

MISSOURI RIVER

R E C O V E R Y P R O G R A M



United States
Army Corps of Engineers

**Outreach
and
Education Programs**

Gene Bormann



AND TO LIVE AS A PEOPLE, WE MUST

ION TO

A STATE

Man in light blue shirt and striped tie, standing in the back row.

Man in dark blue polo shirt with a red logo, standing in the back row.

Man in white polo shirt with a red logo, standing in the back row.

Man in khaki polo shirt with a red logo, standing in the back row.

Man in blue denim shirt with a red logo, standing in the back row.

Woman in a green and grey patterned cardigan, seated on the left side of the sofa.

Man in a black polo shirt, seated in the middle of the sofa.

Woman in a beige cardigan over a dark top, seated in the middle of the sofa.

Woman in a brown vest over a white shirt, seated in the middle of the sofa.

Man in a grey suit and tie, seated on the right side of the sofa.

Woman in a white button-down shirt and grey pants, seated on the right side of the sofa.



Talking to Teachers



Missouri River – A Class Room for Teachers



Watchable Wildlife Conference

Kearney, Nebraska – Oct 2010



Booth @ SD Science & Math



SD Science & Math Conference



ND Science Teachers Conference



ND Science Teachers





WORD WALL

Scientific Method
Steps for solving a problem

SI System
International measuring system based on 7 base units

Structure
what it looks like, how it is built

Function
what it does, its job

Graphs
Line graphs, bar graphs, pie charts, scatter plots

Variables
Independent variable: variable changed by the scientist
Dependent variable: variable measured through experiment

Control group
has no change

Experimental group
has one or more changes from the control group

Testable Question
scientific question answered through experiment

Law
rule that describes patterns or behaviors, don't explain why

Model
idea or picture of something

Diagram
visual representation of an idea or process

Diagram
visual representation of an idea or process

Diagram
visual representation of an idea or process

Today is Thursday, Feb 24
Due today "Songs in the News"
Shape like slip + turn it

Homework: work on "Life of a Cell" (cont. credit, due Wed)

Agenda: ① Mr. Bormann speaking about endangered species
② "Osmosis Jones" worksheet & solo experiments

Cellular Respiration

Glucose + Oxygen → Carbon Dioxide + Water

Photosynthesis

Carbon Dioxide + Water → Glucose + Oxygen

Cellular Transport

Diffusion, Osmosis, Facilitated Diffusion, Active Transport

Cellular Structure

Plant Cell, Animal Cell, Prokaryote, Eukaryote

Cellular Processes

Cell Division, Cell Growth, Cell Death

Cellular Energy

ATP, Cellular Respiration, Photosynthesis

Cellular Communication

Signaling Molecules, Receptors, Signal Transduction

Cellular Homeostasis

Osmosis, Diffusion, Facilitated Diffusion

Cellular Adaptations

Specialized Cells, Tissues, Organs, Organ Systems

Cellular Evolution

Natural Selection, Genetic Drift, Speciation

Cellular Biotechnology

Genetic Engineering, Cloning, Stem Cells

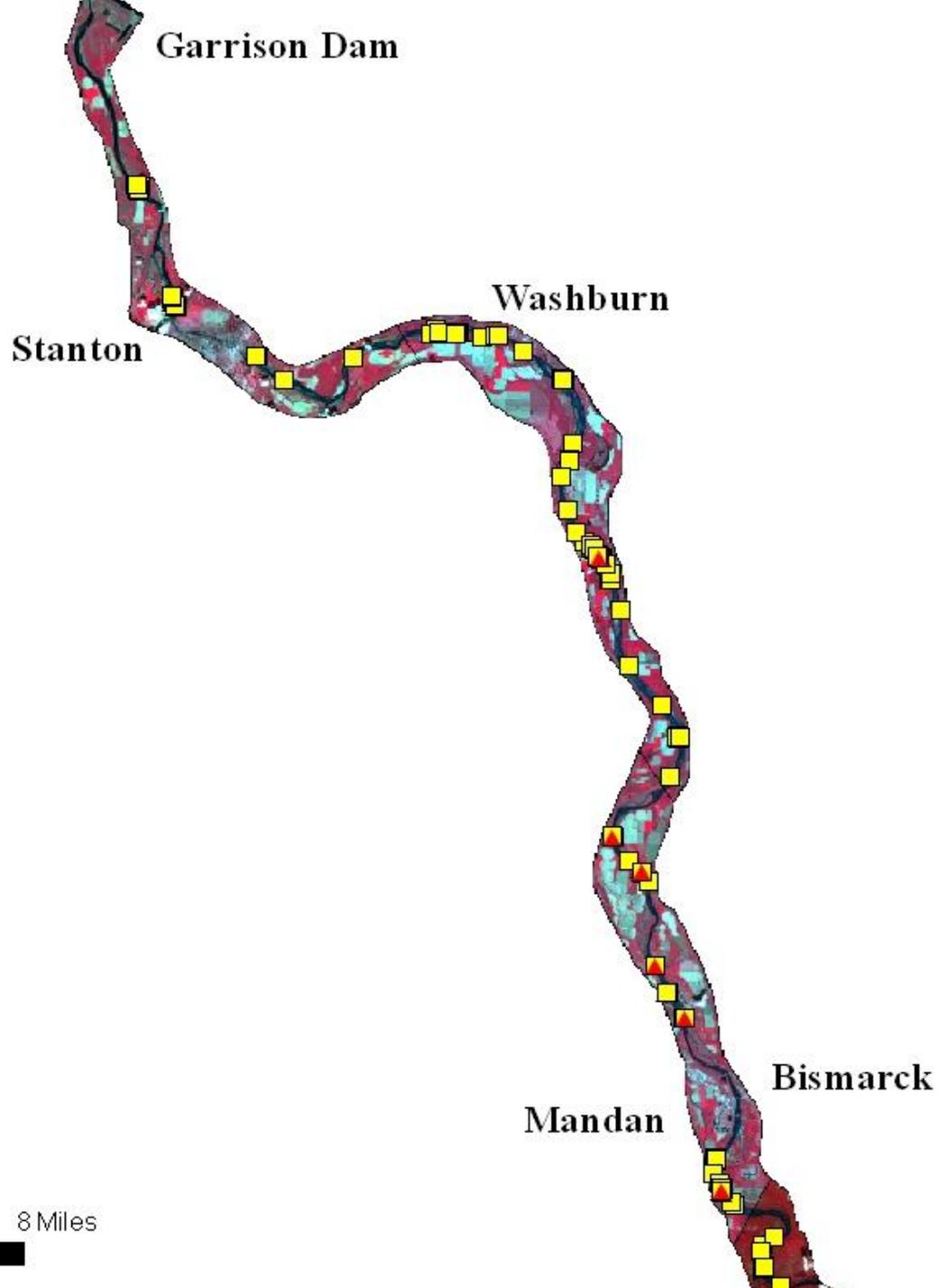
Cellular Research

Microscopy, Biochemistry, Molecular Biology

Cellular Applications

Medicine, Agriculture, Industry











26
74
7/13
28



Four-Year Totals

Year	07-08	*08-09	09-10	10-11	Totals
Reps	51	*34	140	151	3376
Contacts	1177	*768	2526	4277	9124

This year 2011-2012

- 10** school visits: 1 to 7 presentations per visit
- Two** Conferences/ Festivals Attended
- Average Attendance/ Presentation = **24**

*08-09 Limited Outreach due to Month Long Vacation and Extensive Field Work

Educational Resources

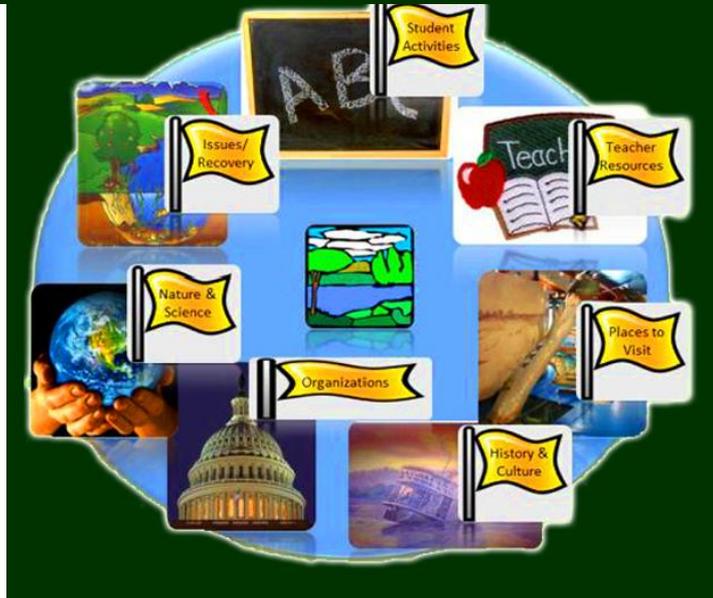
For Missouri River Basin Learning

Home

[Student Activities](#) [Teacher Resources](#) [Places to Visit](#) [History and Culture](#) [Organizations](#) [Nature and Science](#) [Issues and Recovery](#) [River Uses](#)

Welcome, this site is full of information, resources, and activities about the history, facts, and issues of the Missouri River Basin.

Designed with students, teachers, and the general public in mind, our program seeks to promote Missouri River education through information, interactive activities, and much more. [click here to read more...](#)



Find us on Facebook



Missouri River Basin
Education and
Outreach

Like You like this.

Missouri River Basin Education and Outreach

At this website, you can learn all about birds, fish, reptiles, and plants--that live along the river. Recreation website a lot because of the photos and facts about many of these species...

<http://www.nps.gov/mnrr/naturescience/animals.htm>



Animals
www.nps.gov
Animals

The Website

- Educational Resources for Missouri River Basin
<http://mri.usd.edu/outreach/>
- Missouri River Recovery Program
<http://www.moriverrecovery.org>

HOW CAN YOU HELP?

- **Send us** your favorite activities, lesson plans, (include source if not original)
- **Tell us** about Educational Points of Interest
- **Join** the outreach effort
- **Provide feedback:**
 - Good
 - Bad
 - Corrections
 - Recommendations

MISSOURI RIVER

R E C O V E R Y P R O G R A M



Piping Plover

Federally listed as Threatened in the Northern Great Plains

Below: Note the color of the sand and the plover's back.



Above: Chicks and one egg left in the nest. Once the eggs hatch the chicks leave the nest to forage for food on the sandbar. Plovers eat macro invertebrates including small insects, insect larva and small worms such as blood worms.

Piping Plover Breeding Range

Atlantic Coast

North Carolina to Newfoundland

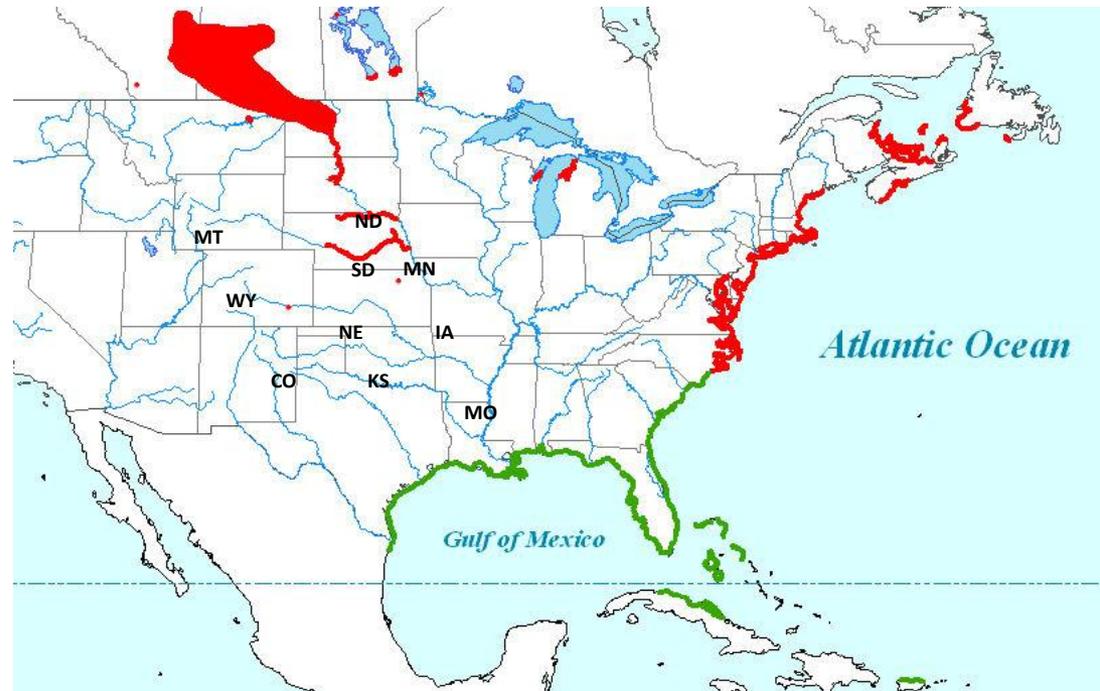
Great Lakes

Michigan, Wisconsin & Ontario

Northern Great Plains

Colorado, Kansas, Minnesota, Nebraska, South Dakota, North Dakota, Montana, Alberta, Manitoba & Saskatchewan

The most recent (2006) International Census indicated that approximately 8000 piping plovers live in the United States with 4800 piping plovers using the Northern Great Plains breeding range.

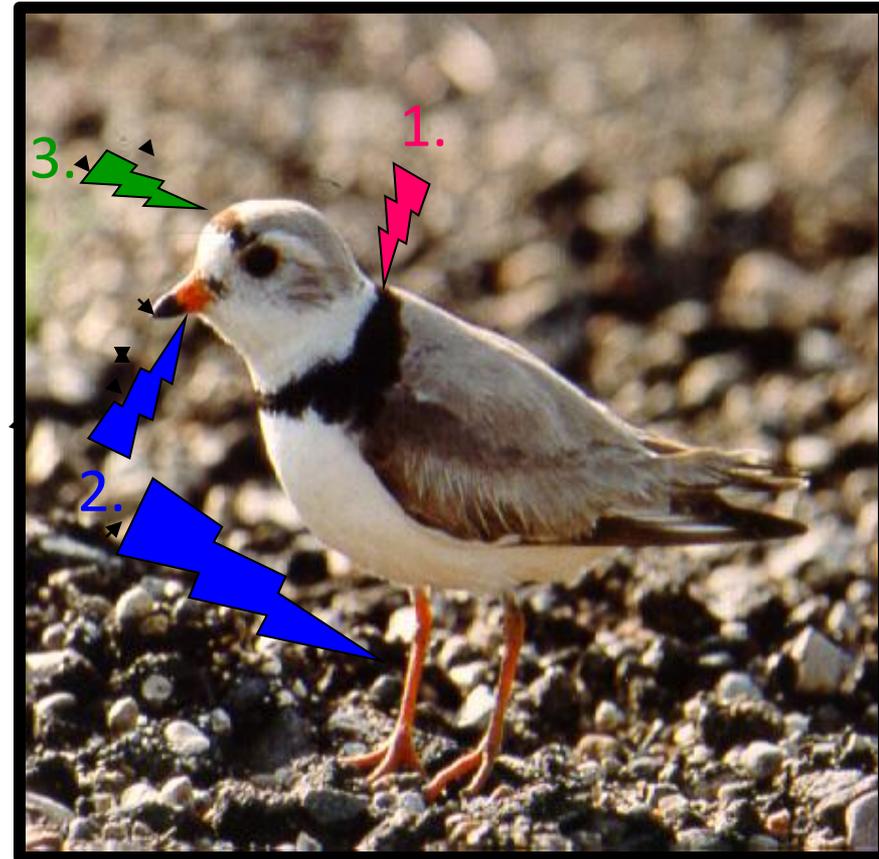


Piping plovers only come to the areas shaded **red** to nest and raise their young. When the chicks are able to fly they migrate south to the areas marked in **green**.

Piping Plover Identification

- Smaller than a robin
- Upper body has the color of dry sand
- A very distinct song
- Identifying Characteristics:

- 1. Single black neck band**
- 2. Black-tipped orange bill and orange legs**
- 3. Black line across forehead**

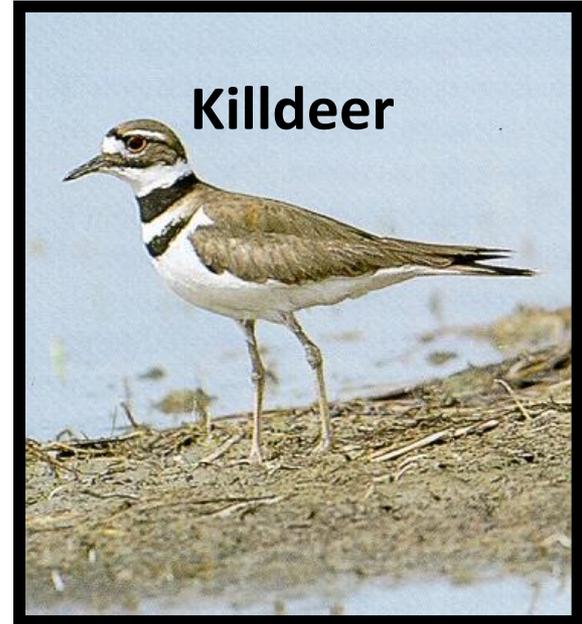


Similar Species

Piping Plover



Killdeer



**Snowy
Plover**



Semipalmated Plover



Piping Plover Nest



- Usually 4 eggs
- Nest lined with small stones
- Incubation lasts 24 – 28 days
- Both parents incubate the nest
- Eggs are conical (top-like) in shape
- Eggs arranged with the pointed end towards the center of the nest

Broken Wing Display



Piping plovers protect their nests and chicks by doing a broken wing display. When a predator comes into a nesting area, the plovers first walk some distance from their nest; vocalize, and then begin the broken wing display in an attempt to lure the predator away from the nest or chicks. The main predators in the Northern Great Plains population are: raccoons, great horned owls, mink, coyotes, foxes, gulls; plus several other species of mammals and birds.



Piping Plover Chicks



Once the plover chicks hatch they spend most of their time feeding in the wet sand found in their nesting area. The chicks are protected by the parents. If a predator comes into the area the parent gives a warning call at which time the chicks lay perfectly still on the sandbar while the parents attempt to lure the predator away.

The two-day old chick in the next slide did not follow its parent's command.



Piping Plover Fledglings



Fledged Plovers (have the ability to fly) differ from the parents' breeding plumage in that they have a totally black beak and they lack the black head and neck bands. When the parents reach the wintering grounds they assume their winter plumage and will look like the fledged birds.

Common Predators



Large Bull Snake

enjoying a meal of Piping Plover Eggs

(Snake was removed and the remaining two eggs eventually hatched)



The Piping Plover is listed as **Threatened** on the Missouri River

- The primary reason for the decline in number of piping plovers is **Loss of Habitat** which resulted from:
 - Construction of the dams on the upper Missouri River
 - The channelization of the lower Missouri River, and
 - The regulation of water flows from the dams which is done to meet the needs of the authorized purposes: flood management, navigation, irrigation, hydroelectric power, water supply, water quality, fish and wildlife including endangered species.

How Can You Help?

- **Avoid nesting areas**

- Entering Nesting Areas disturbs the birds which can result in:

- nest failure,
 - chicks and/or eggs overheating
 - interruptions in feeding behavior, and
 - the scattering of the chicks from their parents.

Obey the restriction sign shown on the next slide

Restriction Sign



AREA CLOSED
Endangered Bird Nesting Site
KEEP OUT!
Entering Area is a Violation of State and Federal Law.

NO Entry **NO** Pets **NO** ATVs **NO** Vehicles **NO** Landing

Least Tern Piping Plover

To Report Violations, Call:
NE Game and Parks 1-800-742-7627
SD Game Fish & Parks 1-888-683-7224

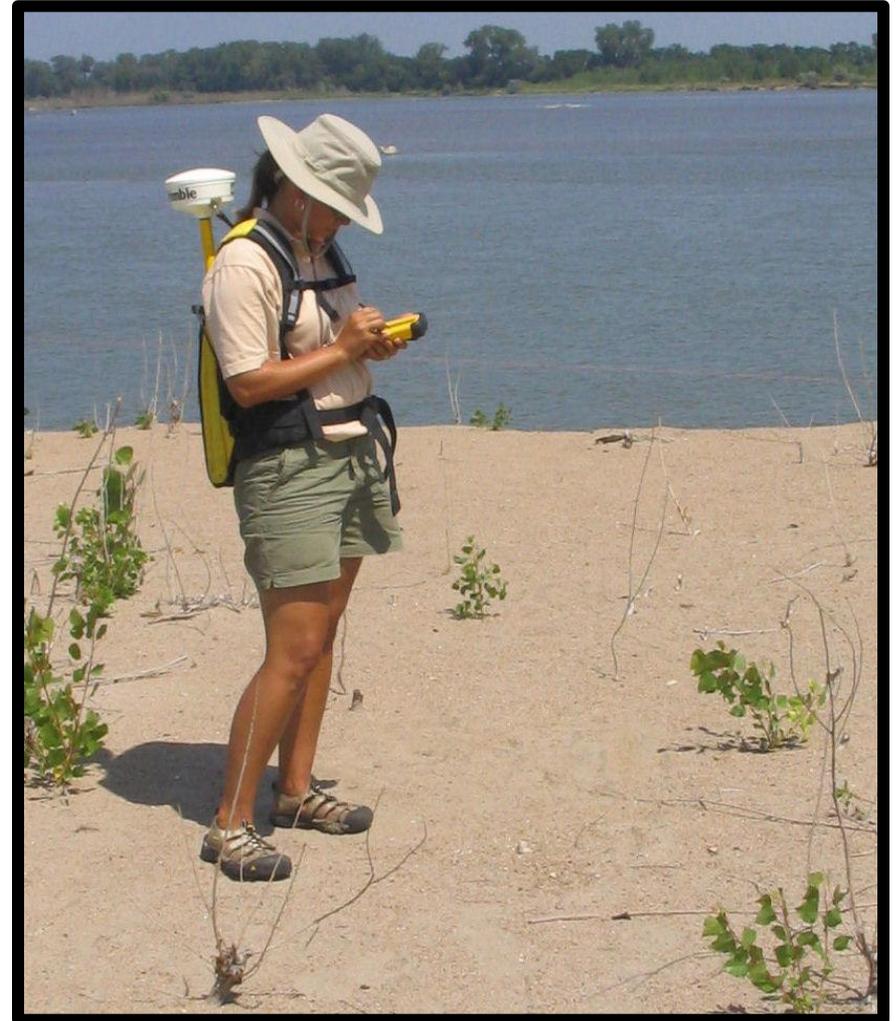
    

Survey History

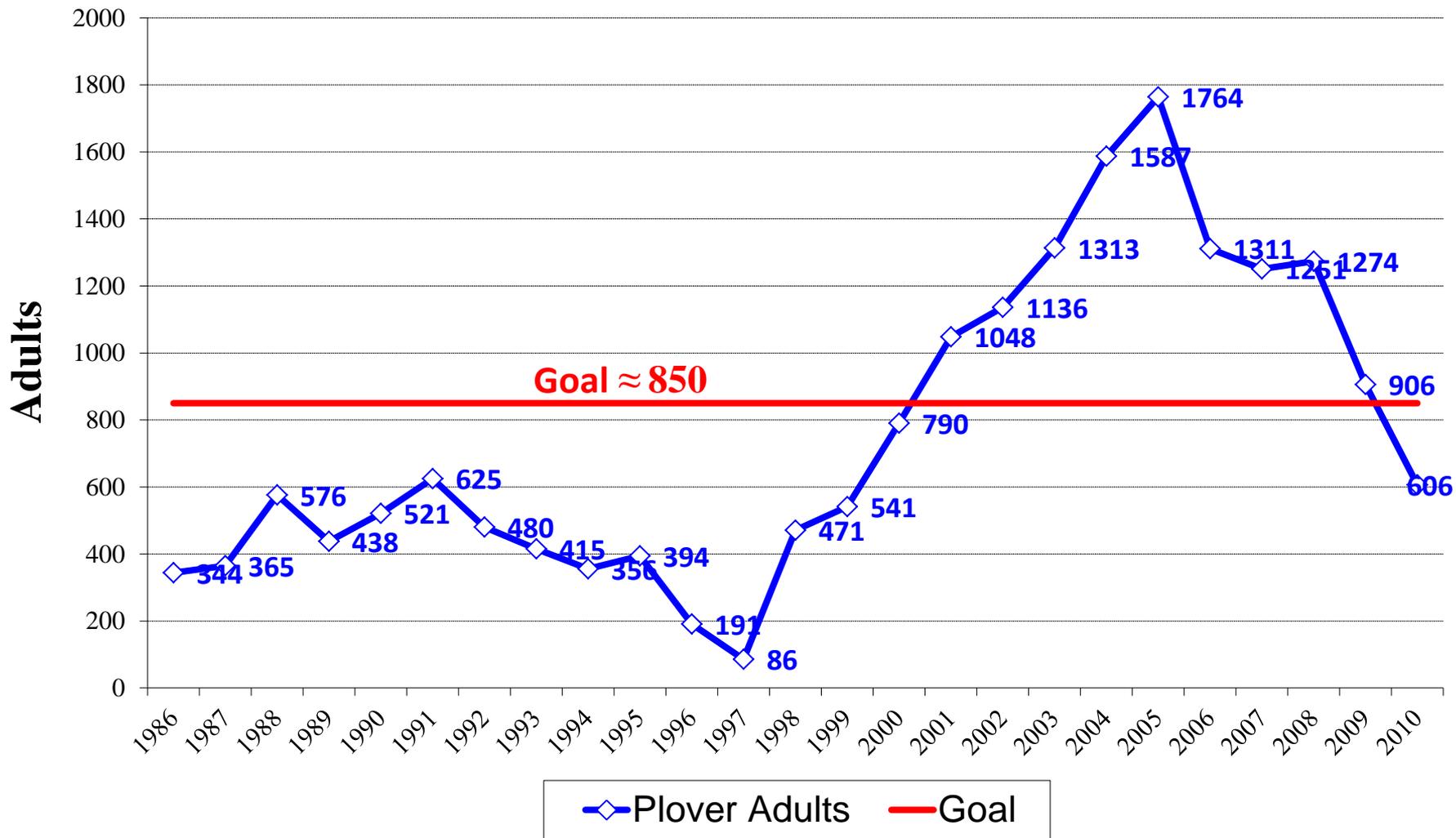
Monitoring of the piping plover nesting on the Missouri River has been conducted since 1986.

Two types of surveys:

- **Adult Census** – counts the number of adults
- **Productivity** – involves locating the nests, determining the nest fate, and counting the chicks that live to fly away to the wintering grounds.

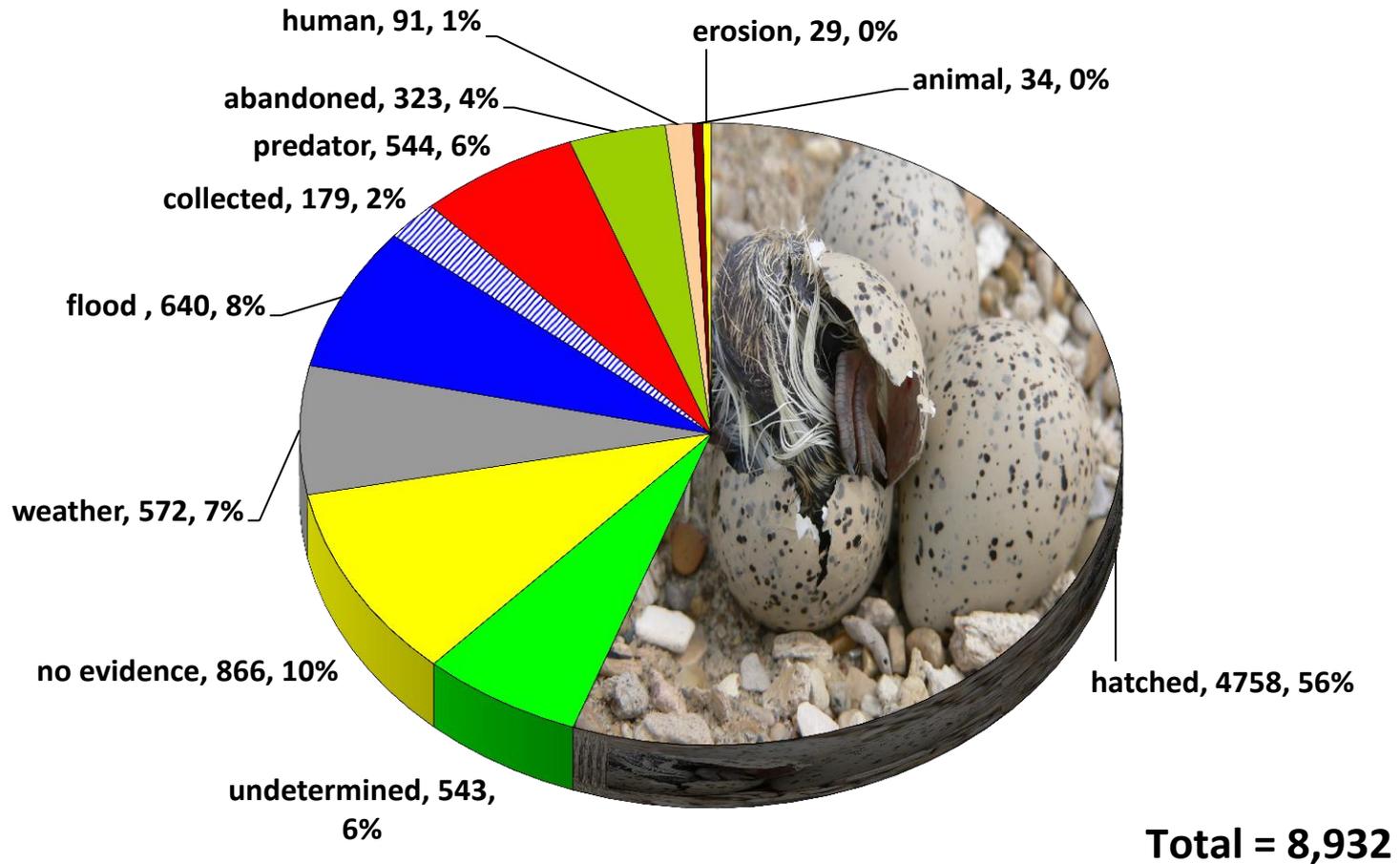


Piping Plover Adult Census Missouri River 1986-2010



Piping Plover Nest Success

Missouri River 1986-2010



Fledge Ratio

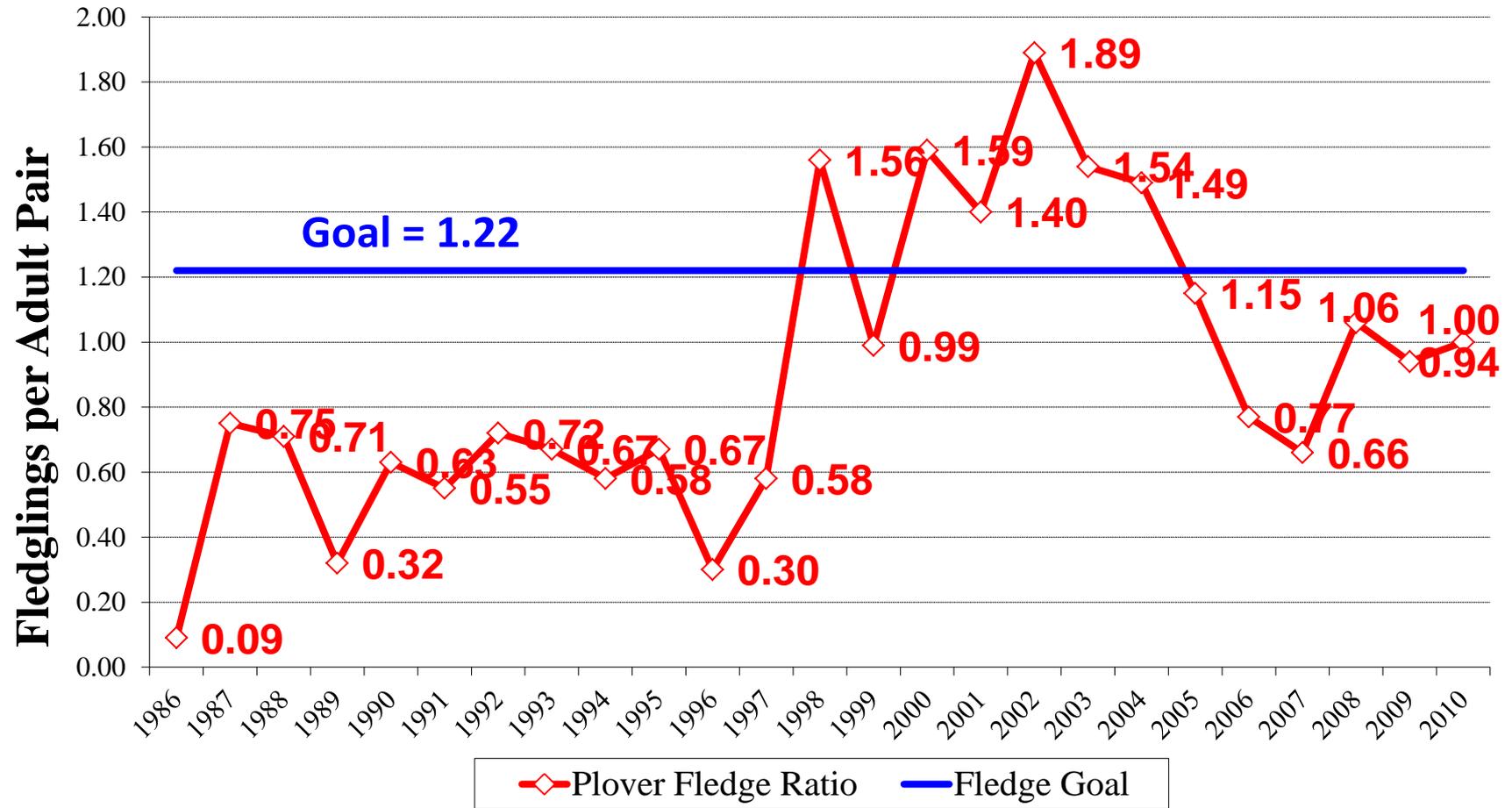


The fledge ratio is determined by dividing the number of fledged birds by the number of nesting pairs.

$$= 1.00$$



Piping Plover Fledge Ratio Missouri River 1986-2010



For More

Piping Plover

Information

- www.moriverrecovery.org
- <http://mri.usd.edu/outreach/>
- <http://bna.birds.cornell.edu/bna/species/002/articles/introduction>
- <http://www.fws.gov/midwest/endangered/pipingplover/pipingpl.html>



Reflections



Plover Recovery Leader





Image USDA Farm Service Agency

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Image © 2011 DigitalGlobe

Google





Finding Chicks



Martin Luther King, Jr. *said:*

***The time
is always ripe
to do Right.***

Darwin is know for
Survival of the Fittest

Some recent studies indicate that:

**Survival of the
Most Cooperative**



Spencer, NE – Spring 2010







Why Another Website

- 1. Provide Age Appropriate Materials Concerning the Missouri River Basin & its Issues
- Provide students and educators with resources, lesson plans, and activities related to the River
- Provide place for students to share their research data // water quality, acid precipitation, etc

Host

Missouri River Institute (MRI)

www.usd.edu/mri

Chosen through the **C**ooperative **E**cosystem **S**tudies **U**nits
(**CESU**) Process

Located on the University of South Dakota campus, Vermillion. SD

“The University of South Dakota established the Missouri River Institute (MRI) to develop and promote research, education, and public awareness related to the natural and cultural resources of the Missouri River Basin.”

Contact Information

- **Gene Bormann**

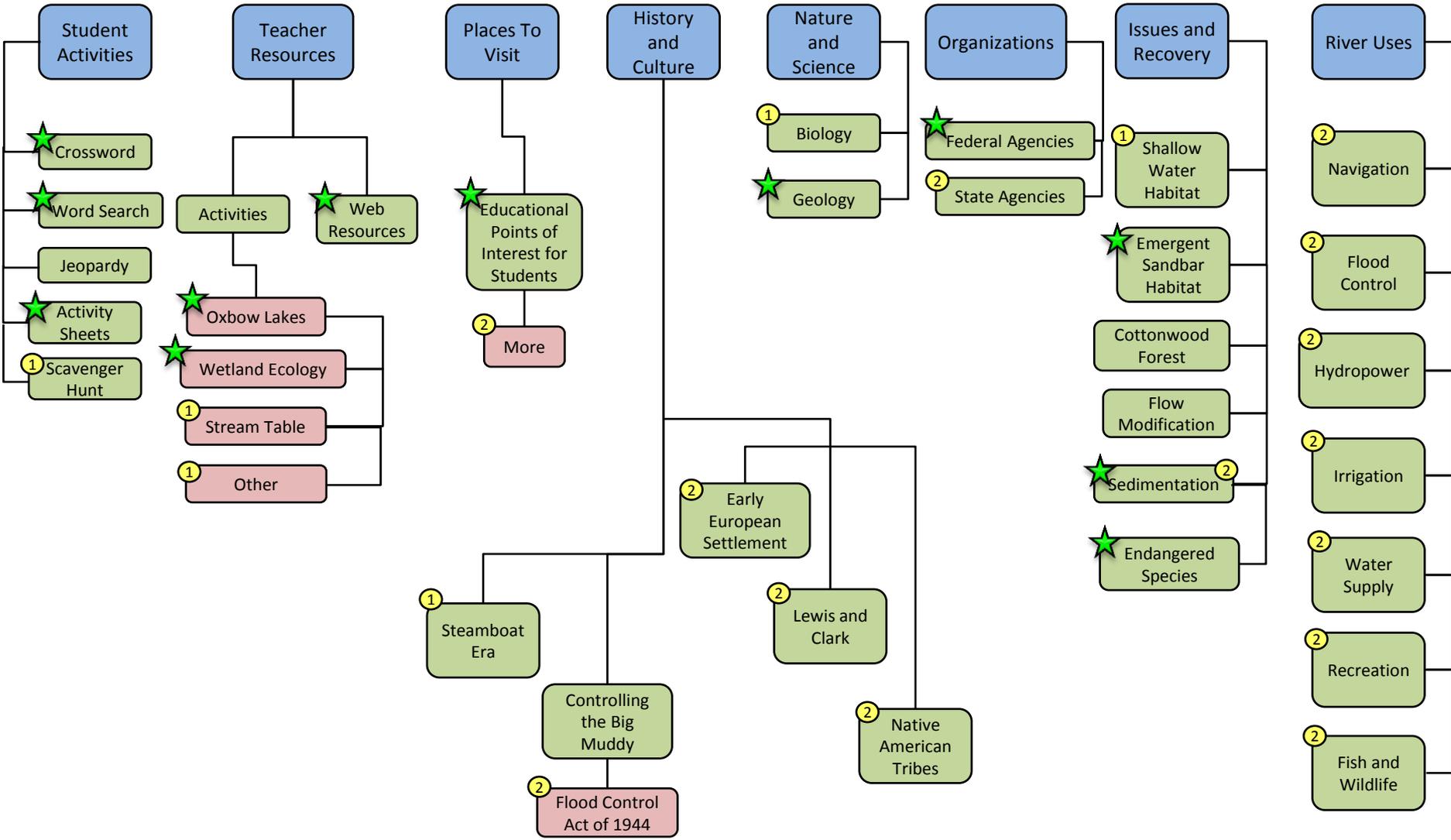
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- Eugene.R.Bormann@usace.army.mil
- 402-667-2583

- **Missouri River Institute**

- www.usd.edu/mri
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Educational Resources

For Missouri River Basin Learning



1 Elizabeth
2 Gene