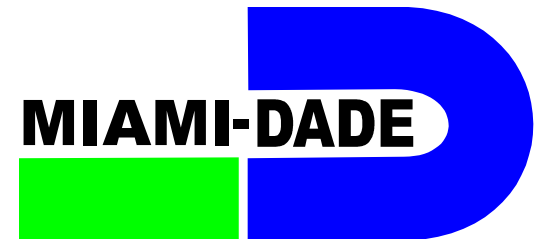


Overview of Surface and Groundwater Monitoring in Miami-Dade

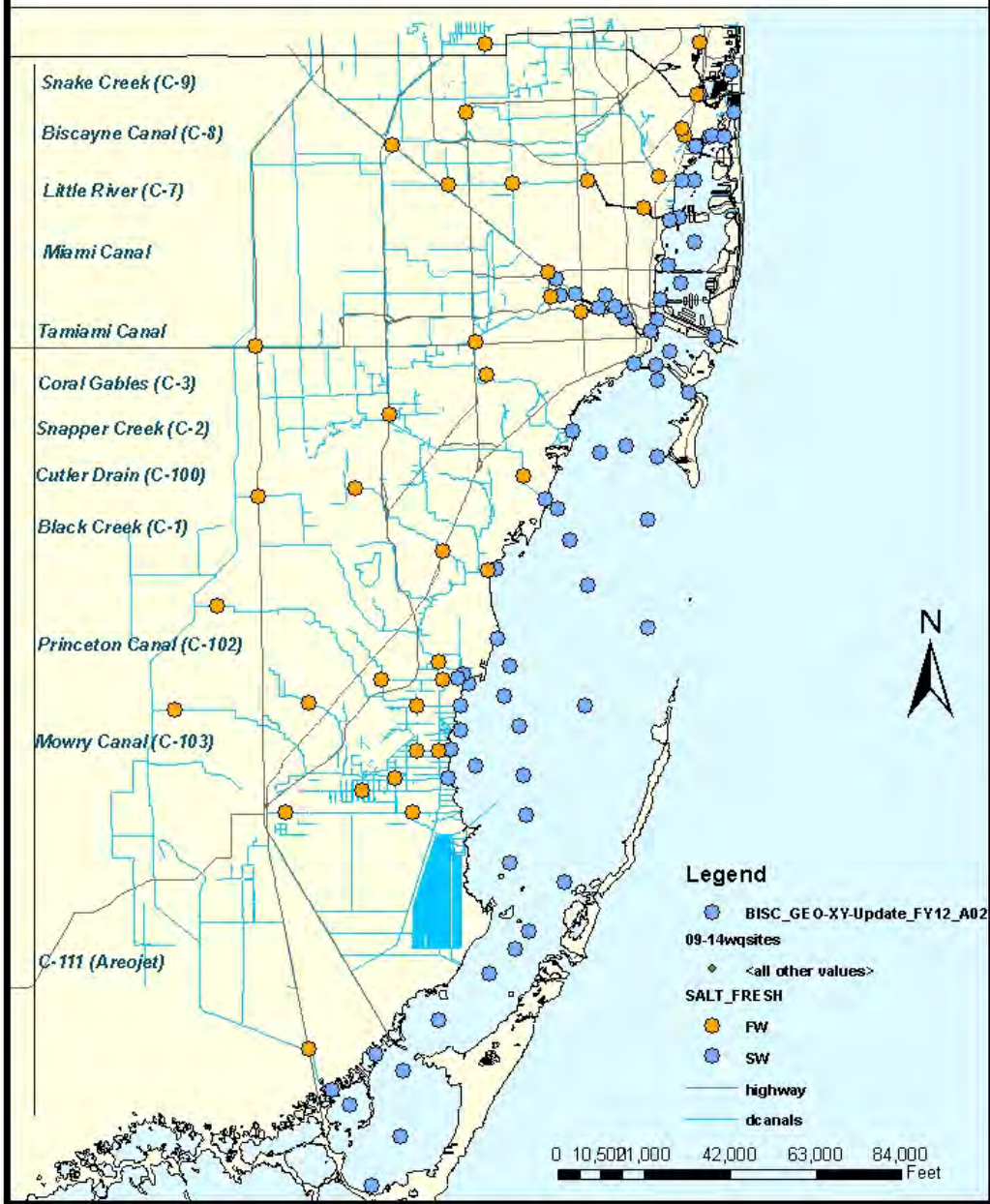
Presentation for FWRMC, October 9, 2012

Miami-Dade Department of Regulatory and
Economic Resources, Environmental Resources
Management (DERM)

Partners: SFWMD, USGS



Miami-Dade Surface Water Quality Monitoring Network 2013-2014 Monitoring Stations



- Biscayne Bay Surface Water Quality Program (BBWQ) initiated in 1979
- Up to 117 locations visited monthly (presently 107)
- WQ Monitoring Matrix
 - o Physio-Chemical
 - o Water Clarity (PAR, TSS, Turb.)
 - o Urban/agriculture contaminants (sewage, stormwater runoff, illegal discharges)
 - Bacteria
 - Nutrients (phosphorus, ammonia, nitrate/nitrite, Chl-a)
 - Toxics (metals, synthetic organics)
- More than 3 mil. WQ records to date (avail. in FLSTORET)
- Funded by Miami-Dade, FDEP (past), and SFWMD (present)
- Identifies status, spatial patterns and temporal trends, and supports
 - o Ecological assessments
 - o Management Decisions
 - o Regulatory Process
 - o Numeric Nutrient Criteria
 - o NPDES/IWR/TMDL programs
 - o WQ & Ecological Modeling
 - o Restoration Targets, Ecological Indicators

Biscayne Bay Surface Water Quality Monitoring Program																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
STATION	Phase	Year	Day	SS	T	pH	DO	Sal	ORP	Temp	Chl-a	TP	Ammonia	NO3	NO2	PO4	SiO4	Fe	Mn	Cu	Pb	Zn	Cd	Hg	As	Se	Co	Cr	Mg	Ni	V	Mo	Sb	Bi	Ag	Cs	Ba	La	Pr	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Be	B	Al	Si	P	S	Cl	K	Ca	Mg	Na	Li	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Pb	Ag	Au	Ir	Rh	Pd	Os	As	Sb	Bi	Po	At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Be	B	Al	Si	P	S	Cl	K	Ca	Mg	Na	Li	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Pb	Ag	Au	Ir	Rh	Pd	Os	As	Sb	Bi	Po	At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Be	B	Al	Si	P	S	Cl	K	Ca	Mg	Na	Li	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Pb	Ag	Au	Ir	Rh	Pd	Os	As	Sb	Bi	Po	At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Be	B	Al	Si	P	S	Cl	K	Ca	Mg	Na	Li	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Pb	Ag	Au	Ir	Rh	Pd	Os	As	Sb	Bi	Po	At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Be	B	Al	Si	P	S	Cl	K	Ca	Mg	Na	Li	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Pb	Ag	Au	Ir	Rh	Pd	Os	As	Sb	Bi	Po	At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Be	B	Al	Si	P	S	Cl	K	Ca	Mg	Na	Li	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Pb	Ag	Au	Ir	Rh	Pd	Os	As	Sb	Bi	Po	At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Be	B	Al	Si	P	S	Cl	K	Ca	Mg	Na	Li	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Pb	Ag	Au	Ir	Rh	Pd	Os	As	Sb	Bi	Po	At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Be	B	Al	Si	P	S	Cl	K	Ca	Mg	Na	Li	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Pb	Ag	Au	Ir	Rh	Pd	Os	As	Sb	Bi	Po	At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Be	B	Al	Si	P	S	Cl	K	Ca	Mg	Na	Li	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Pb	Ag	Au	Ir	Rh	Pd	Os	As	Sb	Bi	Po	At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Be	B	Al	Si	P	S	Cl	K	Ca	Mg	Na	Li	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Pb	Ag	Au	Ir	Rh	Pd	Os	As	Sb	Bi

107 Stations

- 55 'Bay'
- 52 'Canal'

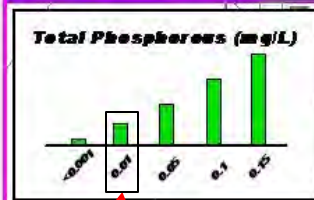
- Frequency:
 - Monthly
 - Bimonthly
 - Quarterly
 - Semi-annual
 - Annual
- 35+ parameters

- 35+ parameters

Miami-Dade County DERM Surface Water Quality Monitoring Program

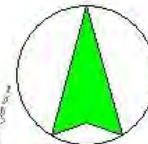
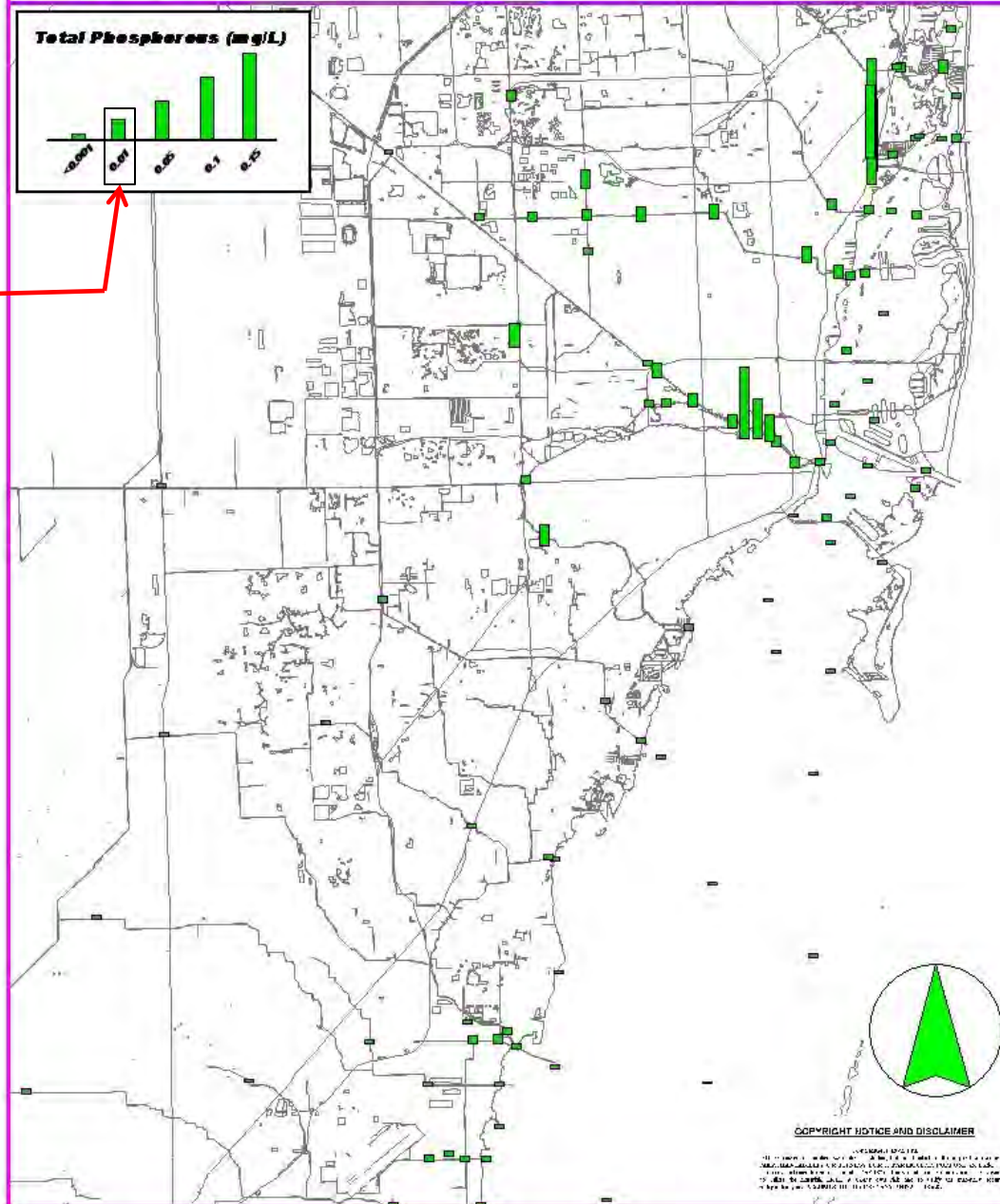


Median Phosphorous (mg/L) 1988-2008



★ 10 ppb

Phosphorus is
limiting nutrient for
Biscayne Bay



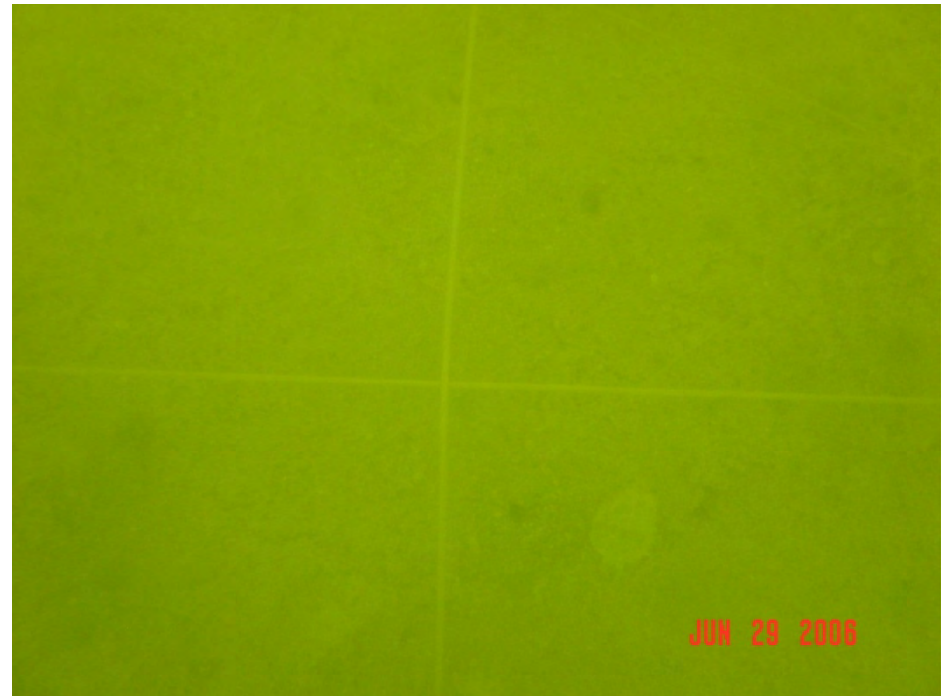
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PATTERNS and TRENDS: Biscayne Bay is a highly oligotrophic, naturally clear system supporting a healthy seagrass community



Long term monitoring played a crucial role in documenting a phytoplankton bloom of unprecedented magnitude and duration from late 2005 through 2008.



Biscayne Bay, Barnes Sound, Manatee Bay Algal Bloom Response To Total P increase

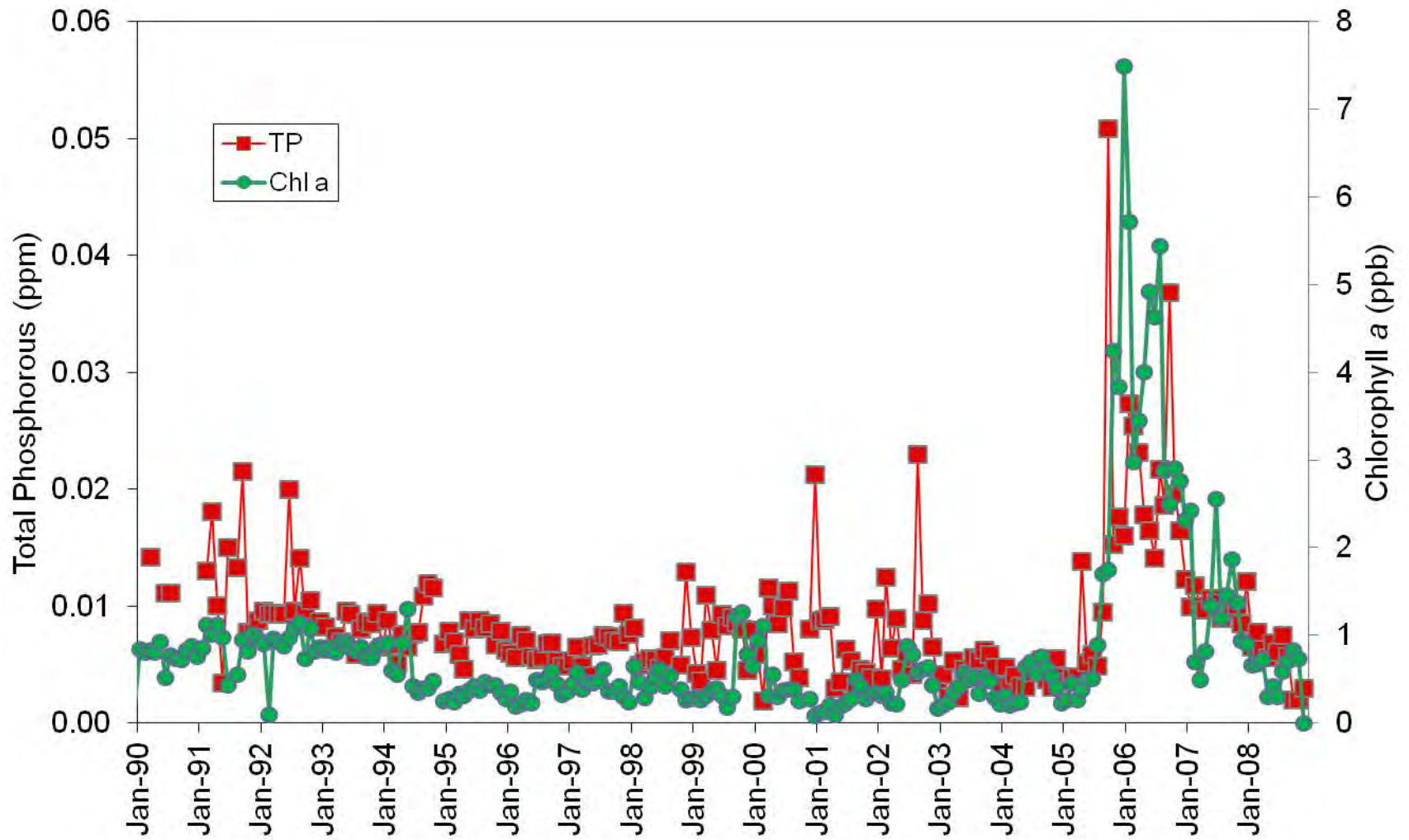
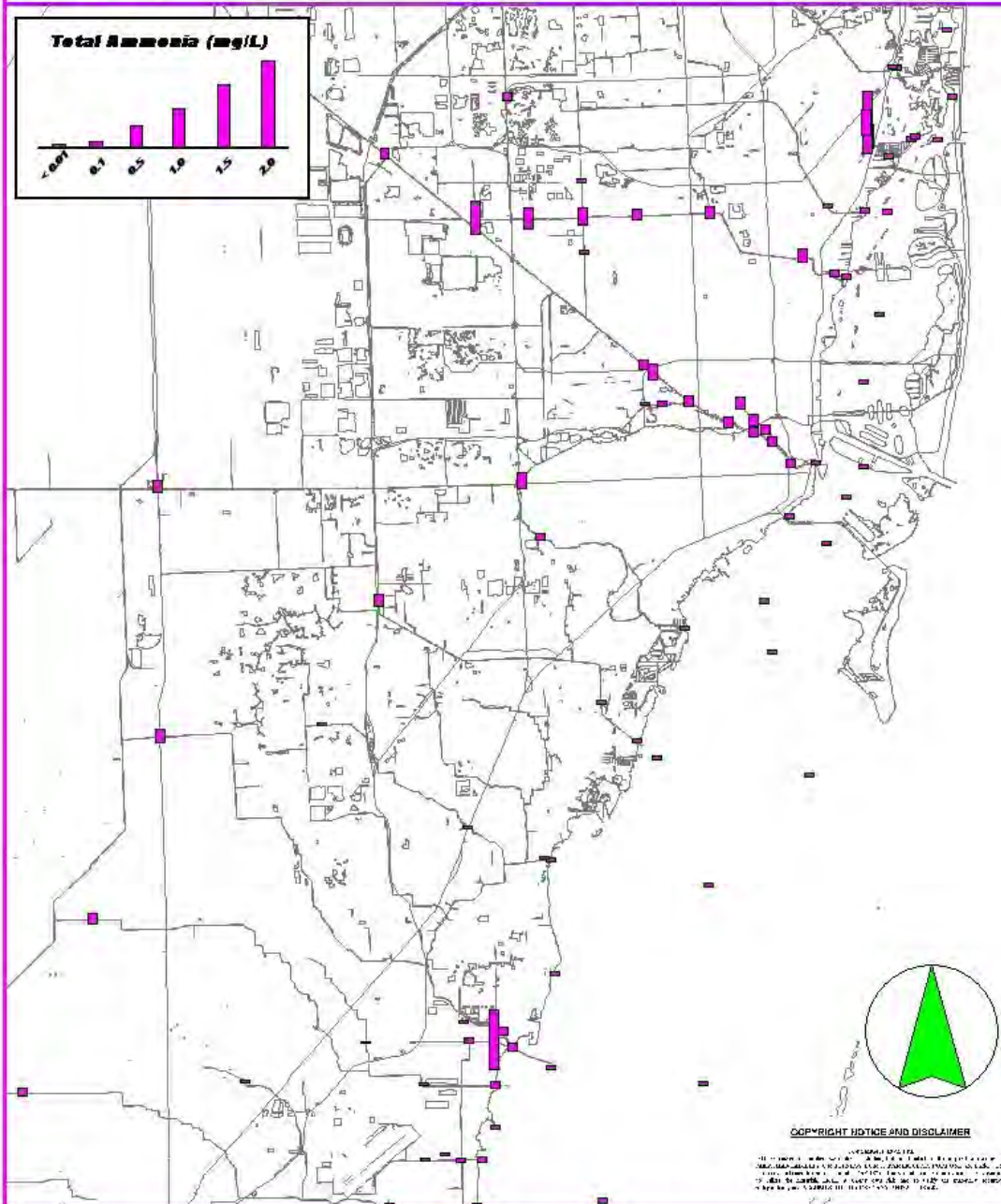


Chart courtesy of C. Kelble (NOAA), using aggregated NOAA, M-D DERM and FIU datasets



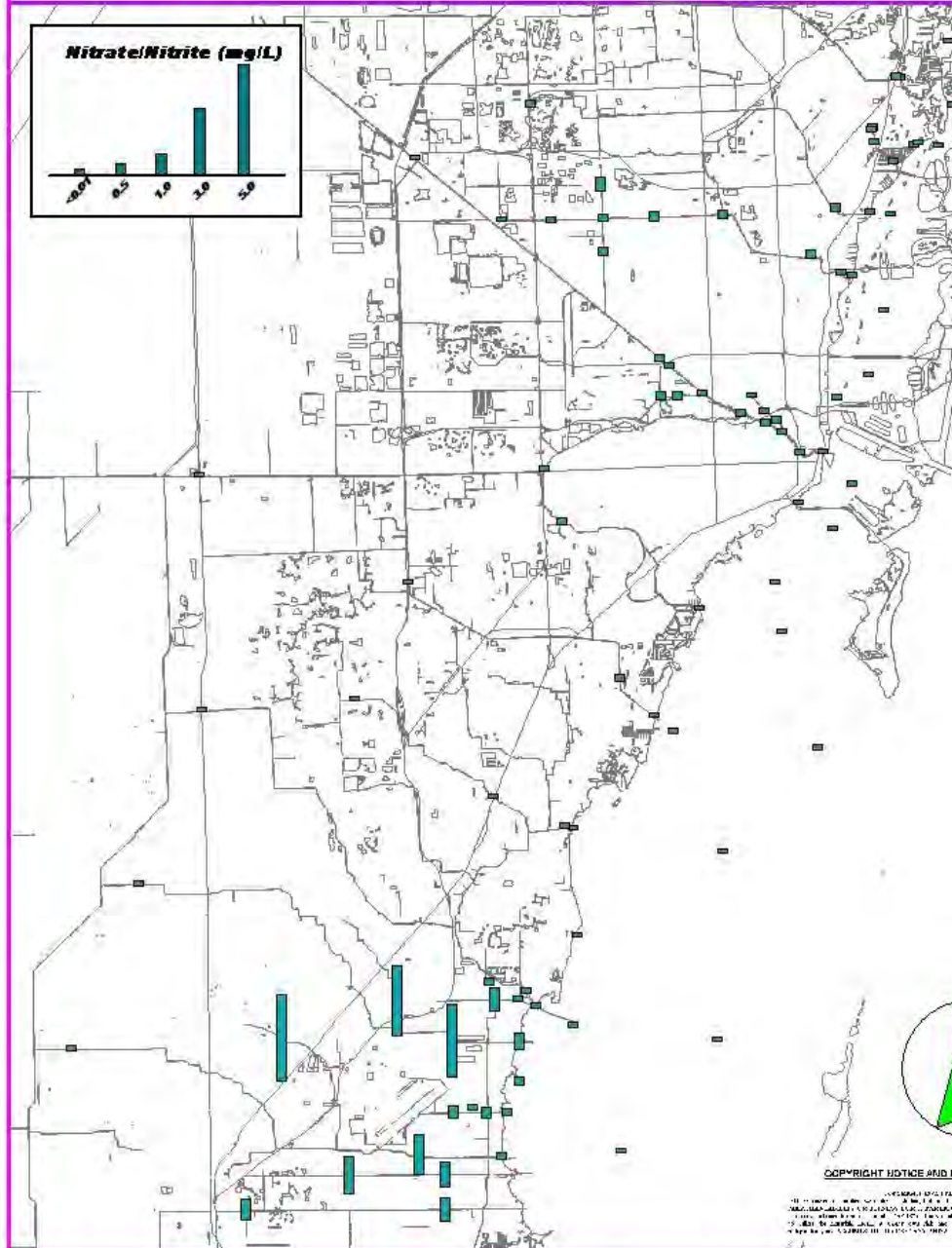
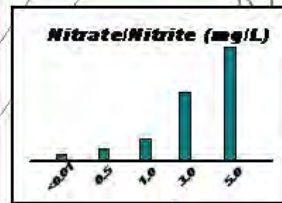
Median Ammonia (mg/L) 1988-2008



Miami-Dade County DERM Surface Water Quality Monitoring Program



Median Nitrate/Nitrite (mg/L) 1988-2008



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Canals: Water Quality not as good as the Bay, but only 1 impaired for nutrients

Canal and coastal wetlands in south Biscayne Bay



Little River

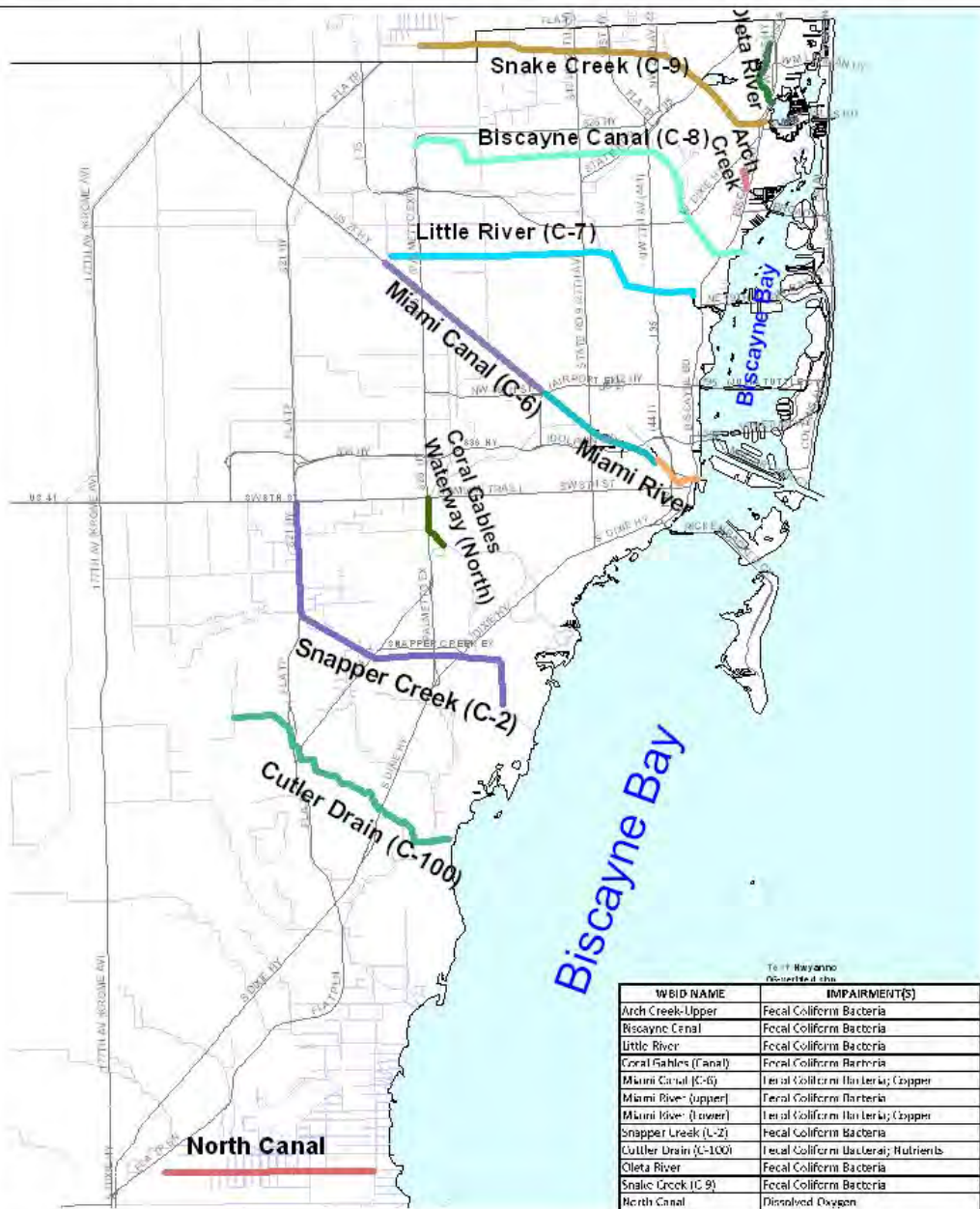


C-100 (Cutler Drain)



C-100 (Cutler Drain)

Miami-Dade County Verified Impaired Water Body Segments (WBIDs) as of June 2010.

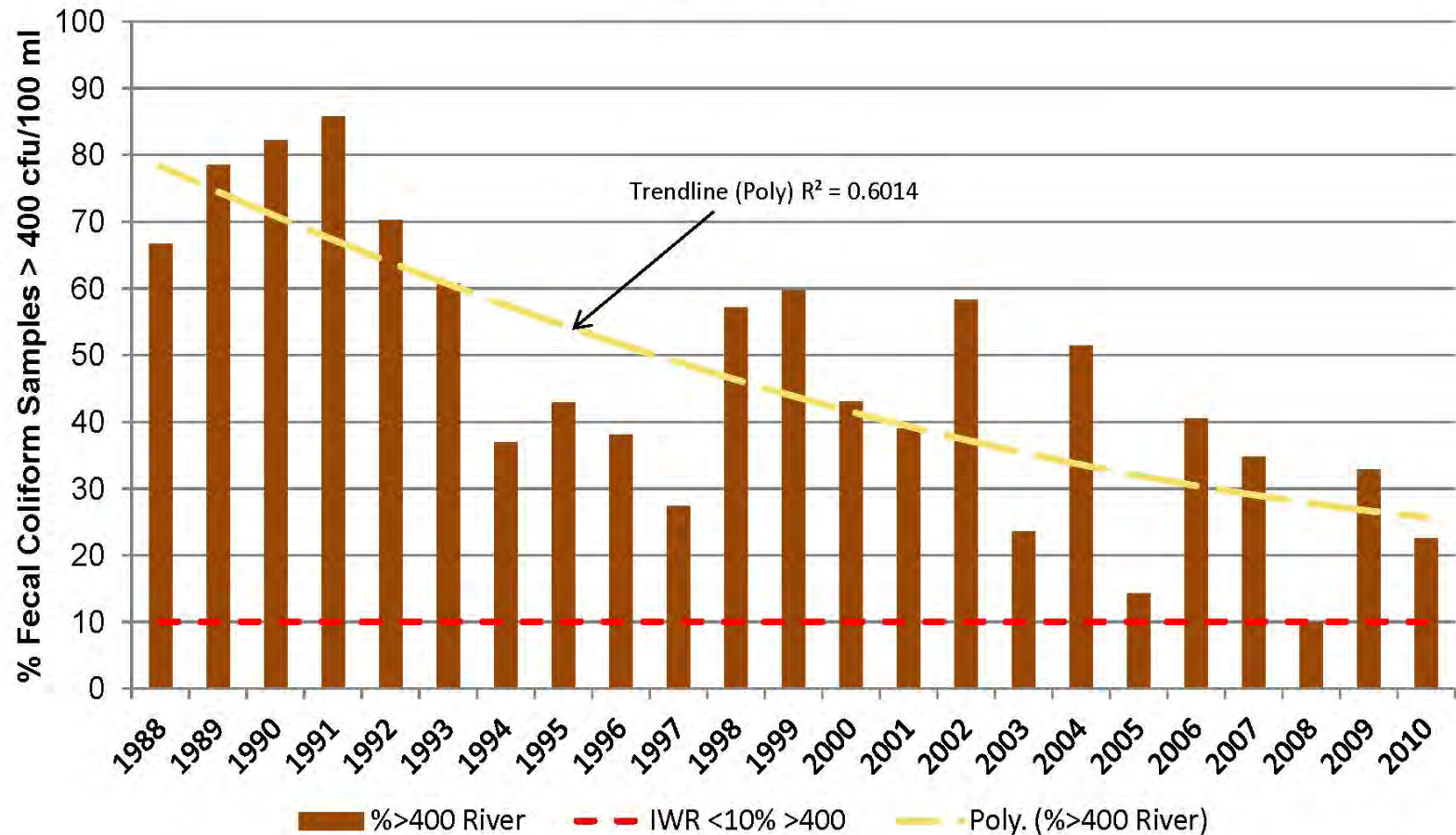


- All canal segments shown are impaired for fecal coliform
- Cutler Drain (C-100) impaired for nutrients
- Miami Canal and lower Miami River impaired for Copper
- Biscayne Bay and other adjoining tidal waters not impaired based upon surface water quality data

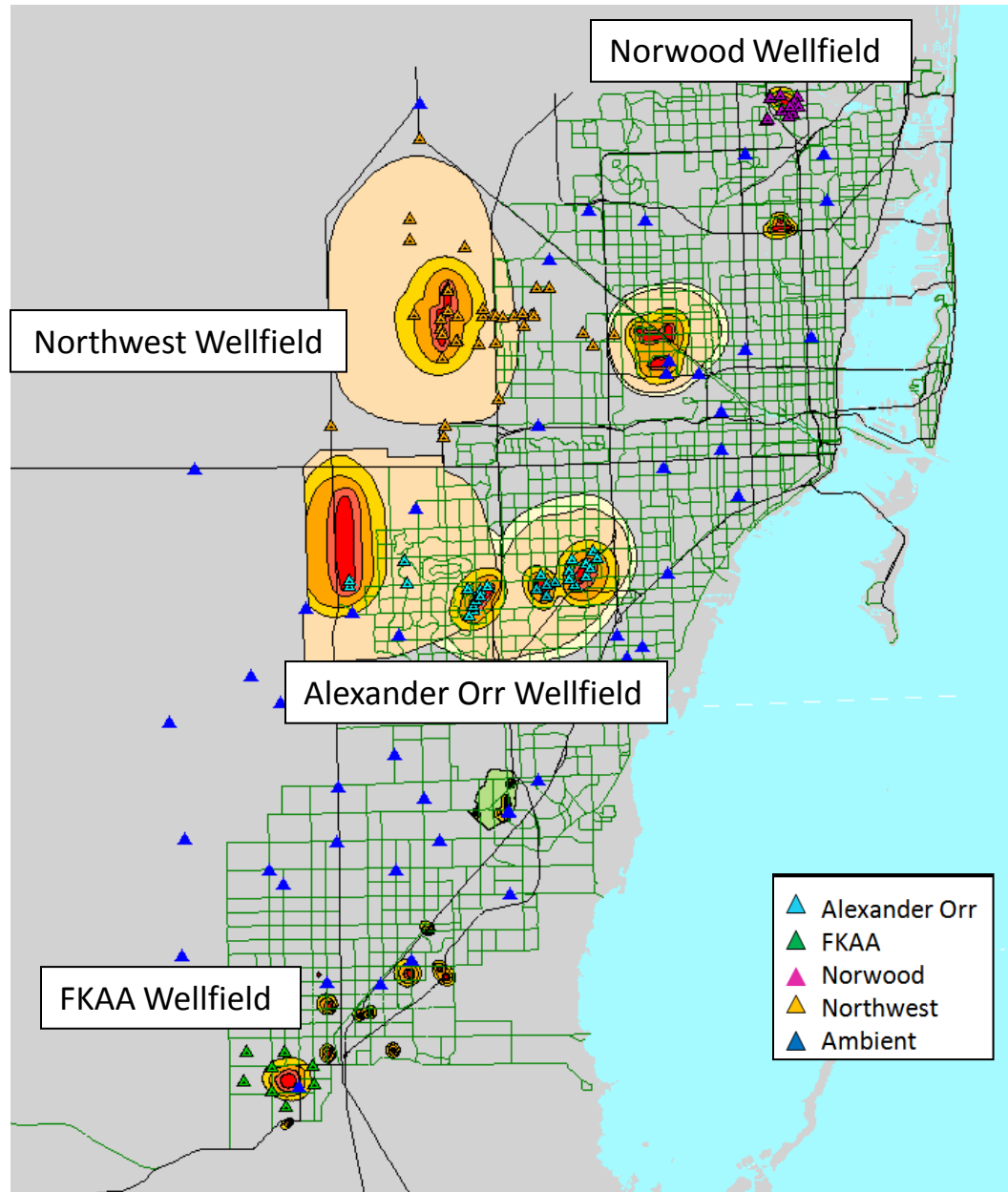
Miami River Fecal Coliform Samples

Annual % > 400 cfu/100ml

(1988 - 2010)



WELLFIELD GROUNDWATER MONITORING PROGRAM



Norwood:

- Sampling began in 2000
- Currently 21 wells sampled 3x a year

Northwest Wellfield:

- Sampling began in 1986
- Currently 28 wells sampled 3x a year

Alexander Orr Wellfield (includes West Wellfield, SW Wellfield, Snapper Creek and Alexander Orr):

- Sampling began in 1990 (West Wellfield)
- Currently 58 wells sampled 3x a year

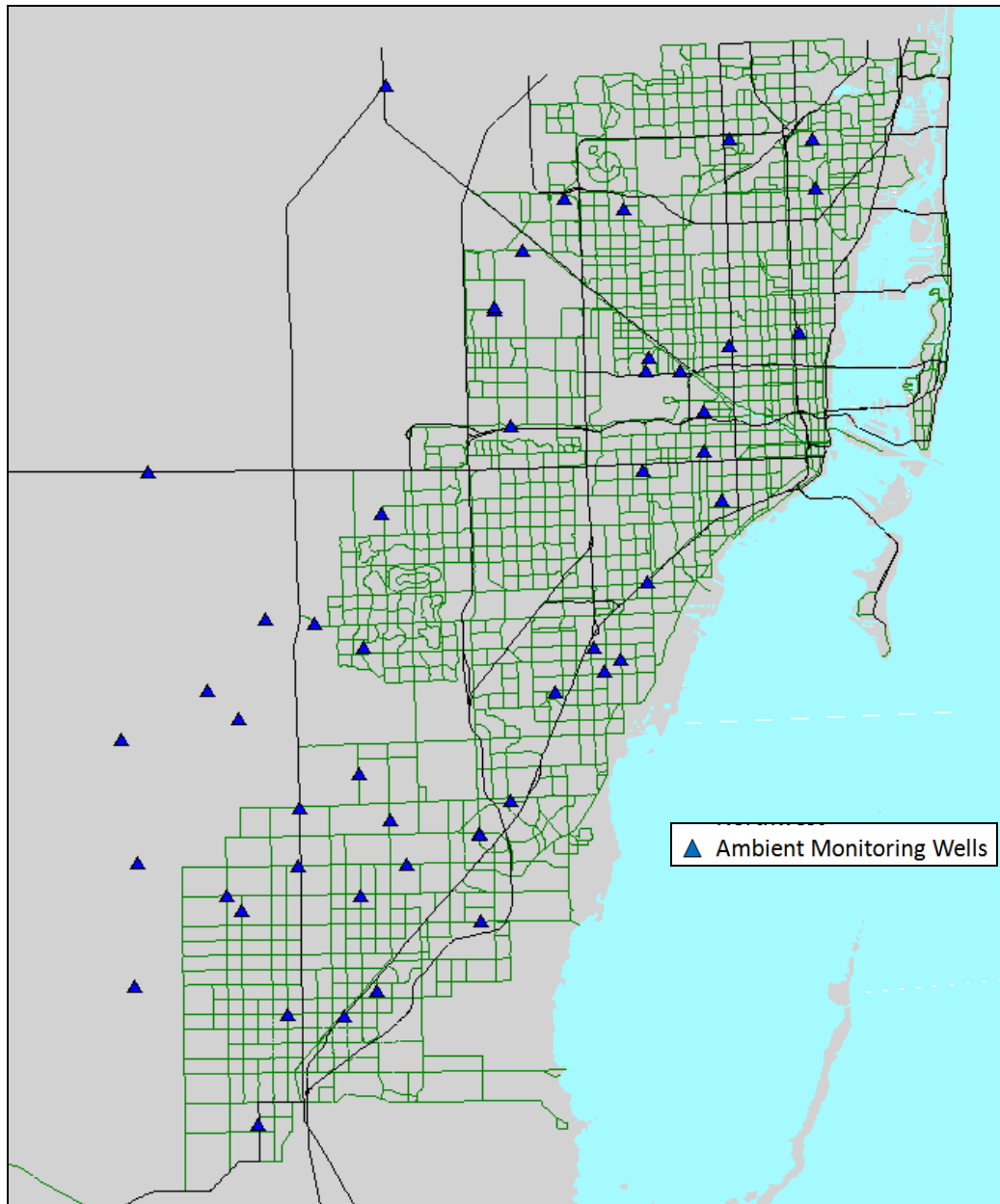
FKAA Wellfield:

- Sampling began in 2009
- Currently 25 wells sampled 2x a year

Northwest Lake Belt:

- Sampling began in 1999
- Currently 16 sites (GW & SW) sampled 4x a year

AMBIENT GROUNDWATER MONITORING PROGRAM



- Began in 1981 using existing USGS wells, continued until 1985
- Reinstated in 1989 to complement FDEP's Ambient Groundwater Monitoring Program sampling, began in 1987
- Established baseline water quality data and monitors for water quality degradation
- 70 well sites historically, 47 currently sampled biannually

Wellfield and Ambient Groundwater Program sampling parameters include:

Pesticides (chlorinated, organophosphorous, carbamate, triazines)

Chlorinated Herbicides

Nutrients (nitrogen, phosphorus, ammonia, etc.)

Semivolatiles

Volatiles

Glyphosate

Coliform bacteria

Cations

Chloride

Color

Cyanide

Fluoride

Hardness

Phenols

Total dissolved solids

Turbidity

Metals (Al, As, Ag, Ba, Cd, Cr, Cr⁶⁺, Cu, Fe, Hg, Mn, Ni, Pb, Zn)

Selenium

*Northwest Lake Belt sampling includes MPA, cryptosporidium and giardia.

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Using the site
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PROVISIONAL DATA
[Data Collection](#)
[USGS Terminology](#)
Data access options
[Real-time monitoring](#)
[Real-time conditions \(de-trended\)](#)
[Real-time conditions \(without trend removal\)](#)
Non-realtime monitoring
[End-of-month conditions \(de-trended\)](#)
[End-of-month conditions \(without trend removal\)](#)

Periodic Measurements
[Periodic water level measurements](#)
[Salinity and chloride samples](#)

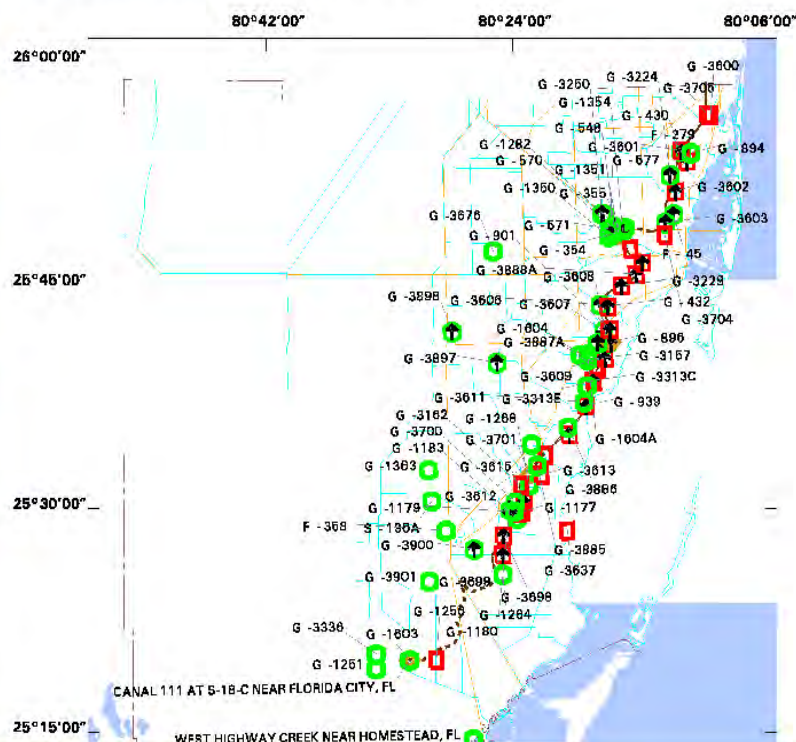
Data from Other Agencies
[Florida Keys Aqueduct Authority](#)
Geographic areas
[Broward County](#)
[Collier County](#)
[Lee County](#)
[Miami-Dade County](#)
[Palm Beach County](#)
[Within Broward County](#)

Salinity and Chloride Data, Sites in Miami-Dade County, Florida, Florida

Site status is calculated based on the latest chloride concentration and the rate of change in recent concentrations.

[Summary of Conditions](#)

PROVISIONAL DRAFT -- Subject to Revision



Internet

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Salinity and chloride measurements in southern Florida

Florida Water Science Center	Real-time conditions (de-trended data)	Real-time conditions (standard data)	End-of-month conditions (de-trended data)	End-of-month conditions (standard data)	Periodic measurements (standard data)	Salinity and Chloride Data
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All data presented on this site are considered to be [PROVISIONAL DATA](#) and subject to revision pending further review.

Miami-Dade County, Florida Sites Reporting as of August 28, 2012

(--, Data not available; referenced concentrations, in mg/l as chloride, have been measured during on-site inspections; maximum and minimum values refer to data collected since the 1986 water year, and prior to the current water year.)

Station Name	USGS Site ID	Chloride concentration	Date and Time	Minimum	Maximum
				(for month of August, for the period of record)	
G -3676	USGS 254720080253002	66	1998-DEC-18 11:00	66	66
F - 279	USGS 255315080111501	3,400	2010-APR-21 16:32	990	3,600
F - 358	USGS 252829080285101	36	2009-JAN-13 11:00	36	36
F - 45	USGS 254943080121501	90	2010-MAY-07 07:59	56	245
G -1009B	USGS 254106080174601	62	2010-MAY-06 12:52	17	90
G -1179	USGS 252944080233401	2,150	2010-APR-06 12:48	23	5,400
G -1180	USGS 252947080235301	35	2010-MAY-06 10:05	9	78
G -1282	USGS 254940080172001	62	1998-APR-27 14:55	41	66
G -1351	USGS 254813080161501	510	2010-APR-16 10:30	24	1,950
G -1354	USGS 254833080155801	47	2010-APR-14 12:55	44	1,300
G -1363	USGS 253233080301001	125	1990-OCT-17	24	125
G -1603	USGS 251949080313102	520	1997-OCT-23 10:30	28	8,900
G -1256	USGS 251952080293401	6,500	1998-OCT-01 11:10	2,400	7,400
G -3336	USGS 252007080335701	42	1995-APR-24 11:20	28	62
G -1264	USGS 252532080244301	64	1997-AUG-22 08:30	30	180
G -1177	USGS 252945080231801	3,600	1996-AUG-30 10:00	3,600	4,500
G -1604	USGS 254019080190201	50	1996-JAN-11 09:44	22	104
G - 576	USGS 254849080154802	12	1996-SEP-27 12:15	10	370

Helicopter Electromagnetic Survey of the Model Land Area, Southeastern Miami-Dade County, Florida

By David V. Fitterman, Maria Deszcz-Pan, and Scott T. Prinos

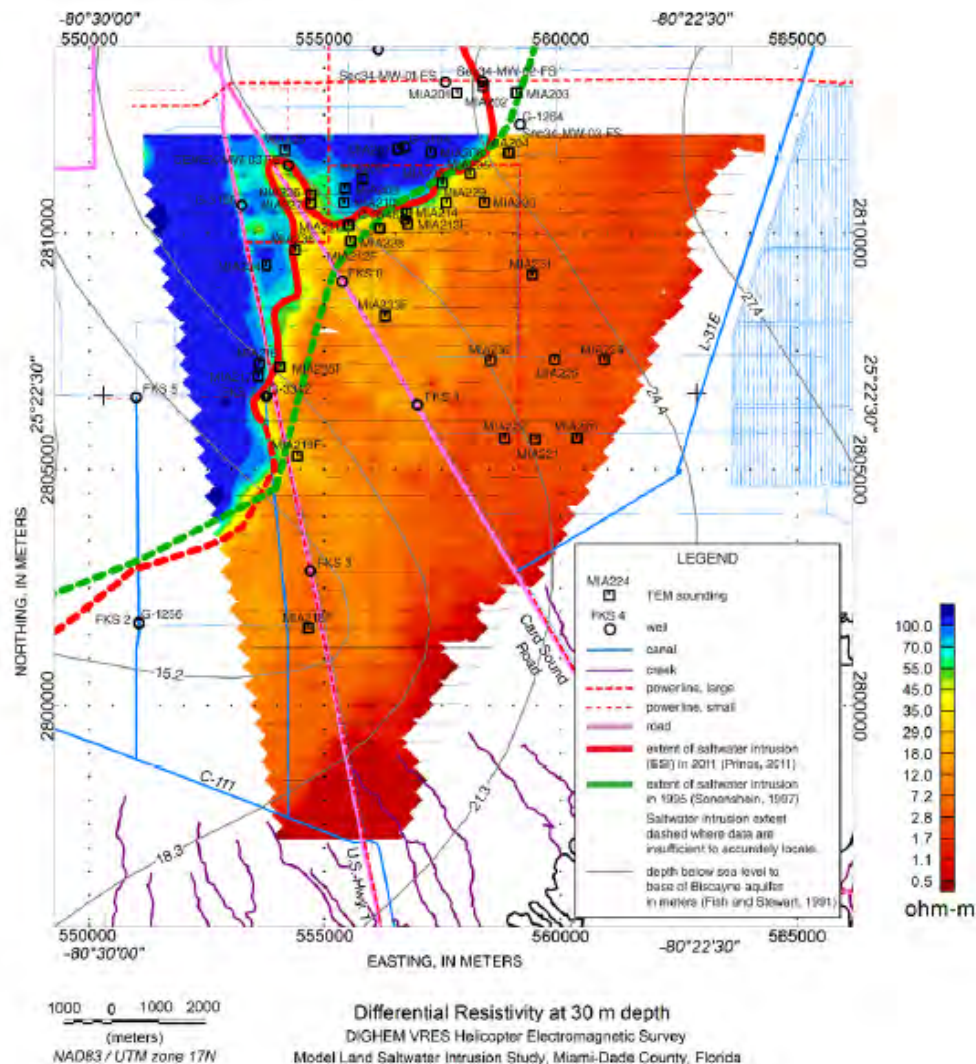


Figure 16. Model Land 30-meter depth differential resistivity depth-slice map.

Miami-Dade Surface Water Monitoring Program data available through STORET, DBHYDRO, and upon request from the Restoration & Enhancement Section, Division of the Department of Regulatory & Economic Resources Department.

Contact Steve Blair :

305-372-6853 or blairs@miamidade.gov

Miami-Dade Ambient and Wellfield Program groundwater data available upon request through the Environmental Monitoring & Restoration Division of the Department of Regulatory & Economic Resources Department.

Contact:

305-372-6700 or DERMPCD@miamidade.gov