

Evaluating the Impacts of Educational Programs on Water Quality

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Objective of Most Educational Efforts in the Water Quality Arena

To change knowledge, attitudes or behaviors with the intent that recommended remedial or preventive practices are adopted thereby enhancing water quality (or quantity).

A Judgment Call

What has been the impact of past educational programs on enhancing water quality in the Heartland Region?



These educational programs have had little or no impact on enhancing water quality in targeted watersheds.

The Context

Who needs to be “educated” on what is rarely addressed in many watershed educational efforts.

Most “educational” efforts focus on announcing the availability of programs or practices.

The medium is considered more important than audience segmentation in educational efforts (note the recent transition from newsletters to web sites).

Educators rarely understand audience needs and capabilities, but assume a “level playing field” with no unintended consequences.

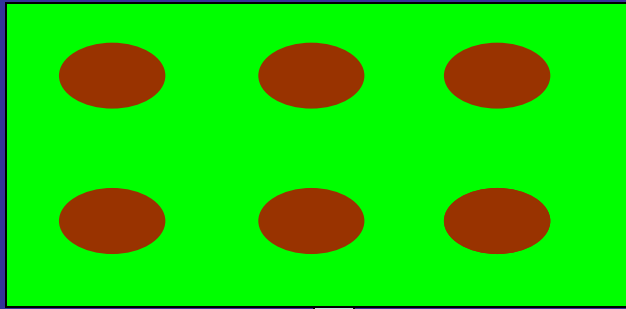
The Context

- Educational efforts are typically a “residual” category in nonpoint programs with few resources (e.g., dollars, staff) expanded in this area.
- Marketing and communication efforts receive low priority.
- There has been a paucity of applied theory and methods applied to this area.

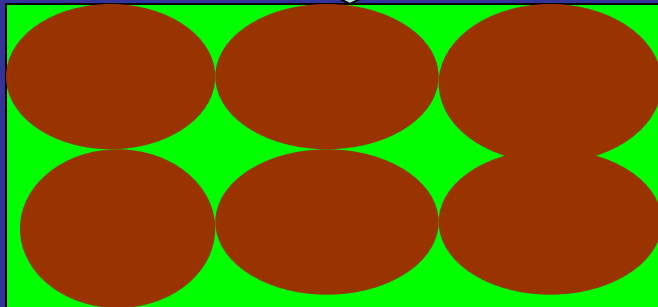
Starting at the Basics

The “Holy Grail of educational programs should be responding to an understanding of who needs to be educated about what.

Tragedy of the Commons



A commons with a number of users.



Each expands use of the commons in their own best interest.



The limits are soon surpassed and the commons collapses.

Tragedy of the Commons

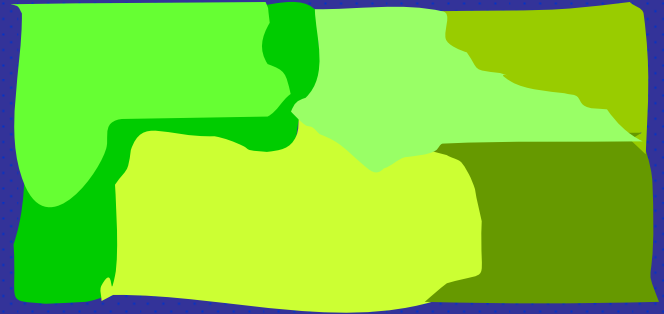
- Policies and programs are formulated to try and substitute government incentives for the act of pursuing one's own interest.
- A significant amount of effort has gone into assessing the most efficient and effective type of incentive.
- We now spend billions annually on these incentives.

The Commons

Is the commons a
homogeneous resource
of uniform resiliency?



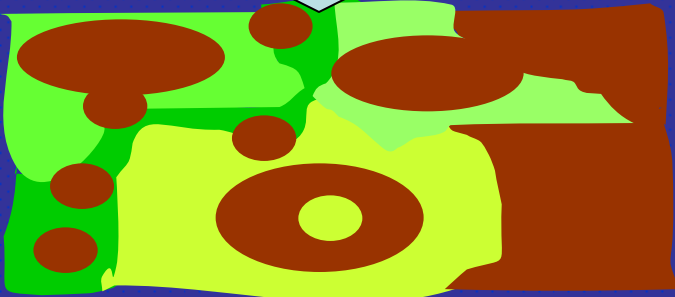
Or is the commons a
highly diverse setting with
heterogeneous resiliency?



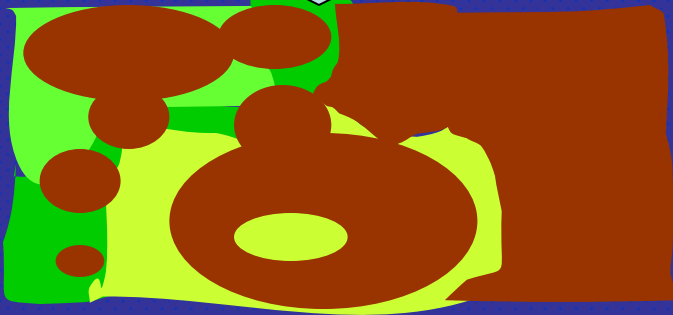
Tragedy of the Commons



The biophysical setting of producer actions is highly variable



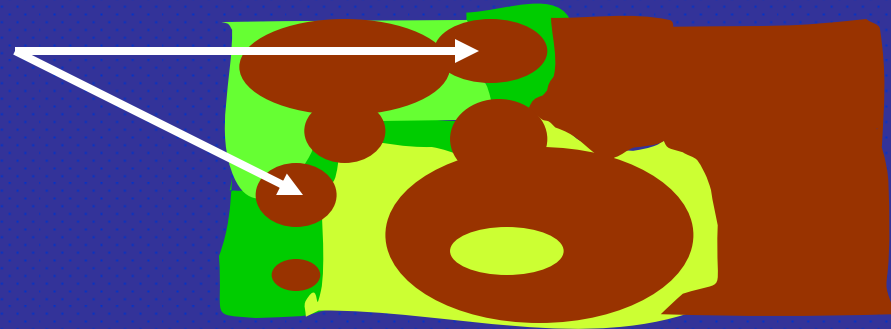
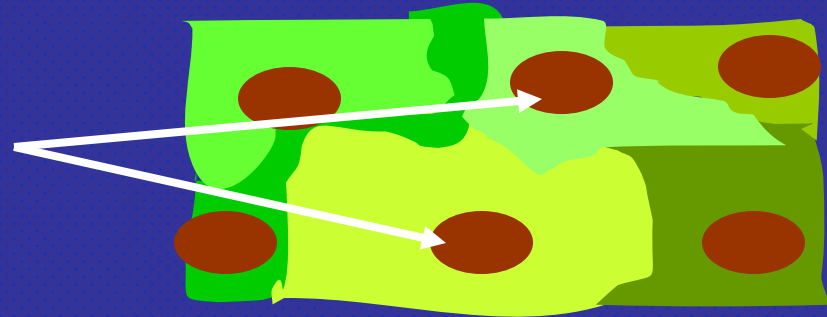
Even identical actions will have different impacts on the commons



What is an appropriate behavior on the commons will be defined by the biophysical setting of that behavior

Who Needs to be Educated About What?

- Not all actors have a similar impact even when using identical systems.
- What constitutes a “fix” or appropriate behavior is relative.



Who Needs to be Educated About What?

- * If our goal is to advance science, then we need to explore what educational activities work with all producers.
- * If our goal is to manage programs, then we need to educate receptive audiences within the program area.
- * If we want to solve water problems, then we need to understand the educational needs of those making disproportionate contributions.

Education in a Log-Normal World

Mineral resources in the earth crust,

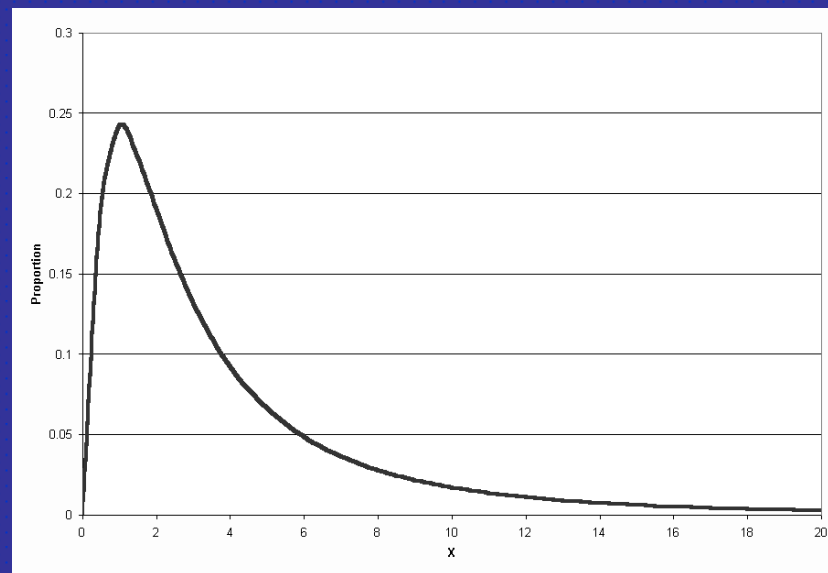
Pollutants in the air,

Sensitivity of individuals to a chemical compound.

Survival times after diagnosis of cancer.

Abundance of plants, fish, birds and insects in ecology,

Distribution of wealth in a social system.

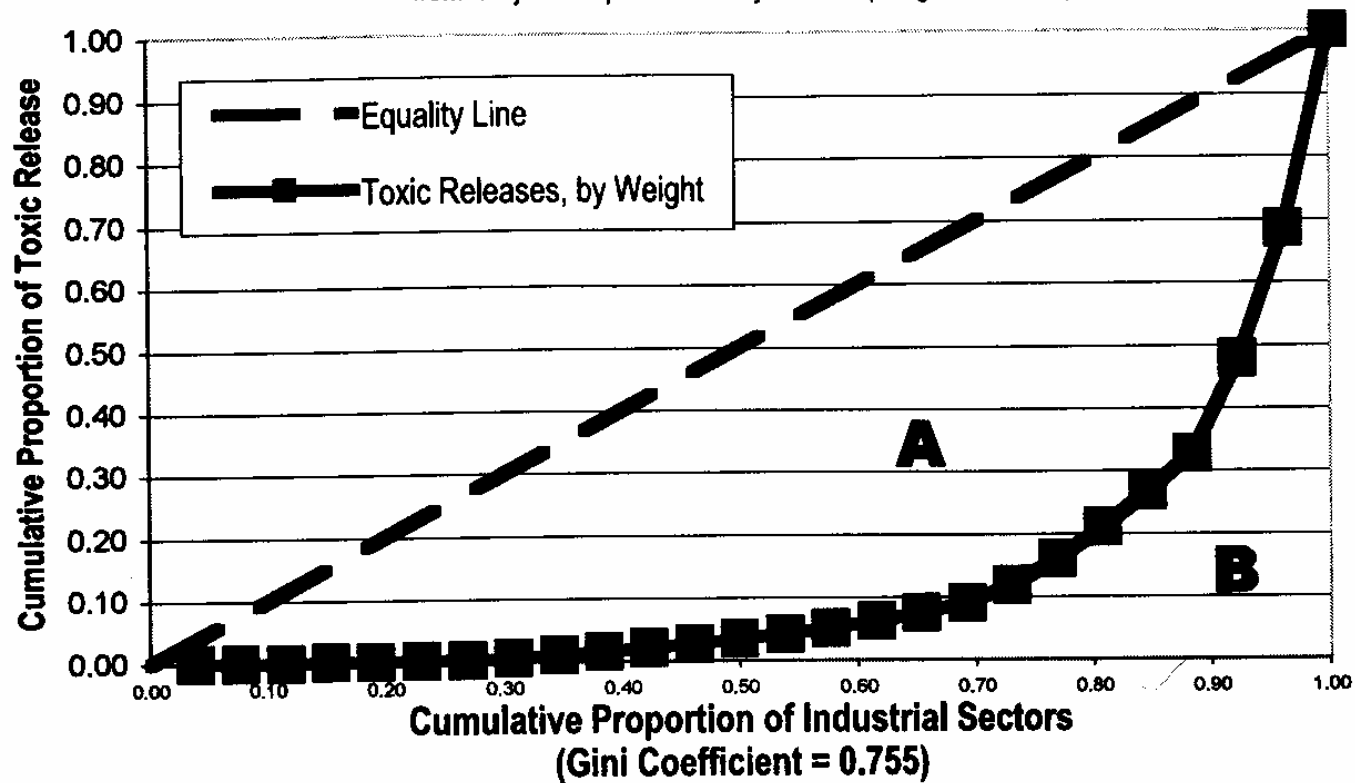


We live in a
log-normal world!

Limpert E, Stahel WA and Abbt M, 2001. Lognormal distributions across the sciences: keys and clues. *Bioscience* **51** (5), 341-352

Does the "Tail" Wag Your Watershed?

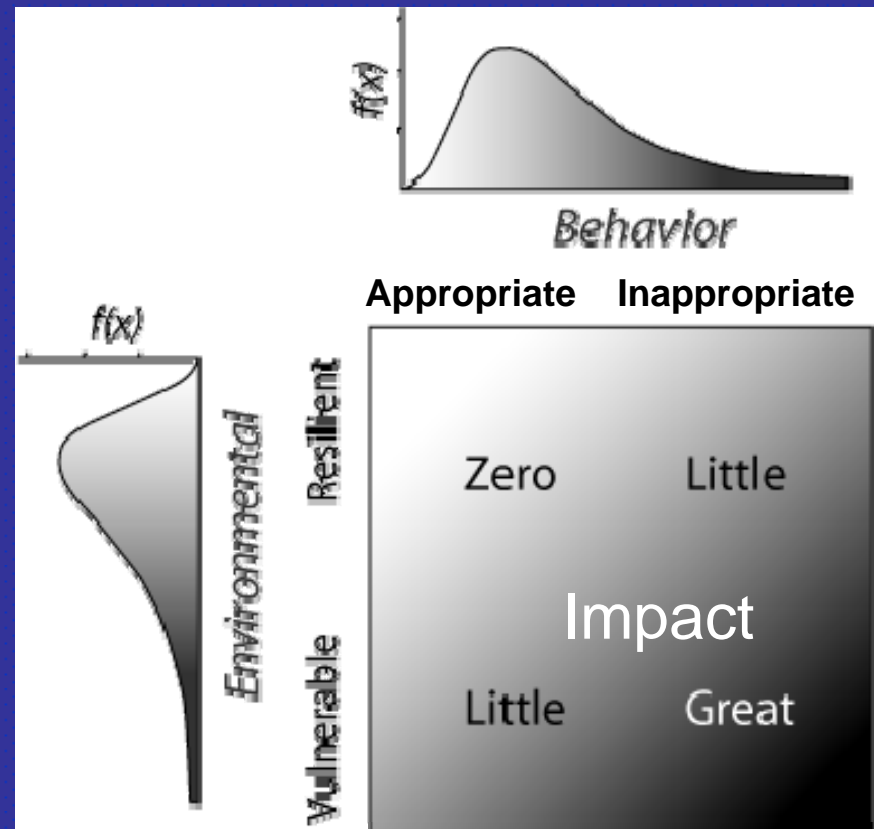
Figure 2a: Proportions of Toxic Releases from "Major Groups" or Industry Sectors (2-digit SIC codes)



Disproportionality

A small proportion of all human behaviors account for a disproportionately large proportion of water quality degradation.

Disproportionality emerges out of scale-specific interactions between human actions and biophysical attributes.



Who Needs to be Educated?

Egregious behaviors in a well-buffered setting may have an insignificant impact on degradation processes.

“Normal” behaviors in a vulnerable setting may have a significant impact on degradation processes.

Disproportionality emerges out of scale-specific interactions between human and biophysical attributes.

Who Needs to be Educated?

- Meanings placed on social behaviors are determined by the biophysical setting where/when they occur.
- Institutional mechanisms need to reflect this fact, i.e., equivalent behaviors do not necessarily receive equivalent incentives.
- A focus on the average (e.g., ecological footprint) hides more than it reveals.

Who Needs to be Educated?

Understanding why inappropriate behaviors in vulnerable biophysical settings are occurring is the foundation of an educational program.


1. Technological “leakage”
2. Tradition/Community norms
3. Market Rationality
4. Ignorance
5. Scale Incongruence

Current Water Quality Programs

Use biophysical measures to justify support for existing programs & BMPs.



Promote the program & BMPs using a variety of generalized communication processes to all land users in targeted area.



Non-adoption is justified by insufficient incentives or incentives are in wrong format.




Educational efforts are not linked to changes in water quality parameters.

Enhancing Impact of Education Programs

Use biophysical measures to identify vulnerable locations within problem area.



Assess salient behaviors in these locations to determine where disproportionality may be occurring.




Gain understanding why inappropriate behaviors are occurring in these locations.

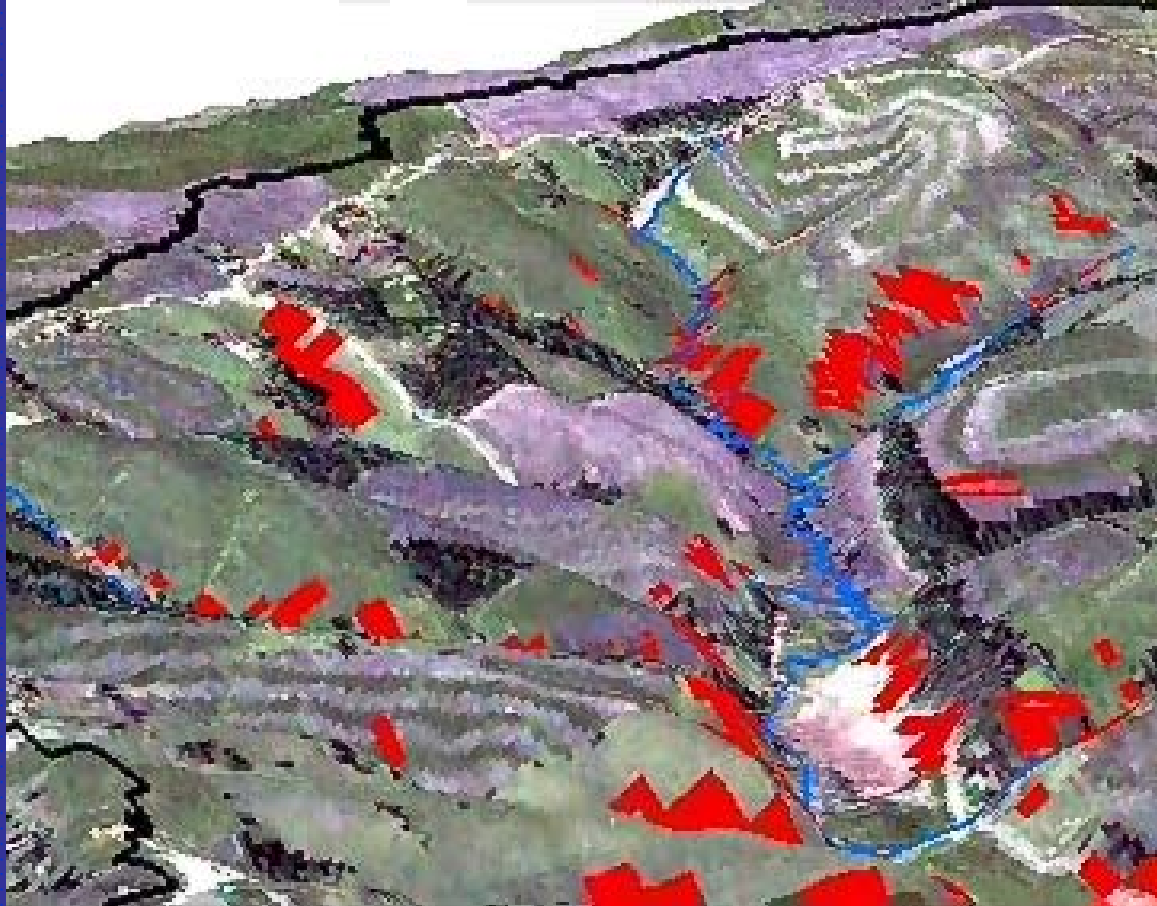


Design intervention and educational effort based on this understanding.

Focal Areas for Assessing Behavior

Relief
Exaggerated

 Areas of high
biophysical
vulnerability




Enhancing Impact of Education Programs

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A Summary: The Myths Preventing the Development of Effective Educational Programs



Myths of NPS Educational Programs

1. You can assume producers have a “Tabula Rasa” perspective relative to you and your responsibilities.
2. Government agencies bring solutions to local environmental problems.
3. It is critical to work with all the producers in your jurisdictional area.
4. Adequate financial resources and incentives are the key to effective resource management programs.

Myth #1: A “Tabula Rasa” Assumption

Producers are not “blank slates” or “empty sponges” waiting for you to come in to fill them with knowledge --- they have history, culture and indigenous knowledge.

Can an educational program teach an “old dog” new tricks? How well do you know your audience?

Myth #2: Government Agencies Bring Solutions

Government agencies bring complexity to on-going systems and processes that are responding to dynamic and imperfect markets and technological change.

Remember, the land owner is the real resource manager, and you are asking them to change

Myth #3: One Must Work with All Producers

The market rule of disproportionality is also true for conservation programs --- at least 80 percent of the problem is created on 20 percent of the land area or during a specific time.

Inappropriate behaviors in vulnerable areas or times needs to be addressed.

Myth #4: Adequate Financial Resources are the Key

There are many legitimate and valid reasons why producers may be unwilling or unable to follow your recommendations --- economics is only one of these.

Understanding these reasons is the most critical piece of information you can gain.

Thank you