

COASTAL ZONE ACT ASSESSMENT REPORT

September 22, 2000

**Prepared by the Delaware
Department of Natural Resources
and Environmental Control**



PREFACE

This report is published pursuant to the Memorandum of Understanding dated March 19, 1998, which instructs the Department of Natural Resources and Environmental Control to publish an assessment report within one year of developing the official "Regulation Governing Delaware's Coastal Zone." This report will be updated every two years henceforth.

BACKGROUND

In June 1971, Delaware was the first state to protect its coastal lands and waters from environmentally harmful industrial development by enacting Delaware's Coastal Zone Act. Since then, under the 1972 Federal Coastal Zone Management Act, twenty-seven coastal states (and territories) have established coastal management programs involving regulation of coastal land and water uses to some degree or another. Delaware's early recognition of the value of its coastal resources and the decision to protect them for the benefit of present and future populations set a national precedent. It is the only state to date to prohibit by statute any new heavy industry in its coastal zone.

Enactment of the Coastal Zone Act was a direct result of the actions, in 1969-70, of the newly elected Governor Russell W. Peterson in calling for protection for Delaware's remaining unspoiled coast, declaring a moratorium on any more industrialization of that area and appointing a Task Force on Marine and Coastal Affairs to advise him on a proper course of action for protecting the coastal zone.

Shell Oil Company was about to break ground for a huge oil refinery to be built on 5,000 acres of choice coastal land. Citizens had tried to stop this in the courts, however the Delaware Supreme Court denied the citizens' complaint and the project seemed destined to proceed. The Shell project was to be the first step in a major industrialization of Delaware's coast planned by the U.S. Department of Commerce in concert with international oil, coal and transportation companies; and Delaware's Chamber of Commerce, and its unions. Several large oil refineries, petrochemical complexes and deep-sea ports for handling oil, coal, iron ore and other products were envisioned.

In April 1971, the Governor's Task Force issued a preliminary report emphasizing the recreational value of the coastal zone and recommending that no further incompatible industries be allowed therein. Meanwhile, the governor's staff drafted the Coastal Zone Act, which, among other things, prohibited outright any more heavy industry or any deep-sea ports in the coastal zone. It was introduced in the General Assembly (HB 300) one month later where it faced intense lobbying from business and labor, and from the federal government. It squeaked through by one vote in each house and was signed into law by Governor Peterson on June 28, 1971. (Title 7, Chapter 70, Delaware Code)

Since its enactment in 1971, there have been several proposals to amend the law. However, only five amendments have been adopted.

In 1979, Section 7002 was amended by adding onshore support facilities for Outer Continental Shelf oil and gas activities to the list of industrial land uses not prohibited as heavy industry uses.

November 1, 1981, administration of the Coastal Zone Act was moved from the Office of Management, Budget and Planning to the Department of Natural Resources and Environmental Control.

The other amendments enacted in 1983 and 1988 allowed a nonconforming steel manufacturing plant at Claymont to retain its nonconforming use status after temporarily discontinuing operations. This legal, nonconforming facility is now operating as Citisteel.

In 1992, the General Assembly amended Section 7004 of the act, to allow existing heavy industry uses in bulk product transfer facilities to expand if a Coastal Zone Permit is acquired.

In 1999, the General Assembly passed HB 330, which defined incinerators as a prohibited use in the coastal zone.

THE GEOGRAPHY OF THE COASTAL ZONE

As described in Section 7002 of the Act, the Coastal Zone includes Delaware's territorial waters of the Delaware River and Bay and the Atlantic Ocean and includes Delaware's part of the Chesapeake and Delaware Canal. On land, the Coastal Zone boundary follows a series of roads and highways including parts of such major roads as Routes I-495, 13, 113 and 1. The width of the land in the zone varies from about a hundred yards north of Wilmington to twelve miles between the Indian River Inlet and Millsboro on the south, averaging about four miles in width. North of Artificial Island (opposite Augustine Beach) the Coastal Zone extends across the Delaware River to the mean low water on the New Jersey side, thus affecting offloading facilities such as docks and piers serving industrial facilities in that state. *Please see the State map on the next page for the precise boundaries of the Coastal Zone.*

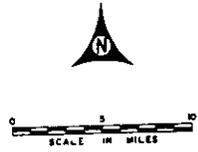
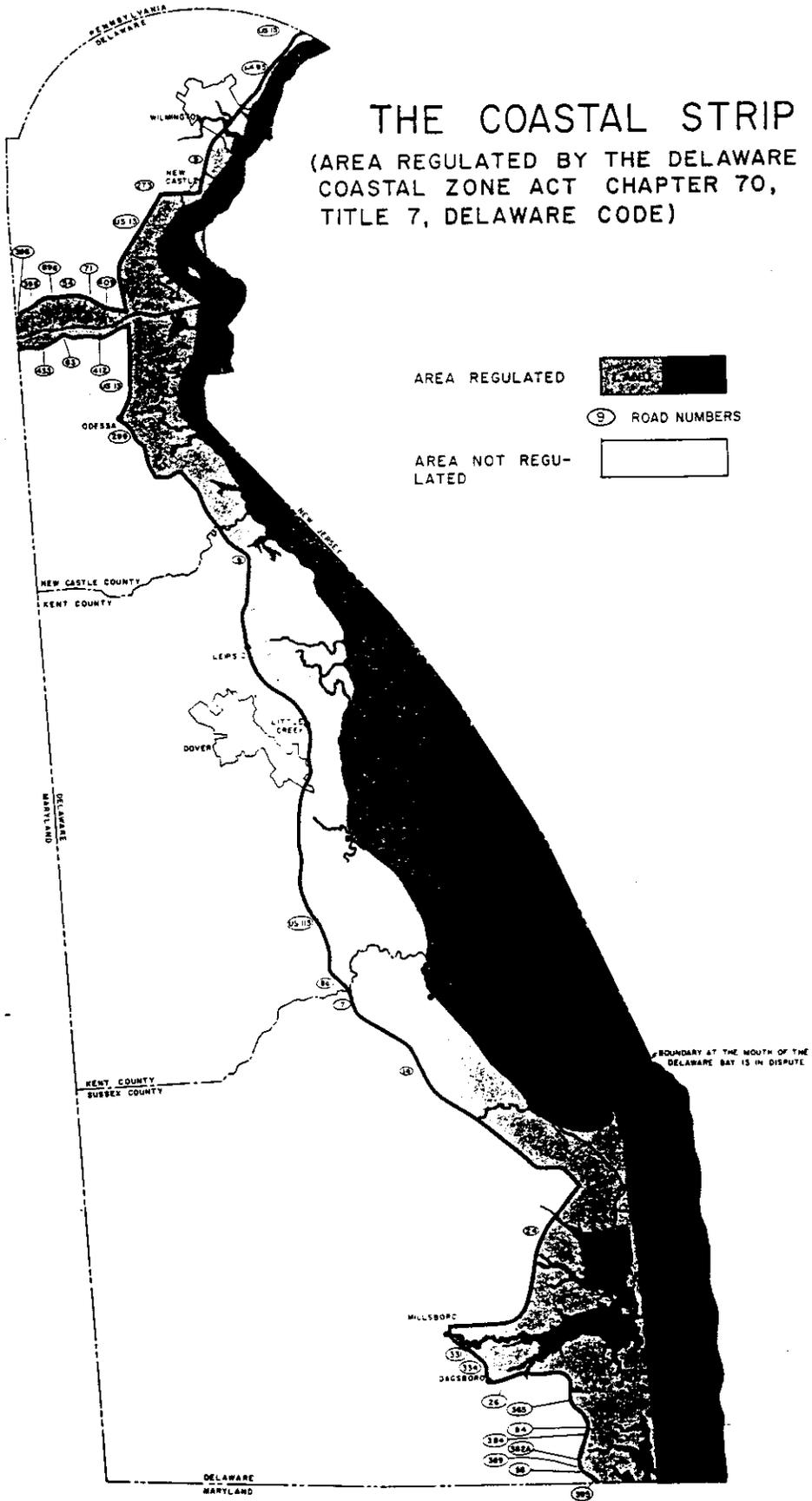
Current Zoning and Land Use

In New Castle County much of the Coastal Zone north of the Chesapeake and Delaware Canal is zoned for manufacturing and industries. South of the canal, in that county and in Kent County, much of the land is State or Federally owned and none of it zoned for industry except for a jet fuel tank farm facility east of Little Creek. In Sussex County the predominant land and water uses are recreation and tourism with only a few areas zoned for manufacturing, notably the Indian River Power Plant, Townsend's Feed Mill, the Intervet plant near Millsboro and the Barcroft plant in Lewes. Most uplands not in use for recreation are zoned for agricultural or residential uses.

As expected, the current use of land within the Coastal Zone reflects the prescribed uses of land authorized by local zoning authorities. The one exception to this is in northern New Castle County where considerable land is zoned by the County for heavy industry. The Coastal Zone Act acts as a veto over local zoning where such local zoning allows for new heavy industry use and strictly prohibits new heavy industry use in the Coastal Zone. However, existing

THE COASTAL STRIP

(AREA REGULATED BY THE DELAWARE COASTAL ZONE ACT CHAPTER 70, TITLE 7, DELAWARE CODE)



(nonconforming) heavy industry can expand to a limited extent, provided a Coastal Zone Permit is acquired.

There are strong land use conflicts within and immediately adjacent to the Coastal Zone. There are several examples of industrial and manufacturing plants within a mile of established residential areas. Such close proximity of vastly differing land uses has led to strong disputes in the past twenty years.

Of Delaware's approximately 750,000 citizens, only about 20,000 to 30,000 reside year-round in the Coastal Zone. However, in the summer many more thousands vacation there to enjoy the zone's valuable amenities, primarily the ocean beaches and offshore recreational fishing.

Residential land use in the zone has increased considerably since 1971, especially in Sussex County around the Inland Bays. However, heavy industrial land use has not increased in the zone. Indeed, it may have diminished through the loss of the Amoco refinery near New Castle and the Akzo chemical plant near Delaware City.

Economic Assets

While relatively few people live year-round in the Coastal Zone, many people find employment there. Several of Delaware's major industrial and manufacturing plants are located within the Coastal Zone. Only a partial listing of these sites includes such well known major companies as Citisteel, DuPont (Edgemoor), Barcroft, Zenith, Formosa Plastics, Georgia Gulf, ICI Americas, IKO Manufacturing, Conectiv, Kaneka Delaware, Occidental Chemical, Zeneca, MetaChem, Motiva and Sun Refining and Marketing. There are many more lesser known companies in the Coastal Zone. All combined, the amount of employment and taxes is impressive. Not including secondary, or spin-off jobs, the main industrial and manufacturing plants employ approximately 6,100 people. These 6,100 people have a combined (1992) payroll of about \$250,000,000 annually. These two numbers do not count non-manufacturing jobs and tax revenues from such other businesses as insurance and car sales, farm employment, or home construction and restaurants.

The few new manufacturing plants in the Coastal Zone are mostly small-scale operations and relatively non-polluting. Since 1971, there have been no new chemical plants in the zone. The zone's (permitted) new manufacturing uses include such uses as orange juice concentrated blending at Citrus Coolstore, automobile seat assembly at Autoport, automobile components at Johnson Controls and manufacturing analysis equipment at T.A. Instruments.

Environmental Quality of the Coastal Zone

The environmental quality of the Coastal Zone is generally good, but conditions vary considerably between different locales. Water quality of the coastal streams has improved since 1971, particularly in regards to fecal coliform bacteria and dissolved oxygen levels. The quality of the Delaware River has improved dramatically since the 1950's. The "lower" Delaware Bay continues to be a high quality estuary. The one possible exception to the generally improving water quality situation is that of Delaware's Inland Bays. These sensitive, shallow bays have

exhibited lower water quality since the early '70's. The overall improvement in the zone's water quality cannot be attributed entirely to the Coastal Zone Act. However, the Act's total prohibition on new heavy industry has surely been a major help.

Air Quality, as measured by those pollutants most directly related to industrial activity in the Coastal Zone, i.e. particulate matter, sulfur dioxide, lead, and nitrogen oxides, is much better than the National Ambient Air Quality Standards. All of Delaware, including the Coastal Zone, is however considered a non-attainment area for ozone. While the degree of the ozone problem has improved over the past 20 years, it's continued persistence can be primarily attributed to the increased use of automobiles and transported pollution from upwind States, and not further industrialization of the State. In fact, there have been no new major industrial plants constructed in Delaware since the mid-70's

The natural habitat of the Coastal Zone contains many living treasures. The zone contains numerous plants and animals rare in Delaware and several that are rare in America. In 1992, the United Nations declared the Delaware Bay a "global resource." The success or mere existence of several bird species such as the Piping Plover's continuing existence in Delaware is dependent upon the Delaware Bay Estuary. Several recreationally and commercially important species of fish utilize the marine resources of the Coastal Zone for spawning. Such species include the Atlantic Sturgeon, Striped Bass (Rock Fish), Sea Trout, Flounder and several species of herrings.

Today, loss of natural habitat in the Coastal Zone is primarily from nonmanufacturing land uses, especially home building around the Inland Bays. The State has little or no authority in local land use or zoning issues.

ENVIRONMENTAL GOALS OF THE COASTAL ZONE

The Department of Natural Resources and Environmental Control, over the past year, has developed a set of Coastal Zone Environmental Goals. Staff of the Delaware Coastal Management Program conducted several daylong seminars with various scientists, environmental groups, and government administration to develop a set of environmental goals specifically for the Coastal Zone. After much discussion and research, the four goals below were developed and agreed upon. These goals will be helpful in reviewing applications for Coastal Zone Act Permits. These goals will help the Department construct various environmental indicators. When established, these indicators will depict quantitatively whether the environment of the Coastal Zone is improving or not. However, it is vital to note that the environmental indicators may not explain why trends are occurring or who is responsible, if any. Therefore, the environmental indicators may have a minimal value in deciding specific application decisions. They will probably have significant value in future revisions of the Coastal Zone Regulations and Department Policies regarding the Coastal Zone Act Program.

Coastal Zone Environmental Goals

Habitat/Land Cover

Protect the mosaic of land cover in the Coastal Zone, including upland, wetland, shoreline and aquatic areas, to ensure a healthy ecosystem. Encourage appropriate land use and land cover. Ensure the protection of natural vistas in the Coastal Zone for public enjoyment.

Air Quality

Improve air quality, which directly or indirectly affects all forms of life within the Coastal Zone.

Water Quality

Improve water quality and quantity, which directly or indirectly affects all forms of life within the Coastal Zone.

Living Resources

Preserve and maintain healthy native animal and plant populations, or biodiversity, in the Coastal Zone. Preserve and improve the ability of non-invasive populations to live and thrive in the Coastal Zone.

ENVIRONMENTAL PROBLEMS OF THE COASTAL ZONE

Delaware's Coastal Zone faces two serious problems. The first is that of air quality verses Federal standards. New Castle and Kent counties are considered severe non-attainment areas for ozone. Sussex County is considered marginal non-attainment for ozone. The reasons for this non-attainment status are complex and will not be discussed here.

A second major problem is that of urban sprawl. Natural areas are being destroyed to provide space for new housing. Farmland is being converted away from agricultural use to urban/suburban residential housing and commercial uses. Such sprawl is a significant source of air pollution as a result of increased automobile use, and a significant source of water pollution due to runoff. Sprawl also generates an additional demand to treat wastewater, either in septic tanks or expanded sewage treatment plants. This sprawl is particularly apparent in eastern Sussex County. There is also large-lot housing in New Castle County south of the Town of New Castle. The Coastal Zone Act does not regulate or even mention this land use change, but the trend is obvious to most that travel through the Coastal Zone.

Little land has been lost to new (permitted) manufacturing uses. Many of the Coastal Zone Act Permit applications received at the Department in the last several years are for new uses at existing facilities, new facilities at existing buildings, or expansions at the Port of Wilmington. No new heavy industry has been allowed in the Coastal Zone.

AIR QUALITY

Current Status

Delaware has been measuring air quality for over 20 years and is required by federal statute to monitor levels of specific gases known as *criteria pollutants* on an hourly basis. Of all the air pollutants that are monitored and have clean air standards, only ozone occurs at levels that are above the federal standard and are classified as “unhealthy.” Ozone is a colorless gas that is the main ingredient of smog. Ground-level ozone is a severe public health concern. It damages lung tissue, aggravates respiratory conditions, and makes people more susceptible to respiratory infections. Children and the elderly are especially vulnerable to ozone’s harmful effects. Ozone also causes damage to sensitive species of plants and agricultural crops. Ozone is formed when a chemical reaction occurs between pollutants in the lower atmosphere on hot, sunny days. The air pollutants contributing most to ozone formation are *volatile organic compounds* and *nitrogen oxides*. There are many sources of both of these pollutants in the Coastal Zone; large and small industrial facilities, motor vehicles, chemical solvents, and natural sources. These chemical compounds can be carried far from their sources before reacting to form ozone. Ozone, or the compounds that form it, can be blown into the Coastal Zone from upwind areas such as Baltimore and Washington, DC and sources even further west. Ozone levels regularly reach unhealthy concentrations in the summer in the northern Coastal Zone.

Air Pollution and Water Quality

Pollution deposition is another problem affecting the Coastal Zone. This occurs when chemicals in the air are washed out by rain or settle out as dry particles. Acid rain and nitrogen compounds are the chief pollutants deposited in this manner in the Coastal Zone. Acid rain can harm aquatic life in lakes and streams, damage vegetation, and erode masonry structures and statues. Nitrogen compounds can also affect rainwater acidity and add to the nitrate load (excess nutrients) of water bodies. The pH of rainwater in the Coastal Zone is acidic, ranging between 4.2 and 4.3 (clean rain is 5.6). While few measurements have been made of nitrogen deposition in the Coastal Zone, research in nearby states indicates that a significant amount of nitrogen is entering the ecosystem from atmospheric pollution. Many other chemicals known or suspected to be capable of causing harm to people can be detected in air in very low concentrations. These chemicals are often referred to as *air toxics* and can come from many sources including industrial facilities, transportation sources, and chemical processes. There are no acceptable official standards for outdoor air concentrations of these chemicals; instead they are controlled through permit limits placed on industry.

WATER QUALITY

As recently as 1975, the Delaware Coastal Zone routinely experienced serious water pollution and public health problems as a result of the discharge of untreated sewage and wastes. Since then, as a result of voluntary efforts, regulatory actions and significant private and public investments in wastewater treatment facilities, localized improvements in water quality have been achieved.

The need for additional cleanup and pollution prevention continues. The focus of water quality management has shifted from point source discharges (end-of-pipe) to decreased stream flows and nonpoint source problems, such as urban and agricultural runoff, erosion, and sedimentation. Unaddressed, these problems lead to poor habitat conditions for fish and other aquatic life, decreased enjoyment of our surface waters for recreation, and unhealthy conditions for those surface waters of the Coastal Zone.

RIVERS and LAKES of the COASTAL ZONE

Delaware's Coastal Zone has many miles of rivers and streams that have been classified using a rating system called for in the Federal Clean Water Act. The classification system is keyed to a management program designed to protect uses of the waters (referred to as "designated uses") for such purposes as drinking water supply, recreation, and the propagation of fish, aquatic life and wildlife. These designated uses serve as Delaware's water quality goals for specific watersheds. In order to protect those uses, a comprehensive set of chemical, biological, and habitat standards has been promulgated. Designated uses and standards are embodied in the State of Delaware Surface Water Quality Standards as amended on August 11, 1999.

The Department of Natural Resources and Environmental Control has found that many of Delaware's Coastal Zone rivers and streams do not fully support fish and wildlife use. Most of these waters do not meet the standards because of nonpoint source pollution impacts.

FISH CONSUMPTION ADVISORIES

Toxic substances such as Polychlorinated Biphenyl (PCB's), metals and pesticides persist in the environment and accumulate in the flesh of fish. The following table lists the current fish consumption advisories (recommended limitation on the consumption of particular fish species) issued jointly by the Delaware Department of Natural Resources and Environmental Control and the Department of Health and Social Services, as of Spring, 1999.

Delaware Fish Consumption Advisories as of June 1999				
Waterbody	Species	Geographical Extent	Contaminants Of Concern*	Advice
Delaware River	All Finfish	Delaware State Line to the C&D Canal	PCBs, Arsenic, Dioxin, Mercury, Chlorinated Pesticides	No Consumption
Red Lion Creek	All Finfish	Rt 13 to the Delaware River	PCBs, Dioxin	No more than three 8-ounce meals per year
Lower Delaware River and Delaware Bay	Striped Bass, Channel Catfish, White Catfish, American Eel, White Perch	C&D Canal to Delaware Bay Mouth	PCBs, Mercury, Dioxin	No more than one 8-ounce meal per year
Chesapeake & Delaware Canal	All Finfish	Entire Canal in Delaware	PCBs	No Consumption
Appoquinimink River	All Finfish	Tidal Portions	PCBs, Dioxin	No more than one 8-ounce meal per year
Drawyers Creek	All Finfish	Tidal Portions	PCB's DDT	No more than one 8-ounce meal per year
St. Jones River	All Finfish	River Mouth to Silver Lake Dam	PCBs, Dioxin, Mercury, Arsenic	No more than two 8-ounce meals per year
* The pollutant listed first is of the greatest concern in this system.				

General Changes or Trends in Water Quality

As a result of water quality protection programs that are in place in Delaware, in general surface water quality in Delaware's Coastal Zone has remained fairly stable in spite of increasing development and population growth. Impacts to waters are generally the result of past practices or contamination events, activities that are not regulated nor otherwise managed, or changes that are occurring on a larger regional scale. For example, air pollutants from sources outside of Delaware contaminate Delaware's surface waters via rainfall.

Improvements in water quality have been documented in localized areas where point discharges were eliminated or better treatment installed. Basin-wide water quality improvements in waters that are being impacted by historical contamination of unquantified pollution sources are very difficult to detect over a short period of time. Targeted monitoring over long time periods (years) is necessary in order to detect changes.

Although Delaware's surface water quality may not have changed significantly over the last several years, there have been many improvements made in watershed assessment

approaches and methodologies. Additionally, many water quality criteria are stricter as a result of amendments to the State's Water Quality Standards. Therefore, we have become more proficient at identifying water quality problems and, at the same time, are calling for higher quality waters.

The stability of Delaware's surface water quality is likely the result of increased efforts to control both point and nonpoint sources of pollution. In addition to the significant investments in wastewater treatment technologies, many private business interests are investing in practical and cost-effective nonpoint source pollution control practices (Best Management Practices) on farms, residential developments, and commercial and industrial sites. Likewise, public agencies such as the Delaware Department of Transportation are investing revenues in improved storm water management practices and wetlands creation to mitigate the impacts of maintenance and new highway construction activities.

Ground Water Quality

The ground water resources of Delaware are generally abundant and of high quality. Ground water quality can be degraded locally by both natural and man-induced causes. The most common naturally occurring problem is dissolved iron that is derived from iron-containing minerals. Chloride and high-dissolved solids are also found along the coastal area of the Delaware Bay, Inland Bays, and the Atlantic Ocean. These contaminants are also found at varying depths below the land surface within the various aquifers. Man-induced ground water quality problems occur from both point sources and non-point sources of contamination. Generally speaking, nutrient problems are most prevalent in southern Delaware while urban/industrial problems are most prevalent in northern Delaware.

In the Inland Bays region of the Coastal Zone, ground water resources provide all of the drinking water needs in the area as well as other freshwater needs such as irrigation and agriculture. Other than naturally occurring dissolved iron, the most common contaminants are nitrates with the major sources being septic systems, animal operations, and application of fertilizer and manure. Chloride problems remain a concern along the coastal reaches of the Atlantic Ocean and the Inland Bays.

The shallow unconfined aquifers are the most commonly impacted but impacts have also been seen in some deeper aquifers. Dissolved iron is the most common ground water quality problem but is naturally found in various parts of aquifers. The most common man-induced contaminant found in public drinking water systems are nitrates. Nitrates are derived primarily from septic systems and the land application of fertilizer and manure. Levels above 10 milligrams per liter exceed the U.S. EPA maximum contaminant level for public drinking water systems. Other contaminants found in public drinking water system but at very low frequencies are lead (likely the result of old home plumbing), volatile organic compounds, and some pesticides. The Division of Public Health responds to exceedences of drinking water standards by requiring the supply owners reduce contaminant concentrations to below drinking water standards.

Point sources of contamination to ground water include septic systems, petroleum storage tanks, hazardous and solid waste sites, and other regulated sites. Statewide, the largest number of sites are domestic septic systems estimated at 78,000. Over half of these are found in Sussex County. Leaking underground storage tank sites may also be a source of contamination.

State of Delaware Total Maximum Daily Program (TMDL)

Section 303(d) of the Federal Clean Water Act (CWA) requires States to develop a list of water bodies for which existing pollution control activities are not sufficient to attain applicable water quality standards (303(d) list) and to develop total Maximum Daily Loads (TMDLs) for pollutants of concern. A TMDL sets a limit on the amount of a pollutant that can be discharged into a waterbody such that water quality standards are met.

The State of Delaware is operating under a court-approved Consent Decree to establish TMDLs for all impaired streams on the State's 1996 303(d) list by the year 2006. So far, the State has established TMDLs for the following watersheds of the Coastal Zone or a portion thereof:

Appoquinimink River watershed. The TMDL for the Appoquinimink River watershed was established in January 1998. The Appoquinimink River TMDL requires reduction of nutrients and organic loads from point and nonpoint sources in the watershed.

Indian River, Indian River Bay, and Rehoboth Bay. The TMDL for Indian River, Indian River Bay, and Rehoboth Bay was established in December 1998. The TMDL requires systematic elimination of all point sources of nutrients in the sub-basin. Furthermore, it requires that nonpoint sources of nutrients (nitrogen and phosphorous) be reduced by 40 to 85 percent.

In addition to above established TMDLs, Delaware DNREC is planning to develop TMDLs for the Murderkill River Watershed within the next two years.

USDA Conservation Program

The objective of current programs will focus on conservation of soil, water, and related resources, water quality protection and improvement, wetland restoration, protection and creation, and wildlife habitat development and protection. More detail on the programs the USDA sponsors can be obtained by contacting the appropriate USDA agency for more specific information.

WATER USES of DELAWARE RIVER and BAY

The table below depicts the amount of area (in square miles) of the Delaware River and Bay (including the New Jersey portion) that supports the Delaware River and Bay Commission's designated uses. Its important to see that very little of the bay and river are "not supporting".

Individual Use Support Summary 1996-1997
Waterbody: DELAWARE ESTUARY/BAY (zones 5, 6) (in square miles)

Use	Size Assessed	Size Fully Supporting	Size Fully Supporting but Threatened	Size Partially Supporting	Size Not Supporting	Size Not Attainable
Aquatic Life	191	36	96	49	10	0
Fish Consumption	841	0	0	803	38	0
Shellfishing	679	582	0	35	62	0
Swimming	191	191	0	0	0	0
Secondary Contact	191	191	0	0	0	0
Drinking Water	*	*	*	*	*	*
Agricultural	*	*	*	*	*	*
Cultural/Ceremonial	*	*	*	*	*	*

Asterisk (*) = category not applicable

Dash (-) = category applicable, no data available

Zero (0) = category applicable, but size of waters in the category is zero

Historical and Archaeological Sites

Throughout the more than 12,000 years of human history in Delaware, the Coastal Zone has provided a rich source of food and raw materials. Each era of human occupation has left its mark on the landscape in the form of archaeological sites, structures, and buildings. As the environment changed from peri-glacial conditions in Paleo-Indian times to the near-sub-tropical conditions of today, the types of resources changed as well, affecting the nature and location of settlements.

Efforts to identify and inventory these cultural resources have been on going since the 1930's, when avocational archaeologists began maintaining a site inventory, and the first Historic American Building Survey was conducted in the state. These efforts increased dramatically after the passage of the National Historic Preservation Act in 1966. Today, most buildings and structures in the state dating before 1950 have been inventoried. The proportion of archaeological sites that have been identified remains quite small, however, because the identification of such sites is labor-intensive and is usually conducted only in advance of federally funded or permitted projects.

Because of the nature of the Cultural Resources Survey inventory maintained by the Delaware State Historic Preservation Office, it is difficult to determine the number of inventoried cultural resources within the coastal zone as defined for this report. Some indication of the resource base can, however, be obtained from a report prepared by the Division of Parks and Recreation's Cultural Heritage Program in 1994. This report lists resources within 100 meters (325 ft.) of the marsh/stream boundary, and was designed to identify resources that might be affected by an oil spill or by the mobilization of efforts to control the spill. The inventory is now available in ArcInfo format. The table below summarizes cultural resources information available for this narrow zone within Delaware's coastal zone.

Property Type	Number	National Register Eligible	Not Eligible	Not Evaluated
Prehistoric sites	515	30	41	444
Historic sites	51	8	2	41
Historic buildings*	182	6		14
Historic districts	24	19		5
Historic structures	72	19	24	29
Historic objects	24	1		23
Totals	868	83	67	556

* Most historic buildings are included within districts and are not reflected in this number.

This table suggests that several thousands of historic sites, buildings, districts, structures, and objects are present within the larger area designated as Delaware’s Coastal Zone. Few have been evaluated for significance or studied in detail. Many prehistoric and historic period archaeological sites remain unidentified. At the same time, the pace of development within the Coastal Zone ensures that many of these cultural resources will be destroyed in the near future.

Living Resources/Rare & Endangered Species

Living Resources

The Coastal Zone, including the Chesapeake & Delaware Canal and the inland bays contains approximately 273,000 acres of land. Excluding open water portions within this area, approximately 232,000 acres of wetlands and uplands are found within the Coastal Zone (CZ). In 1990, the Delaware Open Space Program identified sixty-one percent of this figure, or 142,000 acres for protection in nine different coastal State Resource Areas (SRAs). In New Castle County this acreage includes the Upper & Lower Delaware River SRAs, as well as the Chesapeake & Delaware Canal SRA. Kent County includes Bombay Hook, St. Jones River, and Milford Neck SRAs. Sussex County includes Prime Hook, Cape Henlopen, and the Inland Bays SRAs. Of the 142,235 acres identified for protection, 83,561 acres within the SRAs are already 'protected' to date. Protected land is defined as property managed by a federal, state, or non-governmental conservation organization. The following organizations manage the majority of these lands within the CZ:

United States Fish & Wildlife Service	25,679 acres
Delaware Division of Fish & Wildlife	35,183 acres
Delaware Division of Parks & Recreation	10,472 acres
Delaware Wild Lands, Inc.	7,879 acres
The Nature Conservancy	3,476 acres

Approximately half (71,861) of the 142,000 acres identified for protection by the Open Space Program (which can include agricultural fields for example) have also been included in the Delaware Natural Areas Inventory. Of this total, 637 acres of land within the CZ have been dedicated as State Nature Preserves, the highest level of land protection available in Delaware, including 260 acres not managed by the previously listed organizations.

This leaves approximately 41% of the land identified for protection by the Open Space Program as 'unprotected', which is defined as privately held land not designated for conservation (58,700 acres). These areas include approximately 13,500 acres in New Castle County located in the Dragon Run, Thousand Acre Marsh, Augustine Creek, Silver Run, Appoquinimink River, Blackbird Creek, and Cedar Swamp areas. Approximately 10,000 acres in Kent County are found in the Bombay Hook, Little Creek, and St Jones areas. Kent County also shares an additional 20,000 acres with Sussex County in the Milford Neck, Mispillion River and Cedar Creek areas. Sussex County also has an additional 11,000 acres along the Broadkill River, Cape Henlopen and Inland Bays vicinities in the CZ. The remainder of the Coastal Zone, approximately 90,000 acres, is currently not identified for any type of protection. This is 39% of the total acreage identified within the CZ.

Coastal Zone Habitat for Living Resources

Habitat is the arrangement of food, water, shelter or cover, and space suitable to a living organism's needs. Open water habitats encompasses approximately 41,000 acres within the CZ. Wetlands, especially tidal marshes, form the largest percentage of the remaining 232,000 acres of habitat. Freshwater wetlands and upland forests comprise a much smaller portion of the remaining natural areas. The majority of the upland habitat within the CZ has been converted to agricultural uses.

The living resources, the plants and animals living in, on, and around the CZ range from microscopic plankton, to mosquitoes and dragonflies, oysters, crabs and ducks, and to the oak and tulip trees lining the banks of freshwater inland streams. Over 200 species of fish use the Delaware Estuary and are in some way dependent upon the food and cover it provides. The CZ is also a major staging area for migrant shorebirds, which gorge on horseshoe crab eggs in late May every year. This zone is also an important resource for breeding Black Duck, and thousands of over-wintering waterfowl. Current protection efforts have successfully protected the majority of the coastal tidal wetlands within the CZ. This zone is also a major migratory route for raptors (hawks, eagles, falcons and owls) and other bird species

Rare & Endangered Species Within the Coastal Zone

The Delaware Natural Heritage Program (DNHP) has identified 602 element occurrences of rare (to Delaware) plants, animals and plant communities within the Coastal Zone. The animal list includes:

- 1) 41 species of rare birds, many which breed (or recently bred) in localized areas within the CZ. This list includes Black Rail, Sharp-tailed Sparrow, Sedge Wren, Piping Plover, Least Bittern, Forster's Tern, American Oystercatcher, Short-eared Owl and Bald Eagle.
- 2) 7 rare reptile species, including queen snake, milk snake, and eastern ribbon snake.
- 3) 5 rare fish species; including black-banded sunfish, four-spined sticklebacks and the comely shiner.
- 4) 20 invertebrate species; including 4 tiger beetles, 8 dragonflies and damselflies, 7 butterflies and skippers, and one firefly.
- 5) 1 mammal species; the Delmarva fox squirrel; and
- 6) 4 amphibian species; carpenter frog, Cope's gray treefrog, and 2 salamanders.

The rare and endangered plant list includes 147 different rare species found within the CZ. Sixty-five plant records are found in upland communities, 42 plant records in tidal communities and 202 non-tidal wetland plant records. Many of these rare species sites are found in the 29 various uncommon to rare plant communities the DNHP has identified in the CZ to date, many which support rare animal species as well. Examples of these rare communities include interdunal swales, coastal plain ponds and beach grass dune communities. In the Coastal Zone, 86% of the rare plants are found in upland or non-tidal freshwater wetland habitats. Only 14% of the rare plant locations are in located the tidal areas. Many rare (to Delaware) animal species, including all the amphibians, reptiles, most invertebrates and various birds, are also found in these upland and freshwater wetlands. This is significant because most of the 'protected' lands within the CZ are tidal wetlands, which support the lowest number of rare species. In addition, almost all of the land remaining within the SRAs to be acquired is upstream of these tidal wetlands. Another problem is that the CZ boundary cuts off all of the headwaters of the streams that flow into the tidal marshes. These habitats have not been considered in this analysis, although they are critical to the overall health of the CZ and the Delaware Estuary.

BIODIVERSITY

According to the Environmental Law Institute Research Report, of 1999, "Protecting Delaware's Natural Heritage", biodiversity is the variety of life and its processes. This includes the varieties of living organisms, the genetic differences among them and the communities and ecosystems in which they occur. Concern for biological diversity, or biodiversity, requires the conservation and/or restoration of landscapes, native plant and animal species and the protection of the remaining healthy diverse genetic stocks within species. To better protect the biodiversity of Delaware's Coastal Zone, the remaining plants, animals and ecosystems must be conserved or restored on both public and private lands.

The Coastal Zone Act clearly states in its Purpose Sections (7001) that the "...coastal areas of Delaware are the most critical areas for the future of the State in terms of the quality of life..." The Act seeks to control "...the location, extent and type of industrial development in Delaware's Coastal areas", so that "...the State can better protect the natural environment of its bay and coastal areas and safeguard their use primarily for recreation and tourism." Clearly this law is intended to protect the biodiversity of the Coastal Zone. However, this law only regulates industrial development, including offshore bulk product transfer facilities (except at the Port of Wilmington.)

The Coastal Zone, like all of Delaware, has seen a reduction in biodiversity. The natural environment today is more fragmented than it was in 1971. This degradation in the Coastal Zone is due mainly to suburban sprawl in New Castle County and second home development with its accompanying commercial sprawl around the Inland Bays of Sussex County. The Route 1 area between Lewes and Rehoboth is typical. Also, the area around Ocean View and Millville is moving rapidly from farmland and forest land to housing and commercial land uses.

The State is working towards establishing environmental indicators. These indicators will better depict the loss of natural habitat to other uses. These environmental indicators should be in place before the next Coastal Zone Assessment Report, in May of 2002.

LAND USE/COVER

The land use/cover within the Coastal Zone (not including the Delaware River and Bay) contains a wide variety of activities. The recreation and beach areas of Sussex County to the heavy industries of New Castle offer the two extremes of land uses in the Coastal Zone. However, even in New Castle County, only about 2,000 acres or 3.5% of the land is in heavy industry uses.

As mentioned in the Living Resources section, much of the land in the Coastal Zone consists of wetlands. The two largest land covers are agriculture and wetlands. Please refer to the following land use/cover tables for more detailed information by county regarding land use/cover in the Coastal Zone.

New Castle CZ Landuse/Landcover

Class	Total Acres	Percent Acres
Agriculture	18132.3726	30.21%
Barren Lands	2854.1152	4.76%
Commercial	734.8696	1.22%
Forestland	5822.5142000000	9.70%
Industrial	2090.3839	3.48%
Institutional/Gov.	225.1746	0.38%
Mixed urban or Built-Up land	407.6011	0.68%
Other urban or Built-Up land	1255.8233	2.09%
Rangeland	2154.0869	3.59%
Recreational	358.0015	0.60%
Residential	4168.0382	6.95%
Transportation/Communication	1094.6517	1.82%
Utilities	408.7041	0.68%
Water	4538.5937	7.56%
Wetlands	15769.5699	26.28%
GRAND TOTAL	60014.5005	100%

Kent CZ Landuse/Landcover

Class	Total Acres	Percent Acres
Agriculture	23597.3319	29.78%
Barren Lands	128.4787	0.16%
Commercial	41.3088	0.05%
Forestland	5079.0568	6.41%
Industrial	16.4205	0.02%
Mixed urban or Built-Up land	61.7795	0.08%
Other urban or Built-Up land	274.6937	0.35%
Rangeland	296.17	0.37%
Recreational	28.9474	0.04%
Residential	1489.2044	1.88%
Transportation/Communication	278.9438	0.35%
Utilities	72.2258	0.09%
Water	5337.5588	6.74%
Wetlands	42534.4625	53.68%
GRAND TOTAL	79236.5826	100%

Sussex CZ Landuse/Landcover

Class	Total Acres	Percent Acres
Agriculture	34044.16	25.84%
Barren Lands	3485.383	2.65%
Commercial	1201.238	0.91%
Forestland	15255.99	11.58%
Industrial	157.9616	0.12%
Institutional/Government	431.218	0.33%
Mixed urban or Built-Up land	944.3987	0.72%
Other urban or Built-Up land	416.9083	0.32%
Rangeland	1229.235	0.93%
Recreational	1129.007	0.86%
Residential	15832.89	12.02%
Transportation/Communication	688.0709	0.52%
Utilities	310.3748	0.24%
Water	25185.82	19.12%
Wetlands	31418.06	23.85%
GRAND TOTAL	131731	100%

COASTAL ZONE DECISIONS SINCE MAY 1999

The following is a listing of Coastal Zone decisions since May of 1999 when the "Regulations Governing Delaware's Coastal Zone" became effective.

1. Johnson Controls Interiors LLC of Michigan; CZA Project No. 322SD:
The company submitted a request for a Coastal Zone Status Decision on December 6, 1999. The company needed to know its status under the Act and new Regulations concerning an upcoming expansion of their automotive interior component facility at 600 Centerpoint Boulevard in New Castle. After a thorough review, the Secretary decided on January 13, 2000, that the project as proposed due to the new solid waste to be generated would require a Coastal Zone Act Permit. No appeal was received against this decision.
2. Conectiv Energy, Inc; CZA Project No. 323P:
The company filed for a Coastal Zone Permit on February 29, 2000 for approval of 550 megawatts of new electric generating capacity at the Hay Road facility. These new combustion turbines would be constructed in Phase I. In Phase II, one additional generator powered by steam generated by waste heat from the new combustion turbines would be added. The fuel for the combustion turbine is to be mainly natural gas from existing nearby gas pipelines. The three new combustion turbines will generate new air emissions. To comply with the Regulations, the applicant plans on providing emission reduction from the existing power generating facilities at Hay Road. Part of the emission reductions will come from retrofitting the older equipment with more modern equipment and switching some fuels from oil to natural gas. The company experienced difficulty in making this application acceptable to the U.S. EPA. The application was withdrawn on July 6, 2000.
3. Johnson Controls Interiors, LLC of Michigan; CZA Permit 324P:
On March 22, 2000, Johnson Controls Interiors applied for a Coastal Zone Act Permit. This application is in response to the Secretary's status decision of January 12, 2000 (CZA Project Number 322SD). The company applied for the CZA Permit to raise production to 1.90 million automotive components per year at 600 Centerpoint Boulevard in New Castle. The production will significantly increase their production of solid waste. The company's Offset Proposal is to have 149% of the new solid waste (with some previously approved waste) shipped out of the Coastal Zone for reprocessing/recycling or disposal. The hearing was conducted, May 23, 2000. No decision has yet been rendered. On June 20, 2000, the Secretary granted the CZA Permit with the offset proposal as a special condition of the Permit. No appeal was received against this decision.
4. The Diamond State Port Corporation; CZA Project No. 325SD:
This corporation also known as the Port of Wilmington submitted a Request for a Coastal Zone Status Decision on April 5, 2000. The corporation is seeking approval under the Coastal Zone Act to construct and utilize a new pier/dock at the port into the Delaware River. This new pier/dock will be used to transfer new cars on and off large ships. Other non-bulk products, such as steel, may also move over this dock. Since this is a status determination application, no hearing will be held. No decision has been rendered as of May 15, 2000. On April 25, the Secretary declared the application to be administratively complete. The Secretary decided on May 24, 2000 that this proposed activity at the port is not regulated by the Coastal Zone Act. No appeal was filed against this decision.

5. Carlyle Cocoa, LLC; CZA Project No. 325P:
On May 15, 2000, the DNREC received an application for a Coastal Zone Act Permit from Carlyle Cocoa Company, LLC. The company is seeking the permit to install a cocoa food manufacturing facility within the Delaware River Industrial Park near the Port. The facility plans to use about 20,000 square feet of space in an existing building. Emission will be minimal with about 14 pounds per day of cocoa dust and fumes from a small gas-fueled dryer with some wastewater and solid waste. The applicant's Offset Proposal consisted of planting 150 white pine trees and financing an energy conservation project at a public school in New Castle. A public hearing was conducted on July 31, 2000. On August 22, 2000, the DNREC Secretary granted the CZA Permit with the Offset Proposal as a special condition. No appeal was received.

6. Conectiv Energy, Inc. CZA Project No. 327P:
This is the same project as No. 2 on the preceding page. However, modifications have been made to comply with EPA technology issues. DNREC considered this application to be administratively complete on August 10, 2000. A combined Air Resources and Coastal Zone Permit public hearing was conducted on September 6, 2000 at the Department's office on Lukens Drive. On October 17, 2000, the DNREC Secretary granted Conectiv Energy the Coastal Zone Act Permit, which includes the required environmental offsets.

CONCLUSION

The quality of Delaware's Coastal Zone is generally good in most respects. However, notable problems exist with air quality, primarily ozone pollution. The water quality of the Inland Bays has deteriorated since 1971. Biodiversity has diminished due to the fragmentation of the natural environment. All three of the above problems are largely due to the sharp rise in suburban sprawl (including increased automobile usage.) Perhaps the state needs to consider more State-level land use controls to reduce or better direct the new growth-taking place in New Castle and Sussex Counties portions of the Coastal Zone. The Act and its new regulations have worked well to protect the Coastal Zone from industrial land uses. No new heavy industries have settled along the coast since 1971. All new or expanding (existing) manufacturing uses must acquire a Coastal Zone Act Permit. These permits for manufacturing facilities now require a net reduction of emissions from the Applicant, thus slowly reducing the emissions to the natural environment while allowing for some new economic growth in the Coastal Zone. Unfortunately, the Act does not address other land use issues such as suburban sprawl, which appears to be rapidly degrading the natural habitats of the Coastal Zone. Other State and/or county land use laws, regulations or comprehensive land use plans should address this issue directly.