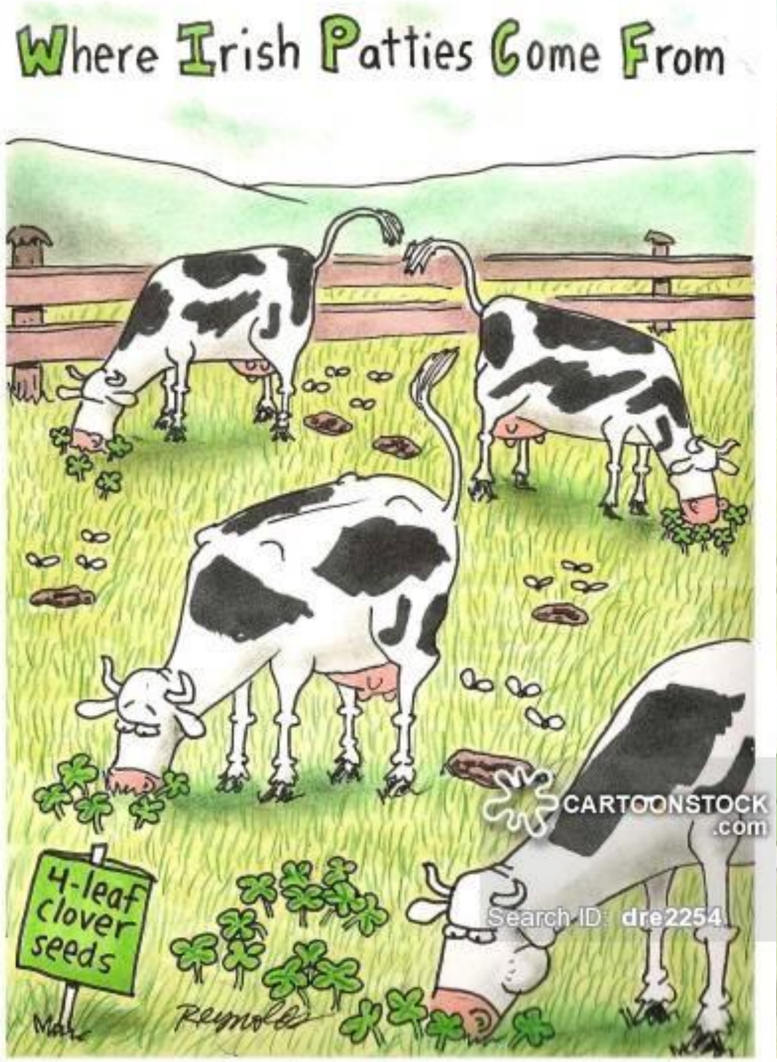

Celebrating St. Patick's Day ???
No, no... we're big Dr. Seuss fans.
GREEN and Ham
CARTOONSTOCK .com
Search ID: dre0308
Reynolds


Where Irish Patties Come From
4-leaf clover seeds
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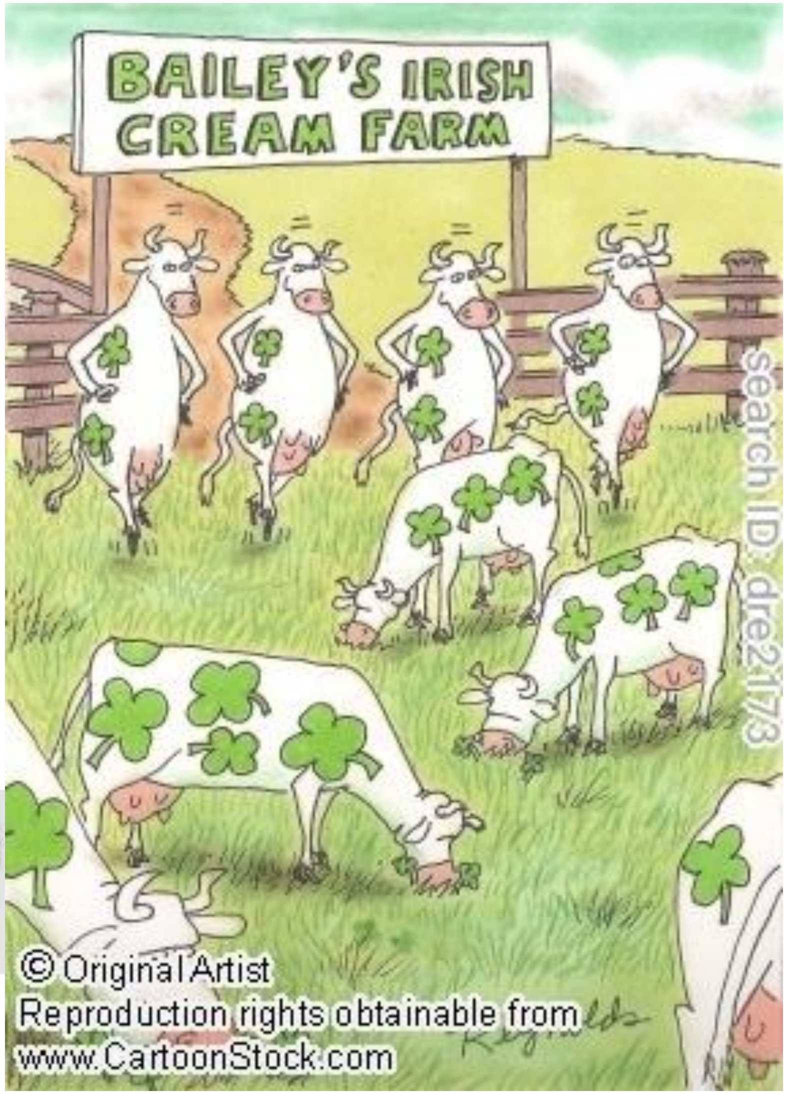
BAILEY'S IRISH CREAM FARM
search ID: dre2173
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# The Economic Land-allocation Model

# Input data

- crop prices ($/ton)
- costs of production ($/ha)
- baseline area planted by rotation (USDA CDL)
- crop yields as a function of N applications, weather, rotation (Cycles)
- runoff as a function of N applications, weather, rotation (Cycles)

# Yield and runoff functions

- Yield: Mitscherlich-Baule function (reflects yield plateau)
- $Y_t = \beta_0\left[1 + \beta_1 D + \gamma T_t - exp\left(-(\beta_2 + \beta_3 D + \rho T_t)(\beta_4 + N)\right)\right] + \varepsilon_t$
- NO3 leaching: log-linear function
  - Cumulative NO3 leaching May 1 to April 30 of following year
- N2O emissions: log-linear function
  - Cumulative N2O emissions May 1 to April 30 of following year

# Output data

- % corn acres in corn following corn; % corn acres in corn following soy
  - 44.56% cfc
  - 39.67% cfs
- crop yield by year, rotation
  - 8.25 Mg/ha cfc 2010
  - 8.06 Mg/ha cfs 2010
- N applications by year, rotation
  - 111.94 kg/ha cfc 2010
  - 127.40 kg/ha cfs 2010
- NO3 leaching by year, rotation
  - 1.41 kg/ha cfc 2010
  - 0.93 kg/ha cfs 2010

# Next steps

- Expand crop set (sfc, etc.)
- Calibrate using RS data on rotations from Armen's group
- Extend to include P applications and leaching

# GLM Update

17 MAR 2017

# Major milestones to-date

GLM workshop in Jan on model calibration

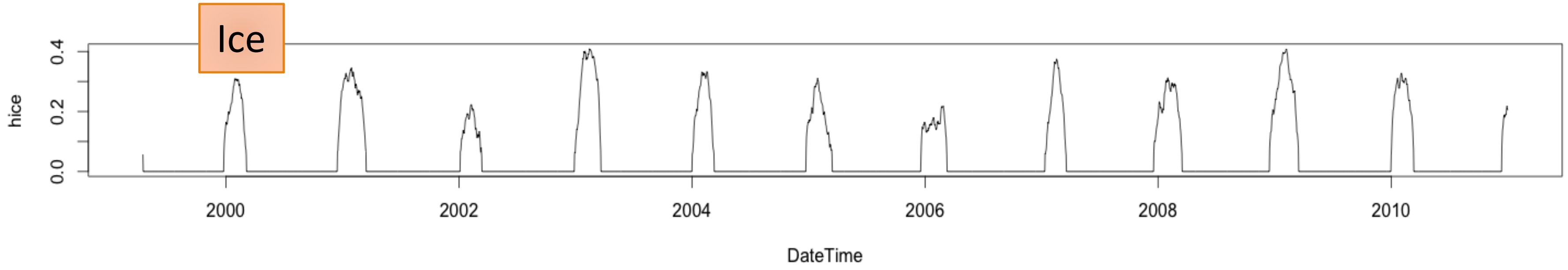
Calibration of short-term Mendota by VT and UW groups

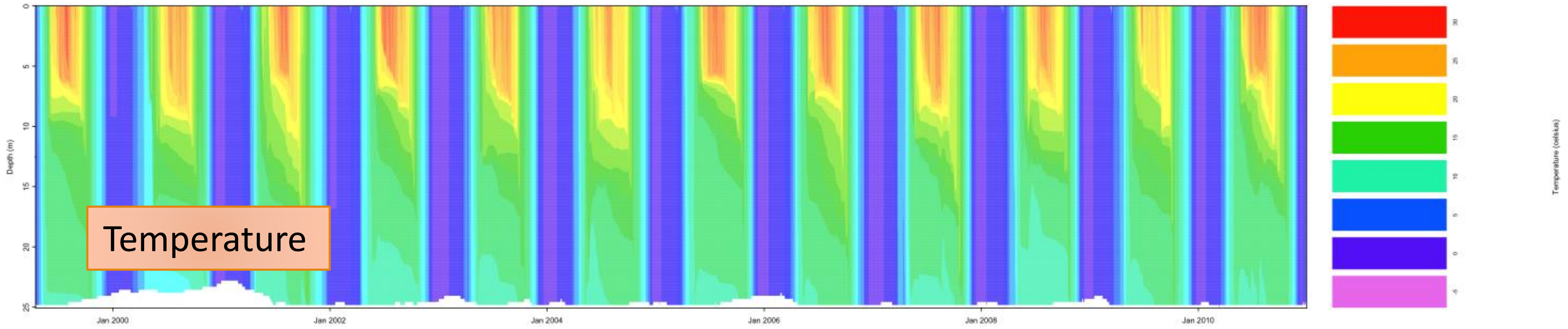
5 year calibration by VT crew

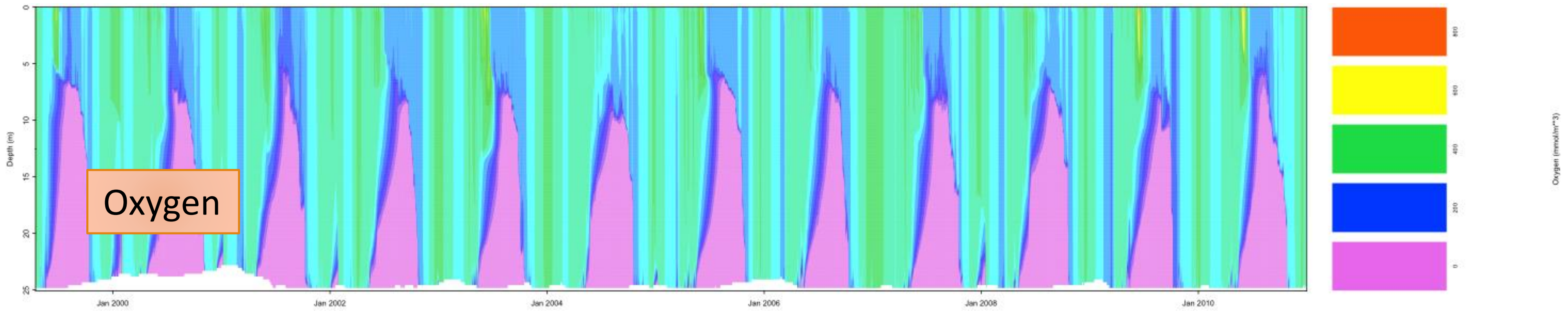
Penn State provided 13 years of calibrated PIHM discharge

UW group working with USGS to model nutrient loads

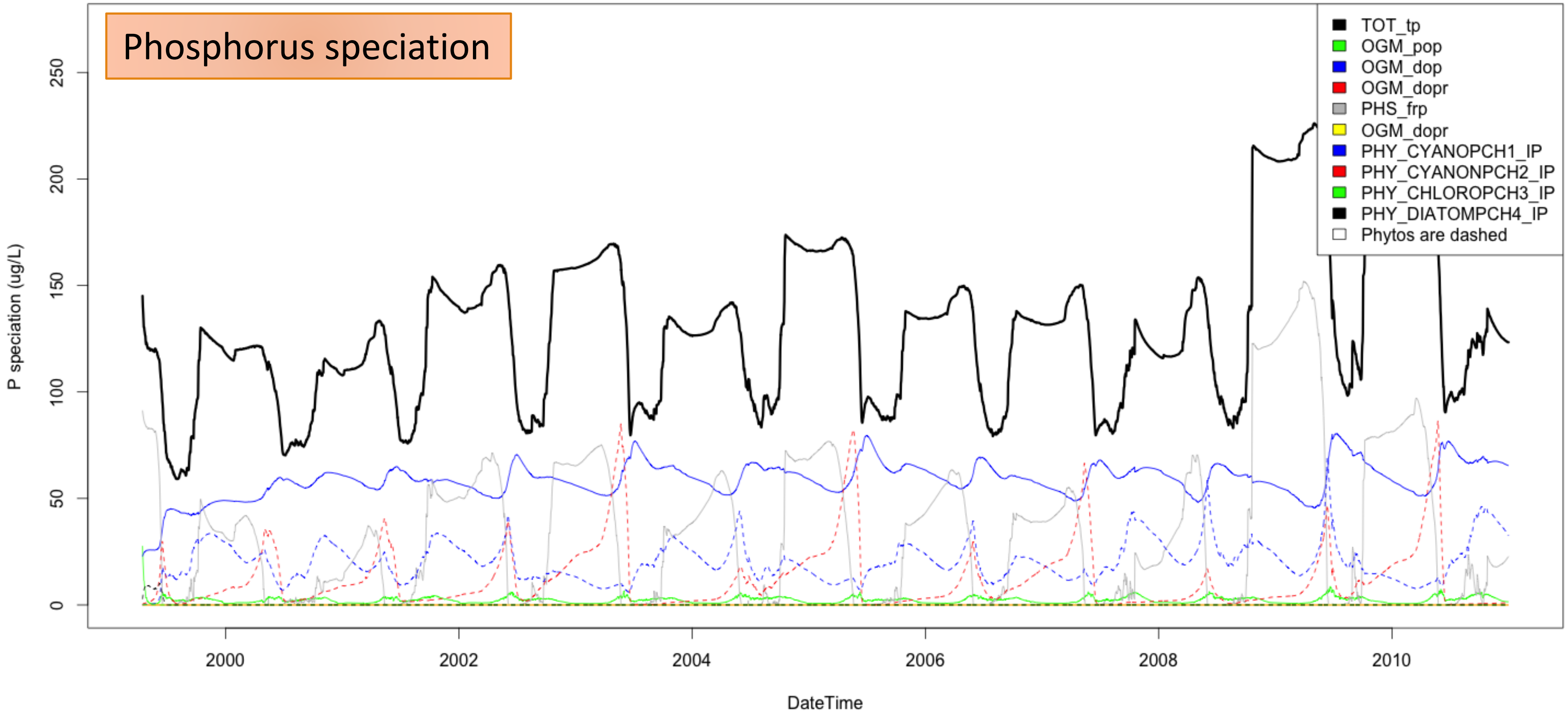
Preliminary results using PIHM hydrology as input to GLM
2000-2011 (only because 2012, 2013 crash)



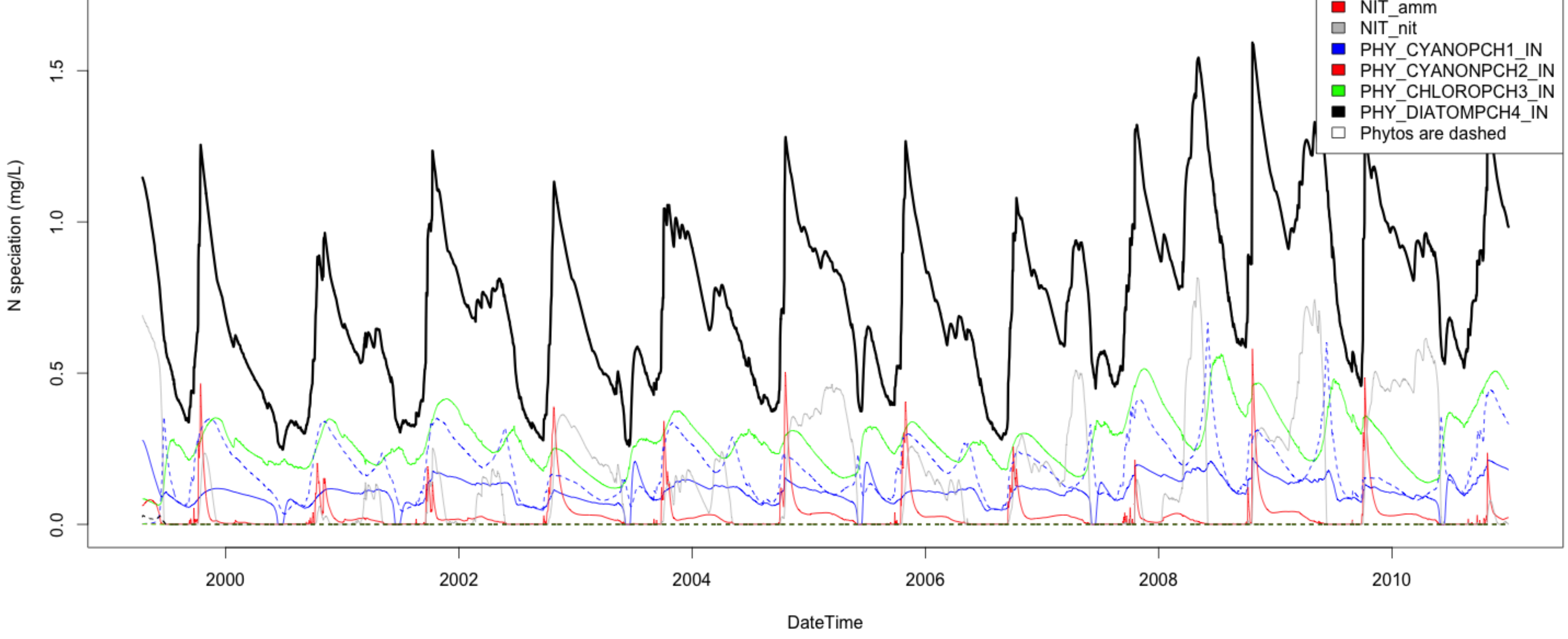



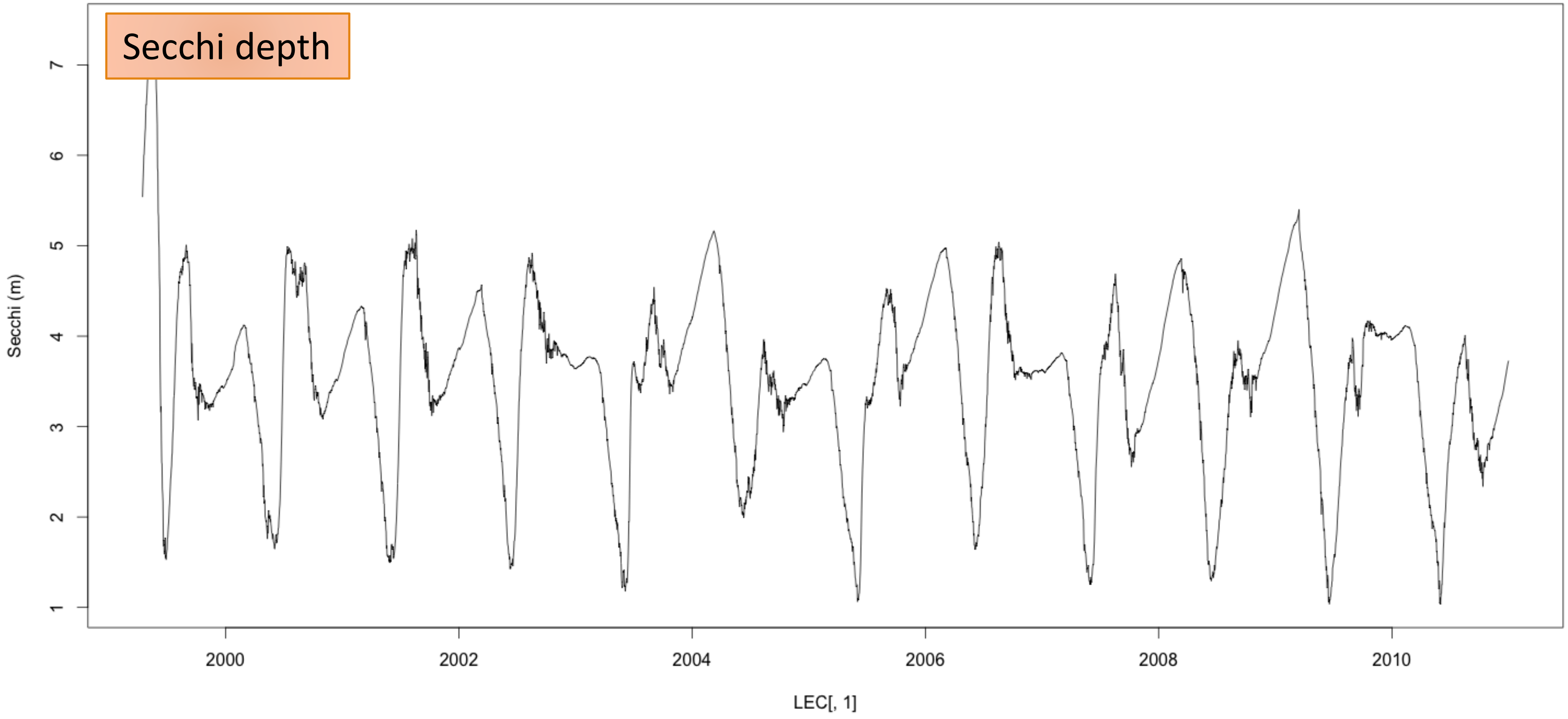



# Phosphorus speciation



# Nitrogen speciation





Secchi depth
Secchi (m)
1
2
3
4
5
6
7
2000
2002
2004
2006
2008
2010
LEC[, 1]

# Next steps

Continue work with USGS (EGRET) to model nutrient loads, given PIHM discharge

Calibrate the water quality against LTER in-lake data

Extend to 30+ year simulation

# The Hedonic Model

# Econometric Model

$Ln(Sp_{ijt}) = \alpha + \beta' H_{ij} + \Upsilon' L_{ij} + \delta' D_{jt} + \theta' W_{ijt} + \lambda' T_t + \eta'{*}B_j + \varepsilon_{ijt}$

where:

$SP_{ijt}$ - sales price of house i in census block j at time t

*H* – vector of house & lot characteristics (e.g., square feet & acreage)

*LC* – vector of property location characteristics (e.g., distance to capital square in Madison)

*D* – vector of demographic characteristics (e.g., average income)

*W* – vector of water quality variables (e.g., secchi disk readings & dissolved oxygen saturation)

*T* – vector binary variables for time of sale (e.g., year)

*B* – vector of binary variables for census location

*ε* – random error term

# Merge data layers

- House locations, sale, prices, property characteristics
- Census block data
- Land cover data
- Water quality data

# Challenge and Opportunity

- Previous studies focus waterfront properties
- We considering impacts across the communities
- Builds the need for as much data as we can access on property sales
- Lost more observations than expected in data cleaning

# Expected Output

- Implicit Value (marginal willingness to pay) for changes in selected water quality variables
- Values will be capitalized value of change in water quality in current dollar values (not per unit of time such as a day or year)
- Link value changes to changes in community property tax revenue