the
WATER HAULER'S BULLETIN

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Escaping Water in Frozen Pipe Spillway Washes Out Backfill

The winter of 1995 / 96 will be remembered for years to come and especially by the staff of the Taber Irrigation District. Lateral E spillway pipeline became blocked in its lower end by ice building through freeze/thaw cycles causing water to begin exiting through a 100-mm diameter pipe vent. Water discharging from the vent pipe soon began eroding the backfill and granular material under the pipe which is on a 33% slope. Kent Bullock P. Eng., district manager, says the twelve-year-old spillway had never experienced any icing problems in past winters though they had allowed small amounts of drainage water to exit through the pipeline.

Arrow points to vent pipe which spewed water – eventually washing out Lateral E Spillway.

Headwalls remained in place thus preventing major damage.

Bullock believes the washout began as the bottom end of the pipeline began icing, eventually freezing solid, and water began backing up in the pipe reaching to a level where there was a four-metre head on the vent pipe. In winter, no regular inspections occur and it was probably sometime before it was reported. Because of the steep 33% slope, the pipeline was designed with a cut-off wall at every pipe joint. None of the cut-off walls collapsed but remained in place and held the pipe on grade. "This certainly prevented major damage" says Bullock.

Repairs began by sloping the dirt back so men and machines could safely begin placing and compacting the washed away material. Gravel was placed and compacted under and up to the spring line of the pipe. The remaining native material was compacted to the surface of the ground. Bullocks estimates repair costs to be around $4000.

To prevent the icing problem from occurring in future, Bullock plans to have water in the system diverted into a Ducks Unlimited impoundment. But just in case some water gets into the spillway he plans on having a cap installed on the vent pipe to prevent leakage.

A check on other spillway pipelines in the district revealed that Lateral 1B was experiencing the same type of problem. Luckily it was caught in time and little damage had been done.

For more information contact Kent Bullock, P. Eng., Manager, Taber Irrigation District, 4900D - 50 Street, Taber, Alberta, Canada T1G 1T3. Telephone (403) 223-2148. ■

Internet in Agriculture:Three Perspectives

Editor's Note: This is Part Two of a three-part series.

The EIDNet – On-Line and Growing

In September 1995, the Eastern Irrigation District (EID) launched its Internet Service, the EIDNet. At present the EIDNet has more than 380 irrigator, public and business clients and is the Internet Service Provider (ISP) for the Brooks Campus of the Medicine Hat College and the Grasslands Regional School Division, No. 6.

The EIDNet grew out of a need identified by the Eastern Irrigation District to make sure that EID irrigators have access to the best and most timely data possible for their farming operations. With the world agricultural markets becoming more global in nature, the EID felt that one of the best ways to provide timely information was to obtain Internet connections for its water users. After a short period of looking for an ISP to bulk price the service for the district, it became apparent that it would be cheaper and of more value to the community for the EID to become a direct Internet Service Provider. In meeting the main objective of dealing with agricultural issues for its water users, the EIDNet has been designed in a manner that provides the public, local businesses and others with affordable access to the Internet.

"The reaction from our water users to this project has been extremely positive," comments Jim Webber, manager of the EID. "At our local area farm meetings in early February the type of information that has been made available to our irrigators via the Internet was widely appreciated." The EIDNet Home Page (URL http://206.12.229.2/) has specific links to agricultural issues including everything from commodity prices to weather to crop and cattle research. In addition, it is a starting point for community members to access the overall World Wide Web and other features of the Internet.

The EIDNet's service is based on a high-speed data link to the Internet. Subscriptions to the service require a $25 sign-up fee (which provides the customer with all of the software needed to make the connection, a username, password and e-mail account). Memberships provide an hour of access to the Internet each day. The days or times not used are not allowed to be banked or accumulated. Individuals can stay on-line for as long as they like with any time in excess of one hour per day being billed out on overtime rate.

"Depending on the type of membership a person wants, the price per month ranges from $14.95 per month to $10.00 per month, and overtime costs can range between $0.75 per hour with the pre-purchase of a 500-hour overtime block to the standard $2.00-per-hour rate,"

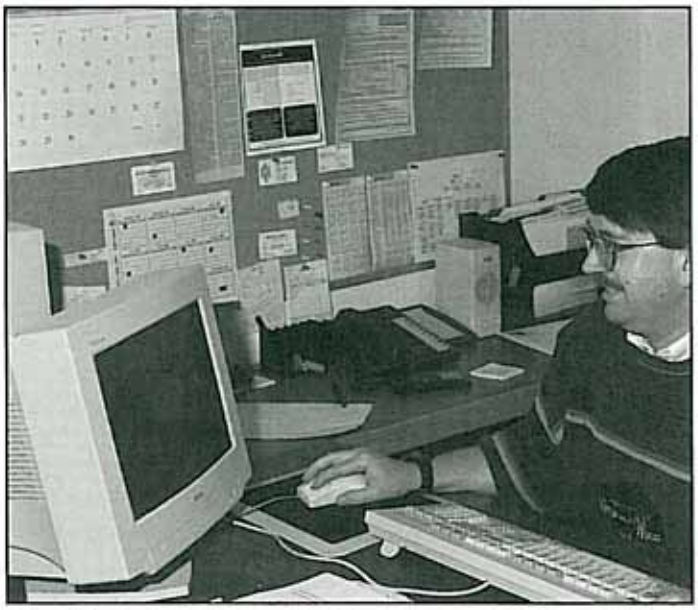
comments Dave Hill, one of those at the EID responsible for the Internet service. "We also wanted to make sure that the software was as easy to use as possible. As a result, all of our software is based on Windows' technology. If you have a computer running Windows' software and a modem with a speed of 14.4 kbps, you can get connected," says Hill.

In setting up its Internet service, the EID was not interested in getting into the computer hardware and technical support business. In order to handle that side of the Internet activity, the EIDNet entered into a partnership with a local computer service store, CNL Communication Networks Ltd. "At CNL we sell memberships to the EIDNet, and by having people come into our store, we make a contact for future sales," comments Darin Crapo, president of CNL. "Having Internet access in the community was important, so we saw our role as complimenting that of the EID, they provide the connection, we provide the bulk of the technical support, some free, and some of a fee for service basis. And we also sell Internet-ready computers that are pre-configured for the EIDNet, so there is also money in it for us."

The EIDNet also has a Web Site Server to host pages on the World Wide Web. This makes it possible for irrigators and local businesses to advertise their expertise, goods and services to a global audience. One of the upcoming initiatives under development is an Internet version of the radio station "trade-e-o" programs. "In the next month or so the EIDNet will add a new feature that will allow our water users to advertise crops, equipment or anything else they want to sell or buy on a trade-e-o page. The service will have a nominal fee attached, but it will allow for a much broader sales audience," says Mark Porter. Porter is the EID's resident WebPage designer amongst his other duties. "Having the ability to host Web Sites takes the EIDNet from simply being an access provider to a full Internet Presence Provider. Our server is currently hosting pages for the EID, the Brooks Campus of the Medicine Hat College, the Brooks Savings and Credit Union, and a growing number of small businesses and community oriented groups."

In looking at the future of the EIDNet, Hill says, "Our initial estimates were that the EIDNet would have about 250 customers at the end of its first nine months of activity. We passed that number at four months. What we are now experiencing is the rapid growth in the use of a new technology that is really in its infancy. The Internet though, does break-down distance barriers, and for those who take the time to make it work for them, there is likely to be a competitive advantage in being connected. We are now expecting to be around the 500 customer level at the end of nine months, and we expect that it will continue to grow."

"The Internet is another tool that districts can use to communicate with their water users, as well as to make information available to the public. In this era where public concerns are gaining more importance, the Internet provides organizations, like irrigation districts, with another opportunity to get their information out," says Jim Webber.



Dave Hill checks out data on EIDNet.

"It is our challenge to make use of the Internet to add to the flexibility and economic stability of our water users, while at the same time promoting the wide range of benefits that come from water management in southern Alberta."

The EIDNet expects its service to continue to evolve. This evolution will require a partnership approach. Already the EIDNet has added the Brooks Savings & Credit Union to its partners list. The Credit Union acts as a subscription agent for the EIDNet for its members, provides for some cost savings on accounts and collects monthly fees on behalf of the EIDNet. In the future, partnerships with local businesses and the Chamber of Commerce will be developed to provide further public access to the Internet as well as to promote the Lake Newell Region on a global basis.

"The Internet today is much like the first colour televisions, a new model is available each month. We will have to make sure that we keep up to these changes so that our water users can PROFIT from their connections," comments Hill. "It is bound to be an interesting voyage."

For more information please contact David Hill, Eastern Irrigation District, Water Resource Policy & Planning EIDNet, P.O. Bag 8, 550 Industrial Road, Brooks, Alberta, Canada T1R 1B2.
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Taking on Risk

It's a blistering hot day in the middle of July in the year 2031. It's the driest summer on record since 1988 and the second year in a row where snow pack in the mountains is well below normal. Irrigation in southern Alberta now services 1.7 million acres. High value speciality crops now account for 25% of the area irrigated. The majority of farmers are running their irrigation systems at peak capacity and canal delivery systems are charged to full supply level. The maximum allowable diversion is being made from the rivers while still maintaining IFN requirements. Water masters and ditchriders have been able to meet delivery with few relatively minor concerns. "Is this fiction or a feasible scenario anticipated in a long-term planning process developed in the previous century?" questions Clarence Vos, water management specialist, irrigation branch.

The Year 2000 Review of Water Allocation in the South Saskatchewan River Basin will be instrumental in determining a viable scenario for a reliable water supply. Although some would argue any shortage of water should be avoided, economic reality suggests that irrigation distribution systems and on-farm irrigation systems are sized and designed to provide water for the majority of situations encountered. Minor deficits, resulting in some inconveniences to water users, may occur with some frequency while major deficits, such as in the case of extreme weather conditions, will hopefully occur with low frequency.

"A term that eventually comes up in discussions regarding the Year 2000 Review of Water Allocation is 'Risk,'" states Vos. Ultimately the results of the review will be dependent on assessing the risk involved in various levels of development and the water allocation associated with each.

This assessment begins by defining the types of risk and identifying an acceptable level of risk each individual or group with an active interest in the water basin will assume. The type of risk that is involved can be examined in various categories which could include agro-climatic, agronomic, hydrological, financial and socio-economic.

Historical meteorological data sets available for the region can be used to predict annual crop water use requirements. By comparing potential water use with precipitation data for the same periods, total irrigation requirements and the timing of irrigation needs can be modelled. From this information district water requirements are calculated and any anticipated deficits in hydrological water supply can be examined. This method of risk analysis can be used to estimate the frequency and severity of water supply deficits using actual recorded weather data.

Another category of risk to consider is the predicted effect water supply deficits will have from an agronomic perspective. Small deficits may have minimal impact on crop production or yield. If the available soil moisture capacity of the soil has been maintained prior to a deficit of 0 - 75 mm, it may result in relatively little impact on crop yield. When larger water supply deficits are anticipated timing plays a major part in the effect on crop production. As an example, a water supply deficit which occurs in the latter part of the irrigation season may have minimal effect on the yield of cereal crops but major impact on the yield of forage crops.

Reduction in yield has a direct financial impact on return to the producer. If a deficit can be anticipated some input costs can be reduced. Depending on the crops grown and commodity price history, some producers may be willing to accept different levels of risk if additional areas can be irrigated.

When crop water requirements for the future are being considered, the analysis of risk should include possible crop mixes, the introduction of new crops, fluctuation in market demand for existing crops, fluctuations in commodity prices and changes in irrigation management patterns. Some areas within a district may see increased demand for water while others may decrease their total irrigation requirements.

"In conclusion" says Vos "a major objective in analysing risk is to avoid pitting the requirements of one producer, district or use against another by anticipating future needs and requirements and providing for them. By determining the risk involved in the development of a number of water allocation scenarios, a tool for making informed decisions will be made available. It will then be a task for the water users, district boards and their management, together with the applicable regulatory authorities to arrive at appropriate water allocation decisions."

For more information regarding the ongoing work in this area, please contact Clarence Vos, Water Management Specialist, Irrigation Branch, Alberta Agriculture, Food and Rural Development, Agriculture Centre, Lethbridge, Alberta, Canada T1J 4C7. Telephone (403) 381-5871. ■

A Date to Set Aside

The Annual Technical Conference for irrigation district management and engineering staff will be held on June 21, 1996 at Ericksen's Family Restaurant. The Alberta Irrigation Projects Association and Alberta Agriculture, Food and Rural Development are co-sponsors. Persons wanting to make a presentation should contact J. Ganesh, P. Eng. at telephone (403) 381-5869. ■

Salinity Mapping and GIS Development

Soil salinity is one of the major soil degradation problems on the Canadian prairies. In Alberta, it is estimated that 1.6 million acres (647,485 ha) of cropland is affected by salinization with an average yield reduction of 25%.

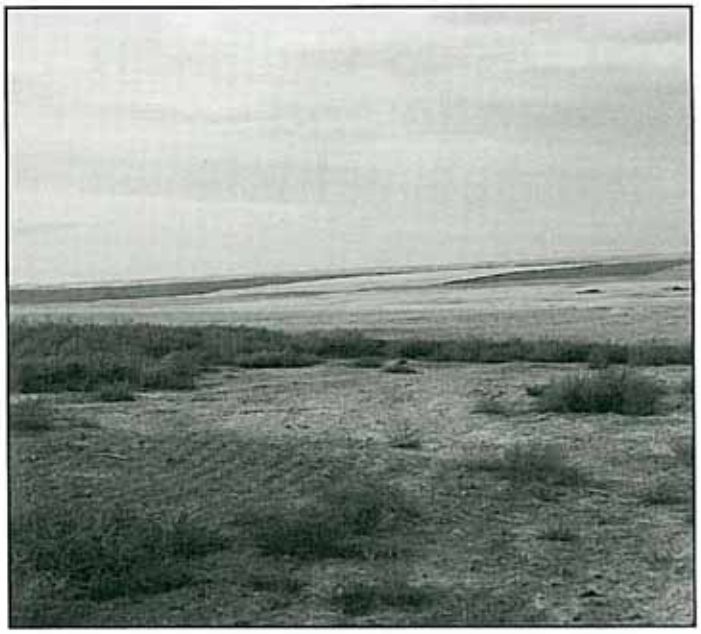
A procedure for mapping salinity on a landscape basis was developed by the conservation and development branch of Alberta Agriculture, Food and Rural Development (AAFRD). The process involves the scanning of aerial photos into a base map format and then digitizing the salinity data onto the base map. The result is the development of a thematic layer to load into a Geographic Information System (GIS). This GIS is an inventory of the acres or hectares salinized as well as the number and types of salinity seeps. The categorization of saline seeps increases the success of management recommendations for control and reclamation.

The saline areas visible on aerial photographs are categorized into six dryland and two irrigation types. The dryland types include primary and secondary salinity. Primary salinity is considered any area that is naturally saline. These include areas like depression and coulee bottom and in some cases artesian salinity. Secondary salinity is the result of farming or cultural practices and include contact and slope change, outcrop and slough ring salinity. Secondary salinity can be controlled with a change in farming practices in most cases. This often includes the planting of a deep rooted perennial crop, like alfalfa, to control groundwater and thus reduce saline seepage. Primary salinity results from natural conditions and cannot easily be controlled or reclaimed.

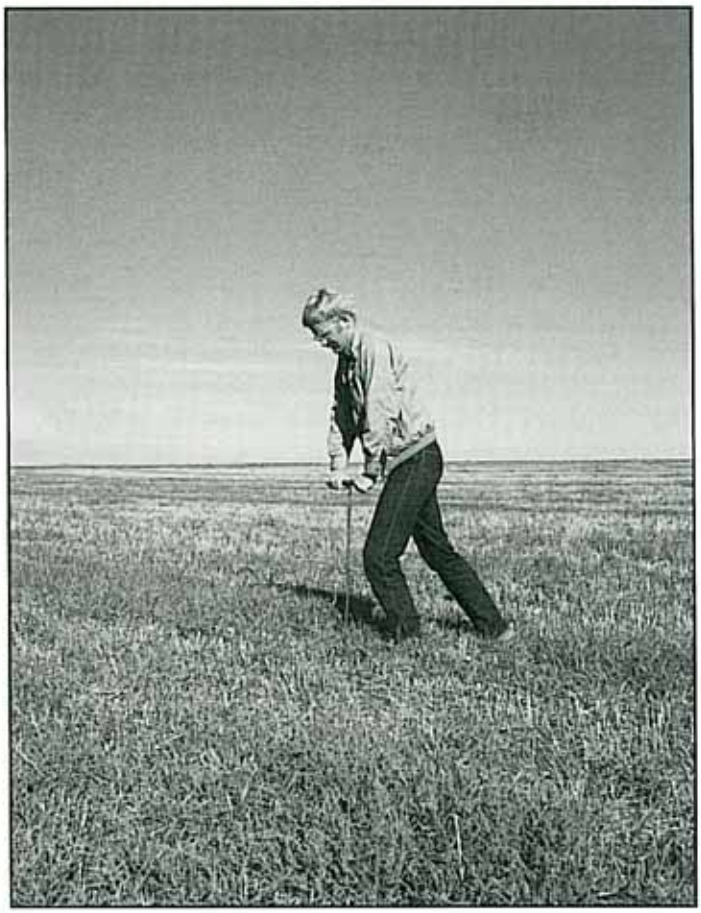
This GIS project was initiated in 1993 and has been cost shared with the municipality being mapped, Canada-Alberta Environmentally Sustainable Agriculture (CAESA) and AAFRD. To date there are nine counties, municipal districts or irrigation districts completed. Each year, an additional four new project areas are completed. This year the project areas include the Blood Indian Reserve which is being cost shared with Prairie Farm Rehabilitation Administration (PFRA).

This mapping technology has also been extended to the INTERNET (http://www.agric.gov.ab.ca/soil/salinity/). The home page on the INTERNET has attracted global attention. There are almost 1000 contacts a month from around the world. The USA has made 47% of these contacts. The other major contacts were made from Australia, Japan, France and Belgium. Areas that also have salinity problems such as Turkey, Israel and New Zealand have also contacted this home page on the INTERNET.

For more information on controlling dryland soil salinity contact Don Wentz, Soil Salinity Specialist, Conservation and Development Branch, Alberta Agriculture, Food and Rural Development, Agriculture Centre, Lethbridge, Alberta, Canada T1J 4C7. Telephone (403) 381-5153. ■



Annual crops do not germinate in highly saline soils.



Jim Pittman probing a contact slaine seep with Dr. Brown moisture probe.

EID Drops Collision Coverage and Changes Vehicle Colour

The Board of Directors of the Eastern Irrigation District, after reviewing its insurance policy, has decided to drop its collision coverage on seventy of its smaller vehicles (half tons, etc.). The decision was made, says Earl Wilson, P. Eng. assistant manager, for two reasons. One, there was a substantial cost savings (Wilson estimates that the district could purchase one and one-half vehicles a year just from the premiums paid out to insurance companies for collision coverage). Second, damaged vehicles are repaired in-house.

Wilson estimates that between eight to ten vehicles will be repaired and painted each winter in their Bassano body shop. The repair work will be done by a ditchrider who has had a lot of training in auto body repair. A couple more ditchriders are learning the trade as they work in the body shop in the off-season.

In addition to the insurance change, the EID decided to change its vehicle colour from metallic blue to white. "The decision" says Wilson "was made because it's much cheaper and easier to match paint on a white vehicle than a coloured one. The cost of white paint is one sixth the cost of other metallics. A damaged fender on a white vehicle can be matched without having to repaint the whole vehicle." Along with the white colour comes a new blue-green decal that is visible from much farther distances.

For more information please contact Earl Wilson, P. Eng., Assistant Manager, Eastern Irrigation District, P.O. Bag 8, 550 Industrial Road, Brooks, Alberta, Canada T1R 1B2. Telephone (403) 362-1400 or Fax (403) 362-6206. ■

Note: New EID decal on white truck.

LAMD: A Geographic Information System for Manure Management Planning in the County of Lethbridge

The County of Lethbridge has the highest density of intensive livestock feeding operations (ILO's) in Alberta. The Lethbridge Northern Irrigation District (LNID) portion of the county has a particularly high density of ILO's. This area is ideally suited to the intensive livestock industry due to availability of water from the irrigation district, abundant feed supplies, proximity to markets and processing facilities, and a favorable climate. Rod Bennett, head of the resource conservation section, irrigation branch, recently reported that rapid expansion of the cattle-feeding industry during the past few years, and the high density of sizeable operations, has increased concern about the availability of land for manure disposal in this area. Overloading of land with manure may lead to nitrate contamination of groundwater, making the water unfit for human or livestock consumption.

The computer and mapping services unit, working in cooperation with agencies involved in the ILO development approval process, recently completed a geographic information system (GIS) application [Land Availability for Manure Disposal (LAMD)]. LAMD was developed to determine the extent of cultivated land near ILO's that is available for manure disposal and to assess the potential for further expansion of the livestock feeding industry within the study area, explains Echo McCarley, unit leader. This pilot project was conducted to demonstrate use of GIS technology in planning further expansion of the livestock feeding industry and to facilitate compliance with the Alberta Environmental Protection and Enhancement Act of 1993.

Three types of computer software were used to develop LAMD, namely Spatialist, AutoCAD and R:Base. Attribute data from 1994, consisting of parcel identification numbers, land ownership, cultivated acreages, ILO types and animal numbers, were stored in R:Base. Manure production and nutrient content estimates were computed in R:Base using conversion factors from the 1995 code of practice for handling of animal manures. AutoCAD and Spatialist were used to display polygons (parcels of land) and point objects (ILO's) spatially in real world coordinates. LAMD was used to depict the location of parcels containing irrigated and dryland cultivated areas, the location and attributes of each ILO, and the location of all owned, cultivated land associated with each ILO or combination thereof. The amount of cultivated land available

for manure disposal and the rate of manure and nutrients required for utilization on cultivated land within the owned land of each operation (or combination of operations) were also determined. Bennett and McCarley emphasize that results indicate the potential for nutrient loading on land owned by ILO's. The actual situation may be considerably different, depending on a host of management factors.

A total of 258 livestock feeding operations were identified within the study area. These feeding operations included: 116 beef cattle feedlots, 62 dairies, 17 poultry-feeding facilities and 63 hog-feeding operations. The capacity of feeding facilities was estimated at: 323,260 head in beef feedlots, 12,660 head in dairies (about 6300 milking cows), 528,000 birds in poultry housing, 7245 sows in farrow to wean and farrow to finish hog operations, with 10,050 feeder pigs also under confinement. About 55,500 ha (78 percent) of the 70,800 ha of land within the study area is presently cultivated for agricultural production. Nearly 45,800 ha are used for irrigated agriculture (65 percent of the total area) and the other 9700 ha are in dryland agricultural production (13 percent of the area). A total of 28,900 ha of cultivated land is owned by ILO's. This land base comprises 52 percent of the cultivated area and 41 percent of the total study area. About one third of the total cultivated area owned by ILO's is used for manure disposal by more than one type of ILO.

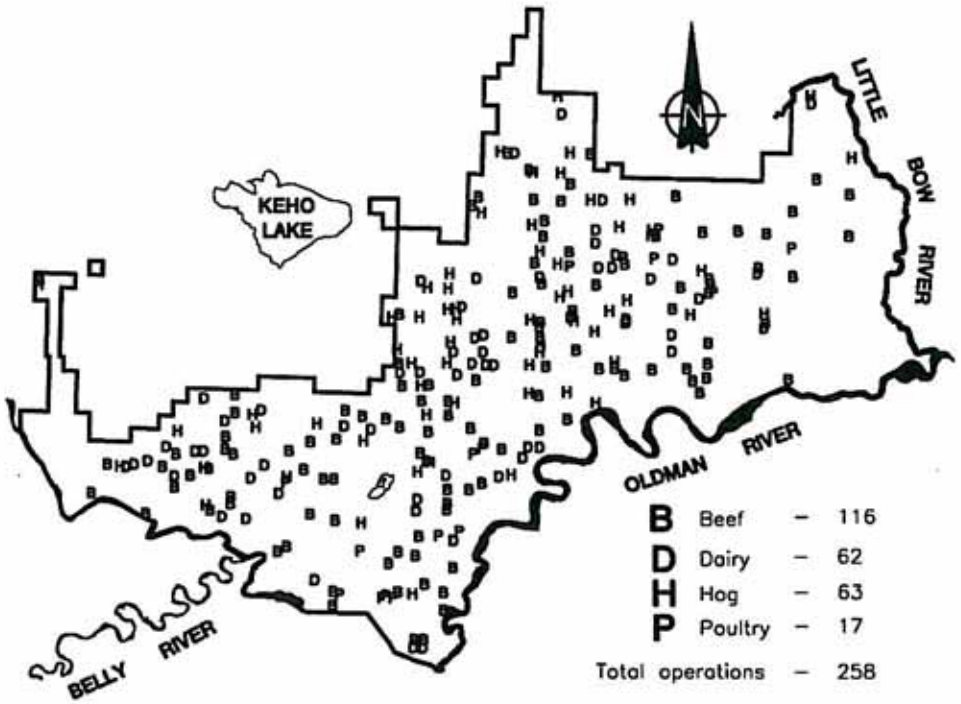
The total amount of manure potentially produced annually from all of the ILO's in the study area was estimated at 1,058,000 Mg (tonnes), including about 685,000 Mg of solid manure from beef cattle and poultry operations, and 373,000 Mg of liquid manure from dairy and hog operations.

Estimated nutrient content of manure was 2475 Mg of crop available nitrogen (nitrogen available to the crop the year of application) and 4730 Mg of total phosphorus (phosphate equivalent) on a wet weight basis.

Using the LAMD GIS for analysis, Bennett and McCarley concluded that about one third of the 258 ILO's in the study area have sufficient land for repeated, annual application of manure at a rate of 20 to 30 Mg ha^{-1}, an agronomic and environmentally responsible rate based on crop nitrogen requirements. The total amount of cultivated land in the entire study area may be insufficient for agronomic utilization of all the nitrogen contained in the manure potentially produced by existing ILO's. Manure application rates based on crop phosphorus requirements would increase the amount of land needed by at least 50 percent. Further expansion of the livestock feeding industry in the study area may be severely limited by the scarcity of cultivated land available for manure disposal.

Further development of the LAMD GIS for the entire County of Lethbridge was recently taken on by Agriculture and Agri-Food Canada (research branch and PFRA). Plans for enhancement of the LAMD GIS include addition of land resource and digital elevation data to permit environmental risk analyses as part of the planning process.

For further information, please contact Rod Bennett or Echo McCarley, Irrigation Branch, Alberta Agriculture, Food and Rural Development, Agriculture Centre, Lethbridge, Alberta, Canada T1J 4C7. Telephone (403) 381-5515. ■



Livstock feeding operations in the LNID portion of the County of Lethbridge.

Irrigation Secretariat Manager Appointed

Ray Bassett, assistant deputy minister with Alberta Agriculture, Food and Rural Development, has announced the appointment of Len Ring as the incoming manager of the Irrigation Secretariat, headquartered in Lethbridge. Mr. Ring assumes the position to be vacated by Larry Spiess who will be retiring from the department effective April 30, 1996. The Irrigation Secretariat provides the secretarial, administrative, technical and management services for Irrigation Council to perform its duties under the Irrigation Act. The Irrigation Council is an appointed body which advises the minister on irrigation policy and programs in the province, administers the cost-sharing programs and generally oversees irrigation district activities.

Len Ring

Larry has been acting manager since January of 1995 and leaves AAFRD after 30 years of service to agriculture in Alberta in the capacities of irrigation specialist in Brooks and irrigation systems specialist, section head, branch head and his present in Lethbridge.

Over the past 30 years, Larry has been part of and seen phenomenal change in irrigation in Alberta. When he started in Brooks, few farmers irrigated using sprinklers, the irrigation infrastructure was in serious need of repair; there were no lined canals or pipelines in the EID. Today, as he passes the baton to Len, he says "Irrigation has evolved in terms of maturity from an adolescent to adult. I've enjoyed all facets of my career because of the dedicated staff, an industry that demands progress and farmers that are genuine."

Larry Spiess

Mr. Ring is a native Albertan, born in Calgary and raised in High River, and brings a wide variety of irrigation experience to the position. He holds a B.Sc. from the University of Saskatchewan and a M.Sc. from Colorado State University, both in agricultural engineering. Len is not new to the department as he was employed from 1970 to 1984 as irrigation engineer, hydrologist, irrigation specialist and irrigation systems engineer in Taber and Lethbridge. Since 1984 Mr. Ring has been the coordinator of the Irrigation Technology program at the Lethbridge Community College.

Len is active in many professional and technical organizations and in 1991 the Irrigation Association of Fairfax, Virginia awarded him the Crawford Reid Award for "significant achievements in promoting proper irrigation techniques and in fostering major advancements in the irrigation industry outside the United States." He is also a past chairman of the Lethbridge branch of the Association of Professional Engineers, Geologists and Geophysicists of Alberta.

"I am very excited about taking on this new challenge," said Ring. "I look forward to renewing my association with the irrigation districts and Alberta Agriculture staff. Alberta is a recognized leader in irrigation and I know that by working together we can all further develop the irrigation industry in an effective and efficient manner." ■

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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 Duncan Lloyd, editor, at Area Code (403) 381-5539, Lethbridge.

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