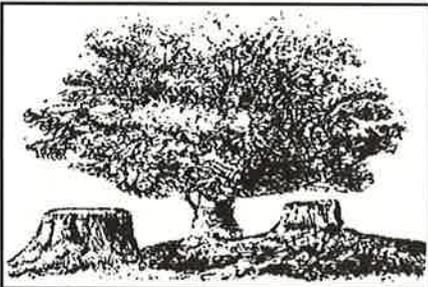
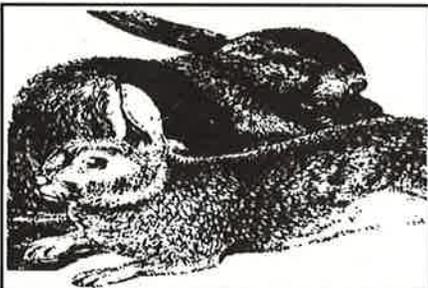
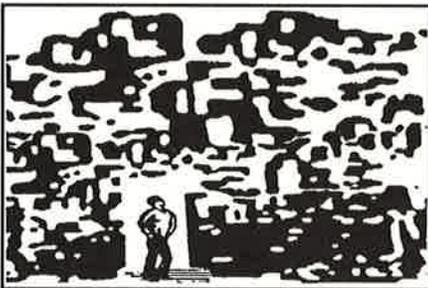
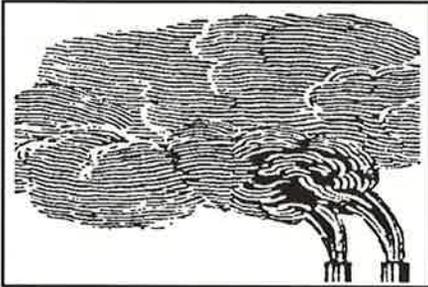


Checking Our Progress

By
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This second annual Tennessee Environmental Quality Index has been prepared and issued by the Tennessee Conservation League in order to inform the citizens of Tennessee about the current condition of their environment, the trends in environmental conditions, the most serious current environmental problems, the most ominous future threats, and our most prominent successes in correcting problems. In it, we look at the condition of five major components of Tennessee's natural resources — water, air, land and soil, wildlife, and forests — and at the problem of solid and hazardous wastes, which threaten to pollute these resources if not carefully and safely handled.

The Tennessee Conservation League (TCL) is a private, non-profit organization dedicated to promoting wise use of Tennessee's natural resources. It is made up of approximately 55 local affiliate organizations and approximately 8,000 individual members. In all, the TCL represents approximately 15,000 members. It is the Tennessee affiliate of the National Wildlife Federation, the world's largest conservation organization, which has over 5.5 million members and supporters.

Last year, in our first Environmental Quality Index, a project celebrating the 20th anniversary of the first Earth Day in April 1970, we examined the changes that had occurred in Tennessee's environment between 1970 and 1990. This year, our EQI will focus more intently on the present conditions, problems and issues. This version has been updated to May 22, 1991, and differs slightly from a preliminary version released earlier. As this series continues, comparison of current and future indices will show whether or not we are making any progress.

The 1990 EQI concluded that many aspects of Tennessee's water, air, land,

forests and wildlife have improved markedly since 1970, because Tennesseans began to care more deeply about their deteriorating environment, to recognize the problems afflicting it, and to commit the resources necessary to correct them. Many streams had been cleaned and aquatic ecosystems restored, the air in the major cities was dramatically cleaner, soil erosion had been reduced, many wildlife species had multiplied and spread, and many forests continued to recover from past abuses. However, a number of environmental threats remain, and new ones have arisen. Tennesseans, along with other Americans, have only just begun to recognize them, much less address them seriously.

Our judgment of the greatest environmental threats facing our state, country and world in 1990 was remarkably similar to those in other recent issue papers, most notably by the U.S. Environmental Protection Agency senior staff, the EPA Science Advisory Board and the Forum of Scientists. Listed below are the problems we highlighted last year as being the most serious ones affecting our environment in 1990. As you read this 1991 EQI, look to see if these problems are being seriously and effectively addressed.

- Global climate change (the greenhouse effect)
- High ozone levels in Tennessee's major cities
- Toxic air pollutants
- Acid rain
- Non-point sources of water pollutants
- Episodic discharges and accidental spills of toxic water pollutants
- Reducing the amount of solid and hazardous waste to be disposed of, and sensibly handling the remainder
- Finding ways to accommodate



competing demands on Tennessee's forests, such as timber production and recreation

- Loss of open space, natural environment and wildlife habitat to urban and suburban development, road construction, intensive agriculture, reservoir construction and other activities
- Protecting and enhancing the status of non-hunted wildlife species and finding a source of funds to support these activities

These problems may not be the ones that are getting the most media attention or are of the most concern to the general public. However, until people are aware of which issues are the most important, and which problems pose the greatest risk, they will be unable to direct our limited resources wisely. Much money may be wasted on problems that are in the public eye but pose only a very small risk, while other problems posing very serious risks are allowed to remain largely unaddressed because of lack of public awareness or resources.

We believe that our assessment of Tennessee's environmental problems is on solid technical and policy ground. We can at least take comfort in the fact that it agrees with some of the leading environmental scientists in the United States. We hope that this EQI will be of some small help in informing our citizens of the actual state of our environment and the problems it faces. We are confident that, when they are convinced of the seriousness of the real problems, they will respond with vigor and wisdom. After all, we did not become known as the Volunteer State by ignoring or running away from problems.

WATER

Most of the point sources of water pollutants are under control, but uncontrolled non-point sources continue to cause pollution. Many sources are outside current legal controls, such as runoff



from farmlands, urban streets and parking lots.

The big news in the water section of the 1990 Environmental Quality Index was that Tennessee's water quality was significantly better in 1990 than it was in 1970. The big news in 1991 is that the water is not getting better any more.

In spite of major advances in providing wastewater treatment for municipal and industrial waste in the past 40 years, Tennesseans have done little to reduce the entrance of pollutants into our streams and lakes from non-point or diffuse sources. Thus, every time it rains, tons of oil, gas, grease and brake lining dust, often containing worn-away toxic metals, are flushed off streets and roads into streams; lawn fertilizers, garden sprays, dog droppings and termite poison are washed off residential lots; pesticides, herbicides and eroded soil are washed off farms; and spilled raw materials and products are washed off industrial sites. These and many other contaminants spilled or placed on the land cause water-quality problems we call non-point source pollution.

Pollution caused by pollutants coming from non-point sources is now the No. 1 water-quality problem in Tennessee. It is increasing faster than the reduction in pollution caused by discharges from wastewater treatment plants (point sources).

Little has been done in the past to combat non-point source pollution. It is much more difficult to address, because of its diffuse nature, the multitude of sources and causes, and, perhaps most importantly, because it stems from millions of individual actions and decisions we all make about the way we live, work, farm, travel and play. To quote the eminent philosopher Pogo, "We have met the enemy, and he is US."

In a 1990 report to the U.S. EPA on the status of water quality in Tennessee, the Tennessee Department of Health and Environment illustrated the problem. Of the streams impacted by water pollution, 19 percent were impacted by non-point sources only, and 10 percent were impacted by both point sources and non-point sources, while only 4 percent were impacted by point sources only. The major causes of pollution were siltation, suspended solids and bacteria from human and animal waste. The major sources were, by far, agriculture and hydrologic modification (channelization).

Ironically, a provision in Tennessee law exempts agriculture from water-quality laws, so the major source of the problem is virtually beyond the reach of regulators. Interestingly, municipal wastewater was in a distant third place, and industrial waste was in an even-

more-distant fifth place. Urban runoff was seventh, and combined sewer overflows, so much in the news today, was 10th. The state has targeted non-point sources for more emphasis in the future, including education and technology transfer activities to encourage the use of best management practices.

Agricultural and urban runoff pollutes twice as many miles of Tennessee streams as municipal and industrial wastewater discharges.

On the bright side, only 3,722 miles (19 percent) of Tennessee's total of 19,124 miles of streams did not meet all water-quality standards, and 2,619 (14 percent) of those met most standards. Only 224 miles (1 percent) did not meet fishing standards, and only 661 miles (3 percent) did not meet swimming standards.

The situation in lakes is not quite so good. Of Tennessee's 429,515 acres of lakes, 108,807 acres (25 percent) do not meet all water-quality standards, but 59,456 of those (14 percent) meet most standards. A total of 16,849 acres (4 percent) do not meet swimming standards, and 55,355 acres (13 percent) do not meet fishing standards.

The major causes of problems in lakes are nutrients, organic matter, siltation and toxic organic chemicals, such as pesticides, solvents, and PCBs. Except for solvents and PCBs, the major sources of these contaminants are agriculture and municipal wastes. Again, agriculture is exempt from regulation. Industrial point sources did not even make the top 10. The figures on the next page graphically illustrate what the real problems are, and what they are not.

Trends are hard to define, because comparable data are sparse, and data are often reported and organized differently from year to year. However, the report indicates that the state believes that 13 percent of Tennessee's streams are declining in quality, while only 4 percent are improving. This reversal of an improving trend of 40 years, due to non-point sources, is very ominous and calls for new and different approaches to attack what has emerged as the water-quality problem of the 1990s. It is time to quit searching for more powerful microscopes to look for the remaining specks in industry's eye and look instead at the log in our own eye.

In addition to the non-point sources, there are still a few troublesome point sources to be corrected among the 1,381 permitted industrial discharges and 250 municipal discharges. By far the worst, according to the Department of Environment and Conservation, is

Point sources of pollutants from industry and cities are now largely under control. Non-point sources continue largely uncontrolled.

Most of Tennessee's lakes and streams meet all water-quality standards, but many are threatened by future developments.

By far the most serious polluter of groundwater in Tennessee is poorly installed and malfunctioning septic tank systems.

Nashville's infiltration/illegal-inflow problem, which allows unwanted storm water to enter and overload the sanitary sewers, causing pumping station bypasses into area creeks. Treatment plant capacity, urban runoff and combined sewer overflows are also problems. In 1990, Nashville and the state agreed on an order for Nashville to build facilities to correct these major problems. The estimated cost is about \$620 million.

Other cities with combined sewer overflow problems include Chattanooga and Clarksville. Elizabethton still has problems with poor treatment, caused by heavy loads of industrial wastes, which leads to frequent violations of the city's discharge permit. Other cities with permit violations due to industrial wastes include Athens, Lawrenceburg, Martin and Portland. Increased emphasis on toxics in the future may cause this list to be expanded. Cities with violations due to conventional wastes include Knoxville, First Utility District of Knox County, Lenoir City, Newbern and Ripley.

Tennessee's two major "industrial" problems are both legacies of careless handling of waste materials in years gone by. The Department of Energy's Oak Ridge Reservation is covered with burial grounds, storage ponds and spill areas containing radioactive wastes, industrial solvents, machine oils, toxic organics, heavy metals and other wastes. Remediation is proceeding, but completion will take 20 to 50 years and cost several billion dollars. The other problem area is the Copper Hill industrial complex, now owned by the Boliden Corp. This area is still leaching sulfuric acid from the smelting of copper sulfide ores in the early 1900s, vegetation is sparse and stunted for miles, erosion is rampant, and area streams and lakes are almost sterile. Conditions are somewhat better than they were 25 years ago, but the situation may take another 100 years to correct completely.

On the bright side, several cities made major improvements in 1990. Cities that eliminated frequent bypassing include Franklin, Rutherford,

Moscow, Clarksville, Bristol and Jonesborough. Moscow, Bristol and Jonesborough also made plant modifications to improve treatment.

Tennessee has so far not been plagued by heavy pollution of its groundwater by pesticides, fertilizers and industrial wastes, as have so many other states, although there are numerous contaminated sites of limited extent. However, groundwater in certain areas, particularly in Middle Tennessee, is heavily polluted by human wastes from poorly designed and installed septic tank systems. The legacy of 15 years of blasting trenches in rock to install septic tank overflow lines has left tens of thousands of holes and cracks allowing raw sewage to run directly into the groundwater. Between one-third and two-thirds of all wells in Davidson, Williamson, Rutherford, Bedford, Sumner and Wilson counties are contaminated. The county environmentalist for Wilson County estimates that 99 percent of wells there are contaminated. Although blasting was outlawed statewide and installation standards improved in 1989 after intensive lobbying by the TCL and the Environmental Action Fund (Williamson, Maury and Rutherford counties had eliminated it earlier), Tennessee's practices and standards are still inadequate, and efforts are made in the General Assembly each year to weaken them.

Tennessee's 557 public water supplies are, as far as we can tell, safe. The vast majority of samples from community water supplies show no sign of potential contamination, and in 1989, the last year for which complete data are available, no cities had persistent violations (down from 5 percent in 1985). Also, no cities are plagued by consistent contamination by toxic organic or inorganic chemicals such as solvents or pesticides. Several cities in West Tennessee discovered traces of volatile organics in some of their wells a few years ago, but all of these problems were corrected by installing treatment or by drilling new wells.

The number of uncertified operators

has dropped from 206 in 1982 to 52 in 1989. However, public perception of public water supplies is poor, and sales of bottled water and home treatment units are growing rapidly. Water utilities have a clear need and a responsibility to convey the facts to the public so money will not be wasted on useless or dangerous products. On the other hand, the safety of non-community water supplies (schools, camps, restaurants, etc., not connected to a city or utility district system) is questionable. The state simply does not have the resources to inspect or test most of them. National statistics show a much higher rate of violations for non-community supplies than for community supplies.

In addition to the non-point source problem, the major threat to Tennessee's water quality is lack of sufficient resources for regulation, monitoring, inspection and enforcement. Numbers of staff in the state Division of Water Pollution Control are woefully inadequate, and salaries are inadequate to retain experienced personnel or to attract sufficiently trained additional personnel. Therefore, permits take much longer than desirable to process, inspections are far fewer than desired, there is little routine monitoring, and follow-up inspections to see if problems are corrected are almost non-existent. This must be corrected if we are to avoid falling further behind, much less make needed gains. All divisions in the Bureau of Environment, now in the Department of Environment and Conservation, are experiencing the same problem, but the situation in the Division of Water Pollution Control is probably the worst of all at present. Thankfully, this will be corrected in the next few years, due to a new law passed by the General Assembly in May, 1991.

AIR

The new Clean Air Act should help make a major improvement in



Tennessee's air, but Tennessee may have a major problem enforcing it, because of lack of staff.

The year 1990 was a landmark year for continued progress in improving the nation's and Tennessee's air quality, because the Clean Air Act Amendments

of 1990 (the act) were signed into law Nov. 15. Much has been written about the impacts of the act on Americans and American industry. Few people, however, now doubt the need for this law. An overview of the new act is presented later in this section.

The two most important air-quality issues in Tennessee in 1990 were non-attainment with the National Ambient Air Quality Standard (NAAQS) and air toxics. Tennessee has two areas that are considered non-attainment with the ozone standard of 0.12 parts per million — Memphis - Shelby County and the Nashville area. The Nashville non-attainment area includes Davidson, Rutherford, Sumner, Williamson and Wilson counties. Memphis is also non-attainment for carbon monoxide. EPA has proposed that this area be extended to include all of Shelby County. The Knoxville-Knox County area has also been proposed for designation as non-attainment for ozone and will probably include Jefferson, Blount, and Anderson counties.

What is ozone, and why is it of such concern? The formation of ozone results from a complex series of reactions between volatile organic compounds (e.g., solvents), oxides of nitrogen, and sunlight. Ozone is typically formed on hot, still, summer days. Ozone is typically formed many miles from the sources of the pollutants, so it is difficult to control. Ozone is a strong oxidant and an irritant of mucous membranes. It has the short-term effect of making it more difficult for people to breathe, and ozone particularly affects people with existing respiratory problems (e.g., senior citizens and people with asthma). In the long term, ozone can retard lung

Table 1—Sources of Ozone Precursors ^a

Pollutant	Nashville Area (tons/day)	Memphis Area (tons/day)
Volatile Organic Compounds		
Point Sources ^b	56	56
Mobile Sources ^c	174	141
Area Sources ^d	78	80
Total	308	277
Oxides of Nitrogen		
Point Sources ^b	80	87
Mobile Sources ^c	174	141
Area Sources ^d	55	66
Total	272	226

^aSource: Emissions inventory developed by the University of Tennessee at Knoxville for the Department of Conservation.
^bPoint sources are manufacturing facilities.
^cMobile sources include cars, trucks and planes.
^dArea sources include gas stations, dry cleaners, landfills and consumer products.

development and may play a role in chronic lung disease. People are not the only ones affected by ozone. Trees and agricultural crops are damaged by exposure to ozone, which affects crop yields and tree growth. The sources of the precursors to ozone for the Nashville and Memphis areas are listed in Table 1.

Air toxics and their release into the environment was the second major issue of 1990. The public now has access to a wealth of information concerning the release of toxics into the environment as provided for in Section 313 of the Superfund Amendments and Reauthorization Act (SARA).

Manufacturers are required under SARA to supply information to the state and the federal government on their

emissions. The data collected in 1987, 1988, and 1989 for Tennessee are presented in Table 2.

Releases of toxics into the environment by all pathways decreased by 10 percent from 1987 to 1989. In many cases, these decreases were "paper" reductions as manufacturers became more familiar with reporting requirements and estimation techniques. However, some of these reductions were real and beneficial to the environment. In the future, we will probably see many more "real" reductions as manufacturers have now become more aware of just how much their emissions actually are and how much bad public relations can be caused by them, even if they are legal and do not cause any measurable harm. Many real reductions have already been made in the past year, and will show up when the 1990 and 1991 data become available.

The decreases in most releases tabulated in Table 2 occurred despite increases in the number of companies reporting. In 1987, only companies that released over 75,000 pounds of a given chemical were required to report. That figure dropped to 50,000 pounds in 1988 and to 25,000 pounds in 1989. Thus, while reporting is still incomplete, it was much more nearly complete in 1989 than it was in 1987. For this and other reasons, the data are not strictly comparable. Also, we must keep in mind that all of these chemicals are not equally toxic. Some are very toxic, but most of the ones released in the greatest quantities, such as ammonium sulfate, methanol, sulfuric acid, ammonia, hydrochloric acid, and ethylene glycol, have relatively low toxicities.

Currently, far more toxics are released into Tennessee's air than is

Table 2—Reported Releases for Tennessee Under SARA ^a

	1987 (Millions of Pounds)	1988 (Millions of Pounds)	1989 (Millions of Pounds)	% Change 1987- 1989
Air Releases	136.4	138	152	+11
Surface Water Releases	13.6	6.3	5.9	-57
Land	18.0	13.6	10.7	-41
Underground Injection	69	49.9	55	-20
Transfer to Sewage Treatment Plants	33.8	24.7	21.0	-38
Off-Site Transfers	22.8	22.0	19.0	-17
Total (Approximate)	293.6	254.6	264.2	-10
Companies reporting	502	526	593	+18

^aSource: 1989 Toxics Release Inventory, May 16, 1991, EPA Office of Communications and Public Affairs.

The local veto sounds good to many people, but it would amount to a statewide ban on legal hazardous waste disposal facilities. This will make it difficult, if not impossible, to dispose of some wastes and might lead to dangerous illegal disposal.

The Division of Solid Waste Management has been criticized for inadequate enforcement, but things are unlikely to improve until more trained staff are made available.

healthy or is necessary, because there has not been any state or federal pressure to reduce emissions. Only seven air pollutants are regulated. This situation changed in 1990 with the passage of amendments to the federal Clean Air Act, so we will see a drastic reduction in air toxics emissions in the next five years.

The Clean Air Act Amendments of 1990 (the act) will impact both ozone

non-attainment and air toxics in Tennessee. The act resulted from a long and heated debate over how far the United States should go to clean up our skies while encouraging economic growth. The result was perhaps the most far-reaching and costly environmental law ever passed in the United States. The act will cost approximately \$25 billion extra per year through the turn of the decade. The act's major

provisions address ozone non-attainment, tailpipe standards for emissions from cars, air toxics, enforcement, acid rain and permits. An overview of the act is provided in Table 3.

The good news is that Tennessee's air quality will improve as a result of implementing the act. The bad news is that Tennessee's Division of Air Pollution Control is ill-equipped to tackle the monumental task of the act's provisions. The division is already short of staff, and the new act will place an enormous new monitoring and enforcement burden on it. The division is also losing experienced staff because of the very low salaries, compared to private business. If this situation had not been at least partially corrected by a new law passed in May, it would have seriously impacted the staff's ability to enforce the act, which would have eventually resulted in degraded air quality for Tennesseans. It could have led to EPA withdrawing the state's delegation to enforce the act, resulting in direct EPA enforcement.

Table 3—Overview of the Major Provisions of the Clean Air Act Amendments of 1990

Title	Highlights
Non-Attainment Provisions	Requires air-quality standards in current non-attainment cities to be met by certain dates depending on how badly they now violate standards (e.g., Nashville and Memphis must meet the ozone standard by November 1996).
Mobile Sources	Requires decreased emissions from cars, the use of alternative fuels and zero-emitting cars.
Air Toxics	Establishes new levels of controls for facilities emitting any of 189 toxic chemicals.
Acid Rain	Establishes a market-based approach for reducing emissions from electric-generating plants. Requires sulfur dioxide emissions to be reduced by 10 million tons/year, and oxides of nitrogen emissions to be reduced by 2 million tons/year, from 1980 emission levels.
Permits	Establishes tighter controls on air pollutant emission permits.
Ozone Depletion	Focuses on decreasing the release of chemicals that adversely affect the earth's protective stratospheric ozone layer.
Enforcement	Establishes criminal penalties and increased fines for violations.

SOLID WASTE

A comprehensive solid waste management plan now exists, but implementation will take



major commitments of resources and political will. Do we have them?

The magnitude of Tennessee's mounting solid-waste problem is illustrated by the statistics presented in Table 4. In 1990, the state finally began a comprehensive study of the problem, including possible solutions.

Tennessee's General Assembly charged the State Planning Office with the task of developing a solid waste management plan for the state. The plan was developed in conjunction with the Waste Management Research and Education Institute at the University of Tennessee, Knoxville. The plan sets an ambitious schedule for tackling Tennessee's solid-waste problem. More specifically, the plan establishes the following goals for the state:

1. Local governments must engage in solid waste planning to assure capacity and achieve waste reduc-

Table 4^a—Tennessee's Solid Waste Crisis

- Tennesseans dispose of approximately 5.4 million tons of solid waste annually (6 pounds/person/day).
- There are 99 permitted municipal solid-waste facilities in Tennessee.
- Nearly half of all active landfills will reach capacity within five years.
- Ninety-four percent of Tennessee's solid waste is disposed of in landfills. The balance is incinerated.
- Only one-third of Tennessee's 95 counties have begun recycling programs.
- The origin of solid waste disposed of in Tennessee is 37 percent residential, 29 percent industrial, 27 percent commercial, 3 percent special and 3 percent other.
- Eighty-three of Tennessee's 95 counties have a solid-waste disposal facility. Twelve counties have no facilities.
- *Managing our Waste: Solid Waste Planning for Tennessee*. December 1990. Waste Management Research and Education Institute, University of Tennessee, Knoxville.

- tion goals.
2. Counties must provide collection services to all citizens.
 3. The state should adopt a 25 percent waste reduction goal to be achieved by July 1994.
 4. Source reduction and recycling initiatives need to be implemented.
 5. Problem wastes (e.g., household hazardous waste) must be separated from the solid waste stream and managed separately.
 6. Public information and education efforts should be made to ensure an informed and dedicated public.
 7. Technical assistance should be provided to local governments to assist them in implementing the goals of the plan.
 8. In order to identify and anticipate potential problems and opportunities, research efforts should be supported and data files maintained.
 9. Local governments should be required to maintain the solid waste accounts on a full-cost basis (e.g., disposal costs should not be kept artificially low by support from property taxes).

Prior to implementing this plan, there are many questions that must be answered. How much will it cost? Where will the funds come from? How will new landfills be sited? How can all local governments be treated in an equitable manner? Where will the technical assistance come from at the state and local levels? The State Planning Office is working on answers to these tough questions. Not all Tennesseans will like the answers, but Tennessee needs to implement the plan or the crisis will just get worse. The

Tennessee Conservation League encourages all Tennesseans to support the solid waste management plans currently being formulated, as well as the new Comprehensive Solid Waste Management Act, which will implement the plan. This Act passed the General Assembly in May.

In 1990, there were two additional solid waste issues that will potentially affect all Tennesseans — namely, the return of the local veto and permit fees. The local veto issue revolves around the perception of some politicians that local governments should have total control over the siting of hazardous waste disposal facilities. This is not a new issue in Tennessee. Local governments in Tennessee at one time had a local veto similar to the one proposed in the bill pending before the General Assembly. Tennessee's legislature had to rescind that law in 1989 in order to enter into a compact with other Southeastern states for demonstrating a capacity to manage hazardous waste in the region. Subsequent to rescinding the local veto law, the Tennessee Division of Solid Waste Management developed stringent siting criteria for hazardous waste facilities. Recently, several companies have proposed hazardous waste disposal facilities in counties in which citizens' groups rapidly mobilized in opposition to those facilities. The legislation proposed in the General Assembly this year to bring back the local veto was sponsored by politicians from these counties.

The local veto issue is very emotional. The practical consequence of the local veto is actually a prohibition on siting any hazardous waste disposal facility in Tennessee. Tennessee

currently has no commercial hazardous waste landfill or hazardous waste incinerator. Hazardous waste generated in Tennessee that must be incinerated by law or landfilled in a permitted facility must be shipped to another state (e.g., Alabama, South Carolina, Illinois or Louisiana).

There are some "experts" who contend that generators of hazardous waste should change their processes and not generate hazardous waste to begin with. This obvious "solution" is not new to generators, who have at least an economic interest in reducing the skyrocketing costs of hazardous waste disposal. Many programs sponsored by the state and industry trade associations are targeted at avoiding or minimizing hazardous waste generation. The fact is that hazardous waste will always be a problem. Until processes become "100 percent efficient" (which by the laws of physics is impossible), there will be some hazardous waste requiring proper disposal. The public needs to accept this and push for safe methods and facilities, no matter where they are. If not, illegal disposal will probably increase.

Tennessee currently has regulations to ensure the proper siting of hazardous waste disposal facilities. We need to let these regulations work and move on with the task of managing our own waste.

However, to be effective, the regulations must be enforced strictly, and that has been a problem in Tennessee. The final major solid waste issue for 1990 concerns the problem of how to ensure adequate staff and funding for current and future programs. Tennessee's current staffing of its solid and hazardous waste divisions lags far behind what is needed to do the job. As a result, the Division of Solid Waste Management has been criticized by EPA, citizens' groups and the General Assembly for inadequate enforcement. The staff members are doing a lot with what they have, but for Tennessee to tackle our solid waste problems and other environmental challenges with any realistic chance of success, the state must have adequate staff and must be able to retain qualified individuals. This considerable increase in financial resources will come from new fees, made possible by legislation passed by the General Assembly in May, 1991.

LAND

Tennessee is experiencing much-needed economic development, but this inevitably means that we are losing much of our open space and natural landscape.



While many land conservation problems in Tennessee are slowly being addressed (if not being solved), the No. 1 threat to natural Tennessee continues unabated. Undeveloped land (farmland, forestland, open space, pastureland, etc.) is being converted to developed land at a rapid pace. Much of this converted land is high-quality farmland, because the same characteristics of mild slope, good drainage and deep soil that produce prime farmland also describe good land for development.

Although the conversion process slowed somewhat in 1990 due to economic slowdown (and a housing glut in some areas), the long-term trend is inevitable and ominous. As long as Tennessee's population continues to grow, and as long as people continue to want to move out of crowded cities to less crowded suburbs, or to mini-farms of 3-10 acres, Tennessee will continue to become less natural and more developed and crowded. Only population stabilization will allow us to preserve the remainder of Tennessee's beautiful open landscape. The same is true of other environmental factors. All other things being equal, the more people there are, the more environmental stress and damage there is, the more crowding there is, and the more it will cost to

control or to minimize the adverse effects.

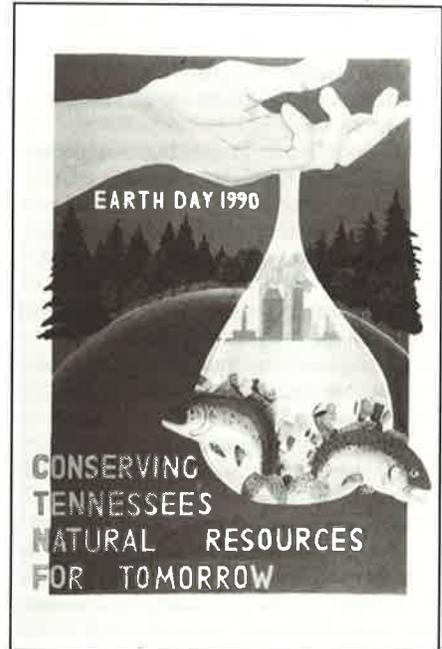
Some of this development is high quality, and some of it preserves as much natural area as possible. However, much is uncontrolled or substandard. Some of Tennessee's cities, and over half of its counties, have no zoning or subdivision regulations, so some of the development destroys much more of the natural landscape than is necessary. Some of the development is also incomplete or substandard, causing cities and counties to have to raise taxes on existing homes and businesses in order to raise funds to complete roads, extend utilities and build new schools.

Erosion continues to be a major problem on both farmland and urban land, but erosion is being reduced somewhat as more farmers, developers and contractors adopt best management practices for controlling erosion on disturbed soil. One of the major factors helping to control erosion on farmland is the increase in area on which conservation tillage (little or no plowing, with weeds controlled by herbicides) is used. In 1990, conservation tillage was used on 1,190,000 acres (34 percent) of Tennessee's cropland, up from about 1,000,000 acres in 1989, and about 50,000 acres in 1980. The trend will probably increase, because many of the plans being prepared for farmers by the U.S. Soil Conservation Service (SCS) under the 1985 Food Security Act to allow farmers to receive crop support payments call for conservation tillage.

The use of conservation tillage and increased herbicides helps protect surface water from eroded soil and its attached contaminants, but it may threaten groundwater. Several research projects are under way in West Tennessee to determine the magnitude of the problem and to determine the best way to manage herbicides in order to reduce the threat to groundwater.

The past abuses of surface mining for coal continue to plague East Tennessee, although current mining practices are

This poster, by student Lisa Alattar, was a finalist in the TCL's 1990 Earth Day Poster Contest.



less damaging, and economic factors have reduced Tennessee surface mining to about half of what it was a decade ago. The state's abandoned mine lands program in the Department of Conservation spent \$986,000 to reclaim 217 acres of orphaned mines in 1990. The SCS funded \$637,000 of remedial work on orphan mine sites in 1990, correcting problems on 93 acres. The total area reclaimed by the state since 1980 totals 1,218 acres in 87 jobs, at a cost of \$11.4 million. Since 1987, 700 acres have been planted in trees, at a cost of \$187,000. The total SCS work since 1980 is 64 jobs on 611 acres, at an on-site cost of over \$3.3 million. All this work has reduced erosion on the affected lands by about 225,000 tons per year. However, there are thousands of acres more waiting to be addressed.

As Tennessee's population and economy continue to grow, there is more and more demand for outdoor recreation land. A 1990 study of Tennessee State Parks by the Office of the Comptroller pointed out the need for more park land and for better care and control of present land. Budgets are tight, but land will never be cheaper than it is today. A long-range plan for acquisition, protection and use of outdoor recreation land and for protection of natural areas and open space is sorely needed. The Tennessee Conser-

The main weapon effective against erosion in West Tennessee farmland is conservation tillage, which continues to expand rapidly. This process also saves energy.

There is still a great shortage of outdoor recreation land in Tennessee, and the value of much of our current land is threatened by overuse or nearby activities.

Wetlands conservation is a very controversial topic. Wetlands have many values, but the landowner does not benefit from all of them. Public and private values collide, and mechanisms to resolve the difference are inadequate.

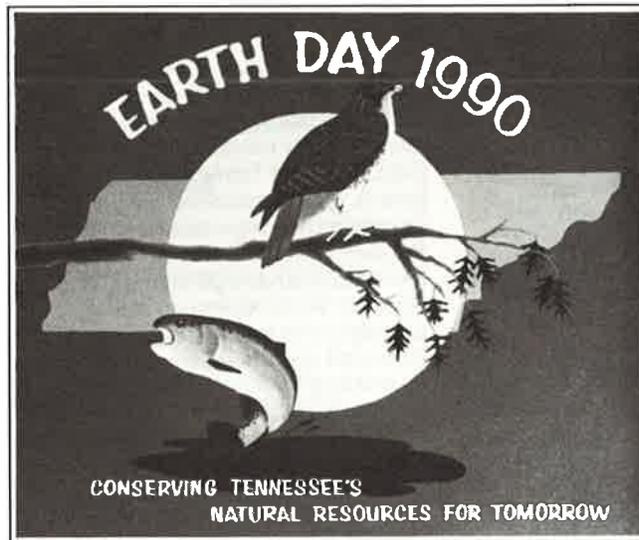
vation League's Neotropical Migrant Project will aid in identifying good candidates for acquisition.

Also, a bill conceived and heavily pushed by the League passed the Tennessee General Assembly in late April. The new law raises the real estate transfer tax by a marginal amount. This will provide about \$1.5 million to purchase land for parks and natural areas and about \$1.5 million for agricultural pollution control. Both areas were identified as significant needs in the League's 1990 EQI.

One of the major land issues in the U.S. today is wetlands conservation, and Tennessee is no exception. Wetlands are valuable for wildlife habitat and breeding grounds, flood control, water-quality enhancement, timber production, groundwater recharge and many other purposes. However, the U.S. has lost over half (53 percent) of its original wetlands (excluding Hawaii and Alaska). Tennessee has lost 59 percent of its original wetlands. Only 787,000 acres, of the original 1,937,000 acres, remain. Most was filled or drained for agriculture.

Although we are now beginning to recognize the value of wetlands and to take steps to protect them, these steps are incomplete and only partially effective. Section 404 of the federal Clean Water Act prohibits filling wetlands without a permit, but the act does not prohibit draining or clearing them.

The 1990 federal farm bill strengthened the "Swampbuster" provision and established a 1 million-acre wetland reserve program to provide incentives for farmers to protect their wetlands. However, a bill introduced in the Tennessee General Assembly in 1990 would have eliminated any control by the Division of Water Pollution Control over landowners who want to drain their wetlands, causing a grave setback for protection efforts. The bill was stopped by intense lobbying by conservationists, but it surfaced again in 1991 and passed easily. Although this drainage is justified in many cases and allows landowners to protect bottomland hardwoods and cropland on previously converted wetlands from swamping and tree death brought on by siltation, beaver dams or debris, it could also make it easier for some landowners to convert existing wetlands and clear more of our few remaining bottomland hardwood forests. A better system to resolve such controversies, considering the interests of both landowners and the public, is sorely needed. The Governor's Task Force on Wetlands, of which the League is a member, is one such method.



Another finalist in the 1990 Earth Day Poster Contest was this selection by student Stephanie Renee Sledge.

WILDLIFE

Large game animals are thriving, but farm wildlife and non-game animals are not faring so well. The Tennessee Conservation League is attacking this problem.



In 1990, our first Environmental Quality Index reported that, while there were many successes in the management of game species (6 percent of the wildlife species), there was little activity with other wildlife species. To begin rectifying that inequality, the Tennessee Conservation League has launched a multi-agency, multi-year program aimed at the conservation of neotropical migrant birds. These are the 79 species that summer in Tennessee and winter in Central and South America.

This TCL project will also involve the Department of Environment and Conservation, the Tennessee Wildlife Resources Agency, the U.S. Forest Service, TVA and the forest products industry. The primary underwriters are the National Fish and Wildlife Foundation and the Lyndhurst Foundation. This three-year program will integrate existing information, collect new information and organize it on the state Geographic Information System.

Products from the GIS will be used for educational programs using Conservation Education Now for Tennessee Students (CENTS), local governments and statewide habitat protection programs. More importantly, this project is the first step in planning for

biological diversity. This plan will identify important natural communities, centers of species richness (including neotropical migrant birds), sites for rare species, and connections or corridors between habitats that will be targets for conservation. The plan will also make recommendations for conservation or management of sites and will help local governments identify and protect important natural resources. The following are individual species reports.

The bald eagle began nesting in Tennessee in 1983 at Lake Barkley near Dover — after an absence of 22 years — as a result of the state's "hacking" program, begun in 1980 at Land Between the Lakes. By the end of 1990, 146 eagles had been released in Tennessee, and eagle watching tours drew thousands of visitors to Reelfoot Lake and other locations.

In cooperation with other state and federal agencies, the TWRA also hacked 65 osprey or fish hawk since 1980. Several raptors were reintroduced in Tennessee through an aggressive hacking program, including 34 peregrine falcons and 85 Mississippi kites. To encourage natural areas for Tennessee's wildlife species while providing a place for individuals to see them, the TWRA increased the number of Wildlife Observation Areas across the state to 43 during the last 10 years.

TWRA's ability to manage the raccoon resource has not improved, because of numerous legislative private acts setting lengthy hunting and dog training seasons. The TCL filed a lawsuit attempting to invalidate the private acts on the grounds that they violate the constitutional mandate to protect wildlife. The court ruled, however, that the Legislature has ultimate constitutional authority to set seasons. Since 1979, raccoon trapping seasons have been set in Middle and

West Tennessee. Urban populations of raccoons have greatly increased.

Populations of beaver and otter have expanded greatly since 1970. The otter has been removed from the threatened list in West Tennessee and an experimental trapping season has been established. During the 1989/90 trapping season, 23 otters were reported taken. River otters were released back into their natural habitats on the Cumberland Plateau and in mountainous areas of Tennessee during 1990.

Coyotes are a new addition to Tennessee fauna since 1970 and are now common statewide. The hunting and trapping seasons are year-around, with no limits. The soft catch trap was legalized to control problem animals.

Seasons for fox have been liberalized since 1984. Populations of other furbearers remain stable. Local decreases occur with major habitat alterations such as channelization projects and intensive agricultural practices.

The white-tailed deer has been Tennessee's major wildlife success story, as in most other Southern states. The deer population has increased in numbers and has expanded throughout the state. In 1990, the population numbered 650,000 to 700,000, with a harvest of 113,500.

Tennessee's herd is expected to continue to grow in the coming years. The management challenge is to maintain effective control on herd numbers in areas with dense populations and to provide adequate access to quality hunting for the state's sportsmen.

Black bear management has come a long way in Tennessee since 1970. Bear populations in 1970 were dangerously low, and the season was closed from 1970 through 1972. Research projects were begun to collect baseline data on the status of the population, its ecology and its habitat needs, resulting in an effective bear management program. Refuges, where no bear hunting was

allowed, were established to protect populations of breeding females, and in 1981 hunting seasons were moved back to December to further reduce the pressures on females. These management strategies appeared to have been successful, and bear populations are increasing, with a new record harvest of 124 in 1990. However, the picture for bears is not entirely rosy. Illegal hunting and declining habitat are likely to continue putting pressure on the population.

There have been some significant bright spots along the way, but generally the outlook for farm wildlife species has worsened in the last several years. In a nutshell, conditions for farm wildlife have improved on public lands, but they have worsened on private lands.

Most notable is the outright loss of habitat and the reduction in the quality of remaining habitats on many private lands. As the Tennessee population has increased, wildlife habitat is being lost at a rapid pace due to construction of housing, airports, shopping malls, industrial parks and the like.

Many of the advancements in farm technology and production have had a negative impact on the quality of farmland habitat. The conglomeration of small family-owned farms into larger corporate farms has eliminated shrubby fencerows and grassy field borders that once provided wildlife food and cover. Larger, more efficient harvest machinery leaves less waste grain available for wildlife food. An increase in double-cropping systems and fall plowing has reduced winter cover for small game, while higher crop plant populations and increased use of pesticides and herbicides reduce native "weed" plants that produce seeds and provide habitat for invertebrates that are food for both game and non-game bird species. An increase in the livestock and show horse industries has resulted in large expanses of land being planted to fescue and being grazed or mowed regularly,

providing scarce benefits to farm wildlife.

Bobwhite quail and cottontail have declined primarily because of the loss of upland habitat, while swamp rabbits, woodcock and snipe have declined primarily because of the loss of wetland habitats. A large amount of wetland habitat has been drained for agricultural purposes.

The open-space-loving mourning dove has apparently not been affected, as populations have remained stable. As Tennessee forest resources have remained relatively stable, squirrel and ruffed grouse populations have held their ground.

On a positive note, the 1985 Farm Bill and its Conservation Reserve Program (CRP) are greatly benefiting farm wildlife. Widespread environmental benefits are being realized by reduction of soil erosion through Farm Bill conservation measures. Approximately 430,000 acres of highly erodible crop acreage has been set-aside under the CRP. In 1990 it was estimated that 25 percent to 40 percent of this acreage provided good or excellent habitat for quail and rabbits. This percentage should increase as more CRP enrollees take advantage of TWRA's program, which provides supplemental cost-sharing for CRP lands established in wildlife habitat. The 1990 Farm Bill even expanded these programs beneficial to wildlife. Farmland habitat should improve in quality as conservation tillage and low-input agricultural practices increase in use and popularity.

Habitat quality on public hunting areas has quickly improved since TWRA began an aggressive program in 1987 to improve small game habitat. Small game emphasis and hunting opportunities have improved on TWRA management areas. Technical assistance and large quantities of seed have been provided for small game seeding on Public Hunt Area lands, and numerous cooperative efforts have been undertaken with TVA, the U.S. Forest Service, the Tennessee Division of Forestry and other agencies.

The outlook for small game on Tennessee public lands is good, as the cooperative mood between state and federal agencies continues to improve. An increase in joint habitat projects between these agencies and private organizations such as Quail Unlimited and the Ruffed Grouse Society is also expected. TWRA's Upland Game Bird Habitat cost-sharing program to improve habitat on private lands continues to grow and will increase in its impact as much as TWRA is able to meet the demand for technical assistance.

The Tennessee Conservation League's Neotropical Migrant Project, aimed at identifying and conserving habitat important to migrating birds, will also benefit many other species of wildlife, as well as other environmental values.

The eagle has landed in Tennessee. Several pairs are now nesting and rearing offspring.

Farm wildlife, such as rabbits and quail, are declining as farms become fewer, larger and cleaner.

Habitat is the key to wildlife protection. Without it, nothing else will help. With it, anything else is possible.

In 1990, wild turkeys were present in all 95 counties. Forty of the 64 counties open for the 1990 hunting season set new harvest records, with 2,626 birds harvested on private land and 699 on wildlife management areas. Seventy-seven counties will be open for spring turkey hunting in 1991. From 1971 through 1990, 4,826 birds were stocked on restoration units across the state.

The outlook for wildlife in Tennessee in the future is cloudy. Although there have been many successes and there are some good current management and protection programs, the inexorable loss of habitat will inevitably reduce many wildlife populations in the future. Habitat is the key. Without habitat, places for shelter, food, and water, there will be no place for wildlife to be safe and healthy.

FORESTS

Tennessee is growing more and more trees, but many of them are not worth much, either for wildlife or for lumber. What should we do with them?



The first Environmental Quality Index, in 1990, reported that Tennessee's forests are increasing substantially in both acreage and wood volume, but that the quality of timber being produced is falling. Some selected statistics from the Tennessee Division of Forestry illustrate this trend. They are tabulated in Table 5. The last statistics available are for 1989, but there is no indication that recent trends have changed.

These data show that forest acreage increased by almost one million acres between 1950 and 1990, due to abandonment of small farms and the growth of the commercial forest industry (mostly pulpwood). The growing stock volume (amount of wood in the forests) increased dramatically, from 5.7 billion cubic feet to 16.7 billion, and the net annual growth is now more than twice what it was in 1950. The volume of timber being cut annually is actually less than it was in 1950. As a consequence, the annual volume of growth is almost three times the annual volume of timber cut.

The gross numbers look good, but there is a major problem. Much of this increased volume of timber is not worth much.

For instance, only 30 percent of the standing hardwood timber volume is high-grade lumber today, down from 44 percent in 1980. This is because lumbermen continue to cut only the best trees, leaving the damaged, diseased, fire-scarred, low-grade, slow-growing, and undesirable and unprofitable species to reseed and produce more of their own kind. Consequently,

Tennessee's forest land is producing wood at only about half of its capacity. Nearly one of every four hardwood trees is considered a cull, essentially worthless.

If Tennessee's forests are to improve in quality as well as quantity, so that they can produce the economic, wildlife and recreational benefits that they are capable of, drastic steps must be taken. Basically, the undesirable trees must be removed and then replaced by more desirable trees. However, there is presently no mechanism for doing this, and it would be prohibitively expensive, in the absence of a market for the wood to be removed.

One of the potential uses for this low-quality wood is for wood chips to feed pulp mills. (Most of it is not suitable for lumber, or poles, or even fence posts.) Much interest has been expressed recently in this opportunity, and, as a result, there have been several proposals made to locate chip mills on the Tennessee River. The plans are to buy the mostly inferior trees cut in surrounding counties, chip them and ship the chips to pulp mills downriver, by barge.

If everything went well, this operation would benefit the forests as well as the local economy. However, there are many potential problems and unanswered questions. Tennessee has no legal mechanism to regulate timbering (such as a forestry practices act), so there is no way to assure that best management practices (BMPs) will be used in the process of cutting and loading the trees. Many independent

Table 5—Selected Tennessee Forest Statistics

Year	Commercial Forest Area (Acres)	Growing Stock Volume (All Species) (Million Cu. Ft.)	Net Annual Growth of Growing Stock All Species) (Million Cu. Ft.)	Annual Removal of Growing Stock (Million Cu. Ft.)	Annual Growth-to-Removal Ratio
1948-50	12,353,800	5,728.5	285.5	252.3	1.1 : 1
1961	13,432,400	7,209.4	322.1	207.7	1.5 : 1
1971	12,819,800	10,395.8	509.1	216.4	2.3 : 1
1980	12,879,000	12,805.2	511.4	213.7	2.4 : 1
1989	13,265,200	16,682.7	637.4	219.4	2.9 : 1

loggers would probably do most of the cutting and hauling, and it is probable that BMPs will not always be followed. This could result in excess erosion, nutrient loss and damage to nearby streams and uncut areas. There is no assurance that primarily low-grade trees would be cut.

Most importantly, there is no assurance that the cut areas would always be reforested with better trees. In areas where they are not, there will be no real improvement, and undesirable trees will grow up to replace undesirable trees. There is no present method to ensure adequate reforestation.

Many conservation groups, including the Tennessee Conservation League, have called for the TVA to prepare an Environmental Impact Statement before issuing permits for the proposed chip mills to build large loading facilities on TVA reservoirs in order to thoroughly investigate these questions, assess the probability of various outcomes, and weigh the environmental pros and cons in an unemotional forum. In the absence of a forestry practices law, the barge-loading permits, which might be conditioned on the mills imposing requirements to use BMPs on those loggers from whom they buy trees, is one of the few mechanisms available to the public to control environmental damage and ensure that the benefits to Tennessee's forests outweigh the costs. TVA has agreed to the call for an Environmental Impact Statement.

The other major issue affecting Tennessee forests in 1990 and early 1991 was Governor Ned McWherter's plan to reorganize Tennessee's conservation and environmental regulatory agencies. As part of this plan, the Division of Forestry was shifted from the Department of Conservation to the Department of Agriculture, similar to the arrangement in the federal government, where the Forest Service is in the Department of Agriculture, not Interior.

This move concerned many conservationists, who feared that the philosophy of the division toward management of the state forests might shift away from one of multiple-use toward more timber production and "tree farming." The other major function of the division, technical assistance to landowners and the industry, should fit well in the Department of Agriculture, which traditionally has had good working relationships with farmers and other landowners.

Officials have assured conservationists that there will be no adverse changes, and there is no reason to automatically assume that there will be. However, extra effort must be made to

There is almost three times as much wood volume in Tennessee's forests now as there was in 1950, but less is actually being cut each year than there was in 1950.

Chip mills have been proposed as a way to use the less desirable trees making up much of Tennessee's forests. If all parts of the process were to be done just right, there would eventually be a great improvement in the forest quality. If not, there might be great damage. Nobody knows which would happen.

keep the dialogue between state forestry officials and conservationists open and to continue to monitor the situation and be ready to work together to solve the inherent conflicts brought about by many different uses competing for space on the same land.

SUMMARY

Although the details differ, the descriptions of the status of Tennessee's varied natural resources, and the effects that wastes and human activity have had and are having on them and on our natural environment all have a common thread. All are better off now than they were 40, or 20, or even 10 years ago.

We have made a lot of progress. We can point with pride to cleaner streams; cleaner, healthier air; more productive farms with less eroding soil; more wildlife for observation, study and hunting; more forests with more and larger trees; and many fewer nuisance dumps. However, we have concluded that overall net progress has stalled. The easy gains and cheap victories have been won. The remaining steps will be much more difficult.

For every step forward (and the preceding sections have mentioned many recent ones), it seems that we have been forced back a step somewhere else. The reasons are basically two: growth and increasing population, and a lack of resources, both public and private. One situation alone would not necessarily be a major problem. We could cope with increasing population and economic activity if we had enough financial resources to protect our environment and manage our natural resources wisely and well. However, the struggle to cope with growth without sufficient financing to protect the environment is causing major problems and is stalling our progress toward providing our citizens the healthy and stable environment they

want and deserve.

We cannot change the growth situation. Economic growth is desirable, and population growth is inevitable for the next generation at least. Therefore, if we are to make much more net progress in protecting our environment and conserving our natural resources, we must devote more resources to the task.

Resources are short in many areas, from construction funds for new wastewater treatment facilities, to funds for buying undeveloped land for nature preserves and parks, to numbers of environmental engineers. However, one critical area of resource shortage that affects many other areas is personnel in the pollution control enforcement agencies of state government. The Bureau of Environment is extremely short-staffed and has been actually shrinking over the last three years, even as the workload and public expectations have been increasing. Many of the senior officials have left for better-paying positions in private business, and the extremely low salary scale does not allow the state to recruit the highly trained engineers, chemists and other specialists required to attack today's complex problems.

The workload of the Bureau of Environment is far greater than it was just five or six years ago. Many new laws have added new responsibilities. The bureau currently is responsible for the regulation, inspection and administration of the following facilities and permits, among others:

- 10,092 air pollutant emission permits
- 1,381 industrial wastewater discharge permits
- 250 municipal wastewater discharge permits
- 565 mining wastewater discharge permits
- 825 dams (for safety)
- 42 permits for hazardous waste handling and storage facilities
- 210 landfill permits
- 17,000 septic tank permits
- 19 closure permits for hazardous

- waste facilities
- 557 community water systems and 902 non-community water systems
- 42,000 underground storage tanks
- 73 active Superfund sites
- 530 radioactive material source licenses
- 11,155 X-ray machine permits

To carry out this enormous job, 806 positions have been authorized. The funded and established positions total 785, but only 683 positions are actually filled as of April, 1991. After a thorough study, the bureau estimated in 1990 that it needed at least 1,131 positions filled within the next four years in order to carry out its responsibilities, 346 more positions than at present and 448 more people than it has at present. In addition, 88 new people are needed for a new division to oversee the remediation of the environmental problems such as DOE's Oak Ridge Reservation.

Although all divisions need more people, the Divisions of Air Pollution Control and Water Supply are projected to need larger increases than the others because of recent federal laws mandating greatly increased responsibilities. The overall increase in positions needed is approximately 55 percent, and the overall increase in actual employees is approximately 78 percent. The extra cost is estimated to be approximately \$18 million per year.

In order to help solve this critical resource problem, a coalition of industry, business, municipal and environmental groups proposed that the bureau be authorized to charge fees for processing applications, reviewing plans, conducting inspections and similar activities. A bill authorizing this was introduced into the 1991 General Assembly and passed in May.

This new source of revenue and the new positions it will fund may well do more to upgrade Tennessee pollution

Some Tennessee Conservation League Accomplishments Since the 1990 EQI was Published

- halted diversion of wildlife conservation funds from the Tennessee Wildlife Resources Agency budget to the state general fund;
- gave away 98,000 green ash seedlings through ReLeaf Tennessee;
- trained 2,200 public schoolteachers in Project CENTS workshops;
- distributed over 12,000 educational packets and posters during National Wildlife Week;
- promoted habitat enhancement through a variety of projects, such as distribution of wood duck nest boxes;
- provided public education on non-point source water pollution through brochures and videotapes; and
- co-sponsored an environmental seminar for the media.

control activity and capability than any other single action since 1971. It will help the public by helping to protect the environment. It would help industry and cities by helping them get their permit applications processed faster and better, and it would more equitably distribute the financial burden of environmental protection. The Tennessee Conservation League strongly supported this progressive move. The League congratulates everyone who worked so hard to bring this about and thank all of the senators and representatives who voted for it. It is our best chance in many years to break the resources bottleneck. We are now ready to take the next big step to get Tennessee moving again.

The authors

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TCL

... that the future may know the bounties of our past



If you would like to join the Tennessee Conservation League and help it protect Tennessee's environment and conserve its natural resources, contact Anthony J. Campbell, Executive Director, 11 Music Circle South, Nashville, Tenn. 37203. Telephone (615) 254-7364.

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