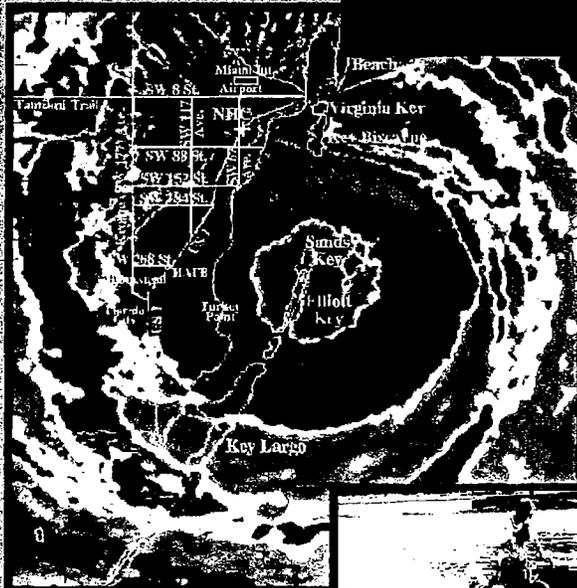




Village of Key Biscayne Floodplain Management Plan

**Volume Three
Support Documents**

**COMPRESSED
VERSION**



**Sponsored
by the
State of Florida
Division of Emergency Management
and the
Village of Key Biscayne, Florida**

March 1998

VOLUME THREE

BINDER I

**EMERGENCY MANAGEMENT PREPAREDNESS AND
ASSISTANCE PROGRAM**

COMPETITIVE GRANT AGREEMENT



VILLAGE OF KEY BISCAYNE

85 West McIntyre Street • Key Biscayne, Florida 33149

**EMERGENCY MANAGEMENT PREPAREDNESS AND
ASSISTANCE TRUST FUND**

FLORIDA DEPARTMENT OF COMMUNITY AFFAIRS

**DIVISION OF EMERGENCY MANAGEMENT
COMPETITIVE GRANT APPLICATION**



VILLAGE OF KEY BISCAYNE

Village Council
John F. Festa, *Mayor*
John Wald, *Vice Mayor*
Raul Lorente
Hugh T. O'Reilly
Michele Padovan
Betty Slme
Raymond P. Sullivan

November 17, 1996

Ms. Suzanne F. Adams, Manager
Emergency Management, Preparedness and Assistance
Trust Fund
Department of Community Affairs
State of Florida
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Re: Letter of Transmittal
Submission of Application
Municipal Competitive Grant Program

Dear Ms. Adams:

The purpose of this letter is to transmit our application for a Municipal Competitive Grant under the State Emergency Management, Preparedness and assistance Grant Program officially noticed in the August 30, 1996 Florida Administrative Weekly.

The proposed project falls under Category 4, as described in Section I of the Application Packet, and involves, more specifically, the preparation, production and implementation of a Floodplain Management Plan for the Key Biscayne Community, including the Village of Key Biscayne and surrounding State and County parks. While the focus of the project will be the Floodplain Management Plan, it expected that the planning process will stimulate, as further detailed in the Application, a number of related sub-projects which should, if successfully implemented, materially improve the Community's effectiveness in addressing Emergency Management Priorities.

The Village is committed to the completion of this project within less than one year, having already

applied to FEMA for participation in the FEMA/ISO Community Rating System (CRS) and having identified, in connection with said Application, the need and desire for a Floodplain Management Plan.

The amount of the Grant requested is \$45,000 out of a total project cost of \$4,519,717 including a total of \$4,462,080 in local non-state funds to be expended on the completion of Key Biscayne's new storm drainage system and on other activities related to the implementation of the proposed Floodplain Management Plan.

Substantial participation in this project is expected from: a. Dade County's Planning, Environmental Resource Management and Emergency Preparedness Agencies; b. the South Florida Water Management District; c. the National Weather Service; d. the Village of Key Biscayne Departments of Public Works, Fire Rescue and Building Zoning & Planning; e. the Federal Emergency Management Agency, Mitigation Program Branch (FEMA) & the Insurance Service Organization (ISO); f. the firm Williams, Hatfield & Stoner, Inc - Engineers Planners & Surveyors; and g. Mr. Peter Kory, KBS Development Associates, Inc. and CRS Coordinator for the Village of Key Biscayne.

The above entities (a through f) are the only ones involved in the proposed Project and this application is made without collusion with any other entity submitting an application. The application is, in all respects, fair and in good faith, without fraud or collusion. The undersigned has full authority to bind the Village of Key Biscayne with respect to the activities proposed under this application.

Sincerely,

C. Samuel Kissinger
Village Manager



STATE OF FLORIDA
DEPARTMENT OF COMMUNITY AFFAIRS

EMERGENCY MANAGEMENT • HOUSING AND COMMUNITY DEVELOPMENT • RESOURCE PLANNING AND MANAGEMENT

LAWTON CHILES
Governor

JAMES F. MURLEY
Secretary

April 15, 1997

Mr. C. Samuel Kissinger
Village Manager
85 West McIntyre Street
Key Biscayne, Florida 33149

Dear Mr. Kissinger:

Enclosed is a fully executed copy of the Emergency Management Preparedness and Assistance Program Competitive Grant Agreement between your organization and the Department of Community Affairs. Also included is a copy of (1) the Financial Report/ Reimbursement Request forms to be used when filing a claim for reimbursement and to be submitted quarterly as a financial status report; and (2) the Summary Project Progress Report which is also required for quarterly reporting to this Division on the project.

If you have requested an advancement of funds under Section C. Attachment F of this Agreement, but have not provided us with a written letter of justification explaining the need for and the anticipated use of any advanced funds, please do so as soon as possible. Absence of this information could cause a delay in the release of advanced funds to you.

Within thirty (30) days of the date of execution of this Agreement, please provide the Division's Finance and Logistics Management Section with a list of deliverables, a timeline for their completion, and a revised budget as noted on page 11, Attachment A of this Agreement. Failure to supply this information could result in the denial of funding.

We are looking forward to working with you. If you have any questions regarding this program, please contact either Mark Crittenden at (904) 413-9942 or me at (904) 413-9934.

Sincerely,

A handwritten signature in cursive script that reads "Suzanne F. Adams".

Suzanne F. Adams, Manager
Emergency Management Preparedness
and Assistance Grants Program

SFA/mcs

Enclosures

2555 SHUMARD OAK BOULEVARD • TALLAHASSEE, FLORIDA 32399-2100

FLORIDA KEYS AREA OF CRITICAL STATE CONCERN
FIELD OFFICE
2796 Overseas Highway, Suite 212
Marathon, Florida 33050-2227

SOUTH FLORIDA RECOVERY OFFICE
P.O. Box 4022
8600 N.W. 36th Street
Miami, Florida 33159-4022

GREEN SWAMP AREA OF CRITICAL STATE CONCERN
FIELD OFFICE
155 East Summerlin
Bartow, Florida 33830-4641



VILLAGE OF KEY BISCAINE

Village Council
John F. Festa, *Mayor*
John Waid, *Vice Mayor*
Raul Llorente
Hugh T. O'Reilly
Michele Padovan
Betty Sime
Raymond P. Sullivan

May 12, 1997

Mr. Joseph F. Myers.
Director of Emergency Management
Department of Community Affairs
Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Attention: Mr. Mark Crittenden

Re: Contract Number: 97CP-05-11-23-02-212

Dear Mr. Myers:

Transmitted herewith please find:

1. The document ("Project Progress Report") required to be supplied for approval by the Department under Attachment A of the subject Contract; and
2. Two Subcontracts for Professional Services to be performed in connection with the fulfillment of the scope of Contract activities.

Said Subcontracts are each being submitted herewith in accordance with the provisions of Attachment E of the subject Grant Agreement as follows:

- A. Each Subcontract contains all terms of the GRANT AGREEMENT by making the Grant Agreement an Exhibit to the Subcontract and a part thereof.
- B. Each Subcontract is being sent herewith as required.
- C. The proposed Subcontracts are not "Subgrants" Therefore this item does not apply.
- D. The required services under the subcontracts are essentially non-competitive in nature.

KBS Development Associates, Inc. and its President, Peter Kory serve as the Community Rating Service (CRS) Coordinator for the Village, a position which functions more like an administrative staff supplement than as an independent consultant. Since the need for the project under the Grant resulted from the Village's efforts to secure a CRS rating, KBS et al is uniquely positioned to effectively coordinate the activities under the Grant with the CRS Program.



Village of Key Biscayne Floodplain Management Plan

Volume Three Support Documents

Village Council

Mayor - John F. Festa
Vice Mayor - Mortimer Fried
Council - Martha Fdez-León Broucek
Council - Gregory C. Han
Council - Hugh T. O'Reilly
Council - Michelle Padovan
Council - Betty Sime

Village Manager

C. Samuel Kissinger

Village Clerk

Conchita H. Alvarez

Working Review Committee

Deborah De Leon, A.I.A. - Chairman
Maribel Balbin
Robert Cuevas, P.E., D.E.E.
Brian Flynn
Gregory C. Han, Ph.D.
Lee A. Niblock, CLP
Ronald White

Village Staff

Assistant to the Village Manager - James DeCocq
Director of Building, Zoning & Planning - John Little
Director of Fire & Rescue - John Gilbert
Building Official - Leo Llanos
Public Works Supervisor - Armando Nunez

KBS Development Associates, Inc.
Williams, Hatfield & Stoner, Inc.

VILLAGE OF KEY BISCAYNE
FLOODPLAIN MANAGEMENT PLAN

VOLUME THREE

SUPPORT DOCUMENTATION

INDEX

The support documentation contained in this Volume Three of the Floodplain Management Plan has been organized in seven (7) binders described below. Because of the large amount of material and the anticipated diversity of its use, ALL of the material in this INDEX has been included IN ONLY A FEW MASTER BINDERS. The OTHER BINDERS will contain references for easy retrieval of this material from the Master Binders, if and when needed.

In any event a copy of the Master Binder will always be available at the Office of the Village Manager and at the Public Library.

Binder I: “Emergency Management, preparedness and Assistance Program Competitive Grant Agreement”(EMPA). This Binder contains a copy of the Agreement between the Village of Key Biscayne and the State of Florida Department of Community Affairs, and related material, including:

- A. Copy of Grant Application Dated November 17, 1996;
- B. Copy of Agreement with all attachments;
- C. Copy of all Quarterly Progress Reports (i.e. 4 reports), other submissions and “deliverables” as required under the EMPA Agreement.
- D. Copy of contracts for professional services with WHS and KBS including Council authorization therefor.

The above material has been included in full in the **Master Binders** only. It is reflected in all other binder by a copy of a title page or of the front page of a text for identification purposes.

Binder II: “Repetitive Loss Properties”. This Binder contains all the material used in addressing that particular subject in the preparation of the Floodplain Management Plan including:

- A. NFIP/CRS “Commentary” Series 500 titled: “Flood Damage Reduction Activities”;
- B. A summary list of repetitive loss properties on Key Biscayne as found by FEMA;
- C. Response to the issue as shown in the Village’s “Community Rating System” (CRS) Application;
- D. Repetitive Loss Property Data Inventory (Phase I Report Part B), which was part of the assessment of the flood hazard.
- E. NFIP compilation of repetitive loss property water depth reached in connection with hurricane Andrew.

The above material has been included in full in the **Master Binders**. With respect to all other binders only the material in A and C above has been included, as it is most directly relevant to the text of the Floodplain Management Plan and its introduction.

Binder III: “Guidelines and Advisory Material”. This Binder contains NFIP, FEMA and State DCA publications used in the preparation of the Floodplain Management Plan or to be used in its implementation, including:

- A. NFIP/CRS booklet titled: “Example Plans” dated July 1996, specifically designed as a guide for the preparation of Floodplain Management Plans;
- B. NFIP/CRS booklet titled: “CRS Credit for Drainage System Maintenance”, dated July 1996;
- C. NFIP/CRS booklet titled: “CRS Record Keeping Guidance” dated July 1996;
- D. NFIP/CRS booklet titled: “Flood Elevation Certificate Software User Manual”, dated December 1996;
- E. “Benefit-Cost Analysis” (one page description of requirement in connection with Hazard Mitigation Grant Program Applications.)
- F. State of Florida DCA Division of Emergency Management: “State Hazard Mitigation Program – Applicant Briefing Package. (Said document was secured at a briefing held March 20, 1998).

The above material is included in full in the **Master Binders**. All other Binders will include only the booklet in A above, “Example Plans” because of its great relevance to the preparation of Floodplain Management Plans.

Binder IV: “Stormwater Master Plan”. This Binder contains the Plan and Report Prepared for the Village of Key Biscayne by Williams Hatfield and Stoner, Inc.,

dated September, 1993. The Plan and Report formed the basis for the Village's storm-sewer system, which in turn was, in substantial part, responsible for the reduction in the number of repetitive loss properties.

A full copy of the Stormwater Master Plan is included in the **Master Binders**. An "Executive Summary" has been included in all other Binders.

Binder V: "Community Rating System Application". This Binder contains a copy of the application submitted to FEMA October 11, 1996, plus:

- A. FEMA's letter to the Village, dated March 5, 1998 advising that the Village "... meets the requirements for a class 7 rating in the CRS."
- B. Various other letters and documents related to the classification process.

A full copy of the CRS Application and the above-related documents are included in the **Master Binders**. With respect to all other Binders, the March 5, 1998 letter from FEMA has been included, as well as the preamble to the CRS Application which includes: the "Letter of Transmittal", the "Prerequisites" for FEMA consideration of the Application and the "Application Cover Sheet".

Binder VI: "Miscellaneous Material" This Binder contains a variety of technical and non-technical support material such as articles, research reports and analysis as well as field data which help document the assumptions and proposals in the Floodplain Management Plan, including:

- A. Sample of Raingauge readings;
- B. Technical Memorandum: "Frequency Analysis of One and Three-Day Rainfall Maxima for Central and Southern Florida" by Paul Trimble, October 1990 South Florida Water Management District;
- C. NOAA, National Weather Service "Surface Weather Observation";
- D. "Surface Water Conditions - Detail Report, June 1997, South Florida Water Management District;
- E. Flood Insurance Study by FEMA 1993;
- F. Article in American Meteorological Society: "Are we seeing a Long-Term Upturn in Atlantic Basin Major Hurricane Activity Related to Decadal-Scale SST Fluctuation" by Stanley B. Goldenberg, Lloyd J. Shapiro and Christopher W. Landsea, Hurricane Research Division/AOML/NOAA, Miami, Florida.
- G. Support Material for Phase II of the Floodplain Management Plan preparation process, including:
 - 1. Relevant News Clips;
 - 2. Copy of National Geographic Article on Barrier Islands;

3. Memorandum from Williams, Hatfield & Stoner, Inc. re: Level of service for Drainage Basins 1-8 in the Village of Key Biscayne.

H. Letter in re: 100 year Storm Water Improvements from Williams, Hatfield & Stoner, Inc. dated November 22, 1996;

I. Proposal for Community Involvement by "Market Force International" dated October 27, 1997.

The above material is included, in full in the **Master Binders**. In view of the fact that virtually all of this material is for general rather than specific action oriented use, none of it has been included in the other binders.

Binder VII: "Long Range Beach Nourishment Plan". This binder contains a copy of said plan as prepared for the Village of Key Biscayne by Coastal Systems International, Inc., well as the Village Council Resolution adopting the plan and an executive summary of the Plan.

A full copy of the Plan is included in the Master Binders, all other Binders will include a copy of the Executive summary.



VILLAGE OF KEY BISCAYNE

Office of the Village Manager

Village Council
John F. Festa, *Mayor*
Michele Padovan, *Vice Mayor*
Mortimer Fried
Gregory C. Han
Hugh T. O'Reilly
Christina Dearing Reed
Betty Sime

July 11, 1997

Village Manager
C. Samuel Kissinger

Mr. Joseph F. Meyers
Director of Emergency Management
Department of Community Affairs
Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Attention: Mr. Mark Crittenden

Re: Contract Number : 97CP-05-11-23-02-212
Quarterly "Summary Project Progress Report"
for Quarter 1, ending June 30, 1997, due July 15, 1997

Dear Mr. Meyers:

Transmitted herewith please find:

1. The Document ("SUMMARY PROJECT PROGRESS REPORT") required to be supplied for approval by the Department under Attachment A of the subject Contract.
2. A current status and progress report for the project.
3. An updated and re-organized "Repetitive Loss Properties Inventory and Related Data" package of worksheet to be used in this and subsequent phases of the project.

RESOLUTION NO. _____

A RESOLUTION OF THE VILLAGE OF KEY BISCAYNE, FLORIDA; AUTHORIZING THE VILLAGE MANAGER TO EXECUTE THE ATTACHED AGREEMENTS WITH KBS DEVELOPMENT ASSOCIATES, MARKED AS EXHIBIT I, AND THE AGREEMENT WITH WILLIAMS, HATFIELD & STONER, INC., MARKED AS EXHIBIT II FOR A TOTAL COST NOT TO EXCEED \$40,000 FOR THE PREPARATION OF A FLOOD PLAIN MANAGEMENT PROGRAM AS GENERALLY DEFINED IN THE NATIONAL FLOOD INSURANCE PROGRAM, PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the Village submitted an application for a \$45,000 grant from the State Emergency Management Preparedness and Assistance Trust Fund, Department of Community Affairs, on November 17, 1996;

WHEREAS, the Department of Community Affairs ranked our application number one out of 270 applications received and the Council of the Village of Key Biscayne was informed of this award at the March 11, 1997, Council meeting;

WHEREAS, the Grant awarded was received, executed and approved by the Department on April 15, 1997;

WHEREAS, the total cost for the Floodplain Management Program will be \$45,000 with the local share being contributed in the form of in-kind contributions;

BE IT RESOLVED BY THE VILLAGE COUNCIL OF KEY BISCAYNE AS FOLLOWS:

Section 1. That the Village Manager is hereby authorized to execute the contracts between KBS Development Associates and William Hatfield & Stoner, Inc. to prepare and finalize the Floodplain Management Program.

Section 2. Funds in the amount of \$45,000 shall be provided by the Florida Department of Community Affairs.

Section 3. This resolution shall take effect immediately upon adoption.

PASSED AND ADOPTED this _____ day of _____, 1997.

JOHN F. FESTA, MAYOR

ATTEST:

CONCHITA ALVAREZ, VILLAGE CLERK

APPROVED AS TO FORM AND LEGAL SUFFICIENCY:

RICHARD J. WEISS, VILLAGE ATTORNEY



VILLAGE OF KEY BISCAYNE

Office of the Village Manager

Village Council
John F. Festa, *Mayor*
Michele Padovan, *Vice Mayor*
Mortimer Fried
Gregory C. Han
Hugh T. O'Reilly
Martha Fdez-León Broucek
Betty Sime

Village Manager
C. Samuel Kissinger

October 14, 1997

Mr. Joseph F. Meyers
Director of Emergency Management
Department of Community Affairs
Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Attention: Mr. Mark Crittenden

Re: Contract Number: 97CP-05-11-23-02-212
Quarterly "Financial Report/Reimbursement Request"
Quarterly "Summary Project Progress Report"
Quarter 2, ending September 30, 1997, due October 15, 1997

Dear Mr. Meyers:

Transmitted herewith please find:

1. A completed "Financial Report/Reimbursement Request" Form;
2. A completed "Summary Project Progress Report" Form;
3. A narrative status and progress report for the subject project;
4. Deliverables covering: a. Working Review Committee meeting activities relating to Phase I of the Project; and, b. the Phase II Report draft to be considered at the Working Review Committee Meetings scheduled for October 24 and October 31, 1997.

Please advise us if you have questions regarding this Report.

Sincerely,

C. Samuel Kissinger
Village Manager

January 14, 1998

Mr. Joseph F. Meyers
Director of emergency Management
Department of Community Affairs
Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Attention: Mr. Mark Crittenden

Re: Contract Number: 97CP-05-11-23-02-212
Quarterly "Financial Report/Reimbursement Request"
Quarterly "Summary Project Progress Report"
Quarter 3, ending December 31, 1997; due January 15, 1998

Dear Mr. Meyers:

Transmitted herewith, please find:

1. A completed "Financial Report/Reimbursement Request" Form;
2. A completed "Summary Project Progress Report" Form; and
3. A Narrative Status and Progress Report for the subject project.

The deliverables, covering the work performed during the quarter, including primarily Phase III of the work (i.e. "Mitigation initiatives" and "Evaluation and enhancement"- namely the areas identified in "C" and "F" in the Contract Scope") will be transmitted to you when the Phase III Report titled: "Review Possible (Floodplain Management) Activities" is completed.

**KBS Development
Associates, Inc.**

55 Ocean Lane Dr.
1035
Key Biscayne,
Florida 33149

Tel. 305-361-9414

Fax 305-361-1341

January 22, 1998

Mr. Joseph F. Meyer
Director of Emergency Management
Department of Community Affairs
Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Attention: Mr. Mark Crittenden

Re: Contract Number 97CP-05-11-23-02-212
Quarter 3 Report Transmittal of "Deliverables"

Dear Mr. Meyers:

This follows Mr. Kissinger's letter of January 14, 1998 wherein he advised you that the deliverables accompanying the Quarter 3 Progress Report would be transmitted to you before the end of January 1998.

Accordingly, please find enclosed a copy of the Phase III report with a copy of the agenda for the Working Review Committee meeting scheduled for February 3, 1998, when the report will be discussed.

As usual, any comments you might have with respect to the enclosed would be much appreciated. Naturally, you would be also most welcome to attend the Working Review Committee meeting and actively participate in the planning process.

Sincerely,



Peter Kory

Peter Kory
President

VOLUME THREE

BINDER II

REPETITIVE LOSS PROPERTIES

500 FLOOD DAMAGE REDUCTION ACTIVITIES

This series of activities addresses flood damage to existing buildings. It complements the previous series that dealt with preventing damage to new development. Recognized damage reduction measures include acquiring, relocating, or retrofitting existing buildings and maintaining drainageways and retention basins. As discussed in Section 504, the Community Rating System (CRS) does not provide credit for structural flood control projects.

Credit points for Activities 520 and 530 are adjusted according to the number of buildings affected. See Sections 301 through 303 for a discussion of impact adjustment ratios based on building counts.

Sections 501 through 503 and Activity 510 (Floodplain Management Planning) are mandatory for all or some repetitive loss communities. See Sections 501 and 502 for a discussion of the applicability of these requirements.

Contents of Series 500

| Section | Page |
|---|--------|
| 500 Flood Damage Reduction Activities | 500-1 |
| 501 The Repetitive Loss List | 500-3 |
| 502 Repetitive Loss Category | 500-4 |
| 503 Repetitive Loss Area Outreach Project | 500-6 |
| 504 Structural Flood Control Projects | 500-9 |
| | |
| 510 Floodplain Management Planning | 510-1 |
| 511 Credit Points | 510-3 |
| 512 Impact Adjustment | 510-16 |
| 513 Credit Calculation | 510-17 |
| 514 Credit Documentation | 510-18 |
| 515 For More Information | 510-20 |
| | |
| 520 Acquisition and Relocation | 520-1 |
| 521 Credit Points | 520-2 |
| 522 Impact Adjustment | 520-4 |
| 523 Credit Calculation | 520-5 |
| 524 Credit Documentation | 520-5 |
| 525 For More Information | 520-7 |
| | |
| 530 Retrofitting | 530-1 |
| 531 Credit Points | 530-2 |
| 532 Impact Adjustment | 530-7 |
| 533 Credit Calculation | 530-9 |
| 534 Credit Documentation | 530-9 |
| 535 For More Information | 530-11 |

| | | |
|-----|-----------------------------|--------|
| 540 | Drainage System Maintenance | 540-1 |
| 541 | Credit Points | 540-3 |
| 542 | Impact Adjustment | 540-6 |
| 543 | Credit Calculation | 540-7 |
| 544 | Credit Documentation | 540-8 |
| 545 | For More Information | 540-10 |

List of Figures

| | | |
|---------|--|--------|
| 500-1. | Floodville's repetitive loss area map | 500-8 |
| 500-2. | Floodville's activity worksheet for repetitive loss areas (AW-502) | 500-11 |
| 510-1. | Floodplain management activities | 510-13 |
| 510-2a. | Floodville's activity worksheet for floodplain management planning (AW-510) | 510-23 |
| 510-2b. | Page two of Floodville's activity worksheet for floodplain management planning(AW-511) | 510-24 |
| 510-3. | Gulf Beach County's activity worksheet for its option 2 progress report (AW-512) | 510-25 |
| 520-1. | Floodville's activity worksheet for acquisition and relocation (AW-520) | 520-8 |
| 530-1a. | Floodville's activity worksheet for retrofitting (AW-530) | 530-13 |
| 530-1b. | Page two of Floodville's activity worksheet for retrofitting (AW-531) | 530-14 |
| 530-3. | Retrofitting techniques | 530-15 |
| 540-1. | "No dumping" sign | 540-5 |
| 540-2. | Floodville's activity worksheet for drainage system maintenance (AW-540) | 540-11 |

501 The Repetitive Loss List

Each year, the Federal Emergency Management Agency (FEMA) produces a list of repetitive loss properties within each National Flood Insurance Program (NFIP) community. This list must be obtained through the FEMA Regional Office by any community considering applying for the CRS.

The community must review the list for accuracy, correct addresses, whether the properties are actually in the community's corporate limits, and whether the insured buildings have been removed, retrofitted, or otherwise protected from the cause of the repetitive flooding. The result of this review is a corrected repetitive loss list (which is recorded on AW-501, Repetitive Loss Corrections Worksheet).

A community with repetitive losses must submit AW-502, Repetitive Loss Areas, and either attach corrections to the list using the AW-501, or note that no corrections are necessary. Failure to submit this material will result in the application being returned.

Each year, FEMA produces a list of properties for which two or more claims of at least \$1,000 have been paid by the NFIP within any 10-year period since 1978 (e.g., two claims during the periods 1978-1987, 1979-1988, etc.). The list includes the property address, the dates of the claims, and, usually, the owner's name. It is printed on a form, AW-501, which can be ordered through the ISO/CRS Specialist or the FEMA Regional Office (see Appendix A) for any NFIP community. Before applying for the CRS, a community must obtain its latest repetitive loss list.

The community needs to make sure it has the latest list before it submits its application or modification to the CRS. It is the applicant community's responsibility to review the list for errors and updating. An error means that the property should not be on the community's list. This can be for one of two reasons:

- The property is not in the community. The property may be outside the community's corporate limits, it may be in another city, or it may have been annexed into another community. If the applicant can determine which community the property belongs in, it will be removed from the list.
- There is an error in the way claims or addresses were submitted to the NFIP.

Updating means that although the property is in the applicant community and it did suffer repetitive losses, it should not be considered a repetitive loss property for CRS purposes. This can be due to one of the following reasons:

- The property has subsequently been protected from the types of events that caused the losses. Buildings that have been acquired, relocated, retrofitted, or otherwise protected from frequent floods are not counted in determining the community's CRS requirements.

- The community can demonstrate that all of the repetitive losses were caused by events that have recurrence intervals of over 100 years (e.g., two 200-year storms).

Although it is hoped that the community will be able to locate all properties on the list and determine why they were flooded, it may be impossible to confirm every one. Errors and updating information are noted on the form, AW-501, for each property that the community was able to locate.

Activity worksheets AW-501 (Repetitive Loss Corrections) and AW-502 (Repetitive Loss Areas) are submitted with the community's CRS application. FEMA reviews the revisions submitted by the applicant. Errors are removed from the list. However, if a property is not in the community, it will not be removed from the list unless the applicant can identify what community the property belongs in. If the applicant knows the property is not in the community, but does not know what community it belongs in, it is treated as an update.

An update remains on the official list of properties that have suffered repetitive losses, but there is a notation that the property is not counted for CRS purposes. If a property cannot be located, as may be the case with a rural route address with no owner's name, it is treated as an update.

Each year, a new repetitive loss list is sent to each CRS community for informational purposes. It will reflect the community's corrections and any new properties that are added due to recent floods. Except as specified in Section 502.b, a community is not required under the CRS to respond to each year's new list. However, the list can be a valuable planning tool and source of information about the location and extent of flooding within the community.

502 Repetitive Loss Category

- a. For CRS purposes, there are three categories of repetitive loss communities based on the number of properties on the CORRECTED repetitive loss list (i.e., after the errors and updates have been reported and accepted by FEMA):
1. Category A: A community with no repetitive loss properties.
 2. Category B: A community with at least one (1), but less than ten (10) repetitive loss properties.
 3. Category C: A community with ten (10) or more repetitive loss properties.

Every community with one or more repetitive loss properties on FEMA's original list must submit the Repetitive Loss Areas activity worksheet, AW-502, if it wants a CRS class of 9 or better. Additional requirements depend on the community's repetitive loss category, which is determined by the number of repetitive loss properties AFTER the applicant has made corrections. Properties

that are identified as errors and updates are not counted when the repetitive loss category is determined.

- A Category A community has no special requirements except to submit information needed to correct the repetitive loss list.
- A Category B community must review and describe its repetitive loss problem and undertake an outreach project for the residents of the repetitive loss area. This is explained in Section 503. The outreach projects are submitted with each year's recertification.
- A Category C community must do the same things as a Category B community AND prepare a floodplain management plan for its repetitive loss areas. The plan requirements are explained in Activity 510 (Floodplain Management Planning).

b. A community's repetitive loss category may change over time as a result of flood damage reduction measures implemented by the community or as a result of floods that add new insurance losses to the FEMA list.

A CRS community has no immediate need to take action as a result of a change in its repetitive loss category except as follows:

1. When it applies for or modifies its application for Activity 510 (Floodplain Management Planning).
2. When it submits a modification that will result in an increase in its CRS classification by two or more classes.
3. When it is slated for a complete reverification of its program. Reverification visits are conducted five years after the original application year for Class 6-9 communities. Class 1-5 communities are reverified on a cycle of every three years.

The last two situations are explained in more detail in Sections 216 and 234. They require that a community submit activity worksheets and documentation for all of its activities, including Activity 510.

503 Repetitive Loss Area Outreach Project

[formerly Section 510]

Because repetitive flooding accounts for approximately 33% of all flood insurance claims payments, an outreach project is required for any community in repetitive loss category B or C. These communities must identify and describe their repetitive loss problem areas and initiate an outreach project to those areas.

In addition to the outreach project, a community in Category C must adopt a floodplain management plan for its repetitive loss areas. The plan must be submitted with the community's *CRS Application* under Activity 510 (Floodplain Management Planning).

IF A CATEGORY B OR C COMMUNITY FAILS TO SUPPLY A COPY OF EACH YEAR'S OUTREACH PROJECT WITH ITS RECERTIFICATION, OR IF A CATEGORY C COMMUNITY FAILS TO SUBMIT ITS ANNUAL FLOODPLAIN MANAGEMENT PLAN EVALUATION REPORT WITH ITS RECERTIFICATION, IT WILL REVERT TO A CRS CLASS 10.

Over 2.5 million buildings are insured by the National Flood Insurance Program (NFIP), but only a tiny fraction of them (less than 2%) account for 33% of the flood insurance claims paid since 1978. This is because these few properties have been flooded more than once, and some of them have been flooded numerous times. The outreach project is mandatory for repetitive loss communities because such a small number of properties has such a big impact on the NFIP. Communities with 10 or more such properties (i.e., Category C communities) must also prepare plans to address their repetitive loss problems.

Although there is no credit for the outreach project, every community with at least one repetitive loss property must undertake it to be eligible to participate in the CRS. Failure to include the items listed in this Section 503 with the *CRS Application* is cause for returning the entire application to the community.

A Category B or C community may be able to demonstrate that it has no repetitive loss properties. If so, the corrections must be noted on the worksheet, AW-501. If all of the properties can be removed from the list by correcting the errors and updating (see Section 501), then the community will be treated as a Category A community. In that case, it does not need to implement the items in this section.

In its *CRS Application*, a community with one or more property on the corrected FEMA list (i.e., a category B or C community) must submit AW-502 and:

- a. A map of its repetitive loss areas. The repetitive loss areas must include the properties on the repetitive loss list obtained from FEMA and adjacent properties with the same or similar flooding conditions.
- b. A description of the cause(s) of the repetitive flooding.

The community is expected to plot all of the properties to the best of its ability. In some cases, such as those in which the address consists of a rural route or box number, a property will be unplotable. All that is needed is for the general area of the property to be located, e.g., the 400 block of a street. The objective is to plot repetitive loss AREAS, that is, those areas with buildings that have been flooded two or more times over a 10-year period since 1978. The repetitive loss areas will include buildings (including uninsured ones) that were subject to the same flood as those on the FEMA list.

The description of the causes of the repetitive flooding should be brief and general. For example, it might include:

- The name of the stream and the recurrence interval of the flood, if known;
- Sewer backup or inadequate drainage system; or
- Similar descriptions of causes of flood damage.

Example 503-1. (See Figure 500-1.) Floodville received its repetitive loss list from the FEMA Regional Office. Thirteen properties were listed and the City Planner was able to plot the general location of each. Floodville is a Category C community. Figure 500-1 shows that the City has two repetitive loss areas.

Area #1: Five of the properties had been flooded by ice jam floods in the late 1970s and early 1980s. The City drew a repetitive loss area boundary around an area that has been flooded by Foster Creek ice jams almost every other year. One of the listed properties was purchased under FEMA's Section 1362 program a few years ago. The City's Foster Creek Park was expanded to the east to include the newly vacated lot. However, there are still 25 buildings remaining in Area #1 that have repeatedly been flooded.

Area #2: The other eight properties are in an area that has been flooded several times because of a railroad culvert that is too small. The culvert was properly sized when built 50 years ago, but new development upstream has increased runoff and recent storms have caused floods. The City had the area studied and is applying for credit for the study under Activity 410 (Additional Flood Data). A total of 22 buildings in Area #2 have been flooded.

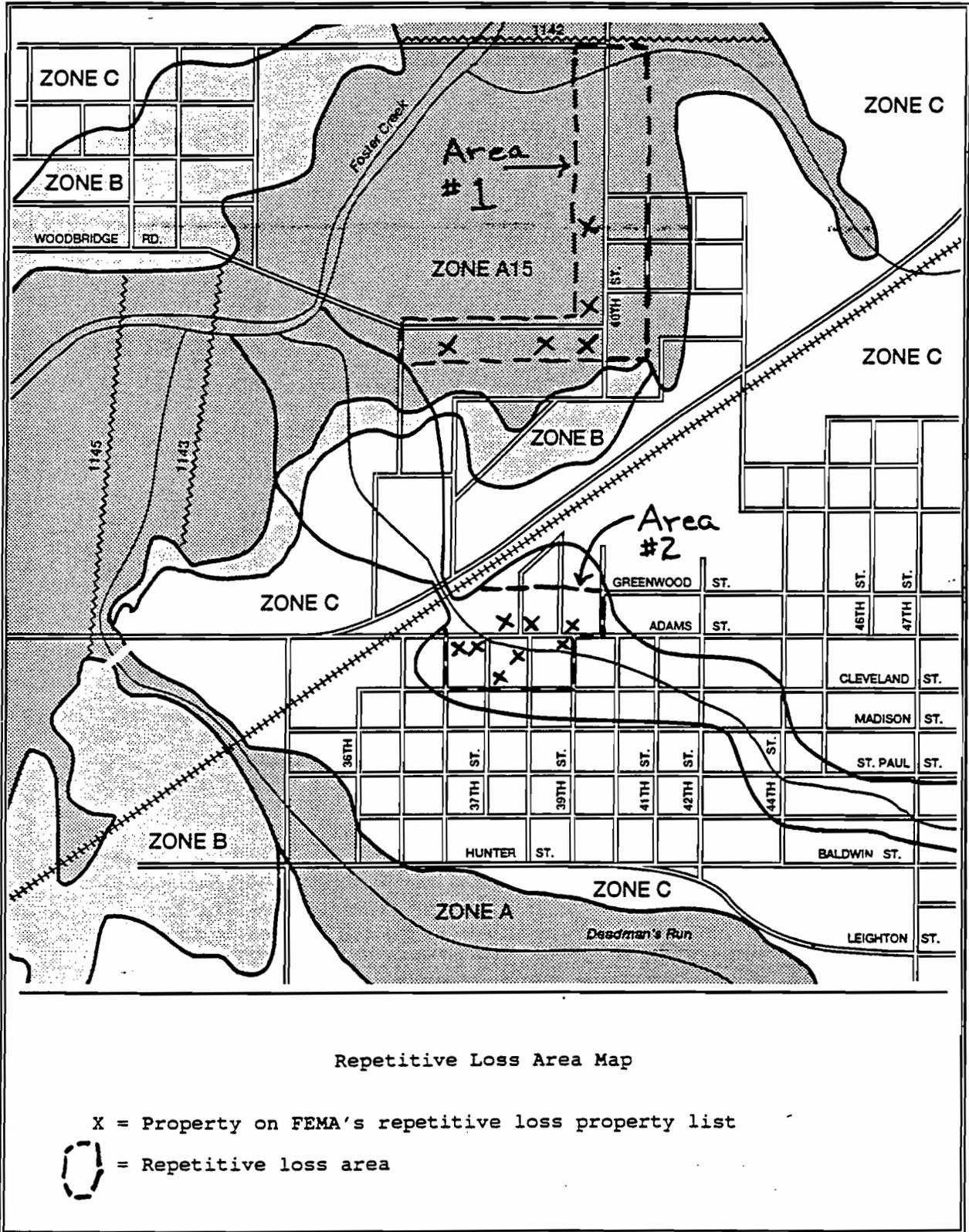


Figure 500-1. Floodville's repetitive loss area map.

- c. A category B or C community must implement an annual outreach project to the properties in the mapped repetitive loss areas and include a copy of the project with its application. The outreach project must advise the recipient that the property is subject to flooding and it must identify property protection measures appropriate for the flood situation.

The outreach project must be sent to all properties in the repetitive loss AREAS, not just the properties on the FEMA list.

- d. A category B or C community must include a copy of each year's outreach project with its annual recertification.

More information on outreach projects can be found in Activity 330 (Outreach Projects). In many cases, the community can combine this repetitive loss area outreach project with an outreach project credited under Activity 330.

An annual outreach project to floodplain properties (OPF) in Activity 330 (Outreach Projects) that reaches all properties in the repetitive loss areas can satisfy this requirement, provided that it covers the property protection topic as described in Section 331. The outreach project may also qualify for credit as an additional outreach project (OPA) under Activity 330.

504 Structural Flood Control Projects

The CRS does not provide credit points for structural flood control projects like channel improvements, reservoirs, levees, and other works. There are two reasons for this.

First, the National Flood Insurance Program (NFIP) was created to offer an alternative to structural projects. As stated in the National Flood Insurance Act, in Executive Order 11988, and in the "Unified National Program for Floodplain Management," the NFIP is one of several federal non-structural floodplain management programs. It is designed to support non-structural floodplain management efforts that do not have the environmental impact, high cost, or maintenance requirements of structural projects.

Second, the CRS is only one part of the classification system used to set flood insurance rates for a building. Before the CRS was initiated, rates were based on only four factors: the type of building, whether it was built pre- or post-FIRM, the flood insurance rate zone in which the building was located, and the elevation of the building in relation to the base flood level. Flood zone and elevation data are provided with the Flood Insurance Rate Map (FIRM).

Rates are lower for buildings in FIRM Zones B, C, and X (i.e., not located in Special Flood Hazard Areas). Rates are also lower in A and V Zones for buildings that are elevated above the base flood level. A community or property owner can lower flood insurance rates by moving

the building out of the floodplain, elevating it above the base flood, or building a structural flood control project.

A structural project usually will either keep flood waters from reaching a building or lower the levels that affect the building. If the project alters the base flood, FEMA will amend the FIRM. A building that was rated as being in an A or V Zone and below the base flood elevation will be rerated after the FIRM is amended. The new rates will be much lower, as the following example shows.

Example 504-1. For a one-story, pre-FIRM house (without a basement) in an A or AE Zone, the flood insurance rates are \$.55 per \$100 for the first \$50,000 of coverage on the building and \$.18 for the rest of the coverage.

If a flood control project lowers the base flood and the owner obtains an elevation certificate that shows that the lowest floor is now at the base flood level, the owner can receive post-FIRM actuarial rates. The same building will have the following rates: \$.36 and \$.07.

If the project lowers the base flood so the lowest floor is now 1 foot above the base flood level, the building will have the following rates: \$.23 and \$.07.

If the project keeps the base floodplain from reaching the building's lot, the building will be rated for C Zones: \$.28 and \$.08 and federal law will no longer require the owner to buy flood insurance.

In other words, a one-story house protected by a flood control project will have its rates lowered by from 35% to 60%. For this type of building, construction of a flood control project that affects the base flood is equivalent to a CRS Class 3 or better.

The CRS therefore does not duplicate the much better rate credits that structural flood control projects provide through the rating mechanism. To receive this rate reduction, the project must alter the flow of the base flood enough to result in a FIRM revision.

500 REPETITIVE LOSS AREASCommunity: Floodville**501. Repetitive Loss List**

We have reviewed the repetitive loss list for our community, dated March 1, 1996, and

Attached are corrected Repetitive Loss Correction Worksheets, AW-501 OR

We have no corrections to FEMA's repetitive loss list.

502 Repetitive Loss Category

Our corrected repetitive loss list has 13 properties counted for CRS purposes. This community is a

Category A community because we have removed all properties from being counted as repetitive loss properties for CRS purposes;

Category B community with 1 to 9 properties counted for CRS purposes; OR

Category C community with 10 or more properties counted for CRS purposes.

NOTE: ALL CATEGORY B AND C REPETITIVE LOSS COMMUNITIES MUST COMPLETE THE FOLLOWING SECTION 503 AND SUBMIT THE ACCOMPANYING DOCUMENTATION. CATEGORY C COMMUNITIES MUST ALSO RECEIVE CREDIT FOR A FLOODPLAIN MANAGEMENT PLAN UNDER ACTIVITY 510 (FLOODPLAIN MANAGEMENT PLANNING). A CATEGORY C COMMUNITY WILL REVERT TO CLASS 10 IF IT FAILS TO SUBMIT A PLAN.

503 Repetitive Loss Area Outreach Project

The following documentation is attached to this worksheet:

a. A map with the repetitive loss areas identified.

b. A description of the causes of the repetitive flooding.

c. Our outreach project to properties in the repetitive loss areas. Either:

A copy of the notice to be sent to property owners in the repetitive loss areas each year, OR

Our annual outreach project to floodplain properties (OPF), which covers the topic of property protection. It is included with our application for Activity 330.

We will submit the following with our annual CRS recertification:

d. A copy of that year's outreach project to repetitive loss areas.

Activity Worksheet

AW-502

Edition: July 1996

Figure 500-2. Floodville's activity worksheet for repetitive loss areas (AW-502).

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510 FLOODPLAIN MANAGEMENT PLANNING

Summary of Section 510

Credit is provided for preparing, adopting, implementing, evaluating, and updating a comprehensive floodplain management plan. The Community Rating System (CRS) does not specify what must be in a plan, but it only credits plans that have been prepared and kept updated according to the standard planning process explained in Section 511.

511 Credit Points. Up to 210 points are provided if the floodplain management plan (FMP) was developed using the following standard planning process. There must be some credit for each step.

| <u>Subsection</u> | <u>Step</u> | <u>Max points</u> |
|-------------------|---------------------------------|-------------------|
| a. | Organize to prepare the plan | 10 |
| b. | Involve the public | 48 |
| c. | Coordinate with other agencies | 18 |
| d. | Assess the hazard | 10 |
| e. | Assess the problem | 30 |
| f. | Set goals | 2 |
| g. | Review possible activities | 30 |
| h. | Draft an action plan | 50 |
| i. | Adopt the plan | 2 |
| j. | Implement, evaluate, and revise | 10 |

512 Impact Adjustment.

- a. Under Option 1, if the plan covers all of the community's known flood hazard areas, the impact adjustment ratio is 1.0.
- b. Under Option 2, if the plan covers all of the community's repetitive loss areas or at least 25% of its known flood hazard areas, the impact adjustment ratio is 0.25.

512 Credit Calculation.

The credit for the floodplain management plan (FMP) is the total of the credit points for the elements in Subsections 511.a-j. If the credit for any one of the 10 elements is 0, then $FMP = 0$. The credit for this activity is FMP multiplied times the impact adjustment ratio.

513 Credit Documentation. The community must submit the following.

- a. A copy of the floodplain management plan with the credited elements noted in the margin or explained in an attached memo.
- b. A copy of the notice(s) advising floodplain residents about the public meeting(s).
- c. Documentation showing that the plan has been adopted by the community's governing body.
The community must submit the following with its annual CRS recertification.
- d. An annual evaluation report on progress toward implementing the plan's objectives.

514 For More Information. A free CRS publication, *Example Plans*, provides more information and examples on this activity.

510 FLOODPLAIN MANAGEMENT PLANNING

*NOTE: A separate publication, **Example Plans**, has a detailed discussion of the requirements of this section, -as well as model plans and application documentation. Communities are encouraged to obtain and read this document before applying for this activity. It will improve the quality of the submittal and reduce the need to provide additional documentation later. To order a free copy, see Appendix E.*

Programs that are based on a comprehensive floodplain management plan address all the community's flood problems more effectively. Therefore, the Community Rating System (CRS) provides credit for preparing, adopting, implementing, evaluating, and updating a comprehensive floodplain management plan. The CRS does not specify what activities a plan must recommend, but it only credits plans that have been prepared according to the standard planning process explained in Section 511.

A Category C repetitive loss community **MUST** prepare a floodplain management plan that covers at least all of its repetitive loss areas.

Floodplain management planning that covers all of a community's known flood hazards is encouraged. However, if the planning is for less than all flood problems (e.g., just the repetitive loss areas), the credit points are reduced by using the impact adjustment (see Sections 512 and 513).

In order to maintain the credit for this activity, the community must annually evaluate progress toward implementing the plan and submit an evaluation report with its annual CRS recertification.

Because each community is different, each floodplain management planning effort will be different. The objective of this credit is to ensure that a process was followed that selected the best measures for the community and its flood hazard. Therefore, the key elements for crediting a floodplain management plan focus on the process used to prepare it. A plan by another name, such as a post-flood hazard mitigation plan, could receive this credit if it was prepared in accordance with the process explained in Section 511.

Planning is a comprehensive "future-oriented" approach that determines how a community will deal with its flooding problem(s) and protect the natural and beneficial functions of its floodplain. Planning guides the community through its flooding problem(s) by reviewing options for solving the problem(s) and identifying the most appropriate solutions.

An ordinance is not a plan. An ordinance sets standards for land development and other activities. Planning may include a review of land development standards and procedures, but it should also cover a much broader range of activities as noted in Figure 510-1.

The floodplain management plan must have been developed using a standard, step-by-step, planning process. To receive credit for a floodplain management plan, the community's process must include each of 10 steps that are explained Section 511:

| <u>Subsection</u> | <u>Step</u> | <u>Max points</u> |
|-------------------|---------------------------------|-------------------|
| a. | Organize to prepare the plan | 10 |
| b. | Involve the public | 48 |
| c. | Coordinate with other agencies | 18 |
| d. | Assess the hazard | 10 |
| e. | Assess the problem | 30 |
| f. | Set goals | 2 |
| g. | Review possible activities | 30 |
| h. | Draft an action plan | 50 |
| i. | Adopt the plan | 2 |
| j. | Implement, evaluate, and revise | <u>10</u> |
| | Total | 210 |

The plan does not need to be organized according to these 10 steps. However, the community must submit the plan with its submittal for credit and identify where these steps were covered. Steps d, e, f, g, and h must appear in the plan document. The other five steps can be in the plan document or they may be explained in a separate memo. The location of each step that is covered in the plan document must be clearly marked.

511 Credit Points

Maximum credit for floodplain management planning: 210 points

The floodplain management plan must have been developed using the standard planning process as presented in steps a-j. TO RECEIVE CREDIT UNDER THIS ACTIVITY, THE PLANNING PROCESS MUST RECEIVE SOME CREDIT FOR EACH OF THE FOLLOWING 10 STEPS, a-j.

Floodplain management planning (FMP) = the total of the following points credited for each of the steps, a-j.

a. Organize to prepare the plan (Maximum credit: 10 points). The credit for this step is the total of the following points, which are based on how the community organizes to prepare its floodplain management plan:

1. 2, if the planning process is under the supervision or direction of a professional planner;

2. 6, if the planning process is conducted through a committee composed of staff from those community departments that will be implementing the majority of the plan's recommendations;
3. 2, if the planning process and/or the committee are formally created or recognized by action of the community's governing board.

The plan itself or a separate explanation needs to document how the community organized to prepare the plan. If the planning committee includes representatives from the public, more credit is provided in the next step.

A "professional planner" may be a community employee, consultant, or an advisor from a state agency or regional planning agency. He or she does not have to be a member of the American Institute of Certified Planners (AICP). Someone with an urban planning degree or someone with land use planning, community planning, or urban renewal experience may be a professional planner. However, the CRS will not recognize a building official, engineer, or other non-planner acting alone as a professional planner.

A planning committee is strongly recommended. By involving those who will be most affected by the planning, the community will get a more realistic product that will have a much better chance of being adopted and implemented. Community departments that should be represented on the committee include:

- Building department/code enforcement
- Land use planning/zoning
- Emergency management/public safety
- Environmental protection/public health
- Engineering
- Public works
- Public information
- Parks/recreation

Two points are provided if the community's governing board (e.g., the city council) formally recognizes the planning process. This can be a motion that is reflected in the minutes. However, a preferred method is a formal resolution that designates who is responsible for preparing the plan and specifies a completion deadline. If a committee with representatives from the public is used, the resolution should identify the members, who acts as chair, and how staff support is provided.

- b. Involve the public (Maximum credit: 48 points). The term "public" includes residents, businesses, property owners, and tenants in the floodplain and other known flood hazard areas. The credit for this step is the total of the following points based on how the community involves the public during the planning process. To receive credit for this step, the process must include Item 1.

1. 2, for at least one meeting to obtain public input on the draft plan held at the end of the planning process at least two weeks before submittal of the recommended plan to the community's governing body.
2. 8, if one or more public meetings are held in the affected area(s) at the beginning of the planning process to obtain public input on flood problems and possible solutions.
3. 4, if public information activities are implemented to explain the planning process and encourage input to the planner or planning committee.
4. 4, if questionnaires are distributed asking the public for information on their flood problems and possible solutions. The questionnaires must be distributed to at least 90% of the floodplain residents.
5. 4, if written comments and recommendations are solicited from neighborhood advisory groups, homeowners' associations, parent-teacher organizations, the Chamber of Commerce, or similar organizations that represent the public in the affected area(s).
6. 26, if the planning process is conducted through a planning committee that includes members of the public. If this is the same planning committee credited under 511.a.2 and 3, at least one half of the members must be representatives of the public, preferably from the floodprone areas. The committee must hold a sufficient number of meetings that involve the members in planning steps 241.d, e, f, g, and h (e.g., at least one meeting on each step).

The term "public" includes floodplain residents, business owners, managers of critical facilities, farmers, landowners, and developers. The community may want to include owners of land outside the floodplain because their activities impact flooding downstream, particularly in smaller watersheds.

The credit points show the importance of involving the public in the planning process, especially as members of the planning committee. The highest number of points for this activity are provided for having a planning committee responsible for floodplain management planning. At least half of its members must be from the public (e.g., residents, businesses, property owners, and tenants in the known flood hazard areas). The rest should be staff from the local government and organizations that will likely be responsible for implementing the plan.

The large number of points provided is because a citizens' planning committee has the following advantages:

- The participants recognize that they are involved and will be more willing to commit themselves to the process.

- The participants can do some of the work, especially data gathering, thereby reducing the overall cost.
- A committee can be an effective forum for discussing alternatives, debating goals and objectives, and matching the technical requirements of a program to the local situation.
- It gives the participants a feeling of "ownership" of the plan and its recommendations, which helps build public support for it.
- Committee members form a constituency that will have a stake in ensuring that the plan is implemented.

No credit is provided if the committee only meets once or twice. It must meet a sufficient number of times to involve the members in the following key steps of the planning process (e.g., at least one meeting on each step):

- d. Assess the hazard
- e. Assess the problem
- f. Set goals
- g. Review possible activities
- h. Draft an action plan

A questionnaire is credited if it is distributed to at least 90% of the floodplain residents. For example, it could be included as a page in a newsletter or other outreach project, such as those credited under Activity 330 (Outreach Projects). If the plan covers only the repetitive loss areas, it could go to at least 90% of the residents of those areas.

If the community holds the meetings credited under items b.1 or b.2, it must attempt to notify floodplain residents of the meetings and explain the planning process in the notification. The notices of the meetings should be in the form of letters to floodplain residents, a notice sent to all residents, or a newspaper article or advertisement. An inconspicuous legal notice appearing in the classified section of the newspaper is not sufficient for CRS credit. If very few residents are affected, as may be the case for a plan that addresses only a repetitive loss area, a written record that the residents were called would be sufficient documentation.

Simply discussing the plan at a regular public meeting of the governing body, just before it is voted on, is not sufficient public input for CRS credit. The CRS does not require public hearings. To receive credit for planning, there must be at least one public meeting at the end of the planning process where the proposals are explained and people can ask questions and submit their comments. State and local laws take precedence, however. The community's legal counsel should determine if a public hearing is required.

- c. Coordinate with other agencies (Maximum credit: 18 points) Other agencies must be contacted to see if they are doing anything that may affect the community's program and to see if they could support the community's efforts. "Other agencies" include neighboring communities and local, regional, state, and federal agencies that implement floodplain management activities.

The credit for this step is the total of the following points. To receive credit for this step, the coordination must include item 4.

1. 3, if the other agencies are contacted at the beginning of the planning process and asked for their input.
2. 10, if meetings are held with representatives of agencies to review common problems, development policies, mitigation strategies, inconsistencies and conflicts in policies, plans, programs, and regulations.
3. 3, if the planning includes a review of the community's needs, goals, and plans for the area.
4. 2, for sending the draft action plan to the other agencies and asking them to comment by a certain date.

This step mirrors step 2, which encourages the planner and the planning committee to communicate and coordinate with the public and with private organizations.

Examples of local and regional agencies that should be contacted include regional flood or sanitary districts, levee districts, county flood control authorities, the soil and water conservation district, and park districts. The State National Flood Insurance Program (NFIP) Coordinator and the state and Federal Emergency Management Agency (FEMA) regional mitigation officers should be able to identify state and federal agencies that may be conducting activities, such as construction projects and regulatory programs, that could affect or should be coordinated with the community's planning.

To receive credit for this step, item 4 must be implemented. For item 2, the meetings need only be held with those agencies that have the most impact on the community's flood problem. Some agencies may be so important that their representatives may be invited to sit on the planning committee.

The community's needs and goals should already be identified as part of previous comprehensive planning activities. If not, they should be identified to ensure that the plan's recommendations will be coordinated with other community activities. Community development and floodplain management goals may be mutually supportive or they may conflict.

For example, if the community wants more recreational opportunities, clearing out the floodplain to provide a scenic waterfront park may be most appropriate. Conversely, if the floodplain includes the downtown and local officials are solidly behind economic development, the plan should probably recommend measures other than removing the community's economic base.

- d. Assess the hazard (Maximum credit: 10 points). The credit for this step is the total of the following points based on what the community includes in its assessment of the hazard. To receive credit for this step, the assessment must include item 1.
1. 5, for including the following in the plan:
 - a. a map of the known flood hazards. "Known flood hazards" means the floodplain shown on the Flood Insurance Rate Map (FIRM), repetitive loss areas, areas not mapped on the FIRM that have flooded in the past, and surface flooding identified in existing studies. No new studies need to be conducted for this assessment.
 - b. a description of the known flood hazards, including source of water, depth of flooding, velocities, and warning time, where such data are available.
 - c. a discussion of past floods, where such data are available.
 2. 5, if the plan includes a map and description of other natural hazards, such as erosion, tsunamis, earthquakes, and hurricanes.

This step involves gathering and reviewing existing flood studies, including the Flood Insurance Study, drainage problem studies, and SLOSH and SPLASH models that identify areas inundated during hurricanes. For CRS credit, the community does not need to conduct studies to develop new flood data.

Agencies that should be contacted include the U.S. Army Corps of Engineers, the Natural Resources Conservation Service, the Bureau of Reclamation, the Tennessee Valley Authority, the National Weather Service, and state and regional planning, flood, and water resources management agencies. Some of these agencies may also be able to provide assistance in preparing the plan. State and county emergency management agencies should have information on other natural hazards.

The hazard assessment needs to describe the local flood hazard and not be a broad or generic discussion of flooding in general. Because the most important readers are elected officials and floodplain residents, the descriptions of the hazards should be in lay terms.

The community's planning may address only some of its floodplain, such as a problem stream, a lakeshore, or a repetitive loss area. This step will be credited if items d.1.a, b, and c are included in the hazard assessment for that area. The impact adjustment in Section 512.b will adjust the credit points to reflect that not all of the community's flood problems are covered in the plan.

- e. Assess the problem (Maximum credit: 30 points) The credit for this step is the total of the following points based on what is included in the assessment of the impact of flooding on the community. To receive credit for this step, the assessment must include item 1.
1. 2, for including the number and types of buildings subject to the hazards identified in the hazard assessment (Section 511.d);
 2. 6, if the plan includes a description of the impact that past or predicted flooding has on buildings, infrastructure, public health and safety;
 3. 3, if the plan describes the need and procedures for warning and evacuating residents and visitors;
 4. 4, if the plan identifies critical facilities, such as hospitals, fire stations, and chemical storage companies;
 5. 4, if the plan describes areas that provide natural and beneficial functions, such as wetlands, riparian areas, sensitive areas, and habitat for rare or endangered species;
 6. 5, if the plan includes a description of development, redevelopment, and population trends and a discussion of what the future brings for development and redevelopment in the floodplain, the watershed, and natural resource areas; and
 7. 6, if the plan includes a summary of the impact of flooding on the community and its economy and tax base.

The previous step assessed the flood hazard. A flood hazard area may or may not have flood problems. Flooding is viewed as a natural occurrence. A floodplain is only a problem if human development gets in the way of the natural flooding. In this step, the community planners or planning committee members collect and summarize data on what is at risk from flooding. An inventory is needed to ensure that all problem areas are addressed by the plan.

For CRS credit, the inventory must include how many and what types of buildings are affected (e.g., residential, commercial, industrial, with or without basements, etc.). In smaller communities, exact counts can be made using aerial photos or windshield surveys. In larger communities, these numbers will likely be approximates.

Data on building damage usually can be obtained from post-flood damage assessment reports, flood insurance claims or disaster assistance data, and flood control studies. Emergency management offices and FEMA may be able to help locate such data. See Section 130 for the definition of "critical facilities" used for CRS purposes.

Emergency management plans may have information on the impact of flooding on public safety and health. A review of past floods would show if there have been illnesses caused by the water or debris after the flood. A map that shows critical facilities can identify health and safety problems caused by flooding, such as when the wastewater treatment plant is flooded. "Life threatening flood hazards" include situations such as barrier islands, flash flooding in mountain valleys, and tsunamis where the flood hazard is high and warning time or evacuation routes may be insufficient.

Along with flood protection, comprehensive floodplain management planning should review the unique natural features, natural areas, and other environmental and aesthetic attributes that may be present in the floodplain. Protecting and preserving these natural and beneficial floodplain functions yield flood protection benefits and also help integrate floodplain management efforts with other community goals and objectives.

- f. Set goals (Maximum credit: 2 points). The two credit points for this step are provided if the plan includes a statement of the goals of the community's floodplain management program.

The planning committee may need several meetings to work out goals statements to which everyone can agree. The goals should set the context for the subsequent review of floodplain management activities and drafting of the action plan. They should incorporate or be consistent with other community goals for the affected areas.

Goals statements do not have to state how the goals will be attained, but they should address the priority flood problems as identified in the previous step. For example, a goal could state "protect buildings from flood damage" rather than "stop the flooding" or "remove the buildings from the floodplain."

Example 511.f.

The following are some example goals statements for Floodville:

- Protect the buildings in repetitive loss area #1 (Woodbridge Road and 40th Street) and repetitive loss area #2 (Adams and Cleveland Streets) from flood damage.
- Protect the Foster Creek bottomlands from development that will disturb habitats.
- Expand Foster Creek Park to provide more recreational facilities to serve the growing north side of the City.
- Prevent new development in the watershed from increasing runoff and resulting increases in flood flows into the City.
- Ensure that residents are given adequate warning of ice jam floods.

- g. Review possible activities (Maximum credit: 30 points) The plan must describe those activities that were considered and note why they were or were not recommended. If an activity is currently being implemented, the plan must note whether it should be modified. The discussion of each activity needs to be detailed enough to be useful to the lay reader.

The credit for this step is the total of the following points based on which floodplain management activities are reviewed in the plan.

1. 5, if the plan reviews preventive activities, such as floodplain and stormwater management regulations and preservation of open space;
2. 5, if the plan reviews property protection activities, such as acquisition, floodproofing, and flood insurance;
3. 5, if the plan reviews activities to protect the natural and beneficial functions of the floodplain, such as wetlands protection;
4. 5, if the plan reviews emergency services activities, such as flood warning and sandbagging;
5. 5, if the plan reviews structural projects, such as reservoirs and channel modifications; and
6. 5, if the plan reviews public information activities, such as outreach projects and environmental education programs.

The objective of this step is to ensure that all possible measures are explored, not just the traditional approaches of flood control, acquisition, and regulation of land use. Figure 510-1 provides a list of some of the types of activities that could be reviewed under each of the six categories. More information on the activities is provided in *Example Plans*.

The range of activities should be evaluated for each site or area affected. While some of them may be quickly eliminated as inappropriate, most deserve careful consideration, especially to ensure full understanding of their costs and benefits. Questions about technical aspects or agency programs can be handled during coordination with other agencies and organizations (see Section 511.c).

The community should strive for a balanced program, selecting measures from more than one category of floodplain management activity. In every case, the community should implement preventive activities to keep its flood problems from getting worse.

- h. Draft an action plan (Maximum credit: 50 points). The action plan specifies those activities appropriate to the community's resources, flood hazard, and vulnerable properties. For each recommendation, the action plan must identify who does what, when it will be done, and how it will be financed.

The credit for this step is based on what is included in the action plan. Credit is provided for a recommendation on floodplain regulations, provided it recommends a regulatory standard that exceeds the minimum requirements of the NFIP.

1. 10, if the action plan includes recommendations for activities from two of the six categories credited in step 511.g, Review possible activities.
2. 20, if the action plan includes recommendations for activities from three of the six categories credited in step 511.g, Review possible activities.
3. 30, if the action plan includes recommendations for activities from four of the six categories credited in step 511.g, Review possible activities.
4. 40, if the action plan includes recommendations for activities from five of the six categories credited in step 511.g, Review possible activities.
5. 10 additional points are provided if the action plan establishes post-disaster mitigation policies and procedures.

The first consideration in the selection of recommended activities is to ensure that the measures are technically appropriate for the hazard threat. The measures should be appropriate for community development trends, needs and goals. The action plan needs to be affordable, implementable, and permitted by local, state, and federal regulations. Where possible, each measure should have objectives that are easy to measure when accomplished.

1. **Preventive** activities keep flood problems from getting worse. The use and development of floodprone areas is limited through planning, land acquisition, or regulation. They are usually administered by building, zoning, planning, and/or code enforcement offices.
 - Planning and zoning
 - Open space preservation
 - Floodplain regulations
 - Stormwater management
 - Drainage system maintenance
 - Dune and beach maintenance
2. **Property protection** activities are usually undertaken by property owners on a building-by-building or parcel basis. They include:
 - Relocation
 - Acquisition
 - Building elevation
 - Floodproofing
 - Sewer backup protection
 - Insurance
3. **Natural resource protection** activities preserve or restore natural areas or the natural functions of floodplain and watershed areas. They are usually implemented by parks, recreation, or conservation agencies or organizations.
 - Wetlands protection
 - Erosion and sediment control
 - Best management practices
4. **Emergency services** measures are taken during a flood to minimize its impact. These measures are the responsibility of city or county emergency management staff and the owners or operators of major or critical facilities.
 - Flood warning
 - Flood response
 - Critical facilities protection
 - Health and safety maintenance
5. **Structural projects** keep floodwaters away from an area with a levee, reservoir, or other flood control measure. They are usually designed by engineers and managed or maintained by public works staff.
 - Reservoirs
 - Levees/floodwalls/seawalls
 - Diversions
 - Channel modifications
 - Beach nourishment
 - Storm sewers
6. **Public information** activities advise property owners, potential property owners, and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of local floodplains. They are usually implemented by a public information office.
 - Map information
 - Outreach projects
 - Real estate disclosure
 - Library
 - Technical assistance
 - Environmental education

Figure 510-1. Floodplain Management Activities.

There is no requirement that a floodplain management plan identify expensive or massive structural flood control projects. The plan should recommend only those activities that the community can be assured will be implemented, either through its own resources or confirmed outside support. Many of the activities could receive CRS credit once they are implemented.

Post-disaster policies should account for the expected damage from a base flood or other disaster. For example, the action plan should identify the areas likely to be worst hit and the policies should determine whether they will be rebuilt if substantially damaged. Post-disaster mitigation procedures should assign responsibilities for public information, code enforcement, planning, and other efforts that encourage, mandate, and/or fund flood loss reduction activities.

Example 511.g.

1. The Planning Commission will review amendments to the floodplain regulation ordinance to prohibit new buildings, filling, or other land disturbance in the Foster Creek bottomlands.

Action: Report recommended ordinance language to the City Council by March 1995.

Budget: staff time (operating funds).

2. The City Engineer will draft a comprehensive stormwater management plan for the ditch draining the southeast part of town to identify the best locations for stormwater facilities and set retention standards for new developments.

Action: Complete the first draft by September 1995.

Budget: staff time (operating funds).

3. The City Engineer will prepare a cost estimate for enlarging the culvert under the railroad tracks to accommodate the base flood. The estimate will include a study of the impact of increased flows on downstream properties, channel banks and habitat.

Action: Complete the study by January 1996.

Budget: staff time (operating funds).

4. The Public Information Officer will distribute a flood hazard notice to each resident of the Special Flood Hazard Area (SFHA) each year. It will include the warning procedures for ice jam flooding and what to do when warnings are issued.

Action: Have the notices in the mail by the beginning of winter each year.

Budget: staff time (operating funds).

5. Six properties in repetitive loss area #1 on the west side of 40th Street, should be purchased. The sites should be cleared and added to Foster Creek Park.

Action: The City Planning Office will apply for funding from FEMA's Flood Mitigation Assistance Program by August 1996.

Budget: staff time (operating funds).

Action: The Park District will acquire the properties by August 1997.

Budget: Flood Mitigation Assistance Program.

Action: Clear the properties and restore them to approximate a natural state by August 1998.

Budget: Park District capital improvement budget.

- i. Adopt the plan (Maximum credit: 2 points) The 2 credit points for this step are provided if the plan and later amendments are officially adopted by the community's governing body.

The plan must be an official plan of the community, not an internal staff proposal. State and regional plans are not adequate unless they specifically address the community's flood hazards and the community's governing body adopted the plan.

- j. Implement, evaluate, and revise (Maximum credit: 10 points) The credit for this step is the total of the following points based on how the community monitors and evaluates its plan.

1. 2, if the community has procedures for monitoring implementation, reviewing progress, and recommending revisions to the plan in an annual evaluation report. The report must be submitted to the governing body, released to the media and made available to the public.
2. 8, if the evaluation report is prepared by the same planning committee that prepared the plan.

To maintain this credit, the community must submit a copy of its annual evaluation report with its recertification each year.

To be useful, planning must be dynamic. It should not sit on a shelf gathering dust once it is completed. Therefore, the community must have an evaluation and update process.

No plan is perfect. As implementation proceeds, flaws will be discovered and changes will be needed. Not only can hazard conditions change but also goals and objectives may change. If a community is hit by a tornado, the planning may be changed to focus attention on the newly damaged areas in the SFHA. Many communities have periodic meetings of the planning committee to review progress to date and recommend changes to the projects for the next year.

Those involved in developing and implementing the plan should meet periodically to review progress toward the objectives and identify changes or revisions that should be made. This is usually done monthly or quarterly, but must be done at least annually to facilitate preparation of the annual evaluation report.

FAILURE TO SUBMIT THE EVALUATION REPORT WITH THE ANNUAL RECERTIFICATION WILL RESULT IN LOSS OF THE PLANNING CREDIT (I.E., FMP = 0). LOSS OF CREDIT FOR THIS ACTIVITY WILL CAUSE A REPETITIVE LOSS CATEGORY C COMMUNITY TO REVERT TO A CLASS 10.

Changes should be made in the action plan when opportunities arise to add new activities or complete some items ahead of schedule. The plan should also be revised if it is found that some activities cannot be completed on the original timetable. The revisions must be adopted by the governing body as required under Section 511.i.

512 Impact Adjustment

a. Option 1:

rFMP = 1.0 if the planning covers all of the community's known flood hazard areas.

b. Option 2:

rFMP = 0.25 if the planning covers either:

1. all of the community's repetitive loss areas or
2. less than all, but at least 25% of, the community's known flood hazard areas.

Option 1 can only be used if the planning covers all of the community's known flood hazard areas. "Known flood hazards" means the SFHA shown on the FIRM, repetitive loss areas, areas not mapped on the FIRM that have flooded in the past, and surface flooding identified in existing studies (see Section 511.d).

If the planning covers all repetitive loss areas, then a default impact adjustment ratio of 0.25 may be used. This option can also be used if the community's planning effort addressed only one or two watersheds, which cover at least 25% of all of the community's known flood problems.

Example 512.c-1. Floodville's planning covers all of the SFHA and other areas of known flood hazard. The City chooses option 1 and rFMP = 1.0.

Example 512.c-2. Gulf Beach County has many flood hazard areas and the staff is unable to prepare a plan that addresses all of them. The County has prepared a floodplain management plan that addresses all three of its repetitive loss areas. These areas represent approximately 10% of all of the buildings in the County's SFHA. The County chooses Option 2 and rFMP = 0.25.

513 Credit Calculation

- a. FMP = the total of the credit points for the 10 steps in Subsections 511.a-j. If the credit for any one of the 10 steps is 0, then FMP = 0.
- b. $c510 = FMP \times rFMP$

Example 513.

Floodville's plan was prepared using the following process:

| | <u>Item Score</u> | <u>Step Total</u> |
|---|-------------------------------|------------------------|
| a. Organize to prepare the plan: The plan was prepared by the City Planner with help from a committee with representatives from other departments. | 2 6 | 8 |
| b. Involve the public Questionnaires were sent to residents with one of the City's annual outreach projects. A public meeting was held to review the draft. | 4 2 | 6 |
| c. Coordinate with other agencies Letters were sent to other agencies asking for input. Meetings were held with key agencies. The planner reviewed the community's needs, goals and plans for the area. The draft action plan was sent to other agencies. | 3 10 3 2 | 18 |
| d. Assess the hazard The plan includes a map and description of the flooding in the SFHA and the newly mapped area. | 5 | 5 |

| | <u>Item Score</u> | <u>Step Total</u> |
|--|-----------------------|-----------------------|
| e. Assess the problem | | |
| The plan discusses the numbers and types of buildings. | 2 | |
| The plan discusses the impact of past floods. | 4 | |
| The plan describes the critical facilities. | 4 | 10 |
| f. Set goals | 2 | 2 |
| g. Review possible activities | | |
| The plan reviews preventive activities. | 5 | |
| The plan reviews property protection activities. | 5 | |
| The plan reviews public information activities. | 5 | 15 |
| h. Draft an action plan | | |
| The action plan recommends preventive, property protection, and public information activities. | 20 | 20 |
| i. Adopt the plan | 2 | 2 |
| j. Implement, evaluate, and revise | | |
| The staff has prepared procedures for the annual evaluation. | 2 | 2 |
| Total points, FMP = | | 88 |

$$c510 = FMP \times rFMP = 88 \times 1.0 = 88$$

514 Credit Documentation

If the community already has a floodplain management or similar plan, it need not prepare a new one just for this CRS credit.

The community must submit the following:

- a. A copy of the floodplain management plan. A description of the process used to develop the plan must be included, either as part of the plan or attached to it. The documentation submitted must be marked in the margins to show where the 10 credited steps appear. While some of the steps can be explained in a separate memo, the following must appear in the plan document:

- 511.d. the hazard assessment
- 511.e. the problem assessment
- 511.f. goals of the floodplain management program
- 511.g. the review of possible activities
- 511.h. the action plan

It must be relatively easy for the ISO/CRS Specialist to review the plan. Therefore, THE ADDITIONAL INFORMATION ABOUT THE PLANNING PROCESS NEEDS TO BE INCLUDED.

- b. A copy of the notice(s) advising floodplain residents about the meeting(s) held pursuant to Step b, Section 511.b.

The notice of the public input meeting(s) should be in the form of letters to floodplain residents, a notice sent to all residents, or a newspaper article or advertisement. An inconspicuous legal notice appearing in the classified section of the newspaper will not be sufficient for CRS credit. If very few residents are affected, as may be the case for planning that addresses only a repetitive loss area, a written record that the residents were called would be sufficient documentation.

- c. Documentation showing that the plan has been adopted by the community's governing body.

Normally a plan is adopted by a formal resolution of the city council, county board, or other governing body. A copy of the resolution or a copy of the minutes for the meeting are appropriate documentation to show that the plan was officially adopted.

The community must submit the following documentation with its annual CRS recertification (see Section 214):

- d. An annual report on evaluating progress toward implementing the action plan's objectives. The evaluation report must be submitted as part of the community's annual recertification.
1. If the community uses Option 1 for the impact adjustment ratio rFMP (see Section 512), the report must include the following:
 - (a) How the reader can obtain a copy of the original plan;
 - (b) A review of each recommendation in the action plan, including a statement on how much was accomplished during the previous year;
 - (c) A discussion of why any objectives were not reached or why implementation is behind schedule; and
 - (d) Recommendations for new projects or revised objectives.
 2. If the community uses Option 2 for the impact adjustment ratio rFMP, it may provide the documentation in Section 514.d.1 above or it may use the activity worksheet AW-512 as the basis for its annual progress report.

The submittal must include other documentation as needed to demonstrate that the evaluation report was submitted to the governing body, released to the media, made available to the public and/or prepared by the same planning committee that prepared the plan.

If the community fails to submit an annual progress report with its recertification, there is no planning credit (FMP = 0). Without continued planning credit, a category C repetitive loss community will revert to a Class 10.

The objective of the annual evaluation report is to ensure that there is a continuing and responsive planning process. It is required for the community to continue to receive the credit for its floodplain management planning. Continued credit for floodplain management planning is dependent on the report being submitted with the community's annual CRS recertification.

The review of each recommendation in the action plan must state how much was accomplished during the previous year. Where possible, the objectives and progress toward them should be measurable (e.g., "five of the six lots slated for acquisition were purchased" or "we improved one mile of stream channel").

If appropriate, new projects or revised objectives may be established. For example, if fewer people requested technical advice than expected, the next year's plan might have a smaller target number. If the original plan's projects or objectives are changed, the evaluation report or a plan amendment must be adopted by the governing body.

Step 511.j shows how the credit points are provided for the evaluation process. When the community submits its recertification, it must include appropriate documentation to show that its evaluation process is conducted in accordance with the points credited. For example, to document releasing the draft report to the media, the recertification must include a copy of the news release, a newspaper article, or similar documentation.

Example 514.d-1. Floodville's staff prepares the annual evaluation report by March 1 each year. This is added to the City Manager's March report to the City Council, which is copied to the local media, the Chamber of Commerce, and three neighborhood organizations that helped prepare the plan. Members of the public may review copies in City Hall.

Example 514.d-2. Gulf Beach County's staff uses AW-512 for its annual evaluation report for the floodplain management plan for the County's repetitive loss areas. An excerpt is shown in Figure 510-3.

515 For More Information

- a. See Appendix E to order a free copy of *Example Plans*.
- b. Contact state or regional planning, water resources, natural resources, environmental protection, or NFIP coordinating agencies for information on state and federal agencies that can assist in preparing a floodplain management plan.
- c. The following publications discuss the planning process and the variety of measures that should be examined. They are available free by calling FEMA's Publication Office at 1-800-480-2520 or faxing a request to 301-497-6378.

Design Guidelines for Flood Damage Reduction, FEMA-15, 1981.

Conceptual Framework and Basic Strategies and Tools for Implementing A Unified National Program for Floodplain Management, FEMA-168, 1989.

Reducing Losses in High Risk Flood Hazard Areas—A Guidebook for Local Officials, FEMA-116, 1987.

"Benefit/Cost Analysis of Hazard Mitigation Projects," FEMA, computer software with instructions, 1995.

- d. Rural communities can request help on this activity from the Natural Resources Conservation Service. Requests should be submitted to the local soil and water conservation district, which is usually located in the county seat.
- e. The U.S. Army Corps of Engineers can also provide technical information and advice to communities interested in preparing a comprehensive floodplain management plan. Requests for assistance should be submitted to the Flood Plain Management Services Coordinator at the appropriate District Office of the Corps.
- f. The Rivers and Trails Conservation Assistance Program of the National Park Service provides planning assistance to communities interested in setting flood protection goals and identifying nonstructural options. The Park Service provides experienced staff to help communities focus on the grass-roots involvement of residents when developing a plan. For more information, contact:

National Park Service
Recreation Resources Assistance Division
P.O. Box 37127
Washington, D.C. 20013-7127
(202) 343-3780

- g. The following publications can also be of assistance. They can be ordered from their publisher by calling the number noted.

A Multi-Objective Planning Process for Mitigating Natural Hazards, FEMA and the National Park Service, 1995, (303) 235-4830 or (303) 969-2850.

Community Flood Mitigation Planning Guidebook, Wisconsin Department of Natural Resources, 1995, (608) 266-0161.

Flood Proofing: How to Evaluate Your Options, U.S. Army Corps of Engineers, 1994.

Flood Hazard Mitigation Handbook, Bruce Menerey and Kirstin Kinzley, Michigan Department of Natural Resources, 1988, (517) 335-3182.

Flood Hazard Mitigation in Northeastern Illinois, a Guidebook for Local Officials, Northeastern Illinois Planning Commission, 1995, (312) 454-0400.

510 FLOODPLAIN MANAGEMENT PLANNING Community: Floodville

511 Credit Points

| | Item Score | Step Total |
|---|---------------|---------------|
| a. Organize to prepare the plan | | |
| 1. Supervision or direction of a professional planner: | <u>2</u> | |
| 2. Planning committee of department staff: | <u>6</u> | |
| 3. Process formally created by the community's governing board: | <u> </u> | <u>8</u> |
| b. Involve the public | | |
| 1. Public meeting held at the end of the planning process (REQUIRED): | <u>2</u> | |
| 2. Public meetings held at the beginning of the planning process: | <u> </u> | |
| 3. Public information activities encourage input: | <u> </u> | |
| 4. Questionnaires ask the public for information: | <u>4</u> | |
| 5. Recommendations are solicited from advisory groups, etc.: | <u> </u> | |
| 6. Planning committee includes the public: | <u> </u> | <u>6</u> |
| c. Coordinate with other agencies | | |
| 1. Other agencies contacted at the beginning of the planning: | <u>3</u> | |
| 2. Meetings are held with representatives of agencies: | <u>10</u> | |
| 3. Review of the community's needs, goals, and plans for the area: | <u>3</u> | |
| 4. Draft action plan is sent to agencies for comment (REQUIRED): | <u>2</u> | <u>18</u> |
| d. Assess the hazard | | |
| 1. The plan includes a map and hazard description (REQUIRED): | <u>5</u> | |
| 2. The plan describes other natural hazards: | <u> </u> | <u>5</u> |
| e. Assess the problem | | |
| 1. Number and types of buildings subject to the hazards (REQUIRED): | <u>2</u> | |
| 2. Description of the impact of flooding: | <u>4</u> | |
| 3. Warning and evacuating residents and visitors: | <u> </u> | |
| 4. Critical facilities: | <u>4</u> | |
| 5. Natural and beneficial functions: | <u> </u> | |
| 6. Development, redevelopment and population trends: | <u> </u> | |
| 7. Summary of the impact of flooding on the community: | <u> </u> | <u>10</u> |
| f. Set goals (REQUIRED): | <u>2</u> | <u>2</u> |
| g. Review possible activities | | |
| 1. Preventive activities: | <u>5</u> | |
| 2. Property protection activities: | <u>5</u> | |
| 3. Natural resource protection activities: | <u> </u> | |
| 4. Emergency services activities: | <u> </u> | |
| 5. Structural projects: | <u> </u> | |
| 6. Public information activities: | <u>5</u> | <u>15</u> |

Activity Worksheet

AW-510

Edition: July 1996

Figure 510-2a. Floodville's activity worksheet for floodplain management planning (AW-510).

| | Item Score | Step Total |
|--|---------------|--------------------|
| h. Draft an action plan | | |
| 1. Recommendations for activities from two of the six categories: | _____ | |
| 2. Recommendations for activities from three of the six categories: | <u>20</u> | |
| 3. Recommendations for activities from four of the six categories: | _____ | |
| 4. Recommendations for activities from five of the six categories: | _____ | |
| 5. Post-disaster mitigation policies and procedures: | _____ | <u>20</u> |
| i. Adopt the plan (REQUIRED): | <u>2</u> | <u>2</u> |
| j. Implement, evaluate and revise | | |
| 1. Procedures for monitoring and recommending revisions to the plan: | <u>2</u> | |
| 2. Same planning committee does evaluation: | _____ | <u>2</u> |
| Add the step totals for lines a through j above | FMP = | <u>88</u> |
| <i>Note: If any step total = 0, then FMP = 0.</i> | | |
| 512 Impact Adjustment: | | |
| a. Option 1: <u>rFMP = 1.0</u> | | |
| b. Option 2: rFMP = 0.25 | | |
| 513 Credit Calculation: | | |
| a. FMP = <u>88</u> . If any of the ten step totals in Subsections 511.a-j is 0, then FMP = 0. | | |
| b. FMP <u>88</u> x rFMP <u>1.0</u> | | = <u>88</u> |
| c510 = value above rounded to the nearest whole number: | | c510 = <u>88</u> |
| 514 Credit Documentation: The following documentation is attached to this worksheet: | | |
| <input checked="" type="checkbox"/> a. A copy of the floodplain management plan. | | |
| <input checked="" type="checkbox"/> b. A copy of the notice(s) of the public meetings. | | |
| <input checked="" type="checkbox"/> c. Documentation showing the plan was adopted by the governing body. | | |
| We will submit the following with our annual recertification: | | |
| <input checked="" type="checkbox"/> d. An annual evaluation report. | | |
| Activity Worksheet | AW-511 | Edition: July 1996 |

Figure 510-2b. Page two of Floodville's activity worksheet for floodplain management planning (AW-511).

514.d OPTION 2 PROGRESS REPORT Community: Gulf Beach County

This report is prepared for submittal for continued credit under the National Flood Insurance Program's Community Rating System (CRS). It is designed to provide a short update and report on accomplishments toward implementing the community's repetitive loss plan. Copies of this report must be distributed to the local media and the community's governing board and be made available to the public. It is also submitted to the state and the Federal Emergency Management Agency as part of its annual CRS recertification.

1. Name of the repetitive loss plan: Gulf Beach County Repetitive Loss Plan

Date adopted: Sept. 15, 1995

Location where copies are available for review: Planning Office,
County Courthouse

2. Summarize any floods that occurred during the year:

A tropical depression hit the coastline in August, causing some beach erosion but no damage to buildings.

What impact did the floods have on the repetitive loss areas?

It heightened awareness of the coastal flood hazard. The Planning Office got twice as many calls for retrofitting assistance as usual.

3. On a separate sheet, list each element or objective of the original plan and note how much was accomplished during the previous year (this can be a photocopy of the plan's recommendations with a note describing implementation of each).

Attached.

4. Were any objectives not reached or is implementation behind schedule? If so, state why:

3.b - Acquire flood-prone buildings - No funding has been obtained, yet.

4.e - Develop flood response plan for inland riverine areas - Emergency Manager resigned and has not yet been replaced.

5. Should new projects be started or should any of the recommendations or objectives be revised?

2.a - Public Info - The Planning Office should develop materials that can be quickly disseminated after a storm while interest is high. To be done by next summer.

For more information, contact: William Berry Phone: 101/555-6789

Activity Worksheet

AW-512

Edition: July 1996

Figure 510-3. Gulf Beach County's activity worksheet for its option 2 progress report (AW-512).

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ACTIVITY 500-510 REPETITIVE LOSS AREAS FLOODPLAIN MANAGEMENT PLANNING

Upon contact with the FEMA Regional Office, Key Biscayne has been furnished with thirty two (32) Forms AW-512 "NFIP Repetitive Loss Correction Worksheets". These worksheets are assumed to take the place of Form AW-502 referred to on page 33 of the CRS Application Document issued by FEMA on May 31, 1996.

Accordingly, each Form AW-512 has been checked for: (1) correct address; (2) whether the properties actually lie within the corporate limits of the Village of Key Biscayne; (3) whether there were two claims for two different floods; and (5) whether the insured buildings have since been removed, retrofitted, or otherwise protected from the cause of the repetitive flooding.

Twenty nine (29) corrected Forms AW-12 are attached hereto with the reasons for change identified as required on the form. The result of the review indicates therefore a corrected list of repetitive loss properties of three (3). As such, Key Biscayne is assumed to qualify as a Category B Community.

Map identifying the repetitive loss AREAS

Attached hereto, in accordance with the requirements for Category B Communities, is a map identifying ALL 32 repetitive loss properties given to us by FEMA on Forms AW-512.

These properties have been: (1) listed on TABLE A by address; (2) given an identification number (#) referenced to the location map; (3) grouped in accordance with drainage basins (DB#) as defined in the Key Biscayne Stormwater Drainage Master Plan (the "repetitive loss AREAS"); (4) referenced to the Base Flood Elevation (BFE) as shown on the 3/4/94 Flood Insurance Rate Map (FIRM) for Key Biscayne; (5) coded to reflect the reason for the change(s) or correction(s) (CHG.CODE) shown on Form AW-12; and (6) identified in terms of the dates of the losse(s).

In addition to the location map, TABLE A and the explanation of Change Codes (CHG.CODE), documentation is submitted, herewith, with respect to Change Code D (Flood Protection Provided) and Change Code E (Losses due to Events Greater than 100 years)

Causes of repetitive loss flooding.

Based on the corrections to the repetitive loss list, the three properties remaining on the list are located in: Drainage Basin 6B, (489 Warren Lane); Drainage Basin 8 (241 Greenwood Lane); Drainage Basin 9, (260 Cypress Drive).

The Base Flood Elevations for Basins 6B and 8 is 10'. It is 9' for basin 9. The NGVD grade elevations in these basins is approximately +4'. This suggests that these basins, (as well as the rest of Key Biscayne) are not only, naturally vulnerable to floods because of their low elevations, but they are particularly vulnerable because this factor is coupled with the relative severity and frequency of rainfalls in the area which average about 60" annually and 9" for one day rainfalls on an average 10 year return period. This is documented in the South Florida Water Management District "Technical Publication 81-3" titled: "Frequency Analysis of Rainfall Maximums for Central and South Florida."

Moreover, according to the Key Biscayne Stormwater Master Plan, soil characteristics in these basins are very silty to a depth of approximately 25 feet and have very low percolation rates (.00001 cubic feet per second per square foot of head).

Most importantly, the implementation of the Stormwater Master plan for these three basins, though in progress, is not as yet completed and consequently, storm sewers as contemplated by the Master Plan do not yet offer the protection for which they are designed.

Outreach Project

All properties identified on TABLE A are included in the outreach project mailing (see Activity 330).

ACTIVITY 510: FLOODPLAIN MANAGEMENT PLANNING

The documentation supporting Change Codes D and E may require further study and analysis and the potential for flood conditions prevailing on Key Biscayne may warrant the preparation of a Floodplain Management Plan as outlined for Activity 510, regardless of whether the Village is designated a Category A, B, or C Community.

Accordingly, it is proposed to initiate such a process, subject to Village Council authorization. In this connection we request that the undertaking of this step be allowed to occur contemporaneously with the formalization an initial CRS Classification for the Village.

503 REPETITIVE LOSS AREAS OUTREACH PROJECT

Community: KEY BISLAYNE, FL

If you are a Category B or C community, you must attach the following documentation to this page of your application. The ISO/CRS Specialist will explain what additional materials will be needed during the verification visit and for your annual recertification. Check each section that applies:

- a. A map identifying the repetitive loss AREAS. Those areas include the properties on the corrected repetitive loss list and adjacent properties with similar flooding conditions.
- b. A description of the causes of the repetitive loss flooding. This may be a brief paragraph for each area.
- c. An outreach project must be sent to each property in your repetitive loss areas. The project must be sent to all properties with buildings on them in the areas identified under 503.a, not just the properties on FEMA's list. This can be documented by:
 - 1. Attach a copy of the outreach project, or
 - 2. Your annual outreach project to floodplain residents (see Section 330.a.2 on page 15) can fulfill this requirement, provided that (1) it reaches all the properties in your repetitive loss areas and (2) it covers the topic of property protection (topic 6, see example on pages 18-19).

IF YOU ARE A CATEGORY C COMMUNITY, YOU MUST ALSO PREPARE A FLOODPLAIN MANAGEMENT PLAN FOR THE REPETITIVE LOSS AREAS MAPPED FOR SECTION 503.a AS EXPLAINED UNDER ACTIVITY 510 (FLOODPLAIN MANAGEMENT PLANNING). A floodplain management plan that covers all of your flood problem areas will meet this requirement and will yield more credit than one that covers only the repetitive loss area(s).

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09 13 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0016833

| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|---|--|
| 104 W MASHTA DRIVE KEY BISCAYNE FL 33149 NAME: BERTHA FUSTE | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 950821 920824 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

593-0 (93)

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD.

10 / 1 / 96

PRINT OR TYPE NAME AND TITLE

SIGNATURE

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09/13/96 | KEY BISCAYNE, VILLAGE OF | 120648 |

| | |
|---|--|
| PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0000498 | |
| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
| 695 HARBOR LANE KEY BISCAYNE FL 33149 1713 NAME: & PAULA C FESTA, JOHN E. | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|----------------------|--------------------------------------|
| 920824 911008 840529 | 3 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

(1) DEMOLISHED & RESULT TO FEMA STDS

5931 5/93

CHANGES AUTHORIZED BY:
PETER KORY CES COORD.

[Signature]

10/1/96

PRINT OR TYPE NAME AND TITLE

SIGNATURE

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO |
|----------|--------------------------|----------|
| 09 13 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0006959

| CURRENT PROPERTY ADDRESS |
|---------------------------|
| 685 ALLENDALE RD |
| KEY BISCAYNE FL 33149 |
| NAME: CARLOS E ALVAREZ MD |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| |
| |
| |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
- renamed
- annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
- no building on property
- all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

5934 (593)

CHANGES AUTHORIZED BY:
PETER KORY CRS COORD.

[Signature]

10/1/96

PRINT OR TYPE NAME AND TITLE

SIGNATURE

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|--------------|--------------------------|-----------|
| 09 / 13 / 96 | KEY BISCAYNE, VILLAGE OF | 20648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0014069

| CURRENT PROPERTY ADDRESS |
|----------------------------|
| 755 ALLENDALE RD |
| KEY BISCAYNE FL 33149 2402 |
| NAME: KIMREY NEWLIN |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| |
| |
| |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|-----------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|---------------|----------------|------------------|
| | | |
| | | |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
- renamed
- annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
- no building on property
- all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

5/93

593

CHANGES AUTHORIZED BY:
PETER KORY CRS COORD.

PRINT OR TYPE NAME AND TITLE

P. Kory
SIGNATURE

10/1/96
DATE

#5 Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09 13 96 | KEY BISCAYNE, VILLAGE OF | 020648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0009751

| CURRENT PROPERTY ADDRESS |
|----------------------------|
| 698 FERNWOOD ROAD |
| KEY BISCAYNE FL 33149 2023 |
| NAME: JOHN I KEASLER |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| |
| |
| |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

(5/93)

59

CHANGES AUTHORIZED BY:

PETER KORY CAS COORD.



10/1/96

PRINT OR TYPE NAME AND TITLE

SIGNATURE

DATE

#6

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|---------------------------|-----------|
| 09 13 96 | KEY BISCAIYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0014061

| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|--|
| 188 WEST MASHTA DR KEY BISCAIYNE FL 33149 2418 NAME: ROBERTO DE CESPEDES | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

- REASON(S) FOR ABOVE CHANGE:
- never correct/never in community renamed annexation/incorporation/disincorporation
- FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):
- flood protection provided no building on property all losses due to events greater than 100 years
- ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

593 (5/93)

CHANGES AUTHORIZED BY: PETER KORY CRS COORD. Phony 10/1/96

PRINT OR TYPE NAME AND TITLE SIGNATURE DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE 03/31/96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|---------------------------|-----------|
| 09/13/96 | KEY BISCAIYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0009789

| CURRENT PROPERTY ADDRESS |
|-----------------------------|
| 220 W MASHYA DR |
| KEY BISCAIYNE FL 33149 2420 |
| NAME: RALPH L PADGETT JR |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| |
| |
| |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911010 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
- renamed
- annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
- no building on property
- all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED: 212 OR 224 W. MASHYA BUT 220

593- (5/93)

CHANGES AUTHORIZED BY:
PETER KORY CRS COORD
PRINT OR TYPE NAME AND TITLE

[Signature]
SIGNATURE

10/1/96
DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

OMB 3067-0195 EXPIRES JUNE 30 1

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO |
|----------|---------------------------|----------|
| 09/13/96 | KEY BISCAIYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0009139

| CURRENT PROPERTY ADDRESS |
|--|
| 599 HARBOR DRIVE KEY BISCAIYNE FL 33149 1740 NAME: MARY DONLAN |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| |
| |
| |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|-----------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|---------------|----------------|------------------|
| | | |
| | | |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

593-C (93)

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD

10/1/96

PRINT OR TYPE NAME AND TITLE

SIGNATURE

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|--------------|--------------------------|-----------|
| 09 / 13 / 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0000329

| CURRENT PROPERTY ADDRESS |
|-----------------------------|
| 629 HAMPTON LANE |
| KEY BISCAYNE FL 33149 2016 |
| NAME: VE P. KOSTER, GENEVIE |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| |
| |
| |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|---------------|----------------|------------------|
| | | |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

(5/93)

593

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD

PRINT OR TYPE NAME AND TITLE



SIGNATURE

10/1/96

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO |
|--------------|--------------------------|----------|
| 09 / 13 / 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

| | |
|--|--|
| PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0014095 | |
| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
| 462 WARREN LANE KEY BISCAYNE FL 33149 0000 NAME: CARLOS BRIZUELA | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED: (1) BLDG DEMOLISHED & REBUILT TO FEMA ST

3/93

593

CHANGES AUTHORIZED BY:

PETER KORY CES COORD.

PKory

10/1/96

PRINT OR TYPE NAME AND TITLE

SIGNATURE

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

12

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09 13 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

| | |
|--|--|
| PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0010405 | |
| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
| 380 REDWOOD LN KEY BISCAYNE FL 33149 1819 NAME: SCOTT KUNKEL | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
- renamed
- annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
- no building on property
- all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

593 3/93

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD.

PRINT OR TYPE NAME AND TITLE

P. Kory

SIGNATURE

10/1/96

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE 03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|---------------------------|-----------|
| 09/13/96 | KEY BISCAIYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0006927

| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|---|--|
| 390 HEATHER LANE KEY BISCAIYNE FL 33149 1222 NAME: JANE S & ABE MENSONI DES | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|-----------------------------|--------------------------------------|
| 920824 911008 871012 840527 | 4 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD.

PRINT OR TYPE NAME AND TITLE

[Signature]

SIGNATURE

10/1/96

DATE

2/16

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE 03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|--------------|---------------------------|-----------|
| 09 / 13 / 96 | KEY BISCAIYNE, VILLAGE OF | 120648 |

| | |
|--|---|
| PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0013772 | |
| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
| 200 CRANDON BLVD (LEFT) | |
| MIAMI FL 33149 0000 | |
| NAME: 200 PALM CORPOR | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911009 | 2 |

| CHANGES REQUIRED | | |
|------------------|----------------|------------------|
| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

- REASON(S) FOR ABOVE CHANGE:
- never correct/never in community renamed annexation/incorporation/disincorporation
- FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):
- flood protection provided no building on property all losses due to events greater than 100 years
- ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

593 (5/93)

CHANGES AUTHORIZED BY: PETER KORY CRS COORD. PKory 10/1/96

PRINT OR TYPE NAME AND TITLE SIGNATURE DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09 13 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0013749

| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|--|
| 200 CRANDON BLVD MIAMI FL 33149 1504 NAME: 200 PLAMS CORPO | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911009 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD.

PRINT OR TYPE NAME AND TITLE

[Signature]

SIGNATURE

10/1/96

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|---------------------------|-----------|
| 09/13/96 | KEY BISCAIYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0000466

| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|---|--|
| 555 CRANDON BLVD #85 KEY BISCAIYNE F FL 33149 1803 NAME: ONDO ASSOC CRANDON TOWER C | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911009 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

5/93

5/93

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD.

PRINT OR TYPE NAME AND TITLE



SIGNATURE

10/1/96

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DATE 03 / 31 / 96
DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09 13 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0009078

| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|--|
| 663 RIDGEWOOD RD. KEY BISCAYNE FL 33149 2018 NAME: C GRANADOSCARLOS A & DANA | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 ⁽¹⁾ no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

(1) DEMOLISHED & REBUILT TO FEMA STDS

5/93
593

CHANGES AUTHORIZED BY:

PETER KORY CES COORD.

PRINT OR TYPE NAME AND TITLE

[Signature]

SIGNATURE

10/1/96

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

OMB 3067-0195 EXPIRES JUNE 30, 19

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|--------------|--------------------------|-----------|
| 09 / 13 / 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0013457

| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|--|
| 676 RIDGEWOOD RD KEY BISCAYNE FL 33149 2019 NAME: BARBARA J STICKNEY | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

- REASON(S) FOR ABOVE CHANGE:
- never correct/never in community
 renamed
 annexation/incorporation/disincorporation
- FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):
- flood protection provided
 no building on property
 all losses due to events greater than 100 years
- ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

593-1 1/93

CHANGES AUTHORIZED BY: PETER KORY CRS COORD. [Signature] 10/1/96

PRINT OR TYPE NAME AND TITLE SIGNATURE DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

OMB 3067-0195 EXPIRES JUNE 30, 19

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE **03 / 31 / 96**

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09 13 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

| | |
|---|--|
| PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0013756 CURRENT PROPERTY ADDRESS 378 CARIBBEAN ROAD KEY BISCAYNE FL 33149 1604 NAME: CARLOS M BARANANO | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|---|--|

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

593

593-C

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD

PRINT OR TYPE NAME AND TITLE

P. Kory
SIGNATURE

10/1/96
DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|---------------------------|-----------|
| 09 13 96 | KEY BISCAIYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0013747

| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|--|
| 390 CARIBBEAN RD KEY BISCAIYNE FL 33149 NAME: JACQUELINE & AL ROSE | |

| DATES OF LOSS | | TOTAL NUMBER OF LOSSES FOR PROPERTY: | |
|---------------|--------|--------------------------------------|--|
| 920824 | 911008 | 2 | |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|---------------|----------------|------------------|
| | | |
| | | |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

593-1 3/93

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD

PRINT OR TYPE NAME AND TITLE

P. Kory

SIGNATURE

10/1/96

DATE

**Federal Emergency Management Agency
NFIP REPETITIVE LOSS CORRECTION WORKSHEET**

OMB 3067-0186 EXPIRES JUNE 30, 1996

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|---------------------------|-----------|
| 09 13 96 | KEY BISCAIYNE, VILLAGE OF | 20648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0000279

| CURRENT PROPERTY ADDRESS |
|---|
| 335 CARIBBEAN ROAD KEY BISCAIYNE FL 33149 NAME: WILLIAM A POWER |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911009 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD

PRINT OR TYPE NAME AND TITLE

[Signature]

SIGNATURE

10/1/96

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 91

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09 13 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0004337

| CURRENT PROPERTY ADDRESS |
|---|
| 379 CARIBBEAN RD KEY BISCAYNE FL 33149 1603 NAME: JUAN F & ELSA F CASAS |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| |
| |
| |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|---------------|----------------|------------------|
| | | |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

593

593

CHANGES AUTHORIZED BY:

| PRINT OR TYPE NAME AND TITLE | SIGNATURE | DATE |
|------------------------------|-----------|------|
| | | |

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

OMB 3067-0186 EXPIRES JUNE 30, 1996

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT.

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09 13 96 | KEY BISCAVNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0014053

| CURRENT PROPERTY ADDRESS |
|---|
| * 365 CARIBBEAN RD KEY BISCAVNE FL 33149 1603 NAME: ANDREW CONTE |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| |
| |
| |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

CHANGES AUTHORIZED BY:

PETER KOBY CRS COORD

PRINT OR TYPE NAME AND TITLE



SIGNATURE

10/1/96

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|---------------------------|-----------|
| 09 13 96 | KEY BISCAIYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0048777

| CURRENT PROPERTY ADDRESS |
|--------------------------|
| 395 CARIBBEAN RD |
| MIAMI FL 33149 0000 |
| NAME: JOHN PETERSEN |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| |
| |
| |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|---------------|----------------|------------------|
| | | |
| | | |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD.

PRINT OR TYPE NAME AND TITLE

[Signature]

SIGNATURE

10/1/96

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE **03 / 31 / 96**

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09 13 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0003829

| CURRENT PROPERTY ADDRESS |
|----------------------------|
| 395 GULF ROAD |
| KEY BISCAYNE FL 33149 1605 |
| NAME: LOTTIE DANIELCZYK |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| |
| |
| |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

5931

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD.

PRINT OR TYPE NAME AND TITLE

P. Kory

SIGNATURE

10/1/96

DATE

428

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE 03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|--------------|--------------------------|-----------|
| 09 / 13 / 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

| | |
|--|--|
| PROPERTY LOCATOR (FOR INTERNAL USE ONLY): <u>0010382</u> | |
| CURRENT PROPERTY ADDRESS | |
| <u>365 GULF RD</u> | |
| <u>KEY BISCAYNE FL 33149 1605</u> | |
| <u>NAME: MICHAEL A & AMALIE G SMITHIES</u> | |
| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER | |
| | |
| | |
| | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|-----------------------------|--------------------------------------|
| <u>920824</u> <u>911008</u> | <u>2</u> |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD.

PRINT OR TYPE NAME AND TITLE

P. Kory

SIGNATURE

10/1/96

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|---------------------------|-----------|
| 09 13 96 | KEY BISCAIYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0013770

| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|---|--|
| 379 GULF RD KEY BISC FL 99999 9999 NAME: TROIS BOIS LTD | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

CHANGES AUTHORIZED BY:
PETER KORY CRS COORD.
 PRINT OR TYPE NAME AND TITLE

[Signature]
 SIGNATURE

10/1/96
 DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

OMB 3067-0196 EXPIRES JUNE 30, 1996

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

30

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09/13/96 | KEY BISCAYNE, VILLAGE OF | 120648 |

| PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0015937 | |
|---|--|
| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
| 364 GULF RD | |
| 364 GULF RD | 364 GULF RD |
| MIAMI FL 33149 1606 | MIAMI FL 33149 0000 |
| NAME: JOHN A & ALICE JOHN A & ALICE | 120648 KEY BISCAYNE, VILLAGE OF |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911007 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

(5/93)

593

CHANGES AUTHORIZED BY:
PETER KORY CRS COORD.

P. Kory

10/1/96

PRINT OR TYPE NAME AND TITLE

SIGNATURE

DATE

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

#21

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE **03 / 31 / 96**

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|---------------------------|-----------|
| 09 13 96 | KEY BISCAIYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): **0058626**

| CURRENT PROPERTY ADDRESS | PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|--|
| 345 GULF ROAD KEY BISCAIYNE FL 33149 1605 NAME: E & ELISABET NAFILYAN, PIERR | |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911008 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
 renamed
 annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
 no building on property
 all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD

PRINT OR TYPE NAME AND TITLE

SIGNATURE

10/1/96

DATE

593

Federal Emergency Management Agency NFIP REPETITIVE LOSS CORRECTION WORKSHEET

NOTE: SEE REVERSE SIDE FOR PAPERWORK BURDEN STATEMENT

32

DETAIL OF REPETITIVE LOSSES BY COMMUNITY FOR CLAIMS ON OR BEFORE

DATE
03 / 31 / 96

| DATE | COMMUNITY NAME | COMM. NO. |
|----------|--------------------------|-----------|
| 09 13 96 | KEY BISCAYNE, VILLAGE OF | 120648 |

PROPERTY LOCATOR (FOR INTERNAL USE ONLY): 0000608

| CURRENT PROPERTY ADDRESS |
|--------------------------|
| 300 SUNRISE DR |
| KEY BISCAYNE FL 33149 |
| NAME: CONNIE L MOLINARI |

| PREVIOUS PROPERTY ADDRESS, COMMUNITY NAME & NUMBER |
|--|
| 300 SUNRISE DRIVE |
| KEY BISCAYNE FL 33149 |
| 125098 METROPOLITAN DADE COUNTY |

| DATES OF LOSS | TOTAL NUMBER OF LOSSES FOR PROPERTY: |
|---------------|--------------------------------------|
| 920824 911009 | 2 |

CHANGES REQUIRED

| COMMUNITY NO. | COMMUNITY NAME | PROPERTY ADDRESS |
|----------------|----------------|------------------|
| | | |
| DATE OF CHANGE | DATE OF CHANGE | DATE OF CHANGE |
| | | |

REASON(S) FOR ABOVE CHANGE:

- never correct/never in community
- renamed
- annexation/incorporation/disincorporation

FOR COMMUNITY USE (REASONS PROPERTY NOT SUBJECT TO REPETITIVE LOSS):

- flood protection provided
- no building on property
- all losses due to events greater than 100 years

ADDRESS NOT SPECIFIC ENOUGH TO BE LOCATED:

5931

5931

CHANGES AUTHORIZED BY:

PETER KORY CRS COORD.

[Signature]

10/1/96

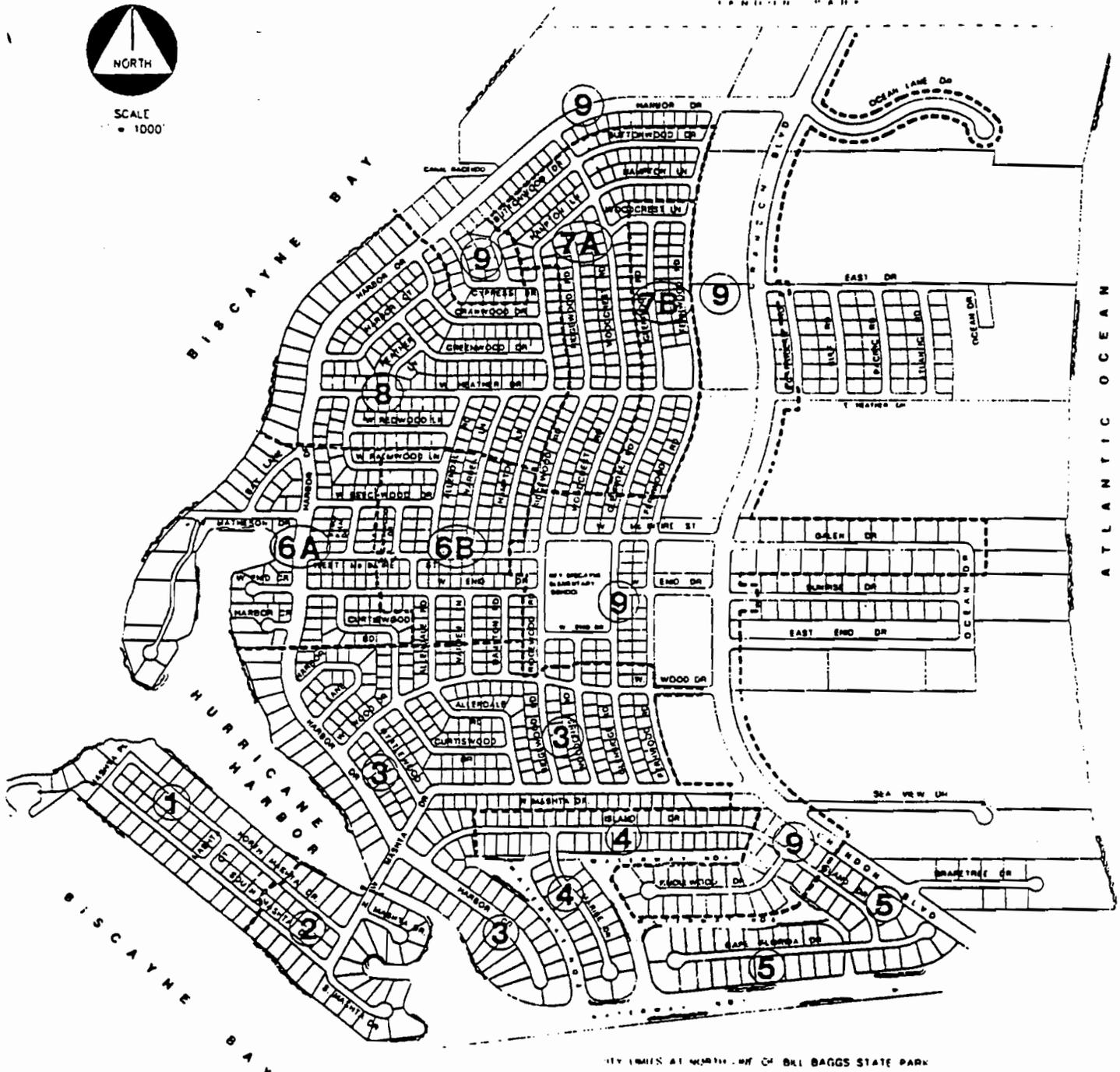
PRINT OR TYPE NAME AND TITLE

SIGNATURE

DATE



SCALE
= 1000'



VILLAGE OF KEY BISCAIYNE, FLORIDA



 WILLIAMS HATFIELD & STONER, INC
NO REPRODUCTION WITHOUT PERMISSION

**PROPOSED
DRAINAGE BASINS
EXHIBIT 2.2**

TABLE A**REPETITIVE LOSS PROPERTIES
COMMUNITY NUMBER 120648
Key Biscayne, Florida**Listing of Repetitive losses identified on AW-512 Worksheets
organized by drainage basins (DB#)

| # | DB# | BFE | Address | CHG.CODE | Dates of Loss | |
|-----|-----|-----|--------------------|----------|---------------|----------|
| 1. | 3 | 9' | 104 W. Mashta Dr | D | 08/21/95 | 08/24/92 |
| 2. | 3 | 10' | 695 Harbor Lane | A/D/E | 10/08/91 | 08/24/92 |
| | | | | | 05/29/84 | |
| 3. | 3 | 10' | 685 Allendale Rd | D/E | 10/08/91 | 08/24/92 |
| 4. | 3 | 10' | 755 Allendale Rd | D/E | 10/08/91 | 08/24/92 |
| 5. | 3 | 9' | 698 Fernwood Rd | D/E | 10/08/91 | 08/24/92 |
| 6. | 3 | 9' | 188 W. Mashta Dr | D/E | 10/08/91 | 08/24/92 |
| 7. | 3 | 10' | 220 W. Mashta Dr | B/D/E | 10/10/91 | 08/24/92 |
| 8. | 6A | 10' | 599 Harbor Dr | E | 10/08/91 | 08/24/92 |
| 9. | 6B | 10' | 629 Hampton Lane | E | 10/08/91 | 08/24/92 |
| 10. | 6B | 10' | 462 Warren Lane | A/E | 10/08/91 | 08/24/92 |
| 11. | 6B | 10' | 489 Warren Lane | NA | 07/16/79 | 03/04/84 |
| 12. | 8 | 10' | 380 Redwood Lane | E | 10/08/91 | 08/24/92 |
| 13. | 8 | 10' | 241 Greenwood Lane | NA | 05/29/84 | 08/24/92 |
| 14. | 8 | 10' | 390 Heather Lane | E | 10/08/91 | 08/24/92 |
| | | | | | 05/27/84 | 10/12/87 |
| 15. | 9 | 9' | 260 Cypress Dr | NA | 11/13/95 | 08/24/92 |
| 16. | 9 | 10' | 200 Crandon Blvd | C/E | 10/09/91 | 08/24/92 |
| 17. | 9 | 10' | 200 Crandon Blvd | C/E | 10/09/91 | 08/24/92 |
| 18. | 9 | 9' | 555 Crandon Blvd | D/E | 10/09/91 | 08/24/92 |
| 19. | 9 | 10' | 663 Ridgewood Rd | A/E | 10/08/91 | 08/24/92 |
| 20. | 9 | 10' | 676 Ridgewood Rd | E | 10/08/91 | 08/24/92 |
| 21. | 9 | 9' | 378 Caribbean Rd | D/E | 10/08/91 | 08/24/92 |
| 22. | 9 | 9' | 390 Caribbean Rd | D/E | 10/08/91 | 08/24/92 |
| 23. | E | 9' | 335 Caribbean Rd | D/E | 10/09/91 | 08/24/92 |
| 24. | E | 9' | 379 Caribbean Rd | D/E | 10/08/91 | 08/24/92 |
| 25. | E | 9' | 365 Caribbean Rd | D/E | 10/08/91 | 08/24/92 |
| 26. | E | 9' | 395 Caribbean Rd | D/E | 10/08/91 | 08/24/92 |
| 27. | E | 9' | 395 Gulf Rd | D/E | 10/08/91 | 08/24/92 |
| 28. | E | 9' | 365 Gulf Rd | D/E | 10/08/91 | 08/24/92 |
| 29. | E | 9' | 379 Gulf Rd | D/E | 10/08/91 | 08/24/92 |
| 30. | E | 9' | 364 Gulf Rd | D/E | 10/07/91 | 08/24/92 |
| 31. | E | 9' | 345 Gulf Rd | D/E | 10/08/91 | 08/24/92 |
| 32. | E | 9' | 300 Sunrise Dr | D/E | 10/09/91 | 08/24/92 |

LEGEND:

= number assigned to property for map identification purpose
 DB# = Drainage Basin Number per Stormwater Drainage Master Plan
 DB#E = East Drainage Basin where, along with DR#3, Work is completed
 BFE = Base Flood Elevation as shown on FIRM, dated March 2, 1994
 Address = Address of property as shown by FEMA on AW-512
 CHG.CODE = See "CHANGE CODE EXPLANATION" on the next page
 Dates of Loss = Dates of Loss per FEMA Form AW-512

CHANGE CODE EXPLANATION (CHG.CODE)

- NA = No change required. Repetitive losses and claims to be addressed in connection with a Floodplain Management Plan which the Village of Key Biscayne commits to prepare, regardless of FEMA's determination of whether the Village is a category A, B, or C Community.
- A = Building(s) demolished. New structure(s) rebuilt on same property meet base flood elevation criteria per Elevation Certificate on record.
- B = Address not found. Search based on owner's name provided by FEMA to be pursued in connection with Floodplain Management Plan.
- C = Building(s) demolished. Property currently in vacant condition. New construction subject to FEMA & BFE requirements.
- D = Flood Protection provided. Property protected by new stormwater drainage system designed to provide protection against 100 year events, ie: events causing waters to rise to BFE (see additional documentation attached hereto)
- E = Losses due to Events Greater than 100 years. Refers to property affected by both Hurricane Andrew on /24/92 and a tropical storm which swamped Key Biscayne on 10/8/91 with over 12" of water. See additional documentation attached hereto.

**ADDITIONAL DOCUMENTATION: CHANGE CODE D
"FLOOD PROTECTION PROVIDED"**

The Village of Key Biscayne has provided flood protection to the properties located in Drainage Basins "E" and "3" where new Stormwater Drainage Systems are now operational, including new storm sewers, pipes, catch basins, pump stations, injection wells, rehabilitation of swales, etc. pursuant to the Village of Key Biscayne's Stormwater Master Plan.

The design of the new system reduces the impact of storms and rainfalls and protects properties located in these basins from most flood events. In the case of events greater than 100 years, design capacities may be exceeded, but even in those circumstances, the extent and severity of flooding will be greatly reduced and the length of time of inundation will be substantially shortened.

It is reasonable to conclude that properties located within these basins will no longer be subject to repetitive losses.

Attached is a letter from the Public Works Supervisor confirming the above.

**ADDITIONAL DOCUMENTATION: CHANGE CODE E
"LOSSES DUE TO EVENTS GREATER THAN 100 YEARS"**

Twenty eight (28) of the thirty two (32) properties identified by FEMA on Form AW-12 indicate August 24, 1992 and October 7,8,9, or 10, 1991 as the dates of the losses.

The losses can be attributed to two events on these dates, one of which occurred on 8/24/92 and the other on 10/8/91.

Each of these events has been deemed to be of a greater than 100 years nature and each is assumed to have been responsible for the repetitive losses sustained by the above 28 properties. In both events, the losses were widespread throughout the Village, rather than concentrated in any one specific location, drainage basin or discreet area on the island.

1. The August 24, 1992 Event

The first date cited above, namely August 24, 1992 is the date Hurricane Andrew devastated much of Dade County. Key Biscayne, as a barrier island, was, of course, particularly hard hit with a combination of tornado-like winds, rains falls and storm surges.

As a matter of common sense, it stands to reason that a Force 4 and 5 hurricane with a level of notoriety that "Andrew" has earned, represents a "greater than one hundred year event". No further evidence than an available and ample historic record of this event should be necessary to document this well known disaster and qualify it as a greater than 100 year occurrence.

2. The October 8, 1991 Event

The second date can be pin-pointed to October 8, 1991.(not October 7, 9 or 10). Though not a hurricane, on that given date, Key Biscayne was deluged by a huge rainstorm that has remained firmly implanted in the memory of most local residents, property owners, public officials and public agencies.

To support the claim that this storm qualifies as a greater than 100 year event, eventhough it was not a hurricane, the following is submitted:

- a. Upon consultation with the South Florida Water Management District (SFWMD), Technical Publication 81-3 Titled: "Frequency Analysis of Rainfall Maximums for Central and South Florida" was obtained.

Said publication, issued by SFWMD, indicates an average 1-day rainfall for the 100 year "return period" of 10.7" or 10.8" on Table 1 (page 10) or 13.5" based on an interpolation of the contours shown on page 24 of the

publication. An updated version, dated October 1990 , as well as a copy of pages 10 and 24 of the 1981 publication are attached hereto.

Based on this source, it fair to assume that if a rainfall of about one foot occurs in one day, this would represent a greater than 100 year occurrence.

- b. Empirical evidence, including news clips, news photos, National Weather Service statements and related information, all of which is attached hereto, (including numerous eyewitness reports) reveals that a very substantial amount of water, involving at least one foot of rain, fell on Key Biscayne on October 8, 1991. There has been a lot of speculation as to what caused this unusually severe downpour, including, among others, meteorological and astronomic anomalies, unusually high tides, sightings of water spouts and the like.

While much of this speculation cannot be treated as scientific evidence, the fact remains that: (1) many residents recall several feet of water, in some cases, on that day; (2) the MIAMI HERALD cited 12 inches of rain on Key Biscayne; and (3) there are photographs and eyewitnesses that support these reports and recollections.

- c. Scientific evidence documenting the amount of rainfall on Key Biscayne, on October 8, 1991 is not readily available. The SFWMD and the US Weather bureau do not have a rainfall gauge on or near Key Biscayne. The nearest is on Miami Beach and all efforts in securing scientifically based evidence have proven futile to date.

This matter will be vigorously pursued however with the SFWMD and related county, state and federal agencies with the intent of seeking sophisticated alternatives methods to develop this information, so that, over time, the subject can be revisited in a more definitive manner in the future.

In conclusion, it is requested that the qualification of the October 8, 1991 deluge (which affected 28 of the 32 properties identified by FEMA as repetitive loss properties) as a greater than 100 year event, be allowed to rest on the factors cited in ¶ a. and b. above.

It should be noted that another method or criterion for determining whether the October 8, 1991 event is a greater than 100 year occurrence was considered. However, it was rejected because of the large number of variable that would have had to be factored in.

This method would have involved measuring the extent to which flood waters reach above the BFE as shown on the FIRM, ie: the extent to which the waters reach Elev.+9' or +10' NGVD on Key Biscayne. With

an average street elevation of between +3.5' and +5' NGVD, this approach would presume that to qualify as a more than 100 year event, waters would have to be shown to rise between 4 and 6 feet, a circumstance hard to imagine in terms other than storm surges in the wake of a major hurricane.

The variables would have had to include, among others: a definition of the duration of the event (ie: one, two or three days) during which the accumulation of the water is measured; the basis for establishing the Base Flood Elevation in relation to existing grades, whether on the basis of current (1985) or earlier (1929) NGVD; the impact of storm surges, rather than rainfalls in fixing the BFE, the existing floor elevation of each affected property in relation to street elevation which tend to vary between one and three feet, and other such factors required to establish the amount of rainfall that constitutes a 100 year event under this method.

Clearly, the use of the SFWD approach, which computes at about 13.5" of rainfall in a 24 hour period for as a 100 year return period, calculated in the manner outlined in its October 1990 technical publication, appears as a fairer, simpler and at least equally valid approach to the problem.

TABLE 1
GUMBEL RESULTS (1-Day)

| Return Period | Rainfall Depth (in.) | | | 80% Confidence Limits (%) | | |
|---------------|----------------------|-----|---------|---------------------------|------|---------|
| | High | Low | Average | High | Low | Average |
| 5 | 9.1 | 4.0 | 5.7 | 19.9 | 7.4 | 12.2 |
| 10 | 11.7 | 4.6 | 7.0 | 21.4 | 8.6 | 13.9 |
| 25 | 15.2 | 5.5 | 8.5 | 22.9 | 9.7 | 15.5 |
| 50 | 17.7 | 6.1 | 9.7 | 23.7 | 10.4 | 16.5 |
| 100 | 20.3 | 6.7 | 10.8 | 24.3 | 10.9 | 17.3 |

LOG PEARSON RESULTS (1-Day)

| Return Period | Rainfall Depth (in.) | | | 80% Confidence Limits (%) | | |
|---------------|----------------------|-----|---------|---------------------------|------|---------|
| | High | Low | Average | High | Low | Average |
| 5 | 7.7 | 3.8 | 5.2 | 21.2 | 6.9 | 12.0 |
| 10 | 10.2 | 4.3 | 6.3 | 27.8 | 8.2 | 15.3 |
| 25 | 14.2 | 4.7 | 7.9 | 41.3 | 10.9 | 22.2 |
| 50 | 18.2 | 5.1 | 9.2 | 56.8 | 13.3 | 28.7 |
| 100 | 23.1 | 5.4 | 10.7 | 77.6 | 16.0 | 36.0 |

The confidence limits are expressed as a percentage of the return period estimates. The high and low columns represent individual station values.

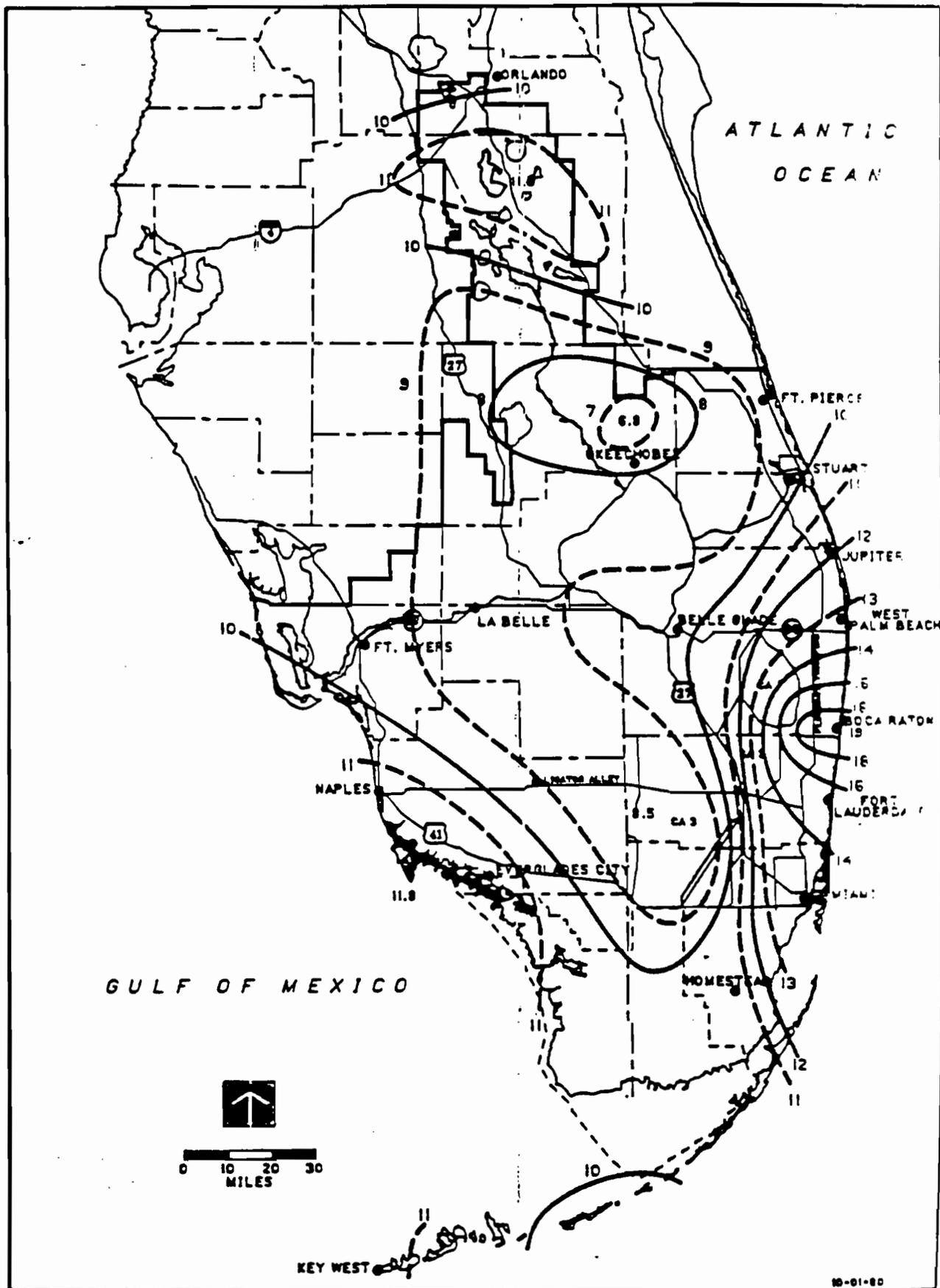


FIGURE 8. 1-DAY RAINFALL: 100 YEAR RETURN PERIOD

Technical Memorandum

**FREQUENCY ANALYSIS OF ONE AND THREE-DAY
RAINFALL MAXIMA FOR
CENTRAL AND SOUTHERN FLORIDA**

by
Paul Trimble

October 1990

**Water Resources Division
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TABLE OF CONTENTS

| | Page |
|--------------------------|------|
| Acknowledgments | iii |
| Introduction | 1 |
| Data Sources | 1 |
| Data Preparation | 3 |
| Frequency Analyses | 4 |
| Results | 4 |
| Summary | 17 |
| References | 18 |
| Appendix | 19 |

LIST OF FIGURES

| | | |
|----|---|----|
| 1 | Rainfall Gage Location | 2 |
| 2 | Distribution of Maximum One-Day Rainfall Event | 5 |
| 3 | Distribution of Maximum Three-Day Rainfall Events | 6 |
| 4 | 1-Day Isohyetal Map: 3-Year Return Period | 8 |
| 5 | 1-Day Isohyetal Map: 5-Year Return Period | 9 |
| 6 | 1-Day Isohyetal Map: 10-Year Return Period | 10 |
| 7 | 1-Day Isohyetal Map: 25-Year Return Period | 11 |
| 8 | 1-Day Isohyetal Map: 100-Year Return Period | 12 |
| 9 | 3-Day Isohyetal Map: 10-Year Return Period | 13 |
| 10 | 3-Day Isohyetal Map: 25-Year Return Period | 14 |
| 11 | 3-Day Isohyetal Map: 100-Year Return Period | 15 |

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I. INTRODUCTION

The South Florida Water Management District (District) is committed to maintaining the most accurate and up-to-date rainfall frequency data for use in evaluating permit applications submitted to the District. The *Frequency Analysis of Rainfall Maximums for Central and Southern Florida, Technical Publication 81-3 (MacVicar, 1981)* presents the results of a comprehensive frequency analysis of maximum rainfall events of 1-, 2-, 3- and 5-day duration along with seasonal and annual durations. The 1- and 3-day duration maximum rainfall events are the most commonly considered by the District's Regulation Department in the permit review process described in the *Management And Storage of Surface Waters, Permit Information Manual, Volume IV (1989)*. The purpose of this report is to update the 1- and 3-day duration frequency analysis included in the Permit Information Manual with the additional data that has become available in recent years. This data allows for additional gages to be added to the analysis while also increasing the reliability of long-term existing gages that were used in the earlier study. Refined and more stringent criteria have been developed to determine whether a particular station year should be used. Only station years that have a 90 percent probability of including the annual maximum event in the observed values were included. Even with these stricter criteria, the number of stations used in the analysis increased from 140 in the earlier analysis to 156 in this analysis. The number of station-years increased from 4,606 to 5,587, or by 21 percent.

The density of rain gages increased the greatest in the Kissimmee River Valley where only sparse data was available for the earlier study. A few gages were eliminated due to more strigent criteria used in selecting the station-years to be analyzed.

II. DATA SOURCES

The sources of data for this study include all the rainfall gages within or near the District for which at least 20 years of quality daily record is available. The data was obtained from the same sources used in the 1981 analysis. These include data that were obtained from the Weather Bureau Records, the South Florida Water Management District, the Lake Worth Drainage District, and the Corps of Engineers. The data that became available in recent years facilitates the production of rainfall frequency maps for South Florida using a higher quality and denser network of rain gages than those used in the earlier study. Figure 1 illustrates the areal distribution of these rain gages along with an indication of the number of years of reliable record at a particular station. More specific information about the rainfall gages will be found in the appendix.

The majority of the rainfall values represent gage readings taken once a day. The time of day that readings are taken varies between stations. In certain cases, hourly values are summed over 24-hour periods to obtain the daily values. No attempt was made to adjust all the daily data to the same 24-hour period, or to estimate maximum 24-hour rainfall from observational daily measurements. No adjustments for bias due to gage type or exposure were made. This analysis was based completely on the daily observations, as was the original analysis completed by the District in 1981.

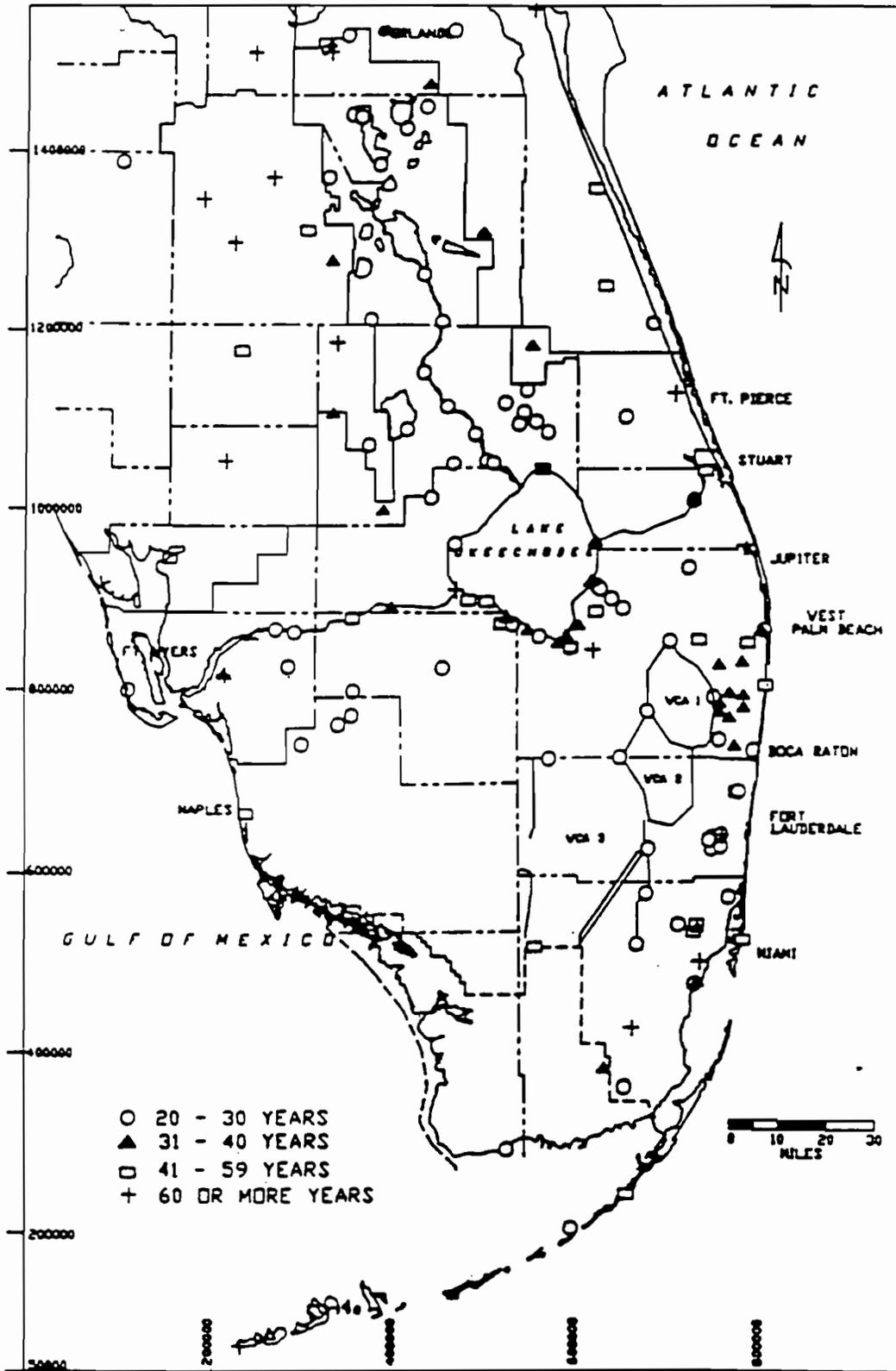


Figure 1. Rainfall Gauge Location

III. DATA PREPARATION

Each year of data is assumed to represent an independent event at that location. A filler technique similar to that used in the previous analysis was used to estimate rainfall at stations that contained missing record. This linear interpolation scheme uses the ratio of the average annual precipitation at nearby stations to that at the station with missing record to determine a weighting factor between the rainfall at the nearby stations and the one with missing data. Then the missing rainfall value may be estimated by the relationship

$$P_x = \frac{1}{N} \sum_{i=1}^N \frac{M_i}{M_x} \cdot P_i$$

where

- P_x is the estimated daily precipitation at the station with missing record,
- M_x is the average annual precipitation at the station with missing record,
- M_i is the average annual precipitation at i th nearby station,
- N is the number of nearby stations used for estimate,
- P_i is daily precipitation at the i th nearby station.

This method is known as the normal ratio method (Paulhus and Kohler, 1952).

Certain stations have accumulated rainfall totals during weekends and holidays. These stations may otherwise have reliable daily records. It is desirable to include these records in the analysis. An accumulated rainfall total was distributed over the individual days during which the rainfall was accumulated based on the temporal distribution of rainfall at the nearby stations that had daily record available. The relationship used to estimate the daily rainfall was the same as for the missing rainfall with the exception that the annual mean rainfall values M_x and M_i are replaced by the accumulated values A_x and A_i . Again, the subscript x refers to the rainfall station that the value is being estimated and the subscript i refers to the i th of n stations used to estimate the daily values. These estimated daily rainfall values were treated the same as observed values if the length of the accumulated period was less than or equal to five days. When the period of accumulated rainfall values was longer than five days, the daily estimates will not be as reliable as those estimated from rainfall totals accumulated over short periods and are flagged as estimated values.

In the previous District rainfall analysis, station-years with up to 150 days of estimated data were included. In this analysis, only station years that have at least a 90 percent probability of including the annual maximum event in the observed values were included. In determining these probabilities, consideration was not only given to the number of missing or estimated days, but also to what month of the year the missing value occurred. The probability that a given daily maximum rainfall event is included in the observed data of a particular year may be represented by the following equation

$$pdm_i = \left[1 - \prod_{m=1}^{12} \left(\frac{nmd_m}{nd_m} \cdot Pr_m \right) \right] \cdot 100$$

where

- pdmi is the probability, expressed as a percentage, of the daily maximum event being included for a given station year,
- nmd is the number of missing days in month m,
- nd is the number of days in month m,
- Pr is the probability for the maximum event to occur during month m.

Long term rainfall stations representing different regions of the District were examined to determine the likelihood of a maximum rainfall event occurring during a particular month of a year. The frequency distributions for the annual maximum 1- and 3-day duration events appear in Figure 2 and Figure 3 for the Keys, Lower East Coast (LEC), Lower West Coast (LWC), Everglades Agricultural Area (EAA), and Kissimmee Valley. The distributions vary significantly from one region of the District to another. The months of June and September generally have the highest probability for the annual maximum 1- and 3-day duration events to occur while the period of December through March has a minimal probability for occurrence of these same events.

IV. FREQUENCY ANALYSIS

The two-parameter Gumbel distribution was chosen as the probability function for analyzing the series of maximum annual rainfall events. This distribution is essentially log-normal distribution with constant skewness (Chow, Ven T., 1954) and also known as Fisher Tippet Type I distribution. It was chosen because it is widely accepted by practicing professionals, the results are easily compared with other similar analysis including the earlier District analysis and that its use has already been established as a design standard. Its cumulative distribution function, defined as the probability that any outcome in X will be less than or equal to a stated limiting value x , may be expressed as

$$P(X \leq x) = \exp\{-\exp[-a(x-u)]\}$$

where a and u are a function of the mean and standard deviation.

V. RESULTS

The rainfall depths for the 3-, 5-, 10-, 25- and 100-year return periods for the 1-day and 10-, 25-, and 100-year return periods for the 3-day duration maximum events were computed for each rain gage included in this analysis. The validity of using the Gumbel distribution for this task was tested using the Kolmogorov-Smirnov goodness-of-fit test. In this test, the maximum difference between the stepwise cumulative frequency function derived from the data set and that of the theoretical distribution function determined by the Gumbel method over the range of observed values, is used as a measure of the discrepancy between the theoretical distribution and the observed data.

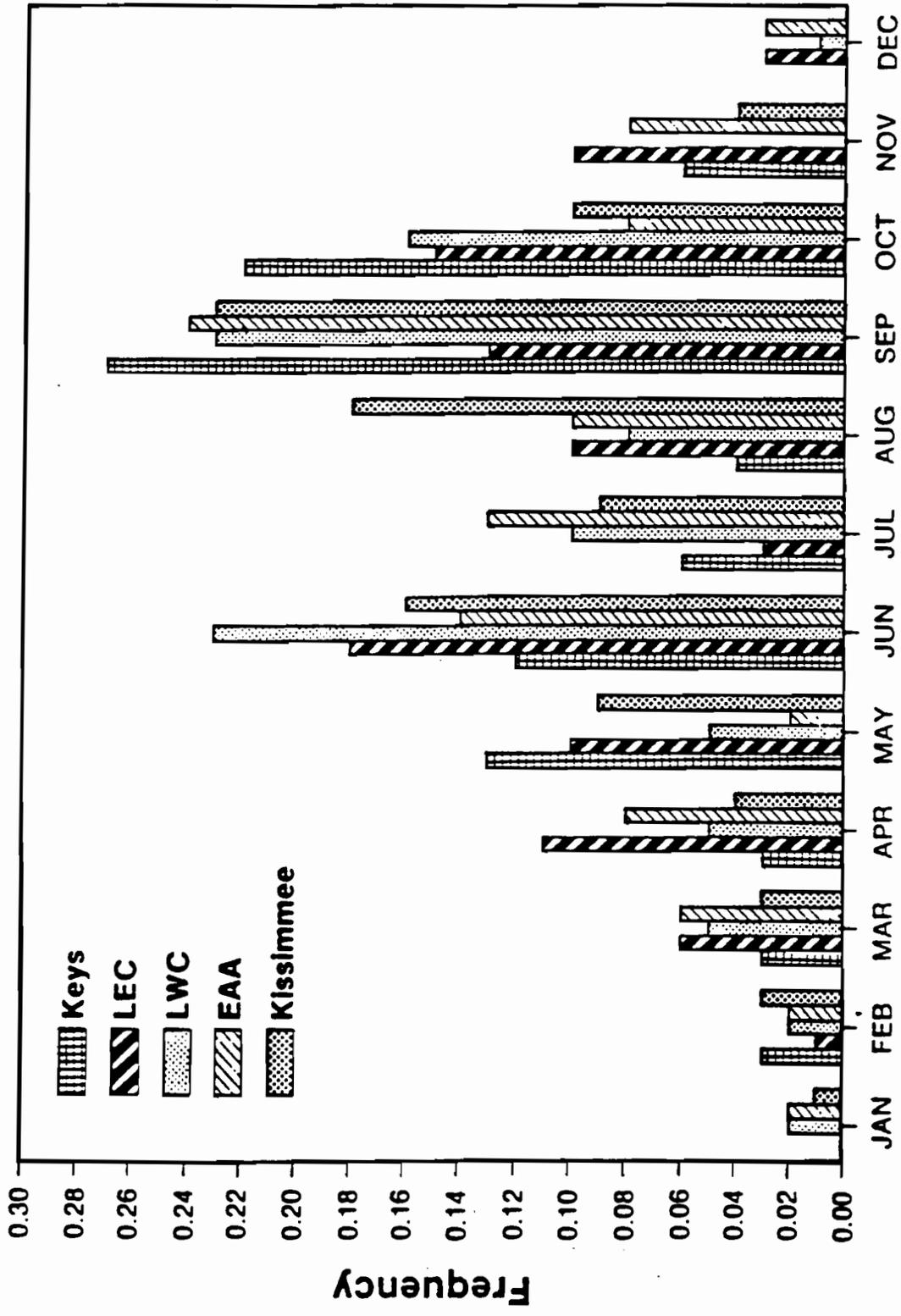


Figure 2. Distribution of Maximum One Day RF Events

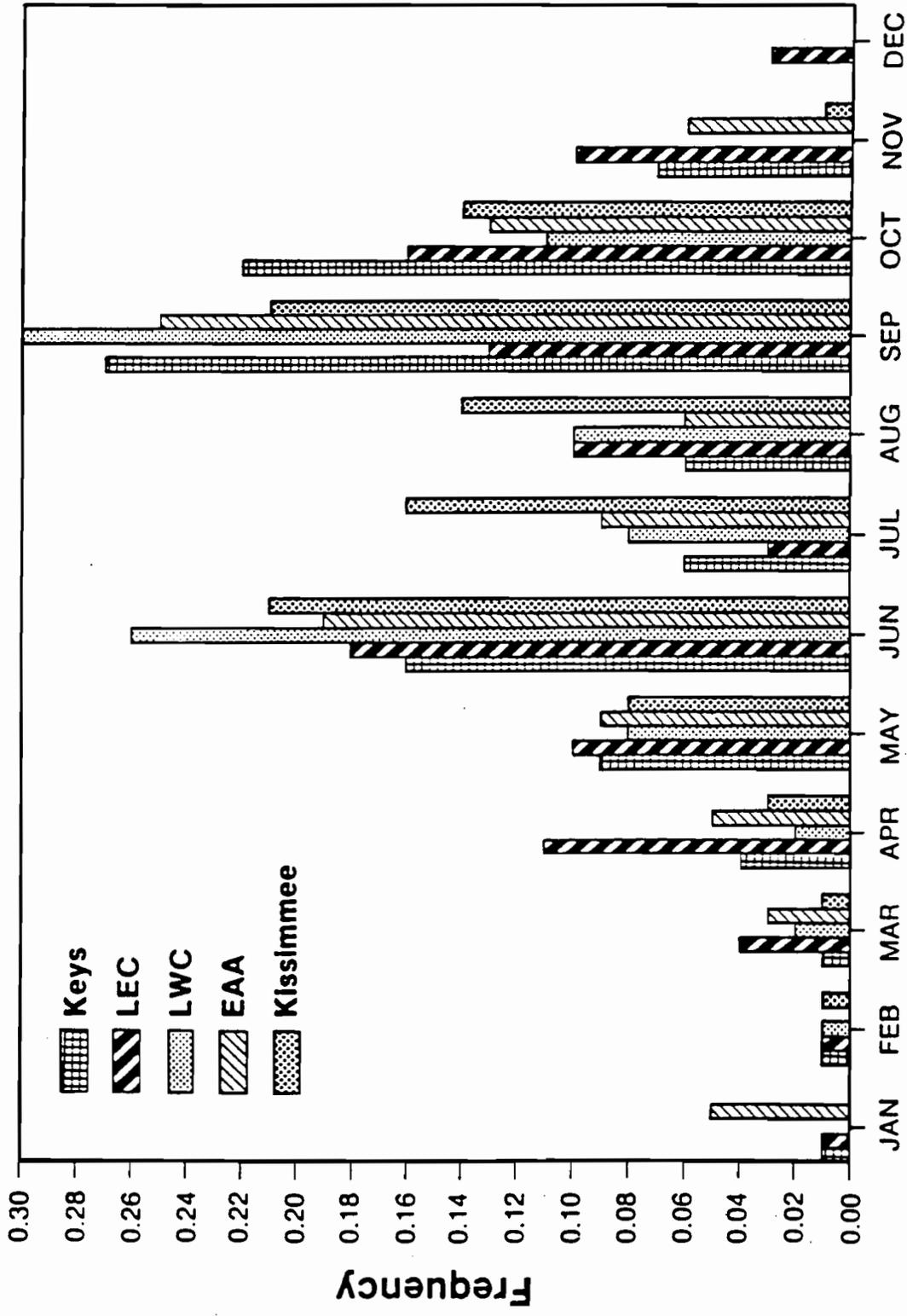


Figure 3. Distribution of Maximum Three Day RF Events

For a specified sample size and the computed maximum difference, a level of significance (α) of the goodness-of-fit can be estimated. For a significance level α , there is a $100 * (1-\alpha)\%$ chance that the population does not follow a specific distribution. In this analysis, 50 percent of the rainfall stations had a significance level of 0.69 or greater for the 1-day maximum events. For the 3-day events, 50 percent of the stations had a significance level of about 0.78. This indicates that over 50 percent of the stations had less than or equal to a 31 percent chance of not following Gumbel distribution for 1-day events, and less than or equal to a 22 percent chance of not following the 3-day events. The test for the 1-day and 3-day events for goodness of fit are independent of each other.

Once rainfall depths were computed, isohyetal maps were produced which illustrate the areal variation in rainfall depths associated with specific return periods and durations. Isohyetals, or lines of equal depths of rainfall, were manually drawn. Large variations in rainfall may occur between stations due to the complex interactions of large scale storm systems with mesoscale systems (1-100 kilometers) such as sea and lake breeze circulations. Rainfall intensities from large scale storm events are often enhanced (or diminished) at locations that normally favor (or resist) the formation of storms due to the mesoscale factors. Examples of regions of enhancement are along the Lower East Coast due to the sea breeze circulations, and to the south of Lake Okeechobee due to lake breeze effects. According to the results of numerical experiments (Pielke, 1974), maximum rainfall amounts, due to the sea breeze circulations interacting with the prevailing summertime southeasterly winds, normally would occur several miles inland along the Lower East Coast. These same results indicate the maximum rainfall events on the Lower West Coast would be much closer to the coastline. Examples of regions that would expect lesser maximums would be over and immediately downwind of water bodies where the air is more stable and more generally in the interior regions of South Florida. In summary, the results of this analysis indicate that regions of largest 1- and 3-day duration maximum events occur in many of the same regions that would be greatly enhanced by mesoscale circulations, and illustrate the importance that these circulations have on depicting the location and intensity of maximum storm events.

Other factors affecting the computed values at each rain gauge include the number and period of the years that quality record was available at the gauge, the type of rain gauge being used, the exposure of the rain gauge, and how well the Gumbel distribution fits the data at a particular gauge. It is difficult to account for all the variations that occur between stations. When station values differ significantly from those of nearby stations, the data of this station was checked to verify the cause of the disparity, and to decide whether this gauge indeed included reliable data. In regions that data was sufficient, only stations with greater than 30 years of record were considered.

Figures 4-8 include the 1-day rainfall totals for the 3-, 5-, 10-, 25-, and 100- year return period events, while figures 9-11 include the 3-day rainfall totals for the 10-, 25-, 100-year return period.

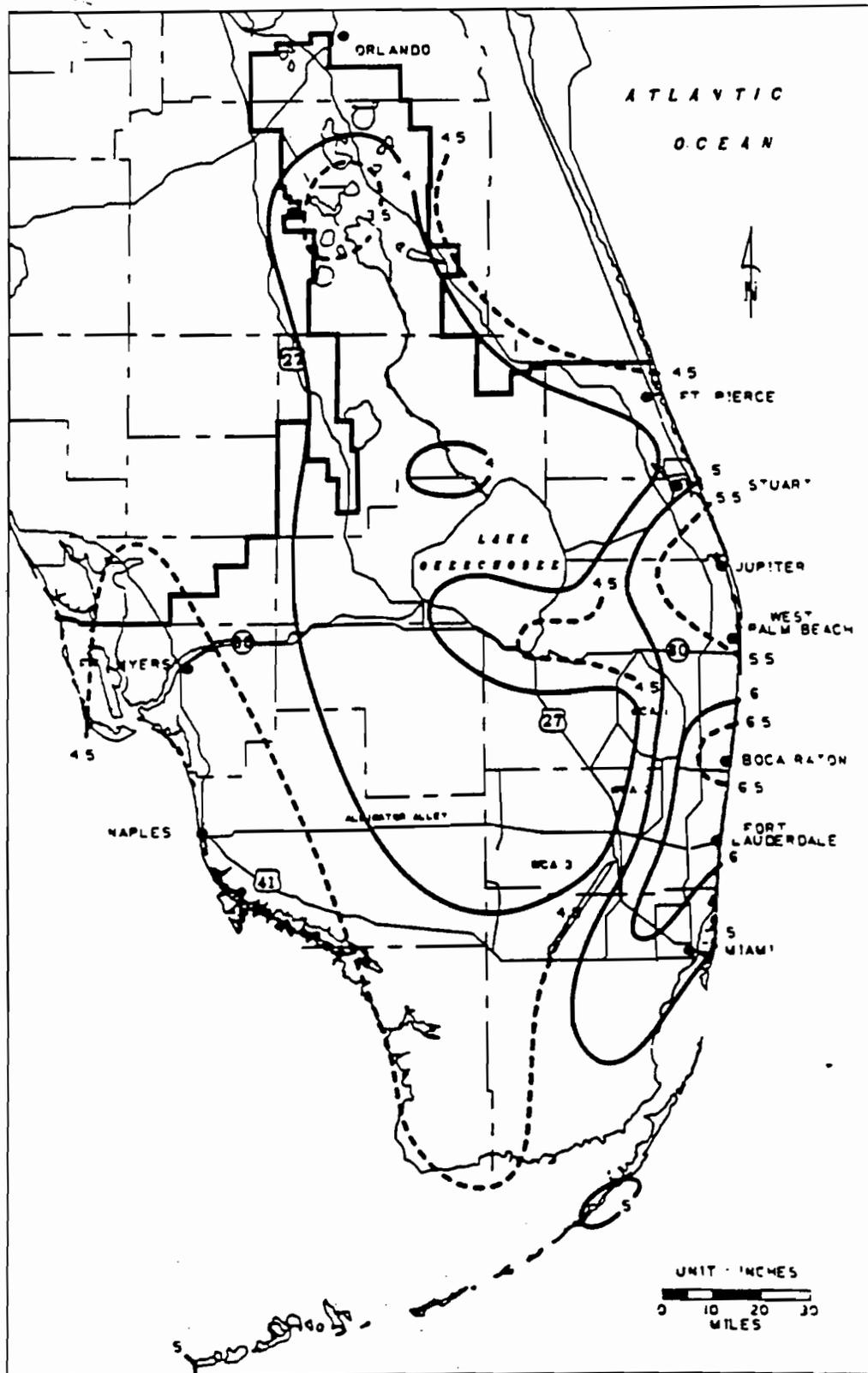


Figure 4. 1-Day Rainfall: 3 Year Return Period

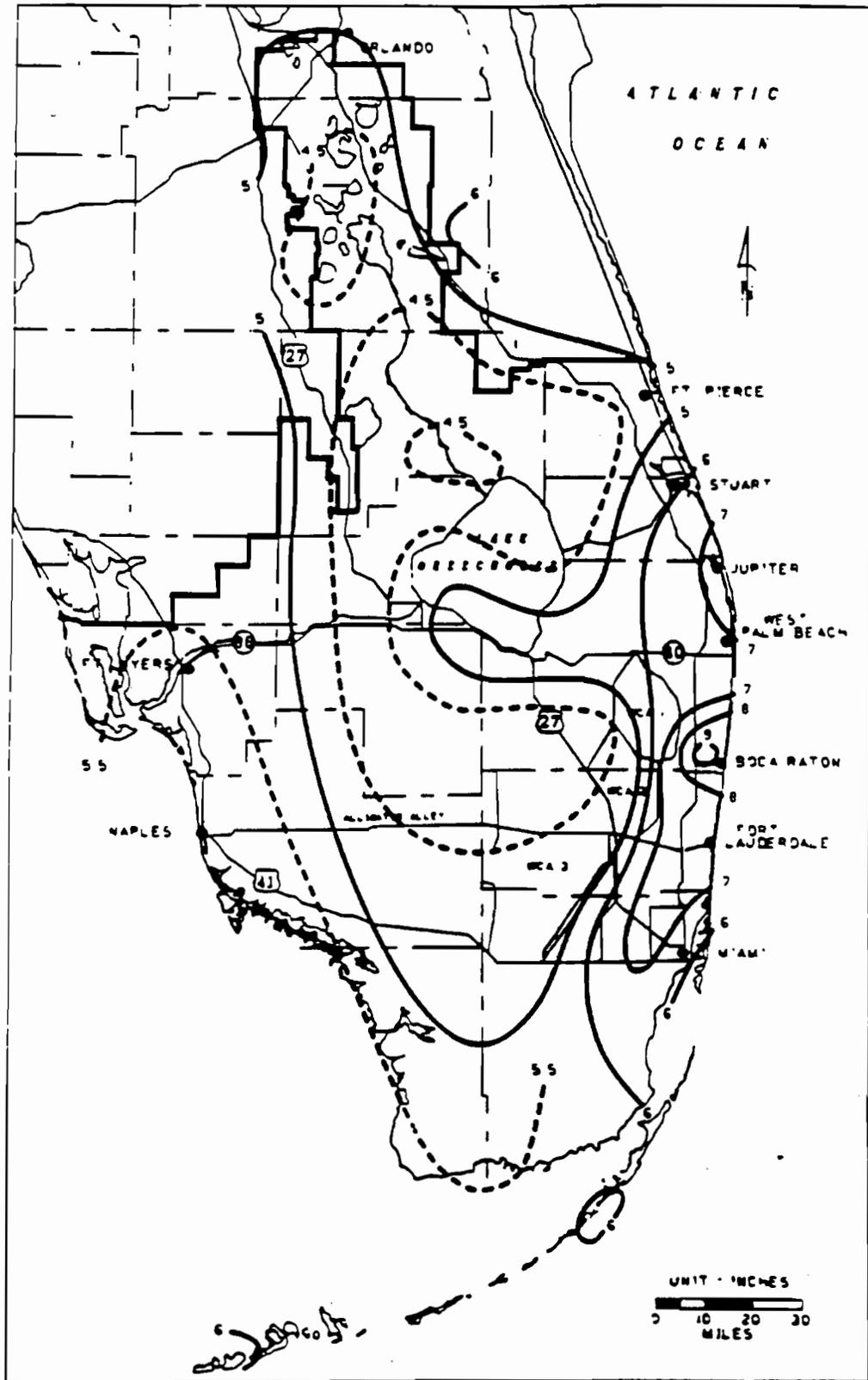


Figure 5. 1-Day Rainfall: 5 Year Return Period

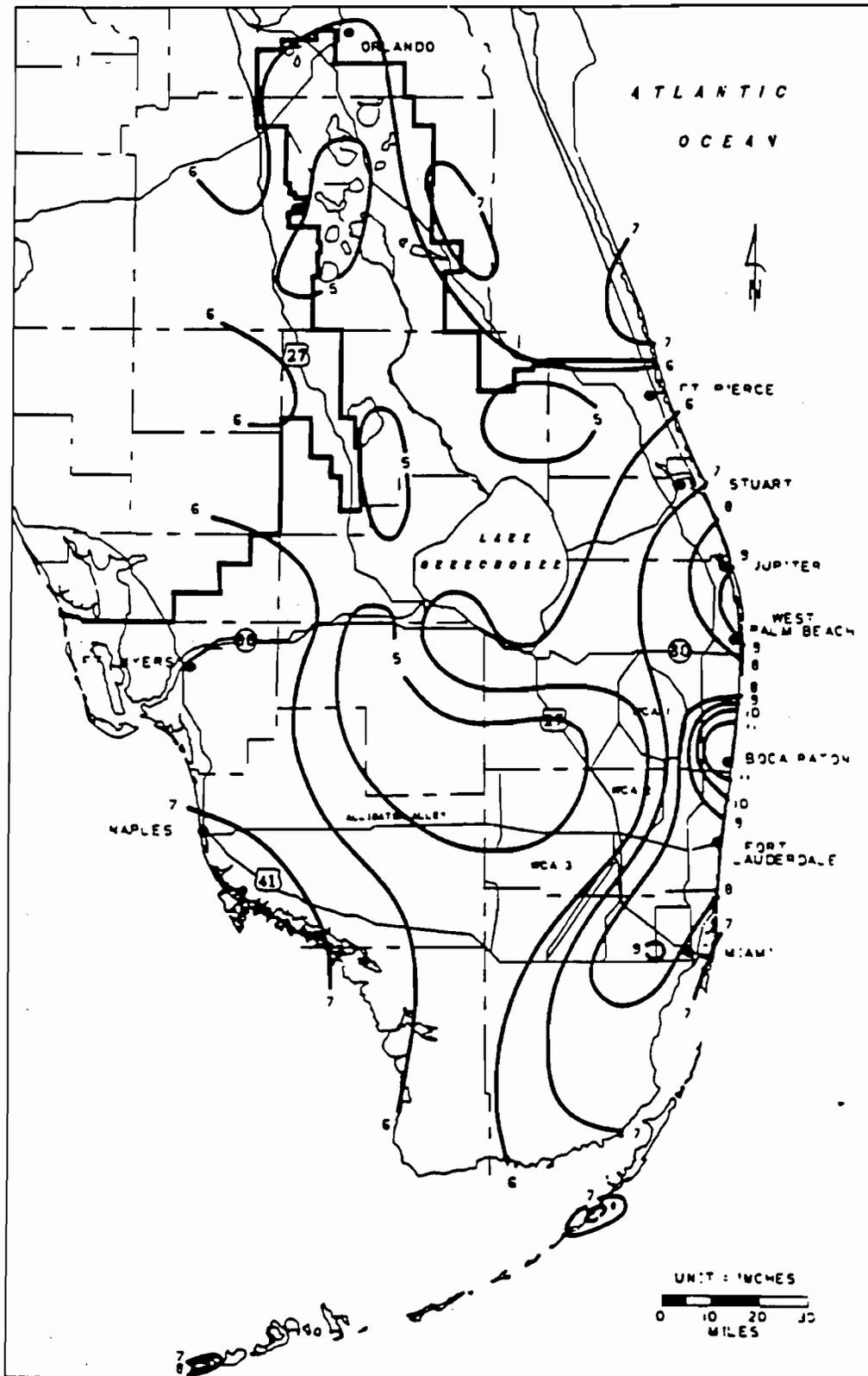


Figure 6. 1-Day Rainfall: 10 Year Return Period

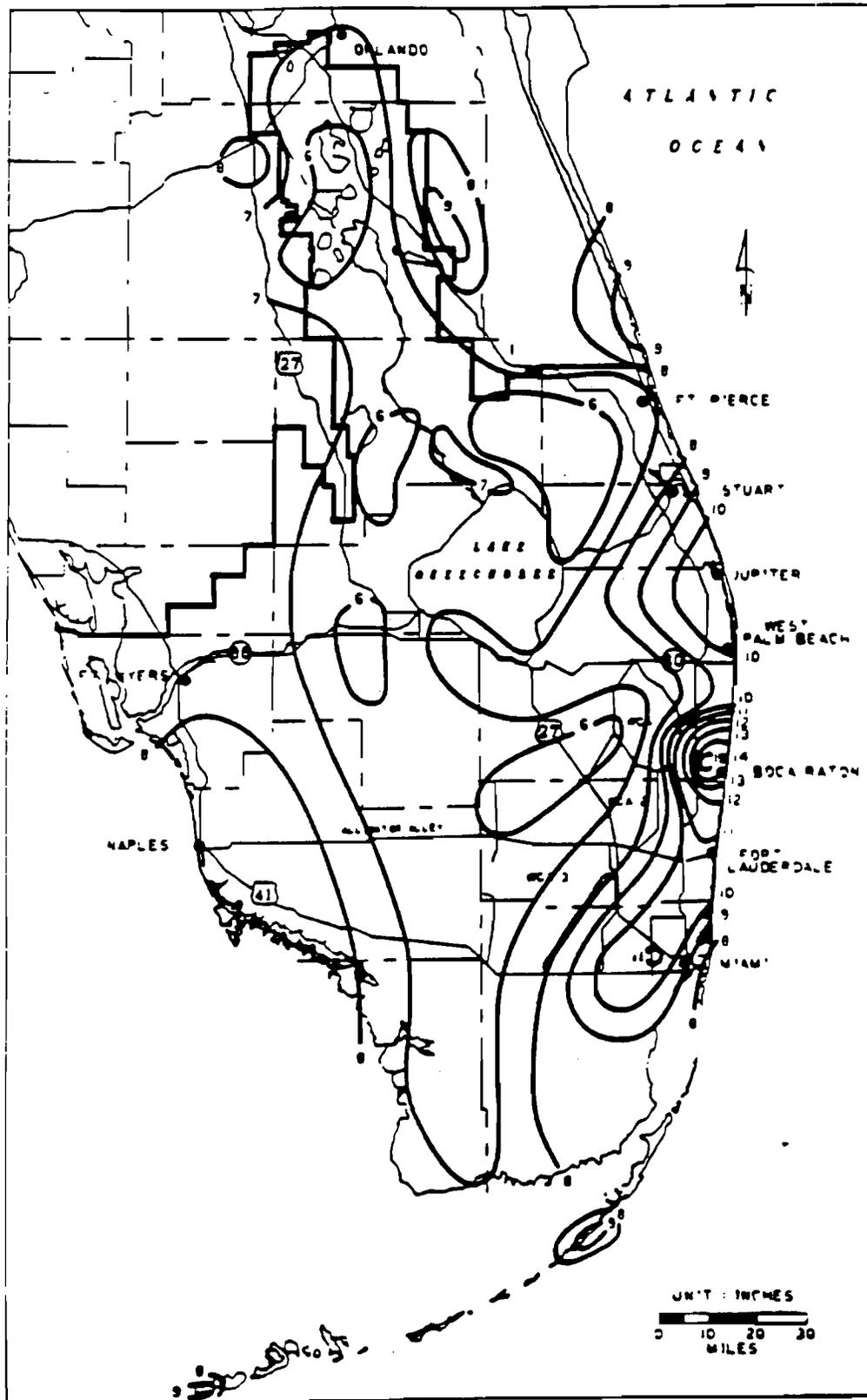


Figure 7. 1-Day Rainfall: 25 Year Return Period

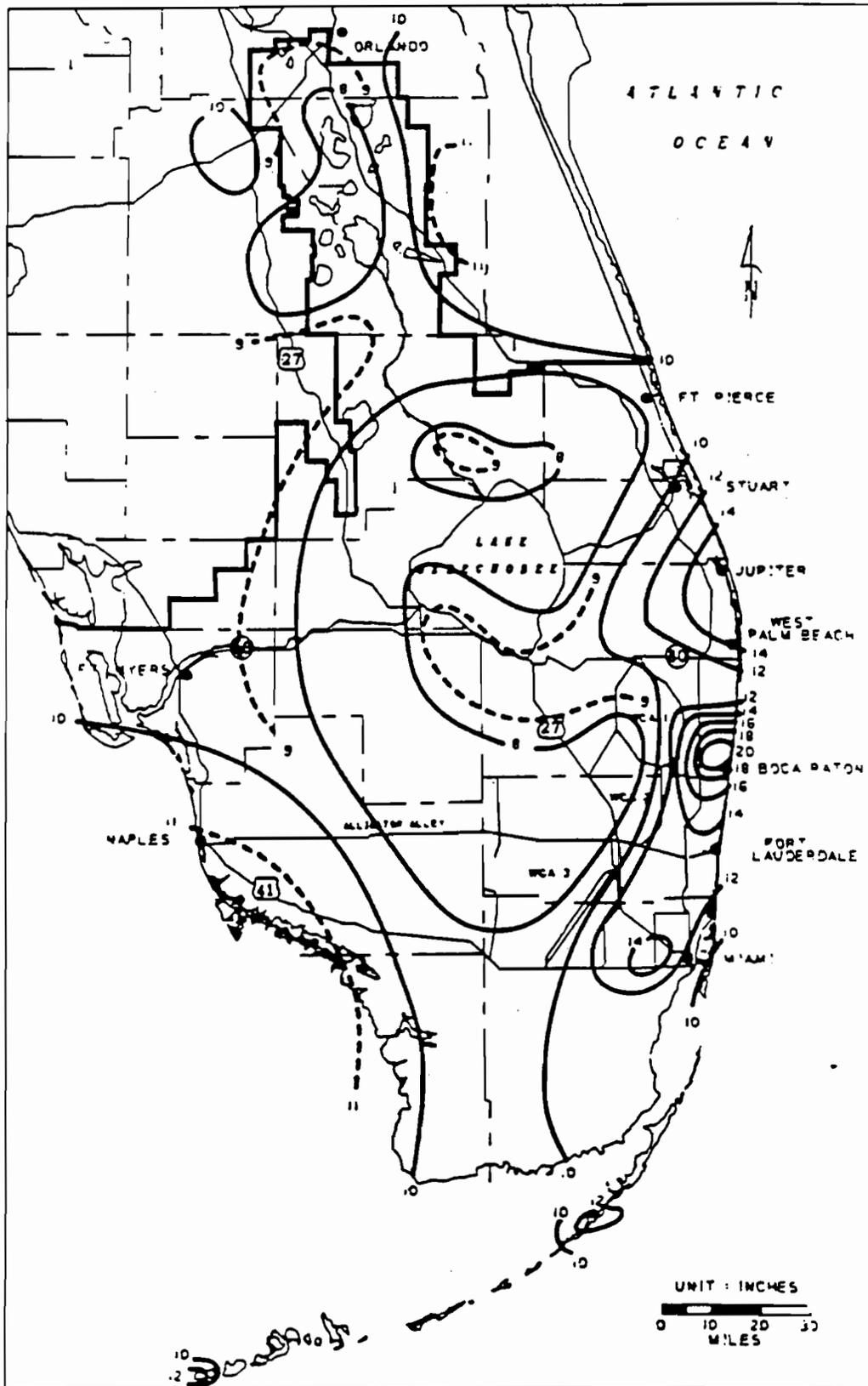


Figure 8. 1-Day Rainfall: 100 Year Return Period

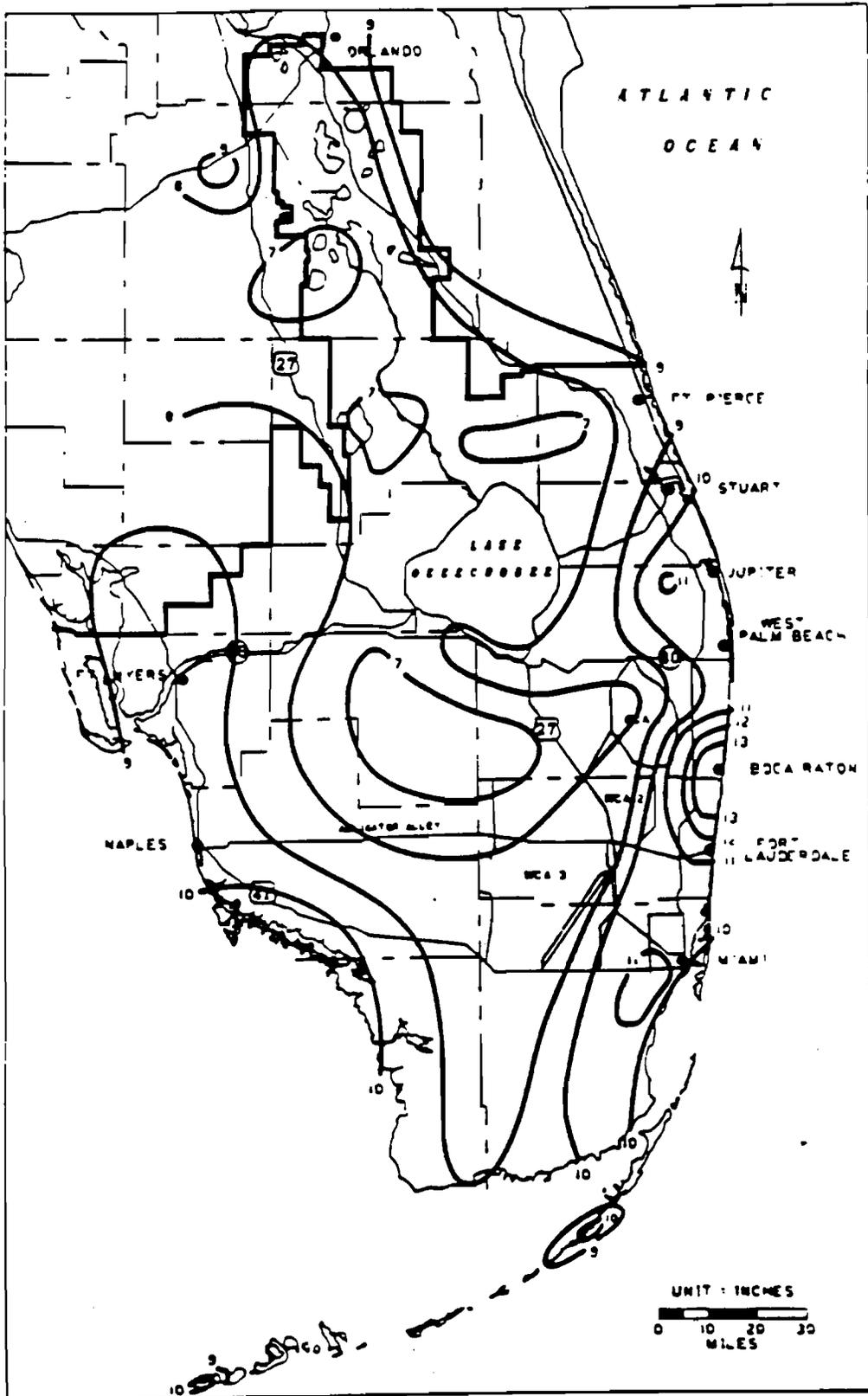


Figure 9. 3-Day Rainfall: 10 Year Return Period

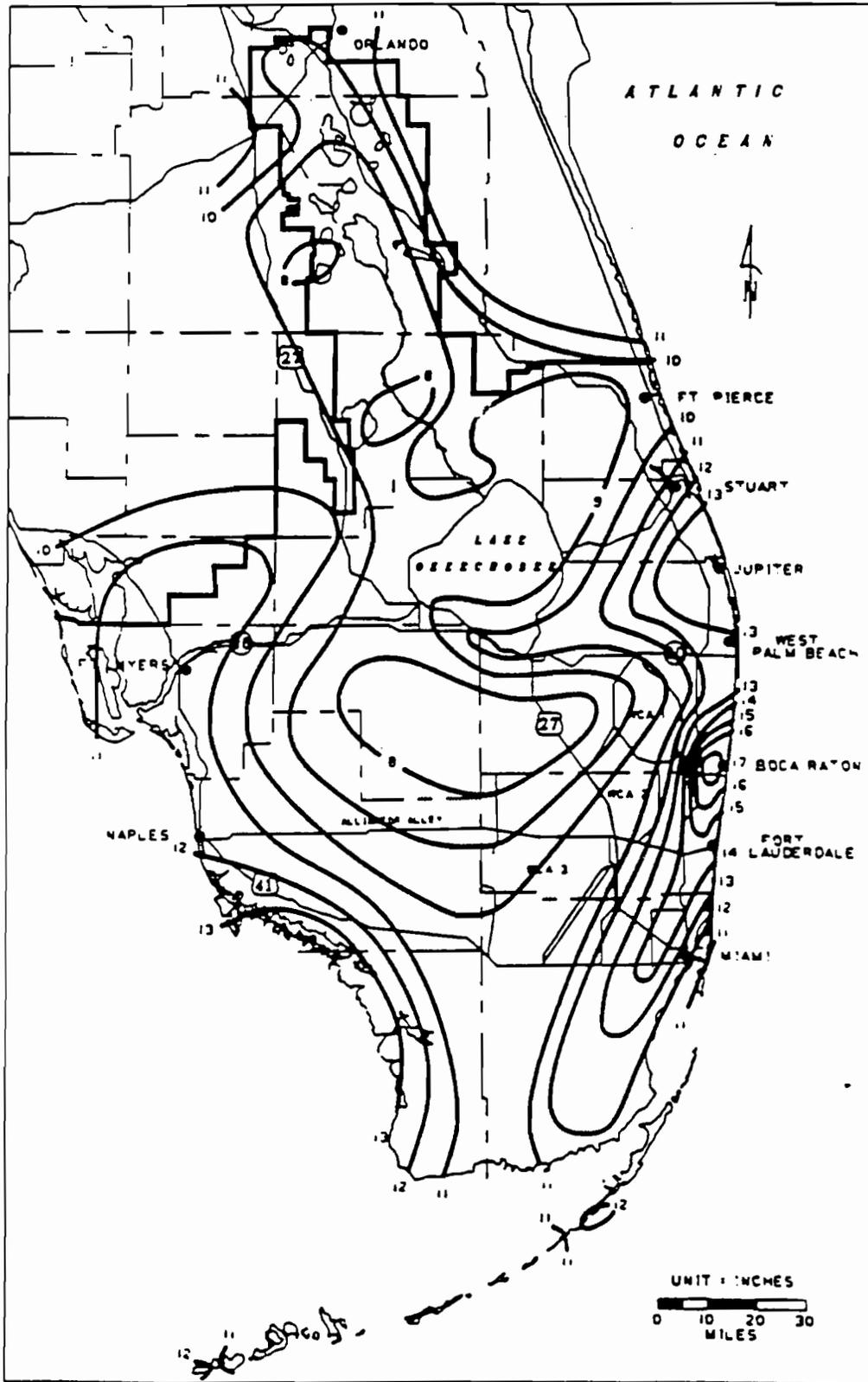


Figure 10. 3-Day Rainfall: 25 Year Return Period

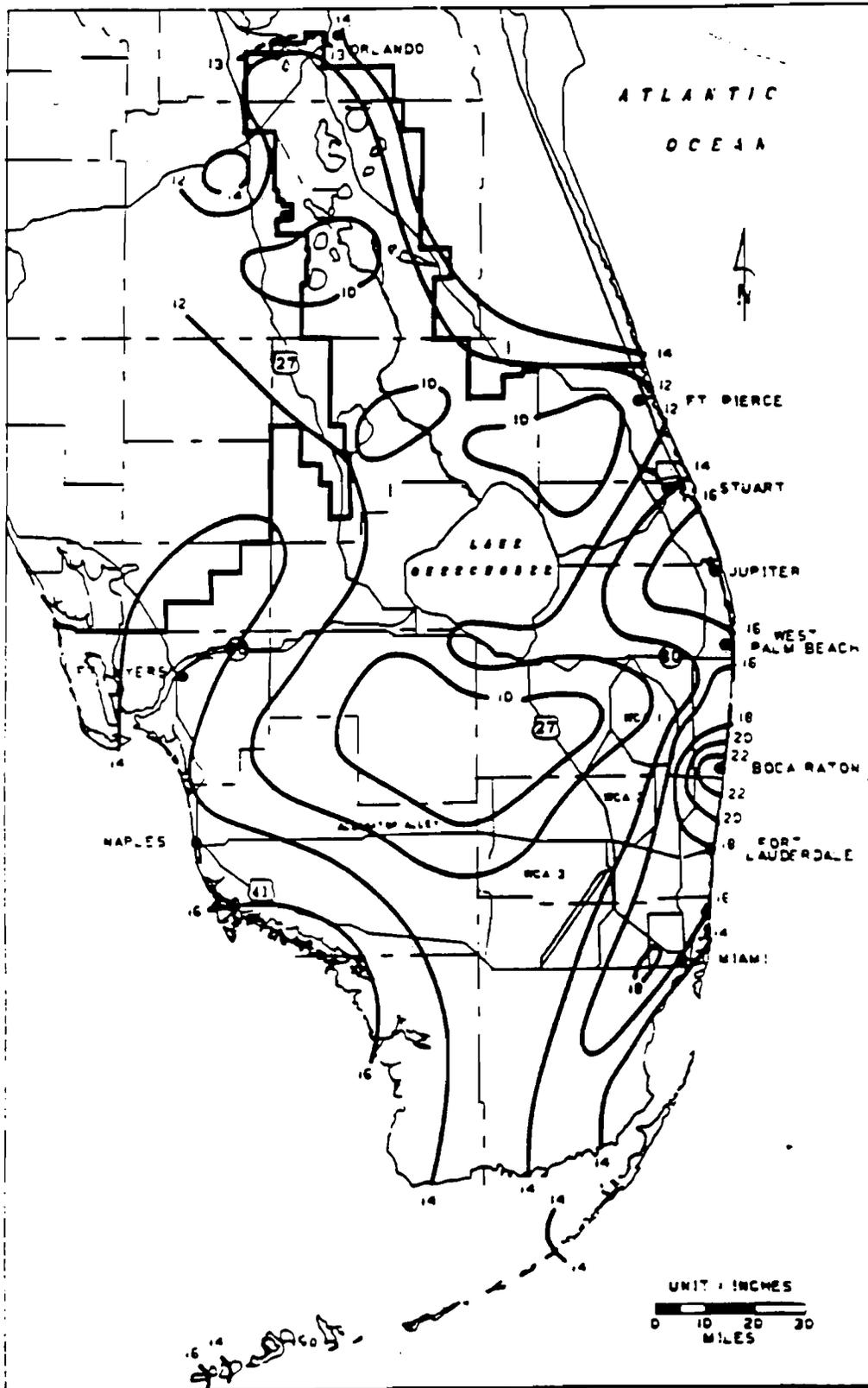


Figure 11. 3-Day Rainfall: 100 Year Return Period

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VI. SUMMARY

The inclusion of additional rainfall gauges, and the greater number of years of record available, allowed greater reliability and detail to be included in the isohyetal maps than earlier District analysis. The general pattern of larger maximum rainfall events along the coastal regions, particularly the Lower East Coast, still exist with only minor changes in the computed extreme events.

Additional gauges with 20 years record in the interior regions, especially in the lower Kissimmee Valley region, allowed for additional detail to be added to these maps in this region. The last 20 years have tended to be drier in the interior sections of south and central Florida which also lowered the maximum expected values of the computed extreme events in this region.

The precipitation regime over Lake Okeechobee and the surrounding ocean is completely different than that over the land mass of Florida. These maps were generated based on measurements taken over land mass and should not be used to estimate rainfall over Lake Okeechobee or nearby marine areas.

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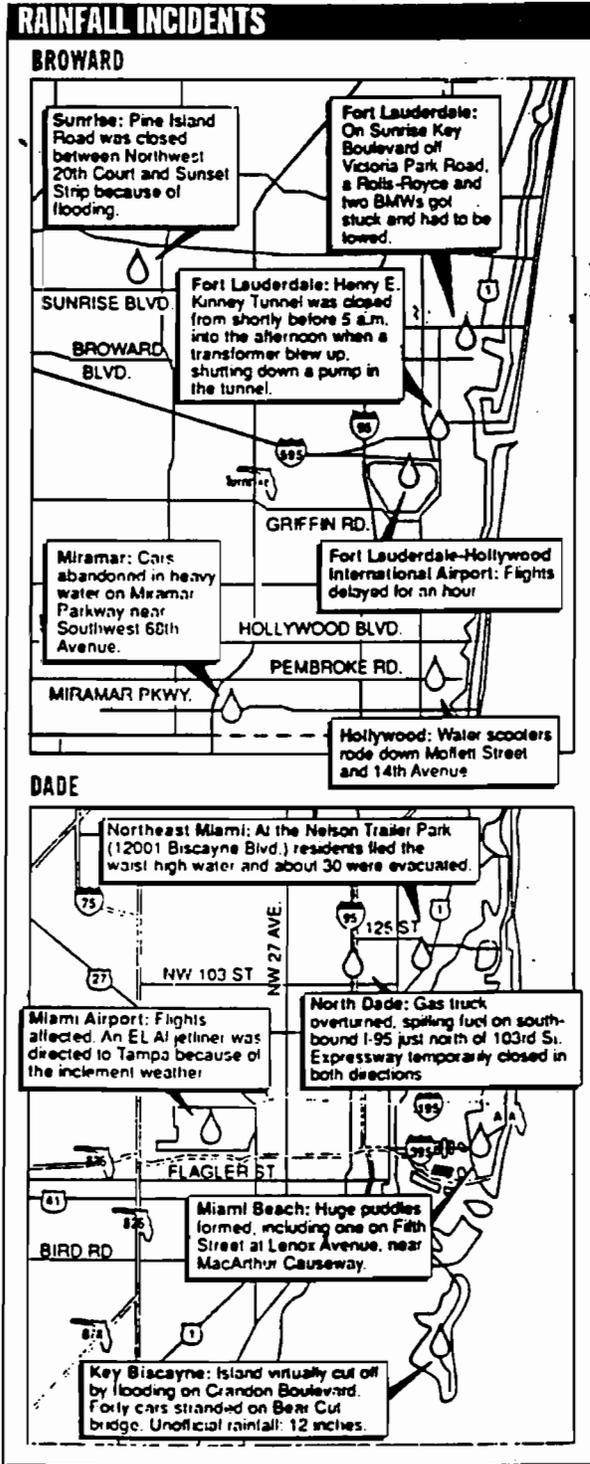
APPENDIX
Rainfall Station Basic Information

| NOF | X-COORDINATE | V-COORDINATE | STATION NAME | COUNTY | # OF YEARS | PERIOD OF RECORD |
|------|--------------|--------------|---|--------------|------------|------------------|
| 101 | 760265 | 747202 | BOCA RATON RD. @ MARAGELINE CLUDD | PALM BEACH | 30 | 1940-1990 |
| 102 | 776952 | 740543 | BOCA RATON @ POWERLINE CLUDD | PALM BEACH | 31 | 1928-1990 |
| 104 | 701828 | 691200 | POMPANO FARMS MARKET | BROWARD | 26 | 1937-1990 |
| 109 | 762544 | 643210 | DIXIE WATER PLANT | BROWARD | 26 | 1937-1990 |
| 109 | 752096 | 640335 | SCHELL'S LOCK | BROWARD | 28 | 1937-1990 |
| 114 | 752148 | 620213 | GILL REALTY | BROWARD | 28 | 1937-1990 |
| 115 | 682565 | 620263 | S-9 PUMP S. NEW RIVER CANAL | BROWARD | 28 | 1940-1990 |
| 117 | 715639 | 543205 | MIAMI FIELD STATION | DIXIE | 23 | 1965-1990 |
| 12 | 416025 | 1423525 | BROOKS PROPERTY | OSCEOLA | 25 | 1962-1990 |
| 124 | 656791 | 362549 | C-111 BELOW S10-C NEAR FLORIDA CITY | DIXIE | 20 | 1967-1990 |
| 125C | 521033 | 073020 | TOWNSITE U.S. SUGAR | PALM BEACH | 44 | 1929-1972 |
| 135 | 625901 | 915303 | PELICAN LAKE DRAINAGE DISTRICT #1 | PALM BEACH | 26 | 1937-1990 |
| 137 | 642244 | 901321 | PANORAMA 1 | PALM BEACH | 27 | 1937-1990 |
| 138 | 654786 | 090764 | PANORAMA 2 | PALM BEACH | 28 | 1937-1990 |
| 16 | 386437 | 1303659 | S-61 SPILLWAY ON C-35 AT LAKE TOWN | OSCEOLA | 21 | 1965-1989 |
| 20 | 329408 | 1969272 | ST. CLAIR RESORT / LAKE MARION (RELFORT) | POLK | 23 | 1965-1990 |
| 206 | 287610 | 026801 | LEHIGH ACRES 1 | LEE | 29 | 1960-1990 |
| 227 | 273503 | 068071 | S-79 SPILLWAY & LOCK ON CALOOSAHATCHEE RIVER | LEE | 29 | 1965-1990 |
| 242 | 356865 | 723499 | SOUTH FLORIDA FIELD LAB - USDA INDOOR | COLLIER | 28 | 1959-1990 |
| 243 | 302280 | 742319 | CORALSREEN SWAMP AT SANCTUARY HEADQUARTERS | COLLIER | 29 | 1959-1990 |
| 250 | 294334 | 065035 | ALVA FARMS / VODER BROS. | LEE | 20 | 1960-1990 |
| 27 | 436062 | 1261202 | S-65 SPILLWAY ON LAKE KISSIMEE AT C-38 | OSCEOLA | 21 | 1965-1990 |
| 301 | 006048 | 066561 | PLANT INTAKE - CITY OF WEST PALM BEACH | PALM BEACH | 40 | 1944-1990 |
| 32 | 456226 | 1200640 | S-65A SPILLWAY ON C-38 | OSCEOLA | 21 | 1965-1990 |
| 33 | 377178 | 1211052 | LAKE MARBUCCLE NEAR MAJOR PARK | POLK | 20 | 1965-1989 |
| 35 | 436787 | 1151538 | S-65B SPILLWAY & LOCK ON C-38 | OKEECHOBEE | 20 | 1965-1990 |
| 37 | 657594 | 1102720 | FT. PIERCE FIELD STATION | ST. LUCIE | 24 | 1965-1990 |
| 38 | 462596 | 1114447 | S65-C SPILLWAY ON C-38 | OKEECHOBEE | 20 | 1966-1990 |
| 4001 | 549280 | 1132131 | WILLIAMSON DITCH AT S-27 NEAR OKEECHOBEE | OKEECHOBEE | 26 | 1955-1983 |
| 4002 | 525414 | 1118073 | TAYLOR CREEK - BASSETT 2 | OKEECHOBEE | 26 | 1955-1983 |
| 4003 | 545793 | 1107892 | TAYLOR CREEK - BAULERSON 3 | OKEECHOBEE | 25 | 1955-1983 |
| 4005 | 540578 | 1094058 | TAYLOR CREEK - DIXIE 5 | OKEECHOBEE | 28 | 1955-1983 |
| 4006 | 559331 | 1097307 | TAYLOR CREEK - MOBLEY 6 | OKEECHOBEE | 27 | 1955-1983 |
| 4007 | 572516 | 1095315 | TAYLOR CREEK - OPAL 7 | OKEECHOBEE | 27 | 1955-1983 |
| 41 | 418201 | 1089067 | S-68 SPILLWAY ON C-41A AT LAKE ISTOPOGA | HIGHLANDS | 22 | 1965-1990 |
| 43 | 492874 | 1083532 | S-65D SPILLWAY ON C-38 | OKEECHOBEE | 24 | 1965-1990 |
| 45 | 512728 | 1051121 | S-65E SPILLWAY & LOCK ON C-38 AT LAKE OKEECHOBEE | OKEECHOBEE | 24 | 1964-1990 |
| 46 | 463037 | 1050626 | DAUGHTON | HIGHLANDS | 22 | 1960-1987 |
| 47 | 586100 | 1044413 | M85-6/S-193 ON TAYLOR CREEK AT LAKE OKEECHOBEE | OKEECHOBEE | 50 | 1938-1989 |
| 48 | 444796 | 1012322 | S-70 SPILLWAY ON C-41 AT INDIAN RESERVATION | GLADES | 22 | 1965-1990 |
| 49 | 732327 | 1009774 | S-80 SPILLWAY & LOCK ON ST. LUCIE CANAL TIDEWATER | GLADES | 23 | 1965-1990 |
| 51 | 624749 | 965965 | PORT MAYACA LOCK (CORPS OF ENGINEERS) | MARTIN | 37 | 1951-1988 |
| 52 | 470608 | 961467 | S-131 | MARTIN | 37 | 1951-1988 |
| 54 | 726000 | 934090 | PRATT & WHITNEY | GLADES | 22 | 1965-1990 |
| 55 | 619735 | 919751 | M85-5 ON LAKE OKEECHOBEE TO U.P.B. CANAL | PALM BEACH | 29 | 1957-1989 |
| 56 | 471558 | 910880 | M85-1 ON LAKE OKEECHOBEE | PALM BEACH | 34 | 1951-1988 |
| 57 | 629617 | 911780 | PELICAN LAKE DRAINAGE DISTRICT #2 | GLADES | 37 | 1951-1988 |
| 60 | 484888 | 899361 | BENBOW - U.S. SUGAR | PALM BEACH | 29 | 1957-1989 |
| 6000 | 419942 | 1623643 | SANFORD | GLADES | 45 | 1929-1973 |
| 6001 | 423288 | 1623573 | SANFORD EXPERIMENT STATION | SEMIHOLE | 42 | 1913-1956 |
| 6002 | 281243 | 1842307 | EUSTIS 25 | SEMIHOLE | 32 | 1956-1989 |
| 6003 | 249059 | 1587870 | CLERMONT | LAKE | 53 | 1900-1958 |
| 6004 | 105297 | 1387048 | HILLSBOROUGH RIVER STATE PARK | LAKE | 78 | 1900-1989 |
| 6006 | 193525 | 1349558 | LAKELAND WA CITY | HILLSBOROUGH | 27 | 1943-1969 |
| 6007 | 287513 | 1297131 | BARTON | POLK | 71 | 1915-1989 |
| 6009 | 288943 | 136988 | LAKE ALFRED - EXPERIMENT STATION | POLK | 77 | 1895-1989 |
| 6010 | 305910 | 1310403 | MOUNTAIN LAKE | POLK | 60 | 1924-1989 |
| | | | | POLK | 52 | 1935-1984 |

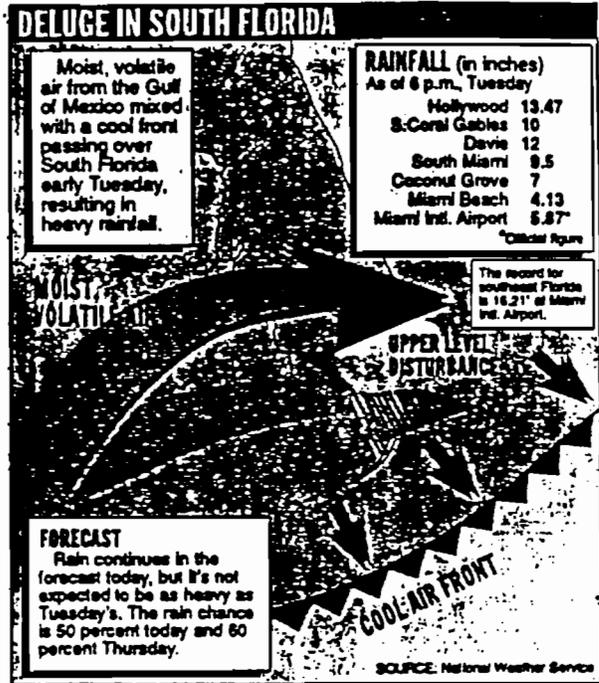
| BRF | X-COORDINATE | Y-COORDINATE | STATION NAME | COUNTY | # OF YEARS | PERIOD OF RECORD |
|------|--------------|--------------|--|--------------|------------|------------------|
| 6011 | 335930 | 1276041 | BARBSON | POCK | 34 | 1947-1989 |
| 6012 | 235413 | 1175990 | MARICHA LA 2N | HARDEE | 54 | 1933-1989 |
| 6013 | 333099 | 1185133 | CITY OF PANAM PARK | HIGHLANDS | 72 | 1892-1989 |
| 6014 | 333392 | 1107293 | DESOTO CITY 85W | HIGHLANDS | 34 | 1925-1989 |
| 6015 | 218370 | 1054921 | ARCADIA | DESOTO | 68 | 1907-1989 |
| 6016 | 157880 | 946317 | PUNTA GORDA | CHARLOTTE | 47 | 1914-1965 |
| 6018 | 553473 | 1556879 | TITUSSVILLE 2H | BREVARD | 70 | 1901-1989 |
| 6019 | 500000 | 1708412 | MILITARY 15 | OSCEOLA | 31 | 1942-1972 |
| 6020 | 553988 | 1181211 | FORT DRUM SHU | OKEECHOBEE | 31 | 1956-1989 |
| 6022 | 623624 | 1248049 | FELLSHIRE | INDIAN RIVER | 59 | 1911-1979 |
| 6023 | 687945 | 1357078 | MELBOURNE | BREVARD | 43 | 1937-1989 |
| 6024 | 330750 | 1206155 | VERO BEACH FAA AIRPORT | INDIAN RIVER | 23 | 1943-1984 |
| 6025 | 441053 | 1508125 | ISLEWORTH | ORANGE | 65 | 1916-1983 |
| 6026 | 365917 | 1472053 | HART LAKE | ORANGE | 33 | 1942-1979 |
| 6027 | 365100 | 1441943 | KISSIMMEE | OSCEOLA | 44 | 1893-1959 |
| 6031 | 375491 | 1433606 | KISSIMMEE | OSCEOLA | 30 | 1948-1989 |
| 6032 | 710834 | 1072312 | LAKE PLACID 25W | HIGHLANDS | 30 | 1933-1968 |
| 6033 | 505416 | 1128713 | FORT PIERCE | ST. LUCIE | 82 | 1901-1989 |
| 6034 | 565637 | 1053946 | OKEECHOBEE 9W | HIGHLANDS | 20 | 1930-1974 |
| 6038 | 471558 | 1044204 | H65-6/5-193 ON TAYLOR CREEK TO LAKE OKEECHOBEE | OKEECHOBEE | 32 | 1948-1989 |
| 6039 | 526649 | 910880 | H65-2 ON LAKE OKEECHOBEE | GLADES | 69 | 1918-1989 |
| 6042 | 621618 | 880690 | CANAL POINT USOA | HENDRY | 39 | 1948-1989 |
| 6044 | 356775 | 921247 | LA BELLE | PALM BEACH | 35 | 1922-1989 |
| 6046 | 341832 | 879515 | MAPLES | HENDRY | 49 | 1929-1989 |
| 6047 | 240884 | 763455 | LAKE TRAFFORD | COLLIER | 23 | 1942-1968 |
| 6048 | 372647 | 667490 | MAPLES | COLLIER | 43 | 1942-1989 |
| 6049 | 234088 | 549519 | KEY WEST (MIX OF RECORDER AND STANDARD CH) | COLLIER | 59 | 1924-1989 |
| 6054 | 557322 | 79499 | TAMERIER | HOMOSE | 63 | 1832-1974 |
| 6058 | 736091 | 243843 | TAMERIER TRAIL AT 40 MILE BEND | DINDE | 46 | 1936-1989 |
| 6059 | 732990 | 518377 | COCONUT GROVE 7S | DADE | 45 | 1941-1989 |
| 6063 | 786202 | 476965 | MIAMI 12S S.W. | DADE | 34 | 1923-1958 |
| 6065 | 735761 | 526653 | MIAMI BEACH | DADE | 24 | 1958-1988 |
| 6066 | 734826 | 539676 | MIAMI AIRPORT WEND AP ONARA STATION 5663 | DADE | 48 | 1927-1989 |
| 6068 | 749358 | 543507 | MIAMI AIRPORT WEND AP ONARA STATION 5663 | DADE | 40 | 1948-1989 |
| 6070 | 762544 | 637485 | FT. LAUDERDALE EXPERIMENT STATION | DADE | 44 | 1941-1989 |
| 6071 | 778640 | 643218 | FT. LAUDERDALE | SPONARD | 24 | 1953-1981 |
| 6073 | 810575 | 630698 | DANIA 4 NW | SPONARD | 68 | 1912-1989 |
| 6074 | 737004 | 691381 | POMPANO BEACH | SPONARD | 28 | 1942-1973 |
| 6075 | 790907 | 806713 | HYPOLUXO | SPONARD | 43 | 1941-1989 |
| 6077 | 350156 | 856114 | LOXWATCHEE | PALM BEACH | 52 | 1890-1959 |
| 6079 | 392985 | 893022 | WEST PALM BEACH AIRPORT | PALM BEACH | 45 | 1941-1988 |
| 6080 | 113082 | 1526836 | LAKE MIAMI/SEE | PALM BEACH | 48 | 1939-1989 |
| 6082 | 743789 | 1592794 | ORLANDO MB AIRPORT | SPRING | 24 | 1939-1964 |
| 6091 | 810124 | 801290 | CAPTIVA | ORANGE | 31 | 1948-1989 |
| 6093 | 217472 | 1042558 | STUART 1H | LEE | 27 | 1939-1967 |
| 6100 | 467895 | 867296 | WEST PALM BEACH | MARTIN | 45 | 1935-1989 |
| 6107 | 633984 | 817624 | FT. MEYERS | PALM BEACH | 26 | 1929-1960 |
| 6118 | 457793 | 898249 | LIBERTY POINT - U.S. SUGAR | GLADES | 75 | 1851-1989 |
| 6119 | 620845 | 382765 | ROYAL PALM RANGER | GLADES | 45 | 1929-1973 |
| 6126 | 528210 | 824768 | DEVIL'S GARDEN TOWER (DUPLICATES) | GLADES | 24 | 1958-1988 |
| 62 | 526649 | 844509 | BELLE GLADE EXPERIMENT STATION | GLADES | 38 | 1949-1989 |
| 63 | 534089 | 233637 | FLAMINGO | GLADES | 25 | 1956-1989 |
| | | 427084 | HOMESTEAD EXPERIMENT STATION | GLADES | 62 | 1924-1989 |
| | | 880690 | H65-2 ON LAKE OKEECHOBEE AT CLEMISTON | GLADES | 24 | 1962-1989 |
| | | 872719 | CLEMISTON FIELD STATION | GLADES | 37 | 1910-1989 |
| | | | | GLADES | 37 | 1951-1988 |
| | | | | GLADES | 20 | 1964-1990 |

| STATION NAME | X-COORDINATE | Y-COORDINATE | COUNTY | # OF YEARS | PERIOD OF RECORD |
|--|--------------|--------------|------------|------------|------------------|
| PELICAN 34 - U.S. SUGAR | 624709 | 887229 | PALM BEACH | 45 | 1929-1973 |
| RUNNOM - U.S. SUGAR | 606168 | 872233 | PALM BEACH | 32 | 1942-1973 |
| MIAMI CANAL AT HGS-3 & S-3 AT LAKE HAREBOR | 550416 | 866576 | PALM BEACH | 36 | 1913-1973 |
| HGS-4 ON LAKE OKEECHOBEE AT HILLS, & N. NEW RIVER | 563018 | 859420 | PALM BEACH | 21 | 1967-1990 |
| KISSIMEE 2 | 593020 | 860558 | PALM BEACH | 36 | 1951-1988 |
| S-80 SPILLWAY & LOCK ON ST. LUCIE CANAL FIDELMATED | 365496 | 1435884 | OSCEOLA | 25 | 1940-1972 |
| VENUS 4 SW | 732327 | 1009774 | MARTIN | 37 | 1940-1981 |
| VENUS 4 SW | 391538 | 499564 | HIGHLANDS | 36 | 1929-1971 |
| PORT MAYACA LOCK: CORPUS OF ENGINEERS) | 624749 | 963967 | MARTIN | 39 | 1940-1984 |
| HGS-2 ON LAKE OKEECHOBEE AT CLEWISTON | 526649 | 881699 | HENDRY | 40 | 1936-1989 |
| HGS-4 ON LAKE OKEECHOBEE AT HILLS, & NEW RIVER | 592686 | 860287 | PALM BEACH | 40 | 1937-1989 |
| HGS-5 ON LAKE OKEECHOBEE TO W.P.B. CANAL | 619721 | 919826 | PALM BEACH | 40 | 1940-1988 |
| SPILLWAY & LOCK ON CALOOSAHATCHEE RIVER | 400590 | 892412 | GLADES | 38 | 1936-1989 |
| FELDA - RECORDING GAUGE | 758317 | 799744 | HENDRY | 26 | 1941-1972 |
| KEY WEST WSO AIRPORT | 267390 | 91429 | HENDRY | 38 | 1941-1985 |
| LIGANUITRAE KEY - RECORDING GAUGE | 599437 | 206018 | MONROE | 27 | 1941-1974 |
| MIAMI W.B. CITY | 737977 | 502333 | MONROE | 27 | 1941-1974 |
| MIAMI AIRPORT WSHO AP CHOWA STATION 56633) | 731490 | 535110 | DADE | 69 | 1901-1983 |
| PENNSUCO SWH | 680128 | 578682 | DADE | 46 | 1935-1989 |
| BOFA RATON | 797636 | 735536 | DADE | 30 | 1941-1989 |
| ORLANDO WB AIRPORT | 392985 | 1532753 | PALM BEACH | 20 | 1940-1989 |
| NORTH NEW RIVER CANAL 2 | 651660 | 727791 | ORANGE | 40 | 1940-1989 |
| TAMIAMI CANAL AT DADE - BROWARD LEVEE | 670038 | 521196 | PALM BEACH | 25 | 1940-1981 |
| FT. MEYERS - RECORDING GAUGE | 216752 | 818636 | DADE | 21 | 1941-1966 |
| SOUTH SHORE - U.S. SUGAR | 583269 | 852796 | LEE | 32 | 1941-1989 |
| SOUTH BAY (BELFORT) | 597341 | 847274 | PALM BEACH | 32 | 1940-1972 |
| SOUTH BAY (BELFORT) | 597341 | 847274 | PALM BEACH | 27 | 1959-1990 |
| S-5A ON W.P.B. CANAL AT W.C.A.1 | 706624 | 854741 | PALM BEACH | 45 | 1929-1981 |
| ORCEMARES (LMOO) | 785339 | 831476 | PALM BEACH | 28 | 1956-1990 |
| LAKE MYRTLE (2A35) | 438597 | 1446710 | PALM BEACH | 31 | 1928-1990 |
| LAKE NORTH RD. AND E1 (LMOO) | 753669 | 828885 | OSCEOLA | 20 | 1953-1990 |
| BOYNTON RD. & MILITARY TR. (LMOO) | 786400 | 795038 | PALM BEACH | 31 | 1940-1990 |
| BOYNTON RD. & E2 (LMOO) | 771212 | 798465 | PALM BEACH | 31 | 1940-1990 |
| LATERAL 28 & RANGELINE (LMOO) | 760656 | 786988 | PALM BEACH | 32 | 1928-1990 |
| W.C.A. 1 IN LEVEE L-40 NEAR BOAT RAMP | 754166 | 793410 | PALM BEACH | 32 | 1940-1990 |
| KISSIMEE FIELD STATION | 355982 | 1438445 | PALM BEACH | 20 | 1960-1990 |
| LAKE NORTH DRAINAGE DISTRICT OFFICE (LMOO) | 782109 | 782109 | OSCEOLA | 21 | 1964-1990 |
| STONEWAKER | 786766 | 782109 | PALM BEACH | 31 | 1955-1990 |
| DELRAY RD. & E2 (LMOO) | 770999 | 574816 | PALM BEACH | 23 | 1953-1979 |
| LATERAL 32 & RANGELINE (LMOO) | 771113 | 771605 | DADE | 32 | 1928-1990 |
| MILLSBORO CANAL AT S-6 NEAR SHARANO | 777391 | 777391 | PALM BEACH | 31 | 1955-1990 |
| S-8 SPILLWAY ON MIAMI CANAL | 681286 | 777786 | PALM BEACH | 27 | 1960-1990 |
| | 573893 | 726262 | PALM BEACH | 22 | 1962-1990 |

S. Florida does the wave



BERT GARCIA, MIAMI HERALD STAFF

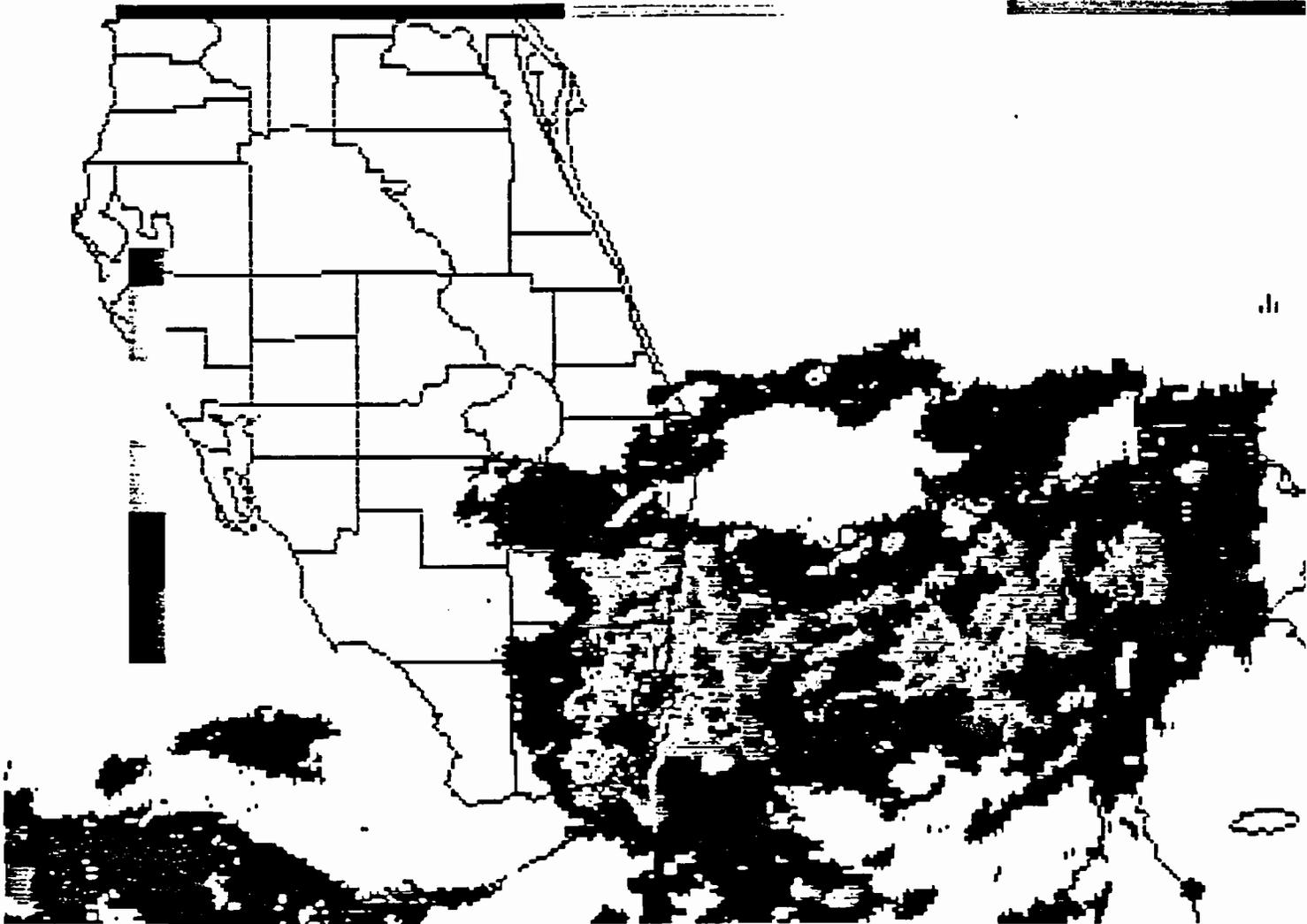


PATTERSON CLARK / Miami Herald Staff

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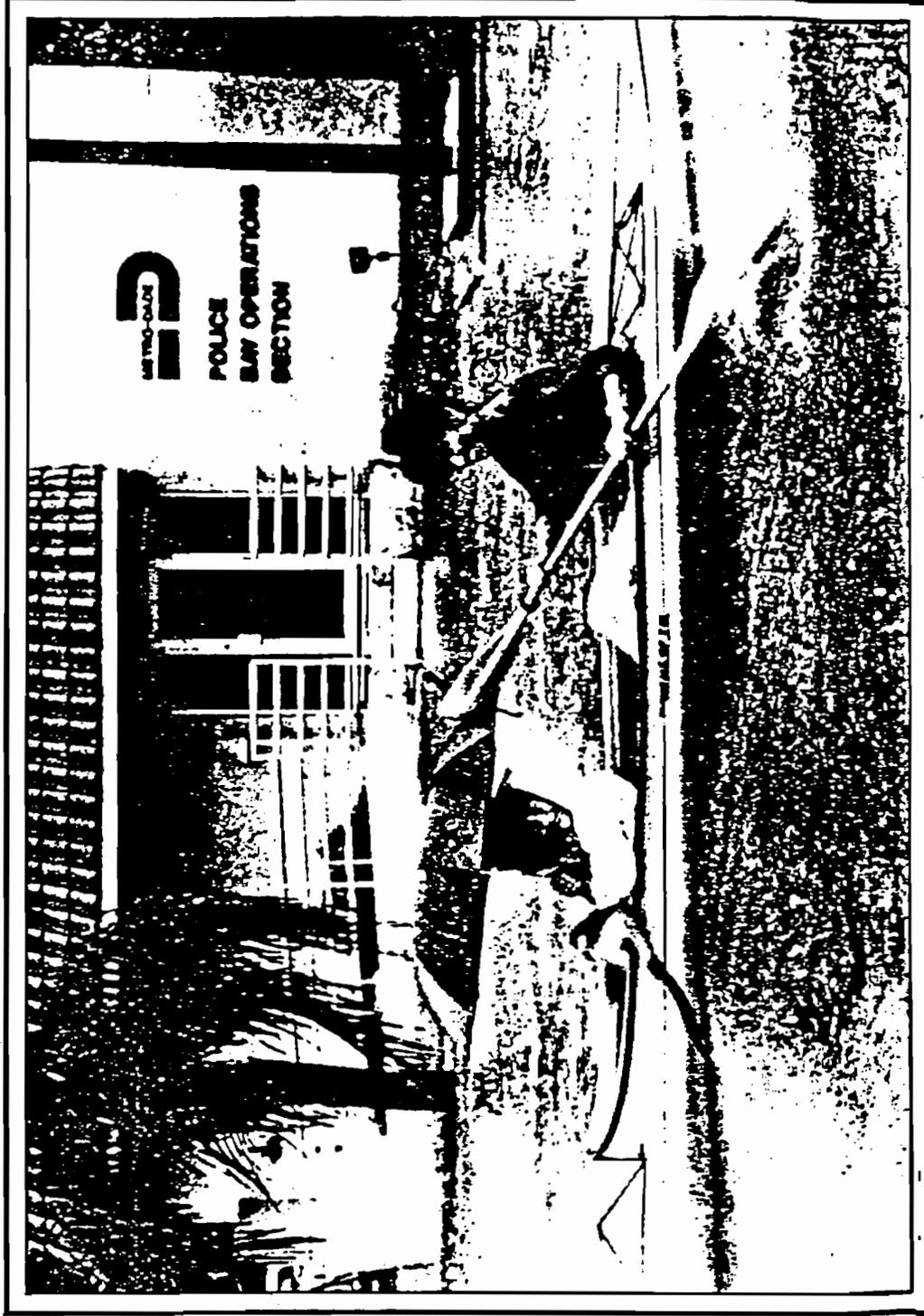
The ISLANDER NEWS

The Life and Times of Key Biscayne, Florida

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Thursday, October 10, 1991

35 cents



An intrepid kayak owner made the most of the severe rain that began early on Tuesday morning, and paddled her children across Lake Winn Dixie. The store closed later in the day when water began washing inside.

10/10/91

Island water logged

By LINDA THORNTON

It wasn't quite raining cats and dogs, but most oldimers said Tuesday's inundation was the worst on the island since Hurricane Betsy in the mid '60s.

Crandon Boulevard, as usual in a heavy rain, was under several feet of water in the park area. Heavy traffic piled up along Crandon Boulevard as park flooding, stalled cars and a downed tree delayed morning rush-hour drivers by as much as an hour. Without a four-wheel drive vehicle, a driver's chances of fording some of the lower areas about the island were not good. Most stalled motorists just called it a day and sloshed back home through thigh-high water.

"Lake" Winn Dixie was cresting inside the store as anxious employees fought against the waves that washed under the door. One enterprising mother was seen ferrying her children and a supermarket customer across the water in a canoe.

In the Holiday Colony section, residents whose houses border East Heather Drive and East Drive were reporting flooding in their homes. Those streets, as were many others east and west of Crandon Boulevard, were almost impassable except by large, four-wheel drive vehicles.

All about the island, tow trucks were

doing a brisk business, with at least 40 cars stranded by noon.

Power flickered on and off throughout most of the day, with some parts of the island reporting outages. A chamber of commerce meeting was called off at the Sonesta Beach Hotel after the hotel had trouble with its generator. The Village Board of Trustees also called off 6 p.m. meeting.

Only 250 of the 550 students at Key Biscayne Elementary School came on Tuesday. Despite the high absence rate, classes continued on schedule.

"We're having a normal school day," said Bob Widergren, assistant principal. "When something like this happens, the kids go crazy."

St. Christopher's by-the-Sea Montessori School held classes for 22 of their 94 students.

"We're going to have them go home at noon because the lights are flashing on and off," said director Kate Hubbell. "We're also getting some water in the school so we think it's best to let them go home."

Residents who didn't have to negotiate the drive to the mainland made the best of the matter, rolling up their pants legs and slogging through the sometimes thigh-high waters.

On Galen Drive, resident Kathye Susnjer found the simple task of walking out into

her condominium parking lot enough to earn her celebrity status. "I put on my aqua shoes and was knee-deep in water," said Susnjer. "In the time it took me to walk to my car, four people stopped and took my photograph."

Marie Swindall of Curtiswood Drive worried about cars trying to avoid high water by cutting onto the higher ground at her corner of West Enid. She had recently installed a septic tank, and was afraid the cars would sink in the water-logged, soft ground around the tank.

Louie Archambeau of the Williamsburg Apartments on Sunrise Drive said he woke up Tuesday morning to find all the cars in the parking lot inundated -- his own with six inches of water inside the car. Like many of those whose cars were submerged in the flood, he worried about what would happen after the deluge.

"My father once drove a car around for a month that had been flooded and then it died. I'll have to find out if there's water inside the transmission case, drain it, and flush it out."

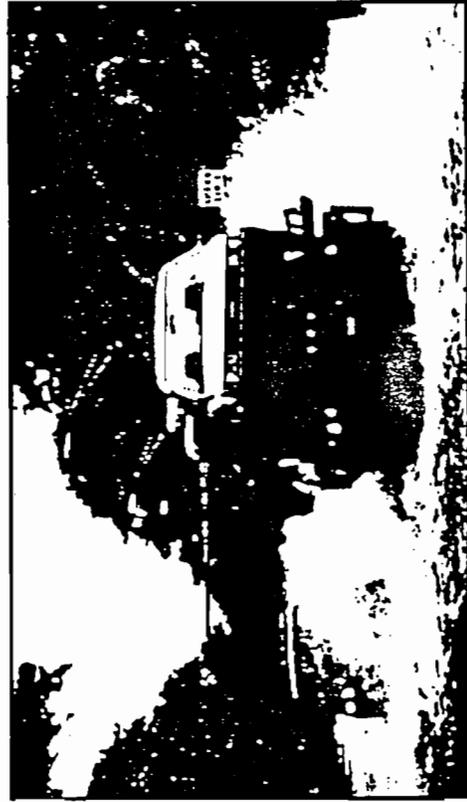
Archambeau, the assistant manager of the apartments, said he was watching one downstairs corner apartment to make sure water didn't run under the door.

Please turn to RAIN p. 2

il with MAST p. 11

INSIDE

| | | | |
|----------|----|---------------------|----|
| Opinion | 6 | Key people | 12 |
| Calendar | 8 | Beach combings | 21 |
| Births | 8 | Sports and outdoors | 23 |
| Deaths | 12 | Unclassifieds | 31 |



Left, one of the many low trucks that made a killing on stranded Key motorists Tuesday also created problems for drivers on Crandon Boulevard, sending waves of water washing over smaller vehicles.
Bottom, Harbor Drive at Crandon Boulevard was representative of most Key streets on Tuesday.
Right, Mariana Dominguez found where there was a will there was a way to get work during the deluge.

PHOTOS BY A. MONTERO-ORRISON



RAIN

While some residents at Williamsburg were trying to figure out how to dry everything from water-logged moving pads to bulletproof vests that had gotten soaked in their cars, others (on the second floor) were reportedly going with the flow by holding high water parties.

"It's kind of a madness around here," said Shell station owner Raul Llorente. "All of a sudden a lot of tow trucks appeared on the island, including one called 'Rambo,' and they pulled into the station. Now there are stalled cars and all the maids who work on Ocean Lane Drive are huddled

looks like a refugee camp."

Anxious residents flooded the police station with calls wanting to know if it was safe to go out. Meanwhile, the police were having their own problems, with all their squad cars taken off the road, and only one four-wheel drive vehicle patrolling. During rush hour the cops had to resort to borrowing a four-wheel drive vehicle from the parks department.

While the flooding was attributed to a stalled front over the Florida Straits, and predictions were calling for more of the wet stuff, some residents had definite opinions about the season for the flooding

Continued from p. 1

Some claimed it was the high tides that caused the mass flooding, while others insisted it was the extensive paving.

"It's all this concrete," said Louie Archaubeau, who remembered a similarly heavy downpour in the mid-'70s. "At that time, there was a field in back (of the Williamsburg Apartments) where there's an apartment building now, and all the rain would just run off. Now there's a wall and the water backs up. With all this macadam and cement, there's no place for the water to go."

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RAY
Gerry Boycks of
International can
Mark Twain felt
about his alleged
Connecticut news-

of my death have
exaggerated," said

Boycks, who is dis-
tancing rumors that Lipton is
of the tournament it
and produced since

The rumors started two weeks
ago when Channel 4 carried an
announcement that Lipton would
no longer be associated with the
tournament.

"The word came out as a news
leak," said Boycks. "It was an
error and that is unfortunate."

Boycks said it was true that af-
ter the 1992 tournament, Lipton
will no longer be producer and
operator of the event.

"We signed a 30-year contract
but then the ATP (Association of
Tennis Professionals) reorganized

and the contract became null
and void," said Boycks. "In
the last three years we have
been operating on a gentle-
man's agreement."

Boycks said the Interna-
tional Players Championships,
which owns the rights to the
tournament and is operated
by brothers Butch and Cliff
Buchholz, made an offer to
Lipton to continue in some
sponsorship capacity with the
tournament. While declining

Please turn to LIPTON p. 3

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Thousands of trees felled by storm in the Florida

THORNTON

what mowed down
10,000-15,000 trees
Florida State Park the
day Oct. 8, but park
rangers next morning,
Oct. 9, it was big.

There have been a funnel
effect water spout or
microbursts, "said park
ranger Frosbutter, who was
taking photos to deter-
mine how many trees, and
what area, were affected.
Thousands of trees were lit-
tered down in the path of
the thick overgrowth
that day. Some of
the trees were uprooted, while
others snapped a few feet
from the ground.

Frosbutter said he and his wife
were on the delivery of

their dog's puppies that night. The
park, like the rest of the island,
was drenched from an all-day rain
that flooded roads, homes and cars.
Frosbutter said he didn't hear
anything louder than the regular
drone of the wind through the trees
until a seagrape came crashing
down on their house by Pines Canal.

"There was wind, but there's
always wind blowing through the
pines," he said.

The other park residents, all of
whom except for the Frosbutter
live in trailers, say they didn't
hear anything other than the wind
until trees started crashing through
the trailers' metal roofs. Three
trailers were damaged by falling
trees, and one park ranger, Gor-
don Gaines, was hit on the head
when a tree crashed through his

Please turn to STORM p. 2



Cape Florida State Park manager John Frosbutter
by a violent wind last week.

Red Ribbon Week, p. 18

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10/17/91

10/17/91

Key Biscayne mops up

By NANCY RAY

The Frosbutter family cocker spaniel couldn't have picked a worse night to have her pups.

When the rain started last Tuesday night, Cockle Bells went into labor. She continued giving birth to her puppies as the storm raged on, even as a seagrap crashed through the Frosbutter's living room window in Cape Florida State Park where John Frosbutter is park manager.

"I was a wreck," said Helene Frosbutter. "We didn't have electricity for 12 hours and I had no way to keep the pups warm."

Last week's unexpected heavy rains wreaked havoc on the island but for many residents whose homes were flooded, the real tragedy began after the rains stopped.

People who live in Holiday Colony on the east side of Crandon Boulevard were particularly hard hit as the flood waters flowed through Caribbean, Atlantic and Pacific roads until early Friday. Numerous Stanley Steamer trucks were parked in front of homes as residents urgently tried to clean soggy carpets.

Linda Rose and her husband, Lee, were double whammied in their two houses on Caribbean.

"What do you do when something like this happens? You call the insurance company," said Rose. "The only problem was we had damage to the pool and septic tanks that isn't covered by insurance."

When Rose's husband attempted to leave for work Tuesday morning, his car stalled in the street. The couple spent that night in the Sonesta Beach Hotel, fearful that the water would come in the house.

"It didn't but we really had a mess with the septic tank backing up and an apartment connected to our house got a lot of water damage," said Rose.

Susan McCarthy was one of the lucky Key Biscayne Elementary School teachers who made it to school Tuesday but paid for her trip in the rain with a damaged car.

When her husband tried to leave the Key Wednesday morning, he became stuck in the one-lane traffic on Crandon Boulevard and decided to turn around and use his time fixing his wife's car. After replacing the fan motor, the automobile was back in tip-top shape.

"On Thursday, Elysa Echeverria was still wearing the sandies she said she first put on her feet Tuesday morning.

"My Florida room was flooded but I was lucky we didn't have any more damage," said Echeverria, who lives across from the elementary school on Glenridge Drive.

According to the South Florida Water Management District, the flooding occurred because the heavy rains which fell in a very short time exceeded the maximum capacity of secondary or local drainage systems. They warn it could happen again.

"The intensity of the rain was so great that there was no way to guard against this type of thing," said Tilford Creel, executive director of the SFWMD. "A major problem we did anticipate was the higher-than-normal lunar tide Tuesday, combined with strong winds blowing on shore, which prevented the water from moving to sea more quickly. We opened our flood control devices in Dade and Broward counties during the preceding low tide."

In addition to the coastal structures, all district pump stations in Dade and Broward counties have been operating at maximum capacity since the heavy rains began. No structural problems or malfunctions hampered flood-control operations.

"Most flood-control systems throughout the region were designed to handle an average of about an inch to 1-1/4 inches of rain per day, so rare storms such as these can and will overtax the whole system," said Creel.

The district has begun to assess the impact of the storm on its flood-control system, and is working with local officials of affected areas on ways to alleviate future problems.

Traffic rerouted during

Tempers flared during a rush-hour traffic jam last Wednesday on Crandon Boulevard, the day after an all-day downpour flooded numerous streets all over the Key.

Water was still deep but passable on the stretch of that road that runs through low-lying Crandon Park. Nevertheless, cautious drivers were converging over the dividing stripe into one lane, causing traffic to back up to a snail's pace.

To counteract the problem, police got the manager at Crandon Park to open up

one of the traffic cou
The park s
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northbound
Cars at
Holiday C
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people sit

TREES

roof. Gaines was not seriously injured.

Next morning, however, scores of trees blocked the roads throughout the park. Frosbutter closed the gates and rangers began the arduous, three-day task of clearing and cutting up trees.

Other damage from the storm was considerable. Power, which had been knocked out during the storm, was restored the next day. In addition, eight inches of water accumulated inside the park office, ruining the carpets. A fence around the maintenance area was knocked down. The most serious damage to the park was to the seawall, where the heavy rivulets of rain scooped out and washed away the sand, weakening the pressure against the wall and allowing the sea water to press against the concrete until it collapsed.

Fallen trees narrowly missed the park's brand new entrance office.

Although it has been a long-term goal of the state to remove the Australian pines from Cape Florida, nature took care of a good part of the job last week. But as Frosbutter pointed out, what may be good in the long-run for the park isn't necessarily good for right now.

Frosbutter said he couldn't begin to estimate how much the cleanup would cost. He

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MARINE WEATHER STATEMENT
NATIONAL WEATHER SERVICE MIAMI FL
144 PM EDT TUE OCT 8 1991

...HIGHER-THAN-USUAL TIDES WILL AFFECT SOUTHEAST FLORIDA COASTAL AREAS THROUGH WEDNESDAY OF THIS WEEK...

...A COMBINATION OF ASTRONOMICAL FORCES ALONG WITH ADDITIONAL EFFECTS OF BREEZY WEATHER CONDITIONS WILL CAUSE TIDES OF 3 TO 3.5 FEET ABOVE MEAN SEA LEVEL AT TIMES OF PREDICTED HIGH TIDES ALONG THE BROWARD AND DADE COASTLINE...

ASTRONOMICAL FORCES THAT DRIVE DAILY TIDAL FLUCTUATIONS ARE AGAIN CAUSING HIGHER-THAN-USUAL TIDES THIS WEEK ALONG THE SOUTHEAST FLORIDA COASTLINE.

THESE SO-CALLED "SPRING TIDES" WHICH ARE NOW OCCURRING HAVE A GREATER RANGE BETWEEN THE LEVELS OF DAILY HIGH AND LOW TIDES. FOR THE NEXT FEW DAYS...DURING THE PHASE OF THE NEW MOON...THE DAILY HIGH TIDES WILL BE NOTICEABLY HIGHER DUE TO THE COMBINED FULL OF THE SUN AND MOON.

ADDED TO THESE NORMAL TIDAL FORCES WILL BE THE EFFECTS OF STRONG ONSHORE-BLOWING WINDS ALONG THE COAST THROUGH TONIGHT AND TUESDAY.

THIS COMBINATION OF ASTRONOMICAL FORCES ALONG WITH ADDITIONAL EFFECTS OF THE BREEZY WEATHER CONDITIONS WILL CAUSE HIGH TIDES TO PEAK AT ABOUT 3 TO 3.5 FEET ABOVE MEAN SEA LEVEL AT TIMES OF HIGH TIDE THROUGH WEDNESDAY, OCT. 9.

THESE TIDE LEVELS WILL BE OF CONCERN MAINLY TO BOATERS...OPERATIONS AROUND MARINAS AND DOCKS...AND OTHER PROPERTY DIRECTLY AFFECTED BY TIDES ON BEACHES AND BAYS.

RECORD REPORT
NATIONAL WEATHER SERVICE MIAMI FL
500 AM EDT WED OCT 09 1991

...MIAMI INTERNATIONAL AIRPORT...

WHEN THE FRONTAL SYSTEM STALLED OVER SOUTH FLORIDA TUESDAY ... 9.59 INCHES OF RAIN WAS DEPOSITED IN THE RAINGAGE AT MIAMI INTERNATIONAL AIRPORT. THE NORMAL RAIN FOR THE MONTH OF OCTOBER IS 7.14 INCHES. THE MAXIMUM EVER RECORDED IN ONE DAY WAS 9.95 INCHES RECORDED ON OCTOBER 5TH 1948 WHEN A HURRICANE MOVED OVER THE AREA.

WITH THE DELUGE OF RAIN TUESDAY AFTERNOON THE TEMPERATURE AT MIAMI INTERNATIONAL AIRPORT ONLY REACHED 80 DEGREES. THIS TEMPERATURE SETS A NEW RECORD LOW MAXIMUM FOR THE DATE. THE PREVIOUS LOW MAXIMUM WAS 82 DEGREES SET IN 1979.

.....PUBLIC SERVICE UNIT.....

URBAN FLOOD ADVISORY
NATIONAL WEATHER SERVICE MIAMI FL
830 AM EDT TUE OCT 8 1991

THE NATIONAL WEATHER SERVICE IN MIAMI HAS ISSUED AN
URBAN FLOOD ADVISORY EFFECTIVE UNTIL 1045 AM EDT
FOR PEOPLE IN THE FOLLOWING LOCATIONS...

IN SOUTHEAST FLORIDA

...BROWARD COUNTY...DADE COUNTY

THE HEAVY RAINS OF THE PAST SEVERAL HOURS HAVE RESULTED IN LOCAL
FLOODING ACROSS THE EASTERN PORTIONS OF BOTH DADE AND BROWARD
COUNTIES.

RADAR AND SATELLITE OBSERVATIONS SHOW THAT MODERATE TO OCCASIONALLY
HEAVY RAIN WILL CONTINUE OVER PORTIONS OF SOUTHEAST FLORIDA FOR THE
FOR MUCH OF TODAY. RAINFALL AMOUNTS FROM 1 AM THROUGH 830 AM

RANGED FROM AROUND 2 INCHES AT THE MIAMI INTERNATIONAL AIRPORT UP TO
9.90 INCHES IN HOLLYWOOD...ADDITIONAL REPORTS OF 4 INCHES WERE
RECEIVED IN SOUTH MIAMI...WITH OTHER REPORTS OF 2.33 INCHES AT
MIAMI BEACH AND...2.40 AT FORT LAUDERDALE. RAINFALL ACCUMULATIONS
HAVE BEEN CONSIDERABLY LIGHTER OVER INLAND AREAS.

RAINS ARE FORECAST TO CONTINUE THROUGHOUT THE REMAINDER OF THE DAY
TODAY WITH ADDITIONAL LOCALLY HEAVY AMOUNTS ON TOP OF EXCESSIVE AMOUNTS
ALREADY RECEIVED.

FLOODED STREETS AND LOW LYING AREAS WILL LIKELY BECOME MORE OF
A PROBLEM THROUGHOUT BOTH DADE AND BROWARD COUNTIES TODAY ESPECIALLY
OVER EASTERN AREAS WHERE RAINS WILL BE HEAVIEST. RUNOFF WILL BE SLOW
WITH STANDING WATER AN INCREASING PROBLEM. STORM DRAINAGE SYSTEMS
WILL BE UNABLE TO HANDLE THE RUNOFF IN MOST AREAS WHERE RAINFALL
RATES APPROACH ONE INCH PER HOUR.

DRIVING WILL BE ESPECIALLY HAZARDOUS. BE CAREFULL WHEN DRIVING YOUR
VEHICLE INTO AREAS WHERE THE WATER COVERS THE ROADWAY. THE WATER DEPTH
MAY BE TOO GREAT TO ALLOW YOUR CAR TO CROSS SAFELY.

1067

RADAR SUMMARY
NATIONAL WEATHER SERVICE KEY WEST FL
140 PM EDT TUE OCT 3 1991

A LARGE AREA OF SHOWERS AND THUNDERSTORMS...SOME WITH VERY HEAVY RAIN...WERE OVER THE STRAITS AND THE SOUTHEAST GULF FROM 40 MILES SOUTHWEST OF KEY WEST TO 80 MILES WEST TO 70 MILES NORTHEAST OF THE DRY TORTUGAS.

SHOWERS AND A FEW THUNDERSTORMS CONTINUED OVER EASTERN DADE AND BROWARD COUNTIES.

A FEW SHOWERS AND THUNDERSTORMS WERE OVER THE STRAITS NEAR THE CAY SAL BANK AND OVER CUDAL.

MOVEMENT WAS SOUTH AT 5 MILES AN HOUR.

/7

015
WWUS35 KMIA 081742
FLZ015)023-041840-
SPECIAL WEATHER STATEMENT AND RADAR SUMMARY
NATIONAL WEATHER SERVICE MIAMI FL
140 PM EDT TUE OCT 3 1991

...FLOOD WARNING IN EFFECT FOR BROWARD AND DADE COUNTIES UNTIL 800 PM...

AT 125 PM MIAMI RADAR INDICATED LARGE AREAS OF RAIN CONTINUED OVER DADE...BROWARD AND SOUTHERN PALM BEACH COUNTIES. THESE AREAS OF PRECIPITATION EXTENDED ACROSS THE BAHAMA ISLANDS TO GRAND BAHAMA AND THE BERRY ISLANDS. THE HEAVIEST RAINFALL WAS OVER COASTAL SECTIONS OF DADE AND SOUTHEASTERN BROWARD COUNTIES.

THESE AREAS OF OCCASIONALLY HEAVY RAINFALL WERE DRIFTING SLOWLY NORTHWARD WITH THE INDIVIDUAL THUNDERSTORMS MOVING WEST AT 10 MILES AN HOUR. DUE TO THE PROLONGED PERIOD OF TORRENTIAL RAINFALL...WIDESPREAD FLOODING OF LOW LYING AREAS AND POORLY DRAINED ROADWAYS IS OCCURRING IN SOUTHEAST FLORIDA. MOTORISTS SHOULD BE EXTREMELY CAUTIOUS ABOUT DRIVING OVER COVERED ROADWAYS. WATER DEPTHS MAY TOO GREAT TO ALLOW YOUR VEHICLE TO CROSS SAFELY.

ELSEWHERE...SCATTERED SHOWERS EXTENDED FROM THE LOWER KEYS TO 15 MILES SOUTHWEST OF CAPE ROMANO.

ISOLATED SHOWERS WERE OVER NORTHERN PALM BEACH...HENDRY AND MAINLAND MONROE COUNTIES...AND BETWEEN THE SOUTHERN BAHAMAS AND THE CAY SAL BANK.

MOVEMENT WAS WEST AT 10 MILES AN HOUR.

THE MAXIMUM PRECIPITATION TOP WAS 44 THOUSAND FEET...LOCATED OVER BISCAYNE BAY JUST WEST OF ELLIOT KEY.

115

```

1
2
3
4 SQL SELECT SITE,RTYPE,SUM(AMOUNT)
5   2 FROM RAIN
6   3 WHERE SDATE BETWEEN '07-OCT-91' AND '09-OCT-91'
7   4 GROUP BY SITE,RTYPE
8   5 ORDER BY SITE;

```

| SITE | RT | SUM(AMOUNT) |
|---------------------|----|-------------|
| ARCHBOLD | M | 0 |
| AVON PARK | M | 0 |
| BONITA SPRINGS | M | 0 |
| CLEWISTON | M | .31 ✓ |
| CLEWISTON FS | M | .17 ✓ |
| EVERGLADES NP | M | 0 |
| FT LAUD FS | M | 4.69 ✓ |
| FT MYERS | M | 1.03 |
| FT PIERCE FS | M | .1 |
| FTL BEACH | M | 5.65 ✓ |
| FTL AREA | M | 10.87 ✓ |

| SITE | RT | SUM(AMOUNT) |
|---------------|----|-----------------|
| G-56 | T | |
| GA-1-8-T | M | |
| GA-111 | M | |
| GA-63 | M | |
| GA-64 | M | |
| GA-65 | M | |
| GA-66 | M | |
| HOLLYWOOD | M | 14.37 ✓ |
| HOMESTEAD AFB | M | 7.53 ✓ |
| HOMESTEAD FS | M | 4.81 |
| HOMESTEAD GEN | M | |

| SITE | RT | SUM(AMOUNT) |
|---------------|----|-------------|
| IMMOKALEE | M | .1 |
| KISSIMMEE FS | M | .35 |
| KISSIMMEE SP | M | .15 |
| MARCO ISLAND | M | 0 |
| MC COY | M | .46 |
| MIAMI FS | M | 8.3 ✓ |
| MIAMI INTL | M | 8.89 ✓ |
| N DADE | M | 6.44 ✓ |
| NAPLES FS | M | .01 |
| OKEECHOBEE FS | M | .31 |
| PBIA | M | 2.19 ✓ |

| SITE | RT | SUM(AMOUNT) |
|-------|----|-------------|
| S-123 | T | 4.91 ✓ |
| S-124 | T | 7.13 ✓ |
| S-127 | M | .06 |
| S-129 | M | .27 |
| S-13 | M | 15.59 ✓ |
| S-13 | TX | 15.58 |
| S-131 | M | .13 |
| S-133 | M | 0 |
| S-135 | M | .06 |
| S-140 | M | .15 ✓ |

| | | | |
|----|-------|----|----------------|
| 2 | | | |
| 3 | | | |
| 4 | S-140 | TX | .22 |
| 5 | SITE | RT | SUM(AMOUNT) |
| 6 | | | |
| 7 | S-153 | T | |
| 8 | S-155 | T | .22 ✓ |
| 9 | S-174 | T | 9.4 ✓ |
| 10 | S-177 | TX | 1.64 ✓ |
| 11 | S-18C | T | 3.49 ✓ |
| 12 | S-2 | M | .29 ✓ |
| 13 | S-2 | TX | .32 ✓ |
| 14 | S-20F | T | 6.46 ✓ |
| 15 | S-20G | T | 6.74 ✓ |
| 16 | S-21 | T | 5.54 ✓ |
| 17 | S-21A | T | .12 |
| 18 | | | |
| 19 | SITE | RT | SUM(AMOUNT) |
| 20 | | | |
| 21 | S-26 | T | |
| 22 | S-27 | T | |
| 23 | S-28Z | T | 3.84 ✓ |
| 24 | S-29 | T | 11.10 ✓ |
| 25 | S-29Z | T | 6.83 ✓ |
| 26 | S-3 | M | .5 ✓ |
| 27 | S-3 | TX | .58 ✓ |
| 28 | S-30 | T | 1.9 ✓ |
| 29 | S-308 | M | .12 ✓ |
| 30 | S-331 | M | 2.29 ✓ |
| 31 | S-35Z | T | .18 |
| 32 | | | |
| 33 | SITE | RT | SUM(AMOUNT) |
| 34 | | | |
| 35 | S-36 | T | 6.83 ✓ |
| 36 | S-37A | T | |
| 37 | S-37B | T | |
| 38 | S-38 | T | 2.87 ✓ |
| 39 | S-39 | T | 1.98 ✓ |
| 40 | S-4 | M | .8 ✓ |
| 41 | S-40 | T | 2.01 ✓ |
| 42 | S-41 | T | .14 ✓ |
| 43 | S-44 | T | 2.59 ✓ |
| 44 | S-49 | M | 1.05 ✓ |
| 45 | S-5A | M | .51 ✓ |
| 46 | | | |
| 47 | SITE | RT | SUM(AMOUNT) |
| 48 | | | |
| 49 | S-5A | TX | .28 ✓ |
| 50 | S-5AX | T | .37 ✓ |
| 51 | S-5AY | T | .3 ✓ |
| 52 | S-6 | M | .1 ✓ |
| 53 | S-6 | TX | .15 ✓ |
| 54 | S-61 | M | .65 ✓ |
| 55 | S-65 | M | .07 ✓ |
| 56 | S-65A | M | .04 ✓ |
| 57 | S-65B | M | 0 |
| 58 | S-65C | M | 0 |
| 59 | S-65D | M | 0 |
| 60 | | | |
| 61 | SITE | RT | SUM(AMOUNT) |
| 62 | | | |

| | SITE | RT | SUM(AMOUNT) |
|----|------------|----|-------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | S-65E | M | 0 |
| 5 | S-68 | M | 0 |
| 6 | S-6Z | T | |
| 7 | S-7 | M | 1.3 ✓ |
| 8 | S-7 | TX | 1.81 |
| 9 | S-77 | M | .85 ✓ |
| 10 | S-78 | M | 0 |
| 11 | S-79 | M | .07 |
| 12 | S-7Z | T | .68 ✓ |
| 13 | S-8 | M | .45 ✓ |
| 14 | S-81 | TX | .46 ✓ |
| 15 | | | |
| | SITE | RT | SUM(AMOUNT) |
| 16 | | | |
| 17 | | | |
| 18 | S-80 | M | .81 |
| 19 | S-8Z | T | .27 |
| 20 | S-9 | M | 2.55 ✓ |
| 21 | S-97 | M | .18 |
| 22 | S-99 | M | .35 ✓ |
| 23 | ST CLOUD | M | .47 |
| 24 | TAMIAMI | M | 2.21 ✓ |
| 25 | VERD BEACH | M | .94 |
| 26 | | | |
| 27 | | | |
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107 records selected.

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.NNNN,
ZCZC MIAFFWMIA
TTAA00 KMIA 081700
BULLETIN-ERS ACTIVATION REQUESTED
FLASH FLOOD WARNING
NATIONAL WEATHER SERVICE MIAMI, FL
PM EDT TUE OCT 08 1991
111011-025-090000-

FLOOD WARNING
NATIONAL WEATHER SERVICE MIAMI FL
100 PM EDT TUE OCT 8 1991

...A FLOOD WARNING IS IN EFFECT FOR BROWARD AND DADE
COUNTIES UNTIL 800 PM EDT FOR PEOPLE IN THE FOLLOWING LOCATIONS...

IN SOUTHEAST FLORIDA

...BROWARD COUNTY...DADE COUNTY

EXTREMELY HEAVY RAINS CONTINUE TO FALL OVER THE IMMEDIATE SOUTHEASTERN
COASTAL AREAS OF FLORIDA. THE RESULT HAS BEEN WIDESPREAD SERIOUS STREET AND
URBAN FLOODING OVER MUCH OF THE AREA FROM POMPANO BEACH SOUTHWARD TO
FORT LAUDERDALE...MIAMI AND HOMESTEAD.

RADAR AND SATELLITE OBSERVATIONS SHOW THAT MODERATE TO OCCASIONALLY
HEAVY RAINS WILL CONTINUE OVER PORTIONS OF SOUTHEAST FLORIDA FOR THE
REMAINDER OF THIS AFTERNOON WITH SOME DECREASE IN THE HEAVIER RAINS
TOWARD NIGHTFALL.

RAINFALL AMOUNTS ARE APPROACHING OR EXCEEDING 10 INCHES OVER A WIDER
AREA OF EASTERN DADE AND BROWARD COUNTIES. THIS IS PRODUCING SERIOUS
FLOOD PROBLEMS WITH SOME TRAILER PARKS IN NORTH DADE COUNTY BEING
EVACUATED DUE TO HIGH WATER. REPORTS OF 5 FEET OF WATER ARE COVERING
AN INTERSECTION WITH SEVERAL CARS FLOATING AT THE INTERSECTION OF FEDERAL
HIGHWAY AND STIRLING ROAD IN DANIA JUST SOUTH OF THE FORT LAUDERDALE AIRPORT.
DRAINAGE PROBLEMS CONTINUE AT FORT LAUDERDALE AIRPORT WHERE AIRPORT OFFICIALS
REPORT SOME TAXIWAYS UNDER WATER.

FLOODED STREETS AND LOW LYING AREAS WILL LIKELY BECOME MORE OF
A PROBLEM THROUGHOUT BOTH DADE AND BROWARD COUNTIES THIS AFTERNOON.
ADDITIONAL EVACUATIONS ARE EXPECTED. RAINS WILL BE HEAVIEST OVER EASTERN
AREAS. RUNOFF WILL BE SLOW WITH STANDING WATER AN INCREASING PROBLEM. STORM
DRAINAGE SYSTEMS WILL BE UNABLE TO HANDLE THE RUNOFF IN MOST AREAS WHERE
RAINFALL RATES APPROACH ONE INCH PER HOUR.

DRIVING WILL BE ESPECIALLY HAZARDOUS WITH SLICK STREETS...LOWERED VISIBILITIES
AND WATERS COVERED ROADWAYS. EXPECT PROLONGED TRAFFIC DELAYS SO PLANS
SHOULD BE MADE TO TRAVEL EARLY OR AVOID ANY UNNECESSARY TRAVEL. BE
CAREFUL OF DRIVING VEHICLES INTO AREAS WHERE WATER COVERS THE
ROADWAY. WATER DEPTHS MAY BE TOO GREAT TO ALLOW YOUR CAR TO CROSS SAFELY
OR WITHOUT BECOMING STALLED.

Storm warning was badly needed

South Florida got blindsided by an October surprise Tuesday, but this time the phenomenon had nothing to do with football or politics.

An unusual confluence of weather systems that occurs only a handful of times each 100 years dumped record amounts of rain on Broward and Dade counties in 24 soggy hours, flooding roadways, stranding cars and generally making life miserable for travelers.

The rainfall totals read more like monthly than daily numbers: Hallandale 12.9 inches, Hollywood 12.42, Miramar 11.25, Pembroke Pines 8.6, Coral Springs 7.92, Fort Lauderdale 7.09.

Occasional heavy rain is not uncommon in South Florida, particularly during hurricane season, but the deluge was so serious precisely because it came as such a surprise to the region's 4 million people. Most had gone to bed Monday night after having heard their television weathermen routinely forecast "a 50 percent chance of showers."

So they set off for work or school Tuesday ill-prepared for the biblical downpour that already was under way. The lucky ones arrived late and a little damp. The unlucky ones had their cars or homes swamped by the rapidly rising water.

It didn't have to be that way.

The National Weather Service knew that

record-breaking rainfall was a distinct possibility for South Florida because of the rare coincidence of a stalled high-pressure system, winds that saturated the front with moisture from the ocean and an upper-level low-pressure trough. But it neglected to tell anybody about it.

The weather forecasters decided "not to go out on a limb." By Tuesday morning, people from Boca Raton to Miami were figuratively treading water.

Obsolete equipment deserves part of the blame for the Weather Service's uncertain trumpet. Radar built in 1957 couldn't distinguish between heavy rain and ground clutter. Rain-measuring instruments and volunteer monitors were out of commission or asleep when the storm began. There apparently was no communication between the Weather Service and the South Florida Water Management District, which does have sophisticated rainfall-monitoring devices.

No alibi, however, excuses the failure of the Weather Service to provide a timely warning to the public that torrential morning rains were highly likely.

In the future, the forecasters should err on the side of caution instead of being obsessed with their batting average.

An occasional false alarm would be infinitely preferable to another soggy October surprise.

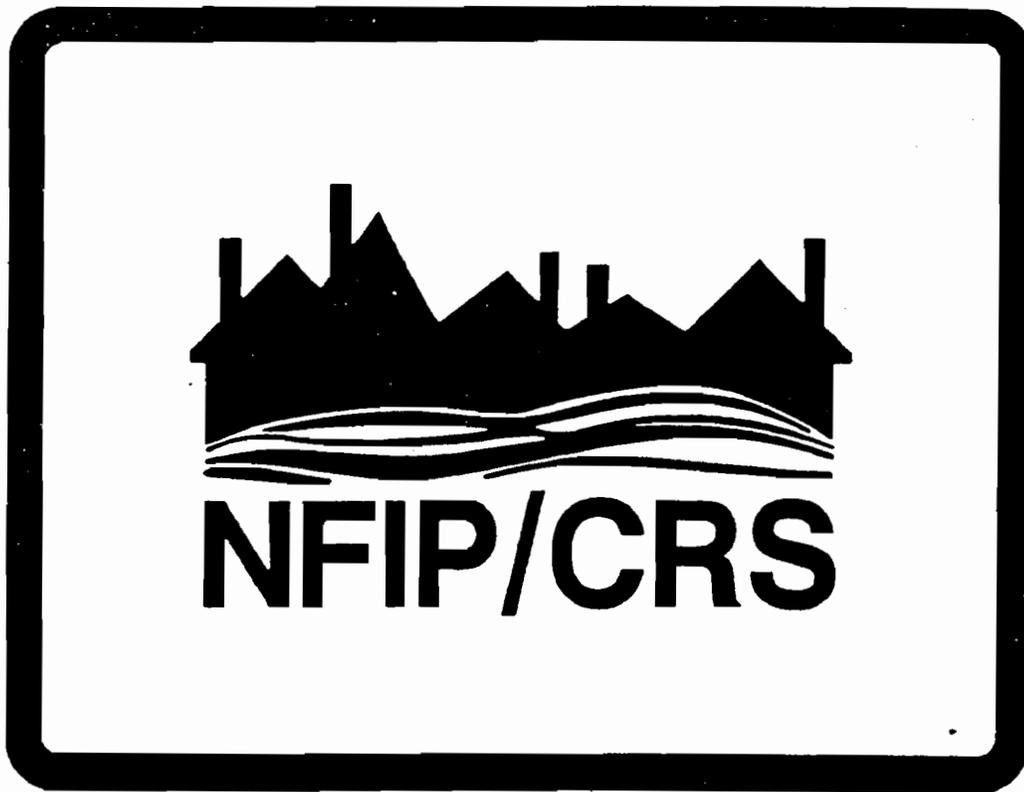
VOLUME THREE

BINDER III

GUIDELINES AND ADVISORY MATERIAL

FEDERAL EMERGENCY MANAGEMENT AGENCY

National Flood Insurance Program Community Rating System

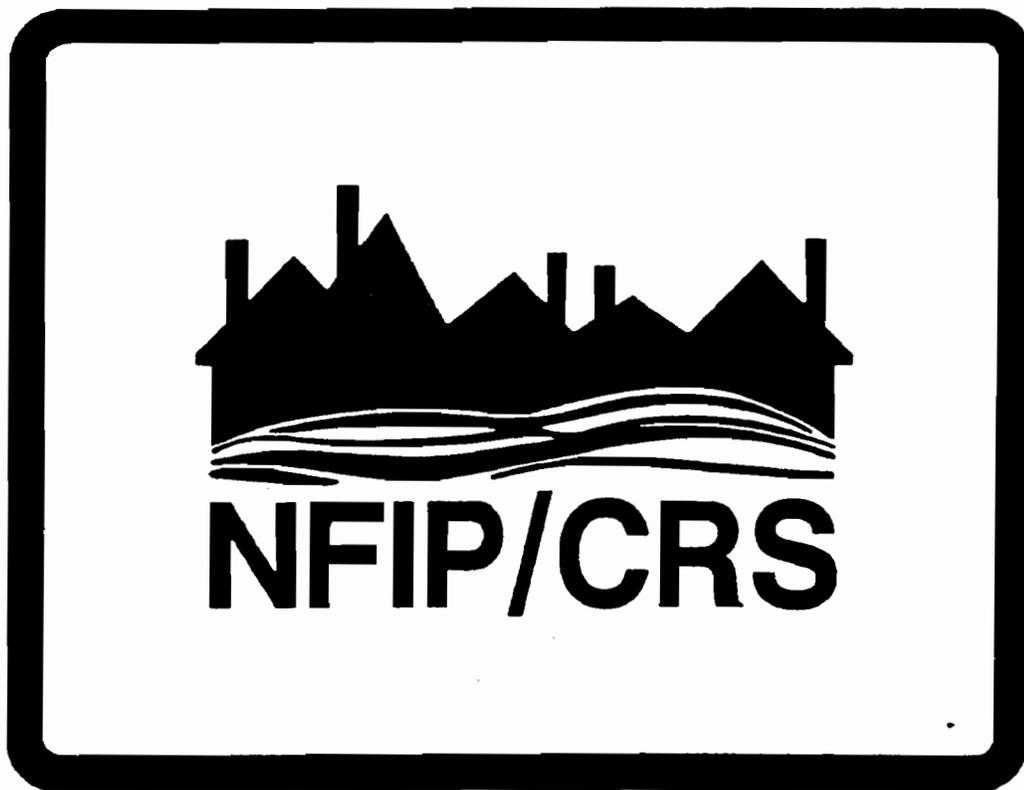


EXAMPLE PLANS

July 1996

FEDERAL EMERGENCY MANAGEMENT AGENCY

National Flood Insurance Program Community Rating System



CRS CREDIT FOR DRAINAGE SYSTEM MAINTENANCE

July 1996

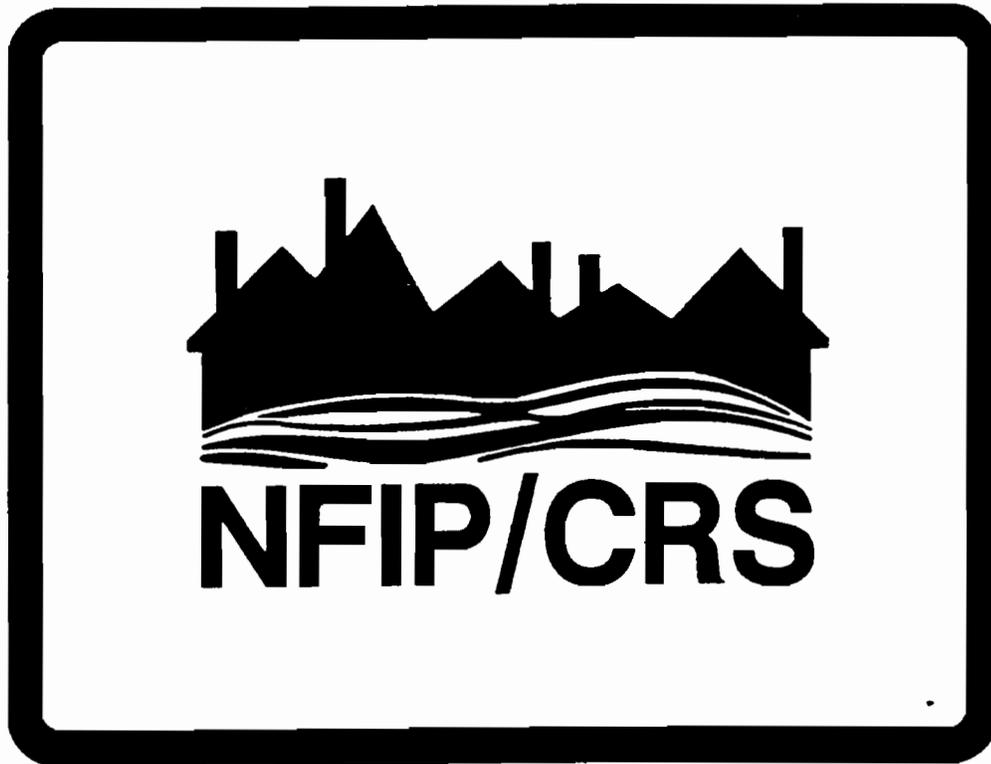
National Flood Insurance Program
Community Rating System

Flood Elevation Certificate Software User Manual



FEDERAL EMERGENCY MANAGEMENT AGENCY

National Flood Insurance Program Community Rating System



CRS RECORD-KEEPING GUIDANCE

July 1996

State Hazard Mitigation Grant Program

Applicant Briefing Package



Department of Community Affairs
Division of Emergency Management

VOLUME THREE

BINDER IV

STORM WATER MASTER PLAN

VILLAGE OF KEY BISCAYNE STORMWATER MASTER PLAN

Executive Summary

ES.1 Introduction

The Village of Key Biscayne contracted with Williams, Hatfield and Stoner, Inc. in April 1993 to prepare a Stormwater Master Plan for the public rights-of-way in the area generally west of Crandon Boulevard. The need for this planning effort was, in part, stimulated by the requirements of the relatively recent Federal regulation known as the National Pollution Discharge Elimination System (NPDES). This legislation requires municipalities to adopt capital improvement plans for stormwater management and a dedicated funding source to implement those plans.

The purpose of this study, therefore, is to develop a capital improvements plan that will reduce the incidence of flooding and improve the quality of stormwater discharged from the study area within the Village. The improvements recommended in this plan will primarily be funded with the revenues generated through the Village's Stormwater Management Utility (SMU). Those funds may be supplemented with other sources such as grants.

The scope of this study includes an analysis of existing conditions, stormwater calculations to determine stormwater management needs, and an evaluation of alternatives for serving the projected volumes of stormwater runoff.

ES.2 Existing Conditions

The existing stormwater management systems on Key Biscayne are a combination of positive drainage systems and seepage (exfiltration) facilities. These systems were installed on a piecemeal basis to address localized flooding problems.

Details of the existing stormwater management system were obtained through field survey and other available information and a database was created (using LOTUS 123 release 3.0 software) to record this information. This database should be updated by the Village as the stormwater management systems are improved.

The elevational characteristics of the study area limit the effectiveness of the existing positive drainage systems. The high water table and low "head" (difference in elevation between surface and water table elevations) result in the catch basins filling up with water and draining very slowly. This is due to the lack of elevational change that is necessary to force water to drain.

The soil characteristics in the study area also limit the effectiveness of exfiltration systems. Soils are very silty to a depth of approximately 25 feet and have very slow percolation rates (.00001 cubic feet per second per square foot per foot of head). Though the auger wells and french drains in the study area can provide storage and slow exfiltration during relative light rain events, they are less productive in heavier rains due to the slow percolation rate.

ES.3 Needs Analysis

Current regulations administered by Dade County's Department of Environmental Resource Management (DERM) require that the municipality's stormwater management system handle the rain intensity of a 5-year storm and provide retention and pretreatment for the first inch of runoff. The existing system in the study area was evaluated based on these water quantity and quality criteria and professional engineering judgement and was found to be inadequate.

A base map of the Village was developed and drainage basins defined as the basis for calculating the demands on the future stormwater management system. The Village was divided into nine drainage basins based on elevational characteristics. The study area includes eight of these nine basins.

The areas, impervious/pervious percentages, and swale storage volumes were calculated for each drainage basin. Using the Rational Method, the volumes of runoff that must be managed in each basin were calculated. (For drainage calculations for each basin see Appendix E.)

An evaluation of alternatives to manage the calculated runoff volumes and provide retention and pretreatment of the first inch of runoff was prepared based on the analysis of existing conditions and results of the needs analysis.

ES.4 Alternatives Evaluation

The five alternatives evaluated are listed below:

- On-site retention or detention
- Exfiltration or seepage systems
- Positive drainage systems with direct outfall
- Positive drainage with pump stations, injection or gravity wells, and emergency outfalls
- Positive drainage system with drainage wells and emergency outfalls

The alternatives considered feasible enough to warrant a detailed analysis were the latter two which both utilize drainage wells. The primary difference between the two alternatives is that one utilizes pumps to force water into the wells and the other relies on gravity for drainage.

After a detailed cost analysis for both alternatives, the development of a positive drainage system with drainage wells that do not rely on pump stations was recommended due to the high cost and maintenance requirements associated with the use of pump stations.

The cost of providing this stormwater management alternative for each basin is provided in Chapter 3, Exhibit 3.7. The costs per basins range from \$184,000 to \$1.2 million. The total system cost is estimated at \$4.9 million.

ES.5 Recommendations and Implementation Guidelines

The Village may choose to construct these facilities over a period of years based on available revenue or all of the facilities could be provided in one to two years if some sort of debt financing is utilized.

If the pay-as-you-go funding method is chosen, the Village will need to prioritize the drainage basins to determine which facilities to construct first with available revenues. To assist in this task, an initial attempt to prioritize the basins based on historical flooding and the potential to maximize short-term water quality improvements is provided in Chapter 4, Exhibit 4.1.

The debt financing techniques available to the Village, revenue bond financing or bank financing, are also described in Chapter 4. If either of these financing methods are chosen, the need to prioritize basin improvements would be eliminated and the improvements to the stormwater management system in the entire study area could be completed in a relatively short period of time.

Other recommendations related to implementing a stormwater management program are included in Chapter 4. These recommendations are divided into the three tasks typically associated with a stormwater management program; administration, operations and maintenance and capital improvements.

VOLUME THREE

BINDER V

COMMUNITY RATING SYSTEM APPLICATION



Federal Emergency Management Agency

Washington, D.C. 20472

MAR 5 1998

Mr. Samuel Kissinger
Village Manager
Village of Key Biscayne
85 West McIntyre Street
Key Biscayne, Florida 33149

Dear Mr. Kissinger:

On behalf of the Federal Emergency Management Agency (FEMA), I would like to congratulate the Village of Key Biscayne on its application to the National Flood Insurance Program (NFIP), Community Rating System (CRS). The voluntary actions undertaken by your community exceeding the minimum standards of the NFIP have been verified, and meet the requirements for a Class 7 rating in the CRS.

The reward for your community's activities will be a 15 percent discount for NFIP policies issued or renewed on or after April 1, 1998. This savings is a tangible result of the voluntary flood mitigation activities your community has implemented that protect lives and property. It should be noted that policies issued or renewed for properties outside the SFHAs (where preferred risk policies are available) already reflect discounts based on the reduced risk, and therefore, they are limited to a 5 percent CRS discount. Please refer to Appendix C in the Community Rating System Commentary. Further, all discounts are applied before the addition of fixed service fees.

Provided that there are no NFIP compliance actions, the rating will be automatically renewed yearly (no letter will be sent) as long as your community continues to implement the activities to which you annually certify each October. If no modifications or new activities are added, your community will not receive another verification visit for 5 years. Meanwhile, we will periodically send you new application materials, updated information, and any other notices to keep your community informed on the CRS.

You are encouraged to add new activities yearly to reach an even better CRS classification. Each improvement in CRS Class brings higher flood insurance premium savings and brings your community closer to being disaster resistant and a truly "sustainable community". This is the goal of FEMA's new initiative, *Project Impact*, which seeks to focus the energy of businesses, citizens, and communities in the U.S. on the importance of reducing their susceptibility to the impact of natural disasters, including hurricanes, severe storms, earthquakes, and wildfires, in addition to floods. *Project Impact* will be using CRS community classifications as one key source to document mitigation activities. For additional *Project Impact* information, please refer to the enclosed Fact Sheet and visit our Web site at www.fema.gov.

If you have any questions regarding your classification or desire more information on the enclosed scoring, please contact our FEMA regional office within 30 days of this notification. However, if the request involves a change in points that does not change your overall CRS class, then due to resource constraints the request for reconsideration will not be reviewed, and should be included as a modification to your next application. Once again, I applaud your community for the CRS activities you've undertaken.

Sincerely,

A handwritten signature in cursive script, reading "Jo Ann Howard", is written over the typed name and title.

Jo Ann Howard
Administrator
Federal Insurance Administration

Enclosure



COMMUNITY
RATING
SYSTEM

VERIFICATION
REPORT

Key Biscayne, Florida

Verified Class 7

NFIP Number: 120648

Application

Date of Verification Field Visit: 10-07-97

This Verification Report is provided to explain the recommendations of Insurance Services Office, Inc. (ISO) to the Federal Insurance Administrator concerning credits under the Community Rating System (CRS) for the above named community.

A total of 1705 credit points are verified which results in a recommendation that the community be classified as a CRS Class 7. The following is a summary of our findings with the total credit points for each activity noted in parenthesis:

Activity 310 - Elevation Certificates: Credit provided for maintaining Elevation Certificates and making these certificates available to requesting parties. (56 points).

Activity 320 - Map Information: Credit provided for making flood zone information available to requesting parties. (140 points).

Activity 330 Outreach Projects: Credit provided the community newsletter containing information addressing all 10 topics. This outreach project was mailed twice to the entire community which is located inside the special flood hazard area. (213 points).

Activity 350 Library: Credit provided for maintaining flood related documents and maps in the local library. (27 points).

Activity 360 Flood Protection Assistance: Credit provided for the communities assistance to the public in making site visits to determine the flooding problem, assisting on retrofitting techniques available and the selection of the appropriate contractors for such work. (56 points).

Activity 420 - Open Space Preservation: Credit provided for regulations preserving approximately 47% of the regulatory floodplain for development. A large part of this area (18%) is preserved in its natural state. (278 points).

Activity 440 - Flood Data Maintenance: Credit provided for maintaining a digitized mapping system used in the development and permit process. (58 points).

Activity 450 - Stormwater Management: Credit provided for enforcing the Dade County Stormwater Management Regulations. (330 points).

Activity 510 - Repetitive Loss: All requirements for a Category B Repetitive Loss Community have been met. (No credit points are applicable to this element.)

Activity 540 - Drainage System Maintenance: Due to the communities on going maintenance program and the no dumping ordinance, the community is eligible for credit under this activity. (330 points).

Activity 610 - Flood Warning: Flood Warning Program credit is awarded for the Village's plans and operations in response to coastal storms, including hurricanes. The Village received credit for its flood threat recognition system, emergency warning dissemination, and response plan. (150 points).

Activity 630 - State Dam Safety: The state regulations provide this credit to all participating communities. (67 points).

Attached is Verification Worksheet AW-720 that lists the verified credit points for the 1997 CRS Cycle Application.

Chief Executive Officer:
Mr. Samuel Kissinger
Village Manager
Village of Key Biscayne
85 West McIntyre Street
Key Biscayne, FL 33149

CRS Coordinator:
Mr. Peter Kory
Village of Key Biscayne
85 West McIntyre Street
Key Biscayne, FL 33149
305-361-9414

Date report prepared: 11/04/97

Community: Key Biscayne, FL

NFIP Number: 120648

720 COMMUNITY CREDIT CALCULATIONS (APPLICATION):

CALCULATION SECTION:

Verified Activity Calculations:

Credit

| | | | | | |
|------|------------|---|-------|-------------|------------|
| c310 | <u>56</u> | = | | | <u>56</u> |
| c320 | <u>140</u> | = | | | <u>140</u> |
| c330 | <u>213</u> | = | | | <u>213</u> |
| c340 | | = | | | |
| c350 | <u>27</u> | = | | | <u>27</u> |
| c360 | <u>56</u> | = | | | <u>56</u> |
| c410 | | = | x CGA | | |
| c420 | <u>232</u> | = | x CGA | <u>1.20</u> | <u>278</u> |
| c430 | | = | x CGA | | |
| c440 | <u>48</u> | = | x CGA | <u>1.20</u> | <u>58</u> |
| c450 | <u>275</u> | = | x CGA | <u>1.20</u> | <u>330</u> |
| c510 | | = | | | |
| c520 | | = | | | |
| c530 | | = | | | |
| c540 | <u>330</u> | = | | | <u>330</u> |
| c610 | <u>150</u> | = | | | <u>150</u> |
| c620 | | = | | | |
| c630 | <u>67</u> | = | | | <u>67</u> |

722 Community Classification Calculation:

cT = total of above

cT = 1705

Community Classification (from Appendix C):

Class = 7

CEO Name/Address:

CRS Coordinator Name/Address:

Mr. Samuel Kissinger, Village Manager

Mr. Peter Kory, CRS Coordinator

Village of Key Biscayne

Village of Key Biscayne

85 West McIntyre Street

55 Ocean Lane Drive, #1035

Key Biscayne, FL 33149

Key Biscayne, FL 33149



PROJECT IMPACT Building a Disaster Resistant Community

BACKGROUND

PROJECT IMPACT is an initiative developed by FEMA Director James Lee Witt to challenge the country to undertake actions that protect families, businesses and communities by reducing the effects of natural disasters. This initiative includes a national awareness campaign, the selection of pilot communities that demonstrate the benefits of hazard mitigation through a partnership approach, and an outreach effort to businesses and communities using a new guidebook that offers a formula for a community or business to follow to become disaster resistant.

RATIONALE

The increasing number and severity of natural disasters the past decade demands that action be taken to reduce the threat that hurricanes, severe storms, earthquakes, floods and wildfires impose upon the economic stability, economic future and safety of the citizens of the U.S. As the federal agency responsible for emergency management, FEMA is committed to reducing disaster losses by focusing the energy of businesses, citizens, and communities in the U.S. on the importance of reducing their susceptibility to the impact of natural disasters.

There are three primary tenets of the PROJECT IMPACT initiative:

- *Mitigation is a local issue.* It is best addressed by a local partnership that involves government, businesses and private citizens.
- *Private sector participation is essential.* Disasters threaten the economic and commercial growth of our cities, towns, villages and counties. Without the participation of the private sector, comprehensive solutions will not be developed.
- *Mitigation is a long-term effort that requires long-term investment.* Disaster losses will not be eliminated overnight.

PILOT COMMUNITIES

Director Witt and FEMA have worked closely with seven communities throughout the U.S. to develop a PROJECT IMPACT plan that localities, businesses and citizens can follow to build disaster resistant communities where they live and work. Director Witt will participate in events in each of these communities to congratulate them on their foresight, commitment, and contribution to a disaster resistant nation.

PROJECT IMPACT GUIDEBOOK

The guidebook presents the steps a community can take to become disaster resistant. It also provides examples of the actions and resources available to accomplish this goal.



VILLAGE OF KEY BISCAYNE

Department of Building, Zoning and Planning

Village Council
John F. Festa, *Mayor*
Betty Sime, *Vice Mayor*
Raul Llorente
Michele Padovan
Hugh T. O'Reilly
Raymond P. Sullivan
John Waid

October 11, 1996

Mr. John C. Heard, Jr.
Mitigation Division, Mitigation Program Branch
Federal Emergency Management Agency, Region IV.
1371 Peachtree Street N.E., Suite 700
Atlanta, Georgia 30309

Re: COMMUNITY RATING SYSTEM APPLICATION SUBMISSION

Dear Mr. Heard:

The Village of Key Biscayne is pleased to submit the enclosed application for classification under the Community Rating System (CRS) of the National Flood Insurance Program.

The application includes the appropriate worksheets and related documentation for the following floodplain management activities: 310 Elevation Certificates; 320 Map Information; 330 Outreach Projects; 350 Flood protection Library; 360 Flood Protection Assistance; 420 Open Space Preservation; 440 Flood Data Maintenance; 450 Stormwater Management; 510 Floodplain Management Planning; 540 Drainage System Maintenance; 610 Flood Warning Program; 630 Dam Safety; and 710 Community Growth Adjustment.

We are requesting a classification of 8 with a total of at least 1000 points and we look forward to a favorable review of our application and to a corresponding reduction in our flood insurance rates.

Sincerely,

Peter Kory
CRS Coordinator

cc/w Duplicate Copy of Application: C. Samuel Kissinger, Village Manager
Danny Hinson ISO/CRS Specialist
Linda Bell Florida Dept Community Affairs

VILLAGE OF KEY BISCAYNE
COMMUNITY RATING SYSTEM APPLICATION 1996

PREREQUISITES

1. Upon checking with the FEMA Regional Office, applicant has been advised that Key Biscayne has been a participant in the National Flood Insurance Program since 9/29/72. Confirmation that its floodplain management program is in full compliance with the requirements of the National Flood Insurance Program will be subject to a Community Assistance Visit (CAV) by FEMA to be performed by FEMA upon receipt of this CRS Application. (see September 9, 1996 letter from Mr. John C. Heard, Jr. included herewith.
2. Key Biscayne is a repetitive loss community. Accordingly this application responds to the requirements of Sections 501-503 of FEMA's NFIP/CRS Application Guide dated May 31, 1994 and to Activity 510 (Floodplain Management Planning).
3. All other prerequisite matters are answered in the letters and communications from the FEMA Regional Office: a. referring to Key Biscayne steps for a determination of compliance with the NFIP; b. providing a current list of repetitive loss properties; c. advising on the number of credit point the Village will receive in connection with Activity 630 (Dam Safety); d. addressing the matter of the U.S. Census Growth Rate by allowing Key Biscayne to develop its own growth rate based on census data for Key Biscayne; and e. providing information such as the amount of flood insurance coverage and current annual premiums paid on Key Biscayne.
4. The letters from FEMA are included in this section of the Application.



Federal Emergency Management Agency

Region IV
1371 Peachtree Street, NE, Suite 700
Atlanta, GA 30309

September 9, 1996

Mr. Peter Cory
Village of Key Biscayne
85 West McIntyre Street
Key Biscayne, Florida 33149

Re: Community Rating System

Dear Mr. Cory:

This is in response to your request for information which will assist you in completing the Community Rating System (CRS) application. We can confirm that the Village of Key Biscayne is a participant in the National Flood Insurance Program (NFIP). Upon receipt of an application, we will perform a Community Assistance Visit in order to confirm that the Village of Key Biscayne has a local floodplain management program which is in full compliance with the requirements of the NFIP.

| | |
|--|----------------|
| Flood Insurance Policies in Force: | 4,925 |
| Annual Written Premium: | \$1,417,945 |
| Total Amount of Flood Insurance Coverage: | \$698,068,000 |
| Repetitive Loss Properties: | 33 |
| Approved State Dam Safety Program: | Yes, 57 points |
| Census Growth Rate Data: (% annual household growth) | 0.00% |

NOTE: The Census Growth Rate is derived from 1985-90 data for Dade County. We have verified that the Village of Key Biscayne may develop its own growth rate based on census data for Key Biscayne.

Key Biscayne flood insurance policy holders could save \$70,897 per year if the community were participating in the CRS with a Class 9 rating, the lowest to which a discount is applied during the first year of eligibility. This represents a 5% reduction over current rates.

Both the State of Florida and the Federal Emergency Management Agency (FEMA) conduct training courses for preparing CRS applications. Please contact Ms. Linda Bell, State CRS Coordinator, at (904) 413-9946 for specific information.

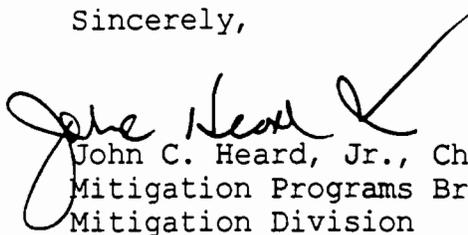
Two complete copies of the CRS application must be submitted to FEMA between October 1, 1996, and December 15, 1996. A complete copy must be submitted to Mr. Charles Speights, State NFIP Coordinator, Florida Department of Community Affairs, Division of Emergency Management, William E. Sadowski Building, 2555 Shumard Oak Boulevard, Tallahassee, Florida 32399-2100. The other agencies on your Notification List need only be sent a copy of your cover letter and the Summary Notice of Application, which briefly describes the activities for which your community has applied.

Once your application has been reviewed and approved by FEMA and the State, it will be sent to ISO Commercial Risk Services, Inc. The ISO conducts all fire insurance rating within Florida and in most other States. FEMA has contracted with the ISO to perform a similar function with regard to CRS and the NFIP. An ISO representative will contact you to set up a verification visit in the spring.

The ISO has developed computer software for preparing CRS applications which is free of charge and IBM compatible. The program will perform all the necessary calculations and will produce a printed application document suitable for submittal. If you are interested in this software, please call Bill Trakimas of the ISO at (317) 848-2898.

For assistance in completing the CRS application, please contact Ms. Linda Bell, or Danny Hinson, ISO, (904) 363-8169. Should you have any further questions, please contact Susan Wilson at (404) 853-4414.

Sincerely,


John C. Heard, Jr., Chief
Mitigation Programs Branch
Mitigation Division



Federal Emergency Management Agency

Region IV
1371 Peachtree Street, NE, Suite 700
Atlanta, GA 30309

September 11, 1996

Mr. Peter Kory
Village of Key Biscayne
85 West McIntyre
Key Biscayne, Florida 33149

Dear Mr. Kory:

This is in response to your request for data in order to make an application to join the Community Rating System (CRS).

Please note that Key Biscayne is a Repetitive Loss Community with 33 repetitive loss properties. You will receive the AW-512 Repetitive Loss Worksheets for these properties from the Computer Sciences Corporation, our insurance contractor, within two weeks.

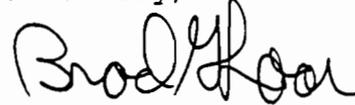
There are 4,925 flood insurance policies in the Village totaling \$700 million dollars worth of coverage. The U.S. Census growth factor is not available in our database for Dade County communities because the communities began participating in the National Flood Insurance Program separately since the last census.

The dam safety credits applicable to Florida will automatically be added to your point total.

Because the community has not received an official Community Assistance Visit from either the State or this office within the past year; one will need to be completed and any issues resolved prior to the community obtaining its class rating.

Thank you for your interest in the CRS. Questions concerning the program can be directed to Danny Hinson of the Insurance Service Office at (904) 786-0985 or me at (404) 853-4414.

Sincerely,



Susan W. Wilson
Mitigation Programs Branch
Mitigation Division



APPLICATION COVERSHEET

The following is attached to this section of the Application:

1. A completed Form 210 CRS APPLICATION, executed by the Village's Chief Executive Officer, ie: the Village Manager.
2. A letter from the Village Manager to the FEMA Regional Office providing the requisite certifications with respect to insurance of Village owned properties, implementation of CRS Activities and designation of a CRS Coordinator.
3. A copy of the letter to the appropriate State and Regional agencies giving notice of the application, summarizing the activities being applied for and requesting comments on the application. A list of said agencies is included.

210 CRS APPLICATION COVER PAGE

1. Community Name: VILLAGE OF KEY BISCAYNE State: FLORIDA
 NFIP Number: 120648 FIRM Effective Date: 9/29, 19 72
 Population: 8,854 Current FIRM Date: 7/17, 19 95
 Application Date: October 11, 19 96 County: Dade

2. Chief Executive Officer: _____ CRS Coordinator: _____
 Name: C. Samuel Kissinger Peter Kory
 Title: Village Manager _____
 Address: 85 West McIntyre Street 55 Ocean Lane Dr. #1035
Key Biscayne, Fl 33149 Key Biscayne, Fl 33149
 Coordinator's Telephone: (305) 361-9414 Fax: (305) 361-1341

3. Attached is our letter from FEMA stating that we are in full compliance with the minimum requirements of the National Flood Insurance Program.
4. Attached are copies of the appropriate *CRS Application* pages and the needed documentation to apply for the following activities (check the ones that apply):

- | | |
|---|---|
| <input checked="" type="checkbox"/> 310 Elevation Certificates | <input checked="" type="checkbox"/> 440 Flood Data Maintenance |
| <input checked="" type="checkbox"/> 320 Map Information | <input checked="" type="checkbox"/> 450 Stormwater Management |
| <input checked="" type="checkbox"/> 330 Outreach Projects | <input type="checkbox"/> 510 Floodplain Management Planning |
| <input type="checkbox"/> 340 Hazard Disclosure | <input type="checkbox"/> 520 Acquisition and Relocation |
| <input checked="" type="checkbox"/> 350 Flood Protection Library | <input type="checkbox"/> 530 Retrofitting |
| <input checked="" type="checkbox"/> 360 Flood Protection Assistance | <input checked="" type="checkbox"/> 540 Drainage System Maintenance |
| <input type="checkbox"/> 400SH Special Hazard Areas | <input checked="" type="checkbox"/> 610 Flood Warning Program |
| <input type="checkbox"/> 410 Additional Flood Data | <input type="checkbox"/> 620 Levee Safety |
| <input checked="" type="checkbox"/> 420 Open Space Preservation | <input checked="" type="checkbox"/> 630 Dam Safety |
| <input type="checkbox"/> 430 Higher Regulatory Standards | <input checked="" type="checkbox"/> 710 Community Growth Adjustment |
| <input type="checkbox"/> 430LZ Low Density Zoning | <input checked="" type="checkbox"/> 720 Community Total Points |

5. Check which applies: There are no repetitive loss properties in our community.
 Attached are the two worksheet pages for Sections 500-503 (Repetitive Loss Areas).
6. Attached is a copy of our Notice of Application and a list of the agencies that received a copy of our Notice of Application.
7. I hereby certify that to the best of my knowledge and belief, we are maintaining in force all flood insurance policies that have been required of us as a condition of federal financial assistance for insurable buildings owned by us and located in the Special Flood Hazard Area shown on our Flood Insurance Rate Map.
8. I hereby certify that the VILLAGE OF KEY BISCAYNE ~~{community name}~~ is implementing those activities designated on the attached pages. We will continue to implement these activities and will advise the Federal Emergency Management Agency if any of them are not being conducted in accordance with this application.
9. Signed: C. Samuel Kissinger (Chief Executive Officer)



VILLAGE OF KEY BISCAYNE

Office of the Village Manager

October 11, 1996

Village Council
John F. Festa, *Mayor*
John Waid, *Vice Mayor*
Raul Llorente
Hugh T. O'Reilly
Michele Padovan
Betty Sime
Raymond P. Sullivan

Village Manager
C. Samuel Kissinger

Mrs. Susan Wilson
Federal Emergency Management Agency, Region IV,
Mitigation Programs Branch, Mitigation Division
1371 Peachtree Street N.E., Suite 700
Atlanta, Georgia 30309

Dear Mrs. Wilson:

I hereby certify that:

The Village of Key Biscayne is maintaining in force all flood insurance policies that have been required as a condition of federal financial assistance for insurable buildings owned by the Village and located in the Special Flood Hazard Area shown on the Flood Insurance Rate Map for Key Biscayne.

The Village of Key Biscayne is implementing the activities designated on the Cover Page of the CRS Application, including among others:

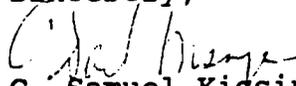
Activity 310 - Elevation Certificates: The Village of Key Biscayne is maintaining as-built Elevation Certificates in accordance with FEMA Guidelines.

Activity 320 - Map Information: The Village of Key Biscayne is providing Flood Insurance Rate Map information and related flood data to the public on an ongoing basis and this service is publicized.

This municipality will continue to implement these and the other activities identified on the Application Cover Sheet and will advise FEMA if any of them are not being conducted in accordance with FEMA and CRS Guidelines.

I have designated Peter Kory as CRS Coordinator. He can be reached at: 55 Ocean Lane Dr, #1035, Key Biscayne, Florida 33149; Tel: (305) 361-9414.

Sincerely,


C. Samuel Kissinger
Village Manager



VILLAGE OF KEY BISCAYNE

Department of Building, Zoning and Planning

Village Council
John F. Festa, *Mayor*
Betty Sime, *Vice Mayor*
Raul Llorente
Michele Padovan
Hugh T. O'Reilly
Raymond P. Sullivan
John Waid

October 16, 1996

Ms. Linda Bell
Department of Community Affairs
Division of Emergency Management/NFIP
2740 Centerview Drive
Tallahassee, Florida 32399

Re: COMMUNITY RATING SYSTEM APPLICATION

Dear Ms. Bell:

This letter is to notify you that the Village of Key Biscayne is applying for classification under the Community Rating System of the National Flood Insurance Program. We are implementing thirteen (13) floodplain management activities, as summarized below.

If you have questions, wish to comment or like more information on these activities, please write to Mrs. Susan Wilson, Mitigation Division, Mitigation Program Branch, Federal Emergency Management Agency, Region IV., 1371 Peachtree Street NE, Suite 700, Atlanta, Georgia 30309, or call her at (404) 853-4200. Should you choose not to comment, it will be assumed that you have no objections to these activities or to Key Biscayne receiving Community Rating System (CRS) credit for them.

Further information on this application is available from Mr. Peter Kory, CRS Coordinator for the Village of Key Biscayne at (305) 361-9414 or at the address on this letterhead.

More specifically, the Village of Key Biscayne will be applying for credit under the following activities:

1. Activity 310 (Elevation Certificates). The Village of Key Biscayne maintains copies of all Flood Elevation Certificates on all newly constructed and substantially improved buildings within the Village.
2. Activity 320 (Map Information). The Village of Key Biscayne through its Building, Zoning and Planning Department, located in the Village Hall at 85 West McIntyre Street, Key Biscayne, Florida 33149, assists the public in the determination of flood zones and related Flood Information Rate Map with respect to all areas in the Village.
3. Activity 330 (Outreach Projects). The Village of Key Biscayne, through bi-annual publications and other means, advises residents and property owners about: local flood hazard, flood warning systems; the availability of Flood Insurance Rate Maps and related information; flood safety measures; flood protection activities; permit requirements; substantial improvement requirements; flood insurance requirements and information; drainage system maintenance; and natural and beneficial functions of local floodplains.
4. Activity 350 (Flood Protection Library). The Key Biscayne Public Library now has information on floodplain hazards, flood insurance, flood protection, floodplain beneficial functions and related subjects, including maps, pamphlets, booklets, books, etc. This material is organized for easy retrieval in the Librarian's card catalogue.
5. Activity 360 (Flood Protection Assistance). The Key Biscayne Building, Zoning and Planning Department offers and publicizes the availability of a wide range of technical information and help, including: providing site-specific flood related data for individual properties; providing names of contractors and consultants experienced and knowledgeable in retrofitting and construction techniques; providing material on how to select and generally work and deal with a contractor; making site visits to review flooding, drainage and sewer problems, providing one-on-one advice to property owners; and providing advice and assistance on how to retrofit or modify a building to protect it from flood damage.
6. Activity 420 (Open space Preservation). The Village of Key Biscayne maintains vacant land in its floodplain, as designated in the Village's Master Plan and zoning code.
7. Activity 440 (Flood Data Maintenance). The Village of Key Biscayne keeps the community's floodplain maps, elevation reference data and other geographic and property information

current and useful with a digitized mapping system and a computer data base.

8. Activity 450 (Stormwater Management). The Village of Key Biscayne is applying for uniform credit minimum credit. The Village is located in the South Florida Water Management District.
9. Activity 510 (Floodplain Management Planning). The Village of Key Biscayne contains a number of repetitive loss properties. Accordingly it is considering the initiation of a Floodplain Management Plan, including, among its other elements, a program of immediate measures to prevent repetitive losses.
10. Activity 540 (Drainage System Maintenance). The Village of Key Biscayne Department of Public Works maintains its storm sewer system including catch basins, channels and all appurtenances, assuring that the system is free-flowing, functions properly and is free from debris and other accumulation of potentially obstructive material. Inspections followed by corrective action occurs at least twice a year and on a complaint response basis.
11. Activity 610 (Flood Warning). The Village of Key Biscayne participates in Dade County and the State's Emergency Management System for early flood and other disaster warnings to the general public.
12. Activity 630 (Dam Safety). The Village of Key Biscayne receives credit for the approved State of Florida Dam Safety Program.
13. Activity 710 (Community Growth Adjustment). The CRS Credit Points earned as a result of some of the above activities are increased by applying the U.S. Census Growth Rate factor established by FEMA for the Village of Key Biscayne. This activity reflects the adjustment.

We are requesting a Class 8 CRS Classification with a total of at least 1000 points based on a preliminary rating calculation.

A copy of the full application is being forwarded to you under separate cover.

We look forward to your participation in the review of our application.

Sincerely,



Peter Kory
CRS Coordinator

FEDERAL EMERGENCY MANAGEMENT AGENCY (F E M A)

CRS APPLICATION CONTACT LIST

Ms. Linda Bell (904) 413-9946
Department of Community Affairs
Division of Emergency Management/NFIP
2740 Centerview Drive
Tallahassee, Florida 32399

Mr. John C. Heard, Jr. (404) 853-4200
Mrs. Susan Wilson
Mitigation Division
Mitigation Program Branch
Federal Emergency Management Agency
Region 4
1371 Peachtree Street, N.E.
Suite 700
Atlanta, Georgia 30309

Mr. Ralph Fanson (800) 432-2045
Professional Engineer Trainer
South Florida Water Management
P.O. Box 24680
West Palm Beach, Florida 33416
Ext 6921

Ms. Carolyn Dekle (954) 985-4416
Director, South Florida
Regional Planning Council
3440 Hollywood Boulevard
Suite 140
Hollywood, Florida 33021

Mr. Danny Hinson (904) 786-0985
ISO/CRS Specialist (904) 786-0985 (Fax)
CRS - ISO Commercial Risk Services, Inc.
1272 Sorrells Court
Jacksonville, Florida 32221

Mr. J.B. Manson-Hing
Engineer
Bureau of Coastal Engineering and Regulation
Florida Department of Environmental Protection
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

VOLUME THREE

BINDER VI

MISCELLANEOUS MATERIAL

**TO BE FOUND IN
MASTER BINDER ONLY**

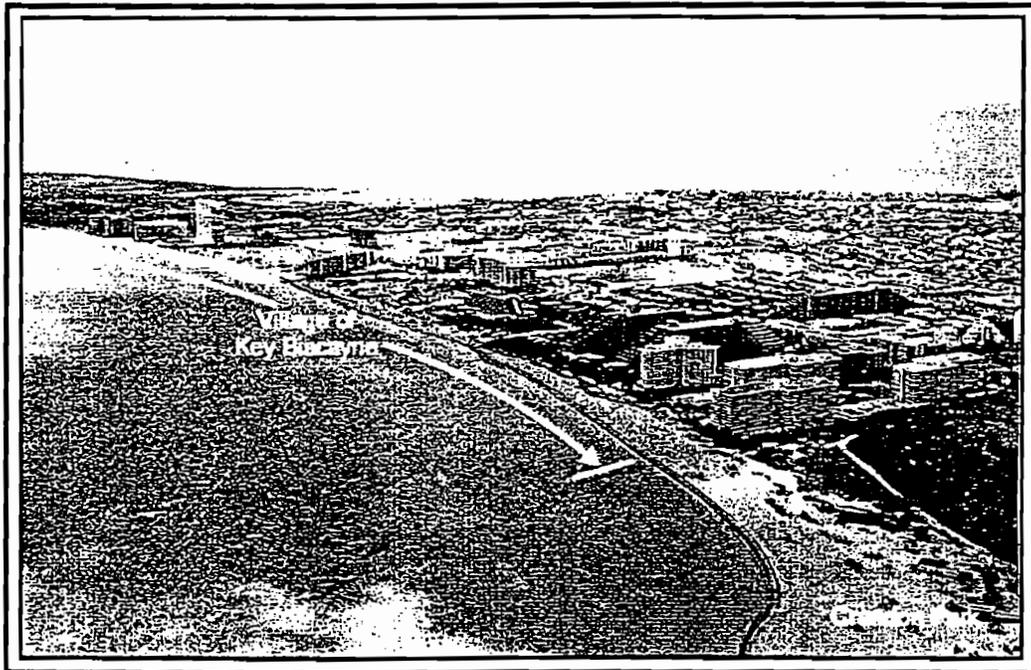
VOLUME THREE

BINDER VII

LONG RANGE BEACH NOURISHMENT PLAN

Long Range Beach Nourishment Plan

for
Village of Key Biscayne
Dade County, Florida



prepared for



VILLAGE OF KEY BISCAYNE

by



Coastal Systems International, Inc.
464 South Dixie Highway, Coral Gables, Florida 33146

August 1997



VILLAGE OF KEY BISCAYNE

Office of the Village Clerk

Village Council

John F. Festa, *Mayor*
Michele Padovan, *Vice Mayor*
Mortimer Fried
Gregory C. Han
Hugh T. O'Reilly
Martha Fdez-León Broucek
Betty Sime

Village Clerk

Conchita H. Alvarez

CERTIFICATION

STATE OF FLORIDA
COUNTY OF DADE

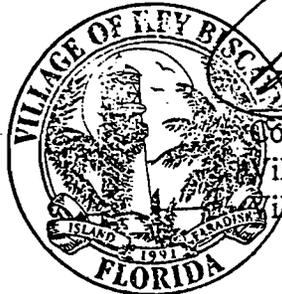
I, Conchita H. Alvarez, duly appointed Village Clerk of the Village of Key Biscayne, Florida, do hereby certify that the attached is a true and correct copy of:

Resolution 97-55 of the Village of Key Biscayne, Florida adopted on October 28, 1997.

IN WITNESS WHEREOF, I hereunto set my hand and affix the Seal of the Village of Key Biscayne, Florida, this 7th day of November, 1997.



Conchita H. Alvarez
Village Clerk
Village of Key Biscayne, Florida



RESOLUTION NO. 97-55

A RESOLUTION OF THE VILLAGE OF KEY BISCAYNE, FLORIDA; ADOPTING THE LONG RANGE BEACH NOURISHMENT PLAN, VILLAGE OF KEY BISCAYNE, DADE COUNTY, FLORIDA; PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the Village Council has historically supported beach preservation through dedicated funding, resolutions, and preparation for the pending beach nourishment; and

WHEREAS, the Village Council adopted Resolution 96-36, November 14, 1996, authorizing the preparation of the Long Range Beach Nourishment Plan; and

WHEREAS, the Village Manager executed the contract with Coastal Systems International, Inc. for the preparation of the Long Range Beach Nourishment Plan on February 14, 1997; and

WHEREAS, the Village Beach Resources and Management (BRM) Task Force presented the Long Range Beach Nourishment Plan, dated August 1997, to Council on August 26, 1997; and

WHEREAS, the Village Beach Resources and Management (BRM) Task Force presented detailed information on the Long Range Beach Nourishment Plan at a public workshop on September 16, 1997; and

WHEREAS, the Village Manager has directed the preparation of a newsletter summarizing the Long Range Beach Nourishment Plan, to be disbursed to all Village residents; and

WHEREAS, the Long Range Beach Nourishment Plan shall provide planning guidance for present and future Councils;

NOW, THEREFORE, BE IT RESOLVED BY THE VILLAGE COUNCIL OF KEY BISCAYNE AS FOLLOWS:

Section 1. The Village Council hereby adopts the Long Range Beach Nourishment Plan, to be utilized as a Municipal, County, State, and Federal planning device for future beach preservation.

Section 2. The Village Manager is authorized to disseminate the Long Range Beach Nourishment Plan to various County, State, and Federal officials.

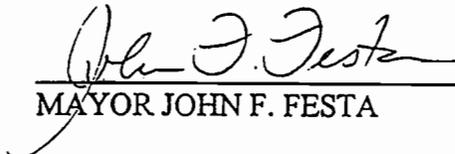
Section 3. The Village Manager is authorized to pursue avenues for dedicated sources of sand and beach nourishment funding, including but not limited to reimbursement agreements with

appropriate governmental agencies.

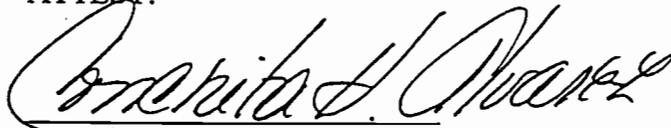
Section 4. The Village Council shall commence and proceed with such efforts as are necessary to implement the beach nourishment program, recommended in the Long Range Beach Nourishment Plan, by the year 1999, or as soon thereafter as is practicably achievable.

Section 5. This resolution shall take effect immediately upon adoption.

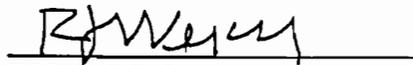
PASSED AND ADOPTED this 28th day of October, 1997


MAYOR JOHN F. FESTA

ATTEST:


CONCHITA H. ALVAREZ, VILLAGE CLERK

APPROVED AS TO FORM AND LEGAL SUFFICIENCY:


RICHARD J. WEISS, VILLAGE ATTORNEY



EXECUTIVE SUMMARY

LONG RANGE BEACH NOURISHMENT PLAN for THE VILLAGE OF KEY BISCAYNE, DADE COUNTY

Purpose: This report presents a long-range beach nourishment plan to address the eroded shoreline along the Village of Key Biscayne, Dade County, Florida. This proposed project represents the first planned nourishment since the 1987 beach restoration project which placed a reported 420,000 cubic yards of sand from monuments R-101 to R-108.

Influence of Government Cut: This proposed nourishment will help to mitigate the long-term downdrift impacts associated with Government Cut to the north. The construction of this navigational inlet in 1904 caused significant erosion along Key Biscayne, Virginia Key, and Fisher Island as determined by the historical mean high water shoreline data. The most significant long-term shoreline erosion has occurred within the Village and near the tip of the Island with both of these locations eroding more than 400 feet by 1945.

Wave Focusing Effects: The shallow littoral sand platform that borders much of Key Biscayne and Virginia Key is largely absent along the Village shoreline making this area much more vulnerable to wave impacts. A numerical model study of the refraction/diffraction effects based on the nearshore and offshore bathymetry showed that the focusing of nearshore wave energy may be influenced by submerged bathymetric features several miles offshore. The results, in particular showed wave energy focusing occurring along the Village shoreline under northeast (winter), east, and southeast (summer) wave conditions in concurrence with the known erosional "hot spots."

Longshore Sediment Movement: Based on the results of the refraction/diffraction wave analysis, the longshore movement of sediment was examined using the energy flux of the breaking waves in the surf zone. The resulting southward littoral movement associated with the dominant northeast and east wave conditions suggest that the total annual net drift is predominantly towards the south. An average erosion rate of approximately 12,000 cubic yards per year occurring since the 1987 fill project was established along the Village shoreline based on examination of the April 1996 survey data. This corresponds to a total loss of approximately 107,000 cubic yards from the Village since the 1987 beach fill.

Beach Nourishment Design: The design of the beach fill template was developed based on the historical erosion rate (based on performance of 1987 fill), critical areas of erosion, location of nearshore seagrasses, and projected nourishment interval. It was determined that a design based on the footprint of the 1987 project would address the above considerations while potentially simplifying the permitting process, since this design essentially represents a restoration of the beach and dune to the pre-existing conditions accurately specified by the 1987 design. The proposed nourishment design, as of 1997,

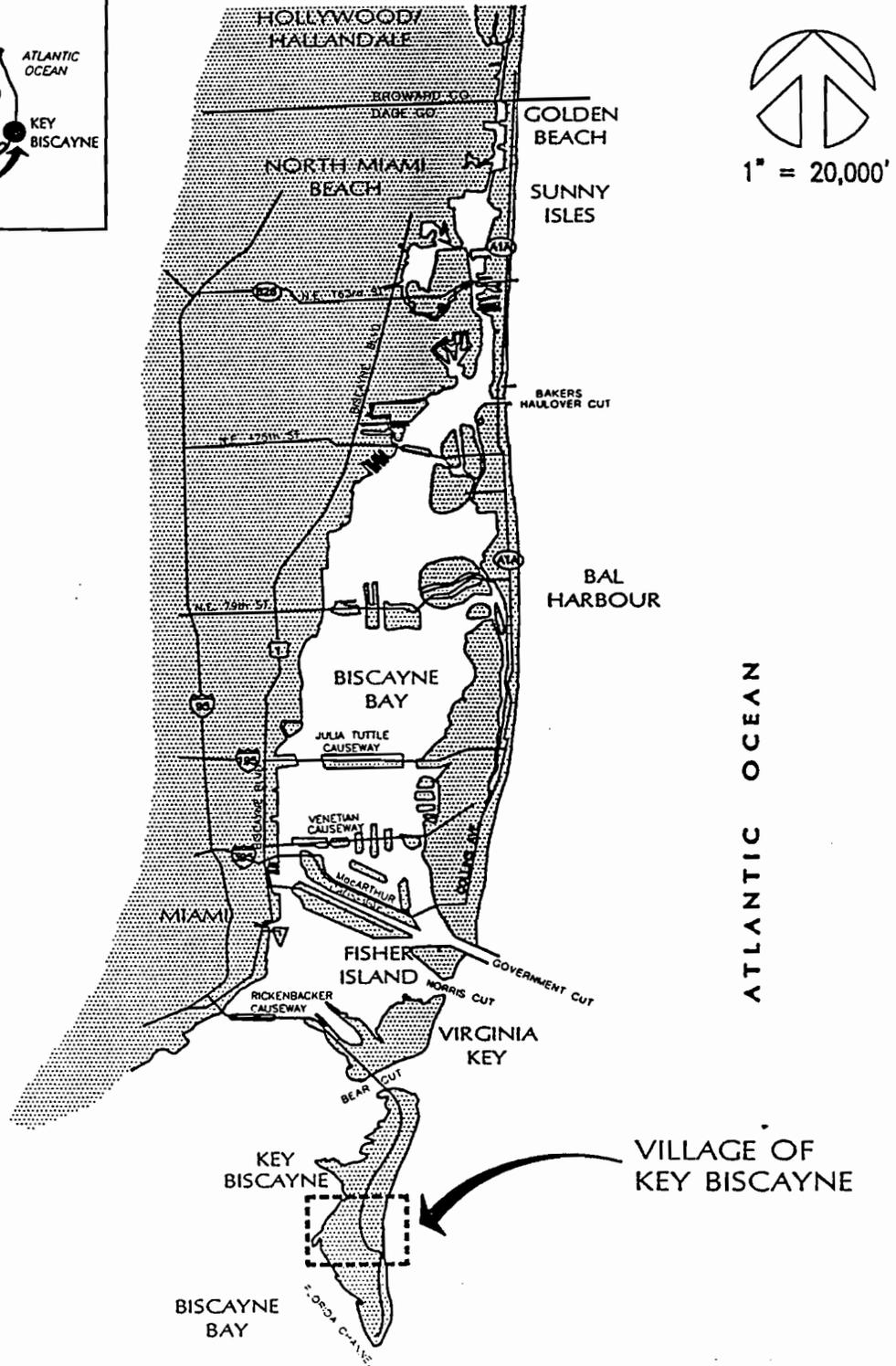
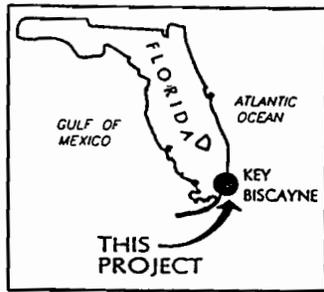
consists of approximately 120,000 cubic yards of fill placed from Commodore Club, approximately 350 feet south of R-101, to the Towers, 500 feet south of R-107, with a berm height of +9 feet NGVD and slope of 1V:14H. Nourishment life is expected at 10 years.

Storm Protection: Potential benefit from increased storm protection of the proposed fill was examined using the same storm surge and numerical model implemented by Florida DEP in establishing the statewide Coastal Construction Control Lines (CCCL). Results show that with the proposed fill in place, the landward limit of the erosion may be reduced by approximately 90 feet at the Sands Condo (monument R-105) under a statistical 100-year storm event. This reduction in the landward encroachment may represent a substantial benefit through reduced undermining and wave impact on upland structures.

Sand Sources: Due to the moderate quantity of sand needed for this project, no clear cost advantages exist between the potential offshore, upland and foreign sources. However, both offshore dredging and imported foreign sources may involve more complicated permitting requirements due to the need for additional environmental, monitoring, and/or geotechnical, archaeological investigations. Numerous upland sand sources are available throughout south and central Florida mines, many of these possessing excellent quality and compatibility. Material and trucking costs of these upland sources ranges from about \$13.00 to \$17.00 per cubic yard with in-place costs estimated at \$16.00 to \$20.00 per cubic yard. Total duration of the beach construction utilizing an upland sand source is estimated at 10 to 14 weeks.

Permitting Requirements: Permitting processing is currently underway and is expected to reach completion by spring 1999. Prior to the construction, extensive field investigations will be required including surveying of the nearshore/offshore topography/bathymetry and environmental resource mapping of nearshore seagrass and hardbottom areas to address the Environmental Impact Assessment (EIA). In general, long-term physical and environmental monitoring will be required, annually for a 5-year duration after the construction.

Costs/Funding: Total estimated cost for the proposed nourishment is \$2.67 million, including construction, engineering, design, permitting, and monitoring. Currently, chances for receiving Federal funding is considered to be very small since this is not an existing authorized project. The Village may be eligible for State funding up to 37% of the total costs, or approximately \$988,000. The County may potentially fund the entire non-state cost of approximately \$1.68 million based on the County's funding of beach projects at other local municipalities. Further consultation between the Village and Dade County is recommended. The annual amortization cost for local share will be \$330,000 over the next 50 years for a total of five beach nourishment projects.



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FIGURE 1.1
LOCATION MAP



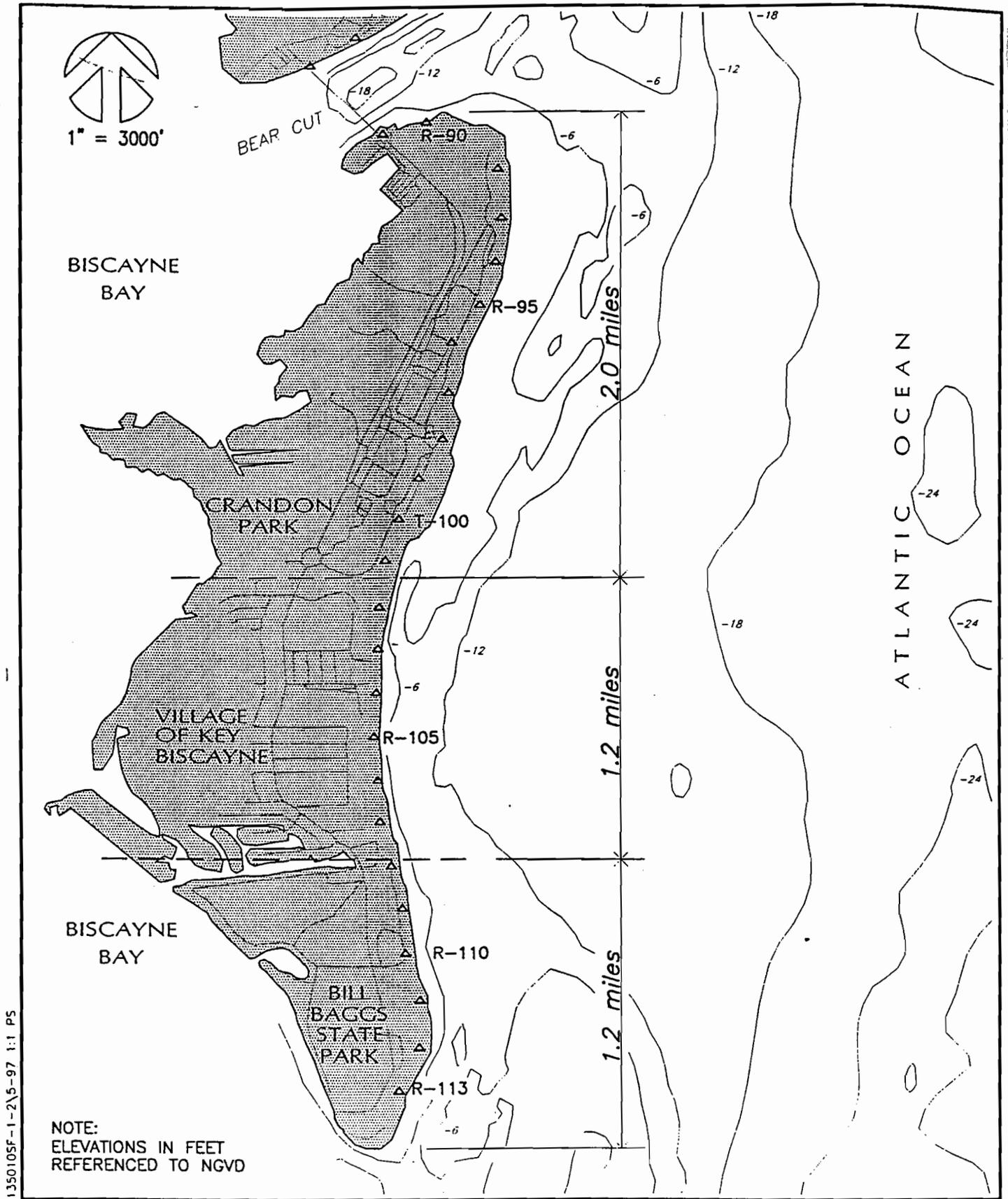
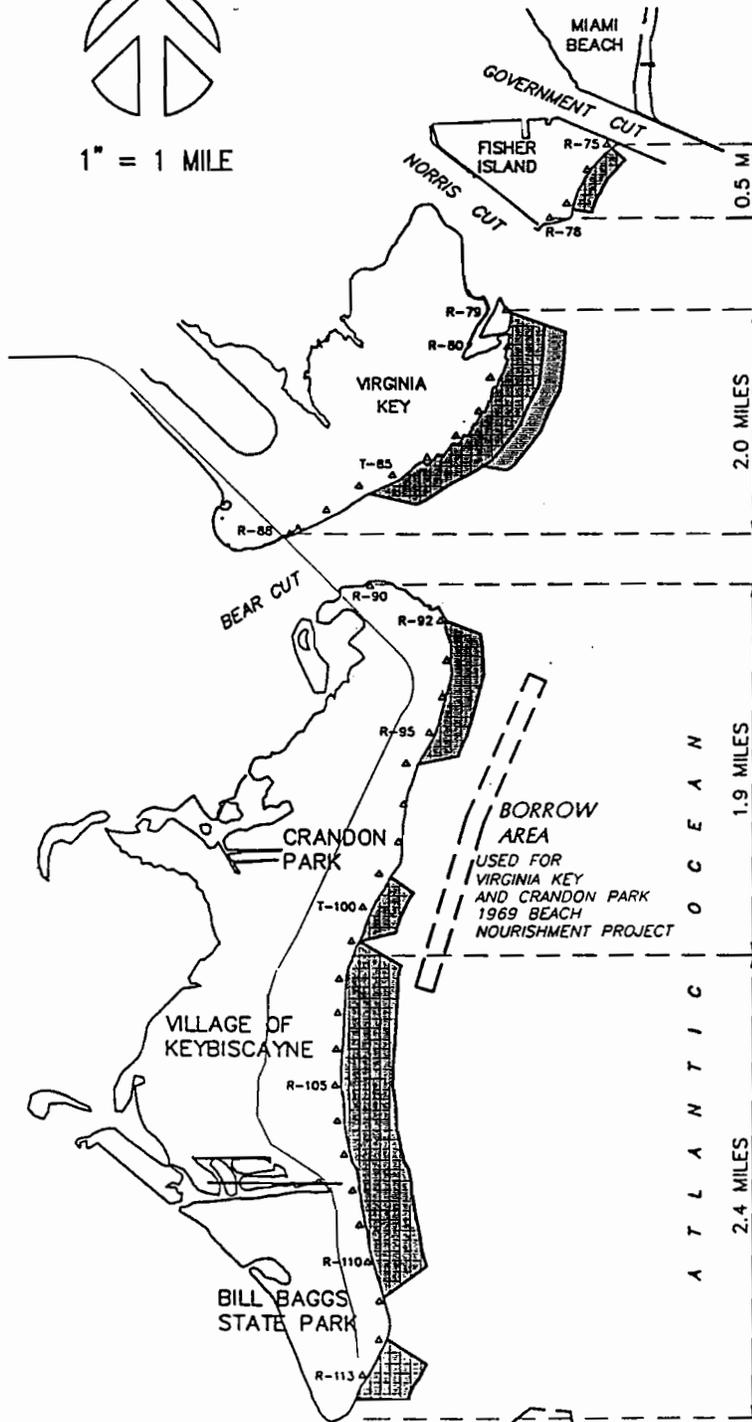


FIGURE 1.2
VICINITY MAP



| PROJECT | YEAR | VOLUME (CU.YD.) |
|---|--------------|--------------------|
| FISHER ISLAND | 1991 | 25,000 |
| VIRGINIA KEY R79 - R86 R79 - R84 | 1969 1974 | 176,800 110,000 |
| CRANDON PARK R92 - R96 R99 - R101 | 1969 | 196,300 |
| VILLAGE AND BILL BAGGS STATE PARK R101 - R111 R112 - R113 | 1987 | 420,000 |

BORROW AREA
USED FOR KEY BISCAYNE
1987 BEACH NOURISHMENT PROJECT

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FIGURE 13
HISTORIC BEACH RENOURISHMENT



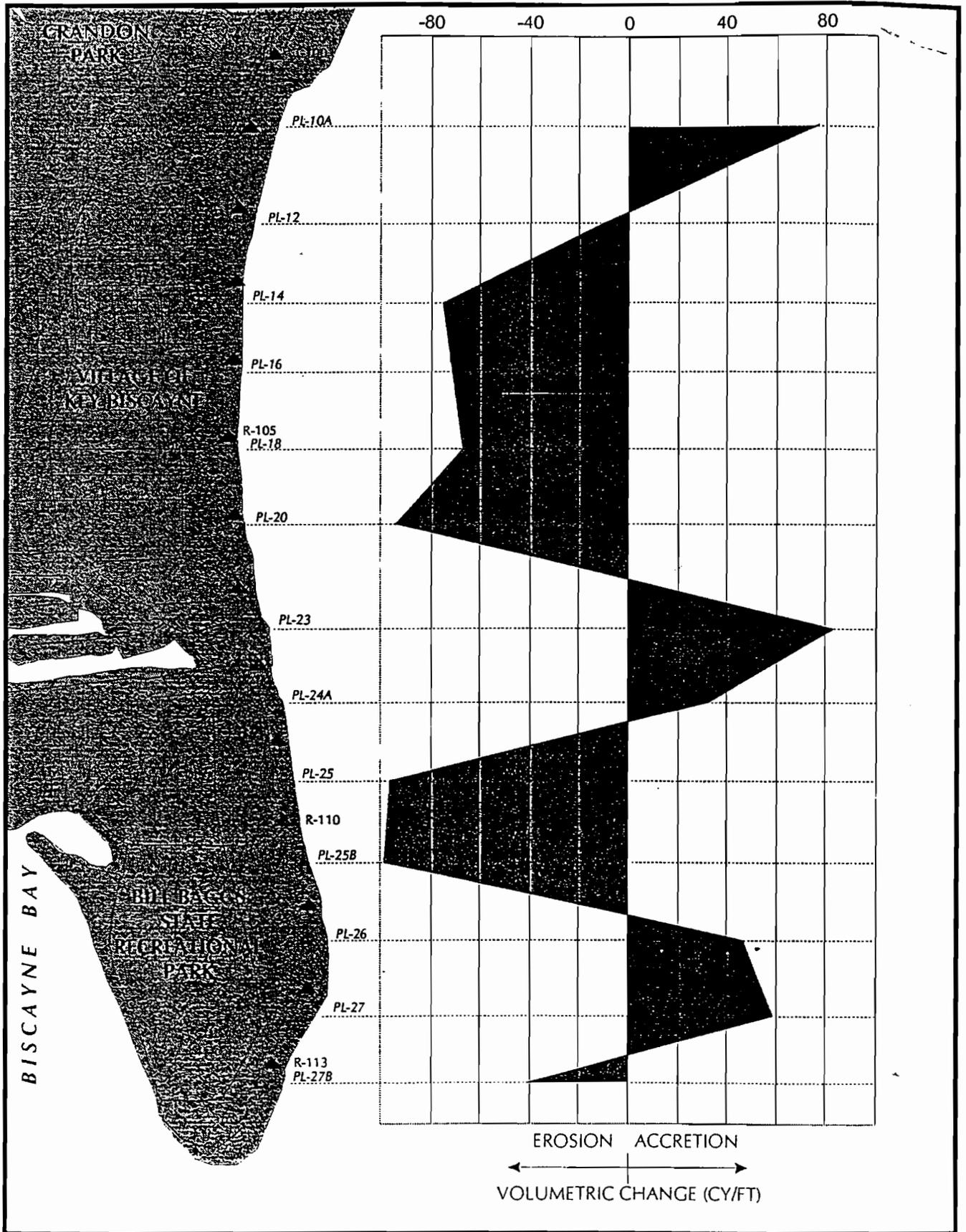


FIGURE 2.17

Volumetric Changes at 47 months (May 1991) USACE Monitoring Survey

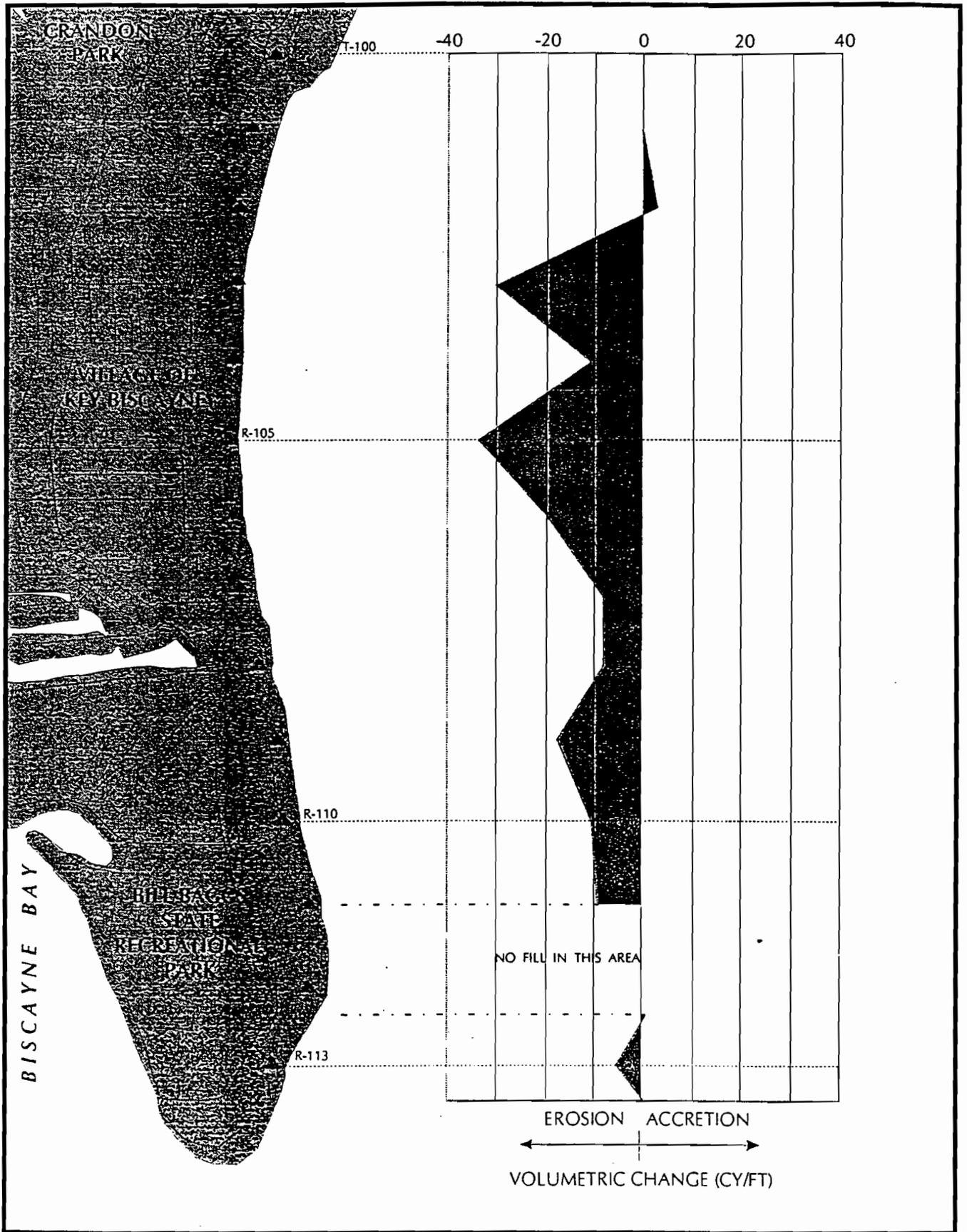


FIGURE 2.19

Volumetric Erosion of 1987 Fill as of April 1996

effect the larger area of Key Biscayne including Bill Baggs State Park and Crandon County Park which draw a large number of tourist and economic benefit. Public education should focus on this high economic value of the beach. The public should additionally be made aware of the importance of the beach/dune in providing storm protection to the upland structures and buildings and the potential economic savings in reduced or subverted storm damage.

- 2) **Expedient Action:** All too often, the impetus to nourish beaches occurs after severe erosion has already stripped away significant beach area and dune habitat. Under these conditions, seawalls and upland structures may be highly vulnerable to direct wave attack, particularly during storm conditions. Part of public education/awareness should include the importance of starting and establishing a plan of action before the beach is in a state of critical erosion.
- 3) **Environmental Issues:** Public awareness on environmental issues pertaining to those addressed in Section 3.4.1 include potential impacts to nearshore seagrasses and hardbottom communities. Long-term benefits associated with the re-establishment of a dune system with the colonization of native vegetation and the maintenance of a stable beach for sea turtle nesting should also be addressed.
- 4) **Funding/Permitting:** Education relating to the funding process including the importance of providing an annual allocation of tax dollars devoted to beach nourishment/enhancement. This would include education on the development of the 10-year budget plan and the requirements imposed by DEP to receive funding eligibility.

4.5 Economics

4.5.1 *Funding*

Potential funding sources for this proposed beach nourishment project include those associated with Federal, State, and Local Agencies. Local sources include Dade County and the Village of Key Biscayne.

Federal: According to "The Coast of Florida Study" (USACE 1996) and our discussion with Mr. Charles Stevens, the Army Corps of Engineers project manager for Dade County beach nourishment projects, the Village of Key Biscayne shoreline protection project was not recommended for Federal funding. Due to budget constraints, the administration limits Federal participation in funding new beach erosion control projects, which are not already authorized by Congress. The chances to obtain Federal funding for this project is considered to be very small at the present time.

State: Pursuant to Section 161.101, Florida statutes, the Florida Beach Erosion Control Assistance Program is authorized and administered under the provisions of Chapter 62B-36, Florida Administrative Code, by the Department of Environmental Protection (DEP). The Florida Beach Erosion Control Assistance Program is a grant-in-aid program established for the purpose of working in cooperation with Local, State, and Federal entities to achieve the protection, preservation, and restoration of the coastal sandy beach resources of the State. The Department is authorized to provide up to 50% of the non-Federal costs of the approved beach nourishment project. Typically, the State will cost share feasibility study, sand search, environmental and other related costs for beach nourishment projects. However, State funding for beach nourishment projects and related studies are based upon the amount of public access and parking established by Department standards.

Local: According to Section 161.25 and 161.37 Florida statutes, the Board of Dade County Commissioners is provided with the power to act as the beach and shore preservation authority and is authorized to use any available County funds for beach erosion control projects. To provide for the capital, operation and maintenance costs of the Beach and Shore preservation program, Dade County has the authority to levy ad valorem pass and issue bonds.

Funding Processes: Starting the Fiscal Year 1998-99, DEP requests each local sponsor, i.e. county or local municipality, to submit a long-range budget plan with supporting documents in their application for State funding. This long-range budget plan includes a

10-year budget projection for a beach erosion control project with a detailed first five year budget and estimate of funding needs for the following five years. The documents submitted will be reviewed by State and prioritized for funding.

The long-range beach erosion control budget plan and supporting documents need to be submitted to DEP no later than March 31 for each fiscal year. Upon receipt of these submittals, DEP will review, validate, prioritize and consolidate into the fixed capital outlay legislature budget request. This budget request will subsequently be submitted to the Governor and Cabinet, the Governor's office, and finally to the Legislature for funding appropriation. The funds may become available on July 1, if the funding request for this project is approved by the Legislature. The chance of receiving a grant for this project depends on total funds appropriated by the Legislature and the project ranking by DEP. If the funding request is not approved for the fiscal year, it will automatically be shifted for next year's consideration.

Funding Eligibility: To be eligible for State financial assistance, pursuant to Sections 161.101 and 161.161, Florida statutes, the project needs to be:

- (a) Designed to protect, preserve, maintain, or enhance beach or dune resources.
- (b) Located in an area which has been designated as a critical erosion area by DEP pursuant to Section 161.101, Florida statutes.
- (c) Cost effective, with tangible benefits which exceed costs.
- (d) Designed to provide a net positive enhancement to the environment and protect historically established habitats.
- (e) Consistent with the local comprehensive plan and Chapters 161.253, 258, and 373, Florida statutes.
- (f) Accessible to the general public.

Public Access: Publicly owned or controlled beach access ways will be granted eligibility for the shoreline length of the access site. Public lodging establishment, i.e. hotels and motels licensed with the Department of Business and Professional Regulation, Division of

Hotels and Restaurants will be granted 100% eligibility for its beach front property. This factor specifically excludes apartment buildings, rooming houses, rental condominiums, time-shares, and transient apartments. To be eligible for consideration of State funding, the public parking facilities must be located no further than one-quarter mile walking distance from a public beach access site. Public parking spaces and beach access site must be opened and available to the general public on an equal serve basis.

Based on the Village's documentation (De Cocq, 1996), the Village currently has 3,540 feet public access, that would increase to 4,640 feet if the proposed beach-front park is complete. This represents approximately 74 percent of the total length of Village beach, 6,304 feet. These public accesses would make the Village eligible for State funding at 50% of the 74% of total project cost, i.e. 34 percent of costs for construction and related studies.

Project Ranking: DEP has developed and utilized the following criteria to prioritize funding applications, which are submitted for beach erosion control projects, pursuant to Section 161.101, Florida statutes. The ranking criteria are divided into two categories as outlined as follows:

- I. PROJECT PERFORMANCE CRITERIA
 - (a) Degree of Erosion
 - (b) Mitigation of Inlet Effects
 - (c) Threat to Existing Development
 - (d) Benefits (Recreational or Economic)
 - (e) Performance of the Project

- II. SUPPLEMENTAL CRITERIA
 - (a) Federal Funding
 - (b) Innovative Technology
 - (c) Local Commitment
 - (d) State Commitment

4.5.2 Long-Range Budget Plan

Project Costs: The total cost for the proposed beach nourishment project at the Village of Key Biscayne is estimated at 2.67 million (Table 4.2). This estimate includes costs associated with the engineering, design, permitting, and the required physical and environmental monitoring components. This estimate does not include the costs associated with the use of the offshore borrow site near the Key Biscayne lighthouse. To obtain a State approval to use this borrow site, the Village may need to perform the studies and field investigation including marine resources, mapping, geotechnical investigation, environmental impact assessments, archeological search, hydrographic and easement surveys at this borrow site. With the assumption that the project will be performed outside of the sea turtle nesting season, the presented monitoring costs do not include sea turtle monitoring components.

Based on a 34% costs sharing, both State and Local will pay approximately \$988,000 and \$1.68 million, respectively. Dade County may potentially share up to 100% of the Local costs depending on funding availability. Further consultation and negotiation with Dade County are recommended.

50-Year Costs: Over a projected 50-year time span, a total of 5 nourishments are anticipated based on a 10-year nourishment interval. Each of these beach nourishments is expected to incur approximately the same total costs of 2.67 million in present day value not considering potential effects due to sea level rise and global warming. The Local share (63%) of these 5 nourishments amortized over 50 years is approximately \$330,000, annually, based on an USACE adopted interest rate of 7.625 % and a yearly inflation of 3.0%.

Project Schedule: The anticipated project schedule for implementation of the required tasks is shown in Table 4.3. The funding and permitting processing is currently underway and is expected to reach completion by spring 1999. During this time, other tasks may be completed including the selection of a sand source, field investigations including hydrographic surveying and marine resource mapping, and development of a preliminary design. After the completion of the permit processing, the final design can be developed with construction bidding starting in the fall, 1999. Construction is anticipated to begin in

November (1999) after the end of the sea turtle nesting season. Post-construction monitoring including both physical and environmental components will generally be required on an annual basis for 5 years after the construction.

TABLE 4.2

**ESTIMATED COST FOR
VILLAGE OF KEY BISCAYNE BEACH NOURISHMENT PROJECT**

| PROJECT ITEMS | 1st BEACH PROJECT | | PROJECTED LOCAL SHARE FOR EACH PROJECT OVER 50-YEAR LIFE ² | | | | | | |
|--------------------------------------|--------------------|--------------------|---|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| | TOTAL | STATE ¹ | LOCAL | FY 09-09 | FY 09-19 | FY 19-29 | FY 29-39 | FY 39-49 | TOTAL |
| Engineering/Design/Permitting | \$320,000 | \$118,000 | \$202,000 | \$202,000 | \$271,000 | \$365,000 | \$490,000 | \$659,000 | \$1,987,000 |
| Monitoring, Physical & Environmental | \$350,000 | \$130,000 | \$220,000 | \$220,000 | \$296,000 | \$397,000 | \$534,000 | \$718,000 | \$2,165,000 |
| Beach Fill Construction | \$2,000,000 | \$740,000 | \$1,260,000 | \$1,260,000 | \$1,693,000 | \$2,276,000 | \$3,058,000 | \$4,110,000 | \$12,397,000 |
| Total | \$2,670,000 | \$988,000 | \$1,682,000 | \$1,682,000 | \$2,260,000 | \$3,038,000 | \$4,082,000 | \$5,487,000 | \$16,549,000 |

1. Based on 74% public access of the entire Village beach

2. Assuming 3% annual inflation rate

5.0 - CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations for this Long-range Beach Nourishment Plan developed for the Village of Key Biscayne are summarized in the following:

5.1 Conclusions

1. The opening of Government Cut in 1904 and subsequent widening and deepening improvements have caused significant erosion along Key Biscayne, Virginia Key and Fisher Island as determined by the historic Mean High Water shoreline data. The most significant long-term shoreline erosion has occurred within the Village and near the tip of the island with both of these locations eroding more than 400 feet by 1945.
2. The shallow littoral sand platform at both north and south ends of Key Biscayne is largely absent along the Village shoreline, making this area much more vulnerable to wave impacts. The results of the REF/DIFF numerical modeling show wave energy focusing occurring along the Village shoreline under predominant wave conditions in concurrence with the known erosion "hot spots."
3. An average erosion rate of approximately 12,000 cubic yards per year has been occurring since the 1987 beach fill project based on examination of the April 1996 survey data. There has been a total loss of approximately 107,000 cubic yards from the Village since the 1987 beach fill. The greatest erosion ("hot spots") occurred at the Silver Sand (R-103) and the Sands Condo (R-105) with an erosion rate at 3.5 cubic yards per year.
4. The proposed nourishment design, as of 1997, consists of approximately 120,000 cubic yards of fill placed from Commodore Club to the Towers in the Village, with a berm height of +9 feet NGVD and a slope of 1V:14H. This

project will increase the beach width a maximum of 60 feet after equilibrium adjustment. Nourishment life is expected at 10 years.

5. The proposed beach nourishment project will provide storm protection benefits, contribute to property value appreciation, enhance tourism and recreation for residents. In addition, this beach nourishment will also preserve natural habitat for sea turtle nesting and beach dune planting.
6. Due to the moderate quantity of sand need for this project, no clear cost advantages exist between the potential offshore, upland and foreign sources. The cost for offshore, upland and foreign sources is estimated to be in the range of \$11.5 to \$15.5, \$13 to \$17, and \$15 to \$23 per cubic yard, respectively. However, both offshore dredging and imported foreign sources may involve more complicated permitting requirements due to the need for additional environmental, monitoring, and/or geotechnical, archeological investigations.
7. The Federal, State, and County permits are required prior to construction of the proposed beach nourishment. Dade County (DERM) is currently processing the permit application. Extensive field investigations will be required to provide the data needed to address the concerns by various permitting agencies. It will take approximately 12 to 24 months to secure all permits.
8. Total estimated cost for the proposed nourishment is \$2.67 million including construction, engineering, design, permitting, and monitoring. This cost does not include the cost associated with exploration of an offshore borrow site. The local, including County and/or Village, may be eligible for State funding up to 37% of the total cost, or approximately \$988,000. Local has to pay for the remaining non-State cost of approximately \$1.68 million. The annual amortization cost for local share will be \$330,000 over the next 50 years for a

total of 5 beach nourishment projects. The project is expected to be under construction in the winter of 1999.

5.2 Recommendations

1. The Village should continue to coordinate with the State and the County towards obtaining potential beach quality material from the Cape Florida Wetland project. The Village should continue to follow up with the U.S. Army Corps of Engineers regarding the progress of investigating the existing offshore borrow site near the Key Biscayne lighthouse and of developing technical specifications for use of a foreign sand source as beach fill.
2. The Village should work with DERM of Dade County towards expediting the permitting processes by addressing the questions and/or concerns that may be raised by various permitting agencies.
3. Based on the County's funding of beach projects at other local municipalities, the County may potentially fund the entire non-State cost of approximately \$1.68 million. However, the Village should consult with Dade County regarding their participation in this beach nourishment project.
4. The local may be eligible for State funding up to \$988,000, based on the qualified public beach access. However, due to funding availability, the State in the past was only able to fund the highly ranked projects. The ranking criteria for State funding is presented in Section 4.5.1 of this report. To increase the ranking of this project, the Village should make the State aware of the importance of this project and its associated benefits. A strategy should be developed to ensure a higher funding ranking for this project.
5. A contingency financial plan for the proposed beach nourishment project should be developed to address the needs in the event of an emergency situation when the State and/or County's funding is not available.



VILLAGE OF KEY BISCAYNE

Office of the Village Clerk

Village Council

John F. Festa, *Mayor*
Michele Padovan, *Vice Mayor*
Mortimer Fried
Gregory C. Han
Hugh T. O'Reilly
Martha Fdez-León Broucek
Betty Sime

Village Clerk

Conchita H. Alvarez

CERTIFICATION

STATE OF FLORIDA
COUNTY OF DADE

I, Conchita H. Alvarez, duly appointed Village Clerk of the Village of Key Biscayne, Florida, do hereby certify that the attached is a true and correct copy of:

Resolution 96-36 of the Village of Key Biscayne, Florida adopted on November 14, 1996.

IN WITNESS WHEREOF, I hereunto set my hand and affix the Seal of the Village of Key Biscayne, Florida, this 7th day of November, 1997.



Conchita H. Alvarez
Conchita H. Alvarez
Village Clerk
Village of Key Biscayne, Florida

RESOLUTION NO. 96-36

A RESOLUTION OF THE VILLAGE OF KEY BISCAIYNE, FLORIDA; AUTHORIZING THE VILLAGE MANAGER TO EXECUTE THE ATTACHED AGREEMENT WITH COASTAL SYSTEMS INTERNATIONAL, INC., CORAL GABLES, FLORIDA, FOR PROFESSIONAL SERVICES IN PREPARING A LONG-TERM BEACH MANAGEMENT PLAN FOR THE VILLAGE KEY BISCAIYNE, FLORIDA; PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the Village Council supports the Long-Term Beach Nourishment and Shoreline Protection;

WHEREAS, the Village Council has approved the funding of the Long-Term Beach Management Plan for the Village;

WHEREAS, long-term planning for beach preservation is deemed necessary by the Village Beach Resource and Management Task Force, Brian Flynn of the Metropolitan Dade County Department of Environmental Resources Management, and the Village Council; and

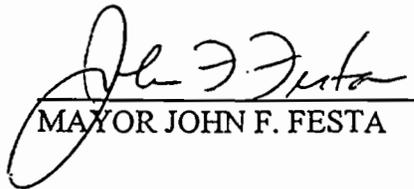
WHEREAS, Coastal Systems International, INC., Coral Gables, Florida, has submitted the attached agreement to perform certain professional services in conjunction with the preparation of said Long-Term Beach Management Plan;

NOW THEREFORE, BE IT RESOLVED BY THE VILLAGE COUNCIL OF KEY BISCAIYNE, FLORIDA AS FOLLOWS:

Section 1. That the Village Manager is hereby authorized to execute the attached agreement, on behalf of the Village, with Coastal Systems International, INC., Coral Gables, Florida, for the provision of professional services relating to the preparation of the Long-Term Beach Management Plan for the Village of Key Biscayne, subject to the recommendations and approval of the Village Attorney.

Section 2. This resolution shall take effect immediately upon adoption.

PASSED AND ADOPTED this 14th day of November, 1996.


MAYOR JOHN F. FESTA

ATTEST:


CONCHITA H. ALVAREZ, VILLAGE CLERK

APPROVED AS TO FORM AND LEGAL SUFFICIENCY:


RICHARD J. WEISS, VILLAGE ATTORNEY

