

## Soil Erosion and its impact on Soil Health

The overall goal of the module is to compare an eroded and uneroded piece of land and illustrate the impact of soil erosion on overall soil health and productivity. Your first step will be to identify two different soils in your area, one eroded and one uneroded. The first unit will show you how to use the Web Soil Survey to identify these soils. If you are unable to find an eroded soil in your area you could substitute a soil from a construction site. This would not be the same but would illustrate the difference between a properly managed soil and a disrupted soil.

The units in this module are designed to work with the Soil Quality Test Kit. More information and instructions for the kit are available at the following link.

[https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/health/assessment/?cid=nrcs142p2\\_053873](https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/health/assessment/?cid=nrcs142p2_053873)

In addition we will be using several companion teaching units from NRCS's Soil Health for Educators site:

[https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/health/assessment/?cid=nrcs142p2\\_053870](https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/health/assessment/?cid=nrcs142p2_053870)

Units are listed in a suggested sequence although you can pick and choose from the units as you see fit. Materials needed are listed for each unit. If you are planning on using all of the units at sometime you may wish to put together a Soil Quality Test Bucket that contains all the materials. For a list of materials in the soil health bucket refer to the following web site:

[https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_050937.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_050937.pdf)

Another good website for soil education is:

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/edu/>

Objective:

- Evaluate the difference between an eroded and an uneroded soil using key soil health indicators.

Materials:

- Soil Quality Test Bucket and Soil Health Kit Guides and Videos (<https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/health/assessment>)
- Soil Probe
- Internet access for Web Soil Survey

Procedures:

Unit 1: Web Soil Survey

Objectives:

Use the Web Soil Survey (<https://websoilsurvey.sc.egov.usda.gov>) to identify eroded soils

Materials:

- Computer with access to the internet
- Youtube Videos
  - [https://www.youtube.com/playlist?list=PLKyiLObeuDlo\\_nzI8g0sOWz3lujRzVck](https://www.youtube.com/playlist?list=PLKyiLObeuDlo_nzI8g0sOWz3lujRzVck)
- PowerPoint Presentation : How to Navigate the Web Soil Survey
- Quiz: How to Navigate Web Soil Survey Quiz
- [https://www.nrdnet.org/sites/default/files/soil\\_erosion.pdf](https://www.nrdnet.org/sites/default/files/soil_erosion.pdf)

Procedure:

1. Use PowerPoint Presentation and Videos to explain how to use the Web Soil Survey
2. Administer quiz over presentations
3. Have each student identify soils near your location or on a farm of their choosing that are eroded and uneroded.

Unit 2: Soil Sampling

Objectives:

Properly take a soil sample for soil health assessment

Materials:

- Soil Quality Test Guide, Measuring Soil Quality (p. 1-3) or nrcs142p2\_052802.pdf
  - [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_053155.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053155.pdf)
  - [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_052802.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052802.pdf)
- Youtube Videos
  - <https://youtu.be/9Eoi4GhY7X0>
  - <https://youtu.be/q4HLYF4HyRU>
  - <https://youtu.be/traj55Rd4i4>
  - <https://youtu.be/jT7-ERu6zYY>
- PowerPoint Presentation : **To Be Developed**
- Quiz: **To Be Developed**
- Soil Probe
  - Can be borrowed from local Ag Business or purchased.
  - Possible supplier: <https://www.ams-samplers.com/>
- Plastic Bucket for sample
- Soil Sampling Bags
  - Zip lock bags or obtain from local extension office or Ag Business

Procedure:

4. Use PowerPoint Presentation and Videos to explain how to take a proper soil sample
5. Administer quizzes over presentations
6. Divide class into groups of 2-3 and have them go to the field to take samples

Unit 3: Bulk Density

Objectives:

- Explain the importance of soil bulk density
- Compare the bulk density of an eroded soil to an uneroded soil

Materials:

- Soil Quality Test Guide, Bulk Density Test (p. 9-13) **or** nrcs142p2\_050936.pdf
  - [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_050957.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_050957.pdf)
  - [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_050936.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_050936.pdf)
- Youtube Videos
  - <https://youtu.be/-ZVIHlo5js>
  - <https://youtu.be/bf9qTZQGNHs>
- PowerPoint Presentation : **To Be Developed**
- Quiz: **To Be Developed**
- 3-inch diameter ring
- hand sledge
- wood block
- garden trowel
- flat-bladed knife
- sealable bags and marker pen
- scale (0.1 g precision)
- 1/8 cup (30 mL) measuring scoop
- paper cups
- 18-inch metal rod
- access to a microwave oven

Procedure:

1. Use PowerPoint Presentation and Videos to explain the concept of Bulk Density
2. Administer quizzes over presentations
3. Divide class into groups of 2-3 and have them go to the field to take samples from eroded and uneroded areas and determine the bulk density of the samples.

Unit 4: Soil Organic Matter

Objectives:

- Explain the importance of soil organic matter
- Compare the organic matter of an eroded soil to an uneroded soil

Materials:

- nrcs142p2\_053140.pdf
  - [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_053140.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053140.pdf)
- YouTube Video
  - <https://youtu.be/y-M23q6Hw58>
  - <https://youtu.be/0iYV0zzChzs>
  - <https://youtu.be/bf9qTZQGNHs>
- PowerPoint Presentation : **To Be Developed**
- Quiz: **To Be Developed**
- Soil Sample from Unit 1
- Color Chart for Estimating Organic Matter
  - <https://pubsplus.illinois.edu/product/color-chart-for-estimating-organic-matter-in-mineral-soils-in-illinois>

Procedure:

1. Use PowerPoint Presentation and Videos to explain the concept of Soil Organic Matter
2. Administer quizzes over presentations
3. Divide class into groups of 2-3 and have them determine the organic matter on a sample from an eroded area and an uneroded area
4. Have students complete the questions on nrcs142p2\_053140.pdf

## Unit 5: Soil Respiration

Objectives:

- Explain the importance of soil respiration
- Compare the soil respiration of an eroded soil to an uneroded soil

Materials:

- Soil Respiration Test
  - [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_051285.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051285.pdf)
- nrcs142p2\_051573.pdf
  - [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_051573.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051573.pdf)
- YouTube Video
  - <https://youtu.be/be51efbavTo>
  - <https://youtu.be/RjnCf0weSUQ>
- PowerPoint Presentation : **To Be Developed**

- Quiz: **To Be Developed**
- 6-inch diameter ring
- lid with rubber stoppers
- hand sledge and wood block
- soil thermometer
- two sections of plastic tubing
- 2 needles
- Draeger tubes
- 140 cc syringe
- stopwatch or timer

Procedure:

5. Use PowerPoint Presentation and Videos to explain the concept of Soil Respiration
6. Administer quizzes over presentations
7. Divide class into groups of 2-3 and have them determine the soil respiration on a sample from an eroded area and an uneroded area

## Unit 6: Soil Electrical Conductivity

Objectives:

- Explain the importance of soil electrical conductivity (EC)
- Compare the electrical conductivity (EC) of an eroded soil to an uneroded soil

Materials:

- Electrical Conductivity Test
  - [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_052213.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052213.pdf)
- nrcs142p2\_052803.pdf
  - [https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_052803.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052803.pdf)
- YouTube Video
  - <https://youtu.be/Se9mMhxfqDQ>
  - <https://youtu.be/GC6485CiRQQ>
  - <https://youtu.be/pbsUPzmkflf>
  - <https://youtu.be/aquwQbMWMjic>
- PowerPoint Presentation : **To Be Developed**
- Quiz: **To Be Developed**
- 1/8-cup (30 mL) measuring scoop
- 120-mL plastic containers with lid
- EC pocket meter (blue with black cap)
- squirt bottle

- calibration solution (0.01 M KCl)
- distilled water

Procedure:

8. Use PowerPoint Presentation and Videos to explain the concept of Soil Electrical Conductivity
9. Administer quizzes over presentations
10. Divide class into groups of 2-3 and have them determine the soil electrical conductivity on a sample from an eroded area and an uneroded area



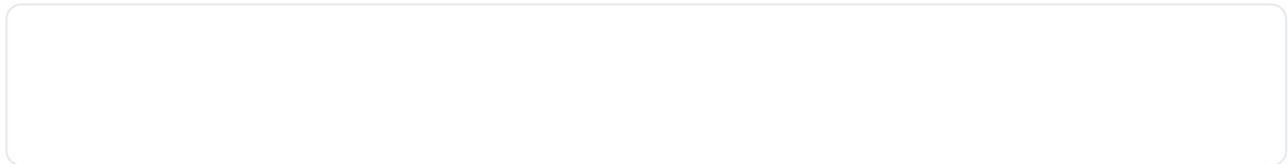
# Table of Contents

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## Overview

Proper management and utilization of livestock facilities and nutrients. Odor control, collection and storage alternatives, nutrient values, application rates and techniques. Construction and size requirements of storage facilities will be explored through facility planning and design projects.

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## University Links

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## Materials

## University of Wisconsin

[Link](#)

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## Purdue Manure Management

[Link](#)

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## Iowa Manure Management Page

[Link](#)

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## University of Nebraska

[Link](#)

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## Manure Central-U of Ill

[Link](#)

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## North Dakota State University

[Link](#)

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## Kansas State University

[Link](#)

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## State Links

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## Modules

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## Kansas Nutrient Management



### [Kansas Manure Management](#)

Link



## Wisconsin DNR



### [Wisconsin DNR](#)

Link



### [Guidelines for Applying Manure in Wisconsin](#)

Link



## Iowa DNR



Iowa has two types of animal feeding operations (AFOs) regulated under the Department of Natural Resources: confinements and open feedlots. See the overview below for general information about the two types of animal feeding operations and state regulations that affect them.

[Animal Feeding Operation Link](#)

Link

[Manure Applicator Certification Requirements](#)

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[MPPDueDateFactsheet](#)

PDF document

[waiversandagreements](#)

PDF document

**Indiana**[Confined Animal Feeding Guide](#)

PDF document

[Indiana Record Book for Confined Animal Feeding](#)

PDF document

[CFO CAFO Application Packet-55051 June 2015](#)

Word Document



## Clean Water Act

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The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.

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### Materials

#### Cuyahoga River

[Link](#)

An explanation of the reasons that the Clean Water Act came into existence.

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#### Clean Water Act

[Link](#)

The Clean Water Act prevents direct discharges of pollutants into the waters of the United States through a program known as the National Pollutant Discharge Elimination System (“NPDES”).<sup>[iii]</sup> The NPDES program has very strict requirements, but it only applies to certain types of water pollution. The program regulates only “point sources” of pollution, which means that pollutants must be carried to the water body by an individual and direct conveyance, such as a pipe or storm drain.

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#### Agriculture

[Link](#)

#### Farm Activity

[Link](#)

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## Modules

<https://www.epa.gov/regulatory-information-sector/agriculture-sectors> ▼

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## Livestock Facility Management

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### Materials

#### [A Brief Overview of the Clean Water Act](#)

Word Document

## Modules

**Poultry Industry-Need For Stewardship** 

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[Environmental Management: Why Is It Necessary?](#)   
Link

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[Clean Water Act Regulatory Requirements for Concentrated Animal Feeding Operations](#)   
Link

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[Nutrient Management Planning and Implementation](#)   
Link

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[Environmental Management - A Poultry Producers Perspective](#)   
Link

**Beef Production** 

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[Beef Feedlot Systems Manual](#)   
PDF document

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**small feelot manual**

PDF document



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**Confinement Beef Facilities**

XSPF File



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**Swine Production**



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**Pork Manure Management is Key**

PDF document



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**Fertilizer**

PDF document



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**Working with Growers**

PDF document



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**Establishing Value**

PDF document



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**Dairy Production**



## Small Open Lot Dairies in Iowa

PDF document



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## Value of nutrients

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## Materials

### Manure Sampling PDF

PDF document

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### Beef Manure Sampling Slides

PDF document

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### Beef manure Sampling Considerations

Link

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### Liquid Manure Sampling

Link

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### Liquid slides ppr

PDF document

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## Storage & handling

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### Modules

Lagoons



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Pits



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Solid Handling



[solid-manure-application-equipment](#)

Link



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## Application

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## Modules

Manure Density



[Calibration Worksheep Liquid Manure](#)

PDF document



# Final Project

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