

Improving Adaptive Deterrent Strategies for Predation Management

NWRC Mission

Apply scientific expertise to resolve human-wildlife conflicts while

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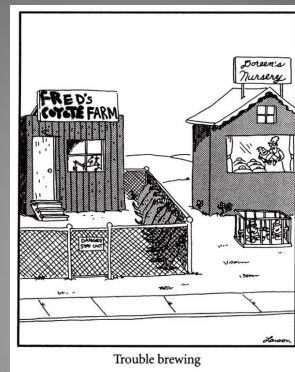


USDA Wildlife Services
NWRC
NATIONAL WILDLIFE RESEARCH CENTER

An Incredible Time to be a Carnivore Ecologist

- Growing and expanding carnivore populations
- Unprecedented tolerance for Carnivores
- Successful reintroductions and recovery efforts

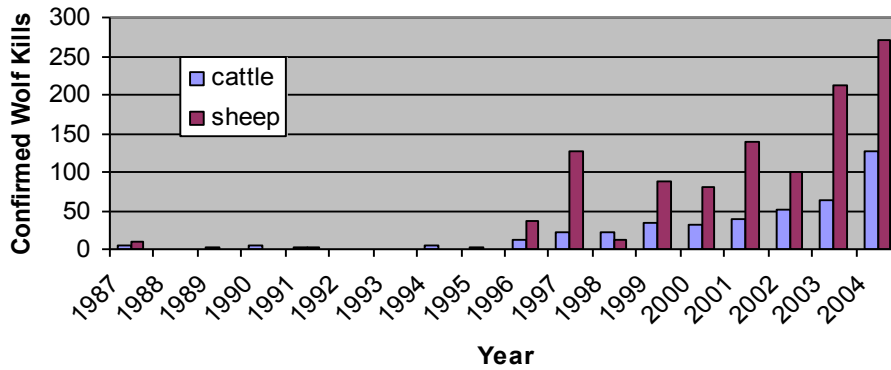
With coexistence comes challenges.....



Trouble brewing

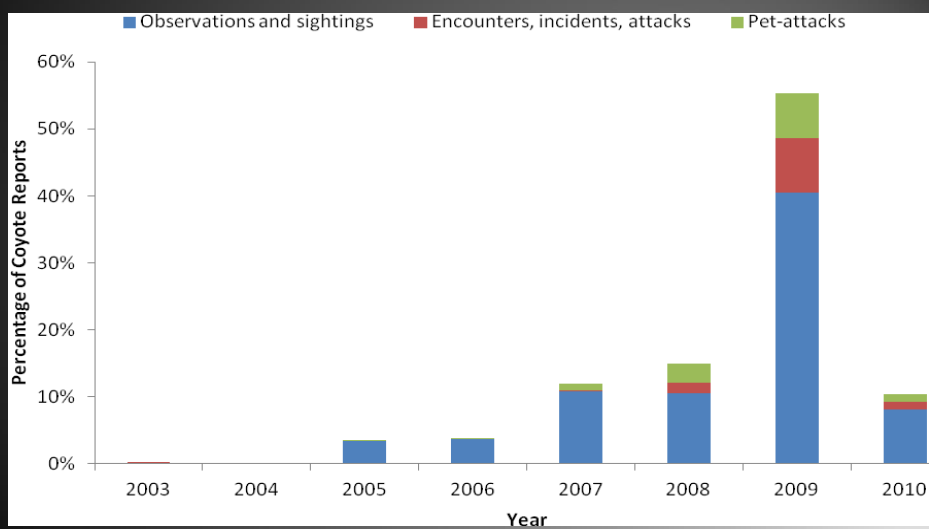
Conflict on the Rise....

Confirmed Wolf Kills in Montana, Idaho and Wyoming



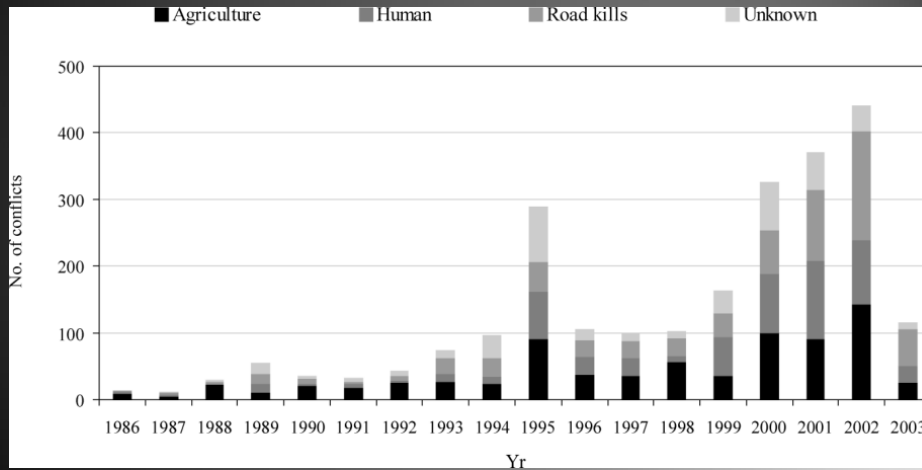
Conflict on the Rise....

Coyote Conflict in Denver

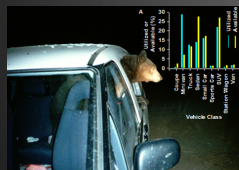


Conflict on the Rise....

Black Bear Conflict in Colorado



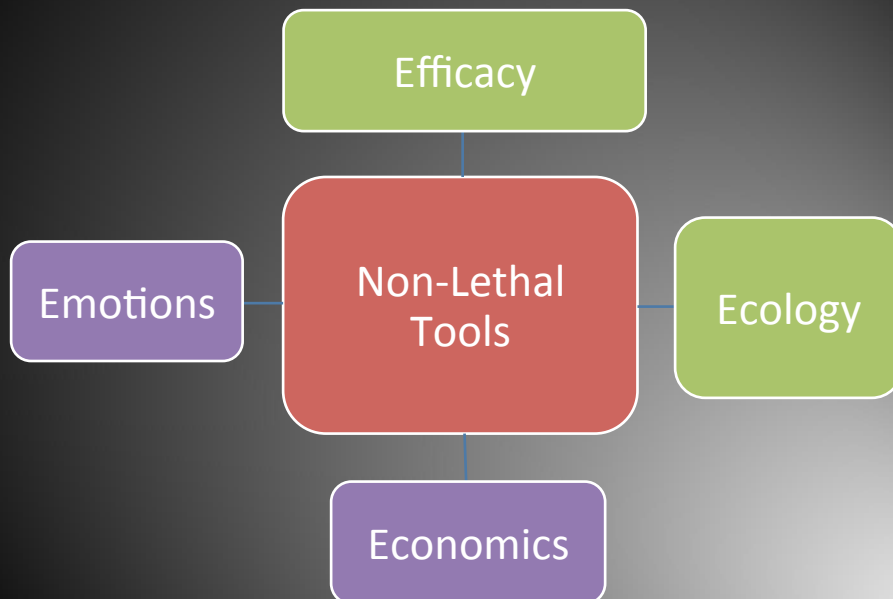
A Brave New World



My Perspective

- Above all we should make decisions based on reliable information
- Goal: Sustainable predator populations and sustainable livestock operations
- Both Lethal and Non-lethal can be appropriate

Developing Non-lethal Tools



Some Non-Lethal Techniques

- Natural Fences
- Electric Fences
- Netting Fences
- Fladry
- Turbo Fladry
- Visual repellents
- Acoustic repellents
- Projectiles
- Electric Collars
- Conditioned taste aversion
- Chemical Repellents
- Protection Collars
- Aggregate Grazing
- Shepherding
- Hotspots avoidance
- Control of calving and lambing
- Confining of livestock at night
- Disposal of livestock carcasses
- Livestock guarding animals
 - Dogs
 - Donkey
 - Llama
 - Other Species
- Sterilization
- Immuno-contraception
- Translocation

How Do We Improve Non-Lethal Strategies for Predation Management?

Change predator behavior

Change predator biology

Change human behavior

Change predator behavior

Negative stimuli:

Disruptive or Aversive

Change predator behavior

Disruptive stimuli

Change predator behavior

Disruptive stimuli

Undesirable stimuli that prevent or alter particular behaviors of animals by causing a “fright” or “startle” response

OR

...act by disrupting appetitive behavior and “frightening” predators away from resources

Change predator behavior

Disruptive stimuli

Undesirable stimuli that prevent or alter particular behaviors of animals by causing a “fright” or “startle” response



Change predator behavior



Change predator behavior

Aversive stimuli

Stimuli that cause discomfort, pain, or an otherwise negative experience & are paired with specific behaviors to achieve conditioning against these behaviors

Modify behavior through conditioning

Change predator behavior

Aversive stimuli

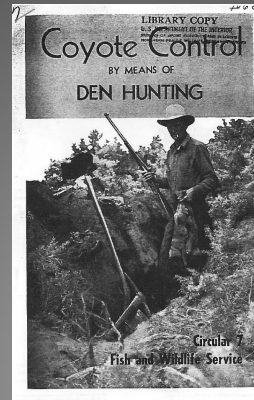
Stimuli that cause discomfort, pain, or an otherwise negative experience & are paired with specific behaviors to achieve conditioning against these behaviors



Change predator behavior

Repellents as negative stimuli: Disruptive or Aversive

Change predator biology



Change predator behavior

Repellents as negative stimuli: Disruptive or Aversive

Change predator biology

Sterilization



Sterilization significantly reduces livestock depredation

Same concept as denning, but without lethal ends

Canids remain as pair bonds

Coyotes – kill fewer pronghorn fawns & sheep

Wolves – live longer

Problem – surgical sterilization is invasive & costly

Will chemical sterilization work?

Change predator behavior

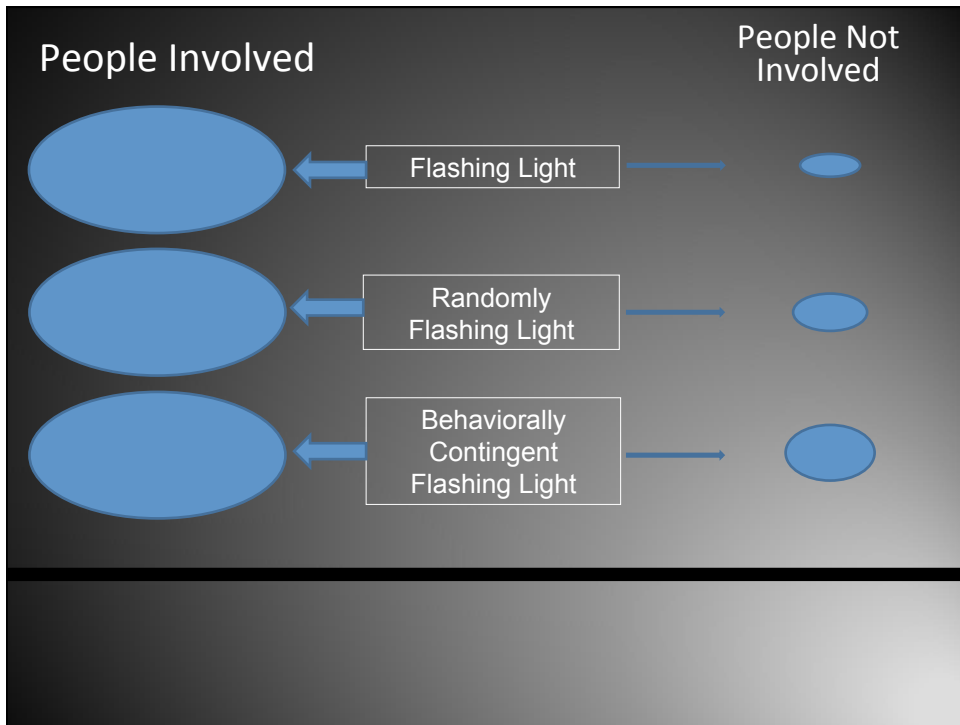
Repellents as negative stimuli: Disruptive or Aversive

Change predator biology

Sterilization

Change human behavior

When & how to use management tools



Sheep Collar Texts Shepherds When Wolves Attack



By Liat Clark, Wired UK

Swiss biologists are testing a sheep collar wolf-warning device that registers heart rate changes and alerts shepherds to attacks via text message, while simultaneously emitting a repellent.

Remote Alarm System in Yosemite NP



People as Adaptive Deterrents Wood River Project in Idaho



Change predator behavior

Repellents as negative stimuli: Disruptive or Aversive

Change predator biology

Sterilization

Change human behavior

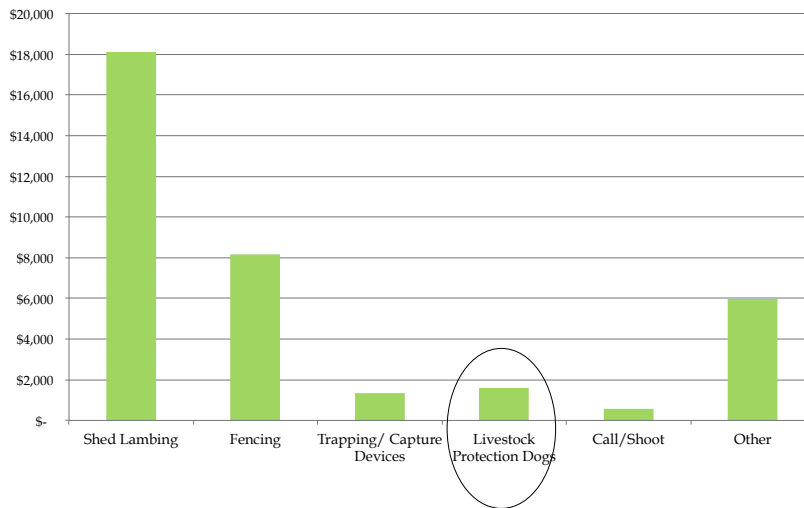
When & how to use management tools

Social & economic acceptance

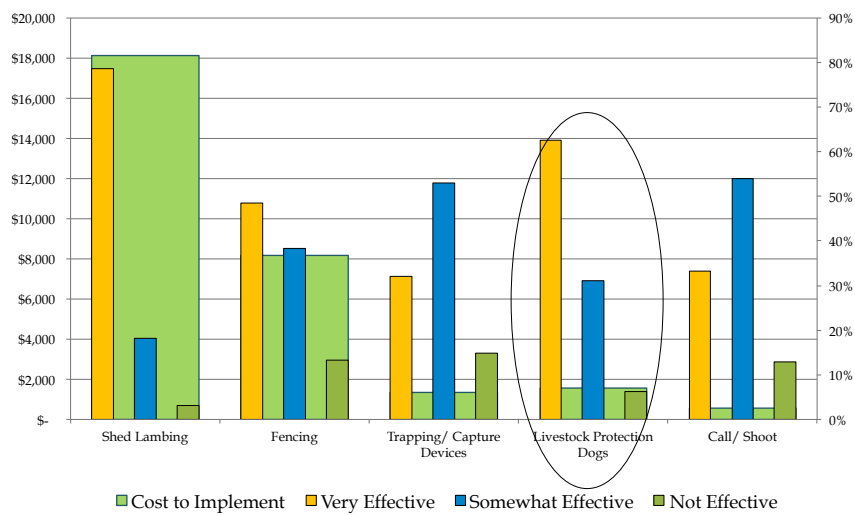
Livestock protection dogs



Producer costs to implement predator control methods (US)



Producers Perception of Effectiveness of Predation Prevention Measures (US)



Why Aren't Non-lethal Tools Being Used More?

- **Emotions**
 - Human Dimensions: Attitudes, Beliefs, Perceptions
 - Underappreciated and Understudied



Case Study: Fladry and Turbo Fladry



Lesson on The Importance of Economics Electrified Fladry

- 100% of producers disagreed that electrified fladry is affordable.
- 100% would not use electrified fladry if they incurred the cost .
- They were more agreeable with using electrified fladry when costs were deferred.



Economics of Non-Lethal Methods

- Time and Money
- Many things feasible but not necessarily practical
- Need fair evaluation of lethal vs. non-lethal tools



