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20--WATER AVAILABILITY IN THE EASTERN UNITED STATES

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A. Introduction

This chapter treats the question of water for synthetic fuel plants in the eastern United States under the maximum credible implementation (MCI) scenario for 1980-2000. Water requirements are set against water supply, and the availability of water from a legal standpoint is discussed.

The Water Resources Council (WRC), which is the agency charged with developing, coordinating, and assessing water resources planning information for the entire nation, is the source of the data on water supply and nonsynthetic fuel requirements used in this chapter*. For the analysis, synthetic fuel plants are located according to the planning areas established by WRC in its study '75 Water Assessment.¹

The '75 Water Assessment provides greater detail concerning water demands, uses, and resources than the previous assessment of 1968. New concerns for increasing energy production within the United States have

*Arden O. Weiss, Chairman of WRC's National Programs and Assessment Committee for the '75 Water Assessment has kindly made data available to this study--data that are, however, preliminary and subject to revision. WRC is not, of course, responsible for any errors in use or interpretation of this data.

changed projected water resource demands dramatically in some regions. WRC is currently working with the Bureau of Mines to determine future water resource requirements for planned and anticipated coal conversion processes of various types. In addition, WRC is reevaluating estimates for future withdrawal and consumptive uses for electric power generation.

Figure 20-1 shows the major river basins of the United States; these correspond to the WRC's water resource regions. Figure 20-2 shows the subareas established by the WRC that are affected by the MCI. The aggregated subareas (ASA) within each region follow major river watersheds and are composed of one or more subareas. For purposes of defining river watershed areas the WRC has normally maintained county lines as subarea boundaries.

B. Water Requirements

Data developed by WRC on "Current and Future Annual Water Requirements" for each ASA for the '75 Water Assessment are used here to provide a regional estimate of the quantities of water required for synthetic fuel plants located in the East. Water requirements for plants hypothetically sited by the MCI in Illinois, Kentucky, Ohio, and West Virginia, are given in Table 6-3 (Chapter 6). Table 20-1 summarizes these requirements for the year 2000; the requirements for plants in Kentucky are divided into eastern and western components; WRC ASA designations are also given.

Table 20-2 lists the consumptive water uses for the plants (Table 20-1), the additional water consumption projected by the WRC, and determines the percentage water consumption as a function of both the total water supply and the indigenously produced water supply for each ASA in which the relevant subareas reside. Data in the upper half of Table 20-2 indicate that, on a gross regional basis, the impact on the water resources of each ASA would appear to be small.

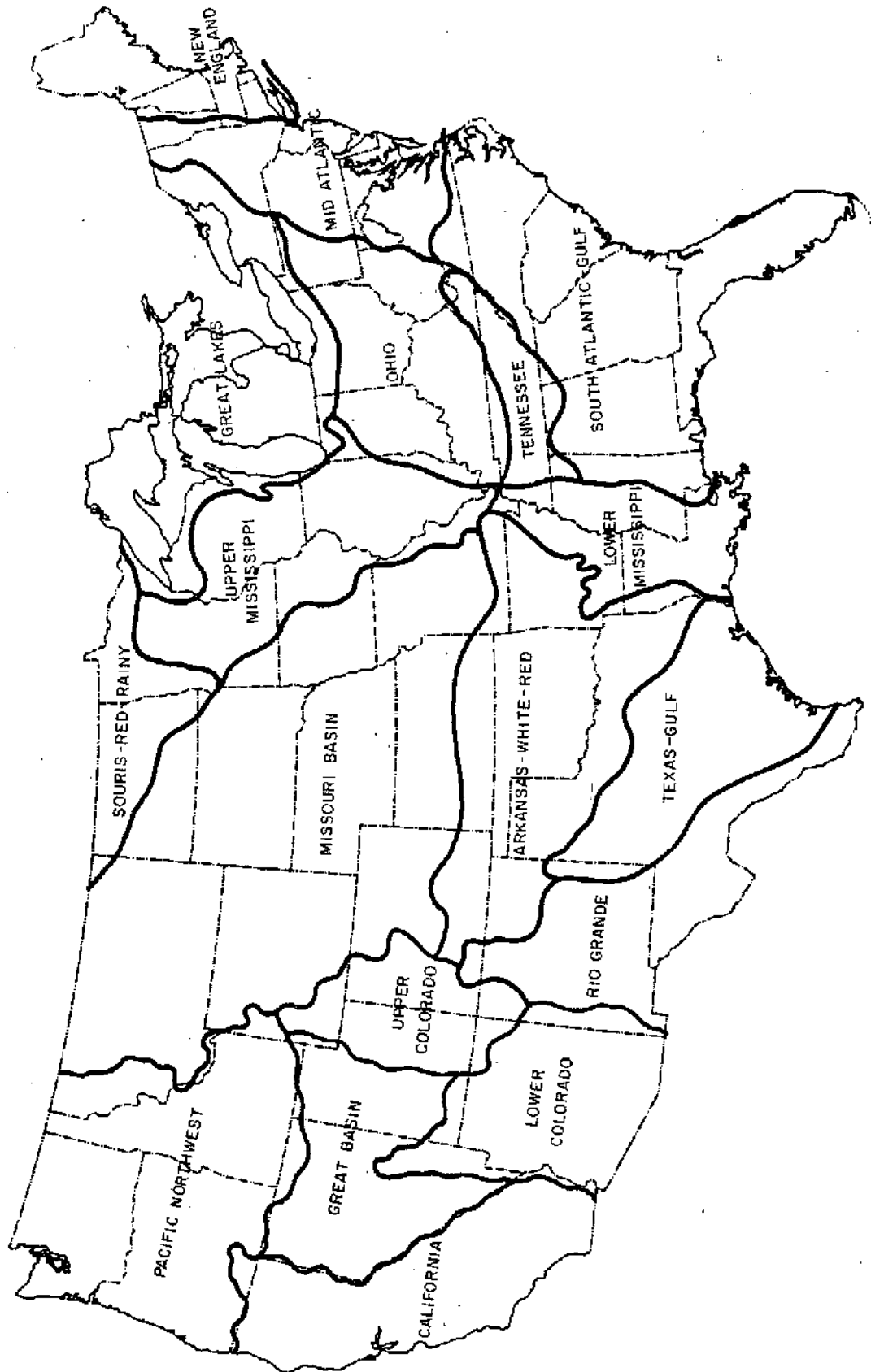


FIGURE 20-1. WATER RESOURCE REGIONS OF THE UNITED STATES

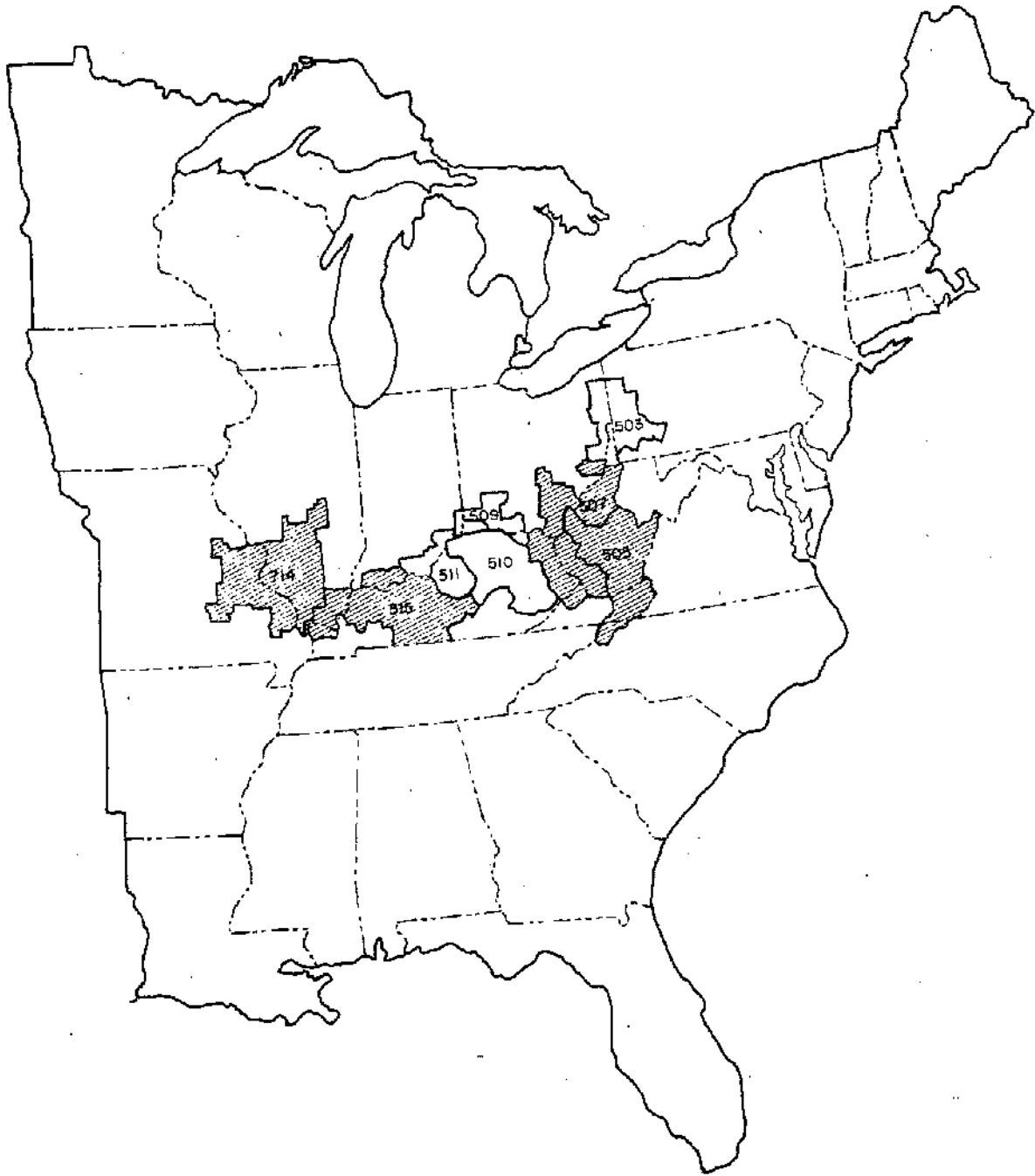


FIGURE 20-2. SUBAREAS FOR THE 1975 WATER ASSESSMENT
(Water Resources Council)

Table 20-1

EASTERN UNITED STATES MAXIMUM CREDIBLE IMPLEMENTATION
SCENARIO WATER REQUIREMENTS IN THE YEAR 2000

<u>State</u>	<u>Requirement (10³ acre-ft/yr)*</u>	<u>WRC ASA No.</u>	<u>WRC Subarea No.</u>
Illinois	415	705	714
Kentucky	266		
East	(133)	502	507 [†]
West	(133)	505	515
Ohio	133	502	507 [†]
West Virginia	134	504	505

*10³ acre-ft/year is about 1.2×10^6 m³/year.

†Note that the Eastern Kentucky and Ohio water requirements are in the same WRC subarea.

However, such conclusions are on an annual basis. The lower part of Table 20-2 shows the relationship of the high and low flow months to the average monthly flow. The "worst case" is the driest month of a dry year in Eastern Kentucky and Ohio (ASA 502). Then average daily flows are only 26 percent of the average monthly flow, and during that month only 95,000 acre-ft would be available compared to the 22,000 acre-ft required by the synthetic liquid fuel plants. Thus, in the driest month of a dry year, the synfuel plants would require about 23 percent of all indigenous water in this region.

Table 20-3 compares the consumptive use requirements for synthetic liquid fuel plants with the consumptive use requirements projected by

Table 20-2

FUTURE WATER DEMAND COMPARED TO WATER SUPPLY IN THE YEAR 2000

	Illinois (ASA 705; subarea 714)	Eastern Kentucky and Ohio (ASA 502; subareas 503, 507, 509)†	Western Kentucky (ASA 505; subareas 510, 511, 515)‡	West Virginia (ASA 504; subarea 505)
Supply				
Total				
Median Year* (10 ³ acre-ft/y)	132,000	71,400	105,000	12,100
Dry year† (10 ³ acre-ft/y)	65,300	46,100	58,700	8,310
Indigenous (Surface)				
Median year‡ (10 ³ acre-ft/y)	14,400	24,650	41,600	11,800
Dry year‡ (10 ³ acre-ft/y)	14,400	15,000	14,300	8,250
Demand				
Projected total of non-synthetic fuel uses (10 ³ acre-ft/y)	406	1,638	691	392
Synthetic liquid fuel (10 ³ acres-ft/y) uses (from Table 20-1)	415	266	133	134
* Fraction of dry year total supply (%)	0.6	0.6	0.2	2
† Fraction of dry year indigenous supply (%)	3	2	0.9	2
Fluctuations in total supply				
• Highest flow month compared to mean monthly flow in a dry year (%)	156	151	167	162
• Lowest flow month compared to mean monthly flow in a dry year (%)	43	7.6	26	14

* 50% chance of being drier

† 5% chance of being drier

‡ relevant subarea underlined

WRC for electric plants in the same ASA; the requirements are generally comparable in magnitude.

Table 20-3

PROJECTED WATER CONSUMPTION BY ELECTRICITY GENERATING
AND SYNTHETIC LIQUID FUEL PLANTS IN THE YEAR 2000
(10³ acre-ft/year)

<u>Area</u>	<u>Electricity Generation Plants</u>	<u>Synthetic Liquid Fuel Plants</u>	<u>Total</u>
Illinois (ASA 705)	70	415	485
Eastern Kentucky and Ohio (ASA 502)	477	266	743
Western Kentucky (ASA 505)	254	133	387
West Virginia (ASA 504)	88	134	222

C. Water Supply

1. Illinois

This area (ASA 705) consists entirely of Subarea 714. This area straddles the Mississippi River and includes portions of Southern Illinois and East-Central Missouri. The Wabash River in Illinois, directly to the east of this subarea is in Subarea 315 (see Western Kentucky section 2-a. below). The plants in this subarea are sited on the Illinois side of the Mississippi River to remain as close to the coal fields as possible. The river basins included are as follows:

- Kaskaskia
- Big Muddy
- Cache.

Existing water storage capacity totals 1,640,000 acre-ft. This storage is in two major lakes on the Kaskaskia River. There is additional potential storage capacity of 1,240,000 acre-ft.

Flows in the Big Muddy River range from a low of 10,000 acre-ft/year in dry years to 268,000 acre-ft/year in median years. Existing water storage capacities total 119,000 acre-ft. This storage is primarily on Rend Lake, which is on the river. There is additional potential storage capacity of 758,000 acre-ft. Current and projected withdrawals for thermal cooling from the Basin are negligible. In view of the low flows in dry years and the relatively small flow from existing storage, the Big Muddy would not appear to be a primary candidate for the location of even a small syncrude plant unless the plant either drew water from the mainstem of the Mississippi River or located a source for transbasin diversion.

2. Kentucky

a. Western Kentucky

The WRC has divided this area (ASA 505) into three subareas: 510, 511, and 515 (Figure 20-2). We have sited the western Kentucky synthetic fuel plants in subarea 515.

Although Subarea 515 spans both sides of the Ohio River mainstem, the main river basin in the subarea is the Green River Basin with a total area of 9273 mi² in 31 counties. Except for a relatively small area in northern Tennessee, the Basin's natural drainage area is entirely within Kentucky. The drainage basin is roughly 60 to 80 miles wide and 160 miles long.² The Green River and its tributaries flow

through the heart of Kentucky's western coal region. The average annual runoff in the Basin is 15-20 inches.² Three major federal reservoirs are in the area--Nolin, Rough, and Barren. Moreover, the identified additional storage potentials in the Basin amount to approximately 1 million acre-ft.²

The general precipitation runoff-storage situation in the Ohio River Basin is as follows: Of the total precipitation, over 60 percent is lost to the atmosphere by evaporation and transpiration. The remainder, averaging annually 17.3 inches equivalent depth over the drainage area, flows to the Mississippi River.² Generally, sufficient runoff for summer and fall use could be stored during each high water season without holding stored waters from year to year except in very high water use areas and during periods of extreme or extended drought. Even in lower tributaries, streams may run dry during periods of low precipitation, especially where ground water seepage is deficient.

Existing storage capacities have been developed generally for flood control and for control of low stream flow because the maintenance of stream flow is important to the preservation of water quality in the region.

While total flows in the region appear adequate to sustain the needs of the synthetic liquid fuel plants, attempts to establish the long-term water supply for necessary plants may require the development of considerable storage capacity or use of existing storage. In addition, general factors relating to the uncertainties of future developments would affect the amount of water that is available.

b. Eastern Kentucky and Ohio

The WRC has divided this area (ASA 502) into three sub-areas: 503, 507, 509. The synthetic liquid fuel plants, however, have

all been sited in subarea 507 which contains 37 counties in Kentucky, Ohio, and West Virginia.

The major rivers in the ASA are the

- Pittsburgh
- Cincinnati
- Little Miami

As this is an area of rugged terrain in the Appalachian mountains, industrial sites are at a premium.

3. West Virginia

This area (ASA 504) consists entirely of subarea 505. The Kanawha River basin includes six major subbasins:³

<u>Subbasin</u>	<u>Drainage Area (mi²)</u>
New River	6918
Greenbrier River	1656
Elk River	1532
Gauley River	1420
Coal River	899
Pocatalico River	359

Average annual precipitation in the Basin as a whole is approximately 43.5 inches. If annual precipitation less than 85 percent of the mean is considered to be a drought condition, 16 of the 76 years for which weather records have been kept for Charleston, West Virginia, would be classified as drought years; 1904, 1930, and 1953 were particularly severe.³

The Kanawha Basin has the highest sustained flow of the tributaries of the upper Ohio River. There are no major natural lakes in the

basin. Streamflows are subject to wide seasonal variations and to relatively wide variations between extremely wet and dry years,³ and thus access to storage capacities would appear essential to satisfy the water demands of the synthetic fuel plants.

The terrain of the area features steeply rising hills and narrow valleys, which lie along the watercourses of the streams and rivers. All of the important existing industrial, residential, and transportation facilities and networks in the basins are located in these valleys. Because of the topography, industrial sites in the basin are at a premium.

D. Legal Aspects of Water Availability

1. Riparian Law

Unlike water rights in the western states, which are governed by an "appropriation" system, water rights in the eastern states are governed by riparian law.* Under riparian law, the right to use water attaches to the land over which the water flows. Thus, historically, a riparian right has been a property right.

Early in American history the rules of English riparian law were incorporated into the law of the respective states:

- "Prima facie the proprietor of each bank of a stream is the proprietor of half of the land covered by the stream; but there is no property in the water."⁴
- "Every proprietor has an equal right to use the water which flows in the stream; and, consequently, no proprietor can have the right to use the water to the prejudice of any other proprietor."⁴

*Riparian relates to that which is located on the banks of a natural watercourse.

- "Without the consent of the other proprietors who may be affected by his operations, no proprietor can... diminish the quantity of water which would otherwise descend to the proprietor below."⁴
- "Every proprietor, who claims a right...to diminish the quantity of water which is to descend below, must, in order to maintain his claim, either prove an actual grant or license from the proprietors affected by his operations, or must prove an uninterrupted enjoyment of twenty years."⁴
- "Though the proprietor may use the water while it runs over his land as an incident to the land, he cannot unreasonably detain it or give it another direction, and he must return it to its ordinary channel when it leaves his estate."⁴

There is also a rule that water may be used only on riparian land by its proprietor. Thus, if a riparian parcel of land is divided and sold in such a manner that what was one large, riparian parcel becomes one riparian and one nonriparian parcel, there are no water rights associated with the newly created nonriparian land. In other words, water rights are incidental to lands bordering on streams and cannot be created or transferred independently. Thus, use of water is strictly limited to uses on riparian lands.

Some states have modified this practice by establishing a test of reasonableness of the nonriparian use. If lower riparians claim injury because of a nonriparian's use of the waters of a stream, the courts will look to the nonriparian's application of the water to determine whether it is reasonable. Generally, the cases indicate that any productive use except waste* is considered reasonable by the courts. Consequently,

*As used here, "waste," is a legal term meaning, roughly: an abuse or destructive use of property by one in rightful possession.

the party seeking to enjoin a diversion by a nonriparian must prove, in addition to injury, that the use to which the diversion is put is unreasonable.

When the stream flow is insufficient to satisfy all users because of low flow, then the rule of "correlative rights" comes into play: All riparians must suffer diminution of use equally.

The general law of riparian water law is in effect in the states in which the eastern synchrude and methanol plants would be sited but the modified rule of reasonable use of diversions is in effect in Kentucky and Illinois.

The National Water Commission made attempts to determine how riparian water law actually works in practice in those states in which it is in effect.⁵ The Commission found the general situation to be as follows: As a consequence of the riparian rules and the absence of records, the public planner and private investor are confronted with the following uncertainties in water resource development:

- What is the existing demand on supply?
- What is potential demand on supply?
- What supply security will present development have in the future?
- What kind of private consensual arrangements can be made to safeguard supply?⁶

Thus our general knowledge of how the riparian system works in actual practice in the states of the East and of how present water rights actually relate to supply is limited. This also applies to the transfer of water rights under riparian law. One type of transfer is common; a sale of riparian land automatically transfers the seller's water rights to the purchaser. This is not the interesting case in terms of the development of a law of water transfers. The interesting case is where the

water is sought to be sold apart from the land. It is here that we have almost no information about the operation of the riparian system. Evidently such transfers are rare in that system, due probably to the plentifulness of water in most of the areas where the riparian system is in effect, but it may also be due to the legal difficulties of attempting to transfer riparian rights except as an incident to a sale of riparian land.⁷

The actual fact is, of course, that power plants using once-through cooling water have been built in the three states under consideration in this study; large chemical processing plants have been developed in West Virginia along the Kanawha; other industrial operations, which require an assured supply of water, have flourished in the states under consideration here. Most such plants are located along the main stems of the major rivers, ones whose flow throughout the year is assured (often with the assistance of major storage projects) and, where the consumptive uses of the plants either diminish the total flow so little that no downstream riparian is injured, or that no downstream riparian is in a position to complain. Shortage of water also plays an important part in the ability to maintain an assured flow for a number of uses. Where this is the case, the common law doctrines of riparian water law may be inapplicable. What often happens is that state and/or federal statutes authorizing the projects became the legal means by which the storage and allocation of water is established (see Section E, below). In the "humid East" these storage projects generally are aimed at capturing and controlling flood waters, waters which could not be of use to any riparian anyway and in most cases constitute a positive threat. The storage of flood waters for later use in the maintenance of stream flows and related or dependent uses appears to present little or no controversy. In fact, the National Water Commission did not consider this aspect of the problem in its strictly legal studies in the area.⁵

In summary, a description of the riparian law which obtains in the eastern states under consideration in this study, while perhaps necessary for background, is of little assistance in determining whether or not water would actually be available.

In contrast with the appropriation law system, the effect of riparian law is more in the nature of a negative influence over new developments rather than a positive system for the identification and determination of quantitative rights in water uses. This is especially true when the contrasted appropriation system has been strengthened through application of a state permit system. Water rights under riparian water law doctrines tend to be uncertain, thereby compounding the difficulty of any attempt to ascertain whether water would be available for the projected development of synthetic fuel plants. Moreover, riparian water law, and the traditions on which it is founded, does not readily lend itself to the development of positive water use permit systems. Proposals that riparian states should enact permit systems like those in effect in some western states have been firmly rejected by the eastern states.

2. Position of the States

The National Water Commission asserted that "no crisis in water use exists generally in the humid East" and that the uncertainties over the state of knowledge of water rights, supply, and demand "have not yet caused serious problems in the East, for water supplies have been abundant."⁶ This situation may have changed in the short time since 1973 when the Commission issued its final report. Water supplies in the East may become generally "critical" at a more rapid rate than was anticipated.

For Project Independence, the Water Resources Council polled the states concerning water related problems in connection with energy

developments.⁸ Those states that attended the WRC regional conferences as a follow-up to the WRC questions "expressed a belief that the Federal government must first propose a definitive policy on energy self-sufficiency including time frames and needs before states can do adequate long range planning."⁸ In the area of "water rights" and legal impediments, the states expressed views indicative of problems that would be encountered by an attempt to establish the plants in the East as a matter of federal policy without that policy also having been adopted by each involved state for itself. In the matter of water rights the states held strong opinions regarding federal jurisdiction over water rights. They felt that energy self-sufficiency would be impeded due to litigation if the federal government were to move strongly into the water rights area. In fact, a suggestion was made that Congress should enact legislation assuring that water rights granted under state law be protected. It was felt that under most present systems, water rights can be acquired by negotiated purchase or by condemnation and most state water laws are well adapted to provide water for self-sufficiency.⁸ In the matter of legal impediments almost all states indicated that compliance with water rights acts and water quality control acts would impede energy developments. However, it was pointed out that regulatory laws may help and not hinder the best use of water and that energy developments should proceed only under strict and rigidly enforced controls. In fact, concern over the adverse impacts of rapid development of energy sources has prompted states to consider or enact stringent regulatory measures for mining, facilities-siting, and related activities.⁸

In view of the foregoing, and because "Federal water projects are seldom initiated without strong State support and almost never undertaken in opposition to State desires,"⁸ it appears that not only state law--in the sense of the riparian law governing water rights--but state policies and administration directed toward water resources development

will heavily influence the question of water availability for projected synthetic fuel plants.

The following is a brief summary of the situation as it pertains to three of the states considered in this chapter.

a. Illinois¹⁰

- The Illinois state constitution contains no water policy statement for the state.
- Water use in Illinois is governed primarily by its state court fashioned rules of law. Generally, in this regard, the courts follow the common law of England, modified as the courts find rules that are in harmony with the state's legal system.
- Periodically, attempts have been made to implement the common law through legislation. These attempts have failed, but there is some disconnected legislation that deals with certain phases of water use.
- There have been relatively few court cases reported regarding water use in Illinois.
- Under the riparian doctrine, the courts have distinguished between artificial and natural uses. The latter use, which includes those needs that are absolutely necessary for the existence of civilization (i.e., drinking water, water for household purposes and for watering livestock) has a clear priority over all other uses in times of drought. Each proprietor may, when necessary, use all of the water in a stream for these purposes without liability to a lower proprietor on the stream.
- The rule of reasonable use appears to apply in Illinois, but its effect in practice is uncertain.
- The state's courts have taken a strict view of what constitutes a navigable stream. It must be in the nature of a highway that bears commerce. A stream that is not naturally navigable cannot be made so by deepening, widening, etc. (Legally, if this state view conflicts with the federal view, the latter prevails.)

- The attorney general has expressed the opinion that the Department of Public Works and Buildings may permit the withdrawal of water from a public body of water through a pipeline for industrial and manufacturing purposes if it determines that to do so will be in the public interest and if the riparian rights of lower riparian owners are not adversely affected by diversion of the water.
- Diversion between basins has been considered by the state's courts mainly as a problem of burdening the riparian owners of the water course from which the diversion was made. That is, a riparian proprietor has the right to natural flow, unaugmented by diversions from other basins.
- The state has broad eminent domain powers for the acquisition of property for water management and development. The Departments of Public Works and Buildings and of Conservation are the primary agencies with the power to exercise eminent domain. The state has also delegated this power to a number of its subunits of government: cities and villages, counties; townships; soil and water conservation districts; subdistricts of same; port, sanitary, river conservancy, surface water protection, and public water districts; and water authorities.
- Under the state's regulatory authorities, permits or approvals are required for the drilling of wells, impoundments, and channel encroachments. Some of these permits require the applicant to obtain the consent or approval of downstream riparian proprietors.
- Approximately seven state-level departments, including 42 divisions and seven boards or commissions are involved in one aspect or another of development, maintenance, operation, and regulation of the state's water resources. In addition, the state has numerous subunits of government, including special purpose districts, which have powers and duties relating to water resources development and utilization.
- As a matter of policy, water management functions in Illinois are centralized. The Department of Business and Economic Development, Division of Water and

Natural Resources, is the state's "lead agency" in the coordination of water resources management and development policies.

- In general, the power of home rule has not been granted to local governmental units by the state. It has granted powers to local governments to develop water resources on a categorical basis: sewage, water supplies, etc. In general, this has led to creation of special purpose districts to solve local problems. These districts have home-rule-like powers for special purposes in some cases.
- Coordination between the state and the federal government, including the Corps of Engineers and the Soil Conservation Service, on matters of water resource management and development is the responsibility of the state's Department of Business and Economic Development.
- The state follows the policy of seeking the greatest degree of overall development of each reservoir project in the state. The Rend Lake project on the Big Muddy is a recent example; the project provides water resources for multipurpose operations: municipal, industrial, and agricultural water supply; recreational facilities; flood protection; minimum downstream low-flows; pollution abatement; and other purposes. The project was carried out by the state's Division of Waterways.
- The Rend Lake project is also an example of the state's policies towards multigovernmental cooperation. The Rend Lake Conservancy District, the state, and the federal government participated directly in the project, with the latter two coordinating with the many other agencies and districts involved.

b. Kentucky³

- Riparian rights under Kentucky law have been narrowed by legislative action. A riparian proprietor has the right to withdraw waters for agricultural and domestic purposes without a permit.

- With the above exception, and the one cited in the following, all other public water users in Kentucky must obtain a permit from the state's Division of Water. The statutory permit system requires the permittee to maintain certain records of withdrawal.
- No permit is required for industrial or manufacturing operations provided that the water withdrawn "is returned in substantially the same quantity and condition as it is withdrawn...."
- Kentucky's permit system does not operate to allocate the state's waters, although the Division of Water has the power to apportion shortages. (This power has apparently never been exercised.) The permit system in effect appears to be a step towards improved record keeping and a potential basis for the exercise of increased state control of water uses should future demands so require.
- The state requires permits for the construction of impoundment dams and other forms of water containment, and for obstructions.
- The state requires permits or exercises authority over water resource related activities concerning drilling or abandoning wells, developments in flood plains, construction of public water supply, and flow regulation.
- By statutory declaration, "it is declared the policy of the Commonwealth to actively encourage and to provide financial, technical and other support for the projects that will control and store our water resources in order that the continued growth and development of the Commonwealth might be assured."
- Approximately nine departments, including eight divisions, and five Boards or commissions are involved in the state's water resources.
- The Division of Water within the Department of Natural Resources is the state function assigned the primary responsibility for developing the state's water resources, preventing floods, and

controlling water usage within the state. The Division also holds the power of eminent domain.

- The state has enabled a number of water resource related special purpose districts: conservancy, flood control (subdivided into city flood control districts, flood control districts, and levee districts), sanitation, soil conservation, and water districts.
- Responsibility for development of the state's water resources is "ultimately" centralized at the various state agencies. The extent and practical nature of home rule in the state is unclear. However, it is thought to be extensive for a number of purposes.

c. West Virginia

- The riparian law of water rights obtains as the common law of West Virginia in practically unmodified form with respect to its origins in the English common law.
- Most of the water rights cases in the state deal with the protection of property against water damage due to excesses of water on lands of others.
- There has been little or no litigation concerning diversion between basins. Strict adherence to riparian doctrines would appear to preclude such diversions, but apparently there has been no significant diversion in the state.
- Impoundments are permitted by the state (for example the Buffalo Creek impoundment was under state permit): the state regulates little else with respect to the use of water resources.
- There are approximately six state departments, including six divisions, and six boards or commissions, which are responsible for state's water resources in one way or another.
- The Division of Water Resources within the Department of Natural Resources is the "lead agency," to the extent that the state does

exercise responsibility, for water resources development and management.

- Three special purpose districts have been created by the state: soil conservation, watershed improvement, and public service districts.
- Home rule obtains in West Virginia by a 1936 amendment to its constitution.

The foregoing overview summary of the laws, policies, and administrative scope of the three states may be deceptive for its apparent simplicity. If the states and their local units of government are involved at all in the siting of projected synthetic fuel plants--and it is difficult to see how they would not be under existing federal-state law unless the Congress were to enact legislation which simply preempts all state law in water related questions--then the plants will be sited within the context of complex, perhaps exceedingly complex, legal, policy and administrative frameworks which, for the most part, are unique to each state. This also means that a particular solution to a problem, or a cluster of problems, related to water availability in one state or locale will not necessarily assist in solutions to similar problems in the other states. From a practical point of view, the issue of water availability in the eastern states may depend more on factors other than apparent quantitative flows. Many of those factors result because of the fact that the states under consideration have no experience with water shortages and therefore have no policy or legal traditions behind them from which to deal with the problem.

It is evident from the material reviewed for this study that the states under consideration in this chapter are strong opponents of trends leading to a centralized planning, implementation, and regulatory approach toward water resources: "Resistance (by the riparian states) to the granting of firmer rights has already been demonstrated by

the general refusal to adopt appropriation style permit systems giving users in the East rights similar to western appropriation rights."⁵ The main argument by the states for retention of the present methods of water resources development and the allocation of water rights on a project-by-project basis appears to be that the rule of "reasonable use" provides a greater flexibility in meeting shifting water demands than would a rigidly applied appropriative system coupled with a "permit" authority. Under riparian law, the basic conflict appears to be between certainty and flexibility: "Courts have responded (to this conflict) generally by expressing the notion that riparian rights must be flexible, and yet practical priorities are recognized. It does seem fair to conclude that reasonableness represents a rule of accommodation, and subject to legitimate claims for accommodation, priority in time is likely to give priority in right over new users competing for an insufficient supply."⁵

Maintaining the riparian system--with all its uncertainties--on a notion of flexibility is all very well when water quantities and qualities are sufficient to allow plenty of room for maneuvering to take advantage of that flexibility. In the event--which now seems to be in the offing--that there is no more room to maneuver between existing demands on the water resource, low-flows in drought years, and increasingly poor water quality in the available supply, the riparian system would probably come under considerable stress if faced with substantial demands for new water resources related to economic growth. Of course, it is impossible to predict how the states may respond to such a situation, and mapping alternative possibilities would be gross speculation at this time.

E. Federal Programs That Relate to Water Resource Development in the East

The following summary identifies the major federal agencies and their programs that relate to water resources development in the eastern states. The discussion does not treat the federal power to conduct such programs in the states because that power applies to both the eastern and the western states. The information is drawn primarily from two staff studies for the National Water Commission,^{11,12} plus additional more recent material.

From the federal government point of view there are two underlying factual differences between the eastern and the western states:

- The federal government is not a substantial landholder in the eastern states.
- Traditionally, the eastern states have not been beholden as have the western states to the federal government's application of massive resources in the development of water resources projects for new irrigation and other land development.

These two historical facts account for the substantially different bases for relationships between the states and the federal government in the East and in the West.

If the primary concern of the states in the "arid West" has been the application of federal resources and funding to the development of water resources to bring water to those lands, then by contrast the primary concern of the states in the East with respect to the federal government has been to seek assistance in keeping excess waters--flood waters--off the lands of the state.

To continue this contrast, while the Bureau of Reclamation has been the federal agency most involved in the development of major public works devoted to the development and conservation of water resources for application to arid lands, the Corps of Engineers has had a much longer

tradition (since 1824) of flood-control works in the eastern and mid-western states. (Navigation is also the responsibility of the Corps.)

The most recent programs of the Corps for reservoirs are directed to multipurpose developments, meaning that a major reservoir project must serve multiple water resources purposes. Primarily it has been the Corps which has undertaken, on behalf of the federal government, the large reservoir projects that relate to improved water resource management and use. It is the Corps that would be involved in any future major works for water storage, although where pumped storage and hydroelectric power are involved the Federal Power Commission and the utility itself undertake the primary responsibilities.

It is not necessary to review the Corps' responsibilities, programs, policies, and practices here because they have been well documented through recent studies and public controversies. However, from a planning point of view, it is important to note that the Corps is running into increasing difficulty in obtaining approval for its water resources development, management, and control projects. The very recent events surrounding the Corps-proposed project to build a \$30 million dam on the Red River Gorge in eastern Kentucky is an example that is geographically and politically pertinent to this study. The Council on Environmental Quality (CEQ), in a rare action, has publicly opposed the Corps' project. In its general nature, the project is a typical multipurpose reservoir project of the type undertaken in the eastern states. Local landowners have succeeded in obtaining a temporary restraining order from a federal court in Louisville to halt the project. They have been joined by a number of conservation groups.* The controversy has split

*Under present doctrine, conservation groups must join with plaintiffs who would actually be injured by the proposed developments in order to achieve standing.

the former and present members of the congressional delegation. Opposition has been going on since at least 1968 when the former Justice and Mrs. Douglas took a walking tour through the area to underscore their personal protests. It is an issue in local elections. The Corps remains adamant on the issue that it need not provide further quantitative information concerning certain aspects of the project, nor does it think it has overlooked the major social and cultural changes that would be wrought through consequential developments. This could force each plant either to go to the main stem of major rivers in the area, such as the Ohio and the Mississippi, or to storage projects for each plant's water needs. The latter could well meet with local opposition as intense as that directed at the Red River project if the project were developed under the eminent domain powers of public authority, which might prove to be a necessity.

In addition to the Corps, the Soil Conservation Service (SCS) has had long standing water resource development and control authority and programs. The responsibilities, powers, programs, and general methods of operation of the SCS are the same in the eastern states as they are in the western states, except that the agency relates to the Corps of Engineers as the developer of large project works instead of the Bureau of Reclamation.

The Federal Power Commission is the federal agency with exclusive powers to license hydroelectric projects. Unlike the statutorily established policies of the other two agencies mentioned above, the court interpretation of the powers of the FPC is that it may exercise its licensing authority in direct derogation of state laws and policies. This, too, has been the basis for intense controversy--both political and legal--in the eastern states over specific projects that have been proposed but not yet approved.

Until recently, the programs of the federal government could be expected to provide stability and certainty of water supplies for major industrial and municipal needs in the face of uncertain and "flexible" (or shifting) water rights under riparian law. Intense opposition to the projects of these development oriented agencies has introduced a strong element of uncertainty into the question of assured and available water supplies for the proposed plants. From a planning point of view, there are no "mechanisms" or "devices" that could be introduced at this time to provide a greater degree of certainty in these areas. Resolution may well depend on political resolution of the underlying factors, such as the relationship of economic growth to environmental protection.

As a final point, the effect of water pollution controls on water availability should be mentioned. It may be that enforcement of water pollution control laws and regulations by each state will reduce the importance of the riparian doctrine as the major allocator of water uses. The stream standards set for each major river and stream are based, in part, on calculated minimum flows during dry years and dry periods during each year; that is, on the average minimum capacities of the flows to abate pollution. Any substantial impact on these stream standards of withdrawals for consumptive uses would tend to increase the burden of additional pollution control of all other dischargers.* In this way, the states may be forced to allocate the quantity and quality of major stream flows among users, which would have the effect of achieving a limited appropriation system-by-permit, although in a relatively indirect manner. With the ability of the states and the federal government to develop water storage and control projects almost at will under serious challenge and with the increasing competition among water users

*The Miami Conservancy District in Ohio has taken this approach, for example, with the municipal dischargers along the river. The interdependency of stream users and dischargers is increased with drinking water standards are included in the balancing.

for what amounts to the assimilative capacity of water courses, and with the newly created drinking water standards responsibilities of the EPA, the question of water rights in the eastern states may become a matter of administrative determination of the departments of environmental protection of the states rather than the divisions of water, as is the present structure.

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