

Livestock Protection Tools for Ranchers

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Overview

- Putting predators in context
- What are we really talking about?
- Tools
- Questions



Predation in Context

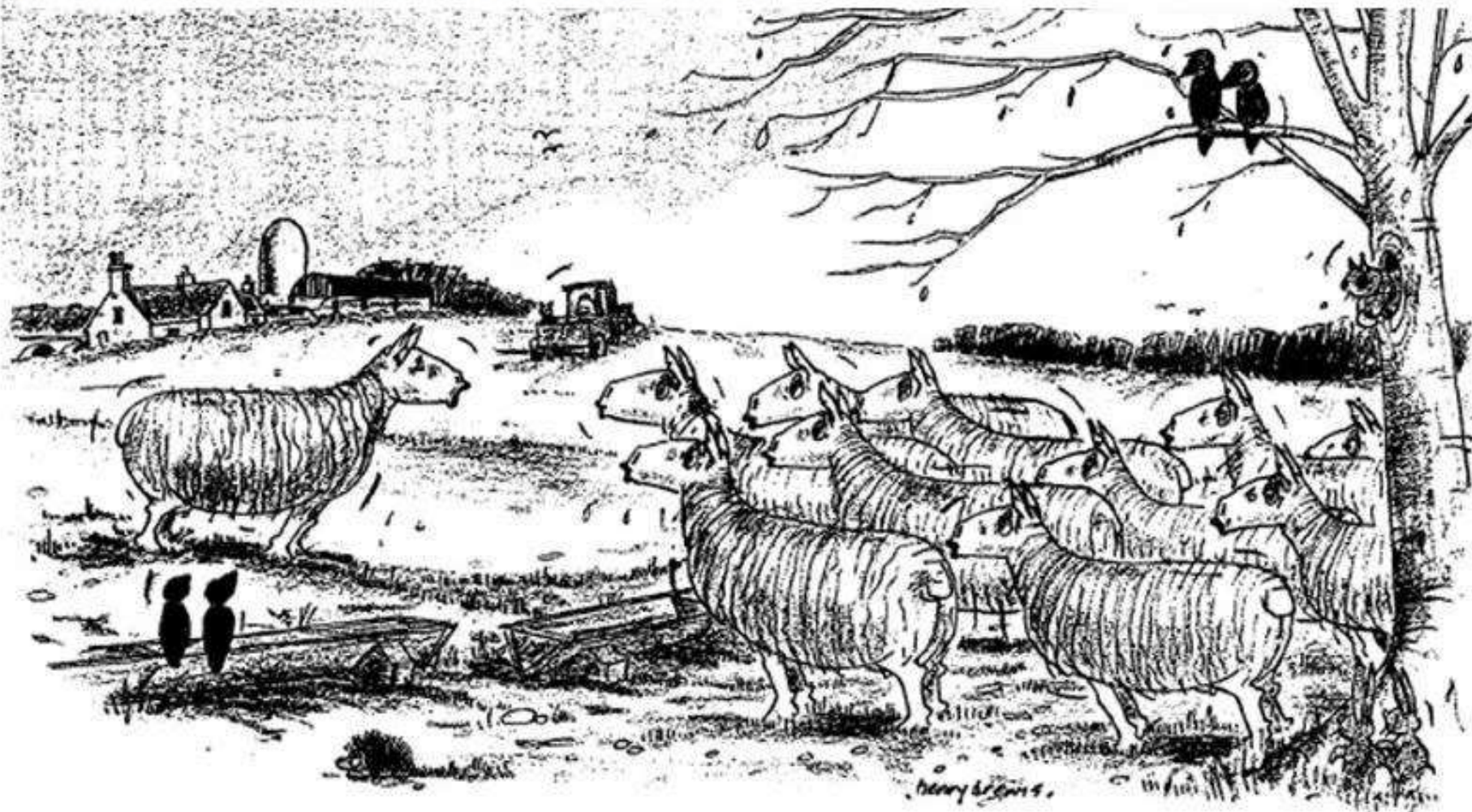
Death losses by cause	Beef Cattle (2015)		Sheep (2014)	
	#	%	#	%
Death losses from predators – mature animals	1,103	1.1	2,277	19.0
Non-predator losses – mature animals	98,897	98.9	9,723	81.0
Death losses from predators – calves/lambs	8,178	5.8	3,171	45.3
Non-predator death losses – calves/lambs	131,822	94.2	3,829	54.7

For California - adapted from USDA APHIS data.

Predation in Context (survey data)

	Cattle (n=78 herds)		Sheep & Goats (n=13)	
	#	% losses	#	% losses
Wolves (confirmed)	0	0%	0	0%
Wolves (suspected)	13	1.6%	31	4.1%
Mountain Lions	44	5.5%	45	6.0%
Coyotes	131	16%	115	15%
Domestic Dogs	73	9.1%	7	0.9%
Birds of Prey	3	0.4%	10	1.3%
Other Birds	10	1.2%	20	2.7%
Bears	9	1.1%	0	0.0%
Snakes	1	0.1%	2	0.3%
Humans	2	0.3%	159	21%
Disease/Natural Causes	521	65%	362	48%

"Listen, girls - it's getting to be that time of year again when we have to decide who is going to drop dead for no apparent reason."



More Context



- Predation impacts can be very significant locally
- The selection of specific tools is based on socio-economic factors:
 - Cost-benefit analyses
 - Cultural attitudes
 - Market pressures
 - Carnivore ecology
- Economic costs
 - Direct losses
 - **Indirect impacts** (see Ramler 2014)
 - UC Study

Predators? In Auburn?!



Livestock Protection Tools – 2016 Survey Data

	Cattle (78 herds)	
	Perceived Effectiveness (1 to 5 scale)	Producers using tool
Carcass Removal	4.3	3.8%
Lethal Control	3.6	14%
Other Guard Animals	3.0	5.1%
Range Rider / Herder	2.6	6.4%
Night Penning	2.0	2.6%
Alarm Devices	2.0	1.3%
Livestock Guardian Dogs	2.0	2.6%
Electric Fencing	1.8	5.1%
Move Livestock	1.5	2.6%
Fladry / Turbo Fladry	NA	0.0%
Other Changes	NA	0.0%

Livestock Protection Tools – 2016 Survey Data

	Sheep & Goats (13 flocks)	
	Perceived Effectiveness (1 to 5 scale)	Producers using tool
Night Penning	4.5	46%
Livestock Guardian Dogs	4.3	77%
Electric Fencing	4.0	38%
Fladry / Turbo Fladry	4.0	7.7%
Range Rider / Herder	3.5	15%
Carcass Removal	2.5	31%
Alarm Devices	2.2	39%
Other Guard Animals	2.0	31%
Move Livestock	1.0	7.7%
Other Changes	1.0	7.7%
Lethal Control	NA	0.0%

If your predator of concern is a:

	Dog	Coyote	Mtn Lion	Black Bear	Gray Wolf	Fox	Bobcat
Livestock guardian dog	●	●	●	●	●	●	●
Donkey	●	●	NA	NA	NA	●	NA
Llama	●	●	NA	NA	NA	●	NA
Woven-wire fencing w/ trip wire	●	●	NA	NA	NA	NA	NA
Permanent electric fencing	●	●	●	?	●	●	●
Temporary electric fencing	●	●	?	NA	●	●	●
Electro-net fencing	●	●	NA	NA	NA	●	●
Fladry or turbo fladry	NA	?	NA	NA	●	NA	NA
Attractant (carcass) removal	●	●	●	●	●	●	●
Human presence / stockmanship	NA	NA	NA	?	●	NA	NA
Night pen (small-scale operations)	●	●	●	●	●	●	●
Fright tactics / devices	NA	?	?	?	?	?	?
Shed lambing / calving / kidding	●	●	●	●	●	●	●
Multi-species grazing (cattle w/ small ruminants)	●	●	?	?	?	●	?

Consider these tools:

● Highly effective ● Moderately effective ? Research results with varying effectiveness NA No available evidence

Livestock Guardian Dogs



- Common breeds (big white dogs!)
- New breeds (in U.S.): Kangal, Karakachan and Cao de Gado Transmontaño
- Appear to protect stock without displacing predators (Coppinger et al 1988)
- May increase grazing efficiency (Weber et al 2015)
- Can be effective on operations of all types/scales (VonBommel and Johnson 2012)
- Pros and cons

Donkeys

- Typically cheaper to buy/keep than dogs
- Must not have access to rumensin!
- Effective with coyotes, dogs and foxes
- Most effective in pastures under 600 ac and with less than 400 hd
- Must be properly bonded
- Most producers remove donkeys during birthing season
- Not as effective in extensive settings
- See Andelt (2004) for more information



Llamas



- Same dietary requirements as ruminants
- Can be effective on small to mid-sized operations (250-300 head on 250-300 ac pastures)
- Wild South American camelids have been observed to chase foxes and flee from cougars
- Single llamas work best
- Not all llamas are naturally aggressive towards coyotes and dogs
- See Andelt (2004)

Attractant Removal



Photo: Travis Trailers

- Many predators are opportunistic scavengers – attracted to dead, sick, injured animals – and bone yards)
- LGDs may be drawn away from livestock (leaving them unprotected)
- Removal presents logistical and legal issues
 - Illegal to compost in CA
 - Check with county environmental health dept. re: burial
 - Retrieval/rendering may be cost prohibitive

Woven-wire Fencing

- Physical barrier to predators
- Most effective with additional psychological barrier
 - Top barbed or electrified wire
 - Outside trip wire
- Adult coyotes can squeeze thru 4x6" opening!
- Expensive to construct and maintain!



Photo: indianaagriculturalfencing.com

Permanent Electric Fencing



Photo: Kencove Fencing

- Mostly a psychological barrier
- Typically 8-12 wires, alternating hot and ground
- May include outside trip wire
- Maintenance is critical!
- Dry soil conditions, grounding on vegetation or itself, or poor construction may contribute to ineffectiveness

Temporary Electric Fencing

- Often used to control grazing on irrigated pasture, in sensitive areas, etc.
- Poly-wire or tape with steel wire for conductivity
- Can be part of multiple-tool approach (typically with livestock guardian animals)



Photo: Rutland Electric Fencing

Electro-Net Fencing



Photo: E. Macon

- A more protective version of temporary electric fence
- 36-48" high, 164-ft sections
- Requires high-capacity energizer
- Shorter lifespan (5-7 yrs)
- Not an option in extensive operations (except for lambing/kidding or for targeted grazing)
- Can reduce/eliminate coyote incursion into pastures (Matchett Breck and Callon 2013)

Fladry and Turbo-Fladry

- Fladry is a series of cloth flags attached to rope or electrified wire (turbo fladry)
- Creates novel visual stimulus that wolves (and other canids?) fear
- Habituation seems to occur in 60-90 days
- May be useful in specific applications (e.g., calving pastures)
- See Musiani et al (2003) and Young Miller and Essex (2015)



Human Presence / Stockmanship

- Large-scale sheep/goat producers often utilize herders
- Range riders have been employed by individuals and groups to deter predators
- Habituation and cost are concerns/barriers
- Some producers working to re-instill herd behaviors (to fight off predators)
- Can help with public perception (Parks 2015)
- May also help identify/remove sick or injured animals
- Economic considerations



Night Penning



Photo: Hopland REC

- Penning livestock in predator-proof enclosure during nighttime hours
- Can be effective for small operations or specific times of year
- Increases capital and labor costs
- Potential for increased livestock health problems
- See Espuno et al (2004)

Fright Tactics and Devices

- Novel stimuli (strobe lights, propane cannons, sirens, etc.) frighten some predators
- Random vs. behavioral activation impact habituation
- Limited geographic scope
- May have place in multi-tool approach



Photo: WA Poultry Equipment

Culling Older Animals



- Older animals may be more prone to predation – culling can remove a predator attractant
- Culling decisions are generally based on behavioral, productivity and health factors (rather than predation)
- Temple Grandin has suggested that by selecting for docility, we're reducing protective behaviors in cows

Altering Production Calendar

- Predators typically have the greatest demand for prey during late gestation and early lactation
- Barriers to altering production calendar:
 - Forage quality/quantity
 - Weather
 - Lengthy gestation (cattle)
 - Seasonal estrus (sheep)
 - Markets
 - Lease requirements



Targeted Human Presence



- More frequent checks in high predation areas or seasons
- Requires producers to observe and be knowledgeable about predator behavior and habitat use
- Can focus additional expense and labor on key times
- Definition of “harass” in state and federal ESA

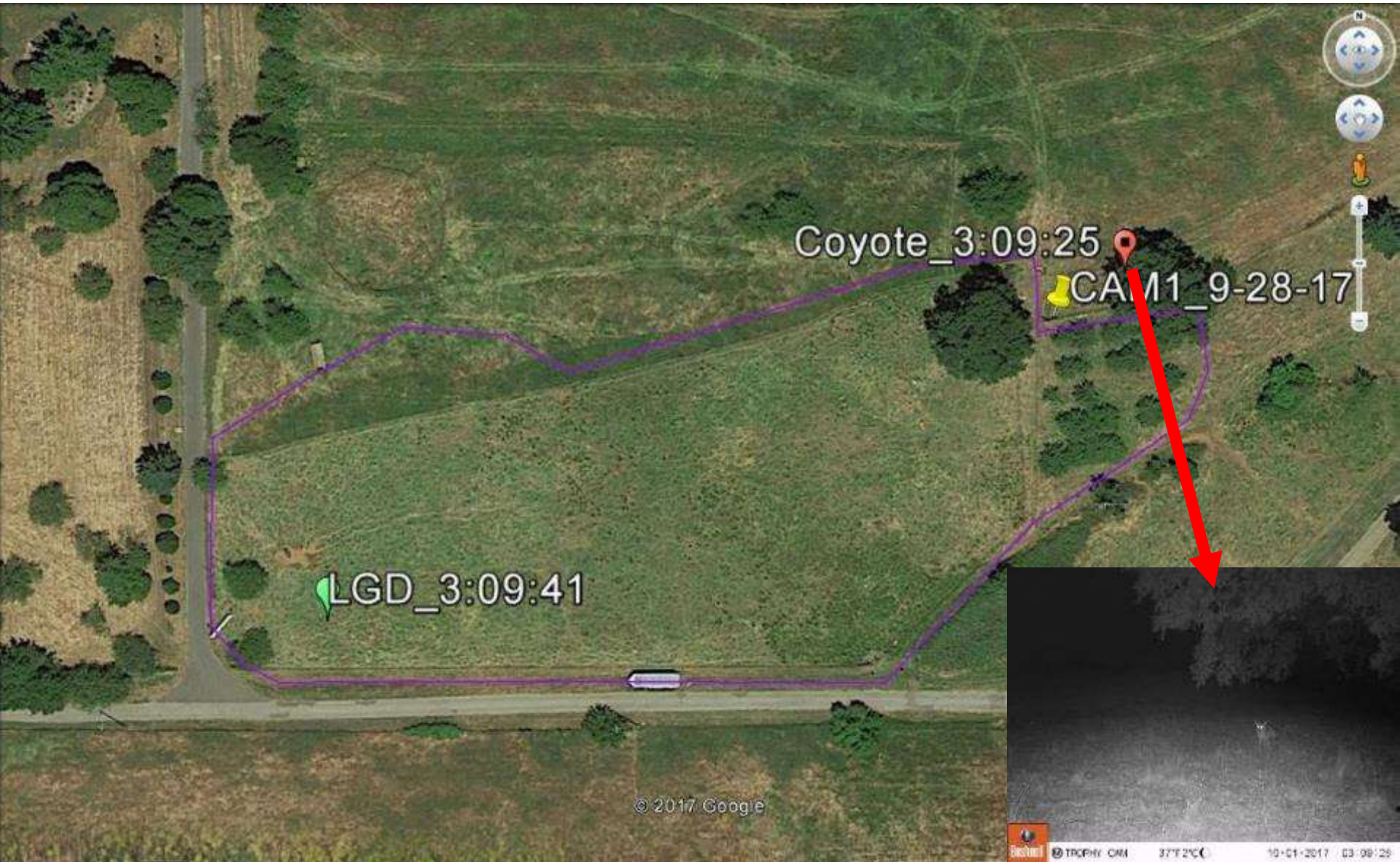
Tool Adoption

- Combinations of tools and adaptive management are key
 - Avoid habituation
- “Tool” might be a bad label – these are largely biological and behavioral techniques
- Site-specificity
- “Show Me”
 - Demonstrations
 - Peer-to-peer learning is critical



Additional Research and Demonstration

- Efficacy vs. mechanisms
 - Difficult to measure something that doesn't happen!
 - Control vs. treatment – do any of us want to be in the unprotected “control” group?
 - Maybe the key question is **how** these tools work!
- LGD Project
 - Collaring LGDs and sheep
 - Paired with trail cameras to detect wildlife
 - Demonstrate LGD behavior relative to specific predators and in specific habitats



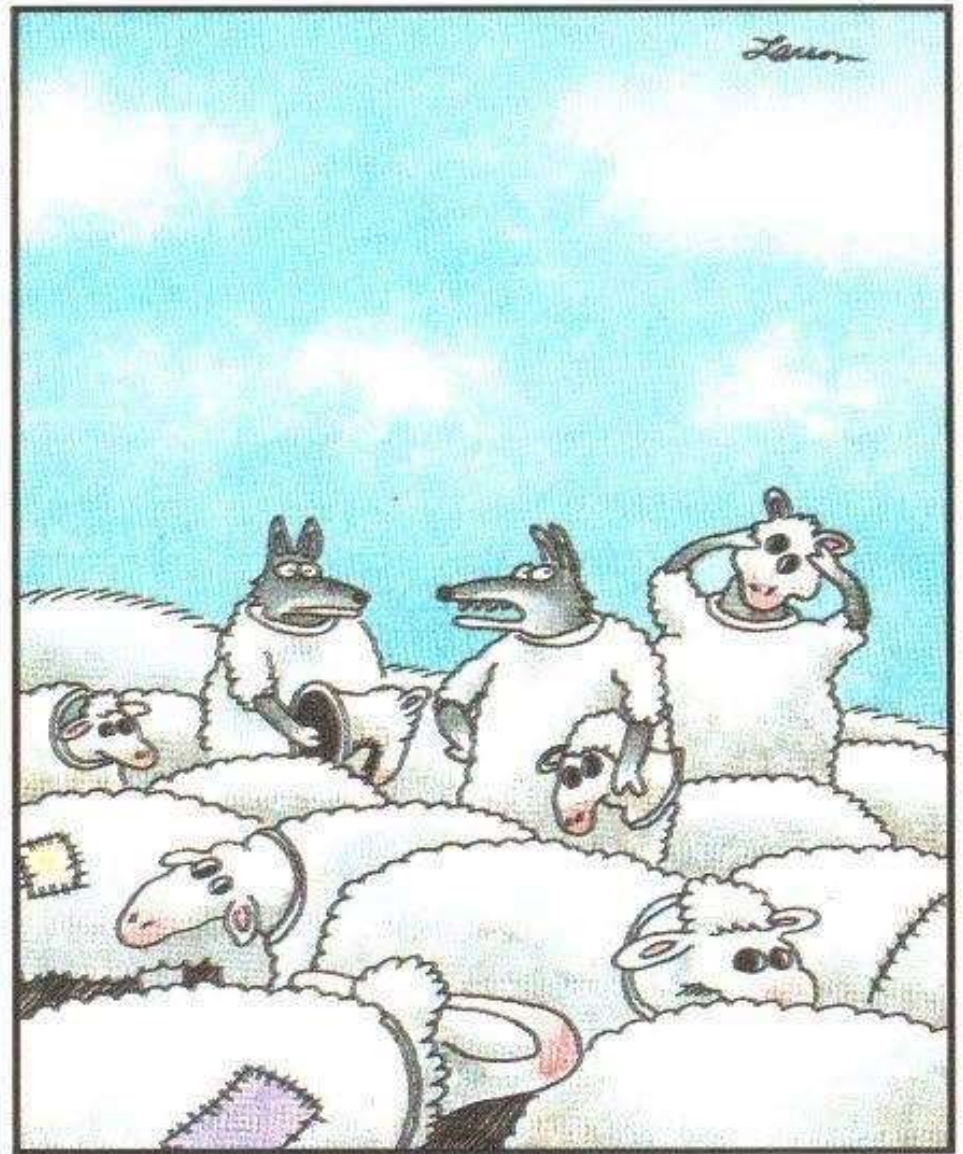
A Few Final Thoughts/Questions

- Coexistence is a contractual relationship that all parties must uphold – including the predators!
 - Rangeland livestock and large carnivores rely on the same habitat (see Miller et al 2016)
 - Nonlethal should refer to both our relationship with predators and predators' relationship with livestock.
- Wildlife Services plays critical role in educating, sharing intelligence
- Is there a relationship between nonlethal tool efficacy and lethal control?
 - Do tools like stockmanship and hazing rely upon the potential for targeted lethal control actions?

Direct/Indirect Impacts Study

- If you're interested in participating in our long term (10-year) study on the direct and indirect impacts of predators on rangeland livestock operations, contact:
 - Dan Macon (dmacon@ucanr.edu)
 - Leslie Roche (lmroche@ucdavis.edu)

Questions?



"Wait a minute! Isn't anyone here a real sheep?"