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1979/80

PFRA

PRAIRIE
FARM
REHABILITATION
ADMINISTRATION

ANNUAL
REPORT
1979-
1980



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of Canada

Gouvernement
du Canada

Regional
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THE BITTER WIND

THE BURNED EARTH AND

RAINLESS SKY

THIS IS THE SOURCE

PFRA

PRAIRIE

FARM

REHABILITATION

ADMINISTRATION

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**THE BITTER WIND
THE PARCHED EARTH AND
RAINLESS SKY**

THIS IS THE SOURCE

Olaf Field said:

When I went to the barber in Swift Current in the summer of 1937 to get a haircut and a shave he said the haircut was okay but he had to quit shaving people. I asked how come and he said he couldn't keep an edge on his razor any more. With the terrible dust and shortage of water, he said sharp particles of sand got imbedded in the skin, or stuck to the surface somehow. Despite the extra honing he gave his razors, a couple of strokes down the side of a customer's face took off the edge completely. Either he had to keep honing after each stroke or two, or the customers got mad. So I settled for a haircut.

James H. Gray, *Men Against the Desert*

PFRA Organization Chart

March 1980

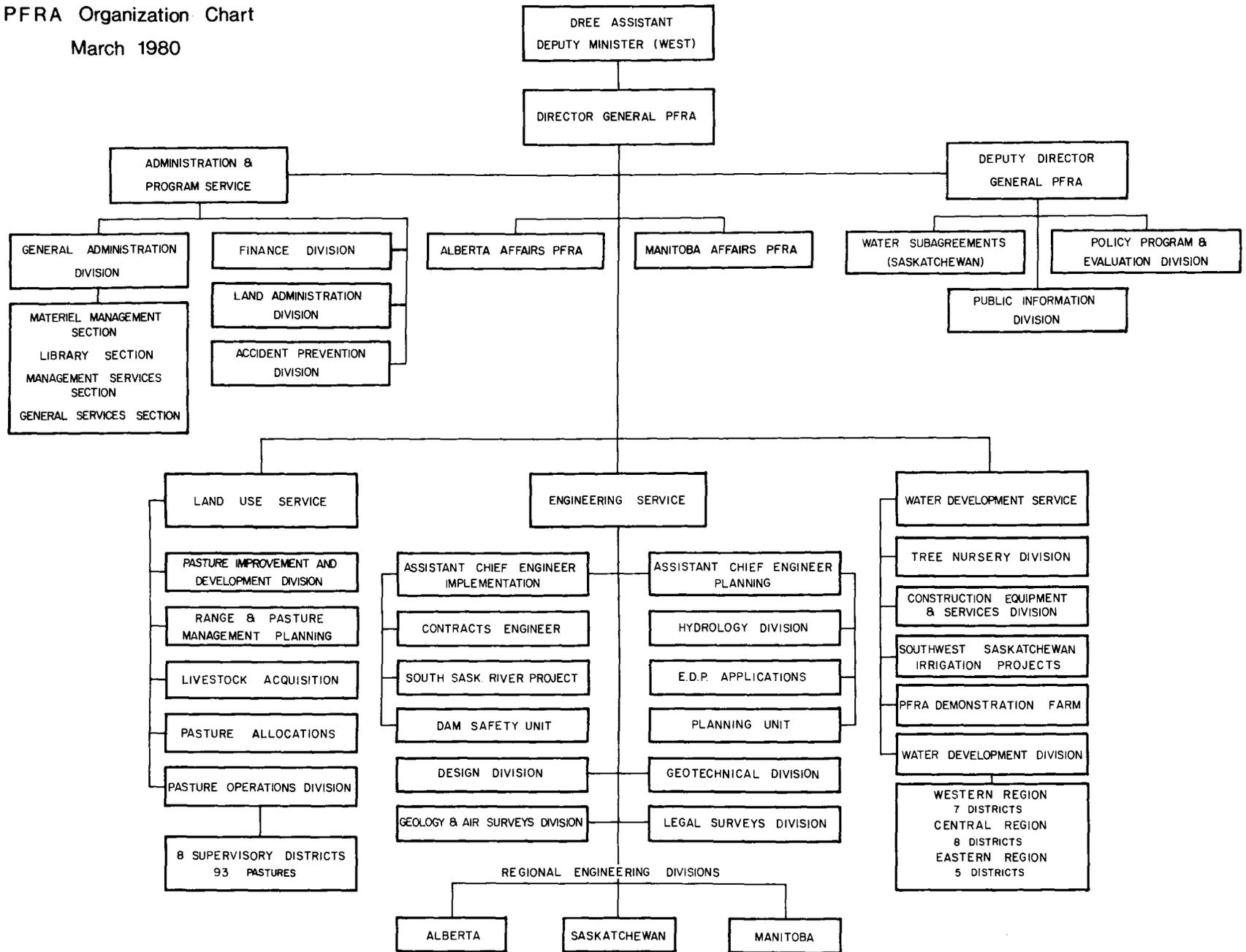


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INTRODUCTORY NOTES

The year under review was a period of transition in that old PFRA programs were being assessed and new directions explored to better respond to the requirements of today's prairie economy and society.

The western drought crisis of 1977 could reappear with little warning, and while weather conditions in 1978 and 1979 were generally benign, a sense of unease prevailed. It was clear that the consequences of severe drought, which has regularly occurred throughout the region, are not understood in terms of our present-day society with its increased water consumption and diversified economic base.

PFRA attention was directed toward the search for new directions in terms of drought proofing studies, technical changes to programs, and more effective cooperative arrangements with various interest groups.

Similarly, detailed in-house program evaluations and exercises in performance measurement suggested changes in program content and organization. This action was in response to the relatively static situation which had prevailed in PFRA over the past several years.

Encouraging results came from most of these endeavours. We look ahead to 1980-81 as a period of program revitalization and reaction to the changing needs of individual program clients, and of the prairie region as a whole, which must be viewed as an increasingly important economic and social segment of the nation.

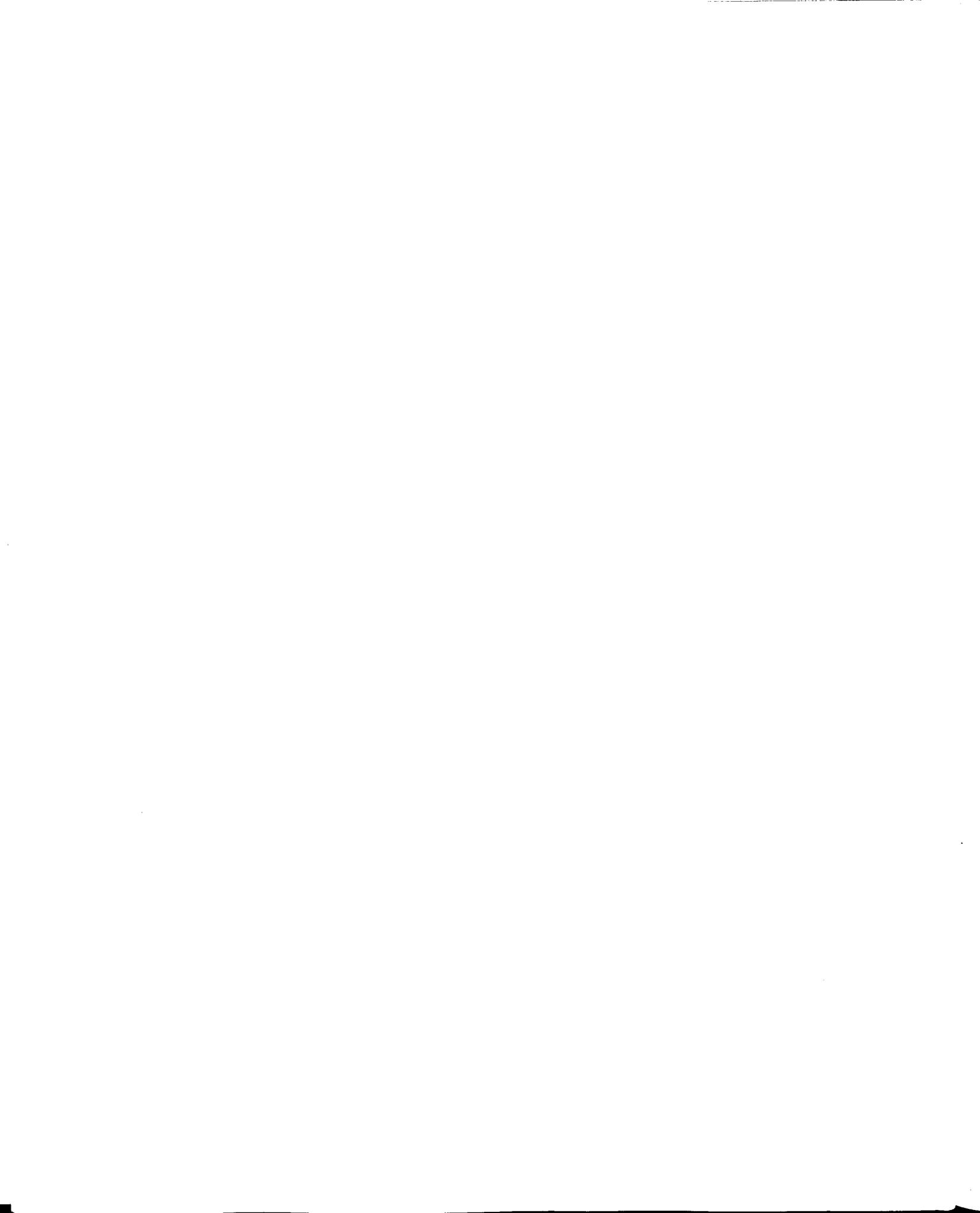
Harry M. Hill
Director General, PFRA



HIGHLIGHTS OF THE YEAR

While 1979 operations proceeded in a near-normal manner, with direct-delivery and cost-shared programs generally meeting targeted goals, a number of activities and developments should be mentioned as highlights:

- Treasury Board accepted the recommendations made in a major community pasture study that costs associated with the provision of pasture grazing be fully recovered from patrons, while costs related to the conservation of the land resource be borne by the government. The first calculations of pasture fees on this basis were made during the year.
- An interim subsidiary agreement on water development for regional economic expansion and drought proofing was signed with the Province of Saskatchewan, and a similar agreement with Manitoba is expected to be ratified in 1980-81.
- Two major program evaluation studies were completed; three others are under way. A number of analytical reports on specific subjects were prepared, and a performance measurement system was formally introduced for the agency as a whole.
- Detailed proposals were prepared to reorganize components of PFRA to establish a Soil and Water Conservation Branch and an amalgamated Construction Service. Implementation is scheduled for 1980.
- Expenditures for the 1979-80 fiscal year totalled \$27 783 000 (not including loans of \$2 050 000 under the Agricultural Service Centres Program), a decrease of 14 per cent over the previous year. This decrease results from the winding down of some programs and a period of spending restraint introduced as part of government policy. Over the same period, person-year utilization declined from 883 to 829. Conversely, program revenues increased by 20 per cent to \$8 720 000 for 1979-80, largely because of increased interest payments on loans under the Agricultural Service Centres Program. (See Appendix I for details of expenditures and revenues.)



LAND USE PROGRAM

The prairie drought of the 1930s brought unprecedented soil drifting and land utilization problems which in 1937 gave rise to a PFRA program to stabilize and rehabilitate lands sub-marginal for cereal production. The Community Pasture Program which evolved, now centres on conserving national land resources, providing supplementary grazing to farmers, improving the quality of beef cattle, and stabilizing western beef herds. Grazing privileges are allocated to benefit smaller producers and are scaled in proportion to each individual's owned, leased, or rented land resource.

Pasture Operations

Operations in 1979-80 involved 93 pastures on 939 500 ha. (Figure 1 shows the location of community pastures; details of the development and operation of community pastures are shown in Appendix II.) Much of this land was available under agreement with the provinces of Saskatchewan and Manitoba, with the remainder under federal ownership. Five thousand patrons pastured 250 000 animals, which generated program revenue of \$5 170 000, compared to 5 200 patrons, 242 500 animals, and \$4 930 000 in revenue for the previous year.

At the end of the 1979 season, four pastures which were operated on Indian reserves were returned to the Indian bands by mutual consent, leaving only two Indian reserve pastures as part of the ongoing Community Pasture Program.

Operating conditions for the year were generally favourable, with good grass cover and water supply, and near-normal weather conditions prevailing. Animal allocations based on stocking rates were met at all pastures.

Responding to policy requirements, a detailed review was made by PFRA management to establish a more formal means to assess and allocate capital and operating costs of the program.

This study, which undertook a detailed analysis of costs related to objectives, recommended that costs associated with the conservation of the land resource be borne by the government, while costs associated with the provision of grazing be accepted by the program patrons. Approval of these recommendations was given in April 1979, and fees for the 1980 grazing season, which are to be substantially increased, were established on this basis.

Fees for 1979 remained the same as for 1978, except for the municipal tax levy, which was doubled to two cents effective April 1, 1979. The last rate increase was April 1, 1977. Fees for 1979 were:

Cattle	head/day	\$0.13	(includes 2¢ municipal levy)
Calves	head/season	\$5.50	
Horses	head/day	\$0.16	(includes 2¢ municipal levy)
Colts	head/season	\$6.50	
Breeding Fee		\$13.00	per cow placed in breeding field

The resolution of Indian land entitlements in Saskatchewan, and how these might be realized, continued to focus on the possibility of PFRA pastures forming part of the settlement arrangements. Six pastures were initially identified as of interest to the Indian bands. Several public meetings were held to consider this and other settlement options. The matter is subject to review by involved parties.

Pasture Improvement and Development

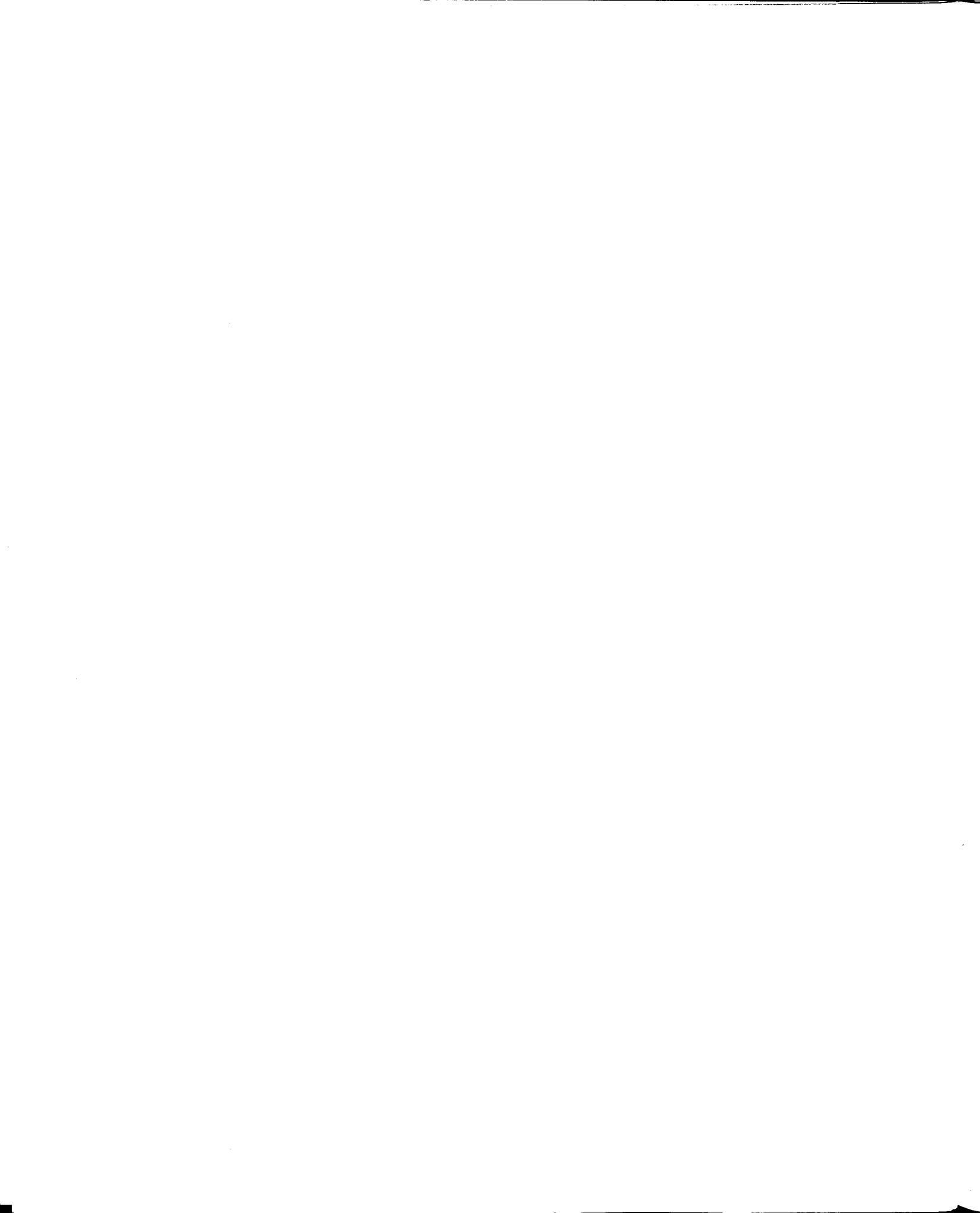
The size and diversity of the PFRA pasture resource requires significant ongoing improvement and development of facilities. In the year under review, attention was particularly directed to a basic program of servicing existing

operations. Water resources in west central Saskatchewan were given special attention, both in establishing new sources and improving those already available. In brush control, burning received precedence over spraying, primarily because of cost factors.

The representative statistics listed below indicate the phasing out in 1978 of an intensive upgrading program and a return to more basic service activities.

	<u>1978</u>	<u>1979</u>
Land Clearing	870 ha	270 ha
Weed and		
Brush Control	14 075 ha	8 084 ha
New Wells	19	13
New Dugouts	41	29
Installation of Steel		
Troughs	153	40
Fence Construction	171 km	70 km
Fence Rebuilding	197 km	203 km
House Renovations (Manager)	5	8

With decreased activity and an increase in mechanization, staff economies, particularly in the use of casual labour, were implemented. In planning and investigations no additional pasture expansion was contemplated. Considerable time was devoted to office studies on new organization structures, consolidation of related internal services, and performance measurement. The PFRA Construction, Equipment and Services Division continued to provide support in such areas as trucking, trade services, and road maintenance.



WATER DEVELOPMENT PROGRAM

Complementary to the PFRA Land Use Program, the basic concepts of conserving and storing water on the drought-prone prairies have found their expression in several undertakings and activities collectively called the "Water Development Program". Included under this heading are individual farm and small community projects, irrigation developments, tree distribution, demonstration work, and associated activities. Water-related undertakings involving large projects or major agreements are found under other headings in this report.

The Water Development Program affects all areas of the prairies and has provided financial and technical assistance to more than 100 000 farm enterprises and 1 400 small communities since its inception over 40 years ago. March 31, 1980 marked the completion of 157 752 individual, community and neighbour projects, with direct financial assistance from PFRA totalling \$41 245 000. (Appendix III lists the services provided under the program during 1979-80; Appendix IV shows the number of projects and the amounts of financial assistance paid during the same period.)

On-Farm Activities

Near-normal weather conditions prevailed across the prairies in 1979, and most existing on-farm water projects were successfully recharged. Program activity, managed from 20 water development offices (see Figure 2 for locations), was approximately the same as in the preceding year, as Table 1 indicates.

As an adjunct to regular activities, water development officers provided on-the-spot drought surveillance information by monitoring and reporting on on-farm and small community water supplies.

Figure 2

PFRA Water Development Offices

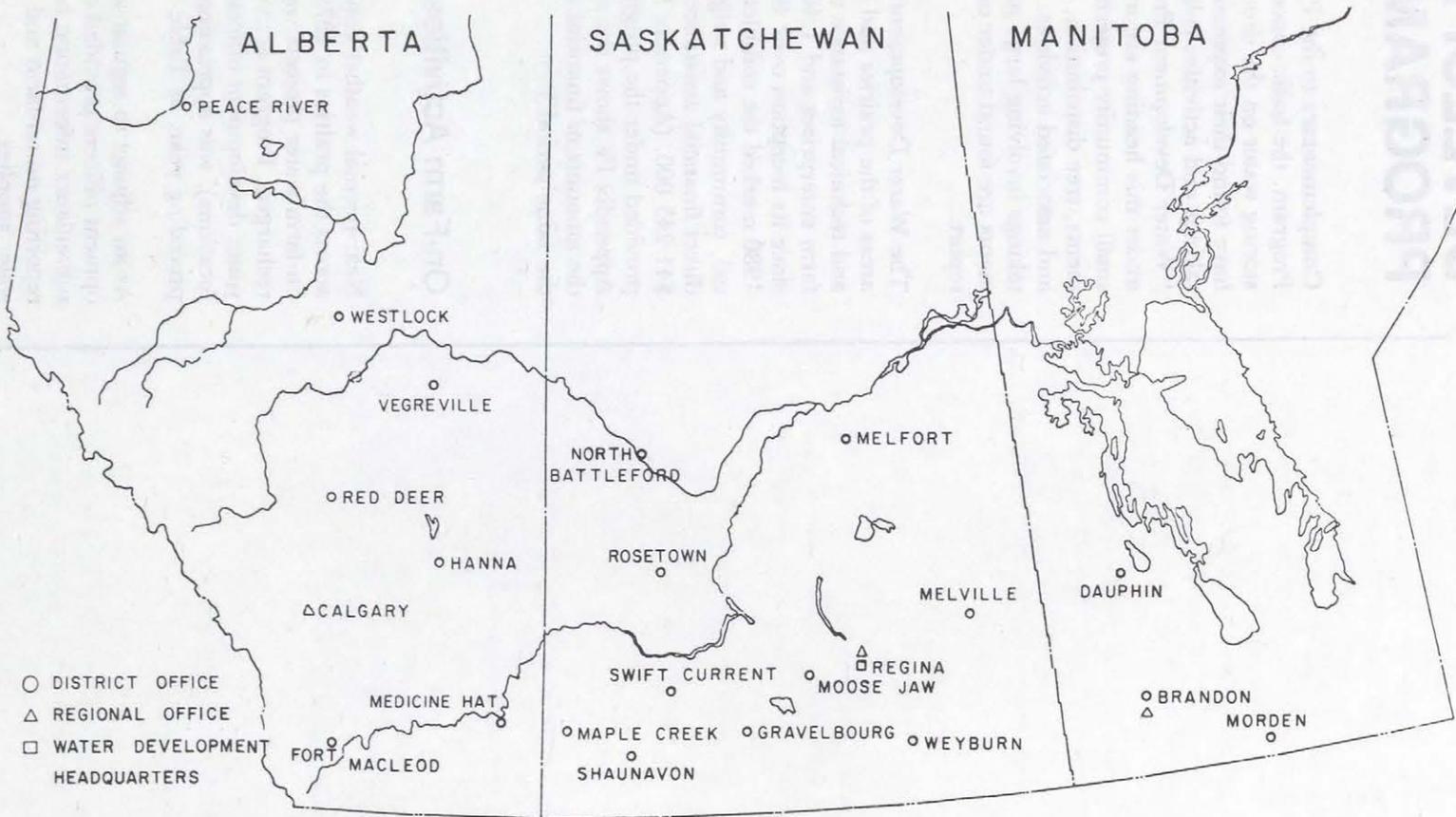


Table 1
Comparison of On-Farm Activities: 1978-79 and 1979-80

	1978-79		1979-80	
	Number of Projects	PFRA Contribution	Number of Projects	PFRA Contribution
Dugouts	958	\$ 327 725	1 075	\$ 373 272
Stockwater Dams	115	40 023	69	25 381
Irrigation	150	85 680	103	58 825
Wells	4 425	1 748 014	4 588	1 784 691
Total	5 648	\$2 201 442	5 835	\$2 242 169

A significant undertaking during the year involved the "On-Farm Contribution Evaluation Study", which generally reviewed the amount of the federal financial contribution and the technical assistance provided in relation to size and number of projects. Recommendations for program changes based on the results of this review were being considered at year end. Attention was also given to relevant sections of a major review of programs and the structure of PFRA, and to performance measurement.

Community Projects

This program, which provides financial and technical assistance to villages, hamlets, and rural municipalities for the storage of surface water, was not as active in 1979 as in previous years. Twenty-five detailed investigations were carried out and five projects were completed, compared to 34 investigations and 10 completions in 1978. Some reasons for this reduction include the 1978 backlog of work from the 1977 drought year, federal spending restraints in 1979, and program parameters which limit the water source to surface water supply. Removing that requirement is now under review, and program indicators for 1980 are encouraging. Over 1 400 projects have been completed since the inception of the program.

Southwest Saskatchewan Irrigation Projects

PFRA operates 23 water storage and six irrigation projects in southwest Saskatchewan. These works primarily provide for the production of forage crops on irrigated plots and thus permit diversification to livestock in the local dryland agricultural economy.

River control, recreation and wildlife conservation interests, urban water supply, and release of water to the United States under international treaty are also served by the storage works.

In 1979, the natural runoff of the streams in the system was well above average and all water requirements were fully met. Although the flow delivered across the International Boundary was at times deficient during the irrigation season, the deficiency was soon refunded by subsequent deliveries. The international allocation to the United States in 1979 was 135 400 cubic decametres (109 700 acre-feet).

Water was provided for the irrigation of 17 650 ha in 1979. Of the land irrigated, 9 370 ha were on the six federal projects, 4 660 ha were on seven provincial irrigation projects, and 3 620 ha were irrigated under private water licences. The city of Swift Current and the towns of Gravelbourg, Lafleche, and Eastend all relied on the PFRA reservoirs for urban supply.

A program of reconstruction and improvement for the six irrigation projects, which was based on recommendations of a 1974 study, had expended over \$1.7 million, and was 85 per cent complete by the beginning of 1979. During the year, some additional progress was made on this program, but accomplishments were less than anticipated because of spending restraints.

A detailed study outline for an evaluation of the irrigation operations was completed in September, and work on the study itself commenced. A private company was retained in January 1980 to carry out the economic component of the review. Work on this evaluation report continues.

Tree Distribution

The Tree Distribution Program is centred at the PFRA Tree Nursery at Indian Head, Saskatchewan. The prime purpose of this activity is to provide seedlings to prairie farmers for field and farmstead shelterbelt purposes. Nursery stock is also made available for federal, provincial, and municipal plantings, particularly for wildlife conservation and reclamation purposes. Since the nursery's inception in 1902, more than 420 million seedlings have been distributed.

In 1979, demand reached 7.5 million seedlings, but because of weather problems two years earlier, only 4.963 million seedlings were available for distribution, a reduction of 25 per cent from the preceding year. Caragana were particularly in short supply. Nursery material was provided to 8 200 applicants, with Saskatchewan receiving 61 per cent of the distribution, Manitoba 35 per cent and Alberta 4 per cent.

A highlight of the year was the opening of a large new cold storage building. This was first used on a trial basis in the fall of 1979 when over 500 000 seedlings of 18 species were placed in the new facility in a large-scale test of the storage environment.

Special activities and investigations in 1979 included the growing of Siberian larch in containers for field shelterbelt planting in dry areas, the first major releases of Japanese and Thompson elms, continuous monitoring of the spread of Dutch Elm Disease, the evaluation of pheromones (sex attractants) in place of chemical insecticides for control of many shelterbelt pests, the use of herbicides on conifers on a production basis, and the promising production of poplar from seed rather than cuttings to reduce cost.

In operations, increased mechanization was promoted and new nursery areas were broken and planted to increase shrub production.

An evaluation study of the Tree Nursery was substantially completed during the year. Recommendations made for changes in policy, program, and organization are under review.

Demonstration Farm

The PFRA Demonstration Farm near Outlook, Saskatchewan, makes an important contribution to the ongoing development of the South Saskatchewan River Project by providing specialized information on irrigation, drainage, fertilizers, weather conditions, crops, and equipment. Its role is largely that of an intermediate demonstration point between research and actual farm production.

Irrigated production continued to be a major activity in 1979 and ranged from varieties of wheat, grain corn, beans, and forage crops to such exotic crops as coriander and caraway. Good weather conditions favoured all agricultural endeavours on the farm.

Livestock feeding trials were interrupted during 1979 because of staff vacancies, but the trials will be introduced again in 1980.

Meteorological data, as related to agricultural needs, continued to be collected and recorded at the farm by Environment Canada.

Group tours were again very popular and provided information to the public and to special interest groups.

A comprehensive study design to evaluate the Demonstration Farm was completed in October 1979, and work will be undertaken on the study components as staff become available.



ENGINEERING PROGRAMS

These programs come under the aegis of the PFRA Engineering Service, which investigates, plans, designs, and is responsible for construction and maintenance of various works relating to water development, irrigation, and community infrastructure. The service provides technical assistance to all PFRA offices, including those responsible for the operation and maintenance of projects in which the federal government retains an interest. The Engineering Service also assists outside agencies, such as the International Joint Commission and the Prairie Provinces Water Board, which are engaged in studies of major river basins of international or interprovincial scope.

Specialized engineering units supply extensive services in investigation, planning, hydrology, design, geology, air survey, geotechnical evaluation, and construction.

Regional offices of the Engineering Service are located in Winnipeg, Regina, and Calgary. (Figure 3 shows the location of projects conducted by the Regional Engineering Divisions.)

A special project office is located at Cutbank, Saskatchewan, to operate and maintain the South Saskatchewan River Project. The Geotechnical Division is located at the University of Saskatchewan, Saskatoon. The headquarters of all other specialized divisions are in Regina.

PFRA's major irrigation, reclamation, water storage, and municipal works projects are summarized in Appendix V.

Figure 3

MAJOR ENGINEERING PROJECTS 1979-80

ALBERTA

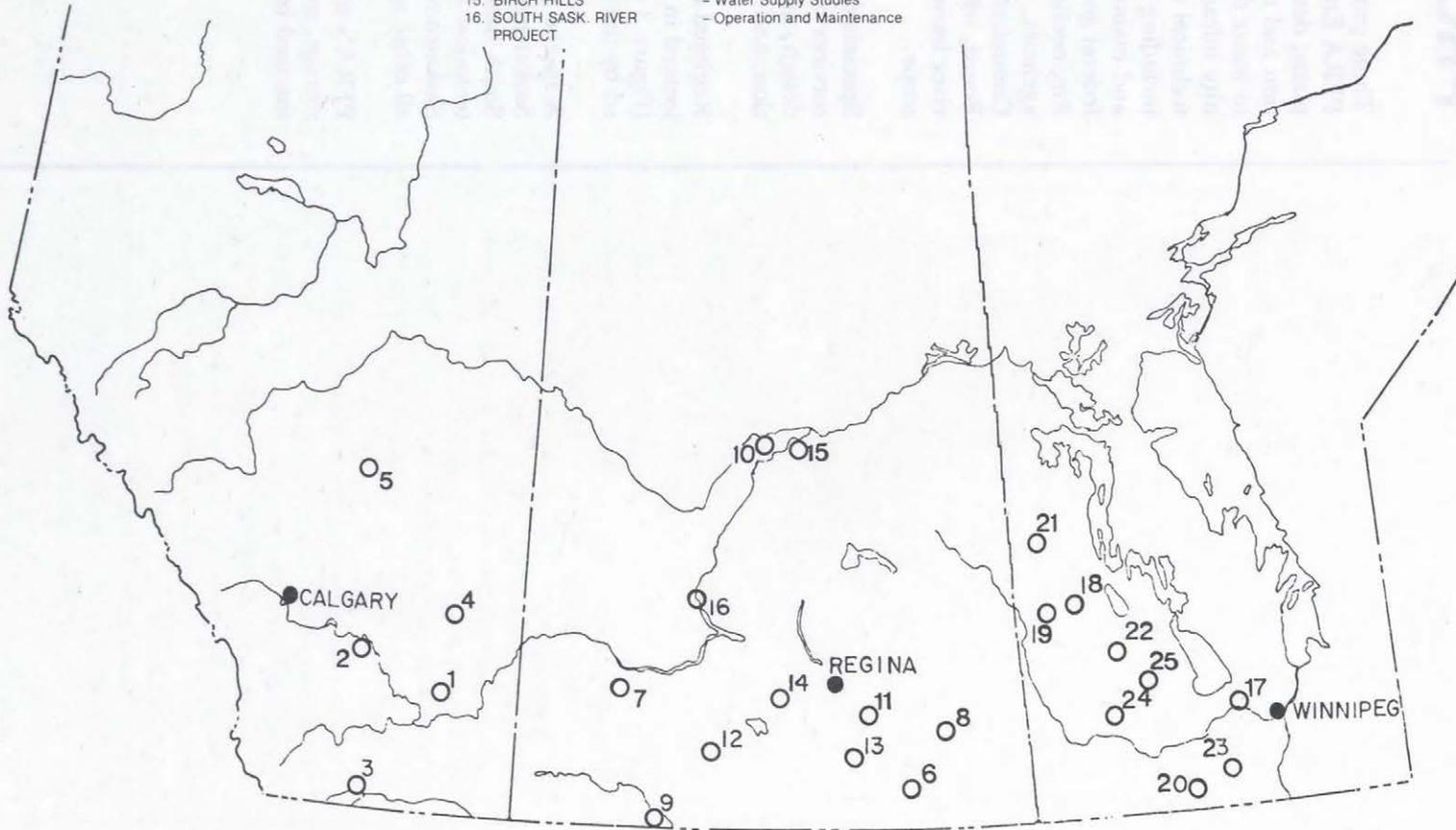
- | | |
|---|--|
| <ul style="list-style-type: none"> 1. BROOKS 2. BASSANO DAM 3. MILK RIVER 4. BERRY CREEK, SOUNDING CREEK 5. PARLBY CREEK | <ul style="list-style-type: none"> - Aqueduct Replacement - Structure Rehabilitation Investigation - Potential Storage Reservoirs Study - Basin Studies - Flood Control Study |
|---|--|

SASKATCHEWAN

- | | |
|--|--|
| <ul style="list-style-type: none"> 6. MIDALE 7. CABRI 8. KIPLING 9. BORDER SITE 10. DUCK LAKE 11. INDIAN HEAD 12. LAFLECHE DAM 13. LARSEN DAM 14. MOOSE JAW 15. BIRCH HILLS 16. SOUTH SASK. RIVER PROJECT | <ul style="list-style-type: none"> - Water Supply Construction Contracts - Water Supply Construction Contracts - Water Supply Study - Water Storage Investigation on Frenchman River - Flood Control and Drainage Study - Tree Nursery Miscellaneous Services - Spillway Repairs - Spillway Repairs - Equipment and Maintenance Depot - Roof Repairs - Water Supply Studies - Operation and Maintenance |
|--|--|

MANITOBA

- | | |
|--|---|
| <ul style="list-style-type: none"> 17. ASSINIBOINE RIVER DYKING 18. GILBERT PLAINS DAM 19. GRANDVIEW 20. PLUM COULEE 21. SWAN RIVER 22. VERMILION DAM AND PUMPHOUSE 23. SOUTHERN MANITOBA IRRIGATION 24. MINNEDOSA 25. WILSON CREEK | <ul style="list-style-type: none"> - Partial System Rehabilitation - Construction - Water Supply Alternatives Study - Water Supply Dugout and Rockfill Weir - Potential In-Channel Dams Study - Construction - Irrigation Studies - Dam Inspection - Watershed Studies |
|--|---|



Agricultural Service Centres (ASC) Program

This program, which provides financial and technical assistance for the construction of municipal water and sewer facilities in 54 designated agricultural centres in the prairie provinces, was introduced in Saskatchewan and Manitoba in 1972 and is to expire March 31, 1982. It was available to Alberta in 1973 and expired March 31, 1979. (See Figure 4 for locations of centres where work was undertaken in 1979-80.)

The total financial commitment authorized by the federal government is \$54 million. Half of this sum is provided as grants and half as loans to the provinces. Approximately \$42.7 million had been spent to March 31, 1980.

Although most of the design work is performed by consulting engineering firms, PFRA makes substantial contributions in engineering and technical assistance, in administering all contracts, and in supervising construction.

In Manitoba, ASC construction valued at \$3.2 million was completed during the year. Of this, \$1.8 million was funded under the program, with the balance financed by the province or CMHC. Of the \$20 million in program funds allotted to Manitoba, \$15.4 million has been spent to date. During the year, engineering or construction work was carried out at 12 of the 16 centres eligible under the program.

In Saskatchewan, \$2.6 million was spent on ASC construction, of which \$2.3 million was funded under the program. By the end of the fiscal year, \$21.5 million of the total \$28 million allocated to the province had been spent. Engineering investigations and construction continued at 23 of the 26 centres.

Alberta ASC activities consisted of cleanup of contract work at one centre at a cost of \$40 000. By the end of the fiscal year, \$5.8 million of the \$6 million allocated had been spent in the eight centres in which work was done. Financial limitations precluded the development of facilities in five communities.

Community Water Projects Program

In March 1973, the federal government made provision for the financing and construction of community water storage projects in the prairie provinces. Such projects, which are built under individual agreements, are to meet municipal, domestic, agricultural and other water needs in rural areas.

Construction costs are shared equally between the initiating province and the federal government, with PFRA contributing engineering services for design and construction, and the province providing the required lands. On completion, the province accepts full responsibility for operation and maintenance.

In Manitoba, PFRA has agreements for the construction of five projects, four of which have been essentially completed. The largest of these is the \$2.2-million Vermilion Dam, which creates a reservoir on the Vermilion River bordering Riding Mountain National Park. The reservoir will greatly improve the water supply to the town of Dauphin and regulate flows in the river for downstream users. Construction began in 1977 and is now complete except for final grassing of some areas. The reservoir was filled for the first time in the spring of 1979.

McEachern Dam, a \$120 000 rockfill weir on the Boyne River, services an agricultural area east of Carman, and was constructed during the 1977-78 fiscal year.

Gilbert Plains Dam, a reinforced-concrete timber-stoplog structure on the Valley River, which has stabilized the water supply for the village of Gilbert Plains, was completed in 1979 at a cost of \$372 500.

Construction of an off-stream water storage project to service the village of Plum Coulee was completed at a cost of \$125 400 in 1978-79; some minor deficiencies were corrected during 1979-80. All costs quoted represent the amount to be shared between Canada and Manitoba.

Figure 4

**Designated Agricultural Service Centres
where work was in progress 1979-1980**



Alternative proposals to provide a water supply for the town of Grandview were studied further this year, in consultation with the Manitoba Water Resources Division. The decision was made to construct an off-stream reservoir. This project, also on the Valley River, is expected to reach the construction stage by the fall of 1981 and will cost approximately \$235 000.

Agreements were signed with the Province of Saskatchewan to provide water supplies for the towns of Midale and Cabri. At Cabri, contracts for an 11.6-km pipeline and pumping facility from the South Saskatchewan River were awarded at a cost of \$323 000. After some delay due to material supply problems, work is well advanced and is scheduled for completion in the early summer of 1980.

Contracts totalling \$382 000 were awarded for the Midale facilities. These works, involving the construction of a pumping station at Dead Lake Reservoir on the Souris River, and an 8.3-km pipeline, were in service by the end of January 1980.

Several other water supply projects, for which studies were previously carried out under the Community Water Projects Program in Saskatchewan, are now being considered or implemented under the Canada-Saskatchewan Interim Subsidiary Agreement on Water Development for Regional Economic Expansion and Drought Proofing. Those projects are referred to elsewhere in this report.

Alberta Irrigation Rehabilitation Program

The Alberta Irrigation Rehabilitation Agreement of 1973 provided for the transfer to Alberta of Canada's interest in the St. Mary and Bow River irrigation projects. A federal financial commitment of \$36 million was made, of which about \$32 million was designated for the repair or replacement of irrigation works and structures. Included were four major

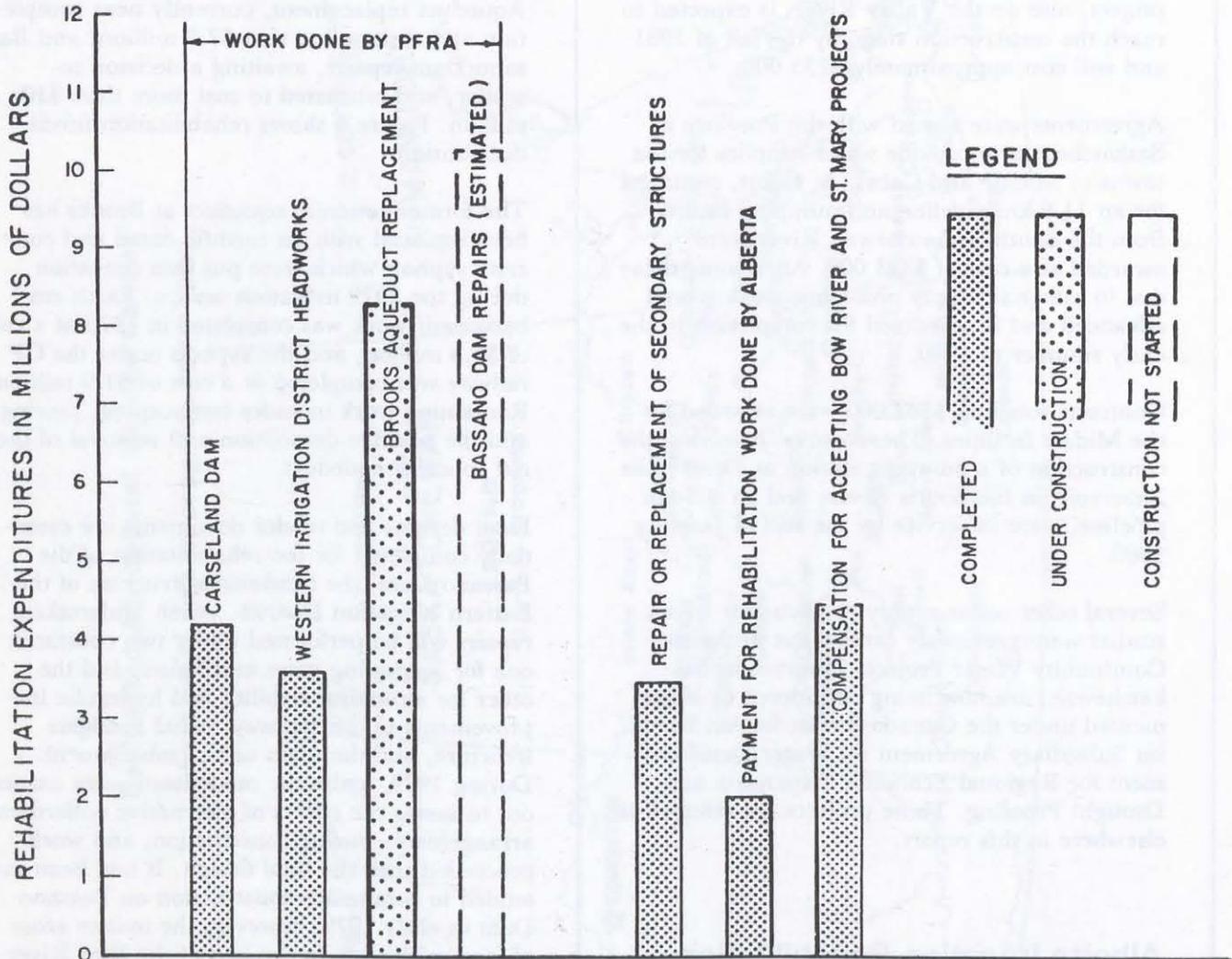
installations on which an estimated \$26.3 million will be spent. These are Carseland Dam, completed at a cost of \$4.2 million; Western Irrigation District headworks, completed at a cost of \$3.6 million; Brooks Aqueduct replacement, currently near completion and expected to cost \$7.8 million; and Bassano Dam repairs, awaiting a decision to tender, and estimated to cost more than \$10 million. Figure 5 shows rehabilitation funds distribution.

The former concrete aqueduct at Brooks has been replaced with an earthfill canal and concrete syphon which were put into operation during the 1979 irrigation season. Earth embankment work was completed in 1979 at a cost of \$5.5 million, and the syphon under the CP railway was completed at a cost of \$1.9 million. Remaining work includes landscaping, fencing, and the possible demolition and removal of the old concrete aqueduct.

Final designs and tender documents are essentially completed for the rehabilitation of the Bassano Dam, the headworks structure of the Eastern Irrigation District. When undertaken, repairs will be performed under two contracts: one for upgrading gates and hoists, and the other for structural stability and hydraulic improvements to the spillway, canal headgate structure, and the main earth embankment. During 1979, hydraulic model tests were carried out to assess the effects of alternative cofferdam arrangements during construction, and work proceeded with the final design. It had been intended to commence construction on Bassano Dam in early 1979; however, the matter arose of land ownership in the bed of the Bow River at the damsite. Indications are that the land is part of an adjacent Indian reserve, and consequently, construction has been delayed until the matter is resolved. The delay in proceeding with the final modifications resulted in the initiation of studies to assess the feasibility and cost of performing interim repairs which could be made prior to the final repair program and thus ensure the continued safe use of the structure. These studies were in progress at year end.

Figure 5

ALBERTA IRRIGATION REHABILITATION PROGRAM FUNDS DISTRIBUTION



FUNDS DISBURSEMENT BY PROJECT TO MARCH 31, 1980

South Saskatchewan River Project

Under the 1958 Canada-Saskatchewan agreement which provided for the construction of the Gardiner and Qu'Appelle River dams, Canada assumed responsibility for maintaining the works for a ten-year period ending March 31, 1979. At the request of the province, Canada and Saskatchewan entered into an agreement whereby PFRA staff would operate and maintain the works for a further five years on behalf of and at the cost of the province. To perform these functions, operation and maintenance, geotechnical, and administrative support staff are maintained at the project.

Before the March 31, 1979 termination date of the 1958 agreement, the province requested extension of the agreement on the basis that sufficient time was not available for a full evaluation of the operational characteristics of the Gardiner Dam. Canada agreed to a further two-year period, to March 31, 1981, during which Canada and the province would complete joint evaluation of the operation of the dam, and both Canada and the province would share in a public information program on construction and operations. Consequently, the effective period of the five-year operational agreement was deferred by two years to commence April 1, 1981, and to end March 31, 1986.

In 1979, reservoir levels were higher than normal in the spring, but due to extremely low summer precipitation in the river drainage basin, fell by September approximately 1.3 meters short of reaching the desired full supply level. Reservoir control was provided by releases through the Saskatchewan Power Corporation's Coteau Creek Generating Station. Minor releases were made through the Qu'Appelle River Dam and through the east side irrigation pumping plant. It was not necessary to discharge water through the spillway.

Dismantling of the construction townsite at Cutbank is essentially completed, although a few vacated areas still require final cleanup and landscaping. Only those facilities required for ongoing operation of the project remain.

Scheduled servicing and maintenance were carried out on equipment and structures associated with the Gardiner and Qu'Appelle River dams. Normal instrumentation observations were made at both dams, and some additional test apparatus was installed during the year.

Detailed design work on the proposed Coteau Creek control conduit was carried to near completion. The conduit and related works could provide a means of regulating water levels in the Coteau Creek arm of the reservoir, independent of the main body of Lake Diefenbaker. Lowering water levels behind the Coteau Creek portion of the embankment is one method of improving its long-term performance.

Drainage test wells were installed in the foundation beneath both the main embankment and the Coteau Creek embankment of Gardiner Dam. These tests and related stability investigations, dealing with gravity and electro-osmotic drainage on the downstream slope of the Coteau Creek portion of the dam as another means of improving its performance, are continuing.

Dissemination of information to the public on the project and its performance continued; and a major publication, *The Design and Construction of the Gardiner Dam and Associated Works*, was being printed at year end.

Assiniboine River Dyking Program

A system of approximately 160 km of dykes, controls flooding along the Assiniboine River between Portage la Prairie and Winnipeg. The operation and maintenance of these dykes has been the responsibility of PFRA since 1950.

A 1978 report provided recommendations for reconstruction and raising of the dykes to revised design flood levels. Initial work to implement the proposals of this report was undertaken in the fall and winter of 1978. During the year under review, eight construction contracts for repair work totalling more than \$100 000 were awarded for the reconstruc-

tion of approximately one km of dykes at four separate locations. This work was essentially completed by the end of December 1979. Detailed field surveys were also conducted in two other areas, and the costs of raising portions of the dyking system, as estimated in the 1978 report, were in the process of being updated.

Studies, Investigations, and Related Activities

In addition to providing technical support to PFRA-administered programs described elsewhere in this report, the engineering staff conducted numerous field and office studies at the request of federal or provincial agencies, and for in-house research and development.

Among external activities, PFRA cooperated with the Province of Manitoba in a preliminary study on the feasibility of developing sprinkler irrigation systems in southern Manitoba. The PFRA contribution consisted of the preparation of estimates for capital and annual costs of the systems. An inspection of the Minnedosa Dam, including a survey of the reservoir to determine sedimentation, was completed at the request of the town of Minnedosa.

Continuing Canada-Manitoba activities on the Wilson Creek Experimental Watershed were supported by a thorough review of the stage-discharge records and the production of a special report on daily and hourly flows for the period 1957 to 1977.

In Saskatchewan, at the request of the province, design assistance was provided for the repair of a damaged conduit at the Elfros Dam, and hydraulic computations were carried out relating to the Theodore Dam and the Albert Street Weir (Regina) on Wascana Creek. The Saskatchewan Water Supply Board also asked PFRA to inspect and report on the conditions of dams and related structures on the Saskatoon-Southwest Water Supply System.

A preliminary engineering report was produced for the Saskatchewan Power Corporation describing the feasibility of developing a small hydro-electric power plant on the Fond du Lac River to supply power to nearby northern communities. Recent repairs to the outlet conduit of the Boundary Dam near Estevan were inspected for the Saskatchewan Power Corporation.

At the request of Environment Saskatchewan, engineering work, including photogrammetric mapping and hydraulic and hydrologic studies, was performed in support of the Canada-Saskatchewan Flood Damage Reduction Program.

In Alberta, under cooperative arrangements between PFRA and Alberta Environment, studies continued on possible alternative storage facilities on the Milk River, and of existing and proposed water control works on Berry and Sounding Creeks near Hanna. A proposed drainage, flood control, and backflood irrigation scheme on Parly Creek was also examined; topographic surveys of the flood plains of the Sheep River and Bragg Creek were completed; and a construction report was produced describing repairs made in 1977 to the spillway of the St. Mary Dam.

In support of a major Alberta thrust in the area of dam safety, PFRA accepted responsibility for appraising a number of dams in Southern Alberta.

Traditional participation in the work of the Prairie Provinces Water Board continued in 1979 with the completion of natural flow studies on Pipestone and Antler Creeks, and the commencement of a similar study on the Assiniboine River. PFRA maintained its membership on the board's committees on Hydrology, Water Quality, and Water Demand. PFRA was also represented on the International Joint Commission's Burlington Dam Task Force which, in 1979, submitted a report on the effects in Canada of the proposed American storage project on the Souris River.

Agriculture Canada requested and received technical support in the analysis of conditions of extreme soil salinity at three sites in the Swift Current area, and a report was also prepared for that department on alternative solutions to problems with the aging water supply and sewerage systems on the Agriculture Canada Range Research Station near Kamloops, British Columbia.

At the request of the Department of Indian Affairs and Northern Development, PFRA investigated methods of improving agricultural drainage on two Indian reserves in southern Manitoba and also gave advice on the reconstruction of a storage dam on the Peigan Reserve in Alberta.

Senior engineering officials accompanied Canadian International Development Agency personnel to Pakistan as technical advisors on proposed engineering and agricultural projects in that country.

Among in-house activities was the involvement of two of the engineering technical divisions in a number of specialized investigations not directly related to any of PFRA's formal programs, but essential to the discharge of the responsibilities of these units. The Geotechnical Division carried out studies on the measurement of the electrolytic corrosion of buried metal components of water control structures, conducted research into the properties of clay-shale soils and the durability of concrete, and continued investigations on the performance of spillway structures founded on shale.

The Hydrology Division, as basic research, continued observations of the development of ice thickness on storage dugouts; detailed investigations into spring runoff in a number of small, ungauged basins; developed further documentation of analytical computer programs and the updating of hydrologic data banks; initiated the preparation of a handbook on the determination of probable maximum floods on the prairies; and did further work on the determination of the magnitude and frequency of prairie floods.

Other in-house activity involved further development of the Dam Safety Program, including research to determine the flood events that would result from the failure of a dam. A considerable amount of effort was directed to observing the movement of surface and sub-surface water on farm lands in the valley of the Assiniboine River upstream from the Shellmouth Reservoir.

On the administration side, a computerized project costing system was designed which, when it is introduced in 1980, should make available detailed and timely reports on operational costs for the purposes of budget management, chargeback, and performance measurement.



AGREEMENTS ON WATER AND DROUGHT PROOFING

Under the umbrella of the Canada-Saskatchewan General Development Agreement (GDA), Canada, through DREE (PFRA) and Environment Canada, entered into the three-year Interim Subsidiary Agreement on Water Development for Regional Economic Expansion and Drought Proofing. The agreement with Saskatchewan was signed on May 17, 1979. A similar agreement with Manitoba is awaiting signature under the Canada-Manitoba GDA.

Funding under the Saskatchewan agreement is as follows:

DREE (PFRA)	\$ 7 400 000
Environment Canada	500 000
Saskatchewan	7 350 000
	<hr/>
	\$15 250 000

The agreement calls for studies to assess the effects of drought on present and future economic development, with special attention directed at the improvement of water supplies. The result of the drought proofing studies will be a long-term resource management strategy aimed at reducing the impact of future drought.

Also called for is the construction of several small-to-medium-size water storage and delivery schemes, engineering studies of water supply problems at a number of communities, and the investigation of major groundwater aquifers in the province. Provision is made for some of the flood damage reduction projects recommended in the Canada-Saskatchewan-Manitoba Souris River Basin Study Report of June 1979.

Construction of water supply projects at Birch Hills and Kipling was approved during the year, and contracts are expected to be let early in 1980. Final design is proceeding for the Weyburn Dam and associated facilities, with construction scheduled to start in the spring of 1981. Engineering investigations in support of agreement programs are under way at Canora, Ceylon, Grenfell, Humboldt, Kerrobert, Radville, and Wynyard.

The signing of the agreement with Manitoba is forecast for early in the 1980-81 fiscal year.

Initial contacts have been made with Alberta for a similar agreement, although other arrangements may also provide equivalent opportunities to work with that province in areas of water development and drought proofing.

POLICY, PROGRAM AND EVALUATION ACTIVITIES

Emphasis continued to be placed on evaluation studies, including program reviews, background analyses, and performance measurement, to support the development of new programs and to make established programs more effective.

During the year, five major evaluation studies were under way. Of these, the reviews of the Community Pasture and Tree Nursery programs were completed; the On-Farm Contribution and Southwest Saskatchewan Irrigation Project studies were partially completed and will continue into 1980; and a beginning was made on an evaluation of the Outlook Demonstration Farm activity. These reviews are referred to elsewhere in this report.

Performance measurement was further refined in 1979, and the first consolidated PFRA-wide report, covering the preceding year, was completed in July of the year under review. The report for the second year of performance measurement was completed in February 1980, and reached a relatively high standard of innovative and practical application.

A number of technical reports on such subjects as soil conservation issues on the prairies, proposed community pasture fees for 1980-81, and proposals to reorganize components of PFRA to establish a soil and water conservation branch and an amalgamated construction service, were also completed. The report on this last subject, particularly, will be of considerable significance as reorganization plans are further pursued in 1980.



PROVISION OF CONSTRUCTION, EQUIPMENT AND SERVICES WITHIN PFRA

In-house construction, trade shop and equipment repair services for all elements of PFRA are provided by the Construction, Equipment and Services Division. Generally, these services are in such areas as specialized field construction and maintenance, site evaluation, equipment servicing, trucking, emergency repairs, and specification preparation. A large service depot is maintained at Moose Jaw, Saskatchewan.

Chargeback of service costs was initiated in 1979, as well as performance measurement, allowing clients to be more selective and the division to more accurately measure efficiency, economy, and service. The general level and value of services provided decreased in 1979 from that of the previous year as Table 2 indicates.

The decrease in activity reflects the period of spending restraint which generally affected programs during the summer of 1979, and a trend by operational divisions toward securing field services through local suppliers and contractors rather than by in-house arrangements. Some results of this included staff reductions in the Construction, Equipment and Services Division, the closing of a revolving fund stores operation, and development of consolidation and reorganization plans scheduled for implementation in 1980.

Table 2
 Number and Value of Work Assignments Performed in 1978 and 1979
 by Construction, Equipment and Services Division

	1978	1979
(A) Service Depot work assignments	2 495	1 239
Value of assignments	\$1 204 751	\$ 982 129
(B) Field Service work assignments	136	83
Value of assignments	\$ 880 924	\$ 647 957

ADMINISTRATION

During the year new administrative approaches were introduced based on performance measurement records, the recommendations of an in-depth internal audit, and new requirements related to recently introduced Treasury Board policies. Emphasis was given to the concepts of accountability, control, and service to clients.

The development of electronic data processing (EDP) techniques as a means of improving the efficiency of financial activities was pursued. Such areas as project cost accounting, commitment control, and revenue forecasting were particularly appropriate for EDP techniques. Additional development has taken place in the areas of independent verification of assets, preparation of financial guides and instruction schedules, and chargeback concepts for internal services provided.

The diverse nature of PFRA operations continued to challenge the PFRA Accident Prevention Division. Emphasis was given to training programs and involved more than 400 employees in such areas as loss control, vehicle safety under extreme weather conditions, handling of explosives, and first aid. Focal points for this activity are 19 local Accident Prevention Committees. The PFRA Fire Prevention and Safety Program received the 1979 Dominion Fire Commissioner's Award for being best among Canadian federal government agencies.

PFRA, one of the largest federal land owners in Western Canada, has title to 523 514 ha of land, and controls another 431 560 ha by lease and reservation. The Land Administration Division completed 16 land purchases and 26 sales during the year, and managed numerous leases, easements, rights-of-entry, and other like transactions. At year end, 482 surface leases to oil companies were on record. Continuing attention was devoted to Indian land entitlements. A summary of the PFRA Land Inventory as of March 31, 1980, is shown in Appendix VI.

Within the area of General Administration, numerous policy and procedure statements and

operational guidelines were produced on subjects ranging from accident prevention to purchasing standing crops. An Administrative Trainee Program involving three person-years was introduced, and major studies on fleet management, computer services, and word processing were initiated. As well, new word processing equipment with telecommunications capability was installed to facilitate operations at headquarters.

The Materiel Management Section accepted responsibility for central stockroom operations and reviewed and introduced new control measures and procedures. A Working Capital Advance Stores operation at the PFRA Moose Jaw Service Depot was terminated as the need for this service had diminished. While the dollar value of procurement decreased somewhat over the year, the number of purchase transactions increased by 10 per cent.

The Management Services Section provided support to studies on computerized tree nursery records, headquarters word processing, performance measurement, revenue forecasting, and fleet management. Forms design and control continued as a significant activity, and assistance was provided in the preparation and issuing of branch policy and procedure statements.

During the year, the PFRA technical library converted to a computerized routing system. To coordinate all associated library operations, a custodian manual was produced for staff managing larger collections outside the central library, and a comprehensive procedure manual was completed for each library position. Requests for computerized literature searches doubled over the past year, indicating an increasing need for current information and statistics to support program activities.

PUBLIC INFORMATION

Public information activities centred on broad information programs to inform the public, special interest groups, and employees about PFRA policies, programs, and undertakings. The focal point for this work was the Information Division where news releases, special feature articles, and speeches were prepared; audio-visual productions produced; and program brochures and information sheets compiled.

The Information Division also supplied information direct to individuals by correspondence and telephone. Miscellaneous editorial services were provided for various technical publications, and a daily press clipping service was introduced for staff at headquarters.

Displays and exhibits were prepared for fairs and exhibitions promoting the stewardship of the soil and water resources of the prairies, and new improved uses were made of slides and other photographic resources to illustrate various program studies and reviews.

The Photography Unit provided coverage of program activities, both for public information purposes and to meet the technical requirements of the specialist divisions of the organization.



APPENDIX I

EXPENDITURES BY SERVICE

Includes Operation, Maintenance, Capital Funds, and Contributions
1935 — March 31, 1980

	1979-80	1935-1980
ADMINISTRATION		
Headquarters Administration and related activities	\$ 2 250 757	\$ 22 520 143
LAND USE SERVICE		
Cultural Work — Soil Drifting, etc. (Experimental Farm Service)	—	4 966 394
Community Pastures — Construction, Operation and Maintenance	7 809 999	107 284 266
Movement of Settlers	—	227 841
WATER DEVELOPMENT SERVICE		
Supervision, Individual Dugouts, Wells, Community Large Water Storage, and Irrigation Projects	4 911 112	108 470 450
Equipment — Purchase and Repairs, Service Depot	1 644 701	30 996 452
Tree Nursery	1 689 948	14 454 921
Bow River Irrigation	—	47 353 798
ENGINEERING SERVICE		
Surveys, Design, Geotechnics, Draining Studies, Legal Surveys, Supervision of Construction	6 110 168	80 495 330
St. Mary Irrigation Project	—	33 928 864
South Saskatchewan River Project	326 281	139 259 126
Assiniboine River Dyking	101 363	1 973 822
Shellmouth Dam and Portage Diversion	—	14 796 868
B.C. Reclamation and Development, including Lillooet Project	—	3 310 182
Land Protection and Reclamation, Manitoba and Eastern Canada	—	4 136 021
Alberta Irrigation Rehabilitation	536 132	25 172 377
Agricultural Service Centres	2 050 170	21 531 532
Vermilion Dam and Reservoir	16 362	1 115 285
Miscellaneous Projects — Construction	336 032	6 104 487
	<u>\$27 783 025</u>	<u>\$668 098 159</u>
REVENUES BY ACTIVITIES		
Community Pastures Operations	\$ 5 166 334	\$ 52 801 360
Irrigation Project Operation and General Revenue	3 553 856	31 336 899
	<u>\$ 8 720 190</u>	<u>\$ 84 138 259</u>

APPENDIX II
DEVELOPMENT AND OPERATION OF COMMUNITY PASTURES
1938—80

<i>Fiscal Year</i>	<i>Operating Pastures</i>	<i>Acreage in Pastures</i>	<i>Construction Costs \$</i>	<i>Livestock Units Pastured</i>	<i>Acres Per Livestock Unit</i>	<i>Revenue \$</i>	<i>Operating Costs * \$</i>	<i>Stock Unit Operating Cost \$</i>	<i>Unit Cost to Patron \$</i>	<i>Municipal Levy Paid** \$</i>
1938-39	14	189 800	165 995	3 231	58.7	6 340	10 186	3.15	1.96	—
1948-49	54	1 436 480	277 358	71 393	20.1	204 012	175 666	2.46	2.86	—
1958-59	62	1 815 265	390 641	117 032	15.5	542 607	686 449	5.87	4.64	—
1968-69	88	2 382 456	696 754	172 629	13.8	1 570 652	1 554 688	9.01	9.10	170 000
1969-70	88	2 386 799	921 610	172 624	13.8	1 652 165	1 666 223	9.65	9.57	160 959
1970-71	90	2 431 784	1 004 514	182 689	13.3	1 754 194	1 900 158	10.40	9.60	162 974
1971-72	93	2 430 940	757 659	205 611	11.8	1 954 604	2 002 379	9.74	9.51	176 435
1972-73	94	2 431 420	650 889	216 708	11.2	1 912 347	2 368 818	10.93	8.82	182 373
1973-74	95	2 419 100	920 504	234 488	10.3	3 217 128	3 014 999	12.86	13.72	182 680
1974-75	95	2 409 220	3 311 642	242 176	9.9	3 116 880	3 549 388	14.66	12.87	188 854
1975-76	96	2 405 392	2 438 966	250 532	9.6	3 712 383	4 238 348	16.92	14.82	191 755
1976-77	96	2 240 447	2 259 723	241 135	9.3	3 584 175	4 337 671	17.99	14.86	200 662
1977-78	97	2 405 381	1 859 358	251 338	9.6	4 714 641	4 600 536	18.30	18.76	193 488
1978-79	96	2 352 510	1 400 741	242 443	9.7	4 931 381	5 294 673	21.83	20.34	197 384
1979-80 (ha)	93	939 509	946 516	249 521	3.8	5 166 334	5 673 279	22.74	20.70	390 445
Totals 1938-80			28 015 738			52 801 360	54 557 642			

* Includes direct operating costs only. Does not include supervision, capital and overhead.

** 1963-64 was the first year tax levied.

N.B. Detailed annual figures for years 1938 through 1968 are in the 1975-76 PFRA Annual Report.

APPENDIX III
 SERVICES PROVIDED BY WATER DEVELOPMENT DIVISION
 April 1, 1979 — March 31, 1980

Agency	Dugout		Stockwatering Dam			Irrigation			Drainage			Community Projects			Wells			Total				
	Technical Investigations	Final Inspections	Technical Investigations	Surveys	Plans	Final Inspections	Technical Investigations	Surveys	Plans	Final Inspections	Technical Investigations	Surveys	Plans	Reports	Final Inspections	Technical Investigations	Final Inspections		Other Services			
PFRA Program	837	1 181	563	192	152	85	1 066	317	198	140	70	23	2	392	10	15	1	1	528	4 674	1 006	11 453
Federal Request	4	1												8	2						4	19
Provincial Request	10	1	76	29	19	3	94	25	18	2	—	—	2	3	4	4	—	—	4		112	406
Municipal Rural-Urban Request											7	—	—	21	2	2	—	1			10	43
Other Groups' or Individuals' Requests											5	3	—	5	1	1					5	20
TOTAL	851	1 183	639	221	171	88	1 160	342	216	142	82	26	4	429	19	22	1	2	532	4 674	1 137	11 941

APPENDIX IV
WATER DEVELOPMENT DIVISION
Number of Projects and Financial Assistance Paid
April 1, 1979 — March 31, 1980

<i>Province and Classification</i>	<i>Dugouts</i>		<i>Stockwatering Dams</i>		<i>Irrigation Schemes</i>		<i>Wells</i>		<i>Total</i>	
	<i>Number of Projects Paid</i>	<i>Financial Assistance Paid \$</i>								
MANITOBA										
Individual Neighbour Small Community	129	46 024.71	1	191.52	4	1 939.41	810	283 788.57	944	331 944.21
TOTAL	129	46 024.71	1	191.52	4	1 939.41	810	283 788.57	944	331 944.21
SASKATCHEWAN										
Individual Neighbour Small Community	448	157 797.65	22	8 185.50	60	34 373.68	1 662	567 868.90	2 192	768 225.73
					3	2 225.84			3	2 225.84
	5	36 798.25							5	36 798.25
TOTAL	453	194 595.90	22	8 185.50	63	36 599.52	1 662	567 868.90	2 200	807 249.82
ALBERTA										
Individual Neighbour Small Community	498	169 449.40	46	17 004.14	36	20 286.46	2 116	933 033.19	2 696	1 139 773.19
TOTAL	498	169 449.40	46	17 004.14	36	20 286.46	2 116	933 033.19	2 696	1 139 773.19
GRAND TOTAL	1 080	410 070.01	69	25 381.16	103	58 825.39	4 588	1 784 690.66	5 840	2 278 967.22

APPENDIX V
 MAJOR PROJECTS — IRRIGATION, RECLAMATION, WATER STORAGE, AND MUNICIPAL WORKS¹
 1935 to March 31, 1980

<i>Name of Project</i>	<i>Location</i>	<i>Type of Project</i>	<i>Date Completed</i>	<i>Irrigated Acres</i>	<i>Storage Capacity Acre-Feet</i>	<i>Costs² \$</i>
MANITOBA						
Assiniboine River Dyking and Cut-offs	Brandon and Portage la Prairie to Baie St. Paul	flood control	not yet complete	—	—	1 973 822
Northwest Escarpment Reclamation Project — Riding Mt. Area	Dauphin Area	flood control	1966	—	—	1 313 103
Fairford River Project	Lake Manitoba	flood control	1960	—	—	287 751
Saskatchewan River Reclamation — Pasquia Area	The Pas	reclamation	1960	—	—	2 256 388
Shellmouth Dam and Portage Diversion	Shellmouth and Portage la Prairie	river control	1970	—	390 000	14 796 868 ³
Agricultural Service Centres	16 communities	water and sewer	not yet complete	—	—	7 741 664 ⁴
The Pas Indian Reserve	The Pas	water, sewer and roads	1975	—	—	1 099 744
Vermilion Dam and Reservoir	Dauphin	water supply	not yet complete	—	—	1 115 285 ³
SASKATCHEWAN						
South Saskatchewan River Project	Outlook	multipurpose	1969	350 000 (potential)	7 600 000	120 461 217 ⁵
Buffalo Pound Project	Qu'Appelle Valley	water supply	1960	—	42 000	2 293 145
Eyebrow Lake Diversion	Eyebrow	water supply	1960	—	—	98 376
Agricultural Service Centres	26 communities	water and sewer	not yet complete	—	—	10 731 229 ⁴

<i>Name of Project</i>	<i>Location</i>	<i>Type of Project</i>	<i>Date Completed</i>	<i>Irrigated Acres</i>	<i>Storage Capacity Acre-Feet</i>	<i>Costs² \$</i>
ALBERTA						
Bow River	Vauxhall	irrigation	—	235 000	408 862	—
(a) Purchase of Canada Land & Irrigation Co.	—	—	—	—	—	2 353 517
(b) Development and Construction	—	—	1974	—	—	24 941 316
St. Mary	Lethbridge	irrigation	—	300 000	460 000	25 160 993
Sawridge Creek	Slave Lake	flood control	1973	—	—	248 377
Alberta Irrigation Rehabilitation	3 projects	irrigation	not yet complete	—	—	25 151 074 ⁶
Agricultural Service Centres	13 communities	water	not yet complete	—	—	2 897 699 ⁴
BRITISH COLUMBIA						
Cawston Benches	Keremeos	irrigation	1951	629	2 000	185 491
Chase & Johnston — Western Canada Ranching	Kamloops	irrigation	1951	755	—	98 243
Lillooet — Pemberton	Pemberton	river control	1953	—	—	1 056 539
Westbank Project	Kelowna	irrigation	1950	1 200	2 500	537 450
Penticton West Bench	Penticton	irrigation	1953	800	—	66 362
B.C. Fruitlands	Kamloops	irrigation	1966	2 000	—	200 000

¹ Funds for certain of these projects were provided by special votes of Parliament.

² Figures do not include operation and maintenance expenditures.

³ Canada's share only.

⁴ Grants only — does not include loans of equal amounts.

⁵ Includes \$25 000 000 contributed by Province of Saskatchewan.

⁶ Includes grants to Province of Alberta of \$3 500 000 for secondary works and \$6 200 000 associated with the turnover of Canada's interest in the Bow and St. Mary Rivers.

APPENDIX VI
SUMMARY OF LAND INVENTORY TO MARCH 31, 1980
(in hectares)

	<i>Title</i>	<i>Reservation, Order-in-Council Lease, Easement</i>	<i>Total</i>
I. WATER DEVELOPMENT SERVICE			
A. <i>Water Conservation</i>			
Saskatchewan	3 929.78	342.04	4 271.82
Alberta	43.54	228.00	271.54
B. <i>Irrigation Projects</i>			
Southwest Saskatchewan	17 027.67	175.15	17 202.82
C. <i>Tree Nursery</i>	63.98	194.25	258.23
D. <i>Demonstration Farm</i>	68.64	—	68.64
	<u>21 133.61</u>	<u>939.44</u>	<u>22 073.05</u>
II. LAND USE SERVICE			
A. <i>Community Pastures</i>			
Manitoba	1 919.99	165 063.83	166 983.82
Saskatchewan	499 647.84	227 825.63	727 473.47
Alberta		37 708.61	37 708.61
	<u>501 567.83</u>	<u>430 598.07</u>	<u>932 165.90</u>
III. ENGINEERING SERVICE			
A. <i>Assiniboine River Dyking</i>	456.48	22.34	478.82
B. <i>South Saskatchewan River Project</i>	50.06	—	50.06
	<u>506.54</u>	<u>22.34</u>	<u>528.88</u>
IV. MISCELLANEOUS			
A. <i>Hydrometric Site</i>	4.05	—	4.05
B. <i>Service Depots</i>	9.51	0.20	9.71
C. <i>Bow River Exchange Lands</i>	292.59	—	292.59
	<u>306.15</u>	<u>0.20</u>	<u>306.35</u>

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