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## WATER MANAGEMENT IN ONTARIO— AN ECONOMIC EVALUATION OF PUBLIC POLICY

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### A. INTRODUCTION

Whenever resources are scarce, choices have to be made to ration them among competing uses and users. In large degree, we depend upon market forces to allocate land, capital, labour and other resources, as we do also for most consumer goods and services. But in some cases, as with water in Ontario, we invoke governmental procedures to modify or replace market decisions about how resources will be used. Ontario is generously endowed with water; yet heavy public and private expenditures incurred in securing supplies and abating pollution testify to its scarcity in the economic sense that it cannot be had without cost or without encroaching on the supply available to others. The existence of a complex framework of water law and regulatory devices also attests to the economic scarcity of water, at least at certain times and places. This essay assesses, from an economic point of view, the efficacy of this machinery for regulating water use in Ontario.

In its emphasis on the economic aspects of water regulation, this study departs from the substantial volume of legal literature on water law and

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property rights. Moreover, for the purposes of economic analysis an examination of the law is insufficient, because the way the resource is allocated, used and managed is influenced also by administrative procedures, institutional arrangements and the economic and social environment. Hence our investigation extends beyond the law to these other matters, in order to understand how legislation, regulations, procedures and administrative decision-making interact to determine how water resources are utilized. We refer to the pattern of all these influences as "policy." Our concern is not confined to provincial water policy, but encompasses, as well, the municipal, federal and international rules, procedures and arrangements that together affect the pattern, rate and form of utilization of the water resources in the province.

Our procedure was to examine, first, the basic features of the common law and the statutory provisions that govern the allocation of water in Ontario and regulate its use in waste disposal. We then studied the structure of the relevant administrative agencies and, utilizing a wide variety of publications and personal interviews with officials, we discovered their procedures, problems and administrative practices. Throughout, our objective has been to reveal the economic implications of current water resource policy. The essay begins with a brief discussion of the salient economic considerations in water allocation. We then review the legal rules and administrative arrangements which determine water policy with respect to the allocation of flows and protection of quality. Finally, we offer an economic commentary on the resulting pattern of water utilization.

## B. ECONOMIC EFFICIENCY IN WATER USE

Among the infinite possibilities for combining and processing available resources to produce useful goods and services, some alternatives generate more benefit to society than others and so they make "more efficient" use of scarce resources. Thus, whenever it is possible to reallocate resources to different activities where they would generate more public or private value, efficiency can be increased. Economic efficiency (or productivity) is sometimes thought of in a narrow sense, referring to the market value of goods produced; however, in this essay it is meant to encompass other non-marketed values (such as public health, recreation and amenity) and costs (such as pollution) as well. This broad criterion of social efficiency, emerging from the balance of social benefits and social costs, is the unifying theme of this essay.<sup>1</sup>

Policies that govern the use of one resource, such as water, inevitably affect the use of other resources such as land, labour and capital as well. Our concern with efficiency therefore extends beyond the allocation of water alone, to the way in which water policy affects the use of all productive resources.

It should be emphasized at the outset that economic efficiency is not the only goal sought by governments nor the only problem susceptible to

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<sup>1</sup> See J. Hirschleifer, J. C. De Haven, and J. W. Milliman, *Water Supply: Economics, Technology and Policy* (Chicago: University of Chicago Press, 1960), especially Chapters IV and IX.

economic analysis. Indeed, existing water policy in Ontario offers plenty of evidence of other objectives — to promote certain kinds of activity, or to benefit certain groups in preference to others, and to favour certain areas. We have set these goals aside; not because they are less important or unworthy of study, but because by doing so we can maintain a consistent analytical frame of reference in efficiency considerations. Moreover, analysis of the efficacy of pursuing such other implied or explicit goals through manipulating water use requires evaluation of the benefits and costs in any event, and we would argue that governments frequently invoke other policy objectives in regulating water use without sufficient awareness of the economic efficiency costs involved. As total demands on water grow, making scarcity more acute, a state of efficiency in water allocation becomes increasingly worth achieving.

It is not our purpose, however, to make numerical judgements of the extent to which efficient allocation in the water sector has been missed. To do so will eventually require a patient gathering of case studies of particular water-using activities in actual locations. In this survey we must confine ourselves to the policy framework, and its responsiveness to demands for and supplies of not only water but also the complementary materials, energy, labour, land and capital with which water is combined.

How much water should be allocated to each use, if efficiency is the goal? To most people this question is unfamiliar, evoking responses that, while not incorrect, simply obscure the problem. For example, it is often suggested that water's indispensability to human life offers a principle that might guide its allocation. Other people say that when water becomes scarce, factory uses should prevail over farming uses, because factories provide more employment and generate more valuable goods and services. But these ideas are not helpful, because policy choices rarely contemplate cutting off water supplies altogether, but simply ask *how much* should go to each user.

The economists' response to the question can be pictured as follows: imagine that society sets itself the problem of improving a given allocation (division) of water among users in their particular activities and allocations. Although it might eventually turn out that certain water uses should be abandoned altogether if total social economic benefits are to be increased, this is both unlikely and cannot be known in advance. Hence an improvement in allocation must proceed by re-allocation "at the margin": small amounts of water are experimentally diverted from one use to another. If the loss in net social value in the use that loses some water exceeds the gain elsewhere, that reallocation is shown to be inefficient. The outcome implies not only that this diversion should be stopped, but that it should probably be reversed.

Economic theory tells us that if this marginal allocation process is continued, the net social values of the last gallons devoted to each purpose or use will become equal. (This equality stems from the old familiar law of diminishing returns: the more water provided to each use, the less value can be derived from each extra gallon. Hence as some uses get more and some less, the values at the margin can be equalized.) When equal values at the margin have been obtained, no further re-allocation can increase total social value. Efficiency in allocation has been achieved.

This experimental process is actually duplicated in the market economy, as other services are allocated among users. Hence there is little concern about, say, materials allocation in Ontario: in the long run raw materials are divided among employments in a way that would be difficult to improve upon. Any inefficiency becomes manifested by opportunities for raw-material producers to shift their products from lower-paying to higher-paying buyers.

It is not difficult to conceive of a system in which water, like land, is also allocated through competitive markets.<sup>2</sup> If markets could be relied upon to work perfectly, a price would be struck for the water of each watercourse which would ration the available supply among competing users. Each demander would then use the resource only to the extent that its marginal value to him exceeded the price (i.e., its value to others). By thus tending to equate its value at the margin in all uses, water would be utilized in its most valuable pattern. However, such efficacy of competitive markets for water is hampered by three factors. The first is that no rights to marketable water, in the river, now exist. The second is that market values would fail to reflect some social values. To the extent that the services of clean water for public health, recreation and amenity were not marketed and appropriable by private owners and producers, the market would fail to make provisions for these socially valued activities. The third difficulty is that the uses of water along a watercourse are all more or less interdependent: the flow diverted by one user is unavailable to others downstream and his waste disposal may affect downstream uses. To allocate total use efficiently, a private owner would have to control the whole watershed to take account of all such interrelated costs and benefits. But the size and complexity of many water systems preclude single ownership, at least under current political attitudes and policies. A public agency with control over all water uses is in a much stronger position to overcome both these obstacles. Nevertheless, we do find a good deal of reliance on market forces indirectly and directly to allocate water in other provinces, and we suggest below that some market mechanisms could be used to enhance efficiency in Ontario.

The opposite extreme — that of no property rights in water at all — raises even more serious implications. Unless the quantity and quality of water were more than sufficient to meet the needs of all demanders everywhere (i.e., unless it were nowhere "scarce"), common property would lead to inefficiencies through users' efforts to secure their supplies. They would tend to locate close to water sources rather than at sites that might otherwise be more suitable, and the potential benefits of efficient use of the flow over its full extent would be dissipated in competitive expenditures to achieve geographical advantage. Moreover, with no rights other than the rule of capture, utilization efficiency would be frustrated by insecurity and uncertainty of supplies.

In Ontario, the use of water is directed primarily through public controls and regulations. In analysing the efficacy of the regulatory system, we put heavy emphasis on the extent to which it recognises the social value that

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<sup>2</sup> See D. Johnson, *An Optimal State Water Law: Fixed Water Rights and Flexible Market Prices* (1972), 3 *Environmental Law Review* 379.

water is capable of generating in alternative uses. This requires, among other things, that all socially valuable uses of water — private and public, and whether the values are manifested in market prices or not — be recognized and provided for in an unbiased way. Moreover, since the most efficient pattern of distribution of water and its assimilative capacity among users inevitably changes through time, we are concerned also with arrangements that govern the transferability of rights. Finally, since certainty of supply is an important determinant of the efficiency with which a resource can be used, we examine also the degree of security enjoyed by those who hold rights to use water.

There are two primary dimensions of water as a valuable resource. One is its physical quantity, which is useful in both “withdrawal uses” such as domestic consumption, industrial processes and irrigation, and “in place uses” such as power generation, navigation and recreation. The scarce factor that requires rationing and regulation on this dimension is the *available flow* which can, of course, be augmented by various works at some cost.

The other dimension is its capacity to absorb and disperse wastes; and we refer to the scarce factor in this case as the *assimilative capacity* of the watercourse (which can also be augmented).

These two dimensions are related; but since the regulation of *available flow* has received rather different legislative and administrative treatment from the regulation of *assimilative capacity* in Ontario, they are discussed separately below.

### C. POLICIES FOR REGULATING WATER APPROPRIATION AND USE (THE DIMENSION OF AVAILABLE FLOW)

In Ontario, water is made available for various uses and users through a mixture of arrangements and procedures based on common law and provincial legislation. In addition, a number of federal statutes, international agreements and municipal arrangements affect the use of water for certain purposes and in certain situations. Our summary review of allocative arrangements begins with the relevant common law, which is the foundation of the Ontario system.

#### 1. *Riparian Rights*

At the core of the Ontario allocative system is the common law doctrine of riparian rights.<sup>3</sup> This doctrine provides occupiers of land bordering a natural stream (riparian land) with certain rights to the use and flow of water. Each riparian on a watercourse has a right to use its water, but this

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<sup>3</sup> The Property and Civil Rights Act, R.S.O. 1970, c. 367, s. 1 adopts the common law of England as it existed on October 15, 1792 into Ontario in matters concerning property and civil rights.

For an historical account of the development of riparian rights, see L. Teclaff, *What You've Always Wanted to Know About Riparian Rights, But Were Afraid to Ask* (1972), 12 Nat.Res.J. 30. Extensive discussions of this area of the common law may be found in *Gale on Easements*, ed. S. Maurice, (14th ed. London: London, Sweet and Maxwell, 1972) and 39 Halsbury (3rd) 514 *et. seq.*

right is subject to similar rights of other riparians.<sup>4</sup> Thus the "flow of a natural stream creates natural rights and liabilities between all the riparian proprietors along the whole of its course."<sup>5</sup>

The riparian right is one of a number of common law rights which are incidental to the ownership of land; these rights prevail unless overridden by legislation. It is thus attached to the land as part of its property right and no separate express grant is necessary to transfer it when riparian land is transferred.<sup>6</sup> The right is confined to access and use: the riparian has no property right in the water resource itself except that portion of it which he appropriates and uses.<sup>7</sup> He is not required to use water in order to preserve his riparian right.<sup>8</sup>

Riparians are limited in the volume of water they may use, depending in part upon the purpose for which they use it. "Ordinary use" of water, including amounts that are "reasonably necessary" for domestic and livestock needs, may be made by a riparian without regard to the effect on downstream users.<sup>9</sup>

The common law rules that govern riparians' other, "extraordinary" uses offer less certainty. As in the case of ordinary use such use must be connected with or incidental to the riparian property; however, it must also be "reasonable"; having regard to the requirements of other "extraordinary users", water diverted must be returned to the watercourse substantially undiminished

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<sup>4</sup> *Wood v. Waud* (1849), 3 Exch. 748; 154 E.R. 1047. There is no priority of precedence of rights between riparians based on date of occupancy. *Omerod v. Todmorden, Joint Stock Mill Company Ltd.* (1883), 11 Q.B.D. 155.

The basic common law rules are summarized in *Embrey v. Owen* (1851), 155 E.R. 579; 6 Exch. 353. See also *Young, (John) and Co. v. Bankier Distillery Company*, [1893] A.C. 691 at 698; 69 L.T.R. 838 at 839-840, per Lord McNaughten. To qualify as a riparian tenement reasonable proximity to the watercourse must coexist with actual contact of the parcel of land with the water: *Attwood v. Llay Main Collieries Ltd.*, [1926] Ch. 444 — in other words merely connecting a non-riparian parcel of land to a river by way of a strip of land which abuts the river would not necessarily qualify the parcel as a riparian tenement.

<sup>5</sup> *Gaved v. Martyn* (1865), 19 C.B. (N.S.) 732; 144 E.R. 974.

<sup>6</sup> *Borough of Portsmouth Waterworks Company v. London Brighton and South Coast Rlwy.* (1909), 26 T.L.R. 173 at 175; *Keewatin Power Co. v. Lake of the Woods Milling Co.*, [1930] A.C. 640; [1930] 4 D.L.R. 961 (P.C.).

<sup>7</sup> *Omerod v. Todmorden Joint Stock Mill Co.* (1883), 11 Q.B.D. 155 per Bowden, L.J.: "It has long been established that running water is not the subject of property, and that the first occupant cannot acquire an exclusive right to it." See also *Mason v. Hill* (1835), 5 B. & Ad. 1; 110 E.R. 692.

<sup>8</sup> A riparian who has never made use of the water could, for example, maintain an action against an upper riparian who diverted the flow for "unreasonable" domestic or cattle watering purposes: *Orr Ewing v. Colquhoun* (1877), 2 A.C. 839 at 854, per Lord Blackburn.

<sup>9</sup> *McCartney v. Londonderry and Lough Swilly Rlwy.*, [1904] A.C. 301 at 306; *Kensit v. Great Eastern Railway* (1884), 27 Ch.D. 122; 32 W.R. 885. *Brown v. Bathurst Electric and Water Power Co.* (1907), 3 N.B. Eq. 543. A lower riparian may not impede the flow or cause it to back up so as to interfere with the upper riparian's right to continued flow. The right to do so must be obtained by license, grant of an easement or by prescription: *Mason v. Hill* (1835), 5 B. & Ad. 1; 110 E.R. 692; *Wright v. Howard*, 1 S. & S. 190; 57 E.R. 76.

in volume and unaltered in character.<sup>10</sup> While extraordinary riparian users have equal rights to use water *inter se*, they must not interfere with a lower riparian owner's right for "ordinary" purposes. Conversely, the flow available to an extraordinary use may be lawfully diminished by upstream ordinary users' withdrawals. However, by 20 years' continuous use for some extraordinary purpose, a riparian can obtain a prescriptive right to that flow as against both ordinary and other extraordinary users.<sup>11</sup>

Riparian rights can be transferred from one riparian to another through privately negotiated easements.<sup>12</sup> In this way an extraordinary user can attempt to secure his supply by contracting with upstream riparians to relinquish their rights to use water for ordinary or other purposes. In order to avoid the restrictions of "reasonable use" or the necessity of returning his withdrawals, he might also negotiate with downstream riparians.

A non-riparian can obtain a right to water from a riparian through a licence or an easement, although the non-riparian acquires it against only the grantor and his successors in title.<sup>13</sup> A licence or easement so obtained does not entitle the non-riparian to even "ordinary use" as against any downstream riparian (whether the downstream riparian has a use for the water or not); nor does the licence or easement offer any protection against diminished flow, even if caused by an upstream riparian's extraordinary or unreasonable use.<sup>14</sup>

Thus, in order to obtain secure rights to flows, a non-riparian is likely to have to acquire rights from *all* downstream and *all* upstream riparians in order to secure his supply.

Riparians and non-riparians alike have a right to use groundwater under the rule of capture; that is any occupier of land may extract groundwater

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<sup>10</sup> *Omerod v. Todmorden Joint Stock Mill Co.* (1883), 11 Q.B.D. 155. In a manufacturing area, "ordinary" use might extend to include manufacturing purposes (*Obiter*, per Brett, M.R. at 168).

See also *Attwood v. Llay Main Collieries*, [1926] Ch. 444, and *McCartney v. Londonderry and Lough Swilly Rlwy. Co.*, [1904] A.C. 301, per Lord McNaughton.

Even if the natural flow is not measurably affected, a downstream riparian can insist that any such withdrawals be returned to the watercourse: *Rugby Joint Water Board v. Walters*, [1967] Ch. 397. Such injury to a riparian's right to flow is, like his right to unadulterated water, actionable without proof of actual damages. See *Jones v. Llanwrst U.D.C.*, [1911] 1 Ch. 393, and also per Parke, B. in *Embrey v. Owen* (1851), 155 E.R. 579; 6 Exch. 353.

On the question of "reasonableness" of the use see *Sharpe v. Wilson, Rotheray, and Co.* (1905), 93 L.T. 155; 21 T.L.R. 679.

<sup>11</sup> *Gale on Easements*, ed. S. Maurice, (14th ed. London: London, Sweet and Maxwell, 1972) 218; *Gaved v. Martyn* (1865), 19 C.B. (N.S.) 732; 144 E.R. 974. Use by a riparian that would be capable of settling into such a right can be enjoined any time before the twenty years have elapsed: *Young and Co. v. Bankier (John) Distillery Co.*, [1893] A.C. 691 at 698; 69 L.T.R. 838 at 839-840 and *Attwood v. Llay Main Collieries Ltd.*, [1926] Ch. 444. Limitations Act, R.S.O. 1970, c. 246, s. 31.

<sup>12</sup> *Wright v. Howard*, 1 S. & S. 190; 57 E.R. 76.

<sup>13</sup> *Omerod v. Todmorden Joint Stock Mill Co.* (1883), 11 Q.B.D. 155.

<sup>14</sup> The grantor of the easement or licence is protected from such an interference, however: *Kensit v. Great Eastern Rlwy. Co.* (1884), 27 Ch.D. 22; 32 W.R. 885. Note that even domestic use by a non-riparian may be a violation of the rights of a downstream extraordinary user.



even if its level is thereby lowered to the detriment of other groundwater or surface water users.<sup>15</sup> No rights to percolating groundwater can be acquired by prescription.<sup>16</sup>

With respect to artificial watercourses, the common law distinguishes between permanent and temporary waterways. Permanent artificial watercourses are treated as natural watercourses, and hence prescriptive rights to use may be acquired. No such rights can be obtained on temporary artificial courses.<sup>17</sup>

## 2. Legislative Provisions

The common law rules that form the basis of Ontario's water allocation system are modified by the "water taking" permit system set out in The Ontario Water Resources Act,<sup>18</sup> which places the responsibility for supervising all the province's water in the Minister of the Environment for the purposes of the Act. The permit system leaves "ordinary" users in their common law position, without requiring them to obtain a permit. But all users for other purposes whose works were constructed or expanded after March 29, 1961 and whose withdrawal exceeds 10,000 gallons per day must obtain permits issued by the Executive Director, Water Resources (hereinafter "Executive Director (WR)").<sup>19</sup> Moreover, any other extraordinary users, regardless of when their works were constructed or their rate of withdrawal, may be required to obtain a permit if, in the opinion of the Executive Director (WR), their withdrawals interfere with any private or public interest in any waters.<sup>20</sup> He also has the power to stop or regulate removal of water from any excavation made for purposes other than obtaining water supplies, such as a gravel pit or quarry, where water removal sometimes lowers the water table in nearby wells.<sup>21</sup>

The Executive Director (WR) has the exclusive discretion to issue,

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<sup>15</sup> *Chasemore v. Richards* (1859), 11 E.R. 140; 7 H.L.C. 349; *Acton v. Blundell* (1843), 152 E.R. 1223; *Bradford Corp v. Pickles*, [1895] A.C. 587 (H.L.).

<sup>16</sup> However, it has been stated that where water flows underground in a defined channel or course, the rules of riparian rights applicable to surface water flowing through natural watercourses apply. *Chasemore v. Richards* (1859), 11 E.R. 140; 7 H.L.C. 349.

<sup>17</sup> See *Wood v. Waud* (1849), 3 Exch. 748 at 776; 154 E.R. 1047 at 1059; and the recent decision of The Supreme Court of Canada: *Epstein v. Reymes*, [1973] S.C.R. 85.

<sup>18</sup> R.S.O. 1970, c. 332, as amended by S.O. 1972, c. 1, s. 70. In addition, this Act, *inter alia*, dissolves the Ontario Water Resources Commission; establishes the Environmental Hearing Board which is empowered to hold public hearings on matters put before it by the Assistant Deputy Minister of the Environment, the Executive Director Water Supply and Pollution Control, or the Executive Director (WR); provides for the regulation of effluent discharges into wells, lakes and rivers; requires licensing of those who engage in the business of well drilling; requires that certain water works and sewage works be approved by the Executive Director Water Supply and Pollution Control; allows municipalities to enter into agreements with the Crown in respect of water and sewage works development; and sets up an appeal procedure in respect of certain administrative decisions.

<sup>19</sup> *Id.*, s. 37(3).

<sup>20</sup> *Id.*, s. 37(2) and s. 37(4).

<sup>21</sup> *Id.*, s. 37(7).

refuse to issue and to cancel permits, and to impose and alter terms and conditions attaching to them. Thus the critical decisions are left to administrative discretion, although appeals are provided for in the granting of permits.<sup>22</sup>

The Act covers withdrawals of both surface and groundwater, and the permit system applies equally to both.<sup>23</sup> Whereas the common law distinguishes between "ordinary" and "extraordinary" uses of surface (but not ground) water, the permit system generally exempts "ordinary" users and is primarily a means of regulating "extraordinary" users, regardless of whether they take from surface or groundwater sources.

The grant of a permit does not remove any of the common law obligations of the permittee, but requires him in addition to conform to the stipulations of the permit. Thus, an "extraordinary" user who obtains a permit is still subject to the riparian rights doctrine: he might have his supply diminished by an increase in the number of "ordinary" users upstream; he must use the water for purposes reasonably connected with the riparian land; he must return the water substantially undiminished in quantity and quality to the watercourse; and he must make use of a "reasonable" quantity — an amount that could conceivably be less than the maximum stipulated in his permit.

Permits in themselves confer no private rights to water use. The common law status of "ordinary" users is not disturbed by permits granted to extraordinary users.<sup>24</sup> Similarly, an allocation through permit does not affect the reasonableness criterion of the riparian doctrine as it applies to extraordinary users *inter se*, nor does it enhance the status of non-riparian users. Hence it is possible that a permit could authorize a larger rate of use than that which would be "reasonable"; in which case the conflict would resolve in favour of the common law criterion. Conversely (and somewhat anomalously) an extraordinary user could exceed the terms of his permit and still be "reasonable": in such a case he would be liable to prosecution for exceeding the terms of his permit but he would not be liable at common law.<sup>25</sup> In effect, the permit represents an upper limit upon the rate of extraordinary

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<sup>22</sup> *Id.*, s. 79: the first step is a hearing *de novo* before the Environmental Appeal Board, a body set up under the Environmental Protection Act. Decisions of this Board may be appealed on questions of law to the county court or on any question other than a question of law, to the Minister of the Environment. Decisions of the county court may be appealed to the Minister on any question other than a question of law. With ultimate appeal lying to the Minister, the Ministry retains control over permit granting policy.

<sup>23</sup> There is one exception to the uniform treatment of both surface and groundwater. Taking *surface* water into storage for watering livestock and poultry may require a permit, while storage of *groundwater* for the same purposes would never require a permit: *Id.*, s. 37(4) and s. 37(2).

<sup>24</sup> An exception to the preferred position of "ordinary" users is that they are deferred in favour of public water supplies in areas that are designated as sources of public water supply by the Executive Director (WR). In such areas no activity that may unduly diminish water availability is permitted. *Id.*, s. 36(1)(c). However, no such areas have been designated.

<sup>25</sup> *Id.*, s. 36.

water use so long as the withdrawal it authorizes is equal to or less than that which a court would consider "reasonable."

### 3. *Administration of the permit system*

The legislation only tersely sets out the skeletal structure of the permit system and provides no guidance to permit granting policy, to the nature of permits or to the manner in which the Executive Director (WR) is to exercise his wide discretionary powers. Thus it is necessary to look beyond the legislation to the internal policies of the Ministry in order to discover how water resources are allocated. Water taking permits may be granted to any occupier of land. An applicant is required to specify the purpose to which he proposes to put the water, the rate of withdrawal and the location of use. Although the Act gives the Minister of the Environment the authority to levy fees for permits, they are issued without charge. Once granted, the date on which a permit is issued is of no significance, except that the permittee may not interfere with the flows which were available to downstream users prior to the issue of the permit. Permits for surface water are limited to five-year terms and for groundwater, typically for ten years. A permittee is required to submit records of his rate of use on an annual (and sometimes, more frequent) basis.

Permits are issued to the party taking the water, and are not transferable to others.<sup>26</sup> They can be amended if the permittee changes the use to which his water is put, and cancelled for violation of their terms and conditions, for violation of the Act, or upon termination of the use of water or upon a change in the occupation of the appurtenant land. Establishment or alteration of works requires (with minor exceptions) the approval of the Executive Director of Water Supply and Pollution Control, who may also attach terms and conditions that he considers necessary. In addition, a condition of each permit is that it may be cancelled or varied for "conservation of water resources" or where withdrawal of the water may cause "injury, damage or loss." In practice, permits are not cancelled outright for these reasons; instead, withdrawal rates may be reduced.

On a given watercourse, permits are granted on a first come, first served basis, subject to several constraints and priorities. First, high priority is attached to protection of the supplies of "ordinary" users, and permits are not issued for water that would interfere with the flow available to them. Second, other "extraordinary" users who already hold permits are usually protected, as long as they have put their allocation to beneficial use (although a prior permittee who has an alternative source of supply, such as from a municipal system, might not be protected in the face of other demands). Beyond this, priorities among uses is very flexible, and considerable official discretion is exercised in determining the precedence of one use over another according to the perceived needs in different areas.

A major constraint in issuing permits relates to what is termed the "natural functioning of the stream": the objective is to avoid making alloca-

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<sup>26</sup> Information on the administration of the legislation was derived from personal interviews with government officials.

tions which would impair the ecological balance of a watercourse beyond some arbitrarily determined degree. Interpretation of this concept is largely left to administrative discretion, and the Ministry of Natural Resources is often consulted on various relevant matters, such as the flows required to maintain fish populations at viable levels. In pursuit of this goal, permits would not be issued or if issued, would have conditions attached to them to ensure that withdrawals do not reduce flows below critical levels during dry periods. In some cases, rates of withdrawal under permit are ordered to be reduced. For groundwater, the objective is to permit withdrawals only to the extent of the perennial rate of recharge of the aquifer.

These objectives imply a considerable reliance on streamflow and other hydrological data. For this purpose, the Ministry has a modest field staff of some 19 people who, in cooperation with the Hydrological Survey of Canada, maintain a network of gauging stations which provide a detailed monitoring of representative streams and observation wells, and to gather information on other watercourses wherever operational problems arise. Additional information is obtained from commercial well drillers who are required to be licensed and who must submit copies of all drilling logs to the Executive Director (WR).<sup>27</sup> Data on water use is obtained from a variety of sources. The records of withdrawals that are required of all permittees — usually annually — provide the most important source of information on water utilization (individual returns are kept confidential). The withdrawals of ordinary users are not monitored directly, although they can be estimated with reasonable accuracy. Large industrial applicants for permits are often required to gather hydrological data at their own expense. The branches of the Ministry concerned with pollution control and local Conservation Authorities also gather some information on water utilization.

Nevertheless, permits must often be issued with imprecise data about streamflows and the rate of aquifer recharging. To prevent excessive withdrawals, terms and conditions are attached to permits requiring, for example, that withdrawal rates be reduced in predictable periods of short supplies, and providing protection or compensation to other users who are adversely affected.<sup>28</sup> The ordering of withdrawal cutbacks is not common, partly because permittees are required, in any event, to avoid interfering with downstream uses and to avoid interfering with the “natural functioning” of the stream.

There are provisions for streamflow “sharing” as a means of reconciling conflicts during periods of inadequate streamflows. Some permits list a scale of withdrawal rates, patterned after the permittee’s works as far as possible, ranging from zero to the maximum rate authorized. Thus a sprinkler

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<sup>27</sup> See, *supra*, note 18, s. 40.

<sup>28</sup> Conditions attaching to a permit for groundwater might require, for example, that where the level of the water in the aquifer is drawn below the level of existing wells through the actions of a permittee, he reduce his rate of withdrawal, compensate the injured user for the cost of deepening his well or for the cost of connecting the injured user to an alternative source e.g. to a municipal system, or supply the injured user with an alternative source e.g. to a municipal system, or supply the injured user with an adequate quantity of water.

irrigator's permit might list alternative rates of intake sufficient to operate zero, four, eight and twelve sprinkler heads. If shortages develop, each permittee is ordered to reduce his rate of withdrawal to some lower rate. Hitherto, this formal "sharing" has been applied only in areas where irrigation was the dominant use. "Ordinary" users, who do not require permits, are exempt from those sharing arrangements. For times of low flows, permittees are encouraged to provide off-stream storage.

In its attempt to minimize the cost of regulation, the Ministry often issues permits in recognition of the risk of inadequate flows. The Ministry is organized to deal with any conflicts as they arise, primarily through the good offices of its field staff, persuasion, precautionary terms and conditions attached to permits, and if necessary, cutback orders and compulsory "sharing". In some cases permits are issued in excess of the available flow, but with terms and conditions attached to them necessary to ensure that they will not all be fully exercised at once.

The distribution of new permitted withdrawals among various purposes varies a good deal from year to year (for example, an enormous increase in authorizations in 1970 was due to two approvals for cooling water at thermal generating plants, which accounted for 92 percent of all new authorizations in that year). In 1971, a fairly typical year, 400 new permits were issued authorizing withdrawals in the amount of nearly 220 trillion gallons per day, mostly from surface sources. Of the total, 61 percent was authorized for industrial purposes, 28 percent for irrigation, 9 percent for municipal use, slightly more than 1 percent for commercial purposes and 0.1 percent for recreation.<sup>20</sup>

The major water users which are not covered by permits (apart from "ordinary" users and those which take less than 10,000 gallons per day) are the large older municipalities, industries and hydroelectric installations whose works predated the legislation. These operators could be ordered to obtain permits at any time, however. Federal water taking, such as at airports and other establishments, are exempt, as is water for use on Indian lands. Other provincial agencies, while not strictly required to do so, normally obtain permits for their water requirements.

#### 4. *Other Provincial Arrangements*

While the permit system provides the main policy instrument for water allocation in the province, several other statutory provisions touch on these arrangements in certain circumstances and the most important of these warrant brief mention here. The Lakes and Rivers Improvement Act<sup>30</sup> regulates

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<sup>20</sup> Ontario Water Resources Commission, *Annual Report* (Toronto, 1972) 71-73. In addition to the 400 new approvals in 1971, 48 authorizations were made by letter of approval. These, and some permits, specify conditions of water taking rather than amounts authorized.

<sup>30</sup>, R.S.O. 1970, c. 233, as amended by S.O. 1971, c. 50. Where anything done under the Act causes injurious affection to land, The Expropriations Act, R.S.O. 1970, c. 154 applies to provide compensation.

the construction and operation of dams and other works, and prohibits the dumping of debris into water. It has, among its objects, the protection of riparians' interests, preservation of public rights in the waters of the province and the management of natural resources dependent upon water. Its coverage of works and obstructions includes works for log driving (which has, however, declined to a rare practice in Ontario).<sup>31</sup> This Act, administered by the Ministry of Natural Resources, requires official approval for the siting of works and for the works themselves; a water taking permit is also required by The Ontario Water Resources Act to fill any dam.

Special status is given, through the Public Utilities Act<sup>32</sup> and the Municipal Act,<sup>33</sup> to municipalities, and through the Power Commission Act<sup>34</sup> to the Ontario Power Commission: these entities are empowered to expropriate riparian water rights with full compensation.<sup>35</sup>

In addition to its provisions for the supervision of water use and pollution control, The Ontario Water Resources Act provides for extensive provincial assistance to municipalities in financing, building and operating water supply and sewage works (to be discussed below). Other provincial legislation of less general importance includes The Drainage Act,<sup>36</sup> administered by the Ministry of Agriculture and Food, which permits cooperative arrangements for draining large areas of land; The Public Works Act,<sup>37</sup> which provides statutory powers to alter the course of rivers and streams; and The Conservation Authorities Act,<sup>38</sup> which offers scope to regional Conservation Authorities to construct works and undertake other measures for flood control, recreation and other purposes.

##### 5. Federal Involvement

Some constitutional uncertainty surrounds the scope for federal involve-

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<sup>31</sup> While this Act covers the construction of obstructions for log driving, the common law includes the right to float timber: *Upper Canada Improvement Co. v. Hydro Electric Power Commission of Ontario*, [1961] S.C.R. 486; 28 D.L.R. (2d) 276. To enjoy this right many users must comply with the vessel registration provisions of the Canada Shipping Act, R.S.C. 1970, c. S-9.

<sup>32</sup>, R.S.O. 1970, c. 390, s. 2(1).

<sup>33</sup>, R.S.O. 1970, c. 284 (as amended), Part XV, and see *McCurdy v. Township of Bayham*, [1935] O.R. 271; [1935] O.W.N. 221 (Ont. C.A.); *Imperial Varnish & Colour Co. v. City of Toronto* (1927), 60 O.L.R. 240; [1927] 2 D.L.R. 860.

<sup>34</sup>, R.S.O. 1970 (as amended), c. 354, ss. 24, 34.

<sup>35</sup> The Ontario Water Resources Act, R.S.O. 1970, c. 332, s. 23, simplifies the acquisition of rights or interests in land in respect of water works or sewage works construction where the grantee is the Crown (or a municipality having a contract with the Crown concerning water works or sewage works) by doing away with the common law requirement that an easement operate in favour of a dominant tenement.

<sup>36</sup>, R.S.O. 1970, c. 136, (as amended).

<sup>37</sup>, R.S.O. 1970, c. 393, (as amended), administered by the Ministry of Government Services.

<sup>38</sup>, R.S.O. 1970, c. 78, (as amended) ss. 17(1), 20 administered by the Ministry of Natural Resources.

ment in water resource management.<sup>39</sup> Additionally, there is the question whether federal involvement in this subject area is desirable.<sup>40</sup> These two points largely explain the lack of initiative shown by the federal government until recently, and the absence of significant federal participation in Ontario water-resource management, apart from boundary-water issues.<sup>41</sup> However, the surge of public interest in pollution and environmental matters has led the federal government to take a much greater interest in water resource management through the Department of the Environment and the Canada Water Act of 1970.<sup>42</sup> This Act is a response to problems arising from increasing demands on water and pollution of water and the environment generally, and is the federal government's most significant attempt toward a comprehensive water management policy.<sup>43</sup>

The Act empowers the federal government to enter into agreements with provincial governments in respect of any waters in which "there is a significant national interest" in their management. These agreements are to establish programmes for preparing inventories of such waters; collecting data on their quality, flows and use; conducting research on them; and for formulating comprehensive management plans and projects for their conservation and use. The agreements may also provide for implementation of plans and projects. The Act sanctions federal-provincial consultative bodies, established on a national, provincial, and on a regional drainage basin basis, to facilitate coordination of policies and programmes, to provide advice on their formula-

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<sup>39</sup> See, for example, D. Gibson, *The Constitutional Context of Canadian Water Planning* (1968/69), 7 Alta. L. Rev. 71 wherein the author advocates a "basin oriented" water management system requiring significant federal involvement which he feels could be accomplished under the present constitution; P. Emond, *The Case for a Greater Federal Role in the Environmental Protection Field: An Examination of the Pollution Problem and the Constitution* (1972), 10 Osgoode Hall L.J. 647; S. Stein, *An Opinion on the Constitutional Validity of Proposed Canada Water Act* (1970) 28 U. of T. Fac. of Law Rev. 74; Dept. of the A.G. Ont., *An Opinion Re: The Constitutionality of the Canada Water Act*; L. McGrady, *Jurisdiction for Water Resources development* (1966-67) 2 Man. Law. J. 219; G. La Forest, *Interprovincial Rivers* (1972), 50 Can. Bar. Rev. 39. See also, *R. v. Interprovincial Co-operatives Ltd. & Dryden Chemicals Ltd.*, [1973] 3 W.W.R. 673 (Man. C.A.).

<sup>40</sup> See H. Landis, *Legal Controls of Pollution in the Great Lakes Basin* (1970), 48 Can. Bar. Rev. 66 at 156-157.

<sup>41</sup> O. Dwivedi, *The Canadian Government Response to Environmental Concern* (1973), 28 Int. J. 134.

<sup>42</sup> R.S.C. 1970 (1st Supp.), C.S., as am. by R.S.C. 1970 (2nd Supp.), c. 14, s. 30. The Department of the Environment is divided into six services, one of which is the Water Management Service. There are also three advisory councils: The Forestry Advisory Council, The Fisheries Advisory Council and the Environmental Advisory Council.

<sup>43</sup> The Act deals separately with "Comprehensive Water Resource Management," "Water Quality Management" and "Nutrients." The role of the federal government varies among four categories of waters which are distinguished in the Act. *Federal waters* are waters under exclusive federal jurisdiction; *inter-jurisdictional waters* may or may not be situated entirely within a province but significantly affect the flow or quality of waters outside the province; *international waters* are those of rivers that flow across the boundary with the United States; and *boundary waters* are lakes and rivers along which the international boundary passes. *Id.*, s. 2. In Ontario the Act thus appears to have greatest potential application to the Great Lakes and to the Ottawa and Winnipeg River Systems.

tion and to offer guidance on research, planning, conservation and utilization of water resources.<sup>44</sup>

The constitutional validity of the provisions of the Canada Water Act has not been tested in the courts, and considerable uncertainty surrounds the competence of the federal Parliament to legislate in this area.<sup>45</sup> Thus the federal role in future water resource management in Ontario, and indeed in the other provinces, remains questionable. To date the only activity in the province undertaken pursuant to this Act has been in recommending measures to alleviate pollution in the Great Lakes (see *infra*).

Up to the present, the federal role in Ontario water management has depended on several other statutes. The International Rivers Improvements Act<sup>46</sup> regulates the construction and operation of dams, canals, reservoirs and other works if they alter the natural flow or wherever they interfere with the actual or potential use of the river outside Canada. The legislation requires a licence for construction and operation of improvements on international rivers, except for certain works that are exempted by the Minister, according to criteria set out in the regulations.<sup>47</sup>

The International Boundary Waters Treaty Act<sup>48</sup> was enacted to ratify the International Boundary Waters Treaty of 1909 with the United States.<sup>49</sup>

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<sup>44</sup> With respect to *federal waters* the Act contemplates the federal government undertaking these activities unilaterally. It may also act alone on *international, boundary, and inter-jurisdictional* waters if it is unable to reach agreement with the province(s) having an interest in these waters. However, with respect to *inter-jurisdictional* waters the Act mentions unilateral federal action only in the formulation of plans and projects, and says nothing about their implementation. *Id.*, ss. 5(1)(b), s. 5(2), s. 5(3). Stein, *supra*, note 39 suggests that the reason for this difference is the doubt about the constitutionality of federal implementation of programmes for water management in the broadly defined category of *inter-jurisdictional waters*.

<sup>45</sup> See, *supra*, note 39.

<sup>46</sup>, R.S.C. 1970, c. I-22, as amended by R.S.C. 1970 (2nd Supp.), c. 14. Under this Act an "international river" is defined as water flowing from any place in Canada to any place outside Canada (s. 2.).

<sup>47</sup> *Id.*, s. 7; excepted are, *inter alia*, works which are used solely for domestic, sanitary, or irrigation purposes or other similar consumptive purposes. See also, S.O.R./56-9, s. 3, which allows the Minister to exclude any international river improvement from the operation of the Act. S.O.R./56-9, s. 5 (1)(a) also excepts works if they alter the level of water at the international boundary by less than 0.1 feet or the flow at the point by less than 10 cubic feet per second.

<sup>48</sup>, R.S.C. 1970, c. 1-20.

<sup>49</sup> Under s. 132 of the British North America Act, the Parliament of Canada is empowered to legislate or alter domestic law with respect to the implementation of treaty obligations entered into by Canada as a member of the British Empire. The International Boundary Waters Treaty of 1909 was entered into by the Crown in right of the United Kingdom on behalf of The Dominion of Canada, and hence the treaty is such as is contemplated by s. 132. Thus, in order to meet the obligations undertaken in the Treaty, Parliament could legislate with respect to, say, Property and Civil Rights, even though under s. 92(13) of the B.N.A. Act such matters are otherwise under provincial jurisdiction.

However, a treaty entered into by the Crown in right of Canada, federally, which required legislation in a provincial sphere of competence as outlined in s. 92 of the B.N.A. Act, could not be implemented by Parliament in respect of those matters falling within provincial jurisdiction: *A.G. for Canada and A.G. for Ontario*, [1937] A.C. 326, and see Gibson, *supra*, note 39.



This Act is aimed at preventing, and providing the means for adjusting and settling, disputes between Canada and the United States over the use of waters along their common border. Toward this end it established the International Joint Commission ("IJC"), comprised of three Commissioners from each country. The Treaty commits the two governments to refer certain kinds of projects, affecting waters forming or crossing the boundary, to the IJC for approval. Among other provisions, it also sets specific limits (revised by a later Treaty) for diversions of the Niagara River above the Falls, in order to divide the flows between the two countries' power plants and the Falls themselves. Another important provision confers standing upon persons in the United States to sue in Canadian courts. This unusual privilege exists where an injured person would have such a right under the domestic law of the province where interference or diversion with boundary waters' levels or flows took place. The Federal Court of Canada has jurisdiction.<sup>50</sup>

The IJC is automatically involved whenever it is proposed to divert or obstruct "boundary waters" (along which the boundary passes) or obstruct any river downstream of the boundary if the effect would be to alter the natural level or flow on the other side of the border.<sup>51</sup> ("Upstream" or "tributary" works are therefore outside this involvement.) In addition to the approval of the Ontario government, approval of the federal government and of the IJC would be required for such works as the canal, locks and power plant on the Canadian side at Sault Ste. Marie, if any of them affected levels or flows in either Lake Superior or across the river in Michigan. In giving its approval, the IJC has regard to two principles: that equal and similar rights should be accorded to the two countries on their own side of the boundary; and that it should observe an order of preference when conflicts arise (precedence, in declining order, is given to uses existing in 1909, domestic and sanitary uses, navigation and power). Furthermore, the IJC may require protective works or indemnities as a condition of its approval.

While the Treaty does not call for IJC approval in questions concerning pollution or other boundary problems, such questions are nevertheless frequently referred to it by the two governments for recommendations. In Ontario, the IJC's attention has been divided since the early part of the century between "approval" questions such as those concerning the levels of the Great Lakes, and pollution problems (see *infra*).

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<sup>50</sup> See, *supra*, note 48, s. 4; see article II of the Treaty imposing a corresponding obligation on the United States. But compare *Albert v. Frazer Co.*, [1937] 1 D.L.R. 39, where the New Brunswick Supreme Court, Appeal Division, held that it did not have jurisdiction to entertain a claim against a New Brunswick resident for damage caused by his obstructing a river in New Brunswick which caused flooding on the plaintiff's land located in Quebec. The decision has been criticized: see Gibson, *supra*, note 39. See also *R. v. Interprovincial Co-operatives Ltd. & Dryden Chemicals Ltd.*, *supra*, note 39.

<sup>51</sup> Approval is not required, however, where either federal government carries out works (such as channel deepening, breakwater construction or harbour development) for improvement of navigation and for the benefit of commerce, provided such works do not affect water levels or flows and are wholly on its own side of the boundary. "Ordinary" uses of water for domestic and sanitary purposes are also excepted. See Article VII of the Treaty.

In addition to these federal statutes that apply to specified geographical situations, there is federal jurisdiction over certain uses of waters, the most important being navigation and fisheries. The federal Parliament preserves the public right to use inland waters for navigation, developed at common law, through the Navigable Water Protection Act,<sup>52</sup> which requires official permission for any obstruction to navigable waters. The Fisheries Act<sup>53</sup> provides the federal Minister of the Environment with powers to control the obstruction of fish streams. However, the provincial Ministry of Natural Resources effectively manages the commercial and sports fisheries in the province (unlike some other provinces) and federal intervention under the Fisheries Act in the regulation of flows is rare. The Great Lakes Fisheries Convention Act<sup>54</sup> was enacted to implement the Convention on Great Lakes Fisheries between Canada and the United States in response to a decline in some of the fisheries of the Great Lakes and their tributaries, but this has not so far been an instrument for federal regulation of water use in Ontario.

#### 6. *Municipal and Regional Arrangements*

A conspicuous feature of Ontario's administration of water supplies and pollution control is the heavy involvement of the province in municipal water and sewage systems. Thus provincial policy depends on arrangements for provincial involvement in the financing, building and operation of local works.<sup>55</sup> In order to encourage municipalities — particularly small ones for which the cost of service per household is usually highest — to construct water and sewage systems, the government has introduced three assistance plans administered by the Ministry of the Environment. The first simply provides long-term financing to municipalities for terms of up to 30 years at provincial government interest rates. The Ministry plans and supervises the installation and operation of the works, and retains ownership of them until the loan is paid. This plan provides no provincial subsidy other than the services of the Ministry's officials, although certain sewage works are eligible for subsidies under the federal Central Mortgage and Housing Corporation.<sup>56</sup>

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<sup>52</sup>, R.S.C. 1970, c. N-19 The common law rules regarding navigation are discussed in *Simpson Sand Co. v. Black Douglas Contractors Ltd.*, [1964] S.C.R. 333; *Stephens v. MacMillan*, [1954] O.R. 133; [1954] 2 D.L.R. 135; *Orr Ewing v. Colquhoun* (1877), 2 A.C. 839 at 854; 35 Halsbury (3rd) 804 and 39 Halsbury (3rd) 540 *et seq.*. Management of federal dams, hydraulic works and other navigation improvements vests in the Minister of Public Works: Public Works Act, R.S.C. 1970, c. P-38, s. 9(1)(a).

<sup>53</sup> R.S.C. 1970, c. F-14.

<sup>54</sup> R.S.C. 1970, c. F-15. The Act authorizes the Governor-in-Council to make regulations to carry out the provisions of the Convention, signed in 1955. However, no such regulations appear to have been made to date.

<sup>55</sup> As mentioned *supra*, note 24, The Ontario Water Resources Act provides for the designation, by order, of waters as public water service or sewage service areas, and in such areas the Assistant Deputy Minister has wide powers to regulate water use and waste disposal (see ss. 41, 61). This authority has not hitherto been exercised.

<sup>56</sup> See *Provincial Assistance to Small Municipalities for Water and Sewage Projects*, and *There Are Three Ways to Get a New Water or Sewage System*, information leaflets published by the Ontario Water Resources Commission, Toronto.

Under The Ontario Municipal Board Act,<sup>57</sup> any municipal undertaking to finance projects over a period more than one year requires approval of the Ontario Municipal Board.<sup>58</sup> As judged by the Board, this provincial loan scheme left water and sewage systems beyond the financial capability of many small municipalities. Accordingly, in 1969, another scheme was introduced by which the province would build and operate works under 40-year financing, selling the water or sewage service on a per gallon basis to municipalities at subsidized rates based on the per household cost of service. In addition to generous financing schedules (which often means that works operate at a loss during early years), the province forgives a portion of the capital cost in excess of a fixed annual cost per average household of water and sewage works servicing.

Under a third scheme, introduced at the same time, the province provides a flexible subsidy for increasing the capacity of municipal works to facilitate the integration of more than one municipal system and to provide for future needs.

The objective of these arrangements is to provide a once-and-for-all subsidy to small municipalities to establish required water and sewage systems; most small municipalities take advantage of one or more of these schemes in planning their facilities. Through these arrangements municipalities can take advantage of the expertise of the Ministry in planning, constructing and operating works, and in arranging their financing and administration. The Ministry works with municipalities in preparing local by-laws and providing for repayment of costs. Within the guidelines of The Public Utilities Act and The Municipal Act, sewage works are normally paid for through a mill rate on property, and sometimes by frontage charges or through a surcharge on the householders' water bill; water works are paid for through footage charges, and in some cases by area charges and per gallon rates. All municipalities are required to prepare planning projections; although the Ministry itself restricts its interest to the provision of required services, the assistance procedure provides for the reconciliation of local plans with the objectives of planning authorities in the Ministry of Treasury, Economics and Inter-Governmental Affairs, to which all project proposals are submitted for formal comment.

A potentially important role in water use can be exercised by the regional Conservation Authorities, which may be organized on a drainage basin basis under The Conservation Authorities Act.<sup>59</sup> With the support of two-thirds of the municipalities involved, the province will establish an Authority and provide 50 per cent of its approved financial requirements; the remainder being raised through an equalized property assessment by the municipalities. The governing board is comprised of representatives of the municipalities involved.

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<sup>57</sup> R.S.O. 1970, c. 323.

<sup>58</sup> The Ontario Municipal Board is entirely separate from the Department of Municipal Affairs. It is a quasi-judicial body with wide powers, particularly in arbitrating between municipalities and between municipalities and individuals, and in approving municipal debts. *Id.*, ss. 36, 64.

<sup>59</sup> See, *supra*, note 38.

The legislation provides considerable flexibility in the functions of Conservation Authorities, but hitherto they have been concerned primarily with water projects and particularly flood control works involving dams and re-channelling of rivers. More recently, their involvement in regional water projects, land acquisition and floodland management has led to multi-purpose schemes with recreation being an important concern.

The relationship of the Authorities with the provincial government is primarily through the Ministry of Natural Resources, which administers the Act, although the Ministry of Environment may request comments from Authorities on matters of pollution control and Authorities often request action from the Ministry on pollution problems. In addition, Authorities require permits from the Ministry for any works they propose which involve the taking or storage of water. The scope and vigor of the 40 or so Authorities established so far (mostly in the southern part of the province) varies widely. Their strength appears to derive from the high degree of local involvement and autonomy in addressing problems on a comprehensive drainage basin basis. Their governing boards, however, are susceptible to rapid turnover in membership, are subject to the vicissitudes of municipal political priorities and interests, and sometimes find themselves in conflict with the province.<sup>60</sup> The future role and authority of Conservation Authorities in water resource management appears somewhat uncertain, particularly in light of the development of regional government through integration of municipalities.<sup>61</sup>

#### 7. *Economic Implications of Flow Allocation Arrangements*

Taken together, all these provisions for water allocation in Ontario create a pattern of water use determined by a mixture of common law, provincial and federal legislation, administrative controls and incentives, and local decisions. Most rural domestic and small agricultural users not linked to collective supplies obtain surface or groundwater supplies under the common law, and lie outside the main control mechanisms. The permit system is the primary instrument of regulation, and covers most other users. Urban users are served by municipal systems, often with provincial assistance, and industrial and commercial users are encouraged to link to these collective works. Most other users draw water under individual permits. A variety of other provincial and federal legislation regulates specific uses of water or the use of water in particular locations.

Economic efficiency in allocating a resource, as described earlier, refers to the extent to which it is allowed to generate its full potential social value.

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<sup>60</sup> For example, the Hamilton Region Conservation Authority, one of the most vigorous in the province, successfully opposed a major highway project in the region, and is currently opposing a provincially-sanctioned expansion of a steel mill on reclaimed land in Hamilton harbour.

<sup>61</sup> Two recent Master of Arts theses at the University of Waterloo provide useful discussions of the role and structure of Conservation Authorities: P. Meman, *Conservation Authorities as an Institutional Approach to Water Resource Management in Southern Ontario: A Case Study of the Grand River Conservation Authority* (School of Urban and Regional Planning, 1970); and D. Wood, *An Investigation of the Objectives of the Conservation Authorities of Ontario* (Department of Geography, 1972).

If water is to be used efficiently in this sense, the system employed in allocating it must meet certain identifiable criteria. All potential users, regardless of their location or other characteristics, must be provided with means to acquire access to the resource. Public and collective demands as well as those of private users must be recognized and all must be treated without bias. To ensure that the flow of any particular watercourse is put to its highest combination of uses the system must take account of the relative value of water at the margin in different uses, and reallocate supplies wherever this would enhance the aggregate social value generated. The arrangements must minimize insecurity of rights and uncertainty of supplies. And they must provide for flexibility as conditions that affect relative values change through time. In light of the foregoing review of the provisions for allocating water resources in Ontario, we can assess the extent to which these criteria for efficiency are met.

a) *Provision for all uses and users.* The common law and permit system together appear to offer sufficient scope to provide for all potential *private* uses and users. Provisions for *public* uses are less specific however. Municipal water supplies and hydro needs are, of course, given special preference under separate statutes; and the legislation and administrative practice relating to the permit system provide for some non-commercial public values through recognition of recreational and aesthetic uses. Discretionary initiative by the Executive Director (WR) is required, however, to prevent "ordinary" users from damaging public uses in the course of exercising their common law rights.

Many non-consumptive public values such as aesthetic, recreational and sport-fishing benefits are protected if natural flows are maintained (subject also, of course, to the protection of water quality). The riparian doctrine thus offers some protection to public values through a riparian's right to insist that others do not interfere substantially with natural flows. Probably more important, however, is the permit system administrators' objective to maintain the "natural functioning" of watercourses. Insofar as this objective is achieved, public values that depend upon natural flows are protected. Nevertheless not all public values can be fully realized simply through maintenance of natural flows, but these other public values may be enhanced by regulation of levels and flows, impoundments and so on. In Ontario only those areas served by active Conservation Authorities appear to be able to respond efficiently to the need for such works on a drainage system basis.

The federal role is also directed largely to the regulation of levels, flows and obstructions in those restricted circumstances in which federal authority is exercised. Through the protection it affords to specific non-consumptive uses such as navigation and fisheries it tends incidentally to protect other values that depend on uninterrupted flows as well.

An important part of the federal role is the means it provides for enhancing efficiency in the use of waters in which other jurisdictions and the nation as a whole have joint interest, where unilateral (and perhaps competitive) regulation by the province and the other jurisdiction(s) separately would be incapable of allocating the total flow efficiently. As emphasized

earlier, efficient management of a water system requires an authority with sufficient scope to take account of all the interdependent demands on it. The provisions for cooperation with the province and the reciprocal approval arrangements with the United States with respect to waters of joint interest provide mechanisms with the necessary scope to reconcile and compromise the interests of the province with those of other jurisdictions in the use of these waters. But where both federal and provincial legislation applies to the same waters, the interests of the two governments cannot be expected to be always identical. Thus, while federal inter-jurisdictional arrangements may enable the province to utilize water more efficiently within the constraints they impose, management decisions that maximise the national or joint-jurisdictional interest will not always be coincident with the provincial interest.

Although the system as a whole offers scope for the recognition of most water uses, they are not all coordinated through a comprehensive regulatory device. Ordinary users are not regulated through the main policy instrument—the permit system—nor is provision made for other users whose works predated the 1961 legislation or most public *in situ* uses such as recreation. Federal statutes and other special purpose provincial legislation restrict the freedom of permittees to carry out certain activities. These features may discourage a coordinated approach to resolve conflicting demands for water.

b) *Allocation to highest use.* The most conspicuous shortcoming of the allocation system from the point of view of economic efficiency is its bias in the treatment of different uses and users without reference to the social values served. The preferences provided to certain uses and to users in certain circumstances militate against efficient use of water and other resources by encouraging the consumption of water in preferred uses that could be put to more valuable uses elsewhere or in other activities. Thus the system offers special privileges to users on riparian land through their common law rights to surface water, creating an obvious incentive for water users to seek preferred locations on watercourses and tending to distort the geographical pattern of economic activity. Moreover, on any stream, a location close to its source offers greater security of supply because it is less susceptible to interference by upstream riparians. Easy transferability of rights among riparians and to non-riparians would help to overcome these common law preferences; unfortunately, the existing arrangements for transfers and easements are too cumbersome, costly and imperfect to leave the system neutral (see also (d) *infra*). As a result, the distribution of economic activity between riparian and non-riparian land, and along watercourses, is different from that which would obtain if all users had equal access to flows, and hence different also from the most efficient geographical pattern. The social cost of these distortions is manifest not so much in the misuses of water as in more subtle misallocations of land and capital as users select locations that are otherwise less suitable from the point of land use, markets and transportation facilities.

More important than these spatial distortions are the biases which occur in allocating water among uses. The common law affords priority to domestic and livestock uses of surface water. Even riparians who could put water to more productive use may find the process of negotiating numerous private easements cumbersome and expensive. This preference is further buttressed

by the administrative practice of protecting ordinary uses in allocating permits. The special statutory privileges provided to municipalities introduce a bias in favour of locating water-using activities within areas served by municipal systems. Ordinary users, municipalities and Ontario Hydro can use water with relative impunity, regardless of the value that it could contribute in other activities.

The permit-granting authorities give priority to established users almost without exception. Beyond this they give precedence to domestic and livestock uses over municipal, commercial and industrial purposes, and tend to accord these higher priority than recreational and aesthetic uses. Other priorities are implied by the special constitutional responsibilities of the federal Parliament in navigation, fisheries and certain foreign relations (although the approvals required under the various statutes protecting these interests do not necessarily mean that other water uses are inadequately considered). As we have seen, the International Joint Commission operates under explicit priorities of use, which, to a degree, complement those of the provincial authorities. Only the Canada Water Act and the Conservation Authorities Act expressly provide for a full and unbiased recognition of all interdependent water uses: the former's provisions for comprehensive resource management are applicable only in certain circumstances and, in any event, have not been applied in Ontario; the opportunities provided to regional Conservation Authorities under the latter Act have not been fully exploited by them, nor has the province passed the regulations necessary for them to do so.<sup>62</sup>

All these preferences and biases have an inevitable effect on the pattern of use of water, land, capital and labour, and the resulting pattern is inefficient in that the resource is not allocated according to the social value it generates in alternative uses. To the extent that this pattern differs through the impact of these distortions, the contribution of water resources to social welfare falls short of its potential. Indeed, even if the preferences to some categories of users were meant to serve some goal of public policy other than economic efficiency, they could not achieve a consistent result, because the value of the indirect subsidy they receive varies with the alternative demands on each watercourse.

Indeed, throughout the regulatory system, there is no explicit recognition of the value of water in alternative uses. The preferences and priorities applied bear no apparent correlation with the social value that water is capable of generating in various uses, nor can they: because, as we have earlier emphasized, the value of a gallon of water varies with the quantity put to any one purpose. Any user enjoying a general priority and paying at most a lump-sum price will rationally expand his usage until the falling marginal value of water to him is not merely less than its value to others, but has become zero. Such is the case not only with individual permittees but, equally important, with unmetered customers of municipal systems. These conditions are inefficient: the aggregate value that could be generated by water is sub-

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<sup>62</sup> Thus, for example, The Conservation Authorities Act provides for regulations to require that permits be issued only for uses sanctioned by the Conservation Authority. No such regulations have been passed.

optimal. This lack of a mechanism capable of taking account of water's marginal value among different activities and persons is probably the most serious, and least appreciated, failure in the system. Its full social cost in foregone private and social benefits can be expected to increase as demands on Ontario's fixed water resources grow.

c) *Security of supplies.* Natural flows are always subject to a degree of variability, although the effects of fluctuations can be mitigated at least in part through expenditures on hydrographic information, storage works and reserve facilities. Theoretically, the optimum expenditure on information gathering and precautionary facilities is determined by the point at which the benefits derived from further outlays no longer exceed the cost. It is difficult to judge whether the level of such expenditures in Ontario is adequate, or whether they take the most efficient form; we can observe only that these activities are not subjected to systematic economic evaluation within the Ministry. Given the constraints of available flows, an efficient allocative system must provide users with supplies that are secure from encroachment by others. To the extent that avoidable insecurity of supplies prevails, economic waste results either from users' excessive expenditures on storage and other precautionary works or from losses in production or enjoyment in periods of interrupted supplies. In addition, waste can result from priorities given to geographical location if security of supplies varies with position on a stream, and from necessity to resort to costly arrangements for securing reliable flows by legal or administrative means.

Under the riparian system in Ontario, each riparian's right is subject to the rights of other riparians on the same watercourse, and he has no recourse if his flow is diminished through other riparians' legal exercise of their rights. Moreover, a riparian always faces the threat of an increase in the number of upstream or downstream riparians; he may be forced to share his supply with any number of newcomers in the future.<sup>63</sup> Similarly, an upper riparian who had made "extraordinary" use of water for less than the twenty-year prescriptive period faces the possibility that new riparian neighbours below him could insist on the strict observance of their rights, notwithstanding that prior to their arrival he had used the water with impunity.

Riparians can, theoretically, protect their supplies from interference by others through easements and other contractual arrangements for transferring rights from one riparian to another; and, through similar measures, non-riparians can attempt to protect their supplies against interference by riparians. Such arrangements offer limited protection even in law, and are likely to be cumbersome and costly.<sup>64</sup> Moreover they cannot protect against new grantees of Crown riparian land who might insist on strict observance of their riparian

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<sup>63</sup> This point is developed fully by W. Ellis, *Water Rights — What are They and How are They Created?* (1967), 13 Rocky Mt. M. L. Inst. 451.

<sup>64</sup> As noted earlier, an extraordinary riparian user seeking secure tenure might have to deal with every other riparian on the watercourse who might be affected, in order to have them relinquish their rights to flows. A non-riparian who seeks secure flows by such means is in an even weaker position unless he bargains with all upstream and downstream riparians because all riparian demands (including unreasonable, extraordinary uses) take precedence over his.



rights. Further, it is apparent that underground supplies are highly vulnerable to the actions of other users. For these reasons, and because of the omnipresent regulatory power of the permit system, privately negotiated arrangements designed to secure free flows from encroachment by others are not common in Ontario.<sup>65</sup>

While the permit system serves to regulate extraordinary users, it does not protect them against interference resulting from the exercise of common law rights by others. This can be accomplished only by bringing the common law users under the umbrella of the permit arrangements. Nor does the permit system offer greater security of flow: permittees are subject to the same constraints as other common law users, and further, they may be called upon by the governing regulatory authorities to share reductions in flows.

Finally, a good measure of uncertainty attends the legal interpretation of "reasonable" and "extraordinary". Whether a use is "reasonable" is a question of fact, and must be determined in its own circumstances. It depends to some extent on the size of the streamflow from which withdrawals are made. A reasonable use at one time may not be so at a later time; likewise changes in the conditions of the property or the district in which it is located could cause an extraordinary user to become an ordinary user and vice versa.<sup>66</sup> Whatever the legal interpretation of these terms, they are not based on economic considerations, and the uncertainty that attends them in any particular case makes it difficult, not only for common law users but also for those who take water under permit, to predict the security of their rights to supplies. Moreover, the security of flows under permits rests heavily upon administrative discretion exercised in renewing permits, in altering their terms as conditions change, in coping with temporary shortages or fluctuation in the water table, and in responding to alterations in permittees' use or works. In contrast, the few circumstances of federal legislative intervention that we have mentioned can be regarded as being directed toward securing the availability of water for the prescribed purposes.

A lack of certainty about available supplies created by inadequate hydrological information, the risk of interference by others, or the possibility of changes in the exercise of administrative discretion can result in a variety of economic costs. Unreliable streamflow or groundwater information may result in erroneous decisions to deny permits, and the loss is the value of the unused water. Users are likely to resort to costly storage and other precautionary works that might otherwise be unnecessary. They may be reluctant

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<sup>65</sup> We have been unable to find evidence of frequent resort to such private contractual arrangements comparable, say, to the "smoke easements" which are common in the Sudbury area by which industrial dischargers of airborne emissions protect themselves against actions by nearby landowners. It is the belief of officials of the Ministry, also, that such private arrangements are uncommon.

<sup>66</sup> Per Brett, M.R., in *Omerod v. Todmorden Joint Stock Mill Co.* (1883), 11 Q.B.D. 155: ". . . it may be that the question what is an ordinary use depends upon the development of trade in the neighbourhood, and on the use which the water of rivers is put in the adjoining district. The diffusion of trade may make a great change as to what constitutes an extraordinary use of running water." (all *obiter dicta*).

to make beneficial changes in their use or works to avoid the risk of applying for a new permit. And in selecting locations they are likely to prefer those which have an abundance of unused water and with few potential competitors even though a sufficient supply may exist in an otherwise more efficient location. The Ontario Water Resources Act was in large measure a response to increasingly frequent interferences with the water table by new well drillers, and competition among farmers (particularly tobacco growers in the southern regions) for scarce supplies during short dry periods of high irrigation demand. While the present regulatory system has proved adequate to eliminate some of the most obvious waste and inefficiency in these situations, the impediments to security of supplies remain.

d) *Flexibility and transferability of rights to flows.* Distortions that are introduced through biases in the procedures for initial allocation of water among uses can be mitigated by transferability of rights among users. Moreover, since economic and social conditions constantly change, an efficient system must facilitate the transfer of water from uses in which its value declines to those in which its value rises. Insofar as the market accurately reflects social values, this can be accomplished through private marketability of water rights: users who can put it to more beneficial use would be able and willing to acquire rights from those to whom it is of lower value (see *infra*). The alternative is an administrative system that systematically weighs relative values in allocating rights to scarce supplies, and stands ready to reallocate them as circumstances change.

We have already observed the obstacles to private transfers of common law rights to water. Permits are explicitly non-transferable. And the reallocation of flows to achieve a more efficient pattern of use through administrative means is not regarded by the Ministry as a significant resource objective. On the contrary, under the permit scheme, ordinary users are not regulated, established permit holders are given strong protection, and the value of water consumed in alternative permitted uses is not usually considered. Moreover, the system provides a strong disincentive for permit holders to relinquish their rights: since no charge is levied for the permitted withdrawals, the value of this privilege to use the water resource inevitably becomes capitalized in the private value of the property to which it is appurtenant, and so to yield the privilege is to sacrifice a valuable asset. All these conditions, far from facilitating the reallocation of the resource tend to rigidify the established pattern.

This critique of the water allocation system in Ontario might lead one to expect a good deal of continuing conflict among water users and between users and the regulatory authorities. In fact, Ontario has seen remarkably little litigation in this area. Among several explanations for this, undoubtedly the most important is that the natural occurrence of water in the province has been relatively plentiful and generally well distributed in relation to the demand. In the absence of frequent and sharp competition for available flows, the regulatory authorities have not been forced to devise explicit techniques for evaluating alternative uses, and simplistic approaches, such as "first in time, first in right" have, for the most part, been adequate to the task of

resource allocation.<sup>67</sup> But already, in the more developed parts of the province at least, water supplies are neither costless to acquire, nor can they be had without effect on other uses. These economic implications of water allocation will obviously increase with growth in the population, industry, technology and environmental concern.

Another important explanation for the apparent quiescence among water users in the province is the readiness of the Ministry to exercise its enormous discretionary power to forestall litigation. The authorities see their responsibilities primarily as managers of the permit system, and while they neither encourage nor discourage the resolution of conflicts between common law users through the courts they stand ready to respond to complaints through their good offices, by requiring permits, by issuing orders and by other measures available to them to avoid infringement on established users' supplies. This tendency coupled with the cost and uncertainties of recourse to legal proceedings, explains the dearth of civil court experience and hence also why some aspects of common law rights and their relation to permittees remain somewhat vague. In any event, the permit system covers most significant water users, offering even greater scope for administrative solutions to conflicts. The Ministry puts a high value on the cooperative working relationships it has established with industrial and other users, and its approach has been to use its influence to achieve voluntary solutions to problems rather than to employ legal measures. Finally, new users, particularly new industrial ventures, tend to seek locations with abundant water not only to avoid having their permits encumbered with terms and conditions governing their withdrawals, but also to facilitate meeting water pollution control requirements (see *infra*). Their choice of such locations eliminate sources of potential conflict over flows.

However, as we have already implied, the absence of overt conflict cannot be regarded as proof that the resource is allocated efficiently. Indeed, the deficiencies of the system enumerated above in terms of its comprehensiveness, its neutrality among uses and users, its provisions for security of flows and its responsiveness to change probably cause significant misallocations of water, land and capital.

If water users are to use the resource efficiently, the system must provide them with incentives to do so. This means that, above all, they must be able to recognize and respond to the cost of their withdrawals including both the cost of delivering their supplies and any values foregone by diverting the flow from other potential uses — i.e. the "opportunity cost" of their con-

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<sup>67</sup> See J. Kratchman, *The Rise and Fall of Natural Resource Systems* (1973), 8 Land and Water Law Review 429 for an interesting discussion of the evolution of legal systems for regulating natural resource use. Primitive or frontier conditions, characterized by plentiful resources relative to demanders and single technology, tend to be associated with little or no legal framework for allocation, depending instead on uncomplicated principles and custom, such as "first in time, first in right". As pressures grow and such established rights are threatened, simple legislation is developed to institutionalize the previously informal operative principles in order to protect users and to reduce conflict. More advanced phases of development involve legislative recognition of multiple objectives of public policy, protection of the resource itself and provisions for reconciling conflicting interests.

sumption. Permits are issued free; but more important, users have no way of recognizing the *marginal* social cost of their withdrawals (the opportunity cost of consuming another gallon) because the private cost of supplies, to them, does not usually vary no matter how much they consume within the limits of their permitted allocation.

An economist's obvious solution to the problem is to employ the pricing system to allocate water, as it is used to allocate scarce land and other resources (and final goods and services) among competing demanders. By thus providing water to the highest bidders in each supply area, the allocation of the available supply to its most productive uses is assured. Such a system would be neutral among uses, providing users with security of supplies as long as they paid the competitive price, which would provide an automatic response to changing conditions of supply or demand. However, there are two difficulties with such a solution. First, the market cannot be depended upon to provide for the public services of water in place, such as recreation, fisheries, navigation and so on, and thus the system would have to be supplemented with other controls. Second, it would require very finely-tuned administrative procedures which may be excessive for the task. The ration price would have to differ on each watercourse or aquifer and (because of return flows) at different points on it, and it would have to vary flexibly through time. Such arrangements may be beyond the practicable capabilities of a public administrative agency.

Notwithstanding these difficulties in using a pricing system to allocate users' access to water, this general approach does offer a feasible means of inducing individual users to recognise the full opportunity cost of their withdrawals through metering and per gallon charges. Metering is still uncommon in many parts of Ontario and there is understandable concern about whether the benefits outweigh the costs of installing, maintaining and reading meters. Yet there is a good deal of evidence that metering (and unit pricing) leads to significant efficiencies in water use by both industries and households, and that it restrains the rate at which costly supply systems must be expanded.<sup>68</sup> We suspect that if all these benefits were fully recognised, and if water prices reflected the full opportunity cost of water used, metering would more often be seen to be beneficial.

An alternative to general pricing which offers the same economic advantages but avoids much of the administrative complexity is a simple system of transferable water rights such as is employed in some other jurisdictions.<sup>69</sup>

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<sup>68</sup> See, for example, the excellent quantitative study of the effect of water pricing in C. Howe and F. Linaweaver, Jr., *The Impact of Price on Residential Water Demand and Its Relation to System Design and Price Structure* (1967), 3 Water Resources Research 13. For a good summary of related studies, see C. Russell, *Restraining Demand by Pricing Water Withdrawals and Wastewater Disposal* (mimeo, Washington, D.C.: Resources for the Future, 1973 and forthcoming in the proceedings of a seminar on Management of Water Supplies, the University of East Anglia, Norwich, England, 1973), and see S. Hanke, "Pricing Urban Water," in S. Mushkin ed., *Public Prices for Public Products*, (Washington, D.C.: The Urban Institute, 1972) 283.

<sup>69</sup> The water rights system in British Columbia, for example, approaches this model. See R. Campbell, P. Pearse and A. Scott, *Water Allocation in British Columbia: An Economic Assessment of Public Policy* (1972), 7 U.B.C. Law Review 247.

Under this scheme the privilege of taking a prescribed quantity of water becomes a marketable property, and the authorities can issue more rights, or purchase some back, to suit their determination of the available flow. Procedures for initial allocations have less economic significance because of market incentives to reallocate supplies to the most productive uses. By such means users can obtain relatively secure rights to flows and the pattern of use remains responsive to changing conditions. The value of the right to water will at all times reflect the value of the resource to other users, and provide a financial incentive for the desired economy in using water. Such a system does not preclude metering individual users who are served by collective systems according to the opportunity cost of their consumption.

It should be noted, also, that either a price-rationing system or a rights arrangement offers a means of appropriating the value of the natural resource for the public landlord. In contrast, insofar as no levy for permits is made, Ontario's policy in allocating water (unlike land and other natural resources) involves relinquishing the Crown's economic interest in the value of the resource in favour of private users.

#### D. POLLUTION POLICIES FOR REGULATING WATER QUALITY

(The dimension of assimilative capacity).

The second economic dimension of the water resource is its capacity to assimilate and disperse wastes: water is one of the most valuable media for the disposal of municipal, industrial and agricultural residuals. Water is scarce in this dimension also, because the assimilative capacity of any watercourse is limited. The problem is the distribution and regulation of waste disposal privileges among dischargers to prevent the assimilative capacity from being taxed beyond desired limits. Again, the relevant devices of control in Ontario consist of a mixture of common law and legislation.

##### 1. Common Law

Anyone who uses water for waste disposal, or who adds or returns water to a watercourse, is restrained by the common law doctrines of riparian rights, public and private nuisance, negligence and certain other rules.<sup>70</sup> The common law provides riparians with the right to reasonable drainage of their

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<sup>70</sup> The rule in *Rylands v. Fletcher*, [1866] 1 Exch. 265; 4 H. & C. 263; [1861-73] All E.R. 1 places strict liability upon occupiers of land who collect anything on their land which, if it escapes, causes damage to another. The rule applies to "unnatural" uses and hence a reservoir which leaked causing damage to a neighbouring land owner was the basis of liability in the case. Presumably the rule could also apply to a manufacturer who collects effluent from his activities and discharges it into a watercourse causing damage to others. See *Fisher & Son Ltd. v. Doolittle and Wilcox Ltd.* (1912), 3 O.W.N. 1417; 22 O.W.R. 445, *obiter*.

Note also the possibility of liability in trespass as a result of effluent discharge into a watercourse. See *Ballard v. Tomlinson* (1885), 29 Ch.D. 115 (C.A.) per Cotton L.J. For a review of the common law of Ontario relating to water pollution see P. Anisman, *Water Pollution Control in Ontario* (1972), 5 *Ottawa Law Review* 342; J. McLaren, *The Common Law Nuisance Actions and the Environmental Battle — Well-Tempered Swords or Broken Reeds?* (1972), 10 *Osgoode Hall L.J.* 505.

land.<sup>71</sup> The most important provisions of riparian law pertaining to water quality relate not to the permitted actions of riparians, but rather to their protection from activities of others who interfere with their rights to clean water. (The distinction between "ordinary" users and "extraordinary" users is irrelevant here.) All riparians are entitled to the natural flow of the watercourse by their land "sensibly" undiminished and unaltered in character or quality.<sup>72</sup> Having proven that a "sensible" interference has occurred, the riparian need not prove that he incurred actual damages in seeking an injunction, damages or both. Even where the watercourse is already polluted by others, anyone who "sensibly" contributes to that pollution is liable to an affected riparian. And a discharger must not interfere with the private fisheries of persons who own the bed of a watercourse.<sup>73</sup> In determining liability in an action based on riparian rights, the court will not consider arguments concerning the local economic importance of the polluter's operations.<sup>74</sup>

The common law right enjoyed by an occupier of riparian land is not restricted to that water which he actually appropriates, he can take a *private* nuisance action against any discharger who alters the quality of the water and makes it unfit for the use to which he normally puts it.<sup>75</sup> Such actions differ from actions based on riparian rights in two significant respects: first, in a *private* nuisance action the injured party must prove "substantial" and

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<sup>71</sup> *Cawkell v. Russell* (1856), 26 L.J. Exch. 34; 112 R.R. 912; *McGillivray v. Township of Lochiel* (1904), 8 O.L.R. 446. He may thus reasonably increase the flow.

<sup>72</sup> *Young (John) and Co. v. Bankier Distilling Co.*, [1893] A.C. 691; 69 L.T.R. 838; *McKie v. KVP Co.*, [1948] 3 D.L.R. 201, aff'd [1949] 1 D.L.R. 39, [1948] O.W.N. 812, aff'd *sub nom. KVP Co. v. McKie*, [1949] 4 D.L.R. 497; [1949] S.C.R. 698; *Crowther v. Cobourg* (1912), 3 O.W.N. 490; 20 O.W.R. 844; *Stollmeyer v. Petroleum Development Co.*, [1918] A.C. 498; *Gauthier v. Naneff*, [1971] 1 O.R. 97. Increasing the temperature of the stream has been held to be altering its natural qualities: *Tipping v. Eckersley*, [1855] K. & J. 264; 69 E.R. 779.

<sup>73</sup> By the Beds of Navigable Waters Act, R.S.O. 1970, c. 41; the ownership of the beds of all navigable rivers within Ontario were, in 1911, vested in the Crown in respect of all Crown grants made subsequent to the passage of the Act. Hence only those grants of riparian land prior to this enactment still retain ownership of the solum of navigable rivers, thereby retaining the rights to the fisheries. See *Fitzgerald v. Firbank*, [1897] 2 Ch. 96 (C.A.); *McKie v. KVP Co.*, [1948] 3 D.L.R. 201, aff'd [1949] 1 D.L.R. 39, [1948] O.W.N. 812, aff'd *sub nom. KVP Co. v. McKie*, [1949] 4 D.L.R. 497; [1949] S.C.R. 698; *Marquis of Granby v. Bakewell Urban District Council* (1923), 21 Knight's Local Government Reports 329.

The Game and Fish Act, R.S.O. 1970, c. 186, as amended, alters the common law relating to fisheries (see s. 72) by requiring the exclusive right to fisheries to be the subject of an express grant.

<sup>74</sup> *McKie v. KVP Co.*, [1948] 3 D.L.R. 201, aff'd [1949] 1 D.L.R. 39, [1948] O.W.N. 812, aff'd *sub nom. KVP Co. v. McKie*, [1949] 4 D.L.R. 497; [1949] S.C.R. 698; and *Gauthier v. Naneff*, [1971] 1 O.R. 97.

<sup>75</sup> See Fleming, *The Law of Torts* (4th ed. Sydney: The Law Book Co., 1971) at 338; *River Park Enterprises Ltd. v. Town of Fort St. John* (1967), 62 D.L.R. (2d) 519; *Fisher & Son Ltd. v. Doolittle and Wilcox Ltd.* (1912), 3 O.W.N. 1417; *Burgess v. City of Woodstock*, [1955] 5 D.L.R. 615; *Crowther v. Cobourg* (1912), 3 O.W.N. 490, 20 O.W.R. 844; *Turner v. Mirfield* (1865), 34 Beav. 390; 55 E.R. 685; *Ballard v. Tomlinson* (1885), 29 Ch.D. 115 (C.A.); *Hodgkinson v. Ennor*, [1863] B. & S. 229, 122 E.R. 446.

“unreasonable” damages; second, the court will balance the respective “social equities” of the competing parties’ activities.<sup>76</sup>

*Public* nuisance actions can be instituted by or in the name of the provincial Attorney General where the pollution of waters causes inconvenience or annoyance to the public at large, and they may also be brought by any private individual who suffers particular personal or property damage over and above that experienced by the general public.<sup>77</sup> A polluter might also face negligence actions for failure to exercise reasonable care in favour of those to whom he owes a legal duty.<sup>78</sup>

A discharger can protect himself against actions by riparians and others through easements or other private contractual arrangements by which he could acquire the right to alter water quality, to interfere with private fisheries or to create a private nuisance.<sup>79</sup> To secure such rights, the discharger would, of course, be required to negotiate with all downstream riparians and any others who might be affected. Riparian and non-riparian polluters alike can protect themselves by this means; however, non-riparian water users have no right to water of any particular quality and therefore they would have to negotiate privately with all upstream polluters to secure water of suitable quality.<sup>80</sup> Apart from these methods, the right to alter the quality of water flowing past riparian land can be acquired by prescription after 20 years’ continuous discharge of pollutants.<sup>81</sup>

Inevitably, these common law provisions have been considered to be inadequate to rationalize the increasing demands on assimilative capacity brought about by growth in the size and concentration of population, expansion of industry and increased concern for environmental quality. Hence legislation has been enacted to modify and supplement the common law.

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<sup>76</sup> In determining the limits of these terms, the court may consider the character of the locality, so what might constitute a nuisance in a residential area, for example, might not in a manufacturing area. See *Fleming on Torts, supra*, note 75.

<sup>77</sup> See *Fleming on Torts, supra*, note 75, p. 340; *McKie v. KVP Co.*, [1949] 3 D.L.R. 201, aff’d [1949] 1 D.L.R. 39, [1948] O.W.N. 812, aff’d *sub nom. KVP Co.*, v. *McKie*, [1949] 4 D.L.R. 497; [1949] S.C.R. 698; *Watson v. City of Toronto Gas & Water Co.* (1847), 4 U.C.Q.B. 158. Members of the public who do not suffer any such particular damage over and above that inflicted upon the community generally have no *locus standi* to maintain an action in nuisance. See W. Estey, *Public Nuisance and Standing to Sue* (1972), 10 Osgoode Hall L.J. 568.

<sup>78</sup> *Suzuki v. “Ionian Leader”*, [1950] 3 D.L.R. 790 (Ex): based on this case on breach of the statutory duty imposed by s. 33 of the Fisheries Act, R.S.C. 1970, c. F-14, prohibiting the discharge of deleterious substances into fishing waters. *Fieldhouse v. City of Toronto* (1919), 44 D.L.R. 392; *Campbell v. Kingsville*, [1929] 4 D.L.R. 772.

<sup>79</sup> *B.C. Forest Products Ltd. v. Nordal* (1954), 11 W.W.R. (N.S.) 403: the right to create a nuisance by pollution of water may be subject of an easement.

<sup>80</sup> Recall that in order to secure their source of supply at common law the non-riparian would have to negotiate with all upstream and all downstream riparians: *Ormerod v. Todmorden Joint Stock Mill Co.* (1883), 11 Q.B.D. 155.

<sup>81</sup> *Young (John) & Co. v. Bankier Distillery Co.* [1893] A.C. 691; 69 L.T.R. 838; *Ballard v. Tomlinson* (1885), 29 Ch.D. 115 at 127 per Lindley L.J. (*obiter*).

## 2. *The Discharge Approval System*

The main legislative instrument for regulating water quality in the province is The Ontario Water Resources Act.<sup>82</sup> As it does for the regulation of withdrawals, this Act provides a basis for administrative discretion in the regulation of effluents without offering much guidance for the manner in which the discretion is to be exercised.

The basic legislative regulatory device is the "approval" required from the Executive Director, Water Supply and Pollution Control (hereinafter, "Executive Director (WSPC)") for any disposal "work".<sup>83</sup>

However, approval of a "work" usually depends upon its performance. And performance, in turn, is judged with reference to the Ministry's published pollution control "guidelines" for receiving water quality.<sup>84</sup> Thus the system goes somewhat further than a simple effluent treatment or equipment standard in being formally linked to environmental requirements.<sup>85</sup>

With some exceptions, an approval is required for any waste disposal works (which include the simplest of discharge pipes or channels) and the Executive Director (WSPC) may refuse approval or grant it on whatever terms and conditions he deems necessary.<sup>86</sup> Dischargers who fail to obtain the required approval are liable to a penalty.<sup>87</sup> The Act empowers the Minister to charge fees for approvals commensurate with the cost of processing the application,<sup>88</sup> but (as with water taking permits) the practice is to issue approvals without charge but for an indefinite term.<sup>89</sup> The Executive Director (WSPC) may order changes in any works or their operation to be made at

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<sup>82</sup> See, *supra*, note 18.

<sup>83</sup> *Id.*, s. 42(1). The Act applies to "sewage works"; but sewage is defined broadly in s. 1(p) as including "drainage, storm water, commercial wastes and industrial wastes . . .". "Sewage works" is broadly defined as "any works for the collection, transmission, treatment and disposal of sewage, or any part of such works . . .", but excludes plumbing. It is, therefore, obvious that the Act is capable of applying to the simplest of discharges and almost any discharge outlet.

<sup>84</sup> *Guidelines and Criteria for Water Quality Management in Ontario* (Toronto: Ministry of the Environment, June 1973).

<sup>85</sup> See also H. Clarke, *Status of the Industrial Pollution Control Programme in Ontario*, paper presented to the Niagara Section of the Chemical Institute of Canada 1969 (mimeo).

<sup>86</sup> The Ontario Water Resources Act, R.S.O. 1970, c. 332, s. 42(4). The Act exempts (s. 42(6)) from the requirement of approval disposal works which do not drain into any well or watercourse: private works for partial treatment of waste which is discharged into a sanitary sewer; private sewage works that serve less than six residences; works draining agricultural land; works established under The Drainage Act, R.S.O. 1970, c. 136, The Cemeteries Act, R.S.O. 1970, c. 57, The Highway Improvement Act, R.S.O. 1970, c. 201 and The Railways Act, R.S.O. 1950, c. 331; and other minor works exempted in the regulations.

<sup>87</sup> The Ontario Water Resources Act, R.S.O. 1970, c. 332, s. 42(2): punishable upon summary conviction by a fine of not more than \$2,000.

<sup>88</sup> *Id.*, s. 75.

<sup>89</sup> See, *supra*, note 26.



the owner's expense, including works which were established prior to the Act or were otherwise exempt from approval when constructed.<sup>90</sup>

Anyone discharging effluent with Ministry approval is deemed to be operating under statutory authority.<sup>91</sup> Where such a discharger is a municipality, an injured landowner may receive compensation through proceedings in which the municipality expropriates the injured party's common law right.<sup>92</sup> However, if the discharger is not a municipality, there is some question whether or not the injured landowner has a remedy, and if he has, in what forum he should proceed.<sup>93</sup>

Further, the Ministry has a variety of unusually strong general powers to prohibit any discharges whatsoever. These may be used in emergencies or may simply reinforce the strength of administrative decisions on the establishment

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<sup>90</sup> The Ontario Water Resources Act, R.S.O. 1970, c. 332, ss. 42(3), 69. See also ss. 49, 51 and 70. The general power to direct the operation, alteration or maintenance of sewage works applies to all sewage works, except those to which Part VII of The Environment Protection Act, S.O. 1971, c. 86, as amended by S.O. 1972, c. 1, s. 67 and S.O. 1972, c. 106 applies.

Where the Executive Director (WSPC) decides that the discharge of wastes into a waste disposal works may interfere with the proper operation of the works, he may also order the discharger to stop or alter his activities: The Ontario Water Resources Act, R.S.O. 1970, c. 332, s. 70.

<sup>91</sup> The Ontario Water Resources Act, R.S.O. 1970, c. 332, s. 48 (approval by the former Department of Health and the now dissolved Ontario Water Resources Commission also confers statutory authority under this section).

<sup>92</sup> The Ontario Water Resources Act, R.S.O. 1970, c. 332, ss. 46, 47. No provision is made for compensation of persons other than landowners except in cases where the municipality fails to comply with its approval or otherwise acts improperly. In these latter cases the Ontario Municipal Board is empowered to determine the claim of the injured party.

<sup>93</sup> The Ontario Water Resources Act, R.S.O. 1970, c. 332, s. 48. The issue of the effect of the statutory authority conferred by s. 48 of the Act has not been before the courts. The general question of effect of statutory authority as a defence to common law remedies of landowners has been frequently considered. *Manchester v. Farnworth*, [1930] A.C. 171; *McGillivray v. Township of Lochiel* (1904), 8 O.L.R. 446; *Stephens v. Village of Richmond Hill*, [1955] 4 D.L.R. 572 aff'd [1956] O.R. 88; 1 D.L.R. (2d) 569; *River Park Enterprises Ltd. v. Town of Fort St. John* (1967), 62 D.L.R. (2d) 519; and *Marriage v. East Norfolk Rivers Catchment Board*, [1950] 1 K.B. 284 applied by the Supreme Court of Canada in *District of North Vancouver v. McKenzie Barge and Marine Ways Ltd.*, [1965] S.C.R. 377. The Court applied the following test: (a) is the activity which caused the injury authorized by statute? (b) is injury contemplated by the statute, as being the result of the activity? (c) is the injury of the kind contemplated by the statute? (d) does the statute make provision for compensation of the injured party? If all these questions are answered in the affirmative, then the injured party must resort to the statute, and the common law remedy is abrogated. While the Act itself makes no provision for compensation where the discharger holding approval is not a municipality, if a statute authorizes injurious affection The Expropriation Act, R.S.O. 1970, c. 154, ss. 1 (1)(m), 2(1) applies and compensation is available thereunder. The question is whether or not damage caused by a discharger acting under Ministerial approval is "injurious affection". If so, the above common laws test will not be relevant. See also P. Anisman, *supra*, note 70 at 389-391. Where the discharger exceeds the terms of his approval, or is negligent, statutory authority would not be a defence: *Fieldhouse v. City of Toronto* (1919), 44 D.L.R. 392.

of works and protected areas.<sup>94</sup> For example, the Minister can apply *ex parte* for an injunction to restrain the discharge of any material into a well or watercourse if, in his opinion, the quality of the water is thereby threatened.<sup>95</sup> Furthermore, any person or municipality is prohibited from discharging any material which may impair water quality. Water is deemed to be impaired if the discharger causes injury to any living thing (through its use of the water or the consumption by it of another living thing which has consumed the water.)<sup>96</sup> The Executive Director (WSPC) also has broad authority to prohibit or regulate any discharges in water.<sup>97</sup>

Equipped with these exceedingly broad powers, the Ministry attempts to protect the quality of water in the province consistent with its published "guidelines".<sup>98</sup> These "guidelines" specify desired and permissible concentrations of specific contaminants, suspended solids, acidity and other characteristics of water used for various agricultural, industrial and public purposes.

Superimposed on these receiving water criteria, however, the Ministry aims at the ". . . best practicable treatment or control (of waters) . . . adequate to protect and whenever possible upgrade water quality . . .".<sup>99</sup> Obviously, the "best practicable treatment" is not always necessary to protect the desired quality of the receiving waters; and in some other cases it would be inadequate. Nor is this criterion amenable to very precise definition. However, both the Industrial Waste Treatment Branch and the Sanitary Engineering Branch (which administer industrial and municipal dischargers respectively) have established "objectives" for effluents, which specify limits to acceptable concentrations of contaminants and changes in water quality

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<sup>94</sup> The legislation provides strong powers to regulate discharges into waters designated as public water supply areas or public sewage service areas. The Ontario Water Resources Act, R.S.O. 1970, c. 332, ss. 36, 61. See also, *supra*, note 55. No such areas have been designated.

<sup>95</sup> *Id.*, s. 31(3). It is the policy of the Ministry to reserve the use of this power for emergency situations in recognition of the fact that: "in the past the legislature has been reluctant to accept injunctions granted by the courts where economic and social factors were opposed to a plant being closed down and where the installation of treatment works was not possible before the effective date of the injunction." (Clarke, *supra*, note 85). Witness for example the response of the legislature of Ontario to the decision of the court to grant an injunction in *McKie v. KVP Co.*, [1948] 3 D.L.R. 201, *aff'd* [1949] 1 D.L.R. 39, [1948] O.W.N. 812, *aff'd sub nom. KVP Co. v. McKie*, [1949] 4 D.L.R. 497; [1949] S.C.R. 698; where it passed an act dissolving the injunction (The KVP Company Limited Act, 1950, S.O. 1950, c. 33).

<sup>96</sup> The Ontario Water Resources Act, R.S.O. 1970, c. 332, s. 32(1). Exempted are those who discharge through approved sewage works, and those (s. 32(5)) who discharge into any watercourse through waste disposal work operated with the approval of the former Department of Health, the now dissolved Ontario Water Resources Commission or in conformity with any order of the Ontario Municipal Board. Impairment need only be potential, and the criterion can be applied even at the point of discharge i.e., dilution is not a defence. *Id.*, s. 30. See *R. v. Industrial Tankers Ltd.*, [1968] 2 O.R. 142.

<sup>97</sup> The Ontario Water Resources Act, R.S.O. 1970, c. 332, s. 33(1).

<sup>98</sup> *Guidelines and Criteria for Water Quality Management in Ontario*, *supra*, note 84.

<sup>99</sup> H. Clarke, *supra*, note 85.

characteristics, and indicate the levels of control generally sought by the Ministry.<sup>100</sup> In practice, "objectives" provide prospective applicants for approvals with a first indication of what is required of them; these requirements may then be modified through bilateral negotiations between the applicant and the Ministry in the light of the circumstances of the particular watercourse. Potential dischargers first seek preliminary approval for their proposed works by submitting their engineering plans and other relevant data; final approval is withheld until the works have demonstrated their performance to the planned standard. In sensitive situations, the Ministry will recommend that a public hearing be held by the Environmental Hearing Board before a preliminary approval is granted, and recommendations arising from such a hearing may influence the requirements imposed. Where a new discharge would be incompatible with maintaining the desired quality of a watercourse, the Ministry will sometimes encourage the applicant to locate elsewhere.

In result, the treatment required of individual dischargers varies considerably. Most new industrial facilities in recent years have been approved under the above procedures and criteria, and achieve a level of abatement acceptable to the Ministry; but many older works do not meet the objectives. Where discharges from older works and others, that are not approved, fail to meet the desired standard the Ministry negotiates with the owner to seek agreement on an acceptable construction programme to improve waste treatment. The effectiveness of this voluntary approach apparently depends upon the good working relations and professional respect between officials and industry, and the potential power of the Executive Director (WSPC) to issue orders to achieve the desired results.<sup>101</sup>

Some assistance in the form of loans is available to industries for the construction of pollution abatement works. In 1970, the Ontario Development Corporation introduced a capital loan programme that makes available loans up to \$250,000 at current rates of interest to operators who meet the requirements. This programme is aimed at assisting smaller industries with their pollution problems, but the loans ". . . are not large enough for major treatment works and are not considered to be much of an incentive by industry".<sup>102</sup> The province has also introduced a grant system for pollution control equipment which amounts to a rebate on the seven per cent provincial sales tax. Nevertheless the Ministry considers the financial constraints on established industries to be a major limitation on the pace at which industrial pollution can be mitigated.<sup>103</sup>

By the end of 1971, 497 industrial plants, of which only 61 per cent met Ministry requirements, were discharging liquid wastes directly into water-

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<sup>100</sup> See D. Caplice (Director, Industrial Wastes Branch), *Remarks* at the Canadian Chemical Engineering Conference, Toronto 1972 (mimeo).

<sup>101</sup> One reason why the Ministry is reluctant to resort to orders is that they carry the right of appeal (*supra*, note 22) which can cause a considerable delay in obtaining corrective action. As well, prosecutions require proof of "impairment" which is often difficult to demonstrate unambiguously. See also *Id.*

<sup>102</sup> *Status of Industrial Water Pollution Control in Ontario as of December 31, 1971* (Toronto: Ministry of the Environment, June 1972) 42.

<sup>103</sup> *Id.*

courses in the province.<sup>104</sup> Nevertheless, the number of direct dischargers had declined by 22 per cent during the preceding two years as a result of closures, introduction of non-effluent systems and connections to municipal works. With the exception of heated water from thermal power stations, the level of contaminants discharged had been substantially reduced, as had total industrial waste flows.<sup>105</sup> The number of approvals, and expenditures on industrial waste treatment, have both increased yearly since 1965. By the end of 1971, 593 approvals had been issued, covering industrial treatment works costing some \$116 million; but an estimated \$300 million in additional expenditures is required to abate remaining sources of industrial pollution — about half of this in the lower Great Lakes basin.<sup>106</sup>

Just as industries are often encouraged to link to municipal water supply systems, the Ministry encourages them to connect their discharges to municipal waste treatment systems whenever practicable. The regulatory authorities believe that these collective systems generally ensure better waste treatment through their more specialized equipment and management expertise. The burden of administration and surveillance is also thus reduced. However, in 1971, industries were discharging 5,210 million gallons per day (m.g.d.) of waste into surface waters, compared with an estimated 700 m.g.d. of municipal discharges (some 60 per cent of which are industrial in origin) and 100 m.g.d. of agricultural water usage.<sup>107</sup>

The pulp and paper industry presents the most conspicuous regulatory problem: this industry accounts for 92 percent of the total biochemical oxygen demand discharged into surface water by all industries and nearly 70 percent of all suspended solids.<sup>108</sup> Only three of the 32 pulp and paper mills which discharge into watercourses meet current effluent requirements.<sup>109</sup> In this industry are included 8 of 56 companies prosecuted by the Ministry which were the subject of 12 of the 32 orders issued between 1965 and 1971.<sup>110</sup> Agricultural wastes and runoff are difficult to administer and are not closely controlled. "Normal agricultural practice" is formally exempt from regulation, but this presents difficulties of definition, particularly with the expansion of feedlot practices.<sup>111</sup> In general, the Ministry encourages the return of animal wastes to the land.

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<sup>104</sup> 305 of the 497 plants, or 61 per cent of the plants had acceptable dischargers. *Id.* at 9.

<sup>105</sup> *Id.* at 10. Total industrial waste flows declined by 10 million gallons per day. The discharge of phosphorous for example, declined by 90 per cent (largely as a result of new equipment introduced at a single plant), biological oxygen demand by 30 per cent, suspended solids by 74 per cent. Chlorides was the only other category of contaminants shown to have increased (by 7 per cent).

<sup>106</sup> *Id.* at 5, 6.

<sup>107</sup> *Id.* at 11.

<sup>108</sup> *Id.*

<sup>109</sup> *Id.* at 4.

<sup>110</sup> The average fine per conviction was \$375. Over this same period, 22 public hearings were held. *Id.* at 21.

<sup>111</sup> See, *supra*, note 86. The use of pesticides is controlled through other legislation, but animal wastes probably exceed human wastes in the province by ten-fold.

Recent amendments to The Ontario Water Resources Act provide for measures to deal with accidents and spills of hazardous materials into water-courses.<sup>112</sup> Unusual discharges must be reported forthwith, and the Ministry has power to order municipalities and private enterprises to have equipment and materials on hand to alleviate any impairment of water quality.<sup>113</sup> In 1971, 285 spills were reported, of which 19 were of major proportions.<sup>114</sup> In addition, the Interim Province of Ontario Contingency Plan is designed to provide a quick response to major spills of oil and other materials, and to complement federal contingency plans on the Great Lakes and local arrangements elsewhere.<sup>115</sup>

### 3. *Municipal — Provincial Arrangements*

The Executive Director (WSPC) has power to require a municipality to develop a waste disposal system, and primary treatment is now the minimum acceptable to the Ministry. Secondary treatment and certain specific measures are required where the assimilative capacity of receiving water is less adequate. The Act allows the Executive Director (WSPC) to approve the extension of waste disposal works into another municipality or into an area without municipal organization, and a municipality's powers of expropriation are extended for this purpose.<sup>116</sup>

Municipal waste treatment systems are closely integrated with the Ministry's water pollution control administration through the financing arrangements discussed earlier in connection with municipal water supplies (see *supra* c(6)). Through these arrangements, provincial assistance is available to municipalities (particularly the smaller ones) for constructing treatment facilities — or the municipalities can arrange to purchase subsidized treatment services from provincially owned plants.<sup>117</sup> In order to obtain this assistance, a municipality must first seek approval of its projections of needs from the provincial planning authorities in the Ministry of Treasury, Economics and Inter-Governmental Affairs. Once this approval has been obtained, the Ministry will assist the municipality with its technical planning and the drafting of sewage by-laws. Providing that the Ontario Municipal Board approves the financing arrangements, it will proceed to assist the municipality in the construction and operation of works, as it does with water supply facilities. Under

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<sup>112</sup> See, *supra*, note 97, s. 32(3).

<sup>113</sup> *Id.*, s. 34(1). Failure to report such an unusual discharge can result in a \$5,000 fine: ss. 32(3), 32(4). Failure to comply with an order to maintain standby facilities can result in a fine of \$500: s. 34(2).

<sup>114</sup> *Status of Industrial Water Pollution Control in Ontario as of December 31, 1971*, *supra*, note 102 at 30.

<sup>115</sup> *Id.* The Ontario Operations Centre provides a continuing central alert for receiving spill reports and initiating the required response.

<sup>116</sup> The Ontario Water Resources Act, R.S.O. 1970, c. 332, ss. 43(3), 46, 47.

<sup>117</sup> *Id.*, s. 52-60.

these arrangements, discussed earlier, most small municipalities seek provincial assistance with required new waste treatment facilities. Their own revenue requirements for repayment are typically met through an addition to the mill rate on property, although frontage charges are sometimes used, and in some cases the sewage charge is integrated with the water bill. Some municipalities levy surcharges on industries for discharges that contain certain contaminants in excess of the concentrations allowed by their sewage by-laws.<sup>118</sup>

At the end of 1971, 265 municipalities in the province had sewage treatment plants; but inadequate and inconsistent regulation of industrial discharges is a major source of concern of the Ministry.<sup>119</sup> Some municipalities may be tempted to neglect enactment or enforcement of adequate sewage by-laws in order to attract industrial development, while others with more stringent requirements require industries to pre-treat their wastes at considerable cost to avoid paying a surcharge fee. The result is that in the latter circumstances industries complain of their competitive disadvantage, and in the former the quality of the effluent is not adequately controlled.<sup>120</sup> Thus, in the course of negotiating provincial participation in the provision of new treatment works, the Ministry prepares a set of model by-laws for consideration by the municipal authorities, and most municipalities that have signed agreements have enacted adequate by-laws. However, the Ministry estimates that 194 municipalities still need to enact by-laws to regulate industrial discharges into their systems.

Through its financial involvement, the Ministry thus exerts considerable influence on municipal waste disposal policy, not only on the pace of development of treatment systems and their financing, but also on the level and kind of treatment provided. The planning of works, the regulatory by-laws, the integration of storm and sanitary services, the accommodation of industries and, indirectly, the incentives for community and regional planning are all affected by this provincial influence.

#### 4. *Other Statutes*

Although The Ontario Water Resources Act offers very wide scope for regulating water quality, other legislation supplements its coverage. The most relevant piece of additional provincial legislation is The Environmental Protection Act,<sup>121</sup> which stresses the environmental and sociological aims of

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<sup>118</sup> *Status of Industrial Water Pollution Control in Ontario as of December 31, 1971*, *supra*, note 114 at 5. Sewage by-laws are designed primarily to protect the treatment facilities and their effectiveness and for this purpose they prescribe maximum allowable concentrations of contaminants in effluent discharges into the system.

<sup>119</sup> *Id.* See also *Remarks* by Hon. James A.C. Auld (Minister of the Environment) to the Industrial Waste Conference, Toronto, June 19, 1972 (mimeo).

<sup>120</sup> *Id.*, at 36.

<sup>121</sup> S.O. 1971, c. 86, as amended by S.O. 1972, c. 1, s. 69 and S.O. 1972, c. 106.

pollution control policy. This Act provides the Environmental Appeal Board with jurisdiction to hear an appeal from anyone who has been issued an order or directive under the Act or The Ontario Water Resources Act.<sup>122</sup> It provides for an Environmental Council to advise the Minister on problems he puts before it and on environmental research.<sup>123</sup> It also provides machinery for regulating emissions of contaminants into the natural environment generally.<sup>124</sup> This Act has not been used hitherto as a major tool in water quality control, but is currently being revised and is expected to play a more important role in the future.

Certain other provincial statutes, such as The Lakes and Rivers Improvement Act<sup>125</sup> and The Public Health Act<sup>126</sup> contain provisions that restrict the depositing of substances in waters, but these are aimed at special purposes and do not constitute an important part of water quality control policy. Regional Conservation Authorities, in varying degrees, provide information on the quality of waters within their jurisdictions, surveillance over dischargers and comments on applications for approvals when requested to do so by the Ministry.

The federal government involves itself in matters concerning water quality in the province under legislation with respect to navigation, shipping, fisheries and international relations.<sup>127</sup> The Navigable Waters Protection Act<sup>128</sup> prohibits the deposit of debris which might interfere with navigation and of any material which might accumulate on the bottom of shallow navigable waters.<sup>129</sup> The Canada Shipping Act<sup>130</sup> regulates the discharge of pollutants from ships, prohibits discharges of oil in normal circumstances, and requires masters to report discharges contrary to the regulations.<sup>131</sup> The

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<sup>122</sup> *Id.*, Part X. See also, *supra*, note 22.

<sup>123</sup> *Id.*, Part XII.

<sup>124</sup> *Id.*, ss. 57, 94(3).

<sup>125</sup> R.S.O. 1970, c. 233 as amended by S.O. 1971, c. 50, s. 50 (and especially s. 36(3)).

<sup>126</sup> R.S.O. 1970, c. 377 as amended.

<sup>127</sup> Income Tax Act, S.C. 1970-71-72, c. 63 as amended, Reg. Sch. B., Class 24 allowing accelerated depreciation in respect of certain property acquired for pollution abatement. See L. Waverman, *Fiscal Instruments and Pollution: An Evaluation of Canadian Legislation* (1970), 18 Can. Tax J. 505.

<sup>128</sup> R.S.C. 1970, c. N-19.

<sup>129</sup> *Id.*, ss. 19, 20. The Governor-in-Council may exempt, by proclamation, any waters from these prohibitions. *Id.*, s. 21.

<sup>130</sup> R.S.C. 1970, c. S-9 as amended by c. 10 (2d Supp.).

<sup>131</sup> The Act defines pollutant as any substance that if added to waters would degrade the quality of those waters to an extent that is detrimental to their use by man or by any animal, fish or plant that is useful to man, and includes oil and substances prescribed by the Governor-in-Council as a pollutant (R.S.C. 1970, c. 10 (2d Supp.), s. 727(1)). Special regulations govern the discharge of oil from large tankers, and other regulations require appropriate equipment to prevent spills or leaks. (*Id.*, ss. 728, 730(1)(a), (b), (n), 731, 752, 753, 755, 760; and regulations S.O.R./71-495, S.O.R./71-654.)

Garbage Pollution Prevention Regulations made under this Act prohibit the dumping of food wastes and refuse from ships.<sup>132</sup>

The Fisheries Act,<sup>133</sup> administered by the federal Minister of the Environment (who is also the Minister of Fisheries) prohibits, broadly, the deposit of any deleterious substance into waters frequented by fish or into any place from which it may enter such waters.<sup>134</sup> The Act enables the Governor-in-Council to make regulations prescribing substances and quantities or concentrations that are deleterious, and under this provision the government has begun to pass regulations that may make the most important and general federal contribution to water quality control.<sup>135</sup> Already, federal regulations have been made that prescribe permitted discharges of contaminants by the pulp and paper industries and the chlor-alkali industry,<sup>136</sup> and similar action is being prepared for the oil refining, mining, fish processing and other industries. The pulp and paper regulations specify maximum discharges of relevant contaminants per unit of product produced, and these might have a major impact on the regulation of these important sources of pollution. However, while they specify effective dates for new mills or expansions (of which there are none contemplated in Ontario) the date of application to existing mills is not specified.<sup>137</sup> Moreover, the constitutional validity of this kind of industrial regulation under the Fisheries Act is not altogether clear, and its relation to provincial authority and procedures is a source of some anxiety for provincial authorities.<sup>138</sup>

The previously mentioned International Boundary Waters Treaty of 1909 with the United States provides:

It is further agreed that the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other.<sup>139</sup>

<sup>132</sup> *Id.*, s. 734 extends the civil liability of the owner of a ship carrying a pollutant in bulk and the owner of the pollutant for the costs and expenses of any action authorized by the Governor-in-Council to remedy any condition resulting from the discharge of the pollutant. Such persons may be liable for actual loss or damage suffered by the Federal Crown or a province or by any person. Section 450(5), which authorizes the master or owner of a ship to throw overboard any dangerous goods (where they are sent onboard in contravention of s. 450, without incurring civil or criminal liability) does not apply to liability under s. 734 unless the Minister of Transport consents to the throwing of such goods overboard.

See Landis, *supra*, note 40 at 99 for a discussion of the constitutional validity of the pollution provisions of the Canada Shipping Act, R.S.C. 1970, c. S-9 and see at 97 for a discussion of their relationship to provincial pollution control legislation.

<sup>133</sup> , R.S.C. 1970, c. F-14.

<sup>134</sup> *Id.*, s. 33(1), (2), (3). "Deleterious substance" is broadly defined in s. 33(2). See also *R. v. Churchill Copper Corp.* (1972), 5 C.C.C. (2d) 319.

<sup>135</sup> Fisheries Act, R.S.C. 1970, c. F-14, ss. 33, 34. The Minister of Fisheries with the approval of the Governor-in-Council may either order modifications of plans for works which are likely to result in deleterious substances being deposited in waters frequented by fish or prohibit construction of any such works. *Id.*, s. 33(1).

<sup>136</sup> The chlor-alkali industry is a major source of mercury pollution. S.O.R./71-578; S.O.R./72-92.

<sup>137</sup> S.O.R./71-578, Sch. F.

<sup>138</sup> See *Status of Industrial Water Pollution Control in Ontario as of Dec. 31, 1971*, *supra*, note 118 at 54.

<sup>139</sup> Article IV of the Treaty, *supra*, note 49.



Accordingly, the question of pollution of waters in the Great Lakes system was referred to the IJC three times — in 1912, 1946 and 1964; in each of its reports the Commission pointed to serious levels of pollution.<sup>140</sup> Finally, in 1972, Canada and the United States signed The Agreement on Great Lakes Water Quality by which both countries agree to implement specific programmes to reduce pollution from municipal, industrial, agricultural, shipping and other sources. The water quality objectives recommended by the IJC in its final report were adopted in the Agreement. The Agreement directed the IJC to assume responsibility for coordinating water quality surveillance and for monitoring compliance with the Agreement, and to report annually on progress. To assist it in carrying out its powers and responsibilities, the IJC was directed to establish a Great Lakes Water Quality Board, consisting of 18 members drawn equally from both countries and appointed by the federal, state and provincial governments affected.<sup>141</sup>

In order to implement the Canadian commitments under these arrangements, an agreement between the governments of Canada and Ontario was signed in 1971, under which Ontario agreed to construct waste treatment works in the amount of \$250 million in the lower Great Lakes basin by 1975 with the help of federal loans of up to \$167 million.<sup>142</sup> In addition, the two governments agreed on a programme of research into pollution abatement problems on a matching grant basis.<sup>143</sup> The federal loans are made available

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<sup>140</sup> The IJC report on a bacteriological investigation in 1912 concluded that pollution along the shores of the Detroit and Niagara Rivers was intense and that the health and welfare of citizens of both countries was endangered in "direct contravention of the Treaty". But little action was taken. Later, both Canada and the United States separately attempted to draft a pollution control treaty, but this was abandoned in the 1930's. In 1946 the two governments referred to the IJC the question of pollution of the "connecting channels" of the Great Lakes, and in 1950 the Commission's report was accepted by both countries and returned to the IJC for implementation. In 1964 the two governments requested another report from the IJC on pollution of Lake Erie, Lake Ontario and the international section of the St. Lawrence River, and in 1970 the Commission reported serious pollution on both sides of these waters, the principal causes being municipal and industrial wastes. The Commission recommended, *inter alia*, that its "General and Specific Objectives" be adopted and adhered to by the governments; that the phosphorus content in detergents be reduced; that a vigorous programme to provide municipal and industrial waste treatment facilities be promptly implemented; that the Commission itself be charged with coordinating continuous surveillance of water quality, and monitoring the implementation of pollution abatement programmes; and that there is a need for international contingency plans to deal with major spills of "hazardous or radioactive materials." See International Joint Commission, *Pollution of Lake Erie, Lake Ontario and the International Section of the St. Lawrence River*, 1970.

<sup>141</sup> The Agreement on Great Lakes Water Quality, April 1972 charges the IJC with, *inter alia*, monitoring water quality, reviewing the actions of the two governments in pursuit of the Agreement, and reporting annually to the two governments. The findings and recommendations are to be made public: See Great Lakes Water Quality Board, *Great Lakes Water Quality: Annual Report to the International Joint Commission*, April 1973. To collect and verify the data and information provided to it by the various governments, the IJC has established an office in Windsor, Ontario.

<sup>142</sup> Memorandum of Agreement between the Government of Canada and the Government of the Province of Ontario, August 13, 1971.

<sup>143</sup> The federal share of research funds is limited to one-half the costs up to a maximum of \$3 million. *Id.* at 9.

under the National Housing Act,<sup>144</sup> and the research funds under the Canada Water Act.<sup>145</sup> To coordinate and approve treatment projects, approve research and generally to advise the two governments, the agreement establishes a Board of Review consisting of three appointees of each government.<sup>146</sup> Through these means the Ontario government and Canadian government are cooperating in the attempt to meet objectives agreed upon between Canada and the United States for water quality in the Great Lakes system.

A particular problem in the lower Great Lakes system is the eutrophication of waters by the addition of nutrients. The flows of phosphorous, particularly, are a major concern of the Board of Review. Regulations under the Canada Water Act have already been used to reduce the content of phosphorous in household detergents sold in Canada.<sup>147</sup>

The Canada Water Act also contains ambitious provisions enabling the federal government to enter into comprehensive water quality management programmes in cooperation with the provinces where the quality of the water is a matter of "urgent national concern" or with regard to any "federal waters".<sup>148</sup> For "federal waters", or other waters where efforts to reach agreement with the province fail or an agreement is terminated, the Act envisages the federal government acting unilaterally.<sup>149</sup> The management agencies appointed to carry out these programmes are given wide authority under the Act to study the water-quality problems of the designated waters, to develop and recommend quality management plans to construct and operate treatment works, collect fees, and generally to "do such other things as are necessary to achieve effective water quality management of those waters".<sup>150</sup>

However, no such water quality management areas have been designated in Ontario, and some uncertainty attends the constitutional authority of the federal government to act in the absence of "urgent national concern".<sup>151</sup> To date, the regulation of phosphorous in detergents and arrangements for research (neither of them negligible) are the main manifestations of the Canada Water Act. Otherwise Ottawa is acting indirectly, by financial support of Ontario's programmes.

##### 5. *Economic Implications of Quality Control Arrangements*

When individuals or groups use resources, their gain roughly coincides with the gain to society at large. The theory of perfect markets rests on this coincidence; when a resource owner or merchant sells a product both he and

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<sup>144</sup> National Housing Act, R.S.C. 1970, c. N-10.

<sup>145</sup> Canada Water Act, R.S.C. 1970 (1st Supp.), c. 5.

<sup>146</sup> Memorandum of Agreement, *supra*, note 142 at 10-11.

<sup>147</sup> Canada Water Act, R.S.C. 1970 (1st Supp.), c. 5, ss. 18, 19. See also S.O.R./70-354 as amended by S.O.R./72-416: "Phosphorous Concentration Control Regulations."

<sup>148</sup> Canada Water Act, R.S.C. 1970 (1st Supp.), c. 5, s. 9.

<sup>149</sup> *Id.*, s. 11(1), (2).

<sup>150</sup> *Id.*, s. 13. The Act (s. 8) prohibits the discharge of any waste, in waters within a water quality management area, which is not permitted under the management area.

<sup>151</sup> See, *supra*, notes 39, 40, 41.

the purchaser gain; and their net gains contribute to the welfare of society as a whole. However, where one person gains at the expense of another, as when one pollutes water, the market mechanism fails to guarantee mutual benefit. This well-known source of market failure ("externalities") is the rationale for public regulation of water quality. Governments must intervene to prevent misallocations of resources that result in a net reduction in social welfare, either through direct public involvement in the use of resources or indirectly through laws and institutions that will ensure that the private sector will bring about a more efficient and socially desirable result.

Successful resource policy does not require either that the government assume full responsibility for resource use or that it turn the resource over to the private sector. Many alternatives for reconciling public ownership with private use through systems of rights, permits, fiscal incentives and regulations are available. The policy for regulating the use of water in Ontario is, as we have seen, a mixture of direct government action in providing works and indirect restraints and incentives to encourage users to achieve the desired results. Our interest here is in the extent to which these arrangements avoid internal contradictions, inefficient use of water, and wasteful expenditures on complementary capital, land and labour. The concern of the Ontario government and of industries about the economic implications of water quality controls, the extensive programmes of assistance to municipalities for waste treatment facilities and the complex international arrangements for pollution control referred to above all testify to the economic importance of this issue.

In attempting to evaluate the mosaic of federal, provincial and municipal policy that regulates the use of water for waste disposal in Ontario, we must consider two related problems. One is the determination of the appropriate quality of water to be maintained in particular circumstances, or analogously, the appropriate degree of use of assimilative capacity. This involves balancing the social losses from further degradation of water quality against the gains (largely in the form of savings in abatement costs) from increased use of the waters in waste disposal. The second problem is the allocation of this available assimilative capacity among dischargers, and particularly the extent to which the system insures that the benefits of production and abatement efforts are maximised.

a) *Determination of the level of use of assimilative capacity*

The quality of water depends not only on the quantity, type and location of wastes discharged into it but also on the size of the particular watercourse, its rate of flow and other characteristics that govern its capacity to absorb contaminants. These latter conditions vary enormously, and so an effective system of water quality control must take account of highly variable resource capacities. In addition to this basic technical consideration, the system must recognize that the value of clean water, and the value of exploiting its assimilative capacity, vary with the private and public uses made of different watercourses.

A particularly strong feature of provincial policy in Ontario is the central importance given to the quality of receiving waters, thus acknowl-

edging the need for flexibility in determining allowable discharges in the light of the varying assimilative capacities of watercourses. Moreover, through its reference to "guidelines" for the quality of water required in different uses the regulatory system recognizes the demands on different waters and enables assimilative capacity to be varied accordingly. The industrial and sanitary waste control "objectives" refer, for the most part, to acceptable changes in the quality of the receiving water — which is not to say that the water quality objectives are everywhere fulfilled. In addition, the use of bio-chemical oxygen demand (BOD) information as the primary measure of receiving water quality accounts for only one aspect of assimilative capacity.

This primary attention to the condition of receiving waters guides the regulatory mechanism directly towards achieving the social objective of protecting water quality. In this respect the approach compares favourably with the policy in some other jurisdictions which depend upon treatment or effluent standards, and indeed with the industrial standards for effluents devised by the federal government under the Fisheries Act.<sup>152</sup> Effluent standards, based either on the concentration of contaminants in the effluent or the quantity of contaminants discharged per unit of product produced, cannot ensure that assimilative capacity will be effectively utilized or that water quality will be protected at any desired level because they account for neither the variability in assimilative capacity of receiving waters nor the demands on them. As a result, such uniform standards will leave some waters over-taxed and others under-utilized, with consequent wasteful use not only of assimilative capacities but also of other resources required for abatement.

However, the Ontario system falls short of regulating discharges entirely according to the available assimilative capacity determined for each watercourse. In deciding the appropriate quality for different waters the relative values of various uses are not systematically analyzed, nor are the benefits and costs of waste disposal. Moreover there is no provision for variation among watercourses in the Ministry's "objectives", and the discretionary variations arrived at in negotiating individual approvals do not appear to be the result of systematic evaluation. The minimum acceptable levels of waste treatment by municipalities are likely to interfere with the full use of available assimilative capacity in some cases, as are the specific prohibitions under federal statutes dealing with navigation, shipping and fisheries.

Finally, the appropriateness of the decision about the degree of utiliza-

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<sup>152</sup> For a critique of the effluent standards approach adopted in British Columbia, see Campbell, *supra*, note 67. The United States has recently adopted broad legislation to eliminate water pollution by means of strict effluent standards: Federal Water Pollution Control Act Amendments of 1972, P.L. 92-500 (92nd Congress, S. 2770).

Note that effluent standards seldom control the total quantity of contaminants discharged. Where they are based on the concentration of contaminants in the effluent, as is generally the case in British Columbia and in the new U.S. legislation, the total quantity of contaminants in the receiving water varies with the number of discharges and their volume of effluent. Where they refer to the quantity of contaminants discharged per unit of industrial product, as in the federal pulp and paper regulations, the total amounts discharged will similarly vary with the number of dischargers and their volume of production.

tion of assimilative capacity is likely to depend on how it is reached. In Ontario the Ministry refers to its "guidelines", but these are based largely on technical criteria which leave considerable scope for interpretation and, like the international objectives for the Great Lakes system, take little account of the varying importance attached to various public and private uses of water in different areas. Clearly, public hearings will assist in determining the desired quality in particular circumstances. But a more responsive mechanism would take full account of the inter-related demands on each drainage system, as is envisaged for the water quality management areas in the Canada Water Act and in The Conservation Authorities Act — neither of which have been fully exploited in this respect. This is an issue that the Ministry has recognized in a recent Green Paper:

At present, most private sector projects come under the purview of existing environmental approvals, permit or review procedures. This scrutiny, however, tends to deal only with the particular problems which the permit or approval procedure was intended to control. Frequently, cumulative, secondary and "off-site" environmental effects have not been identified. Moreover, many major undertakings in the public sector have been promoted with insufficient attention to the environmental and social problems which might result.<sup>168</sup>

The report goes on to recommend a more integrated approach with more emphasis on anticipating and avoiding problems associated with new developments rather than on restorative measures, broader consideration of the effects on environmental systems and greater public participation in decision-making.

b) *Efficiency in the allocation of available assimilative capacity*

Protection of water quality at the proper level does not, of course, ensure that the best use is made of the available assimilative capacity. The regulatory system must be judged also on the extent to which it ensures that the assimilative capacity is put to its most valuable use, which means that it must minimize the aggregate cost of abatement measures and generally prevent wasteful use of other productive resources. This requires that the system be responsive to the different costs of abatement among dischargers and between private and collective treatment works, so that expensive measures are not undertaken by some when the desired objective could be attained through less costly action on the part of others.

Obviously, any uniform treatment or effluent standard fails in this respect because, by requiring the same abatement performance by all, some dischargers are forced to eliminate contaminants that could more economically be eliminated by others, and the aggregate cost would be lower with some reallocation of effort. This important consideration has led some economists to advocate charging a price (or tax) for effluents, high enough to constrain total discharges into a given watercourse to the desired degree. By thus providing an incentive to each discharger, facing his unique abatement cost schedule, to reduce his discharges to the extent that it is less costly to do so than pay the common price, total abatement effort would become distributed in

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<sup>168</sup> *Green Paper on Environmental Assessment* (Toronto: Ministry of the Environment, 1973) at 4.

the least costly pattern.<sup>154</sup> Here, however, we are concerned with the extent to which the regulatory measures in Ontario achieve this same result.

Thus the Ministry's "objectives" for industrial and sanitary wastes introduce an obvious impediment to efficient use of assimilative capacity. Because these "objectives" go beyond the criteria for water quality and are used as a more or less uniform base of reference in determining the required performance of individual works, they can be expected to result in some of the same misallocations as effluent standards. If all dischargers on a stream met the common "objectives", they would, except by coincidence, leave the waters either polluted or under-utilized with the concomitant unnecessary expenditures on abatement. This outcome can be avoided, of course, by discretionary adjustments in the performance required; but if there is more than one discharger the inefficiency can be corrected only if the adjustments take account of the differing costs of abatement among dischargers. Failure to distribute abatement effort in light of the frequently wide cost difference among dischargers is likely to result in aggregate costs of water quality control significantly higher than is necessary. And the procedures of the Ministry, eschewing as they do any dependence on market mechanisms in favour of separate arrangements with each operation, do not really lend themselves to this kind of responsiveness to relative costs.

A related issue is the preference given to collective waste treatment over private works through the unusually vigorous provincial assistance programmes and federal mortgage funds available for municipal systems. The substantial programme for reducing pollution in the Great Lakes under the federal-provincial agreement also emphasizes collective treatment plants. The loans and tax rebates available to industries for treatment works do not compare with the assistance to collective works, creating an incentive for more industries to connect to municipal systems than would be the case in the absence of this bias. Moreover, these incentives for industry to share the subsidies to municipal works by connecting to them are buttressed by the Ministry's policy of generally encouraging municipal treatment of industrial discharges. This emphasis on centralized treatment works undoubtedly reflects, in part at least, the province's strenuous effort to catch up with and keep ahead of the water pollution problem. But it may have gone too far, resulting in large-scale collection and treatment where other decentralized works would be less costly. Certainly this question deserves more attention than it appears to have been given: what is required is a cost-effectiveness study of the best mixture of individual and collective facilities in particular watersheds or regions.<sup>155</sup>

Like water supply systems, collective waste treatment facilities will be inefficiently used and their required capacity excessive if users are given no

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<sup>154</sup> See, for example, A. Kneese, and B. Bower, *Managing Water Quality: Economics, Technology, Institutions* (Baltimore: John Hopkins Press, 1968); W. Baumol and W. Oats, *The Use of Standards and Prices for Protection of the Environment* (1971), 73 *Swedish Journal of Economics* 42; D. DeWees, *Economic Considerations in the Selection of Pollution Control Legislation* (1972), 10 *Osgoode Hall L.J.* 627.

<sup>155</sup> Such analyses are discussed, for example, in Kneese and Bower, *supra*, note 154, ch. 10.

incentive to recognize and respond to the cost of their demands on them.<sup>156</sup> This is the usual case in Ontario, where the cost of service to most users does not vary with the amount discharged, but is fixed on the basis of frontage and connection charges or a property tax levy. Only some of the larger industrial dischargers are charged according to the volume of their effluents, and the few cases of surcharge formulae applied to effluents that exceed by-law concentration limits are unusual examples of an efficiency-inducing pricing mechanism. Much more efficient use of collective treatment facilities could be expected if the use of meters and unit charges were expanded. Insofar as the dischargers of domestic and other users are reasonably correlated with their use of water, a policy of linking sewage charges to water charges based on water meters offers a useful expedient.

Finally, the available assimilative capacity is not likely to be put to its most valuable use if some dischargers are not constrained at all. In Ontario, small residential dischargers, much agricultural drainage and some other sources of contamination are not regulated.<sup>157</sup> Usually, these are not likely to be crucial exclusions, but where watercourses are heavily used these dischargers may pre-empt valuable assimilative capacity for relatively low value use, while regulated dischargers are forced to incur expensive abatement costs. The increase in intensive agricultural practices, in particular, is likely to call for an expansion of the regulatory system to cover these discharges.

c) *Security of discharge rights and the system's responsiveness to change*

We have already referred to the economic importance of both secure rights for users of a resource and flexibility of allocative mechanisms in the face of changing economic and social conditions. These are not conflicting issues: freehold tenure provides a most secure property right in land, for example, while market forces cause the allocation of land among uses to change in response to evolving social needs. Therefore we need to examine on the one hand, whether the allocation of assimilative capacity of water provides users with the security they need to plan and use it (and other resources) efficiently, and on the other the ability of the allocative system to maintain efficient use of resources as conditions change through time.

A striking feature of Ontario's regulatory system is the broad scope for administrative discretion. Dischargers may be required to agree to construct treatment works satisfactory to the Ministry, submit to orders for a wide range of reasons, obtain approvals with terms and conditions decided by the Ministry, and otherwise to regulate their effluents to standards of performance acceptable to the Ministry in its discretion. The large number of dischargers without approvals (except those who are exempt by statute) have very little security in their right to use assimilative capacity, and they essentially discharge at the pleasure of the Ministry. Many approvals, moreover, are only partial, covering a part of the dischargers' works for certain categories of contaminants. In addition, the status and impact of the new federal regulations for industrial effluents have introduced a new source of uncertainty.

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<sup>156</sup> For a summary of the striking evidence of this, see Russell, *supra*, note 68.

<sup>157</sup> Ontario Water Resources Act, R.S.O. 1970, c. 332.

However, the certificate of approval, to the extent that it covers his discharging activities, provides the operator with a high degree of security. It is issued without term, and, unlike water-taking permits, it protects the operator from common law actions (to the extent of operating the works according to the approval) by conferring statutory authority. Indeed, apart from invoking the terms and conditions attached to the approval, the Ministry itself has limited and questionable scope for interfering with the operation of the approved works except by resort to orders.

Since approvals apply to specific works and are not transferable except with the facilities themselves this device impedes desirable reallocation of assimilative capacity among uses and users as circumstances change. Owners of approved works have little incentive to improve or change them, and in the face of evolving technological, economic and social conditions in Ontario the system tends to rigidify the structure and location of economic activity, which in the long run is likely to result in significant misallocation of water and other resources.

The desired flexibility applies also to the quality of water sought. A strength of the policy in Ontario, as reflected in both provincial and federal legislation, is its recognition of non-consumptive or "in-place" uses such as fisheries, recreation and general amenity. An increase in these demands relative to others will call for reduction in the use of assimilative capacity, although the existence of approved discharge works is likely to make such changes difficult to achieve.

#### E. DIRECTIONS FOR REFORM

As we complete this survey, Ontario is reconsidering its legislation and administration governing water resources. It is expected that a revised Environmental Protection Act will play a more dominant role. Our critique of the existing arrangements for regulating access to flows and to the discharge of wastes suggests considerable scope for constructive reform. Fundamentally, we look for a framework of policy that will recognize the diverse social values of demands for flows and for waste-disposal capacity, discourage wasteful use of water and misallocation of complementary inputs, provide secure rights for withdrawals and discharges, and facilitate adjustments to changing conditions through time. In the remaining paragraphs, we note some major issues which, in light of the preceding discussion, seem to us to warrant particular attention in any revision of allocation policy.

We have already referred to the need for greater coordination of decision-making with respect to the use of resources, and the government itself has recognized that ". . . drainage basin management of water resources in Ontario is not being effected in an optimized manner."<sup>158</sup> To avoid costly conflicts, decisions about discharges must not be made without attention to the pattern of use of flows, and both need to be coordinated with policies

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<sup>158</sup> *Status of Industrial Water Pollution Control in Ontario as of Dec. 31, 1971, supra*, note 138 at 40.



for regional and industrial development.<sup>159</sup> But effective coordination of this kind is exceedingly difficult to achieve in practice. As the regulation of watercourse wastes has already become a more pressing and widespread problem than water supply, it may well be that adequate coordination cannot be achieved until the administration of permitted withdrawals and permitted waste discharges is assigned to precisely the same authorities. Such a radical change would lead to a relating (for both new applicants and existing permittees) of individual water demand to individual waste-abatement performance. All such performance should be reconciled with the particular watercourse pattern of needs and uses. The Ministry has already begun to study comprehensive environmental assessment procedures which should reveal such basin-wide patterns.<sup>160</sup> Progress in this complex problem will undoubtedly require greater reliance on decentralized watershed or regional decision-making, more attention to the location of operations and greater public participation to identify and reconcile the pattern of public and private demands on water systems.

However decisions are made about the extent to which water and its assimilative capacity are to be used, there remains the problem of allocating it among users and uses, and the devices employed for this purpose have crucial implications for the efficiency of resource use. The equipment approval system now used for regulating discharges is undoubtedly capable of reducing pollution. Yet it does not promote efficient use of resources, because of its tendency to lead to uniformity of treatment without adequate regard to costs, its focus on works rather than on incentives to economize on use of assimilative capacity, and its lack of flexibility. Furthermore, any such system based on treatment or effluent standards can be adjusted to meet changing needs by direct controls over the number of dischargers or by official adjustment of the standards themselves, which not only ignores differences in costs of treatment but also introduces a degree of uncertainty about expected behaviour. Finally, the water-taking permit system now in use does not ensure that the available flow is put to its most valuable use, that users enjoy secure rights to flows, or that the pattern of use will respond to changing needs. Can these deficiencies be removed?

Two alternative general approaches to allocating flows and assimilative capacity deserve attention in the search for more effective resources management policy — the *pricing approach* and the *rights approach*. Theoretically, either approach, appropriately administered, is capable of ensuring efficient resource utilization.

Using the *pricing approach*, a system of prices (or variable taxes) would provide the means for rationing use of the available flow and assimilative capacity to the desired degree at any point on a watercourse, provide incentives for economical use of water and abatement of waste, and guarantee access to those who can put scarce resources to their highest use. This approach has been widely advocated by economists; but as mentioned earlier,

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<sup>159</sup> For evidence of the current need for more coordination in decision-making, see *Id.* at 38.

<sup>160</sup> *Green Paper on Environmental Assessment*, *supra*, note 153.

realization of its full potential for efficient regulation requires unusually sensitive and detailed administration. The appropriate price for units of withdrawals and pollutants discharged would have to vary among locations in order to reconcile demand with varying resource capacities. Indeed, the whole pattern of charges along a river would have to be reviewed each time any discharger or water user contemplated altering his process or location. It must therefore be admitted that the burden on the administrative agency's research, surveillance and monitoring capability would be heavy, while the differing prices levied on similar resource users on different rivers, or at different locations on the same river might also be regarded as unfairly discriminatory and therefore politically unworkable.<sup>161</sup>

Because of these practical difficulties inherent in flexible price regulation, some investigators have advocated instead a simple, province-wide, flat-rate charge (or tax) per unit of withdrawal or discharge, regardless of location. However, the shortcomings of such a simplified approach should now be obvious: uniform treatment of resource users everywhere would leave none of the desired incentives to respond to the particular streamflow conditions, water quality goals and resource demands at different locations. It would induce the same inefficient conformity of behaviour as a uniform-standards system. Nevertheless, there are some good reasons for accepting this modest system in preference to that now used in Ontario. First, although it does not bring about efficiency at large, the fee, if it is sufficient to cause changes in behaviour at all, will induce resource users to seek the least-cost methods to reduce water use or to abate pollution (in contrast to equipment requirements). Second, it would give both government and users experience with a system that might later be modified to a more site-specific pricing or rights system. And third, it provides complete transferability: industrial and other users can locate in accordance with their costs and markets without facing the obstacle of obtaining a permit or approval, as long as they are prepared to pay the prevailing flat-rate prices for water and discharges.

The *rights approach* implies a regulatory system based on transferable rights to withdraw specified amounts of water and to discharge specified quantities of contaminants up to the limits of streamflow conditions desired on each watercourse. Withdrawal and discharge rights would, of course, have a value equal to the opportunity cost of the resources of the particular watercourse, and this would provide the needed financial incentive to economize on the use of water resources. The marketability of rights would ensure that the available water and assimilative capacity is allocated among those who can put it to its most valuable use (because they would be willing and able

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<sup>161</sup> For a discussion of the problems of equal and unequal effluent charges, see A. Dorsey, *Effluent Charges, Information Generation and Bargaining Behaviour* (1973), 13 *Natural Resources Journal* 118; and I. Fox, *Institutional Design for Water Quality Management: A Case Study of the Wisconsin River Basin*, (Madison: Univ. of Wisconsin Water Resources Center, 1970). For observations on pricing schemes in use, see M. Gaffney, "Comparison of Market Pricing and Other Means of Allocating Water Resources," in *Water Law and Policy in the Southeast*, Papers of the Southeast Water Law Conference, University of Georgia, November 7-10, 1961, published by Institute of Law and Government, the University of Georgia, in cooperation with the Farm Foundation and the Southeastern Land Tenure Research Committee, 1962; pp. 195-229.

to bid rights away from others) and the cost of acquiring and retaining valuable rights would induce water users and dischargers to achieve the socially desired degree of abatement in an efficient pattern and form. Differences in the value of water and discharge rights on different watercourses would also promote efficient industrial, municipal and other location decisions.

Such a rights system would not only provide users with security of access to water resource, but also permit changes in the use of flows and in water quality without involuntary infringement on acquired privileges. Where it is deemed that a watercourse is capable of additional withdrawals or discharges, new rights might be issued or sold by the Crown at the prevailing price. Where use is already excessive, or becomes excessive as demands change, rights to flows or discharges can be purchased back by the Crown.

A singular advantage of such an approach is that it allows market forces to serve an important function which is difficult for a pricing approach or its regulatory agency to perform administratively: to achieve and maintain a pattern of water use that responds to costs and values that vary widely between locations, and from time to time. In contrast to the pricing approach, where the regulating agency must be continuously involved in discriminatory and flexible rate-setting, the rights system allows the regulators to concentrate on allowable withdrawals and discharges.

The rights approach also offers scope for the Crown to appropriate the value of the water resources used, as it ordinarily does in granting rights to utilize public timber, minerals and other resources. This might be done by issuing rights at an initial price, and if the demand for rights were highly competitive, an auction price would approach the full value of the resources allocated. Alternatively, rights might be issued without an initial charge, in which case the resource value would be reflected in the private market value of the rights which might then become the object of a percentage tax. The private market value of a right would be lower to the extent that resource values were subject to the tax, but this partial appropriation would not interfere with the economic forces promoting efficient use.

Our own conclusion — that the rights approach offers most promise — is based on the need to balance two considerations. On the one hand the system should bring about an efficient allocation of resources among conflicting uses, with a minimum time lag as demands, objectives and technology change. On the other hand, it should be easily manageable, which is to say that its benefits should not be cancelled out by high costs of obtaining required information, by uncertainty surrounding official actions or by the necessity of an expensive administrative bureaucracy. An efficient rights system would involve substantially lower costs of transitional implementation and continuing administration. Moreover, while a pricing system is likely to become confused with a revenue purpose, there is already considerable familiarity with the concept of rationing the use of a common property through the issuance of rights (such as those issued to taxi owners, fishermen, oil producers, graziers, radio and TV broadcasters and so on).

The transition from existing arrangements to a rights system might proceed by simply providing licenses to existing dischargers for their effluent and

by appropriate changes in water permits to make them more secure and transferable. The Ministry has already begun to consider effluent permits as an instrument for regulating discharges to meet the established water-quality objectives, which would undoubtedly facilitate enforcement and orient the controls more directly toward water quality management.<sup>162</sup> Such effluent permits, and the existing water-taking permits, could readily be made to serve the economic objectives we have emphasized if they specified quantitative rights to the use of available resource and were transferable.<sup>163</sup>

The term of such rights is not critically important as long as they are marketable.<sup>164</sup> Long terms, or perpetual rights would offer greater security and certainty, while limited terms would increase flexibility in allocation.<sup>165</sup> Crown revenues could be raised in several ways, as with taxes on the use of land. Holders of rights might be subject to an annual rental charge, or to a percentage tax on the market value of the right. If the rights were limited in term, the Crown might levy a proportionate renewal fee or sell the rights at an auction.

While a rights system is likely to be considerably easier to manage than a pricing system, the administrative complexity of any regime that takes account of varying resource capacities and needs must not be underestimated. Theoretically, if rights were perfectly divisible and transferable, and if a unit of withdrawal or discharge at all points on a watercourse had the same effect, a free market for the available rights on each water system would bring about the desired results. Because the capacity of a river system varies over its length, rights to withdrawals or to discharge contaminants would necessarily be specific to the location at which they were first granted, and their transferability to another point on the watercourse would need official investigation, approval and alteration. Thus if a user wished to purchase rights to flows, or to assimilative capacity from other users (upstream or downstream) on a stream that was already fully allocated, the official task would be to determine, in terms of their respective demands on the watercourse, the quantitative equivalence of the rights purchased at the new proposed location. This task is similar to that which would arise when a discharger or water user changes his scale or process of production. Both such changes would

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<sup>162</sup> See *Status of Industrial Water Pollution Control in Ontario as of Dec. 31, 1971*, *supra*, note 159 at 40; and R. Caplice, *supra*, note 101 at 6, which suggests that such permits "... would limit the responsibility of a court . . . to determining whether the effluent exceeded the limits or loads prescribed (a simple case to prove) instead of having to determine if there was a discharge 'that may impair the quality of the water' (a more difficult question of act)."

<sup>163</sup> Any form of water quality control involves complex technical problems in quantifying different kinds of pollutants, their interactions and synergistic effects. Thus discharge licences, or rights, would have to specify quantities of particular contaminants of classes of contaminants.

<sup>164</sup> A system for regulating water quality using marketable rights is discussed by J. Dales, *Pollution, Property and Prices*, (Toronto: University of Toronto Press 1968).

<sup>165</sup> In practice, a system based on transferable rights with a fixed term would have many similarities with a pricing system, since the latter would probably provide for prices predetermined for prescribed periods. But pricing would not offer any transferable property, and would therefore provide less certainty and security.

necessitate calculation of the induced changes in the flow and quality of the stream.

Such transfers, and process changes, may of course make new capacity available at some points, or call for reductions and adjustments by other users. Wherever such changes are large, considerable administrative dexterity may be required to discover and facilitate the most efficient reallocation of discharge or withdrawal rights. This problem is common to all systems which attempt to respond to changing conditions; the rights system's market signals and financial incentives to seek the least cost abatement techniques will greatly assist all indicated adjustments.

In short, while an efficient system of water management must respond to the resource capacity and needs at each location, it will inevitably involve more exacting and more costly administration than simple uniform province-wide equipment standards or fixed prices, which can be easily administered from a central headquarters. We have already shown that such uniform arrangements, although they can reduce strains on the natural resource, will leave it wastefully used through misallocation among users and will also result in wasteful use of capital and land. We believe that the further research which this important issue deserves is likely to show that the higher administrative costs of the sensitive pricing or rights systems that recognize the circumstances of different locations would be easily justified by more efficient use of water and the consequent increased economic and social value derived from resources.