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ANNUAL REPORT

SOUTH CAROLINA DEPARTMENT

OF NATURAL RESOURCES

FISCAL YEAR

JULY 1, 2000 - JUNE 30, 2001

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ANNUAL REPORT

SOUTH CAROLINA DEPARTMENT

OF NATURAL RESOURCES

FISCAL YEAR

JULY 1, 2000 - JUNE 30, 2001

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SOUTH CAROLINA NATURAL RESOURCES BOARD

Dr. Joab M. Lesene, Jr., Chairman ..... Spartanburg

Dr. Julius L. Leary, Vice-Chairman ..... Greenwood

Danny L. Ford ..... Central

M. Russell Holliday, Jr. ..... Galivants Ferry

Ben Gregg ..... Columbia

Dr. Douglas A. Rucker ..... Lancaster

B. Malloy McEachin, Jr. ..... Florence

SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES

Paul A. Sandifer, Director ..... Columbia

Cary Chamblee, Associate Director ..... Columbia

Larry D. Cartee, Assistant Director ..... Columbia

John B. Reeves, Deputy Director
Administration and Suppor ..... Columbia

Carole Collins, Deputy Director
Conservation, Education and Communications ..... Columbia

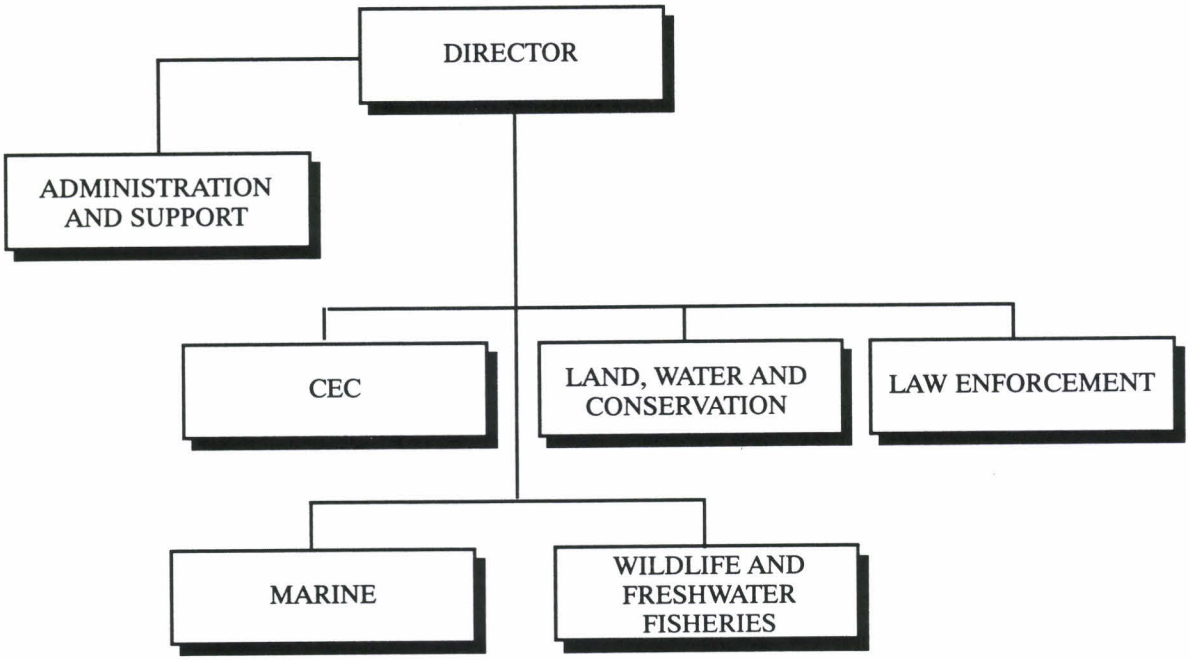
J. Alvin Wright, Deputy Director
Law Enforcement ..... Columbia

John Miglarese, Deputy Director
Marine Resources ..... Charleston

Alfred H. Vang, Deputy Director
Land, Water and Conservation ..... Columbia

Billy McTeer, Deputy Director
Wildlife and Freshwater Fisheries ..... Columbia

ORGANIZATIONAL CHART



SECTION I:
2000/2001 ANNUAL ACCOUNTABILITY REPORT
EXECUTIVE SUMMARY

SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES
August 31, 2001

The quality and abundance of South Carolina's natural resources creates a wealth that is unsurpassed by other states and regions of the country. These resources bring an enviable quality of life to our citizens so as to attract and sustain business activity which translates into economic wealth for all South Carolinians. A recent survey conducted by the U.S. Fish and Wildlife Service revealed that state residents and non-residents spent **$1.5 billion** on wildlife-associated recreation in South Carolina. For fishing and hunting alone, these expenditures translate into an economic impact of almost **$2 billion**. With a total agency budget of approximately $74 million, the $1.5 billion in expenditures represents a return on investment of just over a **$20 bill for every dollar** expended by the S.C. Department of Natural Resources. These figures signify the substantial business and financial results that provide a benchmark for identifying benefits from the programs of the DNR.

During FY 2000-2001, the S.C. Department of Natural Resources operated its programs based upon the DNR Board Strategic Plan entitled *The Natural Resources Agenda: A Strategy for Managing South Carolina's Natural Wealth.* As a result, the DNR implemented the plan's primary goals and strategies to accomplish significant results and major achievements over the past year. Some of these major achievements include the following: 56,807 cumulative acres acquired and protected by the Heritage Trust Program through the calendar year 2000; 1,141,726 acres of Wildlife Management Area lands were managed for public use and enjoyment in 2000; a total of 612 natural and cultural elements have been protected by the Heritage Trust Program through the year 2000; 27,330 children participated in Conservation Education Programs in 2000; 300,000 SCDNR Web Page visits per month for a total of 3,600,000 visits per year for FY 2000-2001; the annual Human Affairs report reflected that the DNR reaches 82.1% of its goals for the most recent evaluation period which was a 9.7% increase in goal attainment from the previous year; recorded 134 non-fatal and 15 fatal boating accidents in FY 00/01 with the 15 fatal accidents being an all-time low; implemented the Coastal Watch Program in 2000 to promote public involvement in natural resource protection; secured the comprehensive modernization of coastal fisheries laws through passage of the 2000 Marine Resources Act; 46 public dove fields were made available for public hunting; hunting and fishing license were made available for purchase to the public on the DNR Web Page; took possession and initiated actions to protect the Morris Island Lighthouse; the S. C. Lands Legacy Initiative was implemented with the DNR as a partner; stocked brook trout, the state's only native trout species, in public waters for the first time in twenty years; and over 8.5 million fish were stocked in state waters during the year 2000.

In the DNR's Strategic Plan, the agency's mission is stated as follows: *"The South Carolina Department of Natural Resources is the advocate for and steward of the state's natural resources and is proactive in protecting the state's natural resources for use and enjoyment by future generations of South Carolinians. The DNR develops and implements policies and programs for the conservation, management, utilization, and protection of the state's natural resources based upon scientifically sound resource assessment and monitoring, applied research, technology transfer, natural resources planning, public education, outreach, technical assistance and customer involvement."* The DNR accomplishes its mission through its values based upon an agenda that encompasses these components:

1. Places the resource first through the permanent protection and management of habitat and cultural (archaeological) resources of special significance.
2. Protects human life, property natural resources and the safety of the persons using those resources.
3. Manages natural resources under its jurisdiction sustainably and as a system, insuring their long-term integrity and diversity.
4. Uses the best available sound scientific and technical information in making natural resources decisions.
5. Conducts applied research to improve the base of scientific knowledge upon which natural resource management decisions are based.
6. Protects, manages and enhances the current and future public's use and enjoyment of South Carolina's fish, wildlife, aquatic, soil water geological and cultural resources.
7. Educates and effectively communicates with the public about South Carolina's natural resources and environment, and provides accountability by routinely involving the public in the department's decision-making processes.
1. Speaks for the state's natural resources in commenting on proposed alteration to the environment.
2. Maintains an agency culture that continuously seeks to improve operations and Effectiveness in a professional manner for its employees and customers.

There are a variety of opportunities and barriers that may affect the DNR's success in fulfilling its mission and achieving its strategic goals. The agency will continue to implement the DNR Board's vision of placing highest priority on protecting and managing the state's natural resource base through the permanent protection and management of habitat and cultural resources of special significance. In the next year, a major legislative effort for habitat conservation and permanent land acquisition will be continued along with the agency's partnership in the S.C. Lands Legacy Initiative. In addition, new sources of federal and private funds will be actively pursued for the protection and management of natural and cultural resources. Actions to protect human life and property will be emphasized through enhanced law enforcement activity and boater/hunter education programs so as to continue to reduce accidents and the loss of life and property. The development and application of the best available scientific information will serve as a focus area in the agency's mission of managing and protecting natural resources. Public outreach and education efforts through the DNR Web Page, legislative proposals from publicly appointed advisory committees, an open public policy process and the agency's educational programs will provide a basis for maintaining and improving relationships with the DNR's constituents and stakeholders. The major barrier to continue to fulfill the agency's mission will be the restoration of the $7 million in budget cuts implemented in the DNR in FY 2001-2002. These reductions affect all of the agency's programs and the ability to meet the mission established for the DNR by statute and the DNR Board. In addition, finding new and adequate funding sources are of utmost importance and serves as a barrier in the DNR's success to its highest priority of permanently protecting and managing the unique habitat and cultural resources of South Carolina.

BUSINESS OVERVIEW
2000/2001 ANNUAL ACCOUNTABILITY REPORT

SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES
August 31, 2001

The SCDNR had 930 full-time equivalent positions based upon the 2000-2001 Appropriations Act. The agency's operations are located statewide in all 46 counties of the state. The major operational locations are the Columbia offices located in the Rembert C. Dennis Building, the Affinity Building, 2221 Devine Street and at #5 Geology Road; the Dennis Wildlife Center at Bonneau; the Marine Resources Center at James Island; and the Waddell Mariculture Center located at Bluffton. The Land and Water Conservation District offices are located in each of the 46 counties of the state primarily in each county seat. In addition to the Marine Resources Center at James Island, the marine program operates regional offices in Beaufort and Georgetown. There are nine Law Enforcement districts that operate statewide and their offices are located in Clemson, Edgefield, Barnwell, St. George, Ridgeland, Bonneau, Columbia, York, Florence, Conway, Port Royal, Charleston, and Georgetown. The Freshwater Fisheries district field offices are located at Pendleton, Abbeville, Greenwood, Rock Hill, Bonneau, Barnwell, Florence, Columbia, Eastover, Lexington, Greer, Bennettsville, and Bonneau. Freshwater fisheries hatcheries are located at Newberry(Glenmore Shirey Hatchery), Barnwell(Barnwell Hatchery), West Columbia(Cohen Campbell Hatchery), Cheraw(Cheraw Hatchery), and Mountain Rest(Wahalla Hatchery). Wildlife Diversity field offices are located at Columbia, Green Pond, Rock Hill, Charleston, Georgetown and Pendleton. Wildlife management field offices are located at Clemson, Greenwood, Union, Bonneau, Garnett and Georgetown. The agency also operates the Samworth and Santee Delta WMA at Georgetown, Santee Coastal Reserve at McClellanville, ACE Basin /Donnelley WMA at Green Pond, Bear Island WMA at Green Pond, and the Yawkey Wildlife Center at Georgetown.

The SCDNR's key customers includes all the people of South Carolina, as well as, non-residents, especially those people that enjoy either actively or passively the natural resources of the state ranging from the mountains to the coast. Based upon the most recent survey by the U.S. Fish and Wildlife Service conducted by the Bureau of the Census, there were 1.1 million participants in the state in wildlife associated recreation, age 16 and over. Of this total, 674,000 engaged in fishing, 243,000 hunted and 829,000 participated in wildlife watching activities to include observing, feeding or photographing wildlife. The fishermen and hunters participated in 14 million days of fishing and 6.5 million days of hunting. Included in this customer base are the 688,000 residents and non-residents that purchased hunting and fishing licenses from the SCDNR. In addition, other key customers include the following: over 2000 landowners participating in the Antlerless Deer Quota Program; 900-1000 landowners/pond consultations per year; over 340,000 active boat registrations; 850,000 records submitted annually to county treasurers for tax purposes; over 27,000 children participating in conservation education programs; 60,000 subscribers to the *S.C. Wildlife* magazine; 46 Land and Water Conservation Districts; over 6000 requests for cartographic products; 300,000 visits per month to the SCDNR Web site; approximately 275 requests/year for hydrological data and technical assistance; over 5000 individuals and requests for watershed and river corridor planning technical assistance; utilities and reservoir owners affected by nuisance aquatic plant species in public waters; public and private requests for climate data , geological maps and information; other state, federal and local government agencies; universities and colleges; commercial/recreational fishermen; planning agencies; etc.

The SCDNR has a diversity of suppliers that provide inputs for the agency's operations. This has evolved as the SCDNR has maintained a traditional focus to develop partnerships and cooperative efforts with state and federal agencies to include: the Department of Health and Environmental Control; Parks, Recreation and Tourism; Forestry Commission; Department of Commerce; Sea Grant Consortium; Medical University of South Carolina; Clemson University; Francis Marion University; College of Charleston; University of South Carolina; State Technical Education System; U.S. Fish and Wildlife Service; U.S. Forest Service; National Marine Fisheries Service; U.S. Coast Guard; National Oceanic and Atmospheric Administration; and the Natural Resources Conservation Service to name a few. In addition, partnerships with private organizations have included The Nature Conservancy, Duke Energy, Crescent Timber, Champion Timber, various land trusts, National Wild Turkey Federation, Ducks Unlimited, Quail Unlimited, Trout Unlimited, the Palmetto Conservation Foundation and the S.C. Sportsmen's Coalition. Other suppliers of inputs to the SCDNR are as follows: 46 fields and over 1700 acres of private land for public dove fields; timber companies, U.S. Forest Service and private individuals to the 1.1 million acre Wildlife Management Area Program; federal grant agencies providing over $4 million for marine resources research and monitoring projects; 524 environmental permit applicants related to commercial and residential development; 50-100 requests/year for resource planning and stewardship assistance; over 200 communities identified as flood hazard areas; city, county and regional water authorities; local river management and conservation organizations; over 3000 surface acres of water bodies treated to control nuisance aquatic weeds; approximately 2 million data streams received by the State Climate Office; SCDNR Advisory Committees; Deputy Law Enforcement Officers; boating dealers, marinas, sporting goods dealers and manufacturers; vehicle dealers; ATV dealers; law enforcement suppliers; agricultural and wildlife management suppliers; pond and aquaculture owners/operators; commercial fishermen; shooting preserves; hunting guides and lodges; commercial and recreational oyster leases/ bottoms; and the state's natural habitat that provides a valuable supply of natural resources for management and protection by the SCDNR.

The SCDNR has a multitude of products and services that are generated by its programs. In general, the primary outputs of the agency relate to the management and protection of the state's natural resources along with an extensive data and information base that is developed, maintained and used in that regard. The major products and services of the agency are as follows: sale of hunting and fishing licenses, permits and fees; titling and registration of boats and motors; collection of casual sales tax for boats and motors; inventory of boats and motors to county tax offices for property taxes; collection and distribution of hunting, fishing and boating fines; public auction of used/surplus equipment; design, construction and repairs to public boat landings; educational programs for educators, schools, youth organizations and other audiences on the conservation and wise use of natural resources; production, promotion and distribution of six issues of *SC Wildlife* magazine per year to paid subscribers; natural resources related products and goods sold through the Wildlife Shop; outdoor workshops and rodeos for youth, women and handicapped natural resources users; production and distribution of maps, brochures, rules and regulations, laws and information related to use and management of the state's natural resources; news media coverage, media relations, information and image distribution and public service announcements for the media relating to the state's natural resources; research, survey and management projects conducted to identify and protect threatened/endangered plant and animal species; acquisition of highly significant properties to preserve and protect the most significant natural and cultural resources; Wildlife Management Area lands provided for public hunting and quality outdoor experiences; technical assistance provided to landowners on wildlife management, pond management and freshwater fishery resources; survey and monitoring projects conducted to secure data for wildlife management and freshwater aquatic resources; agricultural and habitat management practices implemented to maintain and enhance the quality of wildlife; production and stocking of freshwater fish species in public waters, farm ponds and state-managed lakes; enforcement

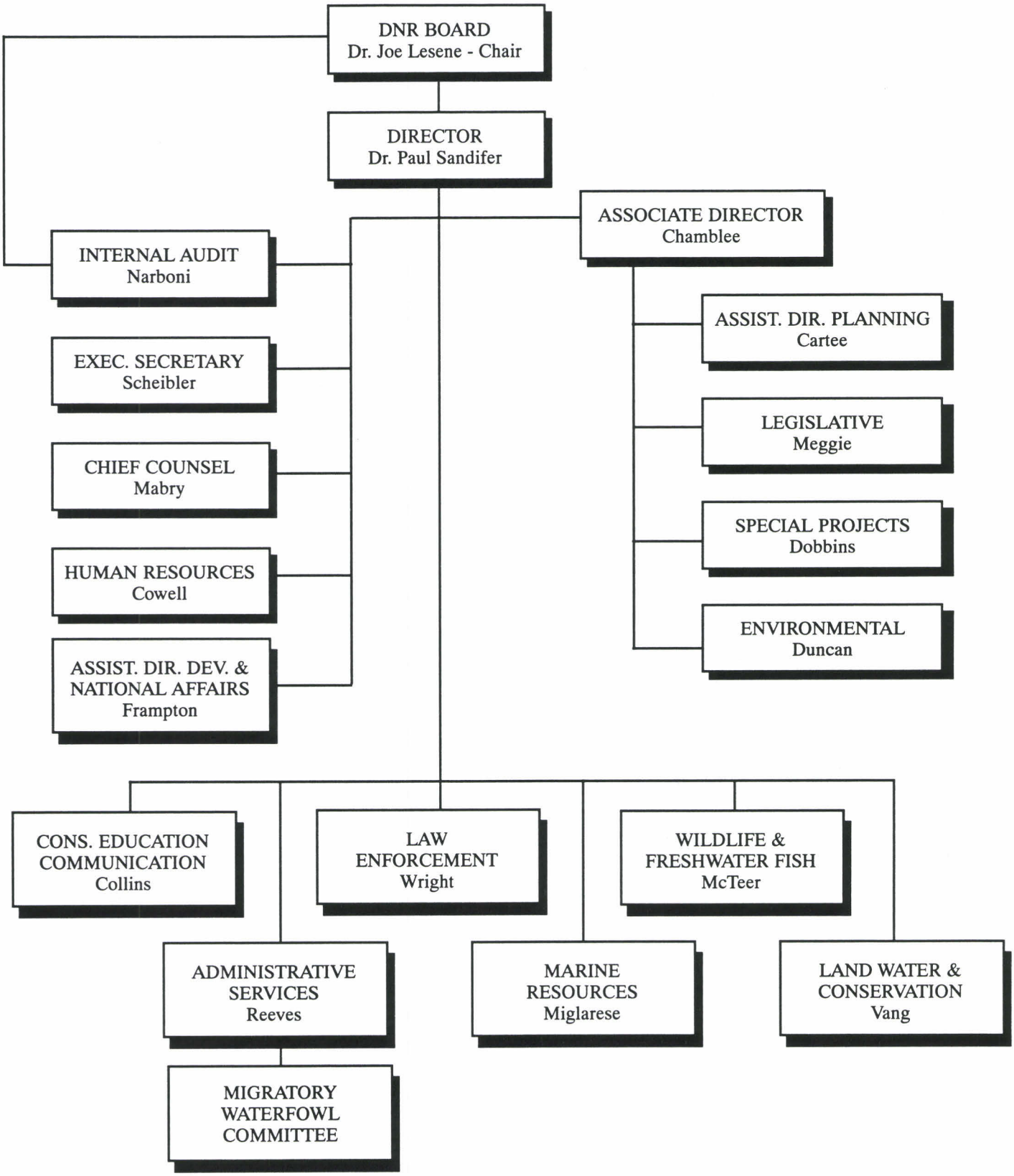
and investigative activities of the agency's 260 law enforcement officers for wildlife, recreational and commercial fisheries, boating and specific environmental laws; support and assistance to other law enforcement agencies with search and rescue missions, manhunts and other special assignments; hunter(mandatory) and boater education classes conducted to enhance knowledge/skills in these activities to reduce accidents and fatalities; cartographic products and assistance to people through the Map and Natural Resources Information Center;administrative/ technical assistance and educational programs for the state's 46 Conservation Districts; data collection, well logging and hydrological research to monitor local and regional changes in the state's hydrology; conservation and management of riverine resources through the State Scenic River Program; water bodies treated and technical information provided to prevent aquatic nuisance species in public waters; development and processing of requests for climate information and data; marine resources research, assessment and monitoring activities to evaluate the condition of the state's estuarine and marine resources; staff support and facilities for marine science education programs at the state's colleges and universities; marine resources educational tools and technology transfer to individuals and organizations involved in promoting utilization of commercial and recreational marine resources; and marine resources management through the regulation of fishing seasons, areas and methods, issuance of experimental, scientific and commercial fishing permits, management of public shellfish grounds and maintaining statistical records of various marine fisheries.

Base Budget Expenditures and Appropriations

	99-00 Actual Expenditures		00-01 Actual Expenditures		01-02 Appropriations Act	
Major Budget Categories	Total Funds	General Funds	Total Funds	General Funds	Total Funds	General Funds
Personal Service	$33,614,418	$19,081,365	$37,331,164	$20,282,964	$37,146,553	$20,013,735
Other Operating	20,926,375	4,890,649	25,343,964	5,224,966	25,397,598	5,494,195
Special Items	16,169	0	16,311	0	(7,089,189)	(4,046,946)
Permanent Improvements	0	0	0	0	0	0
Case Services	0	0	0	0	0	0
Distributions to Subdivisions	1,600,542	414,000	1,780,761	414,000	1,780,761	414,000
Fringe Benefits	9,037,277	4,818,061	9,572,708	5,237,266	9,719,996	5,237,266
Non-recurring	3,337,667	2,667,207	872,505	622,505	0	0
Total	**$68,532,458**	**$31,871,282**	**$74,917,413**	**$31,781,701**	**$66,955,719**	**$27,112,250**

Other Expenditures

Sources of Funds	99-00 Actual Expenditures	00-01 Actual Expenditures
Supplemental Bills	$2,210,000	$1,240,000
Capital Reserve Funds	$725,000	$250,000
Bonds	$0	$0


DNR BOARD
Dr. Joe Lesene - Chair
DIRECTOR
Dr. Paul Sandifer
ASSOCIATE DIRECTOR
Chamblee
INTERNAL AUDIT
Narboni
EXEC. SECRETARY
Scheibler
CHIEF COUNSEL
Mabry
HUMAN RESOURCES
Cowell
ASSIST. DIR. DEV. & NATIONAL AFFAIRS
Frampton
ASSIST. DIR. PLANNING
Cartee
LEGISLATIVE
Meggie
SPECIAL PROJECTS
Dobbins
ENVIRONMENTAL
Duncan
CONS. EDUCATION COMMUNICATION
Collins
LAW ENFORCEMENT
Wright
WILDLIFE & FRESHWATER FISH
McTeer
ADMINISTRATIVE SERVICES
Reeves
MARINE RESOURCES
Miglarese
LAND WATER & CONSERVATION
Vang
MIGRATORY WATERFOWL COMMITTEE

ELEMENTS OF MALCOLM BALDRIDGE AWARD CRITERIA 2000/2001 ANNUAL ACCOUNTABILITY REPORT

SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES
August 31, 2001

Category 1 – Leadership

1.1a-f: The leadership system in the SCDNR describes the direction of the agency and the means by which the direction of the agency is achieved. The primary focus of the agency's leadership is based upon the SCDNR Vision Statement which states where the agency wants to go as follows: *As the guardians of the state's natural resources, the Department of Natural Resources will strive to ensure healthy, sustainable levels of natural resources for the use and enjoyment of present and future generations.* This Vision Statement sets the long-term direction for the agency and is manifested through the agency's Strategic Plan. Each year, the SCDNR reviews its accomplishments over the past year to ensure that performance expectations are being achieved and progress is being made to meet the DNR Vision Statement. These accomplishments are presented to the DNR Board for their review and policy direction, as well providing any new expectations for the coming year. This action also provides a forum by which the public may review progress toward those priorities that are deemed the most important to pursue. In addition to the programmatic accomplishments, the DNR prepares and publishes a comprehensive Annual Report in which performance is deployed and communicated to all aspects of the public and the state's legislative leadership. Through this Annual Report, the agency's values are identified, priorities are established and performance is detailed for all major programs and projects in the agency.

1.2: The senior leadership of the agency establishes and maintains a focus on customers on a continuous basis. As the agency that manages the state's natural resources that are used and enjoyed by the public year-round, there is constant contact with customers ranging from those that own and operate boats, purchase hunting and fishing licenses, manage land and water resources, commercial and recreational customers, farmers, planning agencies, water authorities, university staff, developers, etc. Each and every employee of the DNR is taught that they are all public relations' agents since the agency's products and services bring employees in direct contact with the public at all times. As a result, the DNR has adopted the following DNR Pledge that is embraced by all employees: *Members of the public are of utmost importance to us, whether in the office or the field. We must listen to their concerns and balance their needs with those of the state's natural resources, for which we are accountable. In essence, they are our employers, and we should treat them with the dignity that such a position affords.*

1.3: Senior leaders in the DNR regularly review key performance measures in the agency. This is done primarily through the annual goals and objectives that are developed for each division. These goals and objectives are linked to the DNR Strategic Plan and provide target levels for performance during the year. In addition, these measures are used as a basis for the Employee Performance Management System review for all senior leaders in the agency. The DNR Board evaluates the DNR Director and their recommendations are submitted to the Agency Head Salary Commission.

1.4: Employee feedback is routinely submitted to senior leaders through direct contact, regional workshops, special purpose committees and through the chain of command in the agency's divisions. Employee surveys are also conducted to secure feedback on particular issues or problems. Input from employees is also attained through the DNR Website on matters that have agency-wide significance such as updating the Strategic Plan. Senior leaders review this information and feedback, determine what is applicable in each division and implements needed change to improve leadership effectiveness and management of the agency. Senior leaders also use

task forces to review particular issues/problems so as to provide feedback and performance review findings. This action was taken this year on a review on the DNR Website to determine ways to make it more useful to customers and employees to meet their needs. These task forces develop input after an exhaustive array of meetings and evaluation which is used by senior leaders to implement those actions that improve performance in the agency.

1.5: The DNR addresses the current and potential impact on the public for its products, services, facilities and operations in a variety of ways. These impacts are evaluated through the legislative, regulatory, policy-making and related processes to include extensive public involvement and meetings in order to gain a diverse cross-section of input. The impact of programs and operations are also noted through legislative contact, constituent organizations, commercial and recreational interests, advisory committees and through other private /public entities. In each of the cases, the senior leaders review the information provided on impacts of programs and services to ensure the resource is properly managed and protected, as well as, representing the best interests of the public. In programmatic areas where there is potential risk such as hunting, boating and outdoor enjoyment, the DNR actively promotes public outreach efforts to adequately inform the public of associated risks. These potential risks are further addressed through special education and training classes such as Hunter and Boater Safety. When risks become major public policy issues such as boating related fatalities, the agency will pursue specific laws and/or regulatory controls to protect the safety of people and property.

1.6-1.7: Senior leadership sets and communicates key organizational priorities for improvement through the legislative and budgetary processes. Senior leaders are directly involved each year in the preparation of the DNR legislative package which includes legislative priorities for the year. These proposals are reviewed by the DNR Board and, upon approval, are submitted to the appropriate committees in the General Assembly for introduction. A similar process is followed for the development and submission of the annual DNR budget proposals which are prioritized based upon the needs of the agency for improvement and funding. Both the legislative package and budgetary proposals are linked in their development to critical natural resource issues and needs as identified for emphasis through staff input, interest group input and recommendations from legislators and/or key political leaders. It is through this input and these various processes that the agency can support and strengthen the community and determine areas of emphasis. The senior leadership works to effectively implement these processes so as to maintain a primary focus on customers, the vision of the DNR and the well-being of the state's natural resources.

Category 2 – Strategic Planning

2.1a-e: The primary focus of the planning process in the SCDNR is the Strategic Plan.This plan was first adopted by the SCDNR Board in 1996. It was the first comprehensive strategic document prepared for the agency and provided an excellent opportunity to provide direction to the newly restructured agency that occurred in 1994 as a result of the 1993 Restructuring Act.
The 1996 Strategic Plan has undergone an extensive process to be updated into the 2001 Strategic Plan that currently exists. This Plan is delineated into major strategies: 1) Management; 2) Science and Technology; 3) Education and Public Involvement; 4) Landscape Conservation; and 5) Internal Management and Operations. For each strategy, there is a development of action items which cover all of the programs and activities of the agency. The Strategic Plan provides a focus for the budgeted programs of the SCDNR and also requires that all of these programs be linked or related to the strategies to accomplish the actions noted in the Plan. Each division utilizes this focus to develop a broad based programmatic delivery system that has a broad customer base and focuses on reaching the intended targets identified in the Strategic Plan. It also provides a forum and benchmark for setting priorities in the agency through a comprehensive decision making process based upon the strategies and action items. This decision making process is clearly reflected in the interaction of program development

through input from Governor's Office, General Assembly, SCDNR Board, advisory committees, constituent organizations, professional groups, and public input to insure that resources are used in the most efficient manner.

2.2: Each program in the agency is required to develop specific goals and objectives which are used to deploy the strategies and action items in the Plan so that results/ outcomes are developed and evaluated in the agency. The deployment of these strategies and the relationship to the Strategic Plan occurs each year as goals and objectives are developed for the programs in the agency. As these goals and objectives are developed, they are related to the strategies and action items in the Strategic Plan. In addition, they are further reviewed and justified through the budgetary process that is implemented by the staff and the SCDNR Board. The Strategic Plan also provides direction through the agency's strategic agenda which provides the foundation upon which the agency operates and determines how the DNR accomplishes its mission. The components of this agenda are integrated into the agency's budget programs and are as follows: 1) Places the resource first through the permanent protection and management of habitat and cultural (archaeological) resources of special significance; 2) Protects human life, property natural resources and the safety of the persons using those resources; 3) Manages natural resources under its jurisdiction sustainably and as a system, insuring their long-term integrity and diversity; 4) Uses the best available sound scientific and technical information in making natural resources decisions; 5) Conducts applied research to improve the base of scientific knowledge upon which natural resource management decisions are based; 6) Protects, manages and enhances the current and future public's use and enjoyment of South Carolina's fish wildlife, aquatic, soil, water, geological and cultural resources; 7) Educates and effectively communicates with the public about South Carolina's natural resources and environment, and provides accountability by routinely involving the public in the department's decision-making processes. 8) Speaks for the state's natural resources in commenting on proposed alterations to the environment; 9) Maintains an agency culture that continuously seeks to improve operations and effectiveness in a professional manner for its employees and customers.

2.3: The DNR works continuously to communicate and deploy its strategic objectives, action plans and performance measures. In a broad sense, the strategic objectives and action plans are communicated and deployed to the staff through the strategic planning process and updates that occur with the DNR Strategic Plan. The senior leadership also has specific strategic objectives and action plans that are made a formal part of their Employee Performance Management System each year and are evaluated on this basis. With this being done in each division, the senior leaders in each division are allocated specific objectives and action plans through the various programs and projects. In addition, the senior leaders communicate and deploy strategic objectives through the DNR Board which establishes policy guidance for accomplishing such objectives throughout the agency. The DNR budgetary process also provides a means for communicating and deploying strategic objectives. This is done at the state and federal level as funding proposals and grants are pursued that are based upon specific objectives in the DNR Strategic Plan. The primary method of communicating and deploying performance measures in the agency is through the Annual Accountability Report that produces business results for all programs in the DNR. Performance measures are also communicated through project reports developed for grants and/or federal aid utilized for programs in the agency. More detailed performance measures in the DNR are maintained in an extensive database for Long Term Performance Measures. These measures are updated each year and are available for use in the strategic planning process and reported to the public in the DNR Annual Report.

Category 3 – Customer Focus

3.1-3.2: The Annual Accountability Report for the DNR clearly identifies its customers and the services and outcomes that are provided to these customers. Through the development of the performance measures for the programs in the agency, the processes are identified through these

results/outcomes that deliver services and provide customer satisfaction throughout the state. The agency places a great deal of emphasis on all employees being customer focused and serving as effective public relations agents for the agency. With a broad based staff located throughout the entire state, DNR employees are exposed daily to the agency's customer base and respond to their needs and expectations on a daily basis. In order to develop a comprehensive customer focus for the SC DNR and insure that the agency is providing effective treatment and evaluation of all aspects of customer satisfaction, the DNR developed and implemented a comprehensive survey in 1994. This survey consisted of a public opinion and attitude survey conducted by Responsive Management, Inc., which specializes in surveys of state natural resource agencies. This survey focused upon gauging public opinion and attitudes of the state's residents towards the use and management of the state's natural resources. It also provided feedback from customers to assist the SCDNR in the development of the initial DNR Strategic Plan. The specific survey objectives were as follows:

a. Identify the Department's total market.
b. Identify the market size.
c. Identify what citizens think the Department is doing right.
d. Identify what constituents want from the Department in terms of programs and services.
e. Identify willingness to pay for specific programs and services.
f. Identify sources of information on wildlife for citizens.

The survey results provided very detailed information for use in natural resource management in South Carolina. The customer feedback provided the following results: 1) The public supports a broad range of natural resource management programs administered by the SCDNR. 2) The public supports an expansion of natural resource program emphasis is not a redirection of emphasis. 3) The survey further noted that the state's residents are most supportive of and have the least opposition for spending more time and money on programs related to education and conservation. 4) The survey indicated that residents are willing to pay for these programs in the agency. 5) The agency is highly regarded by the constituent groups it has served in the past. The more contact a respondent had with the DNR, the more likely they are to be aware of the agency, and the more the likely they are to think highly of the agency.

3.3-3.5: The DNR maintains close contact with its customers and undertakes methods to listen and learn about changing customer/business needs. These methods enable the agency to secure the information needed to improve services/programs and measure customer satisfaction. The agency has focused upon customer satisfaction through a series of surveys in the spring and fall of 1997-1999 conducted by the Institute of Public Affairs at the University of South Carolina. These surveys have been conducted for the purpose of developing public opinion and attitudinal survey data on the manner in which the agency treats its customers and various issues with which the agency is charged to implement through the statutes of the State of South Carolina. Some of the issues that have been addressed in these surveys have included the public's contact with the DNR, general impression of the agency, name recognition, satisfaction level with the agency's services, law enforcement, funding, boating safety, and related information on natural resources issues in the State of South Carolina. Some of the major findings of these surveys have been that over 90% of the constituents that have had contact with the DNR over the past year surveyed said they were satisfied with the quality of services they received during contacts or visits to the agency. Over 78% of the respondents had heard of the DNR which represents an extremely high level of public familiarity with the agency. This survey data indicates a very high level of customer satisfaction with the agency and provides evidence that the DNR is conducting business in an effective manner in the treatment of customers and provides detailed data to evaluate and substantiate this level of customer satisfaction. The agency will continue to concentrate its efforts in this arena and develop timely public attitudinal data and information that will be used in management throughout the agency. In addition, these benchmarks of customer satisfaction will be

related to other public sector entities and private organizations to draw valid comparisons and see if any management changes are needed over a period of time. This action was completed recently pursuant to a survey by the University of South Carolina entitled *Growth In South Carolina: A Public Perspective.* One of the major findings of this survey noted that South Carolinians overwhelmingly want both continued growth and a high quality environment with protected natural resources in which to live, work and play. These surveys and the public attitudinal information provides a basis for the DNR Strategic Plan update and detailed feedback from the public on various aspects of that plan as to where resources need to be focused in the future. In general, these public opinion surveys are an important management tool for the agency and provide a solid basis for developing a comprehensive planning process, as well as, developing budgetary recommendations for the allocation of resources in the agency.

3.6: Through the actions noted, the DNR has been able to build positive relationships with customers and stakeholders. As a resource management agency that operates throughout the state, the DNR field staff have been an integral part of the community which has resulted in developing credibility with the customer base. As a law enforcement agency, the DNR has been effective in enforcing laws in a manner that protects the resource for use and enjoyment by a large portion of the citizens of the state. With the state's natural resource base being such an important component of the culture of the state, the agency's ability to preserve and protect this culture has resulted in building positive relationships. The DNR has also been effective in the community by assisting other state, local and federal agencies on responding to emergencies, manhunts, hurricane assistance, security, communications, search and rescue, as well as, actions by DNR divers to find weapons used to commit crimes and the recovery of victims involved in boating/water related fatalities which is important to family members. It is through the extensive statewide contact and assistance provided to customers that the DNR has been able to build and maintain such positive relationships with customers and stakeholders.

Category 4 – Information and Analysis:

4.1: The DNR's performance management system is a reflection of the agency's vision and mission as the programs of the agency operationalize the vision and mission to produce effective business results. The agency decides which operations, processes and systems to measure from several categories. One category used to gauge performance of the DNR is the financial arena. Obviously, the organization needs a sustainable financial base from year to year in order to meet the vision and mission of the DNR. The level of state funding is an integral part of this category as the DNR secures in the vicinity of 45% of its budget from state funds. The agency also collects revenue from a variety of sources which provides key support to law enforcement and wildlife/fishery programs. The levels of hunting and fishing license sales, boat titling and registration fees, marine resources licenses and permits, magazine subscriptions and related revenue sources are key performance measures to track as they affect programs, operations and ultimately the mission of the DNR. Grants also serve as an important funding source in the agency and the level of extramural grants funded has a critical impact on key programs and projects. Another category in which the DNR develops measures is related to its customer base. With a finite level of natural resources and an expanding population in the state, the level of customer participation in outdoor activities and the trends in this participation has a key link to the vision and mission of the DNR. In addition, measures of requests for data/information, technical assistance, maps, educational products/services, conflicts between resource users, changing constituent groups and the like are all critical to the agency's performance. The category of collecting scientific information on the natural resources managed by the DNR is directly linked to the agency's vision and mission. There are a variety of programs in the DNR where the health, well-being and sustainability of natural resources are measured to ensure proper management and protection. Some of these programs include the State Climate Office, hydrology, endangered species, Heritage Trust, wildlife management, freshwater fisheries, marine resources and the S.C. Geological Survey. The DNR makes key management decisions based upon

science in order to utilize the best information available in this process.

4.2: In the aforementioned categories, the effective use of performance measures to make decisions is based upon data quality, reliability, completeness and availability. The DNR ensures that these factors occur through a variety of methods. Through the use of scientific research, the agency collects data pursuant to a protocol based upon standards for data quality and reliability. For making decisions on seasons, bag limits, hunting and fishing methods, etc., the data is collected based upon the time and availability needed to make such decisions and is complete before it is used in this process. Many of the agency's data collections are done through grants and contracts that require a final report for submission to the appropriate agency. In order to maintain credibility for utilizing such grants and to secure reimbursement for funds expended on a grant, the grantor will review the final report to ensure data quality, reliability, completeness and availability. In the financial category, there are innumerable standards that must be followed to maintain data quality and reliability. The DNR routinely has financial audits to see that the standards are met. These audits occur internally and from various outside sources. Through the maintenance of a well-managed financial system with a diversity of checks and balances, the DNR ensures that such financial data is complete and available for use at the appropriate times for decision-makers. As a public agency that serves a very broad customer base, the DNR is dependent upon maintaining a quality database to make decisions regarding these customers. Through the use of current information technologies and a highly skilled workforce, the agency has historically provided reliable and timely data for its customers and for use in the decision-making process. There are also peer reviews of the agency's data collection and use to further ensure its quality and reliability.

4.3-4.4: The agency uses data and information analysis in a continuous manner to provide effective support for decision-making. In the scientific arena, the analysis of data to include trends, regression, correlation analysis and the like, is an integral component of the scientific process. These types of analysis and others are used to draw conclusions on biological issues related to the DNR's mission to protect and conserve the resource. In the law enforcement arena, the agency maintains a comprehensive intelligence system that is used to develop profiles and comparisons of violators in order to support effective decision-making for staffing, patrol patterns, duration of patrols and the time of day/night or season. Data collection and analysis relating to hunting and boating accidents/fatalities are important in investigating such occurrences to determine if criminal charges may exist and to provide feedback. This feedback provides trends or comparisons that supports decision-making on methods to ensure the safety of human life and property. Changing demographics and land-use trends in the state provides valuable information to support planning and management decisions in the agency. Human dimensions data and changing landscape information are constantly developed by the DNR to support decisions relating to future direction of programs and the allocation of resources to meet the vision and mission of the agency. Whenever possible, the DNR will use comparative data and information from other agencies and/or states to support decisions if it is compatible. With the dynamic nature of natural resources management from state to state, it is often difficult to identify compatible data for comparative purposes. Given this complexity, the DNR will, at times, use its own database to make comparisons from on time frame to another for use in the decision-making process.

Category 5 – Human Resources

The most important resource for the Department of Natural Resources is its employees. Their commitment and dedication to the mission of this agency allows the Department to excel in every facet of its diverse mission. The caliber of employee found at DNR does not merely happen by chance. Through effective recruitment and selection processes the Department has been able to attract highly skilled and motivated employees who possess not only the academic requirements needed for the job, but also the more intangible requirement for success in any position, which is a passion for the work. Nevertheless, the Department is well aware that once these highly skilled employees are hired, the

Department must fulfill its obligation to motivate and to provide developmental opportunities in order to retain these individuals.

5.1: The Department is either in the process or has already implemented career paths for several major job categories within the Department. The Law Enforcement Officers have been in a structured career path for several years, which allows them to progress through four ranks based upon performance, years' service, and additional knowledge and skills. After achieving the maximum non-competitive rank of Buck Sergeant, other supervisory level positions may become available through a competitive application process. Additionally, officers may apply for supervisory levels once they achieve the rank of Corporal, bypassing the Buck Sergeant rank. Law Enforcement Officers in a career path comprise approximately 22% of the DNR workforce. Another existing career path at DNR comprising 2% of the DNR workforce is the Boat Titling and Registration Specialists working with the Department. These positions are some of the lowest paid positions within the Department; however, there currently is a three tiered career path in place to allow upward movement based upon time in position, performance, attainment of additional knowledge and skills, and additional job responsibilities. The current budget constraints have, unfortunately, delayed the implementation of additional career paths that are in the process of being developed for Wildlife Biologists and Natural Resources Technicians. Once the Department is able to move forward with this project, these career paths will involve an additional 23% of the DNR workforce, bringing the percentage of employees at DNR working in a structured career path to 47%. Besides formal career paths, the flexibility provided by the current classification and compensation plan allows supervisors and managers the ability to provide financial motivation through the use of additional duties and responsibilities, pay for performance increases, and bonuses in certain circumstances. Training on the compensation system is offered to supervisors and managers on a regular basis. A Management and Leadership Development Plan has been developed to assist in workforce planning for the Department as its aging workforce reaches retirement. The plan encompasses four levels of management and leadership training. This past year, one tier of that plan was implemented which allowed twelve employees with leadership potential to participate in an intense 12 month program involving an in depth overview of each division, coursework in leadership, a mentoring relationship with an individual in a leadership role and a group project. Program evaluations have been strongly supportive of this initiative with constructive feedback to improve future classes. Besides this internal program, the Department also actively participates in the Executive Institute, the Governor's Excel Program, Certified Public Manager Program (CPM) and the Associate Public Manager Program(APM) sponsored by the Budget and Control Board. Additionally, the Department has recently completed an employee survey to determine the best methods to reward and recognize employees. The Rewards and Recognition Committee will make recommendations based upon this employee input for both formal and informal recognition. Informal acknowledgement by immediate supervisors as well as formal acknowledgement at staff meetings and Board meetings were identified as worthwhile. Employees are consistently recognized for outstanding contributions at Deputy Directors' meetings, Board meetings, and in agency newsletters.

5.2: Periodically, needs assessment surveys are conducted to determine the various types of training needed based upon input by employees and supervisors. Most recently, the Human Resources Office has met with managers to gain their perspective on training and development needs. Additionally, regional staff meetings were conducted providing employees the opportunity to address specific training needs. These focus group meetings were beneficial in identifying employees' needs and in ascertaining that current training and development opportunities were addressing the expressed needs of the employees. Additionally, with every training session, employees are provided an evaluation document to give feedback on the particular course with recommendations for improvement.

5.3: The Employee Performance Management System is used as a tool to communicate the expectations of the job.

Supervisors are urged to utilize the planning document as a means to convey the work related expectations at the beginning of the evaluation period, as well as utilizing this document as an ongoing status review periodically throughout the evaluation period. Supervisors are encouraged to make the development of the planning document a joint effort with the employee to ensure buy-in by the employee. Any merit increases are distributed based upon a graduated scale dependent on evaluation rating. Supervisors and managers are encouraged to tie in training needs with the EPMS planning document. Additionally, the Human Resources Office reviews the EPMS document to ascertain if any particular types of training appear to be needed based upon comments provided in that document.

5.4: The recent rewards and recognition survey, as well as the regional staff meetings were strong indicators of employee satisfaction and motivation. An overwhelming number of respondents indicated that the employees they work with and the mission of the agency were factors in their job satisfaction. Additionally, when employees leave the Department, Exit Interview questionnaires are analyzed to determine any issues that may need to be addressed. DNR's turnover rate for FY 2000-2001 was approximately 6%.

5.5: The Training and Development Director functions as the Safety Coordinator for the Department. A committee comprised of representatives from each division is responsible for ensuring that each division is in compliance with safety regulations. Both the coordinator's and the committee's primary responsibility is to raise safety awareness throughout the agency and to notify employees and supervisors of needed safety training that may be available either internally or through sister agencies, such as Labor, License and Regulation or the State Accident Fund. Additionally, the Safety Coordinator is working with other agencies, such as Parks, Recreation and Tourism and the Department of Transportation to determine if the Department of Natural Resources can partner in some of their safety training initiatives. Partnerships with these sister agencies are critical to the Department's maintaining a viable safety program during lean budgetary years.

5.6: The Department's varied programs, by their very nature, are community focused. Besides the ongoing involvement with schools through the Department's education programs and such events as the fishing rodeos, the Palmetto Sportsmen's Classic, Reel Kids, and a host of other community based events, the Department of Natural Resources also encourages its employees to participate in such events as the Walk for Life, United Way Campaign, and the March of Dimes Walk.

Category 6 – Process Management

6.1: The DNR has developed a network of key design and delivery processes for products and services to provide effective management of work in the agency. The key processes are based upon the DNR's mission and major strategic goals of a) management; b) science and technology: c) education and public involvement; and d) landscape conservation. There are a variety of program delivery processes related to the management strategic goal. The key programs in this area include wildlife management and technical assistance, law enforcement, freshwater fisheries management plans and technical assistance, conservation districts, marine resources fisheries management and mariculture, endangered species and protected elements management and the agency's 1.1 million acre Wildlife management Area Program. The primary program delivery processes for the DNR's science and technology goal includes the Marine Resources Research Institute, wildlife and freshwater fisheries research, hydrology, the State Climate Office, State Geological Survey, the Waddell mariculture center, the Yawkey Wildlife Center and the State Water Plan. All divisions in the agency have delivery processes through programs for education and public involvement. The major products and services in this arena includes natural resources planning and public attitudinal surveys, the DNR Web page that secures public input on management plans and projects, SCMAPS, Hunter and Boater Safety/Education, Project WET, Project WILD, *SC Wildlife* magazine, DNR News Program, REEL Kids, HOFNOD and related programs. Landscape conservation is also a critical strategic goal in the agency. Its key program-

matic design and delivery processes include the DNR habitat acquisition program, Heritage Trust Program, Scenic Rivers program, environmental planning, environmental coordination and permitting, conservation districts, drought management and water resources planning. Each of these programs and systems incorporate the use of up-to-date technology and information so as to provide the most effective service delivery. Through direct contact and input from user groups and constituent based surveys of customers that use the products and services of these delivery processes, the DNR is able to maintain changing customer requirements.

6.2: The day-to-day operation of the key delivery processes noted in Section 6.1 are very important to meeting the key performance requirements that ultimately lead to the business results in Category 7. These operations are able to meet these key performance requirements through a diversity of outputs from services and products of the agency. While all of the outputs are too numerous to list, the key outputs from the DNR's major strategic goals are as follows: a) Management – number of Wildlife Management Area acres/hunters, number of public dove fields, number of deer depredation permits issued, number of finfish caught by recreational anglers, number of state lakes managed, total number of fishery species produced and stocked, number of management projects for protected elements and number of acres under conservation plans; b) Science and technology – number of wildlife and freshwater fishery research projects, extramural dollar value of marine resources research and monitoring projects, number of technology transfer opportunities from mariculture research, number of water quality/quantity database projects conducted, number of data requests filled for climate information, percentage increase in climate information dissemination via the Internet, number of wildlife diversity research, survey and monitoring projects conducted and the number of geologic maps produced and published for scientific use; c) Education and Public Involvement – number of public attitudinal surveys conducted, number of visits to the DNR Web page, number of *SC Wildlife* magazine subscribers, number of programs and participants for conservation education programs, number of workshops and teachers trained, number of hunter and boating safety students certified and number of customers reached through DNR news releases and media programs; d) Landscape Conservation – number of acres of habitat acquired per year, number of dedicated Heritage Preserves and/or additions, number of communities identified as flood hazard areas, percentage of cropland and pasture with adequate soil and water conservation management, number of environmental permits/projects reviewed each year, number of Scenic Rivers managed and the number of drought management plans developed and monitored.

6.3: The DNR has an effective level of support processes that are used in the delivery and productivity of the agency's products and services. These support processes are used to provide needed assistance and guidance for the major strategic goals of the agency. The major support processes in the DNR are as follows: a) planning, surveys and performance measures; b) legal; c) human resources; d) legislative affairs; e) environmental permits/coordination; f) data processing and information technology; g) supply and equipment; h) finance and accounting; i) procurement; j) licenses and fees collection; k) boat titling and registration; l) graphics, duplicating and mail services; m) news media and public relations; and n) audio/video productions. Each of these processes includes highly skilled staff resources that maintain activities and performance based upon the most current information and technological strategies. In addition, specialized training and career development plans are created and implemented to ensure the highest level of skill development and performance attributes. Through the agency's workforce planning tools and projects, the DNR is able to improve and update these processes to achieve higher levels of performance.

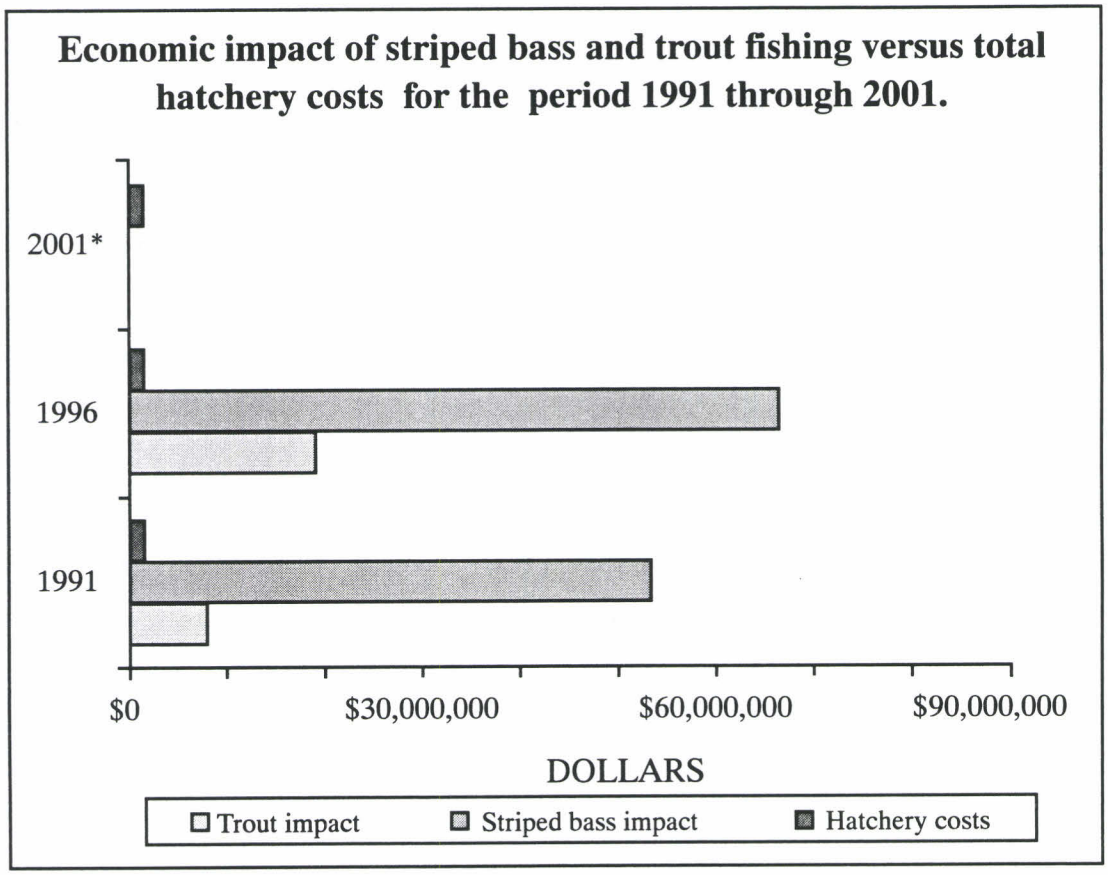
6.4: The management and support provided for key supplier/contractor/partner interactions and processes to improve performance are based upon the actions of the individual work units in the DNR. This area has received some degree of attention and direction in the agency and will be a new area of focus in the future.

Category 7 – Business Results

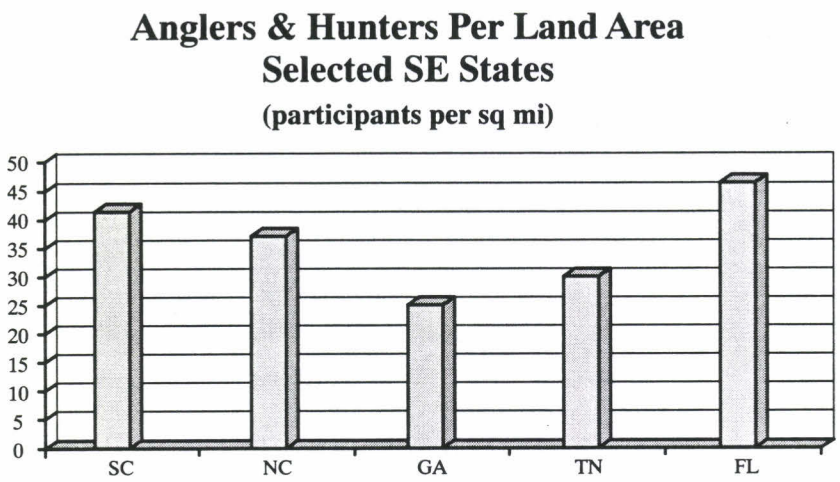
7.1-7.6: The DNR has developed business results based upon the major programs in the agency which are related to the DNR Strategic Plan. These business results are as follows:

Program: Wildlife and Freshwater Fisheries

Freshwater fishing has a total economic impact of over $919 million in South Carolina. Fishing for striped bass and trout generates an economic impact in excess of $66 million and $18 million respectively. In South Carolina approximately 80% of the striped bass fishery and 90% of the coldwater trout fishery is supported by the products from SCDNR fish hatcheries. The total annual cost for the operation of SCDNR's freshwater hatcheries has averaged approximately $1.5 million over the last five years. The economic impact of striped bass and trout fishing alone, when compared against the cost of the entire fish hatchery program, yields a cost benefit ratio of 56 to1 to South Carolina's citizens.

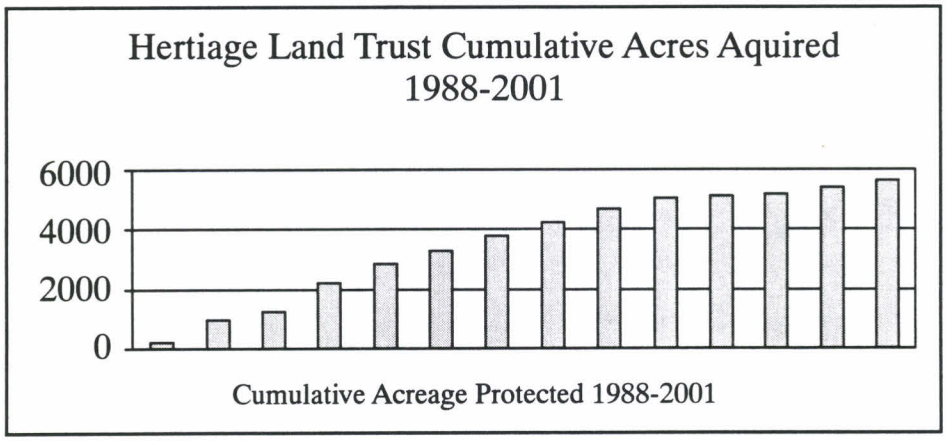


** Economic impact data for 2001 is not yet available. This data will be available in the third quarter of 2002 following analysis of the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. The core mission of the DNR's Wildlife and Freshwater Fisheries Division is to protect, manage and sustain the public enjoyment of natural resources through programs that support hunting, fishing and wildlife watching. South Carolina's abundant and well-managed fish and wildlife resources support a large number of hunting and angling constituents. This includes residents, as well as nonresidents that select South Carolina as a hunting and fishing tourist destination. The annual economic impact of hunting and fishing in the state is estimated to be over $2 billion.*



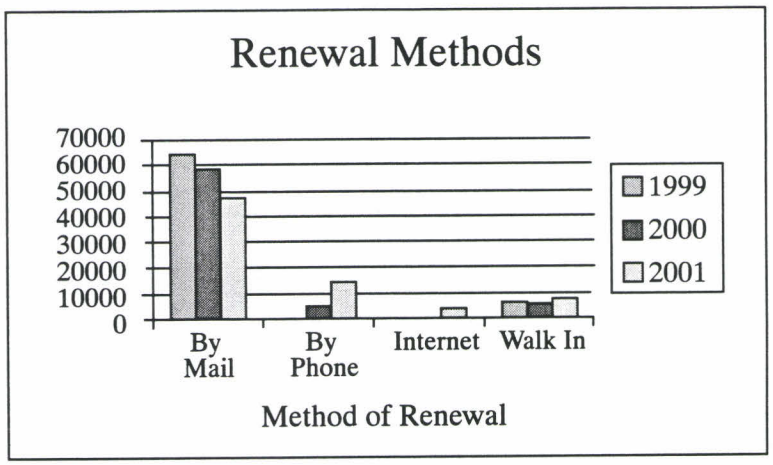
The FY-2001 fiscal year was a successful one for the Heritage Trust Program. Ten different properties, totaling 2,094 acres, were permanently protected. These properties included habitats or buffer for 30 rare elements. Expenditures exceeded revenues and left a balance of $1.3 million in the Heritage Land Trust Fund. On existing preserves, we have increased our work in monitoring rare species, restoring rare habitats and developing volunteer stewardship committees. Further, we are providing better public access facilities, conducting more field trips, organizing additional educational events, and establishing new partnerships. These improvements provide a direct benefit to the public.

We have experienced a number of trends during this period of rapid economic growth. During the last three years, the number of acres protected has grown, but we are still well below our overall average of 4,000 acres per year. Our average cost per acre has increased dramatically and the total amount of donated value has decreased. The number of rare elements protected continues to rise. We are spending slightly more on capital improvements and preserve management each year. These trends indicate that we will be spending more per protected acre in the future, slightly more each year for management, and will continue to improve public access facilities at our preserves. As a result, public interest in the Heritage Trust Program is increasing.



Program: Watercraft Registration and Titling
Strategic Plan Component: Business Results
Organizational Effectiveness Results: Improve and promote electronic information exchange with watercraft owners and county government entities.

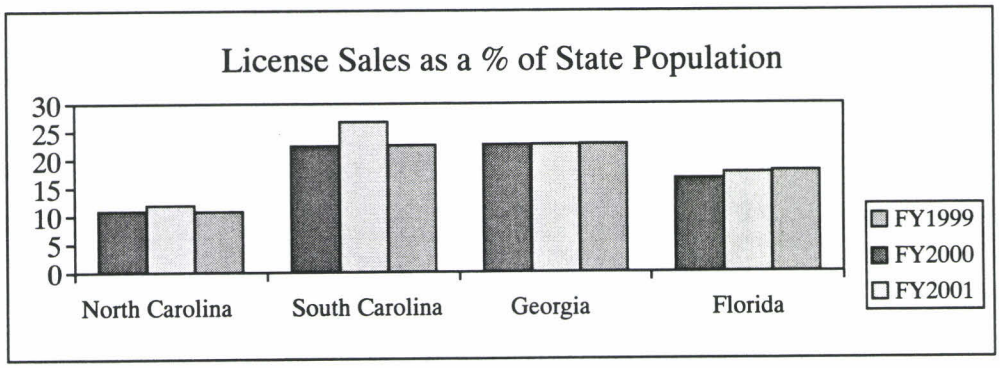
The Watercraft Registration and Titling program provides registration and titling activities for watercraft and outboard motors as required by law. The chart shows the current transactions methods with year 2001 projections as a result of proposed changes to improved customer service and access. To respond more timely to all customer service needs, owners and local government, and to meet the growing number of registered and titled components, Internet and electronic transaction processing will be implemented over the next eighteen months. A VPN (Virtual Private Network) has been installed to allow county auditors and tax collectors to make address changes and updates directly to the Watercraft database to assist in property tax collections and reduce the cost of undeliverable mail. Electronic watercraft registration renewal service will allow the watercraft owner to submit the renewal request and electronic payment, thus reduc-ing DNR clerical personnel requirements. The total electronic transactions are projected to be in excess of 150,000 for 2002.



Program: Game and Fish Licenses
Strategic Plan Component: Business Results
Organizational Effectiveness Results:

Increase license and permit sales through the use of electronic information exchange, providing information concerning hunting and fish-ing opportunities, and additional nationwide exposure of South Carolina's natural resources.

The Game and Fish License program administers licensing and permitting for resident and non-resident sportsmen as required by law. Normal daily license sales are

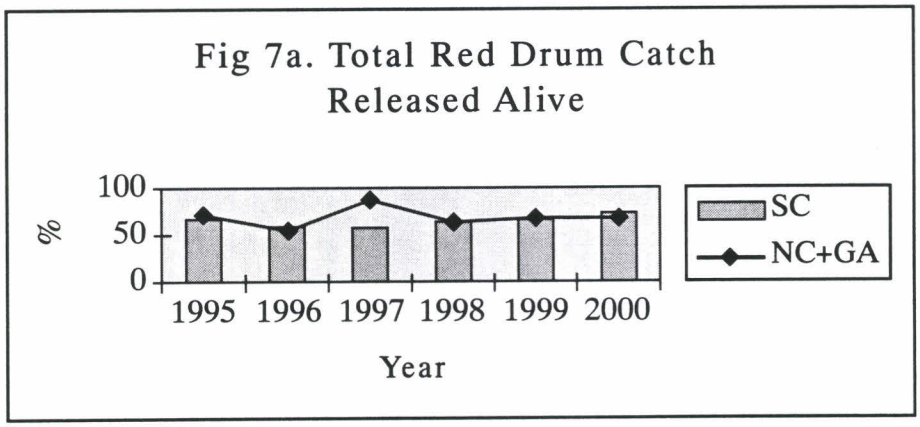


conducted by approximately 1100 License Agents located statewide and a toll free telephone service allows individuals the option to purchase licenses using a credit card at all times. An Internet license sales option was added in mid-year 2000 to provide an additional customer service option. Hunting and fishing opportunities are highlighted in various brochures and pamphlets along with eleven maps of the various Wildlife Management areas and the annual South Carolina Rules and Regulations guide. South Carolina Department of Natural Resources is featured in each BassPro catalog to promote license sales nationwide.

Program: Marine Resources
Strategic Plan Component: Management/Public Involvement/ Resource Sustainability
Organizational Effectiveness Results:

7.1-7.4 Marine Recreational Fishermen (both men and women) represent a large and significant portion of the SCDNR customer base. This customer base represents a diverse group of both licensed and non-licensed consumptive and non-consumptive users including anglers targeting finfish, oysters and clams, shrimp and crabs. The customer focus in this case (their wants and needs) can be broadly summarized as: 1) to provide continued and better recreational fishing opportunities for the citizens and guests of South Carolina; and 2) to ensure that the natural marine resources of this state are protected and conserved for future generations.

In order to meet these needs the Marine Resources Division of the SCDNR utilizes staff and funding opportunities from a wide variety of sources. In addition to state appropriated monies, the SCDNR utilizes federal funds from USFWS Sportfish Restoration Program which is a user pays, user benefits approach that requires a 25% state match. Additionally, the SCDNR effectively worked with the SC General Assembly to pass the Marine Conservation and Management Act of 1991 establishing for the first time a saltwater fishing license to conserve and manage the marine recreational fisheries of SC. The South Carolina Gamefish Tagging Program encourages anglers to tag and release fish not only for scientific purposes, but as a conservation measure to help conserve stocks. In the past five years the program has supplied tagging kits to anglers who have tagged 43,891 fish of priority species. Red drum is one of the most sought after species of marine finfish in this state. As a result of these efforts SC is now releasing alive over 70% of the red drum taken in the recreational fishery (fig 7a.), promoting angling ethics and conserving this popular gamefish for future generations.



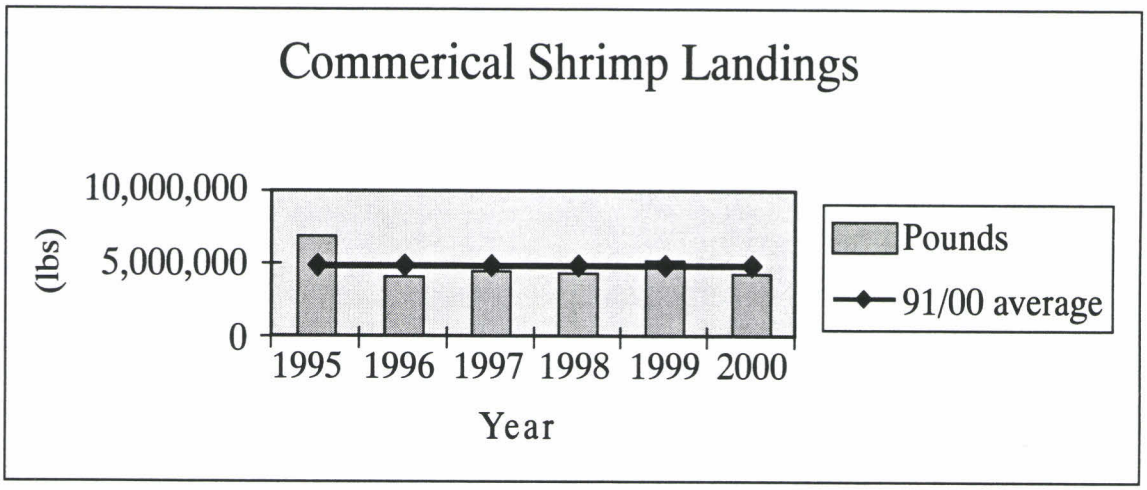
Program: Marine Resources
Strategic Plan Component:
Management/Science/Resources Sustainability
Organizational Effectiveness Results:

7.1-7.4: SC is not a major seafood producer when compared to other coastal states. However, the seafood industry does play an important role in the lives of 1500-2000 commercial fishermen, countless seafood wholesale

and retail dealers and is an important component of the coastal economy and it's heritage. During 2000 the total weight of wild saltwater stocks landed in this state was 15,680,778 lbs. with an ex-vessel value of $28,547,260. The customer focus in this case can be broadly summarized as the fishermen's desire to ensure sustainable, economically viable marine fisheries.

In order to meet these needs the Marine Resources Division of the SCDNR utilizes staff and funding opportunities from a variety of sources. All of the management and assessment work is funded with state appropriation. In addition research and science based efforts are funded through federal grants that are secured on a competitive basis.

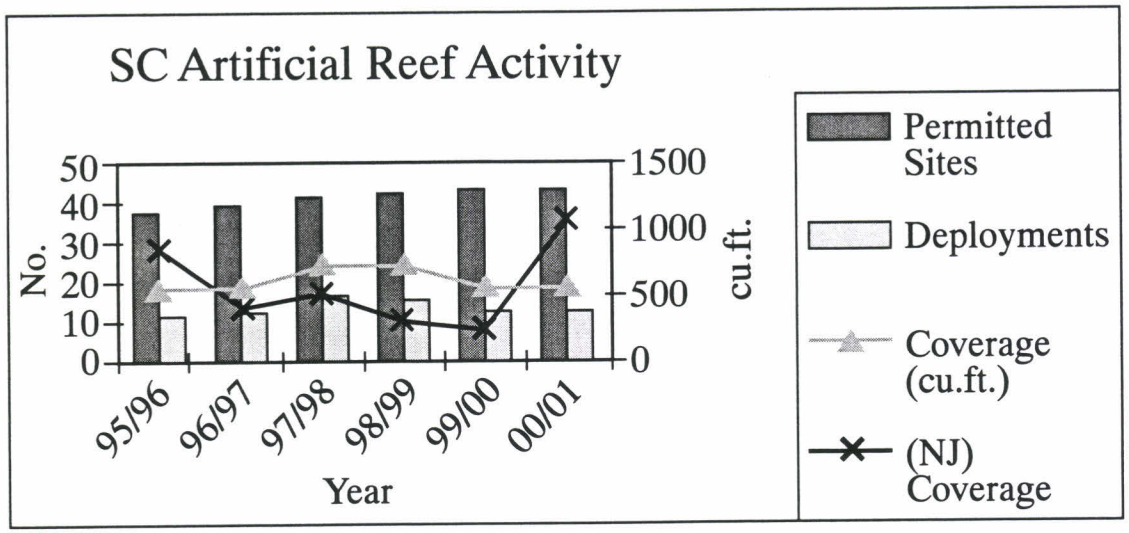
A significant component of the SC commercial seafood industry is our commercial trawl fishery for shrimp. During FY 2001, 685 commercial shrimp trawl licenses were sold. The shrimp season typically opens in spring and closes sometime after Christmas depending mainly on environmental factors. Commercial shrimp landings are comprised mainly of two species, white and brown shrimp, each of which have different life cycles and require somewhat different trawling techniques to catch. The Marine Division utilizes not only legal, licensing and permitting requirements but also good science and management to help sustain this fishery. Over the past five years the commercial shrimp landings have been close to the long-term average. (Fig 7) Despite these efforts, environmental factors such as winter temperatures and summer rainfall can ultimately be the determining factors of a good vs. poor season.



Program: Marine Resources
Strategic Plan Component:
Management/Science/Enhancement
Organizational Effectiveness Results:

7.1-7.4. During the most recent FY (1999/2000) where data is available, there were 103,470 saltwater fishing licenses sold to shellfishers and boat anglers. Boat anglers represent a large portion of the SCDNR customer base. This customer base is extremely important not only because of it's size but also because of the fact that through their purchase of saltwater fishing licenses, they help support a number of recreationally oriented programs. The customer focus can be broadly summarized as: 1) to provide continued and better recreational fishing opportunities for the citizens and guest of South Carolina; and 2) to ensure that the natural marine resources of this state are protected and conserved for future generations.

In order to meet these needs the Marine Resources Division of the SCDNR utilizes staff and funding opportunities from a wide variety of sources. The Marine Artificial Reef program is an excellent example of how the MRD fulfills its obligation to boat anglers in this state by increas-



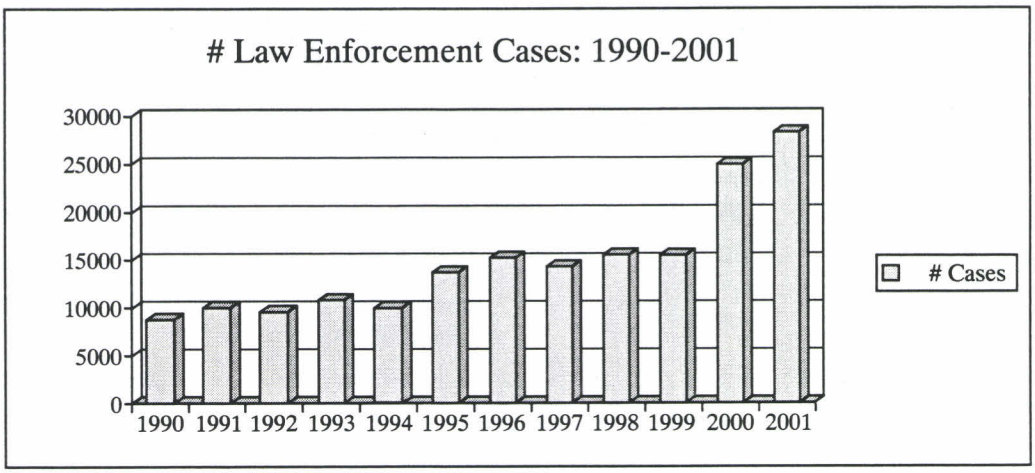
ing and improving saltwater fishing opportunities. Established in 1975 the program now maintains 44 permitted reef sites. Over the past five years over 87 deployments have expanded the amount of fishable bottom on these sites by 3,693,400 cu ft. When compared to NJ, which is considered to have one of the best reef programs in the country, we have generally exceeded their coverage.

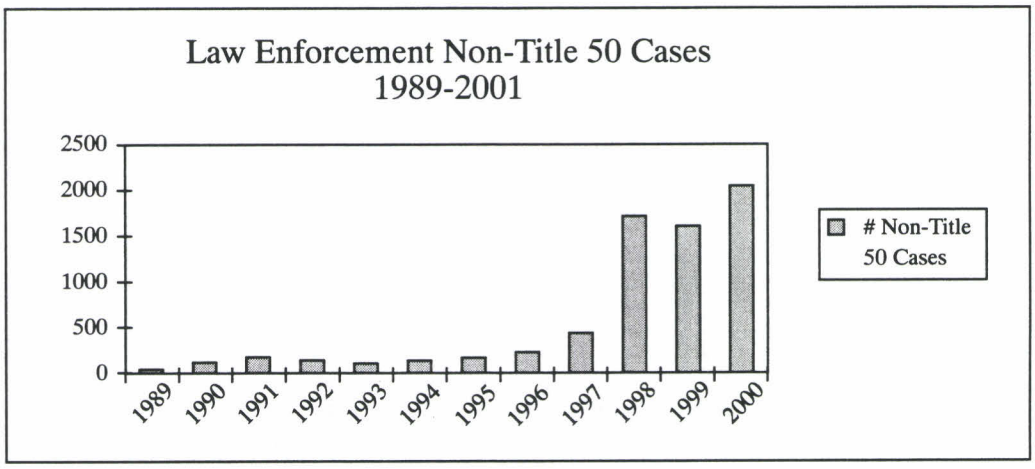
Program: Law Enforcement Operations

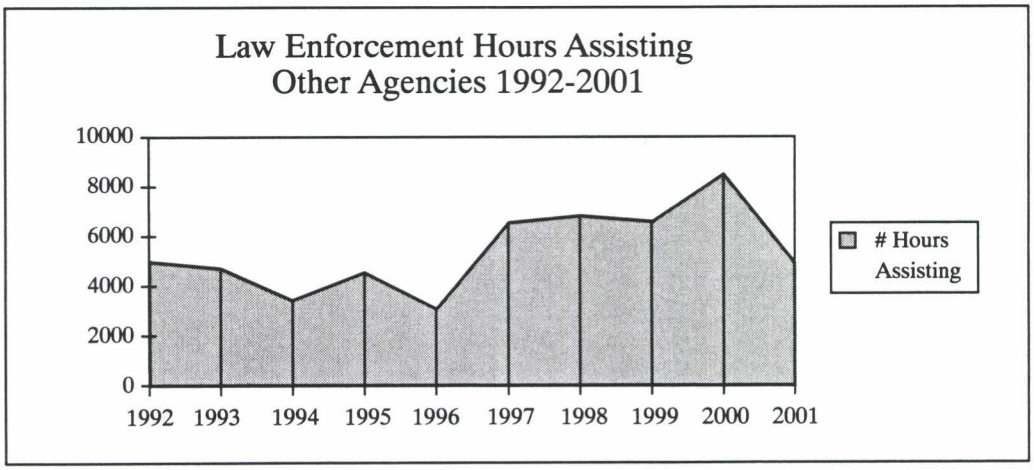
Strategic Plan Component: Strategy 1: Management, Action 3; Strategy 2: Science and Technology, Action 3; Strategy 3: Education and Public Involvement, Action 1 / 3; Strategy 5: Internal Management and Operations, Action 1 / 2 / 3 / 4 / 5 / 6

7.1 - 7.5: Tasked with the responsibility of managing and protecting the natural resources of the state, DNR is in a unique and challenging position of balancing the public desire to utilize our natural resources for recreational and commercial purposes, with the need to implement restrictions (laws and regulations) on the use of the resources to ensure their long-term viability. The Law Enforcement Division has the primary responsibility of protecting these resources and those who utilize them through the enforcement of laws and regulations. In addition to enforcement efforts, the Division conducts educational and public awareness programs to promote safety, improve compliance with the laws and regulations, and enhance ethical behavior. DNR law enforcement officers also routinely assist other law enforcement agencies with a variety of enforcement tasks. By combining resources with other agencies to meet specific needs (in response to natural/manmade disasters, civil disturbances, or man-hunts/search and rescue operations), DNR along with other law enforcement agencies is able to serve the public in a cost-effective manner. In order to assess job performance and the effectiveness of our efforts to protect the states natural resources and those who utilize them, the Division collects and monitors data relating to officer case load for Title-50 cases (game, fish, and boating) and Non-title-50 (as identified in 50-3-410 i.e. littering, alcohol violations, disorderly conduct, simple possession of marijuana, etc.). During 2000-2001, 28,073 game, fish and boating cases and 2,056 other cases were handled by Conservation Officers. In addition, these conservation Officers provided 5,027 hours assisting other law enforcement agencies in the state.

Although it is not the Division's intent to measure officer performance based on case loads alone, nor is it totally accurate to correlate customer satisfaction to an officer case load, it does present an opportunity to assess the type and number of violations that are being committed. Based on an assessment of this data, law enforcement resources can be reallocated to address significant issues/concerns. In addition, in many situations the activities of DNR officers are


Law Enforcement Cases: 1990-2001
30000
25000
20000
15000
10000
5000
0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001
Cases


Law Enforcement Non-Title 50 Cases
1989-2001
2500
2000
1500
1000
500
0
1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000
Non-Title 50 Cases

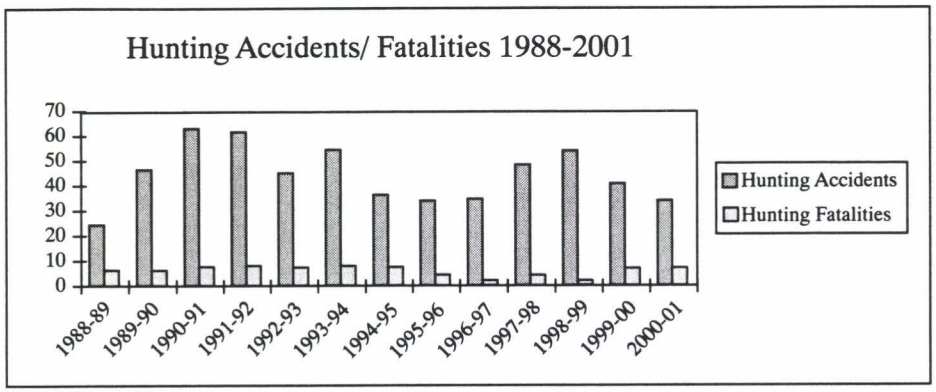

Law Enforcement Hours Assisting
Other Agencies 1992-2001
10000
8000
6000
4000
2000
0
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001
Hours Assisting

directly focused on issues/concerns that the public has identified. The bottom line result of this process should be enforcement efforts that allow the public to enjoy the states' natural resources, with the knowledge and understanding that measures taken to ensure the protection of the resources and those who utilize them are paramount. The areas that are monitored reflect areas of concern to DNR and from the general public.

Program: Hunter Safety

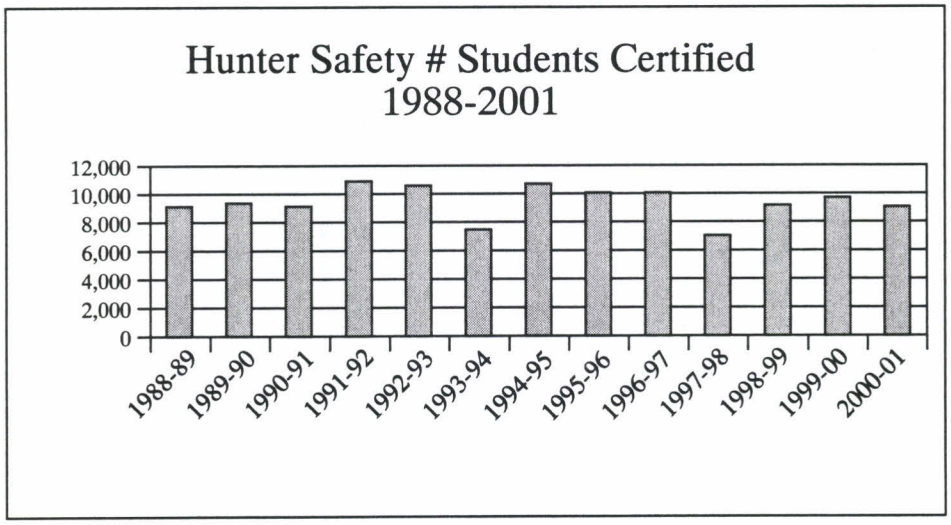
Strategic Plan Component: Strategy 1: Management, Action 3; Strategy 3, Action1 / 2 / 3 / 4 / 5; Strategy 5, Action 4.

7.1-7.2: The law Enforcement Division collects and monitors data on several key functions that relate to job performance and constitute satisfaction. The areas that are monitored reflect areas of concern to DNR and from the hunting public.



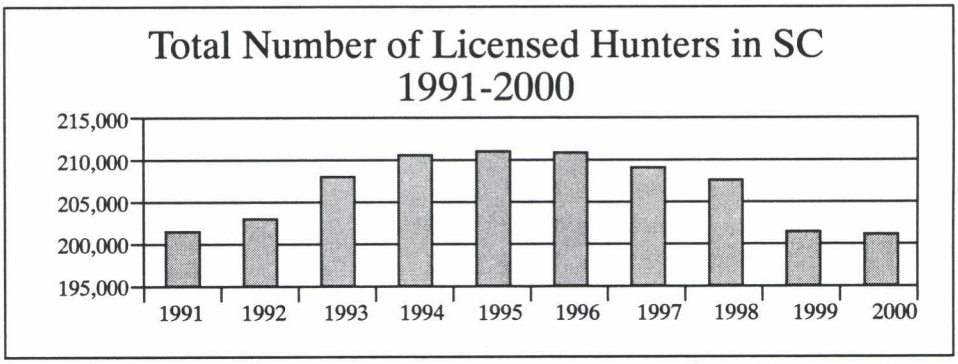
Number of Hunter Educations Courses conducted and the number hunters certified in a DNR Hunter Education Course: Although the course is mandatory for all hunters born after June 30, 1979 prior to purchasing a license to hunt, there are many hunters who participate in the course in an effort to improve their knowledge of hunting and other outdoor skills even-though they are not required to attend. In addition, many South Carolina hunters who travel out-of-state to hunt will attend the course in this state in order that they will be in compliance with the laws of the state they will be hunting in.

7.4: A good measure of constituent satisfaction is reflected



in the continued growth/sustainment in the number of total hunting licenses/permits purchased each year by hunters. This included 201,221 licensed hunters in the state in 2000. Due to the various game that is hunted in the state and the various methods that are used, DNR has to work closely with different hunting constituent groups and the general public to address issues/concerns that affect them. This association has allowed DNR to be successful in obtaining legislation and additional resources (funding sources) to deal with specific hunting related issues/concerns. The partnering has also lead to the development of PSA's to address hunting safety and improvement of the educational programs intended to address hunting safety and ethical behavior.

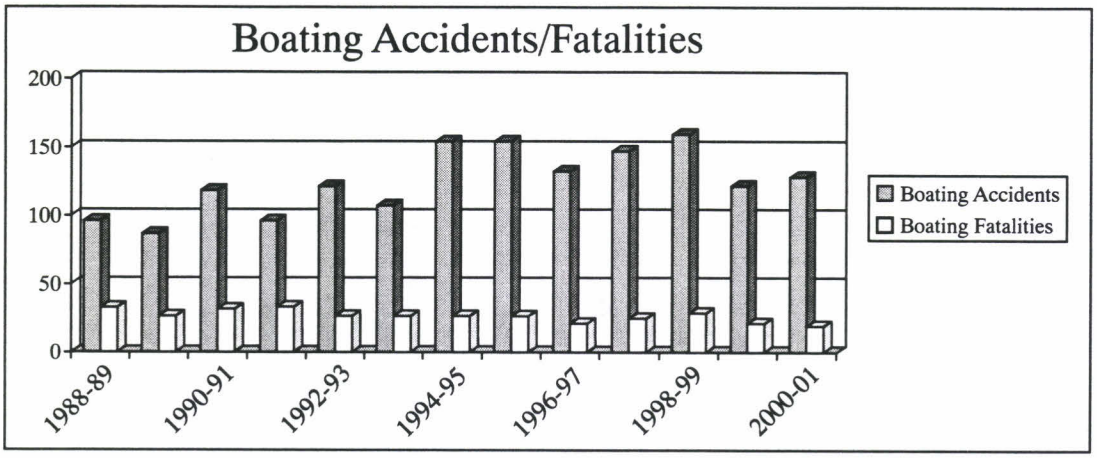
7.5: The total number and type of enforcement cases that are made are indicators of regulatory/legal compliance. From a review of cases made in regards to the nature and location of the violations, DNR is able to prioritize law enforcement resources and adjust the focus of education programs and public awareness campaigns to address hunting related issues/concerns. This information is also useful in establishing legislative priorities. In addition to addressing safety-related concerns in our educations programs and public awareness campaigns, DNR also places great emphasis on the ethical use of our resources. However, in an effort to promote good citizenship and compliance with the laws that regulate hunting in our state, it has been DNR's experience that a viable and visible law enforcement presence tends to have the greatest influence in addressing hunting related problems.

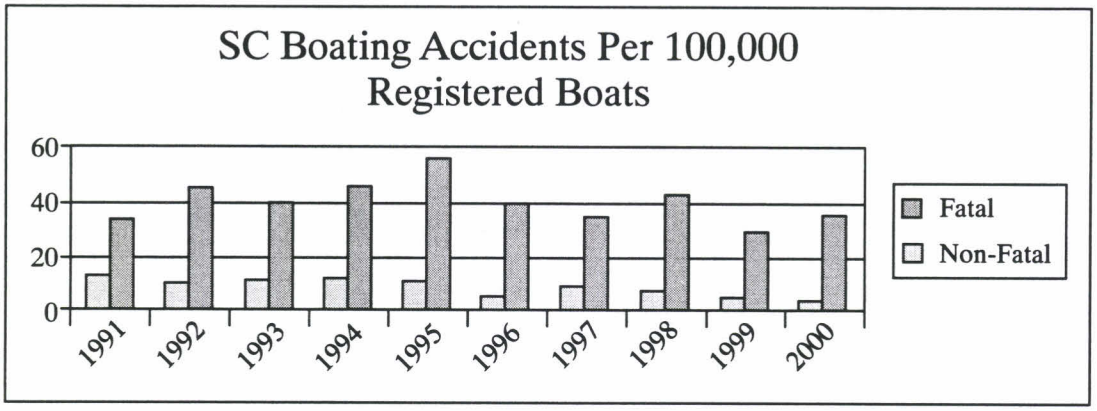


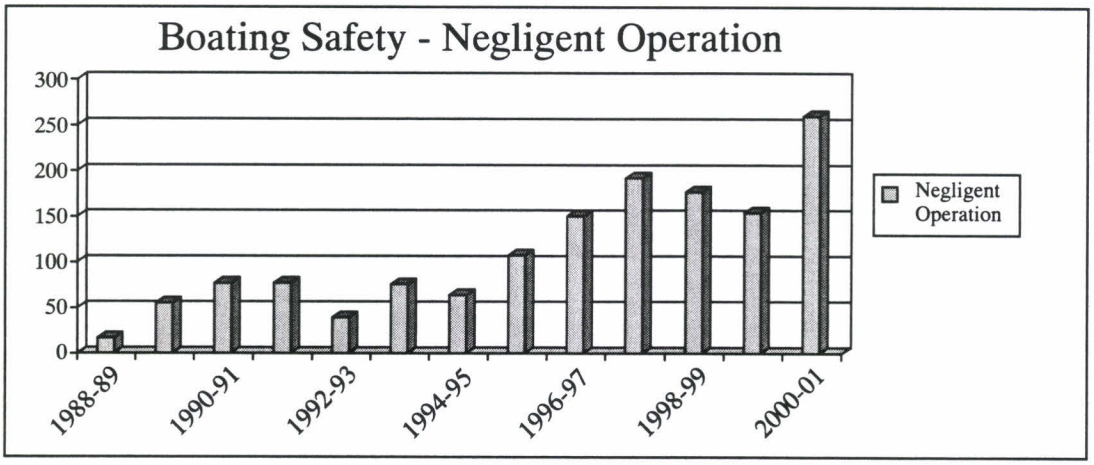
Program: Boater Safety

Strategic Plan Component: Strategy 1: Management, Action 3; Strategy 3: Education and Public Involvement, Action 1 / 2 / 3 / 4 / 5; Strategy 5: Internal Management and Operations, Action 4 Organizational Effectiveness Results:

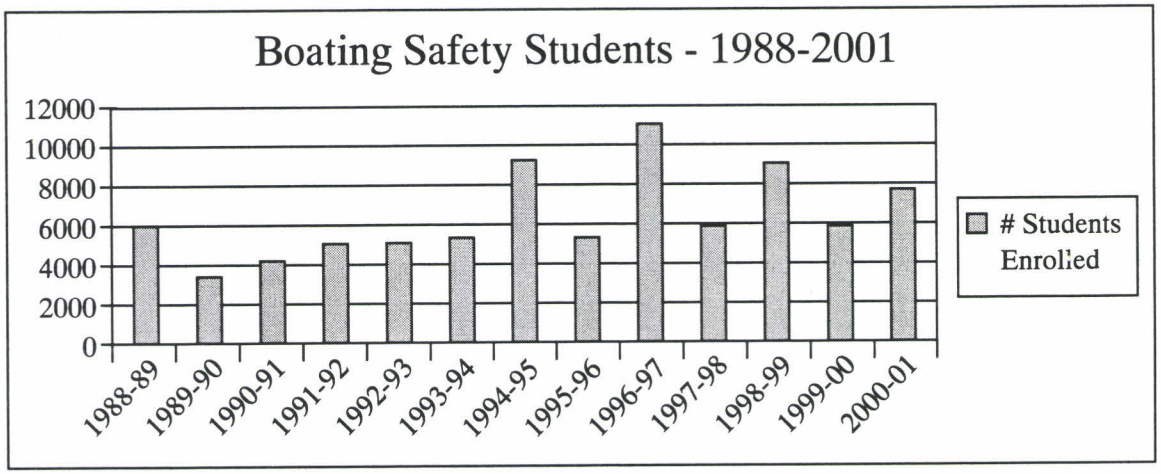
7.1 - 7.2: The Law Enforcement Division collects and monitors data on several key functions that relate to job performance and constituent satisfaction. The areas that are monitored reflect areas of concern to DNR and from the boating public.



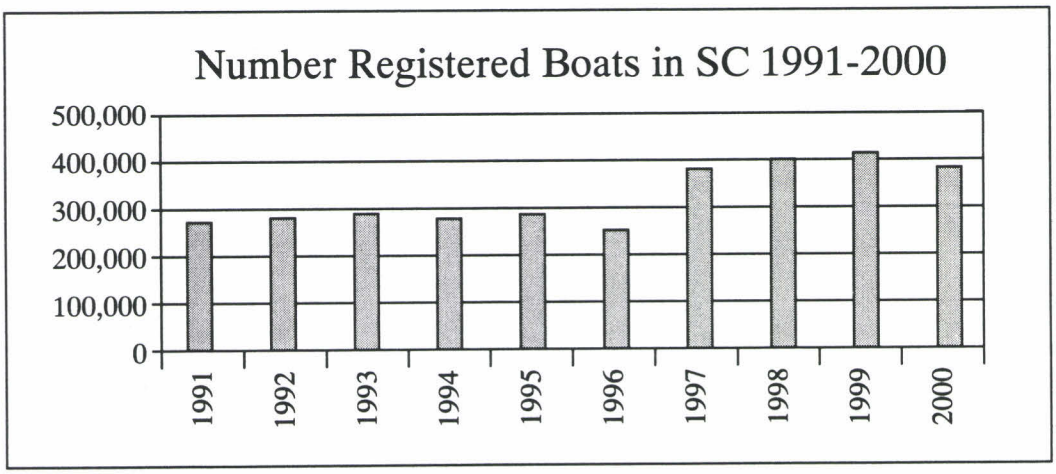




Number of students certified through a DNR Boater Education Course: Although the course is mandatory for boaters under the age of 16 who desire to operate a water craft powered by a 15 h.p. motor or larger without adult supervision, there are many other boaters who participate in the course in an effort to improve their knowledge boating related issues even though they are not required.



7.4 A good measure of constituent satisfaction is reflected in the continued growth in the number of boats registered in the state. Growth of recreational boating in South Carolina has required DNR to work closely with the boating industry and boating groups/associations to address issues/concerns. This association has allowed DNR to be successful in obtaining legislation and additional resources to deal with specific boating related issues and general growth of the activity. The partnering has also lead to the development of PSA's to address boating issues and educational tools (videos).



7.5: The number and type of enforcement cases that are made are indicators of regulatory/legal compliance. From a review of cases made in regards to the nature and location of the violations, DNR is able to prioritize law enforcement resources and adjust the focus of education programs and public awareness campaigns to address boating related issues/concerns. This information is also useful in establishing legislative priorities. In addition to addressing safety-

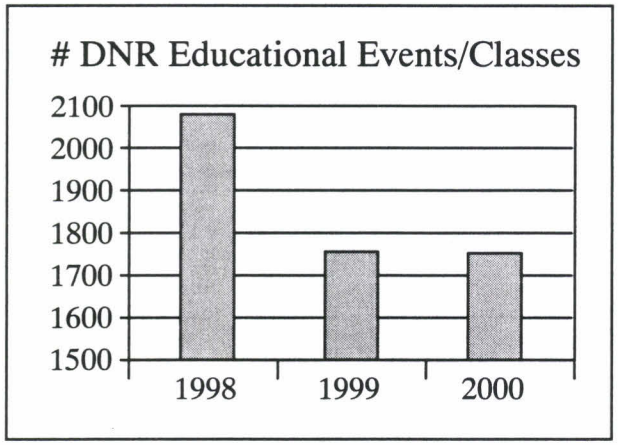
related concerns in our educations programs and public awareness campaigns, DNR also places great emphasis on the ethical use of our resources. However, in an effort to promote good citizenship and compliance with the laws that regulate boating on the waterways of our state, it has been DNR's experience that a viable and visible law enforcement presence tends to have the greatest influence in addressing boating related problems.

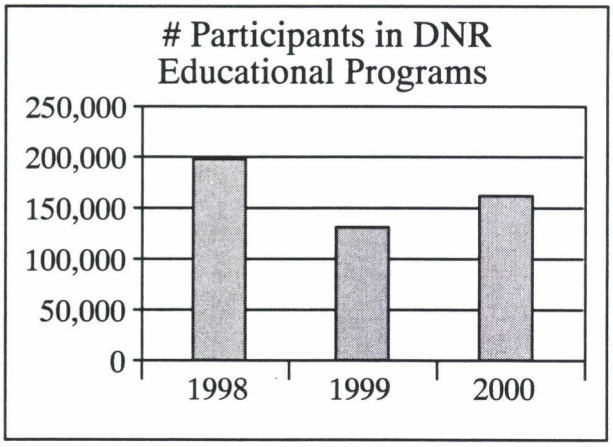
Program: Education
Strategic Plan Component: Action 5: Measures 1 & 2
Organizational Effectiveness Results: Emphasize the importance of education as a portion of every DNR employee's work responsibility.

DNR employees are encouraged to attend or more importantly actively participate in DNR Education and Outreach Events. These programs and events are scheduled during the year at various locations around the state. Employees are then presented with and realize more ownership of the various programs of the agency. These programs and events allow the employees of the agency to interact with the public that the agency is serving and increase their awareness of natural resources. Educational Programs include Project Wild, Project Wet, Camp Wildwood, Envirothon, Aquatic Education, Coastal Adventure Cruise Program, Marsh Classroom, Touch Tank Classroom Activity, MRD Tours, Becoming an Outdoors Woman, Take One Make One, as well as various writing and art competitions conducted through schools and conservation districts. Outreach Events include Beach and River Sweep, Hooked on Fishing Rodeos, Marine Resources Fair and Open House, and the Palmetto Sportsmen's Classic. Recent reductions in funding will undoubtedly result in changes in agency program and outreach efforts. Until these reductions are implemented, we will be unable to determine the effects on current education and outreach programs.

Program: Education
Strategic Plan Component: Item 2 Goal 6
Organizational Effectiveness Results: To increase public awareness of the mission of the Department of Natural Resources.

In July of 1994 the agencies of Wildlife and Marine Resources, Land Resources and Water Resources were combined into the Department of Natural Resources. Since that time there has been a constant effort by the agency to ensure that the name of the agency can be identified by the public as the agency responsible for the protection and utilization of the state's natural resources. In a February 1994 survey, 28% of the respondents indicated that responsibility for managing and protecting fish; game, non-game and natural resources in South Carolina resided with either the South Carolina Wildlife and Marine Resources Department or South Carolina Wildlife (Department). Surveys done since the 1994 formation of the Department of Natural Resources asked the following: "To the best of your knowledge, which state agency





is responsible for the management and protection of South Carolina's natural resources?" The results indicated that the percentage of respondents who correctly identified the Department of Natural Resources as the agency responsible for the management and protection of South Carolina's natural resources has increased slowly over time. This awareness rose steadily from 12.2% in Fall 1997 to 13.8% in Spring 1998, 14.4% in Spring 1999, and 16.5% in Fall 2000.

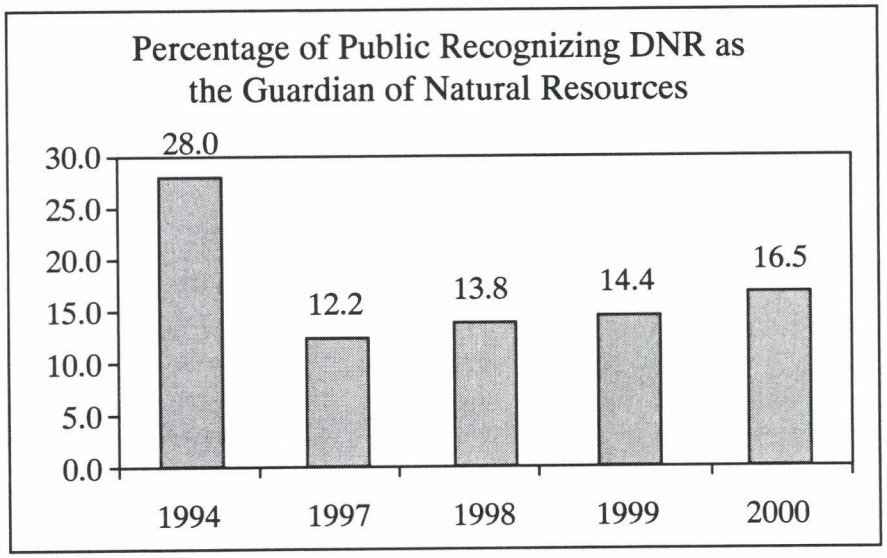
The DNR home page was created in 1994. It contains organizational and administrative information such as job postings, procurement solicitations and awards, hunting and fishing rules and regulations, and various research or fisheries and wildlife management initiatives of the Department. In addition, the DNR home page includes several sources of primary data including river and lake levels, precipitation and temperature station histories, and a series of GIS natural resources layers. There are numerous methods of measuring customer satisfaction and home page effectiveness. The DNR maintains several on-line forums, facts pages and email opportunities for user feedback. In addition, a customer satisfaction survey was conducted in May 2001 as part of an overall website evaluation. More than 140 users responded to the survey. The results indicate a 92% overall satisfaction with the website and their likelihood to re-visit the DNR home page. Public awareness is further enhanced through the 60,000 subscribers to the *SC Wildlife* magazine, approximately 375 statewide and regional news releases and public service announcements aired by approximately 200 radio and TV stations in the state.

Efforts by agency personnel to disseminate the name of the Department of Natural Resources have been effective by increasing the name recognition of the agency. Recent reductions in funding have caused the agency to discontinue participation in the South Carolina Broadcasters Association. Public service announcements link program and activities to the name and slogan, "Working for you .... Naturally." It is anticipated that this will make it increasingly difficult to effectively continue this increase in recognition of the agency's name and mission.

Program: Land, Water and Conservation Districts

Pursuant to the Water Resources Planning and Coordination Act of 1967 ('49-3-10 et seq.), the Division of Land, Water and Conservation develops and implements programs that manage and conserve the land and water resources of South Carolina. This is accomplished by providing guidance in the development and management of these resources

Note: Agency restructuring and name change-1994.

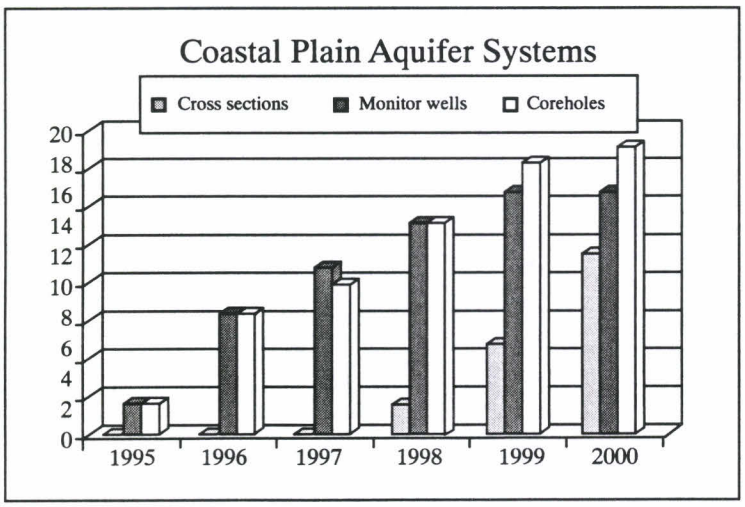


through planning, research, technical assistance, public education, and development of a comprehensive natural resources database.

The division serves as the focal point for climatological matters for State government and provides climate information and services to both public and private sectors. It is also headquarters of the South Carolina Geological Survey. The state's 46 soil and water conservation districts receive staff, funding and guidance from the division, and the SCDNR Internet Home Page is also maintained by this division. Knowledge of where and how much water is available is a major concern to all water users. This knowledge base was significantly expanded during the past six years through the Aquifer Delineation Project. The project resulted in over 10,000 feet of core, drilled at 19 sites in the Coastal Plain. Sixteen monitor wells were installed at depths ranging from 50 to 500 feet. The combined footage of these wells was 4,000 feet. About 100 geophysical logs were obtained with a combined footage of 56,000 feet. Over 700 core samples were analyzed to determine the age of the sedimentary layers that compose the ground water system. These data were used to construct 12 hydrogeologic cross sections that depict the lateral and vertical extents of the principal aquifers and confining units. The cross sections will be accessible from the Internet to provide information to municipalities, industries, farmers, and well drillers about the availability of groundwater resources in the Coastal Plain.

The State Water Plan presents general goals and objectives for sustaining the availability of water for current and future use, precipitation and stream flow from neighboring states; our stored water; and types of water use. Most importantly, the Plan provides considerations and guidelines for how water should be managed in the State. One of the Plan's critical components deals with identifying and addressing water shortages, and the Plan details appropriate responses based on the degree of shortage. Few states in the nation have developed such plans; North Carolina and Georgia are currently working on the framework of their water plans.

The core function of the Geological Survey is the development of geologic map information; and based on citizenship, the unit is the sole source provider for such information within the State. Performance goals compliment legislatively described duties and align processes with strategic objectives. Stakeholders and the STATEMAP Advisory Committee continue to guide the development of action plans. Action plans respond to strategic objectives by anticipating needs for geologic map information, and critical areas needing such information are defined by analysis of development data of either socio-economic growth or man=s impact on the environment.



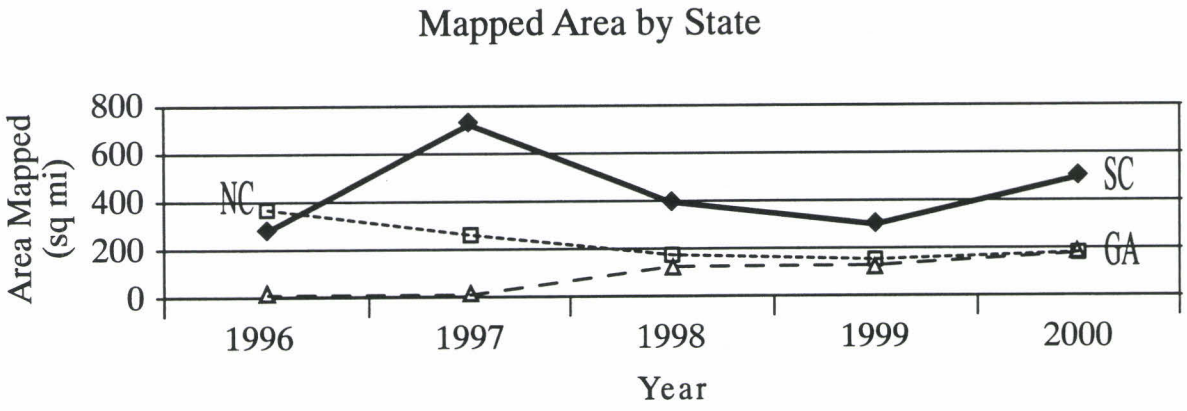
During FY 2000, the Bluffton area and the I-85 growth corridor were determined to be critical areas. In the Bluffton area along the coast, 205 square miles (land area = 3.7 quadrangles) were mapped, and technical innovativeness resulted in mapping facies within depositional systems and in conducting analytical studies to age date those systems. Along the I-85 growth corridor, 280 square miles were mapped (5 quadrangles:3 internally and 2 outsourced). These Piedmont map products were improved by showing fold phases and fault structural style.

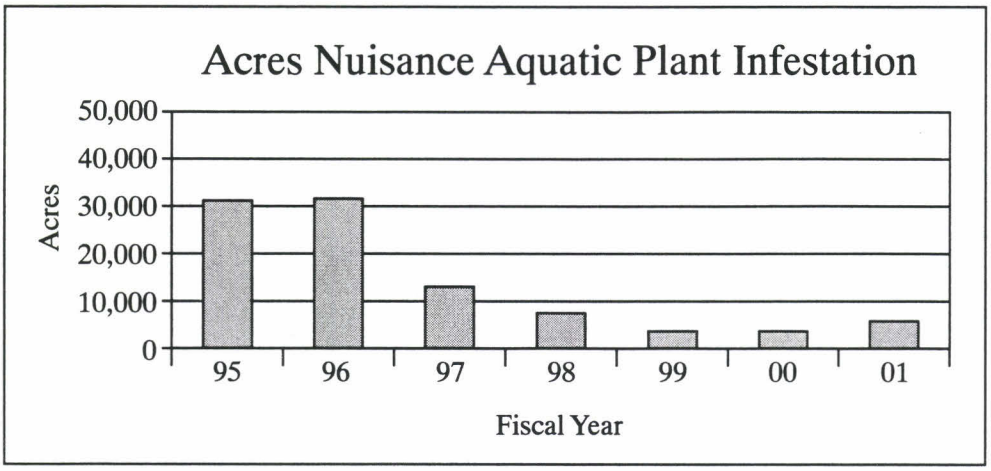
Cycle time for design to introduction of internal map products was maintained at 18 months and continues to be controlled by external STATEMAP funding. Georgia and North Carolina also participate in the STATEMAP program and maintain the same product cycle time. Publishing outsourced maps made additional geologic information available, optimized available resources, and bridged learning gaps created by externally funded priorities. Value was added when the maps were digitized and made available in electronic format. This map information was delivered directly to local and county planning offices, as well as made available to other stakeholders upon demand.

The Land and Water Stewardship Program has several programs in the area of Planning and Resource Management. These programs include the Watershed and River Corridor Planning Program, the South Carolina Scenic Rivers Program and the Natural Resources Planning Initiative. Each of these programs has a strong community-based planning component and a key measure of customer satisfaction, and mission accomplishment is the level of participation in our planning projects. During FY2001, we had over 1500 constituents directly involved in projects ranging from the Reedy River Watershed Study to planning assistance to the Town of Great Falls. Another measure of mission accomplishment and involvement is the completion of resource management plans. During FY2001, we completed three management plans and one scenic river eligibility study.

During FY 2001, program staff completed the South Carolina Zebra Mussel Risk Assessment and expanded Shoreline Habitat Enhancement efforts on Lake Murray with the planting of over 2,000 buttonbushes and cypress trees, 1,000 wild celery plants, and experimental planting of a variety of aquatic plant species. Aquatic plant management operations were conducted on 21 waterbodies at a cost of $483,236. The ultimate success of the program is measured by the presence of aquatic nuisance species in the state's public waters. During the past year, no zebra mussel populations were found and the total area infested with nuisance aquatic vegetation was 7,408 acres. While this is a 54% increase in coverage from FY 2000, it represents an 82% decrease from peak coverage in 1995.

In order to protect and manage the natural resource base,





Department staff provides technical assistance to the public in conjunction with the 46 conservation districts and the USDA-Natural Resource Conservation Service. Technical duties of staff include planning and application of soil and water conservation practices, promoting wildlife habitat, monitoring soil erosion, assessing sediment and storm water problems and conducting technical clinics and workshops. Through conservation districts, $7.48 million in federal cost share assistance was provided for installation of Best Management Practices. An additional 145,041 acres were placed in a conservation plan, bringing the grand total to 7.7 million total acres in South Carolina covered by a conservation plan. Furthermore, Department staff provided technical assistance towards water quality protection and management projects. A major DNR effort included execution of the State Conservation Cost Share Program whereby $690,000 of State Funds were matched by $1.6 million from individuals, non-profits, local governments, and USDA to install conservation practices and projects to address non-point source pollution. Over 391 State Conservation Cost Share projects were funded in the 46 districts. In addition, six conservation districts secured over $500,000 for water quality demonstration projects through Clean Water Act Section 319 Grants.

To foster professional development and employee satisfaction, staff attended training workshops, seminars and periodic staff meetings. Staff attended 8 technical training workshops, a conservation easement workshop and a joint meeting with counterparts from North Carolina. All Section Field Staff participated in three statewide Conservation District Operations Training sessions for conservation district commissioners and employees. Employees are encouraged to be innovative, to look for ways to improve service, to interact with supervisors, and to network with coworkers and others to accomplish job tasks. Another measure of employee satisfaction is job longevity. Of the 23 staff positions, 13 have been employed 15+ years with the Department.

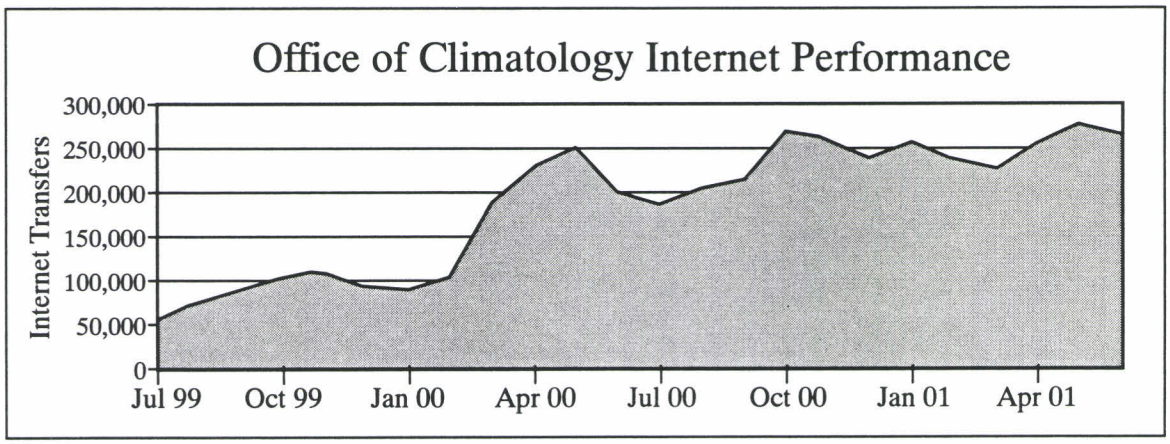
Efforts to promote partner enhancement include staff participation in meetings of the S.C. Conservation Partnership Quality Management Team, State Technical Committee and S.C. Outreach Council. DNR funded a contract with the S.C. Association of Conservation Districts for joint project coordination and achievement. Staff coordinated the Annual Conservation Partnership Conference in conjunction with conservation districts and USDA-NRCS; supported and advised seven committees of the S.C. Association of Conservation Districts (SCACD); and supported the Annual Legislative Conference of the SCACD. Staff met in Washington, D. C. with the S.C. Congressional Delegation.

Office of Climatology

Current and historical climate products for South Carolina and other southeastern States, including Alabama, Florida, Georgia, North Carolina, Virginia, as well as Puerto Rico and US Virgin Islands, are obtained, quality assured, and maintained on data archives to support the climate information needs of various economic sectors in these states and territories. A key indicator for customer satisfaction is 'distribution of offline productivity for each business sector' (i.e., energy, agriculture, transportation, tourism, etc). Twelve of the 32 different business sectors displayed comparative increases in productivity and revenue.

To meet the needs of a diverse and geographically broad customer base, the Land Water and Conservation Division of the SCDNR takes advantage of funding opportunities from a variety of sources. In addition to state appropriated funds (24%), the SCDNR uses federal funds from the National Oceanic and Atmospheric Association (65%), the US Department of Agriculture (8%), and revenue monies from the sale of climatic information and data (3%).

Response Indicators for organizational effectiveness are near-real time information acquisition, innovation rates, revenue efficiency, and legislative compliance. Information acquisition increased by 21% and 16% for NOAA and non-NOAA sources. Information distribution has been effectively transitioned to e-technology processes with a net gain in customer satisfaction. Innovation rates are 58% reduction in manual-offline customer interaction and 45% increase in automated information distribution such as web based (see Figure). Productivity, average revenue generated per item, has increased by 20%. The Office of Climatology, in accordance with the South Carolina Drought Response Act, promulgates regulations. In so doing, the Office has brokered agreements for 21% of Local Drought Committee appointees.



SECTION II: HISTORICAL AND QUALITATIVE INFORMATION

DIVISION OF LAND WATER AND CONSERVATION

Hydrology

The Division, in cooperation with the US Geological Survey, maintains a statewide monitoring network to assess water availability and to evaluate the impact that withdrawals, diversions, floods, and droughts have on our water supplies. Information gained from such a network is the basis for making sound decisions regarding the utilization of our water resources, mitigating potential conflicts of interest, and trend analyses of water quality and availability.

The real-time river and lake water levels are available to the public via the DNR website, and this information is used by private citizens and government agencies, in South Carolina and in other states. Increasingly, private canoeists, kayakers, and rafters, commercial outfitters, fishermen, boaters, and others are accessing this information on a daily basis. The South Carolina Department of Transportation checks river water levels in relation to bridge maintenance, and the South Carolina Department of Health and Environmental Control checks river flows and lake levels for water-quality monitoring. DNR Hydrology Division staff use the information gathered from this network to study river flooding and to determine areas subject to flooding hazards.

South Carolina State Water Plan

The Plan presents general goals and objectives for sustaining the availability of water for current and future use. It also reviews the source of our water – precipitation and stream flow from neighboring states; our stored water; and types of water use. Most importantly, the Plan provides considerations and guidelines for how water should be managed in the State. It creates a broad framework that will conserve water supplies.

One of the Plan's critical components deals with identifying and addressing water shortages, and the Plan details appropriate responses based on the degree of shortage. Having a planned, detailed response to water shortages is recommended by the National Drought Center. Few states in the nation have developed such plans; North Carolina and Georgia are currently working on the framework of their water plans.

Knowledge of where and how much ground water is available is a major concern to all water users in South Carolina. This knowledge base was significantly expanded during the past six years through the Aquifer Delineation Project. The project resulted in over 10,000 feet of core, drilled at 19 sites in the Coastal Plain. Sixteen monitor wells were installed at depths ranging from 50 to 500 feet. The combined footage of these wells was 4,000 feet. About 100 geophysical logs were obtained with a combined footage of 56,000 feet. Over 700 core samples were analyzed to determine the age of the sedimentary layers that compose the ground water system. These data were used to construct 12 hydrogeologic cross sections that depict the lateral and vertical extents of the principal aquifers and confining units. The cross sections will be accessible from the Internet to provide information to municipalities, industries, farmers, and well drillers about the availability of ground water resources in the Coastal Plain.

The number of hydrology-related reports available from the DNR is an indicator of the work done by the Hydrology section. These reports are usually the end result of research projects, such as aquifer delineation, water allocation, saltwater intrusion, and trend analyses of water availability and quality. Hydrology publications, ranging from detailed

technical reports to educational maps, cover a wide range of hydrology topics, including both surface and ground water; water quality, availability, and use; flood and drought studies; and aquifer characteristics. While available to the general public, these reports are particularly useful to municipal governments, water companies, well drillers, engineers, and planners.

South Carolina Geological Survey

As in the previous year, the implementation of Action Plans continued to be a priority at the South Carolina Geological Survey (SCGS). Guidelines for such planning are dictated by the legislatively described duties: mapping, gathering of surface and subsurface data, involvement in regional planning and effective land use, economic development, and distribution of geologic information. Project objectives to satisfy those duties were developed on the basis of defining unique strengths, recognizing opportunities, identifying problems, and determining strategies.

Once logistic problems were overcome, work was conducted under the three, established program areas: Land Use-Environmental, Tactical Support, and Education & Extension. These program areas were established the previous year, and work activities under each area were conducted with a value-added approach. The Land Use-Environmental Program gathers basic field data and produced geologic information from different regions of the State. The Tactical Support Program refines this information and created geologic knowledge in an electronic format. The Education-Extension Program then delivers this knowledge or develops derivative products.

Under the Land Use-Environmental Program, mapping was conducted in different regions and was supported by funding from either State funds, the National Cooperative STATEMAP program, or the AASG. This mapping adds to the 3,720 square miles that were previously mapped from 1988 to 2000. In the Piedmont region, parts of seven different 7.5-minute quadrangles were either mapped or refined, and two outsource maps were published. Glenn Springs, Moore, and Taylors quadrangles were mapped; Tigerville, Paris Mountain, Greer, and the southern-half of Saluda quadrangles were refined; and Cleveland and Slater quadrangles were outsourced. Mapping focused on structural styles of faulting, on fold character and phases, on regional tectonic framework, and on lithostratigraphic description. Gravity surveys also were conducted in the Piedmont region to locate faults and other zones of weakness that might focus earthquake activity. In the Coastal Plain region, the South Carolina portions of Mechanic Hill and Girard quadrangles were completed to illustrate the complex nature of river terraces along the Savannah River. Paleomagnetic studies also were conducted on selected Eocene stratigraphic units in the Coastal Plain to constrain age relations; such stratigraphic information was integrated with microfossil data and known isotopic dates. To further compliment a regional cross-section of the Coastal Plain, drilling was conducted along a traverse line crossing the proposed Branchville scarp; this scarp was not verified by drilling. In the Coastal region, Spring Island, Bluffton, Jasper, and the southeast quarter of Parris Island 7.5-minute quadrangles were mapped. Mapping continued to focus on developing an information base for land-use and ecosystem managers. Since the maps were to be an information base, the maps showed both the different depositonal units and the individual facies that made up those units. This map approach subsequently identified multiple Holocene units along the coast. As part of an effort to evaluate relative sea level rise, SET (surface elevation table) stations in the ACE Basin were measured on a bi-monthly basis, and now data exists for most of the different stations over a 24 month period.

The Tactical Support Program was created to be a value-added program to impact knowledge management. Focus of the program during the past year was on developing digital electronic files of 1:24,000 scale maps. An intern from the University of South Carolina was hired to assist with the digitizing. All 2001 STATEMAP products were digitized; paper copies were printed from those electronic files and were submitted to the U.S.G.S. Program Manager. A variety

of other graphics also were produced as value-added products.

Following a series of meetings with School District Science Coordinators, derivative products were given a priority in the Education-Extension program. The number of power point presentations to compliment the required Earth Science teaching standards was expanded, and those presentations were made available to teachers both on the web and on CD. Education graphics for bulletin boards also were reduced and placed on the web. Although K-8 earth science is taught in the first and second quarters, 598 hits were received after teachers learned of the web site in the third quarter of school. In the office, other education graphics were printed upon demand as teachers from different districts called or visited the SCGS. The number of teacher workshops also was increased so that more students could be reached, and a booth was set up at the South Carolina Science Council meeting in Myrtle Beach.

To assist the distribution of geologic information, the SCGS published Volume 42 of *South Carolina Geology*. One paper in that volume described the geology of Hickory Tavern quadrangle, which was mapped with STATEMAP funds. A second paper described structural styles of brittle faulting in the Piedmont region. Papers were prepared, reviewed, and edited for a Special Issue of *South Carolina Geology* to be published in the fall of 2001 for the Carolina Geological Society. The SCGS also participated in the Southeastern Section Meeting of the Geological Society of America and presented seven papers or posters. Undergraduate students being mentored under the AASG field program also presented a poster.

Work in the Core Repository continued into a third year. Large cores stored in wooden boxes were cut and re-boxed into two-foot cardboard boxes to free up shelf space. Lights and logging tables also were added along one wall to establish a work area. Efforts to change the Core Repository from a storage shed into a research facility were considered complete with the establishment of the work area. The floor in the facility also now is being swept twice a week.

General assistance was provided to 539 general walk-in or call-in customers. More specific help, not included in that number, was provided to the Department of Commerce the Department of Health and Environmental Control, the Emergency Preparedness Division, the South Carolina Building Code Council, and the Governor's office. Information derived from the Lake Marion STATEMAP project was explained to and different field trips were given to resource managers attempting to build duck ponds on eolian sand deposits. Numerous consultants requested information on mineral deposits and earthquakes. Map information and stratigraphic data also were explained to a number of walk-in and phone-in customers.

CONSERVATION DISTRICTS SECTION

TECHNICAL ASSISTANCE TO LANDOWNERS AND USERS - DNR-Conservation Districts Staff provides technical assistance through conservation districts. Technical duties of staff include planning and installation of soil and water conservation practices, promoting wildlife habitat, monitoring soil erosion, assessing sediment and storm water problems and conducting clinics and workshops. Through conservation programs in the districts, $6.5 million in federal cost share assistance has been provided for installation of Best Management Practices. This year, 145,041 additional acres were placed under a conservation plan in South Carolina, bringing the total to 7.7 million acres under conservation plans.

CONSERVATION DISTRICT AND WATERSHED DISTRICT ASSISTANCE - The Division provides program management assistance in the implementation of the Soil and Water Conservation Districts Law and the Watershed Conservation Districts Law. Division staff attended over 600 conservation district board meetings, watershed district

meetings and training sessions providing direct assistance to the 230 district commissioners, 185 watershed directors, district employees and other citizens. There are 37 Watershed Conservation Districts in the state with a combined total of 1,232,654 acres. Division staff provided direct assistance such as district commissioner and watershed director training, grant writing, and program management. During the 2000-01 Session of the SC General Assembly, staff tracked 60 bills relating to natural resource conservation and provided periodic updates to the conservation districts. DNR created a Web site for all 46 conservation districts and staff assisted with Web page development and design for eleven districts.

NONPOINT SOURCE PROGRAM - The Nonpoint Source Program includes education, training, demonstration of best management practices (BMPs), and technical assistance on the selection and design of BMPs. The state program is implemented pursuant to Section 319 of the federal Clean Water Act which requires each state to identify NPS problems and to implement preventive and corrective actions. Currently, 10 conservation districts have received Clean Water Act 319 grants amounting to over one-half million dollars. In addition, Staff continues to monitor and close out the State Conservation Cost Share Program where $690,000 of State Funds were matched by $1.6 million from individuals, non-profits, and local governments to install 391 conservation practices and projects in all 46 counties.

LAND PROTECTION PROGRAMS – Staff and conservation districts are assisting land trusts and other individuals and groups with land protection efforts. In FY 2000-01, staff organized and coordinated a training session for the Pee Dee Land Trust Board and assisted the Pee Dee Land Trust in receiving its first conservation easement on 14 acres of forestland near Hartsville. Staff provided the Lord Berkeley Land Trust with technical assistance and support.

CONSERVATION TECHNOLOGY DEMONSTRATION PROGRAM - The Conservation Technology program demonstrates an innovative approach to promote the adoption of emerging conservation technology to conserve water, save time and money, reduce soil erosion and improve water quality. Sixty-five (65) units of conservation equipment such as no-till drills, tree planters, and drip irrigation machines are made available to the general public through the conservation districts. Conservation districts sponsor field days and demonstrations jointly with assistance from federal, state, and private agencies.

GEOGRAPHIC INFORMATION SYSTEMS (GIS) – Staff, in cooperation with conservation districts, are developing GIS systems to various degrees across the state. Conservation districts are providing natural resource data, maps, and information on soil types, prime farmland, wetlands, waterways, land cover, wildlife, forestry and endangered species.

CONSERVATION PARTNERSHIP CONFERENCES- Working with conservation partners, the S.C. Association of Conservation Districts and the USDA-Natural Resources Conservation Service, Division staff conducted and participated in three conferences with the purpose of providing a forum to discuss issues and ideas from the conservation districts and the public. The Annual Joint Conference was held January 4-6 in Charleston. The conference, attended by over 400 conservation leaders from across the state, focused on growth management, water quality and legislative issues. The Fall Conference, held October 3, 2000, was a working session for the SCACD Standing Committees and an opportunity for commissioners, district employees and agency staff to exchange ideas and develop policy positions and action plans. On January 31, 2001, commissioners, district employees, agency staff and others attended the Spring Legislative Rally. The group visited the State House where they met with their State Legislators to gain support for conservation district initiatives.

OUTDOOR EDUCATION - Division staff were involved in the planning and installation of outdoor classrooms and nature trails at 15 sites around the state. Staff provided technical assistance such as site plan assistance, identification of plant, soil, and water resources and installation of structures. Of particular note is the Calhoun District joining

in with the DNR Heritage Trust Program to purchase 201 acres in Calhoun County, to be known as Congaree Bluffs Heritage Preserve. The acquisition was made possible by a cooperative effort among DNR, the Calhoun District, Congaree Land Trust, The Nature Conservancy, and Friends of Congaree Swamp, all of which provided earnest money to purchase the property. Heritage Trust staff and Land and Water (DNR) staff will work with the Calhoun District and the Calhoun County Museum and Cultural Center to establish an environmental and cultural education center in an existing house on Congaree Bluffs Heritage Preserve. Other outdoor education centers associated with conservation districts include the Bamberg Outdoor Classroom and Nature Trail, the Conservation Station in Richland County, the Blue Heron Nature Trail in Jasper County, the Lynch's Woods Park in Newberry, Playcard Environmental Center in Horry County, the Adair Environmental Center in Laurens County, and the Roper Mountain Center in Greenville.

GOVENOR'S INSTIUTE FOR NATURAL RESOURCE CONSERVATION - Staff of the Division conducted this annual conservation institute held for the first time at Lander University, June 18-22, 2000. High school students sponsored by their local conservation district from across the state attended the weeklong activity. During the workshop, the delegates engaged in hands-on activities learning about water quality, soils, wildlife, land use, and watersheds. Six scholarships were awarded to participants who excelled in workshop activities and delegates who passed the exams given during the week earned one hour of college credit in environmental science. The Institute is coordinated and staffed by DNR with assistance from Lander University faculty and staff.

ENVIROTHON - Envirothon is an international competition for high school teams in natural resource science. Teams apply their knowledge in four the subject areas of soils, aquatics, forestry and wildlife. Thirty-two teams competed at the Sandhill Research Station near Columbia. The team from Spartanburg High School won the state competition and represented South Carolina at the Canon Envirothon held in Mississippi. Division staff coordinated this annual event with assistance from the Envirothon Steering Committee, DHEC, Conservation Districts, Santee Cooper, NRCS, the Forestry Commission, Soil and Water Conservation Society, Richland School District 2 and the Department of Education.

ENVIRONMENTAL EDUCATION INSTITUTES, CLINICS AND FIELD TRIPS FOR TEACHERS - The Division, in cooperation with conservation districts, co-sponsored six Environmental Education Institutes for Teachers. The Institutes were held in cooperation with local school districts and covered many topics related to environmental conservation. These Institutes offered teachers an excellent opportunity to learn about the environment and conservation education services available to schools. Teachers participating in the environmental institutes earn re-certification or graduate level credit. DNR programs, SCMAPS, Project WET, and Project Wild, were included as part of the Institutes and are offered as stand-alone programs throughout the year.

DIVISION OF WILDLIFE AND FRESHWATER FISHERIES

Environmental Programs Office

Goals: To protect, enhance and restore the State's fish and wildlife resources, aquatic and terrestrial habitats, outdoor recreation and associated natural resource values for present and future generations.

Objectives: To meet goals by actively participating in environmental permitting, hydroelectric project licensing, environmental studies, public education, policy formulation, and interagency coordination.

Key Results: Environmental Permits: We reviewed 505 environmental permit applications related to commercial and residential development. This is consistent with the number reviewed from the previous year. Based on review of the past

three years of permitting activity, this number appears to be part of a consistent long-term trend. The number of pond permit applications reviewed, however, has continued to increase substantially over the seven-year period. This trend can be directly attributed to the regional requirement of an individual permit for impoundments of streams not exempt through agriculture.

Stream Surveys: Biological surveys were conducted on 49 freshwater streams and stream health was evaluated using an index of biological integrity. There was a somewhat normal distribution of integrity rankings with the largest class being of fair health. As in the previous year, no streams rated excellent. Preliminary results from stream surveys show a trend of poor integrity above man-made impoundments. An interesting side note is streams with beaver impoundments are not showing the same negative results.

FERC Coordination / Hydroelectric Project Activities: Work was conducted on 16 FERC hydroelectric projects regarding relicensing, shoreline management, operations and fisheries mitigation. As shown in the graph below, this is a decrease in the number of project on which work was conducted in 1998, 1999 and 2000. Projects worked on included Abbeville (Lake Secession), the Augusta Canal, Buzzards Roost, Columbia Canal, Gaston Shoals, Granby Lock and Dam, Greenwood, Lockhart, Neal Shoals, New Savannah Bluff Lock and Dam, Saluda Dam, Santee Cooper, Ware Shoals, Woodside I and II, and the Yonah Dam.

Relicensing: Activities related to relicensing were conducted for the following projects:

Initial consultations were held with the Augusta Canal project. Fish entrainment issues were addressed and a Fisheries Enhancement Plan was completed for Buzzards Roost. A recreation plan and fish enhancement plan was completed for the Lockhart project. "Early start" studies to address anadromous fish issues for Santee Cooper were coordinated with division personnel, the USFWS and the NMFS. Initial consultations were held with Santee Cooper and study requests were developed for the Division. Terms and Conditions were issued for the relicensing of the Columbia Canal Hydroelectric Project.

Shoreline management: Shoreline management plans for the Catawba-Wateree project, Lake Murray and Lake Secession were reviewed. Considerable effort was directed at ensuring license requirements were followed regarding Lake Murray shoreline management. As part of this effort we commented on fourteen proposed land sales and participated in updating the shoreline management maps.

Operations: Requests to conduct sediment dredging and flushing at Gaston Shoals and Woodside I and II hydros were reviewed. We reviewed and commented on a dissolved oxygen study at Buzzards Roost. Instream flow issues associated with the current license were reviewed at the Yonah Dam

Broad River Fisheries Mitigation Trust Fund: Management activities such as reporting, billing, and annual work plans were conducted as needed. Study plans to survey and inventory Broad River aquatic resources were developed and implemented.

DOT Coordination: Work was continued on a five-year agreement with the Department of Transportation (DOT) to provide early coordination for, reviews of, and comments on all highway and road projects. Significant accomplishments include coordination with DOT on more than 27 projects ranging from minor road widenings to new road alignments. Some notable project that we worked on include the Clyburn Causeway over Lake Marion, Dave Lyle Blvd., Eastern Connector in Sumter, I-385 widening, and US-501 widening. Significant work was completed on the Hunter Fork Creek Mitigation Bank, a stream and wetlands bank in Newberry County designated specifically to mitigate DOT projects within the Piedmont physiographic region. We were successful in having this project conditionally approved by the MBRT as a mitigation bank.

WILDLIFE MANAGEMENT SECTION

Significant accomplishments continued with operation of public hunting programs and the Wildlife Management Area Program. During FY 2000-01 1,086,597 acres of land were available to the public for hunting, and a total of 46,548 WMA permits were sold.

Harvests of 13,311 turkeys were recorded at department check stations. Turkey tags were issued to 46,548 hunters during the 2001 spring turkey season. Forty-six public dove fields (1980 acres) were available across the state. 1,151 hunters participated in public waterfowl hunts with a reported harvest of 3,399 ducks.

The Wildlife Management Section's public relations activities continued to inform the public of management programs. Section staff made 442 public presentations before audiences of over 15,984 and assisted in the preparation of 58 news releases.

Research, survey, and population monitoring included 14 dove call counts, 50 quail call counts, 141 furbearer routes, 29 waterfowl routes, goose surveys, bear surveys, mink surveys, mast surveys, rabbit hunter survey, quail brood survey, fox squirrel survey, and alligator surveys. Banding and trapping activities included 282 ducks and 1106 geese. A minimum of 2,259 woodduck box checks were performed during the year.

Technical assistance accomplishments included data analysis for over 1,500 hunt clubs, 659 management plans prepared, technical advice to other agencies on 213 occasions, 1,580 nuisance wildlife complaints handled including 773 nuisance alligator complaints, and 7 environmental notice reviews.

Youth hunting opportunities were provided for deer, raccoon, dove, ducks and turkey.

Hunts for mobility impaired were provided at the Webb Center and on industry and private lands in Newberry County.

Agricultural and habitat management accomplishments included 3,633 acres mowed, 7,899 acres disced, 10,588 acres prescribe burned, 3,950 acres fertilized, 1,225 acres limed, 1,699 acres treated with herbicide, and 241 acres of perennials and 3,435 acres of annuals planted. Dikes mowed included 1,985,560 feet and 826 miles of roads were mowed or scraped. Over 465 miles of boundary were posted with 4,474 WMA signs and 2153 misc. information signs were posted throughout the state.

Wildlife Region I

- Constructed equipment shed for Region 1.
- Mapped roads and boundaries of Jocassee Gorges.
- Co-sponsored a successful Eastern Black Bear Workshop. Completed upgrade on 2 miles of roads on Jocassee Gorges.
- Legislation was passed providing regulations for Jocassee Gorges.
- Work was initiated on the lodge and house at Laurel Valley.
- Deer were collected throughout Region 1 in March and reproductive and health data were analyzed .
- A shoreline restoration demonstration project was initiated behind the Clemson Office.
- An amphitheater was created adjacent to the Clemson Office and funding was secured for further educational landscaping opportunities.
- Stabilization efforts were successful on 3 helipads and 1 shed site on the Jocassee Gorges.
- The format for the Fants' Grove Deer Hunts was tested and worked well.

- A greater variety of agricultural materials were success fully planted in wildlife openings.
- Forty-two bear were harvested during the two-week bear hunt. Twelve bear were trapped, tagged and released.
- Forty presentations were made to 3850 people.
- Dove hunts were very successful with 2 youth and 1 drawing hunt on 8 public dove fields. Ladies and youth hunts for deer were held and a youth only hunt for raccoon was completed.
- The phone system was revamped at the Clemson Office and made more user friendly.
- Survey activity involving bear, deer, turkey, furbearers, hard and soft mast, dove, quail and waterfowl were completed.
- Over 500 geese were relocated.

Wildlife Region II

The Russell Creek Waterfowl Area expansion was completed with a total of 3,825 linear feet of dike constructed, four water control structures installed and the dikes seeded and fertilized. This was accomplished by the Heavy Equipment Section and project personnel who spent over 1,000 man/hours to complete the work.

A contractor completed construction of 2.5 miles of access road on the Mason Tract at a cost of approximately $180,000.00. This work was done through the State Engineer's office and required the use of a consultant engineer. Later in the year the Heavy Equipment Section and Project Personnel completed the clearing, grading and surfacing with 1,500 tons of gravel of 1.1 miles of similar road at a cost of approximately $25,000.00. Other road work completed included scraping and reshaping of approximately 6 miles of access and logging roads on the Clarks Hill WMA in preparation for later spreading of gravel.

While working on the adjacent road, heavy equipment was used to stump and clear about 3 acres of log decks for new wildlife openings on the Mason Tract.

1,014 WMA signs were posted on 159 miles of WMA boundary. 16 Road Closed signs were placed. 54 signs were removed from 17 miles of boundary on lands that were taken out of the WMA program. 88 Public Dove Field signs and 18 Safety Zone signs were placed.

Wildlife habitat was enhanced by planting 432 acres with various wildlife food plants. A considerable portion of this was planted on public dove fields. 323 acres were rotary mowed and herbicide was applied to 153 acres, including 57 acres treated with RoundUp to control Johnsongrass, and 13 acres treated with 2-4D to control coffeeweed, 53 acres treated with Arsenal and 30 acres treated with CrossBow to control undesirable hardwoods in forested areas. A total of 993 acres were control burned, which included 15 acres in dove field preparation.

Timber was marked for thinning on about 85 acres on the Mason Property. This includes about 3 acres marked for clear cutting for use as log decks and future wildlife openings and 25 acres marked as a seed tree regeneration area.

Water levels at Russell Creek Waterfowl Area were manipulated as needed. 85 wood duck nest boxes were checked for utilization and repairs or replacement made where needed. About 120 wood duck boxes were distributed to the public.

Annual management plans were prepared for Federal Aid and the Corps of Engineers. The Southeast Deer Study Group meeting was attended in St. Louis, Mo, as were several state biologist's meetings. Several meetings were attended in the Columbia area relating to the possible transfer of SCE&G lands. All project Technicians attended the Technicians meeting at the Webb Center and the Upstate Technicians Workshop at Union. Annual meetings with WMA cooperators and the U.S. Forest Service were attended. Several project personnel attended a U.S. Forest Service Fire Behavior

refresher course. Biologist Gooding attended a meeting with SCWDS, Corps of Engineers, National Wildlife Health Lab, and Georgia DNR personnel to discuss the ongoing AVM outbreak on Clarks Hill Lake. Pertinent paperwork was prepared, job applications reviewed and interviews held to hire a new Technician II for the DOE Project. Technician III Bobby Ridlehoover resigned in January, 2001 to accept a better paying job in the private sector. A volunteer Erskine College Winterterm student, Josh McDowell, provided valuable assistance during the month of January.

An Adult-Youth dove hunt was held in cooperation with the Forest Service, and a youth deer hunt was carried out in cooperation with Deer Unlimited. A total of 9 public dove fields were provided in the Region. The statewide public dove field survey form was distributed to opening day hunters at five public fields. Biological data were collected on 1,091 deer, and turkey harvest remained stable at 1,869 birds.

Equipment sheds were cleaned as needed. Electrical wiring was replaced at the Key Bridge Shed, and new plywood paneling installed in the storage portion of the shed.

A bald eagle survey was made on Lake Greenwood, but no birds were sighted. WDS Section Eagle Project personnel later confirmed the location of an active nest on lower Lake Greenwood. Assistance was provided to the Eagle Project in banding two fledgling eagles at the Cline nest. Other surveys included quail (4), mourning dove (2), furbearers (10), turkey and quail brood, and fox squirrel. Three Aexperimental@ quail surveys were conducted prior to the normal time. A plant survey of the Mason Property was completed, with 330 species being found. No rare or endangered species were located. Technician Ridlehoover completed collection of new GPS data on all wildlife openings on U.S. Forest Service lands. .

Biologist Gooding served as an instructor at Camp Wildwood for the 33th year. 20 programs on various aspects of project activities or wildlife management were provided to 926 people. All commissioned personnel attended weapons qualification and legals updates. Project personnel manned the Section display at the annual Farm/City Week in Saluda. Deer heads were measured for trophy value at Greenwood and at the Sportsmen's Classic. Project personnel assisted with the annual HOFNOD fishing rodeo at Star Fort Pond.

Wildlife management advice was provided to 1 landowner. Deer data analysis was provided to 5 hunt clubs. Assistance to other agencies included reviewing Forest Service special coop fund requests, review of a Forest Service Analysis Area environmental assessment, two Forest Stewardship site visits, and 13 WHIP application reviews. 2 doe quota investigations were completed in Greenwood County. 45 nuisance animal complaints were handled, including beaver, deer, coyotes, geese, skunks, owls, hawks, squirrels and vultures. Two deer were transported to SCWDS for necropsy. One had EHD and the other an abcess on the spine. A great horned owl found dead on the Mason Tract, and a Bald Eagle found in Savannah River were also transported to SCWDS. The owl proved positive for AVM, but the eagle was too decomposed for analysis. 21 Canada geese were captured and removed from an industrial site north of Columbia. 3 high fence deer pens were investigated prior to issuance of a permit.

D.O.E. Project

Evaluated 126 requests for antlerless deer quotas in Aiken, Barnwell, and Orangeburg counties. Harvest data was evaluated on 495 deer and reports with recommendations provided to 13 Aiken and Orangeburg county clubs. Evaluated 241 jawbones for District V biologist and provided reports to nine clubs.

As primary manager of the Crackerneck Wildlife Management Area and Ecological Reserve, submitted a comprehensive management plan for the area to the USDOE that subsequently gained approval. As called for in the plan, hired a new wildlife technician to assist with the increased work load.

Check stations were maintained for 65 days on Crackerneck WMA & ER with the following harvests: deer (139), hogs (65), turkeys (35), and waterfowl (123) and raccoons (43). Increased harvests were noted for deer (14%), turkeys (94%, a new record), and waterfowl (46%). The raccoon harvest was the first since 1984.

A total of 19 turkeys (11 hens, 8 gobblers) were captured on the SRS with release sites being as follows: Texas (8), Louisiana (4), and SRS (7).

Wildlife work on Crackerneck WMA & ER included: 74 acres disced, 71 acres fertilized, 48 acres limed, 19 acres mowed, and 67 acres planted. Road work included: 30 miles mowed, 36 miles fertilized and reseeded.

Twenty-three wood duck nest boxes on Crackerneck WMA were checked four times for reproduction.

The following signs on Crackerneck were removed and reposted in relocating 7 miles of buffer zone; WMA (460), Safety Zone (465), and DOE No Trespassing (465). Two closed to vehicle signs were erected on the area. Seventy-two WMA signs were reposted on other WMA boundaries.

All pertinent sections of the Rules and Regulations, Spring Turkey Brochure, and the Aiken-Lexington WMA maps were updated. The detailed map of Crackerneck was updated and distributed to hunters. Turkey check stations in Aiken County were supplied with materials, data cards were collected and coded at the conclusion of the season.

Census work and number of routes included: dove (1), turkey, bobwhite (3), furbearer (7), fox squirrel, and bald eagle.

The USDOE was assisted on 11 occasions with their site use system. Serving on the Forest Service - ID Team entailed six meetings and three field inspections to review natural resource prescriptions. Served as core team member for timber compartment 1 (Crackerneck), helping develop this area's prescription. Served on the Natural Resources Coordinating Committee, Set-Aside Task Group and Deer Control Group committees. Provided the USDOE with the Crackerneck Harvest and Utilization Report after each hunt season and non-consumptive use period. An annual accomplishment report as well as future recommendations for Crackerneck were provided. Compiled the history of Skinface Pond Management, Crackerneck turkey harvest (1983 B 2000), and summer turkey brood surveys (1974 B 2000) on the SRS for a USFS researcher compiling sections of the SRS history. Provided 40 muscle plugs from Crackerneck harvested raccoons to the SREL to be analyzed for cesium and heavy metals to be used as controls for SRS research.

Attended biologists, technicians and regional meetings, USFS B SCDNR meeting, pistol re-qualification and in-service training, district DLEO meetings, and training seminars for EPMS and procurement procedures. Attended the annual JAKES event and demonstrated firing a rocket-net.

Other activities included: assisting with antler scoring sessions in Langley, Barnwell, and Columbia; judged three FACE plots in Aiken County; issued 16 depredation permits for beaver and two for raccoon on the SRS and in Aiken county; provided technical assistance to four Aiken and Barnwell county landowners turkey (2), dove, and nuisance geese. Spent two days assisting Clemson Extension Service with their Day on the Farm program by teaching 320 5th graders about wildlife management; attended career day at Wagener-Salley High School; and assisted with two SCDNR kids fishing rodeos; assisted a boy scout troop in erecting 17 bluebird nest boxes on Crackerneck. Investigated four High Deer Fences in Aiken county; and numerous nuisance animal complaints including cougars, geese, dead alligators and birds. Prepared four news releases on Crackerneck hunts and non-consumptive use periods.

Wildlife Region III

Technical assistance was provided to requesting private landowners interested in developing or enhancing wildlife

habitats and wildlife on their lands and appropriate response was provided regarding nuisance and injured wildlife complaints.

Special hunts that included youth dove hunts at two sites, youth deer hunts at three sites and a two day mobility impaired deer hunt at five sites were conducted within the region in cooperation with the U. S. Forest Service, International Paper Company, Bowater Incorporated, Buckmasters and several private landowners.

Wildlife habitat management and enhancement practices were conducted at existing DNR owned properties in Chesterfield, Laurens and York counties.

Surveys to detect trends in wildlife populations were conducted for dove, quail, wild turkey, furbearers, waterfowl and eagles.

Assistance was provided with wildlife plantings and dove field preparation at the Sand Hills State Forest through a cooperative effort with the S. C. Forestry Commission. Cooperative agreements with local chapters of Quail Unlimited, The National Wild Turkey Federation and other interested groups were continued to cost-share wildlife management practices on DNR owned lands or other WMA lands. Assistance was provided with local and regional events such as fishing rodeos, JAKES events and Women In The Outdoors programs.

The Wildlife Diversity Section was assisted with maintenance and land management of the heritage preserves within the region.

Regional personnel assisted at the Palmetto Sportsmens Classic by measuring deer antlers.

The Clemson Extension Service, various schools, hunting clubs and civic groups were assisted through our personnel presenting educational programs about wildlife and wildlife management.

Wildlife Region IV

Provided quality public hunting opportunities on 16 WMA's located on 271,795 acres in Wildlife Region IV.

U.S. Forest Service annual work plans were reviewed. Constant contact was maintained with U.S. Forest Service personnel to review post Hugo interim strategies and to review notices. Coordination meetings were held with the U.S. Forest Service on the Francis Marion Hunt Unit deer hunting with dogs proposals.

Thirty-two roads leading to wildlife openings were improved and 11 were graveled with the use of the Region's heavy equipment. Eight wildlife openings were also cleared and reclaimed.

Staff inspected waterfowl impoundment renovations on Tibwin special use area.

Hunting opportunity on the three Francis Marion Hunt Units open to deer hunting with dogs was evaluated during the season. Recommendations were developed for the 2001-2002 season.

Total deer harvest on the Francis Marion Hunt Unit for the 2000-2001 season was 865 (480 bucks, 385 does), Northampton WMA (121 bucks, 97 does), Santee WMA (112 bucks, 107 does), Hellhole WMA (104 bucks, 100 does), Waterhorn WMA (83 bucks, 71 does), and Wambaw (60 bucks, 10 does).

The one day either sex deer hunt with dogs on Hellhole WMA resulted in 97 deer (64 does, 33 bucks) being harvested.

In order to expand hunting opportunity and control feral hog populations, special hog hunts were held in January and February on the Hellhole (71 hunters, 7 hogs harvested) and Waterhorn (129 hunters, 10 hogs harvested) WMA's of the Francis Marion. A July hunt was held on Waterhorn in which

54 hunters harvested 5 hogs. Nine hogs were also harvested during the deer season on the Waterhorn.

Staff assisted U. S. Forest Service in a mobility impaired deer hunt on Tibwin special use area. One hunt resulted in 3 deer being harvested.

The 2001 spring wild turkey gobbler harvest on the Francis Marion Hunt Unit increased this year with a reported harvest of 69 gobblers.

On the Dungannon Heritage Preserve Tract, roads were mowed, and boundary signs posted as needed. An extension to the archery season for deer and limited waterfowl season were implemented for the 2001-2002 season.

The quail management initiative was continued on the Canal WMA in cooperation with the Small Game Project and the Williamsburg Chapter of Quail Unlimited. Experimental test plots were continued with the Univ. of Kentucky Extension Service along with American Cyanamid to look at various herbicide treatments for killing noxious weeds and grasses and replacing them with native warm season grasses.

Firelines were maintained and control burning continued on the Canal WMA. Extensive random disking to encourage legumes was continued throughout the area.

Two hundred and fifty autumn olive and plum trees were planted on the Canal WMA. Eleven tons of fertilizer were spread on the area to enhance native grass and tree growth.

Eight public quail hunts were held on Canal WMA.

Gravel was spread on a parking lot used during public dove hunts.

A permanent high tensile electric fence was installed around one dove field on the Canal WMA. Temporary electric fences were also installed around 3 other fields to prevent deer browse on sunflowers.

Deer harvest on Moultrie Hunt Unit was: Greenfield WMA (3 buck, 3 does), Halls WMA (5 bucks, 9 does), and North Dike WMA (20 bucks, 12 does).

Santee Cooper WMA deer hunts results were: draw gun hunt (14 does, 3 bucks), primitive weapon and archery (16 bucks, 14 does).

A wildlife and timber management education trail was maintained on Santee Cooper Wildlife Management Area. A number of spur trails to the S.C. Palmetto Trail are open on this area.

A cooperative longleaf pine planting and wildlife opening development program was continued on Santee Cooper Wildlife Management Area in cooperation with the S.C. Public Service Authority and the Orangeburg Chapter of Quail Unlimited.

Oak regenerated sites were herbicided to eliminate undesirable tree species and decrease competition on Santee Cooper WMA.

A white marsh control program and experimental planting of waterfowl food plants was evaluated in conjunction with the Water Resources Division and Santee Cooper on Santee Cooper WMA.

A storage shed was constructed on Santee Cooper WMA.

Two hiking trails and two camp sites remain open on Sandy Beach and Santee Cooper WMA's in cooperation with the South Carolina Palmetto Trail.

A 146 acre dove field was opened on Santee Dam WMA in Clarendon County.

Four new wildlife openings were cleared on Cross Generating Station for youth hunts.

A womens' only hunt was held on Cross Generating

Station in conjunction with Santee Cooper and BOW. Eight women harvested 5 deer (4 does, 1 buck).

Sixty-eight drawn hunters harvested 240 ducks on the Sandy Beach Waterfowl Area for an average of 3.53 ducks/gun.

One hundred and forty one wood duck nest boxes on Santee Cooper WMA (60), North Dike WMA (13) and the Sandy Beach Waterfowl Management Area (68) were cleaned and repaired prior to the nesting season. Post nesting season nest checks were conducted.

A cooperative effort between Santee Cooper and DNR resulted in 690 and 167 wood duck boxes being checked on Lakes Marion and Moultrie, respectively. Not all could be checked due to low water levels.

Eighty-eight hunters were checked during the public waterfowl hunts conducted on the Hatchery Wildlife Management Area in 2000-2001. These hunters harvested 89 ducks, for an average of 1.01 ducks/gun.

The 130 acre Potato Creek Hatchery was placed into the WMA program and limited waterfowl hunts will be conducted on the area beginning in 2001-2002.

Substantial planning and meetings were conducted concerning placing a portion of the Hickory Top WMA into a greentree reservoir.

Intensively managed public dove fields were planted and manipulated on the Canal WMA, Santee Cooper WMA, and Santee Dam WMA. Numerous hunters (1,155) were accommodated on these public fields (Canal B 628 hunters, Santee Cooper B 242 hunters, Santee Dam B 285 hunters).

Approximately 914 acres were planted in wildlife food producing plants, 353 acres of wildlife food and cover plants were maintained, and 966 acres control burned throughout the Region.

Lime was spread on 414 acres of fields and wildlife openings on the following WMA's: Bluefield, Halls, Sandy Beach, North Dike, Santee, Northampton, Waterhorn, Sandy Beach Waterfowl Area, and Cross Generating Station.

One hundred and three sawtooth oaks and crabapple trees were planted on Cross Generating Station (10), Sandy Beach (35), Bluefield WMA (25), Santee WMA (23), and North Dike WMA (10).

Numerous wildlife openings are being planted with summer and winter foods to provide maximum benefit to wildlife.

Fifty-five (55) wild turkeys were trapped and relocated as part of the statewide restoration effort.

Two Canada goose release sites were evaluated and 370 nuisance geese trapped from within the Region were released on these areas. Approximately 18 nuisance goose complaints were received during the year. An early season on resident Canada geese was held in three counties in the region in September.

Nine black bear complaints were handled during the summer. One bear was trapped and relocated.

Two hundred and thirty (230) nuisance wildlife complaints were handled and the Alligator Project was assisted in dealing with 80 nuisance alligator complaints.

Successful youth waterfowl hunts were held on Santee Cooper WMA (2 kids, 2 ducks) and Sandy Beach (5 kids, 27 ducks) waterfowl area.

The draw adult/youth turkey hunt was continued on Santee Cooper WMA with 8 parties taking 1 gobbler.

A youth raccoon hunt and bench show was held in Orangeburg County with 38 kids participating.
The expansion of the special youth deer hunts on North Dike WMA (3 bucks, 13 does) and Cross Generating Station (5

bucks, 14 does) resulted in 135 youths taking 35 deer on 13 hunts.

A youth deer hunt was held on Tibwin special use area.

A youth dove hunt on Santee Dam WMA resulted in 98 hunters (58 kids, 40 adults) harvesting 346 doves.

The Bluefield WMA continues as a youth only hunting area for the 2001-2002 season. Nine deer (7 bucks, 2 does) were harvested from the youth area.

Assistance with youth outdoor recreational programs continued. Staff judged Berkeley County middle school science fair and Kids Who Care environmental projects. One Kids Who Care field day was attended which was coordinated with Berkeley County School System and assistance was provided to the Take One-Make One Program at the Regional level.

Two students from local schools participated in the Mentor Program.

Five presentations, workshops and/or tours concerning the various aspects of wildlife management were made to 311 people during the period.

Game management plans and technical assistance were provided to 63 individuals requesting management assistance with various wildlife species. Assistance was provided to individuals and organizations in managing urban deer herds. Antlerless doe quotas completed totaled 820.

Data cards were distributed to cooperating clubs prior to the season, and deer data analysis was completed and written reports prepared for 38 deer clubs within the Region.

Four newspaper articles on wildlife management were released by or developed in conjunction with Region personnel for columns in local newspapers in the Coastal Region of the state.

Under the Forest Stewardship Program 7 areas were inspected, 4 plans written, 1 plan reviewed and 1 meeting attended.

Cooperation was provided to NRCS, FSA and S.C. Forestry Commission in implementing the 2000 CRP program in the Region.

Development of two focus areas (CAWS and Santee Cooper) under the auspices of the North American Waterfowl Plan were continued.

A dove research project was continued to determine preseason population densities, harvest rates in the local population, productivity and annual survival rates. Project personnel assisted with radio telemetry work and band collection.

The National Wildlife Disease Lab was assisted in collecting dove carcasses from Walworth Plantation and Oakland Club as part of a nationwide lead shot ingestion research study.

The Forestry Commission placed Oak Lea Plantation into the WMA program. A dove field, deer hunts (group draw hunts and archery hunts), small game season, and limited waterfowl hunts were set up for the 2001 season.

Staff visited Santee National Refuge concerning on-the-ground assistance and management activities on the refuge.

Project personnel served on the Forest Legacy committee.

In conjunction with Water Resources, the Wildlife and Freshwater Fisheries section developed a DNR position on hydrilla management and control procedures for the Santee Cooper Lakes.

Technician structure was reorganized so as to be more efficient due to the increased work loads in various parts of the Region.

Administrative staff was taken on field trips to educate them on various aspects within the Region (dove field locations, WMA locations, work deer check station, trap geese, work public dove hunt, work public duck hunt, etc.)

Staff assisted with scoring deer at the Palmetto Classic as well as scoring deer brought to Dennis Center (25 scored) and in Orangeburg (27 scored).

Staff attended several meetings including: quail management seminar at Webb Center, Eastern Black Bear Workshop, Wildlife Society meeting, wetland habitat management seminar, and the Atlantic Fly way wing bee.

A field day was held on Santee Cooper WMA in conjunction with the NWTF Pinelands Stewards program.

The annual dove, quail, turkey, waterfowl, and eagle surveys were conducted. Furbearer census routes were run in conjunction with the Furbearer Project. Mid-winter waterfowl survey was conducted on Santee Cooper WMA. The Waterfowl Section was assisted in operating spy blinds during the experimental September teal season. FACE plots were judged throughout the region.

The deer in the Dennis Center deer pens were routinely fed and maintained. The deer pen was closed to the public during this period to assist the Law Enforcement Division with numerous covert operations concerning deer.

Wildlife Region V

Hunting opportunities for deer, turkey, small game and feral hogs were provided for the public on 16,573 acres of public hunting lands through the Wildlife Management Area Program.

Public use opportunities including wildlife seminars, wildlife conservation and educational programs, and field trips were provided for 22 organized groups totaling 593 persons visiting Webb WMA. Numerous other visitors were hosted informally.

Twenty drawn deer hunts were conducted on Webb WMA with 578 hunters harvesting 227 animals. This includes women, TOMO and mobility impaired hunters on special hunts. Seven drawn deer hunts and one week of archery hunts were held on Palachucola WMA with 285 hunters harvesting 122 deer.

Six public dove hunts were held on Webb Center with approximately 91 hunters taking 363 doves while firing 2,231 shots. Seven hog hunts were held on Webb and Palachucola with 102 hunters harvesting 18 hogs.

Four quail hunts were held with 42 hunters finding 29 coveys and taking 36 quail. Twenty-seven turkeys were taken on Webb and Palachucola during spring hunting. Turkey check stations were operated in the Region.

The SOLO Focus Area project was continued with work in landowner education, public information and resource evaluation completed.

Two SCDNR wildlife biologist meetings, a teacher's workshop, two quail manager's seminars, a WMA Cooperators meeting, a USFS Cooperative meeting, a SCDNR Wildlife Management Technician's meeting, a SCDNR Aquaculture Committee meeting, a SC Botany Committee meeting, a meeting of the TNC Savannah River Partnership, a Clemson University Forest Wildlife Class field trip, two basic training sessions for new LE officers, two boy scout troops, a youth raccoon championship hunt and twenty-four groups of drawn deer and quail hunters were hosted for overnight stays.

Groups hosted for day visits included: an Armstrong State teacher's class, a Furman University Class for a field trip, a Central Caroling Technical College Class for a field trip, a group of International Paper Foresters for a field trip, a beaver management workshop, the SOLO Focus Area group, Lowcountry Institute Volunteer Training group, Caw Caw Interpretive Center group for a field trip, two organized birder groups, three elementary school groups and numerous less formal groups and individual visitors.

Antlerless deer quotas were evaluated on 724 applications received from cooperators in Wildlife Region V and 30,218 tags were issued on 1,388,734 acres. Deer harvest data for 2000-01 were analyzed for 114 cooperators or 16 %. This included 4,185 records of 27,206 deer reported harvested in the Region or 15%. The 2000-01 reported harvest consisted of 11,553 (43 percent) bucks and 15,653 (57 percent) does. Deer jawbones were aged and harvest analyses were provided to all cooperators.

One pine thinning sale was conducted on Webb. Longleaf pine seedlings were planted on 15 acres. Marking and preparations were made for a FY02 sale on Webb.

The following research projects were continued at the Webb Center: 1. Warm Season Grass Demonstrations; 2.Herpetological Survey Project; 3. Harvest Analysis; 4.Fire Ant Impacts on Quail Project; 5. Fire Ant Impacts on Herps Project; and, 6. Forest Management Impacts on Herps Project.

Three antler scoring sessions were conducted with 37 racks scored and 17 making the state record book.

Deer, turkey, dove, quail, wood duck, furbearer, and eagle population surveys were conducted in conjunction with state and federal projects.

Approximately 3,200 acres of pine sawtimber on Webb and Palachucola WMA's were prescribe burned. Fifty-five miles of firebreaks were disked or bulldozed.

Plantings of 275 acres of various crops in fields and wildlife openings were carried out on Webb and Palachucola WMA's. These plantings included corn, sorghum, brown-top millet, Egyptian wheat, kobe lespedeza, wheat, rye, oats, aeschynomene and different varieties of clover.

One hundred and twenty acres of pine timber were herbicided for understory release on Webb and Palachucola. Thirty acres of fields were sprayed for bermuda grass control.

Thirty acres of field edges on Webb were cleared with a bulldozer to reclaim previous openings.

One hundred and seventy wood duck boxes were maintained on state-owned WMAs and lakes.

Considerable renovation was performed on the Mistletoe Grove House on Palachucola. A new roof was installed, insulation was installed in the walls, ceiling and floor, and the exterior was painted. A new compressor was installed in the cooler at the Palachucola check station.

Six miles of road were reshaped and two culverts were installed on Webb and Palachucola WMAs. Ten miles of WMA boundaries were re-posted.

Renovations continued in the Webb lodge with refinishing of wood surfaces, a bathroom renovation and painting of rooms. New faucets were installed in the yard. A new laundry/cooking shed was constructed. Two additions were added to an equipment shed. One old shed was torn down.

All buildings, facilities and grounds at Webb and Palachucola were maintained. Assistance was provided to agencies and landowners through the Forest Stewardship, WHIP, EQIP, CRP and RC&D programs. Considerable time was spent assisting the Forest Legacy Program. The town of Bluffton was assisted in land use planning for wildlife. The Department of Transportation was contacted about establishing a watershed signage program in SC.

Two management plans for military installations were reviewed and recommendations provided.

One employee participated in the Workshop in Leadership Development (WILD) Course.

Detailed technical guidance was provided to landowners and managers on 33 occasions and included recommendations for deer, turkey, waterfowl and quail.
Presentations were made to 69 organized groups of 1,671 persons.

Deer enclosures in the Region were inspected with LE officers and reports forwarded to Columbia.

Law Enforcement activities included 323 WMA patrols for 357 hours, assistance with two night patrols, one covert operation and one stolen vehicle incident, attendance at 4 District meetings, attendance at annual in-service, and one employee attended Special Basic Class at SCCJA,

Several land acquisition projects were initiated to expand WMAs in the Region. Considerable time was spent preparing maps and other info for these projects.

All rules, regulations and publications pertaining to public use in Wildlife Region V were reviewed and updated.

All administrative activities including budgeting, purchasing, report preparation, meeting attendance, training and personnel matters were completed.

Wildlife Region VI

Public hunting opportunities were provided on 14 WMAs and HPs and miscellaneous WMA lands totaling approximately 78,642 acres. Public dove fields were available in Horry, Lee, Marlboro, and Sumter cos.

The public enjoyed excellent opportunities on all of our PDF's. At Lake Wallace, the first three Saturdays resulted in a harvest of 3,144 doves by 373 hunters. The new field in Lee Co. also showed a great deal of promise with the first three Wednesdays resulting in a harvest of 1,443 doves by 325 hunters. Opening day on the Schultz Tract PDF on the Waccamaw River HP saw a record harvest of 553 doves by 61 participants.

Close ties were maintained with citizens groups, conservation organizations, and members of the General Assembly, and 36 presentations were made. Additionally, there were five television and radio interviews and 11 newspaper interviews.

A very successful youth deer hunt was conducted on Poinsett Gunnery Range in Sumter Co. and a successful and well-attended youth dove hunt was held on Manchester State Forest. Project personnel also assisted LE and the FWF Section with fishing rodeos.

All of Region VI was open to Spring turkey hunting.

Continued to work closely with Wildlife Diversity Section personnel on several projects and assisted with the development and review of draft management plans.

Road repairs in the aftermath of Hurricane Floyd damage were accomplished at five sites on four Horry and Marion County HP's utilizing a little over $235,000 in FEMA and HT Capitol Improvement funds.

Continued to work closely with the Small Game Program and SC FC personnel to develop habitat recommendations on approximately 1,900 acres of mitigation lands added to MSF. Plans were developed to improve public waterfowl hunting opportunities on MSF through renovation of the 400 acre Beidler Impoundment.

Cooperated with the Statewide Wood Duck Nest Box Project in the maintenance and surveillance of Dept. owned boxes and in the evaluation of applications for WDNBs and distribution of these units.

A total of 395 ADQP applications were processed.

Fifty-five (55) sets of deer antlers were measured in conjunction with the Department's State Record Deer Program. Two sets of deer antlers, a black bear skull, and four sets of elk antlers were measured and submitted to Boone and Crockett and/or Pope and Young.

Conducted the contract nuisance alligator control program within the Region and 172 complaints were handled, 72 permits issued, 28 animals were taken, and 17 small alligators were relocated.

Biologist Stokes and other DNR Biologists continued to

work on the statewide Forest Legacy program plan.

Approximately 140 acres were prepared, sown, and cultivated on Lake Wallace, Manchester SF, and Pee Dee Station Site WMAs. Another 40 acres were likewise worked on the Schultz Tract, Waccamaw River HP and 70 acres were planted on the Lee Co. PDF.

Project personnel manned a booth at the Pee Dee Deer Classic, and also participated in the Palmetto Sportsmen Classic.

Two hundred and eleven (211) Canada geese were captured at four sites in Florence and Horry cos. and relocated.

Information and technical assistance were provided to numerous clubs and landowners. Also worked cooperatively with NRCS representatives to review EQIP, WHIP, and CRP plans.

Cooperated with the Small Game Program and Clemson Extension Service on the F.A.C.E. project.

Participated in the bobwhite whistling cock and brood surveys, USF&WS mourning dove call counts, furbearer scent station lines, fox squirrel survey, and wild turkey and bobwhite quail summer brood surveys. Project personnel also assisted Clemson University black bear researchers and the Deer Project.

The project leader completed a 42 hour keyboarding adult education course at Johnsonville HS and four NRCS workshops. Wildlife Technician Martin completed the DNR/QU sponsored quail management workshop at the Webb Center.

News releases were completed relative to alligators and an incident involving a black bear threatening a surveying crew near Lewis Ocean Bay HP.

Considerable time was spent removing litter and other debris from HP's, sometimes utilizing inmate labor.

The project leader was privileged to serve on the judges panel for the Twenty-Fourth Boone and Crockett awards period and attended the wildlife workshop and awards banquet at Bass Pro Shops in Springfield, Missouri.

Donnelley and Bear Island

Provided 12 (2 day) gun hunts and three 5-day archery hunts for deer. Provided 6 dove hunts and 6 duck hunts and 4 turkey hunts. Held one 3-day dog hunt for feral hogs and approximately 20 days of small game hunts. Had 1,894 man-days of use.

Dressed 12 duck blinds and built 2 boat blinds.

Banded 148 ducks. Maintained 150 wood duck boxes and monitored 113 boxes monthly from March-June.

Created 10 acre wildlife opening from beetle killed plantation pines.

Maintained approximately 50 miles of roads and dikes.

Repainted all out buildings at shop complex (6).

Burned approximately 1,000 acres of upland and 100 acres of impoundments.

Managed 120 acres of public dove fields, 25 acres of wildlife openings and 130 acres of agricultural wetlands.

Camp Wildwood and a Student Environmental Education Day (SEED) was hosted.

Completed Annual Corp Management Plan for Donnelley WMA.

Completed Timber Sale for FY-2001.

Had 489 registered visitors. Handled 104 alligator complaints.

Long-reach excavator work: completed retopping of 4,500 linear feet of dike. Stock piled 5,500 linear feet of material to retop in Fall of 2001. Cleared 4,000 linear feet of ditch and 1,000 linear feet of hedge row. Installed water control structure on Capers Island. Cleared 10 acres of pine beetle damaged trees on Donnelley. Removed and assisted with installation of pump for Sandy Beach. Repaired two water control structure bulk heads. Replaced wooden box on Matthew's Canal with 40' x 48' aluminum pipe.

Installed new well for work center. Installed new sewage system at campground. Installed new roof on A-15-4. Replaced rotted material on 5 structures and painted office and structures.

Control burned 1,700 acres of impoundments, 100 acres crop land on an annual basis. Control burned 500 acres of pine on a 3 year rotation and 400 acres of hardwood-pine mix on a 5 year rotation. 200 acres of hardwood, pine, palmetto and wax myrtle are left out of the control burn process.

Mowed 50 miles of dikes every 3 weeks from April to October. Repair and grade dikes as needed in the spring of the year. Graded 5 miles of road 6 times per year.

Monitored and adjusted water levels in 5,443 acres of impoundments to encourage desirable plant communities and make beneficial habitat available to wildlife.

Picked up trash at fishing areas. Provided 1,011 man-days of hunting opportunities, 156 days of fishing opportunities, 234 days of observation, hiking and biking activities.

Santee Coastal Reserve

The Project Leader continued to provide technical assistance to private organizations, individuals, and other government agencies.

Fifteen hundred wood duck nest boxes were constructed and delivered statewide.

The Mid-Winter Waterfowl Index was coordinated and results submitted per new software.

The Waterfowl Status Report was compiled and distributed.

The activities of the Santee River Focus Area were coordinated.

The Santee Reserve Management Plan was updated and information disseminated.

Management guidance and administration were provided to all state waterfowl projects.

Banding supplies and records were maintained for statewide waterfowl banding.

Work continued in cooperation with Water Resources personnel to complete the computer model of salinity prediction in the lower Santee River.

Necessary permits were acquired and work commenced on the Big Well NAWCA Project.

Public hunting activities were continued on Santee Coastal Reserve with continual adjustments to improve efficiency and effectiveness.

An aquatic plant management protocol for lakes Marion and Moultrie was completed.

Waterfowl data analyses were conducted on request.

Samworth and Santee Delta

Samworth and Santee-Delta WMAs continued to provide quality public hunting opportunities. On these areas, a minimum of 2,298 man days of public waterfowl hunting was afforded during 2000-01. Project personnel continued to direct efforts toward expanding multiple use opportunities on both areas.

There was continued development of Winyah Bay Focus Area (WBFA) including Task Force meetings, landowner meetings, special events, coordination of resource and planning documents, news releases and coordination with other Focus Areas. Additional private land conservation easement tracts have been identified and work was continued to protect vital acreage through the efforts of the Land Protection Committee.

The 2001 distribution of wood duck nest boxes through the Statewide Wood Duck Nest Box Project marked the 20th continuous year of this program. For the 2001 distribution, 1,500 nest boxes were constructed and 1,282 nest box units were distributed to 241 cooperators. Since 1982, almost 4,000 cooperators have received over 27,000 nest box units. During 2000 minimum documented production of wood ducks was almost 30,000 hatchlings.

Phragmites control efforts were continued on Santee-Delta WMA for the seventh year of treatment as small outbreaks were treated by ground application and large stands were treated by aerial applications in cooperation with the Water Resources Division.

Over 205,000 linear feet of flood-eroded earthen dike was repaired at Samworth as part of the Hurricane Floyd restoration.

Two replacement water control structures were constructed and installed at Samworth WMA.

Deer Project

Supervised and administered the Antlerless Deer Quota Program which lead to the issuance of 82,282 tags to 2,202 cooperators. The reported harvest on the 4.23 million acres enrolled in this program in 2000 was 79,021 deer (33,735 bucks & 45,286 does).

Continued the process of streamlining the Antlerless Deer Quota Program by implementing changes in the renewal process and development and implementation of a new style of tag.

Cooperated with the Licensing Division to supervise and administer the Individual Antlerless Deer Tag Program which lead to the issuance of 140,130 tags to 40,909 participants.

Supervised the completion of year 4 of a 5 year cooperative study with Clemson University entitled A Mortality, Emigration and Antler Development in a Population of White-tailed Deer in Georgetown and Williamsburg Counties. This included the continual monitoring of 92 radio-collared deer that were captured in previous years and the completion of the final project report for year one of the study.

Completed an in-house statewide Deer Hunter Survey which revealed that an estimated 307,123 deer were harvested in 1999.

Cooperated with Chief, other Project Leaders, and survey research consultant to complete the statewide Game Survey which revealed that an estimated 300,765 deer were harvested in 1999.

Coordinated with Wildlife Management Section staff to draft a position statement related to hunting deer over bait.

Continued to work in the area of urban deer management and control which included programs successfully being implemented by a number of resort residential communities.

As state representative to the Southeast Section of the Wildlife Society's Deer Committee, the Deer Project supervisor worked as a member of a designated Subcommittee to develop a document entitled A Report on Deer Management in the Southeast.

Cooperated with Section Chiefs and Regional personnel to effectively manage antlerless deer tag budgets for FY 2001.

Coordinated with Chief and other project biologists to develop a document entitled A Summary Report - background, history, benefits, concerns, legislation, regulation, and other issues related to fenced hunting facilities.

Provided technical assistance related to deer management to property owner in numerous counties. Project supervisor served as ADQP biologist for Richland and Lexington counties which included reviewing applications, setting quotas, and deer data analysis for cooperating clubs.

Made arrangements for Wildlife Management Section personnel to attend the Twenty Fourth Annual Meeting of the Southeast Deer Study Group. Project supervisor was author/co-author on two papers presented at this meeting.

Supervised the permitting process for captive deer. Issued approximately 29 permits for the possession of pet deer.

Cooperated extensively with Law Enforcement and Legal concerning a number of deer related legal issues and cases.

Scheduled and administered antler scoring sessions across the state in sufficient numbers to meet public demand. This included 17 Regional sessions at which approximately 396 sets of antlers were scored. Completed data editing, entry, and issuance of certificates.

Coordinated with Graphics to complete the publication entitled A South Carolina Deer Antler Records - 1999-2000".

Worked with other DNR staff, constituents, and members of the General Assembly to pass several deer related pieces of legislation that were sponsored by the agency. Worked on other legislative matters related to deer as required.

Completed the cooperative efforts by DNR personnel to register existing high fenced areas in South Carolina.Twenty seven deer enclosures were registered.

Project Supervisor served as an advisor to Farm Bureau's Wildlife Committee.

Participated in the training of new Law Enforcement Officers.

Issued 3 permits for the exhibition of deer in South Carolina.

Supervised the permitting process for sales of venison in restaurants. Issued approximately 8 permits allowing for the sale of venison in restaurants.

Cooperated with Law Enforcement to administer the deer depredation program which included receiving, recording and reporting approximately 300 expired permits.

Delivered a minimum of 17 public presentations concerning deer and deer issues to over 865 individuals.

Participated in a minimum of 51 miscellaneous media interviews.

Completed 24 surveys from various federal, state, and private entities.

Submitted 6 news releases.

Drafted and sent approximately 609 responses to public requests for information by e-mail.

Handled 1,251 calls from the public related to various deer related issues/programs and nuisance wildlife.

Furbearer Project

Furbearer populations were monitored through the 17th annual scent station survey, the 15th annual field trial survey and the annual commercial fur harvest survey.

Furbearer Project staff participated in national and international working groups to protect trapping as a wildlife management tool. Staff is serving on a national committee to develop trapping Best Management Practices.

Furbearer project staff continued to successfully coordinate federally funded studies to evaluate the humaneness and efficiency of traps used in the southeastern United States.

The commercial harvest of furbearers in South Carolina was administrated and a report on the harvest analysis was prepared.

A permitting program was successfully administered which issued 990 permits of 19 types.

A total of 12,210 copies of furbearer project publications were distributed.

One regional youth raccoon hunting competition was initiated which brings the number of annual events to four regional hunts and a state-wide championship event.

Coastal flood tide surveys were conducted as a part of ongoing efforts to measure the abundance of mink in South Carolina's coastal marshes.

Research into the feasibility of restoring mink in South Carolina's coastal zone was continued. Mink were successfully translocated from Hilton Head Island to the Cape Romain NWR.

A Black Bear Home Range and Habitat use paper and presentation were developed for the Eastern Black Bear Workshop.

The widely used Nuisance Wildlife Control Operators List was updated.

The Annual 4-H FACE Project was conducted to teach school children about the principles of wildlife habitat enhancement.

Assisted with the State 4-H WHEP contest and the state FFA Wildlife Contests.

A coyote management and control brochure was developed and is near ready for printing.

The Beaver Management and Control brochure was reprinted.

The Muskrat brochure was revised and is near ready for reprinting.

Assisted with interested DNR staff in assessing the feasibility of black bear restoration to the Savannah River Basin area.

Furbearer slide programs were developed into digital format.

Furbearer Project staff continued to assist the Alligator Project with alligator complaints in Richland, Lexington and Calhoun counties.

Turkey Project

Technical assistance was provided to a number of private landowners and U.S. Forest Service staff concerning wild turkey management recommendations in Hurricane Hugo affected areas.

A supplemental stocking of 13 hens was made on an existing restoration site in South Carolina. A total of 80 wild turkeys were trapped and sent to Texas (40), and Louisiana (40) to assist with their turkey restoration projects.

Restoration site agreements for 2 turkey restoration sites have been mailed and the 2002 restoration list will be prepared by mid-November.

Information for the 2001 Spring Turkey Brochure was compiled and submitted to Columbia for printing.

Wild turkey check stations were set up for the spring season, brochures and turkey tags were printed and distributed, and harvest data collected. During the 2001 spring season, 46,543 hunters checked 13,283 turkeys.

Continued to work with the S.C. State and local chapters of the NWTF and completed at least 50 different projects funded through the Super Fund. Purchased 517 acres in Jocassee Gorges with $325,000.00 out of the Super Fund.

Summer turkey survey forms were mailed to cooperators with survey to begin July 1.

Small Game Project

Technical assistance and written small game habitat management plans were provided for 37 private landowners, potentially improving habitat conditions for small game species on approximately 45,000 acres.

Project staff provided on-site technical assistance and written habitat recommendations to USFWS personnel for the Carolina Sandhills NWR (46,000 ac.).

On-site technical assistance and written recommendations were provided for development of the H. Cooper Black, Jr. Memorial Field Trail and Recreation Area (7,000 ac.) in conjunction with the South Carolina Forestry Commission and the South Carolina Department of Parks, Recreation and Tourism.

Small game habitat management projects continued on McBee, Canal, Sand Hills State Forest, Fant's Grove, Santee Cooper, Manchester State Forest, Crackerneck and Webb Wildlife Center WMA's and the Champion Quail Demonstration Area in cooperation with regional biologists. Quail Unlimited funds were solicited and utilized for many of these projects.

Two overnight quail habitat management seminars were conducted at Webb Wildlife Center, attended by 56 sportsmen and women.

The Quail Whistling Cock Survey, the Quail and Rabbit Hunter Surveys, the Quail Brood Sighting Survey and the Fox Squirrel Sighting Survey were continued.

A final report was completed on the results of the Small Game Project Technical Assistance Program survey.

A survey of SCDNR public dove field users was conducted, results compiled and analyzed, and a final report completed and distributed.

A draft of a A Mourning Dove Research and Monitoring Plan for South Carolina was completed and distributed for review.

A small game hunter effort and species harvest telephone survey was conducted as part of a statewide, multiple-species survey effort.

The Project Supervisor served on the *POWER for Wildlife* steering committee, assisting with the successful implementation of a wildlife habitat enhancement grant program on powerline rights-of-way.

Clemson University, University of Georgia and University of Kentucky were assisted with research projects on fire ant effects on bobwhite quail, mourning dove movement and mortality, fox squirrel parasitology and diseases, and conversion of invasive grasses to native warm season grasses.

Cooperative work with 14 local Quail Unlimited (QU) chapters and the S.C. QU State Committee continued, implementing habitat projects and attending fund-raisers.

Continued to work closely with the Southeast Quail Study Group (SEQSG) to stabilize quail populations and improve quail management on a regional scale.

Ninety-six shooting preserves and 15 bird dog training areas were licensed, and reporting requirements were monitored. Shooting preserve year-end reports were compiled and the annual summary prepared. Two shooting preserves were visited and provided with on-site technical assistance.

Licensed and monitored activity for bird dog, rabbit, and squirrel dog field trials. Thirty-five other types of permits or licenses were issued (quail recall pens, rabbit enclosure, etc.)

Native warm season grass plantings were evaluated on three WMA's including a fescue conversion demonstration area on Fant's Grove WMA and a Bahia grass conversion demonstration area on Canal WMA.

Biologist Barnes served on the A Becoming An Outdoors Woman@ (BOW) committee, assisting with workshop planning and program delivery.

Biologist Barnes completed the prestigious Governors EXCEL Leadership Institute training program.

Project public relations plan was carried out through distribution of 13 Department news releases, several media interviews and contributions to various magazine articles.

Project staff presented 34 programs on a variety of wildlife and outdoor recreation oriented topics to a combined audience of 1624 persons.

Alligator Project

Responded to and evaluated over 650 alligator complaints from the public resulting in the capturing and processing of 175 alligators.

Sold 144 alligator skins during the reporting period generating over $36,000 in total revenue. Revenue was distributed to agents and hide broker.

Issued 35 marketing permits to business establishments for the sale of alligator products. This generated $1,225 in revenue for the Alligator Program.

The Private Lands Alligator Harvest Program was continued for the sixth year. During the fall 2000 season, 18 properties applied to be in the program and 15 were permitted and trapped. A total of 214 tags were issued and 121 alligators were harvested. Total revenue generated by the program was $3,952.50.

The long-term research project implemented in 1994 that examines sex ratios of hatchling alligators was continued for a seventh field season this past summer. During 2000, a total of 910 eggs were collected, and 68% hatched and were sexed and returned to their natal area. Collaboration with Dr. Jeff Lang from the Univ. of North Dakota was continued. Hatchling sex ratio for 2000 was 72% female. Work continues on developing research papers. During the field season, over 250 people participated in educational activities pertaining to the research. A feature story in the May 2000 issue of the international magazine Discover summarized the research.

In an effort to educate the public about alligators, 12 talks were given to 410 people, and 15 newspaper articles, 4 television interviews, 3 radio interviews, 3 magazine interviews, and 2 news releases were completed. A total of 847 incoming telephone calls were received.

Additional tissue samples were collected for continuing DNA analysis by University of South Carolina.

Alligator farming regulations were drafted and approved by the General Assembly for a 3-year feasibility study of using alligators to dispose of dead poultry.

Forest Stewardship

The Forest Stewardship Program had a total of 4 plans reviewed, 30 site visits, and 14 plans written (some with more than one part to them). Approximately 9 correspondences (telephone calls or letters) were handled in the administration of the program. One presentation was given by Huckabee (Teacher's Wildlife Conservation Workshop, 11 attendees). A FSP budget meeting was held (May 2001) in conjunction with the SCFC. Five WHIP meetings were attended by Cope (September 2000).

The Forest Stewardship Supervisor Huckabee attended these additional meetings as part of her continuing education: Wildlife Management Section Biologist Meeting (Jan. 2001), SCFC Piedmont and Pedee meetings (February 2001), Power for Wildlife (March 2001), Quail Management Seminar (March 2001), BMP Workshop (March 2001), SCFC Walterboro meeting (March 2001), 16th Eastern Black Bear Workshop (March 2001), SCDNR Awareness Training (May 2001), Master Wildlifer Class at Clemson , niversity (May 2001), Forest Legacy update (May 2001), NRCS Wetland Wildlife Habitat Management / , Wetland Restoration and

Riparian Areas (June 2001), CARA (June 2001), Grasslands Bird Meeting (July 2001), SCTWS and NCTWS joint meeting (July 2001),

The Forest Stewardship Program Supervisor Huckabee also designed and completed a revised brochure for the program as well as an updated Power Point Presentation about the FSP.

The Forest Stewardship Program was represented by Cope and Huckabee at various events including: the Palmetto Sportsman's Classic (March 2001), the Becoming An Outdoors Woman Workshop (May 2001), and Camp Wildwood (June 2001).

WILDLIFE DIVERSITY SECTION

The mission of the Wildlife Diversity Section is to maintain all of South Carolina's native plants and animals in their natural habitats. The Section is administered through the Endangered Species Program and the Heritage Trust Program. The Endangered Species Program conducts surveys and research to determine the status of plant and animal populations, the existence of which may be at risk. Management for those species is accomplished through direct management of public lands and by coordination and consultation with private landowners. The Heritage Trust Program seeks to identify and protect the most important natural and cultural areas in the state. Once sites are identified, land acquisitions are normally sought by Heritage Trust staff in order to protect the areas. Highlights for the year are summarized below.

Migratory Birds – Upper Coastal & Lower Coastal Regions

Bald Eagle: Eleven nesting survey flights were made to monitor over 200 territories in 33 counties of South Carolina. A record number of 162 occupied territories were documented to produce 211 young. Sixteen new territories were located. During the 1977 season, we had only 13 territories in 5 counties, which produced 9 young.

Several nests were also visited on the ground to confirm the survival of nine banded adults in the nesting population. Six of the nine were confirmed at their breeding territories. One new, banded adult was located. This monitoring program has documented a 13% annual mortality rate for adult eagles. Mortality rates are the most important demographic in understanding the dynamics of the population.

Additional effort was given to monitoring the spread of Avian vacuolar myelinopathy (AVM), a lethal disease, which is thought to be caused by a naturally occurring biotoxin. Toxin induced lesions in the brain of affected birds result in loss of coordination followed by death. AVM was diagnosed on Lake Thurmond, Lake Murray and at 2 lakes on the Savannah River Site (SRS). Sixteen dead eagles were recovered from Lake Thurmond and only 4 of 11 territories were active. It is likely that the 14 adult eagles at the unsuccessful territories were killed. Eagles are believed to acquire the toxin by feeding on contaminated coots. AVM has been limited to 11 inland man-made reservoirs in 5 states and has not been documented on the coast. Because the circumstances and the toxin involved in this disease are unknown, the ultimate impact on the eagles in the southeastern US is not known.

Wood Stork: An estimated total of 1,383 nests at 9 colony sites were recorded during aerial surveys. As a result of the prolonged drought, that number was reduced to 1,080 during standardized ground and aerial counts conducted later in the season. Nest abandonment appeared related to the lack of water at several colony sites and not to a lack of feeding habitat. These nests were estimated to fledge 2,077 young or 1.93 young per nest in colonies that were surveyed. Range-wide, stork nesting was poor during the 2001 season because of the drought-induced water loss at colony sites. However, most colonies in South Carolina are in man-made ponds and are resistant to drought.

American Oystercatcher: Seventeen mid-winter surveys were conducted by boat or ATV at high tide roost sites to document the statewide wintering population of oystercatchers. These surveys included 998 intertidal shell mounds and barrier island beaches. A total of 2,459 birds were counted at 98 sites statewide. This is below last year's count of 3,138 birds, but is believed to be a result of unusually high tides that displaced birds from normal sites during part of the survey. South Carolina continues to be a major wintering site for the entire east coast population of oystercatchers.

Sixty-two high tide surveys were also conducted of oystercatcher nesting habitat. A single statewide survey documented 393 breeding territories. This was above last year but is likely due to increased survey effort. Multiple surveys at several study sites throughout the nesting season documented: 1) the seasonality of egg laying, 2) re-nesting, territory fidelity and 3) the relationship between total pairs and nests found. Consistently low productivity has been documented on most nesting areas and is a matter of concern. Temperature dataloggers were deployed in oystercatcher nests to document patterns of incubation and the time interval from placement to failure or hatch.

Least Tern: Sixty-three least tern colony sites were surveyed for nesting activity during ground visits. Of these, 37 active sites had 1,083 nests. A total of 659 nests (60%) were on the roofs of buildings and 424 nests (40%) were on ground sites. This was the first shift away from roof nesting and was the result of recruitment to a man-made island, created for bird nesting, inside a spoil disposal site on the Savannah River. Building roofs are providing a temporary solution to a lack of nesting sites, but these areas will be lost as new, unsuitable roofing materials are used in the future. Letters were sent to all building managers to request that roof maintenance activities be conducted prior to the nesting season. Historic barrier island sites continue to experience a very high level of disturbance from human activities and significant ground colonies were posted. Tern nesting numbers appear to be stable to slightly declining.

Nesting Seabirds: Complete ground counts were conducted on 13 active seabird-nesting sites where 9,578 nests of 13 species were counted. Only the very abundant Laughing Gull was not censused. Most of these species have declined in the state since their numbers peaked in the late 1980's. The numbers of nesting Brown Pelican peaked during 1987-1992, averaging 6,594 nests per season. Since that time, the nesting population has been in decline and during 2001 only 2,856 pelican nests were counted. This is the lowest count since 1976. Loss of nesting sites and a soft tick infestation contributed to the decline.

Colonial Nesting Wading Birds: Aerial surveys (156) and ground surveys (16) were made at 172 wading bird colonies. Of these colonies 104 sites were active and contained an estimated 25,619 nests of 13 species. Many inland colony sites were dry and not used for nesting as a result of the prolonged drought. Relocation of colony sites appears to be increasing as a result of drought conditions and human disturbance. For example, cattle egrets have declined from 19,000 nests in 1989 to less than 1,000 nests this year as a result of the drought. Other species may also be in decline, but complete ground surveys will be required to determine their status.

Migratory Birds – Midlands Region

Red-cockaded Woodpecker Monitoring and Recovery Efforts. There are currently over 90 active groups on state lands in South Carolina including properties managed by the Department of Natural Resources, the State Forestry Commission, and Parks, Recreation, and Tourism. Over 70 of these groups are breeding groups. DNR staff carried out population monitoring for red-cockaded woodpeckers on these state lands. Over 60 active groups of red-cockaded woodpeckers were monitored during the breeding season. More than 70 chicks were banded. Recovery efforts on state lands consisted primarily of cavity management through the use of artificial cavities and mechanical treatment of hardwood mid-story to enhance habitat for red-cockaded woodpeckers. Over 30 artificial cavities were installed on state lands.

South Carolina's Safe Harbor Program for red-cockaded woodpeckers has been an overwhelming success. Currently the program has 57 enrollees protecting over 165,000 acres of land and 198 groups of red-cockaded woodpeckers. Reports were mailed to participants for the second year. Response has been good with over 75%of participants responding. Data is still being compiled from the reports.

Swallow-tailed Kite. Working in collaboration with the SC Center for Birds of Prey, we located and monitored 15 kite nests. The Sandy Island/Waccamaw Refuge area was a hot spot for kites in the summer of 2001; seven nests within a 1.5 mile radius circle were found in this area. Since 1998, 0.74 young have fledged from 46 active kite nests. We also radioed ten nestlings and one adult with 2.5 year VHF radios. Since 1998 we have had two "returns" of 12 radioed nestlings; a 3rd nestling from 1999 stayed in Florida in 2000. We were also able to track one adult kite and one yearling kite throughout most of its annual cycle from the breeding grounds on the Francis Marion National Forest to its wintering grounds in southern Brazil and back to its breeding/natal territory.

Other Migratory Bird Projects. We completed the 11th year of bird-banding at the Monitoring Avian Productivity and Survival (MAPS) station at the Congaree Swamp National Monument._This is one of the oldest continuous running banding stations in the program. Highlights included a nearly 200% increase in the number of Northern Parula compared to the previous 10-year mean; the recapture of an Acadian Flycatcher that is at least 10 years old (this bird has flown approximately 32,000 round-trip miles between its wintering and breeding grounds during its long life span); and the recapture of a female Pileated Woodpecker that is at least 11 years old. Data from this station is combined with >500 other stations for the analysis of migratory bird productivity and survival in the United States.

We ran five of the 44 Breeding Bird Survey routes assigned to South Carolina. This is the largest data set in the world for determining breeding bird population trends and is the basis of many conservation and research efforts.

Technical Guidance. Input on migratory bird habitats was made to the GAP project, a GIS-based analysis of habitiat distribution and critical conservation needs; a presentation on bird management considerations was made to a low country landowners workshop; and monitoring guidance was made to a timber corporation for "smart wood" certification. The state Endangered Bird Committee was convened to assess the current status of the state's endangered, threatened, and special concern birds; information and review was provided for several new and on-going national and regional migratory bird conservation planning efforts; two technical manuscripts were reviewed;

Education/Outreach. Field workshops coordinated by Clemson University Faculty were led for both teachers and students from South Carolina. Children from the Governor's School for Science were led on a field trip to learn about the ecology and conservation of red-cockaded woodpeckers and endangered species issues. A workshop for foresters from Georgia Pacific was given at the Sewee Center in Awendaw, South Carolina. The workshop featured a slide show and demonstration educating foresters about Red-cockaded Woodpecker concerns and providing hands on knowledge for identifying and locating active red-cockaded woodpecker groups on Georgia Pacific forestlands.

Presentations on migratory birds were made to two teacher workshops, ten garden clubs, six school groups and six camps/constituent groups; migratory bird exhibits and brochures were featured for International Migratory Bird Day at Riverbanks Zoo, Sparkleberry Fair, and a bird banding demonstration for Nature Fest at Congaree Swamp National Monument; ten bird banding demonstrations were made for school groups at Sandhills REC and a radio telemetry demonstration was done for a science fest at a local elementary school. One presentation on migratory birds and urban sprawl was made to a "leadership 40" class in Lexington. Five articles on various wildlife topics were written for SC Wildlife magazine and three presentation on birds/wildflowers of the sandhills was made for the neighborhood seminar series at Sandhills REC.

Wildlife Assistance and Permits. A total of 696 assistance or educational calls relating to birds and other wildlife were responded to. Numerous calls were answered regarding importation and possession of exotic and native wildlife; 56 scientific collecting permits were issued; 12 permits relating to bird depredation and special purpose wildlife permits were issued; 6 falconry permits were renewed.

Sea Turtle and Marine Mammal Research and Management

Loggerhead Turtle Nest Protection and Management. There are now 19 nest protection projects involving over 700 individuals including state, federal and private citizens. These projects survey almost half of the 303-km coastline of South Carolina every morning during the sea turtle season, protecting approximated 70% of the nesting effort. Staff made 23 site visits to ensure state guidelines were being followed. The annual Sea Turtle Training Workshop was held in May at Ft. Johnson with 65 volunteers attending. Guest speakers included South Carolina Aquarium staff, DNR veterinarian and MRD economist. A pilot study to document the amount of volunteer time is being tested this year. A pilot study to document the thermal environment of sea turtle nesting sites was initiated. Sand temperatures at nest depth were recorded throughout the nesting season at 18 locations on South Island. This information may be used to evaluate the effects of nest relocation on the temperature dependant sex ratio.

Loggerhead Turtle Population Monitoring. We have conducted statewide aerial beach surveys on a five-year cycle since 1980 as an index to the nesting population. During 2000, 12 aerial surveys were completed with a statewide nesting estimate of 3,373 nests. During 2001, seven complete and three partial aerial surveys resulted in an estimate of 2,636 nests. This is a 22% decline, but is typical of normal, yearly fluctuations. However, the estimated statewide nesting population has declined from an average of 5,412 nests per season in the early 1980's to 2,887 nests per season in the late 1990's. This is a decline of 53.3%, or about 3% per year for 18 years. Ground truth, to verify the accuracy of the aerial counts, was conducted on four islands.

Sea Turtle Stranding and Salvage Network (STSSN). Twelve aerial surveys (one/month) were made to document sea turtle carcasses on remote islands. Marine mammals and other wildlife are also counted. An extra survey was made on opening day of shrimping in state waters and 267 trawlers were counted. Staff biologists coordinate the 40+ volunteers who gather data on dead sea turtles to determine the temporal and spatial distribution of sea turtle mortality in South Carolina. Weekly stranding totals are sent to the National Marine Fisheries Service Miami Laboratory for inclusion in the national database. During 2000, 136 dead turtles were reported. So far in 2001, 116 have been recorded. The number of adult-sized loggerheads that stranded two weeks after the opening of state waters to shrimping was 62% higher than the previous decade for this same time period. Twenty-one post mortem examinations were made of fresh dead sea turtles this fiscal year. Four that stranded alive were taken in for rehabilitation. Two remained at the South Carolina Aquarium's Animal Holding Facility from August to January, but were successfully released in Florida. One is still at the Sea Turtle Hospital in Topsail Beach, North Carolina and one died at the SC Aquarium.

Aerial Surveys for Leatherback Turtles. Five weekly aerial surveys, parallel to the coastline at 1.5 and 3.0 nautical miles were flown during April and May to document the distribution of leatherback turtles during their spring migration. This is done as part of the federal contingency plan for the species. A total of 63 were seen, which is a drop of 60% from last year. The lack of a food source may have caused them to move through our area faster, rather than congregating to feed.

Major Consultations on Permits. Staff provided input on two major activities of the U.S. Army Corps of Engineers, the dredging of Murrells Inlet and placement of sand on adjacent beaches and the re-nourishment of Hunting Island State Park. Staff represented South Carolina at an EPA/COE dredging workshop in Jacksonville. We also provided expertise to the Beaufort County planning staff and County Council on a

beachfront lighting ordinance to protect sea turtles.

Education Projects. Under an agreement between the SCDNR and the Queensland Parks and Wildlife Service, Australia to facilitate better understanding of our coastal ecosystems, flora and fauna and their management under the pressures of ecotourism and development, Dr. Colin Limpus presented a seminar on his conservation work with sea turtles to MRD staff and faculty of the University of Charleston. Three issues of *Loggerheadlines* were produced and mailed out to 166 recipients. Hatchling loggerheads have been provided to the SC Aquarium in Charleston and to the Riverbanks Zoological Park in Columbia.

Presentations. Slide presentations were made to the following groups: Camp Wildwood III, Kiawah Island "End of Season" party, classes from the University of Georgia, Coastal Carolina University and the University of Charleston, teachers at the South Carolina Aquarium, Beaufort Girl Scouts and the Marine Advisory Board. A field trip through the ACE Basin was provided to a group from the Pew Ocean Commission.

Wildlife Assistance. A minimum of 133 calls were handled. This does not include manatee or eagle sightings and/or sea turtle and marine mammal strandings.

Manatees. We continued to document the use of state coastal waters by manatees with 86 reports from the public. Manatees arrive in April and remain there until October. Reak numbers are present from July through September. Beaufort and Charleston Counties represent the majoruty of reports. One pregnant manatee was found dead in Port Royal Sound. This animal was in excellent body condition and actively feeding at the time of death. This acute type of death is consistent with drowning.

The Marine Mammal Stranding Network was created to document the temporal and spatial distribution of stranded (alive and dead) marine mammals in South Carolina. There were 58 stranding events in 2000, including four that stranded alive and one that was euthanized. In 2001, there were 62 stranding events, including 10 that stranded alive. Five were euthanized, three died naturally. Two bottlenose dolphins were captured alive in Bushy Park by a team from NOAA and released alive in the Cooper River. Staff provided numerous live TV and radio interviews during this event. Staff attended the Northern Right Whale Implementation Team meeting in Miami.

Publications:

Hopkins-Murphy, S.R., T.M. Murphy, C.P. Hope, J.W. Coker and M.E. Hoyle. 2001. Population Trends and Nesting Distribution of the Loggerhead Turtle; (*Caretta caretta*) in South Carolina 1980-1997. Final Report to the U.S. Fish and Wildlife Service 41pp.

Hopkins-Murphy, S., D.W. Owens and T.M. Murphy. (in press). Ecology of Benthic Immature Loggerhead Turtles (*Caretta caretta*) on Foraging Grounds and Inter-nesting Habitat Use by Adult Females – Atlantic. In: Biology and Conservation of the Loggerhead Turtle, Smithsonian Institution Press, Wash, D.C.

Poster Presentations at the 21st Symposium on Sea Turtle Biology and Conservation:

Stender, B., D. Whitaker, A. Segars, M. Arendt and S. Hopkins-Murphy. 2001. In-water Collection of Sea Turtles from the Southeastern USA: Overview of Year 1 of a 3-year Study.

Segars, A., D. Whitaker, M. Arendt, S. Hopkins-Murphy and B. Stender. 2001. Analyses of Blood chemistry in Trawl-caught *Caretta caretta* and *Lepidochelys kempi* from the Southeastern USA.

Arendt, M., B. Stender, A. Segars, D. Owens D. Whitaker and S. Hopkins-Murphy. 2001. Morphometric Measurements and Sex of Trawl-caught Sea Turtle on the Southeast Coast.

Migratory BirdSurveys, Small Mammal Surveys, and Related Projects – Mountain Region

Staff carried out a 100-mile winter Bald Eagle survey route on Lake Hartwell with assistance from law enforcement during January 2001. Staff also monitored Peregrine Falcon (*Falco peregrinus*) productivity at Table Rock, including four site visits. No fledglings were produced this year although the eyrie had a pair of adult birds. This is the first time in 13 years that this pair has not been successful in fledging young. No new pairs were detected.

Clark Hill Small Mammal Surveys: A study to measure the diversity of small mammals across the 900-acre Clark Hill SCARNG site was completed and recommendations made. Eight sampling sites included an array of 8 pitfall traps placed beneath logs, box traps, Sherman traps, and a weasel set. Each site was also mist-netted for bats. Harp traps were in locations most suited to them. Over 1280 pitfall trap nights, 1137 small live trap nights, 160 mustelid type trap nights, 464 rabbit box trap nights, 74 harp trap nights and 15 mist net nights (58.75 net hours) were conducted. Twenty-one small mammal species were captured or confirmed by observation of the animals or sign. Harp traps detected four bat species, and two species were detected using nets.

Naval Weapons Station, Mammal Surveys: Terrestrial mammal trapping began in January 2001 and has occurred for ten days each month since then. Trapping included 16 sampling sites with 10 pitfalls per site in addition to 4 Sherman live traps and 2 box traps per site. Total terrestrial mammal trap effort to date included 7610 pitfall trap nights, 3044 Sherman trap nights and 1512 box trap nights. A few sites had to be temporarily closed due to flooding. A total of 22 species have been recorded. Cover boards were set out during March in several areas to detect the presence of salamanders. These sites have been checked once every two weeks and have thus far yielded no records.

Terrestrial Mammal Ranking Review: After consolidating comments from regional mammalogists and gathering information from scientific publications, a SC mammal ranking review meeting was completed. The draft of suggested rankings was reviewed, there were no changes to either the state endangered species classification or the "in need of management list", all were changes in state ranking (ranking changed for four species, the northern long-eared bat, meadow vole, black bear and New England or Appalachian cottontail). Five species, (the rock and water shrews, bog lemming, rock vole and least weasel) for which no SC occurrences have ever been reported were removed from the list, as were three deer subspecies.

Heritage Survey and Inventory: Temperature loggers were retrieved and downloaded from a big-eared bat roost in Oconee County. Staff met with a Furman University representative to evaluate a proposed trail at a registered Heritage Site on campus.

Jocassee Gorges: A staff member participated in five Jocassee Gorges Education and Outreach Committee meetings and two Jocassee Gorges Management and Research Committee (a.k.a. Working Group) meetings. A staff member chairs a subcommittee to review the Palmetto Trail within the Jocassee Gorges. Trail guidelines were developed and approved. The department now has an MOU with the Palmetto Trail, Palmetto Conservation Foundation for a trail between Keowee-Toxaway State Park and Table Rock State Park. Upstate staff participated in an erosion control workday within the Jocassee Gorges. On site assistance was given on a Swainson's warbler research project.

Botanical Research: A contractual report, funded by the Heritage Land Trust fund by recommendation of the Heritage Trust Advisory Board, entitled "Assessment of the *Sagittaria fasciculata* (Bunched Arrowhead) populations in North and South Carolina" was received from Dr. Gillian Newberry. The report was utilized several times this year. A staff member searched a wetland at Beaverdam creek, Greenville County, at the request of several landowners, for bunched arrowhead plants; none were found.

Wildlife Assistance, Technical Guidance and Education: The upstate office handled 404 information and technical or wildlife assistance calls this year. Four interviews were given to various media sources, which included The Greenville

News, the South Carolina Wildlife magazine, and The State paper. Staff presented "Biology and Control of Bats in Buildings" at the Nuisance Wildlife Management meeting at the Riverbanks Zoo, sponsored by Clemson Extension. A brief presentation on a unique method to protect bog species from hog damage was presented to regional land mangers. A program on snakes was given to approximately 70 students at a local elementary school. We assisted in presenting a program on identification of ducks in flight for a bird club.

The Wildlife Control Operators referral list for bat exclusion work was revised and distributed in October. A staff member participated in a meeting reviewing Wildlife Rehabilitation procedures and mechanisms. A staff member developed a draft Site Inspection Review Form for inspectors of rehabilitation facilities.

The upstate office staff provided technical assistance to various organizations, groups and individuals this year. Technical assistance was provided to the following: National Geographic Society, National Parks Service, Native Plant Society, Office of Surface Mining, USFS, US Fish and Wildlife Service, US Army Corps of Engineers, researchers studying bats and wood rats, and various graduate students. Also, technical information was provided to the Francis Marion National Forest regarding *Neotoma floridana*; assistance and information about past bat box studies were provided to Bat Conservation International. Staff inspected some impacted wetlands and proposed mitigation property in Greenville County.

Publications and Reports.

Bunch, M., and R. Harrison 2000. Small Mammal Survey at Clarks Hill Training Site. Unpublished Final Report by South Carolina Department of Natural Resources for the United States Property and Fiscal Office, South Carolina Army National Guard. 26 pp.

Platt, S.G., and M. Bunch.In Press.Distribution and status of swamp rabbits in South Carolina. Proc. Annu. Conf. SEAFWA.

Biological Surveys and Community-based Conservation Planning – Piedmont Region

Heritage Survey and Inventory: Staff continued participation in The Nature Conservancy's ecoregional planning process. Staff reviewed preliminary choices for piedmont areas to be selected as a portfolio of protection project areas. The Piedmont Region portfolio of sites will be completed this year. Other states participating in the Piedmont Region ecoregional planning process include Alabama, Georgia, North Carolina, and Virginia.

Winthrop University's Botany Department and Endnagered Species Program did surveys at Rock Hill Blackjacks and Forty Acre Rock. Over 450 species of plants were documented at Rock Hill Blackjacks. In 1995, 295 Schweinitz's sunflowers were transplanted into a one acre cleared restoration area. That population has increased and there are now 3,400 plants in the restoration area.

Wildlife Assistance, Technical Guidance, and Education: Staff responded to over 555 request for wildlife assistance and information. Requests ranged from dealing with dead birds and the potential for West Nile Virus, snake identification, directions to heritage preserves, rules and regulations and habitat improvement. Staff provided onsite recommendations for improving habitat for wildlife at two local schools, Catawba Nuclear Plant, and on three privately owned tracts of land.

Staff provided extensive wildlife conservation input to the City of Rock Hill as they developed their land-use plan. Staff assisted Katawba Valley Land Trust and Nation Ford Land Trust in protecting open space, wildlife habitat, and cultural sites. Consultations were held with York County and Duke Energy to conserve and manage populations of Schweinitz's sunflower that occur on their property or on their right-of-ways. Wetland alteration permit requests were reviewed weekly. Most alteration permit requests in this region were for pond construction. One pond site was not far from known Carolina Heelsplitter occurences. This site was surveyed for the heelsplitter but none were found.

Heritage Survey and Inventory

Protection Project Development. Staff evaluated Goodwill Plantation, a 3,285-acre plantation, in eastern Richland County (seebotanical surveys, below). Fork Swamp, a 35,000 + acre project located at the confluence of the Wateree and Congaree Rivers was also evaluated. This project includes the Upper Santee Swamp, formed by the impoundment of the Santee River. This area was determined to be significant based on the presence of extensive forested wetlands. Forested wetlands are important for a variety of wildlife species including neotropical migrant songbirds, wading birds and rare species such as the bald eagle and swallow-tailed kite. The Heritage Trust Advisory Board approved Fork Swamp as a protection project in October 2000.

Congaree Bluffs protection project was originally approved in 1986 and comprised seven different bluff areas on the Congaree River in Calhoun County. A 200-acre tract comprising one of the seven sites was put on the market early in 2001, and the Heritage Trust Program was approached by several non-profit conservation organizations to assist in protection of this site. Heritage staff biologists visited the site to assess the current condition of the bluffs and assist in the development of this project. The Heritage Trust Program acquired this site.

The Rose Island/South Hutchinson Island shell middens are marsh-island sites in Colleton County that were originally identified by air survey by Richard Porcher. Ground survey by Heritage staff revealed rare plant species and rare plant communities, as well as archaeological significance. The Heritage Trust Advisory Board approved the sites for protection in October 2000.

Heritage Survey staff assisted the Heritage Protection staff in the development and negotiations for the Goethe Tract addition to Tillman Sand Ridge Heritage Preserve. This tract is a key tract in the preserve design for this Heritage Preserve.

At the request of administrators at the MacDougall Correctional Institution, Heritage staff surveyed a wooded portion of institution-owned land. The woodland was small, second growth, and fairly typical for the region; therefore staff did not make a protection recommendation. Also by request, a large property in the Savannah River floodplain, was surveyed by staff but was found to be highly impacted by agricultural activity. It also was deemed too disturbed to be a protection priority for Heritage Trust.

Protection Planning: Staff continued to support The Nature Conservancy's ecoregional planning process for the Piedmont Ecoregion. Staff attended meetings to develop lists of target elements for this region. Existing plant community data, originally reported under South Carolina's 1986 community classification devised by John B. Nelson, was converted to the current Nature Conservancy national classification to allow region-wide assessment. Staff also supported the Lower Savannah River Basin conservation initiative by attending meetings and providing data and expertise.

Staff met with regional leaders of the S.C. Native Plant Society to plan statewide education and restoration projects for the coming year.

Heritage Data Management. The Heritage Survey and Inventory project provides information on the status and distribution of South Carolina's rare and endangered species for land protection and management permit review and mitigation. Most requests come from environmental consultants, and DNR staff and other public agency staff and cooperating organizations submit requests. Most requestors are directed to the S.C. Heritage web site, which now services all standard data requests. Almost 300 people have access to this web site and it has been accessed almost 3600 times since June 1999.

Approximately 300 element occurrence records (EORs) have been added to the database (total EORs = ~8700). In addition to the EOR file, the site basic record (SBR) file continues to be updated as needed with new HTAB projects and Heritage Preserves, and also with annotations as to

protection status, physiographic province, watershed, etc.

Plant Community Surveys: Eight Oglethorpe Oak (*Quercus oglethorpensis*) / dwarf palmetto (*Sabal minor*) locations on U.S. Forest Service property were surveyed, as part of a re-inspection of such sites initially observed 8-20 years earlier. The oak was relocated in all but one of the sites, but with populations in serious decline. Documentation of this potentially serious disease problem has lent support to Robin Roecker's (USFS) efforts to focus additional Forest Service research on this species. A ninth Oglethorpe oak / dwarf palmetto site that was approved as a Heritage project in 1988, the Troy Gabbro Swamp in McCormick County, was also resurveyed. Essentially intact though slightly reduced in size, it is now the subject of renewed Heritage protection effort.

Restoration: At the Belser Arboretum (University of South Carolina), together with project leader Deborah Johnson, staff recruited and supervised several hundred volunteers over two workdays. Substantial progress was made in the removal of severe infestations of invasive exotic plant species in the arboretum. Staff then followed up with recommendations for re-planting and management. On the Edgefield District of the Sumter National Forest, staff participated in privet-removal along Turkey Creek

Survey and Monitoring of Gopher Frog and Flatwoods Salamander Breeding Sites: Historic sites and potential breeding sites at the Francis Marion National Forest (FMNF) were surveyed for the flatwoods salamander and gopher frog. Over 25 ponds were sampled during this second year of a 2 year Section 6 Fish and Wildlife Service Project. No flatwoods salamanders were documented at any site during the 2-year study. Climatic conditions, in particular lack of rainfall at appropriate times, are believed to be contributory to the absence of salamander breeding.

Gopher frogs were not documented at any site visited on the FMNF during this study and breeding was not documented at the historic site on the Santee Coastal Reserve. The only site where gopher frog breeding was documented this fiscal year was Saracennia Bay at the Savannah River Site. Gopher frog larvae were collected from this site by a Savannah River Ecology Lab employee and verified by Wildlife diversity staff and Alvin Braswell, Curator of Amphibians at the North Carolina Museum of Natural History.

Eastern Diamondback Rattlesnake: The eastern diamondback study at Webb Center continued through this fiscal year. Five animals fitted with radio telemeters during spring 2000 were tracked until April of 2001. At this time these study animals were recovered. Four of these animals had their radios removed and were released. One study animal and three new animals, collected during spring 2001, were surgically implanted with transmitters and tracked through the fiscal year. During spring 2001 thirteen volunteers assisted Wildlife Diversity staff in the collection of study animals for the 2001-2002 field season. Subsequent to radio implantation study animals were tracked four to five times weekly for the entire study period.

General Herpetofaunal Surveys: The survey for amphibians and reptiles at Sandy Island Nature Preserve continued during fiscal year 2001. To date this project has documented 48 species there. Data from the study will be used in developing and implementing a management plan for this preserve.

Staff participated in a planning meeting for surveys at Southeastern Region National Parks and Monuments. Herpetofaunal surveys were the number one priority for many parks, and staff helped develop survey and sampling protocol. The contract for herpetofaunal surveys was awarded to the Savannah River Ecology Laboratory with an endorsement from Wildlife Diversity staff.

Reptile and Amphibian Species of Concern and Conservation Needs: Staff worked with the Legal Office and law Enforcement to develop a legislative proposal to regulate the take, possession and sale of native reptiles and amphibians. Staff coordinated this effort with several representatives of the private sector and with conservation specialists. Drafts of a Bill and subsequent regulations were circulated for review.

Wildlife Assistance, Technical Guidance and Education: Staff handled over 200 requests for assistance from the public concerning reptiles. The vast majority of the requests were from people who had seen a snake in their yard or house and needed help identifying it or information on how to keep snakes away from their home. Other topics include incubation time for snake and turtle eggs, turtles in ponds and their effect on fishing and ducks and exotic reptiles that had escaped or needed a new home.

Staff worked with biologists at Francis Marion National Forest to develop a plan of action for continued, and increased survey and monitoring of the flatwoods salamander and gopher frog on the national forest. Staff also met with representatives of the U.S. fish and Wildlife Service, Riverbanks Zoo and Conservation International to discuss the potential use of the Orangeburg Fish Hatchery for assurance colonies of critically endangered Asian turtles.

Staff provided 13 presentations on reptiles and amphibians to school groups, civic groups and other organizations. Staff prepared an article for publication in South Carolina Wildlife on the eastern diamondback rattlesnake project at the Webb Wildlife Center.

Statewide Botanical Projects.

Coastal Plain Surveys. Surveys of significant examples of plant communities underlain by marl and limestone or coquina were conducted in the outer and middle coastal plain terraces over exposures of the Santee Limestone and Cooper Marl geological formations and on shell mounds along the state's coastal zone. Over 100 potential sites were surveyed for calciphytic plants. Such habitats are typically high in calcium carbonate, a critical plant nutrient, often in limited supply in South Carolina's typically acidic soils. Emphasis for site selection and survey effort was devoted to plant species of state and federal concern. These sites include (1) artesian springs, caves, and marl forests along the Cooper, Edisto, Santee river drainages and (2) coastal shell mound forests in the Ashepoo, Combahee, and Edisto (ACE) basin.

Four new populations of the may white azalea (*Rhododendron eastmanii*) were discovered in marl and limestone ravines near the communities of Lone Star, Vance, and Santee. Such areas support rich, oak-hickory hardwood forests with species more typical of the Upstate, such as white oak *(Quercus alba)*, red oak *(Q. rubra)*, smooth hickory *(Carya glabra)*, umbrella magnolia (*Magnolia tripetala*), and black cohosh (*Cimicifuga racemosa*)— all in abundance at these sites. Underlain with surface deposits of marl or limestone, such plant communities are called marl forests. Several of these sites were surveyed in or around Lake Marion within the Santee-Cooper Authority. The Santee Limestone formation outcrops along the Santee River and its tributaries and has been greatly altered by mining operations, vacation and retirement residential development, and the Santee-Cooper Lakes. But along the ridge lines upslope of the impoundment are significant surface deposits of crystalline limestone.

Although there are other limestone formations in the state, the Santee Formation is the closest to the soil surface and has the greatest economic and natural area potential. Considerable field effort was devoted to Santee State Park and Cave Hall, which are in Orangeburg and Calhoun counties respectively. These two areas also have the best-developed karst features in the state to include limestone bluffs, sinkholes, sinkhole ponds, springs, and caves. Three shell mounds in the ACE Basin were documented and approved for acquisition by Heritage Trust Advisory Board. These mounds are actually middens made by Native Americans and provide habitat for the shell midden morning glory *(Ipomoea macrohiza)* and Godfrey's swamp privet (*Foresteria godfreyi*).

With the assistance of Dr. Charles Horn, botanist at Newberry College, new populations of pyramid magnolia (*M. pyramidata*) and may white azalea (*R. eastmanii)* were discovered along Little Beaver Creek in Calhoun County. These two species of federal concern were documented in a mature, oak-hickory forest along deeply dissected stream terraces in the Congaree Sandhills region of the Midlands. Both plant species seem to be limited to sites with circum-

neutral soils and are very rare throughout their range which includes stations in both the Piedmont and Coastal Plain. See below under Piedmont, Lynches Woods, for a discussion of the second site.

Two important non-calcareous river bluff systems were also surveyed, Goodwill Plantation along the Wateree and the Congaree River Bluffs Heritage Preserve. Both sites support rich, hardwood forests above wide floodplains. Modern paleobotanical research conducted over last 20 + years has greatly deepened the ecological community's appreciation for the importance of such habitats. These moist river bluff systems of the Deep South have provided migration routes for both plant and animal species since the last North American glaciation some 18,000 years ago. Pollen analysis supports the idea that spruce and fir forests (much like today's "great north woods" and boreal forests) may have migrated to approximately as far south as the SC Midlands. Thus, the great variety of species we now find in the Southern Appalachians (and to a lesser degree at the Congaree River Bluffs and Goodwill Plantation) is due to the relatively continuous set of similar, protected bluff habitats which stretch from the southern Blue Ridge down and along these larger southern river systems which drain the foothills and provide environmentally stabilizing conditions of high moisture in sheltered, cool, deep ravines and valleys. Located next to the Wateree River in southern Richland County, Goodwill Plantation is a 3,200 acre tract in the Richland Redhills region of the Midlands. Three additional significant plant communities were documented here to include: the longleaf pine xeric sandhill scrub, pond pine pocosin, and non-alluvial swamp forest types. Goodwill Plantation is the first such protection project for the Richland Redhills region of the state and was approved by the Heritage Trust Advisory Board for protection.

Piedmont Surveys. Two important sites in the Piedmont were surveyed for rare species and significant community types. The first site is a unique freshwater marsh located in the Catawba River drainage along Cane Creek near the town of Lancaster. Dominated by wild rice (*Zizaniopsis milliacea*) and bottomland hardwoods, such vegetation is extremely rare in the Piedmont of the southeastern United States. A second unusual wetland forest cover type was surveyed in cooperation with the U.S. Forest Service. These areas are classified as upland depression swamps and are of interest for their plant community and indigenous species values, namely—Oglethorpe oak (*Quercus oglethorpensis*) (see plant community surveys, above).

The largest known population of the may white azalea (*Rhododendron eastmanii)* was documented at Lynches Woods near the city of Newberry. Lynches Woods is owned by Newberry County and provides habitat for the largest known stand of this South Carolina endemic species anywhere.

Technical Guidance. Site data and information on plant species significance were provided to the The Nature Conservancy/ Heritage Program Ecoregional Planning Team (See Piedmont Biological surveys and Community-based Conservation Planning, above). The South Carolina List of Endangered, Threatened, and Watch Plant Species was updated and revised by the state's botanical experts under the auspices of the Heritage Trust Program. The population status of over three hundred species were reviewed. All participants provided important input by interpreting the available scientific data in order to make the revision scientifically sound and credible.

Heritage Trust Program

Property Acquisitions. During FY-2001, revenues to the Heritage Land Trust Fund (HLTF) totaled $3,450,171 and expenditures totaled $6,094,669. Ten different properties comprising 2,094 acres were protected. Three of the properties formed new heritage preserves and six were additions to existing preserves. Conservation easements on Craig Pond and Crowfield Plantation were also donated to the program. A total of $5,330,927 was spent on property acquisitions and $99,797 was spent on manpower needed to carry out these tasks.

Property donated to the Heritage Trust Program, during FY-2001, was valued at $630,440 and our average total cost

per acre was $2,559. These acquisitions served to protect special habitats or buffer for 30 rare elements. Included are 14 rare plant species, 2 rare animal species, 9 rare plant communities, 1 Carolina bay, 1 geological element and 3 archaeological sites. This is significant because the number of rare elements protected may be the best measure of success for the Heritage Trust Program.

Revenues to the Heritage Land Trust Fund continued to increase, as did our average cost per acre of habitat protected. This is probably the result of increased property values statewide, especially along our coast. The associated development pressures have placed several of our State's most significant archaeological sites in peril. Addressing these situations will be difficult, and a number of professionals feel that we are looking at the very last opportunity to protect certain types of cultural resources. There is also a need to expand and connect a number of our Heritage Preserves, so functioning ecosystems can be protected long term.

Preserve Management. With close to 6 FTEs committed to one or more aspects of preserve management, this function now accounts for the second-largest commitment of time and money in the Section, eclipsed only by wildlife research, surveys and management, with 10 FTEs. Activities on the 63 preserves in the system ranged from the mundane, such as marking boundaries, to the exotic, such as investigating the effects of soil copper on natural propagation of endangered plants. Major categories of work were: monitoring species of concern, restoring habitats, maintaining public access facilities, developing and supporting volunteer stewardship committees, and supporting tours and other public activities on preserves.

Planned monitoring protocols for 14 rare species and other species of concern were completed at 19 preserves. Such monitoring is necessary to assure that the resources of concern, whose presence was usually the reason the preserves were established in the first place, continue to exist there. Moving beyond passive monitoring to restoration, 24 days of prescribed burning were carried out on 3,210 acres on 11 preserves to enhance or maintain desired habitats. Other forms of restoration were carried out on 13 preserves, including planting native species and controlling invasive exotic species such as Japanese honeysuckle.

A program of capital improvements to improve access and enhance special habitats continued in 2000-2001. One of the larger projects this year involved correcting damage from Hurricane Floyd to roads at Waccamaw River, Cartwheel Bay, Lewis Ocean Bay and Little Pee Dee HP's. Other improvements included construction of kiosks at Fort Frederick, Pacolet and Green's Shell HP's. An existing parking area was improved at Pacolet HP, and a new lot installed at Peters Creek HP. Gates were installed at Lynchburg Savanna, BearBranch and Ashmore HP's and a water control structure was repaired at Caper Island HP. Boardwalks were also built at Forty Acre Rock and Segars-McKinnon HPs. Access roads were improved at Watson HP and erosion control work was completed at Chestnut Ridge HP.

Volunteers have also been very involved in constructing and maintaining visitor facilities. Trail maintenance was carried out at seven different preserves and most of the work involved volunteers. Managers have been successful in creating 27 stewardship committees that total almost 400 members and provide approximately 600 man-days of volunteer help annually. One highlight was the work of 10 Americorps workers, plus volunteers from Kalmia Garden and W&FF staff, to construct a 440 ft boardwalk at Segars-McKinnon Heritage Preserve. The boardwalk connects the preserve to Kalmia Gardens via a bridge that had been built previously.

Due to the contributions made by volunteers, our ability to monitor abuse, pick up litter, and maintain trails on preserves has improved tremendously. Volunteers are given hats and t-shirts that identify their affiliation to our program. Events such as the annual battle commemoration at Fort Lamar HP, the Forty-Acre Rock 20th anniversary Commemoration, and archaeology week at Great Pee Dee HP also provide educational demonstrations for attendees and attract hundreds of visitors. The Forty-acre rock anniversary event was organized by volunteers representing numerous organizations and institutions and was attended by over 500 people.

In addition to supporting special events, management staff provided about 288 guided field trips involving over 3,500 people last year and are educating more volunteers to carry out this task. Currently, the Hilton Head Island Museum staff provides weekly field trips to Green's Shell HP and personnel from Charleston County Parks conduct trips to Dungannon HP. We continue to look for more opportunities to partner with local government entities to enhance public use on our preserves.

The growing field of nature-based tourism offers additional opportunities to build a base of appreciative visitors to Heritage Preserves. Our first major venture into the field is the Port Royal Sound Adventure Guide, a large-format map suitable for land- and water-based recreation planning. The map and accompanying literature, now in final stages of development, will provide detailed information on 13 public facilities harboring natural and cultural features of interest, including seven Heritage Preserves. A sea-kayaking trail linking several of these sites is being established in connection with the publication.

One of the stated purposes of the Heritage Preserve system is "for research in fields such as archaeology, agriculture, conservation, ecology, forestry, genetics, geology, history, paleontology, phharmacology, soil science, taxonomy and similar fields" (Section 51-17-30, SC Code Ann., 1976). Consistent with this purpose, investigators in various fields are encouraged to use preserves for their research. Six such projects were under way last year, ranging from forest ecology to plant genetics. One of the most extensive projects was a study of range-wide genetic variation in Atlantic white cedar, involving several sites throughout the Eastern U.S. One case of un-permitted research was also investigated, and one research permit was revoked for cause.

Despite numerous management successes, incidents of abuse on Heritage Preserves continue to accumulate. One of the most prominent problems is the increasing use of all-terrain vehicles (ATVs), which is inconsistent with the purposes of a preserve and prohibited by the Heritage Trust enabling legislation. Unfortunately, the enforcement provisions of this legislation were fatally flawed until they were corrected in the 2000 General Assembly. Emergency regulations banning ATVs are now in effect and actively enforced. Permanent regulations governing activities on preserves are also in development.

Our four sea bird preserves, consisting of little more than recently formed sandbars, pose significant visitor management problems. Nesting seabirds are extremely sensitive to disturbance, and one or two boatloads of visitors at the wrong time of year can significantly diminish reproductive success. A total of 13 trips to these preserves were made during nesting season to post and rope off sensitive areas.

Wildlife Assistance, Technical Guidance and Education. Land Protection and Preserve Management staff responded to approximately 1,200 telephone calls, letters or requests for information from the public. Staff also provided approximately 45 presentations to school groups, civic groups, garden clubs, scout troops, school teachers and similar organizations. Staff also provided technical guidance to management on eight non Heritage Trust properties, notably at the DNR's Santee Coastal Reserve and Joccassee Gorges properties and at Sandy Island, owned by SCDOT and managed by the SC Nature Conservancy.

FRESHWATER FISHERIES SECTION

Program Name: District Operations

Program Goal: The protection, conservation and enhancement of South Carolina's aquatic resource, and providing the citizens of South Carolina with recreational angling opportunities.

Program Objectives: To protect, conserve and enhance South Carolina freshwater fishery resources. To provide

recreational angling opportunities. To support the management and conservation of these resources through the collection, evaluation and dissemination of the relevant data needed to make recommendations.

Performance Measures:

(1) Inputs:

Total cost:	$2,388,290
Personnel:	36 FTEs.
Major equipment:	42 vehicles; 82 boats; 1 tractor.
Facilities:	7 offices and labs
Demand:	480,970 licensed anglers; state population to recover resource damages; 1134 private pond owners.

(2) Outputs:

- Conducted survey and inventory activities on 19 lakes and reservoirs in South Carolina.
- Conducted survey and inventory activities on 13 rivers and streams in South Carolina.
- Conducted 1134 on site pond management consultations.
- Reviewed 52 environmental permit requests.
- Investigated 54 fish kill events.
- Maintained 155 fish concentration areas in South Carolina lakes and streams.
- Genetic evaluation of smallmouth bass from South Carolina reservoirs.
- Evaluate larval growth and food habits of striped bass in Lake Marion.
- Evaluate growth and survival of two different largemouth genetic strains in South Carolina ponds and lakes.
- Tested a site-specific largemouth bass model capable of predicting size structure and other selected biological parameters.
- Participated in a multiple-disciplined cooperative study of fish populations and their interaction in tidal freshwater wetlands of the Cooper River.

(3) Outcomes:

1. Survey and Inventory. The following are examples of results from implemented recommendations based on survey and inventory data.

   a. Creel data collected from Savannah River impoundments has allowed the agency to support proposed changes in largemouth bass size and creel limits in the waters bordering Georgia. Survey data did not justify the proposal based on its biological need, but rather, the data indicated that there was wide public support and that the harvest restrictions would cause no harm to the fishery. (Reference: Freshwater Fisheries District II, Annual Progress Reports, 1998)

   b. A licensed angler survey that was completed during the previous review period continues to be used by the Section to develop programs and set priorities. This survey determined the attitudes, behavior, opinions and demographics of the State's freshwater anglers. Results of this survey have been used to justify the creation of an Aquatic Education Program to be administered by the CEC Division. The survey data were also used to confirm and strengthen the importance of the DNR hatchery program, with an emphasis balanced toward the anglers' preferences. Other important programs are being evaluated based on the results of this study. (Reference: South Carolina Fishing License Holders Opinions and Attitudes Toward Fisheries Management and the South Carolina Department of Natural Resources, 1998)

   c. A survey of South Carolina youth (ages 8 to 18) was conducted to access their awareness of issues related to aquatic natural resources and recreational fishing. Evaluation of survey results is ongoing.

   d. The survey of licensed anglers (as mentioned in item b.) shows that freshwater anglers were

satisfied with largemouth bass (81%), bream (87%), crappie (78%), catfish (87%), striped bass (76%), rebreast (60%), smallmouth bass (67%), brown trout (69%), and rainbow trout fishing (70%) in South Carolina. These anglers are of the opinion that during the past ten years the quality of fishing has improved, remained the same or declined at respective rates of 33%, 26%, and 26%. Improvements were attributed to cleaner water (20%), more fish (13%), improved management (12%) and increased access (9%). Those expressing an opinion of decline base this on over fishing (30%), too many anglers (16%), and pollution (16%). A total of 85% of the respondents are satisfied with the performance of the Freshwater Fisheries Section. These positive opinions come, in part, from management activities generated by recommendations based on the sound biological data from this program. (Reference: South Carolina Fishing License Holders Opinions and Attitudes Toward Fisheries Management and the South Carolina Department of Natural Resources, 1998)

e. Data resulting from this program are routinely used to recommend and implement fish harvest regulations designed to address the program's goal. These would include, but not be limited to: 21 inch and 5 fish creel limits on systems in the Santee Cooper drainage, largemouth bass size limits at selected agency public fishing lakes, set hook regulations on selected coastal plain rivers, and authorization to regulate largemouth bass fisheries in the Spartanburg City reservoirs.

f. The treatment and subsequent reduction of *Hydrilla* from the Santee Cooper Lakes created concerns among the public that largemouth bass reproduction and survival had been harmed. Under public pressure the Section stocked largemouth bass, but the stocking was monitored by sampling under the survey and inventory responsibilities of this program. The sampling indicated that the stocking was neither effective nor necessary. These results supported the Section's contentions that were voiced prior to the stocking, thereby, assuring the public that recommendation were being based on the best science available.

g. Survey data from this program are being used to initiate a delayed harvest recommendation for trout on Chattooga River. This is in response to public requests and is based on biological justifications. (References: Freshwater Fisheries District I, Annual Progress Report, 1998)

2. Technical Assistance. Outcomes are for all aspects of technical assistance including the investigation of fish kills and providing technical assistance to private pond owners.

   a. During this project segment all fish kills were investigated.

   b. A second survey of private pond owners that requested and were provided technical assistance during the reporting period show highly accept able levels of approval for the activity, employees' performance and results of implemented management recommendations. The survey also indicated improvements in performance of the program and acceptance by those receiving the service. Survey results were compared to a previous survey and showed the following responses:

      - 99% indicated employees were courteous.
      - 78% received the needed paperwork for a consultation.
      - 81% indicated that the required paper work was clear.
      - 94% indicated that employees were timely in responding.
      - 98% indicated that employees were on time for an appointment.
      - 99% said the employees were professional and

attentive.

- 98% believe the employees offered advise based on their (the owner) needs.
- 94% said that the management recommendations addressed their problems.
- 99% said management recommendations were clear.
- 92% received follow up information to help them with their problem.
- 97% said that the written recommendations were clear.
- 92% carried out either all of the recommendations or some of them.
- 69% said that the recommendations were either successful (51%) or some of them were (18%).
- Those that did not carry out the recommendations were deterred by cost, labor or time. Only 4% said they could not understand the instructions.
- 67% requested a follow up call.
- 75% said the program was very important and 25% said it was moderately important.
- Most owners found out about the program from DNR, word of mouth or their extension agent.
- Results have been used to change those aspects of the program that need addressing.A new opinion survey was conducted in 2001 and data is being analyzed. (Reference: Private Pond Technical Guidance Program Customer Survey, 1999)

3. Development Activities. Activities include improvements on selected bodies of water for access and fishing success.

   a. Previously developed angler access and fish attractors give resource users a means to fish agency impoundments, access stream habitats and find productive fishing sites on unfamiliar bodies of water. These sites must be maintained to insure that the original intent and expenses are not lost. In those areas where observations suggest a need for additional access or attractors, managers take action to make needed improvements. Pre and post evaluations of this straightforward activity are not needed, and employee initiative is the predetermining factor in providing the service and, when needed, ceasing the service. A survey of licensed anglers indicates that 56% of the respondents feel that this program is one in which the agency should direct more effort and 26% recommend the same level of effort. Public interest in this type of fishery habitat enhancement activities has resulted in the access to $50,000 for the construction and deployment of new permenant fish attractor units in the Santee Cooper lakes. (Reference: South Carolina Fishing License Holders Opinions and Attitudes Toward Fisheries Management and the South Carolina Department of Natural Resources, 1998)

4. The technical assistance provided by this activity gives the Section access to support services not routinely available. The centralization and coordination of the projects' support services insure a needed level of consistency and quality control between the projects and the many resource partners that the Section works with on a daily basis. Examples include, but are not limited to:

   - assuring that graduate students are obtained for projects needing specific bodies of work. This project assures that the research is well designed and completed as required. This project also assures that the research fits into the DNR's needs and is of the highest priority.
   - this project coordinates the activities of regional cooperative units that provide services to the Section and its projects. The

Southeastern Genetics Cooperative Unit, Southeastern Fish Disease Project, Clemson Statistical Cooperative Project and the regional effort to obtain FDA clearance to use selected chemicals are all projects that require coordination if their value to the agency is to remain.

- access to specialized services at universities, other research institutions and through private industry is obtained by the activities of this project.

5. Research. All research is mission oriented.

   a. Research on the genetic makeup of selected fish species is continuing. The identification of any distinct genetic characteristics is then used as part of the management decision making process. Unique genetic stocks are left undisturbed by not taking immediate management action until it is determined that the best interest of the resource is considered. These data are used routinely to manage striped bass, black bass and trout resources. In addition, ongoing research on the performance characteristics of South Carolina's unique largemouth bass strains is providing information that was used to decide if segregated stocks of brood fish will result in healthier fish populations. Additionally, study of bluegill and smallmouth bass genetics will lead to new views for the management of these species.

   b. The Section's large data base of largemouth bass data has routinely been used to address localized areas of interest. This program is responsible for compiling, analyzing and reporting the findings of the data on a statewide basis. Upon completion of this project it is expected that discrete regional variations will lead managers to view the resource in a more holistic manner.

   c. A study designed to compare various set hook configurations has been completed. The study was initiated to address agency concerns relative to a legislative change in the law that liberalized the means by which the devices could be used. The law was amended to address interests over the presence of flathead catfish in coastal plain streams. The study determined if the liberalization of the law is a threat to coastal plain streams' sport fisheries and if it is effective in catching flathead catfish. The study indicates that live bait was not more effective that cut bait in catching flat head catfish; live bait did not increase the catch of game fish in this river system; and live bait did not remain on hooks and was often taken by gar.

(4) Efficiency:

- Lake and reservoir survey and inventory activities were completed at an average cost of $26,143 per water body.
- River and stream survey and inventory activities were completed at an average cost of $34,872 per water body.
- On site pond management consultations were conducted at an average cost of $267 per pond or $74 per surface acre.
- Environmental permit requests were review for an average cost of $595 per review.
- Fish Kills were investigated at an average cost of $700 per event.
- Fish concentration areas were maintained at an average cost of $1259 per site.

(5) Quality:

A total of 85% of respondents to a licensed angler survey indicate satisfaction with the performance of the Freshwater Fisheries Section. These positive opinions come, in part, from management activities generated by

recommendations based on the sound biological data from this program. (Reference: South Carolina Fishing License Holders Opinions and Attitudes Toward Fisheries Management and the South Carolina Department of Natural Resources. 1998)

Program Name: Hatchery and State Lake Operations

Program Goal: To maintain hatchery facilities in sufficient number and in proper repair as to allow for the production of various fish species of adequate number and size to meet program objectives. To provide DNR operated public lake facilities for recreational fishing opportunities.

Program Objectives:

- To propagate those species of fish in sizes required to accomplish fishery management objectives.
- To provide pond owners, at cost, largemouth bass, shellcrackers and bluegill for private pond management purposes.
- To maintain and improve hatchery facilities.
- To provide quality fishing opportunities through management of water quality and fish population structure.
- To provide maintenance of DNR operated lake facilities.

Performance Measures:

(1) Input:

Total cost:	$2,172,043
Personnel:	31 FTEs.
Major equipment:	43 vehicles; 25 boats; 7 hatcheries, ; 20 tractors.
Facilities:	7 hatcheries; 6 raceways; 118 hatchery ponds; 17 public fishing lakes

Demand: 477,000 licensed anglers.state population to restore species of concern; approximately 434 private pond owners.

(2) Outputs:

- Production of catchable and sub-catchable sized trout for stocking into public waters.
- Production of striped bass and hybrid fingerlings for stocking into public waters.
- Production of largemouth bass fingerlings for public water stocking and to provide fish, at cost, to private pond owners.
- Production of bluegill and shellcrackers for public water stocking and to provide fish, at cost to private pond owners.
- Maintenance and improvement of:
- Six warmwater fish hatcheries with a total of 76 acres of water in 118 production ponds.
- One coldwater fish hatchery with six production raceways and a hatching facility.
- Participated in the efforts to recover the imperiled robust redhorse by setting aside five ponds for the culture of the species as a part of a multi-agency effort.
- Managed fertility and other water quality and treated aquatic weeds at 17 public fish lakes containing 1,507 surface acres of water.
- Maintained the support facilities (boat ramps, parking lots, picnic areas, trails, grounds, etc) at 17 public fish lakes.

(3) Outcomes:

1. Private Water Stockings
   a. A second survey of private pond owners who purchased fish for stocking into their pond during the reporting period continues to indicate highly acceptable levels of approval for the activity, employees' performance and the quality of the fish they purchased. Survey results showed the following responses:

- 82% felt the cost of the fish was fair and 8% felt that the cost was too high.
- Only 35% said that they would be willing to pay more for the fish they purchased.
- 66% were satisfied with the size of the fish and 86% were satisfied with the condition of the fish at the time of delivery.

- Only 4% felt that the number of fish they received was not accurate.
- 83% indicate the employees were courteous and helpful.
- 88% received good instruction concerning fish delivery, and 86% felt the delivery site was convenient.
- 84% said the program was important, and 85% would recommend it to their friends.(Reference: Private Pond Stocking Program Customer Survey, 1998)

2. Public Water Stocking
   a. South Carolina has an $18,200,000 trout fishery that serves an estimated 38,200 anglers. Due to the State's limited coldwater resources, only six streams have viable reproducing trout populations capable of sustaining limited fishing pressure. The remaining streams and reservoirs must be stocked with either harvestable size fish or, when conditions allow, fish that are less than six inches in length. The Walhalla State Fish Hatchery produced fish of quality and these were stocked based on sound biological principals, thereby, maintaining the fishery and its benefits. (References: The Economic Benefits of Freshwater Fishing in South Carolina, 1998; The Future of Trout in South Carolina, 1998)

   b. South Carolina has a $66,300,000 striped bass and hybrid bass fishery that serves an estimated 142,900 anglers. While limited naturally reproduc ing populations exist in selected coastal rivers and Santee Cooper, the ultimate viability of the sport fishery is dependent on the A put-grow and take stocking of fingerling striped bass. Hybrid striped bass do not provide any reproduction to the fishery, therefore, this fishery is totally dependent upon stocking. All of the DNR's warmwater fish hatcheries produce striped bass and/or hybrids that are eventually stocked in appropriate waters, by that, maintaining the fishery and its benefits. (References: The Economic Benefits of Freshwater Fishing in South Carolina, 1998; Freshwater Fisheries District II, III, IV and V Annual Progress Report, 1975 - 1998; Hatchery Management Plan, 1993)

   c. Following a major fish kill in public water, restoration stocking is often conducted with fish from DNR hatcheries. Since these events are unpredictable, hatcheries maintain an appropriate level of surplus fish in order to complete the stocking when needed. While data do not exist to quantify the success of these stockings, the rapidity with which the impacted area recovers is evident to the biological staff that conducts routine sampling in these areas.

   d. As part of a multi-agency cooperative effort between the States of South Carolina, North Carolina, Georgia, Carolina Power and Light, Georgia Power, Duke Power, US Fish and Wildlife Service, US Army Corp of Engineers and various other organizations hatchery ponds were devoted to the research effort of culturing the robust redhorse. The robust redhorse is an imperiled species native to the Atlantic slope of the United States and up until nine years ago was thought to be extinct. SCDNR hatcheries are involved with the development of culture practices for the species with both phase one and phase two fingerling production. The products from these on going culture experiments are return for reintroduction into suitable waters in their native range.

3. Hatchery Maintenance.
   a. All DNR hatcheries conduct routine maintenance to retain the financial investment, function, appearance and life the facilities. As required, specific and significant maintenance is required to repair unanticipated damage or deterioration.

   b. The Dennis Wildlife Center received significant

improvements in facilities to maintain their usefulness and effectiveness.

4. Maintenance of DNR operated public fishing lakes provided a preferred public fishing opportunity. A 1998 survey of licensed anglers in South Carolina indicated that over 12% of the respondents usually fished in SCDNR public fishing lakes. A total of 61% felt that the agency should direct more effort toward this program. (Reference: South Carolina Fishing License Holders Opinions and Attitudes Toward Fisheries Management and the South Carolina Department of Natural Resources, 1998)

5. The assets and investments associated with the construction and/or development of agency operated public fishing impoundments must be maintained if the structures and their public enjoyment are to continue. Without routine maintenance negative actions may include, but not be limited to:
   - increased liability associated to personal and property injury.
   - loss of initial investments if structures are not maintained.
   - loss of usage due to unsafe and unappealing conditions.
   - loss of dam certification that could lead to the loss of the impoundment.
   - loss of trust from those partners that share a cooperative agreement with DNR for management of their impoundment for public use.
   - loss of public support for the agency's fishing lake program.

6. Without proper maintenance of water quality, the DNR's public fishing impoundments would lose their ability to provide enjoyable and productive fishing experiences to the users of the resource. Maintenance of productive waters through fertilization is an essential component to managing intensively fished small impoundments, managing aquatic vegetation and managing the balance of fish populations. Water level and water quality must be maintained to insure that the fishery is not harmed by negative impacts associated with poor water quality or fluctuating water levels. Management of aquatic vegetation is essential if the impoundment is to be accessed by anglers and if the fish population is to remain in a balanced healthy condition.

(4) Efficiency:
- Produced and stocked approximately 447,000 trout into public waters at an average cost of approximately $0.30 each.
- Produced and stocked approximately 3,665,583 striped bass fingerlings at an average cost of $0.10 each.
- Produced approximately 518,000 largemouth bass fingerlings at an average cost of $0.07 each.
- Produced approximately 3,670,000 bluegill, shellcrackers and redbreast at an average cost of $0.07 each.
- Improvements and repairs to facilities at the Walhalla State Fish Hatchery continue to occur. Priority repairs are focused on the hatchery's residences.
- Maintenance and management of 16 public fishing lakes was accomplished at an average cost of 278 per surface acre of water.

(5) Quality:
A total of 85% of respondents to a licensed angler survey indicate satisfaction with the performance of the Freshwater Fisheries Section. These positive opinions come, in part, from management activities associated with this program's activities.(Reference: South Carolina Fishing License Holders Opinions and Attitudes Toward Fisheries Management and the South Carolina Department of Natural Resources, 1998). A survey of private pond owners indicated an over all positive opinion of the product provided (84%), and the staff's performance (85%)(Private Pond Stocking Program Customer Survey, 1998).

Program Name: Cooper River Rediversion

Program Goal: The restoration of anadromous fish passage

into the Santee Cooper Lake system to levels that existed before the construction of the Cooper River Rediversion Project.

Program Objectives:

- To pass fish from the Santee and Cooper rivers into the Santee Cooper lake system.
- To evaluate and implement, through cooperation with the USACOE, modifications to improve efficiency of the St. Stephen's fish lift.

Performance Measures:

(1) Input:

Total cost:	$176,150
Personnel:	3.5 FTEs.
Major equipment:	7 vehicles; 8 boats.
Facilities:	St. Stephen Fish Lift
Demand:	480,970 licensed anglers.

(2) Outputs:
- Operate the fish lift at the St. Stephen Power Plant.
- Produce estimates of the number of fish passed at the St. Stephen Fish Lift and at the Pinopolis Lock.
- Monitor the effects of fish lift modifications on the number of fish passed

(3) Outcomes:

1. Passage of Anadromous Fish Species.

a. The passage of migratory fish species (mostly blueback herring and American shad) provides an allochthonous source of prey for the predators of lakes Marion and Moultrie. Each body of water has its own carrying capacity that can be expanded only through outside influences. The influx of additional prey without having to artificially increase nutrients is a benefit to the reservoir's predators enabling them to maintain and exceed expected condition, growth and density. The passage of fish into Santee Cooper predates DNR's survey and inventory efforts and this project, but the system is the state's most fished and one that has the greatest reputation for angling success. These facts were among the justifications for the construction of the St. Stephen Fish Lift following the Corps of Engineer's Cooper River Rediversion Project. (References: U.S. Senate Document 88, Cooper River, South Carolina (Shoaling in Charleston Harbor); South Carolina's Striped Bass, 1968; Rediversion Project Annual Progress Report, 1985 - 1998)

b. The passage of migratory fish species (mostly blueback herring and American shad) increases their available spawning area and spawning success, thereby, contributing fish stocks to the Atlantic Coast fish populations. The Cooper and Santee rivers were impounded during the 1940's. The construction of Wilson and Pinopolis dams prevented selected anadromous fish species from using their historical spawning grounds which effectively reduced their spawning success. These changes occurred before DNR's involvement in fish population monitoring. Passage of some anadromous fish did occur at the boat lock on Cooper River, however, the Cooper River Rediversion Project reduced the effectiveness of this pathway. Construction of the St. Stephen Fish Lift was justified and constructed on the premise that the reduced Cooper River passage could be supplemented by a fish lift on Santee River, and anadromous species would again be able to reach spawning areas.

The St. Stephen Fish Lift has been effective in passing as many as 1,900,000 anadromous fish to their historical spawning areas. Sampling has revealed that juvenile herring and shad are produced and out-migrate to rejoin Atlantic Coast stocks. The passage, spawning and eventual out-migration are important outcomes for this limited area of the fishes' range. Although their total contribution cannot be measured against the total

Atlantic Coast population, its importance is judged to be relative to the habitat and number of adults using the system. (Rediversion Project Annual Progress Report, 1990 - 1998)

2. Evaluation of St. Stephen Fish Lift Modifications.
   a. Inefficiencies at the St. Stephen Fish Lift resulted in a $4,500,000 modification to make improvements. These improvements are completed and first year efforts have been made to learn how to effectively use the new attractant flow. Low water during the passage period complicated the process, however this modification seemed to make the lift more effecting than in previous efforts under similar water levels.

(4) Efficiency:
- The lock doors at the Pinopolis Dam were being replace during the 1998 spring as a result no fish passage occurred at this facility during 1998. Operation of the refurbished lock during 2001 resulted in the passage of 1,320,941 herring units.
- Approximately 1,862,015 blueback herring and 165,875 American shad were passed at St. Stephen during the 2001 fish passage season.

(5) Quality:
A total of 85% of respondents to a licensed angler survey indicate satisfaction with the performance of the Freshwater Fisheries Section. These positive opinions come, in part, from management activities associated with this program's activities. (Reference: South Carolina Fishing License Holders Opinions and Attitudes Toward Fisheries Management and the South Carolina Department of Natural Resources, 1998)

DIVISION OF LAW ENFORECEMENT AND BOATING

Program Name: Law Enforcement Operations

Program Cost:

	State:	$8,069,155
	Federal:	
	Other:	$6,565,537
	Total:	$14,634,692

Goals:

1. Ensure the protection of life, property and natural resources through maintenance of a well-trained, professional natural resources law enforcement force appropriately distributed throughout the state. **(Strategic Goal 1: Management, Action Item 3**

2. Continue to attract and retain talented employees available to carry out the agency's mission in a manner that includes career development and competitive compensation for staff. **Strategic Goal 5: Internal Management and Operations, Action Item 6**

3. Maintain, develop and implement technologies to enhance natural resources, stewardship and conservation (including, but not limited to, fish hatchery, aquaculture and aquatic population restoration and rebuilding technologies). **Strategic Goal 2: Science and Technology, Action Item 3**

4. Promote awareness of natural hazards and educate the public in ways to mitigate loss or injury. **Strategic Goal 3: Education and Public Involvement, Action Item 3**

5. Explore and develop applicable technological innovations to improve natural resources management, planning and customer service. **Strategic Goal 5: Internal Management and Operations, Action Item 2**

6. Continually evaluate efficient use of present funding and pursue new sources of funding for management, conservation and protection for the state's natural resources. **Strategic Goal 5: Internal Management and Operations, Action Item 3**

7. Educate the public about the state's natural resources and encourage them to make more informed contributions to

the management, use, stewardship and enjoyment of our natural resources. **Strategic Goal 3: Education and Public Involvement, Action Item 1, and Action Item 5)**

8. Emphasize the importance of education as a portion of every DNR employee's work responsibilities. **Strategic Goal 3: Education and Public Involvement, Action Item 5**

9. Expand habitat protection, restoration and conservation programs, emphasizing expanded acquisition and conservation easements for properties with high ecological value. **Strategic Goal 5: Internal Management and Operations, Action Item 1, Action Item 2, and Action Item 5**

10. Develop opportunities to promote diversity both within the agency and in its constituents to enhance participation in nature-related activities by all citizens of South Carolina. **Strategic Goal 5: Internal Management and Operations, Action Item 5**

11. Support local, regional and state efforts to conserve and sustain natural resources through comprehensive land use planning. **Strategic Goal 4: Landscape Conservation, Action Item 2; Strategic Goal 5: Internal Management and Operations, Action Item 1**

12. Provide for effective staff development and training in natural resources management, planning and customer service, including continuing education, leadership training, and formal education. **Strategic Goal 5: Internal Management and Operations, Action Item 1**

13. Acquire and incorporate social and economic, as well as biological and physical, data into policies and processes to manage the state's natural resources and provide information on the social, cultural, economics as well as ecological significance of natural resources to the public. **Strategic Goal 1: Management, Action Item 5**

14. Utilize public opinion surveys and the talents of the Department's Advisory Committees to gauge public opinion and educate the public on important natural resources issues. **Strategic Goal 3: Education and Public Involvement, Action Item 6**

15. Assess and communicate public interests, needs and knowledge as it relates to natural resources. **Strategy 3: Education and Public Involvement, Action Item 2**

16. Promote safe, ethical and responsible use of the state's natural resources. **Strategy 3: Education and Public Involvement, Action Item 3**

Program Objectives: Specific Objectives for FY 00/01:

1. Evaluate and make appropriate changes as needed to the DNR Law Enforcement Selection & Hiring process. Identify a solid time line and implement a PHQ test to be administered during the application process. **(Strategic Goal 1: Management, Action Item 3; Strategic Goal 5: Internal Management and Operations, Action Item 6)**

2. Monitor investigative efforts in the illegal commercialization and or importation of wildlife. We will continue to investigate reports of illegal trafficking of wildlife and continue to monitor existing commercial operations for compliance in applicable state and federal laws. **(Strategic Goal 1: Management, Action Item 3; Strategic Goal 2: Science and Technology, Action Item 3; Strategic Goal 3: Education and Public Involvement, Action Item 3)**

3. Evaluate the divisions current reporting system and implement any changes and improvements. We will inventory current reporting procedures to standardize our data collection functions within our division. **(Strategic Goal 2: Science and Technology, Action Item 3; Strategic Goal 5: Internal Management and Operations, Action Item 2)**

4. Improve vehicle maintenance cost accountability by implementing the State Vehicle Management Program. This should be accomplished by enrolling the division in the program, which should reduce expenditures and administrative work load. This system will provide an automated data base by which vehicle maintenance can be monitored.

(Strategic Goal 5: Internal Management and Operations, Action Item 3)

5. In an effort to improve public awareness of natural resource enforcement issues and or services offered by the division, we will evaluate the productivity of all areas of outreach and or education. We will strive to increase our users accessability to these programs. This should be accomplished through the use of media, public presentations and educational opportunities. We will also encourage intra-divisional participation in outreach programs/activities and will support other agency sponsored or endorsed outreach programs. **(Strategic Goal 3: Education and Public Involvement, Action Item 1, Action Item 3, Action Item 4, and Action Item 5)**

6. In an effort to improve productivity and efficiency regarding our administrative staff, we will conduct at least on an annual basis, workshops and or in-service training sessions for our administrative and clerical employees. **(Strategic Goal 5: Internal Management and Operations, Action Item 1, Action Item 2, and Action Item 5)**

7. We will strive to improve working relationships with those agencies tasked with the protection and or regulation of our states natural resources. We will accomplish this through cross training and providing assistance with manpower and equipment as requested. **(Strategic Goal 4: Landscape Conservation, Action Item 2; Strategic Goal 5: Internal Management and Operations, Action Item 1)**

8. In an effort to promote and foster a better working relationship with other divisions, we plan to consolidate in-service training to include all personnel within DNR that have a law enforcement commission. This will ensure that all officers and department DLEO's receive uniform training and information, and will allow them to share experiences and issues of concern. Due to the scope of some training required/provided to regular salaried DNR law enforcement officers, DLEO's may not be involved in all training sessions. **(Strategic Goal 1: Management, Action Item 3; Strategic Goal 5: Internal Management and Operations, Action Item 1)**

9. In an effort ensure adequate measures are taken to protect South Carolina's indigenous fish and to clarify and update the freshwater commercial fisheries laws in Chapter 13 that regulate the aquaculture industry, we will seek a re-write of these laws. Updating these laws and regulations combined with educating those in the freshwater aquaculture industry should improve compliance and ease the burden on those in this industry. In addition, efforts to train and educate DNR officers on the laws that regulate the aquaculture industry should improve enforcement and allow us to utilize law enforcement man-hours for this purpose in the most efficient manner. **(Strategic Goal 1: Management, Action Item 3, Action Item 5; Strategic Goal 2: Science and Technology, Action Item 3; Strategic Goal 3: Education and Public Involvement, Action Item 2; Strategic Goal 5: Internal Management and Operations, Action Item 1)**

10. In an effort to improve the effectiveness of the Operation Game Thief Program, it is our intentions to transition the current OGT program to a community based and supported crime reporting program. The intent of this restructuring is to increase public awareness and involvement in addressing all aspects of crime related to our natural resources. **(Strategic Goal 1: Management, Action Item 3; Strategic Goal 3: Education and Public Involvement, Action Item 1, Action Item 3, Action Item 6; Strategic Goal 5: Internal Management and Operations, Action Item 2)**

Program Objectives: Sustaining Objectives "Long Term Performance Measures"

1. To apprehend violators of state and federal game, fish, and boating laws.

2. To conduct criminal and accident investigations and enforce non-title 50 statutes to enhance public safety and environmental protection.

3. To increase interaction and coordination with outside law enforcement and regulatory agencies with similar or concurrent jurisdiction in resources protection and public safety in the areas of resource issues, intelligence

information, and criminal statistics.

Program Results: Results for Specific Objectives for FY 00 /01:

1. The Law Enforcement selection and hiring process for the 2000-2001 hiring cycle was reviewed by a committee co-chaired by the Director of Human Resources and the Lt. Colonel. The PH (Personal History Questionnaire) was utilized during this past hiring cycle and will remain in place subsequent to any future hiring periods. A time line was established with panel interviews starting early July (July 9th), for a period of 2 to 3 weeks. The agility/written tests will be administered to the top 35% of those interviewed in mid August (August 13). From the list of approved applicants, interviews will be scheduled with the Colonel and will be conducted starting on or about August 20, 2001. Implementation of the above process will be contingent upon sufficient funding for fiscal year 2001-2002

2. A "Task Force" was organized to investigate illegal wildlife commercialization. This "task force" mainly deals with importation of foxes, coyotes, and monitoring activity within "high fence" enclosures and "fox running pens." Also, legislation was passed to limit the number of high fences, and to require permitting of existing high fences and establishment of guidelines for additions/enlargements to existing high fence enclosures. As needed, the "Task Force" has worked jointly with Federal and other State agencies to conduct investigations.

3. Uniform Crime Reporting: More changes were implemented within this system due to a practical review of the procedures implemented in 1999. This system is now almost totally automated. Each month, a report of summons/charges that meet the UCR requirements as established by SLED is automatically tallied and generated. The location (as to field, forest, water, or road) is added by hand and the reports are mailed to SLED. This task now takes a minimal amount of time and manpower.

- Warrant Systems: A free standing warrant system has been developed by Sgt. Sabaka to track and trace warrants as received from the courts. This, combined with the new entries onto the mainframe computer, has allowed a cross check of warrants to assure accountability. These two systems also allow an automated check of warrant status, as opposed to a time consuming manual check. In addition, a "Warrant Log" was established in the Communications Center to provide accountability of original warrants that are stored for the State Wanted Persons File.

- Covert Funds: An automated system has been built by Sgt. Sabaka to trace and account for the use and distribution of covert funds. This provides an automated cross check for manual entries and provides computer enhanced record checks.

- SLED/NCIC Record Systems: An audit was preformed by an auditor from SLED on the use and recording of the NCIC/ CJICS Systems. This audit identified only one item needing improvement. This item was the need to add a case number to each Criminal Record Check (CCH) preformed through our terminals. This change will be implemented in the near future. An audit with only one minor change is a remarkable audit and shows that our use of these records system is well maintained.

- Operation Game Thief Programs: Report improvements/ adjustments were made to the Operation Game Thief Programs (OGT, Coast Watch, Property Watch). These changes involve simplified applications, accountability reports, and record systems to improve integrity within the programs.

- Summons Tickets: Changes were made to the summons tickets to allow a field for restitution received on a conviction, to allow for the changes made on the coastal point systems, and to update the code section references within the summons book. In addition, the officers SSN field was removed from the violator's copy of the summons.

4. In August of 2000, the Law Enforcement Division began utilizing the Commercial Vendor Repair Program provided

through State Fleet Management. The program, which had been used successfully in District Two for approximately eight years in a pilot program status, was implement throughout the Division on a statewide basis. Since that time, with the exception of the "Vehicle Body Repair Program", the Division has used the program for all routine services and major repairs. To date, no assessment has been formally conducted to evaluate the potential cost savings of the program. In addition, except on a limited basis as needed, the Division has not assessed the capability of the program to generate a printout of the "vehicle history" for all Division vehicles. (A complete assessment of the CVRP will be conducted after completing a full year under the program).

5. DNR conducted 711 hunter and boater education courses reaching 16,711 students in an effort to comply with education/license requirements. DNR has obtained assistance from DMV with computer testing of these classes. DNR is utilizing the Internet and CD Rom technology to enhance the availability of hunter/boater education courses. DNR has utilized news releases, billboards and other PSA's to make the public aware of boating safety. DNR has assisted with Becoming an Outdoors Women (BOW), Take one - Make One Program (TOMO) and Get Hooked on Fishing Not on Drugs "fishing rodeos" to increase public awareness.

In addition to these educations/outreach programs, the Operation Game Thief Program was totally redesigned during the year. OGT now consists of basically three different programs.The original OGT Program (for game and fish violations), the Property Watch Program (for property and trespass protection) and the Coast Watch (for marine resources protection). The Division was successful in having legislation approved by the General Assembly to allow adjustments to the OGT programs. A brochure was designed by Records and Intelligence Section for the programs and is being printed at this time. In addition, prototypes of other promotional materials have been developed and are under evaluation at this time. One of the goals of the OGT Program is to develop partnerships within the community to provide support for the program. Three new partnerships have been established to this point. In addition to the support of the Harry Hampton Memorial Wildlife Fund, SunCom has agreed to allow free access to the OGT (*OGT) 1-800 number across the state. In addition, Verizon Wireless has implemented a similar program (#OGT) allowing free access to the OGT 1-800 number. In addition, DNR has established a working relationship with Palmetto Pride to allow the OGT Program to be the focal point for a Statewide Litter Reporting System allowing rewards in a similar fashion as the OGT Programs. These have been incorporated into the new brochures that is in the process of being printed. The Records and Intelligence Section also has designed and purchased a display for the OGT Programs to be used at special events and promotions.

6. On March 7, 2001, an Administrative in-service session was conducted in an effort to update staff and administrative personnel on matters pertaining to human resources, time sheets/payroll, titling and registration and other pertinent information.

7. Cooperated with Palmetto Pride Project on litter awareness "Zero Tolerance", and met with SC Litter Control Officer's Association to discuss ways to more effectively address statewide litter problems. In addition, DNR is a member of the US Attorney Generals' "Environmental Enforcement Group". The Division actively participates with the joint agreement between Clemson University and DNR to address matters dealing with mutual resource protection issues. In agreement with National Marine Fisheries, DNR has established a "joint Project Agreement" (JPA) for offshore resource enforcement of certain marine fisheries. The Division has also implemented cross training with DHEC on environmental crime issues, and has conducted training with SC Forestry Commission on other resource issues.

8. DNR has consolidated in-service training for all full-time officers and all Deputy Law Enforcement Officers (DLEO). The consolidation was done in an effort to ensure quality and consistency of training for all personnel. In addition, the consolidation has helped reduce some duplication of training events/activities that our training staff was

responsible for conducting.

9. Coastal officers have received training on identification of Saltwater Aquaculture species and operations. The chapter regulating freshwater within Title Fifty is Chapter 13. This chapter has been rewritten by the Records and Intelligence Section and reviewed by the Freshwater Fisheries Section of the Wildlife and Freshwater Fisheries Division. The changes have been mutually agreed with and the rewrite has been added to the Aquaculture Enabling Act pending DNR Board approval. This rewrite totally removes the antiquated laws within the Chapter. Examples are laws stating that no size limits shall exist on freshwater fish, individual trout tags, and other such laws that have no bearing on the modern fishery. In addition, the Department's authority has been clearly defined in the area of freshwater fisheries management and the "loopholes" have been removed. These "loopholes" have caused the Division problems for many years. Along with the Aquaculture Enabling Act, this rewrite removes many of the confusing issues within Title 50. The Aquaculture Enabling Act and the Chapter 13 rewrite are complete (in draft form) and have been distributed on a limited basis for comments. This package should be presented to the DNR Board in the summer. On coastal related issues, Sgt. Ben Moise conducts training on saltwater aquaculture as needed and monitors aquaculture operations on the coast.

10. The Operation Game Thief Program was totally redesigned during this year. OGT now consists of basically three different programs. The original OGT Program (for game and fish violations), the Property Watch Program (for property and trespass protection) and the Coast Watch (for marine resources protection). The LED was successful in having legislation approved by the General Assembly to allow adjustments to the OGT programs. A brochure was designed by R&I for the programs and is being printed at this time. In addition, prototypes of other promotional materials have been developed and are under evaluation at this time. One of the goals of the OGT Program is to develop partnerships within the community to provide support for the program. Three new partnerships have established to this point. In addition to the support of the Harry Hampton memorial Wildlife Fund, SunCom has agreed to allow free access to the OGT (*OGT) 1-800-number across the state. Likewise, Verizon Wireless has implemented a similar program (#OGT) allowing free access to the OGT 1-800 number. In addition, the DNR has established a working relationship with Palmetto Pride to allow the OGT Program to be the focal point for a statewide litter reporting system allowing rewards in a similar fashion as the OGT Programs. These have been incorporated into the new brochures that are in the process of being printed. The R&I section also has designed and purchased a display for the OGT Programs to be used at events and promotions.

Program Name: County Fund Operations

Program Cost:	State:	$511,730
	Federal:	
	Other:	
	Total:	$511,730 (This represents the total dispersed in this funding area. The Law Enforcement Division is not the only entity that utilizes these funds).

Goals:

1. Ensure the protection of life, property and natural resources through maintenance of a well-trained, professional natural resources law enforcement force appropriately distributed throughout the state. **(Strategic Goal 1: Management, Action Item 3**

2. Continually evaluate efficient use of present funding and pursue new sources of funding for management, conservation and protection for the state's natural resources. **Strategic Goal 5: Internal Management and Operations, Action Item 3**

3. Maintain, develop and implement technologies to enhance natural resources, stewardship and conservation (including, but not limited to, fish hatchery, aquaculture and aquatic population restoration and rebuilding technologies). **Strategic Goal 2: Science and Technology, Action Item 3**

Program Objectives: Sustaining Objectives:

1. To utilize county funds to purchase equipment and services to support DNR Law Enforcement Field Operations. County funds are utilized to purchase approved items of equipment and services for patrol districts for which department revenue, state appropriations or federal funds are not available. The items of equipment and services are intended to support the specific and sustaining goals and objectives of the Law Enforcement Field Operations section.

Program Results: Results are included in the Law Enforcement Operations portion of the document.

Program Name: Hunter Safety

Program Cost: State:
Federal: $410,984
Other: $140,425
Total: $551,409

Goals:

1. Ensure the protection of life, property and natural resources through maintenance of a well-trained, professional natural resources law enforcement force appropriately distributed throughout the state. **(Strategic Goal 1: Management, Action Item 3**

2. Educate the public about the state's natural resources and encourage them to make more informed contributions to the management, use, stewardship and enjoyment of our natural resources. **Strategic Goal 3: Education and Public Involvement, Action Item 1 Action Item 5)**

3. Assess and communicate public interests, needs and knowledge as it relates to natural resources. **Strategy 3: Education and Public Involvement, Action Item 2**

4. Promote awareness of natural hazards and educate the public in ways to mitigate loss or injury. **Strategic Goal 3: Education and Public Involvement, Action Item 3**

5. Emphasize the importance of education as a portion of every DNR employee's work responsibilities. **Strategic Goal 3: Education and Public Involvement, Action Item 5**

6. Support local, regional and state efforts to conserve and sustain natural resources through comprehensive land use planning. **Strategic Goal 4: Landscape Conservation, Action Item 2; Strategic Goal 5: Internal Management and Operations, Action Item 1**

7. Promote safe, ethical and responsible use of the state's natural resources. **Strategy 3: Education and Public Involvement, Action Item 3**

Program Objectives: Sustaining Objectives:

1. To ensure the needs of the public are being met by offering hunter education programs on a routine basis at locations throughout the state.

2. Review and update content and teaching methods utilized in conducting hunter education programs to ensure that the most effective means are utilized.

3. Maintain a sufficient number of volunteer instructors that are well trained and properly equipped to assist in conducting hunter education programs.

4. To continue legislative efforts promoting hunter safety.

5. Develop Public Service Announcements (PSA's) that promote safe and ethical hunting practices. Utilize various media outlets (television, radio and print) to broadcast PSA's.

Program Name: Boater Safety

Program Cost: State:
Federal: $1,099,734
Other:
Total: $1,099,734

Goals: 1. Ensure the protection of life, property and natural resources through maintenance of a well-trained, professional natural resources law enforcement force appropriately distributed throughout the state. **(Strategic Goal 1: Management, Action Item 3**

2. Educate the public about the state's natural resources and encourage them to make more informed contributions to the management, use, stewardship and enjoyment of our natural resources. **Strategic Goal 3: Education and Public Involvement, Action Item 1 Action Item 5)**

3. Assess and communicate public interests, needs and knowledge as it relates to natural resources. **Strategy 3: Education and Public Involvement, Action Item 2**

4. Promote awareness of natural hazards and educate the public in ways to mitigate loss or injury. **Strategic Goal 3: Education and Public Involvement, Action Item 3**

5. Emphasize the importance of education as a portion of every DNR employee's work responsibilities. **Strategic Goal 3: Education and Public Involvement, Action Item 5**

6. Support local, regional and state efforts to conserve and sustain natural resources through comprehensive land use planning. **Strategic Goal 4: Landscape Conservation, Action Item 2; Strategic Goal 5: Internal Management and Operations, Action Item 1**

7. Promote safe, ethical and responsible use of the state's natural resources. **Strategy 3: Education and Public Involvement, Action Item 3**

DIVISION OF MARINE RESOURCES

The MRD is located on the 90-acre site of historic Fort Johnson on James Island, Charleston. The Division is one of the largest and most sophisticated marine research and management facilities on the east coast. The Division conducts programs to provide solutions to coastal problems through research, management and public education.

Adjacent to the Charleston Harbor, Fort Johnson offers ready access to the state's coastal waters and the Atlantic Ocean. The Division maintains a fleet of four research vessels including the Research Vessel Palmetto – a 110 foot steel hulled ocean vessel, the Research Vessel Lady Lisa – a 73 foot St. Augustine trawler, the Research Vessel Carolina Pride – a 51 foot fiberglass trawler and the Research Vessel Anita – a 52 foot wooden hull inshore vessel. Vessels have trawl capabilities and are able to support extended cruises. U. S. Coast Guard licensed captain's man each vessel. Division vessels support various state and federal agencies with vessel needs as well as academic institutions in their educational efforts.

The Division employs approximately 200 people with a diversity of educational backgrounds, including Ph. D., Master's level and Bachelor's level personnel. The Division operates on a combination of state and federal funds with grants from agencies such as the U. S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, the Environmental Protection Agency and the like.

The Division is responsible for the conservation, protection and wise use of the state's marine resources through efforts in research, management, and public education. The Division addresses coastal issues by conducting projects to analyze conditions in the commercial and recreational fisheries and the habitats upon which these fisheries depend. The Division explores fishing technologies for new and expanded fisheries and actively investigates environmental and ecological concerns. The Division also conducts ongoing research in mariculture at both the Fort Johnson site and the James A. Waddell Mariculture Research and Development Center. This is done to fulfill the goal of fostering a seafood farming industry throughout the state's coastal areas. The Division serves as the state's mission-oriented research facility in the area of marine resources in general.

The Marine Center not only houses the Marine Division, but also other Divisions within the Department of Natural Resources including the Conservation, Education and Communications Division, the Land and Water Conservation District Division, the Law Enforcement and Boating Division and the Wildlife and Freshwater Fisheries Division. It is also home to other research and management facilities such as National Oceanic and Atmospheric Administration – National Marine Fisheries Service, the University of Charleston, the Medical University of Charleston and the University of South Carolina.

Although the Division is not an academic institution, it does provide a seaside facility for the state's colleges and universities. Many of the Division's scientists serve as faculty members to the Master of Science Degree at the University of Charleston, the University of South Carolina and Clemson University.

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Benjamin H. Gregg, Jr. ..... Columbia

OFFICE OF PUBLIC AFFAIRS

The Office of Public Affairs provides broad based informational, educational and public affairs support to all agency coastal programs and activities, including those of the Division of Marine Resources, the Conservation Education and Communications Division and Law Enforcement and Boating Division. Support includes production of news releases, coordination of media relations, legislative outreach, the production of special publications, writing SCW magazine articles, dispensing public information, conducting Center based tours and educational cruises, performing educational outreach activities, development of interpretive literature and facilities, conducting special agency functions and other appropriate activities. It is also the mission of the Office to inform and educate the citizens of South Carolina about:

- the tremendous ecological diversity and economical value of South Carolina's natural coastal resources.
- what the Agency is doing to better understand, manage and conserve these resources
- the expertise we use in our management and research endeavors and
- what user groups can do to protect and conserve these resources.

During FY 2000-2001, the Office information desk received hundreds of telephone calls from the public requesting information on a wide range of topics, including hunting and fishing information, regulations, conservation inquiries, referrals for wildlife assistance and educational activities to name a few. The information desk also served as backup for the central switchboard for handling and routing calls when the switchboard operator does not know an immediate referral.

Media Relations

Office of Public A'ffairs's Public Information Coordinator wrote 86 statewide special newsreleases. Topics included shrimp and shellfish seasons, MRD studies, ECO-Project activities, S.C. Governor's Cup, new regulations, meeting announcements, etc.The weekly news release package is sent by e-mail to all South Carolina news media; requesting DNR staff; DNR enforcement offices, board and advisory committee members; 34 conservation groups; and 12 PRT Welcome Centers.

Education

During FY 2000-2001 approximately 10,000 students, teachers and members of the public participated in educational tours, cruises, classroom programs and special events. Participants came from throughout the state as well as from other states. Approximately 53 educational cruises and 52 classroom programs were conducted that provided hands-on experience to students and teachers, which in many cases represented their first experience with the marine environment. Topics such as marine conservation, wetlands, water quality and the role of the Division in research and management of the state's marine ecosystems were covered during these programs. Additionally, the Marine Education Program participated in large outreach programs including the Southeastern Wildlife Exposition, Palmetto Sportsman's Classic, National Hunting and Fishing Day, Edisto Nature Exposition, Earth Day and the Earth Force Youth Summit. For the second successive year, the Marine Resources Division received a grant from the Gaylord and Dorothy Donnelley Foundation of Chicago to continue working to enhance marine science education in Colleton County middle and high schools. Through this funding, education staff were able to provide much needed assistance in setting up field trips, transportation cost for field trips, teacher workshops, classroom resources and career opportunities for students in Colleton County. The education office worked closely with staff from the ACE Basin NERR to provide

hands-on experiences for students and teachers in the ACE Basin. The ACE Basin was previously unutilized by the teachers in the county due to transportation costs and other barriers. Approximately 900 teachers, students, school administrators and community leaders in Colleton County participated in programs offered through this grant including educational cruises, tours of the Donnelley Wildlife Management Area, career presentations, after-school programs and classroom presentations focusing on natural resources.

Clean Vessel Awareness Campaign

The Clean Vessel Act (CVA) Awareness Campaign was designed to inform and educate boaters and marinas about the potential hazards of sewage pollution, and ways to decrease the amount of pollution in South Carolina's waterways. This campaign started in South Carolina in 1998, and to date has been an extremely successful and well-received anti-pollution effort.

During the year, the CVA coordinator participated in five statewide boat and marine trade shows. These included: NC/SC Marine Trade Show, Grand Strand Boat Show and Sale, Charleston Boat Show and Sale, Charleston In-Water Boat Show, and the Charleston Sport Fishing, Travel & Outdoor Show. Participation in these events consisted of showcasing an interactive Touch Screen presentation, circulation of informational brochures and posters, and distribution of promotional give-away items.

Environmental pollution and water quality programs were developed and implemented in Colleton County schools as part of the Educate Colleton Outdoors (ECO) project. An interactive CD ROM is being developed to be used in Colleton County schools to increase understanding of pollution and water quality issues.

Boating Infrastructure Grant Program

The Boating Infrastructure Grant (BIG) program administered by the US Fish and Wildlife Service was authorized this fiscal year. The BIG programs is a national competitive grant program that provides funding to States to construct and enhance facilities for transient, recreational boaters who operate vessels 26 feet in length and over. South Carolina submitted 5 project proposals requesting a total of $2.03 million in federal funding. Marinas applying for assistance included the Charleston City Marina and the Cooper River Marina.

COASTAL RESERVE AND OUTREACH PROGRAM

The Coastal Reserves and Outreach Program is responsible for coordinating and conducting division-level programs involving input from research and management units, providing field support in the outlying regions and managing representative coastal habitats through linked programs of stewardship, public education and scientific understanding.

The Office continued to implement coastal management plans, identify key coastal land and wetlands, and provide on-site management for reserve properties. Activities continued on Capers Island, a SC Heritage Preserve and component of the International Man and the Biosphere Program. During this FY, estimates 2,817 persons camped overnight on Capers Island. The average length of stay was 3.0 days. Also, an estimated 3,500 students, teachers and the general public visited the Island for nature study and recreation during daylight hours. Maintenance continued on roads and trails, docks, impoundment dikes and headquarters.

The ACE Basin National Estuarine Research Reserve continued in its eighth full year of funding through the National oceanic and Atmospheric Administration under the coastal Zone Management Act. This program is part of a national network of state owned and managed coastal protected areas to promote informed management of the nation's estuarine and coastal habitats. The Reserve has continued to work with SC PRT to build an interpretive

center at Edisto Beach State Park. This facility will be a center of excellence for the coastal park system and serve as primary headquarters for marine/estuarine education in the ACE Basin. Last FY over 2,000students and teachers participated in special educational events in the ACE Basin NERR.

Work on a new research field station at Bennett's Point is nearing completion during this FY. The facility, located in the core research area of the Reserve, will replace the doublewide mobile home currently being used as a platform for researchers conducting marine science in the area. Research and monitoring activities in the Reserve reached new levels this FY with increased efforts in system-wide monitoring for water quality data, baseline studies on contaminants, and long-term biological monitoring.

ACE BASIN PROGRAMS

Since the ACE Basin National Estuarine Research Reserve was established in 1994, the MRD has conducted extensive research and management activities in and around the area. The MRRI /NERR coordinates the research program and assists OFM staff in obtaining the scientific information necessary for managing this important ecological system.

ACE Basin NERR Research Program

During FY 2000-2001, MRRI continued biological and environmental quality monitoring efforts to determine trends in water quality and biological communities in the ACE Basin NERR. The yearly summarization of the baseline data collected by the juvenile and decapod crustacean bottom trawl survey, as well as the data collected during water quality monitoring, is ongoing. Analysis of water quality data from the ACE Basin NERR found no major problems in water quality within the Reserve. Dissolved oxygen concentrations often dropped below desired levels in the Edisto River, but these levels were determined to be natural phenomena. Nutrient samples were collected monthly at water quality monitoring sites and will be related to water quality variables through statistical analyses in fall of 2001.

The bottom trawl survey of estuarine aquatic species ended in July 1999. The Reserve staff has shifted their focus to the tidal freshwater fish communities that occupy the waters adjacent to the Reserve. A five-year study of these fish communities has begun to ascertain how fish populations in this habitat are affected by seasonal changes in the ambient environmental conditions. The study will complement the efforts of the Freshwater Fisheries section to characterize important fisheries in the ACE Basin.

The MRD's ACE Research Coordinator, worked with NOAA's Estuarine Reserve's Division during the past year to develop a written plan for a National Monitoring Program for all NERR sites. Components of the plan include expansion of water quality monitoring, monitoring of nutrient conditions and assessment of habitat change at the 25 NERR sites nationwide.

The ACE NERR staff also continued to integrate information produced by research efforts into the Reserve's education program, which includes boat trips, trail walks, coastal managers' workshops, and a variety of outreach activities for public and educational institutions. Staff completed a draft of a natural history guide to fishes of the ACE Basin. The guide, when completed will provide information on habitats and life history of fauna and flora of the ACE NERR.

ACE Basin Socio-Ecological Characterization Project

This major study was initiated in 1997 and completed in 2000. The characterization encompassed the over 790,000 acres of the ACE Basin watershed, including natural and urbanized areas to the north of the Basin. The study provides extensive descriptive text sections as well as summary data sets for physical, biological, and socio-economic resources in an integrated digital format on a CD-ROM that can be manipulated by the user. The primary target audience is local and state-level resource managers who need access to summary information in order to make effective management decisions concerning the ACE Basin. In addition, a wider audience of scientists, educators, conservation agencies,

industry and private landowners will benefit from the summarization and integration of data and information provided. Staff from all divisions of the DNR as well as individuals from local, state and federal agencies, conservation groups, universities, industries and private landowners were used to summarize the data and focus data synthesis and integration activities on current resource management issues

OFFICE OF FISHERIES MANAGEMENT

The Office of Fisheries Management (OFM) is responsible for proper management of the state's living marine resources and their associated habitats, while considering the economic and social benefits these resources provide, and the equitable utilization of fishery resources. This responsibility includes the regulation of fishing seasons, areas and methods, issuance of experimental, scientific and commercial fishing permits, management of public shellfish grounds and maintaining statistical records of various fisheries.

The OFM works closely with other units within the Division, the Coastal Enforcement District and various state and federal agencies. The Director of this office serves as the designated state official to the South Atlantic Fishery Management Council and as a Commissioner to the Atlantic States Marine Fisheries Commission. The OFM also maintains close contact with the South Carolina Legislature in making recommendations relating to fisheries laws and regulations. Various informational and advisory services related to commercial and recreational fisheries are also provided to the public. The following is a summary of the activities and projects of the OFM during FY 2000-2001.

Recreational Fisheries Conservation and Management Act of 1991

Approximately 111,947 saltwater licenses were sold to saltwater fishermen, generating over $559,735. With the help of the Saltwater Recreational Fisheries Advisory Committee, these monies were dispersed to a number of different recreational fisheries development, management and research projects, and will help support coastal law enforcement efforts. The annual Marine Recreational Fisheries Stamp Program Report was prepared and distributed.

Legislative Assistance

The OFM often recognizes the need for new or amended law to provide for effective protection of coastal fisheries resources. In these matters the OFM develops draft language for consideration by the DNR Board as components of its annual legislative package. The OFM director and staff, through the Department's Legislative Liaison Office, assist legislative committees and members in preparation of Department-proposed legislation, testify on its meaning and merits, and represent the Department's position on legislation proposed by others. OFM also assists fishermen, organizations, and others in development of their legislative proposals, seeking agreement where possible, and assists them in the legislative process.

The major piece of legislation enacted last year, *The Marine Resources Act of 2000*, was implemented across the Department beginning July 1, 2000. This Act is a consolidation and refinement of all marine fisheries laws. Due to its all encompassing nature and complexity several improvements were found needed, and amendments were prepared for introduction. Status of the repair bill, H.379, at the end of the 2001-Special Session of the General Assembly and of other bills of interest to the Division of Marine Resources, are shown in the following table.

Law Book Publication

The Division of Marine Resources publishes the bound booklet *Marine Fisheries and Related Laws* as a reference for commercial and recreational fishermen, law enforcement officers, magistrates, fisheries managers, and others interested in South Carolina's saltwater fisheries. The booklet,

last published in 1996, is normally published each second or third year depending on the number and impact of legislative amendments. Anticipating the complete consolidation and reorganization of allowances and controls on saltwater fisheries upon passage of *The Marine Resources Act of 2000*, the Office of Fisheries Management postponed publication until 2001. Subjects included are commercial and recreational fisheries, aquaculture, non-indigenous species, and specific, related freshwater, boating, and non-game laws. This year's edition may be obtained from the Division of Marine Resources at no cost.

Permit Administration

The Fisheries Permitting Section within OFM administers DNR statutory authority to permit effort to harvest marine resources. Falling into four general categories, being harvest allowance, private management, importation, and experimental, a total of 6,413 permits were issued during the 2000-2001 license year as detailed below.

Fisheries Permit Issuance, License Year 2000-2001

CATEGORY ISSUED	PERMIT TYPE	NUMBER
Harvest		
	State Ground Permit Cards	299
	State Ground Permit Decals	1713
	Culture Ground Permit Cards	536
	Culture Ground Permit Decals	1980
	Culture Ground Personal Limit Cards	382
	Hydraulic Escalator	52
	Scratch Rakes	24
	Hand Rakes	0
	Hand Gathering - Shellfish	14
	Hand Tongs	1
	Patent Tongs	6
	Riparian	0
	Clam Possession (Hard)	13
	Clam Possession (Undersized)	11
	Elver Fyke Nets	4
	Eel Dip Nets	6
	Eel Pots and Traps	1
	Channel Nets	0
	Finfish Trawl	0
	Whelk Trawling	0
	Horseshoe Crab Trawling	1
	Horseshoe Crab (Hand)	39
	Horseshoe Crab (Possession)	6
	Blue Crab Trawl	91

Fisheries Permit Issuance, License Year 2000-2001 (continued)

CATEGORY ISSUED	PERMIT TYPE	NUMBER
Harvest (cont.)	Shark Vessel Permits	59
	Game Fish Harvest	1
	Game Fish Mariculture	1
	Mariculture Grounds Cards	72
	Mariculture Grounds Decals	478
	Experimental	4
	Commercial Display	1
	Total Harvest Permits	5,795
Private Management		
	Culture Permits - New	7
	Culture Permits - 10 Yr. Reissuances	3
	Culture Permits - Renewals	10
	Culture Permits - Continuances	82
	Mariculture Permits - New	1
	Mariculture Permits - 10 yr reissuances	0
	Mariculture Permits - Renewals	2
	Mariculture Permits - Continuances	17
	Planting Variances	24
	Joint DHEC Shellfish Relay - Hydraulic	1
	Joint DHEC Shellfish Relay - Hand	9
	Oyster Seed Removal	0
	Washed Shell Permits	1
	Total Private Management Permits	157
Importation		
	Sponge Crabs	1
	Indigenous Shellfish Importation	3
	Non-Indigenous Shrimp Importation	16
	Other Non-Indigenous Importation	2
	Undersized Blue Crabs	1
	Total Importation Permits	23

Fisheries Permit Issuance, License Year 2000-2001 (continued)

Experimental		
	Drag Dredge	1
	Educational Drag Dredge	1
	Scientific Collection Permits	437
	Total Experimental Permits	439
Exploratory		
	Special Exploratory	0
	Total Exploratory Permits	0
	Grand Total Permits	**6,414**

South Carolina Governor's Cup Billfishing Series

Established by former Governor Carroll Campbell and assigned to the DNR by Governor David M. Beasley, this program has continued to flourish. A Board of Directors appointed by the DNR Board advises on the operation of the series and aids in private fund raising. Mr. Robert H. Hood of Charleston served as chairman during the period. The 2001 program was comprised of six major billfish tournaments held May through July. The interstate competition with North Carolina and Georgia Governor's Cup winners was cancelled due to weather. These events emphasize tag and release to minimize the harvest of billfish. A total of 146 different sportfishing boats participated in the Series. The concept of conserving our billfish resources carried over into everyday fishing with over 98 percent of all billfish caught in FY 2000-2001 being released. Primarily private funds and grants were used to finance the program. The program received over $52,000 in private donations and financial assistance. The 2001 series raised an additional $16,520 for special marine fisheries conservation work.

Economic Analysis

The collection and analysis of economic data have become an important part of state and regional fisheries management, especially when considering the increasing complexity of resource management issues. In addition, the technical complexity of the federally mandated cost-benefit analysis protocols used by the National Marine Fisheries Service when proposing fishery management actions has escalated the need for in-house expertise when reviewing and commenting on proposed federal actions that could adversely impact South Carolina user groups and/or fishery resources.

Commercial fisheries continue to reflect one of the many benefits derived from South Carolina's natural resources. In 2000, commercial fisheries had an estimated total economic (sales) impact of nearly $60 million and generated about 1,500 jobs, mainly in the rural coastal areas of South Carolina. Unfortunately, the productivity of the shrimp trawler fishery was threatened by the impact of extended, severe cold weather on the SC over-wintering white shrimp stock during December, 2000 and January, 2001. Based upon the information gathered by OFM and at the request of the SC Office of the Governor, the Small Business Administration (SBA) declared an economic injury disaster for the SC commercial shrimp industry on March 14, 2001. The declaration made the industry eligible to apply for SBA economic injury loans.

The Division has also been working with the industry on proposed trawler zones that could replace the traditional 3-mile "radar" line or radar area. Based upon a historical analysis of the radar area opening affects on SC trawler landings during the April - June period, it was estimated that opening the radar area to shrimp trawling caused an average, annual incremental increase of about 320,000 pounds and $1.3 million in SC shrimp landings compared to no radar area being opened.

The Department of Agriculture and Applied Economics at Clemson University was contracted to conduct a comprehensive economic study to analyze the financial performance of the SC trawler industry in a manner that will allow the MRD to evaluate these industry economic issues relative to the shrimp baiting fishery. Clemson University conducted a mail survey of licensed SC trawler operators during the first quarter of 2000. The results of this study indicate that SC resident shrimp trawler fleet is under considerable pressure from several sources (e.g. non-resident vessels, etc.) including the possibility that shrimp baiting catches could limit the total catch in South Carolina waters. Given these pressures, the long-run contribution by the trawler industry to the SC economy could be in jeopardy. For example, a 20% decline in SC trawler fleet catch relative to the 1999 season could result in annual losses by the SC economy of over $7 million and nearly 200 jobs. The Clemson University researchers recommended that increased shrimp baiting fees and/or reductions in shrimp baiting limits would be one approach for improving the prospects for commercial shrimpers if shrimp baiting effort was responsible for reducing commercial trawler catches.

Recreational harvesting of the state's marine fish and shellfish also effects the SC coastal economy because fishermen, especially non-coastal residents and out-of-state vacationers, purchase goods and services from coastal businesses related to their fishing trip. These businesses, in turn, buy goods and services to meet their own needs, creating a positive economic "ripple effect" felt by many businesses and individuals in the state. Using SC economic survey results of recreational anglers and secondary data, an economic impact analysis database and software has been developed for estimating these ripple effects or economic impacts created by recreational fishing related expenditures.

Fisheries Statistics Section

The Fisheries Statistics Section (FSS) is comprised of fishery-dependent data collection programs for both commercial and recreational fisheries. Funding for the programs within the FSS comes from several federal grants and state revenue funds.

Commercial Data Collection

Funded by The National Marine Fisheries Service, the commercial section obtained commercial fisheries catch and effort data via a mandatory report submitted by 240 wholesale and shellfish dealers, voluntary weekly shrimp tickets collected from 19 major dealers, voluntary fish trip tickets submitted by 9 dealers, and landings reports required from approximately 300 participants in several special permitted fisheries (horseshoe crab, American shad, and shellfish escalator, among others). Port agents obtained shrimp size and species composition via routine visits to shrimp dealers during the trawl season. During the report period, 153 offshore finfish trips were sampled for length frequency distribution, accounting for 16,741 measurements of priority species. Commercial fisheries data was key entered, edited, and transmitted to the NMFS regional files.

Recreational Data Collection

Recreational data collection was accomplished by the State Finfish Survey, mandatory trip reports from vessels and piers permitted under the Recreational Fisheries Conservation and Management Act, and several

sportfishermen liaison projects. The SFS is funded entirely by Sport Fish Restoration Act funds (Wallop-Breaux). Recreational fishermen liaison projects included the Marine Gamefish Tagging project, the Master Angler project, the State Record project, the Sportfishing Tournament project, and the Billfish Survey project.

State Finfish Survey (SFS)

The State Finfish Survey is an intercept survey designed to collect catch/effort and length measurements of selected species. SFS intercept and target species measurement quotas for This FY were set at 1500 interviews and targeted sheepshead, spotted seatrout, spottail bass, and summer and southern flounders. Personnel obtained 1579 interviews representing contact with 3355 anglers, most of whom were in private boats. The measurement quota for the combined target species was set at 2049 for the period. A total of 2160 individual target species measurements was collected, exceeding the quota by 5%. In addition, 1106 other species of concern were measured.

Vessel and Pier Permit Reporting

Mandatory trip reports were submitted by 29 headboats and 298 charter vessels. Charter vessel trip reports were coded, key-entered, edited and archived. Monthly summaries were generated for use by fisheries managers. Mandatory monthly pier activity summary reports were received from 11 public fishing piers for this performance period. Monthly angler activity for each pier was key-entered and summary reports generated.

Marine Gamefish Tagging Project

During 2000-2001, 5,092 fish were tagged by over 817 participating anglers in the Marine Gamefish Tagging project. Approximately 1,132 tag kits were issued. Over 12,000 anglers have participated in this project since its inception in 1974. Close to 70% of fish that were recaptured with tags were re-released. During the year, anglers reported the recapture of 539 tagged fish. Fish associated with the snapper/grouper complex exhibited high recapture rates. Many tagged fish were recovered after traveling long distances.

Master Angler Project

The Master Angler project was initiated in 1987 to provide recognition to anglers who catch trophy fish and to those anglers who practice conservation through the tag and release of game fish. During FY 2000-2001, nineteen anglers caught fish that qualified for citations. Conservation certificates were awarded to seventy-five anglers who tagged and released at least thirty fish.

Sportfishing Tournament Project

Sportfishing Tournament project personnel continued working closely with tournament organizers in planning and scheduling their events. FY 2000-01 saw 69 competitions held along the coast which ranged in size from shore-based events to events with 15 to over 200 boats. State certified weighing scales were provided to 28 of these events.

Billfish Survey

Fishermen reported a total of 316 billfish (blue marlin, white marlin, sailfish, and swordfish) landed and released off South Carolina during FY 2000-01. Sportfishermen's concern over a perceived worldwide decline in billfish stocks resulted in 310, or 98.1%, being released. Approximately 207 of these were tagged before being released. All known anglers received state billfish certificates. An additional 106 billfish were documented by tagging reports from non-South Carolina waters.

Crustacean Management

The Crustacean Management Section is primarily responsible for the management of the shrimp and blue crab fisheries of South Carolina. This management includes

monitoring and assessment of stocks including participation in applied research projects. Staff also make numerous educational presentations and provide general information to the public. Since 1998, staff have inspected shrimp farms to determine exotic shrimp permit compliance.

Postlarval Shrimp Survey

Plankton samples were taken at Breach Inlet located between the Isle of Palms and Sullivan's Island. During winter and spring 2001, above average numbers of postlarval brown shrimp were found in samples. Later sampling indicated that white shrimp postlarvae recruited in June of 2001 in average numbers, which was encouraging, considering an estimated 97% of the white shrimp stocks were killed by cold water temperatures.

Juvenile Shrimp and Blue Crab Sampling

Tidal creeks were sampled weekly during spring and summer for juvenile shrimp and blue crab. This work is directed towards making an early determination of the abundance and size of shrimp. This aids in prediction of commercial catch and management strategy. Size data are critical in determining growth rates which are used in predicting when shrimp will move into areas open for commercial trawling and when they will reach a harvestable size. Sampling in July-September of 2000 indicated above average numbers of juvenile white shrimp in the tidal creeks near Charleston until September. Creek sampling for juvenile brown shrimp in May and June 2001 produced average to above average numbers of juvenile brown shrimp, at normal sizes for that time of year.

Subadult and Adult Shrimp and Blue Crab Sampling

Catches of white shrimp in sample trawls in the fall of 2000 were below average, as drought conditions prevailed. Following cold water temperatures in winter, several dead and few live white shrimp were collected Federal waters off South Carolina and Georgia were closed to shrimp trawling from March 13 to June 16, to protect the few remaining white shrimp for spawning. The 2001 commercial trawl season opened June 25, when overall size of brown shrimp had reached commercially harvestable size.

Brown shrimp catches were above average in research trawls in 2001, with commercial catches for the whole season expected to be well above average. Numbers of blue crab captured by research trawls were above average in spring of 2001.

The channel net season in Winyah and North Santee Bay's opened September 13 of 2000 and closed on December 12. Landings for this fishery were approximately 145,000 pounds of white shrimp valued at $343,000 to the fishermen. The shrimp baiting season opened September 15, 2000 and closed on November 1. Fifteen thousand nine hundred and twenty nine permitted baiters landed approximately 917,243 lbs. of whole shrimp, one of the poorest harvests since this fishery was first licensed in 1988.

Blue Crab Potting Surveys

A fishery-independent survey of blue crab stocks has been conducted by staff since 1988 in which crab traps are fished in a standardized manner in each of the SC 's major estuaries. The goal of this project is to determine stock trends and if trawling studies are accurately sampling the blue crab population. Catch rates through 13 years of the survey have suggested relatively stable stocks of blue crab. Catch rates in 2000 were below the 13 year average, as drought conditions probably kept blue crabs higher up in the estuaries.

Finfish Management

The Finfish Management Section (FMS) is concerned with the management and development of South Carolina's marine finfish resources. During FY 1999-2000 this section carried out a number of state funded programs and projects as well as federally funded projects which are described below.

Diadromous Fish Projects

The major activity in the NMFS-funded Anadromous Project during the FY 2000-2001 was completion of the eighth year of tagging sturgeon in the lower Edisto River. Sturgeon tagging has yielded excellent growth and movement information on juvenile Atlantic sturgeon and, to a lesser extent, on adult and juvenile shortnose sturgeon. Data have been added to a developing data-set with hopes of determining changes in year class strength that may be indicative of stock status changes.

An ACFCMA-funded tagging study on American shad in the Santee River was conducted for a second consecutive spring in 2001 to determine the fishing rate on pre-spawning females in the Santee, where shad stocks were perceived to be in good condition based on tagging studies in 1991 and 1992. The study was very successful as over 2000 fish were captured for tagging. Results of the 2001 tagging study, in conjunction with St. Stephen fish lift observations, and commercial catch and effort records, indicate that the status of the Santee shad population continues to be healthy.

A survey of young-of-year American eel (elvers) was completed in early 2001 as the second year of a mandated study under the ASMFC's FMP for this species. The survey was conducted immediately below Goose Creek Reservoir for a six-week period using a single fyke net as sampling gear. Elver catches were improved over those observed in early 2000. A long-term data-set will be needed to make any assessments on relative elver abundance or on changes in year class strength.

COASTSPAN Survey

The COASTSPAN (Cooperative Atlantic States Shark Pupping and Nursery Survey) project was started in June 1998. This study utilizes state cooperators in the southeast region to investigate the species and size composition of sharks using estuarine and coastal waters for pupping and nursery areas. The study is funded by the NMFS's (National Marine Fisheries Service) Highly Migratory Species Group and administered by the Apex Predators Program at the NMFS Narragansett, RI laboratory.

Sampling was conducted in Bulls Bay, North Edisto River, Charleston Harbor and St. Helena Sound. The standardized sampling gear is a 229 m gillnet constructed of four inch stretched mesh and a 50-hook bottom longline. Captured sharks are measured, tagged and released. Results to date have confirmed that SC estuarine and near-shore coastal waters are important nursery and pupping areas for a number of species including sandbar, scalloped hammerhead, blacktip, spinner, finetooth, Atlantic sharpnose, lemon and bonnethead.

Red Drum Project

The major emphasis of this project is to develop information on the ocean populations of red drum, which comprise the spawning stock. Estuarine sampling has indicated a very high mortality rate and little recruitment of new fish to the spawning stock although the actual status of offshore stocks is unknown. Red drum are sampled with bottom longlines, primarily during the fall when adult drum are making a post-spawning, offshore migration. The majority of captured red drum are measured, tagged and released to provide information on growth and migrations. A small sample of fish 90 cm or less TL (total length) is kept for age determination and reproductive studies. The growth curve for red drum indicates that fish less than 90 cm TL are 10 years of age or less. There has been considerable concern based on apparent inshore fishing mortality rates that very few fish in this age category were present in the ocean spawning population and that the offshore stock was comprised almost entirely of fish in excess of 20 years old. OFM sampling and aging conducted by the MRRI Estuarine Finfish Program has indicated that red drum in the 3- 10 year age groups do make up a significant portion of the spawning stock in this area. Reproductive studies conducted on these fish have confirmed that they are indeed spawning fish.

Marine Artificial Reef Program

During FY 2000-2001, all privately maintained aids to navigation on artificial reef and wreck sites were inspected. Twelve new buoys were deployed. Ten separate artificial reef construction projects were completed on six different permitted reef sites.

Sixteen separate offshore field trips resulted in a total of 27 days of monitoring activities on the state's marine artificial reefs. Physical stability, structural integrity, and biological effectiveness of individual materials were assessed through diver observations, side scan sonar, and hull mounted sonar

A total of 64 SCUBA dives were conducted throughout the year on reef sites ranging from <10 to 120 feet of water. Diver assessments revealed rapid colonization of fish and invertebrates on several new and experimental reef designs. Video, still and digital photographic records were obtained during diving activities whenever possible.

During FY 2000-2001, sampling continued on an experimental reef site that was established in order to document colonization, immigration, and production on artificial reefs. Fish tagging, video transects and sample collection continued throughout the FY. Sampling was also concluded on a Navy-funded human health risk assessment study designed to determine levels of PCBs found in recreationally important fishes caught on artificial reefs.

Information on South Carolina's system of artificial reefs was provided to the general public through numerous news releases and feature news stories, television appearances, and public presentations. Several hundred phone and mail requests for reef locations or condition reports were also responded to through the distribution of updated reef maps and Loran and GPS listings.

Shellfish Management

The Shellfish Management Section (SMS) develops, implements and supervises initiatives necessary for the effective management of the state's shellfish resources. The following activities were conducted during FY 2000-2001:

Shellfish Season

The season for harvesting oysters and clams, as authorized in the S.C. Code of Laws, Section 50-5-985, opens annually on September 16 and closes on May 15 unless biological or other conditions warrant other times to open or close. This year the season for harvesting oysters and clams opened on September 16, 2000. Oyster season closed on May 15, 2001; however, due to moderate water temperatures and market conditions the clam season was extended to May 31, 2001.

Shellfish Field Management

In response to legislative changes that were implemented in 1986, shellfish acreage available for public use has nearly doubled. Currently, there are 58 state shellfish grounds totaling approximately 6,960 acres of approved bottoms, of which 222 acres are intertidal. Annual assessments of state grounds are conducted during the closed shellfish season (May through September) to determine which grounds, based on resource condition, are suitable for commercial harvesting during the forthcoming season. Similar assessments are conducted on public shellfish grounds to determine priorities for seed or cultch planting.

The most effective management strategy for preventing over-harvesting on state shellfish grounds has been to control the harvesting effort through a commercial permit system and require reporting of harvests from commercial fishermen by geographic area. Shellfish section personnel are involved in management duties concerning shellfish harvesting permits, cultivation requirements, mariculture permits, state shellfish grounds, public shellfish grounds, whelk, scallop, clam and oyster resource assessments, mechanical harvesting permits and providing support to other DNR programs.

A statewide intertidal oyster survey initiated in 1980 is periodically updated in heavily harvested locations. Survey

information continues to be furnished to the SCDHEC and various commercial interests.

Shellfish Culture Permits

One hundred and two commercial shellfish culture permits, totaling 1,744.2 acres are currently under cultivation by 59 permit holders. A total of 57,856 bushels of oysters and 5,063,000 clams were harvested during this season from culture permits. Shellfish survey maps, maintained by the Shellfish Management Section's GIS, are provided to Shellfish culture permit holders and permit applicants.

A series of shellfish maps have been developed from U.S Geological Survey topographic quadrangles indicating locations and boundaries of the five management classifications of South Carolina shellfish bottoms: 1) shellfish culture permit grounds; 2) state shellfish grounds, 3) public shellfish grounds, 4) water quality classifications, and 5) grant areas. Boundary information is updated as changes occur.

Shellfish Culture Permit Planting and Assessment

All shellfish culture permit holders are legally required to plant 50 U.S. bushels (Section 50-5-940) of seed oysters, shell or other approved cultch material for each acre under cultivation each calendar year. During this reporting period, one technician and two biologists successfully monitored planting activities. Effective scheduling and communication has resulted in verification of all seed and cultch material planted in 2000. Recorded planting on commercial shellfish culture permits in 2000 was 15,216.5 U.S. bushels of seed oysters, 4,074.4 bushels of shell, 25,148.8 bushels of approved cultch material, 39,902 bushels of *in situ* cultivation, 2,700 bushels of green-shell and 273.5 bushels of seed clams for a total of 87,315.2 bushels.

From January 1 through June 30, 2001, 3,119 bushels of seed oysters, 26,813 bushels of *in situ* cultivation, 16,025.2 bushels of approved cultch, 3117.5 bushels of shell, no clams and no green-shell for a six month total of 49,074.7 bushels were verified as planted on culture permits. All Shellfish culture permits not planted with the assessed quota must, by law, be canceled or reduced in acreage by the Department.

Mariculture Permitting and Management

Harvesting is allowed on shellfish mariculture permits throughout the year. During FY 2000-2001, the Shellfish Management Section processed one application for a clam mariculture permit. Twenty clam mariculture permits totaling approximately 1346 acres are currently under cultivation, including Atlantic Farms, Inc./SeaPerfect (formally Atlantic Littleneck Clam Farms) in Charleston and Beaufort counties. No oyster mariculture permits are currently in effect.

Commercial Whelk Fishery

South Carolina's offshore whelk fishery began in 1978 as several commercial shrimp fisherman diversified in an effort to compensate for poor shrimp harvests. Using gear similar to shrimp fishing, harvesting subtidal knobbed and channeled whelks evolved as an alternative fishery. Production peaked in 1982 at over 32,000 bushels.

Based on the 1999 season's low production (1887 U.S. bushels), interviews with processors and fishermen, as well as economic and resource considerations, a decision was made to not open the whelk trawling season during the year 2000. The season remained closed during 2001 to allow continued recruitment and recovery.

Geographic Information System and Data Management

Shellfish harvesting data from each state shellfish ground, culture permit and mariculture permit is captured monthly and displayed graphically on Shellfish Management Section computers in order to provide contemporary information for management purposes. Seasonal data is consolidated to illustrate harvesting trends over a 10-year period. Graphic illustrations of harvesting pressure along with *in situ* resource assessments enhance the management of the state shellfish grounds. Geographic Information System (GIS) intertidal

oyster survey maps have been produced and will continue to be used for future shellfish resource management and environmental decisions. Currently these maps are being updated to reflect shellfish ground boundary changes. Cartographic data are now available in both soft and hard copy formats. These color GIS maps are sensitive to the changing dynamics of the coastal environment and allow more responsive management in areas recently closed by poor water quality.

Recreational Maps on the DNR'S Home Page

In order to provide wider dissemination and improved public access of recreational harvesting areas throughout the state, 58 color maps of state shellfish grounds and 20 public shellfish grounds have been digitally scanned and posted on the SCDNR's homepage (http://www.dnr.state.sc.us/fishing.html). Recreational license requirements, shellfish seasons, catch limits and gear restrictions are included along with maps that can be viewed on-line or downloaded.

Recreational Shellfish Management

Recreational shellfish management activities involve the designation, demarcation, mapping and maintenance, through planting and cultivation, of public shellfish grounds. Since recreational harvests are allowed from all public and state shellfish grounds, signs are maintained and replaced on all public and state shellfish grounds. Inspections as to sign condition are conducted each year and replacement is made for damaged or illegible signs. Locations of all newly installed signs have been documented with a Global Positioning System (GPS) unit. This information is entered into the Division's Geographic Information System for inventory purposes. Eight boundary signs were deployed on six recreational state and public grounds during this reporting period.

A law passed in 1996 (Section 50-5-955) redesignated public oyster grounds as public shellfish grounds. Approximately 100 acres of productive intertidal bottoms are currently available as public shellfish grounds. The law also enables the DNR to modify boundaries and delete or establish grounds as considered necessary. Additionally, it prohibits the construction of docks or other structures within public shellfish grounds and restricts the location of new public shellfish grounds to areas that are a minimum of 1,000 feet from high ground, the current maximum allowable length of a private dock

Planting of shucked oyster shell on public shellfish grounds amounted to 6,050 U.S. bushels during this reporting period. During calendar year 2001 these were placed by contractors in Hamlin and Green Creeks in Charleston County. A total of 6,600 U.S. bushels of shucked whelk shell was purchased from a processor in Crescent, Georgia. One hundred and fifty bushels were placed on the Green Creek public ground. The remainder have been stored with the anticipation of placing them on public grounds during the Spring or Summer of 2002.

Oyster Shell Recycling

An oyster shell recycling program has been initiated to collect shucked oyster shell which might be sent to landfills or otherwise discarded. Seven public drop-off sites have been established in Beaufort, Charleston, Colleton and Georgetown Counties. These are selected locations where the general public may deposit shell after shucking. The collected shell will be stockpiled and quarantined for a minimum six months. Contractors will place it on public shellfish grounds as cultch. A portion of the proceeds from the sale of the DNR vessel, *R/V Oyster Catcher II,* has been utilized to purchase shell handling equipment, including a front-end loader, dump trailers and a SCDOT surplus dump truck.

Memorandum of Agreement - SCDNR/SCDHEC Mutual Shellfish Interest

A Memorandum of Agreement was signed between the DNR and the SCDHEC effective October 23, 1995 concerning the classification and restoration of coastal molluscan shellfish growing waters. This agreement

establishes a committee to coordinate cooperative procedures between the two agencies to identify water bodies targeted for restoration based on quantities of shellfish and commercial and recreational harvest potential. Under this agreement DHEC will produce an annual report describing the harvesting classifications of coastal shellfish growing waters within the state, illustrating annual water quality trends. In addition to restoration of growing waters, this committee is investigating the feasibility of establishing a toll-free telephone number to provide current status information on conditionally approved shellfish grounds and installation and maintenance of joint SCDNR/SCDHEC shellfish information bulletin boards near boat landings.

Implementation of Molluscan Shellfish Importation Policy

During FY 2000-2001, three mariculture operations imported seed clams into South Carolina from Aquaculture, Inc., Muscongus Bay, Bremen, Maine and Cedar Creek Shellfish Farm, New Smyrna Beach, Florida for "overwintering" or grow-out. In accordance with Section 50-5-1005, S.C. Code of Laws, each year class of clams was histologically examined and determined to be free of pathogens prior to shipment. In addition, clam shipments were inspected at Fort Johnson en route to planting sites to insure they were free of other organisms.

OFFICE OF ENVIRONMENTAL MANAGEMENT

The Office of Environmental Management (OEM) was built around the former Office of Fisheries Management's Environmental Evaluations Section. The office now includes a director, six permanent staff, a regional biologist (northern coastal area), and one grant-funded position. The grant-funded position is a veterinarian who provides the DNR with new, on-staff expertise. Also, an intern from the University of Charleston Masters in Environmental Science program assisted OEM staff much of this year.

The OEM provides the DNR with thorough reviews, documentation, trend analysis and comments on anthropogenic and natural changes that could negatively affect the natural resources of the coastal zone, and is the Division's primary responder to environmental emergencies. The OEM also provides the Marine Resources Division with guidance in policy linked to environmentally-related initiatives and issues in the coastal zone including permit applications, legislation, regulation, mitigation actions, watershed management, damage assessment, and habitat protection. During FY2000-2001, OEM staff received and reviewed 1,524 permits compared to 2,181 permits during the previous year, a decline of 30 percent. This decline may reflect a slowing economy and a one-year surge in the previous year because of perceptions that permit restrictions in Beaufort and Charleston Counties were about to tighten.

Noteworthy Coastal Projects

OEM staff provided review and comments on hundreds of permit applications submitted to the Office of Ocean and Coastal Resources Management and the US Army Corps of Engineers. The following are some of the major or noteworthy projects that staff have reviewed and consulted on during the year.

Long Island Bridges - A property owner of this small island near Folly Beach proposes to build a residential development and supply access via several bridges.

Folly Beach Groin - The Corps of Engineers considered construction of a 700-foot groin to restore and protect critical habitat and to protect a county park.

Murrel's Inlet dredging proposal - This navigation project was of concern because of impacts to rare beach plants, birds and sea turtles.

Savannah Harbor Expansion - The Georgia Ports Authority has been working for several years for permission to deepen and widen portions of the Savannah River ship channel. There are concerns that dredging could result in saltwater intrusion

will negatively impact the freshwater wetlands, the Floridian aquifer, and certain freshwater and anadromous fish species.

Isaac-German Drainage Project - Charleston County is exploring engineering concepts for eliminating flooding problems in the area northeast of Mount Pleasant.

New Cooper River Bridge - Plans are being made for the replacement of the Cooper River bridges, which will impact coastal marshes and tidal creeks.

Open Water Disposal in Calibogue Sound - A private group was exploring open water disposal of dredged sediments from several marinas and creeks on Hilton Head into

Calibogue Sound. An agreement was made to dispose of the material offshore and the materials were to be tested as requested by DNR. Oyster restoration was also included in a mitigation package.

Participation in Special Projects or Initiatives

OEM staff participated in numerous special projects and initiatives. These included: the DNR Habitat Committee, Charleston Harbor Restoration Feasibility study, Charleston Harbor Project, interagency review of problems associated with dredge materials being dumped offshore of Charleston, FERC relicensing committee for Santee Cooper, West Nile Virus committee, a proposal to re-impound marshes in the Cooper River, and a preliminary review of the impacts of causeways on coastal marshes. OEM staff organized and hosted a national meeting on Mercury in the Environment. This very successful meeting drew participants from more than 20 states.

Routine Meetings

Staff either chaired or participated in the following routine meetings: The Coastal Pesticide Advisory Committee, the statewide Mitigation Banking Review Team (MBRT), Interagency Review, Office of Ocean and Coastal Resources Management appellate panel, Marine Advisory Committee, Southeast Area Monitoring and Assessment Program (SEAMAP), and the Santee Cooper Partnership.

Environmental Emergencies

Staff responded to several minor fish kills, primarily in brackish ponds associated with residential developments. Most of these were attributable to low dissolved oxygen resulting from algal blooms and various other environmental factors. Staff also evaluated the impacts on saltmarsh habitat of an oil spill in the Wando River in which contaminated grass was removed. Staff also participated in the investigation of improperly disposed dredged material from the Charleston Harbor Deepening Project, and from maintenance dredging at the former Charleston Naval Base. Staff worked on developing the Marine Resources Division Standard Operating Procedure (SOP) for responding to oil spills, the SCDHEC/SCDNR Fish Kill Response Manual, and the Wildlife Contingency Plan (an annex to the Charleston Area Oil and Hazardous Material Contingency Plan). Staff also participated in an a table-top drill for a simulated major oil spill which was lead by the Coast Guard.

Superfund Sites

As part of SCDNR's responsibility as a Natural Resource Trustee agency, OEM staff participated in several ecological technical advisory groups for numerous Superfund Sites in coastal South Carolina. These include the Calhoun Park Area Superfund Site, the Koppers Superfund Site, the Macalloy Superfund Site, the Parris Island Marine Corps Recruit Depot Superfund Site, and the Columbia Nitrogen Site. Staff attended numerous meetings and provided written comments on several documents associated with the investigation of contamination and remediation of these sites.

Regional/ National Activities

OEM staff are active in the Atlantic States Marine Fisheries Commission's habitat advisory committee. Staff also participate on the South Atlantic Fishery Management

Council's habitat advisory committee. The OEM provides comments to EPA on proposed changes in clean water guidelines and regulations.

Turtle Project

In this fiscal year, the OEM had oversight of a federally-funded project to develop an index of abundance for sea turtles using trawl nets. This regional study conducted between St. Augustine, Florida to Georgetown, South Carolina, used five different vessels to trawl for sea turtles with large mesh nets. The second summer of field activity began in May 2001. Four vessels were used to capture 182 loggerhead, 12 Kemp's Ridley and 3 green turtles at 615 locations. The overall catch rate was 0.60 loggerheads per hour. This catch rate was nearly identical to that of the first year. Valuable size and health data were recorded for each turtle, and blood samples are taken to assess sex, subpopulation status, and health. The program is scheduled to last for three years, and as a final product, an index of abundance will be established. This index will be useful in trend analysis in future years.

Regional Biologist

The Georgetown regional biologist works on a variety of projects for DNR including habitat/environmental issues, public education, public speaking, minor chemical/oil spill responses, fish kills, west Nile virus monitoring, various assistance to Law Enforcement, and various OFM projects (recycling oyster shell, planting shell at Murrell's Inlet PSG, channel nets, shrimp baiting, shrimp sampling, and fishing tournaments, and others). He also assisted in various projects such as the Turtle study, fish samples of contaminants (for DNR and DHEC), oyster and clam samples for toxicology studies, HAB responses, and samples for USC and the SEAMAP program .

Cooper River Water Quality Project

During the year, OEM staff conducted quarterly sampling in the Cooper River to examine the impacts of harbor deepening and drought on the water quality. Staff monitoring surface and bottom salinities, dissolved oxygen, temperature, and pH. An oxygen sag was noted in the middle part of the river in all seasons, with the summer sag being the worst.

MARINE RESOURCES RESEARCH INSTITUTE

The Marine Resources Research Institute (MRRI) provides the scientific expertise and facilities to support the Marine Division's resource management and educational programs. MRRI scientists work closely with the Office of Fisheries Management (OFM) and the Office of Environmental Management (OEM) to conduct research and monitoring programs to assess the condition of our coastal resources. Institute staff are also involved in developing methods to restore degraded resources and habitats, as well as mariculture technology for producing seafood. Much of the restoration and mariculture research is conducted at the James M. Waddell Mariculture Center (WMC) located in Bluffton, SC. Finally, the MRRI serves as a seaside research and educational facility for many academic institutions including the University of Charleston (UOC), the Medical University of South Carolina (MUSC), Clemson University (CU), South Carolina State University (SCSC), and the University of South Carolina (USC). MRRI scientists participate in educational programs at these institutions as adjunct faculty, providing guidance and financial support for graduate and undergraduate students. Staff also assist in primary and secondary educational programs by teaching classes, serving as mentors to students conducting research projects, and providing curriculum materials. Accomplishments for the Institute's research and educational programs during FY 2000-2001 are described below.

Fisheries Research Program

The primary responsibility of the MRRI fisheries research

program is to conduct monitoring and assessment programs that evaluate the status of stocks of valuable fisheries. Staff also: (1) develop and evaluate new technology and methods for determining the status and trends of fish populations; (2) conduct research to determine factors influencing the abundance and distribution of key fishery species; and (3) conduct programs with OFM staff to assess the effectiveness of previous management actions and evaluate management alternatives.

Coastal Surveys

MRRI staff continued to monitor the status and trends of offshore reef fish populations as part of the SCDNR-National Marine Fisheries Service (NMFS) *Marine Resources Monitoring Assessment and Prediction Program (MARMAP)*. Monitoring of catches from North Carolina to Florida taken by the SCDNR Research Vessel *Palmetto* indicated that there was a slight increase in the relative abundance of vermilion snapper. Catch of red porgy has remained constant since 1998. After a substantial increase in black sea bass during 1999, catches remained at high levels during 2000. Abundance of white grunt and gray triggerfish declined through 2000.

Life history studies conducted on red grouper, red snapper, gray triggerfish, and blueline tilefish provided data such as maximum age, size at age, spawning season and fishing mortality, that have been incorporated into stock assessments by the South Atlantic Fishery Management Council. These fishes are generally long-lived and slow growing, and spawn over several months from spring through summer.

Additional bottom mapping was conducted at the Charleston Bump, an important offshore fishing ground. Oceanographic studies indicated an area of upwelling downstream of the Bump that results in increased productivity at shelf-edge reefs. Analysis of the commercial pelagic longline data showed that the Charleston Bump is an area of concentrated fishing effort and high frequency of billfish catches; however satellite tagging of swordfish showed that most move considerable distances away from the Charleston Bump during the summer.

The offshore reef video camera system was improved during the fiscal year. Twelve fish habitats were successfully rearranged at the underwater research site to within the narrow (10-12°) field-of-view of each of the six video cameras. A diverse fish and sessile invertebrate community has developed over the past two years. The Fish Watch web site where daily images can be viewed continued to be upgraded in text and images, while the attempts to replace the malfunctioning cameras and transmission cable have been, as yet, unsuccessful.

Data were utilized from two ongoing fishery-independent surveys and environmental variables to conduct a stock assessment of blue crab. Minimum annual air temperature, heating days, cooling days, and water temperature were significantly correlated to abundance of sub-legal blue crabs. Fishing mortality has increased steadily since 1987. The estimated population size showed a 50% reduction during 1979 to 1984, followed a rapid increase over the next two years to about 75% of the population size in 1979. While fishing effort (in terms of licenses) is below that which would produce maximum sustainable yield (MSY), landings are at or above MSY.

MRRI staff continued to monitor the status and trends of coastal fishes, crabs, shrimp, horseshoe crabs, sea turtles, mantis shrimp, and squids from Cape Hatteras, NC, to Cape Canaveral, FL. through the NMFS-MRD *Southeast Area Monitoring and Assessment Program-South Atlantic (SEAMAP-SA)* in FY2000-2001. SEAMAP expanded its scope to begin gathering information for determining age and reproductive condition of weakfish, Atlantic croaker, and spot.

Finfish Genetic Studies

The MRRI Fisheries Genetics Laboratory continued genetic studies of red drum, red grouper, black grouper, scamp, dolphin (mahi), red porgy, shrimp and shrimp viruses.

The red drum data indicated that a single stock occurs from FL to SC and substantial variation in the adults contributing to each year class. These data indicated that the number of spawning females in South Carolina ranged from about 100 for years 1990-1993 to about 350 for 1994 and 1995. Studies of red grouper indicated that populations from North Carolina, Florida, and Mexico constitute one genetic stock. However, these separate populations are probably self-recruiting with only occasional exchange between areas, suggesting the need for continued local management approaches. Black grouper samples showed little genetic exchange over long distances and would benefit from regional management. Studies of dolphin (mahi) continued this year and will be summarized in the project report due in December. Studies of genetic variation in red porgy found complete separation of Eastern Atlantic, South Carolina, and Brazilian populations. Studies of the population genetics of native white shrimp suggested that there are few genetic differences throughout the range of this species, from NC into the Gulf of Mexico. A study of temporal genetic variation of white shrimp in Charleston Harbor found little or no significant differences over the course of four years.

Inshore Recreational Fish Surveys:

Sampling of red drum, black drum, spotted seatrout, southern flounder, sheepshead, and striped mullet continued in six estuarine areas along the South Carolina coast. Sixty-two species were caught in the course of trammel net surveys, with target species' totals as follows: 2,203 red drum; 3,172 spotted seatrout; 3,052 mullet, 911 southern flounder; 205 black drum; and 151 sheepshead. It is important to point out, however, that the total number of spotted seatrout caught does not reflect current abundance. Of the 3,172 trout caught, 2,828 were caught from July to December of 2000. Only 344 fish were caught from January through June 2001

Tagging of red drum, black drum and sheepshead continued during the year. Our data indicated a declining trend in the abundance of subadults, particularly one-year old red drum, in South Carolina's estuaries over the past several years. Data on red drum distribution and abundance obtained through our trammel net surveys were made available to South Carolina resource managers and other agencies with management authority during the year.

Surveys of the fish populations within the low salinity reaches of five South Carolina estuaries began in May 2001. Electrofishing boats are being used to sample the relative abundance of fishes, in particular red drum. This project will allow us to: (1) compare abundance and diversity of fishes among areas and seasons, (2) compare the fish community of low salinity areas to that from trammel net collections in higher salinity areas, and (3) determine movement patterns of red drum by mark-recapture techniques. During the year, 67 species were collected by electrofishing. The five most abundant species were menhaden, striped mullet, spot, tidewater silverside, and threadfin shad. One hundred and seventy-nine red drum were encountered.

This year was another successful year for the Freezer Fish Program, which was started in 1995. Since its inception, staff have obtained racks (or filleted skeletons) of thousands of fish. The racks were used to estimate the age and size of the harvested populations of recreationally important species (fisheries-dependent data). The program currently maintains chest freezers at seven locations. Four hundred and seventy-nine spotted seatrout racks were donated in 2000 whereas only 57 trout racks were donated in 2001. Overall, total numbers of donations for all target species decreased in 2001.

The cooperative agreement initiated with DHEC during FY 98-99 continued during FY 00-01. Staff provided DHEC with fillets of legal-sized spotted seatrout, red drum, and southern flounder captured during regular trammel net sampling in estuarine areas. These samples were used to determine concentrations of metals in edible tissues of the fish. In addition, staff assisted DHEC personnel in obtaining samples to determine concentrations of mercury in king mackerel in our summer coastal population.

During FY 00-01, we supplied data on diamondback terrapin, which were caught incidentally in our trammel nets, abundance and collected specimens for graduate students. A Ph.D. student from USC is using tail clips and blood samples to investigate population genetics of diamondback terrapins found in coastal South Carolina. She will also examine contaminant levels (heavy metals) in tissues. A M.S. student from the UOC is conducting research on reproductive biology and endocrine cycling in diamondback terrapins in the Charleston Harbor estuarine system.

A three-year cooperative inter-state project funded by MARFIN was completed in FY 00-01. The project was entitled "Cooperative research on the biology and assessment of near-shore and estuarine fishes along the southeast coast of the U.S." and included four species: southern flounder, spotted seatrout, weakfish and striped mullet. The states of North Carolina, Georgia and Florida were subcontractors to SCDNR on this project. The project investigated life-history aspects of these species such as reproductive parameters (size and age at maturity, spawning season, fecundity), growth and natural mortality rates. In addition, stock assessment parameters such as age-length keys, estimates of fishing mortality, yield-per-recruit and spawning potential ratio, were also determined.

Sturgeon Research

Shortnose and Atlantic sturgeons once supported a valuable fishery in SC. The shortnose sturgeon is now endangered, and the fishery for Atlantic sturgeon is closed in all U.S. waters. In FY 2000-2001, two sturgeon research projects were completed. The movements and habitat use of juvenile shortnose in the Savannah River were studied in order to predict potential impacts of planned harbor deepening. It was found that these young sturgeon migrate seasonally between separate stretches of the river, and that in winter they concentrate in an area that will likely be impacted by dredging. In the Cooper River, it was found that adult shortnose sturgeon concentrate in a portion of the river just above Bushy Park, an area impacted by industry and dredging. The information generated by these projects will assist in making decisions about how to effectively manage sturgeons in SC. These data are also being used regionally and nationally by other state and federal agencies as a basis for management of these rare and valuable resources

Shellfish Research Program

The primary responsibility of MRRI's crustacean and shellfish programs is to conduct research and monitoring programs related to the state's shellfish and crustacean resources. These studies include: (1) monitoring and assessment of native oyster populations, including disease incidence and bed/habitat condition; (2) monitoring selected shrimp and crab populations, including invasive species; (3) technology development and outreach related to shellfish restoration and mariculture; (4) developing a community-based oyster restoration program to educate and involve public in resource/habitat preservation and enhancement; (5) ecological studies related to critical and nursery habitats in the state's extensive tidal creeks; and (6) studying factors which influence the transport of crustacean larvae into South Carolina's estuaries.

Oyster Reef Program

Staff worked with OFM to complete and synthesize a multi-year research program designed to define the ecological functions of oyster reefs to South Carolina estuaries. Staff are: (1) examining recruitment, growth, and survival of oyster spat as an indicator of recovery and recruitment potential on shell repletion and natural sites; (2) following recovery of manipulated sites after 'simulated' harvesting, repletion, and/or major population die-offs and; (3) examining the impact of boat wakes in tidal creeks and their interaction with shell replenishment stability and development. Preliminary studies were completed on the impact of boat wakes on shell stability and marsh erosion. We also began discussions on methods for the evaluation of potential remote sensing techniques for monitoring boat wake/erosional impacts including using aerial photographs to document shoreline erosion.

Bivalve Disease Research

During FY 2000–2001, staff sampled oyster populations across South Carolina's coast to evaluate two major oyster diseases, *Perkinsus marinus* (commonly called Dermo) and *Haplosporidium nelsoni* (MSX). Staff also evaluated the status of oyster grounds prior to the harvesting season being opened. Six past 'dieoff' sites previously sampled in 1996,1997, and 1999 were again sampled in August 2000. The 2000 infection intensity and prevalence levels for both Dermo and MSX are typical for summer South Carolina oyster populations. Our data are important for assessing disease status and trends, assisting research and management decisions relating to shell transplant efforts, seed oyster planting and oyster habitat/resource restoration.

Also, in FY 2000-2001, we continued our bi-monthly oyster disease monitoring at six long-term monitoring stations in Beaufort, Charleston and Georgetown counties. Temperature data were also collected to assess its role. Dermo infections were present in oyster tissues from each of the six sites, with average infection intensity levels ranging from light to moderate. To date, for the period July to December 2000, MSX infections have only been observed at 4 of 6 sampling sites with prevalence and intensity levels varying between sites.

Community Based Oyster Restoration Program

SC intertidal oysters and the habitat they form fulfill many important ecological roles, including forming living reefs that are habitat for juvenile fish and crustaceans, as well as prey organisms that attract larger predators such as fish, crustaceans and birds. Through their normal filtering activities, oysters also significantly improve water clarity and can potentially control eutrophication. Situated between saltmarshes and tidal waters, oyster reefs provide natural bulkheads to control marsh erosion. In many South Carolina estuaries and tidal creeks, oyster populations appear to be declining. In FY00-01, MRRI initiated a community-based program to restore and enhance oyster habitat. Funding for this project was obtained from NOAA, SC Sea Grant, 5 Star Challenge Grant program and the Hilton Head Island Foundation. Local partners in this effort include the Charleston Math and Science Hub, the South Carolina Aquarium, the South Carolina Coastal Conservation League, USC, and Charleston County Parks and Recreation Commission. Seminars were held up and down the coast in spring 2001 to educate citizens on the importance of oyster reefs and to solicit volunteers. Oyster habitats were constructed at 4 sites in FY 2000-2001, using bags filled with various shell treatments (whelk, and Gulf, SC and washed oyster shell). Additional reefs (at least 7-8 more sites) will be constructed in early FY 01-02. Community volunteers filled almost 4,000 shell bags to build these reefs that are along the coast from Murrell's Inlet to Hilton Head. A teacher workshop co-sponsored by the Charleston Math & Science Hub will encourage use of the reefs as living classrooms. Our community restoration efforts also link with the OFM's new shell recycling program and the SRS's studies on restoration/stock enhancement/monitoring. In 2000-01 the community-based restoration program recycled about 1,000 bushels of shell. An extensive interactive website is being built with the assistance of NOAA's Coastal Services Center. New proposals were submitted to Sea Grant, Fish America and NOAA for continuing funding.

Crustacean Research Program

The primary responsibility of MRRI's crustacean research programs are to conduct research and monitoring related to the state's crustacean resources, including: (1) monitoring selected shrimp and crab populations, including invasive species; (2) studying factors which influence the transport of crustacean larvae into South Carolina's estuaries; and (3) conducting research on habitats utilized by crustacean species (covered in Environmental and Wetland Habitats Program summary).

Shrimp Research

Scientists from MRRI and Skidaway Institute of Oceanography completed a long-term collaborative study to investigate the oceanographic processes that influence

transport of larval shrimp from their offshore spawning locations into inlets and marsh nursery areas along the southeastern coast. The research that couples physical and biological data to gain insight into shrimp ingress was funded by SC and GA Sea Grant agencies. Results of the study suggest that water temperature, tidal periodicity, and wind stress are among the most important factors affecting the intensity of larval ingress through these inlets.

Horseshoe Crab Study

Over the last decade there has been an increase in the number of horseshoe crabs harvested in South Carolina due to the valuable properties of their "blue blood." The biomedical industry uses horseshoe crab blood to test for lethal bacteria sometimes present in certain pharmaceutical drugs. The increase in harvesting before the horseshoe crabs are given a chance to spawn has caused great concern regarding healthy and sustainable populations of this species for the future. The SCDNR staff initiated a study to evaluate alternative hand harvesting techniques, that would ensure *Limulus* is given a chance to lay eggs. During April and May spawning events on Harbor Island, a delayed harvest treatment was set up to determine if delaying harvest of the crabs would increase the number of eggs laid. Results indicate that significantly more eggs were spawned along transects within the delayed harvest treatment than in the commercial harvest treatment. There are also efforts to study the habitat, growth, distribution, movement, and rates of predation of juvenile horseshoe crabs for a better understanding of the biology of this species.

Regional Taxonomy Center

A full awareness of the biodiversity of the region's natural bounty is implicit in SCDNR's strategic goals related to our natural resource base. Mindful of those goals, and of the impending taxonomic crisis, the MRD has proposed the establishment of the Southeastern Regional Taxonomic Center (SERTC) in Charleston, South Carolina. This center, which has just been funded, will provide a regional focus on developing taxonomic expertise and skills, as well as the infrastructure needed to support taxonomic endeavors of the regional scientific community.

Environmental and Wetland Habitat Research Programs

MRRI's Environmental Research program conducts studies to evaluate the consequences of human-related activities on marine and estuarine resources. Research emphasis during this year included: (1) continuing the second year of a major new state-wide monitoring program to assess the condition of South Carolina's estuaries; (2) continuing development of new approaches to identify pollution stress in estuarine and marine populations; and (3) evaluating the impact of other (non-polluting) anthropogenic activities on critical habitats and communities. Information produced by MRRI scientists is used by OEM and other Divisions of the SCDNR to comment on various permit requests and to develop policy positions related to water quality, sediment quality, and land use issues.

Estuarine Habitat Quality Studies:

During FY 2000-2001, staff completed the second year of sampling for the state-wide monitoring program designed to annually evaluate the environmental condition of South Carolina's estuaries using a variety of physical, chemical, and biological measures. The primary objective of the *South Carolina Estuarine and Coastal Assessment Program (SCECAP)* is to evaluate overall estuarine habitat quality and biotic condition throughout the state's coastal zone in a manner which is integrated with and complimentary to SCDHEC's Water Quality Monitoring Program. Sites are selected each year to represent both open water (rivers, bays and sounds) and tidal creek habitats (important nursery areas) using sampling methods that permits us to quantify the percentage of each habitat type that meets, or does not meet, a desired level of quality. A comprehensive sampling effort is conducted at each site by SCDNR and SCDHEC to measure water quality, sediment quality, and biological condition. Approximately 60 sites are sampled each year. The environmental data collected include basic water quality parameters (e.g. dissolved oxygen levels, salinity, temperature, pH,

nutrients, biological oxygen demand, fecal coliform concentrations) and measures of sediment composition and sediment contaminant levels. Biological response measures include assays that measure sediment toxicity and sampling to assess the condition of the bottom-dwelling biota, plankton, and demersal finfish and crustacean assemblages.

Preliminary results from 1999 and 2000 indicate a clear need to evaluate these habitats separately to identify levels of stress and show that many of the water quality criteria normally used for larger open water bodies may not be applicable in the smaller tidal creek systems.

Pollution Assessment and Toxicology Studies

In addition to the SCECAP and Tidal Creek Habitat Studies described above, several studies were conducted by staff to evaluate the effects of stress on estuarine habitats and biota. One study focused on the former Columbia Nitrogen plant on the Ashley River in the Charleston Harbor estuary. This study was conducted in cooperation with USEPA, Black & Veatch, and DHEC. A series of water quality and biological effects studies were conducted to determine the biological effects of sediment contamination (especially iron and lead), and the effects of the very low pHs observed at this site. Significant biological effects in the adjacent marsh were observed, and the final risk assessment document from EPA is currently under review.

The Land Use – Coastal Ecosystem Study (LU-CES) was initiated this fiscal year to assess estuarine conditions in the Okatee River, an area of rapid development. Sampling for this study began in December 2000 and will continue into 2003. The goal of the study is to understand the effects of human induced changes in land use patterns on coastal resources and identify the ecological processes that control the condition of tidal creeks and estuaries. The project is funded by the South Carolina Sea Grant Consortium and includes researchers from University of Georgia, Skidaway Institute of Oceanography, Clemson University, University of South Carolina, United States Geological Survey (USGS), National Ocean Service Charleston Laboratory, Beaufort County, and SCDNR. In particular, SCDNR is performing cooperative research with USGS and Beaufort County. USGS has placed instruments to measure streamflow in each of the two creeks. Beaufort County's role in the LU-CES project is to evaluate the land use and impervious surface in the watershed surrounding each creek. MRRI is providing technical support, laboratory space, and housing at the Waddell Mariculture Center for all LU-CES researchers and is actively conducting research on processes controlling water quality, nutrient dynamics, and the benthic (bottom dwelling biota) community in two tidal creeks (i.e., Malind Creek and Okatee Creek). The benthic community has been sampled monthly since December to evaluate the production of the dominant oligochaete and the types and abundances of oligochaetes in the two creeks. Semi-continuous monitoring of water quality in the two creeks was established in December and will continue into the next fiscal year. This monitoring has shown that low DO levels occur in the two study creeks during the winter and spring and that salinity is highly variable, ranging from fresh water to near full-strength over a single tidal cycle.

A study entitled "Evaluation of the Impacts of Dock Structures on South Carolina Estuarine Environments" was initiated in this fiscal year through funding from SCDHEC/OCRM to assess the impacts of docks on critical habitats. The Dock Study began in February of this fiscal year with a final report expected in the winter of 2002.The study will not collect new data, but instead was designed to utilize previous monitoring data collected by SCDNR and others. SCDNR convened a workshop with OCRM and SCDNR staff on June 6, 2001 at OCRM to discuss the present knowledge and proposed tasks. The workshop was very successful and a plan of study was established. The resulting plan of study will include three main components: (1) comparing parameters measured for SCECAP tidal creek sites and TCP tidal creeks with docks and without docks; (2) modeling the amount of *Spartina* shading due to docks that occurs in localized systems and throughout the state; and (3) working with OCRMs contractor in developing surveys for dock owners and non-dock owners to evaluate use and perception of docks.

The use of biomarkers (physiological or biochemical indicators of contaminant exposure or effects) are being evaluated in bivalves and other estuarine organisms. One program involves evaluating a suite of cellular biomarkers in three dominant estuarine species (oysters, grass shrimp, and mummichogs) during winter and summer periods. This work is being conducted in the ACE Basin and the North Inlet systems in order to develop a database of the biomarkers for non-polluted conditions. These studies have also provided important new information regarding seasonal and species-specific differences in the biomarkers, which will facilitate interpretation of data on the indicators collected from degraded and polluted sites by monitoring and impact assessment efforts.

Beach Nourishment and Dredging Studies

Beach erosion is a major problem for large portions of the SC coastline. Beach nourishment projects provide protection for beachfront property and restore the recreational value of the beaches. Staff continued monitoring the Myrtle Beach Renourishment project to evaluate the effects of nourishment projects on nearshore and offshore marine resources. A report summarizing the physical and biological effects of nourishment activities at one offshore sand borrow area was completed as a joint effort by MRRI and Coastal Carolina University's Center for Marine and Wetland Studies. Our findings indicated that the borrow area was filling at a similar rate to other borrow areas previously studied in South Carolina. Biological communities in the area were recovering to pre-dredging conditions, but the sediments filling the area had higher mud content than before dredging occurred.

The Charleston Ocean Dredged Material Disposal Site (ODMDS), located 7 miles off Charleston, is a repository for uncontaminated sediments dredged from Charleston Harbor shipping and entrance channels. An interim assessment of the physical and biological effects of open water disposal, funded by U.S. Army Corps of Engineers (USACE), was completed. The first sampling effort was a joint effort by the U.S. Geological Survey and Coastal Carolina University. The second sampling effort was conducted by MRRI, and collected sediment composition, sediment contaminant, and benthic infaunal samples. The third effort was a sediment mapping survey conducted by the Center for Applied Isotope Studies at the University of Georgia to produce a rapid geochemical characterization of the disposal site and surrounding areas.

In addition to the interim assessment, significant effort was dedicated to two other projects related to the Charleston ODMDS. First, based on findings from the interim assessment, staff identified unauthorized disposal activities occurring at the site. In coordination with the USACE and the USEPA staff organized an investigation into the impacts of these unauthorized dumps. Second, new funding from the USACE was generated to establish index hard bottom reef sites in the vicinity of the Charleston ODMDS to monitor for a five-year period. The goal of the reef monitoring study is to identify any impacts to the abundance, diversity, condition, and areal extent of these critical finfish habitats.

Harmful Algal Bloom and Phytoplankton Research Projects

The Algal Ecology research initiative was established in 2000 to determine the status of algal (i.e., phytoplankton) communities in South Carolina estuaries. These communities form the base of estuarine food webs and ecosystem health is dependent on their composition (e.g., nutritious vs. non-nutritious species) and productivity. Many of these species can form harmful algal blooms (HABs) which produce toxins and can have adverse effects on shellfish, finfish, and humans. HABs have been increasing around the world over the last two decades, and in many areas, these problems have been linked to increases in nutrient loading from human activities. MRRI's Algal Ecology research initiative was implemented with the following goals: (1) to determine the relationship between nutrient (quantity and quality) and phytoplankton community composition; (2) to determine the current distribution of HABs in SC estuaries; (3) to assess the impact of HABs on estuarine ecosystem health, including finfish and shellfish; and (4) to determine the environmental factors favoring HAB formation in SC estuaries so that future

effects on ecosystem and human health can be predicted.

In FY2000-2001, several potentially toxic species never before reported were discovered in SC. We have extended the known distribution of *Pfiesteria* (a fish-killing dinoflagellate) in SC. We also have found SC's red tide dinoflagellate, *Kryptoperidinium* sp., at an earlier period and in colder waters than previously observed, and in several estuaries where it was not known to occur. We have documented the occurrence of blooms of toxic algal species in brackish or freshwater ponds associated with residentially developed areas or golf courses in Charleston, Kiawah Island, and Hilton Head Island. Staff have linked with investigators of eagle deaths in several SC lakes (the Avian Vacuolar Myelinopathy, disease), and established a toxic algae research component. We have initiated a High Performance Liquid Chromatography (HPLC) facility for analyzing phytoplankton pigments, a nutrient analytical facility, and a molecular probe facility to detect harmful algae (e.g. *Pfiesteria, Kryptoperidinium*) by PCR. We have established a data management system complimentary to SCDNR and NOS-Charleston existing systems, and have prioritized rapid data entry as an essential program component. Finally, staff implemented a statewide secondary school volunteer monitoring network and several other outreach mechanisms to educate SC citizens about HABs.

ACE Basin NERR Research Program

During FY2000-2001, MRRI continued biological and environmental quality monitoring efforts to define trends in the *ACE* Basin NEER. The yearly summarization of the baseline data collected by the juvenile and decapod crustacean bottom trawl survey, as well as the data collected during water quality monitoring revealed no new trends in species composition or water quality, respectively.

During the year, staff shifted their focus from bottom trawl surveys to the tidal freshwater fish communities that occupy the waters adjacent to the Reserve. A five-year study of these fish communities will begin next spring to ascertain the how fish populations in this habitat are affected by seasonal changes in the ambient environmental conditions. The study will complement the efforts of the Freshwater Fisheries section to characterize important fisheries in the ACE Basin.

Staff also initiated a study during 1999 to determine the extent of *Phragmites* invasion in the Reserve. *Phragmites australis* has been discovered at several locations in the ACE Basin NERR, including waterfowl impoundments. Because the stands in the area are typically small we will use large-scale maps from the National Geodetic Survey to locate and delineate the stands. The data will provide vital information to impoundment managers.

There have been a number of cooperative studies done in the ACE NERR over the past year. The Florida Geological Survey, in conjunction with SCDNR Geological Survey, continues to investigate sea level rise in the ACE Basin NERR. Dr. Clark Alexander of the SKIO is expanding his investigations of the sedimentation processes in the ACE Basin to include St. Helena Sound.

Staff continued to integrate information produced by research efforts into the Reserve's education program that included boat trips, trail walks, coastal managers' workshops, and a variety of outreach activities for pubic and educational institutions. In addition, staff have begun to demonstrate the *ACE Basin Socio-Ecological Characterization* CD-ROM product.Oral presentations, which focus on the applicability of this product as a management tool, are being given to agencies, local governments, land managers, conservation groups, and private citizens.

Water Quality Synthesis of the National Estuarine Research Reserve System

Detailed analyses of water quality data collected at NERRs locations between 1996-1998 were completed. As a general rule, tidal cycles were the primary influence on water depth, salinity and dissolved oxygen at locations where moderate tides were experienced. Daily fluctuations in these parameters on the order of 20°F (water temperature), 10 ppt

(salinity), and more than 100% saturation (dissolved oxygen) were not uncommon, particularly during the summer months. At 89% of the sampling sites evaluated, gross aquatic respiration exceeded gross aquatic production, indicating that oxygen was consumed at a faster rate than the rate at which it could be produced. Reduction in dissolved oxygen levels below 28% saturation results in hypoxic conditions, the frequency and duration of which was found to be strongly influenced by latitude and climate for the data set analyzed during this study (i.e., areas with warmer weather experienced more and longer hypoxia events than cooler areas).

The findings of this project revealed the properties of water quality parameters in shallow estuarine systems over daily, seasonal, and inter-annual cycles. Similarly, the highly variable nature of these systems illustrated the importance of monitoring these systems on a semi-continuous basis in order the better document and understand natural (i.e., weather systems) and manmade (i.e., pollution, habitat alteration) disturbances to these areas. Efforts are currently underway to examine NERRs data for the years 1995, 1999, and 2000 as part of a follow-up synthesis project. The anticipated benefits of this second report include complete analysis of all years of archived data as well as the use of a longer time series (1995-2000) to begin to examine the effects of climatological shifts (i.e., El Niño/La Niña) on water quality.

Mariculture Programs

During recent decades, many wild fishery resources have been exploited by recreational and commercial sectors at non-sustainable levels. Consequently, many fisheries are depressed and various regulations are in place to attempt restoration of these over-harvested resources. Seafood products and supplies have also varied as a direct result of the changes in fishery landings. Since its inception, MRRI has focused some of the research it conducts on development of tools to increase fishery resources as well as the development of new farmed seafood products. Research areas include: (1) development of environmentally sustainable technology for producing seafood products; (2) utilization of hatchery produced organisms as surrogates for their wild counterparts to improve fisheries assessment evaluations and ecosystem management; (3) development of technology to produce new species of seafood; (4) testing the potential of increasing fishery resources through releases of hatchery produced fish; and (5) technology transfer of important findings to the private and other public sectors. In addition, MRRI's mariculture program routinely provides animals, expertise, and holding facilities to various universities, and state and federal programs.

New Species Culture Development

A cooperative program continued to focus on development of culture techniques for southern flounder and black sea bass. Both species are harvested recreationally and commercially in SC. Using controlled environment tanks and hormonal injections, both species were conditioned to spawn. Control of volitional spawning of flounder continues to be problematic. A mechanical failure during January 2001 resulted in a significant temperature change in the flounder maturation tanks. As a result, captive flounder did not mature and no larvae were produced during spawning experiments. Black sea bass were obtained from the wild after the mechanical problem was corrected. Altogether ninety brood fish were split evenly between our hatchery and a private hatchery. MRRI produced only 125,000 eggs from both tank and strip spawning experiments. However the private hatchery had more success producing 3,990,000 eggs from tank spawning with help from DNR staff. From those eggs 603,075 larvae hatched. Larvae were stocked into intensive tank and extensive pond nursery systems. No fingerlings were produced from the pond systems however approximately 20,000 juveniles were produced in the indoor intensive systems. These fingerlings are currently being performance tested in a series of environmental tolerance and diet studies.

Preliminary trials were begun examining the potential for raising cobia in captivity. One group of 25 brood fish captured from local estuaries, and held in outdoor tanks receiving flow-through water, were volitionally spawned

during early June and produced over one million larvae. Fry were stocked into nursery ponds and at the end of the fiscal year it appeared that both survival and growth of juveniles were excellent in all ponds stocked. Additional studies are planned for this important recreational and commercial species during the coming years.

Refinement of Commercial Culture Techniques

Marine shrimp production continues to be an important segment of mariculture in SC. Recent research has focused on improving the environmental and economic sustainability of this industry. Efforts over the past year have continued to make important progress in several areas.

Environmental sustainability: SCDNR has been a leader in developing technologies to mitigate environmental impacts of coastal mariculture by improving feeds and feeding, filtration and sedimentation technologies and reducing or eliminating water exchange. Studies on the microbial ecology of zero exchange pond- based systems provide the basis for improving efficiency and increasing carrying capacity.

Advanced production systems: Application of greenhouse enclosed raceway-based super-intensive biosecure production technologies is demonstrating technical feasibility while identifying potential bottlenecks to commercialization. Studies on improving hatchery technologies and establishing a cryobank for the preservation of high health and genetically selected seed stocks serve to assure the long term viability of seed supplies.

Disease control: The study of viral disease in wild and farmed shrimp remains a major priority. With the awards of increasing levels of federal grant funding, studies (both basic and applied) continue to address risk assessment and management issues.

Financial sustainability: Studies to evaluate double cropping strategies and farming of marine shrimp in low salinity waters are aimed at improving the outlook for industry expansion in SC. Double cropping may provide a means to reduce risk and thus encourage small family based farms in the coastal zone. Investigating the potential of marine shrimp farming in low salinity waters is being undertaken to provide new aquaculture options for inland SC aquaculture producers.

In-State Shrimp Hatchery Initiative

An expansion of in-state shrimp hatchery capabilities was initiated in FY99-00. This hatchery should help avoid the introduction of non-native shrimp diseases into SC waters as well as increase supplies of high quality shrimp seed to SC farmers. The expansion is being accomplished through a grant from NOAA. Funds were also provided to increase seed production at two commercial hatcheries, and to build additional maturation, larval rearing and broodstock production and holding facilities at the WMC. The construction and improvements at the WMC have been completed. Much of the work focused around the construction of a biosecure greenhouse designed to produce high health broodstock.

Red Drum Stocking Study

Historically, the Ashley River has consistently had the lowest abundance of red drum of any estuarine system sampled in the state by MRD personnel. In Fall 1999, approximately 600,000 red drum juveniles (1-2 inches) were released into this river in an attempt to increase abundance of legal size (14") fish the following year. In the summer and fall of 2000, random samples of the red drum populations indicated that for the first time, the Ashley River had the highest recorded abundance of 10-15 month old fish of any estuary in the state. Further, a sub-sample of the population demonstrated that the four-fold increase in abundance recorded was a direct result of the stocked fish. During fall, 2000, a study on use of a non-toxic insecticide (Agnique) for control of predacious air breathing aquatic insects was conducted during the production of red drum fingerlings. Agnique was applied to nursery ponds prior to stocking. The chemical resulted in a significant decline in density of predacious insects and in ponds with similar densities of planktonic food items the treated ponds produced twice as many red drum juveniles as the untreated ponds. This

approved treatment has the potential to greatly increase production efficiency of red drum nursery ponds. During the fall, 1.5 million juveniles were produced and marked. The juveniles produced were released in the Ashley River at the same density as last year and in the Wando at a lower density to test the effect of stocking density on abundance of legal size fish.

Restoration and Enhancement Coastal Species

Seabeach amaranth is a beach plant that is federally listed as threatened. The number of wild plants along the SC coast decreased to 210 wild plants in the summer of 1998 and further declined until no plants could be located in summer of 1999. Four wild plants were identified in the summer of 2000. Clippings were excised by WMC staff from a portion of the remaining wild population, rooted and grown to produce seeds. During the spring of 2000, WMC staff distributed approximately 2,500 plants to locations in coastal SC.

Mariculture Extension Activities

Information obtained from the various research projects described above were provided directly to SC aquaculture growers through workshops and conferences. MRRI extension specialists made over 100 visits to aquaculture operations to discuss problems and to assist in resolving them. During the year, emphasis was placed on shrimp hatchery technology transfer as commercial shrimp hatcheries in SC expanded operations. In addition, a number of clam hatcheries initiated operations with technical advice from MRRI staff. These types of interactions and relationships provide the most effective methods for transferring technology from researchers to businessmen.

Graduate, Undergraduate, High School and Public Education (update!)

Close educational relationships have continued between the MRRI staff and scientists and UoC, MUSC, USC, CU and several other regional academic institutions. During FY 00-01, MRRI staff contributed as full faculty and adjunct faculty in committees, in advising graduate students (approximately 35, at present) and in teaching specialty courses. Undergraduate and high school students are advised and/ or mentored in projects. Staff also participated in teachers workshops, science fairs, and in presentations at professional meetings and to general audiences., as well as many SC DNR educational activities (Southeastern Wildlife Exposition, Sportsman's Classic, etc.).

Minority Training and Recruitment

During FY 2000-2001, the MRD Minority Internship and Training Program continued to be administered and supported by MRRI staff and scientists. The internship program focuses on encouraging minority students to choose careers in marine or natural science and, possibly, with the SCDNR. Each summer, MRD's Minorities In Marine and Environmental Science program provides opportunities for undergraduate students to conduct independent research projects guided by a mentor from MRD or one of the other agencies at the Marine Center. A total of 47 minority students have participated in the summer training project to date.

Marine Resources Library

During the past year the Marine Resources Library (MRL) received as gifts the professional libraries of Dr. E. W. Seabrook Hull and Mr. Frederick Henry Berry, renowned

marine scientists. These additions plus the continued support from SCDNR, CoC and NOS have given us the largest growth in our book collection that we have seen in recent years. The library added 591 new titles and 375 added volumes during the past year. The net growth of the library's book collection gives MRL a grand total of 24,177 volumes; this represents 21,640 unique titles. Since the library is receiving consistent funding for periodical binding from all three agencies, the bound periodical collection now totals 8,602 volumes.

In Section I, the 2000-2001 Annual Accountability Report, several long-term performance measures are included for budget programs in the DNR. In this section, a variety of additional long term performance measures are provided as follows:

DIVISION OF CONSERVATION EDUCATION AND COMMUNICATIONS

ADVISORY COMMITTEE

Danny Ford, Chairman
(July 99-July 02) ..... Central

A. Pinckney Skinner, III ..... Florence

Carolyn Fair Randolph ..... Columbia

Robert E. Livingston, III ..... Newberry

Charles L. Wyrick, Jr. ..... Charleston

Charles Harrison ..... Columbia

Caroline Stephenson ..... Columbia

Jessie D. McCollough ..... Kingstree

Andrea Adams ..... Murells Inlet

Richard B. Peterson ..... Gilbert

The Division of Conservation Education and Communications (CEC) with offices in Columbia and Charleston is staffed by 39 full-time personnel supporting all divisions and programs of the S.C. Department of Natural Resources. The Division's goal is to assure that information and education efforts are the result of proper planning and coordination, keeping in mind the needs of the public, agency goals, cost effectiveness, thorough review, accuracy and professional standards.

CEC provides the following agency-wide services: Conservation Education programs, Becoming an Outdoors-Woman program, SC Reel Kids Program, publication advisement, coordination and design, art and graphics, duplicating services, agency mail room, *South Carolina Wildlife* magazine production, agency news releases, weekly fishing trend reports, news media assistance, writing and editing, spokesperson services, video production (training, documentary, public service announcements) and video library (free loan instate).

EDUCATION SECTION

Project WILD and Aquatic WILD

Project WILD and Aquatic WILD are internationally known, award winning environmental education programs. Instructional material and workshops supplement any curriculum and support grades K-12 teachers, youth leaders and other types of groups. Each workshop participant receives the teaching manual that contains over 100 activities. Workshops are six hours in length and require a minimum of 15 participants. There are no charges for these programs. For the School year 2000-2001 there were 56 workshops with over 983 particpants.

Workshops were conducted in 15 different counties throughout the year. There is a $30 charge per program.

There were 3 Advanced Project WILD workshops: Loggerhead Legacy, Wild and Crafty, and All About Aquariums. A total of 63 people participated in these workshops.

Partners included in this years programs were: Harry Hampton Memorial Fund, Forestry Commission, USC - Beaufort, PRT, Walmart, SC Aquarium, and Charleston County Parks.

Camp Wildwood I, II, III

Camp Wildwood is designed for high school students and strives to increase their knowledge and experiences in natural resources. The camp uses Kings Mountain State Park and is open to all students in grades 10 through 12. Three different levels of the camp are available. Camp Wildwood was full again this year with over 135 campers. Partners included in this years programs were: Harry Hampton Memorial Fund, Forestry Commission, USC Beaufort, Parks, Recreation and Tourism (PRT), The Garden Club of SC, The Wildlife Federation & Edisto River Canoe and Kayak.

Jr. Duck Stamp Contest

The Jr. Duck Stamp Contest is a cooperative effort between the US Fish and Wildlife Service and the Southeastern Wildlife Exposition. It is a way for students K-12 to express their interest in natural resources through the medium of art. There were over 700 entries in this years competition. Support came from the SE Wildlife Expo, Harry Hampton Memorial Fund, US Fish and Wildlife, Kitchings Mill Social Club and several artists.

State winners are displayed at several events during the year. The Best of Show is entered into the national contest and is displayed with other state winners around the country.

Aquatic Education

The Aquatic Education program is a joint effort between the CEC Division and the W&FWF Division. It is a comprehensive program designed to increase awareness, appreciation, and use of our aquatic natural resources. There are many segments to this program including teacher training workshops (Aquatic WILD), family seminars, school visits and a youth program called "SC Reel Kids". SC Reel Kids features activities such as catching your first fish, participating in Reel Art (an aquatic art contest), visiting a fish hatchery and more. This program was introduced March 2000 at the Palmetto Sportsmen's Classic. Several brochures and printed items were developed and distributed such as the Freshwater Fishrulers and Freshwater Fishing Spots. Fishing 101 became a popular class for the public after being introduced through BOW. There were several fishing rodeos across the state, which are always popular. The Fishing Tackle Loaner Program has increased the number of sites having tackle available to the public.

Conservation Education Programs:

The Conservation Education Program is designed to introduce students K-12 to the DNR. This program involves

the use of live animals and enhances any curriculum and can be arranged to fit into any lesson plan. There is a $35 charge per program. For the School year 2000-2001 there were 168 school visits (average 5 programs per day) with over 27,330 particpants. Programs were conducted in 28 different counties throughout the year.

Becoming an Outdoors-Woman

Becoming an Outdoors-Woman (BOW) is in its 6th year and continues to draw over 300+ women per year to workshops that offer instruction in hunting, fishing, camping, boating, coastal activities, and other nature-related outdoor activities.

In 2000-2001 following events were held.

October 20-22, 2000 114 participants	Weekend Workshop Clemson Outdoor Lab
April 21, 2001 78 participants	Coastal One-day workshop DNR Marine Center
May 18-20, 2001 65 participants	Weekend Workshop Clemson Outdoor Lab
June 6, 2001 49 participants	Ladies on the Lake Lake Murray Marine Patrol

BOW also supported the public draw hunts program of the Wildlife & Freshwater Fisheries division. The program offered the first "women only" hunts on Wildlife Management Areas to provide more opportunity for females to participate in these sports in a non-intimidating atmosphere.

In 2000-2001 the following hunts were held.

September 29-30, 2000 30 participants	Deer Hunt Webb WMA
October 15-16, 2000 26 participants	Deer Hunt Fant's Grove WMA
November 3, 2000 8 participants	Deer Hunt Moultrie WMA
November 21-22, 2000 15 participants	Waterfowl Hunt Samworth WMA
December 2, 2000 4 participants	Quail Hunt Wing & Point Shooting Preserve

Staff promoted the BOW program at the Palmetto Deer Hunters Banquet and Palmetto Sportsman;s Classic in Columbia, Southeastern Wildlife Expo and Harrry Hampton Banquet in Charleston, Harry Hampton/SC Wildlife Officers Assoc. Banquet in Anderson, Harry Hampton Banquet in Spartanburg and various education programs throughout the state.

The BOW mailing list of over 3,100 women interested in outdoor activities was maintained.

Staff continued to seek new sponsors for funding, equipment and supplies, class instruction and educational materials.

Other Education Efforts

Staff from the CEC Education Section offer tremendous support for the other divisions' education programs and agency efforts. Staff supported the DNR in programs such as ENVIROTHON, BOW, SC Conservation Workshop for Youth, Carolina Coastal Adventure, Hunter Education, Cadet Academy, Environmental Institutes for Teachers, Teacher's Wildlife Conservation Workshop, Project WET, Teaching KATE and all Marine Education Programs. Staff has worked with DHEC, SC Forestry Commission and PRT on combined education programs as well as Clemson, USC, SC State and many other colleges and universities. Staff have also been instrumental in the agency's Education Council, acting as co-chair and chair of many sub committees.

MAGAZINE SECTION

As a part of the Conservation Education and Communications Division, magazine section's primary function is publication and promotion of South Carolina Wildlife, the DNR's nationally recognized bimonthly conservation magazine and flagship educational and public relations tool. South Carolina Wildlife informs the public of the value of the state's natural resources while acquainting them with the agency's programs to protect and manage these resources that affect our quality of life. Magazine section also is responsible for a variety of projects that range from maintaining the division's reference library to coordination of the annual Palmetto Sportsmen's Classic. These diverse efforts support accomplishment of the goals that make up CE&C's objective within the DNR's strategic plan.

Featuring articles on outdoor activities, natural and scenic areas, character profiles, conservation issues, wildlife-watching, outdoor humor and news, South Carolina Wildlife also extols the natural resources of our state and promotes its historical and cultural values, encouraging tourism, visitation and conservation of our natural resources.

Working closely with DNR Wildlife Diversity Section staff, SCW produced a special 64-page issue observing the 25th anniversary of the Heritage Trust Program. Titled "Preserving Our Natural Wealth," this special issue traced the history of the program, provided a current-status report, and looked toward the conservation future of Heritage Trust. A complete listing of the 62 Heritage Preserves protected at the time of publication completed the issue. Heritage Trust staff have used the issue to successfully promote the program and raise public awareness of the agency's land-protection efforts.

Staff also produced 75,000 copies of a 16-page Boating Safety supplement, supporting the education arm of DNR Law Enforcement Division. This was available in June 2001, peak boating season.

SCW continued to explore inter-agency cooperation, extending its agreement with S.C. Parks, Recreation and Tourism's State Park Service to publish feature articles that promote the outdoor interests of both agencies. SCPRT has included funding to cover the cost of such articles in its 01/02 budget. Names provided by Parks receive SCW promotions materials.

Another cooperative agreement renewed between SCW and the South Carolina Aquarium continues to provide the opportunity for joint efforts in marketing and product development.

South Carolina Wildlife each year brings recognition to the agency and the Palmetto State for excellence in photography, writing and design through its participation in national competition. The publication received awards from the Association for Conservation Information (ACI), which brings together journalists and educators from state and federal wildlife agencies nationwide. The magazine won recognition for its feature writing and for color photography on posters being sold in The Wildlife Shop. A feature articlewon first place in the Isaak Walton League's Outdoor Ethics competition. Funding constraints limited SCW's participation in other competitions.

Editorial and marketing/promotions planning moved forward, with staff continuing a 12-to 15-month advance schedule and meeting bimonthly with coordinators from other divisions. Magazine subscription sales increased some 3 percent over the previous year with paid circulation averaging about 57,000. The publication continues to achieve one of the highest renewal rates and per capita distribution of any in the 15-member magazine cooperative.

A corporate subscription sales program, "Friends of SCW," was initiated in 99/00 and materials designed and printed for use as outlined in the magazine's business plan goals. Due to the loss of one marketing FTE, those materials are used sparingly, dependent upon staff time and travel funds being available.

Magazine photography staff, whose primary responsibility is to provide the photographs that illustrate and support magazine articles and product-promotion materials, also are responsible for still photography used by the agency in research, outreach and public relations efforts. Photographers from the section regularly provide photo support and expertise to other divisions and agencies, including taking ID photos of DNR personnel and portraits of DNR Board members. Use of a digital camera provides technologically advanced possibilities for product presentation and posting of features on the SCW Web site.

Magazine production schedules have been set up to allow readers to receive their magazine at least one week ahead of each issue's publication date. Layout and design capabilities were enhanced by the art director's and editorial assistant's successful interaction with the printer and color separator via computer technology. A sampling of photographs and text from issues of SCW may be on its Web page at www.scwildlife.com. Each issue, including The Wildlife Shop products offering, is online, and past issues are avaialble in the site's archives. Customers can subscribe online, and as soon as funding is available, online ordering from The Wildlife Shop will be enabled. Staff regularly receives the comments, questions and feedback from Internet visiters.

SCW's fall products catalog was again produced and distributed, increasing our sales successes over those of last year. Total sales rivaled that of last year, even though a deliberate decision was made to delay the annual calendar production and marketing so that revenues were receipted this coming year, rather than during 2000-2001. Staff began working toward ways to print both a holiday and non-holiday catalog as well as envelope inserts for selling through flyers in magazine subscription billings and product shipments, special phone order product discounts and e-mail marketing offers. A toll-free telephone number makes ordering more appealing to customers.

As in previous years, products were carefully chosen for high quality and education potential, as well as unique appeal. Several children's clothing and natural resource, hobby-type toy items were added with success.

SCW again conducted its annual Young Outdoor Writers' Competition, encouraging fifth through twelfth graders to write essays exploring land-use planning options for a tract of urban or suburban riparian land. State Superintendent of Education, Inez Tenenbaum addressed a gathering of the statewide winners at a luncheon at the Palmetto Sportsmen's Classic in March and presented the awards to the ten statewide winners and their sponsoring teachers. First-place winning essays in the three categories were published in the May-June issue of SCW. Judges for the competition were provided by the Coalition for Natural Resource Education.

Organization and administration of the annual Classic is the responsibility of the CEC Division, under Magazine section. Held each March in Columbia at the S.C. State Fairgrounds, the Classic is a three-day regional outdoor event co-hosted by the DNR and the Harry R. E. Hampton Memorial Wildlife Fund. The 2001 Classic, in is 17th year, drew in excess of 40,000 participants.

Attracting people of all ages and emphasizing the appreciation, wise use and stewardship of South Carolina's diverse natural resources, the Classic seeks to increase public awareness of natural resources through interactive educational activities, seminars and exhibits as well as provide a forum for vendors to offer for sale the latest in hunting, fishing and other outdoor-related products. A variety of activities and attractions encourages interaction, builds skills and generates enthusiasm for outdoor-related recreation, while promoting public awareness in helping conserve the Palmetto State's natural resources and quality of life.

The Classic is the DNR's principal public outreach program, and other state agencies plus public and private organizations exhibit, get involved and provide assistance to help ensure the viability of this unique outdoor event. The Classic provides support and exposure for many other DNR outreach programs, with special emphasis on SC Reel Kids and Take One - Make One. Special exhibits and activities

draw public attention to these two worthy programs. Each year the Classic also chooses a specific educational theme to provide children a hands-on educational activity while attending the event. For 2001, kids attending the show could build and take home a working bird feeder, complete with starter pack of birdseed. Over 2,000 feeders were built during the three-day weekend.

With the ongoing support and counsel of the DNR Board and the CEC Advisory Committee, South Carolina Wildlife magazine continues its tradition as South Carolina's own magazine, portraying the best of the natural Palmetto State.

GRAPHICS, DUPLICATING AND MAIL SERVICES

The Graphics, Duplicating and Mail Services Section includes the graphic design unit, the duplicating center and the mail services center, and acts as the agency's coordinator for all publications. All mail, in-house duplicating, graphic design and outside printing is coordinated through this section on a large variety of assignments that include all publications for the department except *South Carolina Wildlife* magazine and certain special projects or technical reports that are assigned to other sections. The section processes work through requests from each division. Once a project is approved, work is completed by direct interaction with the requestor, or writer, of the project. The overall supervision of the section is the responsibility of the Support Services Coordinator.

Graphics

In the graphics design unit, the publications coordinator provides day-to-day supervision of all art work and printed documents as well as defines job specifications for procurement. The assistant publications coordinator is responsible for proofing, verifying and coordinating internal work flow. In addition to these positions, this unit includes four graphic artists all of whom design, layout and assist in the production of agency publications and special projects. Three hundred thirty-five jobs were produced by this unit, supporting the Administrative Services Division with 58 jobs, Wildlife & Freshwater Fisheries with 113 jobs, CEC with 75 jobs, Land, Water and Conservation Districts with 28 jobs, Law Enforcement with 28 jobs, and the Marine Division with 13 jobs.

The objective of the section is to produce and distribute all necessary publications to the agency for: 1) Management, research and law enforcement goals, 2) Protecting and enhancing resources and habitat, and 3) Providing wildlife and fishing and general natural resources enjoyment. Since the department is required to produce and distribute information regarding hunting and fishing rules and regulations and the use of wildlife management areas, this section prepares and updates any publications affecting those activities in the state. Typical of such publications are the annual combined hunting/fishing rules and regulations, turkey hunting regulations, migratory bird regulations and wildlife management area maps that require updating each year. The section also provides a wide variety of general information on individual wildlife species, management and research facilities, game management techniques, conservation, education, fishing, boating, and recreational outdoor sporting activities.

Duplicating and mail services

The duplicating and mail services center is staffed by three full-time employees with one hourly employee. Duties include all in-house duplicating, mail processing/distribution, and courier services. Staff processed approximately $171,264 in postage from the Dennis Building and ran over 1,867,524 impressions on its AB Dick presses.

DNR COMMUNICATIONS SECTION

Over the past fiscal year the DNR Communications Office made significant advances in media relations, news media coverage, information and image distribution, and airing of agency public service announcements on radio and television. Plans are to maintain and improve communications for the upcoming fiscal year, but to do so with an eye toward maximum effectiveness for minimal expenditure.

Purpose: The Communications Office within the Conservation Education and Communications Division provides overall news media, audio and video production services to all divisions of the agency and its cooperative projects with other government agencies, public utilities, organizations and private companies. It served the public through timely and widespread dissemination of needed information, and images.

Through news releases (distributed via mail, fax, e-mail, modem and the DNR Web page) and video and audio productions, the DNR Communications Section:

- Informed and educated the public about the condition and value of South Carolina's natural resources;
- Provided a primary spokesman for office and field operations covering the agency as a whole;
- Planned and coordinated agency-wide public relations, employee Awareness training and media relations training;
- Encouraged ethical and safe conduct afield among outdoors enthusiasts;
- Informed constituents of agency services, application deadlines and points of delivery;
- Provided information on outdoor recreational opportunities;
- Informed constituents of meetings, pending department actions and opportunities for public input; and
- Updated the public on state and federal laws and regulations.

Staffing: The DNR Communications Office includes seven positions (public information and videography) in two offices; Columbia (headquarters) and Charleston. Services are provided agency-wide in news writing; agency spokesperson; television and radio production; news media coordination; video production; South Carolina Wildlife magazine support; script and speech writing; staff orientation; delivery of public statements; public speaking and education; and allied areas in support of all divisions and responses to inquiries from the public and the news media.

Media Relations: The communications director maintains a menu driven 24-Hour News Line that delivers breaking news, voicers and sound-bites on demand via a toll-free number (877-SCDNR-11). The system receives 75 to 100 calls a month and has resulted in a noticeable increase in radio news coverage.

By telephone, the communications director handled approximately 100 media inquiries per month and responded to numerous emergency situations that required on-the-scene media coordination and public information support to all agency divisions.

Video: Video staff produced numerous TV Public Service Announcements, educational, instructional, training videos and special projects. Significant video projects include PSA's on boating safety, the Palmetto Sportsmen's Classic, hurricane preparedness and drought. Other videos include Camp Wildwood, Take One - Make One, sea turtle nest protection, the Walhalla Fish Hatchery, S.C. Reel Kids, Hunter Education, and DNR Careers.

The video staff completed a one-hour SCETV production titled Pass It On Down: Protecting South Carolina's Special Places, which aired April 20. With scripting and narration by Communications Director Mike Willis, Pass It On Down examined conservation practices in South Carolina, especially as they relate to land, water and wildlife. Several state agencies contributed time and video to the project, produced

and edited by John Lucas and Glenn Gardner at the agency's video production facility in Columbia. NatureScene host Rudy Mancke graciously served as the on-camera host. Additional airings are possible on SCETV, and copies of the production were requested state-wide by educators and conservation-minded entities.

News Releases: More than 370 statewide and regional news releases and media notices were produced by the Communications Section working in partnership with all agency divisions and the executive office. The weekly news release package is distributed (by e-mail, modem, fax, mail and web site) to all news media with South Carolina readers or audiences (including media in border states and in the region); to DNR enforcement officers, agency staff, board and committee members and to requesting conservation groups and agencies.

Mail-free Distribution Goal: Staff continued the development and fine-tuning e-mail address list and fax list of all S.C. news media, as well as regional media with SC interest, working toward the goal of completely electronic news release distribution with no need to print paper copies or mail them by the standard mail system. Mail-free news release distribution is projected to save at least $8,000 in annual mailing costs alone.

In March 2001 to reduce budget expenditures for mailing and printing weekly news releases, the Communications Office, after consulting with affected parties, switched the DNR conservation district offices and field law enforcement offices to e-mail distribution and web page access, saving approximately $4,600 in postage annually, not counting savings in paper, printing supplies and staff time.

At the request of the Myrtle Beach Sun-News the Communications Office in September 2000 began e-mailing the newspaper an early copy of the two fishing reports on Wednesday to meet the deadline for their new Thursday Outdoors page. Associated Press has for several years been e-mailed fishing reports each Thursday for immediate transmittal to its members for publication in Friday and weekend editions.

Digital News Photo Support: The digital news photo system for providing images to the media by e-mail was maintained, and photos (with attached print quality files) supporting news releases were regularly posted with news releases on the DNR Web page. Frequent media photo requests - beyond images accessible on the web site - are handled promptly by e-mail. To facilitate their retrieval, digital images are organized by division, often section or program, with duplicate back up storage on removable media (2 gigabyte Jazz disks).

Assistance to the DNR Executive Office: Communications staff covered monthly meetings of the S.C. Natural Resources Board, supporting all needs for news writing and distribution, as well as photography, before, during and after the meetings. Staff researched and wrote speeches for the Executive Office. Communications Office staff member Dawn Mills Campbell in June 2000 accepted additional new job duties, formerly based in the agency's Legal Office, as state Freedom of Information Act (FOIA) officer for the agency and underwent training by the legal office to take on the handling of all incoming FOI requests. An average eight FOIA requests come to the agency monthly and are handled promptly.

News On the Web Site: We continued to improve the quality of the hypertext news release posted weekly on the DNR home page by providing better formatting and supplementary photos and captions. Each digital photo has a "thumbnail" introduction supported by a second print quality 200 pixel per inch jpeg image file for downloading by news media. News releases prompted many requests from media for supporting digital images. Articles and digital photos were supplied weekly to the Budget and Control Board for posting on the state's web site at ***www.myscgov.com.***

News Clipping Archives: Staff continued to log and file newspaper and publication clippings. Hundreds of articles/

entries were entered into a searchable format supported by notebooks with date-based clippings going back into the late 1980s. Important computer files such as this archive and the news releases with indexes going back to 1992 are regularly backed up to off-line storage on 2 gigabyte Jazz disks to guard against computer hard disk failure.

Support of Other Programs: Staff also worked to plan, support and promote agency programs such as Becoming An Outdoors Woman, Envirothon, Beach Sweep/River Sweep, Zero Tolerance for Litter weekend, the Lake Murray Boating Safety Fair, Take One-Make One, the Palmetto Sportsmen's Classic, National Fishing and Boating Week, DNR Free Fishing Days, Camp Wildwood and National Hunting and Fishing Day. Communications staff proposed special promotion and publicity photos for the Weefutt miniatures in the Wildlife Shop prior to the winter holiday season and worked with DNR Graphics to create a Weefutt button for the DNR web page linking it to the Wildlife Shop catalog. A news release and photos were published about the DNR Weefutt conservation mascot miniatures and other South Carolina exclusive products available in the Wildlife Shop.

Becoming An Outdoor Woman Support: Communications office staff worked throughout the year to support the agency's Becoming An Outdoors Woman program with statewide news releases, video assistance, planning, logistics and workshop instruction. In April 2001 specifications were developed to bid out kayaks, accompanying gear and trailer that will be used in BOW program with equipment to be paid for by boating education section of the DNR Law Enforcement Division. An extensive course outline was completed for BOW kayak class in April 2001 which includes a beefed-up section on boater safety. News editor Greg Lucas aught backpacking and kayaking courses at two BOW Clemson workshops, October 2000 and May 2001 (four classes at each workshop). Videographer Glenn Gardner taught the photography class, provided sound system support and shot video for pending BOW video update.

Jocassee Gorges Support: Staff coordinated and edited the DNR Jocassee Gorges newsletter and chaired an outreach committee to communicate problems, issues and concerns with project partners and the general public. Communications staff - providing text, digital photos, review and other content needs - Web worked with designer Adam Tyner to complete the Jocassee Gorges Web site. The Web site offers information on all aspects of Jocassee Gorges and allows them to request Jocassee Journal newsletter subscription and Jocassee brochure. Requests routed to editor Greg Lucas in the Communications Office.. The first two issues of Jocassee Journal, newsletter of Jocassee Gorges, were completed during the year. About 6,000 copies of the new Jocassee Gorges brochure were delivered in July 2000 to Clemson Extension Service offices in Walhalla, Pickens and Anderson, to Andrew Pickens District office of U.S. Forest Service, and to Oconee, Devils Fork, Keowee-Toxaway and Caesars Head state parks. Another 1,000 Jocassee Gorges brochures were delivered to each to Greenville and Spartanburg Clemson Extension Service offices for distribution, and to Marine Center in Charleston.

Communications staff member Greg Lucas completed and submitted a Transportation Enhancement Program grant in March 2001 for Jocassee Gorges Visitors' and Education Center at Keowee-Toxaway State Natural Area, including three revisions requested by DOT. He worked with Tom Kohlsaat on CARA-funded Jocassee Gorges education specialist to be stationed at Keowee-Toxaway. Work was begin by Lucas with Land, Water and Conservation Division on a comprehensive map of Jocassee Gorges showing roads, campsites, trails, etc. Lucas prepared and submitted a$5.6 million grant application to National Scenic Byways Program for Jocassee Gorges Visitors' and Education Center in June 2001.

Media Fishing Tournament: The Eighth Annual Media Fishing Tournament was coordinated and held by the Communications Office on Saturday, June 9, 2001 at the Lake Murray Marine Patrol Headquarters on Lake Murray. Over 45 statewide media representatives participated in the event, sponsored by Shakespeare Fishing Tackle, Ducane Gas Grills, South Carolina Wildlife Magazine and the Harry Hampton Wildlife Memorial Fund.

Communications Awards: In July 2000, DNR gained national honors for its 1999 conservation information efforts at the Association for Conservation Information conference in Reno, Nevada. The S.C. Department of Natural Resources (DNR) won six awards, ranking nationally in a variety of media and publishing fields. Communications Section staff received two of the six awards including Mike Creel, second place for Beetle Mania, a S.C. Wildlife magazine article and Mike Willis, third place for a DNR Free Fishing Days radio PSA.

DNR Education Statistical Data

DNR Outreach Programs

FY 00-01

PROGRAM TITLE PROGRAM CONTACT PHONE NUMBER	STAFF	FTE	NUMBER EVENTS	NUMBER PARTICIPANTS	CONTACT HOURS (PER PARTICIPANT)	CLASSIFICATION (student, adult, teacher)	BUDGET (EXCLUDING SALARIES)	BUDGET SOURCE	PARTNERS
Adopt-a-Landing Ellis Farr (803)734-9105	1	.35	4	900	na	all	$8,775	state	SC Soil and Water Conservation Districts, Charleston Parks and Recreation Commission, Georgetown Parks and Recreation Commission
Conservation Essay Contest Briana Timmerman (803) 737-0800	1	0	1	0			0	SCACD Foundation	Local Conservation Districts, SC Association of Conservation Districts, SC Conservation Districts Foundation, Inc., Land, Water and Conservation Division
Aquatic Education (Fishing 101, educ, Visits, etc.) HOFNOD SC Reel Kids Reel Art Fishing Tackle Loaner Program BeBe Harrison (803) 737-8483	6 14	.50 .25 .05 .10 .10	70 25 1 na	25,000 or more approx. 20,000 800 525 approx. 500	1-6 hours 2-4 hours na na na	students, teachers, adults students students students, teachers students, adults	$99,000 $14,000 @$2,000 $550 $2,200	USFS H. Hampton Shakespeare USPS Bank of America FWS	US Fish and Wildlife Service, Harry Hampton Fund, Shakespeare Fishing Tackle, US Postal Service, Rivers and Glen, Silstar, SC Aquarium, Phoenix Graphix,Piggly Wiggly, State Parks, Driftmaster, Bank of America
4-H FACE for Wildlife Contest Jay Butfiloski (803) 734-4024	1	>.01	1	175	na	student	$1,250	Small Game Project	Clemson Extension Service, Quail Unlimited
River Sweep/Beach Sweep Ellis Farr (803) 734-9105	1	.25	1	2052	na	all	$19,253	Contrib.	SC Sea Grant Consortium, SCANA Corp, Local Groups, SC Soil and Wter Conservation Districts
SC Junior Duck Stamp Competition Steve Bates (803) 734-3885	1	.14	2	700	na	students	$0 $1000 $200 $100	State H. Hampton Kitchens Mill Phoenix	SE Wildlife Expo, W&WF Division, Admin Division, DU, Waterfowl Assoc., US Fish and Wildlife, Kitchens Mill Social Club, Phoenix Graphix
Take One Make One Bob Redfern (803) 734-3942	1	1	84	631 Students 294 adults	1-2 Hours per	students, adults parents, general public	$40,000	Partners	USFWF, NWTF, QU, Buckmasters, State Rev., SCSPC, Bridgestone/Firestone, NRA WESTVACO, Invernational Paper Co.
Weather and Climate Science Education Sean Potter (803) 737-0800	1	.20	6	approx. 200	na	all	$3,000	NOAA	National Climatic Data Center
Young Outdoor Writers' Competition Caroline Foster (803) 734- 3967	1	.18	1	approx. 2,000	na	students, teachers	$2,250	H. Hampton Foundation	Hampton Memorial Wildlife Fund, Coalition for Natual Resources Education
Youth Hunts Tim Ivey (803) 734-4116	1	.05	25-30	275	4 hours	youth	$1200	HH Fund Contri.	Hampton Memorial Wildlife Fund, Private Industry
TOTAL	29	3.17	224	54,052			$194,778		

DNR Educational Camps

FY 00-01

PROGRAM TITLE PROGRAM CONTACT PHONE NUMBER	STAFF	FTE	NUMBER EVENTS	NUMBER PARTICIPANTS	CONTACT HOURS (PER PARTICIPANT)	CLASSIFICATION (student, adult, teacher)	BUDGET (EXCLUDING SALARIES)	BUDGET SOURCE	PARTNERS
Camp Wildood Steve Bates (803) 734-3885	25	.08	2	135	132 hours	students	$15,000 $5,500	GC of SC HH Fund	Harry Hampton Memorial Wildlife Fund, The Garden clubs of South Carolina, Inc., The South Carolina Wildlife Federation, Westvaco, Environmental Education Association of South Carollina, USFWS
Carolina Coastal Adventure Brianna Timmerman (803) 737-0800	8	.25	1	100	51 hours	high school students	$7,000	Consrv Dists, Santee Cooper Berkeley cons. Dist., Berkeley, Co.	Marine Resources, Berkeley Conservation District, Santee Cooper, Land, Water and Conservation Division, Berkeley Electric Coop.
Governor's Institute for Natural Resource Conservation (formerly known as: Conservation Workshop for Youth) Briana Timmerman (803) 737-0800	15	.05	1	68	96 hours	high school students	$33,100 $6,995	fees, contrib state	Corporate, individual and conservation district sponsorships too numerous to list. Land, Water, and Conservation Division
TOTAL	48	.38	4	303			$67,595		

DNR Teacher Education Programs

FY 00-01

PROGRAM TITLE PROGRAM CONTACT PHONE NUMBER	STAFF	FTE	NUMBER EVENTS	NUMBER PARTICIPANTS	CONTACT HOURS (PER PARTICIPANT)	CLASSIFICATION (student, adult, teacher)	BUDGET (EXCLUDING SALARIES)	BUDGET SOURCE	PARTNERS
Environmental Institutes for Teachers Briana Timmeman (803) 737-0800	6	.10	6	140	80 hours	teachers	$10,000 $2,000	fees school dist.	Local conservation districts, COC, NRCS, SCETV Wal-Mart, SCFC, SCDOE, Marine Resources Division, SC Aquarium, SCDHEC, SC Archives and History, Duke Power
Project WET Janice Conner (803) 737-0800	1	.30	20	1041	4-6 hours 12 hr workshop	teachers and Non-formal Educators	$6,000	Registration fees, Harry Hampton	SC Conservation Districts, International Project WET
Project WILD, Aquatic WILD and Advanced Project WILD Steve Bates (803) 734-3885	6	.50	56	983	4-6 hours for regular workshops, Fri-Sun Advanced WILD	teachers, adults	$18,000 $9,000 $1, 260	State HH Fund Participants	National Project WILD, SRS, Conservation Districts, USC,CU, SCU, Lander, N Greenville Col., COC, SC State, USC-B, Coastal Carolina, Anderson College, PC, USC-Spart., Furman, Harbison State Forest(Forestry Commission), DU, Wildlife Society, TU
SCMAPS Steve Bates (803) 734-3885	1	.01	4	117	2-3 days	teachers	$17,600	NSF, CHE, Participants	CU, DOE, Department of Natural Reousrces,
Teacher Wildlife Conservation Workshop Stephanie Thompson (803) 734-4001	4	.05	1	30	40	teachers, conservationists	$10,000	Grants Fees	SC The Wildlife Society, CU, Savannah River Ecology Laboratory
TOTAL	22	1.35	91	2,713			$66,160		

DNR Programs for Students/Adults

FY 00-01

PROGRAM TITLE PROGRAM CONTACT PHONE NUMBER	STAFF	FTE	NUMBER EVENTS	NUMBER PARTICIPANTS	CONTACT HOURS (PER PARTICIPANT)	CLASSIFICATION (student, adult, teacher)	BUDGET (EXCLUDING SALARIES)	BUDGET SOURCE	PARTNERS
Becoming an Outdoors-Woman Sharon Wright (803) 734-4072	195	1	8	388	15 hours	adults, teachers	$31,292 $6,500	fees H. Hampton	Harry Hampton Fund
Coastal Adventure Cruise Program	3	1	53	1,053	1½ - 2 hours	all	$23,000 $12,000	State, Federal	USFWS, Harry Hampton Fund, State Ports Authority Marine Recreational Fisheries Stamp Program, NOAA, TNC, Ace Basin Task Force
Conservation Education Program Steve Bates (803) 734-3885	3	1.84	168	27,330	6 hour	students, teachers	$3,160	fees	USC (Mice)
ENVIROTHON Briana Timmerman (803) 737-0800	15	.40	3	850	state level- 8 hours international Level-168 hrs	high school students, teachers	$2,100 $11,200 $3,000	Reg. Fees Contrib. State	SC DHEC, SC Forestry Commission, Land, Water and Conservation Division, Envirothon Steering Committee, SC Conservation Districts Foundation, SC Conservation Distiricts, SC Dept. Ed., Santee Cooper, Environmental Education Association, BP Amoco, Carolina Eastman, USDA-NRCS
Marine Center Tour Program	2	.3	27	720	1½ hours	all	$9,000	Harry Hampton	Hampton Fund
Marine Touch Tank	2	.3	28	1,680	1½ hours	students, teachers	$4,000	State	Marine Recreational Fisheries Stamp Program
Marsh Classroom Adventure Jaconda Lightburn (843-) 762-5437	2	.3	28	1,680	1½ hours	students, teachers	$500	State	
Project WET Janice Conner (803) 737-0800	1	.30	11	4,325+	2-6 hours	students	$3,000	Grant funding through Intnl. Project WET & the Perrier Gro	The Perrier Group & International Project WET Harry Hampton Memorial Wildlife Fund
TOTAL	223	5.44	326	38,026			$108,752		

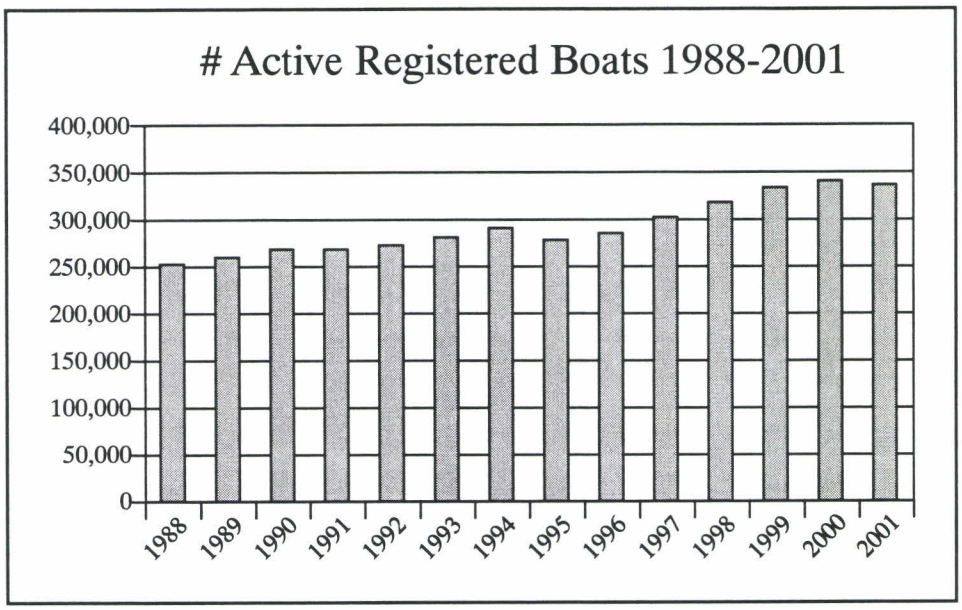
DNR Mandated Programs

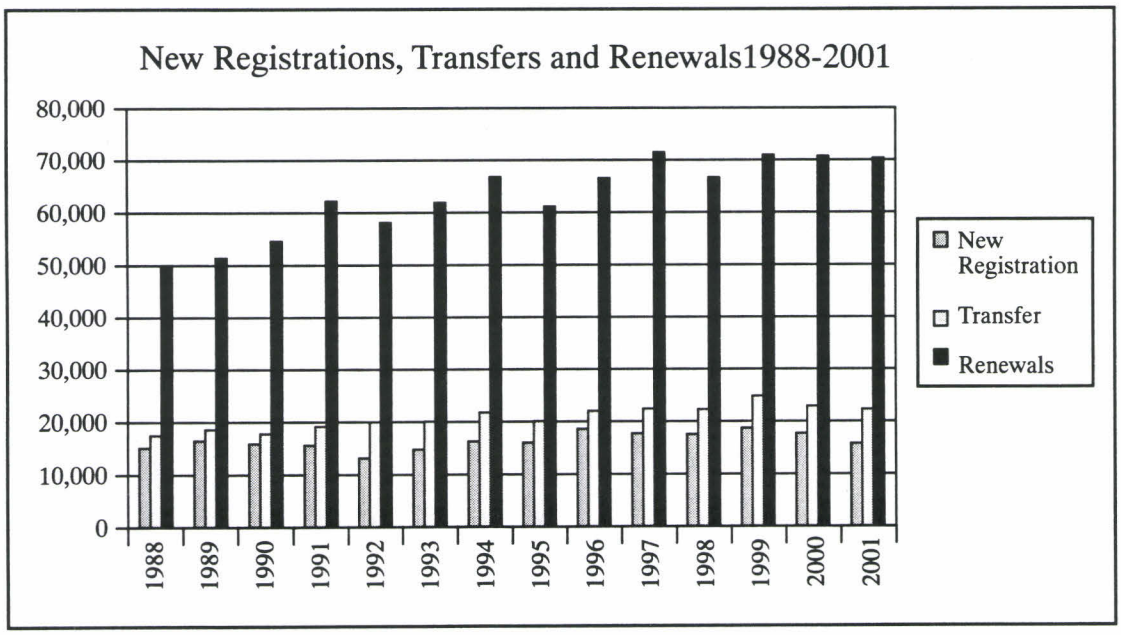
FY 00-01

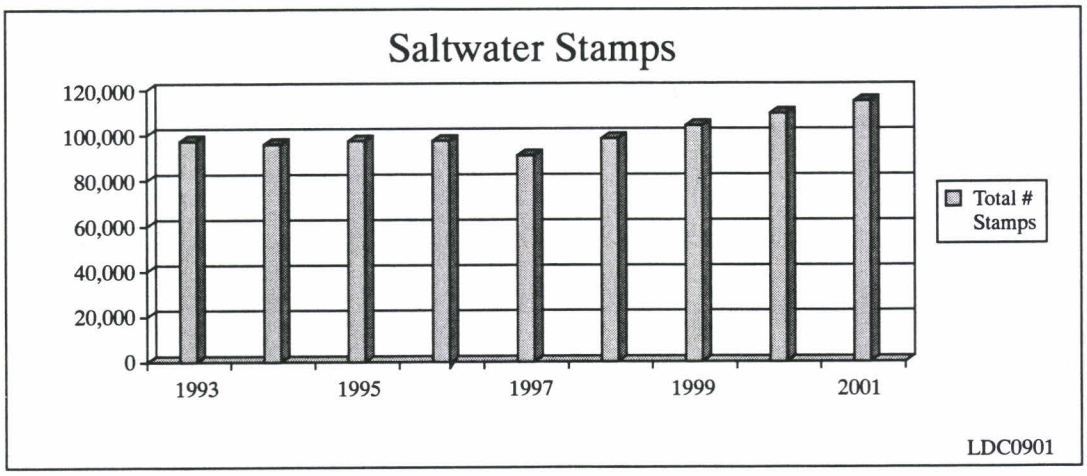
PROGRAM TITLE PROGRAM CONTACT PHONE NUMBER	STAFF	FTE	NUMBER EVENTS	NUMBER PARTICIPANTS	CONTACT HOURS (PER PARTICIPANT)	CLASSIFICATION (student, adult, teacher)	BUDGET (EXCLUDING SALARIES)	BUDGET SOURCE	PARTNERS
Boater Education Lt. Joey Rentiers (803) 734-3993	9	6.50	338	23,769	8 hours	all	$141,985	Federal	Individual volunteers
Hunter Education Lt. Joey Rentiers (803) 734-3993	11	6.50	626	26,982	8 hours	all	$293,067 $100,275	Federal State	Individual volunteers
TOTAL	20	13.00	964	50,751			$535,327		
GRAND TOTAL	**342**	**23.34**	**1,609**	**145,845**			**$972,612**		

SECTION III: LONG TERM PERFORMANCE MEASURES

In Section I, the 2000-2001 Annual Accountibility Report, several long-term performance measures are included for budget programs in the Department of Natural Resources. In this section, a variety of additional long-term performance measures are provided as follows:






Saltwater Stamps
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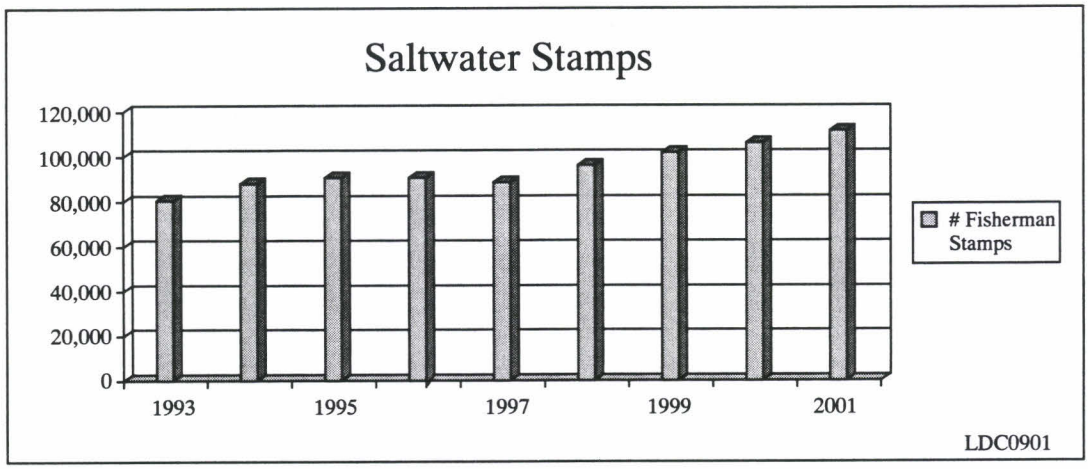
100,000
80,000
60,000
40,000
20,000
0
1993
1995
1997
1999
2001
Total # Stamps
LDC0901


Saltwater Stamps
120,000
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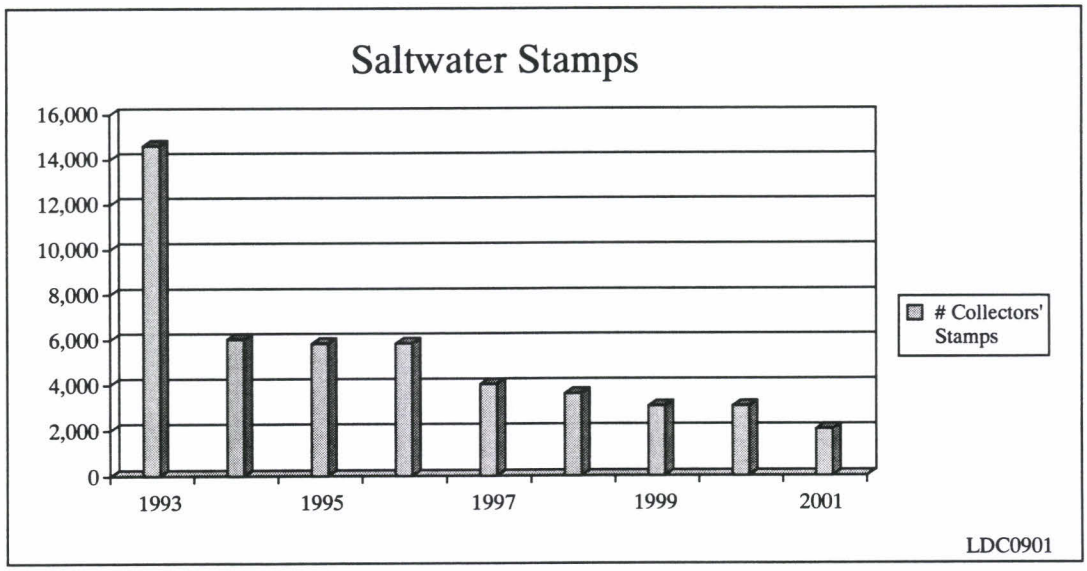
80,000
60,000
40,000
20,000
0
1993
1995
1997
1999
2001
Fisherman Stamps
LDC0901


Saltwater Stamps
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1993
1995
1997
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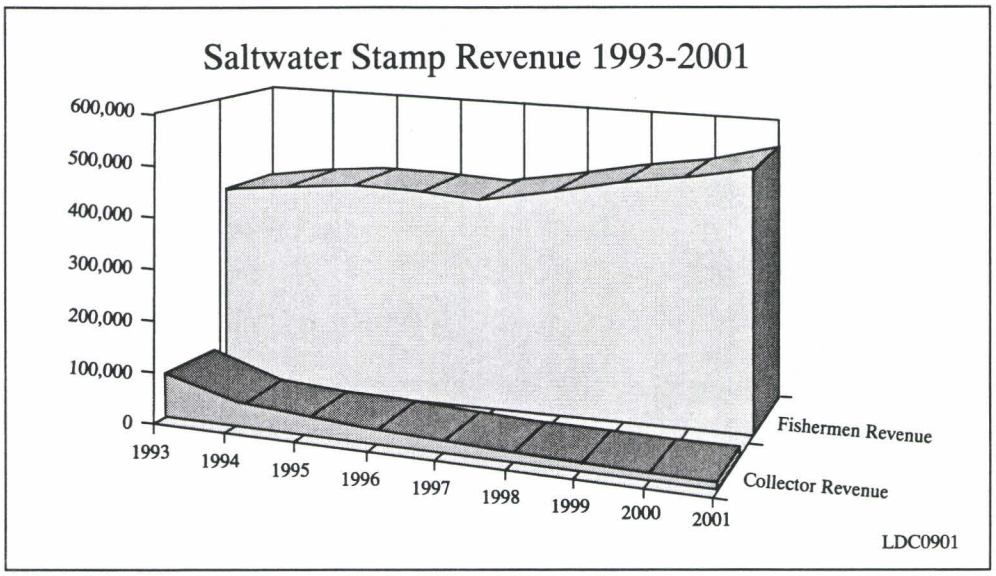
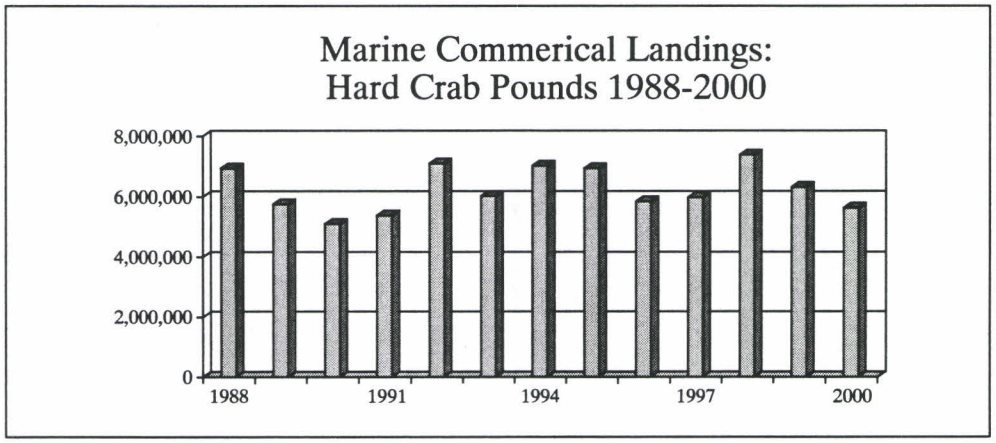
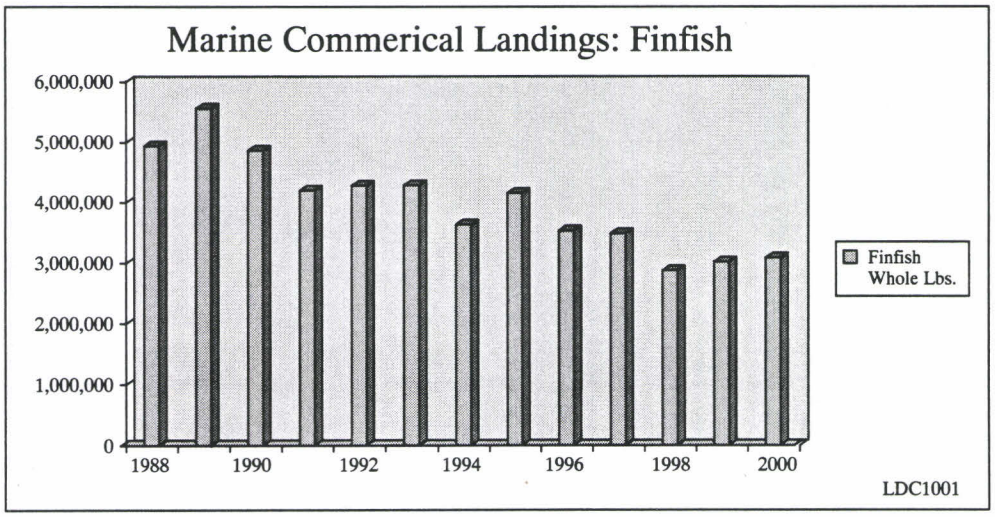
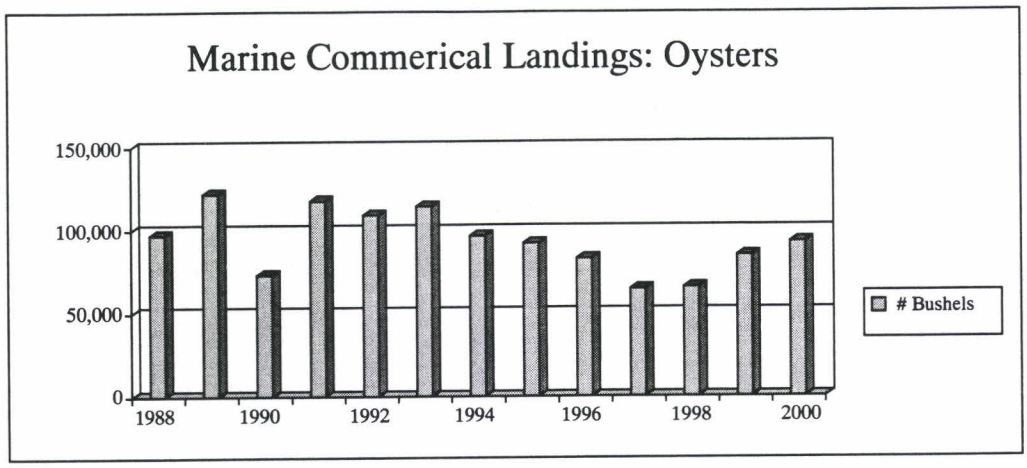
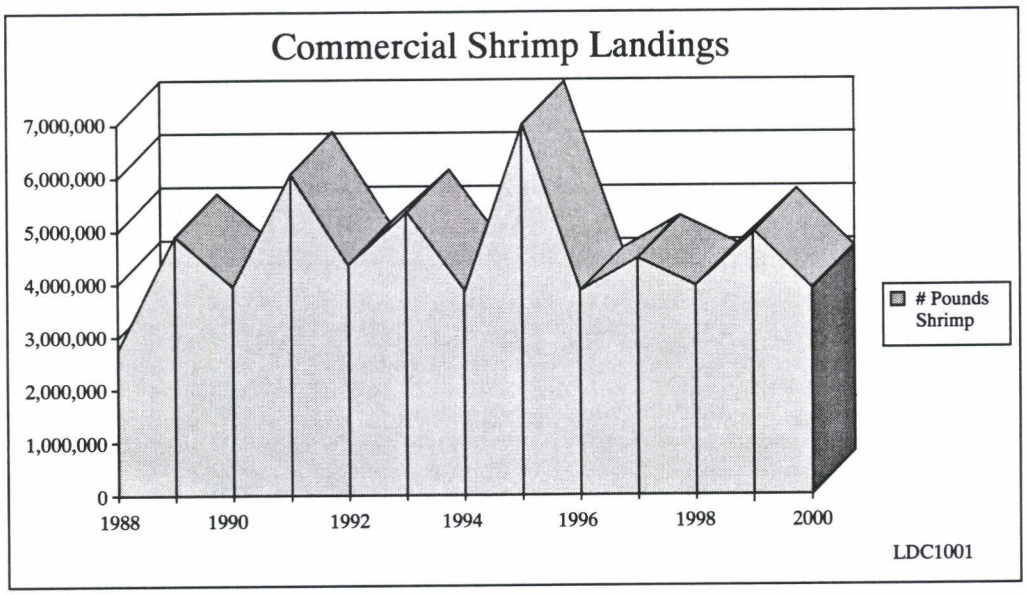
2001
Collectors' Stamps
LDC0901

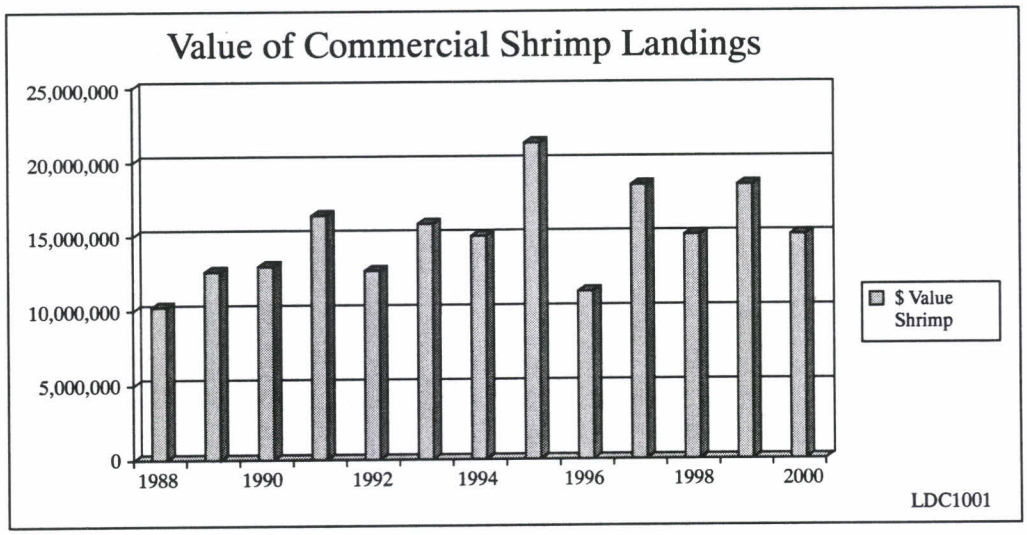

Saltwater Stamp Revenue 1993-2001
600,000
500,000
400,000
300,000
200,000
100,000
0
1993
1994
1995
1996
1997
1998
1999
2000
2001
Fishermen Revenue
Collector Revenue
LDC0901

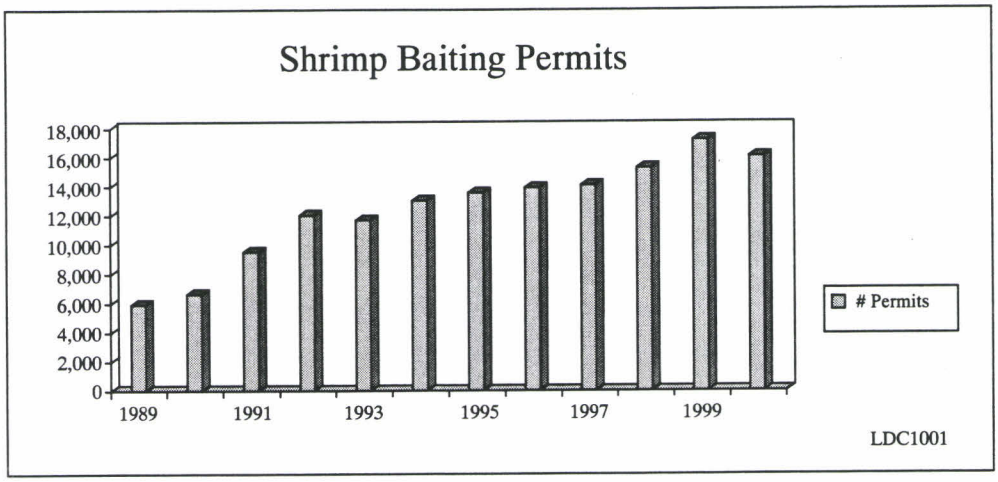

Marine Commerical Landings:
Hard Crab Pounds 1988-2000
8,000,000
6,000,000
4,000,000
2,000,000
0
1988
1991
1994
1997
2000

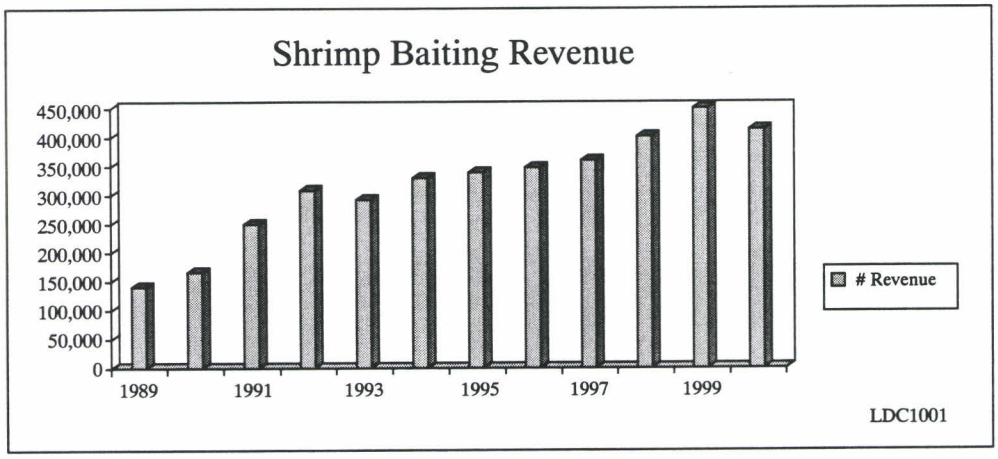

Marine Commerical Landings: Finfish
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1988
1990
1992
1994
1996
1998
2000
Finfish
Whole Lbs.
LDC1001

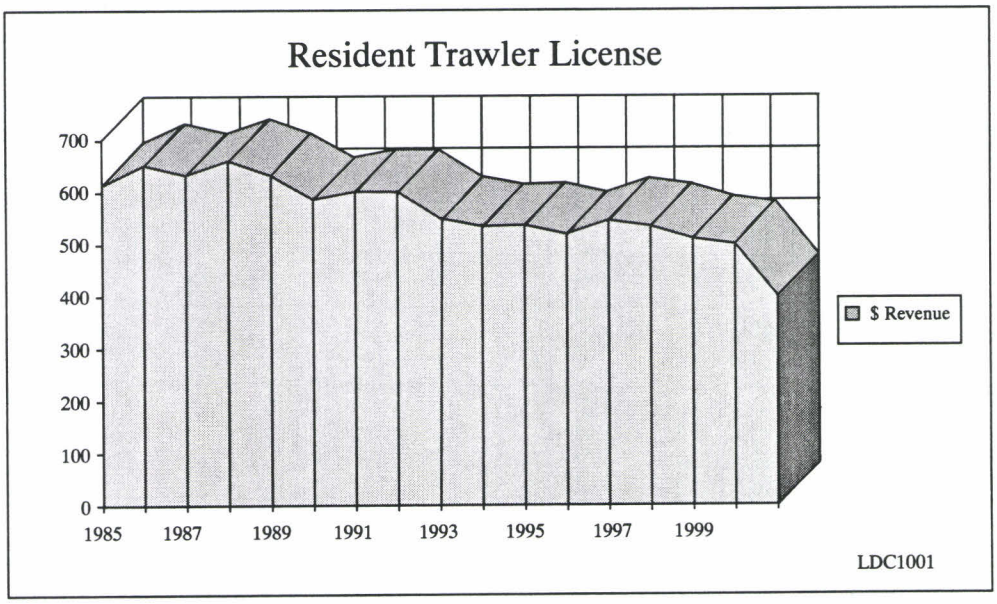

Marine Commerical Landings: Oysters
150,000
100,000
50,000
0
1988
1990
1992
1994
1996
1998
2000
Bushels

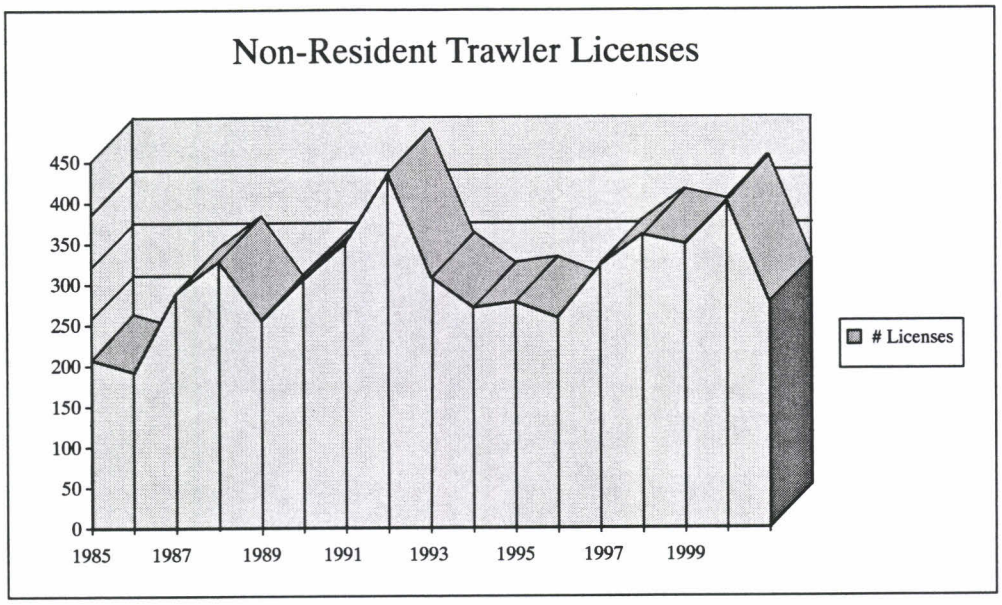

Commercial Shrimp Landings
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1988
1990
1992
1994
1996
1998
2000
Pounds Shrimp
LDC1001

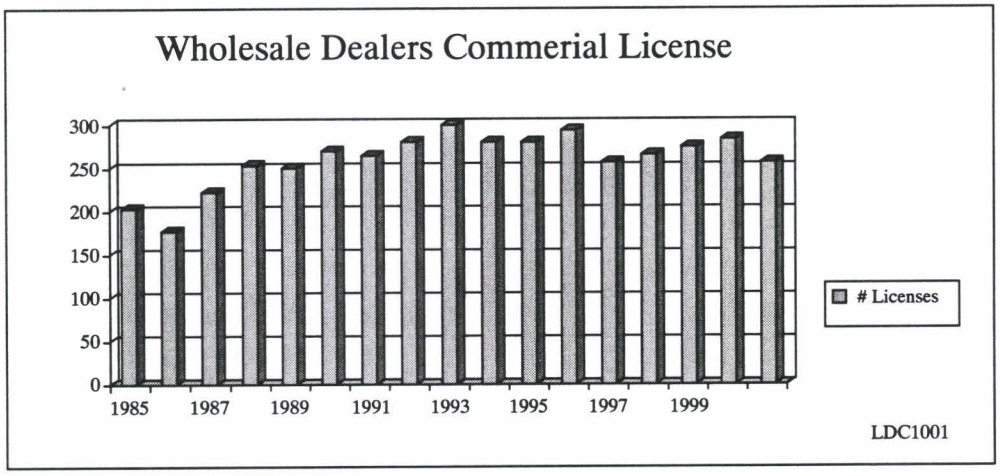

Value of Commercial Shrimp Landings
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
1988
1990
1992
1994
1996
1998
2000
$ Value Shrimp
LDC1001

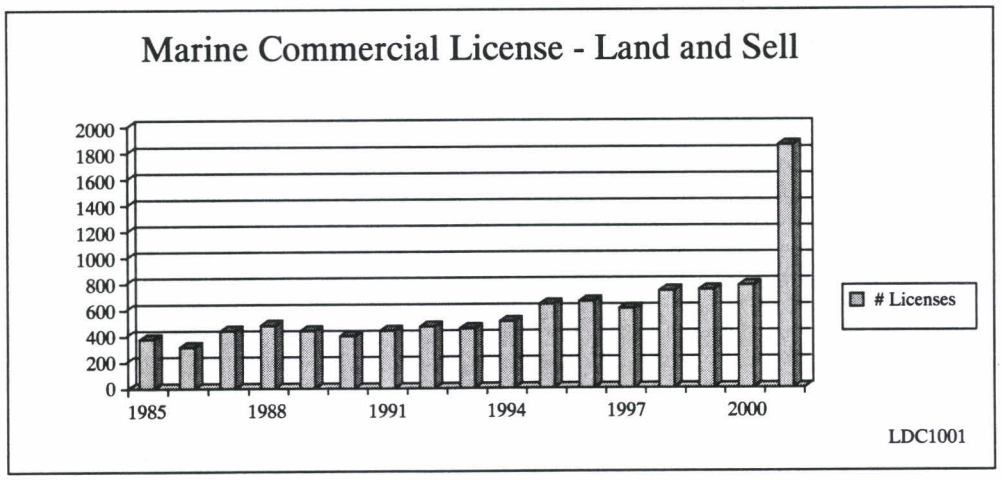

Shrimp Baiting Permits
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1989
1991
1993
1995
1997
1999
Permits
LDC1001

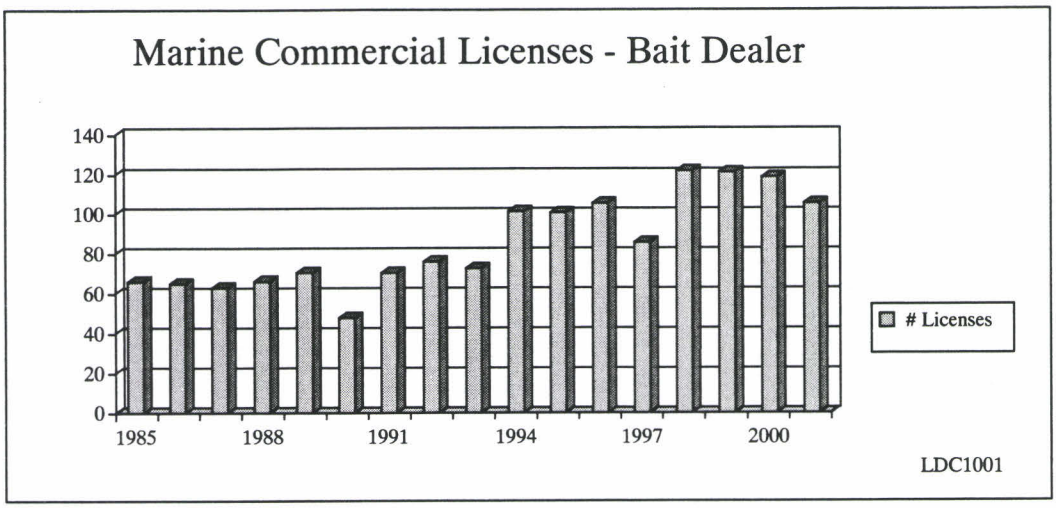

Shrimp Baiting Revenue
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
1989
1991
1993
1995
1997
1999
Revenue
LDC1001

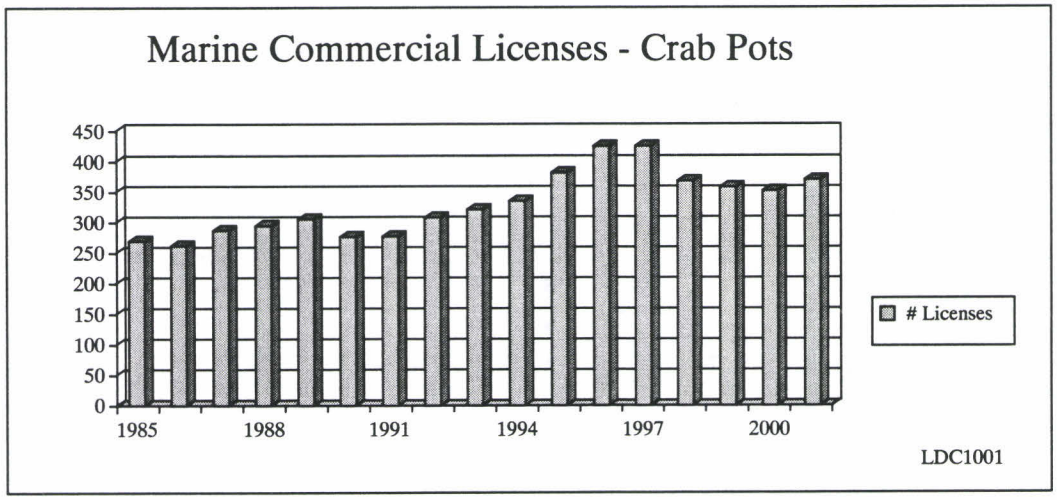

Resident Trawler License
700
600
500
400
300
200
100
0
1985
1987
1989
1991
1993
1995
1997
1999
$ Revenue
LDC1001

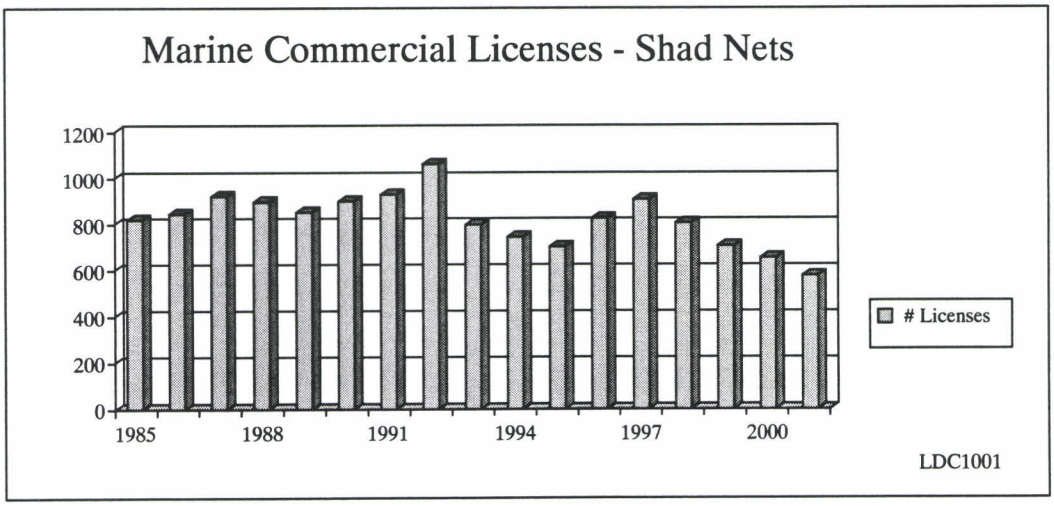

Non-Resident Trawler Licenses
450
400
350
300
250
200
150
100
50
0
1985
1987
1989
1991
1993
1995
1997
1999
Licenses

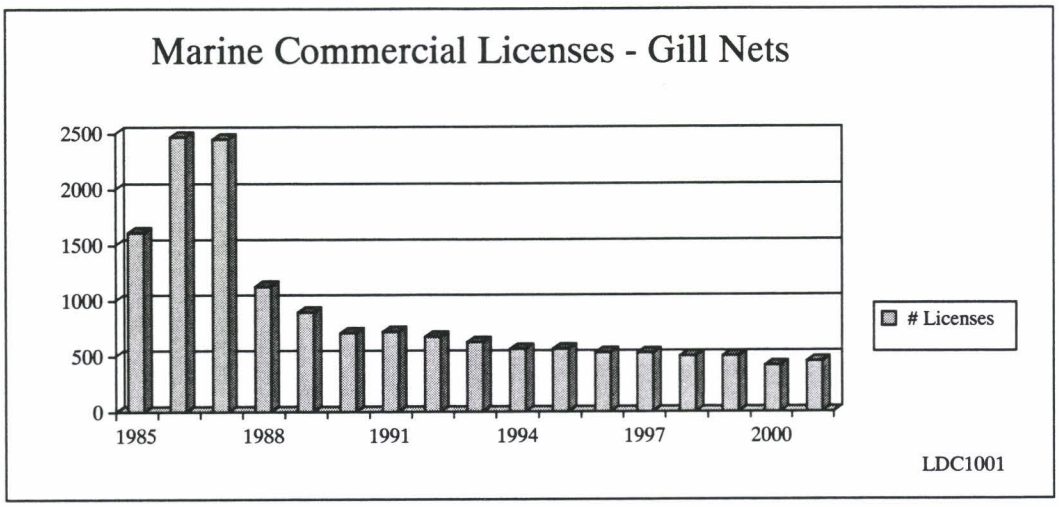

Wholesale Dealers Commerial License
300
250
200
150
100
50
0
1985
1987
1989
1991
1993
1995
1997
1999
Licenses
LDC1001

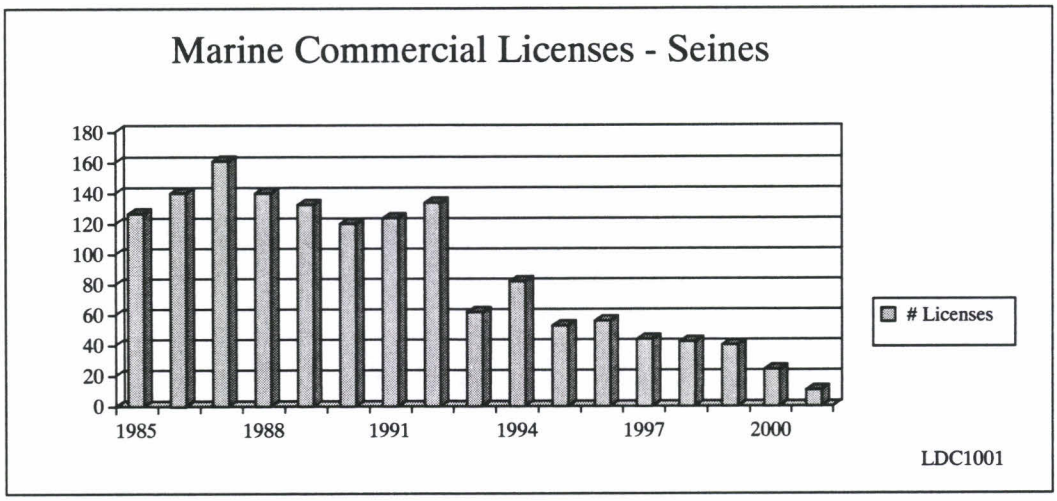

Marine Commercial License - Land and Sell
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1985
1988
1991
1994
1997
2000
Licenses
LDC1001

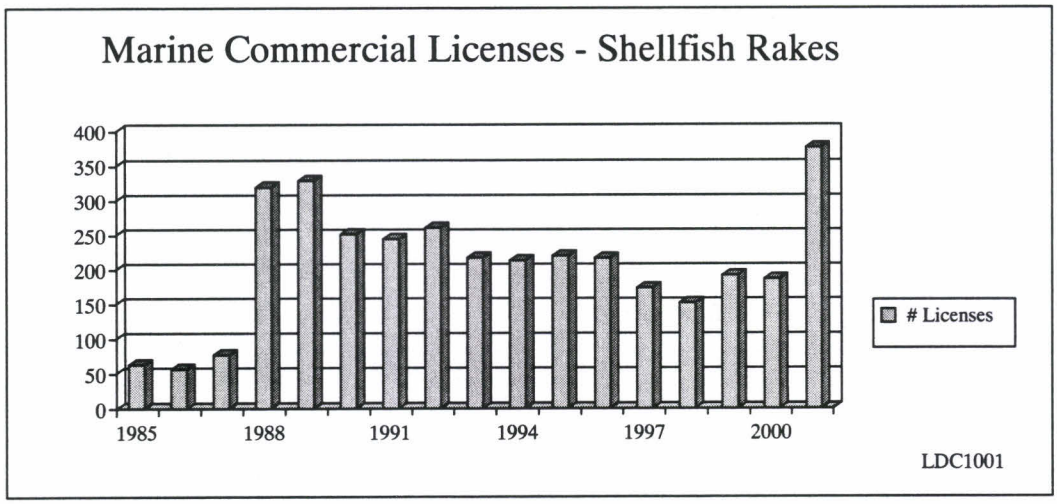

Marine Commercial Licenses - Bait Dealer
140
120
100
80
60
40
20
0
1985
1988
1991
1994
1997
2000
Licenses
LDC1001

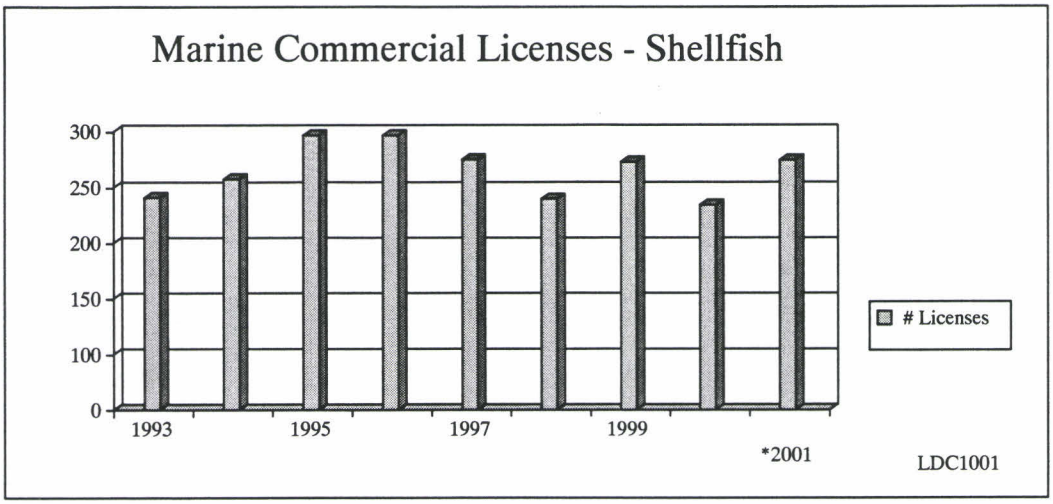

Marine Commercial Licenses - Crab Pots
450
400
350
300
250
200
150
100
50
0
1985
1988
1991
1994
1997
2000
Licenses
LDC1001

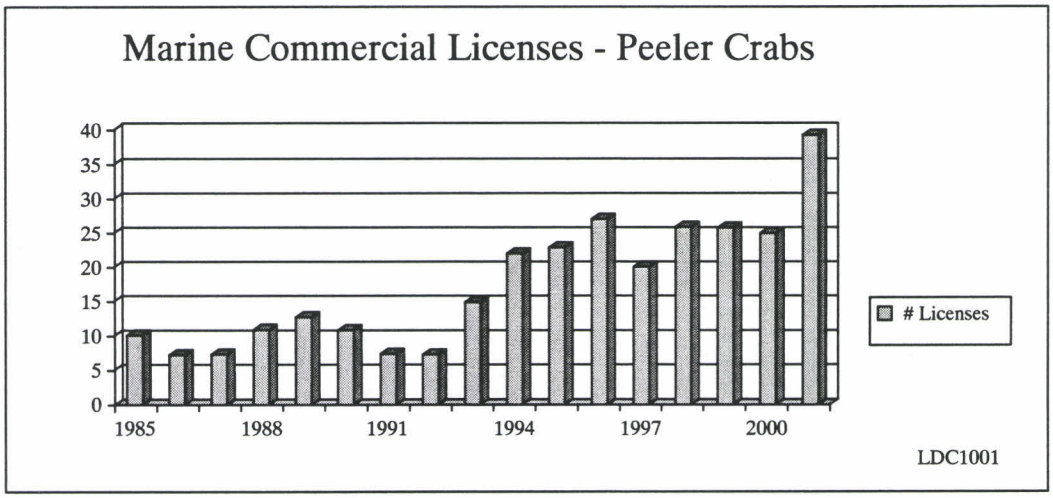

Marine Commercial Licenses - Shad Nets
1200
1000
800
600
400
200
0
1985
1988
1991
1994
1997
2000
Licenses
LDC1001

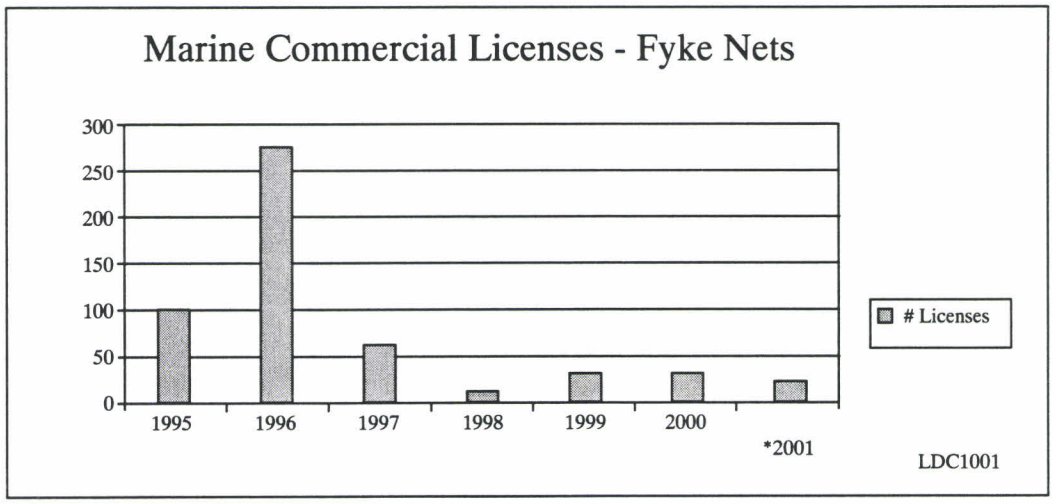

Marine Commercial Licenses - Gill Nets
2500
2000
1500
1000
500
0
1985
1988
1991
1994
1997
2000
Licenses
LDC1001

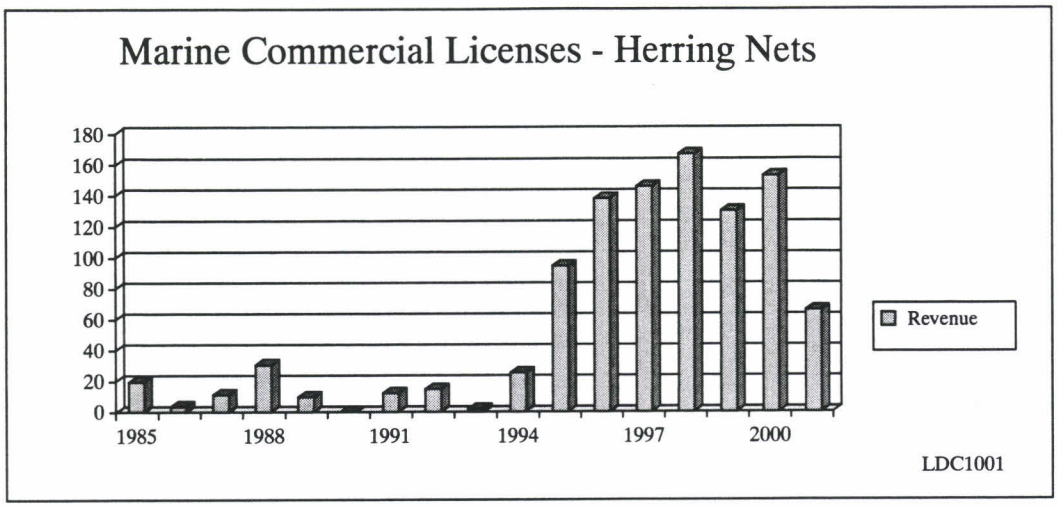

Marine Commercial Licenses - Seines
180
160
140
120
100
80
60
40
20
0
1985
1988
1991
1994
1997
2000
Licenses
LDC1001

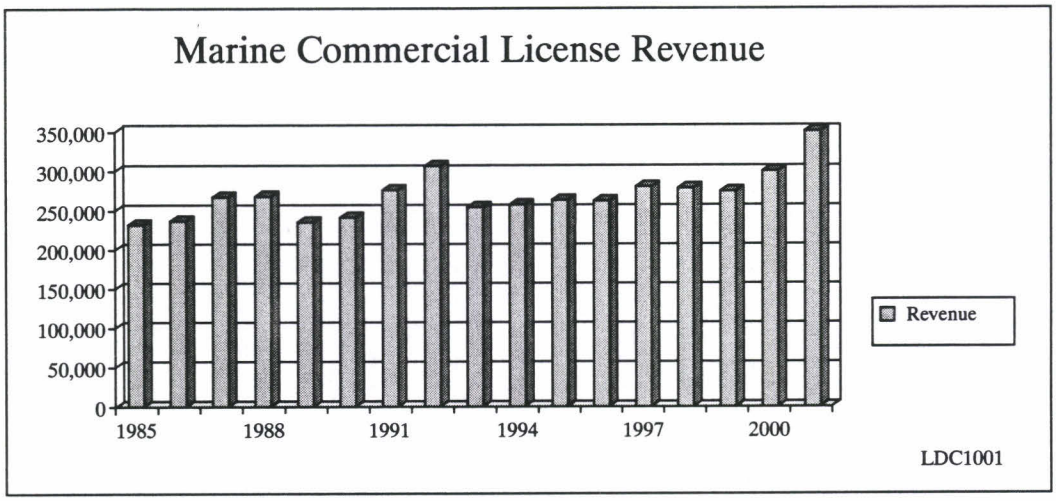

Marine Commercial Licenses - Shellfish Rakes
400
350
300
250
200
150
100
50
0
1985
1988
1991
1994
1997
2000
Licenses
LDC1001

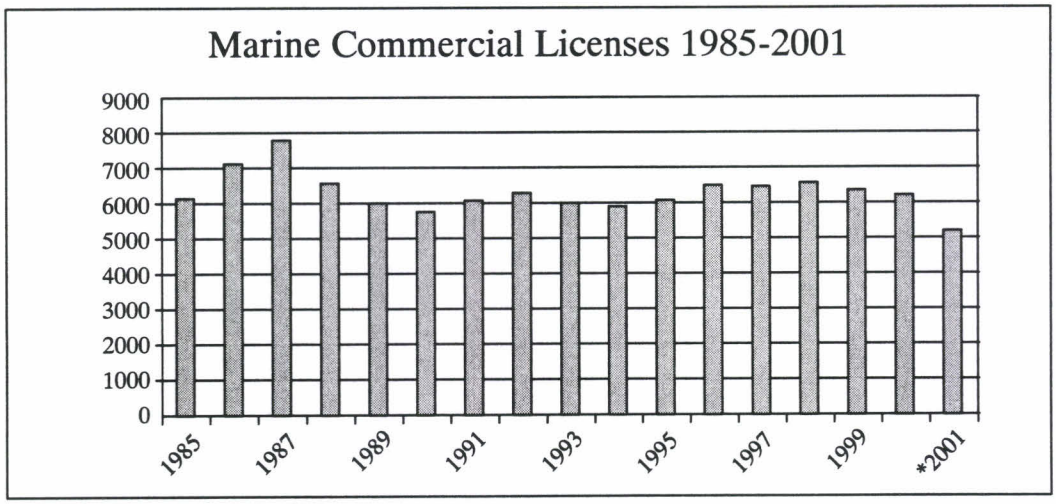

Marine Commercial Licenses - Shellfish
300
250
200
150
100
0
1993
1995
1997
1999
*2001
Licenses
LDC1001

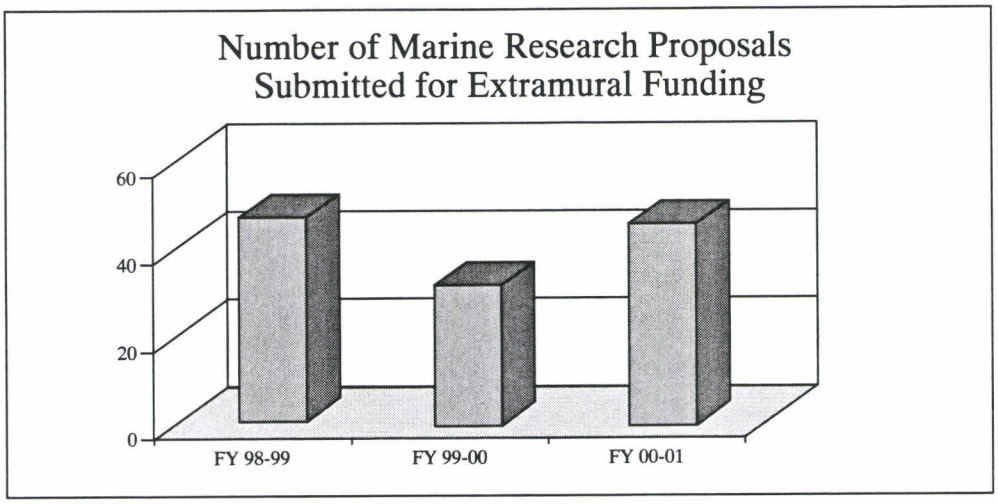

Marine Commercial Licenses - Peeler Crabs
40
35
30
25
20
15
10
5
0
1985
1988
1991
1994
1997
2000
Licenses
LDC1001

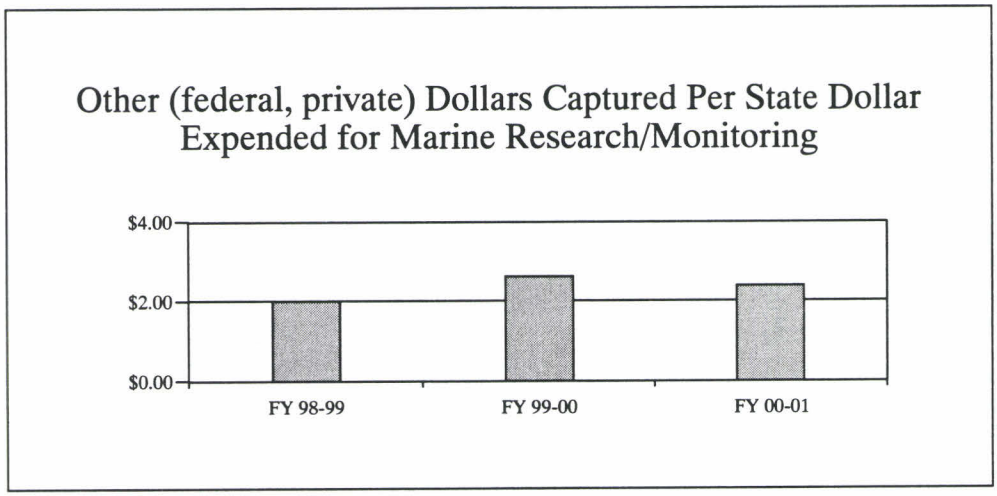

Marine Commercial Licenses - Fyke Nets
300
250
200
150
100
50
0
1995
1996
1997
1998
1999
2000
*2001
Licenses
LDC1001

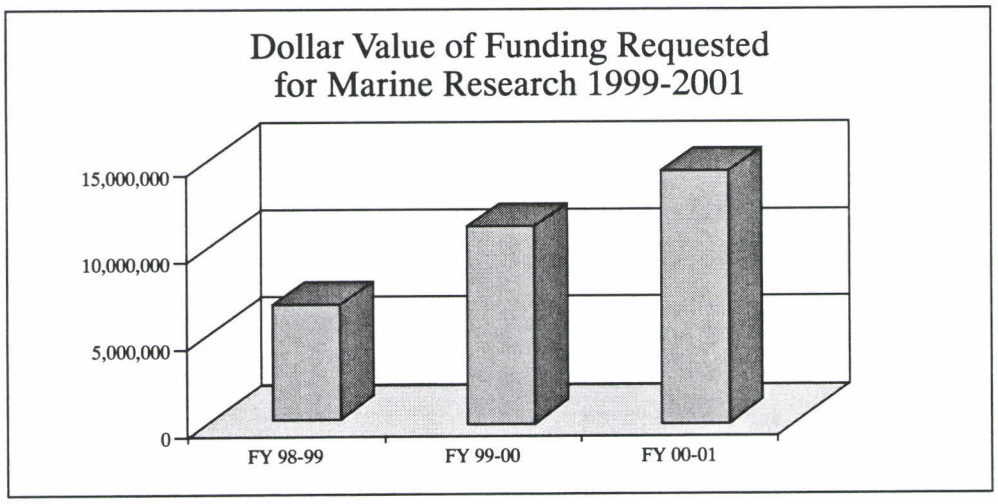

Marine Commercial Licenses - Herring Nets
180
160
140
120
100
80
60
40
20
0
1985
1988
1991
1994
1997
2000
Revenue
LDC1001

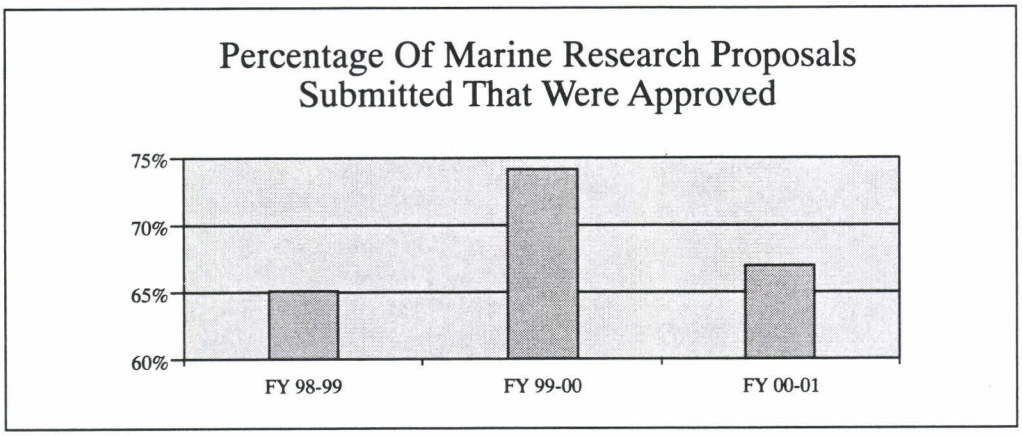

Marine Commercial License Revenue
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
1985
1988
1991
1994
1997
2000
Revenue
LDC1001

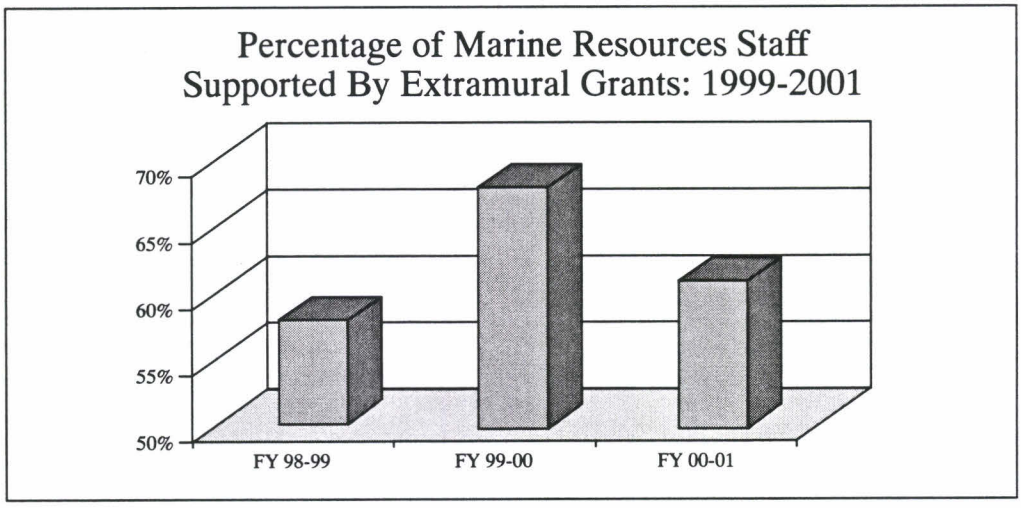

Marine Commercial Licenses 1985-2001
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1985
1987
1989
1991
1993
1995
1997
1999
*2001

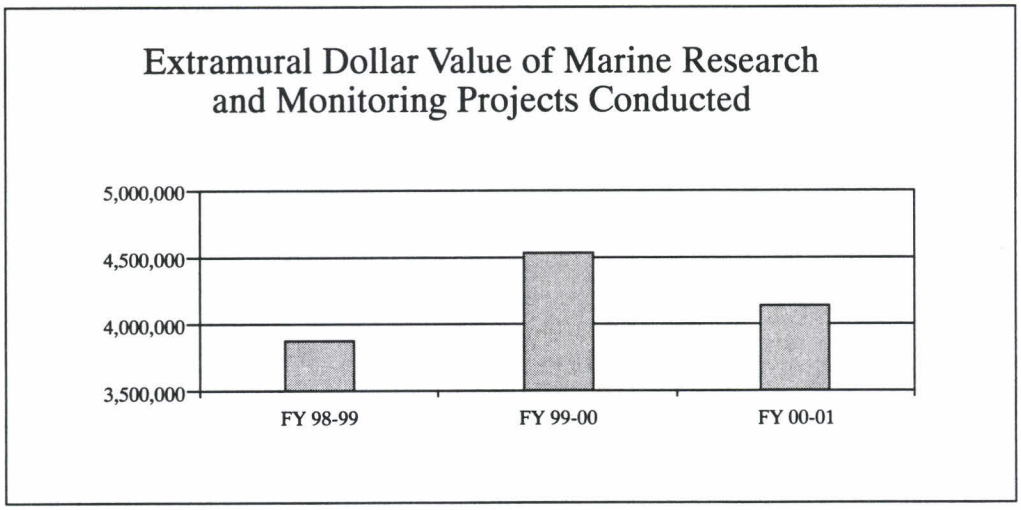

Number of Marine Research Proposals
Submitted for Extramural Funding
60
40
20
0
FY 98-99
FY 99-00
FY 00-01

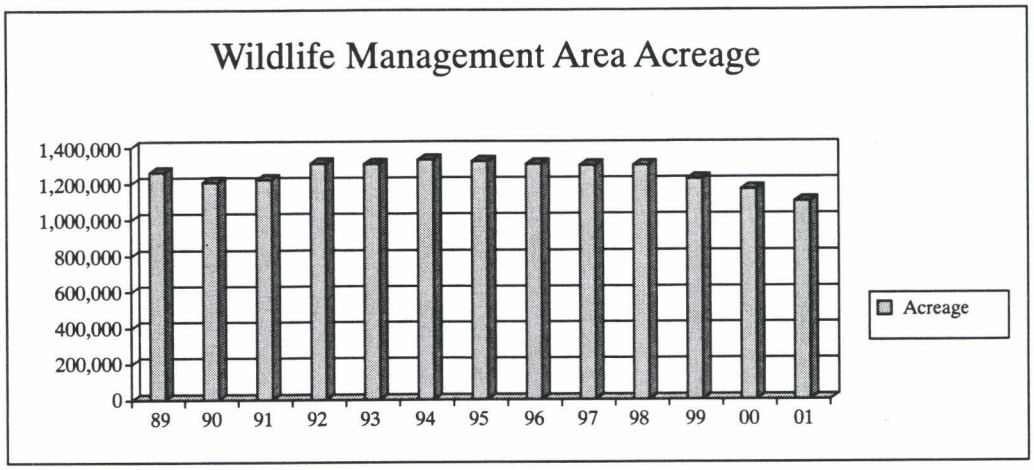

Other (federal, private) Dollars Captured Per State Dollar
Expended for Marine Research/Monitoring
$4.00
$2.00
$0.00
FY 98-99
FY 99-00
FY 00-01

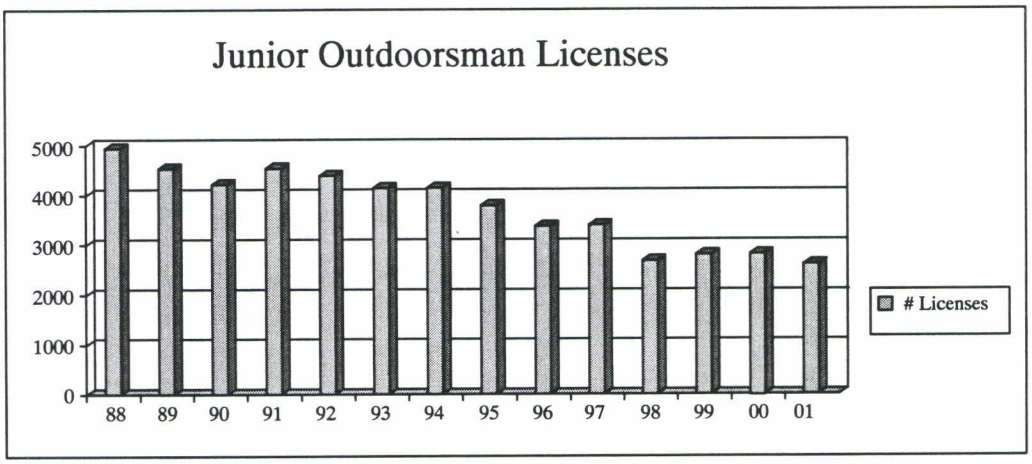

Dollar Value of Funding Requested
for Marine Research 1999-2001
15,000,000
10,000,000
5,000,000
0
FY 98-99
FY 99-00
FY 00-01

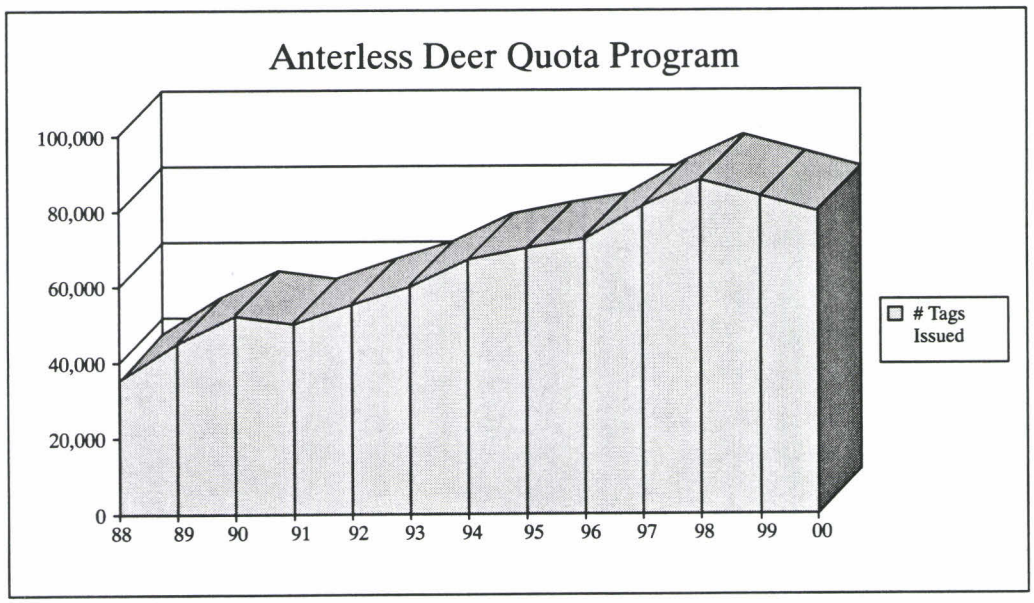

Percentage Of Marine Research Proposals Submitted That Were Approved
75%
70%
65%
60%
FY 98-99
FY 99-00
FY 00-01

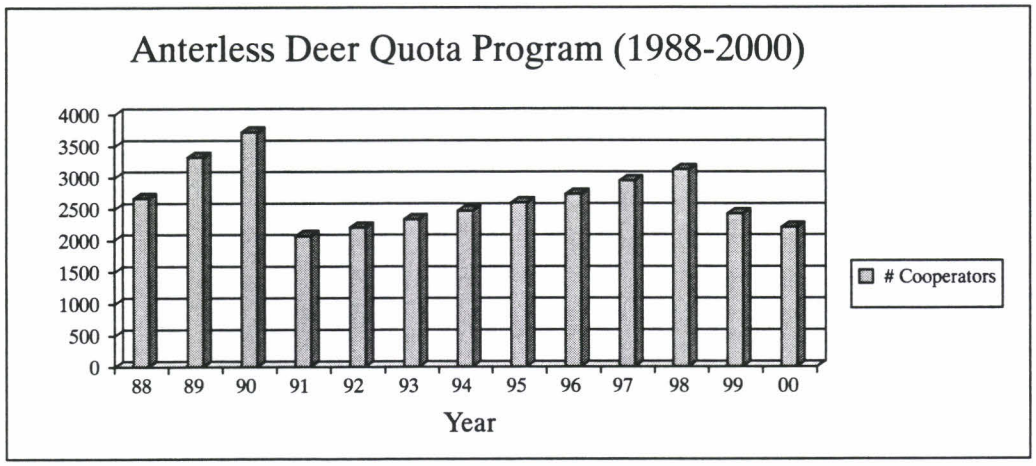

Percentage of Marine Resources Staff Supported By Extramural Grants: 1999-2001
70%
65%
60%
55%
50%
FY 98-99
FY 99-00
FY 00-01

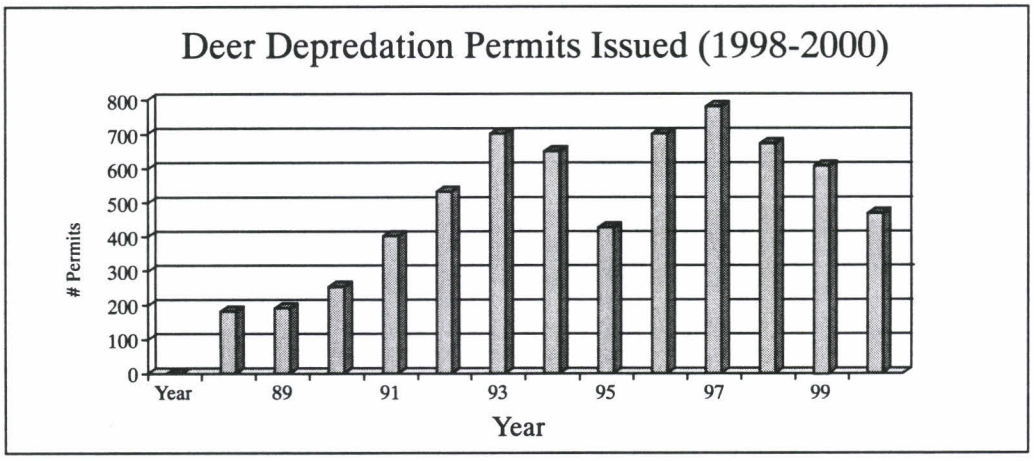

Extramural Dollar Value of Marine Research and Monitoring Projects Conducted
5,000,000
4,500,000
4,000,000
3,500,000
FY 98-99
FY 99-00
FY 00-01

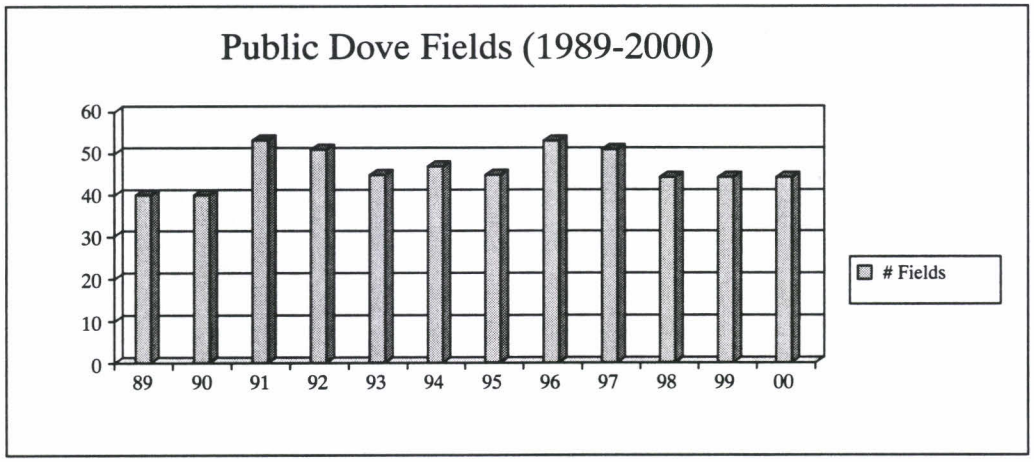

Wildlife Management Area Acreage
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
89 90 91 92 93 94 95 96 97 98 99 00 01
Acreage

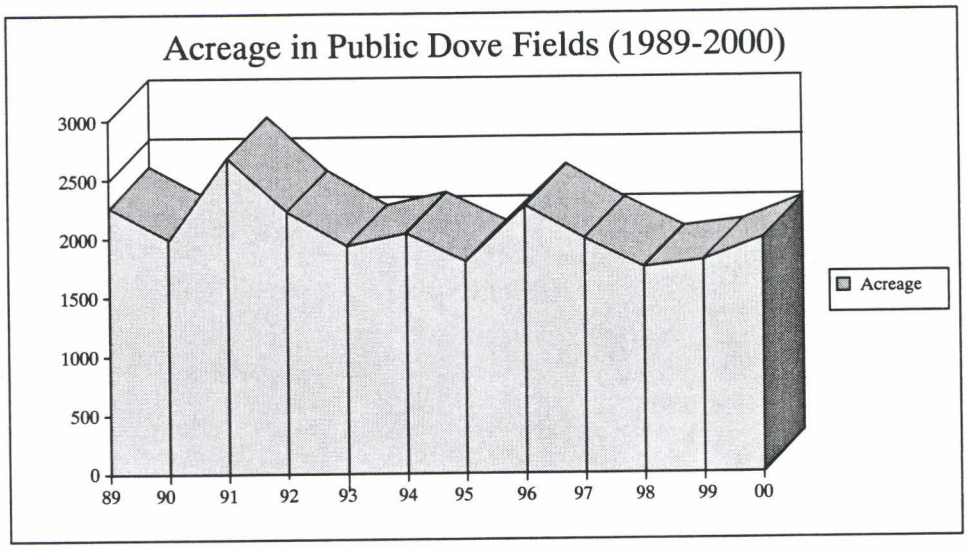

Junior Outdoorsman Licenses
5000
4000
3000
2000
1000
0
88 89 90 91 92 93 94 95 96 97 98 99 00 01
Licenses


Anterless Deer Quota Program
100,000
80,000
60,000
40,000
20,000
0
88 89 90 91 92 93 94 95 96 97 98 99 00
Tags Issued

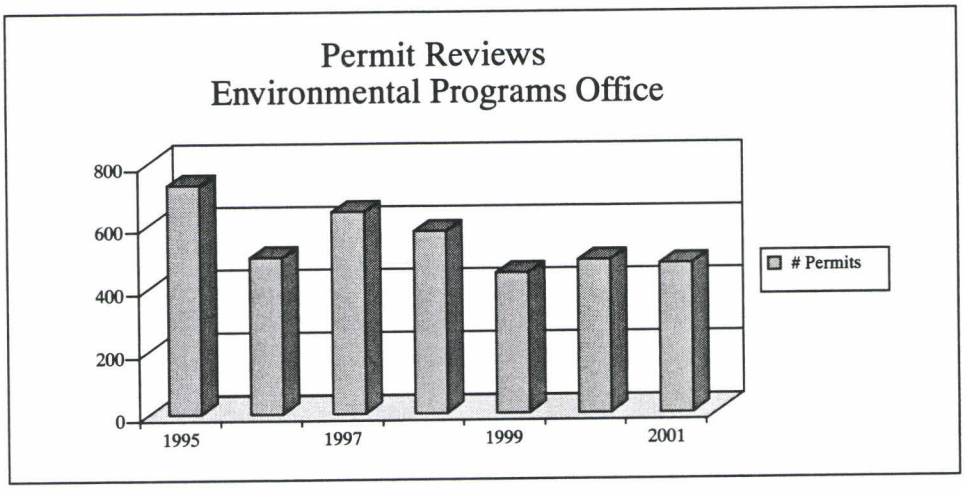

Anterless Deer Quota Program (1988-2000)
4000
3500
3000
2500
2000
1500
1000
500
0
88
89
90
91
92
93
94
95
96
97
98
99
00
Year
Cooperators

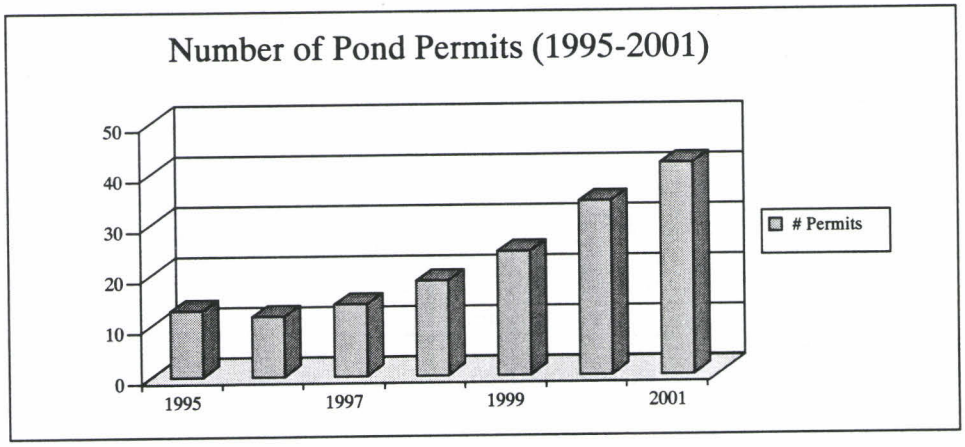

Deer Depredation Permits Issued (1998-2000)
800
700
600
500
400
300
200
100
0
Permits
Year
89
91
93
95
97
99
Year

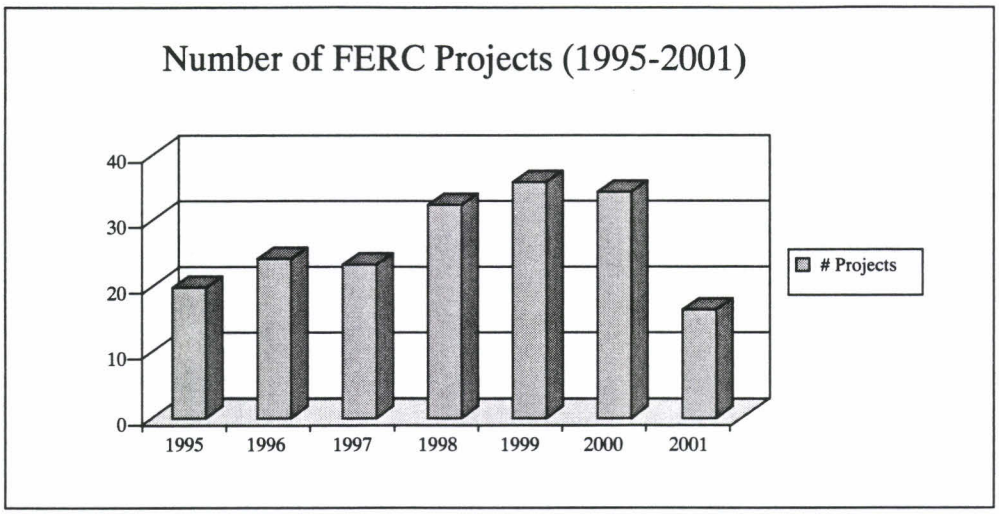

Public Dove Fields (1989-2000)
60
50
40
30
20
10
0
89
90
91
92
93
94
95
96
97
98
99
00
Fields

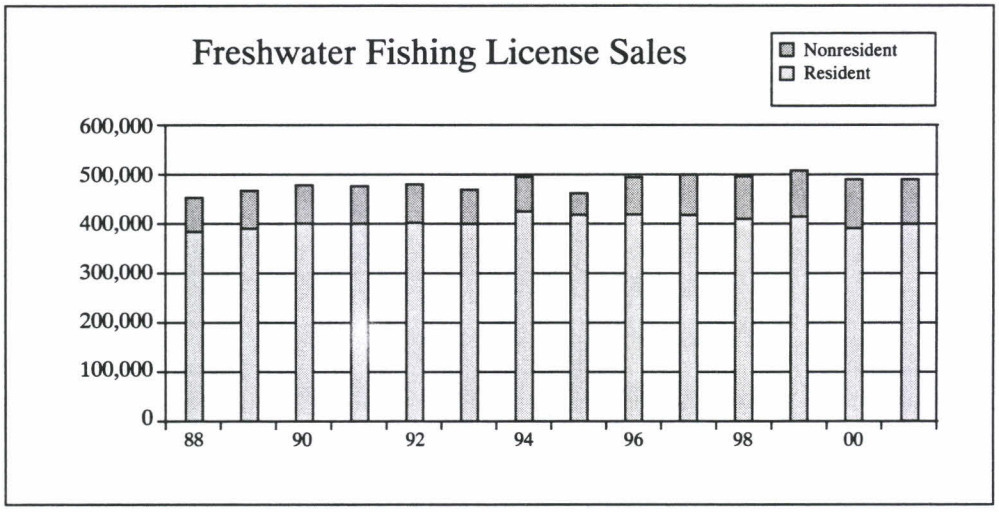


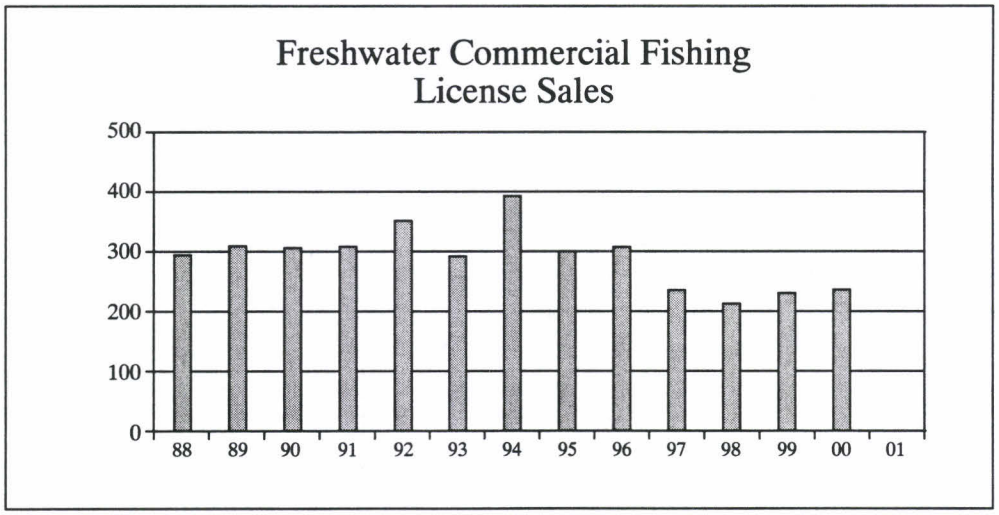
Environmental Programs Office

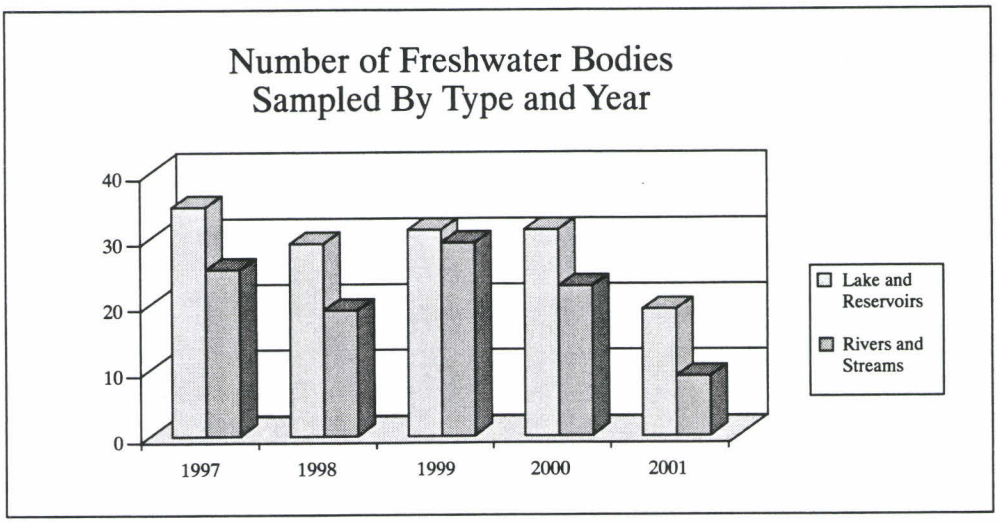


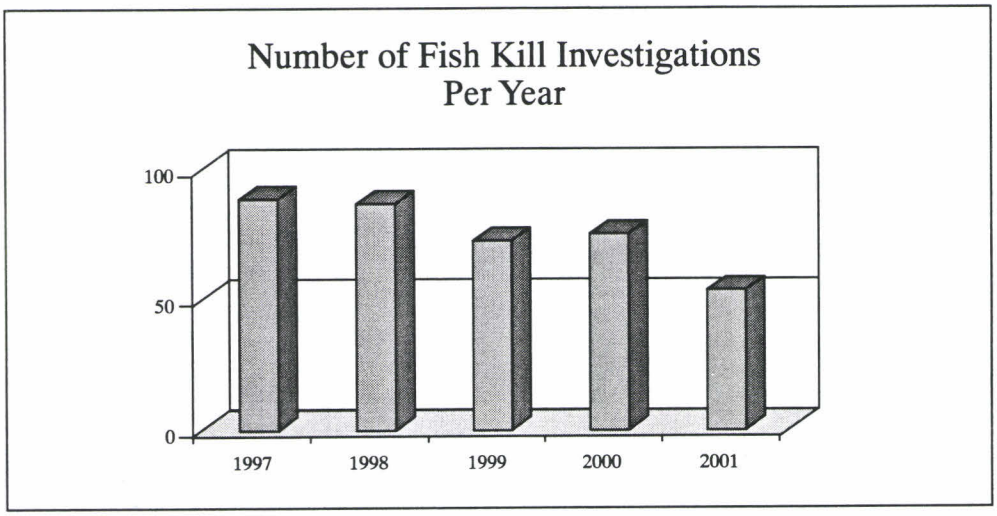


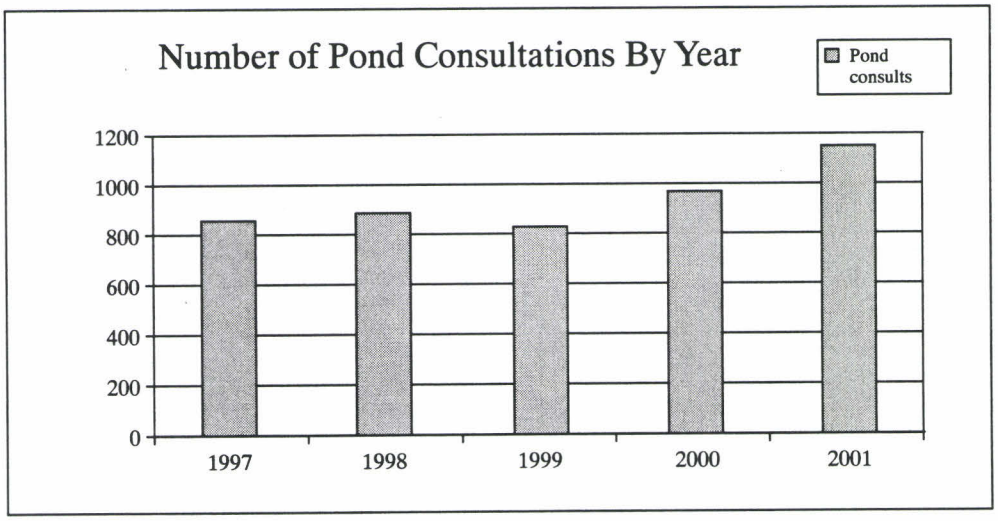

Number of FERC Projects (1995-2001)
40
30
20
10
0
1995
1996
1997
1998
1999
2000
2001
Projects

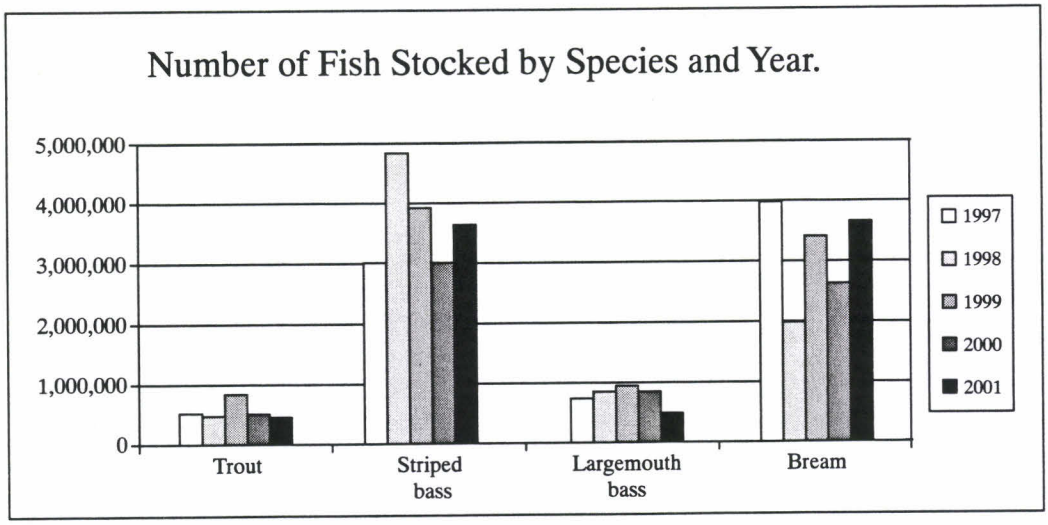

Freshwater Fishing License Sales
Nonresident
Resident
600,000
500,000
400,000
300,000
200,000
100,000
0
88
90
92
94
96
98
00

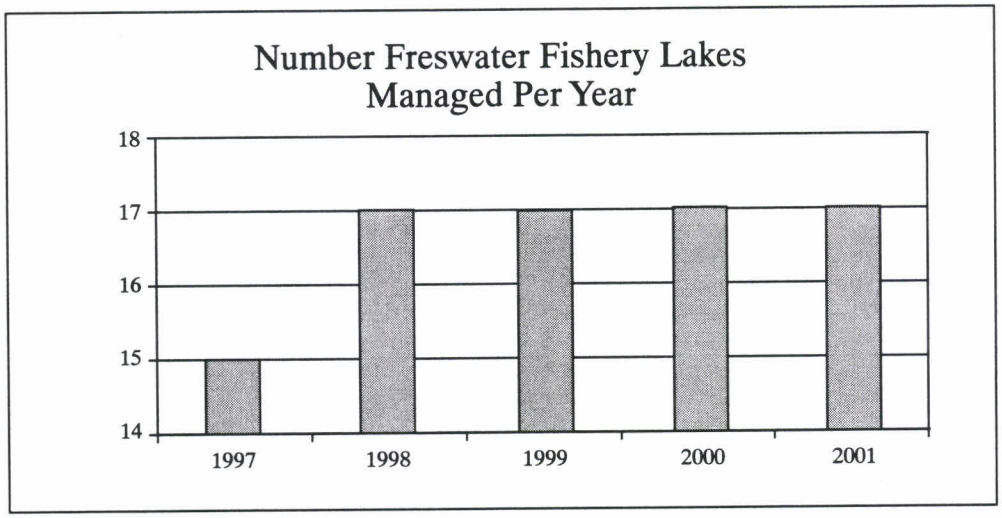

Freshwater Commercial Fishing
License Sales
500
400
300
200
100
0
88
89
90
91
92
93
94
95
96
97
98
99
00
01

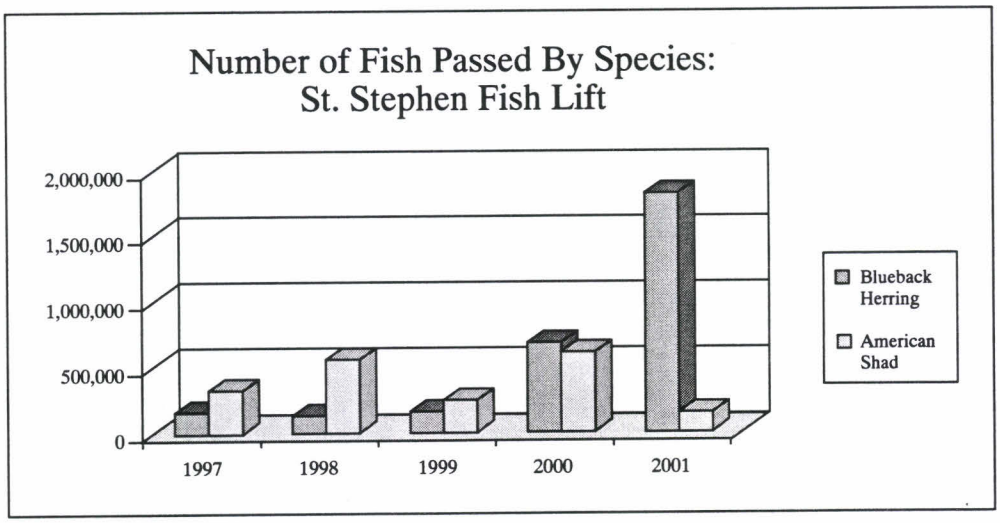

Number of Freshwater Bodies Sampled By Type and Year
40
30
20
10
0
1997
1998
1999
2000
2001
Lake and Reservoirs
Rivers and Streams

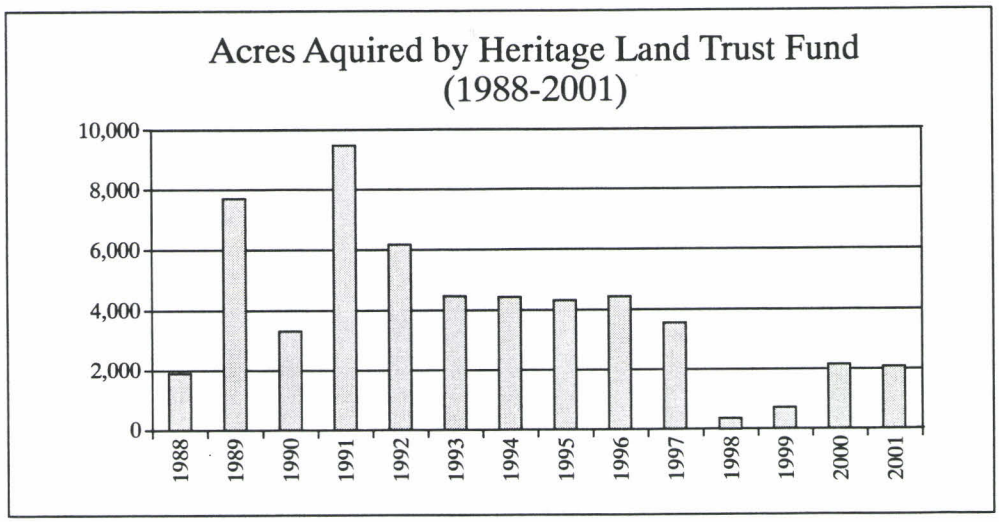

Number of Fish Kill Investigations Per Year
100
50
0
1997
1998
1999
2000
2001

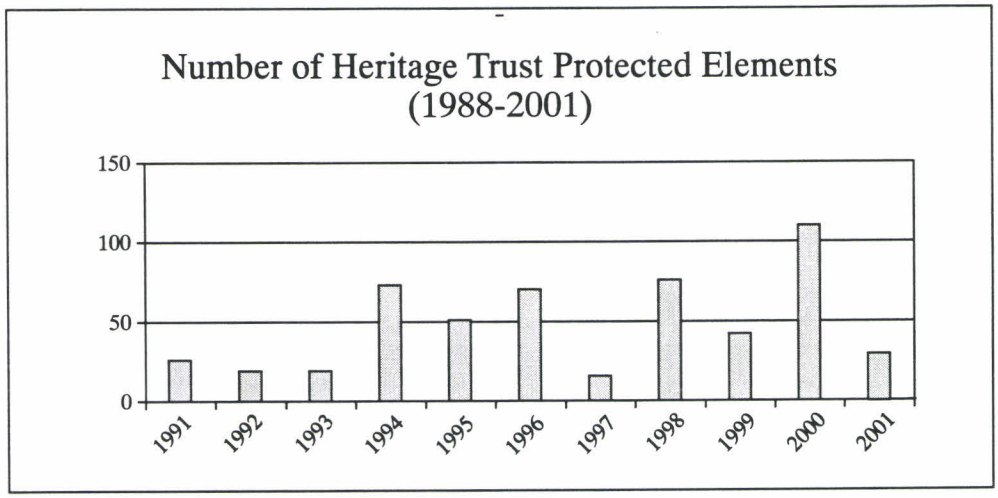

Number of Pond Consultations By Year
Pond consults
1200
1000
800
600
400
200
0
1997
1998
1999
2000
2001

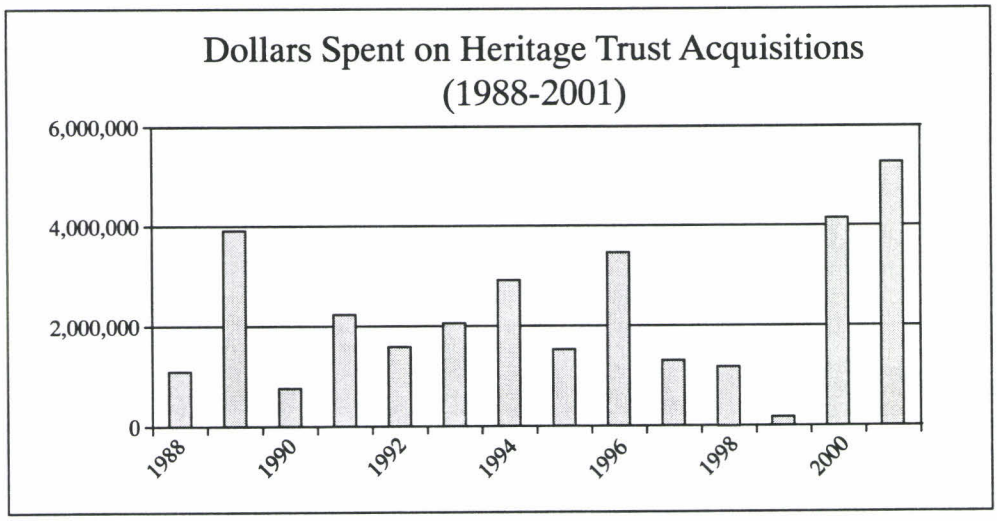

Number of Fish Stocked by Species and Year.
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
Trout
Striped bass
Largemouth bass
Bream
1997
1998
1999
2000
2001

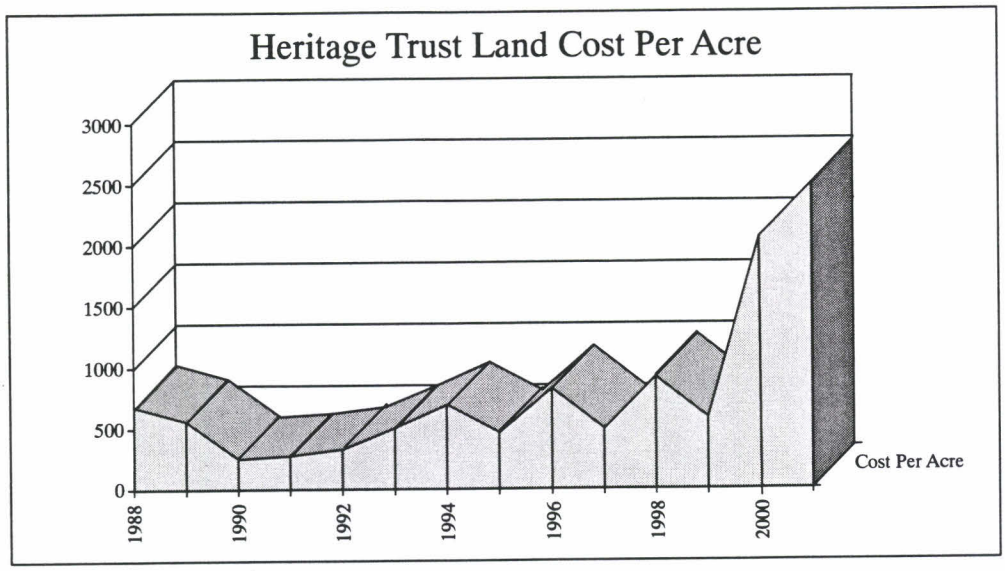

Number Freswater Fishery Lakes Managed Per Year
18
17
16
15
14
1997
1998
1999
2000
2001

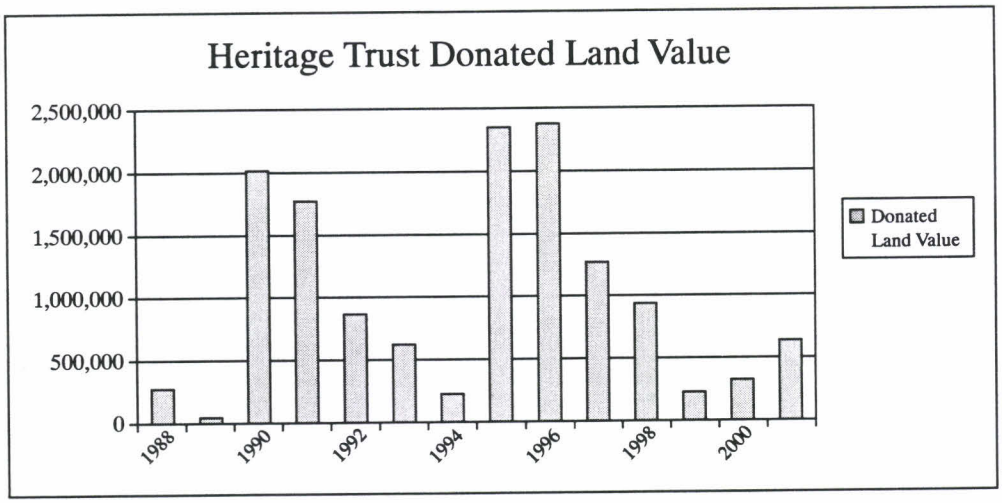

Number of Fish Passed By Species: St. Stephen Fish Lift
2,000,000
1,500,000
1,000,000
500,000
0
1997
1998
1999
2000
2001
Blueback Herring
American Shad

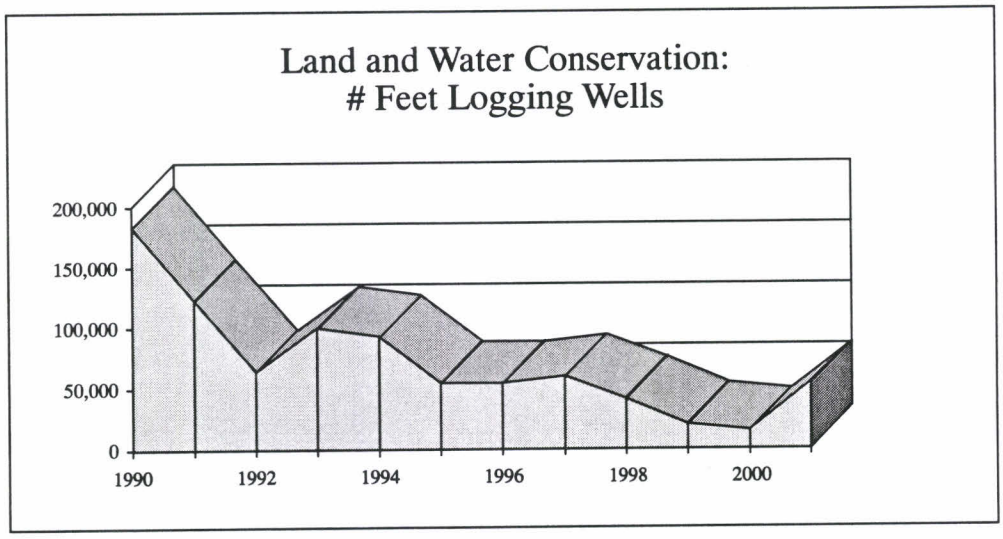

Acres Aquired by Heritage Land Trust Fund
(1988-2001)
10,000
8,000
6,000
4,000
2,000
0
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001

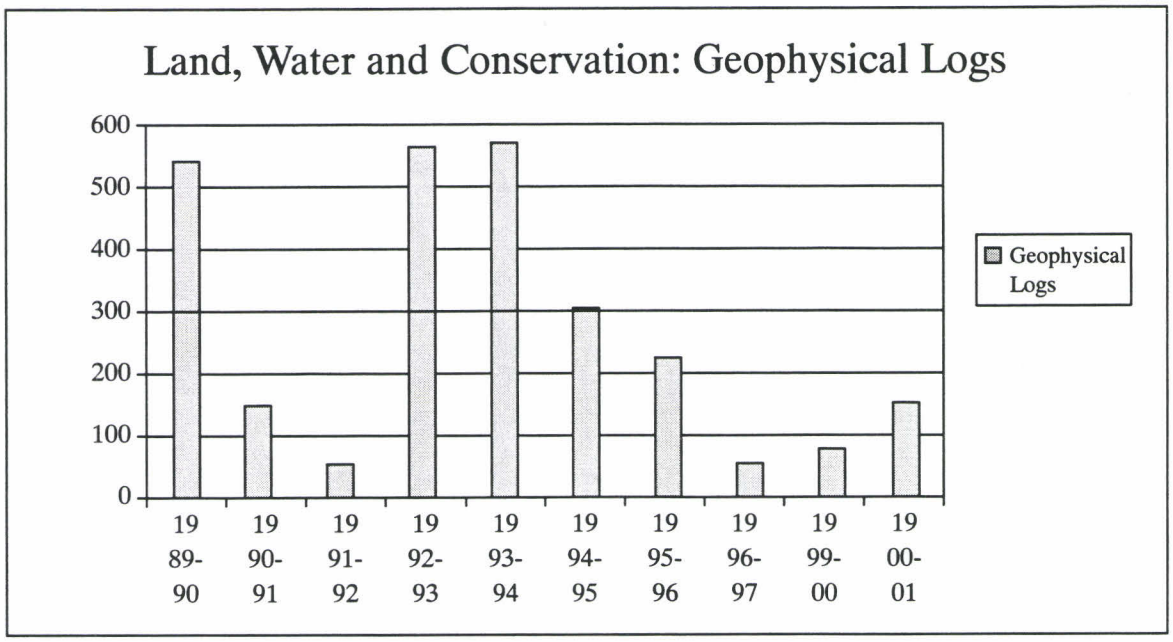

Number of Heritage Trust Protected Elements
(1988-2001)
150
100
50
0
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001


Dollars Spent on Heritage Trust Acquisitions
(1988-2001)
6,000,000
4,000,000
2,000,000
0
1988
1990
1992
1994
1996
1998
2000


Heritage Trust Land Cost Per Acre
3000
2500
2000
1500
1000
500
0
1988
1990
1992
1994
1996
1998
2000
Cost Per Acre


Heritage Trust Donated Land Value
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1988
1990
1992
1994
1996
1998
2000
Donated Land Value


Land and Water Conservation:
Feet Logging Wells
200,000
150,000
100,000
50,000
0
1990
1992
1994
1996
1998
2000


Land, Water and Conservation: Geophysical Logs
600
500
400
300
200
100
0
19 89-90
19 90-91
19 91-92
19 92-93
19 93-94
19 94-95
19 95-96
19 96-97
19 99-00
19 00-01
Geophysical Logs

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