

Upper Snake Rock Conservation Effects Assessment Project

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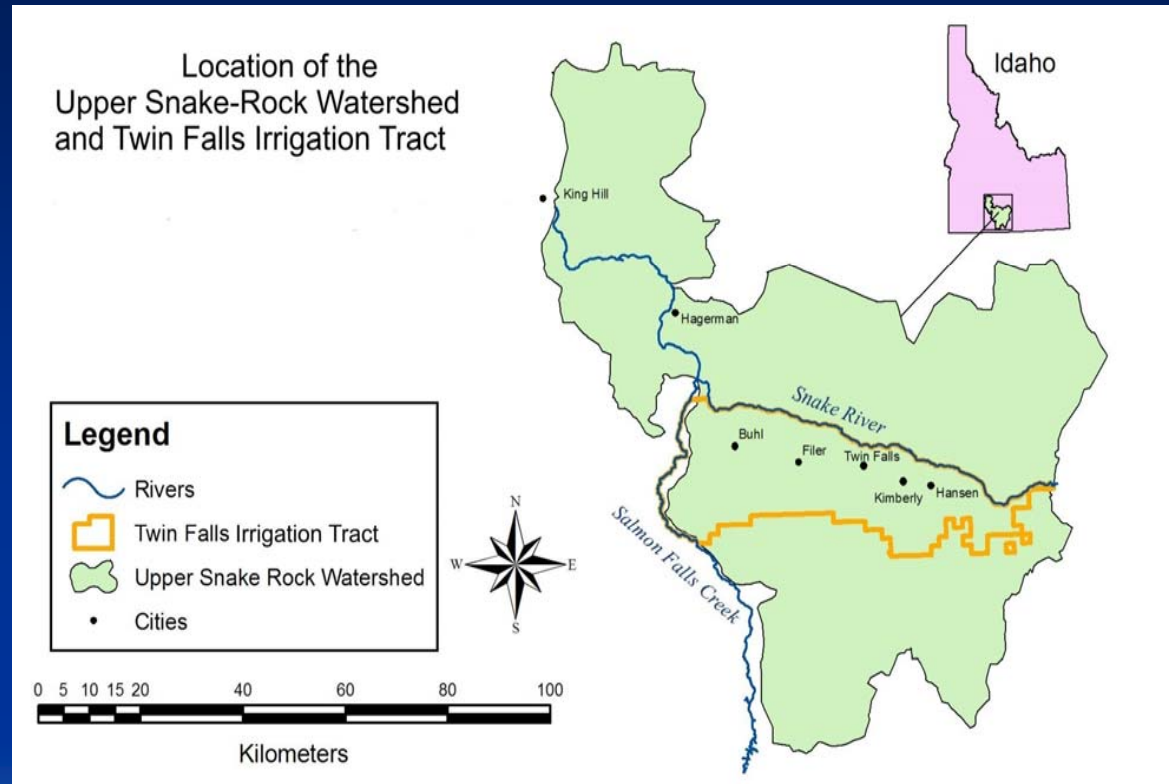
Twin Falls Canal Co.
NRCS, SWCD
Univ. Idaho
ID-DEQ, IDWR
Northside Irrigation Co.



Upper Snake Rock CEAP

The Upper Snake Rock Watershed

- Extends from Milner Dam to Bliss (698,580 ha)
- Includes the North Side and Twin Falls Canal Companies
- About 42% is irrigated while 53% is range or forested land



Three year funded NRCS project concentrates on the Twin Falls Irrigated Tract (Oct. 1, 2004-Sept. 30, 2007).

Twin Falls Canal Irrigated Tract

- ~86,000 ha irrigated
- Defined hydrogeology
- Limited intermittent & perennial streams
- Increasing overhead irrigation (~35%)
- >50% land impacted by soil erosion
- AFOs (small & large)
- **Water Quality Issues:** cold water biota, salmonid spawning, recreation
- **Water Quantity Issues:** urban, industrial, salmon recovery (ESA), drought



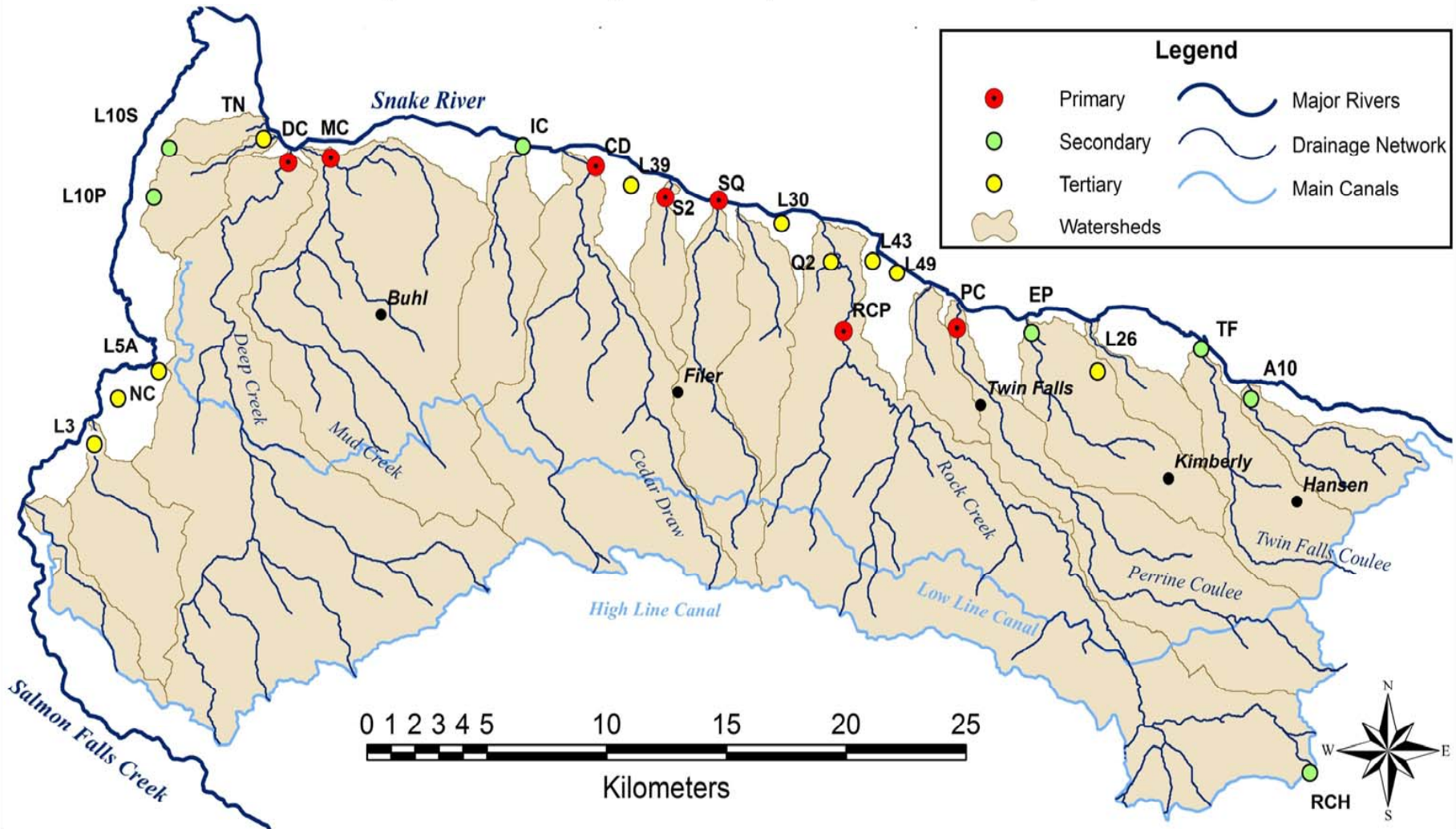
OBJECTIVES

- Determine water and salt balance for irrigation tract. (Salt Balance)
- Determine effect of conservation practices on surface water quality. (Sub-basins)
- Calibrate and validate watershed-scale models for irrigated agriculture
- Develop & compile a water quality database for the USR



Salt Balance Sites

Return Flow Monitoring Sites in Twin Falls
Irrigation Tract, Jan. 1, 2005-Dec. 31, 2007



Water Sample Analysis (Salt balance & Sub-basins)

- Dissolved NO_3 , NH_4 , P, K, Ca, Mg, Na, Al, Fe, Mn, Zn, S, and Cl
- Total suspended solids
- Water pH, EC, Temperature
- Total N, P, K, Ca, Mg, and Na



Other Data Obtained (Salt balance & Sub-basins)

- Cropping distribution
- Conservation practices
- Irrigation systems
- Irrigation water inflows/outflows
- Climate
- Soils
- Cultural practices



Salt Balance Analysis

- Compare findings with salt and water balance data published by Carter in 1970s to determine effect of changes in tract (irrigation systems, sediment ponds, filter strips, PAM, urban development, etc.).



Sub-basin Monitoring & Analysis

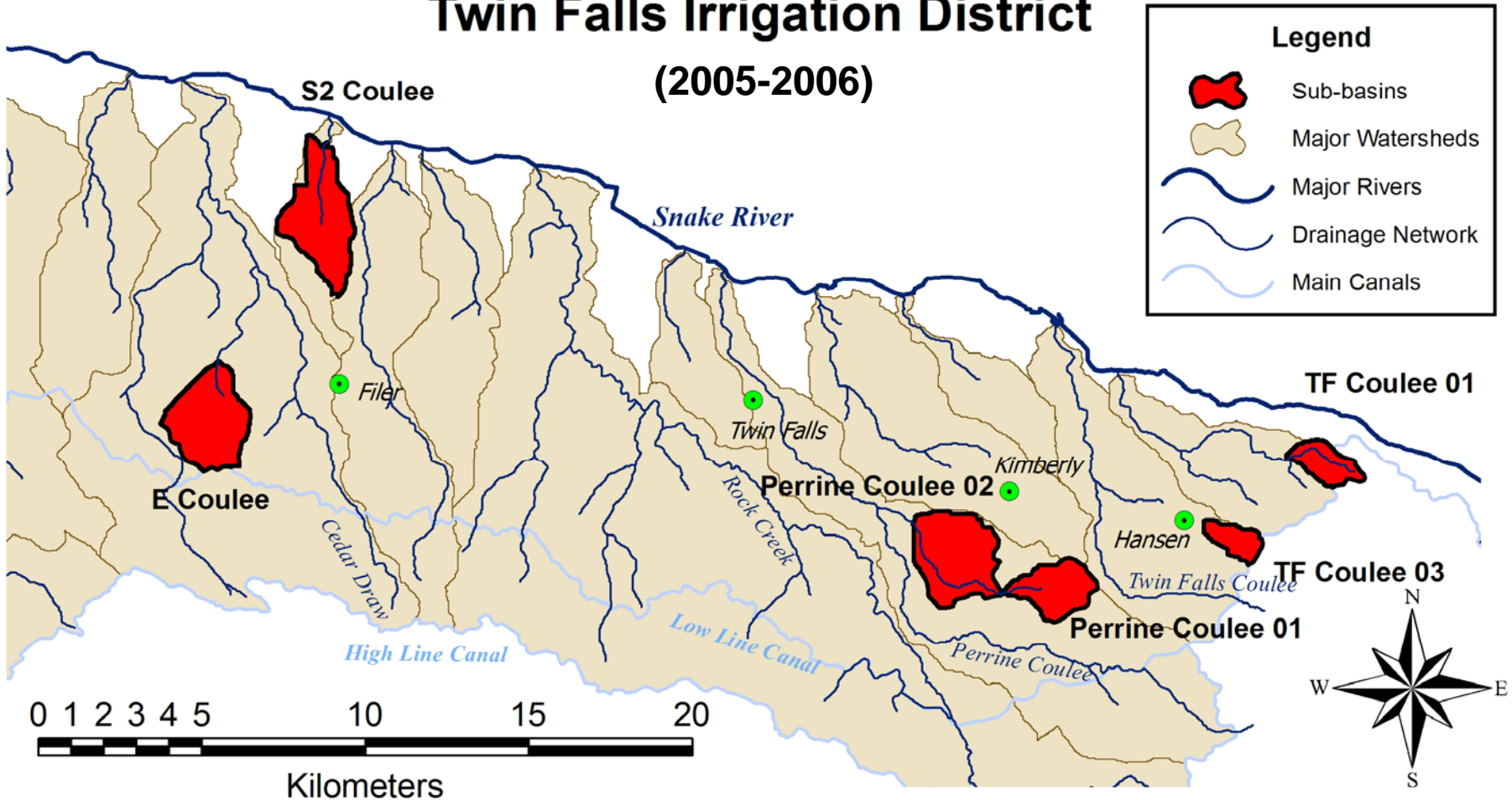
- Multiple watershed approach (6)
- **Objective:** Determine effect of conversion from furrow to sprinkler irrigation on:
 - Water balance
 - Sediment and nutrient concentrations
 - Sediment and nutrient loads



Sub-basins

Location of Sub-basins in the Twin Falls Irrigation District

(2005-2006)



2005 Sub-Basin Characteristics

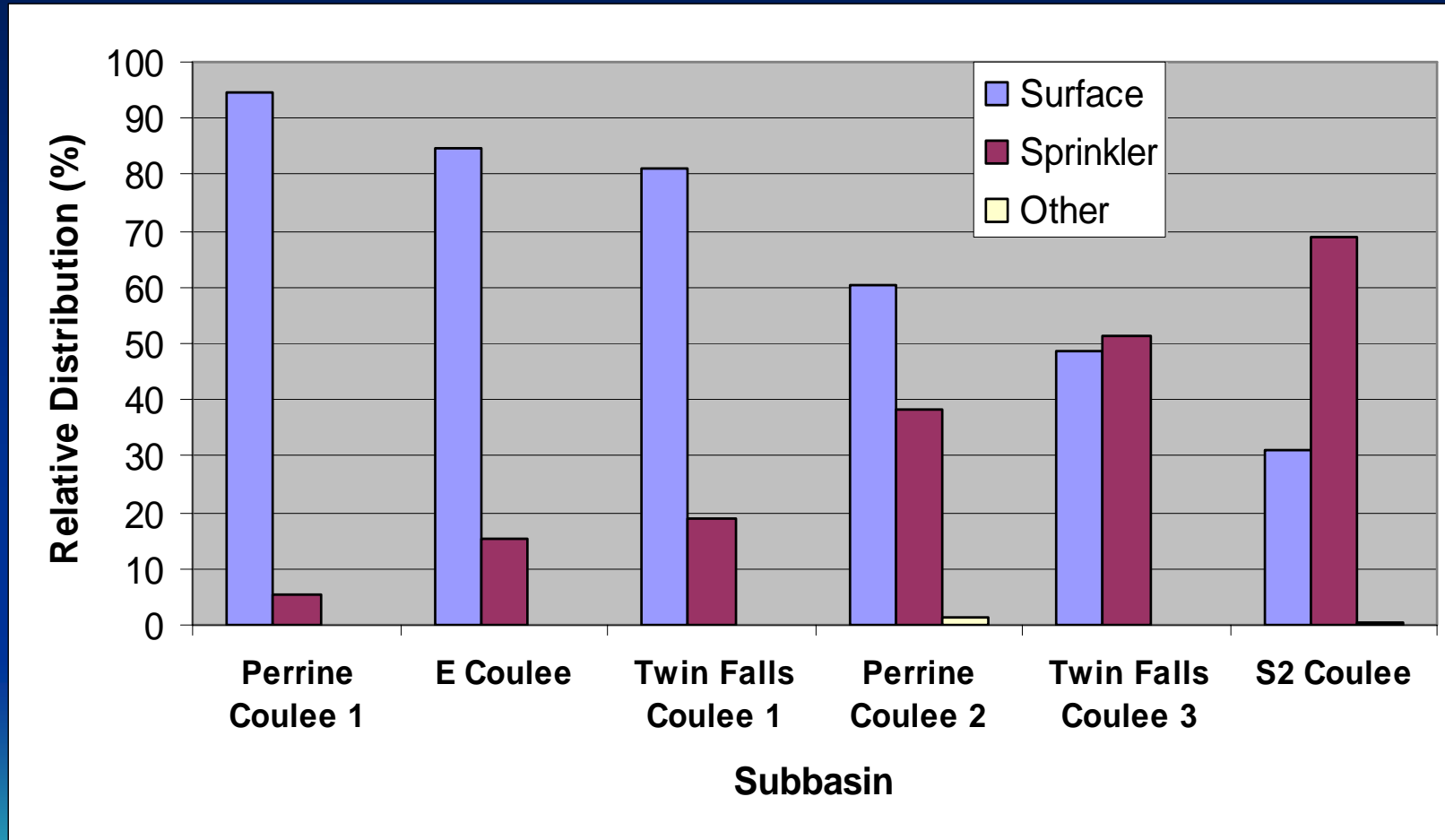
Sub-basin	Sub-basin area (ha)	AFO [†] within Sub-basin	AFO near Sub-basin	Sediment Basins [§]	Seeps	Major Soil Series	Slope (%)
Perrine Coulee 1	397	0	0	2	No	Portneuf Silt Loam	0 to 2
E Coulee	678	0	2	2	Yes	Minveno Silt Loam	2 to 8
Twin Falls Coulee 1	195	1 (very small)	1	3	No	Portneuf Silt Loam	2 to 4
Perrine Coulee 2	510	0	1	2	No	Portneuf Silt Loam	0 to 2
Twin Falls Coulee 3	171	0	0	1	No	Portneuf Silt Loam	2 to 4
S2 Coulee	793	0	0	4	Yes	Portneuf Silt Loam	0 to 2

† Animal Feeding Operations

§ Approximate



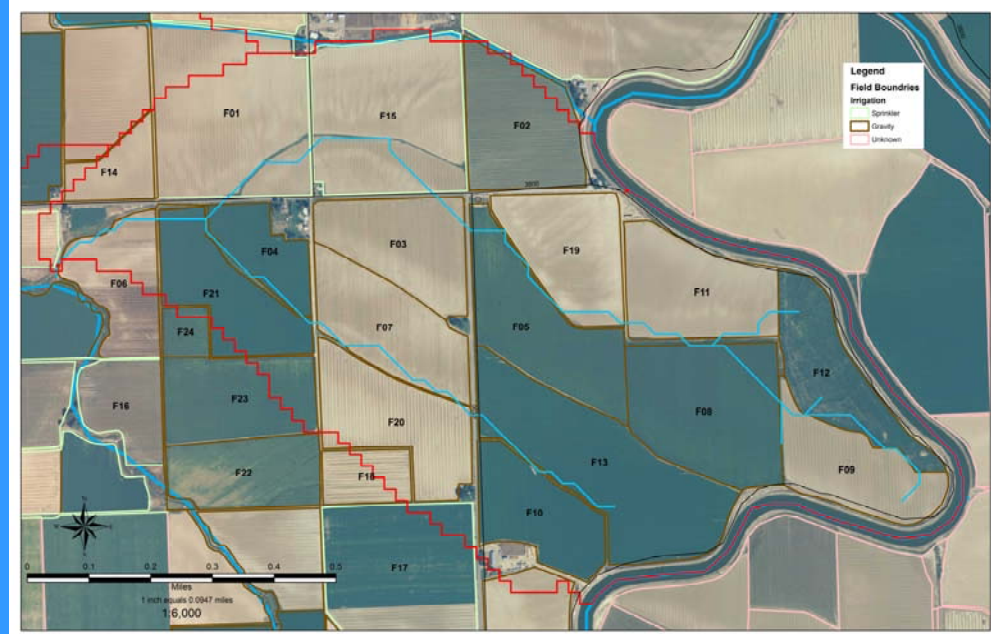
2005 Irrigation Practices in Sub-Basins



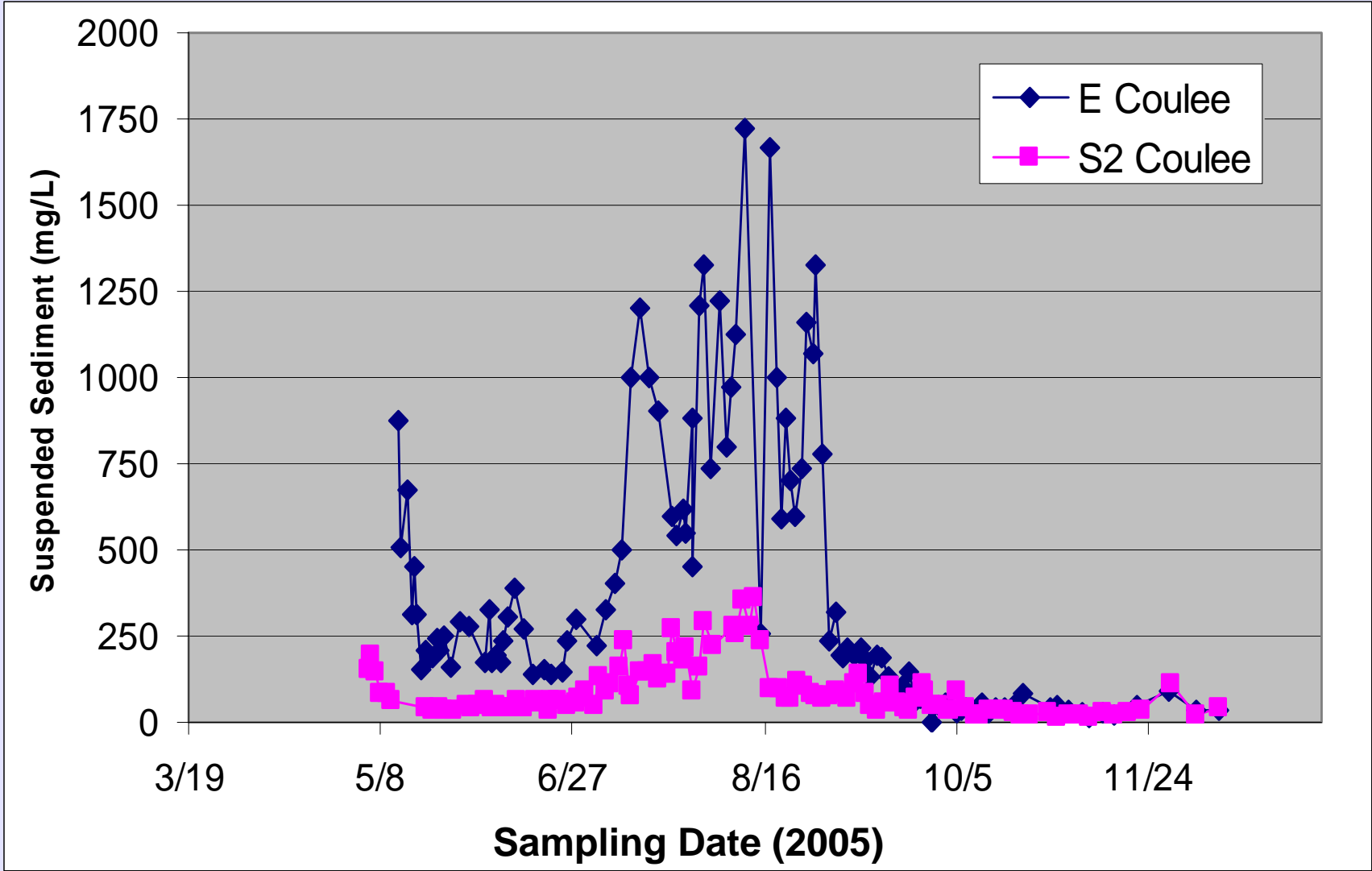
(Summer, 2005)

Sub-Basin Progress

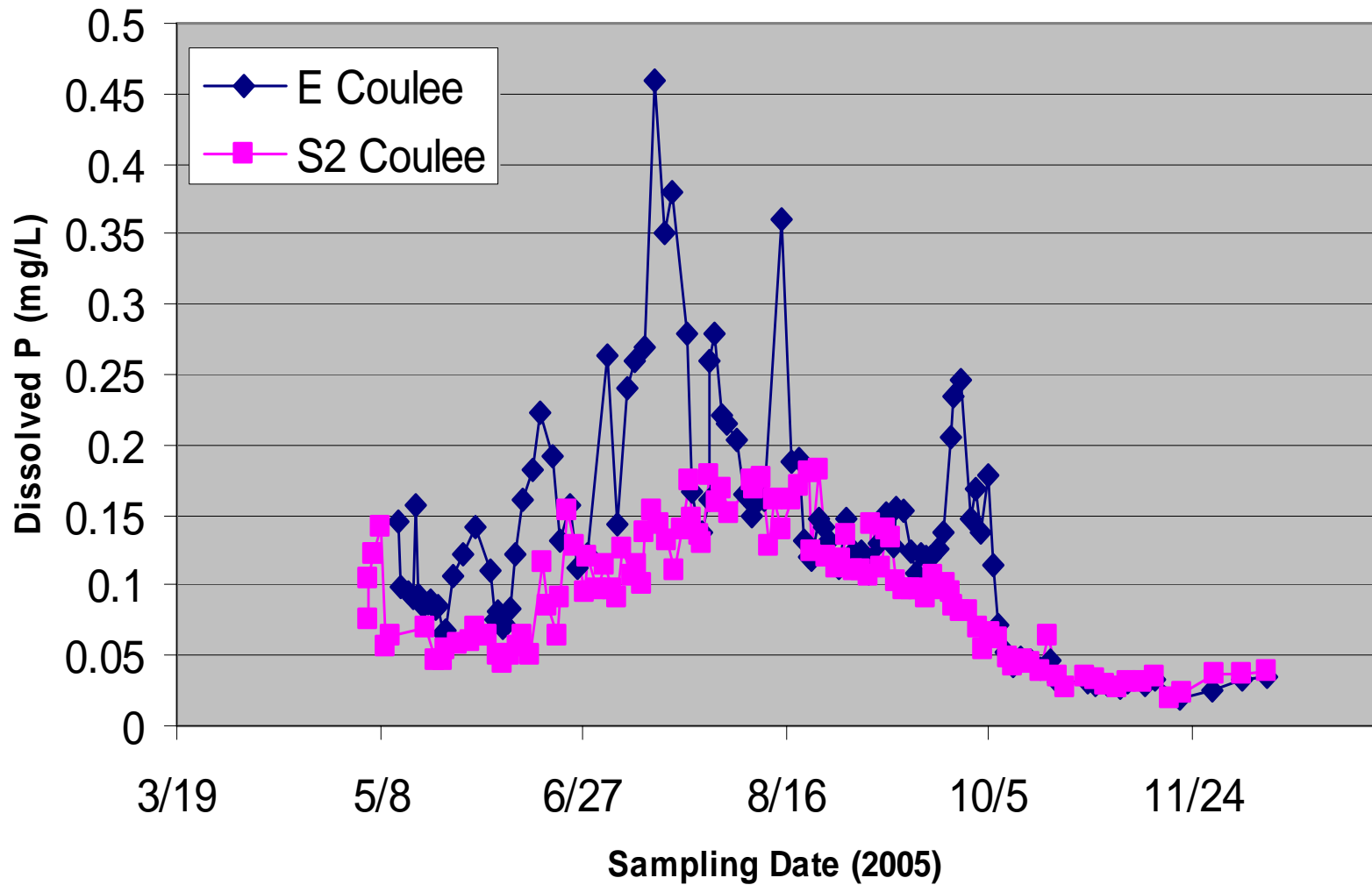
- Collected and analyzed samples from irrigation water and return flow (2005-)
- Conducted field surveys to determine cropping and irrigation practices (2005-)



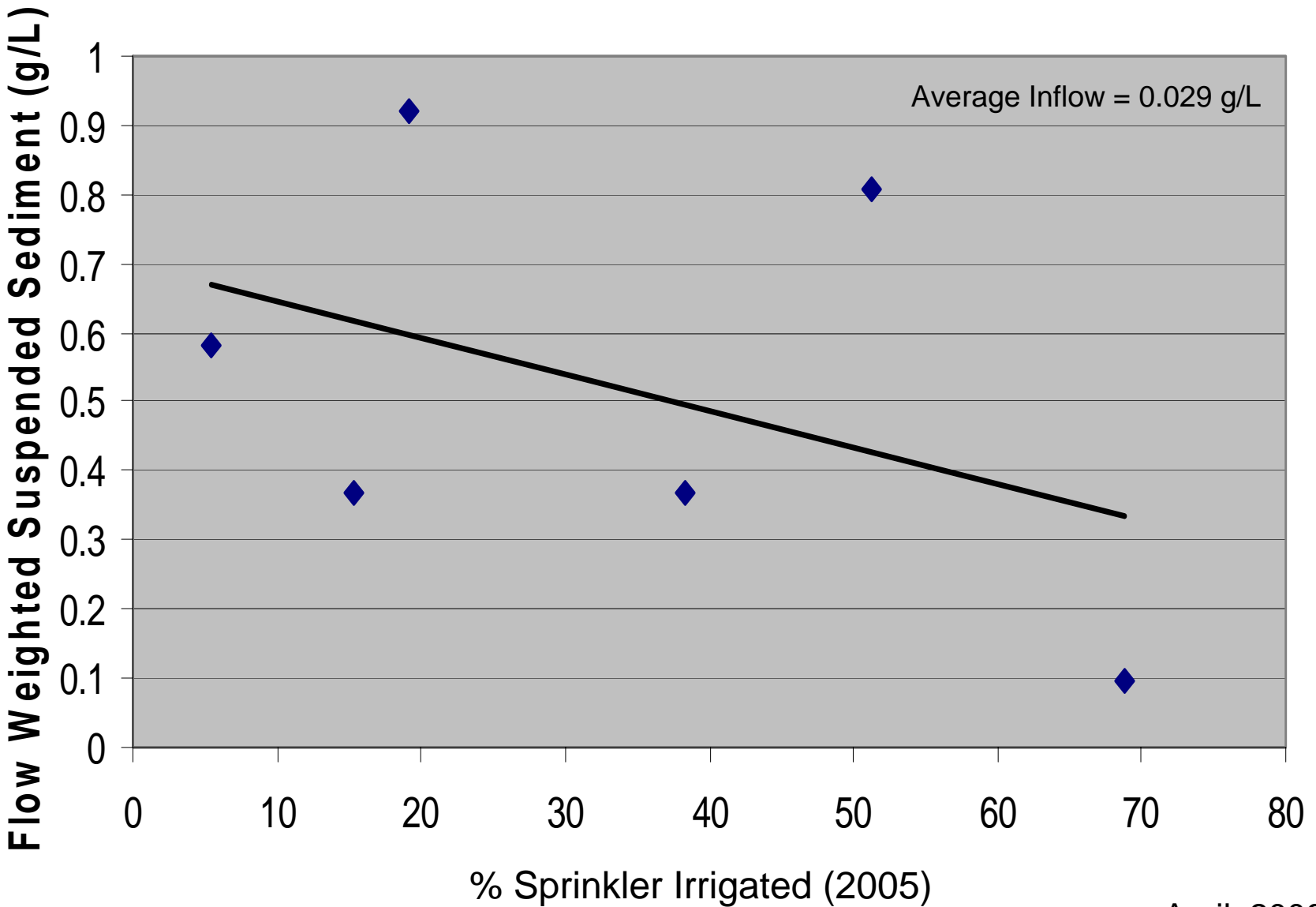
Out-flow Suspended Sediments Concentrations for Two Selected Sub-basins in 2005



Out-flow Dissolved P Concentrations for Two Selected Sub-basins in 2005

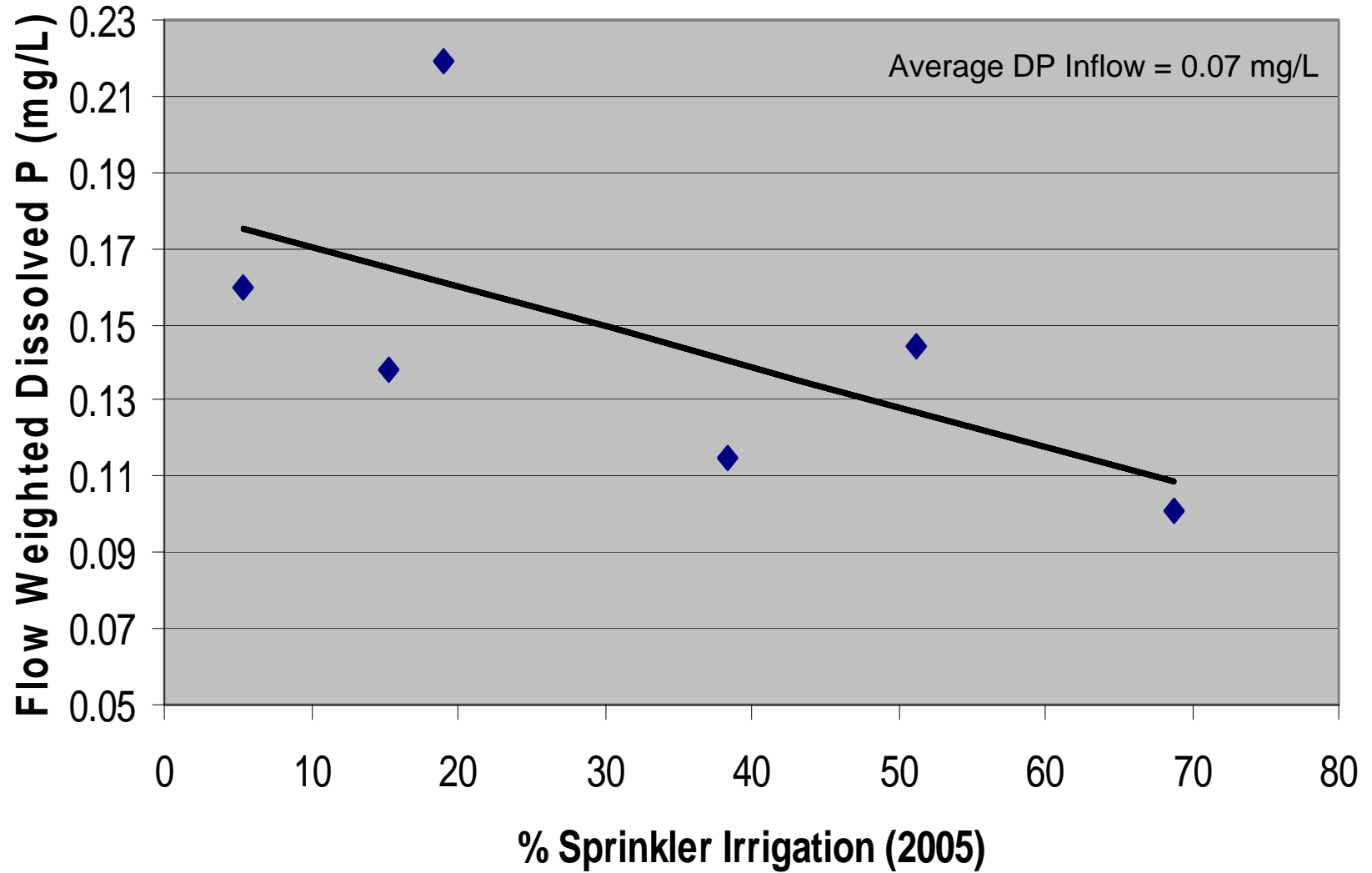


2005 Sub-basins



April, 2006

2005 Sub-basins



April, 2006

Watershed Modeling

- Objectives
 - Calibrate and validate models
 - Simulate water quality effects of additional conservation practices
 - Simulate effects of conservation practice placement
- Models for comparison
 - SWAT – Soil Water Assessment Tool
 - AnnAGNPS – Annualized Agricultural Non-Point Source model
 - Others



Modeling Issues

- There is not an accurately digitized map of the canal system, prohibiting accurate sub-basin delineation.
- There is not a current map of irrigation practices for the entire irrigation tract.
- Existing models must be modified for irrigation and irrigation-induced soil erosion processes.



Progress (May 2006)

- Watershed data compilation in process (IDWR, USGS, IWRRI, IDEQ, TFCC)
- First year water, field and spatial data collection finished and analyses underway
- Second year sampling and data collection in process
- Need modeling support

