

Final Programmatic Environmental Assessment
- Appendices -

Wastewater Management Improvements
in the Florida Keys, Florida



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Appendix A
Acronyms

Appendix A List of Acronyms

ABF	Anoxic biofilter
AIDS	Acquired Immune Deficiency Syndrome
AIRFA	American Indian Religious Freedom Act
ARPA	Archaeological Resources Protection Act
ASTM	American Society of Testing and Materials
ATU	Aerobic Treatment Units
AWT	Advanced Wastewater Treatment levels
BAT	Best Available Technology
BFE	Base flood elevation
BMPs	Best management practices
BOCC	Board of County Commissioners
BOD	Biochemical oxygen demand
BP	Before present
BPAS	Building Permit Allocation System
CARL	Conservation and Recreation Lands
CATEX	Categorical Exclusion
CBRA	Coastal Barrier Resources Act
CBRS	Coastal Barrier Resource System
CEQ	Council on Environmental Quality
CERP	Comprehensive Everglades Restoration Plan
CES	Key West City Electric Services
CFCRS	Continuous Feed Cyclic Reactor System
CFR	Code of Federal Regulations
CFV	Commercial Fishing Village
CIEGP	Cesspit Identification and Elimination Grant Program
CO	Carbon monoxide
CPU	Chemical precipitation unit
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dBA	Decibel
DCA	Department of Community Affairs
EA	Environmental Assessment

Appendix A List of Acronyms

EDU	Equivalent Dwelling Unit
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERP	Environmental Resource Permit
ESA	Endangered Species Act
F.A.C.	Florida Administrative Code
FAST	Fixed Activated Sludge Treatment
FDEP	Florida Department of Environmental Protection
FDH	Florida Department of Health
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FKAA	Florida Keys Aqueduct Authority
FKEC	Florida Keys Electric Cooperative
FKNMS	Florida Keys National Marine Sanctuary
F.L.	Florida Law
FMSF	Florida Master Site File
FPSC	Florida Public Service Commission
GIS	Geographical Information System
GMFMC	Gulf of Mexico Fishery Management Council
gpd	Gallons per day
Ha	Hectares
HHS	Department of Health and Human Services
HUD	U.S. Department of Housing and Urban Development
Hz	Hertz
IMB	Immersed Membrane Bioreactor
IS	Improved Subdivision
Ldn	Day-Night Sound Level
LOS	Levels of Service
M.C.C.	Monroe County Code
MCSWMP	Monroe County Sanitary Wastewater Master Plan

Appendix A List of Acronyms

MFI	Median family income
Mgal	Million gallons
mgd	Million gallons per day
µg/m ³	Micrograms per cubic meter
MHI	Median household income
MOU	Memorandum of understanding
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act of 1969
NGVD	National Geodetic Vertical Datum
NHPA	National Historical Preservation Act
NMFS	National Marine Fisheries Service
NO ₂	Nitrogen dioxide
NO ₃	Nitrate
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
O&M	Operations and Maintenance
O ₃	Ozone
OFW	Outstanding Florida Waters
OSHA	Occupational Safety and Health Administration
OSTDS	On-site sewage treatment and disposal system
OWNRS	On-site wastewater nutrient reduction systems
OWTS	On-site wastewater treatment systems
PATA	Key West Port and Transit Authority
Pb	Lead
PEA	Programmatic Environmental Assessment
PM 10	Particulate matter less than 10 microns
ppm	Parts per million
RBC	Rotating Biological Contactor

Appendix A List of Acronyms

RCRA	Resource Conservation and Recovery Act
ROGO	Rate of Growth Ordinance
RSF	Recirculating sand filter
SAFMC	South Atlantic Fishery Management Council
SDGS	Small diameter gravity sewers
SDI	Subsurface Drip Irrigation system
SEA	Supplemental Environmental Assessment
SER	Supplemental Environmental Review
SFWMD	South Florida Water Management District
SMMP	Stormwater Management Master Plan
SO ₂	Sulfur dioxide
STEP	Septic tank effluent pump
SWMP TAC	Sanitary Wastewater Master Plan Technical Advisory Committee
THM	Trihalomethane
TN	Total nitrogen
TON	Total organic nitrogen
TP	Total phosphorus
TSS	Total Suspended Solids
TTHM	Total trihalomethane
UIC	Underground Injection Control
URM	Urban Residential Mobile Home
USACE	U.S. Army Corps of Engineers
USDW	Underground source of drinking water
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UV	Ultraviolet
WQPP	Water Quality Protection Program
WWTP	Wastewater Treatment Plants

Appendix B
Definitions

Abandonment costs – These include the expenses associated with removal and disposal of an existing wastewater treatment system.

Adsorption – Adhesion of molecules of gases or of ions or molecules to the surfaces of solid bodies with which they are in contact.

Advanced Wastewater Treatment (AWT) – Also known as **tertiary treatment**, AWT follows Secondary Treatment. Removal of soluble nitrogen and phosphorus compounds is a common application of AWT. AWT may involve chemical addition, filtration, or activated carbon processes. As referred to in the MCSWMP, effluent treated to AWT standards meets 5 mg/L BOD, 5 mg/L TSS, 3 mg/L TN, and 1 mg/L TP.

Anthropogenic – Relating to humans and their impact on the natural environment

Belt Filter Press Dewatering – A process used to remove water from sludge thereby producing dewatered biosolids that contain equal to or greater than 20% dry solids.

Benthic Algae – Algae relating to the bottom of a water body.

Best Available Technology (BAT) – The level to which wastewater treatment systems are designed. As referred to in the MCSWMP effluent treated to BAT standards that 10 mg/L BOD, 10 mg/L TSS, 10 mg/L TN, and 1 mg/L TP.

Best Management Practices (BMP) – A set of minimum practices developed and implemented to improve the physical, chemical, and biological integrity of the nation's waters. Examples include installation of silt fencing at a construction site to prevent eroded soils from entering a nearby waterway.

Biochemical Oxygen Demand/Biological Oxygen Demand (BOD) – The oxygen that is needed and used by aerobic organisms living in water that is rich in organic material (such as waters polluted by sewage).

Boulder Zone – A very permeable, cavernous zone in the lower Floridian Aquifer System that is about 2800 to 3300 feet below ground surface.

Calcareous – Containing calcium carbonate. As applied to rock, the predominant percentage of the rock is calcium carbonate.

Cesspool/Cesspit – An unregulated and unpermitted effluent disposal method that consists of an excavated area (100 to 1000 cubic feet, 4 to 8 feet deep) into the ground surface. The area is covered with a slab of concrete, and untreated sewage is then deposited into the pit. Liquid wastes are discharged through the porous limestone formations and ultimately to the nearshore areas. Solid wastes are retained in the pit, which is often abandoned after it becomes full.

Class B Lime Stabilization – The process used to reduce harmful bacteria and odors in sludge or biosolids. Lime is added to untreated sludge in sufficient quantity to raise the pH to 12 or higher. The high pH creates an environment that is not conducive to the survival of microorganisms. Class B Lime Stabilization refers to the EPA classification for the safe treatment, beneficial use, and disposal of biosolids that contain pathogen concentrations levels low enough for some beneficial uses, such as land application with restrictions.

Class I Injection Well – The first of five well classifications developed by the U.S. Environmental Protection Agency under their underground disposal control program to categorize the injection of various types of liquid wastes. Class I wells are typically used by

hazardous waste generators and operators, as well as industrial and municipal disposal systems, to inject fluids into a geologic formation that is beneath the lower-most formation containing an underground source of drinking water within ¼ mile of the well bore. A Class I Well must meet siting, construction, operation, and maintenance criteria specific to this well class, as established by the U.S. Environmental Protection Agency and the Florida State regulating agency.

Class V Injection Well – Similar to a Class I Injection Well, the U.S. Environmental Protection Agency established this well category for a broad range of specialty applications to dispose liquid wastes, which are not categorized under the other four injection well classes. For example, a Class V well could be used to drain stormwater runoff into an aquifer.

Cluster System (of OWNRS) – An OWNRS that serves multiple homes. Clusters can be composed of small groups (such as 2 homes), which share one treatment system, or of large groups (50 homes), which use low-pressure sewers to connect the cluster to a centralized OWNRS.

Effluent – The waste stream from a wastewater treatment system collection unit.

Enteric – Relating to the intestines. Over 100 different human enteric pathogens, including viruses, parasites, and bacteria may be found in municipal wastewater and surface runoff.

Enterococci – A bacterium whose presence indicates Fecal Coliform.

Environmental Impact Statement (EIS) – A public document prepared pursuant to NEPA containing a detailed analysis and evaluation of all the impacts of a proposed major federal action and all its reasonable alternatives that has the potential to significantly affect the quality of the human environment. This is a more rigorous analysis than an Environmental Assessment and provides for formal public involvement.

Epiphyte – A plant growing on another plant but getting little nutrition from its host.

Equivalent Dwelling Unit (EDU) – A household of 2.3 persons generating about 168 gallons of effluent per day.

Eutrophication – The process by which a body of water becomes nutrient-rich and oxygen-deficient.

Executive Order (EO) – A Presidential mandate that directs a federal agency to consider certain issues as an agency plans their actions. For example, former President Jimmy Carter directed all agencies to “minimize the destruction and loss or degradation of wetlands” under EO 11990, “Protection of Wetlands.”

Fecal Coliform – A bacterium used as an indicator of total sewage biological contamination.

Florida Statutory Treatment Standards – Quality standards for discharged wastewater effluent as promulgated in F.A.C. 99-395. Treated effluent generated by sewage facilities with design capacities greater than 100,000 gpd must meet 5 mg/L TP. Sewage facilities with design capacities less than 100,000 gpd must meet 10 mg/L BOD, 10 mg/L TSS, 10 mg/L TN, and 1 mg/L TP. On-site sewage treatment and disposal systems must meet 10 mg/L BOD, 10 mg/L TSS, 10 mg/L TN, and 1 mg/L TP.

Hydraulic Communication – Water movement from one area to another (such as from the Boulder Zone to the ocean).

Hydraulic Conductivity – An aquifer’s water transmission rate; similar to transmissivity.

Hydraulic Head – The driving force influencing groundwater movement, water’s total energy at a given location.

Injection Well (shallow and deep) – An underground well designed to pump treated effluent (or other materials) into shallow (e.g., 90 feet) or deep (e.g., 2,100 feet) geologic locations. Injection wells are designed to account for physical and chemical characteristics of the injection matrix, and require monitoring to ensure mechanical integrity of the well.

Lateral costs – These include the expenses associated with installing wastewater piping on the service recipient’s property for connection to the conveyance piping in the street for a new wastewater system.

Lithologic – A rock’s descriptive characteristics, including color, structure, mineral composition, and grain size.

Median Family Income (MFI) – as defined by the U.S. Census Bureau, refers to the income of a family where a family is defined as two or more people (one of whom is the householder) related by birth, marriage, or adoption residing in the same housing unit.

Median Household Income (MHI) – as defined by the U.S. Census Bureau, refers to the income of a household where a household is defined as all people who occupy a housing unit regardless of relationship. A household may consist of a person living alone or multiple unrelated individuals or families living together.

Microkarst – Karst features on the scale of millimeters. Karst is a type of landform developed over limestone, dolomite, or gypsum through solution of the rock, typified by closed depressions, caves, and underground drainages.

National Environmental Policy Act (NEPA) – A congressional act established in 1969 that directs all federal agencies to consider the environmental effects of their programs, projects, and funding decisions. NEPA considers the effects on all resources of natural and built environments and includes compliance requirements with all other applicable federal laws, such as the Endangered Species Act and the Environmental Justice Executive Order.

Norwalk Virus - Norwalk viruses (and related caliciviruses) are important causes of sporadic and epidemic gastrointestinal disease in the United States, and have typically been associated with eating contaminated shellfish. Water and ice are other sources of infection. Symptoms of Norwalk virus infection include nausea, vomiting, diarrhea, headache, low-grade fever, and abdominal cramps. Persons with this infection usually recover within 2-3 days without serious or long-term health effects.

Oligotrophic – A body of water that is nutrient-poor.

On-Site Wastewater Nutrient Reduction System (OWNRS) – An on-site wastewater treatment system that meets a minimum level of BAT treatment, or 10 mg/L BOD, 10 mg/L TSS, 10 mg/L TN, and 1 mg/L TP.

On-Site Wastewater Treatment System (OWTS) – Any of several wastewater treatment types that are located on the property they serve. Examples include septic systems, cesspools, aerobic treatment units (ATU), and On-Site Wastewater Nutrient Reduction Systems (OWNRS).

Oolites – Rocks consisting mostly of small, spherical calcium carbonate grains.

Operation and maintenance (O&M) costs – These include the monthly or annual costs incurred by service recipients for long-term operation and maintenance of the wastewater management system.

Permeability – The capacity of porous material to transmit water or other fluid. In bedded sediments, horizontal permeability is measured parallel to the bedding direction, and vertical permeability is measured transverse to the bedding.

Phytoplankton - Plant plankton, which float or weakly swim, are often microscopic (e.g., many algae species), and are the primary food source in most aquatic and marine ecosystems.

Primary Treatment – The first level of wastewater treatment that removes solids, greases, oils and other floatable solids from the waste stream, partially clarifying the effluent. Suspended solids, dissolved organic materials, and other pollutants are not removed from the effluent.

Programmatic Environmental Assessment (PEA) – A concise public document prepared pursuant to NEPA. It contains sufficient analysis to determine the likely significance of a group of similar proposed actions (projects) and alternatives' impacts, to aid decision making as to whether or not to prepare an EIS. A project- and site-specific effects evaluation document supplements the PEA, generically called a Supplemental Environmental Review (SER), (described below).

Secondary Treatment – Used in concert with Primary Treatment. This second level of treatment removes dissolved organic materials and more suspended solids, however nutrients such as nitrogen and phosphorus remain in the effluent.

Septic Tank – An OWTS using a tank and drainfield to capture waste, separate solids from liquids, and drain liquid to adjacent soils.

Significantly – In the NEPA context, this term is used to describe both the context and intensity (severity) of impacts. For a detailed description of this term, see Section 1508.27 of the President's Council on Environmental Quality's regulations implementing NEPA.

Slurry – Mixture of coarsely ground solids and liquid.

Specific Gravity – Ratio of a given mass to the mass of an equal volume of water at a specified temperature.

Subsurface Drip Irrigation (SDI) – A form of clarified effluent disposal with discharge into soils via subsurface piping.

Supplemental Environmental Assessment (SEA) – A secondary NEPA public document that references relevant data presented in the PEA and presents site- and project- specific details and evaluation of effects.

Supplemental Environmental Review (SER) – A generic phrase used herein for referencing the site- and project-specific NEPA document that would be prepared following issuance of a final PEA. This document would be either an SEA or EIS depending on the significance of the specific project impacts.

System capital costs – These include expenses associated with planning, designing, engineering, purchasing, building, and installing a wastewater treatment system, and its wastewater conveyance piping in public right-of-ways and selected effluent disposal method (e.g., injection wells, SDI, reuse).

Total Nitrogen/Nitrogen (TN/N) – Nitrogen is a common element found in nature and in wastewater. Nitrogen is an essential nutrient for plants, but contributes to water body eutrophication when more abundant. “Total nitrogen” describes nitrogen in four oxidation states: organic nitrogen, ammonia nitrogen, nitrite nitrogen, and nitrate nitrogen. Removal or reduction of TN from wastewater effluent involves nitrification (where organic N and ammonia N are converted to nitrite N, which easily converts to nitrate N) and denitrification (where nitrate N is converted to nitrogen gas).

Total Phosphorus/Phosphorus (TP/P) – Phosphorus is a natural element, however most phosphorus enters waterways via human activities (i.e., untreated wastewater or fertilizer runoff). Similar to nitrogen, phosphorus is an essential nutrient for plants, but eutrophication occurs when phosphorus is more abundant. “Total phosphorus” is in organic and inorganic forms and can occur in solution, particles, or micro-organisms (such as polyphosphates, which account for 70% of wastewater phosphorus). TP removal or reduction from wastewater effluent typically involves biological treatment (to convert P to the orthophosphate forms), which are then removed via chemical processes.

Total Suspended Solids (TSS) – TSS are solids in water, such as silt, decaying plant and animal matter, and sewage, that can be trapped by a filter. High concentrations of suspended solids can cause many problems for water body health and aquatic life. For example, high TSS can block light from reaching submerged vegetation.

Transmissivity – An aquifer’s ability to transmit water, proportional to the aquifer’s saturated thickness; similar to Hydraulic Conductivity.

Turbidity – A measure of the water clearness as a function of suspended sediment.

Vector Attraction Reduction – Decreasing the characteristic of sewage sludge that attracts rodents, flies, mosquitoes or other organisms that transmit infectious agents.

Wastewater Treatment Plant (WWTP) – An effluent collection, treatment, and disposal system that collects waste from homes and businesses, and transports collected waste through a series of sewers to a centralized treatment plant. Physical, chemical, and biological processes clarify the effluent at the WWTP so that the treated water can be safely released into the environment via water reuse, deep or shallow well injection, or other permitted methods.

Appendix C
Hot Spot Locations

Appendix C Hot Spot Locations

No.	Name	Wastewater Services	Hot Spot Area Name	Area Rank by Region	Rank for Entire Keys
			UPPER KEYS		
24	PAED 19/20	Tavernier/Key Largo Regional	Lake Surprise/Sexton Cove, Ocean Isle Estates, and adjacent area on U.S.1	1	2
23	PAED 18	Tavernier/Key Largo Regional	Key Largo Trailer Village, Largo Gardens, Hibiscus Park, and area adjacent to U.S.1	2	4
23	PAED 18	Tavernier/Key Largo Regional	Cross Key Waterway Estates & Largo Sound Park/Anglers Park Shores/South Creek Village and area along U.S.1	3	7
21	PAED 16	Tavernier/Key Largo Regional	Area A, Wynken, Blyken & Nod	4	9
20	PAED 15	Tavernier/Key Largo Regional	Harris Ocean Park, Palma Sola, Sherrill Park, Hammer Point Park, and along U.S.1	5	12
19	Plantation Key	Islamorada Regional	Area A-Eastern end of Plantation Key including Plantation Key Colony/Kahiki Harbor/Edernaire/Tavernaero/Tropical Atlantic Shores	6	14
24	PAED 19/20	Tavernier/Key Largo Regional	Reminder Of Pead 19/20- Stillwright Point/Paradise Point Cove, Riviera Village, Key Largo Mobile Home Sites, Largo City	7	15
22	PAED 17	Tavernier/Key Largo Regional	Port Largo, Key Largo Beach, Key Largo Ocean Shores, Silver Lake Park, Holiday Home sites, Buttonwood shores, Buttonwood Cove, Lazy Lagoon, Piont Pleasant Sunset Cove	8	17
16	Lower Matecumbe	Lower Matecumbe	Safety Harbor, Toll Gate Shore, Port Antigua, White Marlin Beach, Matecumbe Sandy Beach, Lower Matecumbe Beach	9	18
23	PAED 18	Tavernier/Key Largo Regional	Bahia Mar Estates/Pamela Villa/Winston Waterway	10	19
22	PAED 17	Tavernier/Key Largo Regional	Pirate's Cove, Rock Harbor Estates, Marion Park, Rock Harbor Mannor, Harbor shores, El Dorado	11	20
21	PAED 16	Tavernier/Key Largo Regional	Bay Haven, Lime Grove Estates, Sunrise Piont, Abode Casa Court, Seven Acres, Sun set Gardens, Dove Creek	12	21
17	Upper Matecumbe	Islamorada Regional	Entire Study Area	13	22
20	PAED 15	Tavernier/Key Largo Regional	Old Tavemier	14	24
22	PAED 17	Tavernier/Key Largo Regional	Sunset Waterways, Key Largo Park	15	27
23	PAED 18	Tavernier/Key Largo Regional	Bermuda Shores, Twin Lake	16	29
19	Plantation Key	Islamorada Regional	Venetian Shores	17	30
18	Widley Key	Islamorada Regional	Entire Study Area	18	32
19	Plantation Key	Islamorada Regional	Treasure Harbor, Plantation Ridge Coral Shores	19	33
19	Plantation Key	Islamorada Regional	Indian Waterways, Indian Harbor, Pkantation Key, Lysiloma, Key Heights, Vacation Village, Aergoods Heighths, Pearl City	20	37
19	Plantation Key	Islamorada Regional	Remainder Of Plantation Key	21	38

Appendix C Hot Spot Locations

No.	Name	Wastewater Services	Hot Spot Area Name	Area Rank by Region	Rank for Entire Keys
MIDDLE KEYS					
13	Marathon Primary	Marathon	Little Venice (Phase1)	1	1
14	Marathon Secondary	Conch Key	Conch KEY	2	10
13	Marathon Primary	Marathon	Phased Regional System (PhaseII)	3	13
13	Marathon Primary	Marathon	Remainder Of Regional (PhaseIII)	4	34
14	Marathon Secondary	Marathon	Grassy Key	5	35
14	Marathon Secondary	Hawks Cay	Duck Key	6	40
15	Long Key/Layton	Long Key/ Layton	Long Key Estates, City Of layton, area adjacent to U.S.1	7	45
LOWER KEYS					
1	Stock Island	KW Resort Utility	Unswered K.W. Resort Area	1	3
2	Boca Chica	Big Coppitt	Coppitt/Johnsonville/Gulfview Propoise Point/zgulfrest Park and adjacent area along U.S. 1	2	5
3	Bay Point	Bay Point	Bay Point Subdivision and Saddlebunch Shores	3	6
11	Big Pine	Big Pine Regional	Whispering Pines (s)/Sands/Greiser/Ross Haven/Pat&Mary/Big Pine Cove, and adjacent area along U.S.	4	8
11	Big Pine	Big Pine Regional	Doctor's Arm/Lambert/Tropical Bay, Palma Villa,Whispering Pines (n)	5	11
10	Little Torch	Big Pine Regional	Coral Shores,Windward Beach Estates, Mate's Beach, Jolly Roger Estates, and area east of Mate's Beach south to Jolly Roger Estates	6	16
7	Summerland	Summerland/Cudgeo/Upper Sugarload Regional	Summerland Key Cove/summerland Cove Isle	7	23
11	Big Pine	Big Pine Regional	Edends Pine Colony	8	25
11	Big Pine	Big Pine Regional	Big Pine Key,Inc., Tropical Key Colony, Pine Channel Estates, Cahill Pines & Palms, and adjacent area along U.S.1	9	26
6	Cudjoe	Summerland/Cudgeo/Upper Sugarload Regional	Cutthroat Harbor Estates, Cudjoe Ocean Shores	10	28
5	Upper Sugarloaf	Summerland/Cudgeo/Upper Sugarload Regional	Indians Mounds Estates, Gulf Shores , Vacation Harbour	11	31
6	Cudjoe	Summerland/Cudgeo/Upper Sugarload Regional	Cudjoe Gardens	12	36
9	Ramrod	Big Pine Regional	Breezswep Baech Estates, Gulf Shores and area along U.S. 1	13	39
2	Boca Chica	Big Coppitt	Rockland Key	14	41
11	Big Pine	Big Pine Regional	Port Pine Heights	15	42
2	Boca Chica	Big Coppitt	Boca Chica Shores, Tamarac Park	16	43
4	Lower Sugarloaf	Lower Sugarloaf	Sugarloaf Shores, Orchid Park, area adjacent to U.S. 1	17	44

Appendix D
Water Quality Improvement Analysis

Comparison of Nutrient Contributors from Islamorada Service Area to Groundwater and Marine Waters under Present Conditions versus Wastewater Systems that Meet AWT Standards for Effluent Disposal (5 mg/L BOD, 5 mg/L TSS, 3 mg/L TN, 1 mg/L TP)

Sources of Information:

1. Average daily flow (gpd): Islamorada (2001a) Design/Build/Operate Wastewater Management System(s), Islamorada, Village of Islands.
2. Raw sewage nutrient concentration: Ayres Associates (1998).
3. Nutrient removal by septic systems (TN 4%, TP 15%) Kruczynski (1999, Table 7).
4. Removal of TP from groundwater by chemical reaction with aquifer limestone Kruczynski (1999, p. 22)
5. Removal efficiency of AWT for TN, TP Islamorada (2001a, p. 18), and disposal of AWT effluent to Class V shallow wells Islamorada (2001a, p. 26).

Assumptions:

1. Currently all sewage disposal is by onsite septic systems; no cesspit/cesspool systems; and inflows total – AWT system average daily flow.
2. TP is not removed from groundwater by reaction with aquifer limestones. This is a conservative assumption.
3. Raw sewage nutrient concentrations are the same as Big Pine field experiments (Ayres Associates, 1998, p. 5-1).

Calculations:

1. Total wastewater flow = 911,000 gpd x 3.785 gal/L
= 3,448,135 L/d

2. Total nutrient loading in raw sewage:

$$\begin{aligned} \text{TN} &= 38.4 \text{ mg/L} \times 3,488,135 = 132,408 \text{ mg/day} \\ &\quad \times .002204 = 292 \text{ lbs/day} \end{aligned}$$

$$\begin{aligned} \text{TP} &= 8.39 \text{ mg/L} \times 3,448,135 = 28,930 \text{ mg/day} \\ &\quad \times .002204 = 64 \text{ lbs/day} \end{aligned}$$

Appendix D Water Quality Improvement Analysis

3. Reduction of nutrients by septic systems:

	Raw Sewage	Septic System Removal	Septic System Effluent	GW Removal	To Seawater
TN	292 lbs/d	4%	280 lbs/d	0%	280 lbs/d
TP	64 lbs/d	15%	54 lbs/d	0%	54 lbs/d

4. Reduction of nutrients by AWT system:

	Raw Sewage	Effluent Concentration
TN	292 lbs/d	3 mg/L x 3,448,135 L/d = 10,344 gm/d x .002204 lbs/gm = 22.8 lbs/day
TP	64 lbs/d	1 mg/L x 3,448,135 L/d = 3,448 gm/d x .00224 lbs/gm = 7.6 lbs/day

5. Reduction of nutrients in groundwater transit to marine discharge from AWT:

	Septic System Loading	Removal Efficiency	To Seawater
TN	22.8 lbs/day	0%	22.8 lbs/day
TP	7.6 lbs/day	0%	7.6 lbs/day

Conclusion:

Replacement of existing OWTS (assumed all septic systems) with wastewater management systems that meet AWT treatment standards would result in 92% reduction in TN input to groundwater (280 lbs/day to 22.8 lbs/day), and 86% reduction in TP input to groundwater (54 lbs/day to 7.6 lbs/day). In groundwater transit to discharge to the sea negligible TN reduction occurs, and it is assumed here that no TP is removed by chemical reaction with carbonate rocks of aquifer. Thus, benefit of AWT systems in terms of nutrient removal would be in form of 92% reduction in TN; and an 86% removal of TP.

Appendix E
Applicable Permit Information

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1. Forms needed for Injection Well Permits:

ADMINISTERING AGENCY	FORM TITLE	FORM #
FDEP	Application to Construct/Operate/Abandon Class I, III, or V Injection well Systems	62-528.900(1)
FDEP	Certification of Plugging Completion Class I, III, or V Well	62-528.900(2)
FDEP	Construction/Clearance Permit Application for Class V Well	62-528.900(3)
FDEP	Certification of Class V Well Construction Completion	62-528.900(4)
FDEP	Authorization for Class V Well Use	62-528.900(5)
FDEP	Application for Class V Well Plugging and Abandonment Permit	62-528.900(6)
FDEP	General Permit Form for Closed-Loop Air Conditioning Return Flow Class V Injection well	62-528.900(7)
FDEP	Notification to the Florida Department of Environmental Protection of Class V Well Ownership	62-528.900(8)
FDEP	Certification of Monitor Well Completion	62-528.900(10)

2. Forms needed for Collection System Permits:

ADMINISTERING AGENCY	FORM TITLE	FORM #
FDEP	Application to Construct Domestic Wastewater Collection/Transmission System	62-604.300(7)(a)
FDEP	Domestic Wastewater Collection/Transmission Systems Certification of Completion of Construction	62-604.300(7)(b)
FDEP	Notice of Intent to Use General Permit for Wastewater Collection/Transmission System	62-604.300(7)(c)

Appendix E
Applicable Permit Information

3. Forms needed for Wastewater Rinse Permits:

ADMINISTERING AGENCY	FORM TITLE	FORM #
FDEP	Notice of Intent to Use General Permit For Addition of a Major User of Reclaimed Water	62-610.300(4)(a)1
FDEP	Annual Reclaimed Water Utilization Report	62-610.300(4)(a)2
FDEP	Application for Permission To Place A Public Access Reuse System In Operation	62-610.300(4)(a)3
FDEP	Wastewater Permit Application – Form 1 General Information	62-620.910(1)
FDEP	Reclaimed Water of Effluent Analysis Report	62-620.910(15)

4. Forms needed for Treatment Plant Construction & Operation Permits:

ADMINISTERING AGENCY	FORM TITLE	FORM #
FDEP	Application for a Domestic Wastewater Facility Permit -Form 2A	62-620.910(2)
FDEP	Discharge Monitoring Report	62-620.910(10)
FDEP	Notification of Completion of Construction for Wastewater Facilities	62-620.910(12)
FDEP	Notification of Availability of Record Drawings and Final Operation and Maintenance Manuals	62-620.910(13)
FDEP	(Application For Permit to Operate a Non-Discharge/Closed Loop Recycle System Form 2CR14)	62-620.910
FDEP	Dedicated Disposal Site Plan	62-640.210(2) (b)
FDEP	Standard Domestic Wastewater Residuals Record Keeping Form	62-640.210(2) (c)

5. Forms needed for Stormwater Permits:

ADMINISTERING AGENCY	FORM TITLE	FORM #
FDEP	Discharge Monitoring Report	62-620.910(10)

Appendix E
Applicable Permit Information

6. Forms needed for Onsite Sewage Treatment and Disposal Systems

ADMINISTERING AGENCY	FORM TITLE	FORM #
FDH	Innovative OSTDS Temporary Permit Application	DH 3143
FDH	Homeowner Acknowledgement of Installation of Innovative OSTDS	DH 3144
FDH	Innovative OSTDS Review Information	DH 3145
FDH	Application for Onsite Sewage Treatment and Disposal System Construction Permit - Application	DH 4015 Page 1
FDH	Application for Onsite Sewage Treatment and Disposal System Construction Permit – Site Plan	DH 4015 Page 2
FDH	Site Evaluation and System Specifications	DH 4015 Page 3
FDH	Existing System and System Repair Evaluation	Dh 4015 Page 4
FDH	Construction Permit	DH 4016 Page 1
FDH	System Repair Certification	DH4016 Page 3
FDH	Application for Onsite Sewage Treatment and Disposal System Operating Permit (includes DH 4081A – Assessment of Waste Handling and Business Activities	DH 4081

Appendix F
Federally and State-Listed Species in Monroe County and Fishery Species

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Federally and State-Listed Species in Monroe County and Fishery Species

Federally Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
TERRESTRIAL MAMMALS					
Key Largo woodrat	<i>Neotoma floridana smalli</i>	E	USFWS	Tropical hardwood hammock	Likely
Key deer	<i>Odocoileus virginianus clavium</i>	E	USFWS	Tropical hardwood hammock, Mesic temperate hammock, Pine rockland, Mesic pine flatwoods, Hydric pine flatwoods, Freshwater marsh, Mangrove, Saltmarsh	Likely
Lower Keys silver rice rat (=silver rice rat)	<i>Oryzomys palustris natator</i> (= <i>O. argentatus</i>)	E (CH)	USFWS	Freshwater marsh, Mangrove, Saltmarsh	Likely
Key Largo cotton mouse	<i>Peromyscus gossypinus allapaticola</i>	E	USFWS	Tropical hardwood hammock	Likely
Florida panther	<i>Puma</i> (= <i>Felis</i>) <i>concolor coryi</i>	E	USFWS	High pine, Tropical hardwood hammock, Scrub, Maritime hammock, Mesic temperate hammock, Pine rockland, Scrubby flatwoods, Mesic pine flatwoods, Hydric pine flatwoods, Dry prairie, Wet prairie, Freshwater marsh, Seepage swamp, Pond swamp, Mangrove	Not Likely
Lower Keys marsh rabbit	<i>Sylvilagus palustris hefneri</i>	E	USFWS	Beach dune/Coastal strand, Freshwater marsh, Mangrove, Saltmarsh	Likely
Florida black bear	<i>Ursus americana floridanus</i>	C	USFWS	High pine, Tropical hardwood hammock, Scrub, Maritime hammock, Mesic temperate hammock, Pine rockland, Scrubby flatwoods, Mesic pine flatwoods, Hydric pine flatwoods, Dry prairie, Wet prairie, Freshwater marsh, Seepage swamp, Pond swamp, Mangrove	Not Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

Federally Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
MARINE MAMMALS					
West Indian manatee	<i>Trichechus manatus</i>	E (CH)	USFWS/NMFS	Mangrove, Seagrass, Nearshore reef	Likely
blue whale	<i>Balaenoptera musculus</i>	E	NMFS	Offshore marine	Not Likely
finback whale	<i>Balaenoptera physalus</i>	E	NMFS	Offshore marine	Not Likely
humpback whale	<i>Megaptera novaeangliae</i>	E	NMFS	Offshore marine	Not Likely
right whale	<i>Eubalaena glacialis</i>	E	NMFS	Offshore marine	Not Likely
Sei whale	<i>Balaenoptera borealis</i>	E	NMFS	Offshore marine	Not Likely
sperm whale	<i>Physeter macrocephalus</i>	E	NMFS	Offshore marine	Not Likely
FISH					
Alabama shad	<i>Alosa alabamae</i>	C	NMFS	Large flowing rivers	Not Likely
shortnose sturgeon	<i>Acipenser brevirostrum</i>	E	NMFS	Coastal rivers	Not Likely
Gulf sturgeon	<i>Acipenser oxyrhynchus desotoi</i>	C	NMFS	Coastal rivers and offshore marine waters	Possible
Atlantic sturgeon	<i>Acipenser oxyrhynchus oxyrhynchus</i>	C	NMFS	Coastal rivers, estuarine waters	Not Likely
dusky shark	<i>Carcharhinus obscurus</i>	C	NMFS	Coastal surf zone to offshore marine	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

Federally Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
night shark	<i>Carcharinus signatus</i>	C	NMFS	Deep offshore marine	Likely
speckled hind	<i>Epinephelus drummondhayi</i>	C	NMFS	Hard bottom reefs	Likely
jewfish / goliath grouper	<i>Epinephelus itajara</i>	C	NMFS	Nearshore reefs to shallow offshore waters	Possible
Warsaw grouper	<i>Epinephelus nigritus</i>	C	NMFS	Deepwater reefs	Possible
Nassau grouper	<i>Epinephelus striatus</i>	C	NMFS	Nearshore reefs	Likely
saltmarsh topminnow	<i>Fundulus jenkinsi</i>	C	NMFS	Saltmarsh and brackish water	Likely
Key silverside	<i>Menidia conchorum</i>	C	NMFS	Isolated lagoons; shallow, protected waters	Likely
opposum pipefish	<i>Microphis brachyurus lineatus</i>	C	NMFS	Freshwater associated with panic grass and smart weed	Likely
sand tiger shark	<i>Odontaspis taurus</i>	C	NMFS	Nearshore and offshore marine	Likely
smalltooth sawfish	<i>Pristis pectinata</i>	C	NMFS	Shallow coastal waters	Possible
mangrove rivulus	<i>Rivulus marmoratus</i>	C	NMFS	Land-crab burrows, mangrove forests, mosquito ditches	Likely
BIRDS					
Cape Sable seaside sparrow	<i>Ammodramus(=Am mospiza) maritimus mirabilis</i>	E (CH)	USFWS	Wet prairie, Freshwater marsh	Possible
piping plover	<i>Charadrius melodus</i>	T	USFWS	Beach dune/Coastal strand, Nearshore reef	Likely
Kirtland's warbler	<i>Dendroica kirtlandii</i>	E	USFWS	Upland pine, mesic hammock, rockland hammock, xeric scrub	Not Likely

Federally and State-Listed Species in Monroe County and Fishery Species

Federally Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
peregrine falcon	<i>Falco peregrinus</i>	E	USFWS	Disturbed/Cultivated land, Freshwater marsh, Saltmarsh., Prairie, Ponds/Lakes, Streams/Rivers, Swamp	Possible
bald eagle	<i>Haliaeetus leucocephalus</i>	T	USFWS	High pine, Scrubby high pine, Maritime hammock, Mesic temperate hammock, Pine rockland, Scrubby flatwoods, Mesic pine flatwoods, Hydric pine flatwoods, Dry prairie, Wet prairie, Freshwater marsh, Seepage swamp, Flowing water swamp, Pond swamp, Mangrove, Saltmarsh, Seagrass	Possible
wood stork	<i>Mycteria americana</i>	E	USFWS	Hydric pine flatwoods, Wet prairie, Freshwater marsh, Seepage swamp, Flowing water swamp, Pond swamp, Mangrove, Saltmarsh, Seagrass	Possible
red-cockaded woodpecker	<i>Picoides (= Dendrocopos) borealis</i>	E	USFWS	High pine, Mesic pine flatwoods, Hydric pine flatwoods	Not Likely
Audubon's crested caracara	<i>Polyborus plancus audubonii</i>	T	USFWS	Mesic temperate hammock, Mesic pine flatwoods, Hydric pine flatwoods, Dry prairie, Wet prairie	Possible
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	E (CH)	USFWS	Hydric pine flatwoods, Freshwater marsh, Pond swamp	Possible
roseate tern	<i>Sterna dougallii dougallii</i>	T	USFWS	Beach dune/Coastal strand, Saltmarsh, Seagrass, Nearshore reef	Likely
REPTILES					
American alligator	<i>Alligator mississippiensis</i>	T (S/A)	USFWS	Hydric pine flatwoods, Wet Prairie, Freshwater marsh, Seepage swamp, Pond Swamp, Mangrove, Hydric pine flatwoods, Wet prairie, Seepage swamp, Flowing water swamp, Pond swamp	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

Federally Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
Atlantic loggerhead turtle	<i>Caretta caretta</i>	T	NMFS	Beach dune/Coastal strand, Seagrass, Nearshore reef	Likely
Atlantic green turtle	<i>Chelonia mydas mydas</i>	E	NMFS	Beach dune/Coastal strand, Seagrass, Nearshore reef	Likely
American crocodile	<i>Crocodylus acutus</i>	E (CH)	USFWS	Mangrove, Coastal marsh	Likely
leatherback turtle	<i>Dermochelys coriacea</i>	E	NMFS	Offshore marine	Possible
eastern indigo snake	<i>Drymarchon corais couperi</i>	T	USFWS	High pine, Tropical hardwood hammock, Scrubby high pine, Beach dune/Coastal strand, Maritime hammock, Mesic temperate hammock, Pine rockland, Scrubby flatwoods, Mesic pine flatwoods, Hydric pine flatwoods, Dry prairie, Cutthroat grass, Freshwater marsh, Seepage swamp, Flowing water swamp, Pond swamp, Mangrove	Possible
Atlantic hawksbill (=carey) turtle	<i>Eretmochelys imbricata</i>	E	NMFS	Beach dune/Coastal strand, Seagrass, Nearshore reef	Likely
Kemp's ridley turtle	<i>Lepidochelys kempii</i>	E	NMFS	Marine coastal waters with sandy or muddy bottoms and shorelines of red mangrove	Possible
INVERTEBRATES					
Schaus' swallowtail butterfly	<i>Heraclides (=Papilio) aristodemus ponceanus</i>	E	USFWS	Tropical hardwood hammock	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

Federally Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
Stock Island tree snail	<i>Orthalicus reses reses</i>	T	USFWS	Tropical hardwood hammock	Likely
PLANTS					
Blodgett's wild-mercury	<i>Arygythamnia blodgettii</i>	C	USFWS	Tropical hardwood hammock, Pine rockland	Likely
Big Pine partridge pea	<i>Chamaecrista lineata</i> var. <i>keyensis</i>	C	USFWS	Pine rockland	Likely
deltoid spurge	<i>Chamaesyce</i> (= <i>Euphorbia</i>) <i>deltoidea</i> ssp. <i>deltoidea</i>	E	USFWS	Pine rockland, Beach dune/Coastal strand	Not Likely
Garber's spurge	<i>Chamaesyce garberi</i>	T	USFWS	Pine rockland, Rockland hammocks, Coastal rock barrens, Salt flats, Grass prairies, Beach ridges	Likely
Porter's sandmat (spurge)	<i>Chamaesyce porteriana</i>	C	USFWS	Pine rockland, Rockland hammock, Coastal rock barrens, Marl prairie	Possible
Cape Sable thoroughwort	<i>Chromolaena</i> (= <i>Eupatorium</i>) <i>frustrata</i>	C	USFWS	Tropical hardwood hammock, Pine rockland	Likely
Johnson's seagrass	<i>Halophila johnsonii</i>	T	NMFS	Intertidal waters to 3 meters depth	Not Likely
sand flax	<i>Linum arenicola</i>	C	USFWS	Pine rockland, Marl prairie, Adjacent disturbed areas	Possible
semaphore cactus	<i>Opuntia corallicola</i>	C	USFWS	Tropical hardwood hammock, Beach dune/Coastal strand	Possible

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Federally and State-Listed Species in Monroe County and Fishery Species

Federally Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
Key tree-cactus	<i>Pilosocereus</i> (= <i>Cereus</i>) <i>robinii</i>	E	USFWS	Tropical hardwood hammock	Likely

¹ E=Endangered, T=Threatened, S/A=Similarity of Appearance, CH=Critical Habitat, C=Candidate

² USFWS=U.S. Fish and Wildlife Service, NMFS=National Marine Fisheries Service

³ Expressed as Likely, Possible, Not Likely

Sources: Chafin 2000, EnviroTools 1998, FGFC 1997, FCREPA a, b and c 1992, Hipes et al. 2000, Kale and Maehr 1990, Long and Lakela 1971, Nelson 1994, Nelson 1996, Scurlock 1987, USDA 2001, Wunderlin and Hansen 2000.

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
TERRESTRIAL MAMMALS					
southern mink, (South Florida population)	<i>Mustela vison mink</i> (= <i>M. v. evergladensis</i>)	T	FFWCC	Salt marsh, Freshwater marsh, Cypress swamp, Hardwood swamp	Not Likely
Key Largo woodrat	<i>Neotoma floridana smalli</i>	E	FFWCC	Tropical hardwood hammock	Likely
Key deer	<i>Odocoileus virginianus clavium</i>	E	FFWCC	Tropical hardwood hammock, Mesic temperate hammock, Pine rockland, Mesic pine flatwoods, Hydric pine flatwoods, Freshwater marsh, Mangrove, Saltmarsh	Likely
Lower Keys silver rice rat (= silver rice rat)	<i>Oryzomys palustris natator</i> (= <i>O. argentatus</i>)	E	FFWCC	Freshwater marsh, Mangrove, Saltmarsh	Likely
Key Largo cotton mouse	<i>Peromyscus gossypinus allapaticola</i>	E	FFWCC	Tropical hardwood hammock	Likely
Florida panther	<i>Puma</i> (= <i>Felis</i>) <i>concolor coryi</i>	E	FFWCC	High pine, Tropical hardwood hammock, Scrub, Maritime hammock, Mesic temperate hammock, Pine rockland, Scrubby flatwoods, Mesic pine flatwoods, Hydric pine flatwoods, Dry prairie, Wet prairie, Freshwater marsh, Seepage swamp, Pond swamp, Mangrove	Not Likely
mangrove fox squirrel	<i>Sciurus niger avicennia</i>	T	FFWCC	Pine flatwoods, Cypress swamp, Hardwood hammock	Not Likely
Lower Keys marsh rabbit	<i>Sylvilagus palustris hefneri</i>	E	FFWCC	Beach dune/Coastal strand, Freshwater marsh, Mangrove, Saltmarsh	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
Florida black bear	<i>Ursus americana floridanus</i>	T	FFWCC	High pine, Tropical hardwood hammock, Scrub, Maritime hammock, Mesic temperate hammock, Pine rockland, Scrubby flatwoods, Mesic pine flatwoods, Hydric pine flatwoods, Dry prairie, Wet prairie, Freshwater marsh, Seepage swamp, Pond swamp, Mangrove	Not likely
MARINE MAMMALS					
West Indian manatee	<i>Trichechus manatus</i>	E	FFWCC	Mangrove, Seagrass, Nearshore reef	Likely
Sei whale	<i>Balaenoptera borealis</i>	E	FFWCC	Offshore marine	Not Likely
blue whale	<i>Balaenoptera musculus</i>	E	FFWCC	Offshore marine	Not Likely
finback whale	<i>Balaenoptera physalus</i>	E	FFWCC	Offshore marine	Not Likely
right whale	<i>Eubalaena glacialis</i>	E	FFWCC	Offshore marine	Not Likely
humpback whale	<i>Megaptera novaeangliae</i>	E	FFWCC	Offshore marine	Not Likely
sperm whale	<i>Physeter macrocephalus</i>	E	FFWCC	Offshore marine	Not Likely
FISH					
Key silverside	<i>Menidia conchorum</i>	T	FFWCC	Isolated lagoons; shallow, protected waters	Likely
mangrove rivulus	<i>Rivulus marmoratus</i>	SSC	FFWCC	Land-crab burrows, mangrove forests, mosquito ditches	Likely
Key blenny	<i>Starksia starcki</i>	SSC	FFWCC	Surge channels between rows of coral	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
BIRDS					
roseate spoonbill	<i>Ajaia ajaja</i>	SSC	FFWCC	Mangrove islands, Dredge spoil islands, Willow heads, Tidal flats and ponds, Coastal marshes, Freshwater sloughs and marshes	Likely
Cape Sable seaside sparrow	<i>Ammodramus (=Ammospiza) maritimus mirabilis</i>	E	FFWCC	Wet prairie, Freshwater marsh	Possible
limpkin	<i>Aramus guarauna</i>	SSC	FFWCC	Mangroves, Freshwater marsh, Swamps, Margins of ponds, lakes, and rivers, Sloughs, Impoundments	Possible
snowy plover	<i>Charadrius alexandrinus</i>	T	FFWCC	Beach dune/Coastal strand	Possible
piping plover	<i>Charadrius melodus</i>	T	FFWCC	Beach dune/Coastal strand, Nearshore reef	Likely
white-crowned pigeon	<i>Columba leucocephala</i>	T	FFWCC	Mangrove islands, Tropical hardwood hammock	Likely
Kirtland's warbler	<i>Dendroica kirtlandii</i>	E	USFWS	Upland pine, Mesic hammock, Rockland hammock, Xeric scrub	Not Likely
little blue heron	<i>Egretta caerulea</i>	SSC	FFWCC	Shallow freshwater, brackish, and saltwater habitats	Likely
reddish egret	<i>Egretta rufescens</i>	SSC	FFWCC	Marine tidal flats and shorelines, Salt evaporation pools and lagoons, Coastal mangrove islands, Dredge spoil islands	Likely
snowy egret	<i>Egretta thula</i>	SSC	FFWCC	Permanently and seasonally flooded wetlands, Streams, Lakes, Swamps	Likely
tricolored heron	<i>Egretta tricolor</i>	SSC	FFWCC	Permanently and seasonally flooded wetlands, Mangrove swamps, Tidal creeks and ditches, Edges of ponds and lakes	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
white ibis	<i>Eudocimus albus</i>	SSC	FFWCC	Freshwater and brackish marshes, Salt flats, Saltmarsh, Forested wetlands, Wet prairies, Swales, Seasonally inundated fields and ditches	Likely
peregrine falcon	<i>Falco peregrinus</i>	E	FFWCC	Disturbed/Cultivated land, Freshwater marsh, Saltmarsh., Prairie, Ponds/Lakes, Streams/Rivers, Swamp	Possible
southeastern American kestrel	<i>Falco sparverius paulus</i>	T	FFWCC	Open pine habitat, Woodland edges, Prairies, Pasture land	Possible
Florida sandhill crane	<i>Grus canadensis pratensis</i>	T	FFWCC	Prairies, Freshwater marsh, Pasture land	Not Likely
American oystercatcher	<i>Haematopus palliatus</i>	SSC	FFWCC	Beach dune/Coastal strand, Sandbars, Mudflats, Shellfish beds	Possible
bald eagle	<i>Haliaeetus leucocephalus</i>	T	FFWCC	High pine, Scrubby high pine, Maritime hammock, Mesic temperate hammock, Pine rockland, Scrubby flatwoods, Mesic pine flatwoods, Hydric pine flatwoods, Dry prairie, Wet prairie, Freshwater marsh, Seepage swamp, Flowing water swamp, Pond swamp, Mangrove, Saltmarsh, Seagrass	Possible
wood stork	<i>Mycteria americana</i>	E	FFWCC	Hydric pine flatwoods, Wet prairie, Freshwater marsh, Seepage swamp, Flowing water swamp, Pond swamp, Mangrove, Saltmarsh, Seagrass	Possible
osprey	<i>Pandion haliaetus</i>	SSC	FFWCC	Large lakes, Rivers, Coastal areas	Likely
brown pelican	<i>Pelecanus occidentalis</i>	SSC	FFWCC	Shallow estuarine waters, Sandbars, Sandspits, Mangrove islands	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
red-cockaded woodpecker	<i>Picoides (= Dendrocopos) borealis</i>	T	FFWCC	High pine, Mesic pine flatwoods, Hydric pine flatwoods	Not Likely
Audubon's crested caracara	<i>Polyborus plancus audubonii</i>	T	FFWCC	Mesic temperate hammock, Mesic pine flatwoods, Hydric pine flatwoods, Dry prairie, Wet prairie	Possible
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	E	FFWCC	Hydric pine flatwoods, Freshwater marsh, Pond swamp	Not Likely
black skimmer	<i>Rynchops niger</i>	SSC	FFWCC	Coastal waters, Large lakes, Sandy beaches, Small islands, Dredge spoil islands	Likely
Florida burrowing owl	<i>Speotyto(=Athene)c unicularia floridana</i>	SSC	FFWCC	High, sparsely vegetated, sandy ground, Ruderal areas such as pastures, airports, parks, school grounds, road rights-of-way, and other vacant spaces	Likely
least tern	<i>Sterna antillarum</i>	T	FFWCC	Beach dune/Coastal strand	Likely
roseate tern	<i>Sterna dougallii dougallii</i>	T	FFWCC	Beach dune/Coastal strand, Saltmarsh, Seagrass, Nearshore reef	Likely
REPTILES					
American alligator	<i>Alligator mississippiensis</i>	SSC	FFWCC	Hydric pine flatwoods, Wet Prairie, Freshwater marsh, Seepage swamp, Pond Swamp, Mangrove, Hydric pine flatwoods, Wet prairie, Seepage swamp, Flowing water swamp, Pond swamp	Likely
Atlantic loggerhead turtle	<i>Caretta caretta</i>	T	FFWCC	Beach dune/Coastal strand, Seagrass, Nearshore reef	Likely
Atlantic green turtle	<i>Chelonia mydas mydas</i>	E	FFWCC	Beach dune/Coastal strand, Seagrass, Nearshore reef	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
American crocodile	<i>Crocodylus acutus</i>	E	FFWCC	Mangrove, Coastal marsh	Likely
leatherback turtle	<i>Dermochelys coriacea</i>	E	FFWCC	Offshore marine	Possible
Big Pine Key ringneck snake	<i>Diadophis punctatus acricus</i>	T	FFWCC	Pine rockland, Tropical hardwood hammock	Likely
eastern indigo snake	<i>Drymarchon corais couperi</i>	T	FFWCC	High pine, Tropical hardwood hammock, Scrubby high pine, Beach dune/Coastal strand, Maritime hammock, Mesic temperate hammock, Pine rockland, Scrubby flatwoods, Mesic pine flatwoods, Hydric pine flatwoods, Dry prairie, Cutthroat grass, Freshwater marsh, Seepage swamp, Flowing water swamp, Pond swamp, Mangrove	Possible
red rat snake	<i>Elaphe guttata</i>	SSC ⁴	FFWCC	Pine, hardwood, mangrove forested habitats, Disturbed habitats	Likely
Atlantic hawksbill (=carey) turtle	<i>Eretmochelys imbricata</i>	E	FFWCC	Beach dune/Coastal strand, Seagrass, Nearshore reef	Likely
Florida Keys mole skink	<i>Eumeces egregius egregius</i>	SSC	FFWCC	Beach dune/Coastal strand, Coastal berm, Coastal scrub	Likely
gopher tortoise	<i>Gopherus polyphemus</i>	SSC	FFWCC	Sandhills, Scrub, Xeric oak hammock, Dry pine flatwoods, Pasture land, Oldfields, Road shoulders	Not Likely
Key mud turtle	<i>Kinosternum bauri</i>	E ⁴	FFWCC	Small, usually temporary freshwater to slightly brackish ponds and ditches	Likely
Kemp's ridley turtle	<i>Lepidochelys kempii</i>	E	FFWCC	Marine coastal waters with sandy or muddy bottoms and shorelines of red mangrove	Possible

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
Lower Keys brown snake	<i>Storeria dekayi victa</i>	T ⁴	FFWCC	Pine rockland, Tropical hardwood hammock	Likely
Rim rock crowned snake	<i>Tantilla oolitica</i>	T	FFWCC	Tropical hardwood hammock, Pine rockland, Vacant lots, Pastures	Likely
Florida ribbon snake	<i>Thamnophis sauritus sackenii</i>	T ⁴	FFWCC	Mangrove, Spartina marsh, Freshwater depressions and ditches	Likely
INVERTEBRATES					
pillar coral	<i>Dendrogyra cylindris</i>	E	FFWCC	Coral reef	Likely
Schaus' swallowtail butterfly	<i>Heraclides</i> (= <i>Papilio</i>) <i>aristodemus ponceanus</i>	E	FFWCC	Tropical hardwood hammock	Likely
Florida tree snail	<i>Liguus fasciatus matecumbensii</i>	SSC	FFWCC	Tropical hardwood hammock	Likely
Stock Island tree snail	<i>Orthalicus reses reses</i>	T	FFWCC	Tropical hardwood hammock	Likely
PLANTS					
tamarindillo	<i>Acacia choriophylla</i>	E	FDPI	Rockland hammock, Mangrove swamp, Coastal berm	Likely
barbed-wire cactus	<i>Acanthocereus tetragonus</i> (= <i>Cereus pentagonus</i>)	T	FFWCC	Maritime hammock	Likely
paurotis palm	<i>Acoelorrhaphe wrightii</i>	T	FFWCC	Pine rockland, Rockland hammock	Possible

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
golden leather fern	<i>Acrostichum aureum</i>	T	FFWCC	Mangrove swamp, Saltmarsh, Hydric hammock	Likely
fragrant maidenhair fern	<i>Adiantum melanoleucum</i>	E	FFWCC	Rockland hammock	Possible
meadow jointvetch	<i>Aeschynomene pratensis</i>	E	FFWCC	Marl prairie, Cypress domes, Swales	Not Likely
Cape Sable whiteweed	<i>Ageratum littorale</i>	E	FFWCC	Maritime hammock	Likely
bracted colic-root	<i>Aletris bracteata</i>	E	FFWCC	Marl prairie, Pine rockland	Possible
pineland allamanda	<i>Angadenia beteroi</i>	T	FFWCC	Pine rockland	Likely
sea lavender	<i>Argusia gnaphalodes</i>	E	FFWCC	Beach dune/Coastal strand	Likely
Blodgett's wild-mercury	<i>Arygythamnia blodgettii</i>	E	FFWCC	Tropical hardwood hammock, Pine rockland	Likely
bird's nest spleenwort	<i>Asplenium serratum</i>	E	FFWCC	Cypress swamp, Tropical rockland hammock	Possible
Carter's orchid	<i>Basiphyllaea corallicola</i>	E	FFWCC	Pine rockland, Rockland hammock	Possible
pine-pink orchid	<i>Bletia purpurea</i>	T	FFWCC	Wet pine flatwoods, Cypress strand	Not Likely
pineland strongbark	<i>Bourreria cassinifolia</i>	E	FFWCC	Pine rockland	Likely
rough strongbark	<i>Bourreria radula</i>	E	FFWCC	Rockland hammock, Pine rockland	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
pigeon-berry	<i>Bourreria succulenta</i>	E	FFWCC	Rockland hammock, Pine rockland	Likely
spider orchid	<i>Brassia caudata</i>	E	FFWCC	Hammocks	Not Likely
Keys locustberry	<i>Byrsonima lucida</i>	T	FFWCC	Rockland hammock, Pine rockland	Likely
yellow nicker	<i>Caesalpinia major</i>	E	FFWCC	Upland hammock	Likely
fewflower holdback	<i>Caesalpinia pauciflora</i>	E	FFWCC	Pine rockland	Likely
myrtle-of-the-river	<i>Calyptranthes zuzygium</i>	E	FFWCC	Rockland hammock, maritime hammock	Likely
narrow strap fern	<i>Campyloneurum angustifolium</i>	E	FFWCC	Tropical hardwood hammock, Cypress swamp	Not Likely
wild cinnamon	<i>Canella winteriana</i>	E	FFWCC	Rockland hammock, maritime hammock	Likely
small-flowered lilythorn	<i>Catesbaea parviflora</i>	E	FFWCC	Pine rockland, Coastal strand	Likely
powdery catopsis	<i>Catopsis berteroniana</i>	E	FFWCC	Rockland hammock, Mangrove swamp	Not Likely
many-flowered catopsis	<i>Catopsis floribunda</i>	E	FFWCC	Tropical hardwood hammock, Cypress swamp	Not Likely
West Indian cock's-comb	<i>Celosia nitida</i>	E	FFWCC	Beach dune/Coastal strand, Upland hammock	Likely
slimbristle sandbur	<i>Cenchrus brownii</i>	E	FFWCC	Disturbed/Cultivated open land, Hammocks	Likely
Big Pine partridge pea	<i>Chamaecrista lineata</i> var. <i>keyensis</i>	E	FFWCC	Pine rockland	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
Garber's spurge	<i>Chamaesyce garberi</i>	E	FFWCC	Pine rockland, Rockland hammocks, Coastal rock barrens, Salt flats, Grass prairies, Beach ridges	Likely
rocklands spurge	<i>Chamaesyce pergamena</i>	T	FFWCC	Pine rockland	Likely
Porter's sandmat (spurge)	<i>Chamaesyce porteriana</i>	T	FFWCC	Pine rockland, Rockland hammock, Coastal rock barrens, Marl prairie	Possible
southern lip fern	<i>Cheilanthes microphylla</i>	E	FFWCC	Shell mounds, Pine rockland, Maritime hammock, Mesic hammock	Not Likely
Cape Sable thoroughwort	<i>Chromolaena frustrata</i> (= <i>Eupatorium frustratum</i>)	E	FFWCC	Tropical hardwood hammock, Pine rockland	Likely
satin leaf	<i>Chrysophyllum oliviforme</i>	T	FFWCC	Pine rockland, upland hammock	Likely
Yucatan flymallow	<i>Cienfuegosia yucatanensis</i>	E	FFWCC	Coastal rock barrens, Coastal hammock, Saltmarsh	Likely
silver palm	<i>Coccothrinax argentata</i>	E	FFWCC	Pine rockland, upland hammock	Likely
Cuban snakebark	<i>Colubrina cubensis</i> var. <i>floridana</i>	E	FFWCC	Rockland hammock, Pine rockland	Likely
soldierwood	<i>Colubrina elliptica</i>	E	FFWCC	Rockland hammock	Likely
white geiger	<i>Cordia globosa</i>	E	FFWCC	Upland hammock	Likely
Christmas berry	<i>Crossopetalum ilicifolium</i>	T	FFWCC	Rockland hammock, Pine rockland	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
rhacoma	<i>Crossopetalum rhacoma</i>	E	FFWCC	Rockland hammock, Pine rockland, coastal scrub	Likely
pepperbush croton	<i>Croton humilis</i>	E	FFWCC	Upland hammock	Possible
cupania	<i>Cupania glabra</i>	E	FFWCC	Rockland hammock	Likely
Blodgett's swallow-wort	<i>Cynanchum blodgettii</i>	T	FFWCC	Rockland hammock, Upland hammock	Likely
Florida flatsedge	<i>Cyperus floridanus</i>	E	FFWCC	Coastal berm, Pine rockland	Likely
limestone flatsedge	<i>Cyperus fuliginosus</i>	E	FFWCC	Rockland hammock	Likely
cowhorn orchid	<i>Cyrtopodium punctatum</i>	E	FFWCC	Cypress swamp, Coastal hammock, Pine rockland, Marl prairies	Possible
Brown's Indian rosewood	<i>Dalbergia brownii</i>	E	FFWCC	Mangrove swamp, Hammocks	Likely
Florida prairie-clover	<i>Dalea carthagenensis</i> var. <i>floridana</i>	E	FFWCC	Pine rockland, Rockland hammock, Coastal uplands, Marl prairie	Likely
Caribbean crab grass	<i>Digitaria dilichophylla</i>	T	FFWCC	Pine rockland	Likely
Keys hopbush	<i>Dodonaea elaeagnoides</i>	E	FFWCC	Rockland hammock, pine rockland	Likely
milkbark	<i>Drypetes diversifolia</i>	E	FFWCC	Tropical hammock	Likely
Guiana plum	<i>Drypetes lateriflora</i>	T	FFWCC	Tropical hammock	Likely
dollar orchid	<i>Encyclia boothiana</i> var. <i>erythronioides</i>	E	FFWCC	Rockland hammock, Coastal buttonwood forest	Possible

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
clamshell orchid	<i>Encyclia cochleata</i> var. <i>triandra</i>	E	FFWCC	Rockland hammock, Cypress swamp	Not Likely
dingy-flowered star orchid	<i>Epidendrum anceps</i>	E	FFWCC	Rockland hammock, Cypress swamp	Not Likely
umbelled star orchid	<i>Epidendrum difforme</i>	E	FFWCC	Upland hammock	Not Likely
night-scented orchid	<i>Epidendrum nocturnum</i>	E	FFWCC	Rockland hammock, Cypress swamp	Not Likely
stiff-flowered star orchid	<i>Epidendrum rigidum</i>	E	FFWCC	Rockland hammock, Cypress swamp	Not Likely
black torch	<i>Erithralis fruticosa</i>	T	FFWCC	Beach dune/Coastal strand, maritime hammock	Likely
Coker's beach creeper	<i>Ernodea cokeri</i>	E	FFWCC	Pine rockland	Possible
redberry stopper	<i>Eugenia confusa</i>	E	FFWCC	Rockland hammock	Likely
red stopper	<i>Eugenia rhombea</i>	E	FFWCC	Rockland hammock	Likely
dwarf bindweed	<i>Evolvulus convolvuloides</i>	E	FFWCC	Upland hammock	Likely
Grisebach's bindweed	<i>Evolvulus grisebachii</i>	E	FFWCC	Pine rockland	Likely
princewood	<i>Exostema caribaeum</i>	E	FFWCC	Rockland hammock, Pine rockland	Likely
wild cotton	<i>Gossypium hirsutum</i>	E	FFWCC	Coastal berm, Shell mounds, Maritime hammock	Likely
lignum vitae	<i>Guaiaacum sanctum</i>	E	FFWCC	Rockland hammock	Likely
Fuch's bromeliad	<i>Guzmania monostachia</i>	E	FFWCC	Strand swamp, Rockland hammock	Not Likely
false boxwood	<i>Gyminda latifolia</i>	E	FFWCC	Tropical hardwood hammock	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
west coast prickly apple	<i>Harrisia aboriginum</i> (= <i>Cereus gracilis</i> var. <i>aboriginum</i>)	E	FFWCC	Shell mounds, Rockland hammock, Maritime hammock	Not Likely
Simpson's prickly apple	<i>Harrisia simpsonii</i> (= <i>Cereus gracilis</i> var. <i>simpsonii</i>)	E	FFWCC	Rockland hammock	Likely
manchineel	<i>Hippomane mancinella</i>	E	FFWCC	Coastal berm, Coastal hammock	Likely
white ironwood	<i>Hypelate trifoliata</i>	E	FFWCC	Rockland hammock, Pine rockland	Likely
Florida Keys indigo	<i>Indigofera mucronata</i> var. <i>keyensis</i>	E	FFWCC	Coastal berm, Coastal rock barrens, Rockland hammock	Likely
delicate ionopsis	<i>Ionopsis utricularioides</i>	E	FFWCC	Rockland hammock, Strand swamp	Not Likely
rockland morning glory	<i>Ipomoea tenuissima</i>	E	FFWCC	Pine rockland	Possible
pineland jacquemontia	<i>Jacquemontia curtissii</i>	T	FFWCC	Pine flatwoods, Pine rockland, Marl prairie, spoil banks	Likely
Havana jacquemontia	<i>Jacquemontia havanensis</i>	E	FFWCC	Hardwood hammock	Likely
skyblue clustervine	<i>Jacquemontia pentanthos</i>	E	FFWCC	Pine rockland, Rockland hammock, Coastal rock barren	Likely
joewood	<i>Jacquina keyensis</i>	T	FFWCC	Coastal salt flat, Coastal scrub, Maritime hammock, Pine rockland	Likely
white fen	<i>Kosteletzkya depressa</i>	E	FFWCC	Maritime hammock, Mangrove swamp	Not Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
pineland lantana	<i>Lantana depressa</i> var. <i>depressa</i>	E	FFWCC	Pine rockland, Coastal strand, Coastal grassland, Coastal berm, Marl prairie	Possible
ghost plant	<i>Leiphaimos</i> <i>parasitica</i>	E	FFWCC	Upland hammock	Likely
sand flax	<i>Linum arenicola</i>	E	FFWCC	Pine rockland, Marl prairie, Adjacent disturbed areas	Likely
wild dilly	<i>Manilkara jaimiqui</i>	T	FFWCC	Upland hammock	Likely
mayten	<i>Maytenus</i> <i>phyllanthoides</i>	T	FFWCC	Upland hammock, Coastal dune	Likely
small-leaved melanthera	<i>Melanthera</i> <i>parviflora</i>	T	FFWCC	Pine rockland, Marl prairie	Possible
climbing vine fern	<i>Microgramma</i> <i>heterophylla</i>	E	FFWCC	Rockland hammock	Not Likely
Simpson's stopper	<i>Myrcianthes</i> <i>fragrans</i>	T	FFWCC	Upland hammock	Likely
giant sword fern	<i>Nephrolepis</i> <i>biserrata</i>	T	FFWCC	Mesic hammock, Swamps	Not Likely
ribbon fern	<i>Neurodium</i> <i>lanceolatum</i>	E	FFWCC	Rockland hammock, Mangrove swamp, Upland hammock	Likely
wild basil	<i>Ocimum</i> <i>campechianum</i>	E	FFWCC	Upland hammock, Pine rockland	Likely
beach peanut	<i>Okenia hypogaea</i>	E	FFWCC	Beach dune/Coastal strand	Likely
mule-eared orchid	<i>Oncidium</i> <i>undulatum</i> (= <i>luridum</i>)	E	FFWCC	Hardwood hammock, Cypress swamp, Buttonwood forest	Possible

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State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
hand fern	<i>Ophioglossum palmatum</i>	E	FFWCC	Maritime hammock, Hydric hammock, strand swamp	Not Likely
semaphore cactus	<i>Opuntia corallicola</i> (= <i>spinosissima</i>)	E	FFWCC	Tropical hardwood hammock, Beach dune/Coastal strand	Likely
prickly-pear cactus	<i>Opuntia stricta</i>	T	FFWCC	Tropical hardwood hammock, Beach dune/Coastal strand	Likely
Keys Joe-jumper	<i>Opuntia triacantha</i>	E	FFWCC	Coastal rockland, rockland hammock	Likely
white-flowered passionvine	<i>Passiflora multiflora</i>	E	FFWCC	Tropical hardwood hammock	Likely
pineland passionvine	<i>Passiflora pallens</i>	E	FFWCC	Rockland hammock, Coastal berm, Strand swamp	Not Likely
swampbush	<i>Pavonia paludicola</i>	E	FFWCC	Saltmarsh, Mangrove swamp	Possible
widespread polypody	<i>Pecluma dispersa</i>	E	FFWCC	Hydric hammock, upland hammock, pine rockland	Likely
plume polypody	<i>Pecluma plumula</i>	E	FFWCC	Hardwood hammock	Likely
reddish peperomia	<i>Peperomia humilis</i>	E	FFWCC	Mesic hammock, Coastal berm, Cypress swamp, Maritime hammock	Not Likely
Florida peperomia	<i>Peperomia obtusifolia</i>	E	FFWCC	Rockland hammock, Hydric hammock, Strand swamp	Not Likely
mahogany mistletoe	<i>Phoradendron rubrum</i>	E	FFWCC	Rockland hammock	Likely
Bahama tree cactus	<i>Pilosocereus bahamensis</i>	E	FFWCC	Rockland hammock	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
Key tree-cactus	<i>Pilosocereus</i> (= <i>Cereus</i>) <i>robinii</i>	E	FFWCC	Tropical hardwood hammock	Likely
devil's smooth claws	<i>Pisonia rotundata</i>	E	FFWCC	Pine rockland, Rockland hammock	Likely
blackbead	<i>Pithecellobium keyense</i>	T	FFWCC	Rockland hammock	Likely
Everglades poinsettia	<i>Poinsettia pinetorum</i>	E	FFWCC	Pine rockland	Likely
ghost orchid	<i>Polyradicion lindenii</i>	E	FFWCC	Maritime hammock, Swamps	Not Likely
buccaneer palm	<i>Pseudophoenix sargentii</i>	E	FFWCC	Rockland hammock	Likely
long-stalked stopper	<i>Psidium longipes</i>	T	FFWCC	Pine rockland, Rockland hammock	Likely
Bahama wild coffee	<i>Psychotria ligustrifolia</i>	E	FFWCC	Rockland hammock Mesic flatwoods, Scrubby flatwoods, Wet flatwoods	Likely
Bahama ladder brake	<i>Pteris bahamensis</i>	T	FFWCC	Pine rockland, Upland hammock	Likely
Darling plum	<i>Reynosia septentrionalis</i>	T	FFWCC	Upland hammock	Likely
mistletoe cactus	<i>Rhipsalis baccifera</i>	E	FFWCC	Rockland hammock, Mangrove swamp	Not Likely
Swartz' snoutbean	<i>Rhynchosia swartzii</i>	T	FFWCC	Upland hammock	Likely
Florida royal palm	<i>Roystonea elata</i>	E	FFWCC	Rockland hammock, Strand swamp, Shell mounds	Possible

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State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
Bahama sachsia	<i>Sachsia bahamensis</i> (= <i>polycephala</i>)	E	FFWCC	Pine rockland	Likely
maiden bush	<i>Savia bahamensis</i>	E	FFWCC	Coastal thickets, Maritime hammock	Likely
yellow wood	<i>Schaefferia frutescens</i>	E	FFWCC	Upland hammock	Likely
silky bluestem	<i>Schizachyrium sericatum</i>	E	FFWCC	Pine rockland	Likely
Keys' nutrush	<i>Scleria lithosperma</i>	E	FFWCC	Rockland hammock	Likely
Havana skullcap	<i>Scutellaria havanensis</i>	E	FFWCC	Pine rockland	Likely
Eaton's spike-moss	<i>Selaginella eatonii</i>	E	FFWCC	Rockland sinkholes	Not Likely
Chapman's sensitive-plant	<i>Senna mexicana</i> var. <i>chapmanii</i>	T	FFWCC	Beach dune, Rockland hammock, Pine rockland	Likely
coral panic grass	<i>Setaria chapmanii</i> (= <i>Panicum chapmanii</i>)	E	FFWCC	Shell mounds, Cropland, Upland hammock, Prairies	Likely
Everglades greenbrier	<i>Smilax havanensis</i>	T	FFWCC	Upland hammock, Pine rockland	Likely
potato tree	<i>Solanum donianum</i>	T	FFWCC	Upland hammock	Likely
false buttonweed	<i>Spermacoce terminalis</i>	T	FFWCC	Pine rockland, Flatwoods	Likely
wedgelet fern	<i>Sphenomeris</i> (= <i>Odontosoria</i>) <i>clavata</i>	E	FFWCC	Pine rockland, Sinkholes	Likely

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State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
Tall neottia	<i>Spiranthes elata</i> (= <i>Mesadenus elatus</i>)	E	FFWCC	Rockland hammock, Sinkholes	Not Likely
lace-lip ladies'-tresses	<i>Spiranthes laciniata</i>	T	FFWCC	Flatwoods, Marshes, Swamps	Not Likely
southern ladies'-tresses	<i>Spiranthes torta</i>	E	FFWCC	Pine rockland, Marl prairie, Rockland hammock	Likely
pride-of-Big-Pine	<i>Strumpfia maritima</i>	E	FFWCC	Coastal strand, Coastal rock barren, Pine rockland	Likely
Everglades pencil-flower	<i>Stylosanthes calicola</i>	E	FFWCC	Pine rockland, Marl prairie	Likely
West Indies mahogany	<i>Swietenia mahagoni</i>	E	FFWCC	Rockland hammock, Maritime hammock	Likely
least halberd fern	<i>Tectaria fimbriata</i>	E	FFWCC	Rockland hammock, Sinkholes	Not Likely
tetrazygia	<i>Tetrazygia bicolor</i>	T	FFWCC	Rockland hammock, Pine rockland	Likely
abrupt-tipped maiden fern	<i>Thelypteris augescens</i>	T	FFWCC	Calcareous hammock, Limestone rockland	Likely
brittle thatch palm	<i>Thrinax morrisii</i>	E	FFWCC	Rockland hammock, Pine rockland	Likely
Florida thatch palm	<i>Thrinax radiata</i>	E	FFWCC	Maritime hammock, Upland hammock, Coastal scrub	Likely
inflated wildpine	<i>Tillandsia balbisiana</i>	T	FFWCC	Flatwoods, Hammocks, Swamps	Likely
twisted air plant	<i>Tillandsia flexuosa</i>	E	FFWCC	Hammocks, Pine rockland, Swamps, Shell Mounds	Likely

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State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
giant wildpine	<i>Tillandsia utriculata</i>	E	FFWCC	Flatwoods, Hammocks, Pine rockland, Swamps	Likely
soft-leaved wildpine	<i>Tillandsia valenzuelana</i>	T	FFWCC	Hammocks, Swamps	Likely
bay lavender	<i>Tournefortia gnaphalodes</i>	E	FFWCC	Beach dune, Coastal rockland	Likely
chiggery-grapes	<i>Tournefortia hirsutissima</i>	E	FFWCC	Upland hammock	Likely
rocklands noseburn	<i>Tragia saxicola</i>	T	FFWCC	Pine rockland	Likely
West Indian trema	<i>Trema lamarkianum</i>	E	FFWCC	Upland hammock, Dry prairie, Disturbed areas	Likely
winged filmy fern	<i>Trichomanes holopterum</i>	E	FFWCC	Strand swamps	Not Likely
hoop vine	<i>Trichostigma octandrum</i>	E	FFWCC	Upland hammock, Disturbed areas	Likely
Florida gamagrass	<i>Tripsacum floridanum</i>	T	FFWCC	Pine rockland	Likely
pearl berry	<i>Vallesia antillana</i>	E	FFWCC	Maritime hammock	Likely
wormvine orchid	<i>Vanilla barbellata</i>	E	FFWCC	Rockland hammock, Mangrove swamp	Likely
coastal vervain	<i>Verbena (=Glandularia) maritima</i>	E	FFWCC	Beach dune, Coastal scrub, Pine rockland	Likely
Blodgett's ironweed	<i>Vernonia blodgettii</i>	E	FFWCC	Pine rockland, Mesic flatwoods	Likely

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Federally and State-Listed Species in Monroe County and Fishery Species

State-Listed Species with the Potential to Occur in Monroe County and along the Atlantic Coast and Gulf of Mexico

Common Name	Scientific Name	Status ¹	Jurisdictional Agency ²	Habitat	Likelihood of occurrence in Florida Keys ³
yellowheart	<i>Zanthoxylum flavum</i>	E	FFWCC	Tropical coastal hammock	Likely

¹ E=Endangered, T=Threatened, SSC=Species of Special Concern, PE=Proposed Endangered, PT=Proposed Threatened, PS=Proposed Species of Special Concern

² FFWCC = Florida Fish and Wildlife Conservation Commission, FDPI = Florida Department of Agriculture and Consumer Services, Division of Plant Industry

³ Expressed as Likely, Possible, Not Likely

⁴ Lower Keys population only

Sources: Chafin 2000, EnviroTools 1998, FGFC 1997, FCREPA a, b and c 1992, Hipes et al. 2000, Kale and Maehr 1990, Long and Lakela 1971, Nelson 1994, Nelson 1996, Scurlock 1987, USDA 2001, Wunderlin and Hansen 2000.

Appendix G
Federal and State Agency Correspondence

Coordination Letters were sent to the following:

Jay Slack, Field Supervisor
South Florida Ecological Services Field
Office
U.S. Fish and Wildlife Service
1339 20th Street
Vero Beach, FL 32960
cc: Phil Frank, Biologist

Dr. Janet Matthews, Director
Division of Historical Resources
Florida State Historic Preservation Office
R.A. Gray Building, Room 305
500 South Bronough Street
Tallahassee, FL 32399-0250
cc: Laura Kammerer, Head of Compliance
and Review

Georgia Cranmore
Acting Assistant Regional Admin.
Protective Resources Division
National Marine Fisheries Service
0721 Executive Center Drive North
St. Petersburg, FL 33702
cc: Mike Johnson, Fisheries Biologist

Heinz Mueller, Chief
Office of Environmental Assessment
U.S. Environmental Protection Agency
Sam Nunn Atlanta Federal Center
61 Forsyth Street S.W.
Atlanta, GA 30303

Andy Mager, Chief
Habitat Conservation Division
National Marine Fisheries Service
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9721 Executive Center Drive North, Suite
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2796 Overseas Highway, Suite 221
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Appendix G
Federal and State Agency Correspondence

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Tallahassee, FL 32399-0001

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Superintendent
Florida Keys National Marine Sanctuary
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Marathon, FL 33050

Miles Anderson
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Director
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Florida Department of Environmental
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Tallahassee, FL 32399-0001

Appendix H
Funding and Financing Options

Funding and Financing Options for Wastewater Management Activities in the Florida Keys

The funding and financing options contained in this Appendix identify, in general terms, the range of sources that may be used to fund wastewater treatment activities in the Keys as identified in the MCSWMP and by project applicants (Monroe County, 2000a). The actual funding and financing vehicles used by the project applicant would be project-specific and evaluated in the project-specific SER. As noted in Section 3.6.3, Local Fees and Taxes, the availability of funding and the specific types of financing affect the rates charged to wastewater users.

In general, the various wastewater funding and financing options fall into one of the following categories:

- User fees and charges
- Taxes and assessments
- Grants and contributions
- Redirection of existing Programs or funding
- Financial assistance for low and fixed income users
- Doing more with less

The following describes various funding and financing options associated with each of these categories.

I. USER FEES AND CHARGES

User fees and charges are collected for the provision of the services that provide a specific benefit to a user. Various types of user fees and charges are described below.

Wastewater Rates and Charges

For most utilities, their primary source of revenue is the rate charged to customers. Publicly owned utilities are typically operated as “Enterprise Funds” within the local government’s organization. Enterprise funds are intended to be managed like a business, and are typically expected to be self-supporting, although many utilities do receive additional funds from the city or county’s general fund. In addition to paying for on going operation and maintenance (O&M) costs, portion of a utility’s rate-generated revenues is used to directly fund minor capital programs, as well as to repay the debt service on any outstanding bonds or loans. Rate revenues may be dedicated to a capital reserve account and used to fund annual capital improvements, or may be accumulated until sufficient to fund larger projects. This is the most common method used for funding equipment renewal and replacement requirements. Wastewater may include a minimum or fixed charge that does not vary from billing period to billing period (most frequently month to month), and/or a volume charge that may be based on the user’s water consumption or metered wastewater flows.

Miscellaneous Fees and Charges

Most utilities also charge customers miscellaneous fees for services that the utility may provide, or to provide incentives, such as for prompt payment of bills. These fees are typically designed to recover the utility's costs incurred to provide these specific services, or to recover the costs the utility incurs because of the customers' actions (service line clean outs, lost interest income, etc.).

Connection Fees

Hook-up, tap, or connection fees are charges collected for the new connections to a community wastewater system. In many communities, connection fees are designed to recover just the cost the utility incurs to install the service connection to the sewer main.

Impact Fees

Impact fees, like connection fees, are collected at the time a user connects to the wastewater system. Impact fees are intended to recover the costs the utility incurs to oversize its transmission, treatment, and disposal facilities to provide capacity to serve new users. The intent of these charges is to avoid charging existing customers for the costs the utility is incurring to serve future customers.

Line Extension Fees

Some utility companies charge a fee for extending collection and or transmission lines to serve a new customer's property. This charge, which is generally based on the number of feet that the collection or transmission line must be extended to serve the property, may be collected in addition to the connection and impact fees.

Service Availability Fees

Community water and wastewater utilities frequently require development properties to connect to the system once service is available (i.e., when a collection line has been constructed along their property). In some communities, where the local government has opted not to require a connection to the system, service availability fees have been implemented. The service availability fees are typically designed to recover capital costs that the utility has incurred to make service available to user, which the user is choosing not to exercise. These types of fees are currently being challenged in Florida courts.

II. TAXES AND ASSESSMENTS

Taxes are used to fund activities that do not provide a specific benefit, but provide a more general benefit to the community; the user may not be able to avoid paying the tax. Assessments must show a benefit to the property owned by the user. The various forms of a common taxes and assessments are described in the following section.

Local Improvement District Assessments

The extension of lines to serve existing development is frequently accomplished through the creation of a local improvement district (LID). LIDs are created for the specific purpose of financing capital improvements (e.g. roads, water lines, sewer lines, street lighting, and/or storm water improvements) to serve a specific area. Once the LID has been created, special assessments bonds can be issued, which are secured by liens on the properties located within the LID. Debt service on the bonds issued to finance the improvements is recovered through annual assessments on the property located in the LID. For the sewer line improvements, a property owner's share of cost of the improvements is frequently based on the front footage of the property along which the sewer line is being laid. For improvements involving more than laying the sewer lines, other bases for the assessment are generally collected in the user's annual property tax bill.

Sales Tax/Local Option Tax

A 1-cent (1-percent) sales tax is used frequently to provide funding for a variety of projects and activities, from schools to highways. Monroe County currently receives revenues from a local option sales tax to fund grants for its cesspool replacement program. Residents, tourist, and businesses all pay a sales tax on purchases made in the County.

Property Tax

Property taxes are assessments charged to real property owners based on a percentage (millage rate) of the assessed property value. These taxes generally support the majority of a county's non-enterprise fund activities. However, the revenues from property taxes can also be used for enterprise fund projects, and have been used in many communities to pay debt service on general obligation bonds issued to finance wastewater system improvements. Because communities are limited in the total of millage rate, use of property taxes to fund wastewater management improvements could limit the county's ability to raise funds for other activities.

Municipal Services Taxing/Benefit Unit

Municipal services Taxing Units (MSTUs) and Municipal service Benefit Units (MSBUs) can be established through annual property taxes or assessments to generate funds for projects. Unlike LIDs, MSTUs and MSBUs can be used to fund both capital and annual O&M costs. *Ad valorem* taxes are generated from MSTUs; special assessments generate funds in MSBUs. The taxes and assessments are levied on property owners. Unlike the process required for raising the millage rate on property taxes, no referendum is required to levy taxes or assessments in an MSBU or MSTU, unless the revenues are used for leveraging bonds. The taxes associated with MSTUs are subjected to the cap on the total millage rate. Therefore, use of MSTU to generate funds would constrain the future taxing ability of the County.

Bed Tax

The bed tax generates revenues from tourists' expenditures at hotels, motels, and short-term lodging. Like a sales tax, a bed is usually based on a percentage of expenditures, however, the

tax would be limited to expenditures at a hotel or a motel for lodging, and therefore has little or no direct impact on residents. Monroe County currently collects a 4-percent bed tax, out of which 1% goes to the county land development authority, and the other 3% goes to the county's Tourist Development Council.

Real Estate Transfer Tax

A real estate transfer tax is collected from all sales of real estate in a county. The tax is levied at the time of transfer of real property. These types of taxes may be based on a percentage of assessed value or may be a flat deed registration fee, or both. New property owners would be responsible for paying the real estate transfer tax.

Tax Increment Financing

In areas where publicly financed redevelopment is raising property values, tax increment financing (TIF) can be used to fund new projects. With TIF, the incremental increase in *ad valorem* tax revenues that are a consequence of rising property values (which in turn results from the planned improvements) is dedicated to repaying the debt that financed the capital projects in that area. This approach to funding projects is applicable only in areas undergoing redevelopment.

III. BONDS AND LOANS

Revenue Bonds

Revenue bonds are bonds that are secured by a pledge of the revenues of the utility. The utility issuing bond pledges to generate sufficient revenues annually to cover the systems operating costs, plus meets the annual debt service requirements (principal and interest payment) times a factor, termed the coverage factor, which is designed to provide additional protection to the bondholders. The coverage factor generally ranges from 110 to 150% of the utility's annual or maximum annual debt service requirement in the present or any future year.

General Obligation Bonds

Cities, counties, and special districts generally are able to issue general obligation (GO) bonds that are secured by the full faith and credit of entity. In this case, the local government issuing the bonds pledges to raise its property taxes or use any other source of revenue, to generate sufficient revenues to make the debt service payments on the bonds. A general obligation pledge is stronger pledge than a revenue pledge, and thus must carry a lower interest rate than a revenue bond. Frequently, when local government issue GO bonds for utility improvements, the utility will make the debt service payments on the GO bonds with revenues generated through the utility's rates and charges. However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments.

Local Improvements District Bonds

LID bonds are secured by a lien on the property in the LID. Debt services payments on these bonds are funded through annual assessments to the property owners in the LID, as discussed previously.

State Revolving Fund Loans

The State of Florida, like most states, operates a state revolving fund (SRF) loan program that offers qualified local governments/utilities below-market-rate loans for wastewater projects. The State Revolving Loan Fund in Florida is administered by FDEP through the Water Facilities Funding Program. It makes low-interest loans available for construction, rehabilitation, and replacement of facilities needed to collect, treat, dispose of, or reuse municipal wastewater. It is a revolving fund because loan repayments are used to make additional loans. Loans are made for a 20-year term, with interest rates set at about 60% of the present market interest rate. SRF loans are generally limited to \$10 million per entity per year

State Bond Loan Program

The FDEP and the Division of Bond Finance of the Department of General services jointly administer the State Bond Loan Program. The program generally issues bonds that are sized to provide sufficient funds to meet the capital financing needs of several communities or entities participating in the program. The state will then loan the bond proceeds to these entities at an interest rate slightly higher than the interest rate that the state is paying on bonds. Frequently, the entities participating in the program are smaller communities or entities without the credit history or capability to enter the bond market on their own. These entities get the benefit of being able to gain lower interest rate than they would be able to obtain on their own.

Commercial Loans

Banks and other financial institutions may make commercial loans to local governments to fund capital projects. For utilities, these loans are typically secured by a pledge of a utility's revenues, but may also carry a general obligation pledge.

IV. GRANTS AND CONTRIBUTION

A number of state and federal grant programs are available to provide funding support for local governments and/or utilities to implement specific aspects of their wastewater management program. Grant monies may also be available to qualified homeowners.

At the time of the release of the PEA, the Village of Islamorada and the FKAA have applied for various federal and state grants for wastewater projects. The program, funding agency, and estimated value of these grants are listed in Table H-1. Additional information about the types of grant programs is described below.

Table H-1: Potential Federal and State Assistance Programs Identified by Project Applicants for Wastewater Projects

Program	Funding Agency	Local Recipient	Estimated Value
Unmet Needs Grant Program	FDCA/FEMA	Village of Islamorada	\$2,300,000 requires local match of \$329,000
Water Advisory Panel Funding Program	FDEP	Village of Islamorada	\$900,000 requires local match of \$225,000
Wastewater Project Assistance Program	SFWMD	Village of Islamorada	\$75,000
Unmet Needs Grant Program	FDCA/FEMA	FKAA	\$11,350,906

Source: FEMA Region IV, Village of Islamorada, FKAA

Cesspool Identification and Elimination Grant Program

Monroe County has implemented a grant program to assist homeowners with replacing cesspools. This program provides a grant for at least 62% of the capital cost of an OWNRS. Homeowners whose homes have an assessed value of between \$100,000 and \$200,000 receive an additional grant of \$1,000 over the 62-percent grant amount, or 69% of the total capital costs of these systems. This program is funded through revenues generated from grants from the Florida Department of Environmental Protection and the Florida Department of Community Affairs, as well as from funds from Monroe County’s infrastructure sales tax (Monroe County, 2001a).

Water Advisory Panel Grants

The State of Florida created a water advisory panel in Fiscal Year 1999, which administers a grant program that provides funds for projects that: reduce recurring violations of state water quality standards; resolve a public health threat; reduce discharges of pollutants into an impaired water bod; and reduce discharges into groundwater supplies. Each project must be sponsored by a local governmental entity, including, but not limited to, a city, county, water and sewer district, or a water management district. The project must be identified in an approved local, water management district, or Department of Environmental Protection water management plans as part of a surface water restoration effort. Priority is given to projects that address an area to be served with a population of less than 7,500 and a median household income of less than the statewide median household income. The project sponsor or grant recipient must provide for at least a 50-percent match of the total project cost. Matches may include funds from other local, state, and federal sources and in-kind contributions. Reductions in the match requirement may be considered, based on a demonstration by the project sponsor of inability to provide the match, to the satisfaction of the panel.

Federal Agencies

A number of federal agencies, in addition to FEMA, have programs that can provide funding to assist in improvements to wastewater management in the Keys. Potential grant funding sources include the Environmental Protection Agency, Department of Interior, Department of Housing and Urban Development, Department of Transportation, and Department of Agriculture. Potential federal grant funding programs are identified in the following table.

Table H-2: Potential Federal and State Assistance Programs Related to Wastewater

Program	Funding Agency	Program Objective	Range and Type of Financial Assistance
Water Quality Cooperative Agreements (Clean Water Act, Section 104(b)(3), Public Law 92-500, as amended; 33 U.S.C. 1254(b)(3)) http://www.cfda.gov/static/p66463.htm	EPA	To assist in developing, implementing, and demonstrating innovative approaches relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution.	Project Grants \$5,000 to \$500,000
Wastewater Operator Training Grant Program (Federal Water Pollution Control Act as amended, Section 104(g)(1); 33 U.S.C. 1251 et seq.) http://www.cfda.gov/static/p66467.htm	EPA	To substantially enhance the proficiency of personnel engaged in the operations and maintenance of treatment works and related activities by financing pilot programs	Project Grants \$35,000 for State-wide assistance
Capitalization Grants for State Revolving Funds (Clean Water Act, Public Law 95-217, as amended; Water Quality Act of 1987, Sections 601 through 607, 205(m), Public Law 100-4.) http://www.cfda.gov/public/viewprog.asp	EPA	To create State Revolving Funds (SRFs) through a program of capitalization grants to States which will provide a long term source of State financing for construction of wastewater treatment facilities and implementation of other water quality management activities (see 66.418).	Formula Grants \$10,000,000 to \$216,000,000; average \$30,000,000

Appendix H Funding and Financing Options

Program	Funding Agency	Program Objective	Range and Type of Financial Assistance
<p>Construction Grants for Wastewater Treatment Works</p> <p>Clean Water Act, Public Law 92-500, as amended; Public Laws 97-117 and 95-217; Water Quality Act of 1987, Public Law 100-4; Public Law 96-483; and Public Law 101-144</p> <p>http://www.cfda.gov/static/p66418.htm</p>	EPA	To assist and serve as an incentive in construction of municipal wastewater treatment works which are required to meet State and/or Federal water quality standards and improve the water quality in the waters of the United States.	Project Grants \$10,000 to \$10,000,000; average \$3,000,000.
<p>Water Pollution Control State and Interstate Program Support</p> <p>(Clean Water Act, Section 106, as amended, Public Law 95-217, 33 U.S.C. 1251 et seq)</p> <p>http://www.cfda.gov/static/p66419.htm</p>	EPA	To assist in establishing and maintaining adequate measures for prevention and control of surface and ground water pollution.	Formula Grants \$60,000 to \$9,000,000
<p>Water Reclamation and Reuse Program</p> <p>Reclamation Wastewater and Groundwater Study and Facilities Act, Title XVI, Public Law 102-575, as amended</p> <p>http://www.cfda.gov/static/p15504.htm</p>	Department of the Interior	This Title gives Reclamation general authority to conduct appraisal and feasibility studies on water reclamation and reuse projects. It also provides general authority for research and demonstration programs to test water reclamation and reuse technologies.	Formula Grants Construction funding is limited to 25% of the construction cost or \$20 million per project.

Appendix H Funding and Financing Options

Program	Funding Agency	Program Objective	Range and Type of Financial Assistance
Community Development Block Grants/State's Program Housing and Community Development Act of 1974, Title I, as amended, Public Law 93-383, 88 Stat. 633, 42 U.S.C. 53 http://www.cfda.gov/stratic/p14228.htm	HUD	The primary objective of this program is the development of viable urban communities by providing decent housing, a suitable living environment, and expanding economic opportunities, principally for persons of low and moderate income.	Formula Grants
Community Services Block Grant – Discretionary Awards Community Opportunities, Accountability, Training, and Educational Services Act of 1998, Title II, Section 680, Public Law 105-285. http://www.cfda.gov/stratic/p93570.htm	HHS	To support program activities of national or regional significance to alleviate the causes of poverty in distressed communities which promote: (among other things) a better standard of living for rural low-income individuals in terms of water and waste water treatment	Project Grants \$75,000 to \$500,000

Direct Federal Funding

For projects with national significance, Congress can appropriate federal funds for certain uses. The Florida Keys Water Quality Improvement Act (FKWQIA) was authorized by U.S. Congress to fund water quality improvements in the Keys through the Water Resources Development Act of 2000. This bill authorized \$100 million to be administered through USACE; however, the funding has not yet been appropriated and its future availability remains uncertain.

VI. FINANCIAL ASSISTANCE FOR LOW AND/OR FIXED INCOME USERS

Several programs are designed to reduce the cost of providing wastewater services to users of limited means, including:

- Lifeline Rates
- Cesspool Replacement Grants
- Assessment Deferral Programs

Lifeline Rates

Some communities provide discounts on the monthly wastewater bills to users who are below certain income levels. A more common practice is to set rates that have a low minimum charge and/or use fee for a minimum (“lifeline”) level of service. Higher rates are then collected from users with higher levels of water consumption (and thereby higher estimated wastewater flows).

Cesspool Identification and Elimination Grant Program.

The Cesspool Replacement Program described previously is available to users at 62 to 84% of the cost of the installation of an OWNRS on-site system, based on improved property values.

Assessment Deferral Programs

A program could be established to allow low-income and/or fixed-income users who are required to connect to a community wastewater system to defer their costs of connecting to the wastewater system and/or LID assessments until such time as their property is sold. The interest expense on the deferred assessments or connection fees could be paid through a fund established for this purpose. The deferred assessments and connection fees would constitute a lien on the property, which would need to be satisfied upon the sale of the property. External funding would be needed to establish the fund for providing the interest subsidy for these low-income users.

Appendix I
Notice of Intent to Prepare Environmental Assessment
Public Notice

PUBLIC NOTICE

The Federal Emergency Management Agency (FEMA) has received grant applications to fund the construction of several wastewater treatment systems in Monroe County, Florida. Much of the proposed project funding would be provided through FEMA 1249-DR Post Disaster - Unmet Needs funds. Matching funds will be provided through the Florida Division of Emergency Management and local government applicants.

FEMA hereby publishes notice of intent to prepare an Environmental Assessment (EA) for these actions, pursuant to the National Environmental Policy Act (PL 91-190) and associated environmental statutes, as implemented in FEMA's regulations 44 CFR Part 10. This EA will address the purpose and need of the proposed projects, project alternatives considered, affected environment, environmental consequences, and impact mitigation measures. Once completed, the Draft EA will be available for public review and comment. Notice is also published in accordance with Executive Order 11988, Floodplain Management; as implemented in 44 CFR Part 9, since these actions may affect the floodplain.

Grant Applicants:

- Florida Keys Aqueduct Authority
- Islamorada, Village of Islands

Proposed Actions:

Florida Keys Aqueduct Authority:

One grant application proposes a regional wastewater treatment plant on Key Largo. The proposed treatment capacity of this facility is 2.5 million gallons a day. The applicant's preferred project site alternative is located at Mile Marker 100.5, Oceanside. Two additional grant applications are being developed for small wastewater treatment facilities elsewhere in Monroe County. The details will be published as they become available.

Islamorada, Village of Islands:

The grant application does not specify the scope of work or project locations. These details are scheduled to be developed in 2001, and will be published as they become available.

Comment Period:

Comments concerning the proposed projects will be accepted from the affected public; local, state and federal agencies; and other interested parties in order to consider and evaluate the environmental impacts of the proposed projects. Comments should be made in writing, sent to the FEMA point of contact listed below, and postmarked within 30 days of publication of this notice.

Points of Contact:

- Ms. Science Kilner, Lead Environmental Specialist – Unmet Needs, FEMA Region IV Mitigation Division, 3003 Chamblee Tucker Road, Atlanta, GA 30341-4130
Telephone: (770) 220-5422
Fax: (770) 220-5440
- Mr. Miles Anderson, Planning Manager – Unmet Needs, Florida Division of Emergency Management, 2555 Shumard Oak Boulevard, Tallahassee, FL 32399-2100
Telephone: (850) 922-4442
Fax: (850) 922-0325
- Mr. Roger Braun, Executive Director, Florida Keys Aqueduct Authority, P.O. Box 1239, Key West, FL 33041-1239
Telephone: (305) 296-2454
Fax: (305) 296-3521
- Ms. Zully Williams, Project Manager, Islamorada, Village of Islands, P.O. Box 568, Islamorada, FL 33036
Telephone: (305) 664-2345
Fax: (305) 664-2399

[The above public notice was posted in the Key West Citizen, the Keys Keynoter, and Reporter in August and/or September 2000.]

Appendix J
Supporting Information for the Low-Income Demographic

Appendix J
Supporting Information for the Low-Income Demographic

Table J-1: Examples of Costs to Service Recipients Using FEMA’s Assistance Guidelines

SYSTEM CAPITAL COSTS	\$2,500	\$3,000	\$3,500	\$4,000	\$4,500
<i>Very-low-income Assistance Amount (90%)</i>	\$2,250	\$2,700	\$3,150	\$3,600	\$4,050
<i>Very-low-income Pays this Amount</i>	\$250	\$300	\$350	\$400	\$450
<i>Low-income Assistance Amount (70%)</i>	\$1,750	\$2,100	\$2,450	\$2,800	\$3,150
<i>Low-income Pays this Amount</i>	\$750	\$900	\$1,050	\$1,200	\$1,350
EXISTING SYSTEM ABANDONMENT/NEW LATERAL INSTALLATION COSTS	\$1,500	\$2,000	\$3,000	\$4,000	\$5,000
<i>Very-low-income Assistance Amount (90%)</i>	\$1,350	\$1,800	\$2,700	\$3,000	\$3,000
<i>Very-low-income Pays this Amount</i>	\$150	\$200	\$300	\$1,000	\$2,000
<i>Low-income Assistance Amount (70%)</i>	\$1,050	\$1,400	\$2,100	\$2,800	\$3,000
<i>Low-income Pays this Amount</i>	\$450	\$600	\$900	\$1,200	\$2,000

*Note: 90% and 70% abandonment and lateral installation assistance is up to an allowance of \$3,000.

Table J-2: Fiscal Year 2002 – HUD’s Low and Very Low-Income Limits

Monroe County, Florida

Median Family Income = \$55,100

	1 person	2 person	3 person	4 person	5 person	6 person	7 person	8 person
<i>Low-income</i>	\$30,850	\$35,250	\$39,650	\$44,100	\$47,600	\$51,150	\$54,650	\$58,200
<i>Very-Low-Income</i>	\$19,300	\$22,050	\$24,800	\$27,550	\$29,750	\$31,950	\$34,150	\$36,350

<http://204.29.171.80/framer/navigation.asp?charset=utf-8&cc=US&frameid=1565&lc=en-us&providerid=112&realname=HUD&uid=2318084&url=http%3A%2F%2Fwww.hud.gov%2F>

Published annually by HHS.

MFI figures are projected from the most recent county level census data.

Appendix K
Comments on the Draft PEA and Responses

APPENDIX K COMMENTS ON THE DRAFT PEA AND RESPONSES

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APPENDIX K COMMENTS ON THE DRAFT PEA AND RESPONSES

1.0 INTRODUCTION

The Draft PEA was made available for public comment during the period of September 20, 2002 to October 18, 2002, inclusive. Additionally, to further solicit public comments on the Draft PEA, FEMA held two workshops on October 8th and 9th. FEMA received comments from state agencies as well as individuals. Section 2.0 of this Appendix presents a list of those individuals and agencies that submitted comments on the Draft PEA. Section 3.0 of this Appendix includes summaries of comments received on the Draft PEA and responses to those comments. Any comments received after October 18, 2002, will be considered prior to any FEMA action; however, those comments are not included in Appendix K. Copies of all letters received are part of the public record for this project, and are available for viewing on the FEMA Internet Web site at <http://www.fema.gov/ep/assess.shtm>.

Draft Programmatic Environmental Assessment
- Appendices -

Wastewater Management Improvements
in the Florida Keys, Florida



Prepared For
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September 20, 2002

APPENDIX K COMMENTS ON THE DRAFT PEA AND RESPONSES

2.0 List of Commenters

2.1 State Agencies

Agency	Commenter	Title	ID
Florida Division of Historical Resources	Janet Snyder Matthews, PhD	Director and State Historic Preservation Officer	S1

2.2 Groups and Individuals

Commenter	Affiliation	Title	ID
Bacchus Niebler-Spare Wilkinson	Sydney, PhD Luciann Jerry	Hydroecologist	G1 G2 G3

2.3 Workshop Participants

Commenter	Affiliation	Title	ID
October 8th Workshop Participants			W1
October 9th Workshop Participants			W2

2.4 Website

Commenter	Affiliation	Title	ID
Anonymous			WS1
Anonymous			WS2
Anonymous			WS3
Bloding Casey	Alison Richard	Bio-Microbics Monroe County Housing Authority	Regulatory Affairs Coordinator Programs Administrator
			WS4 WS5

3.0 Comments and Responses

State Agencies

S1 Florida Division of Historical Resources (11-Oct-02)

Comment Summary S1: The nature and location of some proposed activities in undisturbed areas are such that they could impact historic properties. In accordance with Section 106, the proposed project activities should be submitted to the Division of Historical Resources for review and comment to determine any potential impact on historic properties.

Response S1: Comment noted. During the Supplemental Environmental Review (SER) process, proposed project activities would be submitted to the Florida Division of Historical Resources for review and comment prior to the release of FEMA funds.

Groups and Individuals

G1 Sydney Bacchus, PhD (17-Oct-02)

Comment Summary G1-1: Subsection numbers in the Table of Contents do not correspond to the Report, making it difficult to locate information in the Draft PEA

Response G1-1: Section references throughout the report have been revised to match the document's Table of Contents.

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Comment Summary G1-2: The Draft PEA does not adequately answer the questions posed on the Web site soliciting comments regarding the Draft PEA. There is no scientific basis to support the use of “Improvements” in the Draft PEA title.

Response G1-2: *As described in the Draft PEA, there are a number of analyses that demonstrate that septic tanks and cesspits contribute to degraded water quality in inland, nearshore and offshore waters of the Keys. These include Lapointe et al. (1990), Lapointe and Clark (1992), Paul et al. (1995a), Paul et al. (1997), Shinn et al. (1994), and EPA (1993a) referenced in Sections 1.4, 1.5, 1.9 and 3. It is generally accepted that the implementation of more stringent water quality standards for discharged effluent would improve water quality by reducing loadings of nitrogen, phosphorus, and fecal coliform bacteria. As described in Section 3.2.2.2.1, these improvements were demonstrated by Ayres and Associates (1998) in the Big Pine Key Demonstration Project. As of result of treating effluent to Florida Statutory Treatment Standards, there was a 92% reduction in Total Nitrogen and 86% reduction in Total Phosphorus to groundwater.*

Comment Summary G1-3: Extensive comments sent by Lesley Blackner on March 26, 2001 were not considered in the preparation of the Draft PEA.

Response G1-3: *Although the comments sent by Lesley Blackner were received more than one year prior to the public comment period for the Draft PEA, they were taken into consideration when drafting the PEA. Highlights of Ms. Blackner’s comments include NEPA compliance, concern of wastewater injection into Florida’s aquifers, and consultation with the U. S. Fish and Wildlife Service (USFWS) per the Endangered Species Act (ESA). FEMA published its intent to prepare an Environmental Assessment in Monroe County newspapers in August of 2000. Future notices will be released as FEMA prepares the project and site-specific SERs. The Draft PEA is developed in accordance with NEPA, and includes consultation with USFWS and several other local, regional, state and federal agencies. The list of agencies contacted is located in Appendix G of the Draft PEA. Project and site-specific ESA consultations will be completed as part of the SERs. FEMA completed a formal ESA Section 7 consultation with the USFWS in June of 2001 for a proposed Key Largo wastewater project, the details of which will be released in the SER for that project. Ms. Blackner’s letter also outlines 10 points of concern related to the injection of wastewater effluent. The following sections of the Draft PEA address each point: 1) wastewater movement in Florida’s aquifers (Section 3.1.3); 2) “confining zones” in aquifer layers (Section 3.1.3); 3) flow path of injected effluent (Section 3.1.3); 4) speed of effluent movement into nearshore surface waters (Sections 3.2.2.1 and 3.2.2.2); 5) effect of Florida Bay on surface waters (Sections 1.4 and 4.2); 6) effect of Florida Bay on surface waters (Section 1.4 and 4.2); 7) nutrient levels of injected effluent (Sections 1.7, 2.3.2, and 2.3.3); 8) availability of comprehensive studies on fate of aquifer-injected effluent (Sections 3.2.2 and 3.2.3); 9) opinion related to inadequacy of state permitting process (comment noted); 10) opinion related to inadequacy of state permitting process (comment noted). The project- and site- specific effects of this alternative will be analyzed and presented in the SERs.*

Comment Summary G1-4: Local-government officials are only considering “highly-engineered alternatives without any regard to the direct, indirect, and cumulative environmental impacts of the pre-selected alternatives.” “Islamorada had already published Requests for Proposals (RFP) to convert to the highly-engineered alternatives” being analyzed in the PEA, to which URS submitted a bid (subsequently withdrawn). URS bidding on a FEMA funded project and subsequently recommending to FEMA, as its consultant, this is the preferred alternative, appears to be a conflict of interest.

Response G1-4: *Pursuant to NEPA, FEMA only requires its applicants to consider one relevant, practicable project alternative, in addition to no action and the preferred alternative. If the*

APPENDIX K COMMENTS ON THE DRAFT PEA AND RESPONSES

commenter is referring to the RFP issued by the Village of Islamorada on March 4, 2000, for a company to design, build and operate a community wide wastewater treatment system, the three firms that submitted proposals were UEM, Inc., Ogden Water Systems and Florida Water Services. The Village has since elected not to pursue this proposal for FEMA funding. The PEA presents alternatives listed in the Monroe County Sanitary Wastewater Master Plan, of which FEMA's applicants proposed specific alternatives for funding. URS has been tasked to analyze the effects of the projects proposed by Monroe County applicants; it has not been tasked to recommend alternatives.

Comment Summary G1-5: "Pre-disposed bias of URS to support and select alternatives that involve injection of waste into Florida's aquifer system can be found in the background of their 'Preparers', who have developed the State of Florida's rule that allows aquifer-injection of waste."

Response G1-5: *FEMA's applicants selected the project alternatives, including underground injection of wastewater. The preparers of the document were not involved in the State of Florida's rule on aquifer injected wastewater; however, selected technical peer reviewers of the PEA so have this experience and were chosen due to their subject matter expertise. FEMA independently verified the information and analyses in the PEA, and made its own conclusions. Also note response to G1-4 above. .*

Comment Summary G1-6: FEMA should obtain an opinion from the Department of Justice regarding whether it is legal for a firm such as URS, (which previously attempted to secure contracts for activities they later selected as 'recommended alternatives' for the funding agency's Draft EA), to be hired by federal agencies to prepare EAs or related documents, particularly since they will provide additional contract opportunities for their firm in the future."

Response G1-6: *Refer to response G1-4.*

Comment Summary G1-7: In a previous project for the SunCoast Parkway, URS has admitted to "falsifying and fabricating information that was contained in their review document." FEMA should obtain an opinion from the Department of Justice whether it is legal for a firm such as URS, which has admitted to falsifying and fabricating information, should continue to prepare evaluation documents.

Response G1-7: *The URS staff who prepared much of this PEA were not involved in the case in question. FEMA independently verified the information and analyses in the PEA, and drew its own conclusions.*

Comment Summary G1-8: "Page Ab-1 of the Draft Problematic EA Abstract states that a 'supplemental environmental review (SER) document (i.e., Supplemental Environmental Assessment of the Environmental Impact Statement) would be prepared for each individual project covered by this draft PEA'. This piecemeal approach of 'assessment' ensures that the full direct, indirect, and cumulative impacts on the environment of the 'Unmet Needs' funding cannot and will not occur. As only one example, the entire EA focuses solely on the Keys (Monroe County). In reality, the water that is combined with human excrement, to create the so-called 'wastewater', is imported into the Keys. The invaluable water resource that is converted into 'waste' in the Keys is extracted from the aquifer that supports the Florida Everglades. Therefore, the proposed alternative would result in significant adverse impacts to all of the counties associated with the Everglades, as well as the entire national and international tourist industry associated with the Everglades. Those factors are not addressed in the Draft Problematic EA. The enclosed copy of the 1/97 Report describes the types of Cumulative Impacts considered under NEPA and the protocol for conducting a Cumulative Impacts Analysis."

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Response G1-8: *The intent of the PEA is to examine the effects of Keys wastewater treatment alternatives directly, and indirectly where appropriate, and when combined with past, present, and foreseeable future projects affecting the same resources. Section 4 of the DPEA examines cumulative effects. Section 1.4 of the DPEA introduces the sources of nearshore water quality degradation in the Keys, followed by a more detailed discussion in Section 3.2.3. Regardless of how the wastewater is treated, water usage will not change as a result of the proposed alternatives.*

Comment Summary G1-9: “The abstract of the EA clearly illustrates that only highly-engineered alternatives were considered. A comprehensive Environmental Impact Statement (EIS) and Cumulative Impact Analysis need to be conducted by knowledgeable scientists (e.g. National Academy of Sciences) without a pre-disposition to highly-engineered alternatives.”

Response G1-9: *As discussed in Section 2.2 of the PEA, the alternatives presented in the document parallel alternatives studied and approved for consideration by Monroe County in their Sanitary Wastewater Master Plan. The purpose of the PEA is to evaluate the environmental impact of alternatives, not to formulate project alternatives. The decision-making process for wastewater management began in 1997 with the preparation of the Master Plan, involved a comprehensive evaluation and prioritization of many variables, and included considerable public participation opportunities. Representatives from a citizens task force, a technical advisory committee, Board of County Commissioners, and community representatives developed models and considered the alternatives in terms of cost, technical feasibility, performance, environmental impacts, potential for service disruption, reliability, implementation, and strength and weaknesses in order to evaluate alternatives.*

The results of this model were used to recommend the most appropriate alternatives for implementation in Monroe County. These alternatives are also presented in this PEA as proposed alternatives for FEMA funding, and for evaluation under NEPA. The alternatives discussed in this document support established Federal, State, and county objectives by presenting and evaluating alternate methods of wastewater collection and disposal.

Comment Summary G1-10: “Under ‘Topography, Soils, and Geology’: sinkholes are referenced to as a potential effect of aquifer injection, but no reference to the extensive dissolution of the aquifer matrix, a near-certain response, is mentioned.”

Response G1-10: *Although the text does not use the term aquifer matrix, it describes the dissolution of carbonate rock, which, as discussed in Section 3.1.3.1, is the predominant rock type underlying the Florida Keys, and hence, comprising the aquifer. The impact and potential extent of dissolution would be addressed in the site specific SERs once the projects’ location and magnitude of these projects are determined. As stated in Section 3.1.3.2.2, “to mitigate the potential effects of limestone dissolution on shallow well design and function, appropriate geotechnical studies would be conducted by the applicant prior to design and construction to adequately characterize the geological and geotechnical environment. The SER would incorporate the data, results, and design measures as appropriate to fully discuss effects on geology.”*

Comment Summary G1-11: “There is no scientific basis for the claim under the Water Resources & Quality section.”

Response G1-11: *Information contained Section 3.2, Water Resources and Water Quality, was obtained from scientific articles, technical advisors, state and local government agencies, and websites such as:*

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Florida Keys National Marine Sanctuary (FKNMS). 2001. Water Quality Protection Program Overview. Accessed from www.fknms.nos.noaa.gov/research_monitoring/wqpp.html on August 9, 2001.

Halley, R.B., Vacher, H.L., and Shinn, E.A., 1997, Geology and hydrology of the Florida Keys in Geology and Hydrology of Carbonate Islands, Developments in Sedimentology 54, pp. 217-248. Elsevier Science B.V., Amsterdam.

Kruczynski, William. 1999. Water Quality Concerns in the Florida Keys: Sources Effects, and Solutions. Florida Keys National Marine Sanctuary Water Quality Protection Program, National Oceanographic and Atmospheric Administration.

Jones, Ronald and Joseph Boyer. 2001. Water Quality Monitoring Project: FY 2000 Annual Report. Published by the Southeast Environmental Research Center, Florida International University under contract to the EPA.

Leckler, Kurt. 2001. Permit Compliance Specialist, South Florida Water Management District. Personal communication with Jonathan Randall, URS Group, Inc.

Monroe County. 1997. Monroe County Year 2010 Comprehensive Plan. Adopted by the Monroe County Board of County Commissioners, Department of Community Affairs and Administration Commission of the State of Florida. September.

Comment Summary G1-12: “There is no scientific basis for the claim under the first two sentences of the Biological Resources section in the Abstract. The claim in the third sentence of this subsection regarding activities occurring on developed, disturbed areas with low habitat values is without basis. Proposed sites in Key Largo and Islamorada, in addition to the withdrawal sites, all involve direct, indirect, and cumulative impacts to a myriad of federally and state listed species.”

Response G1-12: *The scientific basis for the claims in the Abstract is provided in detail in Section 3.3.2. Biological Resources. Habitat values and concerns with state and federal listed species for individual sites, including impact minimization measures, will be further addressed during the SER process.*

Comment Summary G1-13: “The ‘Air Quality’ section fails to consider impacts from phyto-toxins released into the air after planktonic algal blooms that can be triggered by induced discharge of injected effluent surface waters.”

Response G1-13: *The research indicates that toxins generated by planktonic algae, such as the primary toxin found in the Florida Red Tide, can act as eye and throat irritants when the toxins become aerosols as a result of wave action. Algal blooms are formed from a variety of contributing factors such as temperature, salinity, currents, and nutrients¹. A major function of the projects proposed in this Draft PEA is to bring presently inadequate wastewater systems (e.g., septic tanks and cesspits) into compliance with Florida Statutory Treatment Standards. It is expected that this would greatly reduce the nutrients entering nearshore and offshore waters.*

Comment Summary G1-14: “The ‘Demographic and Environmental Justice’ section fails to consider direct, indirect, and cumulative adverse impacts on surrounding, low-income areas where sludge (generated by the selected alternative) would be dumped and groundwater mining is continued.”

¹ National Oceanic and Atmospheric Administration (NOAA). 2002. *Algae Info*. Accessed from <http://www.chbr.noaa.gov/CoastalResearch/algaeInfo.htm> on December 16, 2002.

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Response G1-14: Comment noted. As described in Response G1-8, none of the alternatives are expected to increase groundwater mining. Section 2.3.2 of the Draft PEA outlines the anticipated disposal methods of sludge created by the proposed projects. Sludge would likely be hauled to a regional wastewater treatment facility in Miami-Dade County for treatment and then used for fertilizer. The Key West WWTP dewateres partially stabilized secondary solids, which are disposed of via private hauler at an agricultural land application site near Okeechobee, Florida. The disposal of sludge in this manner is not anticipated to result in adverse and disproportionate impacts to low income or minority populations.

Comment Summary G1-15: The Hazardous Materials section fails to consider nonylphenol, an endocrine disrupter hazardous to animals, creation by the AWT process.

Response G1-15: The research indicates that nonylphenol is a degradation product of a surfactant widely used for commercial and industrial purposes such as detergents, herbicides and cosmetics and the manufacturing of plastics, textiles, agricultural chemicals and paper. Nonylphenol formation can occur through wastewater treatment and in natural environments. In wastewater treatment processes, it may be formed regardless of whether the waste stream is processed by AWT². The EPA is currently in the process of developing aquatic life criteria for nonylphenol³. Once the criteria is finalized, proposed wastewater systems would be required to comply with State processing and monitoring standards, as applicable. Before formal rules are established, the project applicant would be required to coordinate with FDEP to implement any monitoring protocols that were deemed necessary. Section 3.8 of the Draft PEA has been updated to include this information and coordination/monitoring requirement.

Comment Summary G1-16: Letters sent to the EPA and publications from 1996-2002 documents my assertions above that the PEA is “grossly inadequate and a comprehensive EIS and Cumulative Impacts Analysis need to be conducted by knowledgeable scientists (e.g., National Academy of Scientists) prior to the release of federal funds from your agency for wastewater-related activities in Monroe County.”

Response G1-16: Section 1.2 of the PEA outlines FEMA’s NEPA review process. In determining the appropriate level of NEPA review for the proposed actions, FEMA’s criteria for when to prepare an Environmental Impact Statement (EIS) were applied, and are found in its NEPA implementing regulations at 44 C.F.R Part 10.8(b). At that time, FEMA determined there was insufficient information about the group of projects to satisfy the criteria for an EIS level of analysis, and elected to prepare a PEA to determine if the group of projects required an EIS.

Comment Summary G1-17: “No zero-discharge alternatives were considered in the PEA...Practicable, economical, readily-available alternatives to the generation of sludge were not considered in the Draft Problematic EA.”

Response G1-17: FEMA’s applicants may legally propose any practicable project alternatives. As noted in Response G1-9 and discussed in Section 2.1 of the PEA, the alternatives considered come from the Monroe County Sanitary Wastewater Master Plan. FEMA’s applicants may need to be contacted regarding alternatives reconsideration.

Comment Summary G1-18: “In situ, phyto-treatment systems also were not considered. Likewise, economical, practical, and readily-available alternatives for reducing pollution from stormwater (e.g. in-line filters) also were not considered.”

² Maguire, James R. 1999. Water Quality Research Journal of Canada.

³ U.S. Environmental Protection Agency (EPA). 2002. Water Quality Criteria: Nonylphenol. Accessed from <http://www.epa.gov/waterscience/criteria/aqlife.html> on December 16, 2002.

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Response G1-18: *See Responses G1-17 and G1-8. The projects under consideration are for wastewater management only and not for stormwater management. None of the proposed projects include combined injection of treated wastewater and stormwater. The cumulative effects to water quality from improved stormwater and wastewater management practices are discussed in Section 4 of the PEA.*

Comment Summary G1-19: “Figures 1-2 and 2-5 are an overly simplistic and highly misleading graphic of the aquifer where effluent is proposed to be injected. In reality, the aquifer is characterized by both dissolution features and fractures that result in a highly permeable matrix with many preferential flow-paths for the migration of injected effluent and other contaminants such as stormwater.”

Response G1-19: *The intent of Figures 1-2 and 2-5 is to simply illustrate the wastewater treatment process for each alternative; it is not intended to illustrate aquifer characteristics. Section 3.1.3 discusses the aquifers’ characteristics in detail and has several figures illustrating their characteristics, including Figures 3-2 to 3-5.*

Comment Summary G1-20: “Figure 3-6 illustrates that the Study Areas are confined to the exposed land form of the Keys, excluding coastal waters such as the Marine Sanctuary and the peninsular of Florida, both of which would be affected by the implementation of the Proposed Alternative.” Likewise, the PEA does not consider water quality degradation factors exterior to the Study Area.

Response G1-20: *Figure 3-6 represents stormwater study areas and not wastewater study areas. The scope of the PEA’s study area has been clarified in Section 1.2 and is represented in Figure 1-1. Project and site-specific study areas and areas of effect would be more clearly delineated in the SER process. As noted in Response G1-8 water quality degradation factors external to the Key are discussed in Sections 1-4 and 3-2-3.*

Comment Summary G1-21: “No figures (or other information) were included to show the location of all of the existing and proposed shallow and deep injection wells in south Florida, or even Monroe and the adjacent counties...Likewise, there were no figures indicating the location and nature of the supply wells for the Key’s waste water.” Groundwater mining has been described and documented in published literature, but was not addressed in the Draft PEA.

Response G1-21: *The Florida Department of Environmental Protection’s Underground Injection Control Program and county health departments maintain information on permitted shallow and deep injection wells. As described in Section 3.2.2.1 and Kruczynski (1999), there are about 750 Class V wells currently permitted in the Keys. Including a graphic in the PEA delineating the location of all permitted wells in the Keys is not practical considering the number of wells. The SERs will include information on existing permitted wells within their service area and may include a graphic showing their distribution. Please refer to Response G1-8 for groundwater mining comment.*

Comment Summary G1-22: A large percentage of the references are personal communications. Many of the references in this PEA are documents other than publications in recognized, peer-review journals. Consequently, the References section is severely lacking in both the nature and number of references.

Response G1-22: *It is the nature of the NEPA process to draw from a number of acceptable sources, including peer-reviewed academic journals, government reports, and communication with experts knowledgeable in their field, commensurate with an ‘Environmental Assessment’ level of analysis. FEMA’s NEPA implementing regulations at 44 CFR Part 10.9 outline preparation of EAs. The reference section in the PEA is explicitly designed to present the source of information that is referenced in the body of the document.*

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G2 Luciann Niebler-Spare

Comment Summary G2-1: “What effluent is going to be going down the shallow wells and then into Florida’s Outstanding Waters? Also, how much fresh water effluent will be moving up vertically into the saline waters of the oceans, bays, and canals?”

Response G2-1: *The amount of effluent will depend on the site location and disposal alternative chosen for each site. Therefore, this concern will be further analyzed in the SER process.*

Comment Summary G2-2: “Maybe there should be an experiment between septic systems in the area and injection wells. That might be interesting and worthwhile.”

Response G2-2: *For clarification, it should be noted that many septic systems in the Keys currently use injection wells for disposing of untreated wastewater effluent. An alternative to the use of injection wells is the use of septic drain fields. As described in Section 2.4.2, the problem with installing septic tanks with drain fields in the Keys is that very little or no natural soils exist over the ancient coral/limestone rock, and soil must be imported to construct these systems. The limited soils in the Keys thus reduce the treatment effectiveness of these systems, especially for nutrients. Appendix D of the Draft PEA includes a comparison of the quality of effluent treated to Florida Statutory Treatment Standards as compared to a septic system.*

Comment Summary G2-3: “There are 554 shallow injection wells in Monroe County. They are permitted and then they are on their own, as there is no single map that shows the location of these wells.”

Response G2-3: *The available research indicates that there are about 750 shallow injection wells in the Keys [Section 3.2.2 of the Draft PEA and Kruczynski (1999)]. Comment noted with respect to the single map that shows the location of the wells.*

Comment Summary G2-4: “There needs to be some overall management of the wells regarding their placement and the results of each project.”

Response G2-4: *Please refer to Response G1-21 for injection well management. In approving project funding, FEMA plans to strongly encourage its applicants to implement a water quality monitoring program for each project (see Sections 3.2.2.2.2 and 3.2.2.2.3).*

Comment Summary G2-5: Please look into the possibility of reuse with ultra-violet disinfection.

Response G2-5: *Comment noted. Also, please see Response G1-9.*

Comment Summary G2-6: “In Islamorada, we are very concerned with the potential price tag of a sewage treatment plant for the whole island (Four islands are involved). There are many worried citizens who feel that the village manager and council are trying to move too quickly and are not making a realistic effort to show the true costs involved or to investigate all possible solutions.”

Response G2-6: *The currently proposed Islamorada project only serves one neighborhood. The economic effects of the project will be presented in the project and site specific SER, however the costs per EDU are expected to be within the range presented in Section 3.6.3.2.*

G3 Jerry Wilkinson (4-Oct-02)

Comment Summary G3-1: Problem with the degrading of terrestrial environment at the expense of a small potential enhancement of the marine environment. Land should be used for conservation purposes only.

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Response G3-1: *The project and site-specific SER will evaluate effects to both the terrestrial and marine environments, including impact mitigation measures.*

Comment Summary G3-2: *“The proposed and purchased 20 acres is about pristine of Key Largo hammock as exists today. It has been on the CARL acquisition list and is contiguous to a flyway area to its east. All suggestions for the use of the state and federal lands to the north have been rejected. Does private ownership make this parcel any less qualified for preservation?”*

Response G3-2: *Land decisions are made at the county level, and county representatives should be contacted regarding site selection. FEMA’s applicants may propose any relevant, practicable project alternatives, including site selection. FEMA cannot require applicants to propose additional alternatives if they have already proposed enough relevant, practicable alternatives.*

Comment Summary G3-3: *“The present day stated four acres is only hypothetical as if the FKAA proposed Request for Proposals is approved to construct a community WWTP on 2 acres, the expansion to the future 2.25 mgd regional WWTP will be either impossible or additional acreage must be cleared.”*

Response G3-3: This concern would be further analyzed during the SER process, when the location and magnitude of individual projects would be specified.

Comment Summary G3-4: *“I suggest this parcel be accepted as mitigation for some other lesser violation. Other parcels of land can be found. To follow chapter 7 of the Monroe County Sanitary Master Plan, 10 to 12 other parcels must be acquired on Key Largo; therefore, if only one is available, we might as well throw in the towel.”*

Response G3-4: The County’s site selection process will be presented in the project and site-specific SER.

Workshop Participants

W1 Workshop Participants (8-Oct-02)

Comment Summary W1-1: Status of mile marker 100.5? What about FEMA funding relative to this project's sunset date?

Response W1-1: *This concern relates specifically to the Key Largo project and would be further considered at the SER level.*

Comment Summary W1-2: How can we get both projects in Key Largo moved up so that we do not lose funding for both?

Response W1-2: *Funding timelines are at the discretion of state and federal funding agencies.*

Comment Summary W1-3: Could FEMA environmental requirements stop this project after the "road to nowhere" has been built?

Response W1-3: Federal environmental compliance and state and local permitting requirements for specific projects would be outlined during the SER process. Receipt of federal funding is conditioned on the applicants implementing all required impact mitigation measures and obtaining applicable permits before starting work. .

Comment Summary W1-4: *The project footprint for the project keeps changing. Where will the project be (the 3-acre site)? I have seen three different footprints for it. Monroe County code lets you clear 20% of the site, and I have seen various numbers for that too – 4.6% etc. because we are now looking at some private property. The footprint seems to have changed since we got the information from Fish and Wildlife.*

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Response W1-4: The size and siting of projects would be specified during the SER process.

Comment Summary W1-5: *Is the environmental assessment comprehensive enough that if we want to expand this project to more than three acres, we do not have to do another environmental assessment?*

Response W1-5: Yes, as far as the alternatives presented in the PEA are concerned. However, the SER process evaluates a specific scope of work and its alternatives; and prescribes impact mitigation measures. If a scope of work changes substantially, the environmental analysis must be revised.

Comment Summary W1-6: *Many people still question the science of central treatment, especially when you consider the cost. Is there any plan to do follow-up studies so that at the conclusion of this 20-year project we can say, "we spent the money, we did what we were supposed to do, and it worked"?*

Response W1-6: The Draft PEA recommends water quality monitoring be conducted following implementation of the proposed projects in Sections 3.2.2.2.2 and 3.2.2.2.3.

Comment Summary W1-7: *Will there be interim studies so that if we get to a point at which we have several plants in populated areas, we can say, "It doesn't really make sense to continue this process – on a cost-benefit basis we have solved the problem – and on-site systems are okay for the rest of the Keys"?*

Response W1-7: No such interim studies have been planned at this time. Implementation of the Monroe County Sanitary Wastewater Master Plan is the responsibility of the Florida Keys Aqueduct Authority and Key Largo Wastewater District, along with determining if Plan goals have been accomplished by mandated deadlines.

Comment Summary W1-8: *What median household income was used in the economic part of the study? The census says \$36,000 and some. With 42% of children in Largo school system on the free lunch program, how do we justify an extra \$58/month? This is a serious economic impact to the average family.*

Response W1-8: The median household income (MHI) figure of \$42,283 as cited in Section 3.6 was taken from the 2000 census (Table DP-3. Profile of Selected Economic Characteristics: 2000 – Geographic Area: Monroe County Florida).

Comment Summary W1-9: *How does your study try to prove this is an acceptable impact?*

Response W1-9: Sections 3.6.3 and 3.7.1.2 of the PEA detail the economic impacts and supports the claim that the impact is acceptable in two ways. First, 2% of MHI is cited as the affordability threshold for wastewater costs as established by the U.S. Environmental Protection Agency and by the National Consumer Law Center. Second, an assessment of the estimated average monthly costs for household expenses in the Keys (see Section 3.6.3.1.2) was done to calculate discretionary income and it was determined that 2% of MHI constituted approximately 7% of discretionary income for households at the median income. As 2% of MHI was only 7% of discretionary income, for median and higher level income households, the 2% figure was concluded to be affordable. The analysis of low-income and very-low-income households showed that the impact was indeed unacceptable and therefore assistance guidelines were developed. The low-income assistance program provides 70% assistance for System Capital Costs; and 70% of assistance for Existing System Abandonment and lateral costs up to an allowance amount of \$3,000. The very-low-income assistance program provides 90% assistance for System Capital Costs; and 90% assistance of Existing System Abandonment and lateral costs up to an allowance amount of \$3,000.

Comment Summary W1-10: *Where did your income and average cost figures come from?*

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Response W1-10: Income figures were obtained from the 2000 U.S. Census: Profile of Selected Economic Characteristics for Monroe County, Florida, Poverty 2000, and Money Income in the United States: 2000, Current Population Reports and also from HUD: Fiscal Year 2002 Low and Very Low Income Limits. Average cost figures came from the sources cited in Table 3-6, as described in the paragraph below the table, with the details of each source listed in the corresponding citation in Section 7: References.

Comment Summary W1-11: *Will this study be the basis for us to support the assistance we are going to seek?*

Response W1-11: The low income assistance guidelines presented in the PEA apply only to the FEMA funded projects.

Comment Summary W1-12: *Does operation and maintenance cover all administrative costs?*

Response W1-12: For the purposes of the PEA, yes, it covers all administrative costs.

Comment Summary W1-13: *What if the applicants do not provide low-income assistance?*

Response W1-13: To be eligible for FEMA funding, the applicants will be required to, at a minimum, provide the assistance levels outlined in the PEA (Section 3.7.1.5) for low-income and very-low income qualified families. If the applicants do not comply, they would not receive for FEMA funding.

Comment Summary W1-14: *Where do the FEMA dollars for this come from?*

Response W1-14: Under the Emergency Supplemental Appropriations Act for Fiscal Year 1999, funding for long-term disaster recovery projects in Florida counties whose needs were unmet through primary disaster relief funds, was made available. As a result, Monroe County is eligible for “Unmet Needs” funding from FEMA.

Comment Summary W1-15: *Will low-income assistance be subtracted from the grant money? How much of a reduction will that be?*

Response W1-15: Yes, the low income assistance would come from the grant funds. The proportion of grant funding earmarked for low income assistance will depend how many project service area households qualify for assistance.

Comment Summary W1-16: *Tell us about the Key Largo project specifics, if you have any information.*

Response W1-16: The project specifics will be provided during the SER process.

Comment Summary W1-17: *How many dollars do we have and how much money is needed to meet the needs of low-income families? Is there enough to take care of the number of people who need it?*

Response W1-17: The exact figures of how much funding will be required for low-income families will be determined in the SER process. Using very liberal estimates on percentages of low-income and very-low-income households, based on census data for Monroe County, preliminary estimates indicate that there is enough grant funding to assist low-income households at the prescribed levels.

Comment Summary W1-18: *If applicants have to provide this level of assistance in order to get FEMA dollars, who determines the level of assistance?*

Response W1-18: The required levels of assistance were determined by FEMA. Please see Section 3.7.1.5 in the PEA.

APPENDIX K COMMENTS ON THE DRAFT PEA AND RESPONSES

Comment Summary W1-19: *How do assets play into the income qualification criteria? Are there any limits on assets?*

Response W1-19: As per HUD's policy, only the interest made on assets is counted as income. The actual value of the asset is not counted and has no bearing on income qualification.

Comment Summary W1-20: *I do not agree that \$75/month is an acceptable or affordable price, no matter what your median income. It is too high.*

Response W1-20: As noted in Response W1-9, the Environmental Protection Agency, Department of Housing and Urban Development, and the National Consumer Law Center all use a percentage of median household income as their measure of affordability. Establishing affordability thresholds is also at the discretion of local authorities, in fact the Monroe County Board of County Commissioners has previously passed resolutions addressing this. Accordingly, FEMA applicants may increase the level of assistance per EDU, however, the amount of FEMA grant funding is limited to the amount in the respective original grant applications.

Comment Summary W1-21: *Does the \$75 include all components of the cost – capital, operations and maintenance, and lateral and abandonment?*

Response W1-21: Yes, it includes all of those components, but the \$75 is not a final figure for every project area. It is a general estimate pertaining to all of the project areas and the final figure could be slightly lower or slightly higher for the individual sites.

Comment Summary W1-22: *Can you tell us about funding sources other than this FEMA grant? What funding is available for all proposed projects?*

Response W1-22: Please see Appendix H: Funding and Financing Options in the PEA.

Comment Summary W1-23: *Why should we borrow money from FEMA at 6%? It would be cheaper from the state revolving fund at 3% for non-assisted hook-up costs.*

Response W1-23: FEMA funding is a grant, rather than a loan.

Comment Summary W1-24: *Why not reduce the boundary of the project and have no hook-up fees – only operations and maintenance costs – within the parameters of FEMA funding. Why don't we do just what the FEMA grant will allow us to do?*

Response W1-24: The scopes of the various projects are determined by the applicant, not by FEMA. The question would need to be raised with the applicant.

Comment Summary W1-25: *Equity is a big issue and concern – the cost impacts to citizens.*

Response W1-25: Issues of equity and cost impacts to service recipients have been outlined in detail in Sections 3.6.3 and 3.7.1.2.

Comment Summary W1-26: *Does the report (the DPEA) address which option or system is better for the project? If it is not in this report, is there some sort of consumer report about which system is better than others?*

Response W1-26: The question of which wastewater system is better for the project is beyond the scope of the PEA. The alternatives are derived from the Monroe County Sanitary Wastewater Master Plan, which does evaluate which system alternatives are most suitable.

Comment Summary W1-27: *There is a concern about the fact that the assessment is based on County's master plan. The information may be old and inaccurate. We need an independent analysis to verify the assumptions used in the PEA.*

APPENDIX K COMMENTS ON THE DRAFT PEA AND RESPONSES

Response W1-27: The PEA is based on the County's Sanitary Wastewater Master Plan that was published in June 2000, and is the most current wastewater planning document available for Monroe County. However, it is the applicant's discretion to sponsor further study of alternatives.

Comment Summary W1-28: *Regarding operations and maintenance costs, we need to evaluate which system is less expensive and more efficient to operate to help make good decisions.*

Response W1-28: That is beyond the scope of this PEA. NEPA requires evaluation of the impacts to the environment of the three project alternatives proposed, but not of which is most efficient or cost-effective; also see Responses G1-9 and W1-27.

Comment Summary W1-29: *We don't have a wide choice in systems. The RFP has limited our choices.*

Response W1-29: The system alternatives in RFP packages are consistent with the FEMA funding grant application scope of work.

Comment Summary W1-30: *Candidates for the Wastewater Board should study the science in order to prepare themselves to sit on the Technical Evaluation Panel (TEP).*

Response W1-30: Comment noted.

Comment Summary W1-31: *Regarding the proposed site at mile marker 100.5, we are trading adverse impacts on the terrestrial environment for benefits to the marine environment. Even considering that the site was probably scarified at one particular time, it is still what we would now call high quality hammock land. We need to consider the terrestrial environment to the same degree as the marine environment.*

Response W1-31: This concern would be further analyzed during the SER process, when project locations would be specified.

Comment Summary W1-32: *When will the public meetings be for the site-specific projects?*

Response W1-32: Dates would be determined based upon the completion of each individual draft SER.

Comment Summary W1-33: *Will a statement be made relative to the overall environmental improvements (i.e., that the benefit to water quality is more important than the adverse effects on wood rats)?*

Response W1-33: Impacts on both biological resources and water quality will be considered at the SER level. As part of its obligations under Section 7 of the Endangered Species Act, FEMA will consider impacts to special status species and make efforts to avoid and/or minimize impacts to these species. Note that it is beyond the scope of the NEPA documents to make statements of opinion regarding the acceptability or relative value of environmental tradeoffs.

APPENDIX K COMMENTS ON THE DRAFT PEA AND RESPONSES

W2 Workshop Participants (9-Oct-02)

Comment Summary W2-1: *When a treatment plant is put in on Conch Key, will residents be able to get a septic or cesspit credit?*

Response W2-1: No, septic/cesspit credits would not be used in project areas.

Comment Summary W2-2: *Given our topography and geology, will effluent (which is freshwater) placed in shallow wells come back up in canals, ocean, etc.? Is this a concern? Will this be tracked?*

Response W2-2: *If shallow injection is identified as an alternative method of wastewater disposal for a specific wastewater treatment facility, the effects of this alternative will be analyzed and presented in the SER for that specific facility. Sections 3.1.3 and 3.2.2.1 provide a detail discussion on the Keys geology and the effects of injecting treated effluent, in terms of hydraulic conductivity. Injected treated effluent will eventually surface in nearshore waters, including canals, as it currently does; although it would be treated to much more stringent standards than present.*

Comment Summary W2-3: *How will variation in operations and maintenance costs among possible technologies that may be proposed are taken account of in bid evaluation process? I see this as a huge issue for a small community system as is being proposed for Conch Key.*

Response W2-3: This issue would need to be addressed by the applicant.

Comment Summary W2-4: *Where can we get more information about possible technologies?*

Response W2-4: Please refer to Response G1-9 and information on various wastewater treatment systems can be found on the internet, at the library or obtained from technical experts (e.g., wastewater engineers).

Comment Summary W2-5: *Purestream literature suggests a large difference in operations and maintenance costs between upflow sludge blanket filter systems and sequencing batch reactor systems.*

Response W2-5: Technology alternatives should be brought to the attention of the applicant.

Comment Summary W2-6: *Will the government require three separate bids when you get to site specific steps?*

Response W2-6: Yes, projects must be competitively bid. .

Comment Summary W2-7: *What role does FEMA play in overseeing projects once funding is provided? We have seen projects in the Keys with significant management problems. If FEMA is providing funding, is there any additional assurance for those of us on projects with FEMA funding that costs etc. will be managed better for us?*

Response W2-7: Applicants are responsible for project facility maintenance. FEMA has no long-term oversight in project facility maintenance.

Comment Summary W2-8: *We need sewage treatment.*

Response W2-8: Comment noted.

Comment Summary W2-9: *Is there a sampling point anywhere near Conch Key for fecal coliform? Where is the closest monitoring point?*

APPENDIX K COMMENTS ON THE DRAFT PEA AND RESPONSES

Response W2-9: The closest monitoring site is maintained by Florida International University (No. 244) just northeast of Conch Key, off US 1 (<http://serc.fiu.edu/wqmnetwork/FKNMS-CD/midkeys.htm>). However, fecal coliform is not monitored at this station.

Comment Summary W2-10: *Has there been any interest here in ultraviolet ray disinfection? Water returned after this treatment would be less harmful to corals.*

Response W2-10: The purpose of the PEA is only to evaluate alternatives, not develop alternatives. Please see Response G1-9. The specific disinfection alternatives will be presented in the SER process.

Website

Comment Summary WS1-1: *The only question we have concerns the choice to dismiss the STEP system as an alternative. The fact that each home has a pump should not be something that would eliminate it from consideration. When combining these types of systems with responsible management entities (RMEs) as described in EPA's management guidelines for onsite systems, they can be cost effective and reliable systems. We ask that you reconsider this decision.*

Response WS1-1: Please see Response G1-9.

Comment Summary WS1-2: *Overall, a very well written, informative document.*

Response WS1-2: Comment noted.

Comment Summary WS1-4: *The ER establishes very low-income as incomes less than 50% of Median Family Income (MFI) and low-income as up to 80% of MFI. Further, the ER establishes Monroe County MFI at \$55,100. This is consistent with the most recent annual estimate published by US HUD. Based on these definitions, Monroe County's very low-income households would be those earning no more than \$27,550 and low would be earning no more than \$44,080. I believe that the ER miscalculates these income maximums as \$24,800 and \$39,650 respectively.*

Response WS1-4: The Monroe County MFI of \$55,100 is the average figure published by HUD and covers all family sizes. HUD publishes the adjusted values of MFI for each family size and you are correct in noting that the figures of 50% and 80% do not calculate directly from the \$55,100. The income maximums of \$24,800 for very-low-income and \$39,650 for low-income come directly from HUD's table of adjusted figures for a family of 3 and are not calculated in the PEA. In response to your comment, we have clarified this point in the document.