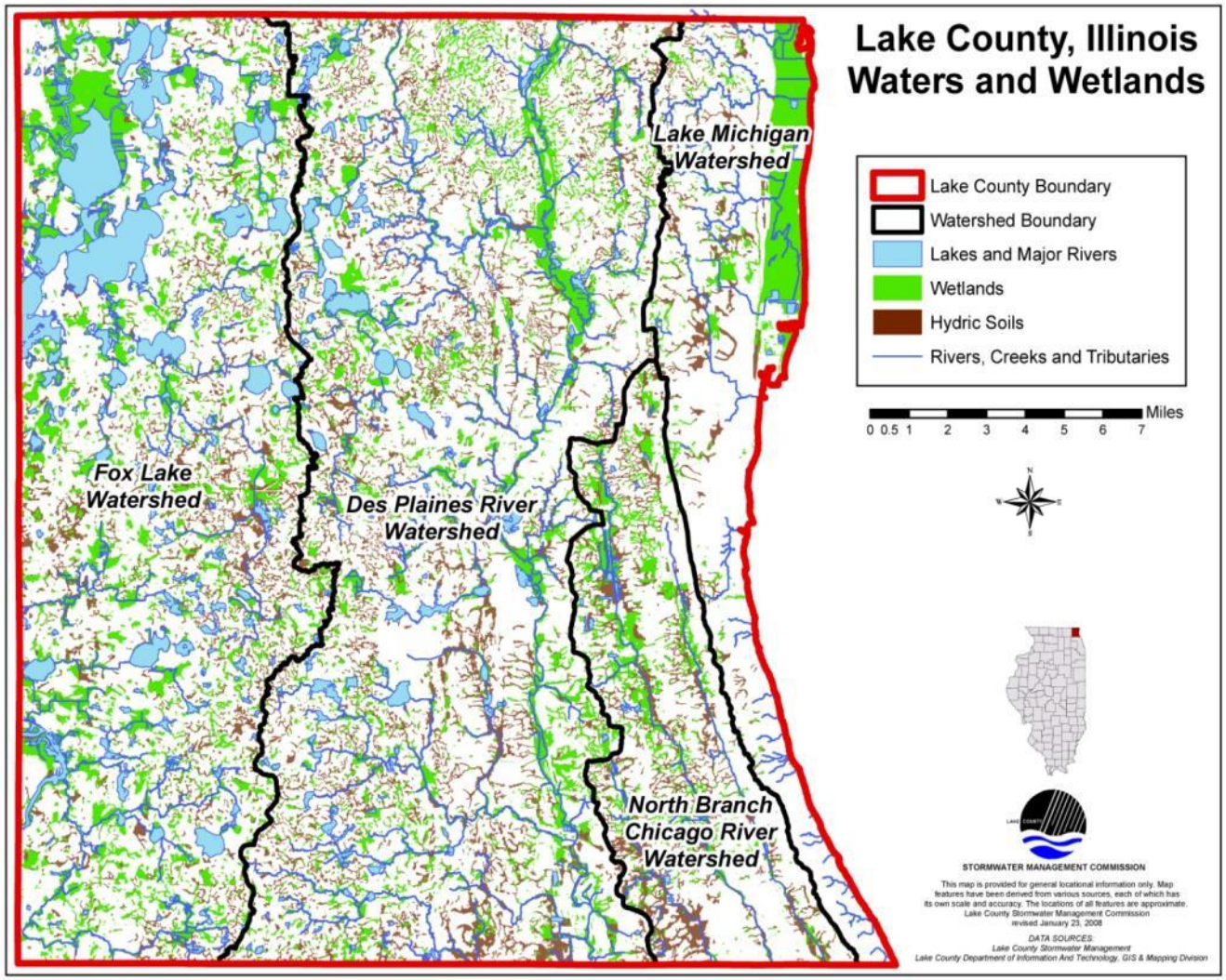
Lake County Stormwater Management Commission's Study of Post-Development Isolated Waters of Lake County, Illinois

Application of the 80% - 150% Wetland Hydrology Design Criteria

IAFSM
March 2013

Background



~21% of County = waters and wetlands (61,500 acres)

~ 11% (7,000 acres) = *"Isolated Waters of Lake County" (IWLC)*

Most of County has slowly permeable soils (Hydro Group C)

STORMWATER MANAGEMENT COMMISSION

Background

- **Developed by Independent Technical Advisory Committee (TAC)**
- **Amended August 2001 to include *isolated wetland* regulations after Supreme Court SWANCC Ruling**
- **Sets minimum county-wide standards for development:**
  - Floodplain
  - Floodway
  - Detention
  - ***Wetlands***
  - Buffers
  - Erosion Control

WDO Wetland Hydrology Requirement ("80-150 Rule")

"The development design shall maintain between 80% and 150% of the existing condition, 2-year, 24-hour storm event runoff volume from the onsite tributary drainage area to the preserved Isolated Waters of Lake County."

(WDO Article IV.E.6)

WDO Wetland Hydrology Requirement ("80-150 Rule")

"The development design shall maintain between **80% and 150%** of the existing condition, 2-year, 24-hour storm event runoff volume from the onsite tributary drainage area to the preserved Isolated Waters of Lake County."

(WDO Article IV.E.6)

WDO Wetland Hydrology Requirement ("80-150 Rule")

"The development design shall maintain between 80% and 150% of the existing condition, **2-year, 24-hour** storm event **runoff volume** from the onsite tributary drainage area to the preserved Isolated Waters of Lake County."

(WDO Article IV.E.6)

WDO Wetland Hydrology Requirement ("80-150 Rule")

"The development design shall maintain between 80% and 150% of the existing condition, 2-year, 24-hour storm event runoff volume from the **onsite tributary** drainage area to the preserved Isolated Waters of Lake County."

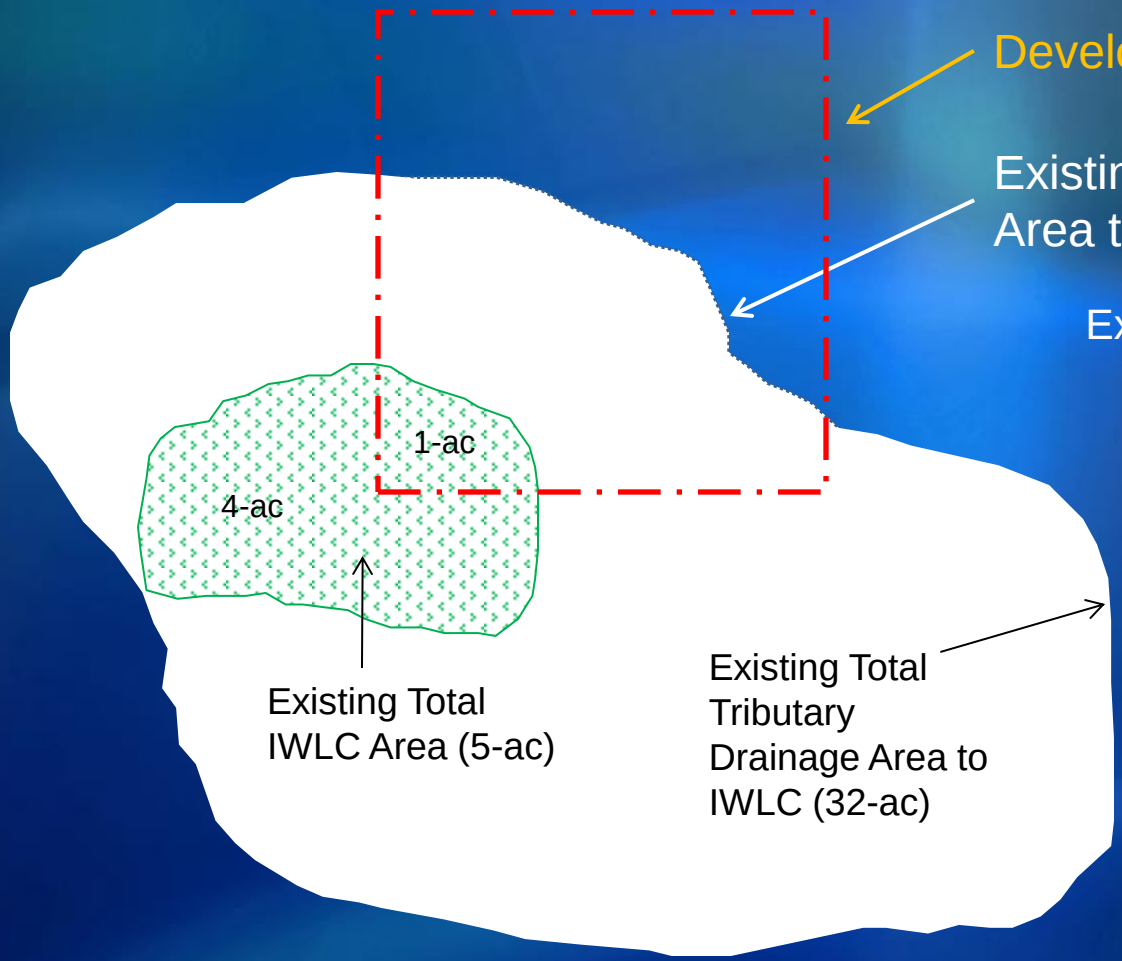
(WDO Article IV.E.6)

WDO Wetland Hydrology Requirement ("80-150 Rule")

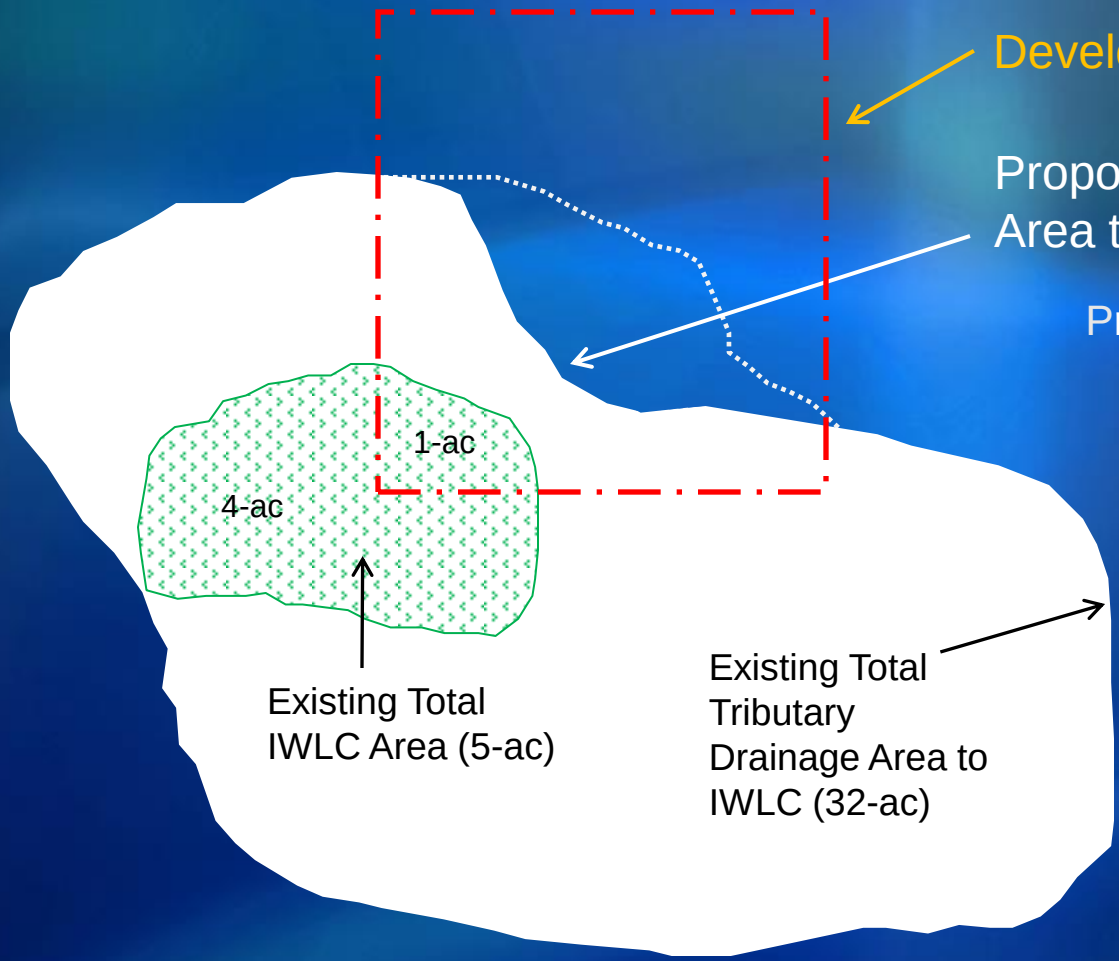
"The development design shall maintain between 80% and 150% of the existing condition, 2-year, 24-hour storm event runoff volume from the onsite tributary drainage area to the **preserved Isolated Waters of Lake County**."

(WDO Article IV.E.6)

Design Example



Design Example



Development Site (15-ac)

Proposed On-Site Tributary Area to IWLC (4-ac)

Proposed CCN:

Scenario #1 - 86

Scenario #2 - 98

Design Example

Example Summary Table for 80-150 Wetland Hydrology Analysis									
Scenario	Existing Conditions				Proposed Conditions				Volume Change[4]
#	On-Site Trib Area (ac)	CCN [1]	Runoff [2] 2-yr, 24-hr (in)	Volume [3] 2-yr, 24-hr (ac-ft)	On-Site Trib Area (ac)	CCN [1]	Runoff [2] 2-yr, 24-hr (in)	Volume [3] 2-yr, 24-hr (ac-ft)	Proposed/Existing (%)
#1	8.00	74	0.79	0.53	4.00	86	1.50	0.50	94%
#2	8.00	74	0.79	0.53	4.00	98	2.57	0.86	162%

[1] Include worksheets showing how runoff composite curve number (CCN) was derived (NRCS TR-55, Tables 2-2a through 2d).

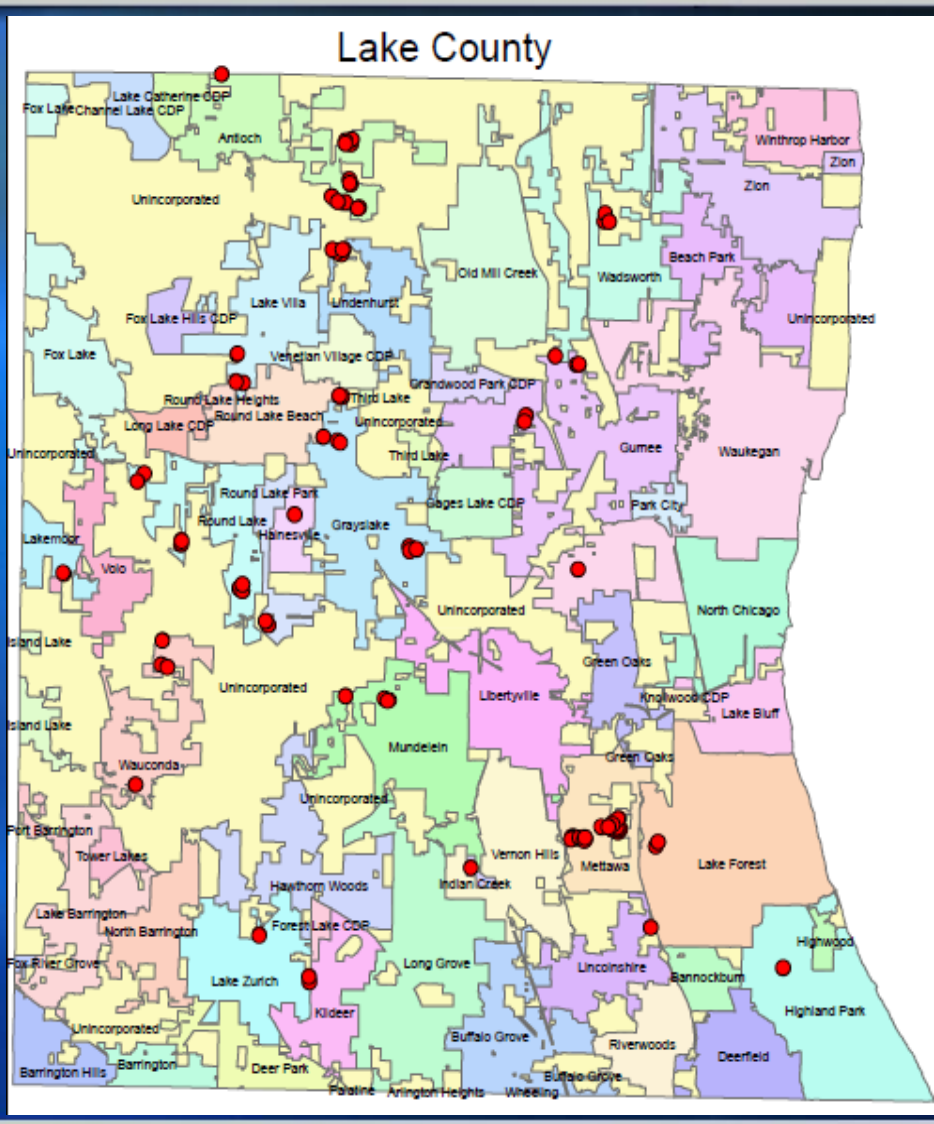
[2] Based on precipitation value of 2.80" for 2-yr, 24-hr storm event (from WDO, Appendix I).

[3] Volume (ac-ft) = Runoff Depth (in)/12 x Onsite Trib Area (ac). Include supporting calculations.

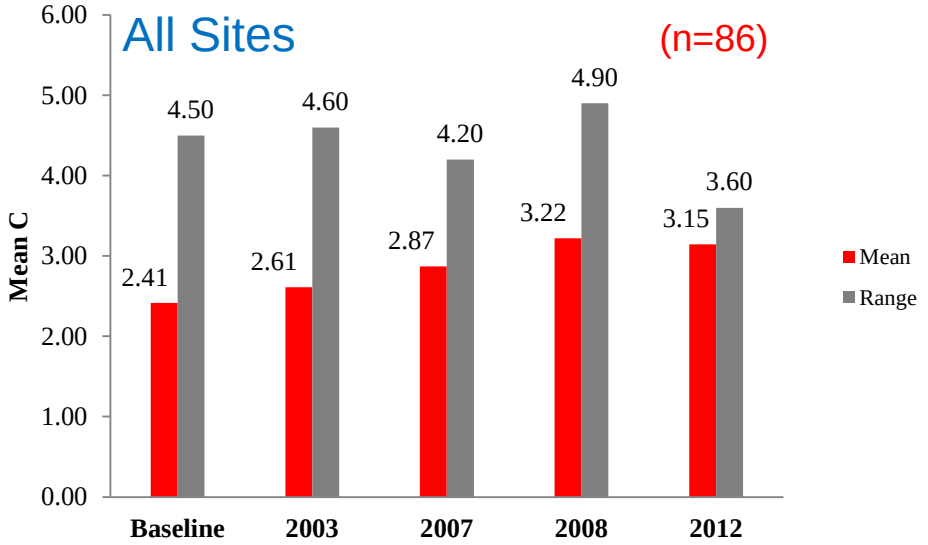
[4] Volume Change (%) = Proposed Volume (ac-ft) / Existing Volume (ac-ft).

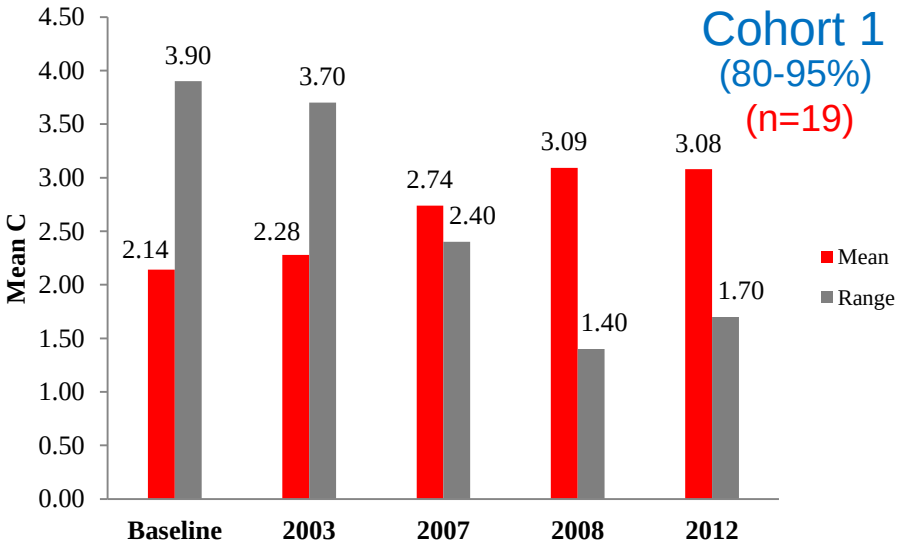
SMC Study

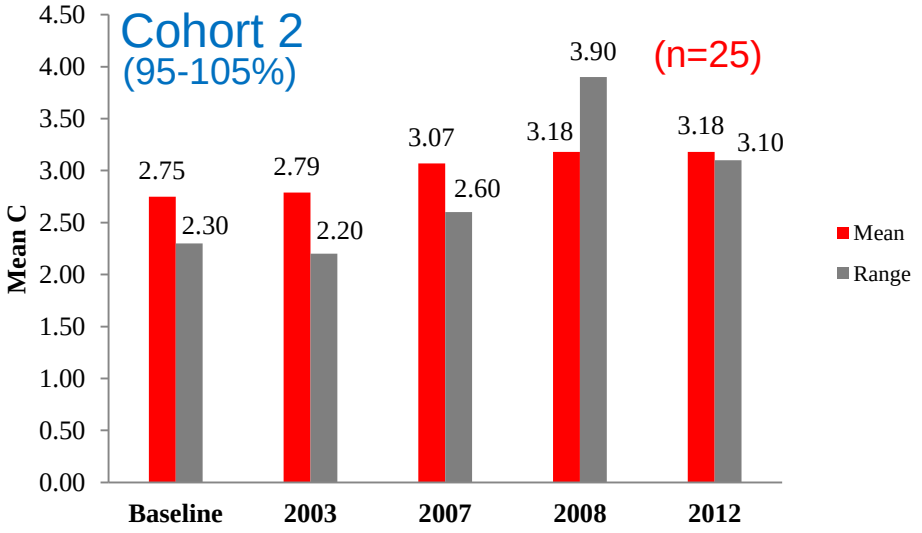
- **Purpose:**
  - Determine Effectiveness of WDO Wetland Hydrology Requirement
- **Method:**
  - Compared pre-and post-development data from 86 sites
  - Modeled hydrology:
    - Avg. 109.1, Range: 80-147.8%
- **Study Years:**
  - 2003, 2007, 2008, and 2012

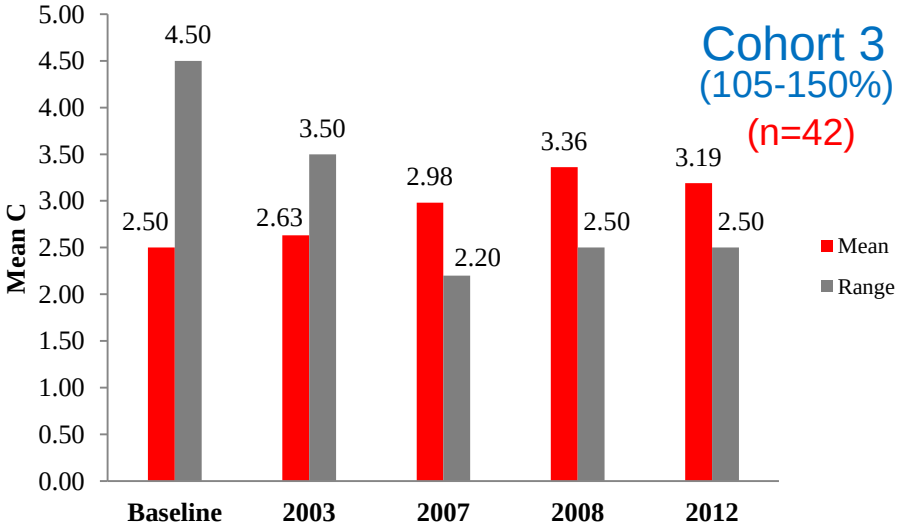


Results – Floristic Quality

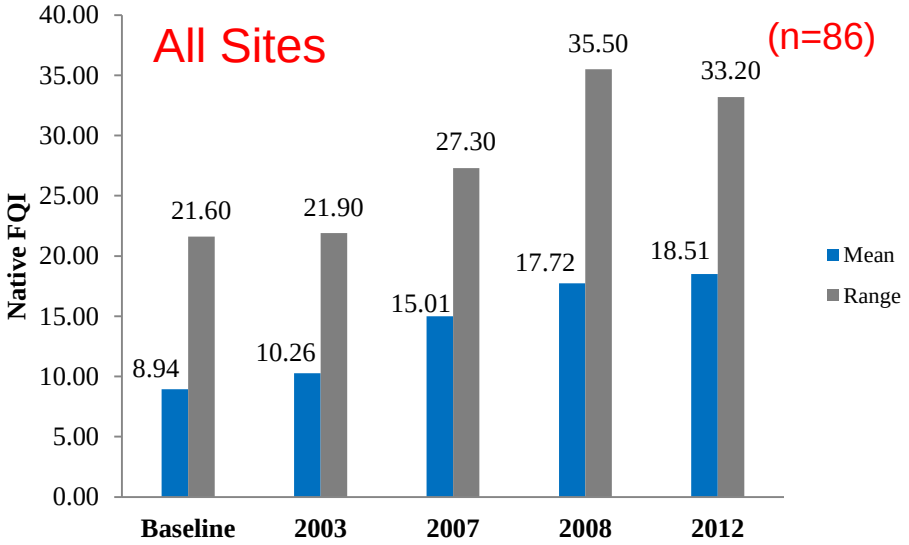


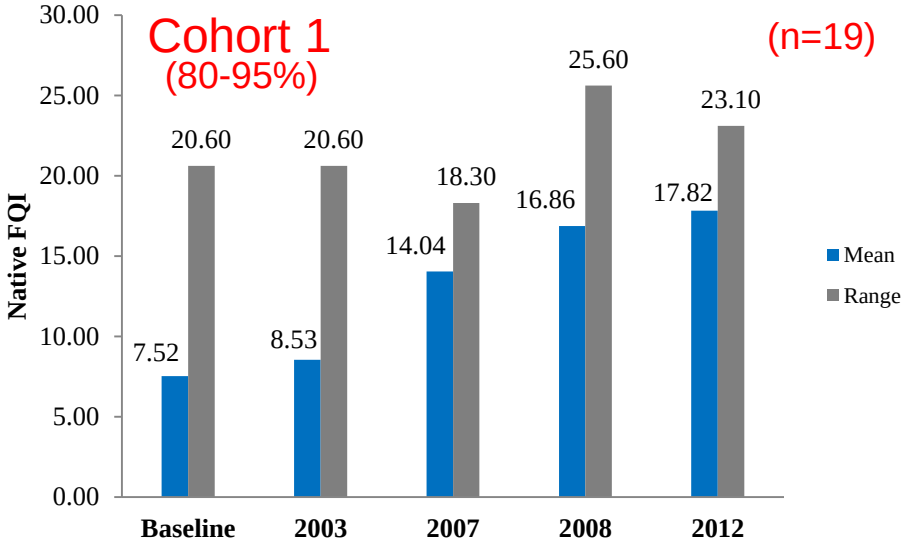


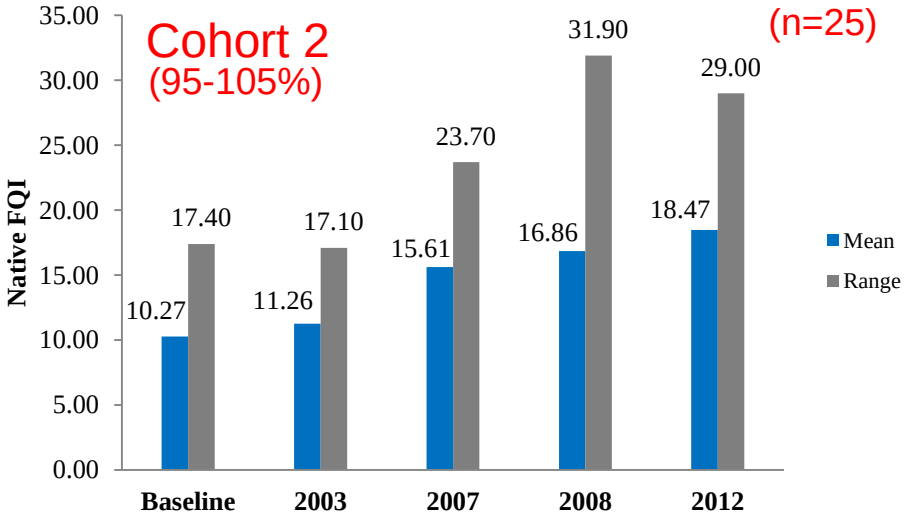


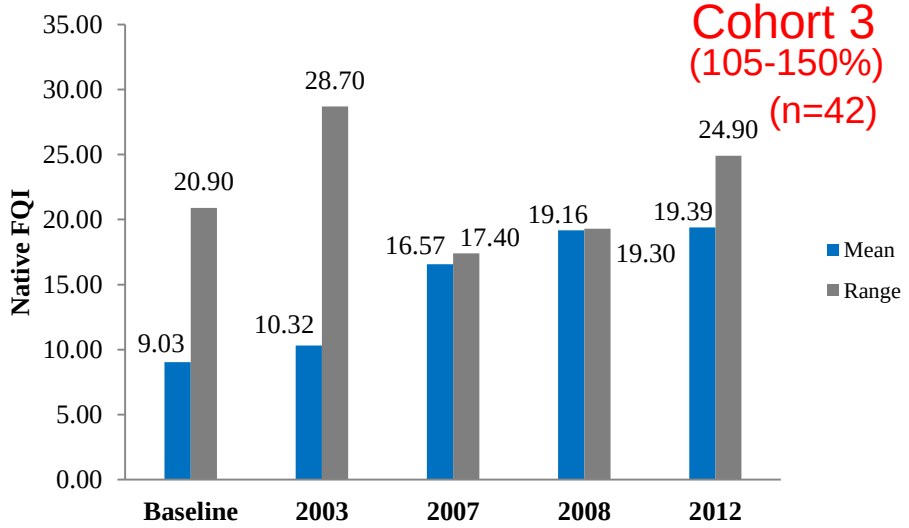


Results – Floristic Diversity

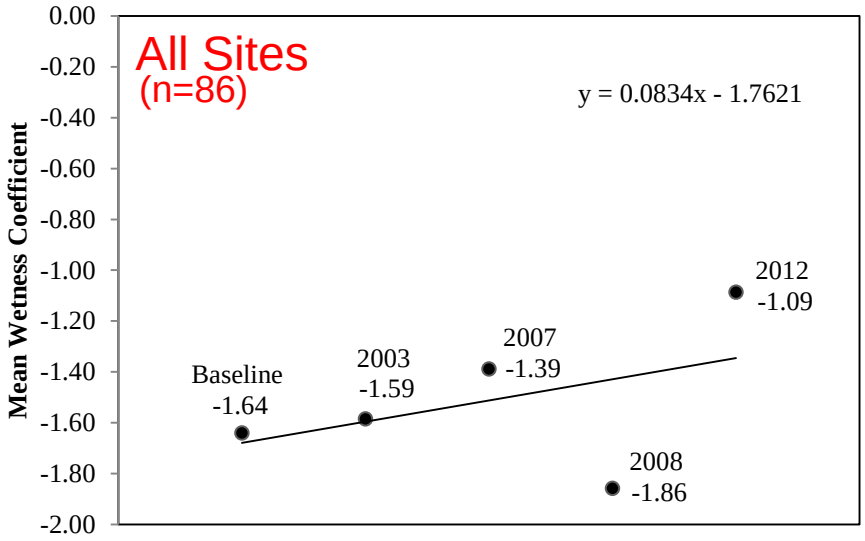


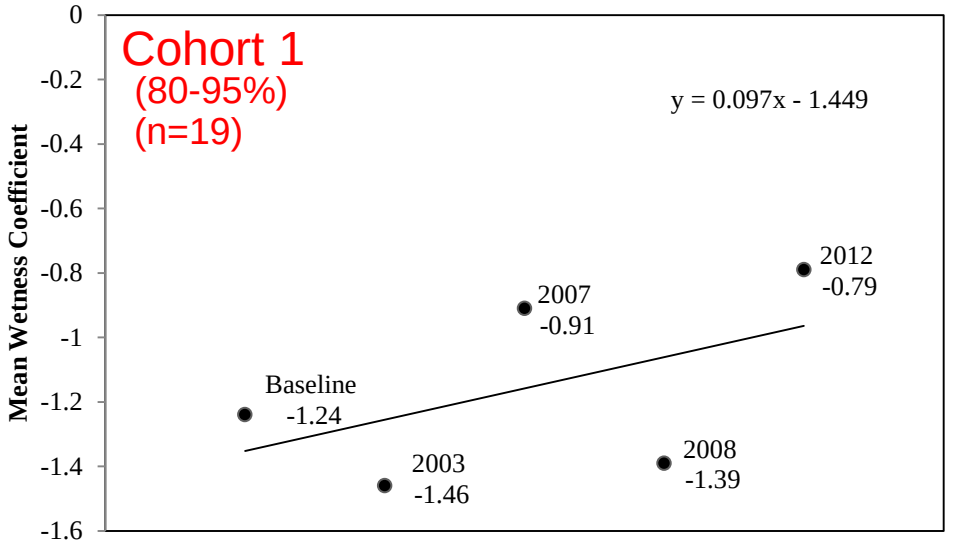


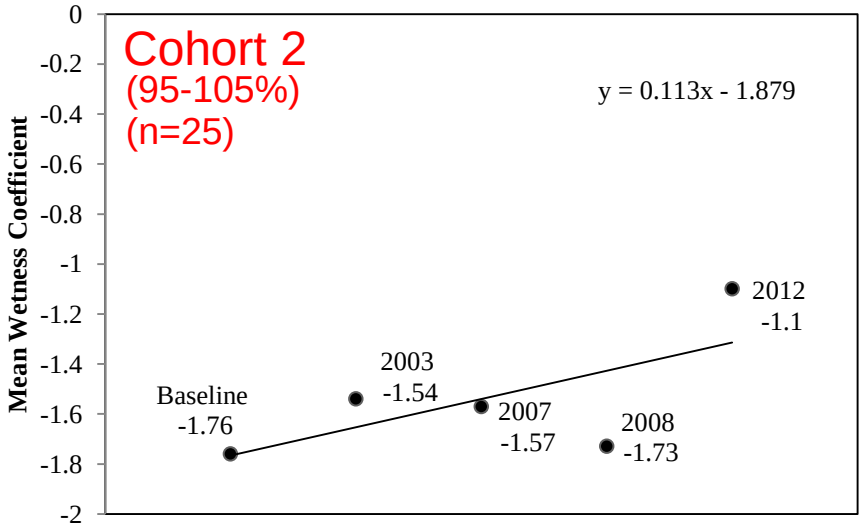


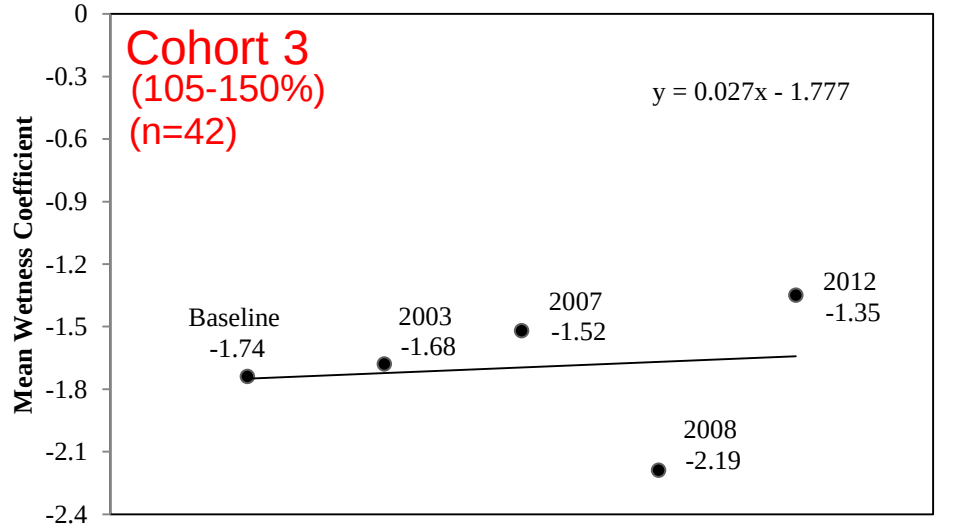


Results – Wetness (Mean W)

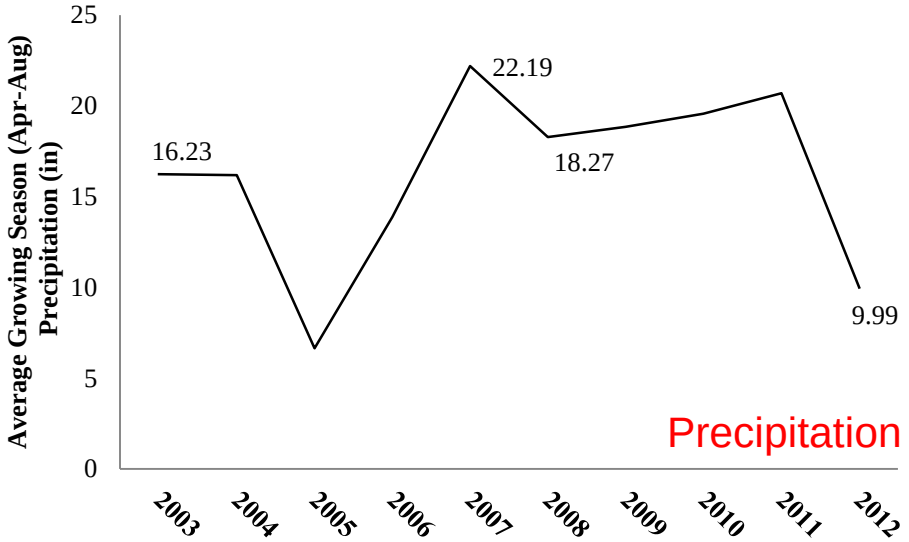


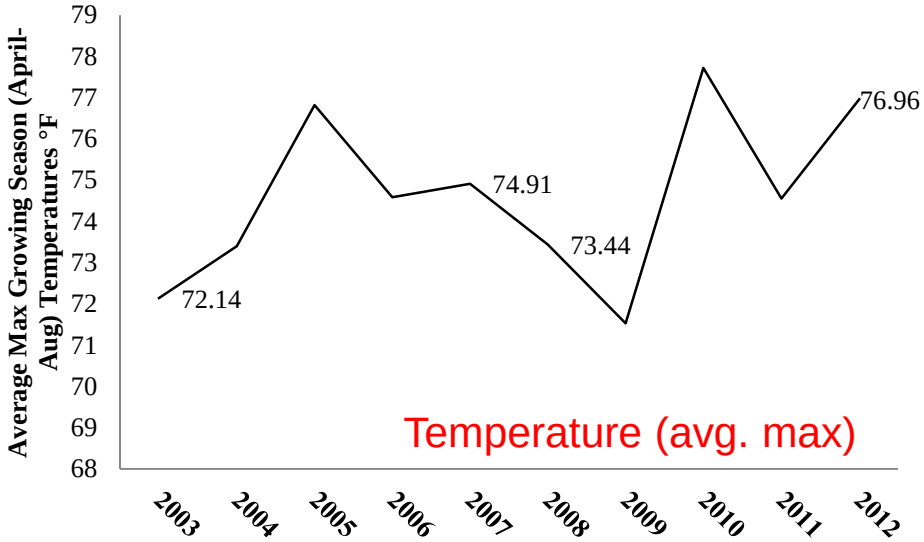


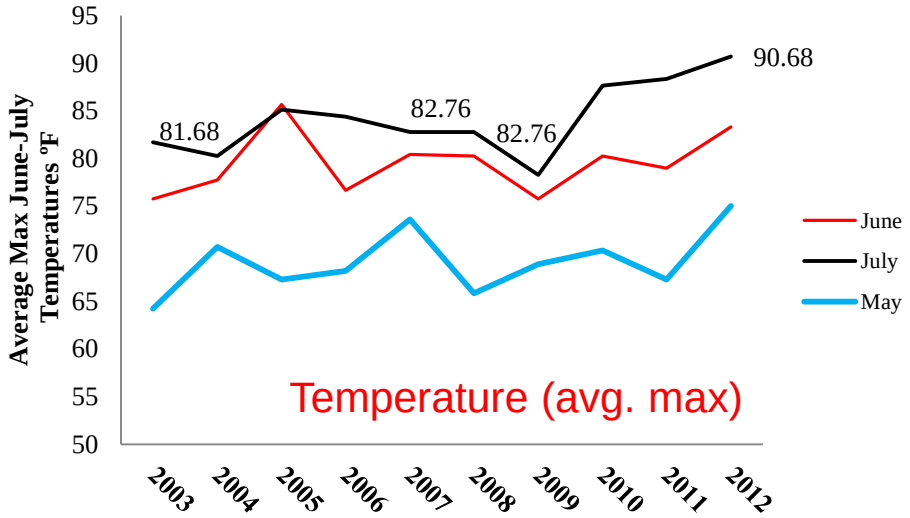




Results – Climate







Conclusions

- **Study confirms the efficacy of the WDO wetland hydrology requirement**
  - Floristic quality and diversity have improved, indicating the strength of these ecosystems
  - Floristic quality and diversity are stabilizing after 6-10 years — adjusting to post-development hydrology
  - IWLC are maintaining wetland hydrology (W= -1.09)
  - The 105-150% range appears to be most effective in maintaining overall wetland integrity
  - Wetland wetness appears to be consistent with design hydrology per cohort analysis

Questions?

- **Full Study Report Available:**

  http://www.lakecountyil.gov/Stormwater/Publications/

Juli E. Crane, PWS, CWS
Principal Wetland Specialist

Lake County SMC
500 W. Winchester Rd.
Libertyville, IL 60048

847-377-7700
jcrane@lakecountyil.gov