Watershed-based Conservation Case Study Workshop

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Recommended Citation
https://scholarworks.uni.edu/sciedconf_documents/55

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Watershed-based Conservation Case Study Workshop

Use Data and Situations From Real Farms to Translate Natural Resources Decisions Into Your Classrooms

This case study is a joint project of Iowa State University and USDA–Natural Resources Conservation Service.
Today’s Agenda

- Conservation Jeopardy
- Watershed Connection
- Why Use Case Studies?
- Opportunity To Dig Into The Case Studies
Conservation Jeopardy

- **Rules**
  - Work in teams to record your answers in the *form of a question* on your white boards.
  - First team to raise their board will have the first chance answer.
  - Teams will have a chance to steal, so don’t erase your answers until given the go ahead.
  - Prizes!
Conservation Jeopardy

100 Points

- An area of land that drains to a common waterbody.
Conservation Jeopardy

100 Points

- An area of land that drains to a common waterbody.

- What is a watershed?
These plants are seeded in the fall, opposite the growing season primary crops, in order to keep plants in the ground year-round.
These plants are seeded in the fall, opposite the growing season primary crops, in order to keep plants in the ground year-round.

What are cover crops?
Conservation Jeopardy

100 Points

- This category of plants doesn’t need to be reseeded each year.
This category of plants doesn’t need to be reseeded each year.

What are perennials?
200 Points

- Nutrients that are necessary for plant growth that can become pollutants in excess quantities. This particular element is very water-soluble and can easily leach down through the soil into the groundwater.
Nutrients that are necessary for plant growth that can become pollutants in excess quantities. This particular element is very water-soluble and can easily leach down through the soil into the groundwater.

- What is nitrogen?
Conservation Jeopardy

200 Points

- This element and essential nutrient is less water-soluble than nitrogen, and thus more likely to be carried into the waterways through surface runoff.
This element and essential nutrient is less water-soluble than nitrogen, and thus more likely to be carried into the waterways through surface runoff.

What is phosphorus?
These underground buffers are engineered to send drainage water through woodchips, which remove nitrate with incredible efficiency.
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What is a bioreactor?
Conservation Jeopardy – Final Round

Make your wager at the top of your board!
These natural landforms, which were at one point old stream channels or bends in the river, can be restored to the landscape to hold floodwater and denitrify runoff.
These natural landforms, which were at one point old stream channels or bends in the river, can be restored to the landscape to hold floodwater and denitrify runoff.

What are oxbows?
Real Dilemmas: Erosion and Nutrient Runoff

Soil loss through erosion affects—

- Soil quality
- Crop productivity
- Water quality and overall ecosystem health
Real Dilemmas: Erosion and Nutrient Runoff

Excess nutrients in aquatic ecosystems lead to—

- Decreased water clarity
- Increased algal growth
- Oxygen deficiencies
- Tainted drinking water supplies
Iowa Nutrient Reduction Strategy

- Commitment to conservation
- Science-based, voluntary approach
- Both point and non-point sources included
- Reduce total nitrogen and phosphorus loads by 45%
  - Reduce nonpoint source nitrogen loads by 41%
  - Reduce nonpoint source phosphorus loads by 29%
- 2008 Gulf of Mexico Hypoxia Action Plan
A few “Why’s?” for Case Studies

Case studies get us closer to real life
- Students research the real piece of land and watershed
- They can empathize with the situations of real farmers
- Multiple case studies and farms represent multiple landscapes in Iowa

Real situations on the farms and watersheds reflect real environmental dilemmas.
Unit Goals

As a result of this case study, students will…

- Become familiar with conservation practices
- Understand and use decisions tools/resources, seeking additional information to develop management plans
- Think critically about the costs and benefits of conservation practices
- Consider the practices’ impact at field-level and the watershed-scale
Cover Crop Selection and Management
After Corn

What is your next crop?

Corn → Soybean

Best choice is oats

Conducive with spring termination?

Seed oats Aug 20 — Sept 10
aerial OR overseed at 50+ lb. PLS/acre

NO: aerial OR overseed at 50-70 lb PLS/acre
Best for wet conditions

YES: Best choice is cereal rye

Seed as soon as possible after harvest, before Aug 1;
grow at 50-60 lb PLS/acre
Best for dry conditions
The Practices (by Case Study)

“In The Field”
- No-till/strip-till
- Cover Crops
- Nutrient Management

“Wetlands and Wildlife”

“Better Utilizing the Field Edge”
- Saturated Buffers
- Bioreactor
- Field Buffers
- Wetlands

“Redefining the Field Edge”
- Strategically-Placed Perennials
Contents of each Case Study

**Educator Resources**
- Overview Booklet for Educators
- Case Study Course Agenda
- Introductory PowerPoint slide set
- Alignment with Iowa Core Standards

**Student Resources**
- Overview Booklet for Students
- Supplemental Resources

Available on provided flash drives and www.conservationlearninggroup.org/training
Case Study Overview

Case studies are designed to provide an in-depth look at a complex real-world problem. The goal of this case study is to help students practice critical thinking, problem solving, and cost-benefit analysis as they navigate the complexities of agricultural production and natural resources management. Case studies work well as capstone projects and can be used for small group learning. The "Questions to Consider" section provides questions to use to guide student projects and assignments; these questions can also be modified to suit course content and desired learning outcomes.

This case study was designed for undergraduate and graduate students, as well as high school students who are studying agriculture or environmental science.

Before starting this case study, students should have:

- Basic understanding of watersheds and how water, soil, and nutrients move
- Basic understanding of row crop agricultural systems
  - Tillage
  - Nutrients/fertilizer
  - Soil health
  - Profitability
- Familiarity with self-guided research (finding and analyzing relevant sources)
- Basic understanding of how to analyze costs and benefits
Contents of Overview Booklets

**Educator’s Overview Booklet**
- Quick Guide
- What’s Happening
- Questions to consider

**Student’s Overview Booklet**
- Quick Guide
- What’s Happening
Student quick guide is identical to educators

- Goals
- Introduction
- What’s happening
- Information about practices

Case Study Quick Guide

In the course of this case study, you will—

- Identify edge-of-field best management practices that can be used in Midwest row crop systems.
- Understand and interpret decision tools and other available resources, as well as gather additional information to determine what edge-of-field practices are appropriate.
- Evaluate the costs and benefits of different conservation practices.
- Consider the impacts of edge-of-field conservation practices at the field level and the watershed scale.

Introduction:

Field edges present opportunities to help improve downstream water quality and quantity and wildlife habitat while maintaining productive acres. Edge-of-field practices highlighted in this case study include field buffers, saturated buffers, bioreactors, and oxbow restoration.

What’s happening:

You’ve been hearing about water quality issues on the local news and have seen swimming advisories for Big Creek Lake, which is near where you live. Big Creek Lake is a favorite spot for you and your family; you spent most summer weekends of your childhood boating and fishing there with your family and have carried on that tradition with your own children and grandchildren.

You even love to bring along the family dogs, Rex and Milly. You’ve caught some amazing bluegill and largemouth bass over the years that you still brag about to your friends. Now, hearing about these water quality issues has you concerned. You’re wondering if it’s safe for you, your family, and your dogs to visit the lake.

As a landowner in the watershed, you’re considering what you could do to help with these water quality issues.

You own 300 acres of farmland in the Big Creek Watershed in central Iowa. The land has been in your family for generations. You took over this operation nearly 30 years ago and
Let’s Dig In!
Let’s Dig In!

- Firstly, read about your group’s wetland and note these factors:
  - Unique features
  - Benefits
  - Costs
  - Suitable landscape

- In groups, devise an “elevator pitch” for your wetland
  - Hit the points you read above
  - But give the big picture too: why do wetlands matter?

- Choose a spokesperson who will “sell” us on the wetland in <2 minutes

- You have 10 minutes!
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Questions?

- Case Studies are free to download here: https://www.conservationlearninggroup.org/training

- Whole Farm Conservation Best Practices Manual is free to download from ISU Extension Store: https://store.extension.iastate.edu/Product/15823

- For more information on conservation practices visit: www.iowalearningfarms.org