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United States
Environmental Protection
Agency

Office of Research and
Development
Cincinnati, OH 45268

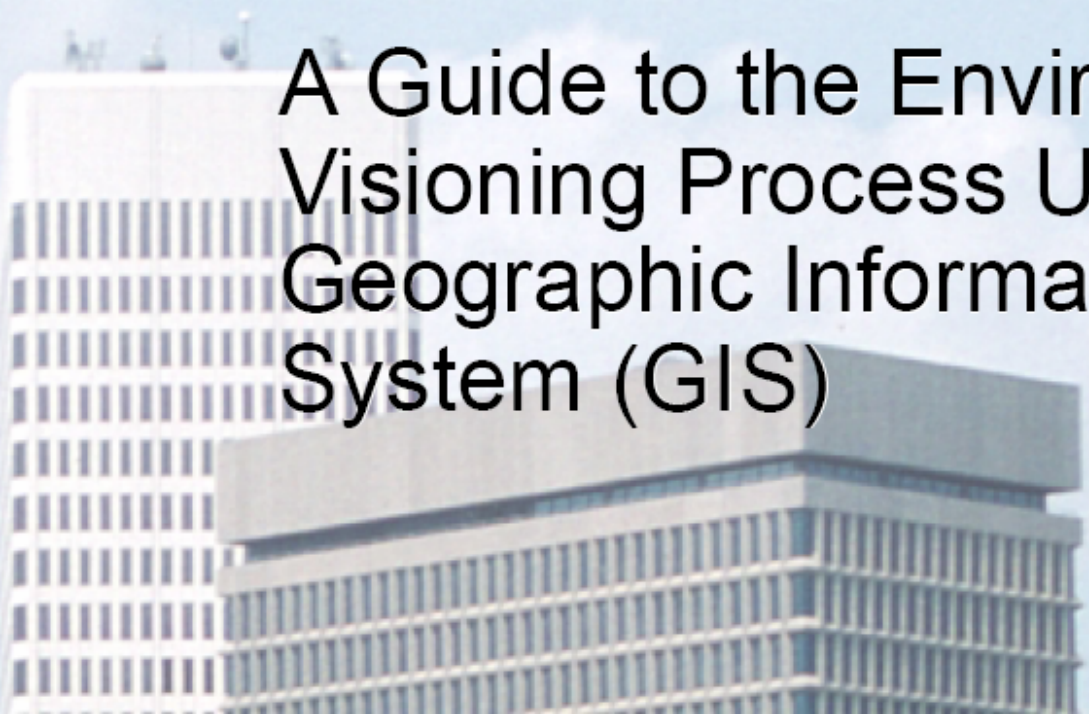
EPA/625/R-98/003
September 2000

Technology Transfer

EPA

Environmental Planning for Communities

A Guide to the Environmental Visioning Process Utilizing a Geographic Information System (GIS)



Example Case Studies

- Monroe County, PA, Poconos
- Camp Pendleton area, CA
- Muddy Creek, Benton County, OR
- Willamette basin, OR
- Iowa agricultural watersheds
- Mojave desert CA
- Blackberry Creek, Kane County, IL,
- Chico Creek, Kitsap County, WA

Case Study:
Iowa Agricultural Watersheds

- Small watersheds in intensive agricultural areas in Iowa
- Leveraged data from earlier studies
- Project activities at universities in Oregon, Iowa, Michigan, Minnesota

Study Region

- U.S. Cornbelt, nearly all land in private ownership, agricultural land use
- Serious concerns over degradation in water quality, soil erosion, native biodiversity, human quality of life
- Precedent and potential for influence of agricultural policy on land use

Land Use Changes to Reduce Soil Erosion

- Alternative agricultural practices
- Expand use of best management practices
- Conservation Reserve Program

Land Use Changes to Reduce Stream Pollution

- Riparian buffers
- Upland filter strips
- Alternative agricultural practices
- Alternative crops or commodities
- Nutrient detention wetlands, engineered features

Land Use Changes to Maintain Biodiversity

- Set-aside reserves
- Use of native species in plantings (roadsides, farmsteads, etc.)
- Restoration of wetlands
- Habitat connections

Land Use Changes to Keep Families on Land

- Extensive livestock farming (instead of confined feeding operations)
- Diversification of operations
- Non-farm homes, biodiversity farmsteads

Evaluating Land Use Alternatives

- Biodiversity
  - Statistics of change in habitat for all non-fish vertebrate species, plus butterflies
  - Spatially explicit population models for all mammals, plus 4 amphibian species
  - Plant community model for plant biodiversity

Evaluating Land Use Alternatives

- Water quality
  - Spatially-distributed water quality model for nutrients and sediment
- Human dimensions
  - Spatially explicit model of economic impacts (EPIC)
  - Farmer interviews and farm planning

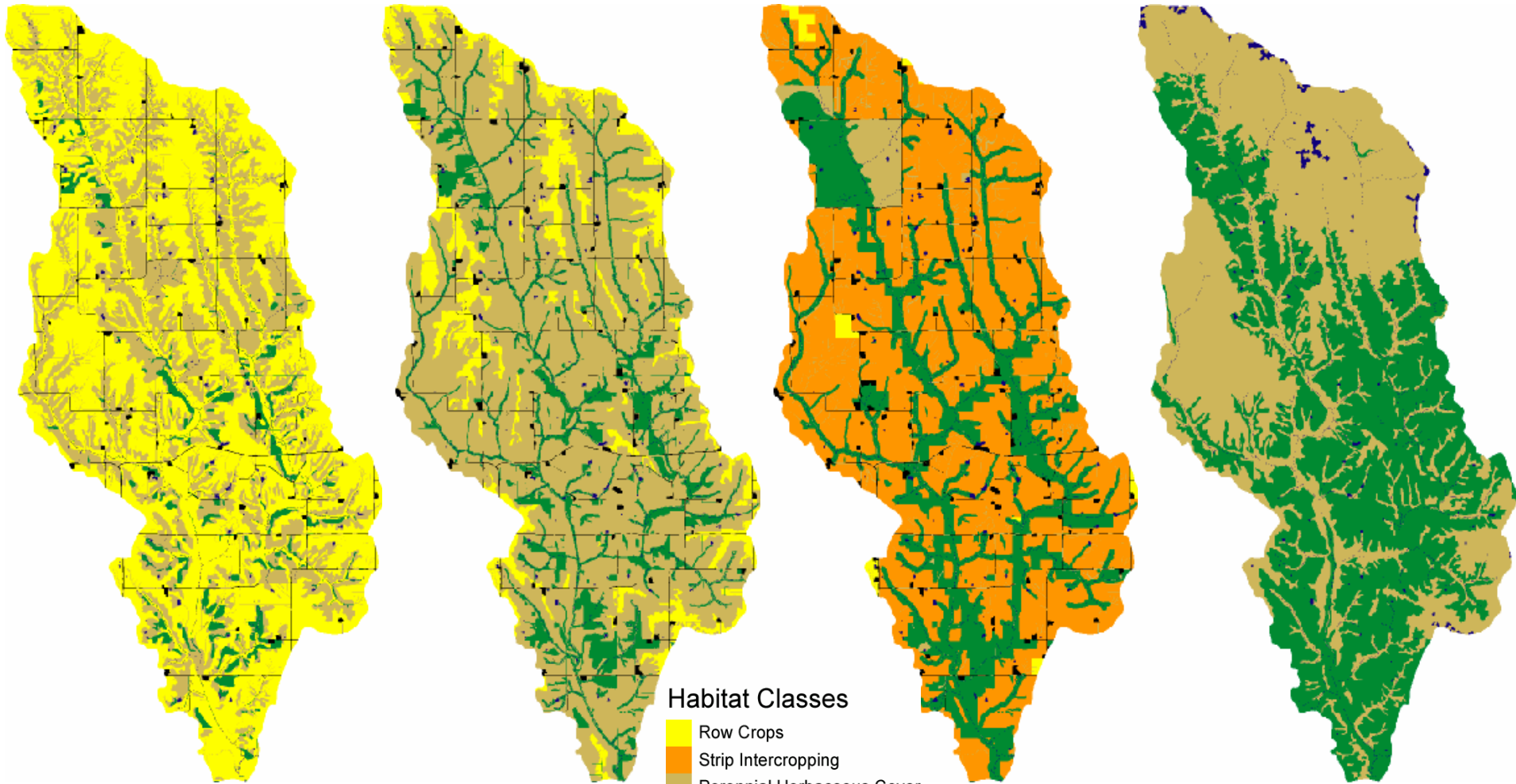
Futures for Buck Creek

Production

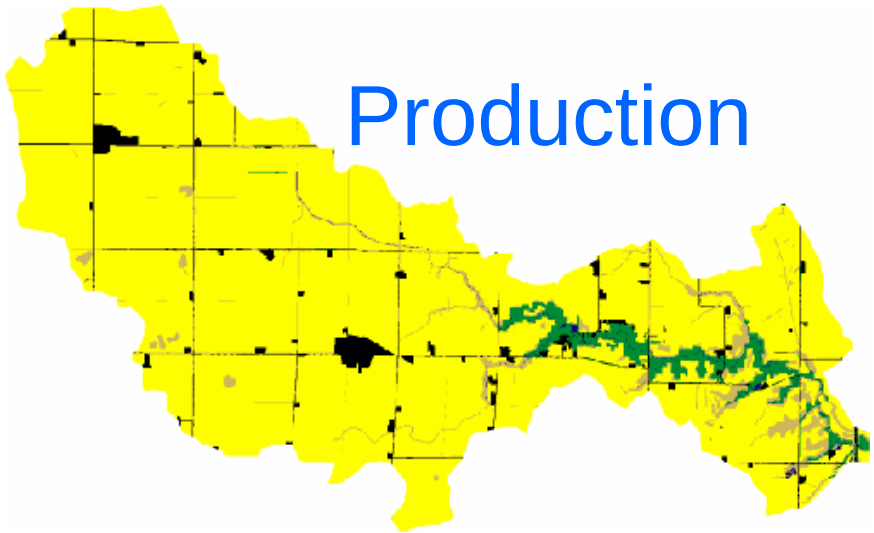
Water Quality

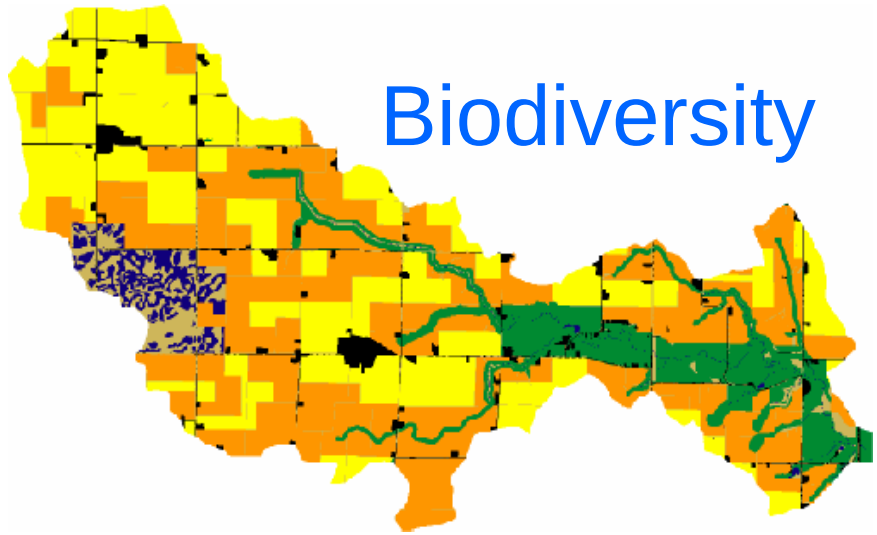
Biodiversity

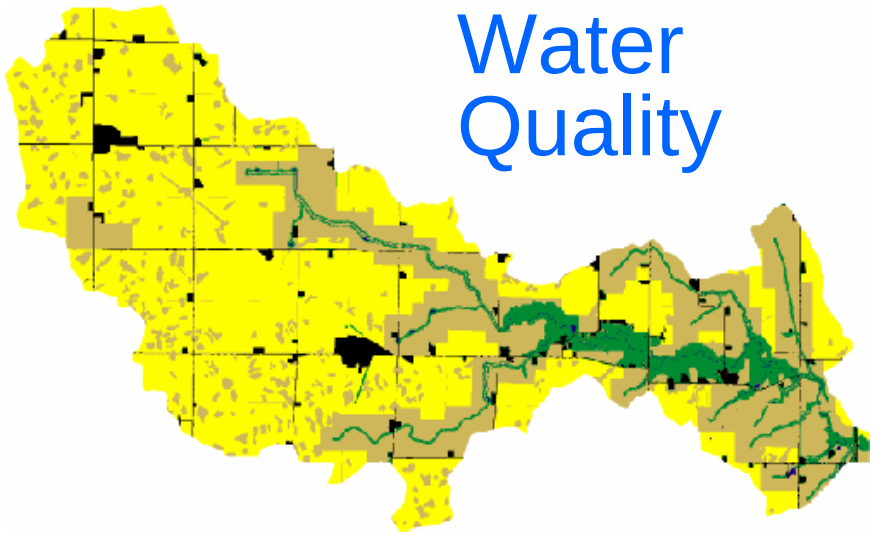
Pre-settlement

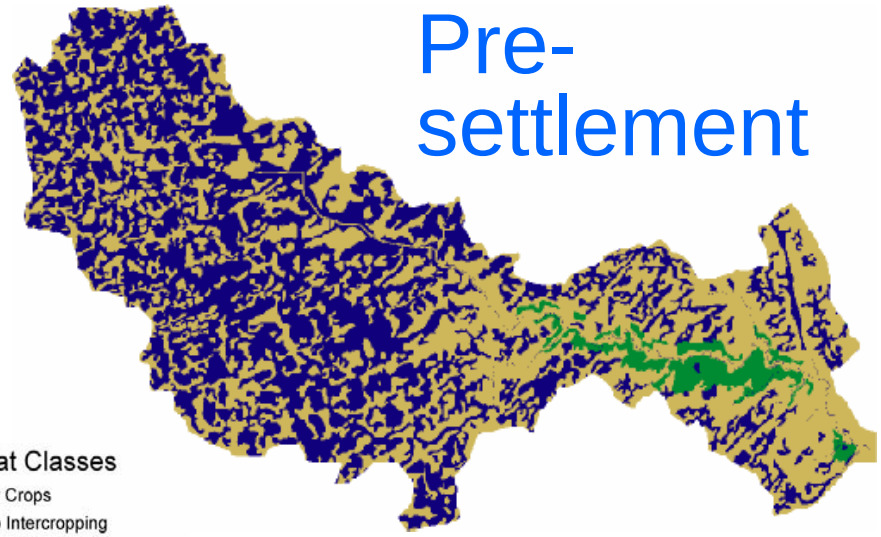


Futures for Walnut Creek







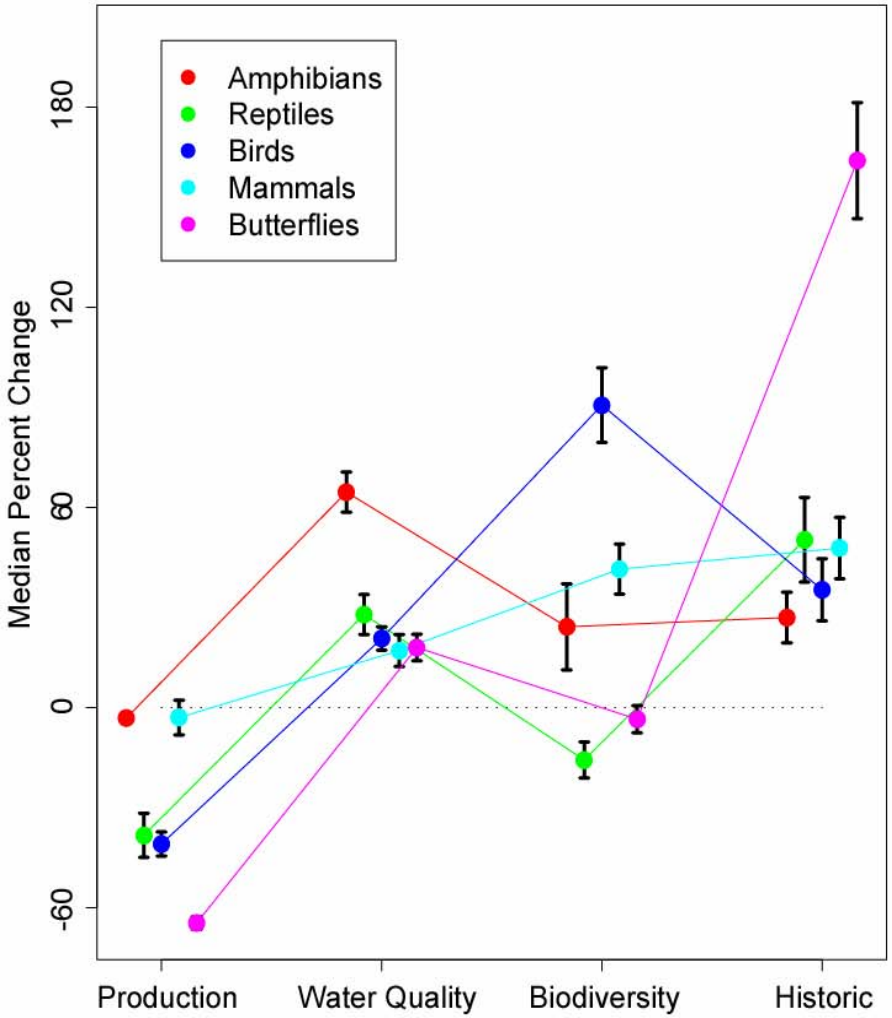


Habitat Classes

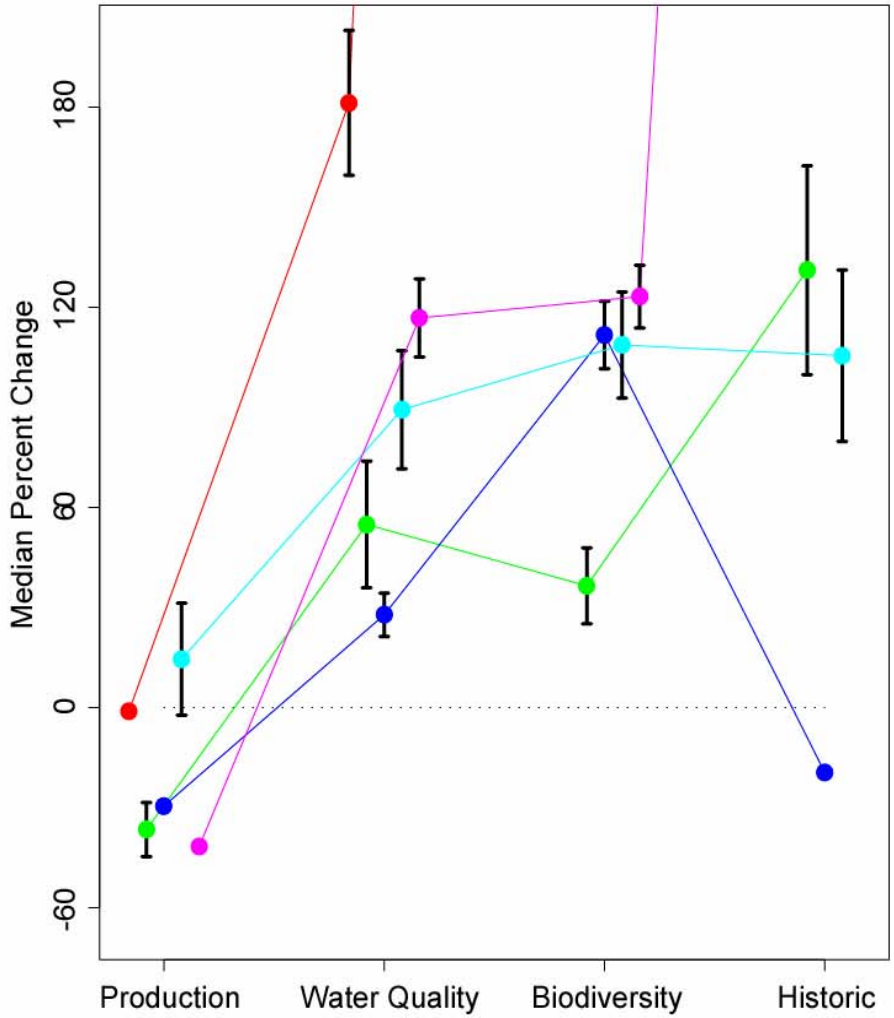
- Row Crops
- Strip Intercropping
- Perennial Herbaceous Cover
- Woodland/Woody Cover
- Water/Wetland
- Urban/Residential/Roads

Changes in Habitat

Buck Creek

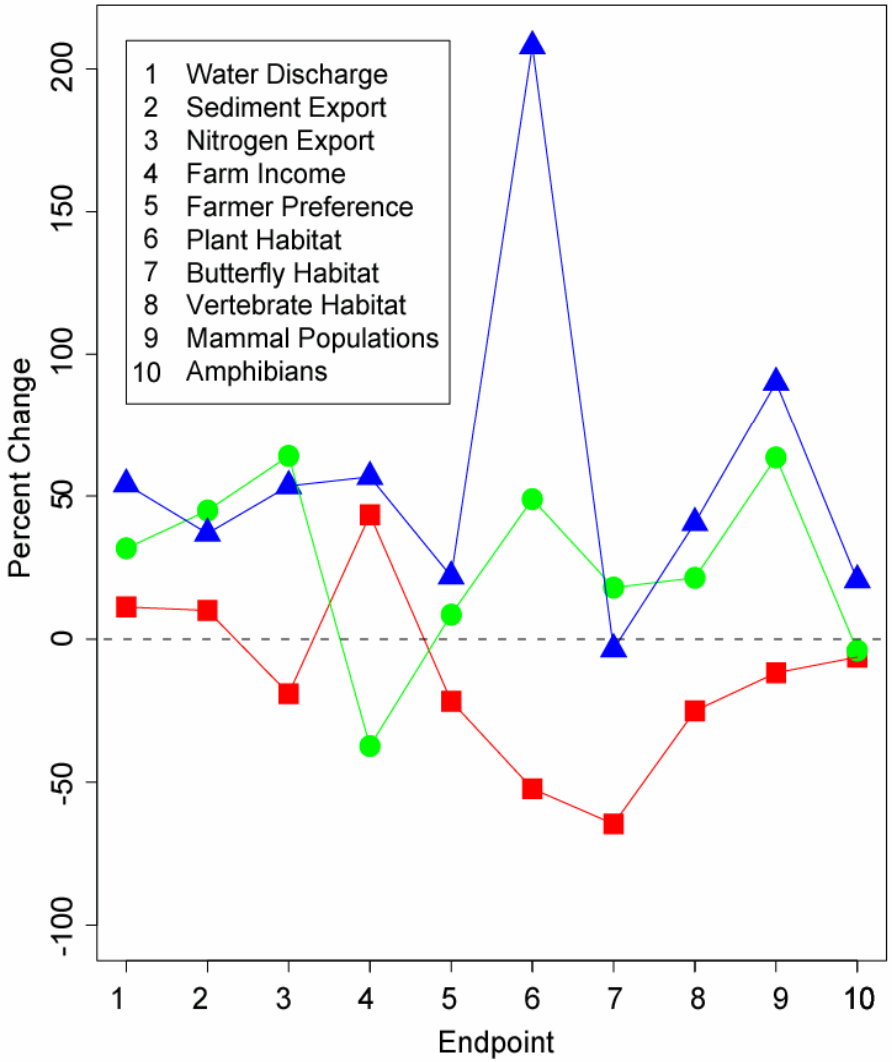


Walnut Creek

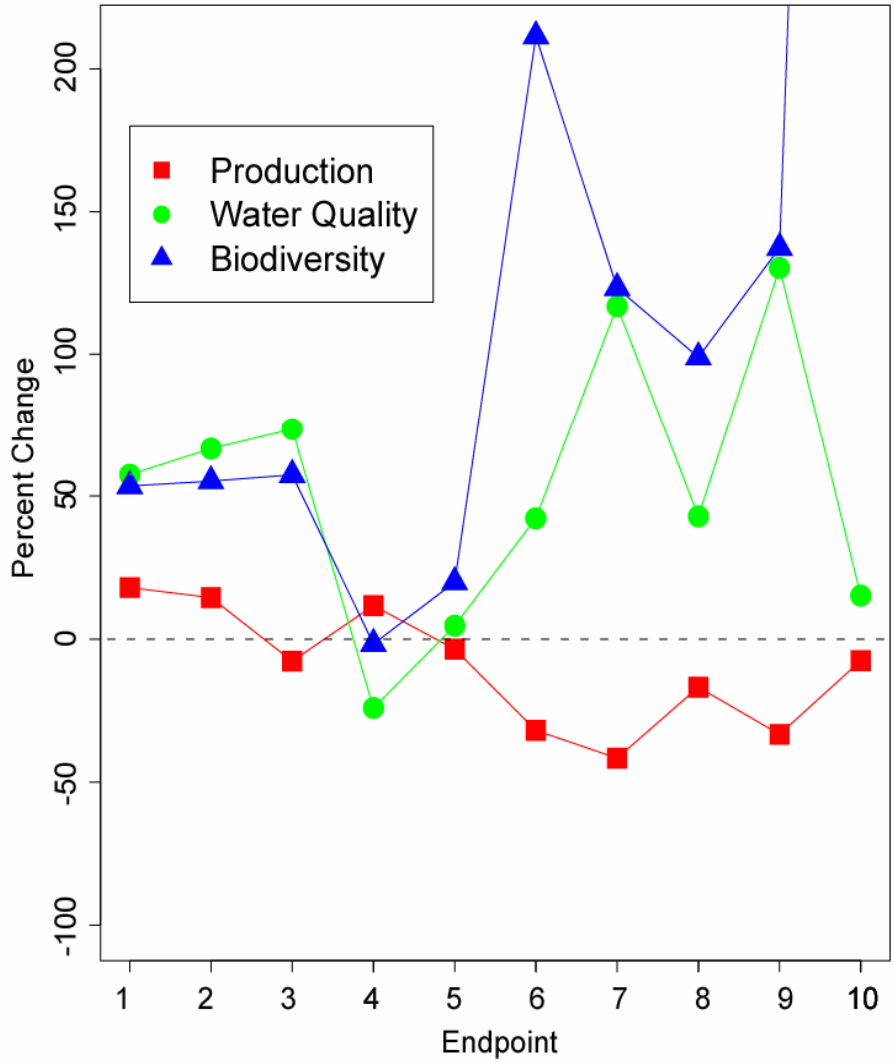


Changes in All Endpoints

Buck Creek



Walnut Creek



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Camp Pendleton, Southern California:
http://www.gsd.harvard.edu/studios/brc/brc.html

Muddy Creek, Oregon:
http://ise.uoregon.edu/Muddy/Muddy_abstract.html

Willamette Basin, Oregon:
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