WATERSHED MANAGEMENT IN ONTARIO THROUGH CONSERVATION AUTHORITIES

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ABSTRACT

There are 30 Conservation Authorities in Ontario with a total area of 20,000 square miles. They have been established to co-ordinate all conservation work including flood control, land use, reforestation, fish and wildlife management and recreation on a watershed basis.

The Conservation Authorities are bodies corporate composed of representatives from all the municipalities lying wholly or partly in the watershed. They may obtain grants from the Province of Ontario and, in some cases, from the Government of Canada.

The Grand Valley Conservation Authority, which has jurisdiction over a watershed of 2,600 square miles in the agricultural region of Ontario, has been used as an example. About 10 per cent of this watershed remains in woodland composed of headwater swamps and farm woodlots, and for this reason the subject has been dealt with from the point of view of hydrometeorology rather than from the point of view of forestry.

INTRODUCTION

The concept of conservation is based on the premise of protection, care and wise use of all the renewable natural resources for all people. To achieve these results the method of operation in Ontario has been to establish local management of these resources within watersheds.

This program was initiated in Ontario by the Provincial Government in 1944 with the establishment of the Conservation Branch of the Department

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of Commerce and Development^a. The Branch was given the responsibility of organizing conservation work in southern Ontario on the basis of river basins with all the municipalities contained therein as equal partners.

Conservation as such is not a new enterprise for the Ontario Government. Many aspects of this work have been undertaken for many years by the four departments of the Government which deal with specific phases of our natural resources. These are the Departments of Agriculture, Lands and Forests, Public Works and the Ontario Water Resources Commission of the Department of Municipal Affairs.

The Conservation Branch is primarily a planning and co-ordinating arm of the government concerned with developing and assisting the activities of the local people in the management of their own particular watershed. It is this emphasis on local participation in management which makes the program of the Conservation Authorities noteworthy.

A Conservation Authority is composed of representatives from all the municipalities in a watershed which includes cities, towns, villages and townships and is a corporate body operating under the Conservation Authorities Act. The present number of Authorities is thirty. They are located primarily in southern Ontario with a combined area of 19,670 square miles. Their size varies greatly from the smallest with 86 square miles to the largest with 2,600 square miles.

In developing a conservation program along these lines it is of utmost importance that the people of the area are made aware of the need for conservation, are informed of the problems within their valley and are advised of the best means of meeting these problems. An informed public is a primary responsibility for an adequate conservation program.

Most of the early Authorities were brought into being because of the need to control flooding. In reaching a solution to this problem they became aware of the necessity of carrying out such supplementary conservation measures as improved methods of land use, reforestation, proper woodlot management, prevention of pollution, investigation of underground water supplies, fish and wildlife studies and recreation.

The Authorities, however, were not in a position to carry out the extensive investigations to indicate where and how this work should be done. The Conservation Branch, therefore, as an aid to this co-operative venture, undertook to carry out preliminary investigations to appraise by means of surveys the conservation needs of each watershed and to submit to each Authority a detailed report outlining the conservation measures that should be followed.

These reports are in the form of a working plan which the Authority members can use to establish their program. The survey work which is written into the report is grouped under six general headings: History, Land Use, Forestry, Water, Wildlife and Recreation.

A review of the type of survey work covered under these headings will give some idea of the scope of the undertakings.

^a On January 1, 1962 The Conservation Branch was transferred from the Department of Commerce and Development to the Department of Lands and Forests and the name changed to the Conservation Authorities Branch.

HISTORY

A certain amount of historical matter is used in each report as a starting point for the study. It has been found that this historical approach is of great interest to the people of the regions dealt with. It often serves to promote an interest in conservation and frequently points up its need among people who would otherwise remain indifferent. Conservation measures aim not only at saving what natural riches exist, but also at setting right the conditions which have caused waste and destruction in the past.

LAND USE

The approach to the subject of 'land use' is through a careful consideration of the relations between soil, agriculture, forestry and water on the watershed. All existing data on soil surveys of the area are heavily drawn upon in preparing the report.

In Ontario the use and management of the soil is primarily the concern of the landowner. His management program is dictated by his interests and farming experience and, of course, by economics. Most farmers realize the need for conserving their soil resources and many carry on their farming practices to this end. There are still, however, far too many who do not.

The place of the Conservation Authorities in soil conservation programs is largely that of publicizing the need for and the value of proper soil management.

The development of farm ponds is an important part of the land use program. About two-thirds of the thirty Authorities have farm pond assistance programs through which both financial and technical assistance are given. Financial assistance is in the form of a grant ranging from \$50 to \$300 per pond depending on the size. Some 2,400 ponds have been constructed under assistance programs.

FORESTRY

For those not too familiar with Ontario it should be pointed out that at one time the southern part of the province was a vast forested area. Now, however, it is primarily agricultural and in many places urban with a vast industrial complex. The wood-lots and swamps of southern Ontario nevertheless cover about 15% of the area and are a valuable asset both to the individuals and to the economy of the whole province.

It has been estimated that in the past 20 years two million acres have gone out of agriculture. Considerable attention is, therefore, being given to farm forestry by pointing up the necessity of re-planting unproductive parts of the farm. However, proper management and protection of existing woodlots must come first. It is as essential to conserve what is already established as to wait for the maturing of a planted forest. Much progress has been made in assisting farmers in proper management practices, including thinning and improvement in their woodlots.

Where large-scale or block forestry operations are necessary, a Conservation Authority Forest Program is designated for the watershed. This is a recommendation for the acquisition of an area of existing woodlots and areas

requiring reforestation whose overall management is to be controlled by one governing body. To date, fifteen Authorities have purchased 50,000 acres of land which constitute Authority forests.

Woodlot grazing causes a great deal of the damage to southern Ontario woodlots. To combat this practice the Authorities are promoting the fencing of woodlots. Demonstration woodlots are also set up to illustrate the good results obtained by protecting them from cattle.

WATER

The water section of the report gives a detailed analysis of the flood problem of the region after a careful study has been made of hydrometric and meteorological data and historical information. Field surveys are made to establish the locations of reservoirs and areas for channel improvements and to study the best methods for regulating summer flow in the river and for controlling floods. All small lakes, community ponds and old mill dams are mapped and examined.

Flood control plans prepared for a number of the Authorities recommend the construction of widespread systems of dams and reservoirs along with channel improvements, dikes and flood walls. The dams and reservoirs built by the Authorities are all established on the concept of multiple purpose. The reservoir areas in this highly productive region are relatively scarce, the cost of construction and of land is high and the need for water for a variety of uses necessitates the fullest possible productive use of the water. Besides the obvious use of flood control for these reservoirs, other water requirements are irrigation, urban water supply, stabilized summer flow for pollution control, industrial use and recreation.

WILDLIFE

Wildlife surveys include general inventories of all species of wildlife, both game and non-game and special emphasis is laid on vanishing or threatened species. Streams are classified as to their condition and suitability for particular species of fish.

There are two quite separate objectives concerning wildlife. The first is to retain for the citizen the opportunity to fish and hunt within the law in an attractive environment and where possible to trap for profit. The second is to retain for every citizen the opportunity to see and enjoy the varied forms of birds, mammals and other wildlife of the regions in the greatest possible variety.

The wide scope of the Conservation Authorities programs provides many opportunities for fish and wildlife management projects. Many of the Authorities have established fishing areas and stock the ponds and lakes. Some Authorities have developed wildlife preserves and nesting areas for wildfowl. Others produce shrubs in their nurseries for wildlife habitat improvement. Nature trails are now constructed in several of the Conservation Areas owned by the Conservation Authorities. More than fifty thousand persons used the Nature Trail at one Conservation Area in 1960.

RECREATION

Recreation surveys include estimates of the present and future population of the areas served, description of the present use of all recreational facilities by local and outside residents, rating of all recreation facilities both publicly and privately owned and recommendations for new recreation areas for both the urban and rural population of the watershed.

The enjoyment of leisure time is now recognized as an essential physical and mental need. Good recreational facilities are known to be as significant in modern life as are good working conditions. Since many types of recreation facilities involve use of the land, recommendations for the proper use and development of recreation resources are a normal part of any land use plan.

Such then is the background of the surveys and reports made by the Conservation Branch and the general development of the program for the Conservation Authorities. Lest, however, we give the impression that the program is mostly philosophy but little action, let us consider the work on one particular basin. For this we have chosen the Grand River.

The drainage area of the Grand is 2,600 square miles with an overall length of 118 miles and varying in width from ten to forty miles. The river rises on a plateau, 1,700 feet above m.s.l., just south of Georgian Bay and flows southward to empty into Lake Erie, elevation 572 feet m.s.l.

The high table land in the northern part of the watershed was originally swampland but it has since been drained and is now under cultivation. This region is subject to low temperatures and heavy snowfall during the winter months.

The central part is rolling farm land and contains most of the urban centres of the watershed.

The southern part is fairly flat and is largely agricultural.

The average annual precipitation for the watershed is about 33 inches. The annual snowfall varies from 45 inches in the southern part to over 90 inches at the headwaters.

The population of the watershed is over 300,000 of which over one-half can be classed as urban. It is, however, chiefly an agricultural area and its soils are among the best in the province.

The original impetus for conservation on the Grand arose from a need to control the river. Floods were a regular and disastrous occurrence each spring while during the summer and fall the river was little better than a muddy slough. In this latter situation pollution was extreme and seriously affected the water supply of several towns and cities.

A few figures will indicate the broad range of flows in the river and the need for control. The peak flow for the main river was 60,000 cubic feet per second in the spring freshet of 1948. At the location where this reading was taken, flooding occurs at 40,000 c.f.s. At the other extreme the lowest recorded flow of 26 c.f.s. occurred in August 1936. The mean flow for the month was 47 c.f.s.

With these values to contend with it is not surprising that the first major project on the watershed was the building of a group of dams and reservoirs in the upper regions of the watershed for flood control and water conservation.

The three dams are earth-fill and concrete structures. At Shand Dam the reservoir is nearly five miles long and one-half a mile wide with a surface area of 1,800 acres. The capacity is 50,000 acre-feet and the cost two million dollars.

Luther Marsh Dam has a reservoir area of 4,500 acres, a capacity of 10,000 acre-feet and was built at a cost of one-quarter of a million dollars.

Conestogo Dam has a reservoir which is six miles long on each of two arms with a width of three-quarters of a mile. The surface area is 1,800 acres and the capacity 45,000 acre-feet. The cost was five million dollars.

In the case of these three dams the financing charges were split 37½% by both the Federal and Provincial Governments and 25% by the benefiting member municipalities. On smaller sized projects the financial arrangement is on a fifty-fifty basis between the Conservation Authority and the Provincial Government.

These reservoirs have proven their worth in water conservation and flood control over and over again since they were built. They have reduced the spring runoff so that the peak flows can be maintained within the channel capacity and they have greatly increased the water supply during the summer months.

Recreation facilities have been created around the reservoirs to the advantage of the people in the surrounding areas while good land use practices have been encouraged by the Authority as a means of erosion control.

Channel improvements have also been undertaken on the main river and tributaries in order to clear out shoals and obstructions in the river channel and thereby improve the flow characteristics as a means of flood control.

One particularly important scheme developed by the Authority is on one of the tributaries through the City of Guelph. At a cost of three-quarters of a million dollars a small control dam was built and the channel improved and straightened for about a mile. The area alongside the small reservoir and the whole length of the channel improvement has been established as a city park which is proving to be a valuable addition to the city.

Besides these major flood control and water conservation schemes there has been a considerable amount of attention given by the Authority to minor works for better control and use of water. Several small dams have been erected or repaired for community ponds. Streambank erosion has been undertaken in several locations as a means of stabilizing the bank and reducing the silting of the stream.

The acquisition of flood plain lands is another means by which the Authority reduces the flood problem.

In the matter of reforestation the Grand River Authority Forest comprises 4,000 acres, and is supplemented by over 2,500 acres of county

forests. Considerable assistance is also given by the Authority to tree planting on private property. The effort of all these groups is a part of the overall scheme of management of the watershed.

This being a rural watershed the Authority has taken a considerable interest in promoting better land use. Demonstrations of gully control and river-bank erosion control have been undertaken, assistance has been given to building farm ponds, and land-judging competitions are a regular feature of its program.

Wildlife activities include Junior Trout Fishing days and the active improvement of streams particularly in the matter of pollution control.

'Conservation Areas' is the designation given to all lands owned by the Authority except Authority Forests. These include surplus land bordering large reservoirs, land around community ponds or reconstructed mill dams, flood plain, swamplands, wooded valley land and land purchased for demonstration of conservation practices. The total of all these on the Grand is some 14,000 acres of which 1,500 are in parks.

The total number of visitors to Grand Valley Conservation Areas in 1957 was 69,000. This year there were 200,000. The demand for recreational areas is at times overwhelming but on the other hand the support is encouraging.

As mentioned earlier, education and public information is a major requirement for the full development of the program of the Conservation Authorities. In this aspect of the work the Grand Valley Conservation Authority is also particularly active. Lectures, motion pictures and school competitions, radio and television programs, demonstration Fall Fair exhibits, the purchase of pictures for schools and conservation books for libraries are all part of the Authority's program to inform the people of the valley of the importance of conservation and the advantages of personal management of their watershed.

The principles of conservation which govern Watershed Management by the Conservation Authorities are summed up in this quotation, "River Valley Development is the wise use of all the natural resources of a river valley for all the people living in the valley, for all time".