**Pennsylvania’s Conservation History**

**A Historical Framework**

**With Nature at its Core: Pre-history to 1750**

Settlers’ relationship with natural resources has been central from pre-history to modern times in Pennsylvania. Archaeological evidence documents the existence of a variety of groups within the Commonwealth as far back as 12,000 years. Over this vast expanse of time, Indian cultures developed and diversified in countless ways as they adapted to the landscape they inhabited. Prior to the arrival of European settlers, Indians were a dynamic collection of distinctive cultural groups who protected and used natural resources for subsistence. As historians and archaeologists have documented, little was wasted by such peoples. Their well-being was concomitant with the well-being and abundance of the natural environment,

A frontier ethos defined much of Pennsylvania’s early history. As the colonial population around them grew, many Indians in eastern Pennsylvania moved west into the Susquehanna, Allegheny, and Ohio Valleys, where they established new communities of mixed tribal affiliations including the Delaware, Shawnee, Iroquois, and others. As European settlement expanded and the fur trade moved westward, hybrid Indian communities, such as at Conestoga Indian Town and areas around modern day Shamokin became centers of native and non-native cultures. Within 50-years of William Penn’s settlement of Penn’s Woods in 1681, however, the transition from Native control of the Commonwealth was solidified by the 1737 “Walking Purchase,” in which the Penn family and the Lenape established the less-than-accurate boundaries that defined land transfers to new settlers.

Even with the development of roads and the use of rivers, the Appalachian Mountains remained a major obstacle for new settlers who wanted to move inland. Colonists and the British Crown built roads and, eventually, seized interior waterways such as the Mississippi River. The French and Indian War – sometimes referred to as the Seven Years War, 1754-63 –expanded the British Crown’s control over the New World that included Pennsylvania.

One major objective of the British in this conflict was to take Fort Duquesne, located at the forks of the Ohio River (the modern-day the site of Pittsburgh). To do as such, the British had to get troops and supplies over the Appalachian Mountains and this meant building the first major road to the west. Braddock’s Road (in honor of British General Braddock). Over time, the federal government realized that old military roads were inadequate for the number of people and goods that traversed them. A “National Road” that would be a primary trade network for the entire Mid-Atlantic region was constructed.

Following the American Revolution the development of new transportation and trade networks were vital. Roads in and prior to the 1700s consisted of primitive paths and trails made by early settlers and Indians. By the early 19th century transportation expanded to include wagon trails, toll roads or “turnpikes,” narrow mountain passages and canals. The majority of these roads and paths were built using private funds and were cleared and constructed by hand.

 In addition to the impact of roadways and the expansion of Colonial and Early Republic settlement on the environment, oil, land and coal speculation dawned that would forever change Pennsylvania’s landscape. The iron industry had a major impact on the environment as forests were cleared and iron ore was mined. Early conservationists raised concerns about the impact of textile manufacturing on waterways especially in Philadelphia. To ensure adequate water supply to Philadelphians, the Philadelphia Water Works was constructed.

 Moreover, key individuals such as John Bartram influenced Thomas Jefferson who sent Meriwether Lewis to study with him before he and William Clark launched the white man’s first major exploration of the American continent in 1803. Their mission resulted in the Louisiana Purchase which greatly expanded the nation’s land holdings. Lewis and Clark also identified new species, waterways, forests, and natural features previously known only to Native Americans. The expedition further exposed the white man to Indian tribes and their lifeways such as the Shoshone and Mandan. Moreover, a path to the Pacific Ocean was mapped for the first time in the new nation’s history. Meriwether Lewis (who studied with Bartram) and William Clark documented native species and created and mapped inland routes. Like Lewis and Clark, John James Audubon document native species focusing specifically on birds and his work gave birth to an organization bearing his name in 1905 whose mission was and is to conserve and restore natural ecosystems. And, organizations like the American Philosophical Society and the nation’s first natural history museum were founded in the Commonwealth to promote scholarship and develop and preserve natural history collections.

 Conservation and environmental stewardship, though somewhat archaic at the time, but began to grow in importance and would further develop as the 18th and 19th centuries progressed.

**The Colonial Period to the New Republic**

**1750 to 1850**

From the late 18th to the mid-19th century, some national leaders were committed to highlighting the natural splendor that distinguished the United States from Europe. Chronicling North America’s natural environment and natural history became an effort of science and patriotism. For example, Charles Wilson Peale worked with the Philosophical Society of Philadelphia in 1784 (later the American Philosophical Society) to establish the first natural history museum in the country. Using scientific methods to better understand North America’s environment, Peale’s large-scale excavation of a Mastodon skeleton in New York State in the late 1700s resulted in a major exhibit at the Pennsylvania State House (Independence Hall) in Philadelphia. Peale’s passion for natural history inspired John James Audubon of Mill Grove (near Philadelphia) who began using his painting talents to artistically depict each species of bird that he could find (and kill) in North America. His book, *The Birds of North America* was first published in 1824.

The American tradition in nature writing grew out of the efforts of other residents of Philadelphia such as John Bartram and his third son William. Keeping journals during their extensive travels throughout the southeastern U.S., the Bartrams gave many American and European readers their first exposure to the details of American nature and wilderness. Most of their expeditions took place in the late 1700s and their publications inspired writers who followed during the 1800s including Henry David Thoreau, Ralph Waldo Emerson and John Muir.

Although the details of his exploration brought new understanding and appreciation to his readers, the real value of Bartram’s accounts resulted in the development of aesthetic appreciation of the nature. For instance, John is given credit, for being the first naturalist to use the term "sublime" to describe nature. Sublimity valued nature for completely non-utilitarian reasons. John’s description of a mountain thunderstorm in Rabun County, Georgia, near the North Carolina border, provides a good example:

It was now afternoon; I approached a charming vale, amidst sublimely high forests, awful shades! Darkness gathers around, far distant thunder rolls over the trembling hills; the black clouds with august majesty and power, moves slowly forwards, shading regions of towering hills, and threatening all the destructions of a thunderstorm. All around is now still as death, not a whisper is heard, but a total inactivity and silence seems to pervade the earth…the face of the earth is obscured by the deluges descending from the firmament, and I am deafened by the din of thunder; the tempestuous scene damps my spirits, and my horse sinks under me at the tremendous peals, as I hasten for the plain.

 Accounts such as this one formed the foundation of American Romanticism, which took shape in the early-to-mid-1800s. Bartram also wrote about the great virtues of Native peoples with whom he had contact, particularly their relationship with and appreciation of natural surroundings. The writings of such as Emerson and Thoreau followed a similar pattern. And, the interest and tradition of natural history was extended through the aesthetic appreciation of oil paintings by the artists of New York’s Hudson River School including Thomas Cole and others.

 Clearly, some 19th-century Americans were capable of appreciating nature for nature’s sake. Conservation was important though perhaps not fully understood in everyday terms. And, the expansion of knowledge regarding species, water and forest resources and the land, though in its infancy, was to become part of America’s scientific and learned culture. Scholars, naturalists, scientists and explorers began to better understand the new nation’s natural environment.

This would soon change, however. As mid-century approached the natural environment was seen by some for its financial value as capitalists and investors learned that Pennsylvania’s forests and deposits of coal, to name a few, could be exploited for profits. The greatest industrial expansion that the world had ever seen was on the doorstop of the United States just prior to the American Civil War. Pennsylvania’s natural resources fueled this industrial growth.

**Conservation Features, Events,**

**Organizations and Influential Individuals**

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| TIME PERIOD: Pre-history, Colonial Era and New Republic, 1750-1850 | Land | Air | Water | Flora | FaunaWildlife | Natural Resource | Other . . . |
| People  | John Chap-man;coal, oil and land specu- lators; Lewis & Clark |   | Benja-min Latrobe | Bartram;Audu-bon;Charles Wilson Peale |   | Samuel Halderman;Iron Masters | Audubon Caitlin;De Toc-Ville;Benja-minFranklin |
| Places  | Forbes and Brad--dock Roads |   | Phila. Water Works; Textile Mills and impact on water |   |   | Iron Furnace Sites; Hopewell, Cornwall and Pine Grove FurnaceSeven Years War forts | Anthra-cite region; - Bitumin-ous mining areas |
| Events  | Walk-ing Pur-Hase;Seven Years War; Lewis & ClarkExped-ition  | Yel-low Fever  | Building of  Canals | Year without SummerPub of Birds of America |   | Growth of iron & coal industries; War of 1812 |   |
| Organiza-tions |  |   |   |   |   | Natural History Museum;Historical Society of PA;American Philosoph-ical Society |   |
| Gov’t  | Map- ping of PA  |  | Mainline & other canals |   |   | Case law related to natural resources  |   |
| Other. . .  | Lewis & Clark Exped- ition  |   |   | Shift to new crops |   | Shift to market-based farming | West- ward Expan- sion |

**Nineteenth Century Industrial Expansion**

 The natural environment became a commodity during the era of Pennsylvania’s industrial ascension from 1850-1900. Timber, coal and oil are prime examples of resources that were essential to industrialization. All were found in Pennsylvania and the Commonwealth attracted capital investors, entrepreneurs, workers, and immigrants.

 Initially, industrialization can be traced to iron plantations. Many of these iron furnaces were built west and north of Philadelphia. Sites such as Hopewell and Cornwall, Pennsylvania, possessed each of the raw materials needed to produce iron --ore, limestone, and hardwood forests for charcoal. Roads and, eventually, state government funded canals were constructed and became essential for the distribution of iron products. The best known of these was the publicly financed Main Line Canal which completed by 1834. Passage across the Allegheny Mountains posed a challenge requiring inclined planes on which canal boats were hoisted on rails, making the system unusually expensive. Iron, coal, lumber and other materials were traded across the Alleghenies which made trade viable between Philadelphia and the Ohio River basin.

The American industrial revolution was also fueled by the extraction of fossil fuels, especially coal. And, it was to be found in abundance in the Commonwealth. Northeastern Pennsylvania had the largest anthracite (hard coal) deposit in the Western Hemisphere. Large deposits of bituminous coal were to be found in Western Pennsylvania. To extract coal, tens of thousands of miners and mineworkers , first from the British Isles and then from Eastern and Southern Europe, poured into Pennsylvania and provided the labor for what became one of the state's largest, most profitable, most dangerous and violent industries.

In the mid-to-late 19th century, the extraction of petroleum in Western Pennsylvania mirrored anthracite in terms of capital investment, technology and the attraction of workers. From the initial well that was struck in 1859 by Colonel Edwin Drake at Titusville, petroleum development boomed through the 1870s. Like coal, oil had an immeasurable impact on industrialization. Pennsylvania’s crude oil industry became especially prominent when John D. Rockefeller, Sr. and his Standard Oil Trust monopolized oil extraction in the Commonwealth.

With regard to extractive industries, periods of expansion often proceeded unfettered until efforts to regulate price, supply and worker safety began to replace laissez-faire policies. For this reason, just as the Commonwealth led the nation into the industrial era, Pennsylvania also can be credited with some of the first efforts to create statutes, regulations and public policies to curb the negative side effects of industrial development. Often these new regulations resulted in specific events that alerted the public to problems. Government was not proactive. It was reactive.

For example, the most deadly of the state's coal mining calamities occurred at the Avondale Colliery in Luzerne County in 1869. The Steuben Coal Company had constructed a breaker directly above the single shaft entrance to the mine. Like other mining companies at that time, it kept small fires burning at the bottom of shaft to create drafts that enabled air circulation in the mine. Sparks from the Avondale ventilating furnace set fire to the timbers in the shaft and the flames engulfed the breaker at the surface - the only exit for those underground. The fire devoured oxygen and collapsed the breaker into the shaft. All told, the fire had asphyxiated 108 men and boys.

In response, in 1870 the state legislature enacted the Anthracite Mine Ventilation Law. The law regulated air currents and movement in mines, forbade the use of a single airway for oxygen intake and exhaust and required the division of mines at each level with each area receiving a separate air current regulated by airlocks and doors. In the decades that followed, however, coal companies continued to ignore safety measures and mineworkers' calls for reform. And, mining’s impact on the environment was largely ignored. “Culm” or coal waste banks dotted the Anthracite and Bituminous coal regions, forests were cleared to provide timbers for coal mines and acid mine drainage polluted waterways.

 After the massive deforestation that supported 19th century industry, reformers also created some of the earliest efforts in the U.S. to conserve forests. Leading these reform efforts was Joseph Rothrock, a botanist and physician who served as the first president of the Pennsylvania Forestry Association, which was created in 1886 to promote conservation and, later, to support the creation of state parks and forests. With the support of Andre Michaux, a French nobleman who had traveled in the Commonwealth in the early 1800s, Rothrock created a special lectureship program in forestry at Penn State University starting in 1877. He headed Penn State’s school of forestry at Mont Alto and in, 1895, he became the Commonwealth's first commissioner of forestry.

Soon thereafter state government began purchasing lands. The Forestry Commission worked with governors and the General Assembly to implement some of the ideas put forth in the 1895 “Report of the Forest Commission of Pennsylvania.” Fire control, scientific management and the need for a system for educating foresters and for creating and maintaining forest reserves were some of the cutting-edge concepts included in the report.

And, Pennsylvania was the first state in the nation to establish a state agency to protect fish. The Pennsylvania Board of Fish Commissioners was established in 1866 to reintroduce native species that had been depleted, report on waterway pollution, and regulate both industrial and individual fishing. Similarly, the Pennsylvania Game Commission was created in 1895 largely out of the General Assembly’s concerns regarding protecting and regulating the taking of game.

As a result of the negative environmental impacts of industrialization, 19th century conservation efforts were evident in the work of specific individuals, institutions and state government. Much work remained to be done, however.

**Conservation** **Features, Events,**

**Organizations and Influential Individuals**

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| TIME PERIOD: 1850-1900Industriali-zation | Land | Air | Water | Flora | Fauna | Natural Resource | Larger Impact |
| People  | Joseph Roth;rock |   |   | Spencer Baird | Spencer Baird | Edwin Drake;Edward Kalbfus;John D. Rocke-feller; Andrew Carnegie. | Popula-tion growth; logging, coal & natural gas boom |
| Places  | Valley Forge State Park | Poll-ution from indus-trializ-ation | Canals; pollu- tion fromIndus-trializ-ation |  |  | Timber, coal and natural gasimpact.  | Gettys-burg historic site; federal preser-vation efforts |
| Events  | Mich-aux lectureseries |   | Floods | Preser-vation of white tailed deer, elk, fish birds |   | Avondale & Twin Shafts mine disasters;Other mining disasters  |   |
| Organiza-tions | PSU; Merrill Land Grant Act. |   |  | PA Fores-try Assoc;South Fork Hunt-ing and Rod Club. |   | Fairmount Park Comm.PA Academy of Natural Sciences | PA Rail-road;Mining & oil cartels..  |
| Gov’t  |  |   | Fish Comm | Game Comm |   | First Geologic Survey; state and federal forestry preser-vation efforts. | Dept. of Interior;PA Game and Fish Comm.  |
| Other. . .  |   |   |   | Extinc-tion sssues |   |   |  Westward Expansion |

**The Progressive and New Deal Eras**

**1900-1945**

 The laissez-faire approach to industrial development was slowly reigned-in between 1900-45. The Progressive Era (1900-1920) increased government involvement and oversight in a variety of arenas such as workplace safety, food inspection, child labor, regulation of interstate commerce, banking and finance, and anti-trust enforcement. Agencies such as the U.S. Department of Labor and the Pennsylvania Department of Labor and Industry were created to ensure workplace safety and eradicate child labor. And, federal and state government s began to implement numerous statues, regulations and policies to counter the exploitation of the environment.

Federal conservation efforts took root early in the 20th century. The best-known historian of conservation in this era, Sam Hays (who taught at the University of Pittsburgh) describes these social changes when he writes:

The broader significance of the conservation movement stemmed from the role it played in the transformation of a decentralized, nontechnical, loosely organized society, where waste and inefficiency ran rampant, into a highly organized, technical and centrally planned and directed social organization which could meet a complex world with efficiency and purpose.

The impulse to control the waste of resources and pollution rapidly became an expression for Americans' unique connection to the land.

The earliest interest in environmental policy grew out of wealthy urbanites of the Gilded Age (1880-1900) who often combined an interest in hunting and fishing with efforts to maintain recreational sites. Hunting “parks” became popular attractions in Pennsylvania, (including Blooming Grove Park) while national figures such as President Theodore Roosevelt forged a clear conception of conservation during the Progress Era. Working with individuals such as Pennsylvanian Gifford Pinchot, Roosevelt galvanized public interest to support the establishment of national forests and national parks to forever protect large tracts of land from development and commercial encroachment.

Preservation and conservation became the mantras. Preservationists used the American Antiquities Act to create national parks and monuments, which came under National Park Service. And, with regard to conservation, federal policy dictated the creation of national forests such as the Allegheny National Forest in which the cutting of timber would be managed and monitored by trained foresters.

 The mark of an ascendant society, Progressives argued, was the awareness of limits of natural resources and the use of the government to manage resources that were in danger of exhaustion. Forest resources would be of particular concern to Pinchot. The first practicing American forester, Pinchot urged Americans to restrain from exploiting forests. Unlike the European model, Pinchot argued that forests needed to be managed much like crops on a farm and that the nation needed to set aside massive tracks of forest for conservation. Pinchot brought these ideas from the national level to the state during his terms as Governor, from 1923 to 1927 and again from 1931 to 1935.

 In addition, early conservationists emphasized wildlife management. Pennsylvania’s General Assembly and Governor enacted stricter wildlife-protection laws and better enforced those that were already in place. During the late 19th and early 20th centuries the state Game Commission reintroduced elk from Wyoming, beaver from Canada, white-tailed deer from Michigan, cottontail rabbits from Kansas and Missouri and quail from Mexico. And, by the 1920s the Pennsylvania Fish Commission stocked the state's streams with shad and other types of fish.

 J. Horace McFarland emerged as another leader of the American horticulture and preservation movements. His work and efforts resulted in the “City Beautiful Movement” that included urban planning and the preservation of threatened urban resources such as trees). Based in Harrisburg, McFarland joined with Myra Lloyd Dock to lobby city governments to enact nuisance laws and pollution ordinances. Dock served as a Pennsylvania State Forest commissioner and equated outdoor recreation with “physical vigor, mental acuity, and emotional health. “ She wrote, “We need not only playgrounds and parks, but we need woods. Both McFarland and Dock were leaders among progressives who believed that the conservation of natural resources was essential to human welfare.

Experts from a variety of fields began to ask new questions and raise concerns about industrialization. For instance, the sociologists working for the Russell Sage Foundation issued the seminal “Pittsburgh Survey” of 1910 that remains one of the most significant studies of the impact of industrialization on human welfare and the natural environment. For instance, a portion reads:

In Pittsburgh, center of thousands of industrial establishments, there was during the year of the Survey no office of the state government charged with the supervision of these industries, and the number of inspectors was sadly insufficient. Industrial work and environment must induce health and not disease if the future shall justify us in employing women in factories. Processes can be made harmless if we work at the problem long enough; workrooms can be made wholesome, speed cut short before the point of depletion.

The findings of the Pittsburgh Survey remain one of the best representations of the ills of unregulated industrialization. As an international hub for steel and iron manufacturing, Pittsburgh was one of the world’s most polluted cities. This study was an important step in the efforts of reformers to help make everyday life in American cities safer and cleaner from the environmental hazards generated from steel, coal and factory production. While soot and air and water pollution had long been considered as a nuisance, the Survey and other studies directly connected it with human health. The connection between industrial pollution and human health became another dimension of conservation and modern environmentalism during the early 20th century resulting in new public policies such as the 1923 Purities of Water Act.

 Franklin Roosevelt’s New Deal expanded the conservation agenda nationally and in Pennsylvania. By September 1933, eighty-eight Civilian Conservation Corps (CCC) camps employed thousands of workers primarily in state and national forests and parks. Overwhelmingly white, young men from a variety of states, the CCC workers built new roads, fire towers, picnic sites, trails, reservoirs, and phone lines while also planting millions of trees. Other New Deal initiatives in the Commonwealth included soil conservation and agricultural extension programs and federal aid for forest conservation. An active approach to conserving natural resources reached new heights as World War II approached.

**Conservation** **Features, Events,**

**Organizations and Influential Individuals**

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| TIME PERIOD: 1900-1945/50Progressive and New Deal eras | Land | Air | Water | Flora | Fauna | Natural Resource | Larger Impact |
| People  |  | Air Pollu-tion impact on humanhealth. |   |   |   |  | Pinchot; McFar-land; Dock; Ralph Brock; T. Roosevelt;FDR. |
| Places  | Alleg- heny Natl Forest; Natl. Parks; Natl. and State Forests. | Mon ValleyAir Qua-lity studies | Wild-wood/River-front parksHBG. | Bloom-ing Grove. | Bloom-ing Grove. | Mont Alto School of Forestry | Fallng-water; Building of Pinchot Roads, Lincoln Highway&4-lane highways. |
| Events  |  |   | Pitts-burgh Typhoid Epidem-ic; flood-ing.  |   |   | Gypsy moth intro-duction; mine disasters. | PGH Survey;Rural Electrifica-tion. |
| Organiza-tions |   | PGH Smoke Com-msion. | Izaak Walton League. | Hawk Mt;PA Fed. Sports-man’s Clubs. | Hawk MtPA Fed. of Sports-man’s Clubs. |  CCC;Alpine Club;PA Fed of Women’s Clubs. |  |
| Gov’t  | Soil Conser-vation. CorpsSurface Mining Act |   | Purity of Waters Act;Clean Streams Act; Shad restor-ation.  | Near extinct-tion of passen-ger pigeon;Migra-tory Bird Act;Lacey Act;Pipman Robin-son Act;US Fish and Wildlife Service. |   |  | Federal & state regulatory agencies; State Forestry Comm; American Antiq-uities Act;PA Turn-pike. |
| Other. . .  |   |   | Gazeteer of Streams |   |   |  | Beginning of Suburban Develop-ment; PGH Survey. |

**The Era of Public Policy Reforms**

**1945 to 1970**

 The emergence of modern environmentalism after World War II forever altered Americans’ relationship with the natural world. During this time period a plethora of public policies were enacted to enhance and protect the natural environment. Most often, these laws extended Progressive-era ideas of government regulation but added a logic and organization derived from new scientific understandings, particularly in the area of ecology. And, they usually resulted from catastrophes and extensive damage to the environment.

For instance, in 1948 Donora, Pennsylvania suffered a concentrated air pollution event – or air inversion -that stunned every observer. As the city grew into a major metal manufacturing locale in the early 1900s, residents complained about the industrial pollutants. An investigation by the state government's Bureau of Industrial Hygiene revealed an extraordinarily high level of sulfur dioxide, soluble sulphants, and fluorides in the air.

Typically, the hills surrounding Donora kept such pollutants from dissipating very quickly. However, in October, 1948 a combined unusually dense fog kept the pollutants close to the earth's surface where the residents inhaled them resulting in several deaths and serious illnesses. The Donora Smog, as it became known, attracted attention to the problem of unregulated air pollution from industrial plants. Although the smog's effect on the people in and around Donora was extreme, residents of other communities also suffered from environmental contaminants. Consequently in 1949, Pennsylvania established the Division of Air Pollution Control to study air pollution and recommend statutory remedies to mitigate related problems. Donora was just the sort of catalyst to encourage young scientists to find ways to inform environmental public policy.

The 1959 Knox Mine Disaster near Wilkes-Barre demonstrated how mining carelessness negatively impacted the environment. On January 22, 1959, miners drilled for coal under the Susquehanna River precariously close to the riverbed. The Susquehanna crashed through the River Slope tunnel of the Knox Mine, killing 12 workers. The hole in the riverbed had to be filled with over 200 railroad cars before it was plugged by the construction of a coffer dam and the pumping of hundreds of tons of concrete into the chasm. The disaster ended most large-scale underground mining of anthracite coal in the Scranton-Wilkes-Barre area, exacerbated acid mine drainage into the Susquehanna and demonstrated the callousness of mine operators who put profits and before the environment and people. Within a decade, the Commonwealth had in-place laws to deal with acid mine drainage, mine reclamation and mining under waterways.

Air and land pollution composed the most frequent environmental problems before 1950 and scientific inquiry was required to definitively connect health problems to pollution and chemicals. In such cases, many scientists worked for the industries that were responsible for creating such toxicity while others worked for universities or for the government. And, each environmental and conservation cause had at least one strong proponent who demanded reform. Although many individuals and activists helped to spur this new era, Rachel Carson towers over the others in importance.

Carson, who was raised in Pittsburgh, lived through a period when Americans’ scientific understanding began to catch-up with the zeal for industrial expansion. Carson was one of the first activists to take-on the impact of industrial pollution. She began writing about nature for general readers in the late 1950s. In 1962 Rachel Carson's *Silent Spring* erupted on to the public scene and became a bestseller after first being serialized in *The New Yorker*.

Carson’s scientific findings brought into question basic assumptions that Americans had about their own safety, the quality of air and water and many of the chemicals used by various industries. Carson concluded that some of the unregulated chemicals used for agriculture and other purposes (such as DDT) were entering natural food chains and had deleterious effects. Although chemical manufacturers fought back, DDT and other chemicals were eventually banned altogether or closely regulated by federal and laws.

 Carson used science to demand action in a manner similar to other conservationists such as Maurice Goddard. In many ways, Goddard personified the changes occurring in the area of conservation after 1960. After serving as the director of the Mont Alto Forestry School, Goddard went on to head the Pennsylvania State University Forestry School. When Governor George Leader was elected in 1954, Goddard was appointed to head the Commonwealth’s Department of Forests and Waters and set a goal of establishing state parks within 25 miles of every Pennsylvanian. In 1971, the Department of Forests and Waters was combined with several other state agencies to create the Department of Environmental Resources in 1970 which Goddard headed until 1979.

 The new agency combined water quality programs housed in the Department of Health, forestry and state park programs lodged in the Departments of Forest and Waters and regulatory and permitting programs formerly in the Department of Mines and Mineral Industries. This new superagency became Pennsylvania’s premier environmental watchdog and developed a tough reputation.

 Goddard undertook special initiatives such as Project 70 and Project 500 to raise public funds to expand state parks and forests and to provide abundant outdoor recreational activities. In time, Goddard added 45 state parks and 130,000 acres of state forest land. Consequently, visitation went from eight million visitors in 1955 to 24 million by 1961. He also led efforts to closely regulate landfills, mitigate the impact of acid mine drainage, clean-up polluted waters and prosecute industrial polluters. In Pennsylvania, Goddard remains a legend.

At about the same time, State Senator Franklin Kury and other progressive legislators led the effort to make Pennsylvania one of the first states to amend its constitution to contain an "Environmental Bill of Rights" which read:

**Constitution of the Commonwealth of Pennsylvania**

 **Article I, Section 27**

**“The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania’s public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.”**

This measure placed Pennsylvania at the forefront of public policy reforms that protected the environment.

In addition, Ralph Abele led the Pennsylvania Fish Commission on a crusade against water pollution and in its landmark efforts to propagate fish species. And, Governor William Scranton oversaw the dramatic expansion of state and local recreation areas and environmental reforms as did Governor Raymond Shafer. Moreover, events such as Earth Day in 1970 raised public environmental consciousness across the nation.

The negative impact of disasters, water and air pollution and the carelessness of various industries resulted in new public policies and the application of science steered conservation and environmental causes in new directions, reaching its peak in the 1970s.

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**Conservation** **Features, Events,**

**Organizations and Influential Individuals**

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| TIME PERIOD: 1945-early 1970sEra of Public Policy and Earth Day | Land | Air | Water | Flora | Fauna | Natural Resource | Larger Impact  |
| People  |  |  Carl Mason  |  John Saylor;Walter Lyon;Ralph Abele  |  Otto Jennings |   | Maurice Goddard;George Leader;William Scranton; Raymond Shafer; Ralph Abele;Franklin Kury; Ralph Abele; PAlegislators | Rachel Carson; Sam HaysHoward Zahniser; |
| Places  | Centralia | Pitts-burghRenai-ssance | Lake Erie;Kinzua Dam | Ferncliff Peninsula |   |   | Nuclear power plants  |
| Events  | Interstate Highway Act of 1956Appala-chian Trail first thru hiker | DonoraSmog; Acid Rain | Floods;Knox Mine Disaster | White Tail Deer Mgmt. | White Tail Deer Mgmt. |   | Earth Day |
| Organiza-tions | WPA & Nature Conserv-ncy | Group against Smog (pollution) | Susque-hanna RBC | WPA Conser-vancy |  WPA Conser-vancy |   |  |
| Gov’t  | U.S.Deptof Agri-culture Soil Conserva-tion programs |  | Clean Streams Act | Bald Eagle Act |   | 1964 Surface Mine Act | DER; EPA PA Consti- tution; Wilderness Act;Nat’l Historic Preserva-tion Act; Interstate Highways; Projects 70 and 500; other state and federal laws and regulations |

**Conservation’s Zenith**

**1970 to 2000**

From Earth Day to the end of the 20th century national and state concern about and interest in the environment and conservation grew tremendously. Public demand for change, novel public policies and environmental activism defined a new era of conservation. Policymakers worked to balance conservation and environmental protection with economic development.

In the Commonwealth, Earth Day marches and demonstrations occurred in many locales. One of these locations was campus of Penn State University at State College where thousands of students, professors, activists and ordinary citizens gathered to hear policymakers such as Republican U.S. Representative John Saylor of Johnstown, who introduced himself during a speech as “…a veteran of many battles on behalf of the environment, with many political scars. “ He urged his listeners not to just create radical protests on behalf of the environment but to also use constructive approaches “to bring middle America around to the point where they, too, see the dangers facing their way of life if uncontrolled pollution is allowed to continue.”

Immediate changes occurred at the state level. In addition to the creation of the Department of Environmental Resources, the Pennsylvania Game Commission more aggressively apply scientific principles to managing the white-tailed deer herd, helping to oversee a population recovery. The Fish Commission propagated millions of fish and became a partner with DER in protecting and cleaning-up lakes and streams. And, a special “Environmental Strike Force” headed by Pennsylvania’s Attorney General investigated and prosecuted hundreds of polluters, big and small.

Pennsylvania also emerged as a national leader in recycling. Conshohocken, Pennsylvania was home to the first plastic recycling mill in the country, which opened in 1972. Efforts continued at the community level and in 1988 Governor Robert P. Casey signed the Municipal Waste Planning Recycling and Waste Reduction Act (Act 101) which required larger municipalities to recycle plastics, aluminum and other materials that would otherwise end-up in landfills. Act 101 established a $2-per-ton fee on all waste disposed at municipal waste landfills and made the Commonwealth the first state to require recycling plans from each county. The state required each county to manage its own waste to assure a minimum of ten years of disposal capacity. By the early 21st century nearly 94 percent of the Pennsylvania’s population has access to recycling, quite a remarkable achievement.

On the national level, members of Congress, such as Pennsylvania’s Representative Saylor, voted in favor of landmark legislation such as the Wild and Scenic Rivers Act which protected unspoiled stretches of the Colorado, Delaware and Allegheny rivers from damming and pollution. And, the administration of President Richard M. Nixon’s created the U.S. Environmental Protection Agency that was soon followed by new federal clean air and water statutes. Similarly, Tionesta-native Howard Zahnhiser was one of the key lobbyists behind the 1964 Wilderness Act, which became a primary tool of conservationists to protect unspoiled land for the remainder of the century and beyond. And during this era, Indiana, Pennsylvania-native Edward Abbey used his writing about the “Monkey-wrench Gang” to inspire a generation of devoted environmental activists. In their adventures, these “eco-vigilantes” aggressively moved outside the boundaries of the law to confront development and natural resource abuse. Abbey’s depiction helped to inspire the actions of an entire generation, including organizations such as Earth First! and Greenpeace.

In the last decades of the twentieth century, few things stirred environmental reform like a news-making, environmental cataclysm—particularly if it was human induced. For example, during this era Lake Erie was said to be “dead.” For decades the lake was polluted from a variety of sources including far more nutrients – such as phosphorous - than the lake could handle. Phosphorous was found in many commercial detergents and its impact is to induce plant growth and algae when it comes in contact with water. Plant species began dying and decomposing creating anoxia (severe deficiency of oxygen) at the bottom of the lake leaving the water's surface putrid and mossy. The lack of oxygen killed fish and other aquatic species and the smelly surface repelled anglers, tourists and those living around Lake Erie. In response to public concern the watchdog Lake Erie International Joint Commission was formed that consisted of environmental agencies and organizations from several states and Canada. One result was the 1972 Great Lakes Water Quality Agreement that initiated clean-up programs and regulated discharges into the lake.

 Moreover, an accident at the Three Mile Island’s Unit Two nuclear power plant near Middletown, Pennsylvania, on March 28, 1979, was the most serious in U.S, history. Though no deaths or injuries occurred, small amounts of radiation were discharged from the plant and Unit Two was rendered inoperable. TMI raised national concerns about the safety of commercial nuclear energy and its potential negative impacts on the environment and humans. It brought about sweeping changes in emergency response planning, reactor operator training, radiation protection and government agency cooperation. The accident at TMI also caused the U.S. Nuclear Regulatory Commission to tighten its regulatory oversight and halted the issuance of licenses for commercial nuclear power plants nearly to the end of the century.

Everyday life in the Commonwealth changed dramatically as a result of new environmental policies and activism in the late 20th century. For example, the administration of Governor Tom Ridge divided the Department of Environmental Resources into two agencies: the Department of Environmental Protection (DEP) and the Department of Conservation and Natural Resources (DCNR). Many policymakers thought that such a division made good sense: DEP would focus on regulatory matters while DCNR was made responsible for managing state parks, forests, and state-owed recreational features.

Additional initiatives included: “Growing Greener” policies to preserve, protect and expand open space and agricultural land; rails-to-trails programs; brownfield site redevelopment; enhancement of urban parks, and; expanded recycling programs. Conservation and environmentalism yielded additional positive results. For example, the Commonwealth’s Bald Eagle, Peregrine Falcon, Osprey, and Shad populations were on the mend – something almost unimaginable 50-years earlier. The Fish and Boat Commission expanded its fish stocking programs. Strict enforcement of air and water pollution laws and regulations became the norm.

In addition, non-profit organizations such as the Pennsylvania Parks and Forests Foundation was founded in 1999 as a statewide nonprofit organization to provide a voice for the Commonwealth’s 120 state parks and 2.2 million acres of forest land. And, the Pennsylvania Federation of Sportsmen’s Clubs, created in 1932, collaborated with state government on a host of environmental protection and conservation initiatives. The Federation conducts conservation schools each summer at which students spend several days learning about conservation and the environment and it became instrumental in establishing hunter education programs and requirements. The organization advocates the notion that hunters are stewards of our heritage and that they must take safety, ethics, and conservation seriously if the next generation is to have these same opportunities.

In sum, the latter decades of the 20th century saw a good deal of progress with regard to environmental protection and conservation. More work remained to be done however.

**Conservation’s Challenges in the 21st Century**

Today, the complexity of efforts to conserve the natural environment has intensified. For example, scientific information is being put to use to better understand and mitigate the impact of the hemlock blight and the wooly algid influx as well as to carefully manage populations of white tailed deer, black bears and other species. Activist groups such as the Sierra Club and Trout Unlimited have strong voices in the public policy arena. And, state and federal agencies and policymakers continue to carefully balance conservation with the demands of a modern economy. Perhaps no better example can be found than in the highly controversial area of energy development.

Advancements in drilling technologies and rising energy prices in the early 21st century led many energy companies to experiment with drilling into shale for natural gas deposits. By 2008, energy companies speculated that the Marcellus Shale geological formation in Pennsylvania contained a bounty of energy that could last decades. A boom emerged as companies moved into the Commonwealth from the southern and southwestern United States and offered landowners large sums of money to drill for natural gas. The Marcellus Shale industry also provided jobs and, therefore, was seen by many policy makers as a boom for Pennsylvania’s economy. In order to release gas or oil, the companies used so-called “fracking,” or hydraulic fracturing of shale to release natural gas deposits.

In some instances energy developers faced vigorous resistance from landowners and environmentalists. For instance, in 2010 Josh Fox, who received a lease offer for his family’s property, turned his experience and his search for answers into a documentary film. “Gasland” became an international hit and a well-known expose’ of the effort by energy companies to limit scientific research and the public’s access to information about their tactics when it came to drilling practices. A newly emerging anti-fracking movement became a symbol of a new era of informed, green culture—a group of consumers who were willing to prioritize sustainability and environmental concerns such as climate change over temporary jobs and boom development.

Unlike the free-for-all of oil and coal extraction that occurred in the Commonwealth during the 19th and early 20th centuries, at least some regulations are in place to reduce the environmental problems caused by drilling for shale gas. Current laws require drillers to acquire permits, submit plans, post bonds, establish setbacks between gas wells and water sources, encase wells through the groundwater table, notify nearby landowners and comply with local zoning requirements. In 2011, Senator Robert Casey, Jr. publically acknowledged that Pennsylvanians should have learned something from its experience with coal and oil extraction and its aftermath and that these lessons should be applied to form contemporary policies on gas drilling.

Nevertheless, the Energy Policy Act of 2005 largely exempts the natural gas industry from complying with parts of the following federal legislation: the Safe Drinking Water Act, the Clean Water Act, the National Environmental Policy Act, and the Comprehensive Environmental Response, Compensation and Liability Act or Superfund law. In fact, one new aspect of the ethic of extraction today might be a boom driven less by specific economic opportunity and more by the race of corporations to sew up leases prior to government moratoriums or heavy-handed regulation.

With regard to other conservation matters, white-tailed deer hunting continues as a long-honored tradition in the Commonwealth. By the mid-20th century, it was clear to wildlife scientists that deer overpopulation had become one of the greatest threats to the scientific management of Penn's woods. In addition, the loss of agricultural land and rapid increase in suburban development decreased the areas over which the deer herd ranged. By regulating hunting in the state, managing Pennsylvania's deer population has become an on-going experiment. Today, the Game Commission continues to be the agency tasked with balancing the need to cull the population of deer.

The Commonwealth’s reliance on coal mining continues to have residual implications. The effort to mitigate the impact of coal mining began with the 1964 Mine Reclamation Act and continued with the better known Surface Mining Control and Reclamation Act (SCMRA) of 1977. Most important for the Commonwealth, SMCRA required that mining sites be restored to their original contours, particularly the sites of surface mining that have experienced radical alteration and that a mining operator submit a plan for restoring the land and for mitigating acid mine drainage. SMCRA initiated a massive effort in Pennsylvania after 1977 to reclaim coal lands.

 In addition to such large-scale impacts, coal mining caused other changes that were more subtle. For instance, abandoned mines have been a particularly problematic source of stream pollution throughout the Commonwealth. The U.S. General Accounting Office estimates that there are 560,000 abandoned mines on federal lands in the United States. In the state of Pennsylvania alone, 5,600 of the 9,000 known abandoned mines are considered threats to human health or to environmental quality. More than $1.5 billion has been spent since 1977 restoring abandoned mines; two-thirds of the funds have been spent in four states: Pennsylvania, Kentucky, West Virginia, and Wyoming.

Following decades of fossil fuel extraction in the Commonwealth, new federal subsidies during the first decade of the 21st century aided many states in diversifying their energy production to include renewable forms of energy production. In Pennsylvania, wind and solar power is prominent in new energy development. Foreign-based companies such as Gamesa moved production facilities into the Johnstown area and constructed wind turbines. With hundreds of turbines on more than twenty projects by 2010, wind-generated energy had peaked.

To concluded on a positive note, by 2000, close to 60 percent of Pennsylvania was state was restored to forest cover again. A century after the establishment of the Forestry Commission of Pennsylvania, the Commonwealth owned more than four million acres, 2.2 million of which were managed by the Commonwealth’s Bureau of Forestry. Sustainability is the primary ethic that governs Pennsylvania’s state forest products industry, including mandating that more than two acres will be grown for every acre harvested.

These resources, along with the Allegheny National Forest, which is the largest federal forest east of the Mississippi, and sections of seventeen rivers and streams that are preserved in their natural state, dozens of excellent state parks and innumerable other outdoor assets, Pennsylvania remains a destination for travelers who hunt, fish, camp, hike and enjoy the marvels of the natural world. In a state known for its remarkable natural resources, the continued hope of conservationists is that lobbying and putting pressure on policymakers will ensure continued conservation and environmental protection.