated steel pipe of the same size.

The Bow Island Grazing Reserve used Big 'O' Polyethylene pipe to drop irrigation water from top of river bank down to river flat where they sprinkler irrigate about 200 acres. The flexibility of the pipe made it easy to install around the bends. No leaks are evident on this very steep slope.

* * *

NEWS FROM APPLIED RESEARCH SECTION

The Applied Research Section of the Project Planning Branch, in cooperation with 6 Irrigation Districts is presently undertaking an internal study of several types of flexible pipes to determine deflection, siltation, cracking or any other problems that may have arisen since installation. The interior pipeline inspection is being done by pulling a closed-circuit T.V. camera through the pipelines and recording on video-tape any deviations from the norm.

The project is now at the tendering stage and the actual video inspection will be done after water shutoff, probably in early November.

Results of the video inspection will be published upon completion of the project and will be available on request.

* * *

Agrivision a co-production of CFAC Lethbridge Television and Alberta Agriculture will start its 7th season, on Tuesday, October 6, 1981 at 10:30 p.m. on channels 2 and 7. The hosts this year will be Len Ring, Irrigation Systems Engineer and Don Wentz, District Agriculturist. Some of the upcoming shows will feature:

Surface Irrigation Automation
City of Cranbrook Wastewater Irrigation
Irrigation Canal Liners
And a Variety of Other Irrigation and Agricultural Topics

Suggestions for additional topics are always welcome.

The Water Hauler's Bulletin is for you, the irrigation "water haulers" of Southern Alberta. Therefore, we want to print what you want to read. Please take a few minutes to reflect on the past year's articles and offer your comments. Your suggestions for future topics to be covered would be appreciated. Please clip and mail to the address on the reverse side. Thank you.

COMMENTS: _____

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TOPIC SUGGESTIONS: _____

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FLOW METERING SERVICE AVAILABLE TO IRRIGATION DISTRICTS

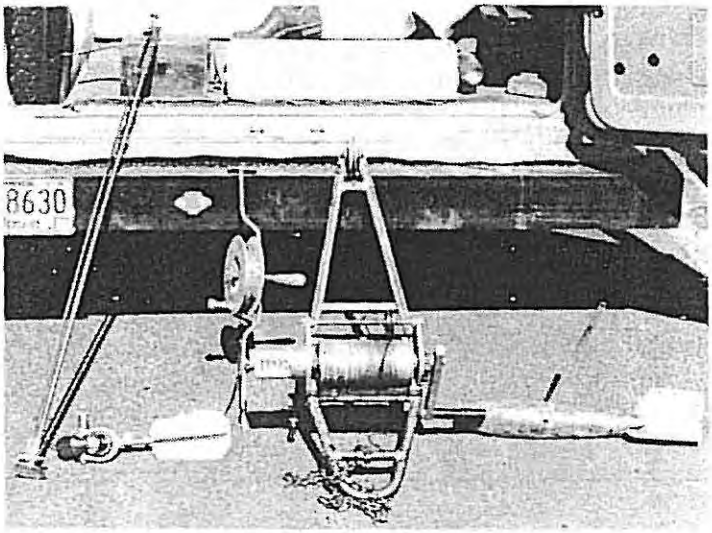
Since water is equally as important as land to grow crops, and since potentially irrigable land exists in far larger amounts than the available water supply, more emphasis is being put on management and the regulation of water flow used for irrigation in Southern Alberta. This has inspired many Irrigation Districts to better manage the water that their systems convey. One aid in accomplishing this goal is a flow metering program.

By using a flow metering program, the District can determine how much water the canals can carry and at what points there is a definite need for resizing or rehabilitation.

In 1980, a flow metering program was initiated by Alberta Agriculture, Irrigation Division, Project Planning Branch, to determine what the canal capacities were at key locations throughout a District. In the first year, the program started in only two Irrigation Districts and has now been expanded to include eight of the thirteen Districts.

The program was initiated to establish the present capacities of the canals as compared to the design capacities, but has now been expanded to provide such items as: calibration of structures; determination of seepage loss areas; and determination of the differences in flow conditions between poorly and well maintained distribution systems. (Essentially determination of Manning's roughness value "n".)

This is a relatively new program being offered to the Irrigation Districts by the Irrigation Division. It is hoped that this program will be expanded even more in the near future for the benefit of participating Irrigation Districts.



Some of the equipment used for flow metering: left to right: computing rod, flow meter, tag line, bridge frame and reel, and sounding weight.

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THE WATER HAULER'S BULLETIN

Designed to provide the operation and management personnel of Irrigation Districts with items of interest in their line of work. Comments are welcome. Please contact Roger Knibbs at 329-5164, Lethbridge.

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