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SOME PROBLEMS OF WATER RESOURCE MANAGEMENT IN VIRGINIA. A PRELIMINARY EXAMINATION

Joseph A. Miri*

INTRODUCTION

In terms of the basic availability of water resources, Virginia is relatively fortunate. In light of its latitude and topographical characteristics, the normal annual precipitation of 43 inches is moderate to moderately high. The bulk of the land area of the state receives between 40 and 46 inches, although small portions in the southeastern and southwestern corners of the state experience as much as 50 inches and a section of the northwestern edge receives as little as 36 inches. While the temporal distribution is characterized by some fluctuation during the course of the year, Virginia experiences a relatively even seasonal distribution, although extremely dry years may disturb that pattern.

Only a part of the total precipitation received is available for use. Due to evapotranspiration, roughly one-third of the total precipitation, or about 25 billion gallons per day, is theoretically available for surface diversion.1 Ground water sources in certain areas of the state are able to supplement surface supplies. Estimates by the Virginia Division of Water Resources place projected demands for water use for the year 2000 at between 8 and 9 billion gallons per day. With adequate development of available supplies therefore, Virginia is in a favorable position to meet its future withdrawal requirements.2

To the extent that such an encouraging prognosis leads to lack of concern for water resources, it can be dangerously misleading. First, the general availability of sufficient supplies for the state as a whole obscures the fact that particular districts may face needs which will soon

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The author wishes to acknowledge the research assistance of Woodrow Turner, a student at the Marshall-Wythe School of Law, College of William and Mary.

1. One reason for this loss is the fact that surface storage is always susceptible to evaporation, which increases as the surface area of impounded water increases.

2. See Table I infra.
outstrip available resources. Even before this happens plans by different communities to develop the same source of supply, because of its cost attractiveness or proximity, could lead to conflicts between local water agencies. Moreover, conflicts between different types of water use may develop long before quantitative limitations on supplies are reached.

Second, the availability of sources of supply is no guarantee that their development can be financed easily and the costs properly allocated among different areas receiving the water. These tasks can severely strain the financial and administrative capacities of both governmental and private institutions.

Generally, the pressures on limited water resources and the conflicts that result from the development and use of water supplies mutually manifest themselves in urban and metropolitan areas, where the growth of large concentrations of population and industry require huge quantities of water. In these high-demand areas, the overall state-wide surplus of available water supplies may bear little relation to the practical realities of obtaining water rights and providing the funds necessary to construct facilities. The pressures and conflicts in growing urban areas stem from two sources:

1. The widespread effects of water withdrawals and the complex interrelationships among different water uses, and
2. the fiscal and administrative weaknesses of local political subdivisions.

The widespread effects of water use are numerous. Water diverted from a stream decreases the yield available for localities downstream. If the downstream communities do not have immediate need for large amounts of water, diversions to supply the more densely populated areas may pass without objection. However, as their populations grow the downstream communities will experience their own needs for new supplies. In other cases, different municipalities in a metropolitan area may each attempt to develop the same source independently.

The usable supply downstream is also reduced to the extent that undiverted streamflow is utilized for the dilution of industrial or municipal wastes. There are, of course, alternative methods of dealing with wastes other than the use of streamflow, e.g., various degrees of treatment and the use of trunk sewer lines to remove them physically from the local area. However, as population density increases and industrial and recreational development spreads over wider areas, removal of
wastes to another locality becomes less feasible, and recipient areas can be expected to become less willing to condone such practices.

The use of underground water, where it is available, does allow a municipality or water agency to avoid some of the aforementioned problems, but other conflicts can erupt; even these communities are not immune from the effects of each other's activities. For example, a well has a cone-shaped zone of influence that spreads outward as its depth increases, so that a large area can be affected by withdrawals. Should different wells tap the same underground aquifer, a very rapid decrease in the water table could result. Moreover, surface and ground sources are to a large degree interdependent, since well fields near a river can significantly reduce streamflow. In addition to the depletion of groundwater reserves, suburban residential areas which utilize individual septic tanks rather than a sewage system can often pollute groundwater sources.

Polluted waters are, of course, limited for recreation use, to say nothing of the resulting health hazards. The use of a reservoir for public water supply purposes will sometimes conflict with recreational activities because of the severe drawdown in water levels during dry summer months when public supply needs and recreational uses are both at their highest levels. As a tool of flood control, the effectiveness of a reservoir is also affected by its use as a water supply, since higher levels of water storage to provide for strong water demand reduce a reservoir's ability to contain storm runoff. Finally, the flooding of large areas and the construction of dams to satisfy water supply needs will often interfere with either the ecological balance of a particular locale or its scenic value. For all of these reasons, then, the problem of allocation and coordination among different communities and/or purposes becomes increasingly difficult.

The second basic source of difficulty in water resource development is the fiscal and administrative limitations of most local political subdivisions and water supply agencies. The administrative problems result from the limited geographic jurisdiction of local governments. Until very recently, different municipalities within the same metropolitan area have planned and constructed water supply and waste treatment facilities on an individual, rather than regional, basis.

Under these circumstances, construction of a sewage treatment plant by a municipality to treat its wastes was viewed as benefiting only those municipalities downstream, consequently, upstream development of these facilities was often avoided. This also acted as a deterrent to inter-municipal cooperation in regional sewage systems. Facilities which
were built tended to be small, inadequate, and very often inefficient. Likewise, water supply facilities were, and still are, planned and built by individual political subdivisions. While there is much less resistance to local expenditures for water supply facilities than to expenditures for sewage treatment facilities because the former are financed by user charges, the large initial capital investment required often hinders needed development and engenders smaller fragmented water supply systems.

Regional cooperation is desperately needed in metropolitan areas where municipalities compete with each other for new supplies. However, it is precisely in such municipalities that citizens are often suspicious of losing control of a valuable asset and productive source of municipal revenue to a regional entity. Additionally, the allocation of the costs of new facilities among owner communities and user communities can become much more complex than such allocation initially appears to be.

**Riparian Law**

*The Problem of Uncertainty*

As in most eastern states, water resource development and use is governed by the riparian doctrine, a common law concept inherited from England. Under this doctrine, ownership of land bordering a river confers certain rights in the water flowing past that land. The riparian owner has the privilege of making reasonable use of the water, but this privilege is subject to and limited by the correlative rights of other riparian owners along the watercourse. The riparian owner may not reduce the quantity or quality of the stream, except as occasioned by its reasonable use, “unless he has acquired a right to do so by grant, prescription or license.” The doctrine of prior appropriation is the legal system which prevails in the arid, western states. This western doctrine adjudicates conflicts over water use by giving precedence to those whose rights to use the water were established first in time, rather than relying on the criterion of reasonable use.

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3. Federal and state grant programs are improving this situation to some degree.
4. The English common law version of riparian law was modified by the colonial and state courts, which moved away from the “natural flow” theory to the “reasonable use” approach.
In the riparian states, conflicts are adjudicated in the courts on the basis of what constitutes a reasonable use. Precisely what is reasonable depends on the circumstances of each case and in making this determination the court would be obliged to consider such factors as the social importance and need for specific use, its size in view of the total flow of the stream, and the requirements of other riparian owners. The fact that the streamflow varies from season to season and from year to year would be relevant in these considerations. On the other hand, the court would weigh the severity of the harm resulting from the diversion. This balancing of equities would involve the social importance of the interests injured and the question of whether or not the injured party might have easily avoided the harm. The extent of such considerations was well stated by one court:

What is a reasonable and just use of flowing water is dependent upon the state of civilization, the development of the mechanical and engineering art, climatic conditions, the custom of the neighborhood and the other varying circumstances of each case.  

The fact that riparian rights are dependent on the circumstances prevailing at any given time has been viewed as providing the courts with a degree of flexibility which facilitates the settlement of conflicts over water use. Thus, the courts take into account both the public interest and the private rights of the riparian owner. The reverse side of the coin of flexibility, however, is uncertainty. First, the delineation of a riparian's right, and thus the adjudication of the conflict between two uses or diversions, cannot be made except through litigation which very often is commenced long after a riparian owner has constructed his plant or factory and/or diversion facilities. This uncertainty may discourage the location of water-using industries or other land utilization not only because of fear of the conflict but also because it cannot be settled prior to a financial commitment.

This uncertainty, of course, is less of a deterrent to municipalities or other public service corporations which may acquire the necessary water rights from riparian owners through eminent domain proceedings. However, the large sums of money required for these acquisitions and the unsettling effect of litigation long after water supply

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8. For further discussion of the rights of a municipality supplying its citizens with water, see text accompanying notes 14-21 infra.
facilities have been built could work serious hardships. Although Virginia courts have not ruled on this specific point, in some states the diverting municipality cannot reduce the damages to be paid by pleading that the riparian owner could have suffered the same loss without any right to compensation by the subsequent uses of another riparian owner. Moreover, for industries or other private diverters eminent domain acquisition is unavailable. Even after a case has been concluded the riparian right still lacks security, since the way is always open in a subsequent proceeding to a change in what may be considered a reasonable use.

Second, aside from this deterrent factor, the development of riparian law toward the establishment of rules as to what is a reasonable diversion under a given set of circumstances has been significantly retarded by the maxim that a water use cannot be restrained solely on the basis that an abstract right has been violated. Thus, the mere fact that the party does not possess a right to divert the water is insufficient to restrain the diversion or award even nominal damages, since the complaining party must suffer actual or threatened serious damage. An examination of water law in Virginia will reveal in numerous instances the lack of well developed riparian rules.

Inter-Basin Transfers

In addition to the uncertainty which makes the resolution of conflicting uses so difficult, the riparian system has other weaknesses which hinder the optimum development of water resources. For example, the riparian doctrine does not provide a mechanism for inter-basin transfers of water which might become necessary should shortages occur. The difficulty lies in the definition of riparian lands, which are deemed not to extend beyond the watershed of a given stream. Thus, if riparian use requirements in a given watershed do not divert the available yield, the surplus must flow out to the sea.

10. As a practical matter this does not actually occur as frequently as it could, but the uncertainty remains.
This is not to say that diversions of water from one basin to another have not occurred, but should they be successfully challenged by lower riparian owners, diverters could be liable for substantial damages. The fact that such challenges were not brought immediately after the diversions began would not harm a complainant’s case, since riparian rights are not lost by failure to use them. If, however, damages were incurred and no legal challenge was made, the period of prescription would begin to run so that failure to bring suit within 15 years would cause a forfeiture of riparian privileges.

In addition to the limitations on riparian rights arising from the “same watershed” requirement, individual riparian owners are further precluded from using water on land physically separated from that on the bank of a stream, despite the fact that the user may own both tracts. Consequently, a municipality owning a small riparian parcel and the land on which its storage facilities are situated cannot as a matter of riparian right use that water as a public supply for its inhabitants. While this situation may conjure up images of thirsty citizens going without water while millions of gallons flow downstream for use only on riparian land, it should be noted that a court would probably grant a delay on any requested injunction against diversion to allow the diverting municipality or public service corporation sufficient time to acquire the rights of lower riparian owners through condemnation. Under the riparian doctrine, the municipality would thereby acquire the right to divert an “unreasonable” amount of water. Suits seeking damages or injunctive relief from inter-basin transfers could also be resolved in this fashion.

**Groundwater Resources**

Likewise, the riparian doctrine is ill-suited to the coordination and management of groundwater resources. First, the problem of uncer-

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15. The City of Norfolk’s supply involves a transfer from the Nottoway and Blackwater watersheds. Plans for other supplies will involve inter-basin transfers. The Attorney General has been asked for an opinion on whether these transfers are permitted under Virginia riparian law.


19. In this discussion the terms groundwater and underground water will be used to refer to percolating water which under Virginia law is defined as all groundwater that does not flow in a known and defined channel. Clinchfield Coal Corp. v. Compton, 148 Va. 437, 446, 139 S.E. 308, 311 (1927).
tainty has similar effects on groundwater use. The fact that very few definitive rulings have been made by Virginia courts on groundwater use and the need to rely on judicial interpretation on a case-by-case basis, as in surface water law, leave many questions arising out of possible conflicting uses unanswered. The most serious defect in Virginia's common law in this area is that it is as yet unclear whether an owner of property may withdraw as much water as he pleases from his land for his discretionary use, even exhausting the source, or whether he is obliged to make only a reasonable use of the water. Even if the reasonable use doctrine were applied to groundwater, it could engender problems for groundwater transported off the property and used elsewhere as a public water supply, since the doctrine forbids "withdrawal for sale or distribution for uses not connected with the beneficial enjoyment of ownership of the land from which it is taken."  

**Statutory Law**

**Statutory Directions**

As the public interest in water resources grows, statutory law is enacted to supplement the riparian rules formulated by the courts. When it was deemed in the public interest to promote water development for what were viewed as highly beneficial uses, legislation supplementing and in some ways modifying riparian law was promulgated.  

1. **Quantity Controls**

As early as 1667, the Colonial Assembly established the right of a riparian owner to erect a mill dam across a stream and, where necessary, to condemn the opposing abutment after he had secured permission from the local circuit court. Several amendments to the law made in the seventeenth and eighteenth centuries provided that in granting or denying permission to erect the court was to take into account whether or not

22. See, e.g., 3 Henings's Statutes at Large 46 (1691) and 8 Henings's Statutes at Large 556 (1772) [hereinafter cited as Henings]. Discussion will cover only general statutes and not the numerous special acts of the General Assembly which promoted the development for navigation and other uses of specific rivers and streams in Virginia.
23. 2 Henings 260 (1667). See generally A. Embrey, Waters of the State 169-73 (1931) [hereinafter cited as Embrey].
1. anyone’s dwelling, outhouse, or yard would be flooded,
2. “the health of the neighbors [would] be annoyed,” and
3. navigation and the passage of fish would be obstructed.24

The courts were also charged with the duty to ascertain just compensation for damage caused by the flooding and any other damages. Prior to this legislation, prevailing riparian law left the construction and operation of such mill dams in doubt even when condemnation was unnecessary

In cases involving the conflicting operation of these dams, Virginia courts altered the reasonable use rule and introduced an element of the prior appropriation doctrine, holding that “[t]he proprietor who first erects his dam for a useful purpose has a right to maintain it, as against the proprietors above and below,” 25 and that if its operation “occupies so much of the fall as to prevent the proprietor above from a dam or mill on his land, it is *damnnum absque injuria.*” 26 The protections afforded property rights obtained under the Mill Act were not usually so well defined under ordinary riparian rules. Water power generation was thus recognized as worthy of preferred treatment.

The next major effort to supplement riparian rules and expand the power of the state over water impoundments came in the twentieth century with the passage of the Water Power Act of 1928. Under this statute, 27 anyone proposing to build a dam for hydroelectric power (or for any purpose over certain streams) must apply to the State Corporation Commission for a license to do so. 28 After a public hearing at which

the applicant and any other interested person, firm, association or corporation shall be given an opportunity to present facts, evidence and argument for and against the granting of the application,

the Commission is to pass upon the application. 29

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26. Id. Of course, this doctrine gave no right to monopolize the whole stream or deprive others of the like right to reasonable use, but it gave a right to that amount of water actually necessary for the operation of the mill.
The most recent major attempt to supplement riparian law in water resource development came in 1956 after the Virginia Advisory Legislative Council Report on Water Resources of Virginia observed that under the strict interpretation of the riparian doctrine flood waters in streams are part of the stream and, as such, cannot be acquired by anyone. Like normal or other flows they are available to riparian owners for "reasonable uses" only.\textsuperscript{30}

As a result of the recommendation of the Virginia Advisory Legislative Council the Surface Water Impoundment Act was passed by the General Assembly authorizing riparian owners to obtain approval from a circuit court for the impoundment of "water . . . over and above the average flow of the stream . . . for their later use."\textsuperscript{31} The Act, the purpose of which was to facilitate small impoundments for agriculture, exempted from its jurisdiction any impoundments under the Mill Acts or the Power Act.\textsuperscript{32}

This discussion thus far has shown that the riparian system has inherent weakness with respect to uses affecting the quantity of water in a stream in that it simply cannot control diversions until damages are shown and a suit is brought. Absent injury and suit, no control can be achieved even though the public interest in an equitable allocation of water supplies throughout a metropolitan region and the state as a whole may be threatened. Further, it is possible that the common law system could preclude water agencies from effecting inter-basin transfers, even though increasing uses of water resources require them in order to prevent local water shortages. Even when the system does permit such transfers, it may place heavy burdens on the agency seeking to effectuate such measures. All this means that new statutory and administrative rules governing water quantity must be adopted, just as has already been done in the field of water quality.

2. Quality Controls

Probably the clearest indication of the inability of the common law riparian system to balance the heavy demands placed on water resources with the public interest is the necessity for heavy statutory supplement to deal with the problem of pollution. Throughout the history of the


Commonwealth, the General Assembly has enacted statutes to control pollution, beginning with laws to strengthen criminal sanctions against polluters and prevent the disposal of polluting material into Commonwealth's waters. However, it was not until 1946, when the State Water Control Law was passed, that meaningful control of water quality became possible. By creating the State Water Control Board, an agency was empowered to protect existing water quality and reduce the pollution which already occurred.

Exclusive reliance on the common law riparian system was abandoned as a means of regulating uses affecting water quality because of its inherent inability to take affirmative steps to control the use of streams so as to avoid conflicts between users. The riparian common law was also limited in its application because it came to be recognized that the general public had an interest in clean streams which transcended the private interests of riparian owners. Since actual or threatened damages had to be shown before a court could take action, the public's general interest in the condition of the stream from health, ecological, and aesthetic viewpoints was often ignored to the point where water pollution actually threatened the safety and well-being of every citizen.

Despite the fact that the existing quantitative controls represent increasing concern on the part of state government in the area of control over water diversions, it is clear that the controls were primarily contemplated not as regulatory mechanisms in the sense of ensuring equitable distribution of water supplies but rather as a means of promoting the use of the state's waters to reap economic and social benefits that would result from these various activities. This is not to say that the Mill Acts, the Water Power Act, and the Impoundment Act were unwise laws when they were passed, but only to suggest that increasing pressures now require greater emphasis on the development consistent with water quality, recreational needs, and ecological and aesthetic values.

34. Va. Code Ann. §§ 62.1-14 to -44.1 (Cum. Supp. 1971) Other laws relating to pollution control such as the Fish Laws, §§ 21-148 to -153, and the Sanitation District Laws, §§ 21-224 to -290, will not be discussed, since the Water Control Law is the most comprehensive and the scope of this article is rather limited. In addition, in the case of the Sanitation District Laws the legislature did not delegate significant regulatory powers, but rather provided primarily for the establishment of an administrative and financial mechanism to build waste treatment facilities. Limitations on the scope of this report likewise did not permit discussion of flood control and flood plain zoning.
The first Mill Act, entitled an “Act for Encouragement of Erecting Mills,” declared that the construction and operation of the Mills "would conduce much to the convenicne of this country." Notwithstanding the declaration that "the control and regulation on the part of the State of the development of the waters of the State shall be paramount," the promotion of power development is the prime purpose of the Water Power Act. This is clear from the statement of public policy, and also from the provision outlining the procedure for granting a license to construct a dam or mill:

In pursuance of the herin expressed policy of the State to encourage water power development, the plans of the applicant provide for the greatest practicable extent of utilization of the waters of the State and that the applicant is financially able to construct and operate the proposed dam and works and that the general public interest will be promoted thereby, it shall grant the license.

Shortly after the passage of the Power Act, it was noted that the legislation lacked "any references whatsoever to the recreational, scenic or other possibilities, not wholly or professedly utilitarian, in the 'Waters of the State.'"

The power-development orientation of the State Corporation Commission statutes was restated by the Virginia Supreme Court in *Garden Club of Virginia v. Virginia Public Service Commission*, when the court said that the purpose of the Act's provisions was to prevent pre-emption of dam sites taken to forestall competition, to prevent speculation and to force present adequate development which without such safeguards might be retarded rather than promoted.

Of course, the danger is that because of the particular orientation and specific mission which the Commission has historically carried out, concern for the environmental impact of a project might not assume as
prominent a position in its deliberations as it otherwise should. The recent clash between the State Corporation Commission and the Water Control Board over the flow release requirements for the North Anna power project could be a manifestation of the different roles these agencies have heretofore played.\textsuperscript{43}

Likewise, the Surface Water Impoundment Act of 1956 was not conceived as a mechanism to insure availability of water supplies for all areas of a region or state, but simply as a means whereby riparian owners could store floodwaters for irrigation purposes without fear of suit for damages by other riparian owners.\textsuperscript{44} As such, it was an attempt to remove some of the uncertainty, prevalent under riparian rules, by providing a proceeding to establish rights before damages occur.

Under the 1956 Act, any riparian owner desiring to store floodwaters "may apply for leave to do so to the circuit court of the county or corporation court of the city wherein the impounding structure is proposed to be built."\textsuperscript{45} The State Commissioner of Water Resources is to examine the application and report to the court on, among other things:

1. "Whether the proposed project conflicts with any other proposed or likely developments on the watershed;"\textsuperscript{46}
2. "the effect of the proposed impoundment on pollution abatement to be evidenced by a certified statement from the State Water Control Board together with such other relevant comments as such desires to make;"\textsuperscript{47} and
3. "any other relevant matters which he desires to place before the court."\textsuperscript{48}

If, on the basis of the Commissioner's report and other evidence

\begin{quotation}
\textit{it appears to the court that by granting such leave other riparian owners will be injured, or there are other justifiable reasons for denying the petition, the leave shall not be granted; provided that in no case shall leave be granted if the certified statement from the State Water Control Board filed under § 62.1-109 shows that, in the opinion of such Board, the reduction of pollution will be}
\end{quotation}

\textsuperscript{43} See text accompanying notes 85-89 infra. See also text accompanying notes 53-60 infra.
\textsuperscript{44} See VALC RESOURCES REPORT, supra note 30.
\textsuperscript{45} VA. CODE ANN. § 62.1-107 (Supp. 1968).
\textsuperscript{46} VA. CODE ANN. § 62.1-109(2) (Supp. 1968).
\textsuperscript{47} VA. CODE ANN. § 62.1-109(3) (Supp. 1968).
impaired or made more difficult. If it be granted, the court shall place the applicant under such terms and conditions as shall seem to be right.\textsuperscript{40}

In terms of the ability of the state to manage and control the use of its water resources and ensure access to them for all citizens, the requirement that the Commissioner of Water Resources and the Water Control Board must report on the effects of the impoundment is sound. This provision would make clear how the impoundments affect the quality and availability of water for the surrounding region.

Unfortunately, however, the applicability of this Act is rather limited. Since the statute does not apply to impoundments which fall under the Water Power and Mill Acts, as a practical matter it affects only non-power related impoundments on waters within the State.\textsuperscript{50} This restriction confines the impact of the Act to the smaller streams. The most fundamental limitation, of course, is that the act is merely optional and does not require that a diverter apply to the court for approval. Thus, it would not affect proposed public water supply impoundments if the municipality or public service corporation chose to obtain the water rights through ordinary eminent domain procedures.\textsuperscript{51} The result is that the full ramifications of a given water supply project may not always be examined. Finally, even if the Act were more widely applicable it can be faulted, since it leaves the final approval of an impoundment project to a local court which might tend to take a parochial view of the project and fail to give sufficient consideration to its regional implications from a resource management or environmental standpoint.

\textbf{Fragmentation of Water Resource Management Responsibilities}

A second problem with these statutory laws is fragmented responsibilities and overlapping jurisdictions. Under the Water Power Act, the State Corporation Commission is empowered to impose

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\textit{\textit{such terms and conditions with respect to the character of construction, operation and maintenance of the proposed dam and works as may be reasonably necessary in the interest of public safety; and determine what provision, if any, shall be made}}
\end{quote}

\textsuperscript{49. VA. CODE ANN. § 62.1-111 (Supp. 1968).}

\textsuperscript{50. VA. CODE ANN. § 62.1-114 (Supp. 1968).}

The right to attach terms and conditions to its licenses allows the State Corporation Commission to specify minimum flow release schedules in the operation of a dam to protect water quality in the stream. This power has already caused conflicts with the power of the Water Control Board to impose similar requirements in issuing its certificates for the discharge of sewage, industrial wastes, and other wastes into or adjacent to or the alteration otherwise of the physical, chemical, or biological properties of State waters under prescribed conditions.

In the recent clash over which agency's minimum flow release schedule should prevail, the Attorney General ruled that "in water power projects the final decision as to flow release schedules is that of the State Corporation Commission." 54 In making such a ruling, the Attorney General candidly admitted that balancing demands for the development of resources with the need to protect environmental values is rendered more difficult "when governmental responsibilities are fragmented, conflicting or in need of clarification," 55 and said "there is a definite need to consider legislation that would redefine—and perhaps redetermine, more clearly the locus of responsibility" in this area. 56

Although the Attorney General referred to just one instance of overlapping jurisdictions, there are several other areas where the division of responsibilities between these two agencies is poorly defined. According to section 62.1-83 of the Code of Virginia, no one proposing to construct or reconstruct any dam across or in the waters of the State shall begin the construction or reconstruction of any such dam unless and until the provisions of this chapter [7] have been complied with. 57 (Emphasis supplied.)

54. Letter from Attorney General Miller to the Executive Secretary of the Water Control Board, February 5, 1971, page 7, on file in the Attorney General's Office, Richmond, Virginia [hereinafter cited as ATTORNEY GENERAL'S OPINION].
55. Id. at 10.
56. Id. This section also provides that a proposed hydroelectric power dam "in any rivers or streams within the State" must also be approved by the State Corporation Commission. (Emphasis supplied)
Section 62.1-85 provides that

[t]he construction or reconstruction as is mentioned in Section 62.1-83 shall not be begun until the person, firm, association or corporation, private or municipal, proposing to construct or re-
construct same shall first obtain a license to do so from the State Corporation Commission. 58

Any doubt as to the scope of the State Corporation Commission's power in this area was dispelled by the Virginia Supreme Court's ruling in Vaughn v. VEPCO that:

As to "waters of the State," the authority of the Commission extends to the licensing of any dam proposed to be constructed in or across such waters regardless of the purpose for which the dam is to be used. 60 (Emphasis supplied).

Under these statutes, the Commission may presumably pass judgment on the right of many public water supply agencies to construct dams for reservoir projects with no delineation of the role of the other state agencies concerned with the environmental aspects of water resource development. It is likely that where there is any threat to water quality as a result of such water supply impoundments, a question over which agency's authority should take precedence would probably be resolved in favor of the Water Control Board. However, this presumption is not a substitute for clear statutory authority. Moreover, insofar as the Water Control Board is probably not able to exercise jurisdiction over water supply impoundments unless some water quality degradation is threatened, there will probably be many cases where the Corporation Commission will be the only state agency with any statutory authority to regulate and approve such projects.

In granting its approval for dams the State Corporation Commission is to "weigh all the respective advantages and disadvantages from the standpoint of the State as a whole and the people thereof," 60 and may make such investigations as may be appropriate as to the effect of the proposed construction upon any cities, towns and counties and

59. 211 Va. 500, 502 (1971) "Waters within the State" were construed to mean "all other" waters not included in the definition of "waters of the State." See text accompanying note 63-74 infra.
upon the prospective development of other natural resources and the property of others.61

This provision allows the Commission considerable latitude to take into account the environmental aspects of the dam and the diversion, but it fails to establish clear guidelines and makes consultation with other agencies voluntary 62

The "waters of the State" referred to in section 62.1-83 of the Code are defined in the following ways:

(a) Any stream or that portion of any stream in this State which prior to June twenty-first, nineteen hundred thirty-two has been declared navigable by any unrepealed statute of this State, or (b) any stream or that portion of any stream in this State, the bed of which is owned by the Commonwealth, or (c) those parts of streams or other bodies of water in this State which either in their natural or improved condition, notwithstanding interruptions between the navigable parts of such streams or waters by falls, shallows, or rapids, compelling land carriage, are used or suitable for use for the transportation of persons or property in interstate or foreign commerce, including therein all such interrupting falls, shallows, or rapids, and also any stream or part thereof in this State other than those mentioned in this subdivision in which the construction of any dam or works as authorized by this chapter would affect the interests of interstate or foreign commerce, or (d) that portion of any river or stream flowing between the high-water mark on the Virginia shore and the low-water mark when such low-water mark constitutes the boundary line between Virginia and another state.63

The exact meaning of waters of the State has rendered the interface between the State Corporation Commission and the State Water Control Board even more obscure. The first category, (a), includes those streams which are not necessarily navigable in fact, although most of them are, but which were declared navigable by the General Assembly prior to 1932. These streams are fairly easy to identify by reference to the statutes. They include most of the large, obviously navigable rivers

61. Id.

62. There is a requirement to consult the Water Control Board in the granting of certificates of assurance that water quality standards are not violated by projects licensed under Federal law. (Pub. L. No. 91-224, § 21(b) Federal Water Quality Improvement Act of 1970.) See also ATTORNEY GENERAL'S OPINION, supra note 54.

as well as some smaller streams which would not normally be thought of as navigable.\textsuperscript{64} Taking the remainder out of order, category (c) generally refers to any rivers used or suitable for use for interstate or foreign commerce, a classification which involves a considerable degree of judicial interpretation. The reference to those rivers over which proposed dams would “affect the interests of interstate or foreign commerce” \textsuperscript{65} was initially interpreted to apply to waterborne commerce only and not to landborne commerce.\textsuperscript{66} However, this part of the statute was more recently construed to include rivers over which dams are built for generating electricity for interstate transmission.\textsuperscript{67} Category (d) refers to a well defined group of streams which form portions of the boundaries of the state.

Contributing most heavily, however, to the confusion over the division of responsibility between the State Corporation Commission and the State Water Control Board is the doubt over the meaning of category (b), which is shrouded in the mists of incomplete, if not conflicting, judicial interpretation. Although state ownership of the beds of tidal streams is not in any legal doubt,\textsuperscript{68} the precise question of the state’s ownership of non-tidal rivers has never been directly ruled upon. References to state ownership of this type of streambed in court decisions as well as the interpretations made by various authorities are in conflict.\textsuperscript{69} According to Embrey, who relies on the case of \textit{Old Dominion Iron & Nail Co v. Chesapeake & Ohio Railway},\textsuperscript{70}

\begin{quote}
the waters and the bottom of a river of the State, non-tidal though it may be, [if] navigable in fact, that is capable of being navigated \ldots is a public river \ldots [and] belongs to the State.\textsuperscript{71}
\end{quote}

Other commentators give different meanings to the holding in this case, which dealt with the navigability and ownership of a non-tidal portion of the James River, the bed of which was found to belong to the state.\textsuperscript{72} Walker, for example, points out that although the court,

\begin{itemize}
\item \textsuperscript{64} Embrey, \textit{supra} note 23, Appendix A.
\item \textsuperscript{67} Vaughn v. VEPCO, 211 Va. 500 (1971).
\item \textsuperscript{68} See, e.g., text accompanying notes 69-73 infra.
\item \textsuperscript{69} Embrey, \textit{supra} note 23, at 148-51.
\item \textsuperscript{70} 116 Va. 166, 81 S.E. 108 (1914).
\item \textsuperscript{71} Embrey, \textit{supra} note 23, at 151.
\item \textsuperscript{72} Christian, \textit{The Rights of a Riparian Owner upon a Freshwater Navigable Stream}, 2 Va. L. Rev. 436, 445 n.21 (1915).
\end{itemize}
did uphold public ownership of the bed in question the decision was based largely upon the special circumstances of the case and did not require a choice between the two opposing views of ownership [of non-tidal riverbeds].

A more recent case contains dicta lending weight to the view that navigability in fact does not necessarily mean that there is state ownership of the bed, but this issue is still unsettled. The question of what criteria does determine state ownership, if navigability in fact does not do so, is also unclear.

Such uncertainty in delineating waters of the State and hence the jurisdiction of the State Corporation Commission is unwieldy and administratively unsound. It could definitely lead to clashes between the Corporation Commission and the Water Control Board over certain projects, and could result in future legal controversies over whether or not a dam was properly licensed. For example, if a party showed that the State Corporation Commission failed to license a dam for water supply across what is claimed were waters of the State, the right to build and use the dam might be placed in question. An immediate attempt must be made to clarify the jurisdiction of the Corporation Commission, either by redefining waters of the State or by actually modifying the respective authority of the Commission and the Water Control Board where non-power impoundments are concerned. When power generation is not involved, jurisdiction over water projects might more properly rest with an agency other than the State Corporation Commission. Such changes would, of course, be subject to other modifications in the powers and duties of all agencies in the water management field.

One of the original purposes of the Water Power Act was to regulate the structure of dams in the interest of public safety. However, the Corporation Commission, due to manpower shortages and lack of sufficient funds, does not after making its initial investigation make periodic inspections of the dams to examine their physical condition or operation. The state should consider making such activity the specific responsibility of a state agency and provide it with the funds and

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73. Resources, supra note 5, at 65.
75. The State Corporation Commission has the power "to employ expert engineers or other experts or persons to examine and report upon projects as proposed in application for licenses, or the structures thereof, or upon plans submitted after the issuance of licenses covering additional details on succeeding stages of construction." Va. Code Ann. § 62.1-100 (Supp. 1968).
staff to formulate and enforce the criteria for dam construction through field inspections.

Finally, even where responsibilities are clearly delineated, the fragmentation of tasks often poses a serious problem. This in turn raises the question of whether or not all water resource development regulation might better be carried out if it were entrusted to one agency. This article has shown how past legislation dealing with water resource development and management has been more or less single purpose in scope, water power, mills, irrigation, protection of fish and wildlife, etc. Separate responsibility for different types of regulation over water development and use makes evaluation of different values and costs much more difficult, since each agency approaches a particular project or policy from its own point of view. The balancing of often conflicting values and costs, such as recreation versus public supply, power generation versus scenic beauty, or economic development versus water quality, must be resolved notwithstanding the interdepartmental disputes which arise. While there are limits on the extent to which centralization is administratively beneficial, consolidation of different water resource management tasks should be carefully considered.

Fragmentation of responsibilities can result in inefficient administration, and the inherent conflict from expanding duties under federal and state law intensify this problem. The Executive Director of the Water Control Board, A. H. Paessler, has said that "quite a complex review system [for water resource projects] has developed among State agencies, with the result that there undoubtedly is duplication of effort and loss of efficiency". Of course, some, but not all, of these effects can be eliminated through improved operating procedures and do not necessarily require radical administrative reorganization.

We have focused on the sharing of responsibilities between the State Corporation Commission and the Water Control Board, but fragmentation of water management functions exists among other agencies as well. Disagreements have occurred between the Water Control Board and the Board of Conservation and Economic Development over water resource projects because planning and water quantity matters are the responsibilities of the latter while water quality is that of the former. The Marine Resources Commission and the Water Control Board have also disagreed over state policy. While recommendations for the pre-

cise extent of centralization of all water management functions requires more detailed and comprehensive study, this preliminary examination clearly points to the need for a substantial consolidation of management tasks.

In any contemplated administrative reorganization, the relationship between the Division of Water Resources and the Water Control Board should be redefined to eliminate the artificial and troublesome separation of water quality from water quantity. Merger of the two agencies would be one immediate but temporary means of accomplishing this purpose, pending further study to determine overall administrative reorganization of management functions. Attention must also be given to the artificial distinction between tidal and non-tidal waters which separates the Water Control Board from the Marine Resources Commission. Thus, any new powers assumed by the state over wetland areas should be viewed in the context of overall water resource management, rather than as an independent function. This caveat applies to flood plain regulation as well.

**The Need for Regulation of Diversions**

**Limitations on State Water Control Board Power**

The discussion thus far has stressed the weaknesses of present riparian and statutory law dealing with the management of water resources. The inability to prevent conflicts among users, fragmentation of responsibilities, and an overemphasis on development and use rather than regulation and control have prevented the optimum utilization of water resources in Virginia. The efficient and equitable allocation of water resources will require some mechanism to regulate diversions and impoundments. Only in this way can available resources be developed to their fullest capacity in a manner consistent with environmental and other social values. In this section we focus on the most powerful of the water agencies, the State Water Control Board, and determine whether its authority allows the state to regulate diversions and impoundments on Virginia's streams and if so, to what extent.

There are three formal powers by which the Water Control Board exercises control over water resource use. First, the Board has the power to grant permits "for the discharge of sewage, industrial waters, and other wastes into or adjacent to [state waters] or [for] the alteration otherwise of the physical, chemical or biological properties of State
Second, with respect to industrial pollution, the Water Control Act provides that “[a]ny owner who erects, constructs, opens, reopens, expands or employs new processes in or operates any establishment from which there is a potential or actual discharge of industrial wastes or other wastes to State waters, shall first provide facilities approved by the Board for the treatment or control of such industrial wastes or other wastes.”

Third, the Board is empowered to issue certificates, after a joint review with the Department of Health, authorizing the construction of all sewage systems and treatment works “designed to serve more than 400 persons and which will have a potential discharge to State waters.”

In any of these cases the Board is authorized to issue cease and desist orders to polluters, and to issue orders to those “who have failed to construct facilities in accordance with final approved plans and specifications.”

Earlier this year these generally broad powers were significantly curtailed by an amendment to the Water Control Act. The Board’s effective power to order the construction or improvement of a sewage system or sewage treatment works was limited to those instances where “the Board shall have previously committed itself to provide financial assistance from Federal and State funds equal to the maximum amount” provided for under the Federal Water Pollution Control Act.

With respect to control over diversions, at least at the outset when the diverter seeks approval from a court under the Surface Water Impoundment Act the Board does have power to prevent certain diversions. The law provides that,

in no case shall leave be granted [for the impoundment] if the certified statement from the State Water Control Board shows

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79. VA. CODE ANN. § 62.1-44.19 (Cum. Supp. 1971). The State Board of Health, generally, has supervisory control over water supplies insofar as sanitary and physical quality of drinking water is concerned. VA. CODE ANN. § 62.1-46 (Supp. 1968). The Board may give advice as to sources and purity of water. VA. CODE ANN. § 62.1-49 (Supp. 1968). However, since no owner may operate a water supply system for drinking or domestic purposes without a permit from the Board, it is axiomatic that a proposed project would not be undertaken without first seeking the advice of the Board. VA. CODE ANN. § 62.1-50 (Supp. 1968). In addition, the Board of Health does have authority to approve or disapprove plans for sewage system construction. This authority is shared with the Water Control Board. VA. CODE ANN. § 62.1-44.18, 19 (Cum. Supp. 1971).
that, in the opinion of such Board, the reduction of pollution will be impaired or made more difficult.\textsuperscript{82}

As has been stated, municipalities and public service corporations are not required to seek permission to impound under this Act, and its applicability is limited in other ways.\textsuperscript{83} As a result, the Board has not had the opportunity to exercise this power very frequently.

In other cases, any power to regulate diversions would appear to revolve around the Board's authority to issue certificates for the discharge of wastes into the state's waters and for "the alteration of the physical, chemical or biological properties of State waters under prescribed conditions and to revoke or amend such certificates."\textsuperscript{84} These provisions, and the authority to "take all appropriate steps to prevent quality alteration contrary to the public interest or to [quality] standards established [by the Board],"\textsuperscript{85} would appear to allow the Board to exercise some control in certain instances.

In the North Anna River power project the proposed impoundment of water would have reduced the downstream flow so as to cause the salinity line to shift upstream. The Board explicitly acted under section 62.1-44.15(5) of the Code in granting its certificate to the Virginia Electric and Power Company and in imposing a minimum release schedule. The shifting of the salinity line would have constituted an "alteration in the physical, chemical or biological properties"\textsuperscript{86} of state waters and would have rendered them "detrimental to the public health, or to animal or aquatic life."\textsuperscript{87} And although the Board's authority seemed proper, an advisory opinion of the Attorney General ruled that the State Corporation Commission's jurisdiction took precedence in cases concerned with power development, even in light of the fact that the Water Control Board possessed the general statutory power.\textsuperscript{88} The Board could impose conditions on a non-power diversion and, presumably, bar it completely if the proposed project would cause an alteration in the quality of the water. Requirements for minimum flows and other limitations such as monitoring can have the practical effect of

\textsuperscript{82} VA. CODE ANN. § 62.1-111 (Supp. 1968).
\textsuperscript{83} See text accompanying notes 49-51 \textit{supra}.
\textsuperscript{84} VA. CODE ANN. § 62.1-44.15(5) (Cum. Supp. 1971)
\textsuperscript{86} VA. CODE ANN. § 62.1-44.15(5) (Cum. Supp. 1971)
\textsuperscript{87} VA. CODE ANN. § 62.1-44.5 (Cum. Supp. 1971)
\textsuperscript{88} ATTORNEY GENERAL'S OPINION, \textit{supra} note 54.
blocking a proposed impoundment project because the Board's additional requirements are often very costly to the applicant. 89

The minimum flow releases in both the North Anna and Northwest River projects were imposed by the Board to prevent salinity from spreading upstream. In Spotsylvania and Culpepper Counties, minimum flow releases were requested by the Board to maintain downstream quality. Even though the danger to water quality actually was remote, the requests were met by the parties concerned because the Board had worked closely with the local political subdivisions, the project planners, the Soil and Water Conservation Districts involved, the State Soil and Water Conservation Commission, and the Division of Water Resources. These requests, or "recommendations," have not been challenged and ruled on in court.

It would appear that where degradation of water quality is not present or threatened, the State Water Control Board cannot prohibit or impose limitations on a water supply impoundment. It is also apparent that even where degradation is actually involved, any limitation must be for quality protection and cannot go beyond those constraints required for that limited protection.

There have been cases, however, and there will be many more in the future, where even though proposed diversions do not cause any significant water quality degradation they may seriously affect the cost and availability of water supplies for other nearby areas. For example, public water supply diversions at one point on a stream could eliminate that stream as a source of supply for other communities up- or downstream. One such situation occurred recently when a reservoir was proposed on the Pamunkey River to impound water for the Richmond metropolitan area. Downstream communities in King William County which considered this river as their water and hoped to develop the source vehemently opposed the project. This opposition caused only a temporary abandonment of the project, and the potential for serious conflict remains. Elsewhere, the concurrent use of Rappahannock River water may be required to supply parts of northeastern Virginia, while at the same time water users in the Fredericksburg metropolitan area and beyond will no doubt eventually want to use the same source.

89. This was the effect of the limitations and conditions imposed on a certificate of assurance granted by the Board under federal law to the City of Chesapeake in the Northwest River water supply impoundment project. Apparently Chesapeake will now proceed with a direct intake on the river and not build the reservoir.
Orientation in Terms of an Overall Assessment

The equitable solution of conflicts over plans to develop and preserve available supplies may require a new role for the state in which it could assess overall needs and modify projects where nearby areas would be adversely affected. This would make the optimum development of water resources a more easily attainable goal than is foreseeable at the moment, when the prospect of inter-municipal and inter-regional competition over water supplies is clear. Conflicting, inefficient, and irreversible developments may result. Here, neither the Water Control Board nor any other state agency presently has the power to act. The state should therefore give serious consideration to the adoption of administrative procedures for control over water diversions which would broaden the scope of the decision-making criteria and more clearly approach the problem in terms of an overall state-wide solution. This could be done by giving a state agency the power to approve all diversions for consumptive use over a specified minimum quantity regardless of the uses. Whether the diversions are for public water supply, industrial supply, irrigation, or other use, one agency would issue permits specifying the maximum amount that could be withdrawn. Existing diversions would be recognized as rights to continue withdrawing water so long as they were registered within a certain period. Permits could also be issued for a limited number of years.

This type of centralized approach would greatly modify, if not completely abrogate, the riparian doctrine, depending on the actual power and jurisdiction of the permit system. It should, however, not be adopted without detailed studies of all aspects of present water resource management in the state. Meaningful standards and criteria must be established for the issuance of the permits. As in the case of water quality control, sufficient staff and funds for effective monitoring are

90. A non-consumptive use is one in which the water is not removed from the stream or is returned to it. A consumptive use is one in which the water is not returned, as in irrigation or as a result of its incorporation into a product in manufacturing or food processing. The agency could be given power to issue permits for non-consumptive uses, but grants of consumptive permits should be kept to a minimum.

91. It should be noted that the proposed Potomac River Basin Commission would strengthen water management in that basin. For example, the Commission would have the power to regulate diversions under certain conditions. It could also act in the area of water supply development, water quality control, flood control, recreation, and planning. At present, only Virginia has entered the Compact to establish such a Commission. The other jurisdictions in the Potomac Basin, Maryland, Pennsylvania, West Virginia, and the District of Columbia, have yet to adopt it. See Potomac River Basin Compact [codified at VA. CODE ANN. § 62.1-69.1 et seq. (Repl. Vol. 1971)].
critical. The experience of other states in these areas should be carefully investigated before the permit system is established.

**Groundwater Withdrawal Problems**

With regard to groundwater supplies, the need for management and regulation of available supplies is even more immediate than it is for surface water. Groundwater is a particular problem in southeastern Virginia, where withdrawals in some areas are 40 times what they were less than 30 years ago. The key to groundwater management is preserving the ability of aquifers to recharge themselves. If withdrawals proceed at too rapid a rate, the mining of water will occur and eventually the aquifer will be exhausted. On the other hand, the monitoring of water tables by means of observation wells and strict regulation of withdrawals will help to ensure that the aquifer can consistently yield a supply of water. Moreover, as indicated at the outset of this article, certain groundwater withdrawals significantly affect surface water availability. The proper amount of groundwater withdrawal can give optimum yields from available supplies. Managed withdrawals increase the absorptive capacity of the water-bearing rock and soil, thus preserving its ability to act as a water storage reservoir.

Except for the requirement that abandoned wells be capped, Virginia has no control over groundwater withdrawals. The riparian law provides the only restrictions, and even these are at the moment extremely uncertain because the state courts have not ruled on several important questions. However, no matter how strictly the riparian rules are interpreted they will in all likelihood not provide the needed management controls.

The state should give immediate consideration to the problem of groundwater regulation under some form of permit system which grants withdrawal rights only for specific periods. As in the surface water permit system, existing withdrawal and use of groundwater would become recognized as rights to withdraw, provided they were registered before a certain date, while all other withdrawals over a certain minimum would then require a permit.

**Planning and Development**

**Need for an Affirmative Approach**

As we have seen, controls over quality and surface or groundwater withdrawals are critical tools of water resource management. Limitation
of diversions can also prevent certain users from preempting the available supplies in an area. Vital as they are, however, in insuring that all communities in a region will have supplies available when they require them, these powers can only operate in a negative fashion to modify or block the proposed water project; they cannot affirmatively guarantee that supplies will be developed when and where they are needed. Problems of conflicting plans for the development of the same supply source and the difficulties of financing and cost allocation cannot be dealt with by negative controls alone. Likewise, while the Water Control Board can order the construction of waste treatment facilities, funds must be made available to local communities not possessed of adequate resources. To provide truly equitable and efficient use of water resources, there is a need to stimulate coordinated planning and development of water supplies and construction of waste treatment facilities.

Since public water supply facilities are built and operated by local agencies, and since water resource development has obvious regional consequences, consideration of planning and development necessarily involves inter-governmental relationships. This requires a shift of emphasis in the last segment of this article from the legal to the primarily administrative and political, because these aspects of water management are more important in analyzing such relationships.

**A More Assertive Role for the State**

Virginia now possesses ample power to carry out long-range water resource planning through the Board of Conservation and Economic Development. Under section 10-17.1 of the Code, “the Board is assigned the responsibility for planning the development, conservation and utilization of Virginia’s water resources.” The Board is directed to establish “plans and programs for the development of the water resources of this State in such a manner as to encourage, promote and secure the maximum beneficial use and control thereof” and is now formulating comprehensive plans for the major river basins of the state. Where conflicts over water use arise the Board, in its coordinative role, is authorized, at the request of any state agency or political subdivision or on its own initiative, to recommend a plan to resolve any conflict as to actual or proposed water use or other practice directly affecting water use that in-

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94. See [Table II infra.](#).
96. VA. CODE ANN. § 10-17.3 (Cum. Supp. 1971)
volves a potential or existing conflict between water use functions under the jurisdiction of different state agencies.\footnote{97}

While valuable as coordinative guidelines, these plans are wholly advisory. The purpose of section 10-17.2 may have been to resolve interagency disputes, but the recommendations made by the Board, such as in the flow-release controversy over the North Anna River Project, were not accepted by the other state agencies.

Water resource planning is also carried out by the State Soil and Water Conservation Commission, various soil and water conservation districts, the State Water Control Board, regional planning district commissions, water and sewer authorities, sanitary authorities, sanitation districts, and, of course, the local governments. The districts and authorities have been extremely helpful in stimulating inter-governmental cooperation in both the planning and construction of projects by providing means whereby area-wide problems can be dealt with on at least an inter-local, if not a regional, basis. Coordinating the plans and projects proposed by all of these entities, however, requires extensive consultation and cooperation.\footnote{98}

Since plentiful surface water supplies are not available within the boundaries of most municipalities, the exhaustion or unavailability of groundwater supplies leads those communities to develop supplies in suburban and rural outlying areas. Communities without the capacity to finance a major capital undertaking such as this must purchase water on a wholesale basis or allow another agency to service its residents. For those political subdivisions which build and own reservoirs outside their own boundaries, relationships with the outlying communities are not always cordial. While condemnation allows the needy municipality to acquire reservoir sites and water rights, the outlying areas are usually not pleased when forced to give up water which they consider theirs.

Although this is beginning to change, in the past the most effective way of assuring that the source of supply would not become polluted was to buy as much of the land in the watershed as possible and bar any economic development of the area. Since municipal ownership of


\footnote{98. The scope of this article does not permit a thorough discussion of the local and regional entities because of the focus on the role of agencies at the state level. However, in any further study of water resources management the role of soil and water conservation districts, sanitary districts, water and sewer authorities, etc., should be examined to find ways of stimulating further coordination with state agencies and among themselves.}
land exempts it from property taxes, this arrangement was not always a happy one. In other cases, where the city developing the supply agreed to provide sewerage facilities for outlying communities to protect its supply, allocating the costs of the facilities led to controversy. In both of these situations, inter-municipal relations became strained and the voluntary cooperation necessary for coordination of water resource planning and development was not forthcoming.

Once several different water supply systems are operating in the same metropolitan area, unification of water agencies or even mere cooperation becomes very difficult. Strong public attitudes concerning local autonomy, the high cost of building water resource facilities, and the desire to maintain control over something as vital as water supply all contribute to fragmentation.

The revenue raising ability of an amortized water supply system, which can provide revenue for general municipal expenditures, often acts as a deterrent to the consolidation of water supply systems because it involves selling these valuable facilities to either a larger municipal system or an authority. Ownership of a water supply also allows greater control over rates charged to customers, and can give the supplying municipality a certain amount of political and economic leverage over the user communities to which it provides water. Many cities supplying neighboring areas have even used the threat of withdrawal of water service in attempts to force annexation or prevent unfavorable consolidation of nearby cities or towns.99 Furthermore, there is ordinarily a distinct price differential between local customers and those outside the city limits.100 Regardless of the basis for this differential, lower water rates are usually an advantage in attracting water-using industries. The joining of water systems might threaten this differential enjoyed by the owning municipality.

The high cost of developing water supplies is also closely related to the lack of enthusiasm for ultimate consolidation of existing systems. The greater part of the cost of providing water consists of site acquisition costs and the construction charges for the storage and transmission facilities. The cost of purchasing water rights, if they are not already owned, can also be substantial. This means that until the water facilities are completely amortized the price of water will be rather high, since the

99. The City of Norfolk, according to newspaper reports, made some veiled threats in this direction.
100. The differential is usually based on the fact that the cost of supplying outlying areas is greater than the cost of serving local residents.
price charged to the customer must reflect not only operation and maintenance costs but also the initial costs of site and water rights acquisition and construction. The initial customers of the water supply system thus pay a proportionately larger share of the costs of the facility, and this often makes embarking on a new water supply project unattractive to the taxpaying customers of a municipal water agency.

An additional burden falls on early customers. Economies of scale make it impractical to construct and finance storage and transmission facilities in small increments corresponding to increasing water demand. The capacity of facilities must, therefore, be larger than initially necessary to provide for future increases in demand. While the safe potential yield of a facility might be 25 million gallons per day, only 15 may be needed when it is built, thus resulting in a much higher price per million gallons initially than will be the case when the full capacity is purchased and used by the customers. The combined effect of amortization and full purchase of the yield can sometimes cause rates to be reduced to as little as one-sixth of their original level. While this at first makes large-scale water supply projects even less attractive, once they are built and their costs amortized it is understandable for a municipal agency to desire to retain ownership of its system.

The dynamics of these competing factors are well illustrated in the metropolitan area around the City of Norfolk, since there are several water supply agencies operating in the Norfolk-Portsmouth metropolitan area. The City of Norfolk owns a waterworks system which also serves the northeastern section of the cities of Chesapeake and Virginia Beach. The City of Portsmouth serves its residents as well as the City of Suffolk, parts of Nansemond County, and Chesapeake. Both Virginia Beach and Chesapeake obtain part of their supplies on a bulk basis for resale to their citizens through distribution systems owned by each city, while other sections of these cities receive water on a retail basis through distribution lines owned by the supplying cities of Norfolk and Portsmouth.

Planning for required new supplies has been marred by inter-gov-

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101. The sources of supply are a group of lakes east of the city, mostly in Virginia Beach, and several auxiliary intakes involving inter-basin transfers from the Blackwater and Nottoway Rivers.

102. The sources of these supplies are four impoundments in the Nansemond River watershed.

103. Existing public water supply-demand averages 70 million gallons per day in the region and the present safe yield of the water supply systems serving the area is about the same amount. This is the figure used by the State Division of Water Resources.
ernmental strife and bickering, which was clearly aggravated when Virginia Beach and Princess Anne County were consolidated in 1962. The new City of Virginia Beach and Chesapeake commissioned an engineering study for possible new water supply sources for the area. This report called for a metropolitan water authority, which was effectively opposed by Norfolk and Portsmouth because of fears that the cities would lose control of their facilities and water customers would be subsidizing the new supply developments with increased water rates. This lack of support made the buyer-seller relationship all the less amicable, and water contract negotiations often became heated.104

The major concern over these disputes is that they have led the purchasing municipalities to seek sources to develop on their own. Chesapeake recently sought approval for a reservoir and pumping station on the Northwest River, and Virginia Beach is seeking its own supply. From the standpoint of regional coordination of water supply planning and development, these are not long-range solutions to the water problems of the area.

Moreover, as the smaller cities in the region build their own water supply facilities, regional coordination and management becomes increasingly difficult because of vested interests in the maintenance and expansion of these systems by each individual jurisdiction. This in turn will encourage further institutionalization of the fragmentation as other communities proceed independently to provide for their own needs.105

Clearly, in situations like this, a regional solution is necessary.

**Regional Authorities and Service Districts**

The basic question at this point is: What should the role of the state be in arriving at such a solution? Under present law, there are at least two alternatives whereby large-scale regional water supply systems can be established. One possibility is the regional water authority, composed of political subdivisions joined to form an entity empowered to con-

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104. Norfolk felt that the rates for Virginia Beach customers should cover the great bulk of costs necessary in order to continue to make supplies available to these customers. Virginia Beach disputed Norfolk’s estimates of these costs.

105. For example, Norfolk will most likely expand its diversions from the Blackwater and Nottoway Rivers. Norfolk recently agreed that it might sell its water supply system to a regional authority, but up until now the city’s asking price is too high for the other cities which would compose the regional entity.
struct water resource facilities and issue revenue bonds for their financing. Another alternative is the creation of a service district, which may be formed at the request of two or more political subdivisions under the jurisdiction of a planning district commission.

While the service district has much the same power to acquire land by eminent domain and construct and finance facilities by issuing revenue bonds, a major difference is that only the service district is empowered to provide services in addition to water supply and sewerage. A service district has the same general powers as a water authority, except that the district is empowered to levy annual assessments upon the political subdivisions within it. Consequently, the formation of a district is a bit more complex than an authority.

The two primary advantages of the service district and the regional water authority are the flexibility to encompass, geographically and administratively, the communities whose water systems should be unified and the ability to finance, through the sale of bonds, the construction of facilities which would be too large or expensive for any individual political subdivision. The major stumbling block in the formation of either entity is the necessity of achieving agreement among the prospective members. Theoretically, the cities with fully paid existing systems should sell their facilities to any new entity created. Even if these cities are unwilling to sell, either entity could still be formed, but its smaller size might make the water it develops more expensive. A much more important problem is that such an authority or district which does not encompass all of the relevant political subdivisions is not ultimately promotive of regional coordination of water supply systems. Such arrangements have been adopted in other states in the hope that an area-wide agency would be formed later and eventually acquire all the existing systems in the region, but such acquisitions have often not occurred. With the passage of time future formation of a genuinely area-wide entity becomes more difficult, since the subregional systems build up vested interests of their own. Thus, for example, if Norfolk and Portsmouth, the cities with the largest water supply systems in

109. E.g., in New Jersey it was hoped that the New Jersey Water Supply District, created in 1916, would form the basis for a truly area-wide regional water supply agency. This hope, however, has not been realized. See N. J. STAT. ANN. § 58:5-1 et seq. (1964).
southeastern Virginia, were not initially included in any authority or district, genuine regionalization would probably be much more difficult to achieve in the future.

In the final analysis, the representatives of the local governments concerned must reach a consensus and, of course, a majority of the members of the particular district commission must agree on one course of action. If, however, they cannot reach an agreement on a regional entity, there should be some means whereby the state government could settle a protracted deadlock. State action is imperative because the product of such a deadlock will more than likely result in the proliferation of fragmented water supply systems as each jurisdiction is forced to go its own way on a subregional or individual basis. Whether such power is given to the Water Control Board or some other agency, the state should give serious consideration to a more assertive role where a proposed local project or disagreement over a proposed regional project threatens the cost or continued availability of water resources to any portion of the state.

One way to implement this role would be to delegate to the state agency which issues the water use permits already proposed the exclusive right to grant approval or conditional approval subject to modification of all plans for water projects exceeding a certain size. Depending on the degree to which the water management functions of the state are centralized in one body, this power might also include the authority to arbitrate disputes where state agencies themselves cannot agree on a project or a specific policy. This authority should definitely include powers of implementation and enforcement.

Other State Measures

Where a conflict or disagreement may produce a shortage, significantly add to the fragmentation of water supply systems, or otherwise hinder optimum water resource development, the state should consider:

(1) providing financial resources to facilitate development of supplies where the lack of funds prevents such development; and

(2) undertaking actual construction and operation of water supply facilities where there is prolonged inaction by local governments. Such authority would provide the state with a potent and flexible tool to promote optimum development of its resources. It could be utilized not only to avoid fragmentation of planning and development but also to stimulate multiple purpose water resource projects or effectuate the

110. See text accompanying notes 90-93 supra.
modification of single purpose projects to include other uses. State financial aid could significantly help to cover the costs of making changes in water projects which serve the interests of a region or the state as a whole in recreation, flood control, and low-flow augmentation. Financial aid for the construction of regional waste treatment facilities could also be provided through state bonds, just as it is now provided by general appropriation funds.

Lastly, regional planning and optimum development of water resources requires that reservoir sites be purchased substantially in advance of their actual use. It is almost certain that requirements of metropolitan growth and other preemptive demands for land will eventually render many sites unusable before the time when they can be developed. Since local governments cannot purchase sites until revenue from the actual sale of water is available, the state should consider the purchase of these sites through bond issues. The need to protect land and aquatic ecological systems, recreational sites, and scenic values will require coordinated, well-timed, and well-placed water resource projects.

CONCLUSION: THE NEED FOR COMPREHENSIVE STUDY

This article has pointed to several problems in water resource management facing the Commonwealth of Virginia. Riparian law has not been totally effective in promoting optimum development of water resources because of its inability to prevent conflicts and its restrictive approach to the determination of uses to which water may be put. Statutory law providing for control over the development of water resources has two limiting characteristics:

1. since the boundaries of responsibilities are often indistinct, there are inevitable overlaps of jurisdictions; and
2. it appears that with the exception of the Water Control Act the various statutes are directed more toward the narrow ideals of water resource development and use rather than to the all-encompassing concept of water resource management.

Water resource planning at the local level is uncoordinated and often plagued with local rivalries which lead to inefficient and fragmented water supply systems.

This article has not sought to formulate precise recommendations for administrative and legislative change because the nature of these problems and their solutions warrant a comprehensive study of water resources management at the state and local level before any sweeping
changes in authority and responsibility are made. In addition to planning and other technical investigations it is imperative that the administrative, legal, and political aspects of water management be studied, since the shift away from a traditional riparian system involves at least the partial substitution of administrative rules and procedures for a system based on judicial precedents. The actual degree of such a shift should be weighed and considered most carefully, with significant thought given to a more dominant role for state government in the financing, construction, and operation of water facilities.

The suggestion for extensive studies should not be interpreted to mean that changes can be long postponed. All studies must be completed within a rigorous timetable and should contain detailed recommendations. There can be no doubt of the need for more effective, efficient, and comprehensive water management in Virginia. The Commonwealth has an excellent opportunity to learn from the experience of other states where the growth of population and industry occurred at a point in time before governmental mechanisms could be devised to protect their resources and physical environment.

TABLE I

<table>
<thead>
<tr>
<th>Type of Supply</th>
<th>1970 Demand (mgd)</th>
<th>1980 Demand (mgd)</th>
<th>1990 Demand (mgd)</th>
<th>2000 Demand (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Supply</td>
<td>369</td>
<td>560</td>
<td>840</td>
<td>1,200</td>
</tr>
<tr>
<td>Separate Industrial</td>
<td>883</td>
<td>1,100</td>
<td>1,400</td>
<td>1,800</td>
</tr>
<tr>
<td>Steam Electric Cooling</td>
<td>3,000</td>
<td>3,500</td>
<td>4,400</td>
<td>5,400</td>
</tr>
<tr>
<td>Agricultural Irrigation</td>
<td>250</td>
<td>400</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>Total Estimated Use</td>
<td>5,410</td>
<td>3,040</td>
<td>9,000</td>
<td></td>
</tr>
</tbody>
</table>

a Million gallons per day
b Demand expected during 1/10 year drought during growing season. 1970 figures are not available.

111. Source: Virginia Division of Water Resources.
### TABLE II

**Cost of Water Development**

<table>
<thead>
<tr>
<th>Construction Costs of Water Development (Millions of 1970 Dollars)</th>
<th>New</th>
<th>Potomac-Shenandoah</th>
<th>James</th>
<th>York</th>
<th>Rappahannock</th>
<th>Chowan-Dismal Swamp</th>
<th>Tennessee-Big Sandy</th>
<th>Roanoke</th>
<th>Small Costal Basins and Chesapeake Bay</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18</td>
<td>69</td>
<td>274</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>23</td>
<td>70</td>
<td>6</td>
<td>514</td>
</tr>
</tbody>
</table>

*a* Cost of constructing raw water reservoirs, flood control projects, and major raw water transmission mains.

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112. Id.