

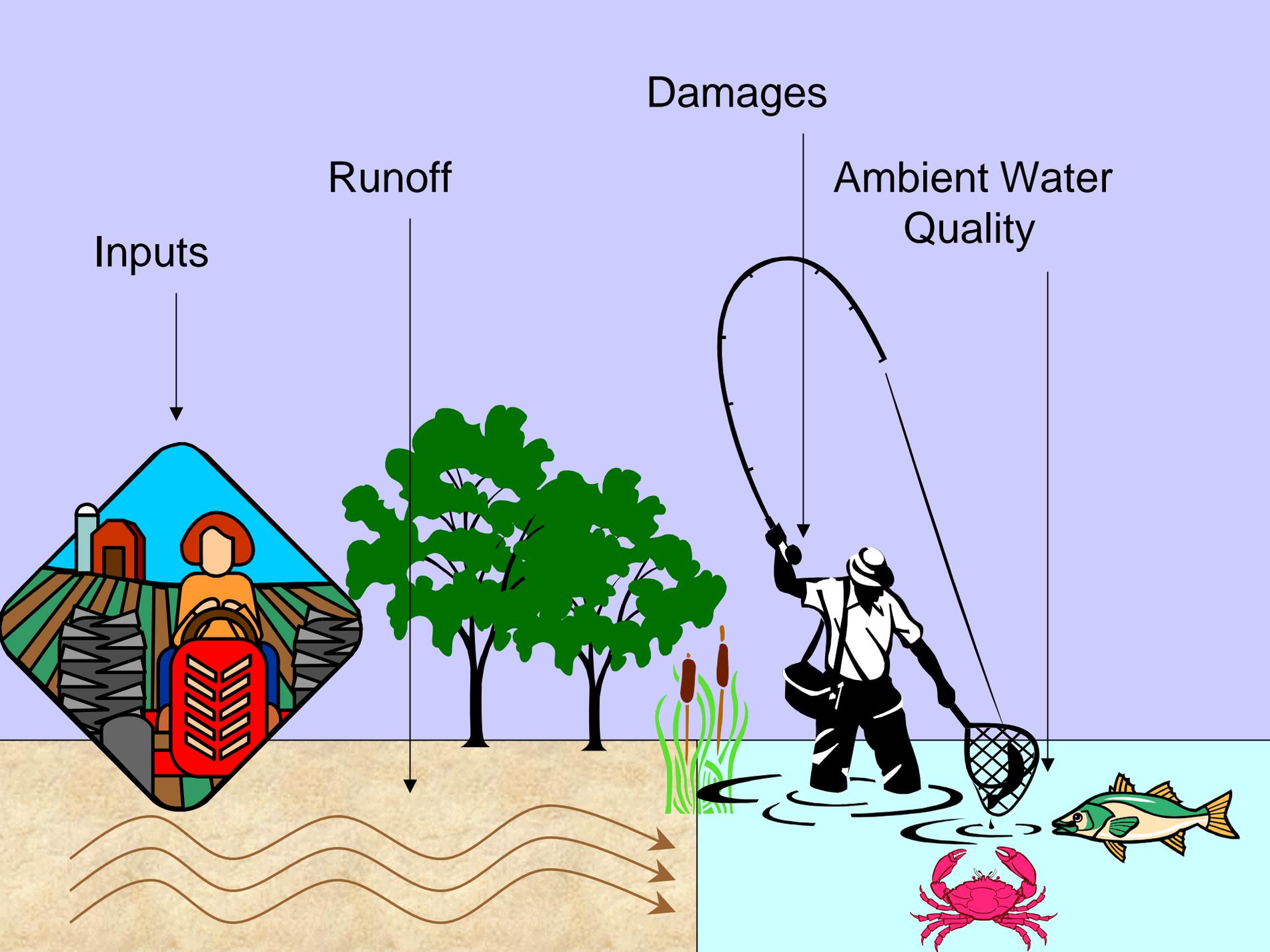
Using SPARROW for Agricultural Analysis

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Why does ERS care about water quality?

- Agriculture is the largest land use in the U.S.
- Agriculture is generally recognized as the largest contributor of non-point pollution in the U.S.



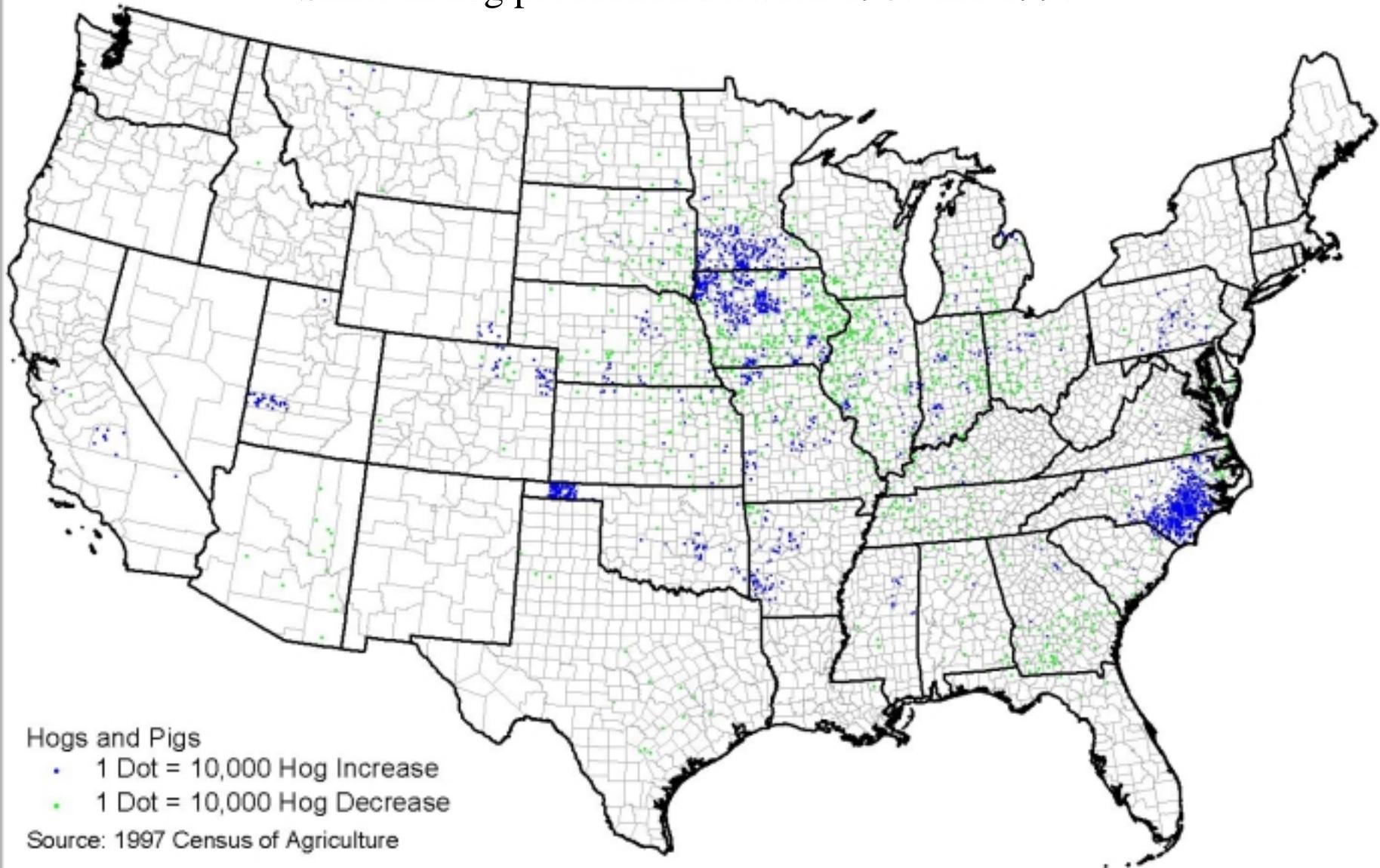
Damages

Runoff

Inputs

Ambient Water Quality

Shifts in hog production between 1987 and 1997



Working Farmland Conservation Programs



Policy Questions



What are the environmental and economic tradeoffs inherent in working land programs and their designs?

- **EQIP and CSP**

Environmental Damages and Benefits

Environmental Externality	Medium	Relative Damage Measurement	Estimate (acre ⁻¹ year ⁻¹) Transport Factor
Sheet and Rill Nitrogen	Surface Estuary	Tons Lbs.	Same As Phosphorus Derived from SPARROW
Phosphorus	Surface	Lbs.	Derived from SPARROW
Pesticides	Surface	TPUs	Same as Phosphorus
Nitrogen	Ground	Lbs.	100%
Pesticides	Ground	TPUs	100%
Wind Erosion	Air	Tons	100%
Carbon	Air	Tons	100%
Soil Productivity	Soil	\$'s	100%



	Sheet	Nitr_g	Nitr_e	Phos	Wind	Prod_d	Carb_e	Pest_s	Pest_g
Nitr_g	-0.0288 0.3254	1.0000							
Nitr_e	0.1721 0.0000	0.0855 0.0035	1.0000						
Phos	0.7677 0.0000	0.1389 0.0000	0.2814 0.0000	1.0000					
Wind	0.0037 0.9005	-0.1249 0.0000	-0.1688 0.0000	-0.1795 0.0000	1.0000				
Prod_d	0.2421 0.0000	-0.0171 0.5588	0.0142 0.6271	0.2384 0.0000	-0.0674 0.0213	1.0000			
Carb_e	0.1526 0.0000	-0.0360 0.2195	0.1105 0.0002	0.1190 0.0000	0.0537 0.0670	0.0971 0.0009	1.0000		
Pest_s	0.0860 0.0033	-0.0227 0.4380	0.0104 0.7223	0.0828 0.0047	0.0096 0.7436	0.0114 0.6971	-0.1246 0.0000	1.0000	
Pest_g	-0.0155 0.5972	0.3822 0.0000	0.0347 0.2370	0.0932 0.0014	-0.0573 0.0504	-0.0384 0.1896	-0.1011 0.0005	0.0019 0.9487	1.0000
Sum	0.4885 0.0000	0.5971 0.0000	0.3590 0.0000	0.6458 0.0000	-0.1109 0.0001	0.2315 0.0000	0.5187 0.0000	0.1550 0.0000	0.3761 0.0000

Correlation Matrix (current, area weighted)



Land Use and the Environment at the Extensive Margin



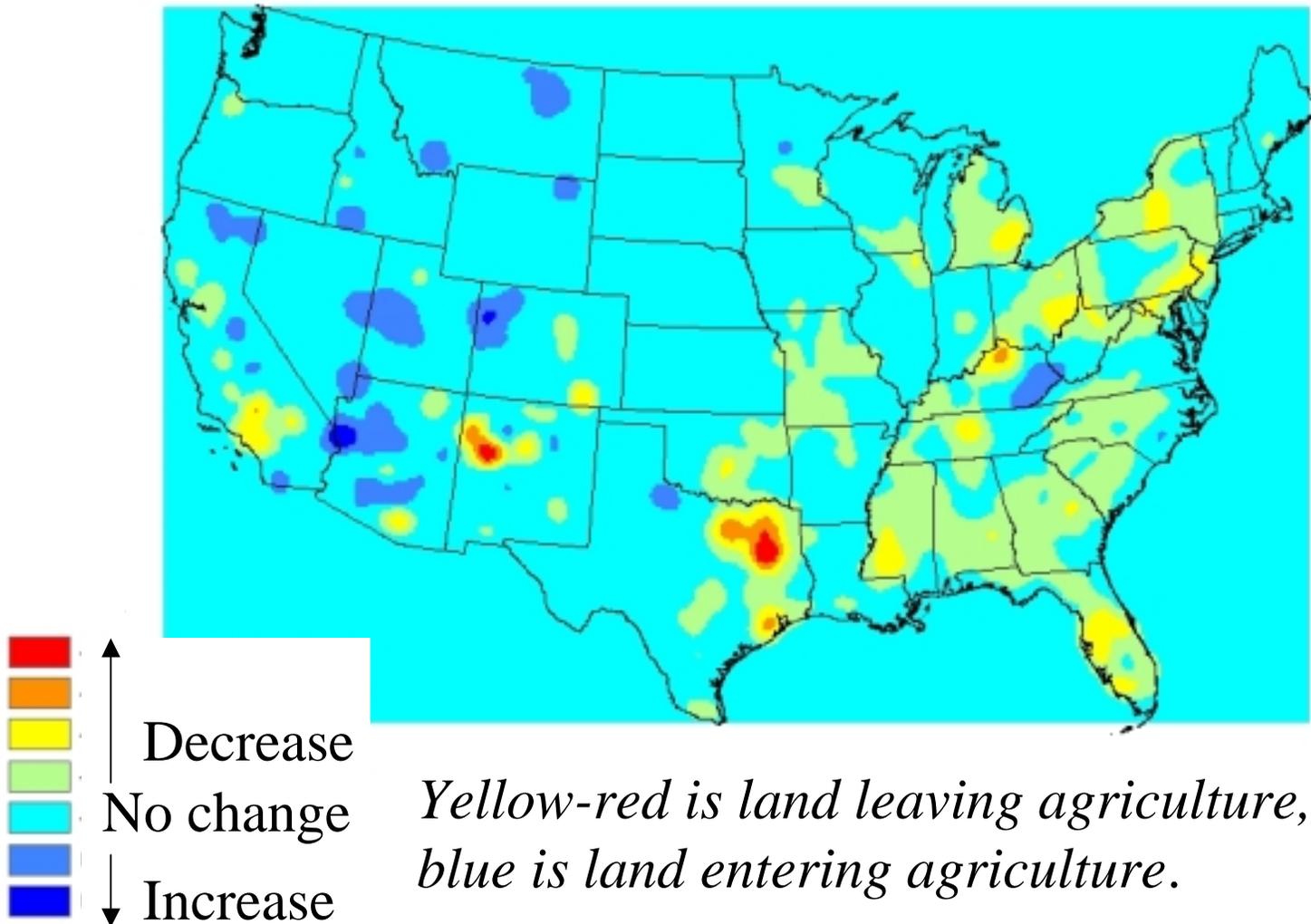
Policy Questions

How do government programs such as

- **crop insurance subsidies**
- **set-aside programs (CRP)**
- **price supports**

influence the environment?

Net Gain/Loss of Agricultural Land 1982-1997



Characterizing Environmental Attributes of Land

- **Use maps and tables demonstrating the environmental characteristics of land and how it varies spatially.**
- **Emphasize exogenous features of the landscape**
- **Map and analyze a variety of environmental indicators including:**
 - ✓ county-level data set on species endangerment (Biodata Inc.)
 - ✓ pesticide, nitrogen, phosphorus, and sediment concentrations (USGS)
 - ✓ recreational activities and trips (2000 NSRE and 1996 NSFWS)

Concluding Comments

Policy Feedback 4

**Agricultural &/or
Environmental Policy**

↓1

**Changes in production practices,
input use and outputs**

↓2

**Changes in physical measures
of environmental impacts**

↓3

**Changes in economic measures
of environmental impacts**

- ERS has expertise in examining 1, 3, and 4
- SPARROW can assist us in understanding 2