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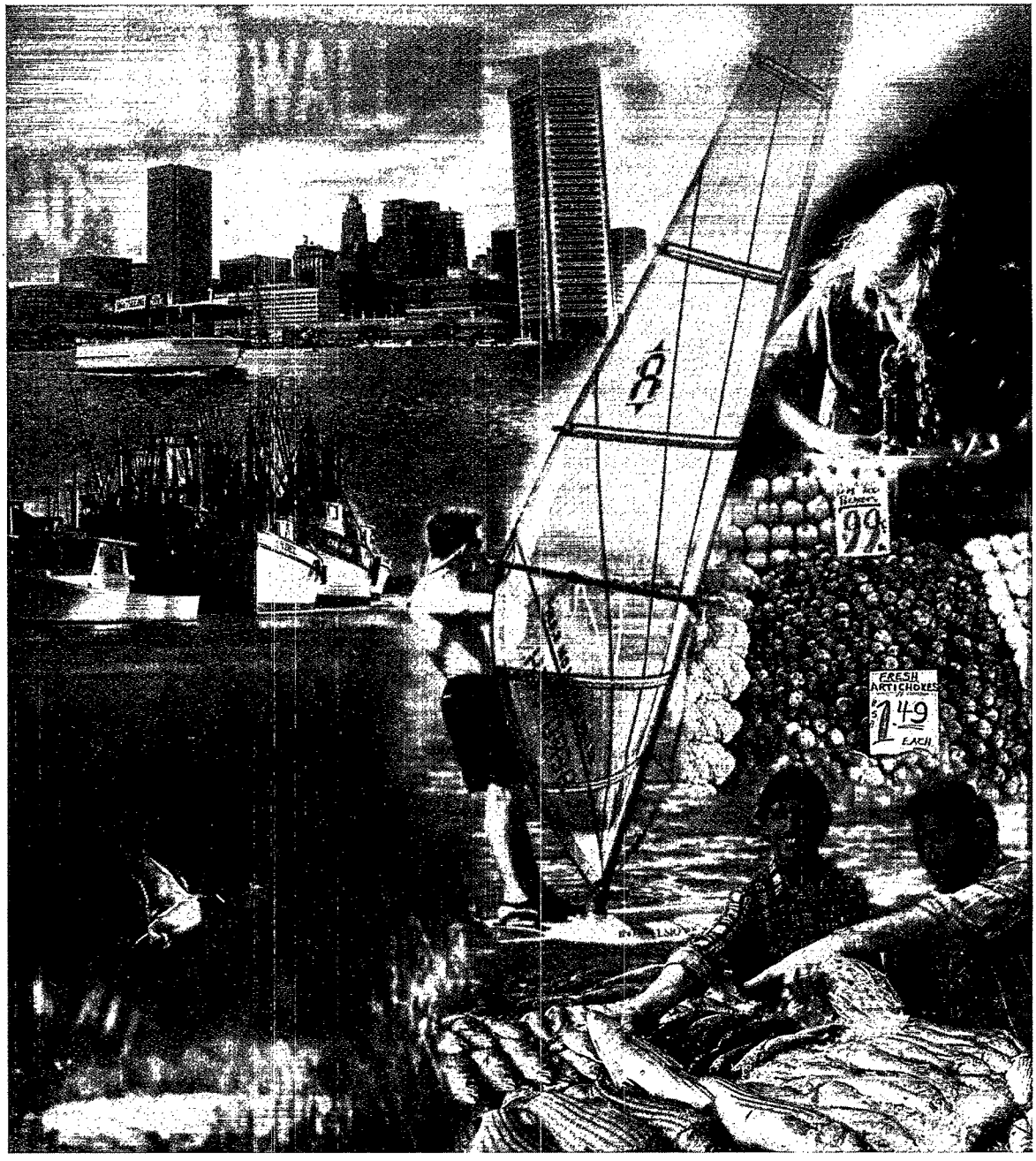
Liquid Assets:

A Summertime Perspective on the Importance of Clean Water to the Nation's Economy



In Memory...

Edmund S. Muskie
1914 - 1996

This report is dedicated to the memory of Edmund Muskie, an American statesman from Maine who served our nation as a Secretary of State, as a United States Senator, and as a strong advocate for the environment.

The following observation, which captures the central theme of this report, was made by Mr. Muskie during a speech in 1966.

> *"High quality water is more than the dream of conservationists, more than a political slogan; high quality water in the right quantity at the right place at the right time, is essential to health, recreation, and economic growth"*

Thirty years later, it still holds true.

Liquid Assets:

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United States Environmental Protection Agency
Office of Water
Washington, DC

Second printing, August 1996

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Executive Summary

Each year, the Memorial Day weekend launches a busy season of recreational activity around America's rivers, lakes, and beaches. In addition to providing fun and relaxation, these activities also provide a major boost for our nation's economy. Billions of dollars are spent on food, lodging, gas, special equipment, licenses, and services, all so people can enjoy themselves on and around the water.

But, the dividends from clean water are not limited to just the recreation and tourism industry. From Main Street to Wall Street to the family farm, clean water affects the profits and growth potential of many other economic sectors, including agriculture, commercial fishing, real estate, and manufacturing. This report, *Liquid Assets: A Summertime Perspective on the Importance of Clean Water to the Nation's Economy*, provides a snapshot of these sectors to highlight how and why clean water and a safe, clean environment are so important to economic prosperity and healthy, thriving communities.

Clean water is a vital commodity for major sectors of the U.S. economy.

- **Beaches, rivers, and lakes are the number one vacation choice for Americans,** helping to support a flourishing recreation and tourism industry. Each year, Americans take over 1.8 billion trips to go fishing, swimming, or boating, or just to relax around favorite water destinations.

- **About 15 percent of American farm lands use irrigation** to support operations—and maintain our lucrative position as "breadbasket to the world." Crops grown on irrigated lands are valued at nearly $70 billion a year—about 40 percent of the total value of all crops sold.

- **The $45 billion commercial fishing and shellfishing industry needs clean water in order to deliver products safe for us to eat.** Americans now eat 15 pounds of fish and shellfish per person a year.

- On average, **the value of real estate along desirable water areas is nearly 30 percent greater than similar properties located inland.** A *Money* magazine survey found that clean water and clean air are the two most important factors Americans consider in choosing a place to live.

- **Manufacturers use about 13 trillion gallons of water every year**—more than 9 times the volume that flows through the Mississippi River into the Gulf of Mexico every day. The soft drink manufacturing industry alone uses over 12 billion gallons of water a year to produce products valued at more than $50 billion.

Clean water means jobs.

- The **recreation and tourism industry is the second largest employer in the country** after health care, providing jobs for over 6 million Americans.

- **Agriculture, which relies on clean water for livestock and crops, provides farm jobs for over 3 million people.** The largest agricultural sector, cattle production, employs over 186,000 people on the farm and over a million more in other areas of the economy.

- The **environmental technology industry is creating jobs at twice the rate of the U.S. economy as a whole,** now employing over one million people.

- **Over a quarter of a million people work to harvest fish and shellfish** from the Great Lakes, the Gulf of Mexico, and other waterbodies that serve as "protein factories" around the country.

Clean water means profits.

- With sales of more than $380 billion, **the recreation and tourism industry provides a $22 billion trade surplus, the highest of all economic sectors.** Annual sales for just three activities—fishing, boating, and viewing and hunting ducks and other birds—is estimated at nearly $45 billion.

- Using clean water for irrigation and raising animals, American farmers produce and sell over **$174 billion worth of food and fiber products** every year. The cattle industry, with sales of more than $40 billion, provides one-fourth of the world's beef.

- Our fleet of commercial fishing vessels delivers **fish and shellfish products worth $3.5 billion a year, a value that increases by more than tenfold in the commercial marketplace.** In Puget Sound, an acre of shellfishing beds produces oysters, mussels, and other products worth between $40,000 and $60,000 every three years.

- The **clean water technology industry has sales of over $64 billion a year here in the U.S. and over $170 billion abroad.** With an international environmental market expected to double by the turn of the century, the forecast for future earnings looks promising.

Clean water provides a major stimulus for healthy, thriving local economies.

In communities across the country, clean water is often a critical factor in determining economic conditions.

- In rural West Virginia, white-water rivers attract 200,000 people a year for rafting trips, and help support the State's $2.5 billion recreation and tourism industry.
- In South Florida, the total value of all uses of the Indian River Estuary is estimated at over $700 million a year.
- In the West, recreational activity around Lake Mead National Park generates spending of nearly $940 million a year.

These profiles show that for businesses and communities throughout the country, clean water can mean the difference between economic decline and a bright, prosperous future. They also show just why clean water needs such special care and attention.

The national portfolio of water resources is large and diverse...


3.5 million miles of rivers and streams


41 million acres of lakes


58,000 miles of shoreline


34,400 square miles of estuaries (excludes Alaska)


278 million acres of wetlands


33,000 trillion gallons of ground water

...but so are the challenges of managing it.

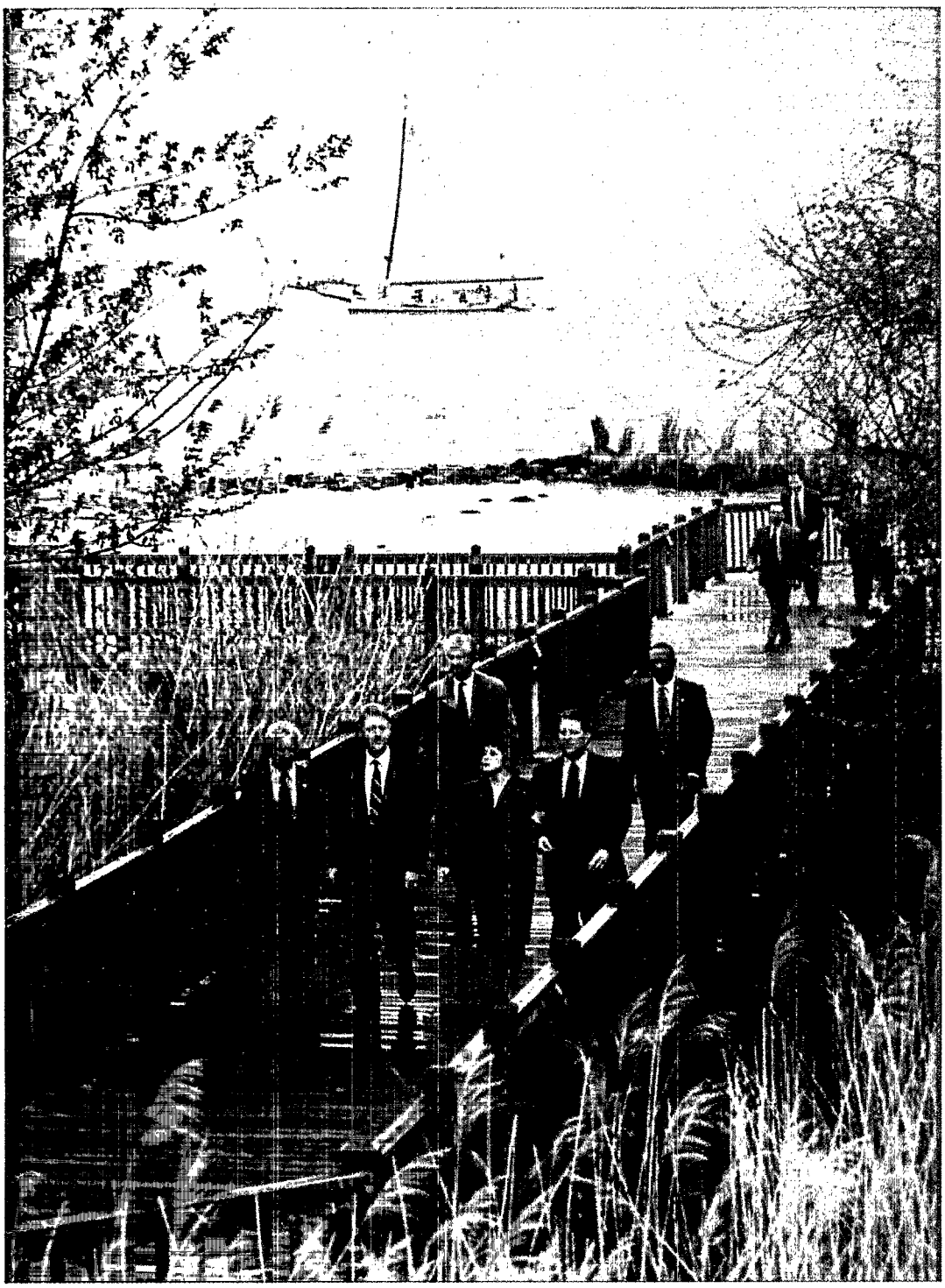
While seemingly plentiful, clean water is a resource at risk.

- Our drinking water supply is one of the safest in the world, but one out of every five people receives water from a facility that violates a national safety requirement.
- Our rivers, lakes, and coastal waters are cleaner today than 25 years ago, yet nearly 40 percent are still too polluted for safe swimming or fishing.
- Wetland losses have been significantly reduced, but between 70,000 and 90,000 acres are still lost every year.
- Advisories or bans have been issued for more than 1,500 waterbodies to protect the public from eating chemically contaminated fish.
- One out of every three shellfishing beds is closed for harvest.
- More than 2,000 beaches were closed in 1994 to protect the public from harmful bacteria and other pollutants found in the water.

These problems represent major challenges that defy quick and easy solutions. Firm commitment and strong partnerships involving individuals and organizations from the public and private sectors offer the greatest promise for ensuring clean water in the future.

Under the Clinton Administration, EPA has led and supported multiple partnerships to provide safe, clean water for our communities.

- A national drinking water loan program was proposed to help communities meet their drinking water needs. This program, which establishes a powerful financial partnership between EPA and the States, marks the first time ever that ensuring safe drinking water has been made a federal investment priority.
- National guidance was issued to better control raw sewage spills—spills that can cause beach and shellfishing bed closures—in more than 1,000 communities. This consensus product, developed with State and local governments, industry and environmentalists, provides for sound environmental management at one-fourth the cost of previous proposals.
- A historic consensus agreement on water allocation was negotiated among multiple parties, including farmers, urban users and environmentalists in California's Bay-Delta region. The common sense agreement broke a ten-year deadlock on one of the area's most difficult issues.
- Following extensive negotiations with the States, industries and other interested parties, national guidance was issued to reduce the flow of toxic pollution into the Great Lakes. By ensuring more consistent standards of performance, the guidance provides for a safer, cleaner environment and a more level economic playing field among competitors.
- One of America's most unique ecosystems—the Florida Everglades— is being restored. A comprehensive approach, including $1.5 billion in federal funding, is helping to speed up the restoration process.

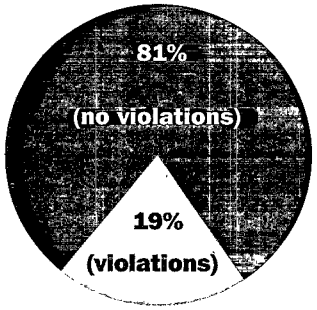


President Bill Clinton and Vice President Al Gore visit a wildlife and recreation area along the Chesapeake Bay.

Good News, Bad News

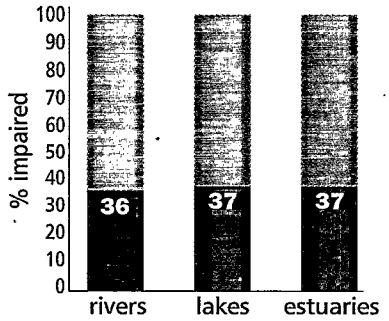
The Current Condition of Our Nation's Water Resources

Our drinking water supply is one of the safest in the world, but...



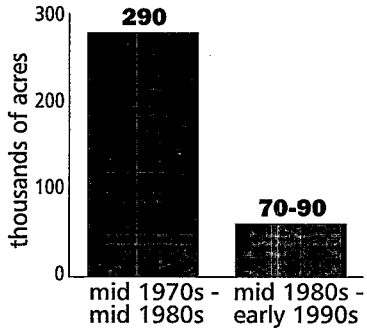
...one out of every five people receives water from a facility violating a national safety requirement.

Our rivers, lakes and coastal waters are cleaner today than 25 years ago, but...



...nearly 40 percent of those surveyed are still too polluted for safe fishing or swimming.

Wetland losses have been significantly reduced, but...



...between 70,000 and 90,000 acres are still lost every year.

Clean Water:

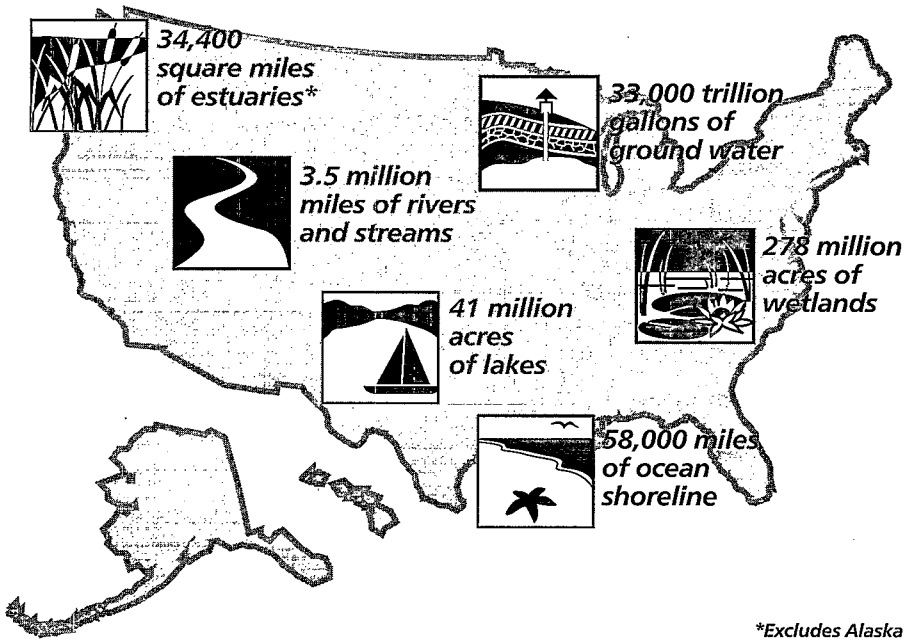
A National Asset, A National Challenge

Each year, the Memorial Day weekend launches a busy season of recreational activity around America's beaches, lakes, and streams. In fact, these areas are our number one vacation choice. In addition to providing relaxation and family fun, travel to these areas also provides a boost to our national economy. Billions of dollars are spent each year for food, lodging, gas, as well as special equipment, licenses, and services, all so people can enjoy themselves on and around the water.

The impact of clean water on the recreation and tourism industry is profound. But, the same is true for many other sectors of our economy. In many ways, clean water is the fuel that powers the nation's economic engine. Commercial fishing, agriculture, real estate, and manufacturing are just a few of the sectors which rely on clean water to operate and ensure productivity.

Despite the many benefits that water provides for society and our economy, some communities are unable to use local water resources to their full advantage. Contaminated drinking water supplies, fish kills, and beach closures are just a few of the problems that communities can face. These problems, which can have far-reaching consequences, call for continued environmental vigilance.

America's Water Resources: A Large and Diverse Portfolio



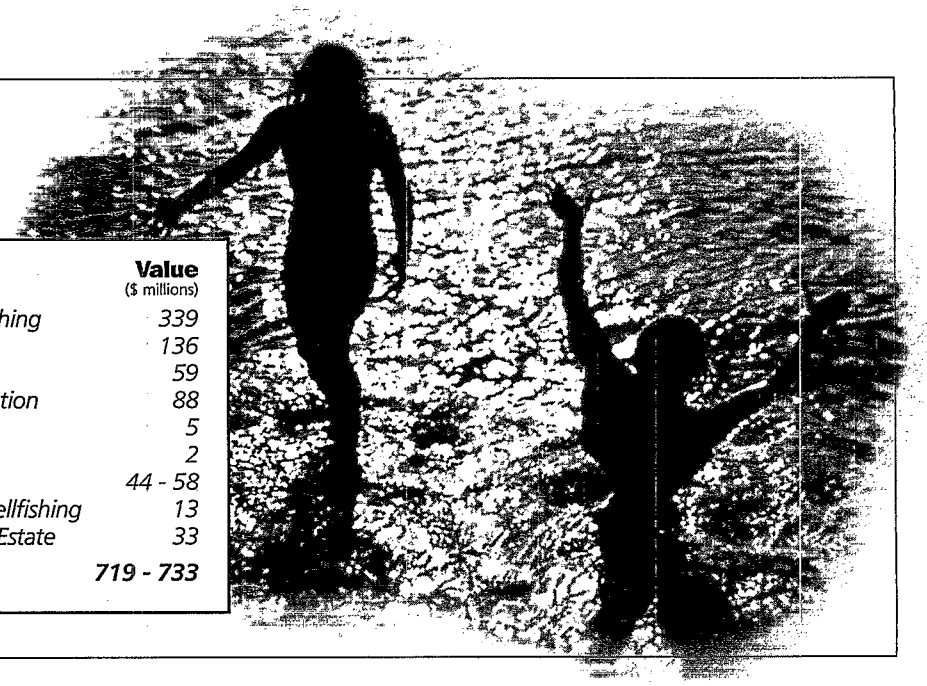
*Excludes Alaska

Profile

What Is Water Worth?

The answer is over $700 million a year for the waters of Indian River Lagoon, an estuary along South Florida's Atlantic coast. An economic evaluation was undertaken to support development of a comprehensive plan for managing the estuary. The results, based on a number of uses by those living in the area, show that the people there are wise to invest in its protection.

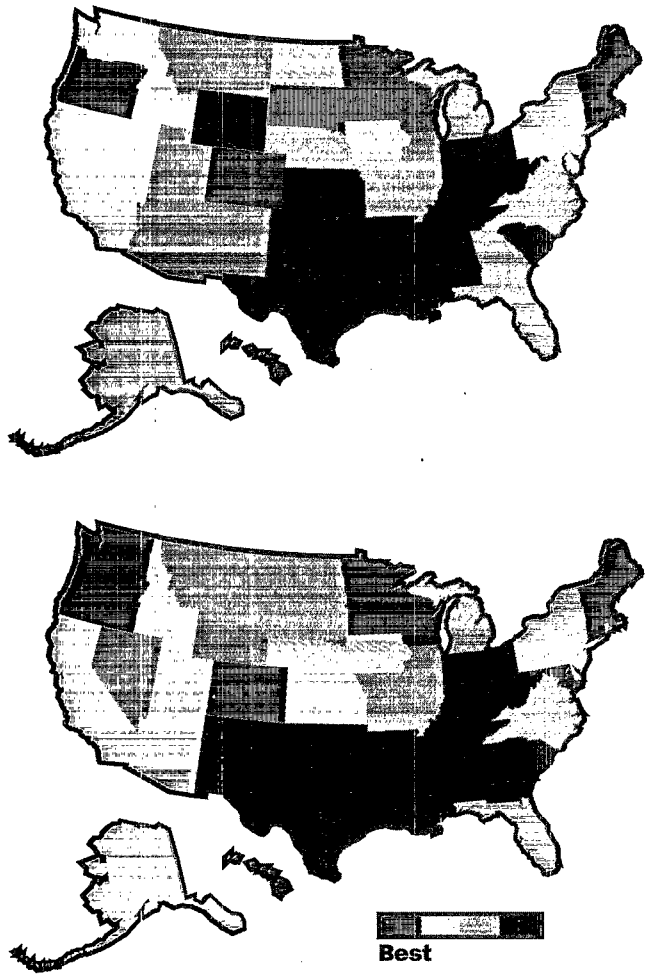
Use	Value ($ millions)
Recreational Fishing	*339*
Swimming	*136*
Boating	*59*
Nature Observation	*88*
Water Sports	*5*
Hunting	*2*
Passive Use	*44 - 58*
Commercial Shellfishing	*13*
Riverfront Real Estate	*33*
Total Value	***719 - 733***



Increasingly, the evidence shows that strong environmental protection and a strong, healthy economy go hand in hand. A study by the Institute for Southern Studies showed that states with the best environmental records also offered the best job opportunities and climate for economic development. Similarly, a study out of the Massachusetts Institute of Technology found that States with stronger environmental standards outperformed those with weaker standards on all economic measures.

This report, *Liquid Assets: A Summertime Perspective on the Importance of Clean Water to the Nation's Economy*, demonstrates the linkage between a strong economy and clean water by focusing on specific sectors. Sector profiles were developed using statistical data from federal agencies, or using appropriate information from other relevant sources, such as trade organizations or individuals working in a particular business. In addition, the report provides information on our nations's clean water laws, on the many efforts underway to help improve water quality in communities throughout the country, and on the many challenges that still lie ahead.

The Economy and the Environment



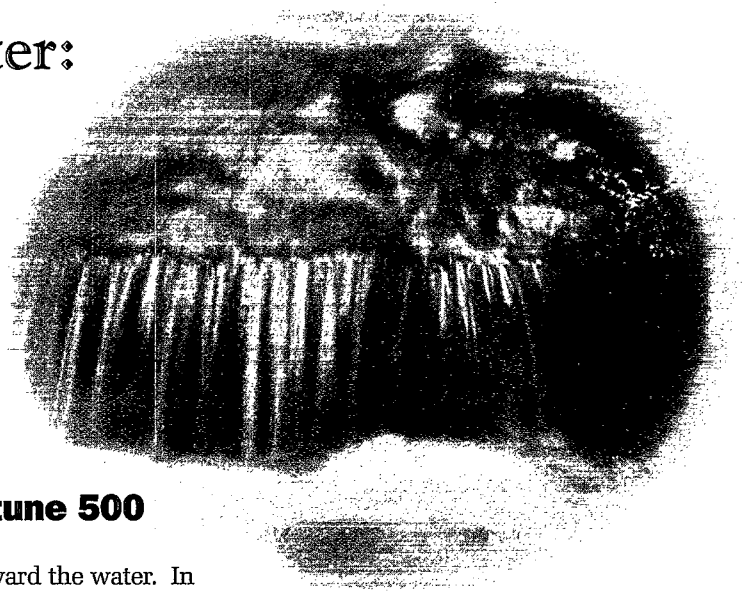
The states with the best record of environmental stewardship...

...often have the healthiest economies.

Source: The Institute for Southern Studies

The Business of Clean Water:

A Look at How Water Quality Affects Major Economic Sectors



What do soft drink manufacturing, river rafting companies, and the commercial fishing industry have in common? They all have a basic need for clean water. Day in and day out, these and other sectors of the U.S. economy rely on clean water to grow, process or deliver their products and services. In various ways, water quality can either help or hurt productivity. Take a look at a few sectors for which clean water is a vital commodity.

Recreation and Tourism: Rivaling the Fortune 500

An abundance of beautiful beaches, white water rivers, and calm, cool lakes is one of the factors contributing to a flourishing recreation and tourism industry in this country. Water has a powerful attraction for people, one that is translating into jobs and profits for our economy. In 1993, recreation and tourism was the second largest employer in the nation behind only the health care industry. It provided jobs for over 6 million people, and generated sales of over $380 billion, nearly three times the amount of farm products. The industry has a $22 billion trade surplus, the largest of any sector in the U.S. economy.

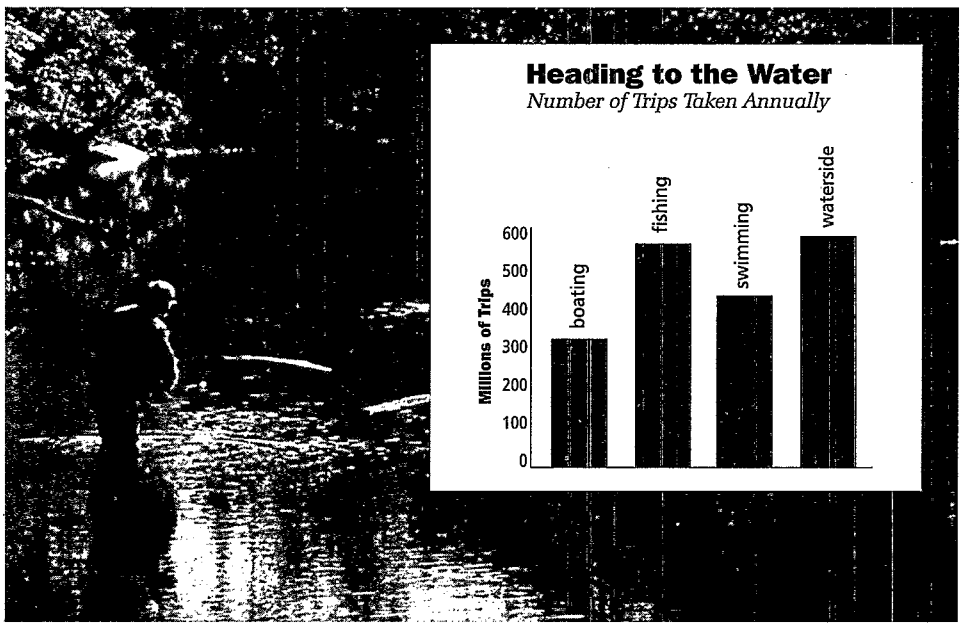
When people decide to plan vacations and travel for pleasure, there is a strong tendency to head toward the water. In fact, a 1994 Roper Survey found that beaches, rivers, and lakes are Americans' top vacation choices followed by federal and state parks. About a fourth of the population goes swimming every year, making it our second most popular recreational activity behind walking. All total, Americans make an estimated 1.8 billion trips a year to enjoy boating, fishing, swimming or just relaxing around the water.

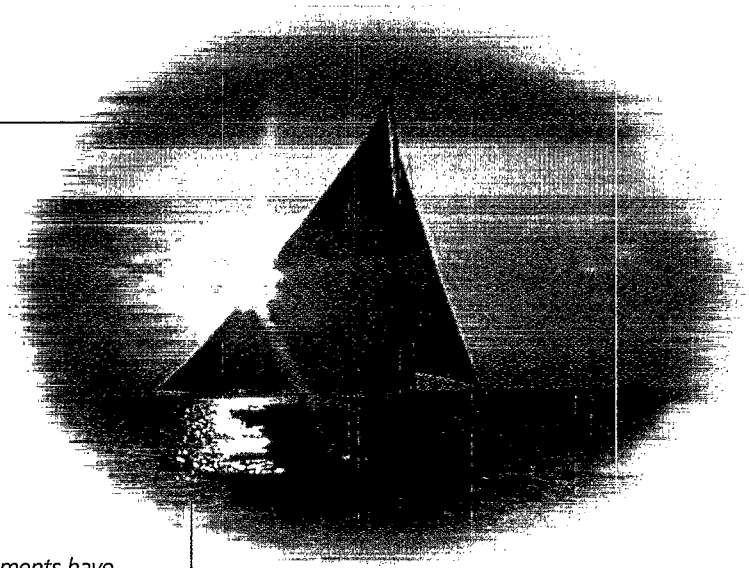
About 300 million trips are made every year to go boating. Over half of these trips involve power boating, but sailing and paddle sports, such as kayaking, canoeing, and rafting, are popular, too. Boating sales are estimated at over $14 billion a year, and over 6,000 companies are involved in manufacturing boats, trailers, motors and accessory items. The recreational marine boating industry alone employs about 600,000 people.

"beaches, rivers, and lakes are Americans' top vacation choices"

A significant portion of recreational spending is tied to fish and wildlife, both of which require high-quality water and habitat, such as wetlands, for survival. Nearly 49 million American anglers spend $24 billion a year pursuing their sport, ultimately generating $69 billion for our economy. If sportfishing were incorporated as a single business, it would rank 27th on the Fortune 500 List of top sales producers, surpassing such giants as Coca-Cola, GTE, and Dow Chemical.

Ducks and other birds that depend on clean water also generate economic activity for the recreation and tourism industry. In 1991, nearly 3 million people spent about $544 million hunting migratory waterfowl. And even more Americans watch and photograph them. Over 19 million people participate every year, spending over $3 billion, and generating nearly $10 billion in total economic activity. When all birds, not just waterfowl, are factored in, the impact is even more significant. The

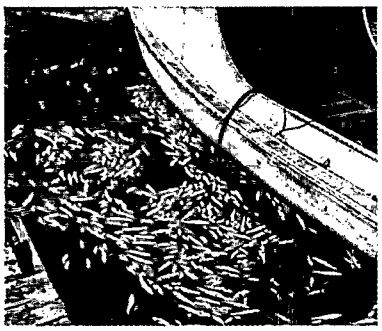




Profile

The Return of Recreation on the Potomac

The Potomac River, which flows through the nation's capital, provides one of the best examples of how water quality can limit or enhance recreational opportunities for people living in or visiting an area. For decades the Potomac suffered from the harmful effects of water pollution. As early as 1894, the U.S. Public Health Service declared, "At certain times of the year, the Potomac River is so loaded with sediments as to be unfit for bathing as well as for drinking and cooking purposes." In 1965, President Lyndon Johnson called the Potomac a "national disgrace" and promised to have "clean water by 1975."



1960s: Fish kills were commonplace.

Over time, dramatic improvements have been made, largely as a result of the Clean Water Act of 1972. The legislation was the foundation for stronger environmental performance standards and federal funding. These funds helped to build a state-of-the-art sewage treatment plant which now treats over 70 percent of the region's waste before discharging it into the Potomac. Improved sewage treatment is recognized as the single biggest factor in the Potomac's restoration.

With improvements made in sewage treatment, more recent efforts have focused on reducing another major pollution source—polluted runoff from urban and rural areas. In 1987, a landmark agreement was reached between Federal, State, and local governments in the region which called for reducing nutrient loadings, such as fertilizers, by 40 percent by the year 2000. The agreement focused on the Chesapeake Bay, but as a major bay tributary, it also applies to the Potomac.

Today, the Potomac River is a much cleaner and safer body of water. Restaurants and shops line the river in Georgetown and Old Town Alexandria. A bass fishing industry has been established, and the river has been the sight of national and regional fishing tournaments. In total, the economic benefit of recreation and other uses of the river is estimated at about $120 million a year for Maryland, Virginia, West Virginia, and Washington, D.C.

Nina Wilson, owner of Potomac Party Cruises since the late 1970s, offers a glimpse of how water quality has improved over the years, and what these improvements have meant for her business. Speaking of earlier conditions, she said "I was ashamed of the unsightly, filthy, smelly water of the Potomac. In particular, luncheon business suffered as a result of noticeably poor water quality in the light of day." Today, her business thrives, and annual revenues have increased by tens of thousands of dollars. These increases are clearly linked to a cleaner environment. According to Ms. Wilson, "the Potomac is much, much cleaner and more inviting."

1990s: A fishing guide at work.

U.S. Fish and Wildlife Service estimates that nearly 30 million people participate, and the total economic impact is nearly $20 billion. Birdwatching, in particular, is a high growth sport. In just the past 5 years, the American Birding Association has seen its membership nearly triple.

Water-based recreation can have significant impacts for local, State, or regional economies. Tony Fedler of the Sport Fishing Institute commented in *Fisheries Magazine* that "Many state governments are beginning to recognize the economic payoffs of helping attract more fishers and increasing good fishing opportunities. By investing in boat ramps, fishing piers, aquatic habitat, angler education, fish stocking, and similar programs, communities are helping their economy by attracting more anglers."

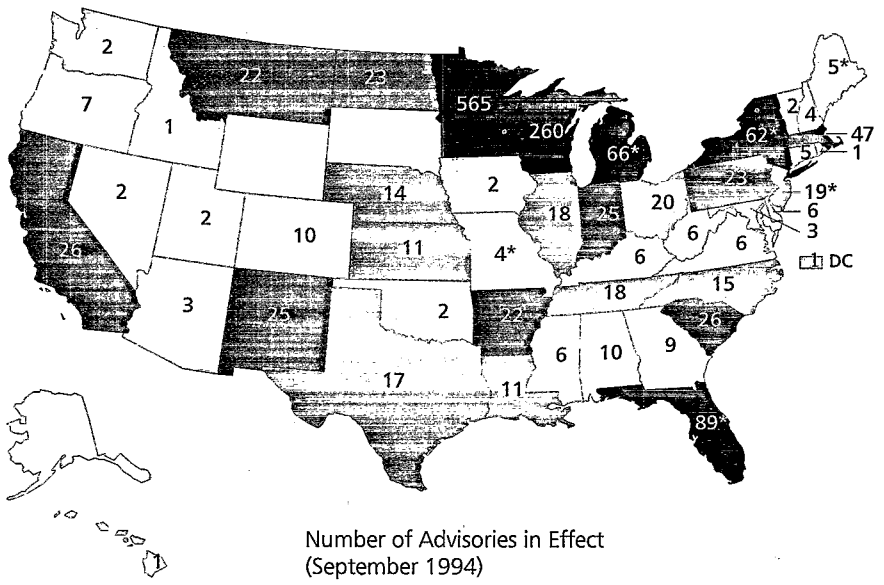
West Virginia is just one State that has recognized and moved to capitalize on its ecological riches. With over 29,000 miles of rivers, West Virginia offers some of the country's best white-water rafting. In 1994, over 200,000 people enjoyed rafting trips on five commercially regulated rivers. The State now brings in over $2.5 billion a year from all tourism activities, and business continues to grow.

In the western United States, recreational use of the Colorado River is valued at about $100 million a year. Lake Mead National Park provides another major economic stimulus for the region. The park is visited by over 9 million people, and collectively, these visitors spend nearly $940 million.

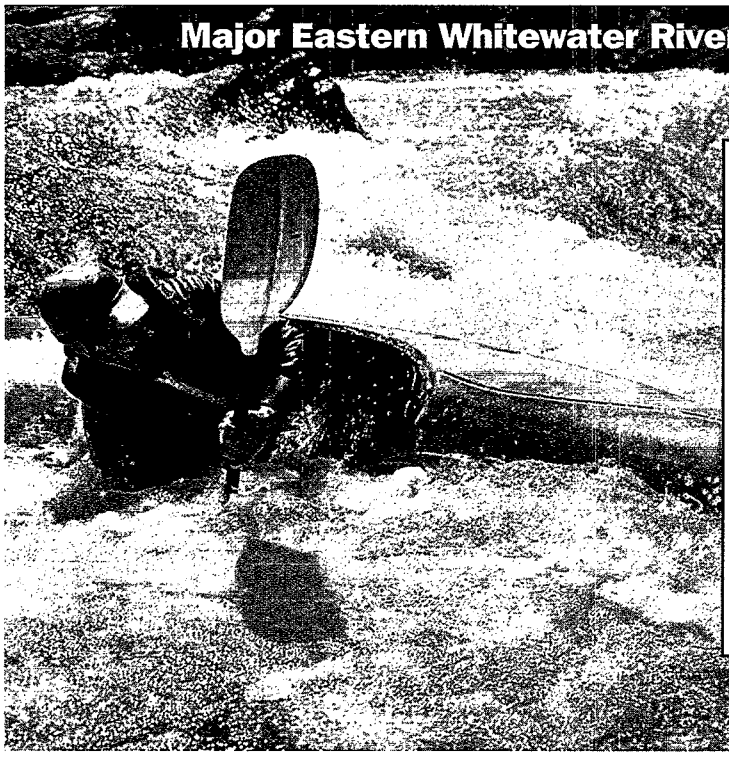
Given the strong attraction of water as a recreational choice, the future growth and prosperity of the tourism industry is certain to be affected by water quality conditions. Commenting on the medical waste wash-ups that closed New York and New Jersey beaches in 1988, real estate agent Jack McHugh stated, "No one came back in 1989. We are usually completely booked-up by March. That year, we sat around waiting for the phone to ring." Economic losses to the region were estimated at more than $4 billion. In 1994, sewage and health concerns about other pollutants led States to close nearly 2,300 beaches to the public.

Economic losses also result when recreational fisheries are placed off limits. In 1995, States issued fish consumption advisories or bans for over 1,500 rivers and lakes where the fish were too contaminated to eat. Mercury is the toxic pollutant most often causing these advisories. While specific data regarding the impact of these advisories on recreational fishing do not exist, warning signs along a river clearly diminish the joy of the fishing experience—and quite possibly, economic opportunity for the local community.

Fish Consumption Advisories in the United States



Major Eastern Whitewater Rivers Ranked by Annual User Days



RIVER	STATE	ANNUAL USE
LeHigh	PA	129,350
Youghiogheny	PA	125,000
Nantahala	NC	100,000
Ocohee	TN	90,000
New	WV	83,000
Shenandoah	WV/MD	60,000
Chattooga	GA/SC	55,129
Cheat	WV	40,000
Gauley	WV	25,000
Kennebec	ME	14,400
Penobscot (W. Branch)	ME	12,000
Nolichucky	TN	8,000
Indian-Hudson	NY	3,500
Total		**745,379**

Profile

Reopening of Shellfishing Beds in Puget Sound

Thanks to the effort of scores of people, from public officials to farmers to homeowners to volunteers, clam and oyster harvesting has recently been allowed again in at least four areas of Puget Sound. Although more than 20,000 acres of Washington's commercial shellfish beds still remain closed, there has been success in reducing pollution that had caused some beds to be closed for as long as 12 years. "The oyster industry is more prosperous than ever," says Tim Smith of the Pacific Coast Oyster Growers Association. "It also has a more uncertain future. It's all about the water."

The revival of the half shell trade, coupled with a booming Asian market, has helped turn Washington's $40 million a year oyster industry into the nation's largest. Mussels and clams, produced almost exclusively in Puget Sound, generate an additional $18 million annually. An acre of oyster tidelands can yield about $40,000 to $60,000 every three years, depending on the location and oceanic conditions.

Since 1986, the State has prohibited or restricted oyster harvesting on nearly 45,000 acres of shellfish beds—a quarter of all available grounds in Puget Sound. The culprit is usually poorly treated waste contaminating the waters. A number of steps have helped reduce this contamination. For example, about 100 farmers in the Burley Lagoon watershed have cooperated with the Kitsap Conservation District to cover manure piles, construct fences along streams to keep animals out, and rotate grazing areas to reduce runoff from erosion. Also, a major campaign was launched to identify and upgrade failing septic systems in the watershed.

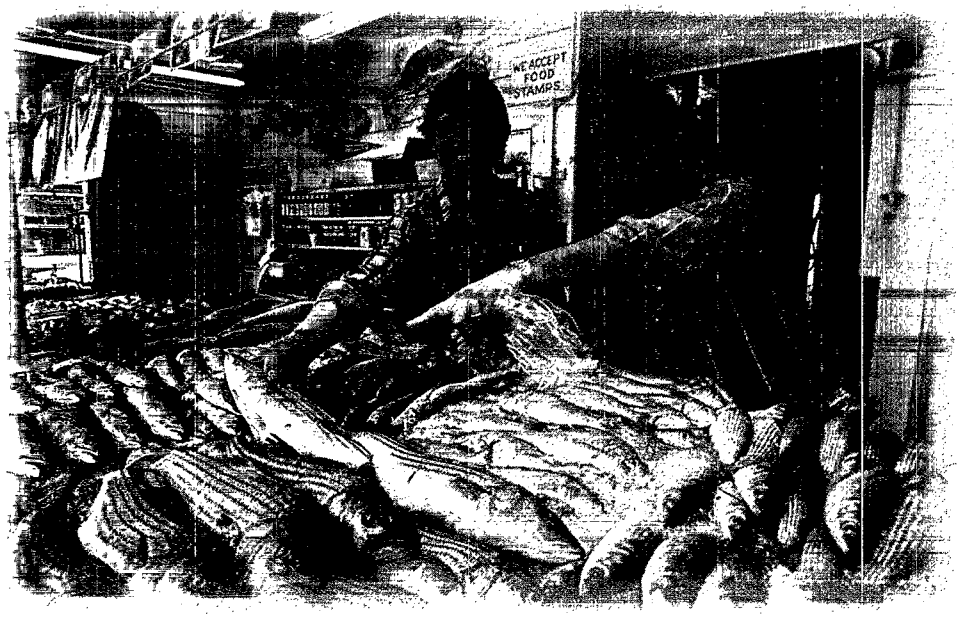
"Homeowners and farmers have worked hard to improve their sewage systems, farm management practices, and to stop the pollution that was damaging Burley Lagoon," stated Eric Slagle, an Assistant Secretary of the State Department of Health. "It's great to see that effort pay off."

Commercial Fishing: What a Catch

H.L. Mencken, an American journalist, once compared the Chesapeake Bay to a giant protein factory. Every year, our nation's protein factories—the Great Lakes, the Gulf of Mexico, and other coastal areas—produce over 10 billion pounds of fish and shellfish. Producing fish and shellfish for consumption and industrial uses, these fisheries are valued at $3.5 billion annually. However, once these products enter the retail market, the value increases more than tenfold. Americans now eat an average of 15 pounds of fish a year, collectively spending $35 billion. An additional $7 billion is sold every year to our trading partners.

The vessels and ports which support the commercial fishing industry generate additional revenues for the economy. Our commercial fishing fleet includes nearly 70,000 vessels and boats, and employs 250,000 people. But, there is reason to be worried about this industry's future.

Data from the National Marine Fisheries Service show declining populations for many species, including salmon, bluefin tuna, cod, haddock, and flounder. These declines can be linked to a number of factors, most notably overfishing. But environmental degradation is a key factor, too. Wetlands, for example, provide critical habitat during various life cycle phases for about 70 percent of all commercial fish species. While wetland losses have been significantly reduced in recent years, about 70,000 - 90,000 acres are still lost annually. Polluted runoff from urban and rural areas, and impacts from poorly treated sewage, represent additional stressors. Shellfish, such as oysters, clams, and mussels, extract their food by filtering water over their gills. If these waters are contaminated, the shellfish can become contaminated too. To protect the public from eating unsafe products, States may restrict or close shellfishing beds. The result can be a significant loss of revenue. In 1994, nearly one out of every three shellfish beds was closed or placed under special restrictions by States.



Agriculture: A Bountiful Market

Water is an absolute necessity for ensuring agricultural productivity. Without water, there would be no farming in this country—no fruits, no vegetables, no grain, and no livestock. The loss would be seen on the dinner table—and nationally, in the gross domestic product.

American farmers produce food and fiber products worth $174 billion a year. In 1994, the industry provided jobs for about 3 million people. The cattle industry represents the largest sector of the agricultural economy. With sales of over $40 billion a year, this industry supports about 186,000 farm jobs and over a million more jobs in other areas of the economy.

Other products, not always recognized as part of the agricultural industry, contribute, too. For example, those poinsettias purchased by so many Americans during the holidays generate over $170 million a year. Farm-raised fish are another agricultural product, and as an industry, aquaculture continues to grow strongly. The U.S. Department of Agriculture reports the industry has grown by 20 percent per year since 1980.

Agriculture is an important industry in every state. From cranberry bogs in Massachusetts, to corn fields in Kansas, to potato farms in Idaho, agriculture provides jobs and helps boost our economy. All together, American farmers produce over 165 different agricultural products, making this nation the "breadbasket to the world." In 1994, the U.S. exported over $45 billion in products. Record sales of $60 billion are forecast for 1996.

Water, in combination with rich agricultural lands and technological advancements, helps make all this productivity possible. Irrigation for agriculture represents our nation's single largest use of fresh water—about 40 percent. An estimated 136 billion gallons are used daily to irrigate crops. About 4.5 billion gallons are used to raise livestock, including horses and farm-raised fish, as well as other animals raised for meat, eggs, dairy products, wool, and fur.

Having sufficient quantity is the most important water issue for farmers. But quality matters, too. Today many farmers are working hard to manage their operations in a more environmentally sound manner.

Did You Know....

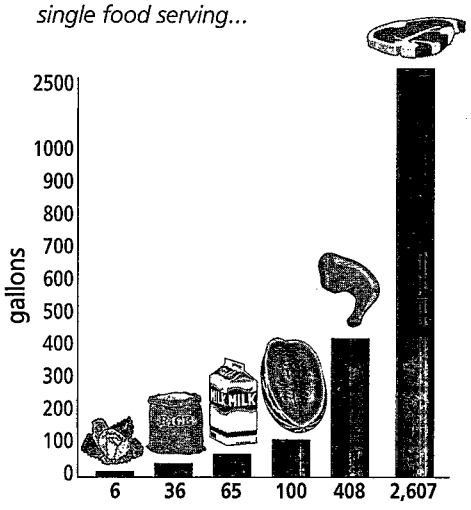
Each year, one American farmer provides food and fiber for 129 people—97 in the U.S. and 32 abroad.

One-fourth of the world's beef and nearly one-fifth of the world's grain, milk, and eggs are produced in the U.S.

About 15 percent of America's 2 million farms use irrigation.

Oh, How Does Your Garden Grow?

Gallons of water needed to produce a single food serving...



Profile

Wisconsin Farmers Save Money and Protect Water Quality

Farmers all over the country are finding it makes good environmental and economic sense to cut down on the amount of fertilizers and pesticides that are wasted when rain washes them off farmland. Farmers in Wisconsin's Lake Mendota watershed, for example, took the guesswork out of nutrient application, basing their fertilizer rates on soil test results. They reduced phosphorus application by more than 50 percent on more than 30,000 acres and saved $200,000 in the process.

Profile

Real Estate Values Around Lake Champlain

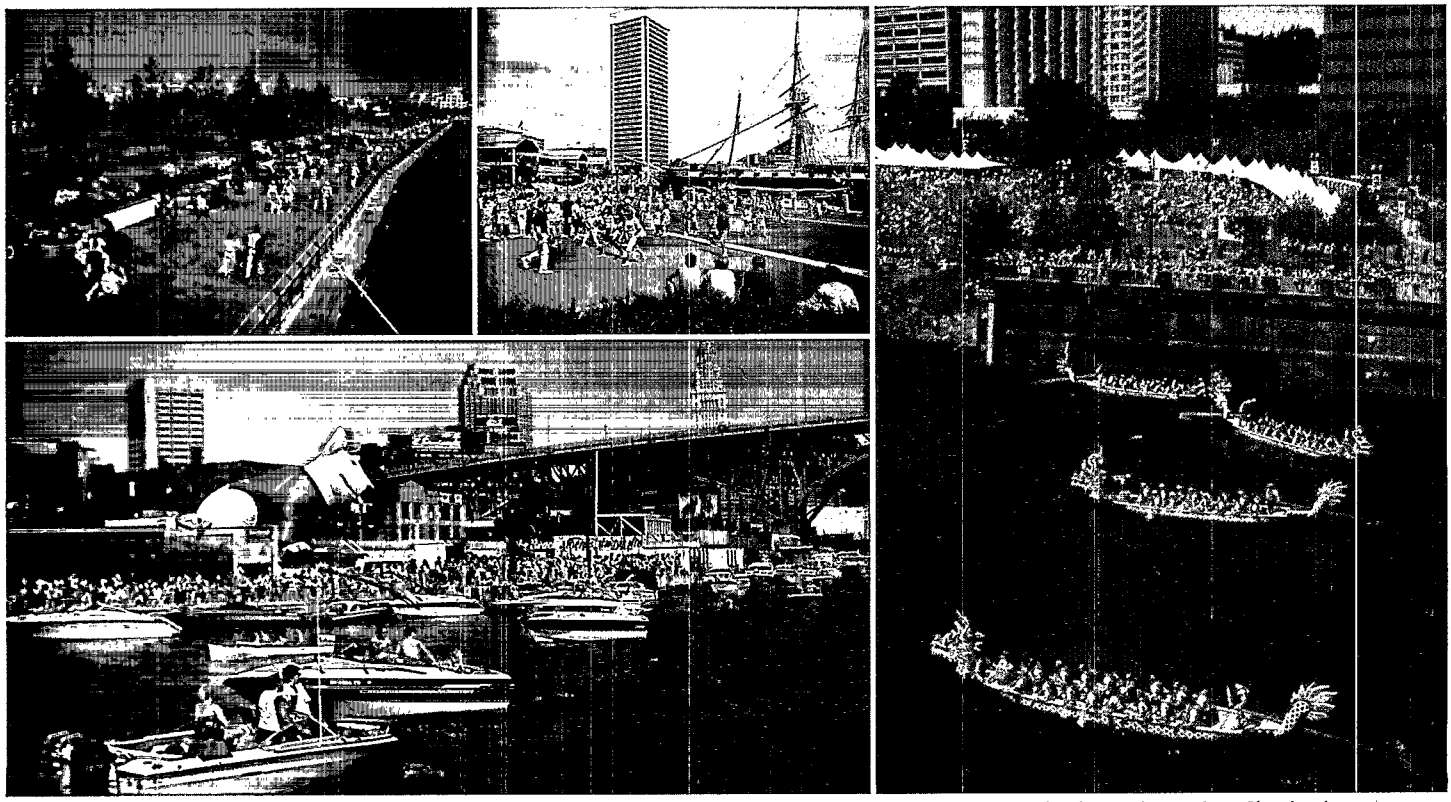
A study of real estate values around Lake Champlain in the mid-'80s demonstrated the real-world effect that pollution can have in a community and on peoples' pocketbooks. Property values in an area of the lake with good water quality were compared to those in an area of poorer water quality. On average, houses in the better quality areas were worth about 20 percent more—a $4,500 difference for these homeowners.

Real Estate: Location, Location, Location

When it comes to real estate, a waterfront view is a prime selling feature—as long as the water is clean. Ocean, lake, or riverfront properties often sell or rent for several times the value of similar properties located inland. In fact, according to the National Association of Home Builders, proximity to water raises the value of a home by about 28 percent. Similarly, a 1991 American Housing Survey found that "when all else is equal, the price of a home located within 300 feet from a body of water increases by up to 28 percent."

Community and business leaders also understand the potential value of waterfront locations. Today, waterfronts are often a focal point for urban renewal in many cities. These opportunities are due, in part, to the federal Clean Water Act. Prior to passage, many of our rivers and waterfronts were so polluted that no one wanted to go near them, much less invest in new development. As an example, the Nashua River in New Hampshire was reported to be so degraded that some property along the

Waterfronts Act as Magnets



Clockwise from top left: *Mississippi River, New Orleans; Chesapeake Bay, Baltimore Harbor; Willamette River, Portland; Cuyahoga River, Cleveland*

river was actually assessed as "worthless" because of the poor conditions. Today, because of cleaner water and revitalization efforts along the Nashua River and in other communities, waterfront areas are often considered "priceless" by those who enjoy them. They act as a strong magnet for business, tourists, and local residents. Restaurants, shops, and aquariums are springing up in areas that were once no more than dilapidated urban wastelands.

Many communities now hold festivals and other special events to celebrate the beauty and bounty of their waters. These events are held because people recognize and value the contribution that a river or lake or beach can have in enhancing their overall quality of life. Clean water consistently ranks as a leading quality of life indicator. Each year, *Money* magazine conducts a "Best Places To Live" survey, and in 1995, clean water and air were the two most important factors for choosing a place to live, over low crime rates, plentiful doctors or hospitals, or low taxes.

Profile

The Change in Chattanooga

What happens when a city receives the title of most polluted city in the country? This label, attached by the U.S. Department of Health, Education, and Welfare in 1970, served as a wake-up call for Chattanooga, Tennessee, a city of 150,000 which sits on a bend of the Tennessee River in the southeastern corner of the State. Chattanooga has transformed itself with a major focus on cleaner water, and today, it receives international recognition as a model of sustainable development. In fact, it was recently chosen as one of 21 areas selected for study by President Clinton's Council on Sustainable Development.

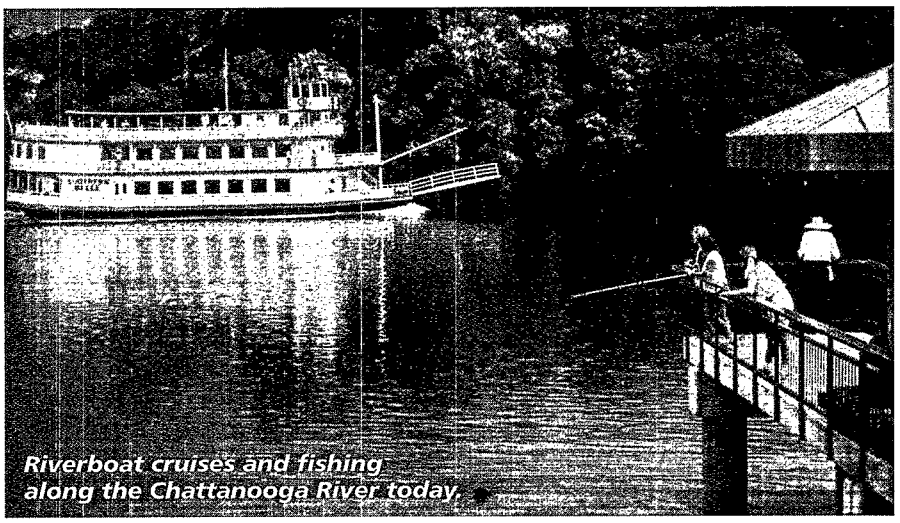
Over the years, easy access to transportation by railway and the river helped Chattanooga grow into a small industrial city. With this growth came pollution, and by the 1960s, the haze in the air was so thick that headlights were sometimes necessary at midday, and the river was unsafe for fishing or swimming.

In 1984, after years of decay, concerned citizens and members of the business community established "Chattanooga Venture" to tackle the city's problems. A group of over 1,700 community members reached consensus on 40 goals that included water quality, air quality, economic development, transportation, education, and housing. Together, they showed a desire for a strong local economy, but also clean air, recreational use of their river, and locally caught fish that were safe to eat.

Restoration of the waterfront was a top priority, and over the next 10 years, deteriorating warehouses and piers were removed to open up access and views of the river. In 1992, the Tennessee Aquarium opened with a focus on freshwater fish and their river and lake habitats. Built at a cost of $45 million, it generated $133 million during its first year of operation. About 1.3 million people now visit every year.

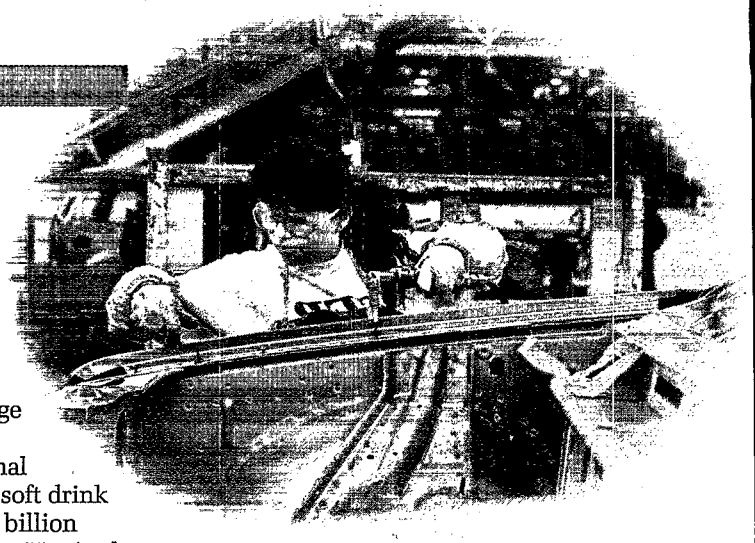
Waterfront space was also revitalized for a new 4-acre park and plaza area, known as Ross's Landing. Today, the area provides residents and visitors with open space as well as shopping and restaurants. In addition, about 2 miles of a planned 22-mile-long park along the eastern shore have been completed, providing recreational benefits for cyclists, pedestrians, skaters, and anglers. Mixed commercial and residential buildings are also planned along this greenway.

The improvements that have been made to Chattanooga's waterfront led James Yenckel, writer for the Washington Post *Sunday Travel Section to write, "By reinvesting in its river heritage, Chattanooga seems to have restored its faith in itself, and it appears—at least to my eyes—to be well on its way to becoming one of the prettiest cities for its size in America."*



Riverboat cruises and fishing along the Chattanooga River today.

Manufacturing: The Universal Solvent Is Also a Key Ingredient



The size and nature of American industries vary widely, and yet, in one way or another, nearly all of them share a common need—a reliable source of water to support operations. In some cases, water is needed primarily for production purposes, such as in the manufacturing of computer chips or steel. In others, clean water is an essential ingredient in the final product, such as soft drinks and pharmaceuticals.

"My company requires high-quality water to produce a high-quality product."

The most recent data on water used in all manufacturing was last gathered by the Bureau of the Census over a decade ago. At that time, manufacturing companies used over 13 trillion gallons of water a year—more than 9 times the volume that flows from the Mississippi River into the Gulf of Mexico every day. About 84 percent of total use was attributed to four major industries—chemicals, metals, paper products, and petroleum.

More recent data on water are available from specific industries. For example, water is clearly vital to beverage manufacturers, and according to its national trade association, the soft drink industry uses over 12 billion gallons of water a year. Use is also high for malt beverage producers—it takes about 10 barrels of water to produce a single barrel of beer. These are highly lucrative industries, with each generating about $50 billion a year in sales. Together, they support about 3.5 million jobs and generate $270 billion in total economic activity. In sum, all manufacturing contributes about $1 trillion a year to the U.S. gross domestic product.

Increasingly, companies are choosing to become directly involved in community programs to protect the local water source. The Hershey Foods Corporation is working with its local water company in Pennsylvania to ensure that its water stays clean. And Coors Brewing Company in Colorado is working to prevent pollution of the local aquifer.

"Water is a fundamental input to our production process. My company requires high-quality water to produce a high-quality product. We must support protection of the community's ground water supply not only to protect our employees, but also to keep production costs down," says Jack Huggins, President and Chief Executive Officer of an ethanol and agricultural feed producing company in Pekin, Illinois. This reliance has not been lost on the local Chamber of Commerce. "We are going to use the Pekin protected water supply as a marketing tool for the community to expand business and attract companies," said Charles Renner, the Chamber of Commerce Executive Director. Indeed, if the water supply can be protected, the water supplier can avoid having to install expensive treatment technology. The result is a lower water bill for manufacturers and other customers in the community, as well as a higher level of confidence in the local drinking water supply.

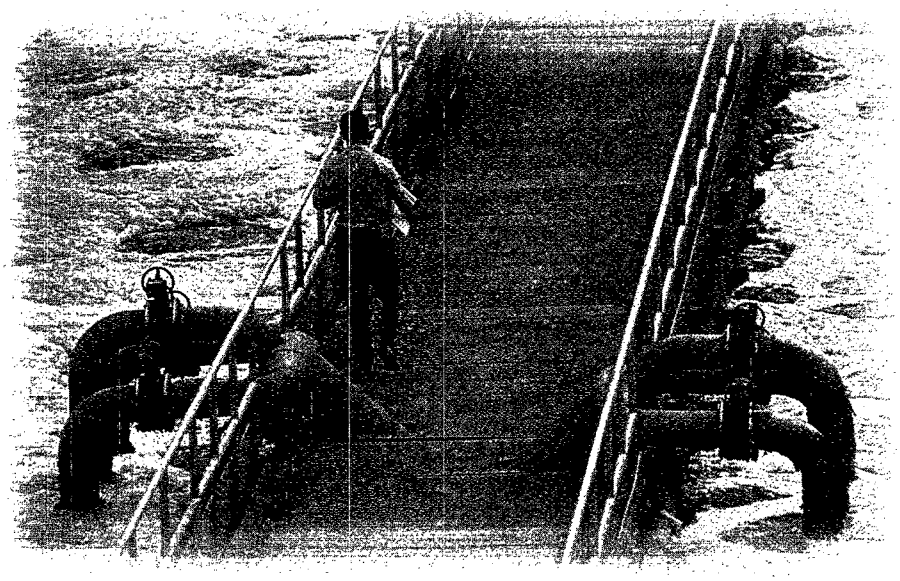
Clean water often plays a role in corporate marketing campaigns. Several national companies use powerful images of water to convey qualities of freshness and purity. For example, Olympia Brewing Company in Washington has adopted the motto "It's the water" as its marketing slogan. As Samuel Rowse, President of juice manufacturer Veryfine Products, noted, "The integrity of a town's water reflects upon the integrity of the companies within that town."

Bringing Products to Market: How Many Gallons of Water Are Used...?

To process a quarter pound of hamburger?	*1*
To make one board foot of lumber?	*5*
To process one can of fruit or vegetables?	*9*
To process one chicken?	*12*
To make one pound of plastic?	*24*
To make one pound of wool or cotton?	*101*
To refine one barrel of crude oil?	*1,851*
To make four new tires?	*2,072*
To manufacture a new car, including tires?	*39,090*
To produce one ton of steel?	*62,600*

Latest Estimate:

Manufacturing companies use over 13 trillion gallons of water a year—more than 9 times the volume that flows from the Mississippi River into the Gulf of Mexico every day.



Environmental Technology: New Products, New Markets

The future of the environmental technology industry depends not so much on *using* clean water, but on *delivering* it as a final product. Water companies treat water from local water sources, such as a river, an aquifer, or reservoir, and provide a product safe for drinking. Similarly, sewage plants treat wastewater from our homes and industries before releasing it to local rivers and streams. In 1994, the market for water-related equipment, chemicals, and services was over $64 billion here in the United States and over $170 billion worldwide.

While the U.S. has traditionally represented the world's strongest environmental market because of higher standards, other countries are beginning to invest in environmental infrastructure and technologies. The international environmental market, now estimated at over $400 billion for all media (i.e., water, air, and waste), is expected to double in size by the turn of the century, and foreign shores represent major market development opportunities. In general, water-related investments are likely to be among the first made. Safe drinking water and sewage treatment are essential services that simply do not exist in some areas.

While improving the environment, U.S. and global investments in environmental technologies also create high-skill, high-wage jobs. Nearly 1.3 million Americans are employed by more than 50,000 private environmental technology companies nationwide. Thousands more work for public companies, such as sewage treatment and drinking water plants. In 1995, the Department of Labor identified environmental technology as a key growth sector for the economy, creating jobs at about twice the rate of the economy as a whole.

"As we protect our environment, we must invest in the environmental technologies of the future which will create jobs."

President Clinton
State of the Union Address,
January 1994

Clean Water Technology Keeps Our Communities Healthy

The United States has:

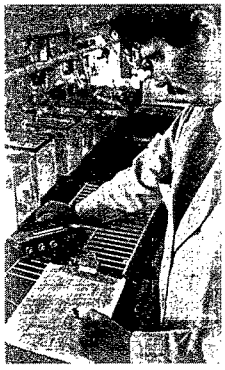
- *nearly **58,000 community water systems** providing drinking water for about 80 million households.*
- *nearly **16,000 public sewage treatment plants** providing service for about 71 million households.*

***Wastewater treatment technology** prevents over 900 million pounds of sewage and 1 billion pounds of toxic chemicals from entering our waterways every year.*

***Drinking water safety standards and technologies** help prevent over 100,000 cases of gastrointestinal illness and reduce lead exposure for over 50 million people.*

Profile

Creating Jobs *and* a Clean Environment



Environmental technology represents a major growth industry for California's economy. The State's Employment Development Department estimates that about 200,000 people work in the environmental technology sector. Revenues from this industry are expected to reach $27 billion by 1997, up from $19 billion in 1992.

Clean Water Insurance:

Our Three Major Water Laws

Over the years, major legislation has been written, debated, and signed into law to help protect the quality of America's water resources. The three most significant laws are the Clean Water Act, the Safe Drinking Water Act, and the Ocean Dumping Act. Together, they represent a national clean water insurance policy. By providing a framework for protection and investment, they offer the promise of safer, cleaner waters for all of us and for generations to come.

Clean Water Act

The Federal Water Pollution Control Act is the primary Federal legislation that protects surface waters, such as lakes, rivers, and coastal areas. Originally enacted in 1948, the legislation was significantly expanded and strengthened in 1972 in response to growing public concern for serious and widespread water pollution problems. This 1972 legislation, which became known as the Clean Water Act (CWA), provided the foundation for the dramatic progress in reducing water pollution over the past twenty years. Amendments to the 1972 Clean Water Act were made in 1977, 1981, and 1987.

The Clean Water Act focuses on improving water quality by maintaining and restoring the physical, chemical, and biological integrity of the nation's waters. It provides a comprehensive framework of standards, technical tools, and financial assistance to address the many stressors that can cause pollution and adversely affect water quality, including municipal and industrial wastewater discharges, polluted runoff from urban and rural areas, and habitat destruction.

The Clean Water Act requires national performance standards for major industries, such as iron and steel manufacturing and petroleum refining, that provide a minimum level of pollution control based on the best technologies available. These national standards result in the removal of over one billion pounds of toxic pollution from our waters every year.

In addition, the Clean Water Act establishes a framework whereby States and Tribes survey their waters, determine appropriate uses, such as recreation or water supply, and then set specific water quality criteria for various pollutants to protect those uses. These criteria, together with the national industry standards, are the basis for permits that limit the amount of pollution that can be discharged to a waterbody. Under the National Pollutant Discharge Elimination System, sewage treatment plants and industries that discharge wastewater are required to obtain permits and to meet the specified limits in those permits.

The Clean Water Act also provides Federal funding to help States and communities meet their clean water infrastructure needs. Since 1972, over $66 billion in Federal grants and loans have been provided, primarily for building or upgrading sewage treatment plants. Funding is also provided to address another major water quality problem—polluted runoff from urban and rural areas.

Protecting valuable aquatic habitat, such as wetlands, is another important component of this law. Filling wetlands with dredged or fill material can destroy or degrade these important aquatic areas and have a profound impact on water quality. To minimize impacts, the Clean Water Act establishes a permitting program to ensure that these types of activities are conducted in an environmentally sound manner.

Safe Drinking Water Act

The Safe Drinking Water Act was passed in 1974 following public concern over findings of harmful chemicals in drinking water supplies. The law established the basic Federal-State partnership for drinking water used today. It focuses on ensuring safe water from public water supplies and on protecting the nation's aquifers from contamination.

To ensure the safety of public water supplies, the law requires EPA to set safety standards for drinking water.

Standards are now in place for over 80 different contaminants. EPA sets a maximum level for each contaminant; however, in cases where it is not economically or technologically feasible to make this distinction, EPA specifies an appropriate treatment technology instead. Water suppliers are required to test their drinking water supplies and maintain records to ensure quality and safety. Most States have the responsibility for ensuring that their public water supplies are in compliance with the national safety standards.

Provisions also authorize EPA to conduct basic research on drinking water contamination, to provide technical assistance to States and municipalities, and to provide grants to States to help them manage their drinking water programs.

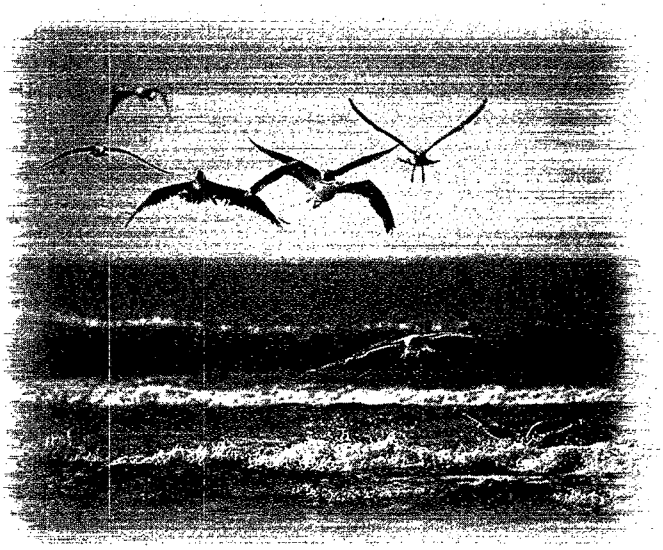
To protect ground water supplies, the law provides a framework for managing underground injection of wastes. EPA has responsibility for issuing permits for these operations and ensuring compliance. As part of that responsibility, EPA may disallow new underground injection wells based on concerns over possible contamination of a current or potential drinking water aquifer.

Ocean Dumping Act

Also passed in 1972, the Ocean Dumping Act provides a framework for managing ocean dumping activities and for conducting basic oceanic research. The law bans ocean dumping of radiological, chemical, and biological warfare agents and high-level radioactive waste. Amendments in 1988 extended this ban to sewage sludge, industrial waste, and medical wastes.

The law provides a mechanism for meeting U.S. commitments under the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters, an international ocean dumping treaty signed by 80 countries.

It also authorizes research on the effects of ocean dumping, pollution, over-fishing, and other human-induced stressors, including oil spills. Provisions added in 1992 establish a national coastal water quality monitoring program to evaluate the health and quality of ocean waters and the pollution sources that affect them.



Joint Ventures:

How EPA Works in Partnership to Improve our Waters and Protect Public Health

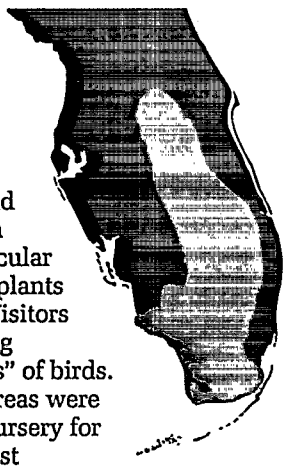
"Waste not, want not," a common American adage, should be considered as a national motto for managing our nation's water resources. Indeed, because our rivers, lakes, and coastal waters are so vital to our economy, our health, and our overall quality of life, they must be treated as a national treasure of the very highest priority.

EPA has a major role in managing this national treasure, acting as the nation's clean water guardian. But, the job of protecting and improving our waters cannot be done by just one government agency. Today, EPA is working hard to build and nurture partnerships with other federal agencies, citizens, industry and business leaders, and State, local and Tribal governments, all of which have important contributions to make in keeping our waters safe and clean. By leveraging resources and targeting actions to those problems in need of attention, EPA and its partners are helping to make safe, clean water and stronger economies a reality for all of us.

Restoring Valuable Ecosystems

EPA and its partners are involved in clean-up and protection efforts in hundreds of watersheds throughout the country, but a few areas are getting special attention. Nationally, these areas represent some of our most important waters—ecologically and economically.

The Everglades



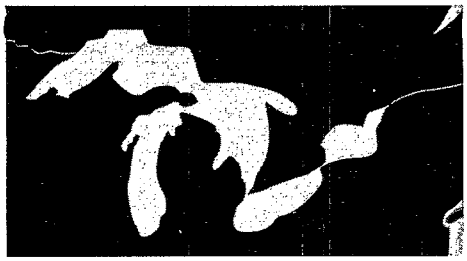
One hundred years ago, this unique ecosystem of water and land provided a home to spectacular populations of plants and animals. Visitors described seeing literally "clouds" of birds. Rich wetland areas were the principal nursery for the State's robust commercial and sport fishing industries. Today, while still a major tourist attraction, the Everglades are recognized as being on the verge of collapse. Ninety percent of the wading birds are gone, the estuarine fisheries have declined, and dozens of species are listed as endangered or threatened.

How did this happen? In the 1940s, intense flooding in South Florida took lives and damaged property. A complex system of public canals, levees, pumping stations and other structures was built to control the water and make the land more suitable for farming and urban development. The system worked—too well. Half of the Everglades' wetlands were drained and converted to agriculture or urban developments.

Over time, the impact of these conversions has become obvious, and a series of actions has been taken to restore the natural ecosystem. In 1993, Florida and the U.S. Army Corps of Engineers began the task of converting the Kissimmee River from an "engineered" channel back into its more natural, riverine form. In addition, a special federal task force on South Florida ecosystem restoration was established to improve coordination among the Federal, State, and Tribal interests in the area. A milestone was reached when the State and the sugar industry agreed to work together to reduce phosphorus loadings by 75 percent. This past January, the Clinton Administration announced a comprehensive restoration approach, including a $1.5 billion federal assistance package, to speed up the restoration process. Among other things, the funding is to be used to acquire, in partnership with Florida, enough land to make restoration a reality, including the purchase and reconversion of over 100,000 acres of farm lands. The funding is also to be used to continue work on the Kissimmee River, to construct wetlands to serve as natural filters for phosphorus and other pollutants, and to develop a multi-species recovery plan. Most recently, in April 1996, Congress passed and the President signed into law a new Federal Agriculture Improvement and Reform Act, otherwise known as the Farm Bill, which provides up to $300 million for Everglades restoration.

Together, these and other investments have the potential to make an enormous difference in the health of this great ecosystem, and future generations may very well look back and point to the 1990s as the turning point in Everglades history. A Save Our Everglades campaign has helped to acquire and protect over 326,000 acres of land in the area. Hydrologic improvements have helped rid the ecosystem of exotic species that invade and disrupt the area's natural vegetation and habitat. And, in just the last three years, phosphorus levels in water discharged from farm lands north of the Everglades have been cut by about 30 percent.

But while signs of improvement can be seen, the ecosystem remains in critical condition. The road to recovery will require continued vigilance and commitment to addressing the many stressors that threaten this fragile ecosystem and the many species that live there.



The Great Lakes

Considering that about 95 percent of all fresh water above ground in the U.S. is in the Great Lakes, it is pretty clear why water quality there is so important. Over 23 million people living in the region depend on these magnificent lakes to provide their drinking water and to support other uses. Not surprisingly, a study by the Health Education Research organization found that over 80 percent of those surveyed wanted to see more done to protect the Great Lakes environment.

And more is being done. In just the past two years, toxic pollution from a wide variety of sources, including manufacturing and sewage treatment plants, has been significantly reduced. PCB emissions have been virtually eliminated and levels of mercury, the pollutant most often found in contaminated fish, have been cut by over 60 percent.

The eight States which border the Great Lakes have long recognized the need to work together on common-sense, cost-effective solutions to reduce the harmful effects of toxic pollution. In the late 1980s, the States asked EPA to help develop a consistent approach for achieving these reductions. In 1994, a major milestone was reached. After working closely with the States, industry, and other interested parties, EPA issued guidance that goes a long way toward reducing toxic pollution. Known as the Great Lakes Water Quality Initiative, this guidance will help ensure a consistent level of environmental protection throughout the region. In addition to providing a cleaner, healthier environment, the guidance will also help to level the economic playing field among corporate competitors. Companies in similar industries throughout the region will be held to the same performance standard, eliminating economic advantages that might occur as a result of lower standards in some areas.

Other efforts are also underway to help protect the Great Lakes from toxic pollution. DDT and other pesticides have been banned for use in this country, and yet they can still pose a powerful threat if old supplies are forgotten or disposed of improperly. Several States in the Region now host agricultural "clean sweeps" to gather and arrange proper disposal of these and other pesticides. EPA has helped States and counties sponsor these events, and many individuals have volunteered their time to help organize and manage them. Between 1992 and 1994, community clean sweep events helped remove nearly 20,000 pounds of toxic material from around Lake Superior.

The medical industry is another active partner, helping to reduce one of region's most serious toxic problems—mercury. The majority of mercury pollution in the Great Lakes comes from air pollution generated by coal-burning utilities and incinerators. However, mercury is also found in many medical products, and unless these products are disposed of properly, the very products designed to improve public health can cause serious harm. To reduce this risk, EPA supports a partnership between regional doctors, nurses, hospitals, local governments and the National Wildlife Federation aimed at educating those working in the industry about proper disposal and product alternatives. The goal is to reduce mercury, and if possible, to eliminate the use of mercury-containing products altogether.

"Many hospitals and health care facilities throughout Michigan are already taking steps to eliminate as much of the mercury we use as possible. In keeping with our mission of providing quality health care and promoting a healthy environment, we're looking forward to spreading this information across the Michigan health care community," said David Seaman, Executive Vice-President of the State Health and Hospital Association.

While the amount of toxic pollution being released into the Great Lakes is being reduced, the problem is not completely solved. Toxic chemicals from the air, from contaminated bottom sediments, from agricultural and urban runoff and from Superfund sites still pose a threat to the environment and the people who live there. These sources present a management challenge, and they call for a continued strong emphasis on pollution prevention and toxics control throughout the region.

Profile

Action by the Auto Industry

The American Automobile Manufacturers Association, on behalf of Chrysler Corporation, Ford Motor Company and General Motors Corporation, worked with the Michigan Department of Natural Resources to establish an automobile pollution prevention project. Launched in 1991, the manufacturers agreed to voluntary actions to help reduce emissions of over 65 toxic chemicals in the Great Lakes area. Since that time, toxic emissions have been cut by 15 percent. If zinc emissions from two plants are excluded, the rate of total toxic reduction is over 50 percent. Because of its success, the program is now being expanded to automobile manufacturers in other parts of the country.

San Francisco Bay-Delta

The San Francisco Bay-Delta is another area getting special attention. Comprising more than 1,650 square miles—an area about the size of Rhode Island—the estuary is a source of drinking water for 20 million people, provides irrigation for over 4.5 million acres of farmland, supports more than 120 species of fish, and is an internationally important waterfowl migration area. It also drains nearly 40 percent of California's land area. Over the years, water diversion, loss of wetlands, and polluted runoff from urban and rural areas have seriously impacted the health of the ecosystem.

Today, multiple government agencies, groups, and individuals are working to stop the pollution and repair the damage. One of the most important efforts to date occurred in 1994. The Clinton Administration worked with

Profile

Volunteers Make a Difference

Increasingly, private citizens are turning their concern for their local environment into action by volunteering to monitor water quality in lakes, rivers, or coastal areas. In the Bay-Delta area, hundreds of people, young and old, have received training and begun to collect and report important water quality information. Mike Rigney, who works at the Coyote Creek Riparian Station, has trained nearly 200 people in the last few years. When asked whether these volunteers really provide reliable data, Mike was quick to answer "yes!" Indeed, these individuals are making a valiant and valuable contribution, doing what they can to help improve conditions in their community.

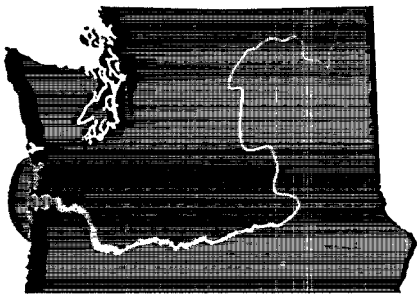
industry, farmers, environmentalists, state officials, and others to craft a historic consensus-based agreement on actions to improve the Bay-Delta environment while providing more certainty in water supplies for the State's future. The common-sense strategy allocates water use among the estuary, farmers, and urban users, breaking gridlock on a decade-long water war in the region.

The North Bay Initiative is another important component in the ecosystem's restoration. The North Bay is known for vast ranch lands, rich aquatic habitats, and some of the most productive vineyards in the world. EPA and other Federal, State, and local governments are working together and with landowners in the area to promote common-sense land use management.

The San Francisco Bay National Estuary Program has provided a major platform for planning, coordinating, and managing many restoration activities. The National Estuary Program, which includes 27 other high-priority estuaries in addition to the Bay-Delta, brings together multiple stakeholders, including government, business interests, and private citizens to set priorities and find practical solutions for the problems threatening their estuary. Mapping the distribution of native fish species and streamside forests, preserving wetlands, and monitoring water quality are just a few of the activities that have been conducted since the San Francisco Bay-Delta program was established in 1987.

Work to restore the Bay-Delta is also being done by the academic community. For example, Professor Robert Twiss of the University of California at Berkeley's Center for Environmental Design and Research is building an extensive geographic information system (GIS), an electronic tool that can map and compare different environmental and land use factors. With more than 50 data sources, the GIS will be able to show everything from streams and wetlands to urban growth scenarios. To Twiss, GIS and advanced telecommunications have the power to ensure wide public access to information. Rather than having one centralized government repository, Twiss envisions a large number of information suppliers (universities, government agencies, volunteer groups) and users (libraries, schools, homes, private firms) connected by a network. "Demystifying and de-professionalizing this kind of information is a very important democratic principle," says Twiss. "It's enormously empowering. It's a way for the estuary project to connect at the grassroots level."

These and other efforts are helping to improve conditions in one of the country's most productive areas. In particular, the Bay-Delta accord addressing water allocation shows that progress can be made on even the most complex and contentious issues. Remaining challenges, as well as emerging ones, such as the rapid introduction and growth of exotic species, will require a similar level of resolve and commitment to finding workable, common-sense solutions.



The Columbia River

As the second largest river in the U.S., the Columbia River is a resource of national and regional significance. This mighty river drains seven states before emptying into the Pacific Ocean, where the mixing of fresh water with salt water provides important estuarine habitat for fish, other aquatic species and wildlife. The river also helps to support agriculture, forestry, commercial and sport fisheries, hydropower generation, and recreation and tourism industries.

Despite its many uses and benefits for the region, evidence continues to show that this great river is at risk. High concentrations of PCBs, dioxin and other toxic pollutants have been found in sediment and fish tissue in the lower river. Reproductive success for salmon and other species is being affected, and fish consumption advisories are now in place throughout the region. Dam operations, along with habitat loss and pollution, have hurt fisheries. Some salmon species are threatened, endangered, or already extinct. These impacts represent quite a loss in a river that was once a passageway for over 15 million salmon a year.

Recognizing the significance of the resource and the need to ensure its protection and restoration, the Lower Columbia River was selected as a site for inclusion in the National Estuary Program in 1995. A team of concerned citizens along with representatives from Federal, State, and local government agencies, environmental groups, and industry is being established to plan and guide priority actions. In addition, in 1994, President Clinton announced a Pacific Northwest Forest Plan to improve management of over 25 million acres of

federally owned forests in the region. Improving forest management will involve protecting streamside areas and reducing polluted runoff from harvest areas, both of which should help to improve water quality and habitat for salmon and other fisheries. One of the largest-scale ecosystem management efforts ever undertaken, the plan will maintain and restore old growth forests, water quality, fish and wildlife habitat, and allow sustainable timber harvests of over 1 billion board feet per year. It calls for over 2.6 million acres to be set aside along streams and wetlands to provide clean water and habitat for fish and wildlife. It provides a stronger scientific basis for managing the area's resources by increasing monitoring and data analyses, and provides funding for education and training to help counter any potential job losses related to timber harvesting restrictions. To date, more than 500 watershed restoration projects have been initiated or completed to improve ecological conditions.

The comprehensive management plan being developed through the National Estuary Program and the Forest Plan provide a strong basis for addressing some of the highest priority problems facing the region. But, they represent only a beginning. Remaining challenges, such as how to best reduce toxic pollution, call for continued action and attention.

Targeting High-Priority Problems

As a result of public and private sector investments in infrastructure and technologies and a commitment to preventing pollution and improving overall environmental performance, our waters are much cleaner today compared to twenty-five years ago. But, we still have areas where the water is too polluted to safely swim or eat the fish. And Americans are increasingly worried about the safety of their drinking water. The problems that still plague our waters do not have fast and easy fixes. To a great extent, our ability to find and apply workable solutions will depend on strong, highly committed partnerships involving individuals as well as the public and private sectors.

Drinking Water Contamination

In 1993, a drinking water crisis in Milwaukee sounded a national alarm on drinking water safety. The contaminant *Cryptosporidium* shut down the city's water supply, costing businesses and commercial establishments over $50 million in lost economic activity. Even more importantly, it left over 400,000 people sick, and was attributed as the cause of over 100 deaths.

Unlike many microorganisms, *Cryptosporidium* cannot be eliminated with normal disinfection processes, but contamination can be reduced through careful filtration. Recognizing the need to protect people from this and other microbial contaminants, public water suppliers and EPA developed the "Partnership for Safe Water." Under this voluntary program, suppliers that use surface waters carefully survey their filtration systems, operating and maintenance procedures, and other management activities to determine whether action is needed to reduce the risk of contamination occurring. To date, 140 water companies serving more than 74 million Americans have joined up and committed to take action, if needed.

The Groundwater Guardian Program is another voluntary way to improve drinking water safety. Established and managed by a nonprofit organization in the Midwest, and strongly promoted by EPA, this program focuses on communities that rely on ground water for their drinking water. It provides special recognition and technical assistance to help communities protect their ground water from contamination. Since beginning in 1994, Groundwater Guardian programs have been established in nearly 100 communities in 31 States.

These voluntary efforts represent practical approaches to help ensure safe drinking water. But for some risks, stronger safeguards are needed. For example, to better protect the public against *Cryptosporidium*, EPA recently began requiring the nation's largest water suppliers to monitor for signs of contamination. The data will be used to clarify current scientific uncertainties and allow EPA to move forward on setting an appropriate safety standard for all systems in the future.

Profile

Guarding Ground Water in Oklahoma

Ada, Oklahoma, is a small town of 15,000 people which relies on a single aquifer for its drinking water. Eight people there have formed a Groundwater Guardian team and are now volunteering their time and energy to keep their ground water clean. To accomplish this goal, the team focuses on education. In the past year, they have developed and widely distributed an information brochure to the local citizens. They have also made numerous presentations to local service clubs and held public meetings to inform local residents about drinking water issues.

Profile

Rochester Takes Action

Rochester, New York, is one city that has already acted to address its combined sewer overflow problems. Using an approach similar to the national combined sewer overflow policy, Rochester's sewer system now captures and treats more than 3 billion gallons of combined sewage annually. Automated rainfall monitoring and computerized "smart" controls help the system optimize its response to a variety of rainfall and flow conditions. As a result, combined sewer overflows discharge to the Genesee River only about twice a year, and they have been virtually eliminated as a cause of beach closures on Lake Ontario. An increase in real estate values along Irondequoit Bay has been directly linked to the recent water quality improvements.

Raw Sewage Spills

For the most part, raw sewage is no longer routinely dumped into our nation's waters. Sewage treatment plants are very effective at treating wastewater so that it can be safely discharged to local waterbodies. In fact, the amount of pollution being discharged from these plants has been cut by over one-third during the past twenty years, even as the number of people being served has doubled.

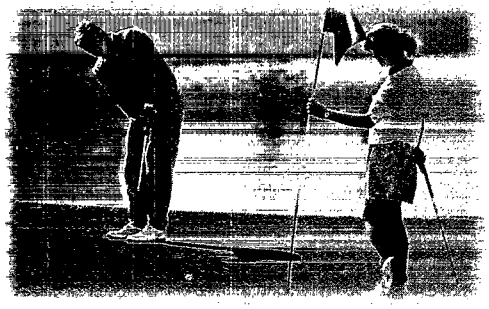
Yet, in some communities, raw sewage spills still occur. Sometimes spills occur because a sewer line is blocked, broken or too small. Spills can also occur during periods of heavy rainfall when the capacity of the sewer line or sewage treatment plant becomes overloaded and sewer lines overflow into city streets or streams. In many older cities, sewers were designed to carry stormwater runoff along with sewage, and to overflow if a heavy rain exceeded the capacity of the system. These combined sewer overflows, or "CSOs" as they are often called, occur in about 1,000 cities around the country.

In addition to spilling raw sewage, CSOs can also release untreated industrial wastewater and street debris. The result can be a real menace to public health, recreational uses, and commercial fishing. In fact, CSOs are a leading cause of beach closures and shellfishing restrictions around the country.

While the local impacts of CSOs can be significant, so is the cost of fixing them. For years, many cities were too daunted by the financial considerations to take action. But in 1994, a breakthrough occurred. Working closely with the States, affected cities, and environmental groups, EPA helped develop a consensus policy to guide action on CSOs. It encourages cities to pursue certain minimum, low-cost controls and to develop a full understanding of local CSO occurrences and impacts before making longer-term investments in additional wastewater treatment, temporary storage capacity, and sewer rehabilitation. The policy balances the need to protect the environment and the public with the need for reasonable, cost-effective controls tailored to local environmental and financial conditions. This departure from a one-size-fits-all regulatory approach is expected to provide sound environmental protection at one-fourth the cost of previous proposals.

Profile

Golf Goes Green



For years, the golf industry and the environmental community have been at odds over environmental benefits of golf courses. Golf course architects, superintendents, and owners have always considered themselves stewards of the land. In contrast, the environmental community viewed the use of pesticides and other golf course management practices as damaging to habitat and water quality. With little actual contact, neither constituency had a clear grasp of the other's ideas and the distance between the two camps continued to grow.

In January 1995, however, a new relationship was established. At that time, EPA helped convene the first ever national meeting between the golf industry and the environmental community. A diverse group of 75 participants met to consider, "Is golf as environmentally safe and sensitive as it can be?" and "How can we make it more so?" The conference opened a long-overdue dialogue that has led to an agreed-upon set of principles for managing golf courses in an environmentally sound manner. They are not rules, but rather a set of voluntary guidelines for golf course developers, architects, superintendents, owners, and individual golfers. The principles have been very well received, earning endorsements from the American Society of Golf Course Architects, the Ladies Professional Golf Association, the Southern Environmental Law Center, and the National Wildlife Federation.

Polluted Runoff

Rain, sleet, and snowmelt wash off the land into streams, lakes, and bays or seep into ground water. Moving across farm fields, city streets, or suburban backyards, this runoff picks up soil particles, pesticides, fertilizers, animal wastes and other pollutants. Because it comes from so many areas and sources, polluted runoff is much more difficult to quantify and to control than pollution from industry and municipal wastewater outfalls. Yet, State and Tribal water quality agencies now estimate that it is the leading cause of water pollution.

To deal with the problem, EPA is emphasizing voluntary, cooperative management approaches designed to create greater awareness about how our waters can become polluted from everyday activities or lifestyle choices. Many businesses now understand how their operations can affect water quality, and they are willing to work with EPA to find common-sense, practical solutions.

EPA's Partners in Prevention program has helped bring many of these partners

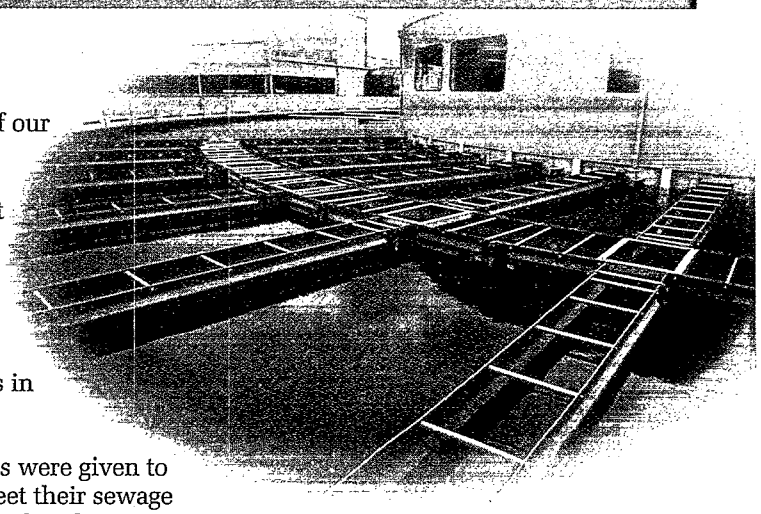
to the table. Through this program, EPA is working with national associations to accelerate voluntary adoption by their members of modern, economical management practices that reduce polluted runoff while maintaining or even enhancing production.

One partner that is very active and providing leadership for the entire livestock industry is the National Pork Producers Council (Pork Council), an organization that represents over 90,000 pork producers in all 50 States. If not managed properly, waste from hog farms can have a devastating impact on water quality. To improve overall environmental performance, the Pork Council produced and distributed to its members the *Guide to Environmental Quality in Pork Production*, a "plain-English" handbook describing sound management practices that should be followed. Since publication in 1993, the Pork Council has been working in partnership with EPA, the U.S. Department of Agriculture, and State water quality agencies to hold workshops designed to deliver hands-on, practical advice for putting these practices into place. Over 65 workshops have been conducted in 14 States. The next step is an Environmental Assurance Program which will promote on-the-farm self-assessments to identify potentially needed environmental improvements. Most recently, the Pork Council held a national summit on environmental issues to continue to improve the industry's commitment and response to ongoing concerns, including proper management and design of hog waste lagoons.

In the summer of 1995, a hog waste spill along the New River in North Carolina killed thousands of fish and resulted in a health warning to protect public health. This incident, which serves as an example of why environmental performance standards are needed, was followed by national guidance from EPA in 1996 which clarifies how large livestock operations should be managed to ensure compliance with national water pollution control requirements.

Investing in Technology and Infrastructure

Since 1972, the Federal government has invested over $66 billion in municipal wastewater treatment. Millions more have been invested by State and local governments to help meet the service needs of a constantly growing population. And these investments have paid off.



The fact that so many of our nation's waters are now cleaner compared to 25 years ago is in large part due to better sewage treatment. Today, the U.S. enjoys what is probably the most advanced network of sewage treatment plants in the world.

For years, Federal dollars were given to communities to help meet their sewage treatment needs through the Clean Water Act Construction Grants Program. However, in 1987, Congress replaced the grants program with a revolving loan program, known as the State Revolving Fund. Under this program, EPA provides grants to the States, and the States then make loans to communities. As the money is paid back, new loans are given to other communities also needing help.

This program represents a powerful financial partnership between EPA and the States, allowing the States to fund their highest priority needs. While traditionally used to build or improve wastewater plants, the State Revolving Fund is also being used to address other water quality problems, such as polluted runoff and sewer overflows.

The program is also a model of efficiency, allowing Federal, State, and local government agencies to leverage limited dollars. Because of the revolving nature, over a twenty-year period, an initial federal investment can result in the construction of up to 4 times as many projects compared to a one-time federal grant. And because of new streamlined requirements, State Revolving Fund projects are completed about 30 percent faster than those funded with grants. Local governments can benefit by saving a great deal of money. The typical cost of a project funded with a State Revolving Fund loan is about 30 percent to 50 percent less than the cost of a project funded through the commercial bond market.

Because of the program's efficiency and importance in helping communities meet their clean water goals, in 1994, the Clinton Administration recommended a similar program to help communities provide an equally important service—safe drinking water. A total of $1.8 billion has been proposed since then, marking the first time ever that funds to ensure safe drinking water have been made a federal investment priority.

Profile

Sewage Solutions in Indiana

Two small towns in Indiana, Wanatah and Lake of the Woods, received loans from the State Revolving Fund to help replace septic tanks and construct badly needed sewage collection and treatment systems. In both cases, the septic tanks were not functioning properly because of inadequate lot sizes and unsuitable soils. The result was sewage contamination in local streams and lakes. The centralized treatment systems allowed each town to eliminate a major source of water pollution, restoring recreational opportunities for local citizens.

The new sewage systems also helped restore economic opportunity. "In Wanatah, growth was at a standstill due to the septic tank moratorium" said Chuck Mack, the town utility supervisor. The SRF loan allowed the community to lift the moratorium and begin providing service to commercial and private residents. Because of the loan's lower interest rates, these services are provided at a lower monthly cost. According to Mr. Mack, "We see the loan as a real benefit to our community."

Conclusion

Clean water has irreplaceable value and enormous potential for affecting many sectors of the economy. A full spectrum of industries and commercial businesses are at stake as well as the livelihoods of real people. Real estate agents in the Northeast, commercial fishermen in the Gulf of Mexico, charterboat captains in the Great Lakes, and hotel owners along Southern California beaches are just a few of the people that depend on clean water to deliver their products and services.

Investing in clean water is a common-sense way to protect these businesses and ensure healthy, thriving communities. And many people and organizations are making that investment by joining in partnership with EPA, States, Tribes, and others to help clean up and protect our waters. These partnerships are encouraging as they demonstrate a willingness to invest both time and resources in order to receive the most important of all dividends—the assurance of safe, clean water for use today and tomorrow. In the short term and long term, for communities and for the nation, it is hard to imagine a sounder investment opportunity.

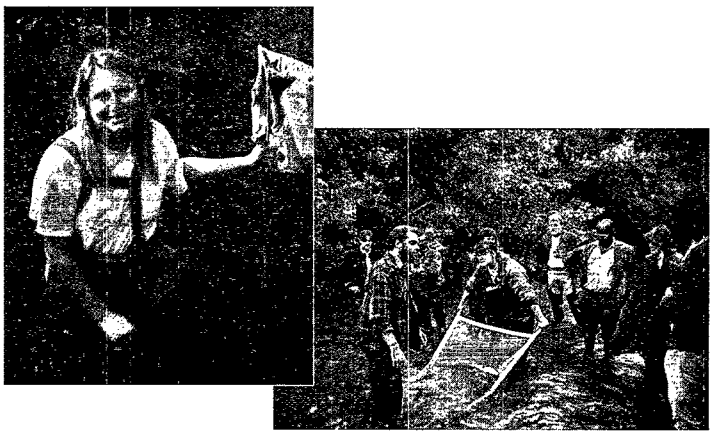
A Final Footnote

How You Can Help Keep Our Waters Clean

If you would like to find out more about water issues, contact EPA at the following address.

U.S. Environmental Protection Agency
Office of Water Communications Staff
Mail Code 4102
401 M Street, SW
Washington, DC 20460
(202) 260-3881

Information is also available on the Internet. Visit EPA's World Wide Web site at "http://www.epa.gov/OW" or send an electronic message to "OW-GENERAL@epamail.epa.gov".



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