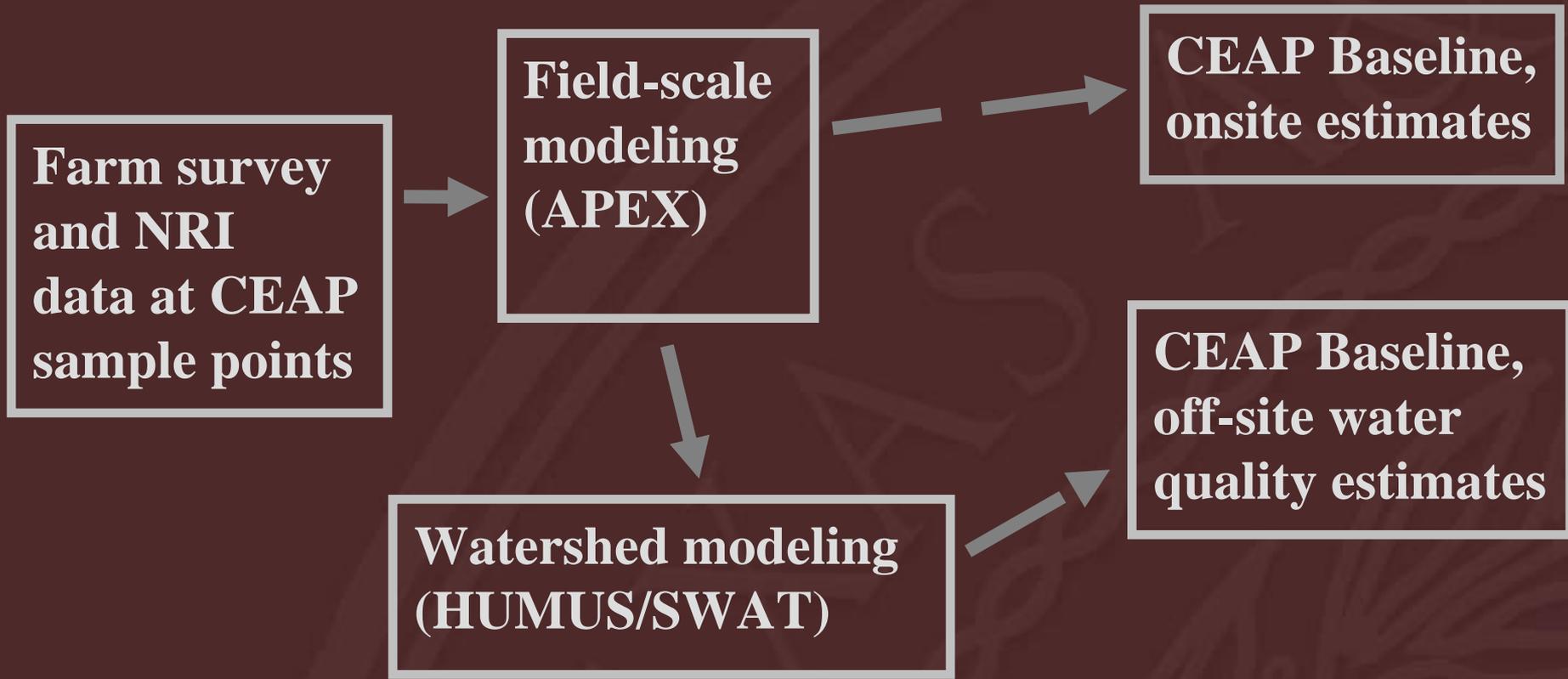




Simulating CEAP Sample Points with the APEX Model

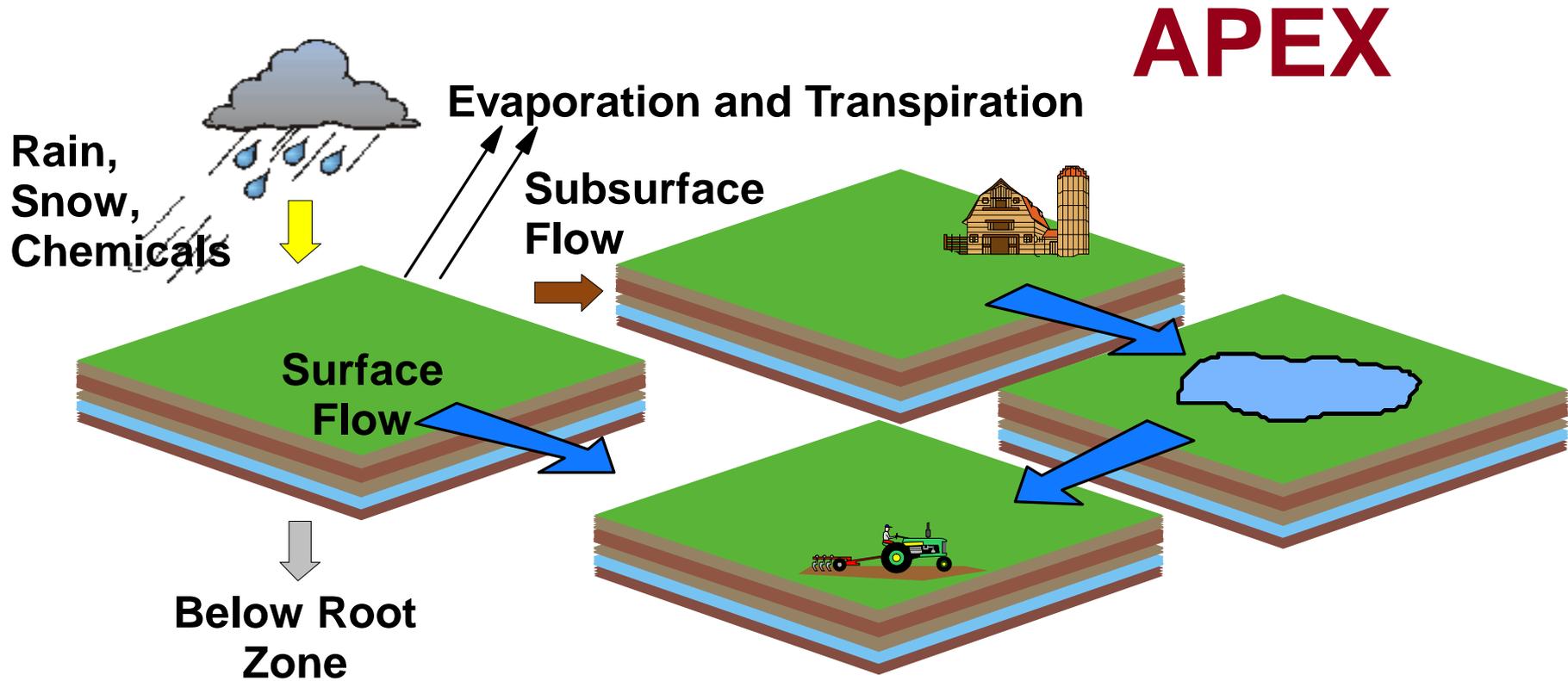
**Steven Potter
Xiuying (Susan) Wang
Jerry Lemunyon
Jimmy Williams
Arnold King**

**Blackland Research Center
Temple, Texas**



Schematic for Construction of CEAP Cropland Estimated Effects

Agricultural Policy Environmental eXtender



Field-scale Simulation for the CEAP National Assessment

- **CEAP Farmer Survey**
 - Cropping System & Field Operations
 - Fertilizer Form, Rate, Timing, Method
 - Conservation Practices (Farmer, NRCS, FSA/CREP)
- **National Resource Inventory**
 - Location
 - Soil Type
 - Slope
- **Other National Level Data**
 - Climate
 - N Deposition
 - Soil Data

CEAP Field-scale Simulation

Conservation Practices

- Which conservation practices were included in simulation. Which were not included.
- How conservation practices were modeled.

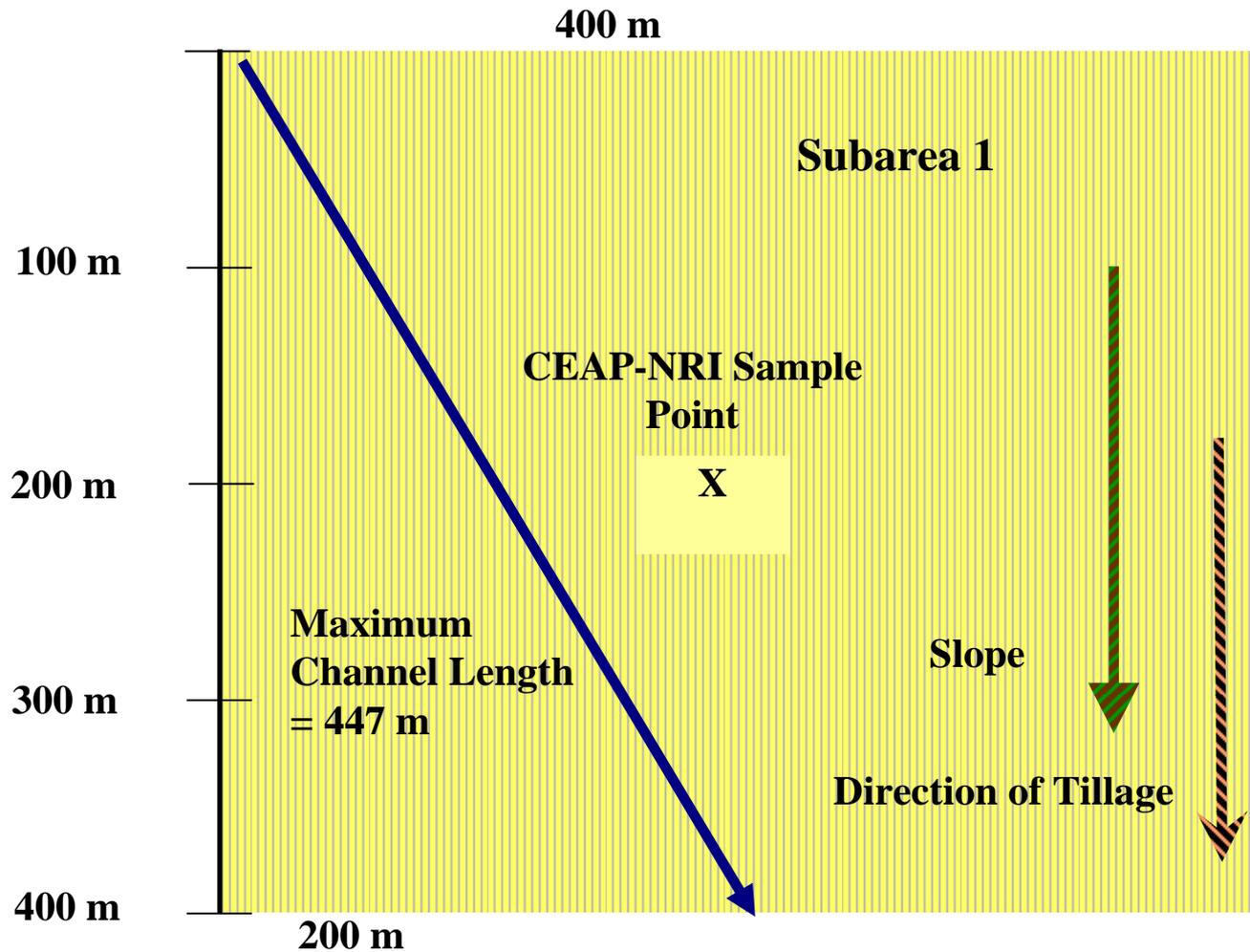
CEAP National Assessment

**Stylized Fields
for Simulating Conservation
Practices on Cropland**

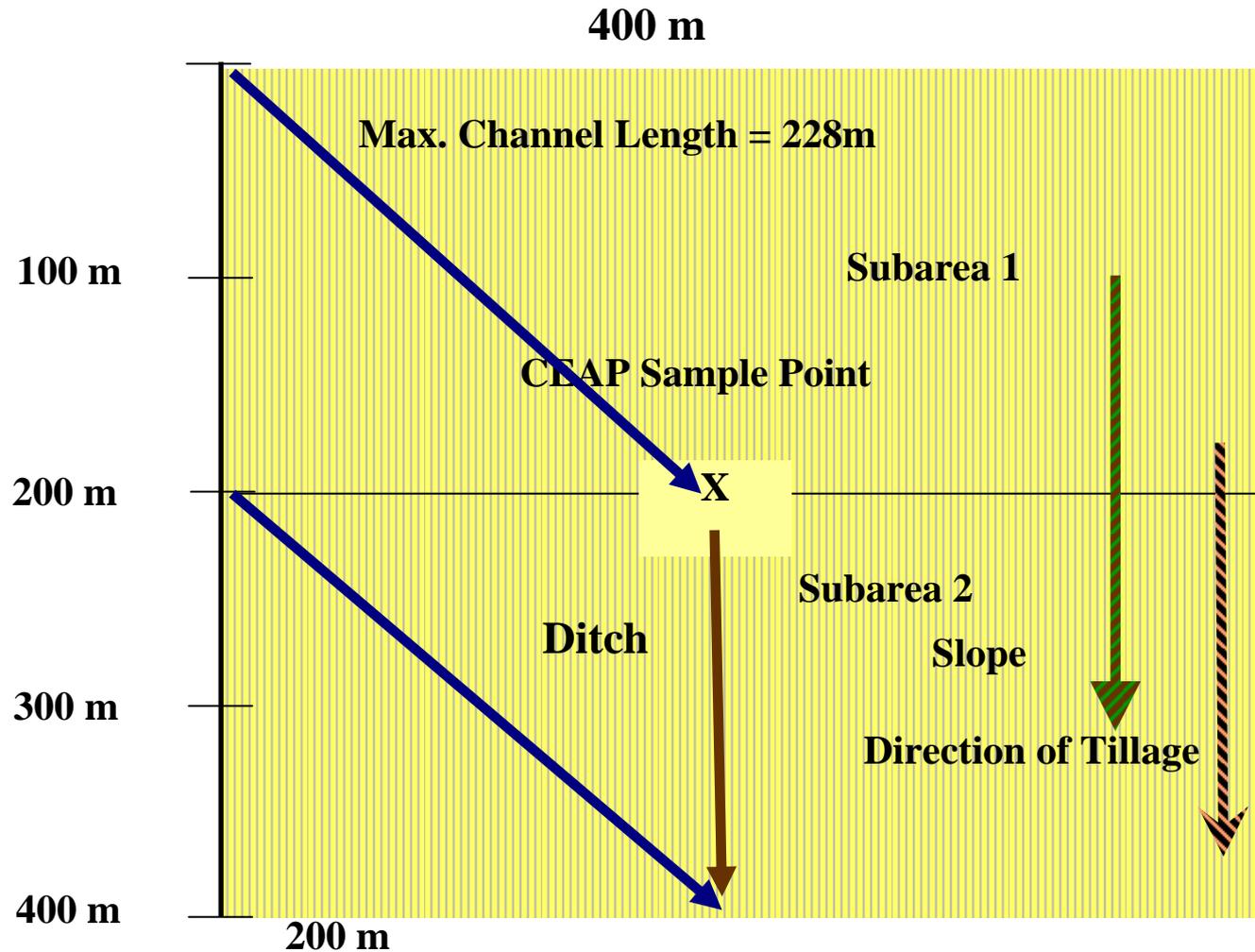
No Practice And Baseline Scenarios

CEAP National Assessment

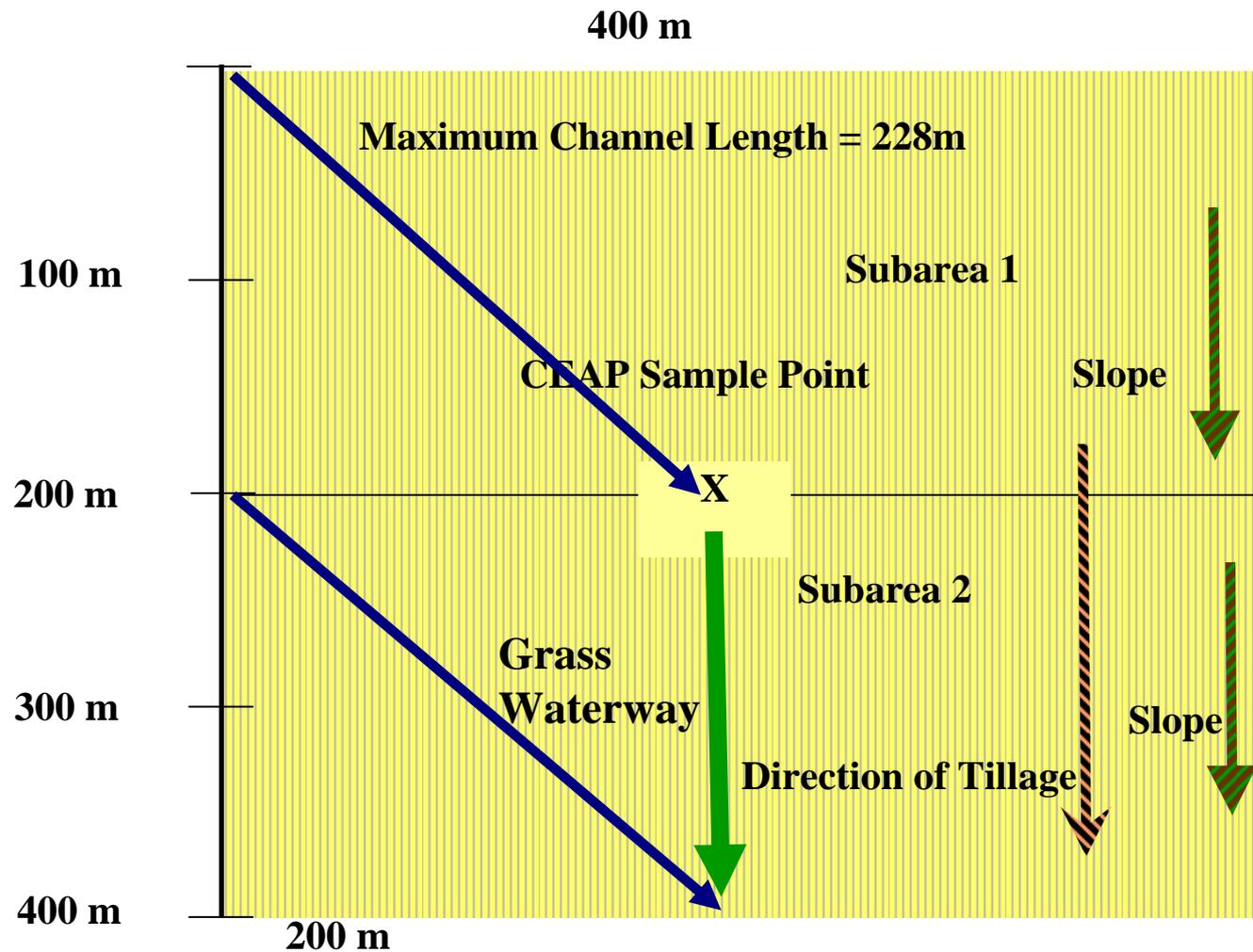
No Conservation Practices



No Conservation Practice w/ Eroding Ditch

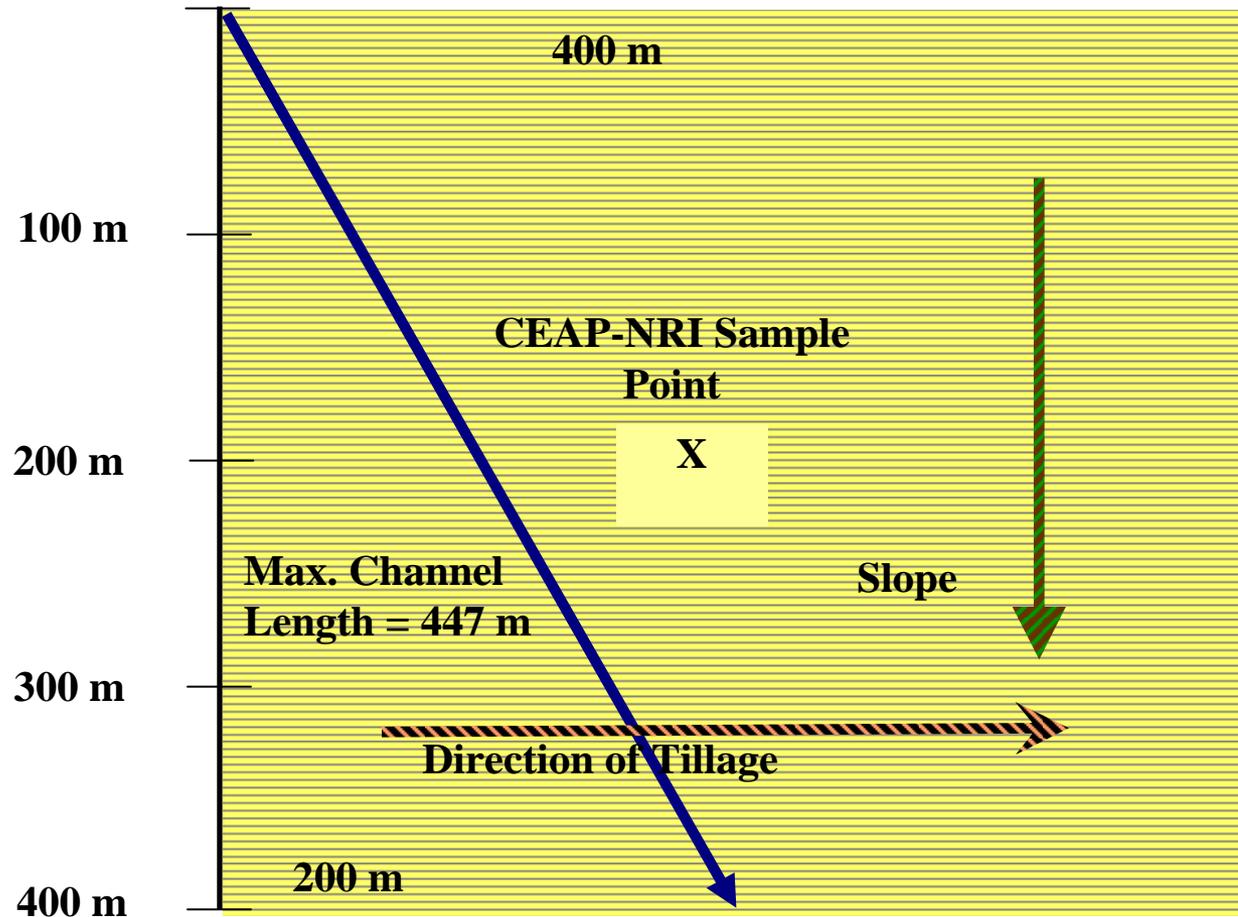


Grass Waterway Only





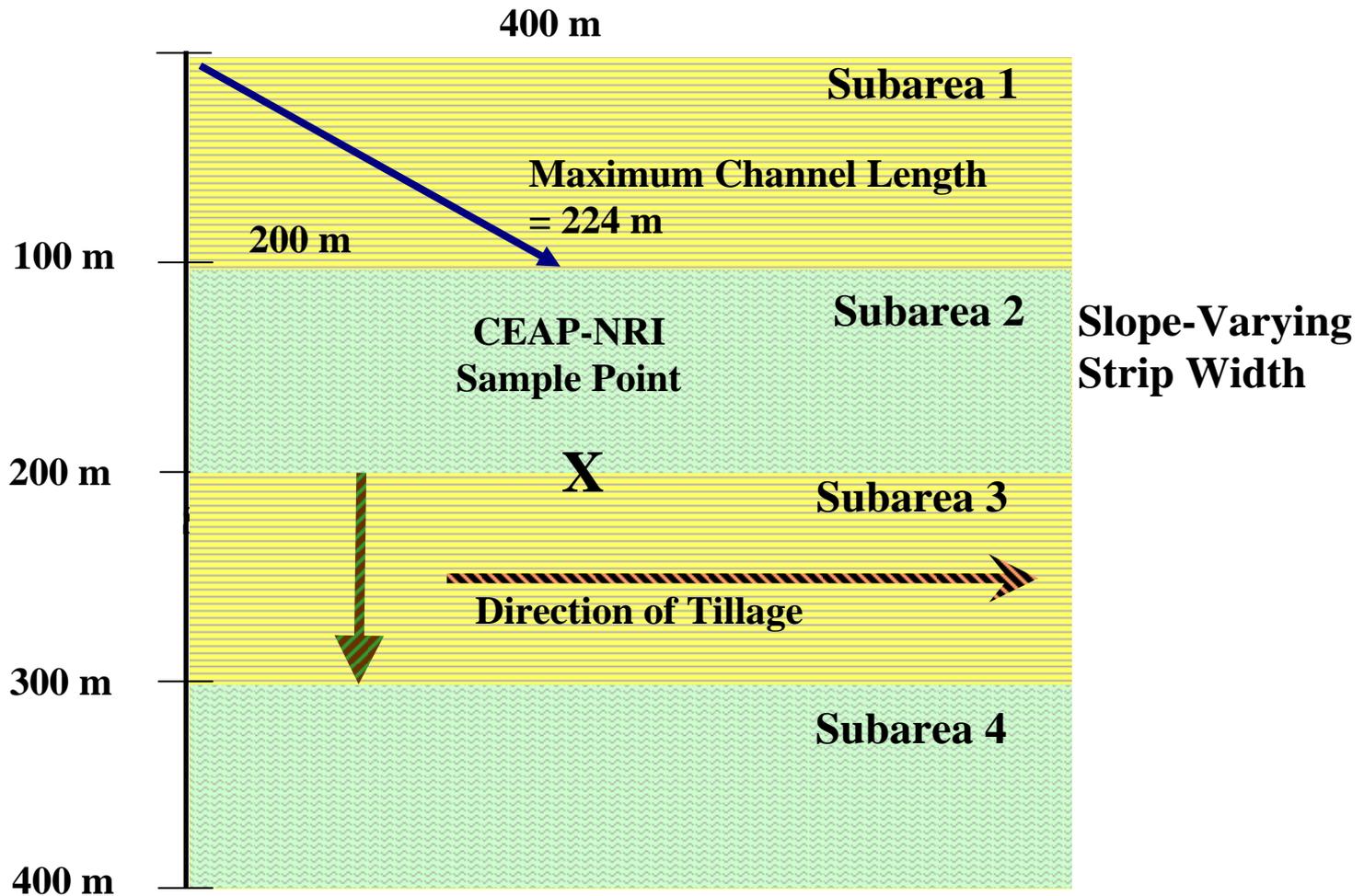
Contours Only





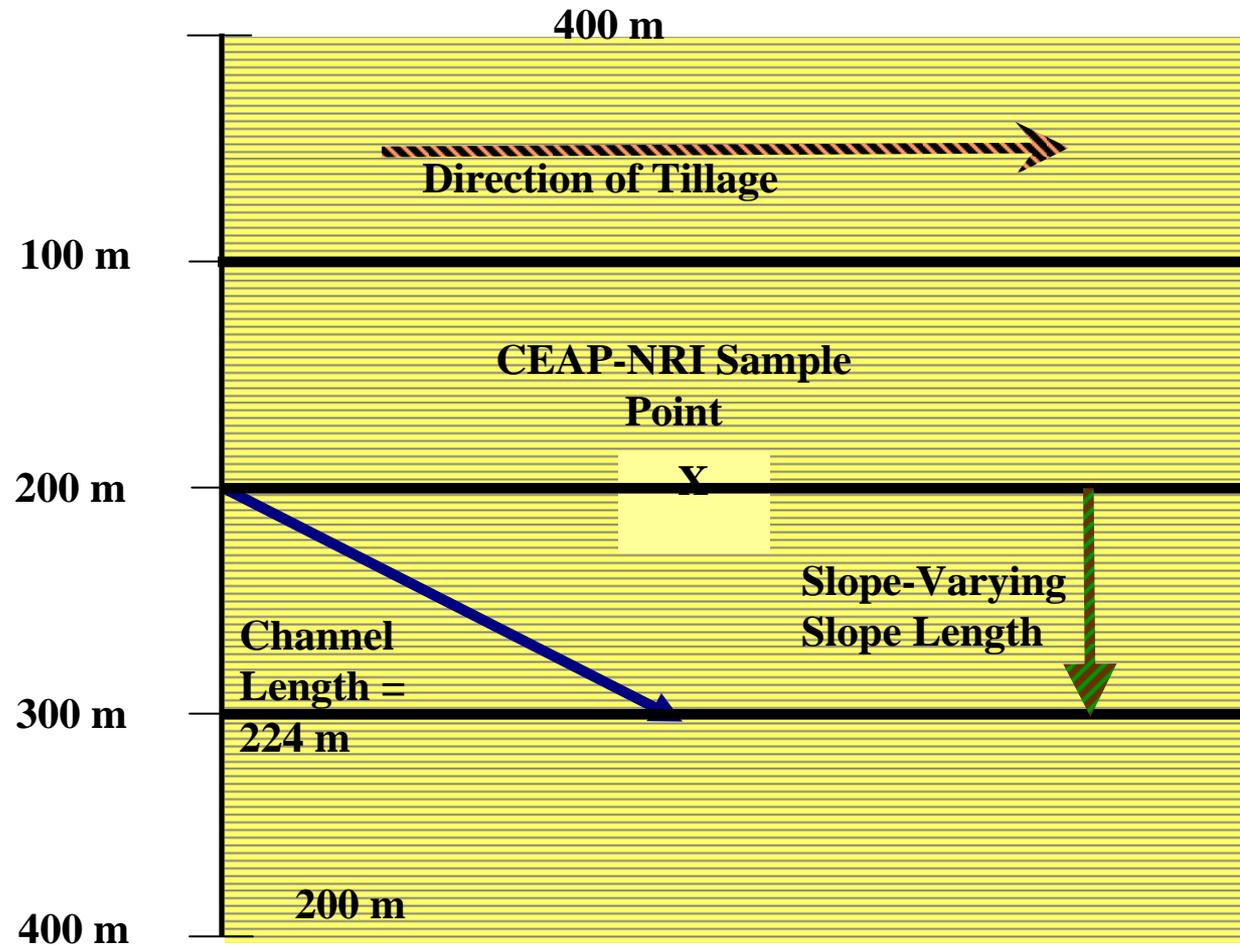
Contour Strip Cropping

(4 100 m Strips)

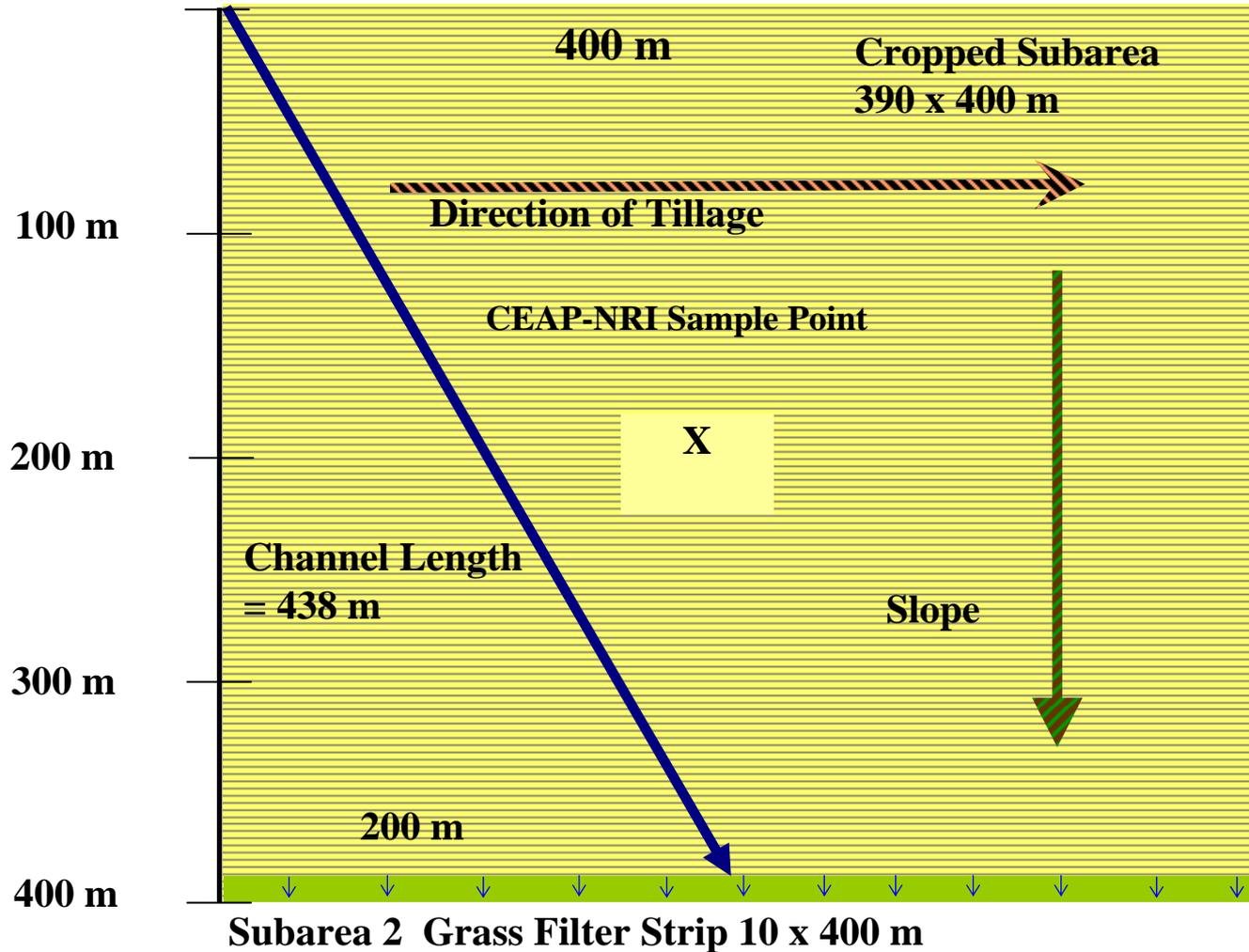




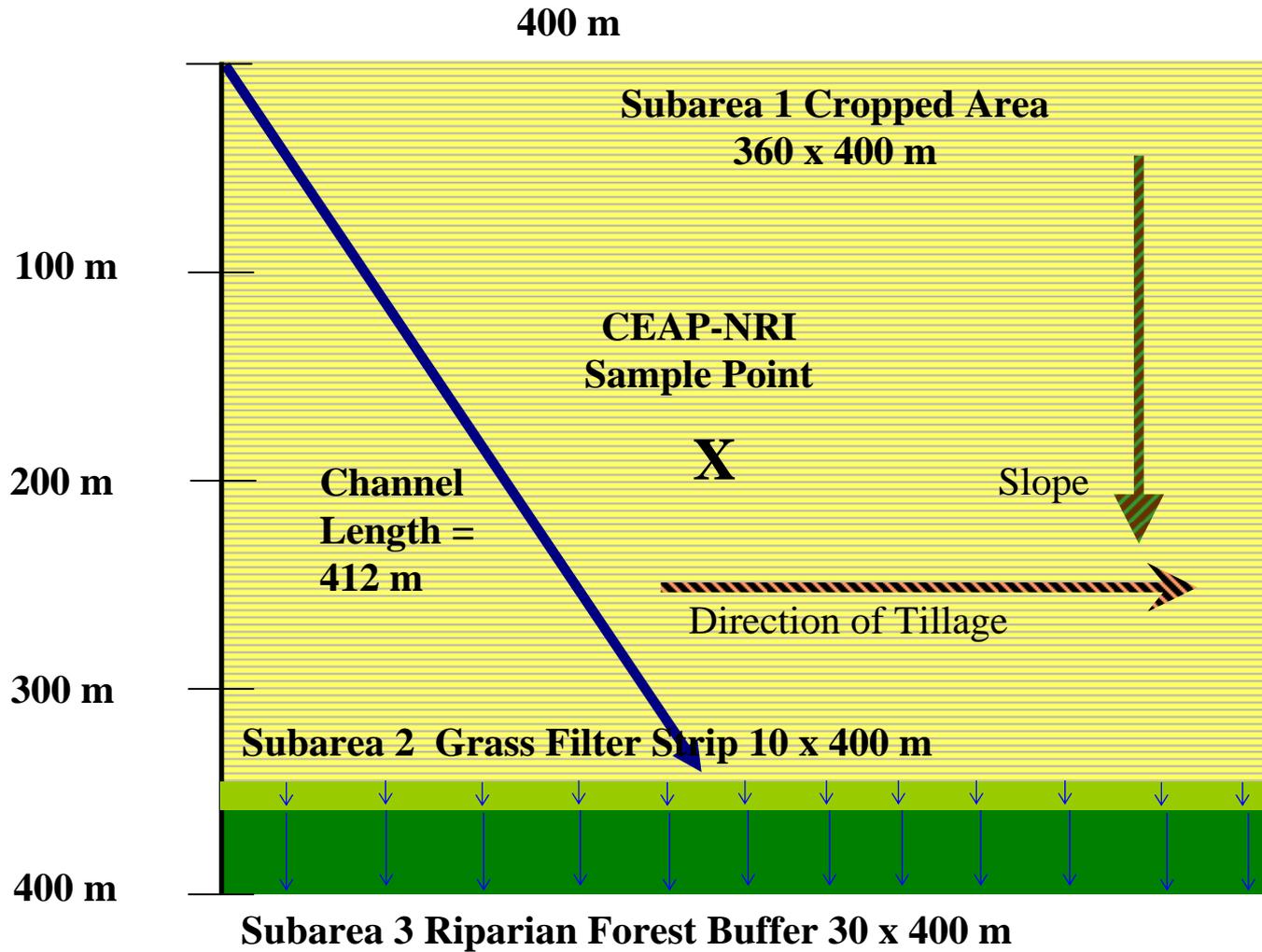
Terraces



Contours & Grass Filter Strip



Contours, Grass Filter Strip & Riparian Buffer



A CEAP Point Described

- South Georgia, Continuous Cotton, 2.3% Slope
- Tifton Fine Sandy Loam, Hydro Group B
- Precipitation ~50 inches per year
- 3 Disking Ops, 1 Bedder/Shaper Op
- Terraces and Grass Waterway
- 2 Scenarios => No Practice & Baseline

No Practice vs. Baseline

Both have same

- Crop Rotation
 - Fertilizer form, rate, timing, method
 - Simulation Period (daily weather inputs)
 - Other management
-

No Practice

- Till Up & Down Slope
- Eroding Ditch

Baseline

- Conservation Practices
 - Terraces
 - Grass Waterway

	No Practice	Baseline	Change from No Practice	Percent change from No Practice
Runoff (inches)	9.8	7.4	-2.4	-24.5%
Percolation (inches)	5.7	7	1.3	22.8%
Sediment (tons /acre)	6.3	1.5	-4.8	-76.2%
N in Sediment	9.6	2.8	-6.8	-70.8%
N in Runoff	0.62	0.41	-0.21	-33.9%
N in Leachate	5.4	6.7	1.3	24.1%
Total N (lbs./acre)	15.62	9.91	-5.71	-36.6%
P in Sediment	4	1.1	-2.9	-72.5%
Soluble P Loss	1.12	1.05	-0.07	-6.3%
Total P (lbs./acre)	5.12	2.15	-2.97	-58.0%
Pesticides	?	?	?	?

A CEAP Point Described

- Iowa, Corn-Soybeans, 8% Slope
- Exira Silty Clay Loam, Hydro Group B
- Precipitation ~32 inches per year
- No-till
- Grass-Terraces, Grass Waterway, Riparian Forest Buffer
- 2 Scenarios => No Practice & Baseline

	No Practice	Baseline	Change from No Practice	Percent change from No Practice
Runoff (inches)	3.4	2.1	-1.4	-39.7%
Percolation (inches)	0.2	0.9	0.7	315.5%
Sediment (tons /acre)	7.5	0.5	-7.1	-94.0%
N in Sediment	39.9	3.4	-36.5	-91.5%
N in Runoff	0.6	0.3	-0.3	-46.1%
N in Leachate	0.1	0.3	0.2	326.0%
Total N (lbs./acre)	40.5	4.0	-36.5	-90.1%
P in Sediment	9.1	0.7	-8.4	-92.6%
Soluble P Loss	0.4	0.3	0.0	-7.7%
Total P (lbs./acre)	9.4	1.0	-8.4	-89.4%
Pesticides	?	?	?	?

**Important to validate results by
comparing to measured field data**

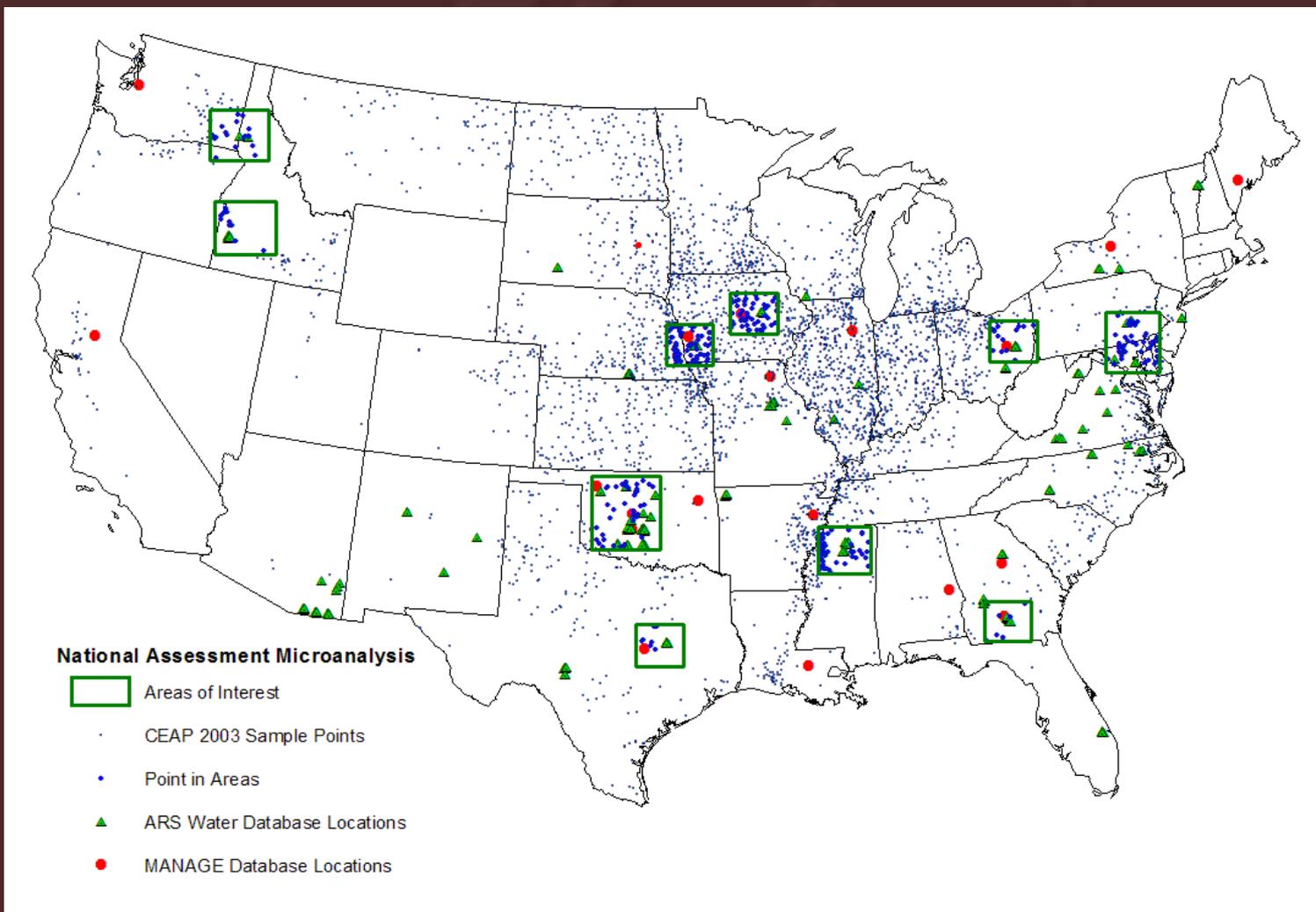
Sensitivity analysis of APEX for national assessment

X. Wang, S. R. Potter, J.R. Williams, J.D. Atwood



APEX Model Validation for CEAP

J. Williams, S. Potter, X. Wang, J. Lemunyon, A. King, J. Atwood, L. Norfleet, T. Gerik, E. Steglich, C. Wang, and *ARS Scientists*



Comparison to Conservation Practice Physical Effects

Arnold King, Pat Mielnick, and others

Do quantitative APEX results
correlate with the qualitative
data contained in CPPE?

Compilation of Measured Nutrient Load Data for Agricultural Land Uses in the US

**Daren Harmel (ARS-Temple), Steve Potter, Pamela Ellis, Ken
Reckhow, Colleen Green, Rick Haney**

ARS

TAES

Duke

**The MANAGE database (v1) is freely available online
at**

<http://ars.usda.gov/Research/docs.htm?docid=11079>

Next Steps

- Continue ...

Thank You

For more information:

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