South Florida Action Plan For Applied Behavioral Sciences

South Florida Ecosystem Restoration Working Group
Governor's Commission for a Sustainable South Florida

November 9, 1999

Origin and Purpose of the Action Plan

The *South Florida Action Plan for Applied Behavioral Sciences* has been developed as a guide for managers involved in South Florida ecosystem restoration –a guide designed to help integrate cultural, social, and economic concerns into the decision-making process.

The genesis of this project began when the "Working Group" for the South Florida Ecosystem Restoration Task Force asked its Science Coordination Team to develop this plan. The purpose was to identify socio-economic and cultural information gaps that hinder objective decision-making and to recommend pertinent methodologies and research to improve the restoration process and projects currently underway.

The Action Plan recommendations stem from strategies developed at the South Florida Social Science Symposium held February 26-27, 1998.

Action Plan Goals

1. Propose an agenda, specifying applied behavioral science projects, programs and research which are critically linked to specific ecosystem restoration projects.
2. Identify scopes, budgets, and implementation schedules for these "actions."
3. Provide an overview of the utility of applied behavioral science tools and methodologies applicable to the greater South Florida ecosystem effort.

For more Information

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Acknowledgements

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Core Group

A Core Group of experts assembled from a cross-section of federal, state and local agencies led the South Florida Social Science Initiative. This Core Group provided project oversight and guidance. The Group was established through consultation with NOAA, the Governor's Commission for a Sustainable South Florida and the Science Coordination Team of the South Florida Ecosystem Restoration Working Group. It is expected that the Core Group will continue as the project evolves. Although participants may change, it is anticipated that the member agencies will continue to serve on the Core Group.

Core Group Members

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South Florida Ecosystem Restoration Task Force
The Nature Conservancy
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USACE, Socio-Economics Branch
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USDA, Economics Research Service
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Foreword

Since statehood in 1845, Florida's fundamental asset has been land, lots of it, though much of this land was covered with water. Not surprisingly, Napoleon Bonaparte Broward's promise to "drain the Everglades" won him his election for Governor in 1904. Since that time, over half of the original Everglades has been lost and South Florida now has the dubious distinction of having one of the world's most extensive "plumbing" systems—the C&SF Project (Project) which includes one thousand miles of levees and canals, 150 gates and other water control structures and sixteen major pump stations. Originally designed for a possible maximum population of 2 million, the Project now provides flood control and water supply for 3 times that number. With population projections of between 12-15 million persons by the year 2050, clearly land and water are at a premium. The detrimental impacts to the natural system have been extensive, unprecedented, and legendary. Currently billions of dollars are earmarked for natural system restoration efforts in South Florida. In this context, resource managers find themselves trying to balance the needs of an imperiled natural system within a highly sensitive economy and multicultural landscape.

We've all learned that our quality of life is inextricably linked to the health and vitality of the natural system; and that a healthy Everglades system is essential to plant, animal and human populations alike. We've also learned about adaptive management and the critical need for science-based decisions. What we haven't learned enough of is how to fully integrate our understanding of the "natural" system with its human counterpart. As complex and interdependent as the ecological or hydrological systems, South Florida communities offer a rich array of cultures, beliefs, attitudes, institutions, economies, land use and history. Historically the two systems have been managed in relative isolation from one another—with scientists selecting only a few "givens" such as gross population increase or daily per capita water use consumption to connect the two. This presumption that people merely uniformly "impact" the greater ecosystem is analogous to perceiving a cypress dome as static, neither could be as far away from the truth.

The applied behavioral sciences focus on the human side of the ecosystem, emphasizing dynamic cultural and social systems. By studying the interactions between the natural and built environments, social scientists are able to predict change and suggest programs for modifying behavior. For example, a psychologist may seek to understand an individual's water use habits, indoors and outdoors. A sociologist, who studies groups of individuals, may assess the sociological 'needs' resulting in community lawn irrigation patterns. An economist might study the benefit/cost of water rate schedules and subsequent water use patterns and the economic impacts of varied water rate schedules. In all these inquiries and more, humans and their social or economic institutions are characterized as dynamic, moveable and reactive.

With responsibilities increasing and resources decreasing, it is imperative that natural resource managers include the human system in the decision-making process. Natural resource managers have little familiarity with the applied behavioral science disciplines

and to most managers, their contributions are vastly unknown. More behaviorally applied issues such as cost-benefit analyses, public outreach, planning, and land use projections or assessments have much if not all their analytical components based squarely in one or more of these disciplines. It is time to depict the contributions the social sciences can bring to our analyses and to the decision-making processes. The emphasis on public accountability, inclusion and cost-effectiveness requires it. The various public(s) now demand it. Toward this end, this Action Plan is provided to demonstrate the types and applications of applied behavioral science information and how it can contribute to more beneficial and effective decision-making.

This Action Plan signifies the first step in:

(1) describing the kinds of information we need to do our collective jobs better;
(2) how understanding our public(s) can assist us all in formulating better decisions;
(3) how improved communications can enhance resource management processes;
(4) how improved assessment and projecting methodologies can give us a clearer picture of where we might be and why; and
(5) how through improved knowledge, we might modify our demands or behaviors, to satisfy the needs of both the natural and the human system.

It is with greatest pleasure that I submit this Action Plan to the Working Group of the South Florida Ecosystem Restoration Task Force and to the larger community of social scientists involved with ecosystem restoration initiatives. My hope is that this initial Action Plan finds fertile minds and programs and subsequently bears a much broader understanding of the need for, the complexities of, and the paths toward successful Everglades restoration.

Dr. Bonnie Kranzer, Project Director

Executive Director,
Governor's Commission for a Sustainable South Florida

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Section I: Introduction

The *South Florida Action Plan for Applied Behavioral Sciences* is organized into four sections, described below.

1. The Introduction addresses the utility of applied behavioral science research to South Florida ecosystem restoration, in particular emphasizing the way this research can help resource managers make informed decisions. The Introduction also includes information on federal regulations and legal requirements mandating social impact assessments, public involvement and other regulations that stipulate the use of applied behavioral science research;
2. The Executive Summary offers an overview and synopsis of the projects proposed in the Action Plan;
3. Section III contains the Action Plan. The Plan is organized into three different funding requests (called scenarios). These funding scenarios are for $500K, $1M, and $2M—with 8 projects recommended in Funding Scenario I, 13 in Funding Scenario II, and 16 in Funding Scenario III. Each funding scenario builds upon the previous, with some projects expanded in scope and other projects added. All project descriptions include a depiction of the problem addressed, scope of work, and the anticipated outcomes; and
4. The appendices to this document include: an overview of the region; a description of the South Florida Social Science Symposium; symposium contact information; a description of the social science disciplines; existing social science resources; and references cited.

The Need for Applied Behavioral Sciences

Why is this Effort Needed?

The South Florida ecosystem is not just about the natural environment, it's about both the natural and the built environment. Most everyone understands that the South Florida society, economy and the environment are highly interrelated and interdependent. Yet understanding precisely how they are interrelated and the explicit nature and magnitude of those linkages is a subject area rarely contemplated. Successful ecosystem restoration will depend upon an integrated approach that recognizes and understands the interrelationships between natural systems and healthy, sustainable, social and economic systems. This ensures that:

- The human system is not characterized as static, monolithic, unengaged, unreachable or inflexible;
- All relevant ecological, cultural and socio-economic benefits and costs are considered in project planning and implementation;
- Communication between the general public and government agencies is improved;
- Federal responsibilities such as the Executive Order on Environmental Justice is performed efficiently and cost-effectively; and
- Community involvement and support is a fundamental and integral component of restoration programs.

Integrating the Social Sciences into the Decision-Making Process:
In his Inaugural Address, Governor Jeb Bush reminded us that "While our cities have grown larger, our communities have grown weaker and our natural treasures more exposed to harm (1/5/99)." With South Florida's current population of 6.3 million projected to increase an additional 5.25 million more by the year 2050 (Corps/SFWMD, Oct. 1998), the decisions made today become extremely pivotal. A scientific framework that collects, analyzes, disseminates, and integrates cultural and socio-economic data with on-going ecological and hydrological modeling must provide the basis for future research, funding and policy decisions. The actions outlined in this plan represent a first step toward integrating applied behavioral science data and research into restoration planning, management and decision-making. Aside from the strategies reported herein, overall actions will require:

- Establishment of a sound and dynamic cultural and socio-economic data base region-wide;
- Increased applied behavioral science staffing and/or data collection/research within natural resource management agencies;
- Improved monitoring and evaluation of human system interactions as part of the adaptive management strategies for all relevant restoration projects;
- Greater participation of non-agency applied behavioral scientists with restoration initiatives; and
- Development of a "peer review" process and policy for cultural and socio-economic research in South Florida.

Integration of Funding:
The implementation of this Action Plan requires the support of government agencies, through existing funding mechanisms, new mechanisms, and political advocacy. Moreover, implementation also requires the development of partnerships between government agencies, private institutions, non-governmental and community-based organizations, local volunteers, and academic institutions. The development of these partnerships is not only fiscally responsible, but it also facilitates public engagement in the restoration process. In other words, the success of this plan depends upon the active involvement of the targeted communities.

As a product of the Working Group of the South Florida Ecosystem Restoration Task Force, Working Group member agencies have the responsibility to garner resources from their agencies to implement this plan.

Management Needs

The majority of the projects described in this Action Plan were developed in response to a shortfall symposium participants recognized between what is legally required (in terms of social and economic impact assessment, public involvement, etc.) and what was actually being implemented as part of ecosystem restoration initiatives.

Legal Mandate:
Traditionally natural resource restoration initiatives have been conceived, developed and then implemented in relative isolation from the communities who may be affected. The Florida Sunshine Law, the Presidential Executive Order on Environmental Justice, the Water Resources Development Acts (WRDA), and National Environmental Policy Act of 1969 (NEPA) are but a few of the statutes now existent designed to promote and protect the public welfare in the process.

NEPA 1969 mandates extensive public involvement in all federally funded projects, while WRDA specifically calls for public involvement in South Florida ecosystem restoration. In addition, the American Indian Religious Freedom Act, the Native American Graves Protection and Repatriation Act, and the National Preservation Act all call for greater involvement of Indians and other groups in the review of public projects.

Thus far, "public engagement" in the process has been limited to the standard repertoire of public meetings, announcements, document review and comment periods. Though these procedures represent a first step toward fulfilling legal mandates, they rarely reach and involve community members who are inexperienced with the process of government language and protocol. On the other hand, when community activists or "stakeholders" do speak at public meetings, sometimes resource managers have a hard time translating local understandings of problems into policy. In these cases, the message can get lost and the public engagement process becomes derailed. Standard social science procedures can help project managers meet public engagement goals—by quickly and inexpensively identifying community groups, local values, and natural resource usage, then translating this information into policy recommendations.

NEPA regulations stipulate that federally-funded projects include social impact assessments (SIAs). Under NEPA, SIA is implemented as part of the environmental assessments and environmental impact statements. Other regulations, orders and guidelines for the SIA process are outlined by the Council on Environmental Quality and the General Services Administration (GSA). GSA has published "principles" that should structure any SIA. These principles are available in detail through the GSA's NEPA technical information website (**www.gsa.gov/pbs/pt/call-in/nepa.htm)**, and include the following:

1. Involve the diverse public. Public involvement should be an active and interactive process, in which members of the public are full participants in the SIA enterprise. The word "diverse" is important, too. It is essential that all

potentially effected segments of the public have opportunities to participate. Public involvement should reach out to groups that do not routinely participate in government decision-making because of cultural, linguistic, and economic barriers.

2. Analyze impact equity. A basic part of the SIA is to analyze who wins and who loses with each alternative proposed, with special attention paid to whether an alternative may have high and disproportionate adverse environmental or health effects on a low-income or minority population.
3. Use SIA practitioners. Trained social scientists, using appropriate professional methods, will provide the best results.

The "Executive Order 12898 on Federal Actions to Address Environmental Justice in Minority and Low Income Populations" strengthens the inclusion of SIA in NEPA analysis, requiring the examination of "disproportionate and adverse" impacts on the environmental health concerns of these communities.

Information Gaps:
Ecosystem restoration effects both the social and natural systems, and therefore the majority of decisions that managers face involve negotiating a bewildering assortment of cultural, political, and economic concerns. This Action Plan proposes 16 projects designed to provide managers with information to make better-informed decisions.

It would be fairly easy to pick up this plan, contract out the recommendations, and then consider the "social" side of restoration completed. But of course that's not the intention. This plan is designed to serve as a model—one that managers can use to see what kind of questions they need to ask when approaching a project. Some of these questions, or information gaps, include:

- What (where and when) will be the future demands of our citizens and what resources will we use to meet or modify these demands?
- What are the economic costs and benefits of restoration?
- Will restoration activities impact traditionally vulnerable communities, and if so, how can we avoid or mitigate these impacts?
- What does "sustainability" mean to South Florida's various communities?
- How do we develop community participation and incentive programs that really work?
- How are various communities interacting (as consumers, recreationers, polluters, etc.) with natural areas in South Florida?

Section II: Executive Summary

Action Plan Themes

This plan includes descriptions of 16 discrete applied behavioral science projects, some proposing research and others suggesting ways to apply existing information and techniques to restoration activities. Upon reviewing these projects, five themes emerged highlighting the conceptual concerns of the symposium participants. These themes suggest areas of critical importance to South Florida restoration: Agriculture, Demographics and Community Studies, the Economic Benefits of Ecosystem Restoration, Planning and Environmental Justice, and Public Outreach.

A brief description of these themes follows:

1. **Agriculture:** There are 4 agriculture-related projects included in this plan. Florida is the nation's ninth leading agricultural state, with annual farm cash receipts totaling $6 billion. South Florida counties lead the nation in sugar cane production (Palm Beach), oranges (Hendry), grapefruit (St. Lucie), and snap beans (Miami-Dade) (SFERTF, 1998). Yet like agriculture in much of the nation, farmers in South Florida are experiencing a crisis – with farmland under threat from external sources (NAFTA and the global economy and fierce competition) as well as locally (urban sprawl, soil subsidence, permitting and regulatory issues, land conversion and compatibility issues, etc.). The Action Plan projects address a full range of information needs required to maintain a strong agricultural sector in South Florida—while at the same time, analyzing the unique and substantial ways agriculture contributes to natural system restoration. One project recommends an extensive analysis of the economic role of agriculture, the cost of staying in business, economic value and possible displacement costs for the South Florida economy. Another project addresses the exploration of alternative land acquisition/land conservation programs of specific parcels as a mutually beneficial means toward restoration. Refined modeling of water use demands (agricultural, municipal and industrial) in responses to price and availability is also needed to better articulate future water supply planning with more refined projection techniques. A final study, understanding the meaning of sustainable agriculture outlines the importance of more in-depth dialogue with and understanding of the agriculture community to find means of achieving the often-times perceived competing objectives of ecosystem restoration.

2. **Demographics and Community Studies:** There are 4 projects in this theme area. Required baseline information updates and projections are recommended for land use, population, and water use. To improve the validity of the supply/demand components, studies (both qualitative and

quantitative) of the public's environmental values are recommended to analyze the public's needs and understanding concerning restoration initiatives. Site-specific baseline inventories are recommended for the North Lake Okeechobee area (in conjunction with the Restudy's reservoir planning efforts) and in the North Fork of the New River (urbanized area of Ft. Lauderdale). The former study proposes an assessment of socio-cultural, demographic, and economic parameters, including community values and needs. For the North Fork, an ethnography is recommended to identify community stakeholders, develop a community profile, and inventory significant resources and uses of the river by residents.

3. **Economic Benefits of Ecosystem Restoration:** Though notable politicians have emphatically stated that, "In Florida, the environment is the economy" (Vice President Al Gore, 1997), a common-sense demonstration of the argument has not been successfully portrayed to the average citizen. Since the South Florida environment is the foundation for a $18 billion/year recreation and tourism industry and supports countless amenities for commercial, residential and employment sectors, it is crucial that economic assessments clearly demonstrate those benefits. The lack of such analysis has hindered a balanced dialogue on the pros and cons of ecosystem restoration. One project is included in this theme area. A graduated number of economic benefit assessments on restoration projects are then prescribed, including market (those that can be monetized) and non-market economic values (use and non-use economic values).

4. **Planning and Environmental Justice:** Four projects are included in this theme area in the plan. Since planning is dependent on valid and reliable information, much of the baseline knowledge and information in Theme 2 is a prerequisite for the Theme 4 projects. These projects are designed to initiate and enhance community planning, and visioning, as well as to integrate these community goals and needs with restoration objectives. A "peer review" process for social science initiatives is included to improve public accountability. These projects also target the traditionally underprivileged, low income or minority groups in order to identify and resolve environmental justice issues, as well as specifically focusing on social and environmental justice concerns affecting the residents of the Biscayne Bay region and the North Fork of the New River. The latter project seeks to better the linkage between community goals and river restoration activities through community visioning, goal setting and conservation/restoration incentives programs.

5. **Public Outreach:** Three public outreach projects are included in this plan. The goal of the Task Force's public outreach plan is to "attain broad-based understanding and long-term support by residents, visitors, and national interests for a restored ecosystem and a sustainable South Florida." It seeks a two-way exchange of information between the public and the decision-makers. Forging this path is often difficult due to lack of experience,

knowledge, funds, or staff. Recommendations offered to overcome these deficiencies range from developing a protocol for a socio-economic report card to complement ecological report cards; the development of public maps and a map series for improved and standardized information; and an inventory, assessment, and subsequent training of outreach personnel.

Funding Scenarios

The Action Plan is organized into three funding scenarios that were developed by the Core Group. The scenarios represent levels of funding that were believed to be possible to attain and that would demonstrate the vitality of integrating applied behavioral sciences into the decision-making process. Projects in Funding Scenario I total $500,000; Funding Scenario II totals $1 million; and Funding Scenario III totals $2 million. Eight projects are included in Scenario I, 13 in Scenario II, and 16 in Scenario III.

The funding scenarios build upon each other. Projects included in Funding Scenarios II and III include projects from Funding Scenario I—with, in most cases, the scopes of works significantly enhanced.

A table illustrating how the themes are represented in the three funding scenarios follows on the next page.

Guide to Numbering in the Action Plan

Each project recommended in the Action Plan includes a three-digit numbering sequence. For example, the project entitled "Relationship of Agriculture to Natural System Restoration" is designated "1A.1".

The **first number** in the sequence represents the theme group of the recommendation; with: 1=Agriculture, 2=Demographics and Community Studies, 3=Economic Benefits of Ecosystem Restoration, 4=Planning and Environmental Justice, and 5=Public Outreach. Therefore for the example noted above, the project would fall under the "Agriculture" theme.

There are sixteen discrete projects recommended in this plan, with the majority of the projects' scopes of work enhanced in Funding Scenarios II and III. The **letter** designation allows the reader to track the project through the three funding scenarios. For instance, the example above appears in all three funding scenarios and is referred to as project "1A.1", "1A.2", and "1A.3." As there are four different projects proposed in the Agriculture theme, agriculture-related projects are numbered 1A, 1B, 1C, and 1D. Likewise, there are four projects recommended under the "Planning and Environmental Justice" theme and are thus designated: "4A", "4B", "4C", and "4D."

The **last number** specifies the Funding Scenario. So the listed above appears in Funding Scenario I.

Theme/Project/Funding Scenario Summary

Project Descriptions		Funding Scenarios I	II	III
Agriculture				
1A.1	Relationship of agriculture to natural system restoration	$100K		
1A.2	Relationship of agriculture to natural system restoration		$100K	
1A.3	Relationship of agriculture to natural system restoration			$100K
1B.2	Alternative land acquisition approaches/feasibility for water storage		$ 50K	
1B.3	Alternative land acquisition approaches/feasibility for water storage			$100K
1C.2	Modeling agricultural, municipal and industrial responses to water availability		$ 75K	
1C.3	Modeling agricultural, municipal and industrial responses to water availability			$100K
1D.3	Meaning of "sustainable agriculture" to S. Fl. farmers			$ 50K
Total	**Agriculture**	**$100K**	**$225K**	**$350K**
Demographics and Community Studies				
2A.1	Update demographic, land and water use parameters	$ 50K		
2A.2	Update demographic, land and water use parameters		$100K	
2A.3	Update demographic, land and water use parameters			$200K
2B.2	Ecosystem restoration perceptions survey		$ 50K	
2B.3	Ecosystem restoration perceptions survey			$100K
2C.2	Ethnography of the N. Fork of the New River		$ 50K	
2C.3	Ethnography of the N. Fork of the New River			$150K
2D.1	Community study (socio-cultural, perceptions/needs) L. Okeechobee	$125K		
2D.2	Community study (socio-cultural, perceptions/needs, indicators and monitoring) Lake Okeechobee		$200K	
2D.3	Community study (socio-cultural, perceptions/needs, indicators and monitoring) Lake Okeechobee			$250K
Total Demographics & Community Studies		**$175K**	**$400K**	**$700K**
Economic Benefits of Ecosystem Restoration				
3A.1	Economic benefits of natural system restoration	$50K		
3A.2	Economic benefits of natural system restoration		$150K	
3A.3	Economic benefits of natural system restoration			$400K
Total Economic Benefits of Ecosystem Restoration		**$50K**	**$150K**	**$400K**
Planning and Environmental Justice				
4A.2	Community-based planning - N. Fork of New River		$ 25K	
4A.3	Community-based planning and incentives - N. Fork of New River			$100K
4B.1	Resolving community impacts and environmental justice issues	$ 50K		
4B.2	Resolving community impacts and environmental justice issues		$ 75K	
4B.3	Resolving community impacts and environmental justice issues			$100K
4C.3	Southern Biscayne Bay environmental justice issues			$100K
4D.3	Peer review process for applied behavioral sciences			$ 20K
Total Planning and Environmental Justice		**$50K**	**$100K**	**$320K**
Public Outreach				
5A.1	Socio-economic report card and workshop	$ 25K		
5A.2	Socio-economic report card and workshop		$ 25K	
5A.3	Socio-economic report card and workshop and focus groups			$ 30K
5B.1	Public maps for restoration efforts	$ 25K		
5B.2	Public maps for restoration efforts		$ 25K	
5B.3	Public maps for restoration efforts			$ 50K
5C.1	Outreach/participatory techniques training to engage all groups	$ 75K		
5C.2	Outreach/participatory techniques training to engage all groups		$ 75K	
5C.3	Outreach/participatory techniques training to engage all groups			$150K
Total Public Outreach		$125K	$125K	$230K
Total All Projects		**$500K**	**$1M**	**$2M**

Section III: ACTION PLAN

Funding Scenario I

Theme 1: Agriculture

This funding scenario would allocate $500,000 funding the completion of 8 projects. This funding would be targeted towards:

- Assessing the economic role, value and costs of maintaining a strong agricultural sector in South Florida;
- Updating demographic, land and water use parameters generally;
- Investigating the needs, relationships and perceptions of a local community toward a specific restoration project in the Lake Okeechobee area;
- Providing an explicit economic valuation of benefits derived from a specific restoration project;
- Initiating a socio-economic report card and workshop;
- Developing a user-friendly map as a public outreach tool;
- Providing outreach training for strengthening restoration-related communications; and
- Developing an environmental justice program linked to a specific restoration initiative.

Funding Distribution Scenario I

Project		Cost
1A.1	Relationship of agriculture to natural system restoration	$100K
2A.1	Update demographic, land and water use parameters	$50K
2D.1	Community study (socio-cultural, perceptions/needs) Lake Okeechobee	$125K
3A.1	Economic benefits of natural system restoration	$50K
4B.1	Resolving community impacts and environmental justice issues	$50K
5A.1	Socio-economic report card and workshop	$ 25K
5B.1	Public maps for restoration efforts	$25K
5C.1	Outreach/participatory techniques training to engage all groups	$75K
Total		$500K

1A.1 Relationship of Agriculture to Natural System Restoration ($100K)

Problem: Agricultural activities interact with the South Florida ecosystem in a variety of ways. In terms of its impact on the environment, agriculture is generally a less intensive economic activity when compared to manufacturing or other urban activities. As such, agriculture can in many instances be a much more benign land use and can in fact provide potential environmental benefits, e.g. water storage, water recharge and open space. If, however, economic returns decline as a result of restoration efforts or changing economic or environmental conditions and policies, agriculture may be replaced by alternative land uses that may not be as benign. There are numerous agricultural and environmental policy options being proposed by the various state and federal agencies designed to achieve natural system restoration while providing water and other natural resources for agricultural and urban uses. These options could have significant detrimental effects on agricultural productivity, farm labor, or economic viability.

Scope of Work: This project would consider the variety of policy options available, both those directly designed to enhance natural system restoration and those that currently exist that influence the agricultural economy of South Florida, e.g., agricultural and trade policies. The project would examine the potential impact of policy options on agricultural production, changes in the cost of production, farm labor issues, and the potential for agricultural relocation. Attention also would focus on existing and potential Best Management Practices (BMPs) for agriculture, their costs and benefits, the probability of adoption, and their short and long-term economic consequences. Research will also address the socio-economic impact of potential land-use changes on the local tax structure and rural infrastructure and what bearing that may have on the acceptance of restoration objectives.

Anticipated Outcomes:

- Identify different options that have the potential to effect agriculture, i.e., ecosystem restoration projects or agricultural policies;
- Determine potential socio-economic impacts;
- Identify existing and potential agricultural production practices and BMPs that may mitigate some of the impacts of agricultural activities on the natural system;
- Estimate the costs of production and the costs of changing to BMPs;
- Estimate the costs to the agricultural sector of land-use changes; and
- Inform policy makers of array of costs and benefits of restoration options to agriculture.

Theme 2: Demographics and Community Studies

2A.1 Update Demographic, Land and Water Use Parameters ($50K)

Problem: Population, land use and water demand are the major driving forces behind South Florida's present and future resource needs. Restoration efforts require reliable and valid baseline information about these parameters while restoration, water supply or other planning or implementation projects are being developed for regional or sub-regional scales. Projecting these parameters is an uncertain process that needs updating and sensitivity analyses to provide the best inputs to planning and restoration activities.

Scope of Work: Funding would be used to update population, land use and water use projections utilizing the latest available information. Updates will be based largely on time series analyses. Agricultural land use will be based on land suitability and availability as well as trend analyses. In addition, scenarios and sensitivity analyses will be conducted on the effects of major modifying events which arise from changes in foreign competition, changes in public policy toward crops such as sugarcane and changes in irrigation technology and crop varieties.

Anticipated Outcomes:

- Provide baseline information and updated (most likely) trend-based projections of population, land use and water use for utilization in restoration activities and/or water supply plans;
- Provide the assignment of the urban and agricultural water demands to suppliers and sources as is needed for evaluations within the restoration activities; and
- Assure the consistency of projections with local government comprehensive plans and with utility development plans.

2D.1: Community Study (Socio-cultural, perceptions/needs) Lake Okeechobee ($125K)

Problem: To maximize the socio-economic benefits of the Lake Okeechobee water storage component of the C&SF Restudy Comprehensive Plan, baseline demographic, social, and cultural information must be collected and used in project planning activities. Sustainable ecosystems require that human and environmental needs be incorporated into the restoration project development and implementation. The incorporation of community values in project planning reduces future conflict and increases community support.

Scope of Work: Qualitative and quantitative research will be conducted on communities that may be impacted by water storage in the Lake Okeechobee region. The socio-cultural characteristics of the communities directly and indirectly effected by the proposed reservoir(s) will be identified. Communities will be surveyed to determine various groups' perceptions of and interactions with the environment. Researchers will assess community needs related to the environment based on this research.

Anticipated Outcomes:

- Identify the socio-cultural characteristics of effected communities;
- Assessment of various populations' perceptions of and interactions with the environment;
- Establish impact of proposed reservoir(s) on community economic and social needs;
- Assessment of community environmental needs;
- Increase peoples' awareness of conservation issues; and
- Reduction in conflict.

Theme 3: Economic Benefits of Ecosystem Restoration

3A.1: Economic Benefits of Natural System Restoration ($50K)

Problem: Most of the ecosystem restoration projects being considered for South Florida will involve changes in the uses of the area's natural resources and will require significant public investment. Current economic analyses tend to focus on natural resource usage that will be negatively impacted by restoration projects. There has not been sufficient attention paid to determining the economic benefits of restoration, such as for recreation and tourism as well as other commercial and employment opportunities. To build public support for making investments in ecosystem restoration, there is a need for a more balanced presentation of the costs and benefits of restoration alternatives. This project will produce important information to demonstrate the contribution of the "Green" sector to the economy and how the ecosystem restoration project contributes specifically toward that end.

Scope of Work: Environmental and economic benefits of restoration will be determined for one restoration project. In general, the benefit estimates will be accomplished by first determining the ecosystem outputs in cooperation with a team of ecologists. The ecosystem outputs would then be monetized to produce estimates of the economic benefits of the restoration project. Economic benefits are defined here to include market economic values (e.g. sales/output, income and employment) and non-market economic values (e.g. the amount individuals are willing to pay for ecosystem improvement). The non-market economic values can be further broken-down into use and non-use economic values. The non-market economic values are those that are appropriate to include in a benefit-cost analysis.

Given a selected restoration project with design alternatives, a team of ecologists would first specify and quantify the expected ecological outputs of alternative project designs. At this level of funding, non-market, non-use values cannot be estimated due to the costs of design and implementation of the contingent valuation methods required for determining non-use economic values. However, the expected outcomes could be identified and could then be ranked according to desirability. Values can be placed on market-based outcomes.

Anticipated Outcomes:

- Identify different policies and restoration options that have the potential to effect the economy of South Florida and the environment;
- Determine potential ecological outcomes associated with restoration project options;
- Determine potential market-based economic impacts associated with restoration options;
- Present ecological and market-based economic outcomes in a way to provide decision-makers with information to help choose desirable outcomes;
- Build public support for restoration activities; and
- Help guide restoration activities toward those that will be most beneficial.

Theme 4: Planning and Environmental Justice

4B.1: Resolving Community Impacts and Environmental Justice Issues ($50K)

Problem: Modifications of the Central and Southern Florida (C&SF) Project to achieve ecosystem restoration will result in a wide array of benefits and costs. Some of the costs may translate into potentially adverse health, social, and economic effects. In addition, the beneficial and adverse effects of restoration alternatives may have disproportionate impacts on minority and low-income populations.

Scope of Work: This project would: (1) identify minority and low-income populations potentially affected by structural and management measures associated with ecosystem restoration, (2) assess potential beneficial and adverse health, social, and economic effects on these vulnerable groups, and (3) develop and implement an environmental justice program to maximize beneficial effects and minimize and mitigate disproportionate negative environmental, health, and socio-

economic effects on these groups. The motivation and empowerment of vulnerable social groups to join and become involved in community-based planning involving the restoration planning process is a critical aspect of this Scope of Work.

Anticipated Outcomes:

- **Mapping**: identification and "mapping" of minority and low-income groups potentially affected by ecosystem restoration actions;
- **Risk Assessment**: identification, estimation, and evaluation of potential effects on these groups, including environmental, health, social, and economic impacts;
- **Environmental Justice Program**:
  - Identification of minority and low-income stakeholders;
  - Improved community access to public information;
  - Increased public participation in the restoration process;
  - Increased agency awareness of vulnerable social and economic groups;
  - More effective enforcement of all health and environmental statutes;
  - More effective interagency coordination of research and data collection associated with environmental and health effects of restoration actions;
  - Increased recognition of differential patterns of consumption of natural resources (e.g., subsistence or recreational fishing/hunting); and
  - Greater awareness of multiple and cumulative health and socio-economic pressures on vulnerable minority and low-income groups.

Theme 5: Public Outreach

5A.1: Socio-economic Report Card and Workshop ($25K)

Problem: The South Florida ecosystem restoration effort is an on-going effort involving substantial public and private investments. These projects will have significant environmental, institutional, fiscal and socio-economic benefits and costs. Building public support for restoration projects will require the effective communication of these socio-economic costs and benefits to a wide variety of audiences. Each audience may require different levels of information detail and/or methods of information display. The workshop will bring together social scientists and experts in education, public outreach, and marketing to help develop socio-economic report cards.

Scope of Work: A workshop will be organized and held to determine how to create and design socio-economic report cards. The focus of the workshop will be to determine the content of the report card and how this information should be displayed. The workshop will also address these same issues with respect to target audiences (e.g. the general public, managers, or other scientists).

Anticipated Outcomes:

- Produce a set of guidelines for the development of socio-economic report cards;
- Determine separate guidelines for different target audiences; and
- Develop mock-ups of report cards for existing programs.

5B.1: Public Maps for Restoration Efforts ($25K)

Problem: Maps are powerful educational tools. Much of the decision-making regarding restoration projects is based on maps (e.g., hydrology and environmental variables; socio-economic, administrative and other factors). Acceptance and support for restoration projects will be improved by developing clear, accurate and useful maps designed to meet the public's and decision-makers' information needs and by widely distributing such maps.

Scope of Work: First, an inventory of existing maps associated with the restoration will be conducted. The maps will be prioritized according to their usefulness in communicating important restoration information to the public and decision-makers. A select set of high priority maps will be redesigned following good cartographic and communication principles. Clear and concise legends will provide useful information. Common design elements will be used to create a coherent public map series. The public map series will be distributed (with other literature) through various outlets to educate and inform the public.

Anticipated Outcomes:

- An inventory of maps associated with the restoration effort – a catalog of maps

assembled from the various restoration projects;
- A collection of maps that have been identified as important to share with the public and decision-makers;
- A redesigned "public map series" – printed on paper and on CD-ROM – developed to inform and educate the public about the restoration;
- Distribution of this map series to newspapers, public libraries, schools and universities, etc.; and
- Improved public understanding of and support for restoration efforts.

5C.1: Outreach/Participatory Techniques Training to Engage All Groups ($75K)

Problem: All restoration efforts in areas of human habitation/use are ultimately locally based and implemented. If local people do not support and participate actively in the design and implementation stages of the project, possibilities for successful project outcomes are seriously jeopardized. Local priorities and concerns must be integrated into restoration objectives for successful program implementation. In addition, project stakeholders and decision-makers don't always know how to collect and/or use socio-economic information to support ecosystem restoration projects or to design and/or implement sustainable development plans. Outreach/training efforts are required to assist both of these groups.

Scope of Work: This project would include full implementation for a selected restoration project or a selected community for a wider range of issues. The Scope of Work includes four components: (1) Develop an inventory of outreach and participatory techniques, (2) Select, from this inventory, the appropriate techniques for the types of stakeholders, decision-makers, and issues that will be involved in the project, (3) Develop and/or assemble a team of public participation experts, who will then, (4) Train the different stakeholders and decision-makers that will be involved in community outreach and implementing the restoration project. The Scope of Work is designed to give both stakeholders and decision-makers the skills they will need to effectively participate in the adaptive process of forming project/program goal-activities.

Anticipated Outcomes:
- Provision of an inventory of existing participatory techniques, tools and training;
- Develop an outreach program and educational material based on the selected restoration project's specific needs;
- Train a team of outreach specialists; and
- Implement suggested outreach/training program.

Funding Scenario II

This funding scenario would allocate $1 million and includes all projects listed in Funding Scenario I, as well as five additional projects. New projects included in Funding Scenario II would:

- Investigate alternative land acquisition approaches, including the feasibility of using agricultural lands for water storage;
- Model agriculture, municipal, and industrial responses to water availability;
- Conduct a survey of the public's perceptions of ecosystem restoration efforts in South Florida;
- Initiate an ethnography of the urban North Fork of the New River neighborhood restoration areas; and
- Initiate a community-based environmental planning effort along the North Fork of the New River.

Several projects suggested in Funding Scenario I have been significantly enhanced in this funding scenario. These enhancements would:

- Expand the "Demographics, Land, and Water Use Parameters" project to include price and performance information on water treatment technologies and water use technologies;
- Include a socio-cultural indicators and monitoring component for the Lake Okeechobee community study project;
- Expand the scope of work for the "Economic Benefits of Natural System Restoration" to analyze the benefits of two restoration projects; and
- Include a community-based planning element to the "Resolving Community Impacts and Environmental Justice Issues" project.

Funding Distribution Scenario II

Project		Cost
1A.2	Relationship of agriculture to natural system restoration	$100K
1B.2	Alternative land acquisition approaches/feasibility for water storage	$ 50K
1C.2	Modeling agricultural, municipal and industrial responses to water availability	$ 75K
2A.2	Update demographic, land and water use parameters	$100K
2B.2	Ecosystem restoration perceptions survey	$ 50K
2C.2	Ethnography of the N. Fork of the New River	$ 50K
2D.2	Community study (socio-cultural, perceptions/needs, indicators and monitoring) Lake Okeechobee	$200K
3A.2	Economic benefits of natural system restoration	$150K
4A.2	Community-based planning – N. Fork of New River	$ 25K
4B.2	Resolving community impacts and environmental justice issues	$ 75K
5A.2	Socio-economic report card and workshop	$ 25K
5B.2	Public maps for restoration efforts	$ 25K
5C.2	Outreach/participatory techniques training to engage all groups	$ 75K
Total		$1,000K

Theme 1: Agriculture

1A.2: Relationship of Agriculture to Natural System Restoration ($100K)

See Funding Scenario I, Project 1A.1 (page 15)

1B.2: Alternative Land Acquisition Approaches/Feasibility for Water Storage ($50K)

Problem: Property rights associated with land are made up of a variety of specific rights or interests in land. For example, interests may include mineral rights, water rights, farmland rental agreements, conservation easements, and other elements of land ownership. These interests can be held and traded separately, providing public agencies opportunities to influence resource use other than through regulation or land ownership. Examples of public policy tools used to affect resource use include the Conservation Reserve Program, the Wetlands Reserve Program (both programs managed by the USDA's NRCS and the Farm Services Agency), farmland protection easements, tradable development rights, and real estate tax preferences. Often, land use management objectives are met through partnerships with private-nonprofit and public land trusts.

Scope of Work: This project will explore options for land conservation through acquisition alternatives. Of particular concern is the need to conserve lands for water storage in various parts of the ecosystem. Much of the land being considered for water storage is currently in agricultural production. Outright purchase of these lands for water storage may prove the most expensive land use option.

Land acquisition alternatives for specific key areas in South Florida, (e.g., Everglades Agricultural Area, land which may be used for water storage north of Lake Okeechobee, Western Miami-Dade Co., etc.) will be determined through examining existing land acquisition programs, and assessing the feasibility of existing options and new approaches. Water storage effectiveness and other environmental costs and benefits will be determined. This analysis will enable program managers to rank land acquisition options according to their cost effectiveness and budgetary requirements.

Anticipated Outcomes:

- Identify different options for acquiring conservation uses from land;
- Assess and rank cost effective strategies for acquiring conservation uses of land; and
- Reduce overall costs of increasing water storage capacity.

1C.2: Modeling Agricultural, Municipal and Industrial Responses to Water Availability ($75K)

Problem: Static economic models do not fully account for the ability of water users to adapt their practices to altered price and availability regimes. Understanding the complex relationship between water availability, price and usage rates is critical to informing the policy debate concerning the impacts of water allocation or reallocation. Existing static economic models project future water demand based on current consumptive usage rates and agricultural land use patterns. These projections may overestimate future shortages and lead to wide spread misconceptions regarding the magnitude of conflicting water demands between agriculture, municipal and industrial, and the natural system.

Scope of Work: This project would survey available models of each sector's response to changes in water supply, demand, and price. Relevant and appropriate models would be adapted to South Florida conditions, integrated with the Economics Post Processor (EPP), and validated. The model would be used to assess alternative policies. Results and sensitivity analyses would contribute to decision alternatives and NEPA process documents. Funding at this level would be sufficient to perform a literature survey, develop an add-on module for the EPP, and perform some basic pro-forma analyses.

Anticipated Outcomes:

- Improve impact assessment and policy analysis through improved modeling of agricultural and industrial responses;

- Knowledge of industries' responses is likely to reveal a wider array of available policy options; and
- Improve allocation of resources to satisfy more interest groups.

Theme 2: Demographics and Community Studies

2A.2: Update Demographic, Land Use, and Water Use Parameters ($100K)

Problem: Population, land use and water demand projections are the major driving forces behind South Florida's present and future resource needs. Restoration efforts require reliable and valid baseline information about these parameters while restoration, water supply or other planning or implementation projects are being developed for regional or sub-regional scales. Projecting these parameters is an uncertain process that needs updating and sensitivity analyses to provide the best inputs to planning and restoration activities.

Scope of Work: Funding would be used to update population, land use and water use projections utilizing the latest available information. In addition to the population, land use and water use data, price and performance information on water treatment technologies (such as conventional treatment, ultra-filtration and reverse osmosis) and water use technologies (such as ultra-low water use plumbing devices and low-volume irrigation systems) will be evaluated. This will allow the projection updates to be based on non-trend price and technological factors as well as on time series analyses. Agricultural land use will be based on land suitability and availability as well as trend analyses. In addition, scenarios and sensitivity analyses will be conducted on the effects of major modifying events which arise from changes in foreign competition, changes in public policy toward crops such as sugarcane and changes in irrigation technology and crop varieties.

Anticipated Outcomes:
- Provide baseline information and updated (most likely) projections of population, land use and water use based on trend factors and changes in water treatment and use technologies for utilization in restoration activities and/or water supply plans;
- Provide the assignment of the urban and agricultural water demands to suppliers and sources as is needed for evaluations within the restoration activities; and
- Assure the consistency of projections with local government comprehensive plans and with utility development plans.

2B.2: Ecosystem Restoration Perceptions Survey ($50K)

Problem: Although South Florida ecosystem restoration initiatives are funded primarily through state and federal agencies, there is little scientific information on the public's fundamental environmental values to confirm or validate these initiatives. Environmental values research will help gauge the public's understandings and perceptions of the natural system, as well as help shape restoration projects' political and social feasibility as well as their implementation schedules.

Scope of Work: Surveys will be conducted to derive profiles of the public's environmental values and perceptions of specific restoration projects. Various subgroups within South Florida will be surveyed, with question formats designed around "willingness to pay" scenarios. Subgroups will be identified based on their ethnicity, age groups, occupation, communities of interest, and social class.

Anticipated Outcomes:
- Determine "willingness to pay" scenarios for ecosystem restoration;
- Provide justification for governmental support of restoration initiatives;
- Aid in developing effective public engagement strategies, such as public outreach activities and community participation campaigns; and
- Supplement Institute for Food & Agricultural Sciences (Milon et. al., 1999) study "Public Preferences for Changes in the South Florida Water Management System."

2C.2: Ethnography of the North Fork of the New River ($50K)

Problem: Meeting restoration goals at the North Fork of the New River requires involving community stakeholders in the development and implementation of project alternatives, project monitoring and assessment strategies. Prior to their engagement in the process, stakeholders must be identified through partnerships with community-based organizations and churches.

Scope of Work: A community profile of the North Fork of the New River will be completed based upon a review of existing social and cultural information and Rapid Ethnographic Assessment (REAP) techniques. Community stakeholders will be identified through partnerships with community organizations. Researchers will conduct interviews with community stakeholders to inventory community-identified social, cultural and natural places with historic significance.

Anticipated Outcomes:

- Identify community stakeholders in North Fork of the New River restoration area;
- Provide baseline information for formulating planning alternatives, project monitoring, and assessment;
- Facilitate community involvement in restoration process; and
- Provide data for meeting federal mandates, including NEPA and the Executive Order on Environmental Justice, as well as historic preservation concerns.

2D.2: Community Study (Socio-cultural, perceptions/needs, indicators and monitoring) Lake Okeechobee ($200K)

Problem: To maximize the socio-economic benefits of the Lake Okeechobee water storage component of the C&SF Restudy Comprehensive Plan, baseline demographic, social, and cultural information must be collected and used in project planning activities. By developing community indicators, project managers can monitor the positive and negative impacts of the restoration project. The incorporation of community values in project planning and monitoring reduces future conflict and increases community support.

Scope of Work: Qualitative and quantitative research will be conducted on communities that may be impacted by the development of a water storage component of the C&SF Restudy Comprehensive Plan. The socio-cultural characteristics of the communities directly and indirectly effected by the proposed reservoir(s) will be identified. Communities will be surveyed to determine various groups' perceptions of and interactions with the environment. Researchers will assess community needs related to the environment based on this research. Community indicators will be developed for the following areas: land use/ownership, demographics (such as employment structure, economy, population change), and community structure/organization. The indicators will be monitored in response to project activity. Impacts on the community socio-economic base will be assessed.

Anticipated Outcomes:

- Identify the socio-cultural characteristics of effected communities;
- Assessment of various populations' perceptions of and interactions with the environment;
- Assessment of community environmental needs;
- Increase peoples' awareness of conservation issues;
- Reduction in conflict;
- Establish impact of proposed reservoir(s) on community; and
- Provide information for future project design improvements and adaptive assessment protocol.

Theme 3: Economic Benefits of Ecosystem Restoration

3A.2: Economic Benefits of Natural System Restoration ($150K)

Problem: Most of the ecosystem restoration projects being considered for South Florida will involve changes in the uses of the area's natural resources and will require significant public investment. Current economic analyses tend to focus on natural resource

usage that will be negatively impacted by restoration projects. There has not been sufficient attention paid to determining the economic benefits of restoration, such as for recreation and tourism as well as other commercial and employment opportunities. To build public support for making investments in ecosystem restoration, there is a need for a more balanced presentation of the costs and benefits of restoration alternatives. This project will produce important information to demonstrate the contribution of the "Green" sector to the economy and how the ecosystem restoration project contributes specifically toward that end.

Scope of Work: Environmental and economic benefits of restoration will be determined for two restoration projects, including benefits for recreation and tourism as well as other commercial and employment opportunities. In general, the benefit estimates will be accomplished by first determining the ecosystem outputs in cooperation with a team of ecologists. The ecosystem outputs would then be monetized to produce estimates of the economic benefits of the restoration project. Economic benefits are defined here to include market economic values (e.g. sales/output, income, employment and socio-economic beneficiaries (racial, ethnic, etc.)) and non-market economic values (e.g. the amount individuals are willing to pay for ecosystem improvement). The non-market economic values can be further broken-down into use and non-use economic values. The non-market economic values are those that are appropriate to include in a benefit-cost analysis.

Given the selected restoration projects with design alternatives, a team of ecologists would first specify and quantify the expected ecological outputs of alternative project designs. At this level of funding, non-market, non-use values cannot be estimated due to the costs of design and implementation of the contingent valuation methods required for determining non-use economic values. However, the expected outcomes could be identified and could then be ranked according to desirability. Values can be placed on market-based outcomes.

Anticipated Outcomes:

- Identify different policies and restoration options that have the potential to effect the economy of South Florida and the environment;
- Determine potential ecological outcomes associated with two different restoration project options;
- Determine potential market-based economic impacts associated with restoration options;
- Present ecological and market-based economic outcomes in a way to provide decision-makers with information to help choose desirable outcomes;
- Build public support for restoration activities; and
- Help guide restoration activities toward those that will be most beneficial.

Theme 4: Planning and Environmental Justice

4A.2: Community-Based Planning for the North Fork of the New River ($25K)

Problem: After community stakeholders have been identified for the North Fork of the New River (*Project 2C.2*), successful restoration requires the involvement of these stakeholders in the planning of restoration initiatives.

Scope of Work: Community visioning workshops will be conducted with stakeholders of the North Fork of the New River. Workshops will include a visual preference survey designed to obtain information regarding the community's vision for their neighborhood and goals for the future. This low-cost project will provide planners with a better linkage between the community's goals and river restoration, as well as build a local community co-sponsor for restoration initiatives.

Anticipated Outcomes:

- Identify community environmental goals for expansion of the Franklin Neighborhood Enhancement plan;
- Facilitate community involvement in restoration process;
- Provide a mechanism for meeting federal mandates for community involvement as required by WRDA;
- Identify community goals for North Fork of the New River restoration project; and

- Enhance long-term success of restoration project implementation.

4B.2: Resolving Community Impacts and Environmental Justice Issues ($75K)

Problem: Modifications of the Central and Southern Florida (C&SF) project to achieve ecosystem restoration will result in a wide array of costs and benefits. Some of the costs may translate into potentially adverse health, social, and economic effects. In addition, the beneficial and adverse effects of restoration alternatives may have disproportionate impacts on minority and low-income populations.

Scope of Work: This project would be used to: (1) identify minority and low-income populations potentially affected by structural and management measures associated with ecosystem restoration, (2) assess potential beneficial and adverse health, social, and economic effects on these vulnerable groups, and (3) develop and implement an environmental justice program to maximize beneficial effects and minimize and mitigate disproportionate negative environmental, health, and socio-economic effects on these groups. The motivation and empowerment of vulnerable social groups to join and become involved in community-based planning involving the restoration planning process is a critical aspect of this project.

Anticipated Outcomes:

- **Mapping**: Identification and "mapping" of minority and low-income groups potentially affected by ecosystem restoration actions;
- **Risk Assessment**: identification, estimation, and evaluation of potential effects on these groups, including environmental, health, social, and economic impacts;
- **Environmental Justice Program:**
  - Identification of minority and low-income stakeholders;
  - Improved community access to public information;
  - Increased public participation in the restoration process;
  - Increased agency awareness of vulnerable social and economic groups;
  - More effective enforcement of all health and environmental statutes;
  - More effective interagency coordination of research and data collection associated with environmental and health effects of restoration actions;
  - Increased recognition of differential patterns of consumption of natural resources (e.g., subsistence or recreational fishing/hunting);
  - Greater awareness of multiple and cumulative health and socio-economic pressures on vulnerable minority and low-income groups;
- **Community-Based Planning:**
  - Historical analysis of local culture; and
  - Ethnographic interviews of potentially affected minority and low-income groups.

Theme 5: Public Outreach

5A.2: Socio-economic Report Card and Workshop ($25)

See Funding Scenario I, Project 5A.1 (page 18)

5B.2: Public Maps for Restoration Effort ($25K)

See Funding Scenario I, Project 5B.1 (page 18)

5C.2: Outreach/Participatory Techniques Training to Engage all Groups ($75K)

See Funding Scenario I, Project 5C.1 (page 19)

Funding Scenario III

This funding scenario would allocate $2 million to fund 16 projects. Three new projects have been added to this funding scenario. These projects would:

- Study the meaning of "sustainable agriculture" among different agricultural communities in South Florida;
- Develop an environmental justice program for communities affected by Southern Biscayne Bay restoration and planning projects; and
- Integrate a peer review process for all applied behavior science projects related to South Florida ecosystem restoration.

Several of the projects included in this funding scenario have been significantly expanded in scope. These expansions include:

- Assessing the feasibility and cost effectiveness of land acquisition programs for specific areas within the South Florida ecosystem, as well as proposing new approaches;
- Developing a new water forecasting tool to model agricultural, municipal and industrial responses to variations in water availability;
- Including an analysis of major modifying events such as natural disasters, changes in development patterns, or changes in economic or immigration policies to the "Demographic, Land and Water Use Parameters" project;
- Integrating a specific focus on vulnerable populations (migrant, economically disadvantaged) potentially impacted by a restoration project near Lake Okeechobee;
- Evaluating the economic benefits of three (rather than two) specific restoration projects;
- Identification and conservation of culturally valued places as a part of the "Resolving Community Impacts and Environmental Justice Issues" project;
- Testing and evaluation of the socio-economic report cards and restoration maps using focus groups; and
- Providing outreach training for two (rather than one) restoration project.

Funding Distribution Scenario III

Project		Cost
1A.3	Relationship of agriculture to natural system restoration	$100K
1B.3	Alternative land acquisition approaches/feasibility for water storage	$100K
1C.3	Modeling agricultural, municipal and industrial responses to water availability	$100K
1D.3	Meaning of "sustainable agriculture" to S FL. farmers	$ 50K
2A.3	Update demographic, land and water use parameters	$200K
2B.3	Ecosystem restoration perceptions survey	$100K
2C.3	Ethnography of the N. Fork of the New River	$150K
2D.3	Community study (socio-cultural, perceptions/needs, indicators and monitoring) Lake Okeechobee	$250K
3A.3	Economic benefits of natural system restoration	$400K
4A.3	Community-based planning and incentives - N. Fork of New River	$100K
4B.3	Resolving community impacts and environmental justice issues	$100K
4C.3	Southern Biscayne Bay environmental justice issues	$100K
4D.3	Peer review process for applied behavioral sciences	$ 20K
5A.3	Socio-economic report card and workshop and focus groups	$ 30K
5B.3	Public maps for restoration efforts	$ 50K
5C.3	Outreach/participatory techniques training to engage all groups	$150K
Total		$2,000K

Theme 1: Agriculture

1A.3: Relationship of Agriculture to Natural System Restoration ($100K)

See Funding Scenario I, Project 1A.1 (page 15)

1B.3: Alternative Land Acquisition Approaches/Feasibility for Water Storage ($100K)

Problem: Property rights associated with land are made up of a variety of specific rights or interests in land. For example, interests may include mineral rights, water rights, farmland rental agreements, conservation easements, and other elements of land ownership. These interests can be held and traded separately, providing public agencies opportunities to influence resource use other than through regulation or land ownership. Examples of public policy tools used to affect resource use include the Conservation Reserve Program, Wetlands Reserve Program (both programs managed by the USDA's NRCS and the Farm Services Agency), farmland protection easements, tradable development rights, and real estate tax preferences. Often, land use management objectives are met through partnerships with private-nonprofit and public land trusts.

Scope of Work: This project will explore options for land conservation through acquisition alternatives. Of particular concern is the need to conserve lands for water storage in various parts of the ecosystem. Much of the land being considered for water storage is currently in agricultural production. Outright purchase of these lands for water storage may prove the most expensive land use option.

Land acquisition alternatives for specific key areas in South Florida, (e.g., Everglades Agricultural Area, land which may be used for water storage north of Lake Okeechobee, Western Miami-Dade Co., etc.), and their trade-offs in terms of cost-effectiveness to the larger ecosystem of acquiring particular land tracts will be explored. The project will examine existing land acquisition programs and assess the feasibility of existing options and propose new approaches. Water storage effectiveness, impacts on agricultural, urban, and environmental uses, and costs will be assessed for the various acquisition options. Determining the option costs will likely require obtaining additional information on land values and earning potentials of the alternative land uses. Data may come from secondary sources, but primary data collection will be supported. A cost effectiveness analysis of the various acquisition options will assist program managers to select land acquisition options according to their cost effectiveness and budgetary requirements.

Anticipated Outcomes:

- Identify different options for acquiring conservation uses from land;
- Identify specific areas and current land uses that would be appropriate for land conservation uses;
- Assess and rank cost effective strategies for acquiring conservation uses of land; and
- Reduce overall costs of increasing water storage capacity.

1C.3: Modeling Agricultural, Municipal and Industrial Responses to Water Availability ($100K)

Problem: Static economic models do not fully account for the ability of water users to adapt their practices to altered price and availability regimes. Understanding the complex relationship between water availability, price and usage rates is critical to informing the policy debate concerning the impacts of water allocation or reallocation. Existing static economic models project future water demand based on current consumptive usage rates and agricultural land use patterns. These projections may overestimate future shortages and lead to wide spread misconceptions regarding the magnitude of conflicting water demands between agricultural, municipal and industrial, and natural system requirements.

Scope of Work: This project would survey available models of each sector's response to changes in water supply, demand, and price.

Relevant and appropriate models would be adapted to South Florida conditions, integrated with the Economics Post Processor (EPP), and validated. The model would be used to assess alternative water supply/allocation policies. Results and sensitivity analyses would contribute to decision alternatives and NEPA process documents. Funding at this level would be sufficient to perform a literature survey, develop a new module integrated into the EPP, and provide a flexible tool to analyze policies on demand.

Anticipated Outcomes:

- Improve impact assessment and policy analysis by better modeling of agricultural and industrial responses;
- Knowledge of industries' responses is likely to reveal a wider array of available policy options;
- Ability to evaluate how a policy is implemented as well as its ultimate effect; and
- Improve allocation of resources to satisfy more interest groups.

1D.3: Meaning of "Sustainable Agriculture" to South Florida Farmers ($50K)

Problem: Successful ecosystem restoration in South Florida depends on retaining land in agriculture and fostering agricultural practices that support ecological goals (through BMP programs etc.). To encourage sustainable agriculture and BMP compliance, policymakers need to have a better understanding of what sustainable agriculture means to different farming groups in South Florida.

Scope of Work: Conduct ethnographic research (including interviews, participant observation, and focus group discussions) among different groups of farmers within the South Florida ecosystem: sugarcane and citrus growers, cattle ranchers, dairy farmers, vegetable growers, and nurseries. Research will focus on farmers' understanding of "sustainable agriculture," their participation in sustainable practices (including BMPs), and farmers understandings of themselves in the future and the meaning of agriculture to themselves and their families.

Anticipated Outcomes:

- Provide Natural Resources Conservation Service (NRCS) and other agencies with information to develop and transfer BMPs to meet Everglades Forever Act 2003 deadline;
- Provide a better understanding of what "sustainability" means to farmers, ranchers, and farm workers; and
- Encourage a more informed dialogue between agricultural sectors and regulatory agencies.

Theme 2: Demographics and Community Studies

2A.3: Update Demographic, Land and Water Use Parameters ($200K)

Problem: Population, land use and water demand are the major driving forces behind South Florida's present and future resource needs. Restoration efforts require reliable and valid baseline information about these parameters while restoration, water supply or other planning or implementation projects are being developed for regional or sub-regional scales. Projecting these parameters is an uncertain process that needs updating and sensitivity analyses to provide the best inputs to planning and restoration activities.

Scope of Work: Funding would be used to update population, land use and water use projections utilizing the latest available information. In addition to the population, land use and water use data, price and performance information on water treatment technologies (such as conventional treatment, ultra-filtration and reverse osmosis) and water use technologies (such as ultra-low water use plumbing devices and low-volume irrigation systems) will be evaluated. This will allow the projection updates to be based on non-trend price and technological factors as well as on time series analyses. Agricultural land use will be based on land suitability and availability as well as trend analyses. In addition, scenarios and sensitivity analyses will be conducted on the effects of major modifying events which arise from changes in foreign competition, changes in

public policy toward crops such as sugarcane and changes in irrigation technology and crop varieties.

Anticipated Outcomes:

- Provide baseline information and updated (most likely) projections of population, land use and water use based on trend factors and changes in water treatment and use technologies for utilization in restoration activities and/or water supply plans;
- Provide the assignment of the urban and agricultural water demands to suppliers and sources as is needed for evaluations within the restoration activities;
- Assure the consistency of projections with local government comprehensive plans and with utility development plans; and
- Provide analyses of the potential impacts of major modifying events which may include natural disasters (e.g. major hurricanes), changes in development patterns (e.g. Eastward Ho!), changes in immigration patterns or policies, effects of international competition on agriculture, effects of subsidence on agriculture on muck soils (EAA), and effects of new crops or crop varieties that may be drought or flood tolerant.

2B.3: Ecosystem Restoration Perceptions Survey ($100K)

Problem: Although South Florida ecosystem restoration initiatives are funded primarily through state and federal taxes, there is little scientific information on the public's fundamental environmental values to confirm or validate these initiatives. Environmental values research will help gauge the public's understandings and perceptions of the natural system, as well as help shape restoration projects' political and social feasibility as well as their implementation schedules.

Scope of Work: Surveys will be conducted to derive profiles of the public's environmental values and perceptions of specific restoration projects. Various subgroups within South Florida will be surveyed, with question formats designed around "willingness to pay" scenarios. Subgroups will be identified based on their ethnicity, age groups, occupation, communities of interest, and social class. In addition to the questionnaire format, interviews will be conducted using traditional ethnographic techniques including focus group discussions.

Anticipated Outcomes:

- Determine "willingness to pay" scenarios for ecosystem restoration;
- Provide justification for governmental support of restoration initiatives;
- Aid in developing effective public engagement strategies, such as public outreach activities and community participation campaigns; and
- Supplement Institute for Food & Agricultural Sciences' (Milon et al., 1999) study "Public Preferences for Changes in the South Florida Water Management System."

2C.3: Ethnography of the North Fork of the New River ($150K)

Problem: Meeting restoration goals at the North Fork of the New River requires involving community stakeholders in the development and implementation of project alternatives, project monitoring and assessment strategies. Prior to their engagement in the process, stakeholders must be identified through partnerships with community-based organizations and churches.

Scope of Work: A community profile of the North Fork of the New River will be completed based upon a review of existing social and cultural information and Rapid Ethnographic Assessment (REAP) techniques. Community stakeholders will be identified through partnerships with community organizations. Researchers will conduct interviews with community stakeholders to inventory community-identified social, cultural and natural places with historic significance. Long-term ethnographic techniques will establish community use of river and environment, leadership patterns of neighborhoods, document informal economic activities, and survey environmental needs of homeless populations.

Anticipated Outcomes:

- Identify community stakeholders in North Fork of the New River restoration area;

- Provide baseline information for formulating planning alternatives, project monitoring, and assessment;
- Facilitate community involvement in restoration process;
- Identify community use of river, including: subsistence/recreational fishing, plant use, water use, river-adjacent land use; and
- Provide data for meeting federal mandates, including NEPA and the Executive Order on Environmental Justice, as well as historic preservation concerns.

2D.3: Community Study (Socio-cultural, perceptions/needs, indicators and monitoring) Lake Okeechobee ($250K)

Problem: To maximize the socio-economic benefits of the Lake Okeechobee water storage component of the C&SF Restudy Comprehensive Plan, baseline demographic, social, and cultural information must be collected and used in project planning activities. By developing community indicators, project managers can monitor the positive and negative impacts of the restoration project, with particular emphasis on vulnerable populations. The incorporation of community values in project planning and monitoring reduces future conflict and increases community support.

Scope of Work: Qualitative and quantitative research will be conducted on communities that may be impacted by the development of a water storage component of the C&SF Restudy Comprehensive Plan. The socio-cultural characteristics of the communities directly and indirectly effected by the proposed reservoir(s) will be identified. Additional research will be conducted to determine how vulnerable communities (poor and disadvantaged, migrant populations) will be particularly impacted by restoration activities. Communities will be surveyed to determine various groups' perceptions of and interactions with the environment. Researchers will assess community needs related to the environment based on this research. Community indicators will be developed for the following areas: land use/ownership, demographics (such as employment structure, economy and population change), and community structure/organization. The indicators will be monitored in response to project activity. Impacts on the community socio-economic base will be assessed.

Anticipated Outcomes:
- Identify the socio-cultural characteristics of effected communities;
- Assessment of various populations' perceptions of and interactions with the environment;
- Assessment of community environmental needs;
- Allocate benefits of the projects to the disadvantaged to ensure economic justice;
- Increase peoples' awareness of conservation issues and reduction of conflict;
- Establish impact of proposed reservoir(s) on community; and
- Provide information for future project design improvements (adaptive management strategies).

Theme 3: Economic Benefits of Ecosystem Restoration

3A.3: Economic Benefits of Natural System Restoration ($400K)

Problem: Most of the ecosystem restoration projects being considered for South Florida will involve changes in the uses of the area's natural resources and will require significant public investment. Current economic analyses tend to focus on natural resource usage that will be negatively impacted by restoration projects. There has not been sufficient attention paid to determining the economic benefits of restoration, such as for recreation and tourism as well as other commercial and employment opportunities. To build public support for making investments in ecosystem restoration, there is a need for a more balanced presentation of the costs and benefits of restoration alternatives. This project will produce important information to demonstrate the contribution of the "Green" sector to the economy and how the ecosystem restoration project contributes specifically toward that end.

Scope of Work: Environmental and economic benefits will be determined for three restoration projects. Important benefits will likely arise from restoration for recreation and tourism as well as other commercial and employment opportunities. In general, the benefit estimates will be accomplished by first determining the ecosystem outputs in cooperation with a team of ecologists. The ecosystem outputs would then be monetized to produce estimates of the economic benefits of the restoration project. Economic benefits are defined here to include market economic values (e.g. sales/output, income, employment, and socio-economic beneficiaries (racial, ethnic, etc.)) and non-market economic values (e.g. the amount individuals are willing to pay for ecosystem improvement). The non-market economic values can be further broken-down into use and non-use economic values. The non-market economic values are those that are appropriate to include in a benefit-cost analysis.

At this level of funding, the benefits estimated would be expanded to include non-market, non-use values of ecosystem restoration. Given the selected restoration projects with design alternatives, a team of ecologists would first specify and quantify the expected ecological outputs of alternative project designs. Market and non-market economic values would then be used to quantify the economic values of ecological outputs.

Anticipated Outcomes:

- Identify different policies and restoration options that have the potential to effect the economy of South Florida and the environment;
- Determine potential ecological outcomes associated with restoration project options;
- Determine potential full array of economic benefits including both market- and non-market-based economic impacts associated with restoration options;
- Present ecological and market-based and non-market economic outcomes in a way which provides decision-makers with information to help choose desirable outcomes;
- Build public support for restoration activities; and
- Help guide restoration activities toward those that will be most beneficial.

Theme 4: Planning and Environmental Justice

4A.3: Community-Based Planning and Incentives – North Fork of the New River ($100K)

Problem: After community stakeholders have been identified for the North Fork of the New River (*Scope of Work 2C.3*), successful restoration requires the involvement of these stakeholders in the planning of restoration initiatives and incentives for promoting more sustainable neighborhoods.

Scope of Work: Community visioning workshops will be conducted with stakeholders of the North Fork of the New River. Workshops will include a visual preference survey designed to obtain information regarding the community's vision for their neighborhood and goals for the future. This low-cost project will provide planners with a better linkage between the community's goals and river restoration, as well as build a local community co-sponsor for restoration initiatives. At this funding level, a second phase of community planning includes developing incentives to change behaviors that negatively impact the ecosystem. Actions will be identified that neighborhood stakeholders could employ to improve river quality (such as installing and maintaining vegetation to stabilize riverbanks, screen litter, improve aesthetics, etc.). Incentives for community action may include reduced property taxes, improved access to approved disposal sites, etc. The cost/effectiveness of the incentives program will be calculated.

Anticipated Outcomes:

- Identify community environmental goals for expansion of the Franklin Neighborhood Enhancement plan;
- Facilitate community involvement and support for restoration process;
- Promote sustainable behaviors;
- Provide a mechanism for meeting federal mandates for community involvement as required by WRDA;

- Identify community goals for North Fork of the New River restoration project;
- Enhance long-term success of restoration project implementation;
- Develop incentives that government or businesses could offer that would change behaviors to those which have a positive effect on the river; and
- Identify income opportunities for community residents resulting from these incentives or from pollution management.

4B.3: Resolving Community Impacts and Environmental Justice Issues ($100K)

Problem: Modifications of the Central and Southern Florida (C&SF) project to achieve ecosystem restoration will result in a wide array of benefits and costs. Some of the costs may translate into potentially adverse health, social, and economic effects. In addition, the beneficial and adverse effects of restoration alternatives may have disproportionate impacts on minority and low-income populations.

Scope of Work: This project would: (1) identify minority and low-income populations potentially affected by structural and management measures associated with ecosystem restoration, (2) assess potential beneficial and adverse health, social, and economic effects on these vulnerable groups, and (3) develop and implement an environmental justice program to maximize beneficial effects and minimize and mitigate disproportionate negative environmental, health, and socio-economic effects on these groups. The motivation and empowerment of vulnerable social groups to join and become involved in community-based planning involving the restoration planning process is a critical aspect of this Scope of Work.

Anticipated Outcomes:
- **Mapping**: Identification and "mapping" of minority and low-income groups potentially affected by ecosystem restoration actions;
- **Risk Assessment**: identification, estimation, and evaluation of potential effects on these groups, including environmental, health, social, and economic impacts;
- **Environmental Justice Program:**
  - Increased public participation in the restoration process;
  - Increased agency awareness of vulnerable social and economic groups;
  - More effective enforcement of all health and environmental statutes;
  - Increased recognition of differential patterns of consumption of natural resources (e.g., subsistence or recreational fishing/hunting);
  - Greater awareness of multiple and cumulative health and socio-economic pressures on vulnerable minority and low-income groups;
- **Community-Based Planning**:
  - Historical analysis of local culture;
  - Review of land use regulations to reduce land speculation and rapid turnover;
  - Cultural conservation plans; and
  - Identification of critical culturally valued places.

4C.3: Southern Biscayne Bay Environmental Justice Issues ($100K)

Problem: Changes in regulations and policies stemming from the Southern Biscayne Bay Watershed Management Plan may impact traditionally vulnerable groups. Executive Order 12989 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" requires agencies to address these impacts.

Scope of Work: At this funding level, the potential impacts of this plan will be assessed. Stakeholder groups in the region will be identified, and the costs and benefits of the plan will be evaluated for each of these stakeholder groups. Environmental effects analyzed will include human health, economic, and social effects. Results of the evaluation will be included in the EIS component under NEPA, and mitigation strategies will be recommended.

Anticipated Outcomes:
- **Mapping**: Identification and "mapping" of minority and low-income groups potentially affected by plan;

- **Risk Assessment**: identification, estimation, and evaluation of potential effects on these groups, including environmental, health, social, and economic impacts;
- **Environmental Justice Program**:
  - Increased public participation in the restoration process;
  - Increased agency awareness of vulnerable social and economic groups;
  - More effective enforcement of all health and environmental statutes;
  - Increased recognition of differential patterns of consumption of natural resources (e.g., subsistence or recreational fishing/hunting, farming);
  - Greater awareness of multiple and cumulative health and socio-economic pressures on vulnerable minority and low-income groups;
- **Community-Based Planning**:
  - Historical analysis of local culture;
  - Review of land use regulations to reduce land speculation and rapid turnover;
  - Cultural conservation plans; and
  - Identification of critical culturally valued places.

4D.3: Peer Review Process for Applied Behavioral Sciences ($20K)

Problem: Credible and reliable social science data and research needs to be integrated into the restoration decision-making processes at all governmental levels. A "peer review" process is needed to help develop, guide, critique and assess the role and contributions of such information, to better insure its applicable usage and acceptance.

Scope of Work: Funding would provide for a "peer review" of applied behavioral science activities in South Florida related to ecosystem restoration. The "peer review" individuals would advise the Science Coordination Team of the Working Group and help guide research and use of applied behavioral sciences information. Because of the broad range of inter-disciplinary and intergovernmental and non-governmental subjects potentially encountered, such a peer group would be compensated (estimate of approximately 2 days /month) to assist in setting standards, selecting priority projects, timing and review of studies for regional relevance and applicability. This would also include a review of the project's proposed data sources, methodology, ethics and objectivity.

Anticipated Outcomes:
- Provide objective, unbiased and cross-disciplinary guidance for applied behavioral science research/applications in South Florida;
- Ensure objectivity and validity of applicable social science applications for stakeholders and agencies alike;
- Build on the South Florida Water Management District's existent peer review process and the National Park Service's quality assurance/quality control initiatives;
- Promote public confidence in research findings and programs; and
- Inject an equivalent respect for applied behavioral sciences as currently exists for the natural sciences through the introduction and counsel of national experts.

Theme 5: Public Outreach

5A.3: Socioeconomic Report Card Workshop ($30K)

Problem: The South Florida ecosystem restoration effort is an on-going effort involving substantial public and private investments. These projects will have significant environmental, institutional, fiscal and socio-economic benefits and costs. Building public support for restoration projects will require the effective communication of these socio-economic benefits and costs to a wide variety of audiences. Each audience may require different levels of information detail and/or methods of information display. The workshop will bring together social scientists and experts in education, public outreach, and marketing to help develop socio-economic report cards.

Scope of Work: A workshop will be organized and held to determine how to create and design socio-economic report cards. The focus of the

workshop will be to determine the content of the report card and how this information should be displayed. The workshop will also address these same issues with respect to target audiences (e.g. the general public, managers, or other scientists). In addition, report cards will be tested and evaluated through focus groups.

Anticipated Outcomes:

- Produce a set of guidelines for the development of socio-economic report cards;
- Determine separate guidelines for different target audiences;
- Evaluate report cards through focus groups to determine their effectiveness in communicating socio-economic information; and
- Develop mock-ups of report cards for existing programs.

5B.3: Public Maps for Restoration Efforts ($50K)

Problem: Maps are powerful educational tools. Much of the decision-making regarding restoration projects is based on maps (e.g., hydrology and environmental variables; socio-economic, administrative and other factors). Acceptance and support for restoration projects will be improved by developing clear, accurate and useful maps designed to meet the public's and decision-makers' information needs and by widely distributing such maps.

Scope of Work: First, an inventory of existing maps associated with the restoration effort will be conducted. The maps will be prioritized according to their usefulness in communicating important restoration information to the public and decision-makers. A select set of high priority maps will be redesigned following good cartographic and communication principles. Gaps in the map series will also be identified, spatial data collected, and new maps developed as needed for the public. Clear and concise legends will provide useful information. Common design elements will be used to create a coherent public map series. A small focus group will be assembled to review examples of the public maps during the redesign process. The maps will be distributed (with other literature) through various outlets to educate and inform the public.

Anticipated Outcomes:

- An inventory of maps associated with the restoration effort – a catalog of maps assembled from the various restoration projects;
- A collection of maps that have been identified as important to share with the public and decision-makers;
- A redesigned "public map series" – printed on paper, on CD-ROM and posted on the web – developed to inform and educate the public about the restoration;
- An additional set of maps (part of the public map series) to address gaps in information needed by the public and decision-makers;
- A public review of the map series to help improve it;
- Distribution of the map series to newspapers, public libraries, schools and universities, etc., and
- Improved public understanding of and support for restoration efforts.

5C.3: Outreach/Participatory Techniques Training to Engage All Groups ($150K)

Problem: All restoration efforts in areas of human habitation/use are ultimately locally based and implemented. If local people do not support and participate actively in the design and implementation stages of the project, possibilities for successful project outcomes are seriously jeopardized. Local priorities and concerns must be integrated into restoration objectives for successful program implementation. In addition, project stakeholders and decision-makers don't always know how to collect and/or use socio-economic information to support ecosystem restoration projects or to design and/or implement sustainable development plans. Outreach/training efforts are required to assist both of these groups.

Scope of Work: This project would include full implementation for two selected restoration projects or selected communities for a wider range of issues. The Scope of Work includes

four components: (1) Develop an inventory of outreach and participatory techniques, (2) Select, from this inventory, the appropriate techniques for the types of stakeholders, decision-makers, and issues that will be involved in the project, (3) Develop and/or assemble a team of public participation experts who will then, (4) Train the different stakeholders and decision-makers in community outreach and implementing the restoration projects. The Scope of Work is designed to give both stakeholders, and decision-makers that will be involved, the skills they will need to effectively participate in the adaptive process of forming project/program goal-activities.

Anticipated Outcomes:

- Provision of an inventory of existing participatory techniques, tools and training;
- Develop an outreach program and educational material based on the selected restoration project's specific needs;
- Train a team of outreach specialists; and
- Implement the suggested outreach/training program.

Appendix 1: The South Florida Context

Brief Description of the Region:
South Florida is widely recognized as a unique area of state, national and international importance. The region is an international, commercial, agricultural, and tourist center, with a diversity population that reflects a range of rich and varied ethnic, economic and social values. It boasts of its climate, multi-cultural population, expanding economy and numerous other physical and social assets.

Geographical Extent:
South Florida encompasses about 18,000 square miles, stretching from the Kissimmee- Lake Okeechobee region south of Orlando through the coral reefs in the Florida Keys. It includes the Everglades, the Florida Keys, Florida Bay, Biscayne Bay and other hydrologically related systems, including all or parts of 16 counties. The region is bounded on the West by the Gulf of Mexico north of the Caloosahatchee River and Ft. Myers, and on the East by the Atlantic Ocean where it meets the Indian River Lagoon north of Ft. Pierce, Florida.

Natural Systems:
The Everglades system is water-dominated and encompasses a myriad of interconnected freshwater rivers, lakes, marshes, prairies, forests, and estuaries and includes the natural systems of the Kissimmee River Basin, Lake Okeechobee, the Everglades, Big Cypress Swamp, Florida Bay, Biscayne Bay, the Florida Keys reef tract, Charlotte Harbor and Indian River Lagoon. It is characterized by a mixture of these distinct habitats encompassing lakes, swamps, upland pine woods, coastal mangrove forests, beaches and coral reefs.

Population Characteristics:
Over 6 million persons live in South Florida, with the majority living in a narrow band along the lower East Coast. The area contains the greater Southern Orlando Kissimmee region, the megalopolis of the lower east coast (West Palm Beach to Miami), and a rapidly growing West Coast region (Naples/Ft. Myers). The interior is sprinkled with rural communities and tribal lands. Tourism is one of the regions major economic sectors, generating approximately 20 million visitors/yr.

Land Use:
Almost one third of South Florida is in public ownership. Urban areas are located mainly along the coasts with inland area predominantly public lands, agricultural or rural communities. Development and growth have transformed large tracts of wetlands, native rangelands, and upland habitat into cropland and housing developments with a proliferation of low-density sprawl development and a growing backlog of infrastructure.

Social Characteristics:
South Florida's economy is based on services, agriculture and tourism. Proportionately, the population is more Hispanic and older than those in the rest of the state and the nation. It has and continues to be dominated by in-migration patterns. Critical issues emerging include the growing disparity between the "haves" and "have nots", trends in declining personal income for the lower East Coast, and the growing level of poverty among the elderly.

Appendix 2: Social Science Symposium

As a first step toward integrating societal and economic goals into restoration planning, monitoring, and adaptive management strategies, the South Florida Ecosystem Restoration Task Force "Working Group" (SFERWG) charged its Science Coordination Team with understanding the need for and developing a plan for social science input into the restoration process. With support through the Critical Ecosystem Science Initiative funds (distributed by the Department of the Interior), as well as staff support from various regional state, federal, and tribal agencies, a symposium process was designed to help develop an "Action Plan" for social science research and the application of social science methods into the restoration process. Agencies involved in the planning of the Symposium included: NOAA, US EPA, National Park Service, US Army Corps of Engineers, South Florida Water Management District, USDA, Seminole Tribe of Florida, and the Governor's Commission for a Sustainable South Florida. This symposium was held in late February (1998) in Key Largo, FL.

Over 70 social scientists representing the disciplines of Anthropology (including Archaeology), Geography, Economics, Environmental Psychology, History, Political Science, and Sociology, as well as applied fields of Policy/Policy Analysis, Risk Assessment, Environmental Justice, and Planning worked in six interdisciplinary breakout groups to examine how social science (research and programs) could be applied to current South Florida ecosystem restoration efforts.

Symposium Process

Prior to the symposium, a literature review was conducted to identify social science activities in South Florida. In addition, studies outside of South Florida, but relevant to this effort, were also included. The results of this literature review were collated into a database and distributed to symposium participants prior to the meeting. This database is available at the website: http://www.orca.nos.noaa.gov/projects/econkeys/econkeys.html.

At the symposium, participants were divided into six breakout groups. The breakout groups examined projects (as case studies) representing a cross section of the range of SFERWG (or member agency) restoration efforts. These projects, which where chosen from the SFERWG's Integrated Financial Plan, the U.S. Army Corps of Engineers' Restudy effort and Critical Projects List, and the 1996 Farm Bill, were representative of different stages in the project planning process, geographic scale, location, range and land use issues. Through a facilitated process, participants identified social science information or program needs that they found critically lacking when evaluating the project or projects in their breakout group. Participants then translated these information "gaps" into research recommendations (such as integrating a community involvement Scope of Work in the project scoping phase).

The symposium process included three distinct steps:

1. **Evaluation of Social/Economic Studies:** Symposium participants reviewed the studies included in the literature review. They then discussed if existing studies adequately addressed the socio-cultural and/or economic impact(s) of proposed projects. Symposium participants also provided additional references for the literature review;

2. **Identification and Prioritization of Management Needs:** In this step, participants identified the critical social science information needed for each project, and identified the social science information gaps associated with each project. Participants then prioritized the gaps and needs using the following criteria: Required (by law), Critical, Important, and Useful; and

3. **Developing Actions to Meet Needs:** After the gaps were prioritized, participants then developed actions to fill these information gaps. Participants outlined the scope of each of these actions, and determined the stage in the process where the action(s) would be most beneficial.

The Role of the Core Group

A "Core Group" of social science experts from federal, state, regional, tribal, and local agencies worked to develop the symposium process (members listed on page 2). After the symposium, the Core Group evaluated all the recommendations made at the symposium (a total of 52) to determine which should be included in the Action Plan. Core Group members evaluated the symposium recommendations by first recognizing the priorities established in the breakout groups and the rankings determined in the overall symposium. In addition, the Core Group used the following criteria to evaluate activities:

- Required: activities that are required and/or essential for project management and/or planning. These are "must do" activities, including activities legally required;
- Critical: those that are vital to successful project management and/or planning. Project management and/or planning would be hindered if these activities are not implemented; and
- Important: those activities that would significantly improve project management and/or planning.

Other considerations in the selection process included the need to choose projects that would demonstrate quick success, the likelihood of project funding, populations affected, and the recommendation's potential as a pilot project. From the initial 52 recommendations made at the symposium, the Core Group chose 16 projects to be included in this plan. These 16 projects were either taken directly from symposium recommendations or became a "hybrid" project by summing significant recommendations from related subject or geographic areas into a cohesive feasible project.

Symposium Breakout Groups

The topics of the breakout groups served as "case studies" for social science input into the restoration process. The activities linked to each case study could then be applied to similar efforts throughout the study area. A summary of breakout group topics follow:

Group 1a: Best Management Practices (BMPs) for Agriculture: This group examined BMPs for agriculture in S. Florida. Participants reviewed BMP program materials that were provided by the US Department of Agriculture prior to arriving at the symposium. During the breakout session, Natural Resources Conservation Service project managers presented additional information and answered questions on BMP programs in Florida. In addition, participants evaluated other agricultural issues related to restoration.

Group 1b: Economic Assessment of the C&SF Restudy Project: The Central and Southern Florida (C&SF) Project, first authorized by Congress in 1948, was designed as a multipurpose water resource project—facilitating the drainage of wetlands for agriculture and development, as well as providing flood control and water delivery for South Florida communities. Over the past 50 years, this project has resulted in some unintended consequences to the environment in South Florida. According to the C&SF Project Restudy Plan, "the purpose of the Restudy is to reexamine the Project to determine the feasibility of structural or operational modifications essential to restoration of the Everglades and Florida Bay ecosystems while providing for other water-related needs such as urban and agricultural water supply and flood control." The Corps has developed a scope of work for the economic evaluation of the Restudy plan formulation process. This scope of work was developed to meet federal laws, regulations and statues that guide economic evaluation of water resources and ecosystem restoration projects. Symposium participants received this scope of work prior to attending the meeting; Corps economists and their consultants were on hand to provide additional information to symposium participants.

Group 2: Water Storage North and West of Lake Okeechobee: Symposium participants examined two potential components of the C&SF Project Restudy plan. Both components have similar goals, though impacting different

regions. These goals are to increase regional water storage, and provide flood attenuation, estuary flow protection and water supply benefits.

The area impacted by a storage facility north of Lake Okeechobee is part of the historic Kissimmee River Basin. The lake spans a 730 square mile area in six counties. Development along the northern half of the northwest edge of the lake is sparse. The Brighton Seminole Reservation is located along the northwest edge; and the city of Okeechobee is located at the central northernmost portion of the lake. The rest of the land bordering Lake Okeechobee is agricultural, primarily composed of cattle and dairy industries, but also including sugar cane and citrus. The proposed storage facility would span approximately 35,000 acres—most likely in close proximity to the lake to allow for inflows to be pumped out of the lake when waters rise above the inflow line.

A storage facility west of Lake Okeechobee would create water storage within the Caloosahatchee River basin to accept lake regulatory discharges and local basin runoff, as well as to provide environmental water deliveries to the Caloosahatchee Estuary. Land use within this area near Lake Okeechobee is primarily agricultural, specifically sugar cane. Moving west the land use pattern changes from agriculture (cattle grazing and citrus) mixed with extractive industry (sand mining) to urban uses, particularly subdivisions. The affected counties have some of the most extreme cyclical employment rates in the state. Agriculture remains a critical component of the tax base. Storage in the area would be created through the construction of a 20,000 acre water storage reservoir.

Group 3: North Fork of the New River Restoration Process: The North Fork of the New River Restoration is part of a larger effort to revitalize the environmental and aesthetic qualities of the New River Basin. The 30-mile long New River is one of the few naturally occurring surface water bodies in Broward County. The North Fork, particularly from World War I to the 1960's, was once the heart of the African American community in Fort Lauderdale, FL. Today the waterway is an urban focal point of activity for many commercial, residential, urban, environmental, and tourism interests in Broward County. A 1991 Broward County Department of Natural Resource Protection assessment identified the North Fork as an area of low water quality due to impacts from pollution and low water circulation. Stormwater runoff, illicit discharges, and debris dumping have been chronic problems. In addition, other potential sources of contaminants such as septic tanks and sewage lines surround the waterway. These factors have led to a more degraded natural system that meanders predominantly through low-income minority communities. The river's water and sediment quality characteristics also pose a potential health risk to the local residents. The New River project represents a unique juncture of natural resource restoration, urban renewal and revitalization issues.

Group 4: South Biscayne Watershed Management Plan and the Florida Keys Carrying Capacity Study: Both the Biscayne Bay Watershed Management Plan and the Florida Keys Carrying Capacity Study represent planning projects at the southern end of the historic Everglades system. These projects, at the scoping phase, are intended to balance the competing needs of the region's fragile natural resources with the current and future growth and development demands of the area.

The impetus for the Southern Biscayne Watershed Management Plan stems from the future redevelopment of the Homestead Airforce Base into a commercial airport and the impact this transfer may have on the agricultural land values adjacent to the airbase. Biscayne National Park would prefer adjacent lands to remain in agriculture as a means of retaining an open space boundary between the park and urban sprawl from Miami. A number of business interests and the agricultural community are conversely concerned that zoning restrictions would severely restrict the future economic growth of the entire South Miami-Dade region compounding the effects of Hurricane Andrew on the region. A stakeholder working group developed the scope of work for the land management plan in an effort to balance the

environmental health of Biscayne National Park and water quality, while fully preserving the necessary rights, credit and equity of land owners within the study area boundaries.

The Florida Keys Carrying Capacity Study's goal is to determine what level of human population activities can be supported by a healthy, balanced, functioning natural system. Identifying "component thresholds" which define the ecosystem's sustainability will make this determination. The study was initiated to comply with an executive order from the Governor of Florida.

Participants received both scopes of work prior to attending the symposium; project managers for both studies attended the breakout group session to answer additional questions. Participants were asked to evaluate each scope.

Group 5: Indian River Lagoon Restoration Feasibility Study: The Indian River Lagoon spans some 156 miles along Florida's central east coast and includes two counties, Martin and St. Lucie. In 1991, it was listed as an estuary of national significance and included in the National Estuary Program. The protected waters of the Lagoon provide a crucial link between the land and the ocean, and safe harbor for boats and safe passage along the Intracoastal Waterway. The inlets provide a mechanism of saltwater flushing creating salt and brackish water habitat that is used as a spawning ground for fish and other marine life. The Lagoon and the St. Lucie Estuary, a major tributary at the southern end of the Lagoon, provide habitats for a wide variety of commercial, recreational, and ecologically important aquatic organisms. Today, high volume freshwater flows to the St. Lucie Estuary through canals constructed as part of the C&SF Project cause rapid decreases in salinity, increase sediment loading, reduce aquatic productivity, and produce unfavorable water quality conditions for estuarine plants and animals. Both commercial and recreational uses of the lagoon are important to the economic base of the region. The estimated amount spent by recreational fishermen in the Lagoon exceeded $54 million in 1990 and is expected to increase to $87 million by the year 2010. The economy of the region is also supported by a number of marine service facilities, marine construction and maintenance facilities, yacht clubs and resorts. Approximately 15% of the hotels and restaurants in Florida exist within the Lagoon area.

Symposium participants reviewed the scope of work for the Lagoon Restoration Feasibility Study prior to arriving at the meeting and project managers were available in the breakout group to answer additional questions.

Priority Social Science Actions

Participants within each breakout group ranked their social science recommendations. Below is a synopsis of the top three recommendations for each group:

Symposium Recommendations

Group 1a: BMPs for Agriculture

1. Ethnographic study of key farming groups in the South Florida ecosystem, focused on the local meanings of "sustainable agriculture";
2. Expand planning to include BMPs to urban areas (include chemical inputs from other sources: parks, golf courses, homeowners, etc.); and
3. Examine the potential of agriculture's sustainability within the international market place.

Group 1b: Economic Assessment of the Restudy

1. Develop a carrying capacity study of South Florida and develop a natural resource accounting system;
2. Establish and implement an integrated natural and social science based adaptive management plan;
3. Update and document demographic, land use, and water use parameters for models; and
4. "Green GNP": Economic benefits of ecosystem restoration.

Items 1 and 2 were tied for 1st place.

Group 2: Water Storage North and West of Lake Okeechobee

1. Community Studies: Socio-cultural characteristics, perceptions, and values;
2. Build a vision for South Florida, characterizing society, economy, and environment for 2020 and 2050;
3. Baseline of social/economic community; develop indicators, monitor for feedback into project design; and
4. Projections of population density, land use, tourism, economic base, export base, create maps, GIS, computer forecast modeling.

Items 3 and 4 were tied for 3rd place.

Symposium Recommendations

Group 3: North Fork of the New River

1. Community based planning designed to help set and implement goals for North Fork of the New River Restoration;
2. Ethnography of river use/cultural inventory;
3. Evaluate existing crime levels and determine how they influence use of the river; evaluate impact of river restoration project on crime in the neighborhood; and
4. Proactive steps to mitigate adverse social consequences of restoration.

Items 3 and 4 were tied for 3rd place.

Group 4: Florida Keys and Southern Biscayne Bay

1. Conduct lifestyle studies: impacts of lifestyles related to quality of life, different sub-populations;
2. Identify and incorporate representative societal preferences (not just advocates) in these projects; and
3. Evaluate housing/tourism developments/agricultural land use equity impacts.

Group 5: Indian River Lagoon

1. Social impact analysis of proposed projects;
2. Develop strong/early public participation (build broad-based participation, community relations approach, minority outreach, ensure public participation in decision-making); and
3. Develop socio-cultural profiles of communities affected by proposed projects.

Appendix 3: Overview of the Social Science Disciplines

Traditionally, six disciplines are included in the social sciences, though interdisciplinary research with the Humanities (such as Environmental History) and the Natural Sciences (such as Ethno-botony) is quite common. Many applied fields, such as urban and natural resource planning, risk assessment, public outreach and engagement, utilize social science methodologies and research. The following descriptions briefly illustrate the ways the social science disciplines aid in ecosystem restoration efforts:

Anthropology: by analyzing the interrelationships between peoples' cultures and the ecological consequences of these activities.

Economics: through understanding the cost and benefits of projects, and the role of the natural ecosystem in the local, regional, and national economies.

Geography: through studies of tourist travel and locational patterns, human impacts upon the built and non-built environment, and trends in natural resource usage.

Political Science: through analyzing relationships of institutional power and its implementation and understanding of public participation in the development of public policy.

Psychology: through understanding of how values and beliefs relate to individual choices in conservation decision-making and citizen involvement.

Sociology: through studies of demographic trends, group behavior and public opinion, and relationship between environmental problems and social action.

Appendix 4: Existing Social Science Information Resources

A survey of applied behavioral science research and resources related to the South Florida environment was conducted as part of the development of this Action Plan. This information has been collated and is available in bibliographic format at the following website: http://www-orca.nos.noaa.gov/projects/econkeys/econkeys.html. To request a copy of the Proceedings of the Social Science Symposium, please contact Karyn Ferro of Everglades National Park at Karyn_Ferro@nps.gov.

Participants helping to develop this action plan receive updates and share information through the South Florida Social Science Network, an e-mail list serve. Those interested in participating in this list serve may contact Laura Ogden at LaOgden@aol.com.

South Florida's Regional Planning Councils also serve as excellent sources for social, demographic, and economic information.

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Several federal agencies have embarked upon similar efforts to integrate the behavioral sciences into planning and policy, as well as applying this research in programs throughout the country. Some of these efforts are summarized below:

- The United States Department of Agriculture's (USDA) Forest Service has completed *Guidelines for Conducting Social Assessments within a Human Dimensions Framework*. This document is the result of a 1997 social science workshop on the need for improved human dimensions information in ecosystem management and, more specifically, in the USDA Forest Service planning processes. The Guidelines present a framework for identifying and organizing human dimensions information into a Human Dimensions Framework (HDF) and provides guidance on how to use this framework to conduct social assessments—the collection and analysis of social structure, social processes, social change and indicators. A website supports the use of this framework and also provides access to secondary social information about the Social, Economic, Environmental, Leisure, Assessment (SEELA) data set. The website address is www.srs.fs.fed.us/athens.
- In 1997, the United States Geological Survey (USGS) held a workshop whose purpose was to evaluate and define a role for the social sciences within the agency. Participants identified eight activities in their mission statement where the social sciences would be relevant. A position paper on the conference results is forthcoming.
- The National Park Service (NPS) has completed two planning documents for integrating applied human behavioral sciences into their programs. These documents are *Usable Knowledge: A Plan for Furthering Social Science and the National Parks* and *A Social Science Plan for South Florida National Park Service Units*.
- The United States Environmental Protection Agency's (EPA) Office of Research and Development, in conjunction with the National Science Foundation (NSF) sponsors a joint research program for using the social sciences in research and tools development. Of the two most relevant sections, Water and Watersheds and Decision-making and Valuation, both include emphasis on natural and social science multi-disciplinary approaches.
- Using a cooperative agreement with the Society for Applied Anthropology (SfAA), an international membership organization concerned with the application of the social sciences to contemporary issues, EPA has provided technical assistance to communities throughout the United States (including South Florida) in the form of internships, fellowships, consultant assistance and workshops. The data produced from these programs includes information about community values and perceptions, the linkages between stakeholders, resulting in the re-framing of long-standing issues. Anthropologists are identifying the cultural models being used by stakeholders to understand the causes, consequences and solutions to environmental problems. These models are being used to facilitate dialogue between the different stakeholder groups and to influence the development of policy.

CASE STUDY: Adams County, Ohio

Adams County is one of the most economically depressed counties in Ohio, with job losses and rural poverty critically impacting the opportunities for community development. At the same time, the rolling hills and deep woods of the region provide habitation for a number of endangered species. Within this area, the Nature Conservancy (TNC) manages a tract of land, intended as a managed conservation preserve. As TNC planned for preserve-related sustainable harvesting of trees and increases educational and research programs, it became increasingly aware of the need for community participation, as well as the need to address the lack of land use planning in the community. At first, TNC had little hope of establishing a sustainability ethic in the area.

US EPA's Office of Policy has developed a *Community Cultural Profiling Guide: Understanding a Community's Sense of Place* that discusses community and culture, and outlines a variety of community "characteristics." The guide also includes directions for using social science methodology to create a community profile. Using this guide, TNC conducted a community profile of Adams County, which included focus groups, a survey, interviews, and an analysis of local newspapers. The profiling exposed how the managers of TNC's nature preserve misperceived local attitudes and values concerning the environment. In fact, the profiling results showed remarkable support for the preservation of the existing quality of life, including the county's natural beauty, and for a sustainable economic development approach. The results have catalyzed a countywide effort to envision and plan for the future. Managers' comments reveal the benefits of the profiling techniques:

> I've lived in Adams County for six and a half years and from this one exercise [community cultural profiling] I've learned so much more and realized that preserve managers were making decisions on errant assumptions . . . [We] previously ignored social stresses in site conservation assessments. This process teaches us what we have to do.
>
> TNC Preserve Manager, Adams County, Ohio

> The community profiling process . . . has been fascinating and the results sometimes surprising . . . Up to now, we, as with most preserve managers and program directors, could only speculate about past and current community issues and their relevance . . . Having seen this process in action, I believe it will be a wonderful tool for preservation projects across all geographic and sociological boundaries.
>
> TNC's community partner, Cincinnati Museum Center Preserve Manager

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