

ENVIRONMENTAL TRENDS  
IMPLICATIONS FOR WATER RESOURCES

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Introduction

My charge is to "identify environmental issues" that will shape the future of water resources development and management and the consequences of society adopting various courses of action. Specifically I will look at the impact of environmental laws on water resources development. We all know how the National Environmental Policy Act (NEPA) of 1969, and Earth Day 1970, the Fish and Wildlife Coordination Act, the Endangered Species Act, the Water Resources Council Principles and Standards and other policies put an end to water development projects. Can you imagine being able to design and build a water project with so many environmental laws and attitudes? It is not possible that the day of federal water projects is already finished! By 1972 we had been building projects at a rapid rate for some 70 years. How many more projects could be built on the Tennessee, the Rio Grande, the Colorado, the Savannah, the Chattahoochee? I propose that a contrarian view is more accurate.

In economics we deal with choices, how they are made and by whom. Our objectives are optimization -- maximize net returns, maximize benefits, minimize costs, maximize GNP, maximize personal income. Kenneth Boulding, taking a cue from A. Marshall, has said that we, as a society, more likely engage in suboptimization: maximize the irrelevant, achieve efficiency in undesirable outputs, and develop least cost methods of doing the unnecessary. But this accusation does not apply to water resources? I propose that achieving efficiency in water projects, and the failure to recognize that point, was a major "reason for," or incentive for environmental laws.

Attempted overinvestment in water projects contributed to development of environmental laws. Building too many water projects too fast helped create the environmental movement that we are quite proud of today. Now that we have disposed of the question of the impact of environmental laws, let's look at some other aspects of environmental trends and water resources.

I find it hard to separate environmental trends from the age in which we live. It is a complex age -- one of massive amounts of information and data that can be used either to support or discredit an idea or an issue. With these general thoughts in mind I want to review briefly three kinds of environmental trends:

1. General and technical trends
2. Commodity trends, and
3. Issue trends

#### General Trends

We are, as a nation and within the water resources community, moving rather swiftly to an era beyond that perceived as industrial maturity. The era is often described as a high technology era. These times have also been described in terms such as "post-industrial era," "service era," "communications-information era," "environmental era," "computer era," and the "era of limits." There are numerous other subsets of these descriptions of our times but they all point to a major shift in the way society conducts its business, orders its priorities, and views itself vis-a-vis other social eras. It is a new era, as clearly evident as the era that it replaces, i.e., the industrial revolution and its two centuries or so of social structure.

Our interests as professionals are focused on water -- a most elementary, age-old, but ageless resource. How do we resolve our work with this resource with the environmental issues in the high technology era? First, we must recognize the changing social structure and use its attributes as well in this era as our forebearers did in earlier eras. Second, we must not be shy about suggesting innovations and changes in both technologies and institutions that will keep the core of our

discipline, i.e. hydrology, competitive with other disciplines. We must keep ourselves abreast of the latest operating modes and needs of our society. We must recognize that in a span of one or two decades, we in the water business have made the transition from the industrial era, characterized by fabrication and development of durable goods, to an environmentally sensitive, high technology era, characterized by recycling resources and management of tertiary services. These services include community utilities, resource allocation, waste management, health, research, education and recreation. Who would imagine, in 1961, the a Corps of Engineers reservoir in Georgia (Lake Lanier) would accomodate more visitors than our largest national park? We are, in this era, more concerned with water services such as reuse, conservation, quality protection, and delivery of pluralistic water services than we are with methods such as levies, dams and locks.

What are the symptoms of environmental concern and high technology, that is, the signs of transition from development to management that are evident everywhere? We indulge in instant coffee, instant stock market quotes, instant news of catastrophies, instant governmental policies and near instant movement from coast to coast or continent to continent. We are admonished by futurists to accept the potentials of a new state of society while we are yet unable to comprehend much of the existing state of affairs. We know that certain forms of technology and behavior described by Aldous Huxley's Brave New World in 1931 and by George Orwell's 1984 in 1949 are, sometimes painfully, becoming more evident. It is easy to recognize the a, b and c vocabularies of "newspeak" described by Orwell. What else but "newspeak" uses terms such as "cad-cam," "word processors" and "user-friendly" as also inferred in Huxley's scented disk, a.f.632?

We are in an age of environmental sensitivity that is also in transition from water resources development to water resources management. For example, the federal government's withdrawal from its significant role in water resource financing resulted in pressures from a large segment of the population to look at environmental issues and consequences -- to look at new methods of developing and managing the

nation's water resources. These conditions lead directly to more pressure on state and local governments to assume additional responsibilities for managing the nation's water resources. These interrelated developments were coincident with significant developments of technology and significant changes in the structure of North American society. They force us, at least, to ask questions about the ways we have been doing business with water resources. I shall point out a few indicators that point decidedly to changes in environmental and economic trends that have implications for water resources and related industries. These changes have implications for the way we do business, the way we conduct research, the kind of students we train and the quality of public service activities we provide our sponsoring citizens.

One of the least understood interrelationships that is about us today is that between privatization and environmental interests. Privatization is a major trend of this decade. It seeks to shift more of the costs and responsibilities of society from government toward the private sector. I think we have accepted many aspects of this trend without being fully conscious of its implications or where it comes from. For example, we now have, some major corporations and many small ones in the waste management business charging users directly or contracting with municipalities and other governments for such services. (The signal companies, now Allied Corp., are heavily involved.) Some states, such as a Tennessee, are contracting with the private sector to operate its prison system. The armed forces started contracting for food services from the private sector in the late 1950s and early 60s.

George F. Will's premise in his book on Statecraft as Soulcraft is enlightening on this issue. He says government has a role in making society work well for its individuals and small groups -- not necessarily for self-appointed public interest groups (or their elitist leadership). "Statecraft is a successful management of the state with equal concern for maintaining the highest level of individual and civic responsibility. We have, because of the foresight, the prevailing interests and the compromises of the founding fathers, the world's finest

set of institutions to manage the state of the tone that encourages, even stimulates creativity and innovation. Capitalism is dynamic -- it creates economic and social transformations, it dissolves "old" micro-institutions (organizations and alliances), it diminishes generations of skills and jobs and industries, it creates new industries and organizations and new modes of operations, new communities and new alliances." One of the most active manifestations of these privatization dynamics are the interests in environmental values; that is, a good environment now and in the future. We have created, mostly with volunteers, the new institutions to look after our environmental interests.

We must recognize and join in these innovations if we are to continue on the course of being a society of free persons. We must create and innovate in our fields, we must teach our children and our students to do this if we are to grow. We must perform. We cannot shirk our civic responsibilities in the small (our discipline) or in the large (our society). We are seeing such changes today. An environmental group is actively promoting a market system for reallocating water in the lower Colorado. This concept would have been heresy to an environmental organization a decade ago.

We are engaged, or should be, in a debate on public policy about our water resources that will effect the continuity and health of our field and our society in proportion to how well we resolve the changes that are imminent. Our roles as professionals and citizens should be that of seeking larger outcomes and solutions that do more than just remake the waters of the nation to our limited concerns. We should dispel the idea that changes in the operation and management of our waters do not involve real financial and social costs. We should identify and publicize the true costs and benefits of new public policies to our discipline, to the economy, to the environment and to society.

What are some of the indicators of our environmental era and environmental trends that affect water resources? We can look at table 1, Non-Agricultural Employment, and see what is happening to our basic

Table 1. Non-Agricultural Employment By Sectors, 1957-84.

Year	Total Non-Agricultural Employment Million	Goods Related				Services Related					
		Total		Manufacturing		Total		Services		Government	
		Mill.	%	Mill.	%	Mill.	%	Mill.	%	Mill.	%
1957	52.9	21.0	40	17.2	32	31.9	60	6.7	13	7.6	14
1958	51.3	19.5	38	16.0	31	31.8	62	6.8	13	7.8	15
1959	53.3	20.4	38	16.7	31	32.9	62	7.1	13	8.1	15
1960	54.2	20.4	38	16.8	31	33.8	62	7.4	14	8.4	15
1961	54.1	20.0	37	16.3	30	34.1	63	7.6	14	8.6	16
1962	55.5	20.5	37	17.0	31	35.1	63	8.0	14	9.0	16
1963	56.7	21.0	37	17.0	30	36.0	63	8.3	15	9.2	16
1964	58.3	21.0	36	17.3	30	37.3	64	8.7	15	9.6	16
1965	60.8	22.0	36	18.1	30	38.8	64	9.0	15	10.1	17
1966	64.0	23.2	36	19.2	30	41.0	64	9.5	15	11.0	17
1967	66.0	23.3	35	19.4	29	42.5	64	10.0	15	11.4	17
1968	68.0	24.0	35	20.0	29	44.2	65	11.0	16	12.0	18
1969	70.4	24.4	35	20.2	29	46.0	65	11.2	16	12.2	17
1970	71.0	24.0	34	19.4	27	47.3	67	11.5	16	12.6	18
1971	71.2	23.0	32	18.6	26	48.3	68	12.0	17	13.0	18
1972	74.0	24.0	32	19.2	26	50.0	68	12.3	17	13.3	18
1973	77.0	25.0	32	20.2	26	52.0	68	13.0	17	14.0	18
1974	78.3	25.0	32	20.1	26	53.5	68	13.4	17	14.2	18
1975	77.0	23.0	30	18.3	24	54.3	71	14.0	18	15.0	19
1976	79.4	23.4	29	19.0	24	56.0	71	15.0	19	15.0	19
1977	82.5	24.3	29	20.0	24	58.1	70	15.3	19	15.1	18
1978	87.0	26.0	30	21.0	24	61.1	70	16.3	19	16.0	18
1979	90.0	26.5	29	21.0	23	63.4	70	17.1	19	16.0	18
1980	90.4	26.0	29	20.3	22	65.0	72	18.0	20	16.2	18
1981	91.1	25.5	28	20.2	22	66.0	72	19.0	21	16.0	18
1982	90.0	24.0	27	18.8	21	66.0	73	19.0	21	16.0	18
1983	90.1	23.4	26	18.5	21	66.7	74	19.7	22	15.9	18
1984, June <sup>1</sup>	94.0	25.0	27	19.6	21	69.0	73	20.7	22	15.8	17
1957-71 %	135	110	--	108	--	151	--	179	--	171	--
1970-84 %	132	104	--	97	--	146	--	180	--	125	--

<sup>1</sup>Preliminary. Seasonally adjusted for payroll period including the 12th month.

Source: U.S. Statistical Abstract 1985.

way of doing business. For example, total employment increased 35 percent over the 15-year period from 1957 to 1971. During the 15-year period from 1970 to 1984, this rate of growth of employment was 32 percent, practically no change in the two 15-year periods. However, if we look at the goods producing sector of the economy, total employment in goods related sectors was 40 percent of the labor force in 1957 and only 27 percent in 1984. This decline represents a growth rate of employment in goods related sectors of 10 percent from 1957 through 1971 but only 4 percent during the 15-year period of 1970 through 1984. The decline in manufacturing was even more severe, decreasing from 32 percent of the total in 1957 to 21 percent of the total employment in 1984. The growth rate during the first 15-year period was 8 percent while employment declined by 3 percent over the last 15-year period (1970-1984).

Let's look now at the service producing area and the employment therein. Total employment in services was 60 percent in 1957, increasing to 73 percent in 1984. If we look at services alone, excluding governments, employment was 13 percent in 1957. Service employment increased to 22 percent in 1984. The growth rate in services related employment during the first 15-year period (1957-1971) was 51 percent, decreasing to 46 percent during the next 15-year period (1970-1985). Services, exclusive of government, grew by 79 percent and by 80 percent over the two 15-year periods. As an aside, we can see that total government employment increased from about 14 percent in 1957 to about 18 percent in 1967. However, government employment has remained relatively constant as a proportion of total non-agricultural employment since that time.

What does this mean to our environmental interests as they relate to water resources? It indicates that people will have more leisure time, that they will be engaged in largely inside occupations, that they will require more outdoor area and recreational opportunities away from home. These are all trends that will be of concern for environmental interests and for water resources.

I will summarize the general indicators of environmental trends by looking at two categories of legislation with respect to U.S.

congressional interest. These two categories of laws -- preservation legislation and pollution control legislation -- are by no means all inclusive. First, the data in table 2 show the concentration of preservation legislation passed in the 1970s. Certainly there have been other preservation acts, but nothing like the activity in major new directions such as in wilderness, clean water, fisheries, endangered species. Second, the data in table 3 are focused on federal pollution control legislation and its heyday in the decade of the 1970s. The heavy activities were in water pollution, air pollution, noise, pesticides and "toxics."

#### Commodity Trends \*

Environmental commodities may sound a bit crass but the term helps make a point. Environmental commodities are the water we drink, the air we breathe, the wildlife we enjoy, the wilderness areas we visit, the rivers we float, the lakes we fish and all of the other natural amenities we consume. These environmental amenities are also environmental services in a service dominated era. A park is no less an environmental service than are public schools or insurance. Let's look briefly at the trends involving environmental amenities (commodities, services, resources).

Air Quality. Since 1975, air quality appears to be improving in terms of the five measured pollutants as they occur in the air and in terms of emissions. Carbon monoxide and sulfur oxide emissions and ambient air levels have shown more improvement than other pollutants. Even though carbon dioxide ambient levels and emissions have increased dramatically since 1945,

\* The most authoritative and comprehensive source of data on environmental trends is found in State of the Environment, published by The Conservation Foundation, Washington, D.C. 1984. All notes refer to figures in this publication. These data in Environmental Trends are available in tabular form in the annual reports of the Council on Environmental Quality (Environmental Quality ----) and the Environmental Protection Agency (annual reports and special reports).



Table 2. Preservation Legislation Enacted by the U.S. Congress

Law	Year enacted	Main preservation provision(s)
Yellowstone Park Act	1872	Created first national park.
Antiquities Act	1906	Created system of national monuments.
National Parks Act	1916	Created National Park System.
Wilderness Act	1964	Created national wilderness system.
National Historic Preservation Act	1966,1980 amend.	Expands scope of historic preservation, directs federal agencies to examine impacts on historic properties.
Wild and Scenic Rivers Act	1968	Created national wild and scenic rivers system.
National Trails System Act	1968	Created national trail system.
Bald Eagle Protection Act	1969,1972 amend.	Forbids killing of bald and golden eagles and protects habitat.
National Environmental Policy Act	1969	Requires study of environmental impacts associated with major federal actions.
Wild and Free-Roaming Horse and Burro Act	1971	Provides for federal management and protection of wild horses and burros.
Clean Water Act	1972 amend.	Sets national standards for clean waters.
Endangered Species Act	1973	Bars federal actions that would jeopardize an endangered or threatened species.
Eastern Wilderness Act	1975	Extended wilderness system into East, creating first eastern wilderness areas.
Fisheries Conservation and Management Act (FCMA)	1976	U.S. right to manage fisheries within 200nm.
Federal Land Policy and Management Act	1976	Requires wilderness review of BLM lands.
Surface Mining Control and Reclamation Act	1977	Requires restoration of mined land to original condition.
Endangered American Wilderness Act	1978	Added 1.3 million acres of new wilderness.
National Parks and Recreation Act	1978	Made important additions to the wild and scenic rivers system, and national wilderness system.
Public Rangelands Improvement Act	1978	Sets goal to restore rangelands to earlier productivity.
Archeological Resources Protection Act	1979	Requires permits for site excavations and artifact removal, provides other protections for archeological resources on federal lands.
Alaska National Interest Lands Conservation Act	1980	Establishes large new national parks, wildlife refuges, wilderness areas, and other "conservation system units" in Alaska.

Source: Adapted from Robert H. Nelson. "The Public Lands" in Current Issue in Natural Resource Policy. Resources for the Future, Incorporated. Washington, 1982.

Table 3. Federal Pollution-Control Statutes

Statute	Year Passed
<u>Statutes Focusing on "Conventional" Pollutants</u>	
Rivers and Harbors Act (Navigable Waters)	1899
Clean Air Act Amendments	1970
Resource Recovery Act (Amendments to the Solid Waste Disposal Act)	1970
Water Pollution Control Act Amendments	1972
Noise Control Act (Amendments to the Federal Aviation Act)	1972
Ocean Dumping Act (A title of the Marine Protection Research and Sanctuaries Act)	1972
Noise Control Act Amendments	1976 1978
<u>Statutes Focusing on "Toxics"</u>	
Federal Environmental Pesticide Control Act (Amendments to the Federal Insecticide, Fungicide and Rodenticide Act)	1972
Safe Drinking Water Act (Amendments to the Public Health Service Act)	1974
Resource Conservation and Recovery Act (Amendments to the Resource Recovery Act focusing on hazardous wastes)	1976
Toxic Substances Control Act	1976
Clean Air Act Amendments	1977
Clean Water Act (Amendments to the Water Pollution Control Act)	1977
Federal Insecticide, Fungicide and Rodenticide Act Amendments	1978
Comprehensive Environmental Response, Compensation and Liability Act (more commonly, Superfund)	1980

Source: Adapted from State of the Environment, The Conservation Foundation. Washington, D.C. 1984. p. 38.

it is unclear whether the warming is CO<sub>2</sub> related or natural part of the secular interglacial cycle. The overall measure of air quality is the Pollution Standards Index (PSI) that measures number of days per year with unhealthful conditions in 23 metropolitan areas. Since 1974 such days have declined from 91 per year to only 41 days per year in 1981. These are good signs for air quality.

Wildlife. One of the best indicators of environmental quality trends is the health and vitality of our flora and fauna. As measured by the U.S. Fish and Wildlife Service, on U.S. Forest Service lands, large animals such as moose, elk, peccary, sheep, mountain lion and antelope have increased their population over the last 20 years. Wild turkey populations have more than doubled, due largely to effective stocking programs. However, wolf, grizzly and black bears and mule deer populations have declined. White-tailed deer and duck populations are relatively unchanged. Here, with large animals and waterfowl, the successes are attributable partly to habitat improvements, to better hunting management and to restocking.

Recreation and Recreational Resources. Participation in outdoor recreation, much of which is water related, has remained relatively steady over the past eight years. The most participation is on Forest Service lands with second place going to U.S. Army Corps of Engineers reservoir projects and the third level of visitation to national parks. Most of the added visits to national parks since 1972 have been to new areas, relieving pressure on the older parks. For example, Golden Gate Natural Recreation Area did not exist in 1960 but it recorded 20 million visitor days in 1982, far exceeding such parks as Great Smokey Mountains (9 million) or Yosemite and Yellowstone (about 3 million each). There are good signs for better utilization and conservation of national parks and other public access lands and waters.

Substantial increases have been made in adding natural recreation areas, even excluding Alaska, since 1960. There have been about 5 million acres added to state and national parks; about 12-13 million acres to wildlife areas; 26 million acres to the wilderness preservation systems

(all since 1965); and more than 1,000 river miles to the Wild and Scenic River systems (all since 1968).

On the negative side, we have lost about 11 million acres of valuable fresh water wetlands, much of which was used for waterfowl and wildlife sanctuaries.

Pollution Control Investments. Pollution abatement and control expenditures by both the public and private sectors (in 1972 dollars) peaked out in 1979 with declines underway for air, water and solid waste pollution abatement. However, investments in pollution control, as a percent of GNP, peaked at 1.9 percent in 1976 but declined to 1.7 percent in 1982. This decline is not a good trend for environmental quality for the future unless we have in fact changed our life styles, business operations and attitudes sufficiently to have reduced permanently our waste emissions.

The best quantitative indicator of overall interest in environmental affairs is the willingness to pay. This evidence is clear with the substantial increases in dues paying members of environment organizations. The larger (more than 100,000 members) organizations (National Wildlife Federation, National Audubon Society, Sierra Club and Wilderness Society have more than doubled their membership since the early 1970s). Substantial gains have been shown by all of the "big four" since 1980, in tune with the privatization theme. Most of the smaller organizations (less than 75,000 members) did not exist in 1970. The largest growth rates have occurred in the Environmental Defense Fund, Natural Resources Defense Council and Defenders of Wildlife.

The more subjective indicators of environmental interests have been provided by Public Opinion and Roper Polls. There has, since 1980, been an increase in those who think environmental laws and regulations have "not gone far enough" and a decline in those who think we are "about right." There also has been a decline in those who think environmental laws and regulations have "gone too far," especially since 1980. These opinions indicate a continuing strong interest in public support (about 0

percent think we have "not gone far enough") for environmental programs. These environmental programs and attitudes toward them substantially affect how we develop, use and manage our water resources. I think we will have fewer projects and we will spend relatively more for environmental enhancement such as mitigation. We will spend more on managing our waters to protect in-stream flow needs, riparian habitats and other amenities.

#### Environmental Issue Trends

There are several ways to look at environmental trends. We have looked at the commodity aspects of environment, that is, how pure is the air, how clean is the water, and how many species are we saving. Perhaps a more interesting aspect is to look at environmental trends in terms of how well we live. That is, we should look at environmental trends in terms of the ideology or the philosophy that comprises the environmental movement. One of the most interesting aspects of the current environmental trend is what I would describe as the enclosure period. All we need to do is to look about us and see the manner in which communities are being planned, developed and constructed today. From hotels to residential living areas, we are enclosing ourselves with an artificially constructed environment. Communities are planned with walls surrounding them, with security gates, with enclosed gardens, and with all of the natural resource amenities (golf courses and riding trails) within a single community. This means we are tending to look more inward for environmental amenities than in the past two decades.

In the past several decades, because of the manner in which we lived in isolated residences, we depended on public parks and other publically supported recreational areas. We tended to be outward looking. This time we are clearly inward looking in a large segment of society, providing within our communities a large supply of environmental amenities. I am not sure how long this trend will continue but, if Europe is an indicator, it will continue for several centuries. This is especially true in older inner cities where one seeks the closeness of a major city and its amenities while not giving up a higher quality of

life. The only way we could do this in major cities with today's inner city decline is to turn inward, that is, to enclose ourselves about a created environment. This does not mean that we will be able, in the short run, to reduce our support of publicly provided environmental amenities. I believe we must continue for some time to spend large amounts of private and public money to expand and maintain public access, open space, parks and other environmental amenities. What this does is to privatize more of the environmental amenities according to the current, widely held attitudes.

We can think also of environmentalism and environmental trends in terms of the ideologies. In earlier decades the main ideology for environmentalism was conservation and preservation. We looked at policy in terms of science. We are now looking more carefully at science driven by policy. We also looked at ownership of natural resources that benefit our environment as a legitimate public investment. We do not see this changing quickly. However, it may erode gradually over time as outside pressures force retrenchment in public expenditures for environmental, water and related resources.

The trend I see now is somewhat opposite or contradictory to earlier decades when the ideology was conservation. The new ideologies now include such terms as multiple use, sustained yield (evenflow harvest), primary productivity, and natural diversity. I will leave it to your imagination to name the specific descriptive term that will prevail historically. My own idea is that multiple use will prevail. Difficulty with multiple use is that it is in some ways contradictory to conservation. With the multiple use concept we advocate "use" up front rather than conservation. We are also looking for multiple services that can be provided by our environmental resources. In conservation ideology of the last 80 years, we could structure a doctrine that provided for free access to all public parks, lands, wildlife refuges, hunting and fishing, etc. We could offer what we had in abundance for free admission. However, the current concept of multiple use offers no clear decision making framework. There is no acceptable way to time harvests

or investments when we openly promote optimum uses that conflict. When and how should we harvest timber in a national forest or wildlife refuge to protect recreation and wildlife? The consequences of multiple use are opposite that intended. That is, we are favoring current consumption as opposed to future consumption implied so strongly in the conservation ideology.

However, there were some drawbacks to the conservation ideology in that it ignored distributional issues by cliches that were only vague statements about "the greatest good for the greatest number." This carryover of conservation ideology will force us to recognize certain "environmental entitlements" for natural resources. Some of these include grazing rights, timber cutting, fishing and hunting, and access to wilderness areas. These entitlements, although not tested legally at this point, will most likely have a political strength that is at least equivalent to welfare entitlements today. There is not likely to be sufficient political pressure for a long time to successfully attack these entitlements. What this means for the environmental trends is that we will have a combination of inward turning or enclosing for a large segment of the population while we continue to recognize the entitlements through the public lands such as parks, reservoirs, and wildlife refuges. Entitlements also will mean a larger interest in using wilderness areas even though they are ostensibly well protected from overuse.

The interface of economics to environment in this instance must take place in terms of allocation to these publicly provided environmental entitlements. We will see most certainly large increases in user fees and other restrictions such as quotas that we now use in many natural resource entitlement areas. For example, the number of boat trips on the Colorado River are limited by quota to avoid overuse of this resource. Now that we have a precedent for more efficient allocation, we will tend to view the use of environmental amenities more in terms of user fees. The next step is to convert these user fees into funds that will expand the system or improve the existing amenity in order to provide more

access without destruction. That is, we must seek to develop and recognize the concept of a sustained yield for all environmental commodities -- water, air, land, wildlife, wetlands, etc.

Another important issue concerns the way we have chosen to manage environmental affairs. This issue is a book unto itself so I will only touch it, leaving the rest to your independent thinking. Traditionally, in the water resources business, the federal government exercised a direct role by providing funding, planning and constructing projects and by owning and managing these projects thereafter, collecting revenues from vendible services and exercising considerable direct control. In the environmental area the federal government reversed its role, giving grants and shunning ownership, but, and this is important, delegating responsibility for environmentally related issues to the states. The data in table 4 show eight environmental programs that have been (or can be) delegated to states for implementation and management. This process offers some flexibility to the states but it also offers substantial costs with few to zero opportunities for vendible services (cost recovery) such as electricity sales or municipal water supply services. If I were a state, I would prefer to be delegated a multiple purpose water project to manage than a National Pollutant Discharge Elimination System Permitting program. Enough said!

#### Summary

We have been making measurable progress in improving most parameters of environmental quality, especially at what I have described as the commodity aspects. Much needs to be done, especially in the areas of defining what are truly substantive improvements to the environment. For example, what constitutes a viable riparian habitat and how should stream flows be managed to insure this condition? However, I fear some of the environmental gains have been made at the expense of water resource development. Our job now is to recognize the need for environmental concern and busy ourselves figuring out better ways to manage our water resources so as to enhance environmental amenities. Perhaps this can be done at your 31st Annual New Mexico Water Conference.



Table 4. Delegation of Selected Environmental Programs  
to State and Territorial Governments, 1984

Program	Number of Delegations	
	Full	Partial <sup>1</sup>
<u>Clean Air Act</u>		
PSD permits - for new and modified sources in areas classified for prevention of significant deterioration	36	10
NSPS permits - for sources required to meet new source performance standards	34	18
NESHAPS permits - for hazardous air pollutants	37	11
<u>Clean Water Act</u>		
NPDES permits - for point-source dischargers	15	21
Construction-grants management	4	51
404 permits - dredge-and-fill	0	--
<u>Safe Drinking Water Act</u>		
Drinking-water-standards enforcement	52	--
Underground-injection-wells control program	22	8
<u>Coastal Zone Management Act</u>		
Coastal-zone-management programs	28	--
<u>Federal Insecticide, Fungicide and Rodenticide Act</u>		
Applicator certification training	48	--
Restricted pesticide uses	48	0
<u>Occupational Safety and Health Act</u>		
Occupational safety and health programs	2	
	1	--
<u>Resource Conservation and Recovery Act</u>		
Interim program		
Phase I	45	--
Phase II	12	11
Final Program	1	--
<u>Surface Mining Control and Reclamation Act</u>		
Regulatory programs	25 <sup>2</sup>	--

<sup>1</sup>"Partial" has different meanings in different programs. See figure references for full explanation.

<sup>2</sup>Two states may soon have their approvals revoked. See figure references.  
Source: State of the Environment. The Conservation Foundation. Washington D.C. 1984. p. 457.