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ENHANCED PUBLIC COASTAL INFORMATION THROUGH A STATEWIDE DATABANK NETWORK IN FLORIDA : FEASIBILITY AND PILOT STUDY

by

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EXECUTIVE SUMMARY

Rapid coastal population growth and urbanization in Florida requires current and extensive information for a variety of public and private interests. Individual organizations charged with developing or providing such information face a widening gap between the awareness of their increasing audiences and the effectiveness of their efforts, due in part to a shortage of personnel and communications resources. Pooling information resources through state-of-the-art computer technology is one approach to beginning to reduce this gap.

This project demonstrated that it is feasible to organize a remote-access statewide information service for a variety of users to contact to determine what information is available for a coastal subject and where it may be obtained. Two types of computer-based systems for facilitating the exchange and promoting the awareness of information regarding Florida coastal issues and resources were developed, tested and evaluated. Although both systems are feasible technically, for several reasons a microcomputer system was found preferable to a mainframe computer system to implement a coastal information network. Options for operating both kinds of systems are reviewed in this report, including fiscal and technical requirements. With growth of a Coastal Information System, use of a mainframe computer could become feasible after several years.

The recommended network could be accessed directly through a remote computer terminal or microcomputer and modem or through a written or verbal request to system operators. The computer caller would be able to search a bibliography on marine topics drawn from published sources as well as governmental, academic and private institution's less widely accessible resources. Specialized bibliographies, a bulletin board of coming marine events and a message center for caller use could also be accessed. The system envisioned is a clearing house, not a library. Callers would receive a bibliography of references for a given subject and information and assistance on how to obtain the works.

Potential applications of such a network and interests in Florida are numerous. Examples include; increasing public awareness of the sea through schools or the media, understanding coastal development, planning, and building guidelines of local and state governments, or managing coastal environmental quality and productivity of aquatic habitats for long-term food and game fishery harvests.

Major categories of information needs in Florida were determined through a statewide survey of key coastal-related organizations representing governmental, academic, and non-profit sectors. Particularly important topics include quality of estuarine fisheries and habitat, shoreline stability and erosion, natural history of marine organisms, and quality and variety of sea-

foods. Individual respondents to the survey reported up to 6000 requests for information annually, per organization.

Available computer hardware, software, and communications systems were evaluated and utilized or adapted to the degree possible for this demonstration. No existing aquatic information system nationally or in Florida could be directly adopted as a Coastal Information System. Many existing natural resource-oriented systems are too technical or limited in accessibility. However, one of the great strengths of the system recommended is its ability to electronically download references directly from another computer without the need of retyping. This capability will allow the rapid assembly of an extensive marine bibliography, drawing resources currently scattered in marine institutions across the state into a central repository. Far from replacing individual institution's specialized bibliographies the network would allow them access to the holdings of similar institutions around the state, enhancing communication and helping to avoid duplication of effort. It would also provide public access to this information at minimal cost to the individual agencies.

A microcomputer system based upon a network of Zenith 150 personal computers operated by Florida Sea Grant and its Extension Program was tested, using a pilot databank of nearly 1000 references to marine publications and other information materials. Among other topics, searches of the database in the area of fisheries, artificial reefs, and coastal erosion were conducted. The bibliographic software used, Reference Manager, allows searches by keyword, source, author, editor or a string of characters in the reference and supports searches by multiple terms. The Multi-Link communications package utilized enables simultaneous access from more than one terminal.

A mainframe computer system was developed only partially, due to funding limitations, but all components and an organizational scheme for its operation were identified. A Cyber computer, operated by a non-profit organization, was selected as the most effective hardware, and software from a Federal agency was found to be the most useful database management program.

It is recommended that planning be undertaken to organize a computer-based statewide system. Operation of a Coastal Information System could be initiated by a single organization or a consortium, with lead responsibility falling to either a private organization or a public agency or university. Start-up and initial operating costs would be $68,000 in the first year if the system were created in a new office situation. The cost to add it to an existing program would be less. Options for funding the system include a legislative appropriation directly to it, or shared subscriptions by a number of marine-focused State, Federal, regional, and private entities. Half of the 33 agencies, laboratories and academic marine programs surveyed during this study (all of those that responded to the survey) expressed interest in the concept of a coastal information network as described by this project.

Computer-based information management for aquatic subjects is in its early stages of development in Florida, and is characterized by independent and uncoordinated efforts. To enhance the cost-effectiveness of a coastal information system in Florida (1) existing mechanisms, such as the State's FIRNCOM system for local access to educational information, should be tested before new efforts are initiated, and (2) State agencies should consider establishing a mandatory reporting system for grant and contract-supported projects so that a central repository of information useful to broad audiences would be available.

INTRODUCTION

Florida is nationally recognized as being in the forefront of America's "growth states," as evidenced by the gain of four new Congressional seats after the 1980 census. Three-fourths of the State's new population settles on the coast, due to the economic and aesthetic attractiveness of Florida's sea and marine resources. Along with the prosperity brought by coastal development has emerged a significant need for information in a variety of audiences whose well-being is influenced by marine resources.

To address ways in which these audiences might exchange information -- as well as simply become aware of it -- the project described in this report was undertaken. A more extensive discussion of the rationale for it, and the needs addressed by it, is presented in the proposal submitted to the Florida Department of Environmental Regulation (FDER) (Seaman et al. 1984).

Florida Coastal Situation

By the year 2000 Florida's current population of slightly over 10,000,000 will increase to almost 15,000,000, with the major settlement happening in just half of the State's coastal counties. A combination of (1) commercial and recreational uses dependent upon a stable and renewable natural resource base, (2) residential and tourist housing and amenities, and (3) certain heavy industries, all in coastal and nearshore settings, has established Florida prominently in the nation's marine economy. For example, approximately one-half million motorboats are registered in the state, its commercial fisheries are sixth most valuable in the U.S., and tourists consider "beaches" as their prime motivation to visit Florida.

To accommodate coastal utilization and development, a variety of regulations and guidelines have been issued by several State and Federal agencies plus the coastal counties and cities. Meanwhile, universities and laboratories conduct research in many marine areas, the public often is organized to advocate various interests such as conservation, recreation, etc., and private and business interests also are involved in such efforts. Profiles of many of these numerous organizations are provided by Leahy (1984). In this framework, examples of very diverse information needs include:

.understanding coastal development restrictions of State and local government (e.g., homeowners, builders, planners)
.enhancing marine business profitability (e.g., small businesses)
.developing new service industries for marine trades (e.g. chambers of commerce)
.managing coastal environmental quality and productivity of aquatic habitats (e.g., fishermen, agencies)
.increasing public awareness of the sea (e.g., the media, schools)
.promoting the public capacity to make informed decisions (e.g., legislators).

While many coastal interests develop or transmit information, their efforts normally do not reach mass audiences nor are they equally distributed throughout the state. This pertains both to technical/scientific and to lay levels. "Information and Education" offices in governmental agencies typical-

ly are small and yet are charged with broad responsibilities that exceed a focus on coastal resource issues. Media coverage of such issues may be localized and spotty, a pattern also typical of primary and secondary education.

In short, there is a "gap" in general public awareness of coastal facts, issues, and the important role of nearshore resources in Florida. Secondly more technical interests also seek to obtain or transfer information. A telling statistic is that only one person in three was able to correctly identify the term "mangrove" in a public survey recently conducted in Southwest Florida (Florida Dept. Natural Resources 1984). This is despite the occurrence of about a half million acres of mangrove forest in Florida (including the survey area) and their vital role in maintaining various important coastal fish and shellfish species (Lewis, in press).

Because of the perception from a number of quarters that the collective ability of various formal and informal information sources to keep pace with public needs was being outpaced by Florida's rapid coastal population growth (both residential and tourist), this project was initiated to explore very specific ways to pool resources using state-of-the-art electronic communications and data processing technology.

PROJECT DESCRIPTION

The goal of the project was to determine the feasibility of using a computer-based information retrieval system to assist persons and organizations in Florida to identify and locate coastal resources information.

It was envisioned that such a system could facilitate and multiply the efforts of independent but coordinated interests in serving larger audiences to keep pace with accelerated needs for marine information. Potential beneficiaries include lay and semi-technical interests (e.g., general public, media) and technical interests (e.g., legislative staffs, agency planners, educators, scientists).

As explained in the following section, the approach of this project was to survey and evaluate existing computer systems and bibliographic programs that might be used or modified. Major sources of Florida coastal information were surveyed for potential interest, and selected references were electronically transferred for pilot testing and demonstration.

The specific objective was to develop two working pilot databases of coastal references that could be accessed directly through a computer or terminal, and provide recommendations for options for implementing such a system.

METHODS

The project was conducted in January-October 1985 with financial support from FDER and matching support from Florida Sea Grant (FSG) that included utilization of its Zenith microcomputers on and off-campus. The milestones presented in the original proposal were fulfilled, with quarterly reports submitted at the end of March and June.

In preparing a feasibility report for a computer-based information system, a prototype was constructed using the best available software and the database described below. This prototype was demonstrated September 19, 1985 at a meeting of the Board of Directors of the Florida Marine Information Network, Inc., and on October 8 to a small group of executives at FDER, and also was tested by a number of persons active in marine affairs around the state (see Acknowledgments). Factors discussed include technical feasibility of the system, costs, availability and transfer of data from other sources, and potential interest and cooperation among related marine organizations.

Computer Systems

Two separate systems were evaluated concurrently, i.e. a microcomputer and a mainframe computer, to provide a greater range of options for consideration in meeting the needs that motivated this study. In addition to initial consultation with FDER, periodic contact with representatives of the Board of Directors of the Florida Marine Information Network, Inc. (MARINE) was maintained. Experts at other agencies, in business, and at the University of Florida also were consulted (see Acknowledgments). This was in lieu of convening an advisory committee originally conceived before the project started.

Microcomputer software initially was run on Zenith 150 personal computers (with 10 megabyte hard drive). Other brands of computers subsequently were used to access the system. Remote access included communication by agents of the Florida Sea Grant Extension Program, which previously had equipped its staff with Zenith model 100 microcomputer equipment compatible with that in the FSG central office. This was to assess the potential for establishing a network of access points. The different software packages evaluated during this study are described below, under Results.

Mainframe computer options were assessed in cooperation with Florida Agricultural Services and Technologies (FAST), after evaluating other options as described in the Results section.

Database

The basic database for this project consisted of citations to (1) over 800 publications and other information materials produced by the Florida Sea Grant College Program, which is a statewide effort of the State University System of Florida and hosted by the University of Florida (UF); (2) 125 FDER contract reports held by its Office of Coastal Management; and (3) 27 model ordinances from the UF Center for Governmental Responsibility (CGR), included at the request of FDER.

By organizing this information in formats that could be searched according to standard bibliographic notation (e.g., author, source, title, and/or keyword), it was intended that persons at remote locations could have access to -- and actually prepare their own -- individually tailored lists of citations. The intent was to afford wide access by many diverse audiences.

Citations of FSG information were assembled from previously established databases, primarily the National Sea Grant Depository at the Pell Library of the University of Rhode Island, which holds all publications (e.g., books,

newsletters, technical reports) of all Sea Grant programs nationally. This database was electronically searched and the citations of all FSG publications were transferred using the SGNET communications system operated by the National Sea Grant Office.

In fact, the information/communication system most immediately relevant to this project was the National Sea Grant SGNET system, through which (1) the references held by the National Sea Grant Depository and (2) the projects and investigators funded by Sea Grant may be identified. These two databases consist of tens of thousands of items, reflecting nearly 20 years' effort nationwide (conducted under the auspices of the U. S. Department of Commerce National Oceanic and Atmospheric Administration [NOAA] primarily through university programs in partnership with state and local agencies and industries). Through SGNET the entire file of citations for all Florida Sea Grant publications provided to the Depository since 1972 was transferred electronically. It should be noted, however, that neither the Depository reference collection nor the Sea Grant project/investigator file are established as a widely accessible information source to serve general audiences.

Secondly, information about masters theses and doctoral dissertations prepared under the auspices of FSG was drawn from a file newly established on DEC-mate (Digital Electronic Corporation) word processing equipment at FSG. Descriptions of FSG research, education, and extension projects which over the years have been submitted to the National Sea Grant Office also were transferred via SGNET. The FDER coastal report citations were transcribed on the DEC-mate and electronically transferred to the Zenith. The CGR ordinance file was transferred on disk to the Zenith.

Bibliographic and reference systems operating nationally and in Florida for other aquatic and natural resource subjects also were identified in the course of this study, with the intention of (1) securing operations guidelines, and (2) identifying potential databases of use to Florida coastal audiences.

Information Needs

Two complementary surveys of requests for coastal information were conducted, to establish possible subject matter emphases for a potential coastal information system (CIS).

Due to the MARINE interface with several Florida coastal/marine organizations and its potential involvement with actual implementation of a coastal information service, a statewide survey of interest was conducted under the auspices of that organization. The survey of 33 organizations was designed to determine the level of inquiry concerning coastal issues directed to the key marine-related Federal and State agencies, private laboratories, and academic departments in Florida. In addition to assessing the possible need for a centralized coastal information system, the survey also sought the interest of organizations in participation in it. (See Appendix 1.)

A second survey was conducted in-house to determine the major categories of information requested of FSG Extension Program agents located in coastal counties in Florida. (See Appendix 2.)

RESULTS AND DISCUSSION

The principal conclusion of this study is that it is possible to establish for Florida a computer-based information/bibliographic system dealing with coastal subjects that is accessible to statewide audiences. The following discussion first gives a national and state perspective for such a system, then reviews the hardware and software evaluated in this project, and provides recommendations for how such a system might be implemented.

Review of Aquatic Information Systems

An early phase of this project was directed to finding hardware and software that might be directly used in, or at least adapted to, the coastal needs described above. This effort put us in touch with other related activities, with results pertinent to both this project and possible follow-up.

In short, we did not locate an information or library management system that could be directly instituted by a potential operator of a coastal information program in Florida. Each of the aquatic information systems discussed below was investigated to some degree to determine the feasibility of placing the CIS databank on it or of adapting the systems used to the construction of the databank. Not surprisingly, each of these systems has a unique mandate and specific data requirements that preclude its direct utilization by the CIS effort.

For example the focus of most governmental systems is defined by law or agency rule. Thus, each system was set up to meet the requirements of certain audiences, usually limited to more technical aspects.

Furthermore, some databanks do not allow direct public access, while the national systems which do, such as ERIC on Dialog, contain thousands of references irrelevant to a Florida Coastal Information System. Also, they require that each user establish and pay for the use of an account. This is unacceptable for a system desiring to make Florida marine information available to the largest possible audience.

While no system on which to place the CIS databank was found, our investigation of existing systems did provide guidelines for developing the system ourselves. Information on data formatting and retrieval requirements, communications systems, systems to aid user access, and problems encountered by system operators was extremely helpful in the formation of a working system in a relatively brief time (see Acknowledgments).

Interaction with existing aquatic information systems also made it apparent that typical systems do not designate public and semi-technical audiences as primary users; their focus is usually on a specific, limited technical interest. Meanwhile, the aim of the Coastal Information System is to provide a central clearinghouse on information about the Florida coast, not to duplicate their efforts. The ability to transfer data from these systems has been well established by this project. Thus a primary focus of the CIS databank should be to draw brief citations of relevant data (e.g., bibliographic references) from these scattered and tightly focused databases into a central repository where it will be available to the more general audiences usually overlooked by existing aquatic information systems.

National Level

The principal aquatic information systems that are national in scope and accessible to at least some external audiences include:

.Fish and Wildlife Reference Service, maintained by the U. S. Fish and Wildlife Service, which provides citations on Federal aid-sponsored research and associated programs, published or unpublished

.National Environmental Data Referral Service (NEDRES), maintained by NOAA, which is a computer-searchable catalog and index of descriptions of available environmental data and organizations

.National Marine Pollution Information System (NMPIS), one of several oceanographic databases maintained by the National Oceanographic Data Center (NODC) and probably the largest repository on marine science information in the U. S., which maintains files on Federal activities in marine pollution; NODC is also currently developing a database of citations to Federal "gray literature" marine pollution documents (i.e., internal reports, mimeographed papers, etc.)

.ERIC, a database of citations to general educational material, including marine education, which is maintained on the Dialog national on-line database

.Aquatic Science and Fisheries Abstracts, which maintains a national database of abstracted citations

.AQUACULTURE, a database of citations, maintained on Dialog

.International Association of Marine Science Libraries and Information Centers (IAMSLIC) does not provide a central database but does provide indirect access to the bibliographic listings of its over 100 personal and institutional members in 17 countries

In each case, the systems do not constitute a broad base of coastal information. However, each offers a potential database to include in a CIS, and guidance should a CIS be implemented.

Databases in Other States

Organizations with a statewide mission also maintain databases of marine information and education materials. In the Southeast these include:

.Marine Education Materials System (MEMS), maintained by the Virginia Institute of Marine Science and the Virginia Sea Grant Marine Education Program, which provides a bibliographic database of marine education materials as well as the materials themselves

.Coastal Information Management System, maintained for in-house use by the Mississippi-Alabama Sea Grant Consortium, which contains bibliographic files of Sea Grant publications and projects in the MississippiAlabama area

.Marine Data Base, being developed by the Sea Grant Marine Extension Program, Clemson University, the South Carolina Parks, Recreation and Tourism Department, and the National Weather Service to contain citations to Sea Grant publications and timely marine information

.Gunter Library, Gulf Coast Research Laboratory, provides a bibliographic database of marine scientific research publications.

Among the state and national systems reviewed, perhaps MEMS and ERIC have the widest potential audience, due to their designation of teachers as principal users. To our knowledge these systems do not exchange or share databases, so that potential users -- typically working through their employing organization -- contact each one separately to initiate a "search."

Efforts in Florida

A number of aquatic-related databases have been or are being developed within the state of Florida, including:

.Aquatic Weed Information and Retrieval Center, at the University of Florida Center for Aquatic Weeds, which provides citations to scientific publications in its area

.Florida Water Resources Bibliography, maintained by the Water Quality Monitoring and Quality Assurance Section of the FDER Bureau of Water Quality Management, on a computer information system and designed to be a "central repository" of all information on water quality in the State of Florida, as mandated by the Legislature

.Coastal Engineering Information Management System, Index Subsystem (CEIMS), being developed by the U. S. Army Corps of Engineers, will include an extensive bibliography on coastal sandy beaches

.Division of Storm Water and Nonpoint Source Pollution of the FDER is developing a database in their area which will include many coastal references

.Tampa Bay Management Data Base and Information System, maintained by the Tampa Bay Regional Planning Council, will provide citations germane to the Tampa Bay ecological system.

While each of the above databases provides some information on the coastal zone of Florida, none are attempting to provide information on all aspects of the coastal zone, nor to make that information readily available to inter-

ested parties in Florida. Rather, these systems are oriented to more technical concerns and are more subject-specific, thus limiting their widespread use by a broader range of Florida interests. We note also that computer-based information management for aquatic subjects is in its early stages of development in Florida, and perhaps characteristically the efforts are independent and uncoordinated.

(This review of databases has not addressed communication systems, most notable of which may be FIRN, which readers familiar with Florida may feel is relevant. This is discussed in a later section of the report.)

Boundaries for a Florida System

The mandates of the three primary organizations involved with this project provide initial guidance regarding areas of coverage as well as limits to a possible statewide coastal information system: (1) As funding agency the FDER Office of Coastal Management reflects a public policy and regulatory viewpoint that encompasses the need to educate citizens, coastal residents, and local authorities in specific details of coastal planning elements (e.g., zoning, legal issues, habitat quality, etc.) as well as broad aspects of coastal land and water system dynamics (e.g., carrying capacity). (2) As a public, non-profit educational entity MARINE is concerned with the dissemination of information to a broad array of citizens, interests, and public and private audiences who must make decisions concerning the welfare of coastal resources over long-term periods. (3) Florida Sea Grant, meanwhile, in conducting the project affords the experience of a statewide information delivery system operated from the perspective of a university public service program charged with enhancing marine productivity through research and development.

Survey of Marine Organizations

To sharpen the focus of the vision of these three organizations for a statewide, objective source of diverse coastal information to meet the needs of public and private, lay-level and technical interests, on a "user-friendly" basis, the survey of key organizations provided an indication of potential demand and interest statewide. As described in Appendix 1 relevant organizations were asked (Item 1) to complete and return a brief survey sheet (Item 2) regarding the nature and amount of inquiry they received in the field of coastal subjects and issues, and their effort and interest related to response and information transfer.

Of 16 respondents, three were Florida governmental agencies with responsibilities in aquatic resource management, three were university programs, two were private laboratories, and one was a conservation organization, all headquartered in Florida. The other seven included five regional (with offices in Florida) and one national unit of Federal agencies with missions including but not limited to Florida coastal resource systems, and one private foundation with worldwide activities. All 16 respondents expressed an interest in the concept of a coastal information databank as described by this project. Responses to survey questions are summarized in Table 1.

Table 1. Level and nature of activity of Florida-related technical coastal organizations in responding to requests for information.

Organization	Requests for Information (Monthly)		Nature of Information Holdings	
	Technical	Lay-level	Electronically Transferable	Approx. No. References
St. Johns Water Mgt. Dist.	2-4	2-5	Yes	500
NW Florida Water Mgt. Dist.	4	2	No	20-100
Florida Dept. Natural Resources, Bur. Marine Research	150	75	No	500
Univ. Florida, Whitney Marine Research Lab	1-2	4-8	No	Hundreds[a]
Florida Sea Grant College Director's Office	Few	200-500	Yes	1100
Univ. Miami, Rosenstiel School Marine & Atmos. Sci.	15-20	-0-	No	650 books, 25 journals
Harbor Branch Found.	>50	>50	Yes	>500
Mote Marine Lab	40-60	100-120	Yes	2500-3000
Internat. Oceanog. Found., Sea Secrets Dept.	--	--	No	--
Environ. Protection Agency, Environ. Research Lab. (Gulf Breeze)	3	2	Some bibliographic	>50
Nat. Marine Fish. Serv., SE Fisheries Ctr.	20-30[b]	20-30[b]	No	200
Nat. Marine Fish. Serv. Regional Office	Few	Few	Limited	--
Gulf of Mexico Fishery Mgt. Council	--	3-4	No	--
Army Corps of Eng., Jacksonville Dist.	Some	Many[c]	Yes	300[d]
National Marine Pollution Program Office, Nat. Oceanic & Atmos. Admin.	2-5	-0-	Yes	5000[e]
Florida Defenders of Envt.	1	2	No	--

[a] In bibliography
[b] Florida only
[c] Includes reporters
[d] Organizing Coastal Sandy Beaches Database
[e] In progress is a 5000-reference database of marine pollution gray literature

Demand for Information

The number of "requests for information about the coastal zone" received by each respondent monthly ranged from one to 150 for "technical" inquiries, and zero to 500 from the "lay public."

For all organizations that supplied estimates, it appears that twice as many lay-level requests (i.e., 8160) as technical requests (i.e., 4080) are received annually. To account for a small number of additional responses that defined the level more qualitatively (using terms such as "some,") and to provide a graphic comparison of patterns of response, broad categories of inquiry level are depicted in Figure 1. The majority of organizations indicated an inquiry level of a "few" (i.e., 1-8 requests) per month for both technical and lay inquiries. This includes smaller organizations dealing with only sections of the state or not necessarily being devoted primarily to coastal issues.

Yet five organizations indicated at least 15 and as many as 100 or more of each of the two kinds of inquiry per month. Thus for the organizations with a higher profile, a broader geographic and subject matter purview, and a significant or complete focus on Florida and its coast there appears to be a rate of at least 1000 or more requests for coastal information per year for individual organizations. Combined, just for organizations that responded to the survey, a significant information transfer process exists. (It is noteworthy that local county-level or municipal interest is not reflected in the survey. This includes local extension agents, who are a well-used information source. Nor does this reflect inquiries to FDER, which obviously has sufficient demand for information to actively support this study.)

Nature of Information Requested

The kinds of information requested of the organizations listed in Table 1, although diverse as would be expected in a state as large and complex as Florida, can be described in terms of broad categories. In response to the survey (Appendix 1, Item 2), respondents listed several "of the most commonly asked (serious) coastal resource-related questions -- or categories of questions -- directed to you by your various clients, whether... public-at-large or more specialized..." The total of 81 entries listed by responding organizations were classified according to 11 broad subject matter categories as listed in Table 2. The subject raised with the largest number of organizations was Coastal Habitat and Quality, addressed to two-thirds (i.e. 9) of them. This subject also was most popular in terms of questions listed as most common, in that 17 entries (21%) listed by respondents fell in this area. (Note that in this analysis we are dealing only with the most commonly asked questions, not all questions ever received by the organizations but not reported in the survey.)

Examples of Coastal Habitat and Quality inquiries include questions such as the effects of pollution in nearshore waters, seaweed biology, freshwater requirements of estuaries, and general ecology. The subject with the second highest level of inquiry, 14 requests (17% of the total), was Shore Dynamics, Circulation, and Erosion, addressing beaches, erosion, coastal hydraulics, tides, sea level change, and oceanographic processes. For this subject eight of the 14 responding organizations reported inquiries.
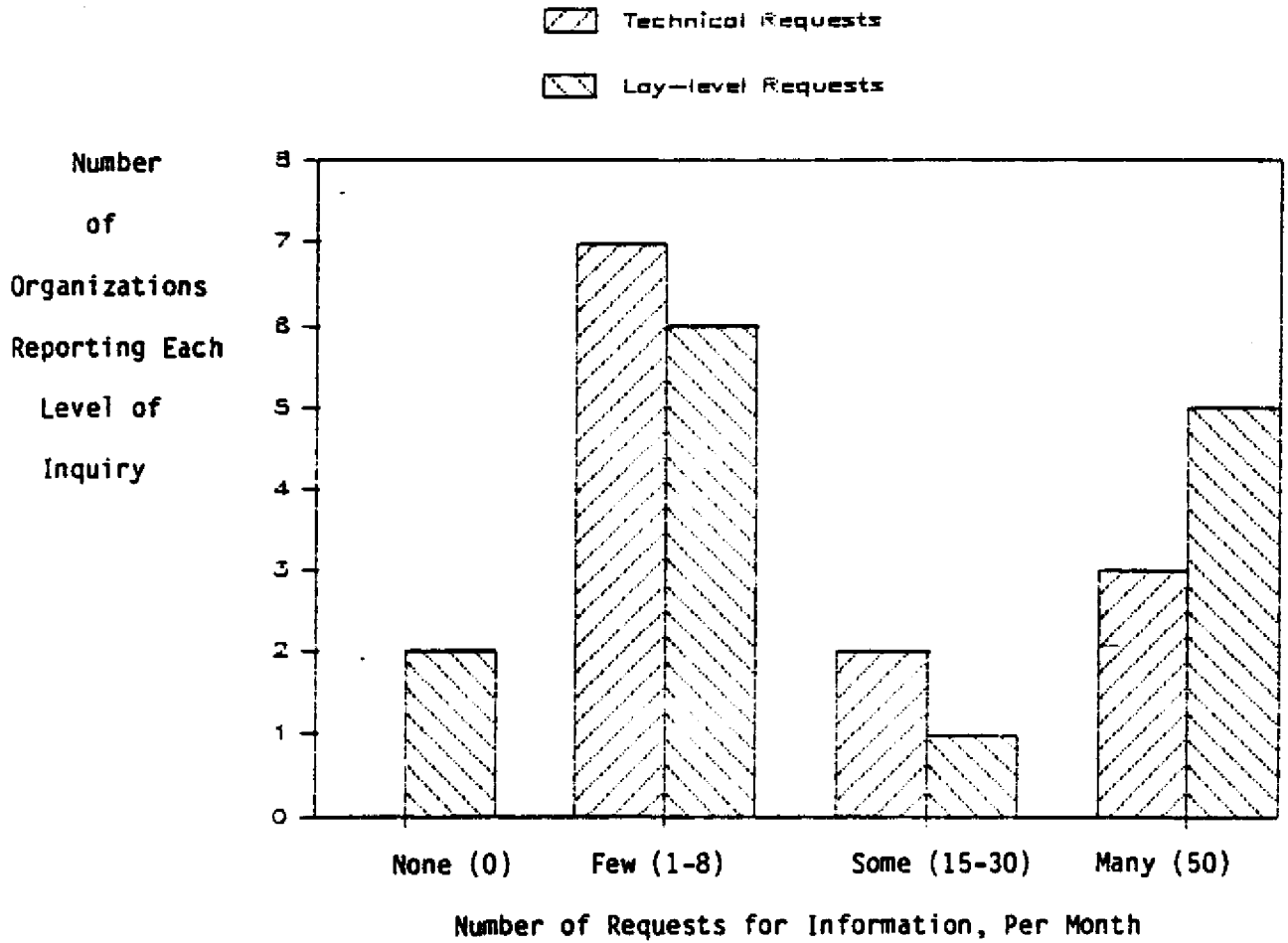
Figure 1. Levels of inquiry by two audience types seeking Florida coastal information from organizations.

Table 2. Popularity of various categories of coastal and marine information as directed to 14 coast-related organizations in Florida.

Subject Matter	No. Organizations Receiving Requests	Percentage of Requests for a Given Subject
Economics and Business	3	5
Recreation	1	1
Seafood Quality and Harvest	5	9
Fishery Biology and Management	7	15
Aquaculture and Natural Products	4	5
Shore Dynamics Circulation and Erosion	8	17
Marine Structures and Engineering	5	9
Policy, Regulation and Legal Issues	2	2
Coastal Habitat Quality	9	21
Natural History and Identification of organisms	8	12
Educational Materials and Speakers	3	4

The overall emphasis of inquiries was on the so-called living marine re-
sources of Florida's coast and sea, with 15% of the reported information re-
quests dealing with the category of Fishery Biology and Management, and an-
other 12% requesting assistance with identification of organisms or informa-
tion about their life history. An additional nine percent of all inquiries
dealt with aspects of Seafood Quality and Harvest, sometimes asking for exam-
ple, if a product was good to eat or where to obtain high quality seafood.

Only a small number of inquiries dealt with recreation, or sought infor-
mation about different aspects of regulation. A few requests dealt with get-
ting started in marine businesses, such as fishing or aquaculture. A complete
list of questions and categories of questions, according to the subject areas
described above and listed in Table 2, is in Appendix 3.

Survey of Extension Agents

A second source of information about the most popular coastal subjects
was the network of 11 marine extension agents employed by the Florida Sea
Grant Extension Program. For this survey, however, levels of inquiry were not
determined. Just the most-asked questions were enumerated. Thus the same
question sent to organizations was sent to the 11 agents located in different
coastal cities around the Florida coast, with results of the survey (Appendix
3) listed in Table 3.

The survey of agents also indicated a tendency for coastal information
requests to focus on living marine resources. In this case seafood was most
commonly addressed; issues related to marine organisms including life history
and identification also were common. The second most prevalent subject was
Shore Dynamics, reflecting concerns for beach erosion, dune stabilization,
etc.

In contrast with the organizations surveyed, the extension agents receiv-
ed significantly more inquiries regarding recreation, a logical result due to
their local knowledge (Figure 2). This finding also held true for policy, or
"how to get things done" locally. Agencies and other organizations, mean-
while, tended to receive more inquiries on shore dynamics and coastal environ-
mental quality.

Potential Involvement of Survey Respondents

Finally, the efforts of organizations to conduct or improve the informa-
tion transfer process, and the potential or actual involvement of others in it
must be addressed. With regard to the latter point, slightly more than half
(51%) of the organizations contacted did not respond to the survey. Among the
non-respondents the principal category was university departments (Table 4),
as might be predicted considering that they typically do not operate primarily
as an information source to audiences immediately beyond their subject spe-
cialties. Among the other non-respondents, however, it is apparent that some
level of inquiry for coastal information would exist, such as in the legisla-
tive committees and certain agencies whose counterparts in other geographic
areas did respond to the survey (Table 1). In other words, statewide in
Florida there is a greater demand for information services than the already
considerable level determined by the survey, so that the estimate of 12,240
requests per year is extremely low, as discussed above.

Table 3. Categories of coastal subject matter addressed in information re-
quests made to marine extension agents in Florida.

Subject Matter	Percentage of Requests According to Subject
Economics and Business	7
Recreation	10
Seafood Quality and Harvest	17
Fishery Biology and Management	10
Fishing Gear	2
Aquaculture and Natural Products	10
Shore Dynamics, Circulation and Erosion	13
Marine Structures and Engineering	4
Policy, Regulation and Legal Issues	8
Coastal Habitat Quality	7
Natural History and Identification of Organisms	12
Educational Materials and Speakers	0
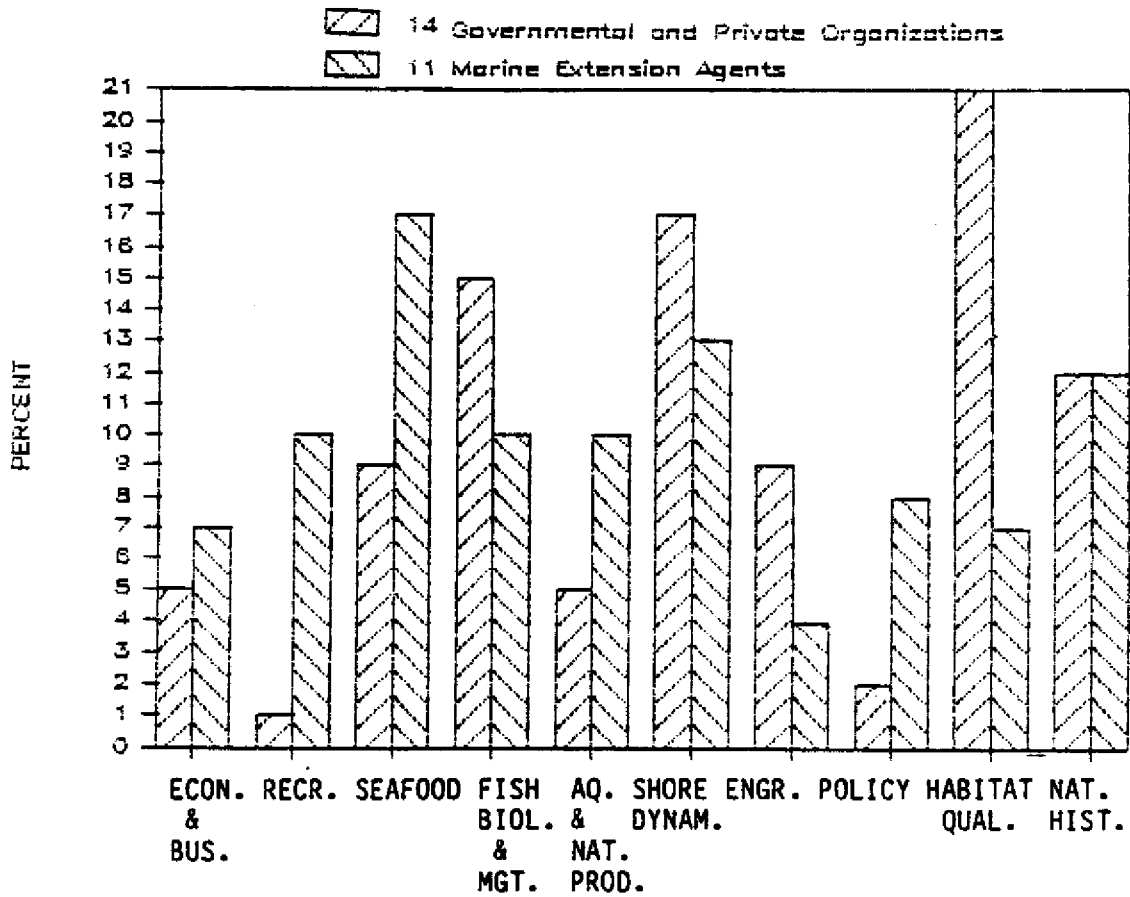
Figure 2. Distribution of requests for coastal information made to two categories of source organizations, according to subject matter.

Table 4. Organizations contacted but not providing information to coastal information survey.

Florida Legislature, House Natural Resources Committee Staff

Florida Legislature, Senate Natural Resources Committee Staff

Florida Department of Natural Resources, Office of Executive Director

Suwannee Water Management District

South Florida Water Management District

Southwest Florida Water Management District

Atlantic Oceanographic and Meteorological Laboratory

U. S. Fish and Wildlife Service

University of South Florida, Department of Marine Science

Florida State University, Department of Oceanography

Florida State University, Marine Biology Laboratory

Florida Atlantic University, Department of Ocean Engineering

University of Florida, Coastal & Oceanographic Engineering Department

University of Florida, Department of Fisheries & Aquaculture

South Atlantic Fishery Management Council

Florida Audubon Society

Florida Environmental Service Center

The high interest level of survey respondents requires follow-up analysis to indicate the potential for future involvement and cooperation in any attempt to operate a CIS. For example, on-site visits and extensive interviews by a CIS manager would refine the major categories of information needs. Eight organizations indicated that their databases could be transferred electronically (e.g., if a centralized information system were being compiled); eight do not have that capability. Those organizations with electronically transferred citations hold on the order of 7000 or more references that might be included in a database; in addition there are specialized bibliographies that might apply also.

There are many more agencies and organizations with a coastal mandate in Florida and the databank should continue to grow steadily over its first five years, but at a much slower rate than in its initial year. A large databank will encounter many duplications between the holdings of Florida-focused agencies.

One of the most significant areas of growth for the CIS databank could easily be in the importation of specialized bibliographies, which could either be merged into the generalized databank or kept as specialized companion databases on the same computer. Agencies such as Sea Grant, FDER, and NMFS frequently sponsor the production of extensive bibliographies in specialized technical fields. These works are invariably produced on a word processor or computer. Future grants from agencies participating in the CIS databank could require the electronic transfer of appropriate citations to the databank as part of the grant.

In summary, given the above findings and assuming a continuing stream of citations of new publications from participating agencies, the CIS databank will probably need personnel and systems to store 5,000 or more citations per year over its first five years and sufficient capacity to add 2,000 or more of those citations to its databank(s). A growth rate in this rough area would result in a databank holding of about 15,000 citations in five years. (See Figure 3 for an example of the growth of one specialized marine databank, The Aquatic Weed Program.)

Accurate estimates of numbers of users of a CIS databank are impossible. Use will depend on cost to the user, system capabilities, degree of exposure of the system to the general and marine publics, public response, and other imponderables. However, agencies which responded to the MARINE survey reported up to 6,000 requests for information per year. A successful state-wide databank should certainly generate that many requests, and probably many more. A minimal capability for the first five years should therefore be planned to handle 6,000 or more annual requests for information (either directly using the system through computer or terminal and modem, or written and verbal requests) per year. (See Figure 3 for an idea of the percentile growth experienced by the Aquatic Weed Program. The audience of the CIS databank is many times larger.

Evaluation of Possible Coastal System Components

Based on the above estimates of involvement of other organizations and projections of levels of inquiry from lay and technical interests, appropriate hardware and software were evaluated to meet the needs of a Florida Coastal

Aquatic Weed Program Update Bibliographies Requested
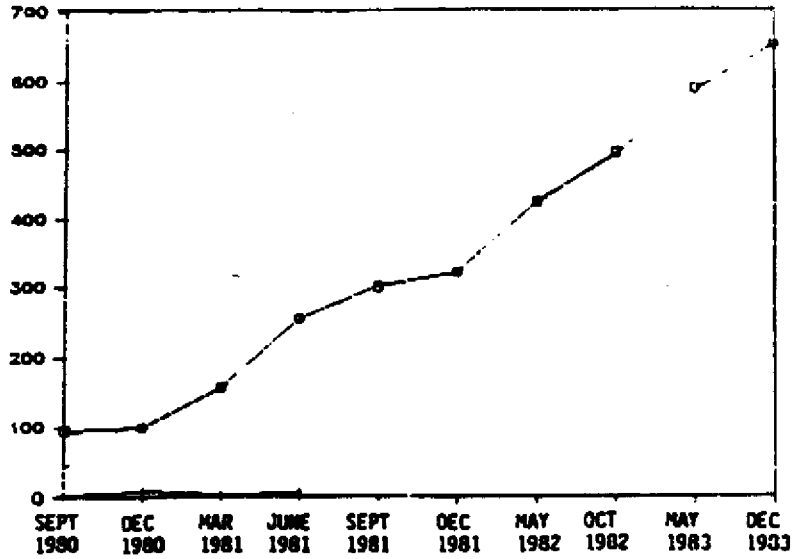
The Aquatic Weed Program

The Aquatic Weed Program maintains an information exchange system which is shared by several thousand aquatic plant and ecosystem researchers worldwide. Program users contribute research articles, reports and books and, in return, receive printed lists of citations of articles and books, according to their specific research interests. Citation lists (bibliographies) are requested and produced by computer according to plant species, subject categories and sub-categories and keywords of the literature. In this way, researchers keep track of world-wide research in their specialties. This service is provided free of charge by the Aquatic Weed Program.

The graph above shows the number of individuals who receive regular updates to their aquatic plant bibliographies. (Several hundred more researchers a year receive one-time "retrospective" searches but do not request regular updates.) The graph below shows the number of articles and reports contained in the database whose citations and category/keyword lists are retrievable from the program's computer-based system. Most of these articles and reports have been contributed by users of the system and are on file in the program library.

Identifying, locating and requesting research works from authors, indexing, filing and entering information into the computer system, as well as keeping track of the thousands of library items and pieces of mail sent and received every year by the Aquatic Weed Program, is work done by Loren Brown, Kathleen Colver, Leslie Landry, Alexandria Patterson and Victor Ramey.

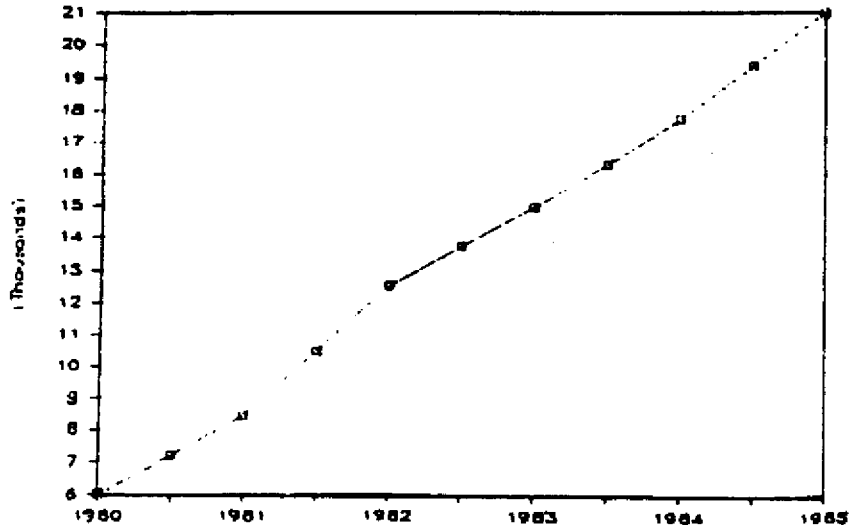**Aquatic Weed Program
Articles in Database**

Figure 3. Growth experienced by one aquatic databank: the Aquatic Weed Program at the University of Florida.

Information System. To proceed cost-effectively, the intent of this project was, to the degree possible, to build upon existing systems to establish a pilot system for coastal information management. To do this we first evaluated available computer resources. Although the review of current aquatic information systems did not identify a package already in use and which could be directly adopted in Florida with no modification, satisfactory software packages generally useful for bibliographic information management were located, as was expected, and were utilized on the mainframe and microcomputer systems as described in the following paragraphs.

Computer Systems

There are advantages to both types of hardware systems employed in this project: Mainframe computers provide virtually unlimited data storage and an established communications system in a multi-user environment. Microcomputers provide flexibility of use, a tremendous number of custom-tailored software applications, and low maintenance cost. Also access to an operator-controlled network can be governed directly by project personnel.

Mainframe Systems

A number of mainframe computer systems were considered for the pilot mainframe test. Each is discussed individually below. However, early in the investigation it became apparent that the desire to allow users to access the Coastal Information System databank directly would be the major constraint in choosing a host for the test. Most mainframe systems control access through account numbers and passwords. Once the account number and password have been given, the user is "logged in" and is free to use available programs in the way he/she sees fit. This is unacceptable for the CIS. Its operator cannot be expected to pay for personal computer time, therefore we needed a system which could guarantee that users would be channeled into and out of the CIS databank without the opportunity to stray. The system finally chosen, The Florida Agricultural Services and Technologies (FAST) Cyber computer, has that capability and this is one of its prime recommendations.

a. **Individual Mainframe Computer Systems**

    1. **The Northeast Regional Data Center Computer (NERDC)**

Advantages
--Supports a variety of database management programs.
--Professional support staff.
--Good access via terminal or modem.
--Virtually unlimited memory storage.

Disadvantages
--Charges for maintenance of files and user access.
--Access limited to those with an account.
--Difficulty in limiting users to only the files and programs desired.

2. The IFAS* VAX Minicomputer

Advantages
--Generous memory storage.
--No cost to maintain our files or for authorized users to access them.

Disadvantages
--Access is difficult during the working day due to a continuing shortage of access ports to the computer.
--Access is limited to associates of IFAS who have established an account.
--The database manager on the computer is new and professional support staff have had little time to master it.

3. The Florida Agricultural Services and Technologies Computer

The Cyber computer operated by the Florida Agricultural Services and Technologies was chosen for development of the mainframe test pilot data base.

Advantages
--Generous memory storage.
--Ability to custom tailor access for those we allow into the system assuring no user abuse of our account.
--Good access via terminal or modem.

Disadvantages
--Charges for maintenance of files and user access.
--New facility with uncertain professional support depth.

Microcomputers

As noted previously, the Zenith 150PC (IBM-PC compatible) microcomputer was taken as the given host system for the databank since this machine was available to the project investigators from Sea Grant. Other microcomputers (e.g., Osborne, Zenith Z100, IBM AT, IBM PC, Apple II-E) were used as terminals to test access to the pilot database.

The "PC compatible" microcomputer has become the defacto standard for the industry. Use of this standard assures accessibility by the maximum number of potential users and also assures us of the ability to update the system as needed, since a PC compatible version is put out for virtually every new microcomputer software application.

Bibliographic Software Systems

Mainframe Software

Software systems available on a number of sites in the Florida system of

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*IFAS = Institute of Food and Agricultural Sciences, University of Florida.

data centers were investigated. As mentioned above, the major constraint on choosing a mainframe computer for the CIS databank pilot test revolved around the ability to control patron entry and use and abuse of the system. Therefore, when a system (the Cyber computer) which fulfilled this requirement had been chosen, investigation of software systems was necessarily limited to those available for that system.

Mainframe database management programs are large and usually very generalized in nature in order to handle the maximum number of different applications. Thus extensive work is necessary to customize a database for any particular application. Naturally, customizations have been carried out for each of the existing mainframe bibliographic database systems and our first effort was to see if we could obtain such a customized system. These systems and their customizations are extremely expensive. We were successful in finding a system developed by the U.S. Corps of Engineers on the BASIS database management program (see below), which seemed to be well suited to adaptation to our requirements, and the Corps showed interest in providing us with their programming (see Acknowledgments). However, we were unable to locate a host computer facility which had BASIS available in the state of Florida. Its high cost ($50,000+) precluded purchase and we were forced to continue our search, any attempt to place the CIS databank on a mainframe computer should include further investigation of this possibility.

Three Cyber database management programs were investigated for use with the CIS databank: IPF2, BASIS, and INFOFETCH. They are discussed below.

IPF2 -- Extensive test development was carried out with IPF2, during the pilot project. Record formats and data retrieval configurations were defined and small test files of citations were prepared and entered into the system. However, IPF2 was found to be too numerically oriented to lend itself to a database made up of text citations. Data entry systems were found to be too restrictive for loading of large electronic transfers of citations and rigid formats entailed excessive waste of space in storage of citations.

BASIS -- BASIS is a text-oriented database management program, currently being used by the U.S. Army Corps of Engineers, Jacksonville District, for the creation of The Coastal Engineering Information Management System (CEIMS). Literature on the system and expert CDC consultants suggest that this would be the best selection for developing the databank on the Cyber computer. However, as noted above, a search for a host computer system in Florida which had BASIS available was unsuccessful and the high cost of obtaining the system made its use impossible.

INFOFETCH -- INFOFETCH also is a numerically oriented database management program, but it was found to be somewhat more flexible than IPF2 for the loading of large electronic transfer of citations and it also allows the use of custom-written routines in file handling. After investigation, INFOFETCH was chosen for the development of the mainframe pilot test database. Although the system was incomplete, it was developed sufficiently to illustrate the feasibility of constructing an INFOFETCH based CIS databank. It is discussed further below in the section, Mainframe Pilot System.

Microcomputer Software

Two major types of microcomputer software systems were evaluated: general purpose database programs and bibliographic database management programs.

General purpose database management programs were the first sophisticated database management programs available on microcomputers. Some, such as dBase II, have gained wide acceptance among computer users. General purpose database management programs considered included: dBase II and III, Dataflex, and Rbase 4,000. Each was found to be capable of supporting a bibliographic database. However, many of these systems' functions, such as number manipulations, are of little use in our applications and some of the most valuable functions supported by reference management programs (unlimited record length, variable length fields, single indexes to multiple fields such as authors and keywords within the same record) are unsupported on most of these systems.

Reference management programs are specifically designed to handle bibliographies and similar materials. Most are capable of the direct electronic capture of materials from other computer databases and have capabilities for sophisticated search routines while being relatively simple to use, an important consideration for a system designed for direct user access. More than 20 reference management programs were investigated. Some, such as the Professional Bibliographic System[1], and Biosuperfile[2] were rejected due to lack of a sufficient number of indexes (each has one index into which you have to retype anything you want to search by, such as author, keyword, source, date, etc.) and/or an inability to search the entire database for a word or phrase ("text searching" a cumbersome, but important option). Some had no indexes and only allowed text searches, which would make them slow with the large database anticipated for the CIS databank, (but see the discussion of Sci-Mate below). The investigation quickly narrowed to consideration of three reference management programs[4] which seemed to come closest to meeting our requirements. Sci-Mate[3], Ref-11[4], and Reference Manager[5].

Sci-Mate was one of the first of the relatively sophisticated bibliographic database managers. It utilizes a text search to retrieve desired citations, usually a slow and cumbersome technique with larger numbers of citations. However, through a propriety system, Sci-Mate has managed to maintain an acceptable speed (they claim, and seem to deliver, a search rate of approximately 5,000 brief [300 character] records per minute on a hard disk.) Sci-Mate also has a program for on-line search and retrieval of a number of the national bibliographic databases such as Dialog, BRS, and Medline.

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[1]Developed by Personal Bibliographic Software, Inc., Ann Arbor, MI.

[2]Developed by Biosciences Information Service, Philadelphia, PA.

[3]Developed by the Institute for Scientific Information, Philadelphia, PA.

[4]Developed by DG Systems, Hartford, CT.

[5]Developed by Research Information Systems, Inc., La Jolla, CA.

Although Sci-Mate met most of our requirements, closer investigation led to the discovery of a number of problems with using it to construct a Coastal Information System databank. The most serious of these is that currently Sci-Mate cannot be used by more than one person at a time, except in a CP/M operating system. A system restricted to a single user at a time would have a very limited growth potential. (Although it is possible to configure a "PC compatible" for CP/M operation, it is cumbersome and limits the capabilities of the machine.) System designers have promised an update which will solve this and other problems, but they have fallen considerably behind their own schedule.

Ref-11 and Reference Manager have very similar capabilities. Both use index searches for speed, can upload text files of references, are menu driven, allow full screen editing of references, allow wild card searches (e.g., a request for author Wil* would find Wilson, Williams, Willis, etc.), maintain variable length records for efficient storage space use, allow custom tailoring of bibliographic output, and function in a multi-user environment. However, there are some significant differences between the two as well. Reference Manager allows entry of up to 27 authors or editors and 36 keywords, and does not limit length on other fields, such as title and abstract. Ref-11 allows eight authors, four editors, and eight keywords, and places length limitations on the other reference fields. Reference Manager also maintains four searchable indexes (author, editor, keyword, and source) and allows text searching of title and abstract fields as well as searching by date of publication. Ref-11 maintains two searchable indexes (author and keyword), does allow searching by date of publication, but allows text searching of only the title field. Ref-11's limitations might be borne, if a better system were not available. Reference Manager is available however, and it was chosen to manage the CIS databank. It is discussed further below in the section, Results of Pilot Studies.

Microcomputer Multi-user/Communications Programs

Microcomputers, such as the Zenith 150, are not designed to handle more than one user at a time, usually the person sitting at the keyboard (IBM AT compatible computers are designed to allow multiple users, but only if they have terminals or microcomputers specifically prepared for the job). For the CIS databank, it is necessary that two or more users, operating on a wide variety of terminals, be able to access the computer at the same time, first to allow for increasing use of the databank, should it be successful, and secondly to allow the databank manager to work on the computer while users are calling in, an essential requirement for databank maintenance and for fulfilling written or verbal requests for information. A caller-controlled 24-hour databank also necessitates a program to usher the user into the system, allow him to do his work, then bring him back out and prepare for the next caller, all without losing the caller in the system or letting the caller abuse or damage it. A number of communications programs were examined which dealt with all or parts of these necessities. They are discussed below.

Programs which allow multiple users or multiple tasks on the computer generally do so through reserving a portion of the machine's random access memory (RAM) for each user or potential user. Although programs such as

VENIX[1] and Topview[2] were in late stages of development, only two programs which actually performed this function were available when the pilot study was carried out: Concurrent PC-DOS[3] and Multilink Advanced[4]. Closer examination of C/PCDOS proved that it required specification of the characteristics of the calling terminal before a connection could be made (difficult for an all-comers databank) and its current release would not handle Reference Manager, the bibliographic database manager chosen for the databank. Multilink Advanced was found to handle multiple users well, and it did not interfere with the functioning of Reference Manager. It was purchased for the databank.

Multilink Advanced also provides a bulletin board and programming for bringing users into and out of the system while guarding against losing the caller or letting him abuse the system. This system was utilized for the databank. However, it proved somewhat cumbersome and simple minded. (For example, users must sign on to the bulletin board again after retrieving their references.) It can be improved, but there are a number of other systems which perform this same function, some of which can be utilized in Mutilink's multiuser environment (RBBS-PC[5] and Intelliterm[6]). While Multilink's system has been adequate, further investigation of these systems to develop the best possible communications handling for the fully operational databank is advised.

Results of Pilot Study

This section compares the results of the microcomputer-based and mainframe-based pilot tests. We conclude that a microcomputer system is preferable and will adequately meet projected needs over the short-term of the next five years, as explained in the next section.

Working pilot databases were developed on both the microcomputer and the mainframe. In each case the goal was to find an acceptable programming package which could be adapted to our needs. This goal was achieved for the microcomputer system, and a pilot databank which works well was constructed. The goal was partially achieved for the mainframe computer system. A computer system configuration (the Cyber computer and an INFOFETCH-based bibliographic database designed specifically for the CIS databank) which, with a good deal more work, could become a fully acceptable host for the databank was developed. A system configuration which could be adapted to our needs (the Cyber computer using the bibliographic system developed by the U.S. Army Corps of Engineers for use with the BASIS database management program) was also identified and problems of access and implementation were defined.

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[1] Developed by Microsoft Corp.

[2] Developed by IBM, Inc.

[3] Developed by Digital Research, Inc., Monterey, CA.

[4] Developed by The Software Link, Inc., Atlanta, GA.

[5] Developed by Capital PC Software Exchange, Silver Spring, MD.

[6] Developed by Microcorp, Inc., Philadelphia, PA.

Advantages of Microcomputer Systems

Implementation and integration of the mainframe pilot databank proved inferior to that of the microcomputer primarily because there is a difference in design philosophy between microcomputer and mainframe programs. Our main problem with the microcomputer bibliographic database management program was choosing between a number of quality products crafted for precisely this application. However, on the mainframe it was necessary to build our own bibliographic database management program using the generalized capabilities of an all purpose database manager, since we were unable to secure access to an acceptable prepackaged system. Not surprisingly our efforts fell short of those of the competing microcomputer bibliographic database management program, whose author had spent years in its development.

A mainframe computer database should not be ruled out as the eventual home of the CIS databank. Existing aquatic information systems and our pilot development on the Cyber computer amply prove its feasibility and in time the database may grow too large and/or have too many users for efficient operation in a microcomputer environment. However, the development or purchase of such a system will require far more time and money than it was possible for the present study to provide; the excellent performance of the microcomputer pilot test configuration suggests that, at least for the foreseeable future the costly but powerful mainframe environment is not required.

Microcomputer Pilot System

This section provides a brief general overview of the pilot system. Following a similar overview of the mainframe system, detailed technical specifications are listed.

Callers entering the microcomputer pilot system are met by a welcome message, asked to sign on giving their name, organization/address, and areas of interest for system records and user interaction. They are then presented with a series of menus of system options. These include (1) a bulletin board system on which they can leave and pick up messages, (2) system utilities for uploading and downloading files, (3) extensive help files to guide them in the use of the system, and (4) the "window" through which they enter the CIS databank. These files are all contained on the bulletin board system of the Multilink Advanced software.

When users are ready, they enter the databank through the window system which allows them into the disk operating system of the computer. Access is limited and controlled through "batch" files which bring the user to the start-up menu of Reference Manager, the database manager. There they are guided by menus in the retrieval and examination of references. The program they are using is a special edition of Reference Manager, created for the CIS databank, which limits callers to examination of references and certain utilities (creation of a bibliography, creation of a journal format for reference output, viewing of keywords, authors, editors, and journals in the system, and

viewing of database statistics). References may be retrieved through searching for keywords, authors, editors, journals, date of publication, or words or phrases in the title or abstract. Searches may be narrowed through the use of multiple search terms and combination of terms. Boolean "or", "and" and "not" are supported and truncation (e.g., fish* is the same as fishes, fishery, fisheries, etc.) is allowed. The "full" version of Reference Manager allows the addition of new references, editing and the creation of new databases, etc. (See the section on Microcomputer Software above and Appendix 4 for further discussion of both Reference Manager and Multilink Advanced.)

After callers have searched the databank, they once more are ushered through batch files to the bulletin board, where they must sign on again (an annoying feature which will require custom programming to correct). They can then download the references they chose, enter messages, etc., and exit from the system.

Mainframe Pilot System

The mainframe pilot system is similar to the micro system in its layout (Figure 4). In both systems callers are introduced to the system, offered short tutorials in how to use the various components and given the opportunity to view listings of terms to search by. Only when they have been prepared do they enter the actual databank.

On entering the Cyber mainframe pilot system, callers are greeted by a welcome message and brought to a menu which allows them to select from the functions of the system. Each function chosen is governed by a further menu which allows users to perform the desired function(s) and then return to the main menu to make further choices or exit the system. Choices, however, are currently more limited than on the microcomputer system. Users can view bulletins, help files, and listings of keywords, authors and journals, or enter the databank. There is no message system for entering or receiving personal messages and no capability for special formatting of reports.

When they are ready, callers enter the databank through a menu which allows them to search by author, keyword, source, or a word or phrase "string" in any field of the reference. Source and "string" searches are not fully implemented as of now, but keyword and author searches work well. Boolean "or", "and", and "not" are supported and truncation is allowed. When fully implemented, capabilities would also include searches by multiple terms and combinations of terms.

As discussed above in the section, Mainframe Software, development of the system was carried far enough to show its feasibility, but left incomplete due to lack of funds for extensive custom programming. Expenditures for computer use alone on the system partially developed were $1,284 and estimated consultant and site support (which were not charged) came to $925. To bring the system to completion would have cost approximately $5-7,000.

The extensive work already completed on the Mainframe System, along with its documentation, has been copied to microcomputer disks where it can be preserved for its possible future use in the CIS databank.

Figure 4. An Infofetch-Controlled, CIS Databank. (Completed portions of the system are enclosed in solid boxes, incomplete portions in dashed boxes.)

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                                                    ┌─────────────────────────────┐
                                                    │ Main Menu of System Operations │
                                                    └─────────────────────────────┘

1 ┌──────────────────┐        2 ┌──────────────────────┐        3 ┌──────────────┐     4 ┌──────────┐    5 ┌────────┐
  │ System Entry:    │          │                      │          │ Read/Post    │       │ Get Help │      │ Exit   │
  │ Welcome & Sign On│          │                      │          │ Bulletins    │       │ (Menu)   │      │ System │
  └──────────────────┘          └──────────────────────┘          │ or Mail      │       └──────────┘      └────────┘
```

Enter Data Bank & Retrieve References

Databank Menu

Exit Databank

1 Keyword Menu

2 Author Menu *

3 Source Menu

4 Title/"String" Menu

5 Return To Main Menu

Search Keywords Only

Search Keywords & Authors

Search Keywords & Source

Enter Databank

Keyword?

References Found

1 Search Keywords Only

4 Return to Main Menu

5 Exit System

Print Specially Formatted Reports

Read Bulletins or Mail

Post Bulletins or Mail

Print Selected Help File(s)

* Author searches have been developed to the same degree as keyword searches and are similar in format.

Recommended System for Maintaining and Augmenting a Working
Databank and Bulletin Board

This section outlines the technical specifications of the system believed to be the most practicable, given the results of the pilot tests and our analysis of anticipated system requirements over its first five years of existence. Options for actual implementation of the recommended system are described in the next major section, Options for Implementation. Technical instructions to operate the system are in Appendix 4, available on request from Florida Sea Grant College.

The system described is based on the pilot microcomputer system developed, tested and demonstrated during the project. It envisions the CIS databank as a largely autonomous unit which would contact sources of citations directly and be contacted directly by those desiring information. User contacts are expected to be in two major forms: direct access of the computer database by callers with microcomputers or terminals and modems, and verbal or written requests for databank searches. Verbal or written requests for searches will probably far outnumber direct user searches at the outset of the system. However, users' ability to get citations immediately and to conduct the search interactively until they have what they need will quickly increase use of direct access. Direct access is the most efficient way of getting the information to users since it requires no personnel time. The recommended "800" toll-free telephone line will clear the last impediment to distant user access by making the call free. (As suggested later, in Options for Implementation, the possibility of providing toll-free access through the Florida Information Resource Network FIRN should be explored at the outset of permanent funding of the CIS databank. This would save the databank thousands of dollars in "800" charges per year. FIRN does limit access in some ways however, and its use must be carefully considered.)

System Components and Costs

Below are listed the components required to maintain and supplement a working databank and bulletin board in a microcomputer environment. Requirements to handle the expected level of growth for the first five years are described for each component. The discussion of this recommended system is based upon the assumption that it would be situated in a stand-alone office. An existing agency/organization home for the databank could result in some economies.

System operating costs (Tables 5, 6, 7, 8) assume a minimum of five years of vigorous growth for the system to approach a state of maturity in which all major agency contributions to the databank will have been made and growth will be substantially limited to adding new works relevant to marine information. For the first year of operation, and start-up, a budget of $68,100 is projected (Table 5).

1) Personnel -- The CIS databank will require the full-time work of one person (a manager) capable of maintaining and augmenting the system. While excellent all-around skills with microcomputer systems will be necessary, the ability to communicate and work with the different marine organizations and the general public will be just as important in this job. Secretarial assistance (at least 1/2 time and preferably full time in a stand-alone office) will be necessary for reformatting citations, channeling requests for reprints

to the proper agencies, telephone calls, etc. In addition, technical assistance in custom programming of communication systems, and program interfaces for incoming callers will be necessary in the first year in order to insure the best possible system configuration.

2) Fringe Benefits -- Fringe benefits of 20% will be required for the manager and secretary.

3) Expendable Supplies -- Two "green" computer monitors will be necessary for the CIS databank. A full complement of software for the normal day-to-day needs of the manager and secretary (Multilink requires the PC DOS operating system, communications software, etc.) and a good word processing program (WordStar, with its non-document capabilities, has proven to be an excellent tool for reformatting citations to the specifications required by Reference Manager) will also be necessary. Postage, printing, and office supplies will be required.

4) Travel -- Travel costs are expected to be approximately $4,000 during the first year of the system's existence and can be expected to remain at a comparable level during the initial five years of vigorous growth of the system. This level is required due to the need for the manager to visit key organizations around the state to assist their participation in a CIS.

5) Copy machine rental -- a copy machine will be essential for forwarding requests for reprints to appropriate agencies.

6) Telephone -- Two dedicated computer telephone lines are recommended for user access to the system: an "800" line, for free calling within Florida, and a second line for local calls. A voice line will also be necessary for verbal requests and the day-to-day operations of the databank.

7) Office Equipment -- Desks, chairs, filing cabinets and etc. (Again, this budget is based on opening a brand new office.)

8) Computer Equipment -- (a) Purchase of two computers is recommended, one an IBM AT compatible, with 20 megabyte hard drive, to house the CIS databank, the other an IBM XT compatible, with 10 megabyte hard drive, for secretarial use and to act as an emergency back-up for the databank, (b) Modems -- A Hayes 1200 Smartmodem or its true compatible is the minimum acceptable modem for system operation. It is required for the proper operation of the Multilink Advanced multiuser system. Eventual upgrading to 2400 baud capability is desirable, but as of now few users have equipment which would be able to take advantage of this capability. Two modems are recommended for the initial system, allowing two simultaneous callers, one on the recommended "800" telephone line, the other on a regular line. (c) Printer -- A good quality dot matrix printer capable of at least 120 character per second printing (to keep up with the modem communication rate) will be necessary to handle printed output from the system. (d) Software -- Reference Manager 3.2 in both a full (for the operator to maintain and augment the system) and a limited (for callers) format will be necessary for citation handling. Multilink Advanced 3.1 or above will be necessary to allow multiple users to access the databank and for bringing users into and back out of the system.

9) Overhead -- Office space, electricity, housekeeping, etc.

Costs for years two through five are listed in Tables 5-8.

Table 5. Approximate costs[a] to establish and operate a Coastal Information System in its first two years.

Component	Year One		Year Two[b]	
1) Salaries:				
Manager (@ current $11 per hr.)	$22,880		$24,024	
Full time secretary @5.35 per hr.	11,168		11,726	
Programming consultant (Yr. 1 only)	1,000			
Subtotal: salaries		$35,048		$35,750
2) Fringe benefits: (20% Mgr. & Sec)		6,810		7,150
3) Expendable Supplies				
2 Zenith "green" monitors @84 ea	168			
WordStar software	250			
PC DOS Operating System	50			
Postage, office supplies, printing,	1,500		1,570	
Subtotal: supplies		1,968		1,570
4) Travel		4,000		4,200
5) Copy machine rental		1,200		1,260
6) Telephone				
Touchtone Line - 1st yr instal-				
lation charges & purchase plus 2				
jacks for computer. Installation:				
2@ 51. Purchase of 1 phone 75.	177			
Monthly charge 2@ 20.70	497		522	
Long distance charges	500		525	
1 Florida "800" Line Installation:	105			
Per Mo. flat fee				
38 X 5 mos. operation - Yr. 1	190			
38 X 12 mos. operation - Yr. 2			456	
E.G. @45 hrs. avg. per mo.*				
(25 day, 10 eve., 10 nt.) =				
602.85 X 5 mos	3,014			
602.85 X 12 mos = 7,234 + 5%				
assumed price increase			7,596	
Subtotal: telephone		4,483		9,099

*Hourly charge rates:	DAY	EVENING	NT. WKEND
USE LEVEL	8-5	5:01-11	11:01-7:59
0-15 hrs.	19.92	13.60	8.99
15.1-40 hrs.	17.74	12.42	8.99
40.1-80 hrs.	15.55	11.25	8.99
80.1-120 hrs.	13.15	9.96	8.99

Table 5. Continued

Component	Year One	Year Two[b]
7) Office Equipment		
2 desks @ 400 ea.	800	
1 2-drawer file cabinet	200	
2 computer stands @ 143	286	
2 secretarial chairs @ 146	292	
2 side chairs @ 125.	250	
Subtotal: equipment	1,828	
8) Computer Equipment		
Zenith Z200 (IBM AT compatible)	2,900	
Zenith Z150 (IBM XT compatible)	2,000	
2 Modems (Hayes @ 500 each)	1,000	
Printer (Radix SR-15 or comparable)	649	
Software		
Reference Manager	695	
Multilink Advanced	500	
Subtotal: computer	7,744	
TOTAL DIRECT COSTS	**$63,081**	**$59,029**
9) Overhead:		
Office space, electricity, housekeeping, etc.	5,000	5,250
TOTAL[c] COSTS:	**$68,081**	**$64,279**
START-UP COSTS:	**$11,322**	
YEARLY OPERATING COSTS:	**$56,759**	**$64,279**
TOTAL	**$68,081**	**$64,279**

[a] All costs are figured at rates paid by the University of Florida and assume a new stand-alone office.

b Maintenance of first year levels and a five percent across-the-board increase in costs are assumed.

c These costs assume the project is independent. If it were a budget item of an organization such as the University of Florida, overhead (item 9) would be forgiven. If the project were funded by an outside source, but carried out at the University of Florida, indirect costs would be added. At 25% excluding computer equipment and overhead, these charges would be: 1st Year $13,834, 2nd Year $14,757.

Table 6.   Approximate costs to operate a Coastal Information System in its
third year. (Maintenance of second year levels and a five percent
across-the-board increase in costs are assumed.)

Component	Approximate Costs
1) Second year direct operating costs:	$64,238
2) 5% cost increase:	3,212
3) 50% hourly use charge increase* for greater use of the "800" toll-free line.	3,979
SUBTOTAL: DIRECT OPERATING COSTS	71,429
4) Purchase of 2 2400 baud Hayes Modems @ 500 each.	1,000
TOTAL:	$72,429

*
Twenty-three hours more use per month (68 hrs. total), spread over the
hourly rate categories in the same ratios as year one, but allowing for 10% in
rate increases since year one. Total "800" hourly charges for year three
equal 11,963.

Table 7. Approximate costs to operate a Coastal Information System in its fourth year. (Maintenance of third year levels and a five percent across-the-board in crease in costs are assumed.)

Components	Approximate Costs
1) Third year direct Operating costs:	$71,429
2) 5% cost increase:	3,571
3) 33% hourly use of the "800" toll-free line[*]	1,743
TOTAL	76,743

[*] Twenty-two hours more use per month (90 hrs. total), over year three, figured at the same ratio of hourly rates as year one, but allowing for 15% increase in hourly rate charges since year one. The increase in cost does not equal one third, since increased use has placed the databank in a lower rate category. Total "800" hourly charges for year four equal 14,304.

Table 8. Approximate costs to operate a Coastal Information System in its fifth year. (Maintenance of fourth year levels and a five percent across-the-board increase in costs are assumed.)

Components	Approximate Costs
1) Fourth year direct operating costs:	$76,743
2) 5% cost increase:	3,837
3) 16% greater use of the "800" toll-free line*	2,403
TOTAL:	82,983

* Fifteen hours more use per month (105 hrs. total), over year four, figured at the same ratio of hourly rates as year one, but allowing for 20% increase in hourly rate charges since year one. Total "800" hourly charges for year five equal 17,422.

Options for Implementation

Due to the statewide and interorganizational cooperative nature of an effective CIS, it is unrealistic to think in terms of short-range implementation of the system. In other words, the prototype system organized by this project to demonstrate the feasibility of a CIS would not suffice as a "public resource." There is not a budget to support a central staff person (e.g., an information specialist) to perform even the rudimentary duty of turning on the power for the computer daily, nor to support operating expenses such as publicity and updating the information files. Further, the contents of the present database are largely Florida Sea Grant titles, so that a large body of references is lacking.

Hence our recommendation is that a long-range plan to fully implement a Florida Coastal Information System be developed according to the specifications in the preceding section. The approximate cost for such an effort is estimated as $68,000 in the first year. Initial effort would be organized according to the tasks listed in Table 9. It is anticipated that the system could be operating on a statewide basis, and well-advertised eight months after initial funding.

Start-up Tasks

Initially, the existing database of over 800 Florida Sea Grant titles, plus 125 FDER contract reports, and 27 model ordinances from the Center for Government Responsibility could be revised to insure 100% accuracy (task A, Table 9). Concurrently, the software development companies would be contacted for any necessary revisions of the computer programs used in the CIS (task B). Using the Florida Sea Grant Extension Program network of 11 agent field offices and four specialist offices, controlled access field testing of the current and revised pilot version of CIS could be done (task C).

Almost immediately on receipt of funding work also should begin to expand the database (task D) by enlisting the help of some or all of the organizations that volunteered cooperation in the 1985 survey. Telephone and personal contact would be needed to make arrangements for this, and to provide guidance for electronic transfer of data after organization in the proper format. Realistically a limited number of organizations should be targeted for first-year contact. In its first year CIS will need heavy effort just to organize it. If successfully initiated, in successive years work will shift to updating and maintenance.

Initial contact has already been made with the Florida Information Resource Network (FIRN) concerning the possibility of handling communications between callers and the CIS databank on FIRNCOM, the state-wide communications network maintained by FIRN. FIRNCOM allows local calling from any place in the state to reach any computer on the network. This would eliminate user long distance costs for accessing the CIS, without the considerable cost of maintaining an "800" toll-free telephone line. FIRN's mission is to improve communications in education and our inquiries concerning possible use were greeted with interest. When the databank is funded, a concrete proposal to FIRN should be considered, however, FIRN does have some restrictions on access to FIRNCOM and these must be explored thoroughly in light of the mission of the CIS databank.

Table 9. Tasks for a coastal information system manager in first year of operation.

Activity	MONTH											
	1	2	3	4	5	6	7	8	9	10	11	12
A. Revise existing database	X	X										
B. Upgrade software (from vendor)	X	X										
C. Field test CIS access	X		X			X						
D. Secure additional databases		X	X	X	X							
E. Interagency coordinating meeting						X						
F. Advertise to selected audiences							X					
G. Operate CIS								X	X	X	X	X
H. Further expansion of database									X	X	X	
I. Statewide advertisement												X
J. Annual report												X

Also in year one it is envisioned that some advertisement of the CIS would be made, with addition of other databases and expansion of services if resources are available to support appropriate labor and costs (Table 9).

System Operation

Finally, this report touches on the options for an organizational headquarters for a Coastal Information System. As indicated previously, no system exists onto which a CIS could be "piggy-backed," without incurring new costs. Thus, possibilities for hosting/operating the CIS include:

.a private, non-profit organization dedicated to non-advocacy, objective "brokering" of information. The Florida Marine Information Network (MARINE) is in this category.

.an individual State agency focused on coastal issues. One example is the Office of Coastal Management of the Florida Department of Environmental Regulation.

.a statewide, university public service program with local delivery outlets, such as Florida Sea Grant College.

.a newly created State entity.

.a consortium of public and private organizations that agree to an annual subscription program for sharing costs of operation, with headquarters at a place to be determined.

Previously, the personnel and operating requirements for a CIS were described. In closing, it is relevant to note that the CIS could be operated quite flexibly in terms of giving users broad access to the system (e.g., by telephone verbal request, by computer modem, or in writing, at a central office or at branches), for not only citations and reference information for printed materials but also audio-visual resources, lists of speakers, etc. In a growth state the size of Florida, the price tag is a bargain when compared to the value of Florida's coastal resource.

CONCLUSIONS

1. In Florida there is a widening gap between public awareness of vital coastal subjects -- and their practical applications -- and the ability of marine organizations to deliver timely coastal information. This is at a time when such information is all the more crucial due to increased multiple use of coastal resources.

2. Sixteen of 33 marine organizations surveyed responded and all expressed interest in how a computer-based coastal information system might be established to provide coordinated and streamlined response to technical and lay-level requests for coastal information.

3. A conservative estimate is that 16 public and private marine and coastal-related organizations in Florida receive at least 12,200 information requests annually. (Non-respondents to the project survey would increase this level of inquiry.)

4. No system is in operation to provide an electronically activated coastal information service to serve the needs of Florida's broad array of marine and coastal interests.

5. Existing computer systems may be utilized in a Florida Coastal Information System (CIS). A pilot microcomputer system was established and demonstrated by this project, proving the feasibility of a CIS.

6. At projected levels of demand over the next five years, a mainframe computer network is not practical.

7. In its first year a Florida Coastal Information System could build a database of over 5000 coastal reference citations.

8. A pool of 16 public and private organizations exists as possible participants in organizing such a system.

9. Major categories of information sought in inquiries directed to these organizations and marine extension agents include living marine resource subjects such as seafood quality, coastal habitat quality, life history of plants and animals, beach processes such as erosion, coastal regulations and government policy, and engineering/construction.

10. Audiences for coastal information include homeowners, journalists, developers, planners, water managers, tourists, fishermen, boaters, local governments, etc.

11. The first-year start-up cost -- to completely organize from "scratch" -- of a Florida Coastal Information System is approximately $68,000. Annual operating costs (in 1985 dollars) are about $64,000. Start-up in an organization with office space and support could be substantially less (i.e.,$60,000).

ACKNOWLEDGMENTS

their tremendous assistance with development of the mainframe pilot database; to Ann King and Dr. Richard Strain for their help with general purpose microcomputer database programs; to Jeff Lillycrop and Paul May of the Corps of Engineers for their assistance with mainframe database systems; to Ken French for his help in all facets of system development; and to Doug Gregory, Bob Wilson, Dean Jackman, Joe Hand, Tom Savage, Russ Fee, Don Sweat, Jackie Whitehouse and Marilyn Little for their help in testing and setting up demonstrations of the system.

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APPENDICES 1-3*

May 14, 1985

NO ITEM TO INSERT

Dear
NO ITEM TO INSERT ,
:

This letter is to introduce a pilot project dealing with ways to enhance communications and information flow in the area of coastal and marine resources. Earlier this year we started a 10-month project to determine how computer-based systems might help natural resource organizations streamline the flow of information between sources and those interests that request information. The kinds of information and interests we are addressing include technical and governmental concerns as well as lay-level, semi-technical issues related to coastal development, recreation, fisheries, ecology, marine trades, etc.

On a trial basis we are assembling citations for reference information such as reports, extension bulletins, films, etc. from the Florida Sea Grant library and the Florida Department of Environmental Regulations. We are evaluating various mainframe and microcomputer bibliographic software packages to use in storing and recalling citations to these references. Various trials are planned, and the project will culminate this fall with a demonstration of the pilot system and preparation of a feasibility report regarding different system options.

As part of the feasibility report we want to make some projection as to the need and interest of organizations such as yours relative to the possible operation of such an information system. We obviously are not asking anyone to make a binding commitment. Our goal at this point is simply to assess who might find such a system potentially useful. Among the possible users are: technical staffs of water-related agencies seeking planning documents, model ordinances, etc.; businesses in search of economic or environmental reports; journalists; educators and coastal homeowners.

Therefore we are asking you or someone you designate to complete and return the enclosed survey sheet. The responses will be compiled in an anonymous summary in our final report, and will be helpful in deciding on follow-up to the pilot study. We are designing our database to be capable of taking materials from the largest variety of electronic sources possible; anything from word processors to main frames. So please list all sources available in your area, even if you're not sure about them.

The intent of the project is not to assemble a library. Rather, we are deciding whether it is possible to establish a "yellow pages" that identifies what information (e.g., publications, people, films) is available for a coastal subject, and where to obtain it.

-2-

Your help will be very much appreciated. We intend to provide a copy of the final report to organizations that return a completed survey. If you'd like more information call our project coordinator, David Reddy at (904) 392-5870.

Sincerely yours,

Paul D. Fulham
Acting Executive Director

Enclosure

Florida Coastal Information Systems Resource Report Form

The Coastal Information System Project, as outlined in the accompanying letter, is examining the feasibility of using a computer-based bibliographic system to improve access to technical and semi-technical information about Florida's coastal resources for researchers, governmental agencies, educators, legislators, etc. and the general public. This form attempts to gauge the interest of organizations which maintain, produce, or disseminate information on the coastal zone in participating in such a network and to develop an estimate of the kinds and volume of queries such a network might deal with.

The response of your organization to this survey will help determine possible follow-up to the feasibility study. Completion of this form by the person responsible for information programs and data management is requested.

I Organization _____

Contact Person Completing This Form _____

Telephone _____ (SUNCOM) _____

Address _____

_____

_____

II. If this kind of system existed would you be interested in participating?

_____

III. Please list in the space below a half-dozen or so of the most commonly asked (serious) coastal resource-related questions—or categories of questions—directed to you by your various clients, whether they're the public-at-large or more specialized commercial, governmental, or private interests.

-2-

IV. Approximately how many requests for information about the coastal zone do you receive each month? A. TECHNICAL: _____

B. LAY PUBLIC: _____

V. Would you be willing to provide us with citations to references and reports on the coastal zone, from data and information files you maintain?

_____

If so, are any of these references stored on electronic media which would allow direct electronic transfer? _____

Approximately how many references might be involved? _____

_____

Please return this form by   , to Mr. David Reddy, Florida Sea Grant College, Building 803, University of Florida, Gainesville 32611.

Thank you for your assistance. If you have any questions or suggestions, please call David Reddy at 904/392-5870, SUNCOM 622-5870.

FLORIDA SEA GRANT COLLEGE

Building 803, University of Florida, Gainesville 32611
(904) 392-5870 Suncom 622-5870

April 11, 1985

TO: FSGEP Agents & Specialists

FR: William Seaman *Bill*

RE: Coastal information system

REPLY REQUESTED

Earlier this year I sent to you copies of our proposal for the feasibility study of using a computer-based bibliographic system to enhance our response to various requests for information. I've briefed the specialists about the project and a few others of you also have met David Reddy, the project coordinator. This memo springs from a planning meeting Don Sweat attended with us the other day.

Specifically, in beginning to index information resources in the pilot system we need to establish categories and key words. We need your help as follows:

Please list in the space below a half-dozen or so of the most commonly asked (serious) questions -- or categories of questions -- directed to you by your various clients, whether they're the public-at-large or more specialized commercial, governmental, or private interests.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Examples of generic questions might be "How do I buy fresh fish?" or "How can I save my beach?". More specific questions might include "Are there any beach access ordinances in Florida?" or "Where does red tide occur?".

Please give this some thought and take just the few minutes to write in your questions.   Please reply
by **April 30. Thanks.**

A final note: "No flaky entries, please. Offer void where prohibited by law."

WS/ml/hl.14

cc: M. Clarke
     D. Reddy
     Project file

List of Questions, and Categories of Questions,
Most Commonly Asked of Organizations
Responding to Survey of Coastal Information
Requests in Florida

Subject Matter   Question, or Category of Question

Economics and Business

1. I'm new to the area. Can you tell me what fisheries would be good to go into?

2. Questions from soon-to-be retirees from the North about potentials for (1) aquaculture in Florida, (2) getting into various businesses (marinas, seafood wholesale, etc.), (3) anything else to supplement retirement income.

Recreation

3. Where can I go fishing, get maps, put in my boat, rent a boat?

Seafood Quality and Harvest

4. Shellfish harvesting areas.

5. Edibility of sea life.

6. Are waters of ..... presently open for shellfish harvesting?

7. Is there a red tide at ..... and is .... safe to eat?

8. Marine animals as food (especially shellfish).

9. Is ..... safe to eat?

Fishery Biology and Management

10. Information on federal fishing regulations.

11. Where are certain fish?

12. Why are certain fish no longer here any longer?

13. Coastal fishes, fisheries & aquaculture.

14. What are the laws regarding fishing for ... (e.g. lobsters, stone crabs) ... in Florida?

Aquaculture and Natural Product

15. Role of marine animals in studying epilepsy, heart disease, and mental illness.

16. Send me information on aquaculture of (tilapia, catfish, shrimp, etc.)

Shore Dynamics, Circulation and Erosion

17. Solutions to Erosion Problems

18. Coastal setback, seawall construction and repair.

19. Historic shoreline changes.

20. Wave climate information.

21. Beaches and beach erosion.

22. Questions on the physics of littoral transport.

23. Coastal geology, sediments, continental shelf.

24. Coastal hydraulics, tides and oceanography.

25. Detailed tidal/current information.

26. Historic erosion rates.

27. Sea level and other coastal changes.

28. Can fluctuations in coastal oceanographic processes and/or plant-animal community structure be predicted from modeling schemes?

29. Salt tolerable grasses and plants. Natural vegetation for landscaping.

Marine Structures and Engineering

30. Questions on construction of erosion control structures.

31. Location and depth of existing federal navigation channels.

32. Clogging of powerplant cooling - water intake by jellyfish.

33. Coastal engineering and structures.

34. Saltwater intrusion.

35. Navigation, recreation.

36. Environmental problems caused by construction.

Policy, Regulation and Legal Issues

37. Who is in charge of what -- federal, state, local?

38. Saltwater fishing regulations.

39. Is (dredging, filling, effluent, etc) at ..... legal, and who can I call to (complain, check records, etc.)?

40. Coastal zone management.

41. Is it legal to import .....?

42. Regulatory ·responsibilities and limit of authority for governmental agencies.

Coastal Habitat Quality

43. Environmental resources.

44. Why can't this area be developed (involving wetlands)?

45. What is the value of wetlands to fish?

46. Effects of "pollution" on marine resources.

47. Requests for information on: Mangroves and mangrove management.

48. Concerns about offshore drilling.

49. Sewage outfall areas, etc.

50. What is known about recruitment of seaweeds, animal larvae (both invertebrates and fishes) in coastal waters?

51. How will man-induced disturbances (both urban and industrial developments) impact water quality, nearshore currents and sedimentation processes?

52. Are data bases representing long-term monitoring of nearshore marine and estuarine environments available.

53. Location of wetland areas.

54. Importance of freshwater nutrient inputs to coastal fisheries.

55. Freshwater requirements for estuaries.

56. Economic values of coastal ecosystems.

57. Estuarine pollution problems.

58. Pollutant migration.

59. Effects of organic sediments on estuarine water quality.

60. Aeration (re-aeration) of oxygen-deficient waters.

Natural History and Identification of Organisms

61. Dangers of stinging by jellyfish and Portuguese Man-'O-War.

62. What should I do with this injured (animal, usually a bird)?

63. Biology of marine animals (especially sharks).

64. Who do I call about a stranded turtle, porpoise or whale?

65. Fish identification.

66. Manatee and seaturtle.

67. Coastal ecology

68. Sturgeons.

69. Does MML have data on ..... during ..... or at .....?

70. Identification of fish and local invertebrates.

71. Have the local marine flora and fauna been described in regard to regional and seasonal patterns of diversity distribution and density?

72. Species inventories for specific areas.

73. ... plus a wide range of questions on the natural history of local plants and animals.

74. What animal is this? (followed by a description)

Educational Materials and Speakers

75. What is our reaction to (media reports on coastal issues)?

76. Marine biology speaker request.

77. Possibility of providing programs for school classes.

78. General questions (normally from out-of-state) from students wanting to attend universities in Florida where are they, what are programs, etc?

79. Send me everything you have on the subject of .....
Really a wide variety of subjects.

ml/h3.8