

U.L. v. Cateret,

Monmouth County

- Appendix A - Groundwater Report
- Appendix B - Chap. 1 - Stream Corridor Protection

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APPENDIX A

GROUNDWATER

WHAT IS HAPPENING BENEATH MONMOUTH COUNTY
AND NORTHERN OCEAN COUNTY?



**MANASQUAN
RESERVOIR SYSTEM**



**NEW JERSEY
WATER SUPPLY AUTHORITY**

Metcalf & Eddy, Inc.
Woodward-Clyde Consultants
New Jersey First, Inc.
Holt & Ross, Inc.
Arthur Young & Company

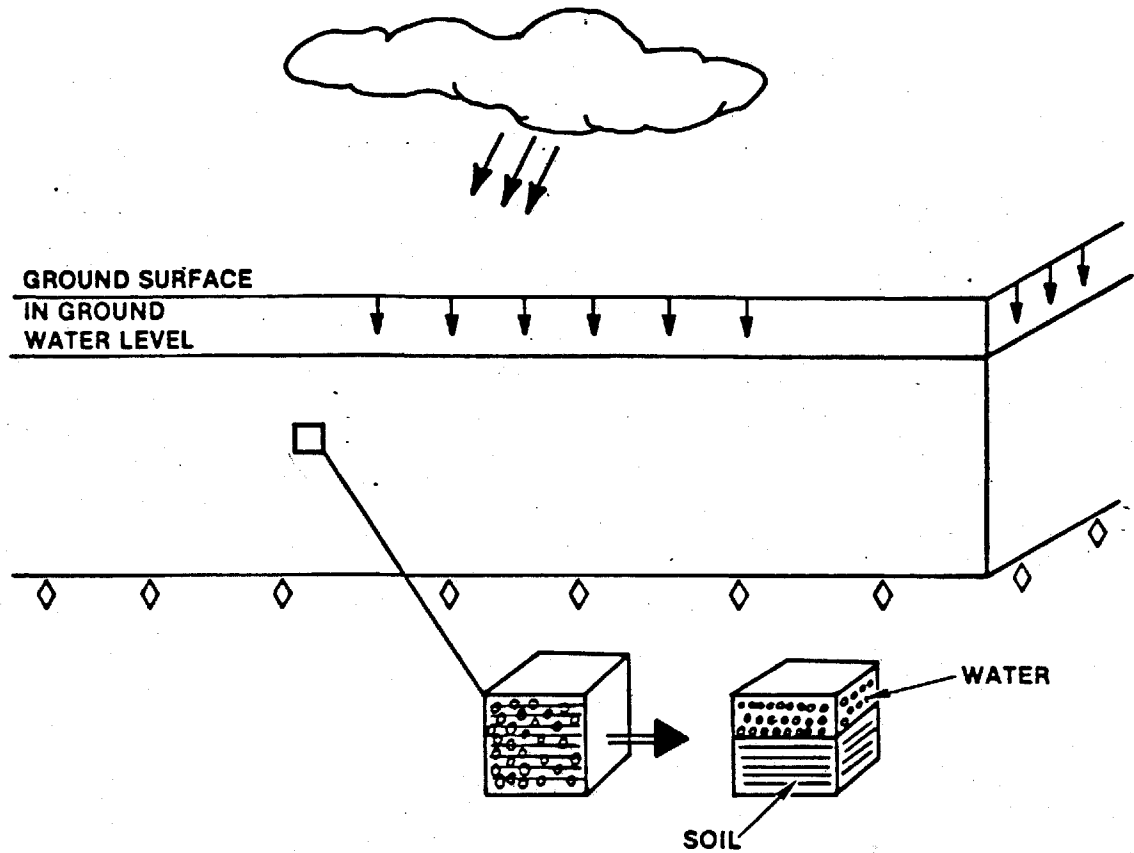
Introduction

The purpose of this report is to give a basic understanding of the aquifers that lie beneath the Monmouth County area and what happens to these aquifers as water is withdrawn from them. This report will use illustrations to show:

- What aquifers are;
- How they store water;
- What happens when water is withdrawn from them.

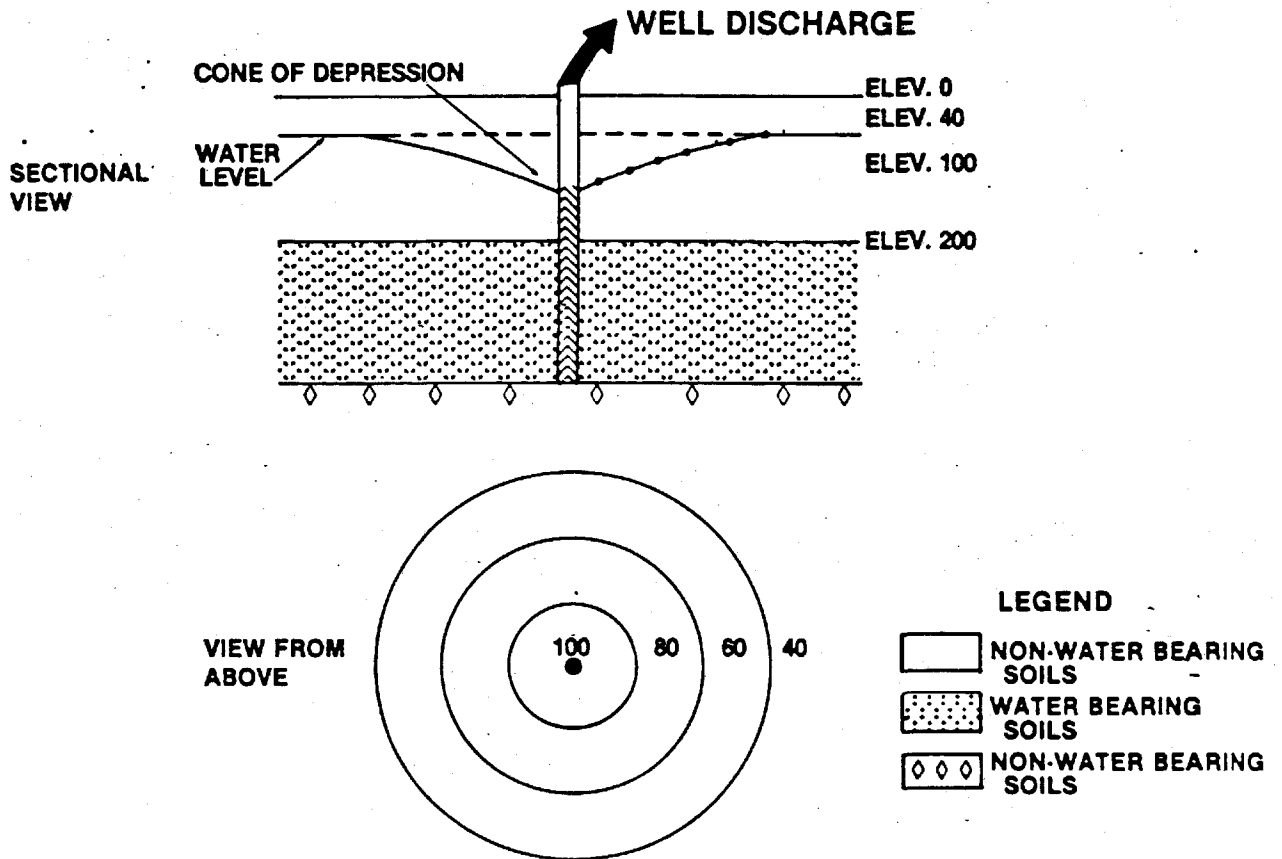
This report also shows the effect that withdrawal of large amounts of water is having on one of the major aquifers, the Englishtown aquifer, that serves the Monmouth-Ocean County area. Similar information is provided for a part of the Raritan Magothy aquifer.

Storage of rainfall in underground reservoirs



When rainfall enters the surface aquifers, or the recharge areas of confined aquifers, it percolates downward as far as necessary to fill the lower areas in the aquifer that have no water. Thus, if a block of aquifer soil was examined; it would be found to consist of a mixture of soil and water.

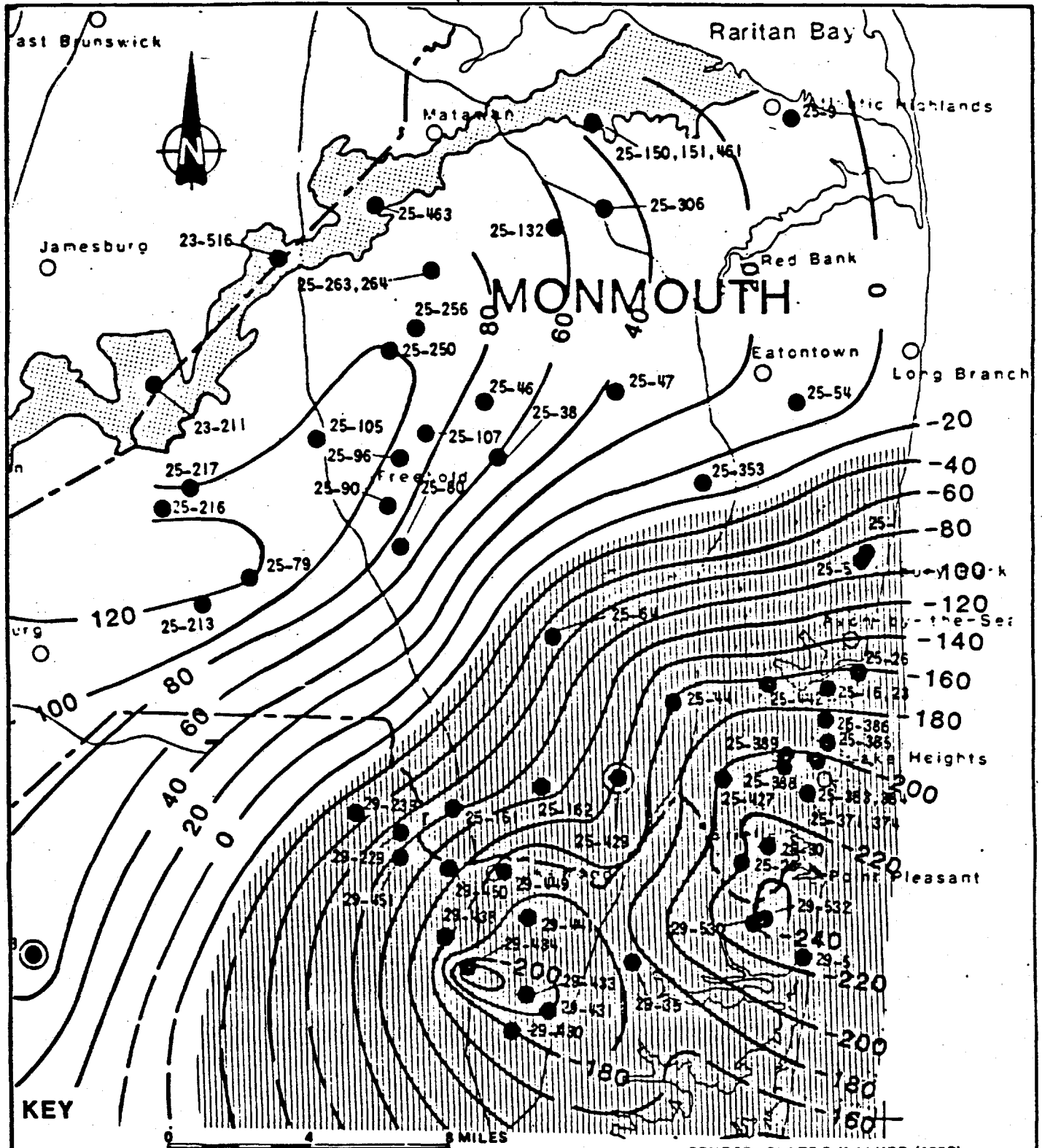
Pumping from a confined aquifer



The picture above shows what happens when water is removed from confined aquifers — the ones that are typically located deep underground. These aquifers often contain water that is under pressure, especially when they are tapped deep in the ground, far from the place where they are recharged by rainfall. In those cases, this hydrostatic pressure can actually raise the water level above the top of the soil layer that contains the water.

As in the previous illustration, the water drawn from the area around the well is replaced by water that moves to refill the space from which the water was removed; water then moves to replace that water, and so on. As a result, the water level declines near the well and throughout the rest of the aquifer, with the levels of greatest decline occurring closest to the active well.

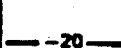
Here again, an unused well adjacent to an active well would be affected by the working well. If several of these idle wells were present, they could be used to plot and map the varying water levels and the locations of the rings of constant water level in the aquifer. By doing this, the plots would show where the cones of depression are.



KEY



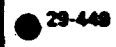
CRITICAL AREA
OUTCROP AREA OF THE ENGLISHTOWN FORMATION



POTENTIOMETRIC CONTOUR, SHOWS ELEVATION IN FEET AT WHICH WATER WOULD HAVE STOOD IN TIGHTLY CASED WELLS (NATIONAL GEODETIC VERTICAL DATUM OF 1929)



OBSERVATION WELL AND NUMBER SHOWN IN TABLE 4 AND FIGURE 6 OF WALKER (1983)



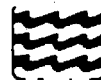
DATA POINT AND NUMBER SHOWN IN TABLE 4 OF WALKER (1983)

SCALE

SOURCE: PLATE 3, WALKER (1983)

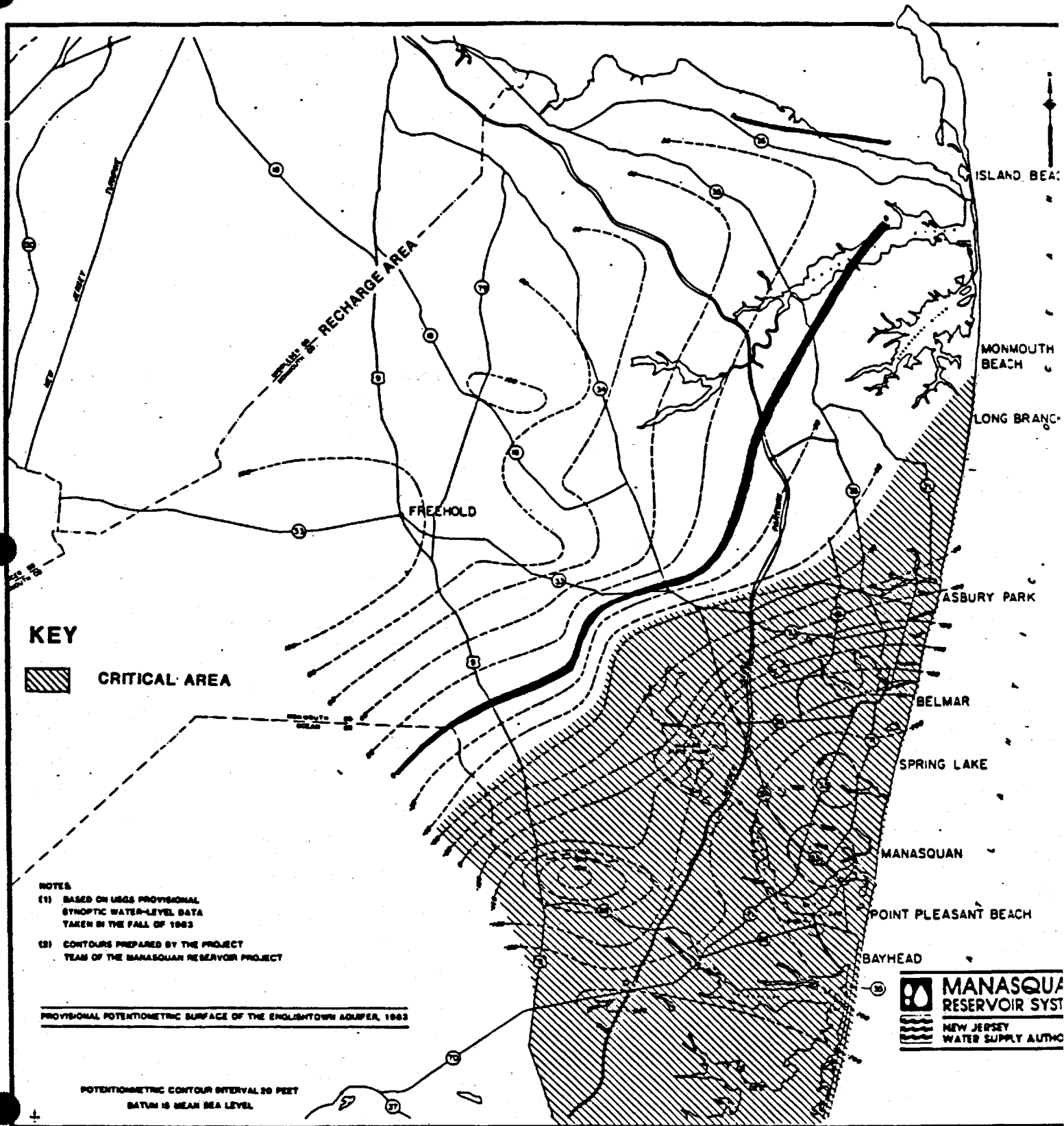


MANASQUAN RESERVOIR SYSTEM



NEW JERSEY WATER SUPPLY AUTHORITY

POTENTIOMETRIC SURFACE OF THE ENGLISHTOWN AQUIFER, 1978



RECHARGE AREA

FREEHOLD

ISLAND BEACH

MONMOUTH BEACH

LONG BRANCH

ASBURY PARK

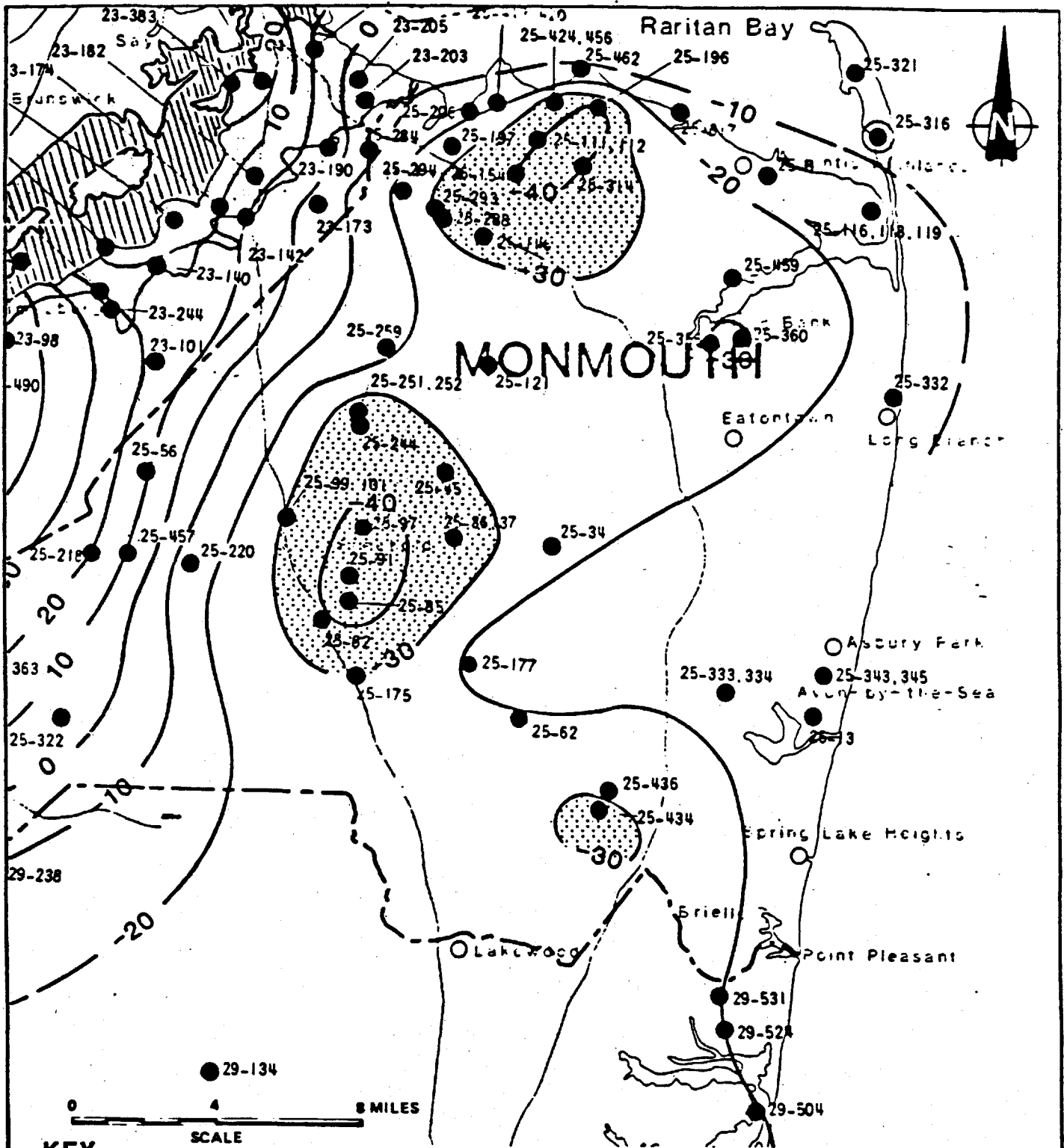
BELMAR

SPRING LAKE

MANASQUAN






POINT PLEASANT BEACH

BAYHEAD



KEY



-  **CRITICAL AREA**
-  **OUTCROP AREA OF THE OLD BRIDGE SAND MEMBER**
-  **POTENTIOMETRIC CONTOUR, SHOWS ELEVATION IN FEET AT WHICH WATER WOULD HAVE STOOD IN TIGHTLY CASED WELLS (NATIONAL GEODETIC VERTICAL DATUM OF 1929)**
-  **25-306**
OBSERVATION WELL AND NUMBER SHOWN IN TABLE 3 AND FIGURE 5 OF WALKER (1983)
-  **39-134**
DATA POINT AND NUMBER SHOWN IN TABLE 3 OF WALKER (1983)



SOURCE: PLATE 2, WALKER (1983)



MANASQUAN RESERVOIR SYSTEM

NEW JERSEY WATER SUPPLY AUTHORITY

POTENTIOMETRIC SURFACE OF THE OLD BRIDGE SAND, 1978

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Chapter One

Stream Corridor Protection



LEGAL UNDERPINNINGS
of
STREAM CORRIDOR PROTECTION

The regulations of land bordering water ways, inevitably involve some limit setting on the rights of property owners to the full use and enjoyment of his property. Consequently, questions have arisen as to the legal defensibility of stream corridor or even flood plain protection. By examining court action involving flood plain and wetlands protection it is possible to gain a clearer understanding of the actual basis for judicial decision making.

Underlying Issues in Flood Plain Protection

When municipalities have been challenged in court on the legitimacy of flood plain ordinances, judicial decisions will consider several factors. Where ordinances have been upheld - municipalities have been given clear, delegated authority from the state, the adopted regulations are viewed as serving legitimate police power objectives, the regulations are reasonable and generally precise in their wording, they do not discriminate against similarly situated landowners, and they do not deprive a property owner of the reasonable use of his property. Generally, it is the absence of more than one of these characteristics that results in the overturning of a local ordinance.

The courts have recognized a public purpose in flood plain protection beyond that of protecting individuals from self-inflicted property damage due to their occupancy of the flood plain. In Kraiser vs. Zoning Hearing Board of Horsham Township (1979) the Pennsylvania Commonwealth Court upheld a local Zoning Board denial of a variance for development of duplex housing within a 100-year flood plain. The court stated that buildings would "increase flood height and conceivably increase the hazard to the inhabitants of other buildings both on and away from the zoned area."

Court decisions involving flood plain ordinances can be categorized by the era in which they were rendered. Prior to the 1970's courts took a narrow view of local restrictions on flood plain development. Ordinances which prohibited encroachments in the floodway were upheld, but any limit setting on development in the flood fringe was likely to result in the invalidation of the ordinance. In one state, a flood plain ordinance which allowed marinas, boat houses, parks, farmland and wildlife but little else was struck down. In another state, the construction of multi-family housing on flood prone land was given court approval.

The Association of New Jersey Environmental Commissions in its review of wetlands statutes observed that ordinances can be overturned by a court of law if they: are based on a lack of sufficient factual data and are therefore unreasonable; fail to utilize the valid police powers; impose undue restraint upon private property; or discriminate against a particular landowner. On the other hand courts have sustained wetlands ordinances whose objectives are to prevent flood damage, control water pollution, or protect water supplies.

Among the most heatedly discussed aspect of wetlands and flood plain zoning, is the taking issue. Overly restrictive regulations which prevent a landowner from realizing the value of his property were considered by plaintiffs as a taking of property rights without just compensation. In an exhaustive review of more recent court decisions one author observed that when the taking issue has arisen, ordinances have been invalidated when a landowner has been deprived of the reasonable use or economic benefits of his property.⁴³ No standards for determining reasonable use has been established. We have already seen in Turnpike Realty vs. Dedham that claims of a 10 fold reduction of property value due to flood plain restrictions were held not to be a taking due to other considerations.

It is significant that during the 1970's only two court decisions struck down local ordinances based solely on the taking issue. In Sturdy Homes, Inc. vs. Township of Redford, a Michigan court found regulations to be confiscatory because no evidence of flooding in the regulated area had been presented. In American National Bank and Trust Company of Chicago vs. Willaged Winfield, an Illinois court found that local ordinances which limited residents on flood plain land to single family houses were unreasonable. In this particular case, 70% of the 32 acre parcel was within the flood plain. The cost of adding fill would have cost \$4,192 - \$12,577 an acre, while at the same time the land was worth only \$6,000 an acre for single family use. While ruling against the restrictions in the limited case the court supported the concept of regulations to protect open space, aquifer recharge and flood storage.

New Jersey's courts have upheld wetlands protection statutes in those limited instances when they have been enacted. In Love-ladies Property vs. Roab, the court ruled that adoption of an ordinance and the mapping of wetlands are the appropriate prerequisites for requiring a permit from a landowner. The court was firm that ordinances could not discriminate against landowners in the same situation. In Morris County Land Improvement Co. vs. Parsippany-Troy Hills Township, a local ordinance was declared invalid because it discriminated against upstream landowners. New Jersey's own coastal Wetlands Act has been upheld as a legitimate exercise of the government's right to protect its own resources without taking from property owners their rights to development (American Dredging Co. vs. State of New Jersey).

To date, courts across the country have not invalidated any of the basic requirements of the National Flood Insurance Program. The right to delineate the floodway and flood fringe area under the equal conveyance system, the prohibition of new structures and fill in the floodway, and the construction of residential buildings above the 100 year flood level have been sustained. Recent trends show a willingness to support restrictions on the building of structures outside the floodway, even when flood mitigation is not the sole or primary objective. The issue of reasonable use, alluded to earlier, may well be encompassed by the use of cluster ordinances which allow the development potential of most riparian lands when densities are adjusted elsewhere on the property.

Municipal Authority to Protect Stream Corridors

The Home Rule Act, N.J.S.A. 40:48-1 et seq. of 1917 invests every municipality with broad police powers, enabling them to adopt ordinances considered necessary and proper to promote public health, safety and welfare. Such provisions, however, may not be contrary to the laws of New Jersey or the federal government. In Hudson Circle Servicer, Inc. vs. Kearney, courts affirmed the delegation of police power as stated in the Constitution.

Stringent regulations on particular land uses that impair the environment have been validated in courts of law. In Dock Watch Hollow Quarry Pit vs. Township of Warren the strict regulation of quarry operation was upheld, with the court commenting:

...The Supreme Court has recognized that the protection of public health through the preservation of the environment is a valid, and indeed primary objective of the police power. Huron Portland Cement Co. vs. Detroit, 362 U.S. 440, 442, 80S. Ct. 813, 815 YL. Ed. 2d 852, 855 (1960). Today it cannot possibly be questioned that the preservation of the environment and the protection of ecological values are, without more, sufficient to warrant an exercise of this power...

(For further information see Middlesex, Somerset, Mercer Regional Study Council, Sourland Ground Water Study, 1983.

Municipal governments have been likewise given broad powers and discretion to adopt zoning ordinances limiting and restricting building structures according to the nature and extent of their intended use and that of the land.

Under the Municipal Land Use Law, Chapter 291, Laws of N.J. 1975, municipalities have been given broad powers to protect natural resource features of significance. Of the specific purposes of the act, four would be at least partially achieved by a stream corridor protection program:

- To provide adequate light, air, and open space;

ORDINANCE GUIDELINES

STREAM CORRIDOR DEFINITION

OBJECTIVES: To protect property from flooding, to reduce land development impacts on stream water quality and flows, and to provide recreation and wildlife migration corridors, management areas for perennial and intermittent streams are proposed (see Figure 3).

PERENNIAL STREAM CORRIDOR

1. Flood Plains

The stream corridor should include as a minimum the land now inundated or likely to be inundated by the flood of 100 year frequency. It includes the flood way and the New Jersey Flood Hazard Area and the encroachment lines of undelineated streams. Where the flood plain extends beyond the limits of the stream buffer area (defined below), then the full extent of the flood plain should be included in the stream buffer areas and the required setbacks should be measured from the edge of the flood plain.

2. Stream buffer area

This component of the corridor is comprised of lands whose disturbance would likely adversely impact the annual flow regime or water quality of a stream. Included are:

a. Wet soil areas

Soils having a seasonally high water table within a foot of the surface and located contiguous to a permanently flowing stream or contiguous to other wet soils which are hydrologically connected with a permanently flowing stream. The extent of these soils is indicated on Soil Conservation Service maps, but must be confirmed through field investigation (see accompanying chart).

The U. S. Fish and Wildlife Service definition of wetland may be substituted for wet soils in defining the buffer area. The wetlands have at least one of three attributes:

- (1) at least periodically, the land supports predominantly hydrophytes or
- (2) the land substrate is predominantly undrained hydric soil or
- (3) the substrate is non-soil and is saturated with water or covered by shallow water at sometime during the growing season. (See Classification of Wetlands and Deepwater Habitats of the United States, U. S. Fish and Wildlife Service, 1979.)

b. Slopes of 12% or greater

Land whose slope exhibits a change in elevation greater than 12% of the corresponding distance through the slope and where the toe of the slope lies within 50 feet of the stream channel bank, the flood plain or contiguous wet soils/wetlands. The protection area for slopes shall be the greater of...

- (1) A distance of 100' from the toe of slopes having a consistently average slope of 12% or greater or
- (2) A distance of 50' beyond the first point in which the average slope is less than 12% for the distance of 25 or more feet.

c. Riparian Lands Set Back

For streams which are not immediately bounded by a well defined flood plain, by wet soils or by slopes of 12% or more, the following vegetated setbacks shall apply -

- (1) one hundred feet (100') from the channel bank for purposes of protecting water quality from erosion and overland flow, nutrient runoff and septic tank effluent
- (2) one hundred fifty (150') feet from the channel bank for providing water quality benefits, usable recreation and wildlife corridors
- (3) 50' vegetated buffers shall be preserved around all riparian wet soil or wetland areas to control land runoff and mitigate the entry of nutrients and toxic substances.

INTERMITTENT STREAM CORRIDORS

Intermittent stream corridors are areas including and surrounding surface water drainage channels which are characterized as having seasonal, rather than perennial, stream flows. The extent of these swales or ephemeral stream corridors is the greater of:

- a. the outer boundary of alluvial soils or alluvium plus contiguous slopes of 12% or more (but extending a distance not to exceed 50' from the toe of the slope)
- b. 25' or more on either side of the stream channel

GUIDELINES

STREAM CORRIDOR OBJECTIVES

1. To prevent the erection of structures of land subject to seasonal or periodic flooding so as not to endanger the health, safety or welfare of the occupants thereof, or of the public generally, or so as to burden the public with costs resulting from unwise individual choices of land use.
2. To retain the natural storage capacity of the watershed.
3. To protect, preserve, and maintain the water table and water recharge areas within the municipality so as to preserve present and potential water supplies for the public's health and safety.
4. To minimize danger to public health by protecting the quality and quantity of surface and subsurface water supplies adjacent to and underlying stream corridor areas and promoting safe and sanitary drainage.
5. To permit only those uses which can be appropriately located in the stream corridor which will neither impede the flow and storage of flood waters, nor cause accelerated erosion, soil failure, accelerated seepage or other conditions which may create a danger to life and/or property at, above, or below their locations along the stream corridor.
6. To prevent inappropriate development in order to avoid potential dangers for human usage caused by erosion, stream siltation, soil failure leading to structural collapse or damage and/or unsanitary conditions of associated hazards.
7. To assume the continuation of the natural flow pattern of watercourses within the municipality, in order to provide adequate and safe floodwater storage capacity to protect person and property against the hazards of flood inundation.
8. To maintain undisturbed the ecological balance between those natural system elements, including wildlife, vegetation and marine life, dependent upon watercourses, steep slopes and wetlands.
9. To protect other municipalities within the same watershed from the impact of improper stream corridor development and the consequent increased potential for flooding.
10. To maintain a framework of stream corridors of high quality for public access within close proximity to neighborhood and population centers.

ORDINANCE GUIDELINES

Land Uses Within Stream Corridor Protection Zone

Permitted Uses:

1. Cultivation and farming (including truck gardening and harvesting of any wild crops such as marsh hay, ferns, moss, berries or wild rice) according to best management practices of the Soil Conservation Service or the State Soil Conservation Committee.
2. Pasture and controlled grazing of animals according to recognized soil conservation practices.
3. Outdoor plant nursery, vineyards, and orchards according to recognized soil conservation practices.
4. Wildlife sanctuary, woodland preserve, and arboretum exclusive of facilities subject to damage by flooding.
5. Game farms, fish hatcheries, or hunting and fishing reserves, operated for the protection and propagation of wildlife, but excluding enclosed structures.
6. Forestry, lumbering and reforestation according to recognized natural resources conservation practices of the New Jersey Forest Society.
7. Structures, buildings, retaining walls associated with flood retention, water supply impoundments, culverts or bridges.

Prohibited Uses:

1. New construction or replacement of free standing structures, buildings and retaining walls not in the public interest.
2. On-site sewage disposal systems.
3. Any solid or liquid waste or refuse disposal including sanitary landfills, transfer stations and wastewater lagoons.
4. Junk yards, commercial and industrial storage facilities and the open storage of vehicles and materials.

7. Parking facilities, when it can be demonstrated that parking will not be utilized during periods of flooding and will pose no threat to the safety of vehicles, their users and/or downstream properties. (Temporary parking for periods not to exceed one hour, and/or parking recreation uses would be examples of such exceptions.) When constructing parking facilities, the use of pervious rather than impervious materials should be encouraged on soils having moderate or better recharge potential.
8. Grading or regrading of lands, including the deposit of topsoils and the grading thereof, when incidental to permitted construction, provided that
 - a. all net increases in drainage flows, off-site, and changes to the stream corridor protection that result in increased flood heights are quantified.
 - b. All applications for amending the boundaries to the Stream Corridor Protection zone is submitted if the boundaries are affected by the grading or regrading of land.
 - c. A plan is submitted indicating the deposition of any fill or materials proposed to be deposited by the grading or regrading of land.
 - d. No fill is placed on wetlands.
 - e. All Soil Erosion and Sediment Control Standards of the Soil Conservation District are met.
9. Utility transmission lines, installed during periods of low stream flow according to Soil Erosion and Sediment Control Standards and in a manner which will not impede flows or pond water.
10. Fences of wood, wire or other materials which will not impede the flow of floodwaters and passage of debris. No fence should be erected which will prevent the passage of recreational craft.

7. The riparian lands setback gives each municipality more of an equal share in protecting the one resource which links all municipalities together. The lands set aside during additional recreation facilities to each community. The protection policies work to the good of the commonly shared aquatic ecosystem.

8. For the first time, inland wetlands and headwaters areas, two long neglected sensitive resources, will be provided some protection.

9. By using a corridor concept which permits variability due to the presence of sensitive resource features, the limitations of fixed width setbacks can be overcome. The fixed width setbacks currently in use do not provide complete protection of the Millstone River floodplain whose total width may vary from 100' to 1,000' in Piedmont streams, up to 1,000' in the Upper Millstone and up to 2,000' in the lower Millstone River.

