Cattle Grazing & the Declines of Amphibians

Matt Spain
Amphibian Ecology and Conservation

Persuasive Points

• Cattle Grazing’s effects on Amphibian Declines
• What Evidence is there ???
• Effects on Individuals and Populations
• Why this factor is clearly the most important?

CLEARLY!

HABITAT LOSS IS THE NUMBER ONE CAUSE OF AMPHIBIAN DECLINES

No THEORIES needed...
Obvious physical evidence.

“A recent assessment of the status of global amphibian populations identified habitat loss as the single greatest identifiable factor contributing to amphibian declines.”

(Stuart et al., 2004) via National Biological Information Infrastructure - Coordinator of the World’s First Analysis on Amphibian Populations (Global Amphibian Assessment)
Cattle & Amphibian Interface

- 1.1 million beef cattle farms in United States
  - 2 million total farms in US
  - Roughly 1 farm (450 acres) for every 275 Americans
- 97 million head of cattle in United States
  - Roughly 1 cow for every 3 Americans

PROBLEM???
Conflict occurs when farms contain farm ponds, wetlands or a natural occurring water source.

Naturally Occurring?

Take Home Message
Constant pressure on wetland/moist area is main cause to damaged habitats
Cattle aren't free ranging
(Avg. 450 ac.)

Need to change farming practices!

Cattle cause direct damage by...

- Foraging and Trampling
  - Succession next slide
- Deposition of nitrogenous waste (12x/day@~51 lb= 355/wk)
  - Immediate populations and downstream populations
- Destroying egg masses/ direct adult mortality

(Schmutzer et al.)
Compounding Problem

- Not only are cattle destroying habitat (1st slide)
  - Destroying food source
  - Destroying adult breeding grounds & cover from prey
  - Destroying young & egg masses

- Effectively, there is no way a population can sustain life with cattle present in watershed
  - Exception: Rana catesbeiana (habitat generalist)

**2-15 years of total livestock exclusion is required to initiate the recovery process (Duff 1977, Skovlin 1984, Clary and Webster 1989, Elmore 1996, Clary et al. 1996).**

Quotes on Grazing

- In some cases grazing may be even more damaging in wetter than in drier environments because moist soils are more vulnerable to compaction and disturbance than dry soils (Marlow and Pogacnik 1985, Trimble and Mendel 1995, McInnis 1996).
Loss by Category
- Conversion of wetland/forest to agriculture
- Presence of cattle over long periods of time
- Nitrogenous deposits (immediate/downstream)
  - Ammonia, nitrite, nitrate
  - Decrease survival of embryos & larvae
  - Negatively affect body size & increase malformation rates
  - Increased nitrogen = decreased DO
  - EUTROPHICATION
- Damage to vegetation (habitat/eggs/covers)
  - (previous slide)
- Open (no cover) — increased temp.

Quantifying the Problem
In a 2008 report, Schmutzer, Gray, Burton, & Miller found that
- Mean species richness of larvae was 2.7x greater in wetlands without cattle
- Mean species diversity was 2-4x greater in wetlands without cattle

In the same study, Schmutzer, Gray, Burton, & Miller found that
- Body length & total length of Pseudacris crucifer were 13.4% & 18.5% greater in non-accessed wetlands respectively.

More Numbers...
In the same 2008 report, Schmutzer, Gray, Burton and Miller found
- Biomass of detritus was 10.5% greater in non-accessed wetlands (habitat/eggs/covers/load)

Non-accessed vs. accessed wetlands detrital biomass
- May = 21.6x higher
- July = 5.3x higher
- August = 9.8x higher

Cattle and wetlands need to be protected from each other
CROPLANDS = 19%
PASTURELANDS = 6%
RANGELAND = 21%
DEVELOPED LANDS = 6%
Totaling = 52%

Total Surface Acres = 1,438 Million Acres

NRCS 2003

576.4 million acres out of 1,938 million acres

30%

Quotes:

• Larval amphibian species richness is greater in non-accessed wetlands
  • (Schmutzer et al.)

• Overall species richness greater in non-accessed wetlands
  • (Knutson et al.)

• Lower rates of amphibian species richness in non-accessed wetlands
  • (Schmutzer et al. 2004)

• Development of amphibian species richness in non-accessed wetlands
  • (Knutson et al. 2004)

4/2/2009
Why is THIS the biggest cause of Amphibian declines?
• Roughly 107.7 million acres of wetlands (USFWS 2004)
• Location of wetlands within watersheds?
• Location of farms within watersheds?
• LOCATION, LOCATION, LOCATION!!!
Concluding...

The conclusion that all grazing (Page 12, Belsky, Matzke, Uselman) practices detrimentally affect wetland areas (Elmore and Kauffman 1994) is to be expected since traditional grazing systems were developed for protecting upland grasses, not for protecting riparian plants and streambanks (Platts 1991, Saah et al. 1995).

The Sky is Falling !!!

• What can we do???

• (In regards to cattle grazing), damage can be reduced by (A) improving grazing methods, (B) herding or fencing cattle away from streams, (C) reducing livestock numbers, or (D) increasing the period of rest from grazing


QUESTIONS PLEASE

HANDOUT
Sources


Sources


Sources


Sources

- Schmutzer, A.C. 2007. Influences of cattle on larval populations and the aquatic environment in the Cumberland Plateau wetlands. Thesis, University of Tennessee, Knoxville, USA.

Source Websites

- www.USFWS.gov