The Use of DOC Surrogates in the Sacramento-San Joaquin Delta

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SOLANO WATER
WASTE NOT • WANT NOT

Background

- DOC measured throughout the Delta
- Equipment costs
- Is there an alternative?

UVA-254 (Absorption)

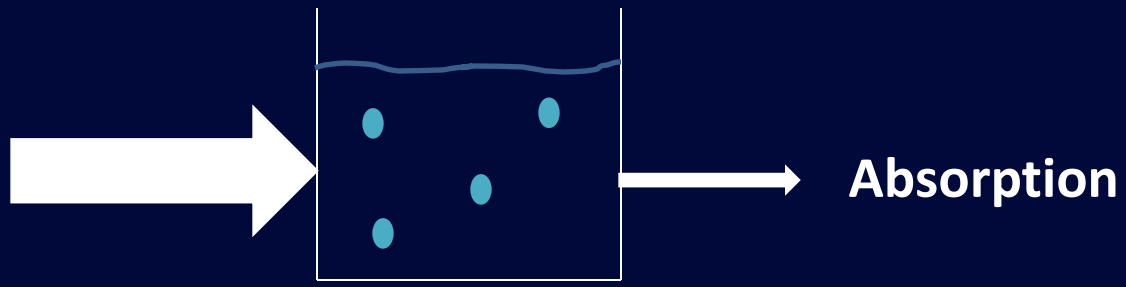
FLUORESCENCE (FDOM)

Why Fluorescence?

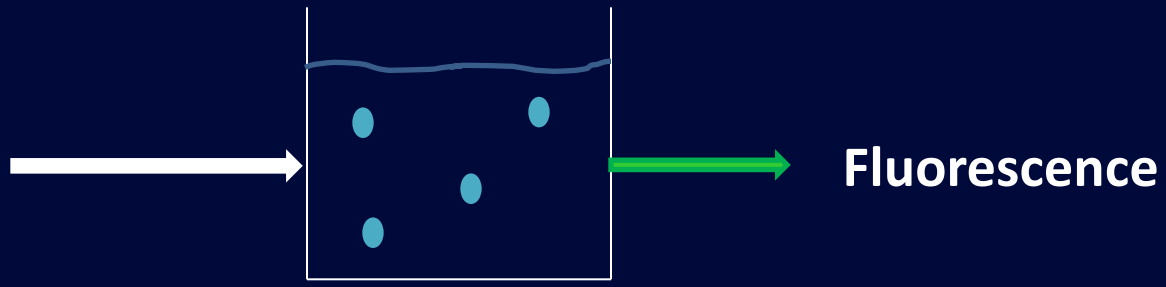
- Its Cheap(er)!
  - $3,000 vs. $30,000
- Proven
- Fairly Easy to Use

How it Works

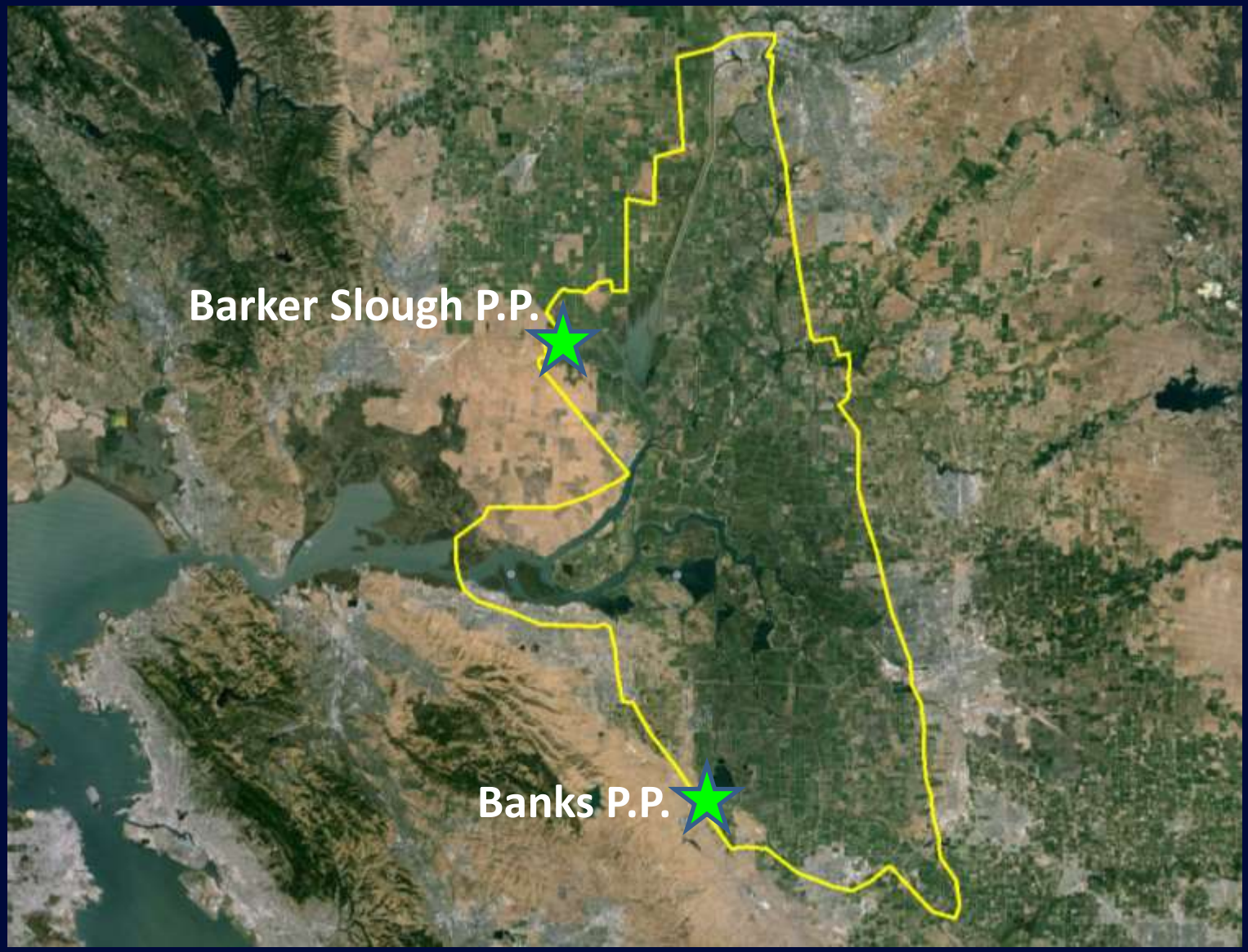
UVA:



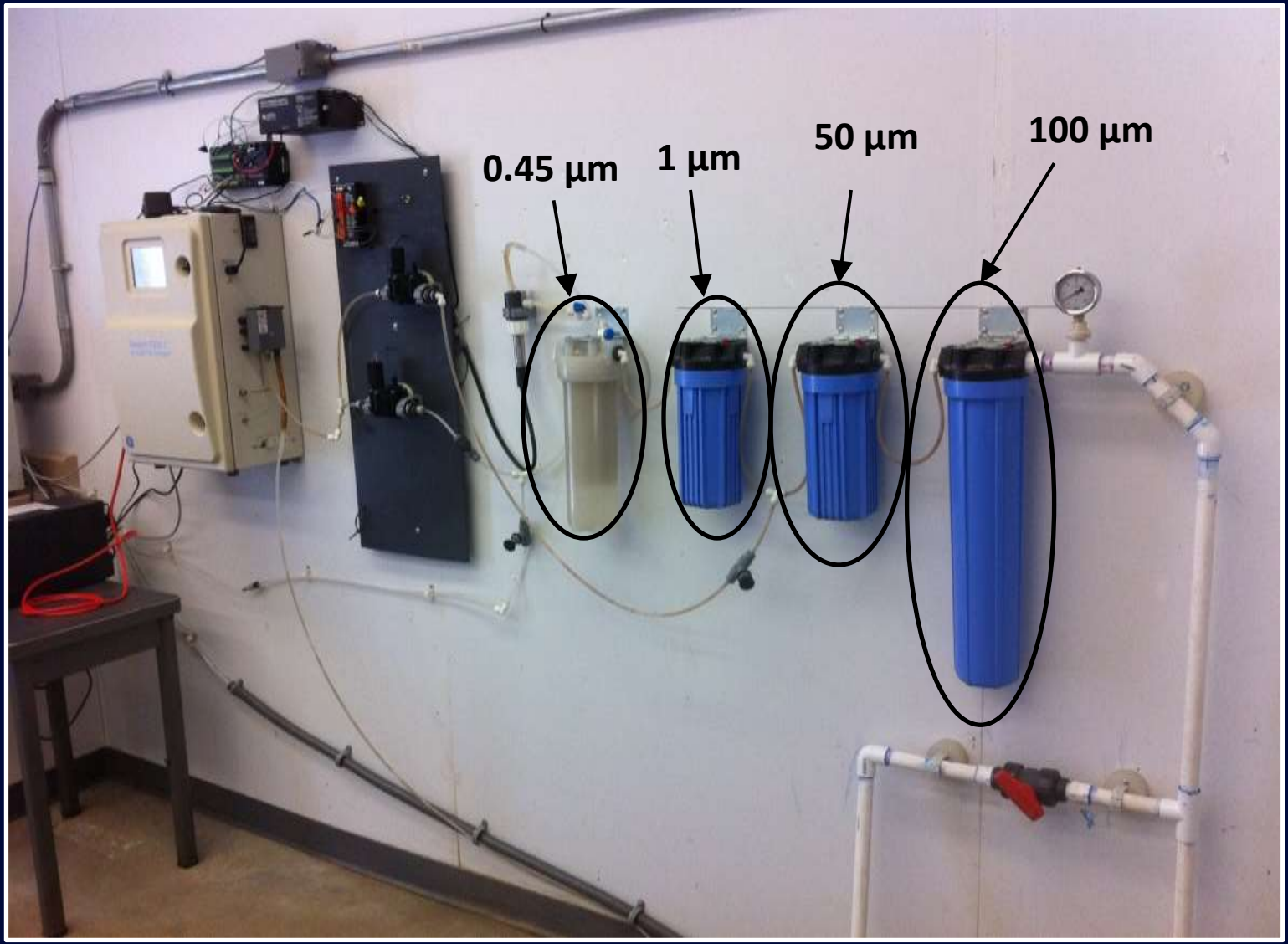
FDOM:



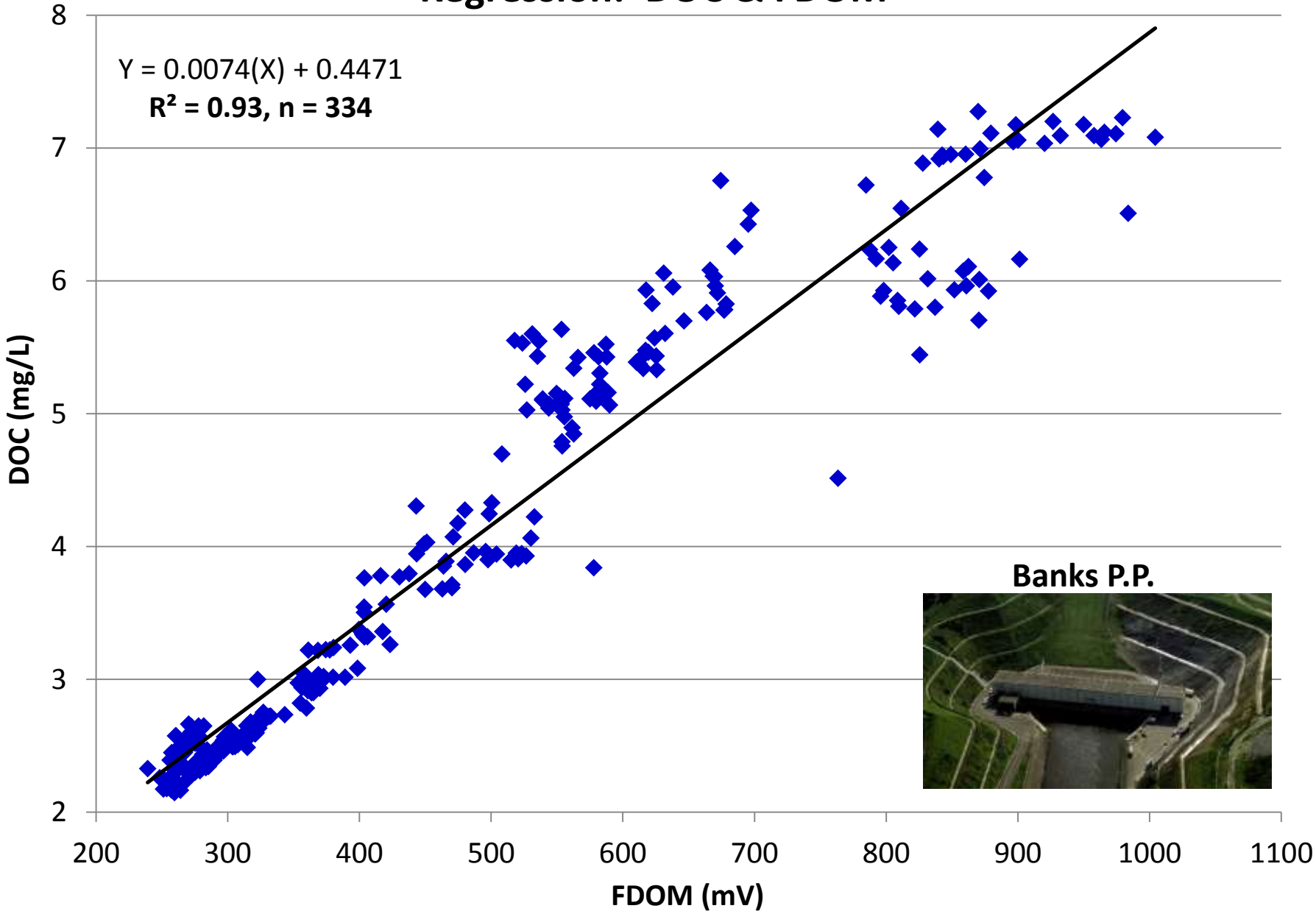
Location of Banks & Barker Sl PP

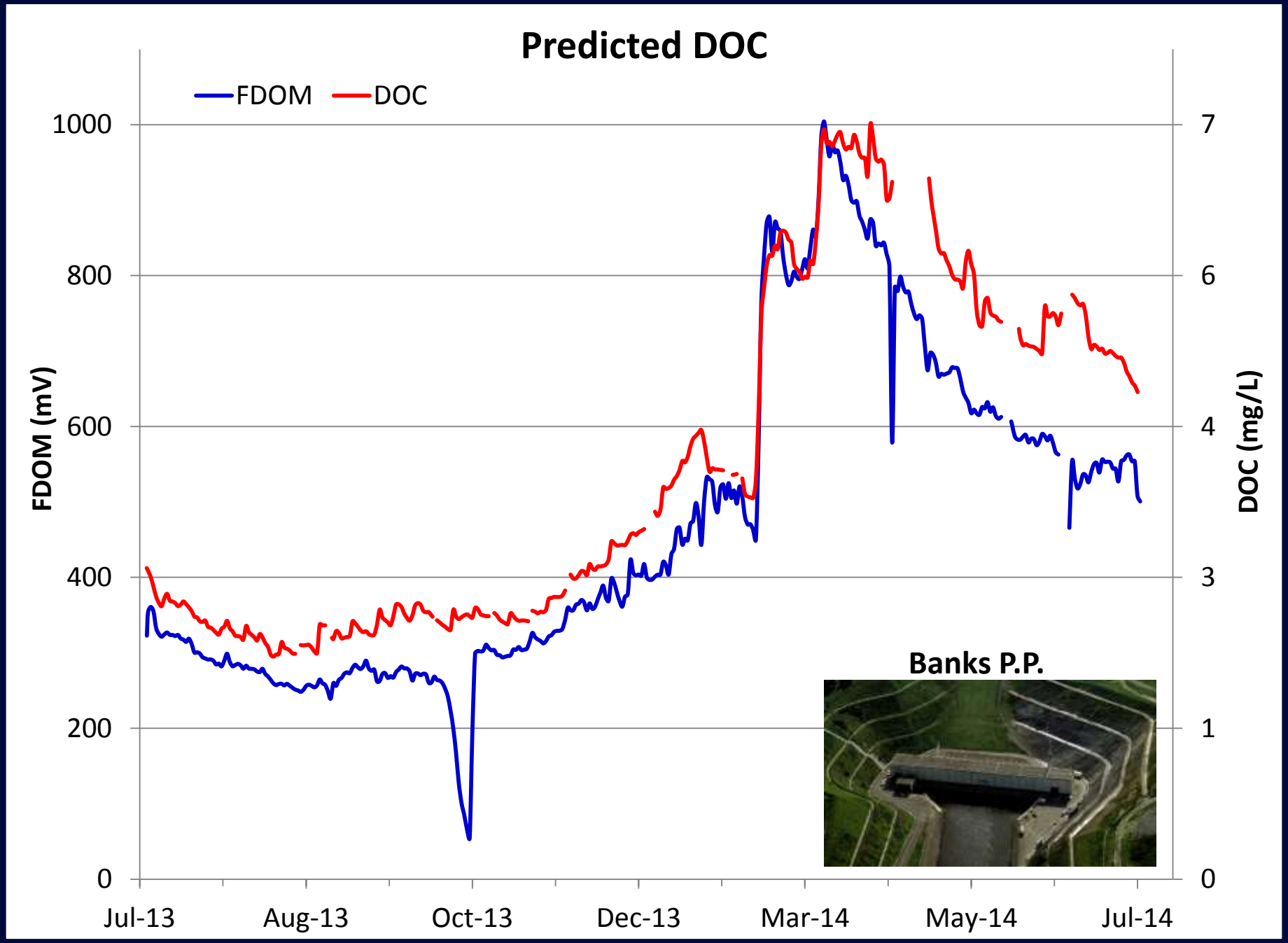


Methods at Banks



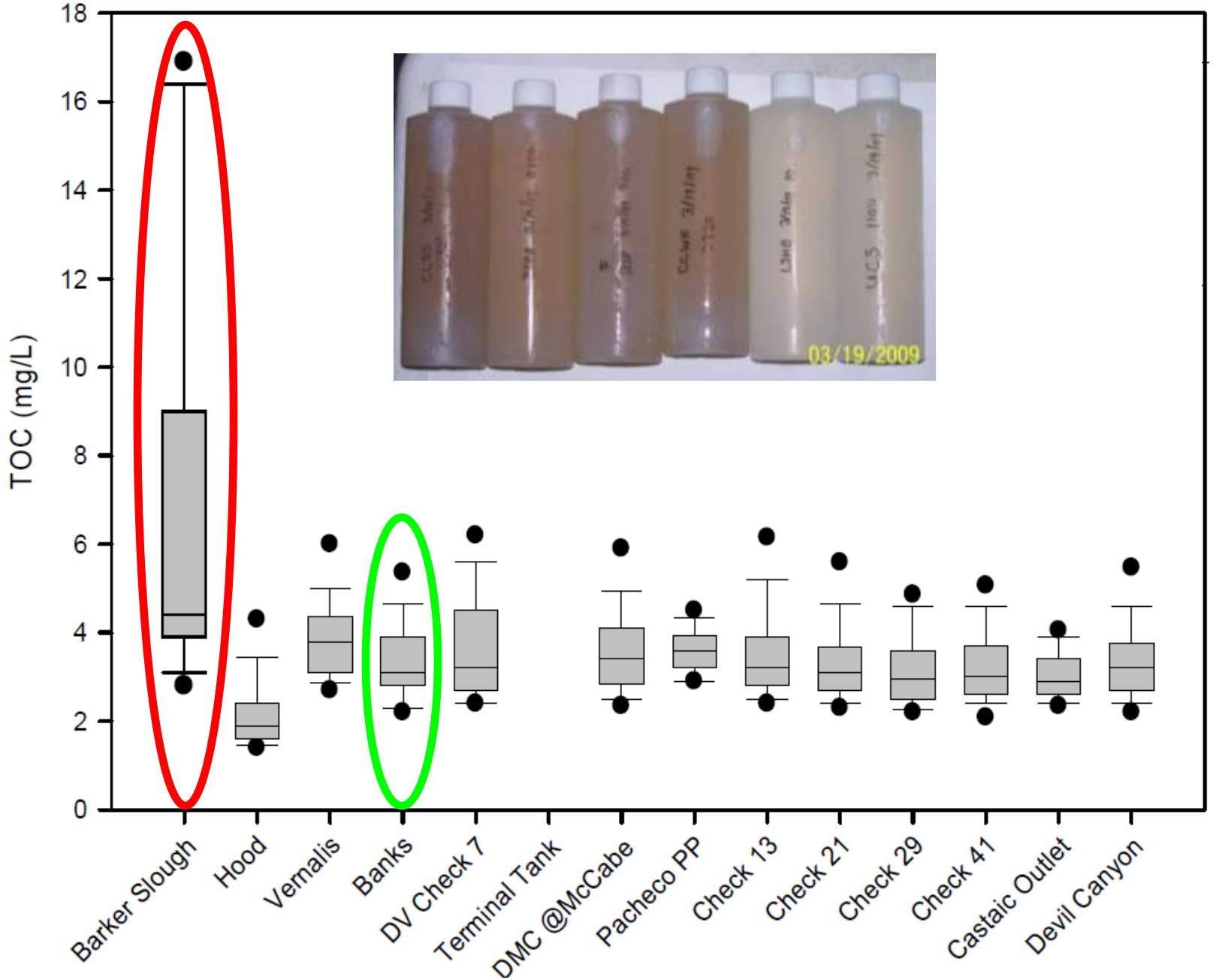
Regression: DOC & FDOM




Predicted DOC
FDOM
DOC
FDOM (mV)
DOC (mg/L)
1000
800
600
400
200
0
7
6
4
3
1
0
Jul-13
Aug-13
Oct-13
Dec-13
Mar-14
May-14
Jul-14
Banks P.P.

Barker Slough P.P.

- Location: Cache Slough Complex
- Source Water: Sac River & Localized Runoff
  - Rapid degradation of WQ
  - Source to WTP: Hours (Days-Weeks @ Banks)
  - Operational need for real-time DOC



Source: SWP 2006 Watershed Sanitary Survey Update, Archibald et al., 2007

Barker Slough P.P.

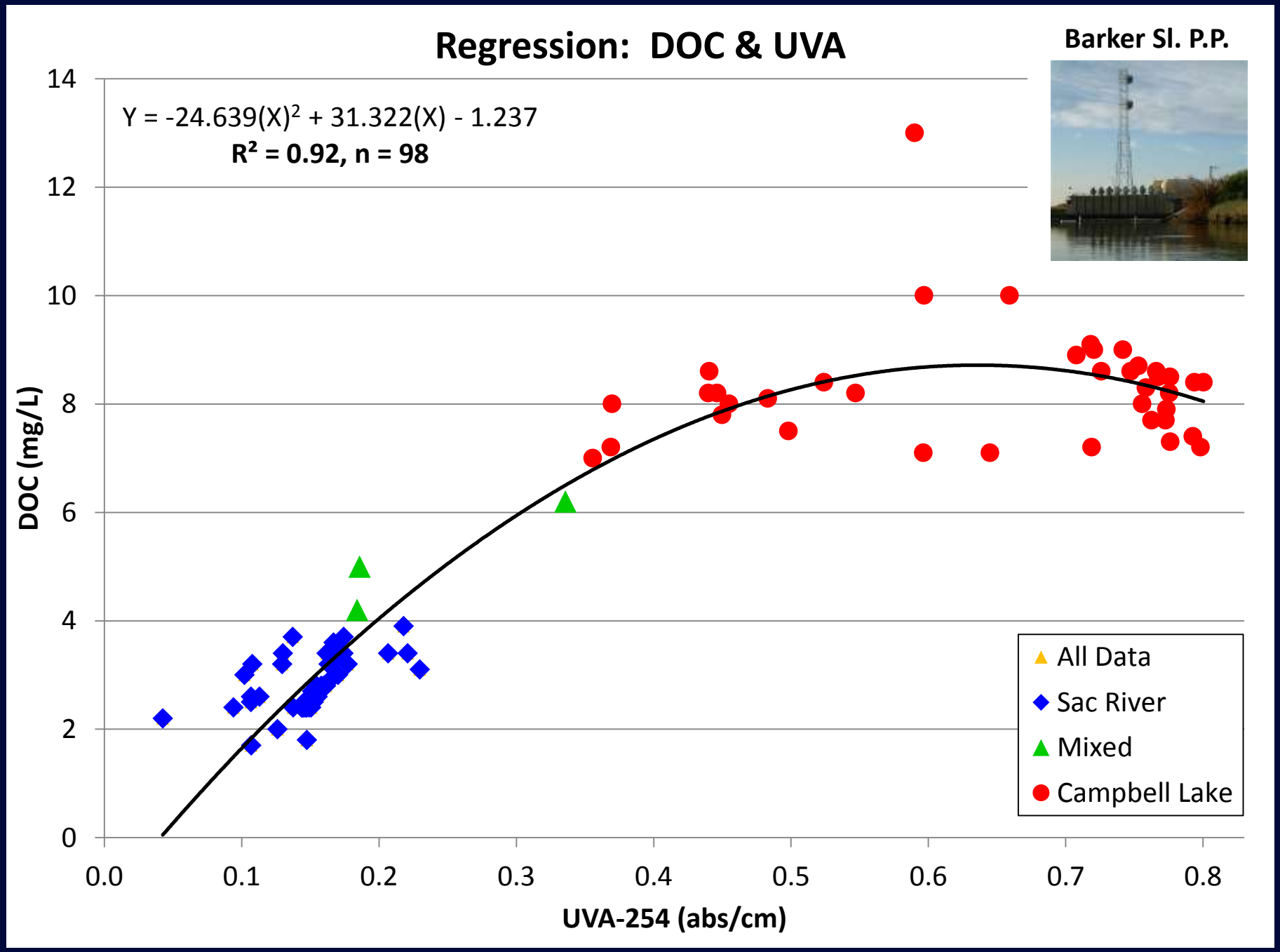
Surrogate instruments @ NBA:

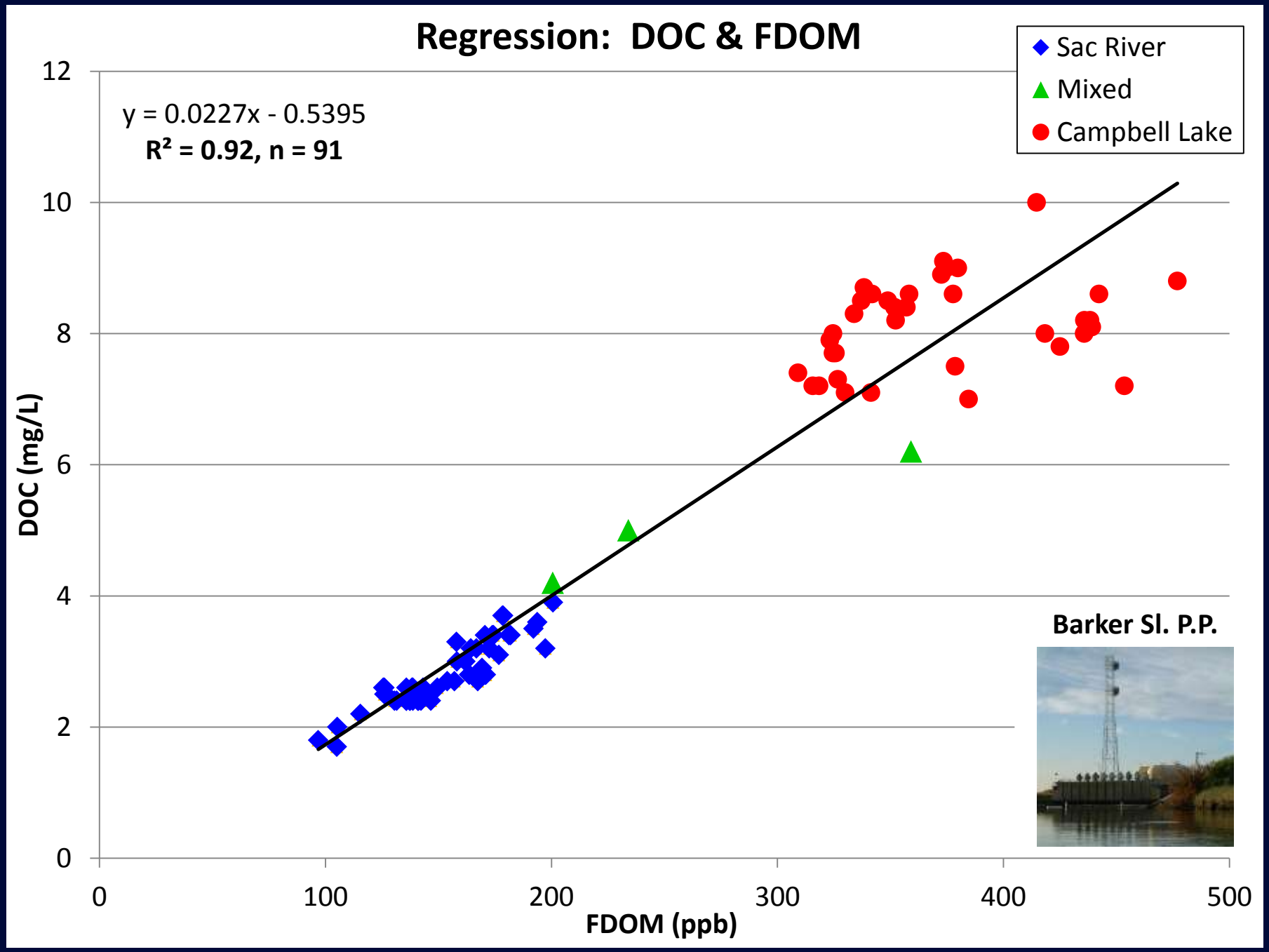
- UVA-254
- FDOM

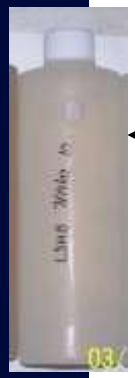
Intake

Filters

Sensors


Regression: DOC & UVA
Barker Sl. P.P.
Y = -24.639(X)² + 31.322(X) - 1.237
R² = 0.92, n = 98
DOC (mg/L)
UVA-254 (abs/cm)
0
2
4
6
8
10
12
14
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
All Data
Sac River
Mixed
Campbell Lake


Regression: DOC & FDOM
Sac River
Mixed
Campbell Lake
y = 0.0227x - 0.5395
R² = 0.92, n = 91
DOC (mg/L)
FDOM (ppb)
0
2
4
6
8
10
12
0
100
200
300
400
500
Barker Sl. P.P.



Predicted DOC: WY 2014

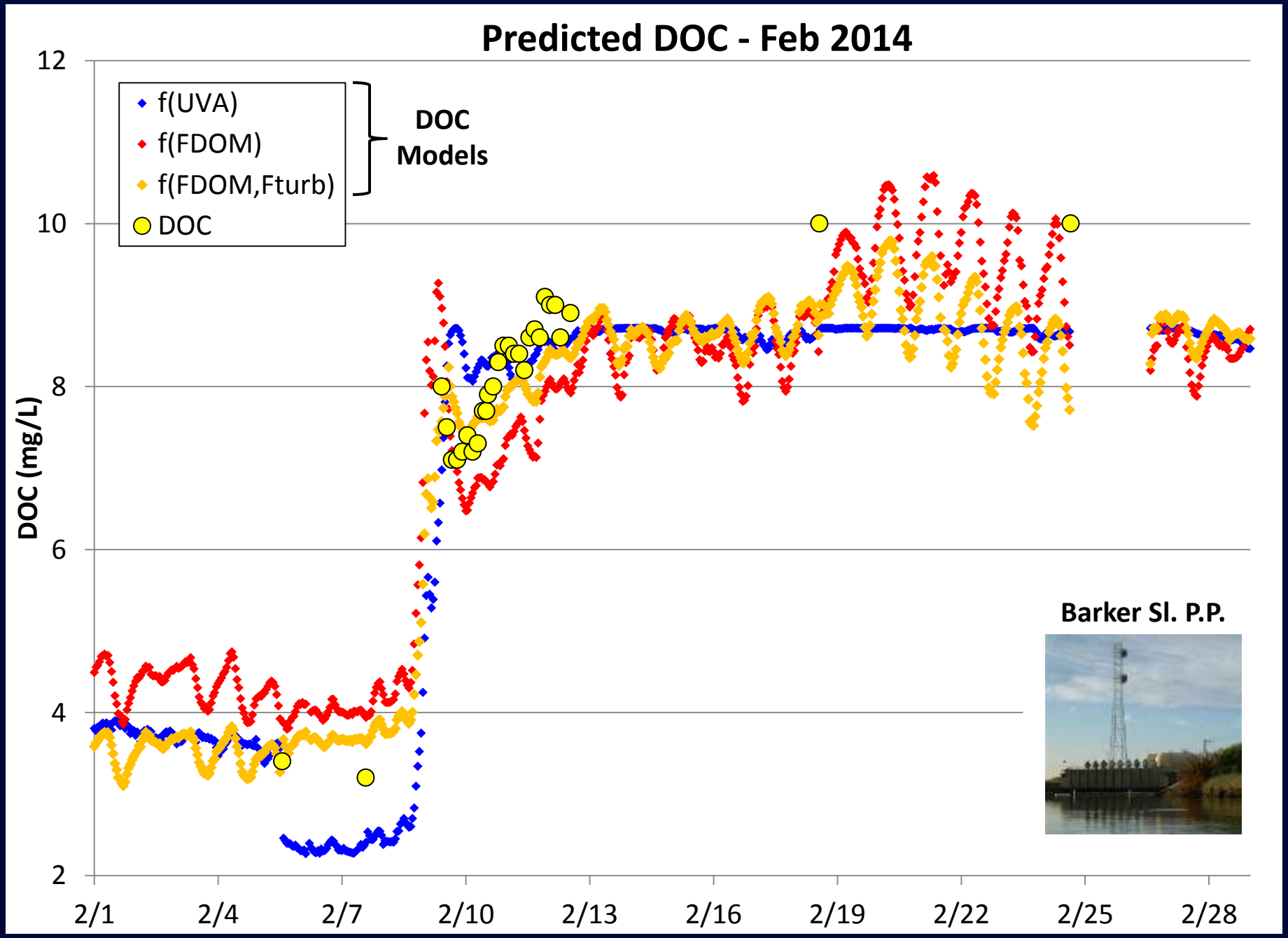
DOC (mg/L)

12
10
8
6
4
2
0

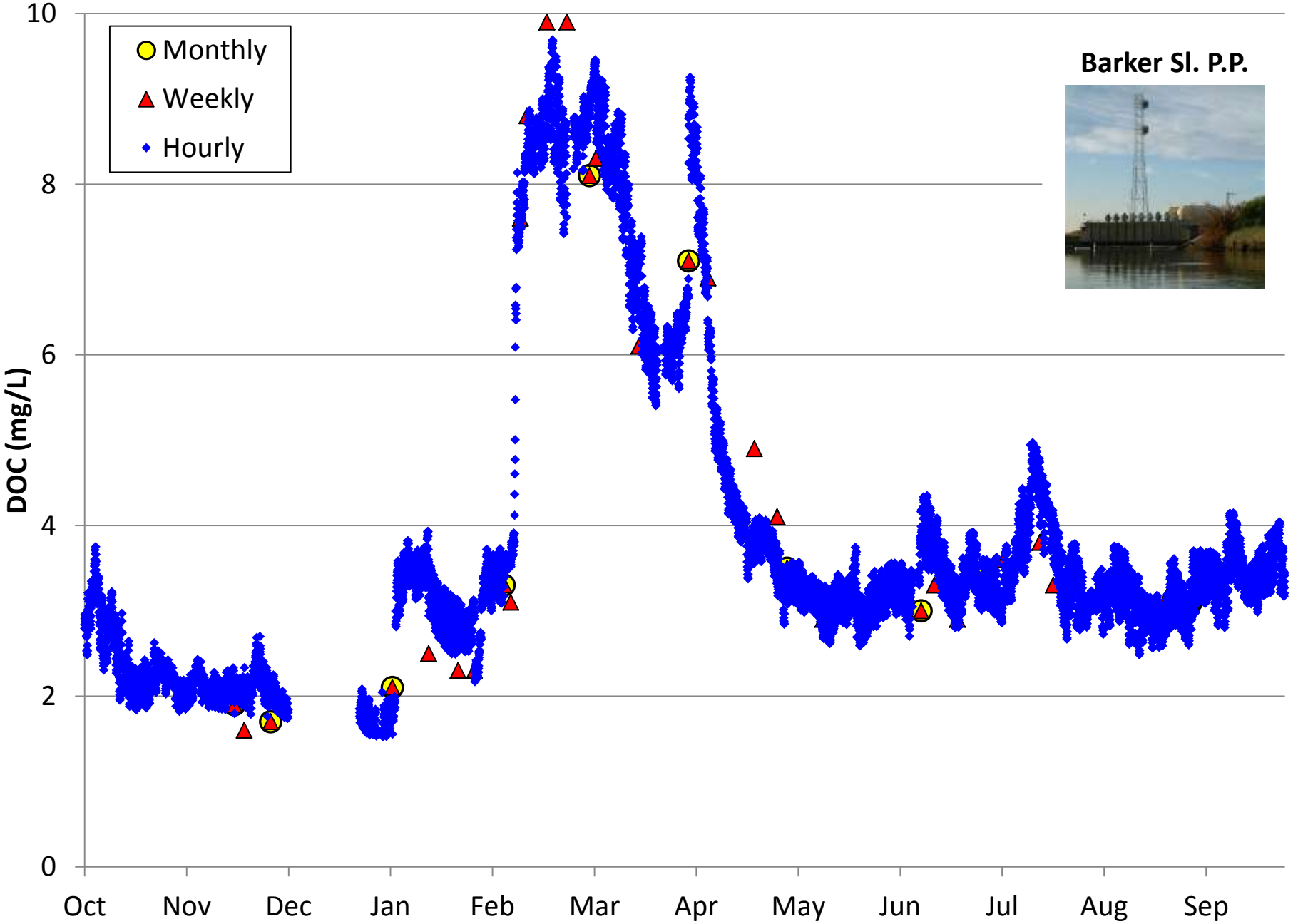
Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep

DOC Models

- f(UVA)
- f(FDOM)
- f(FDOM,Fturb)
- DOC


Predicted DOC - Feb 2014
f(UVA)
f(FDOM)
f(FDOM,Fturb)
DOC
DOC Models
DOC (mg/L)
12
10
8
6
4
2
2/1
2/4
2/7
2/10
2/13
2/16
2/19
2/22
2/25
2/28
Barker Sl. P.P.

DOC: Different Time Scales



Summary

- UVA & FDOM – “Good” surrogates for DOC
- Finer resolution

- Challenges
  - Lack of widespread standards (FDOM)
  - Need for filtration
  - Suitable wiper

Behind the Scenes

DWR

- Steve San Julian
- Joe Christen
- MWQI Field Staff

SCWA

- Marissa Hartley
- Jeff Schuyler, Eyasco
- Marc Estrade, Eyasco

SOLANO COUNTY WATER AGENCY