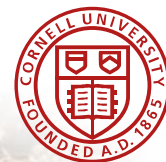




Produce Safety

A L L I A N C E



Cornell University



Module 4: Wildlife, Domesticated Animals, and Land Use

Learning Objectives

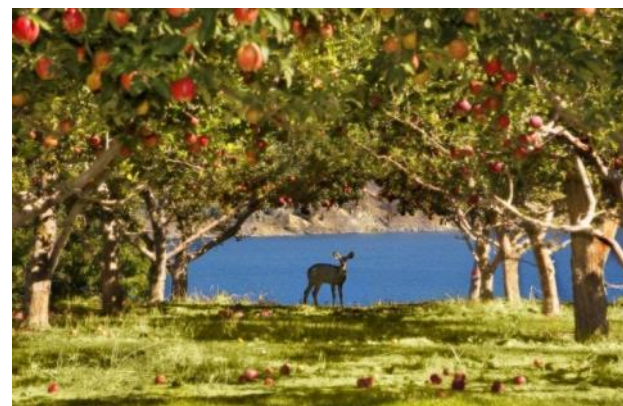
- Identify potential routes of contamination from wildlife, domesticated animals, and land use
- Describe practices to mitigate risks associated with wildlife, domesticated animals, and land use
- Describe co-management strategies that address conservation and food safety goals
- Describe the importance of conducting a pre-plant and pre-harvest assessment of fields
- Describe corrective actions that could be used if significant risks are present in production fields
- Identify records that should be kept to document any management, monitoring, or corrective actions





Animals Are A Produce Safety Concern Because They:

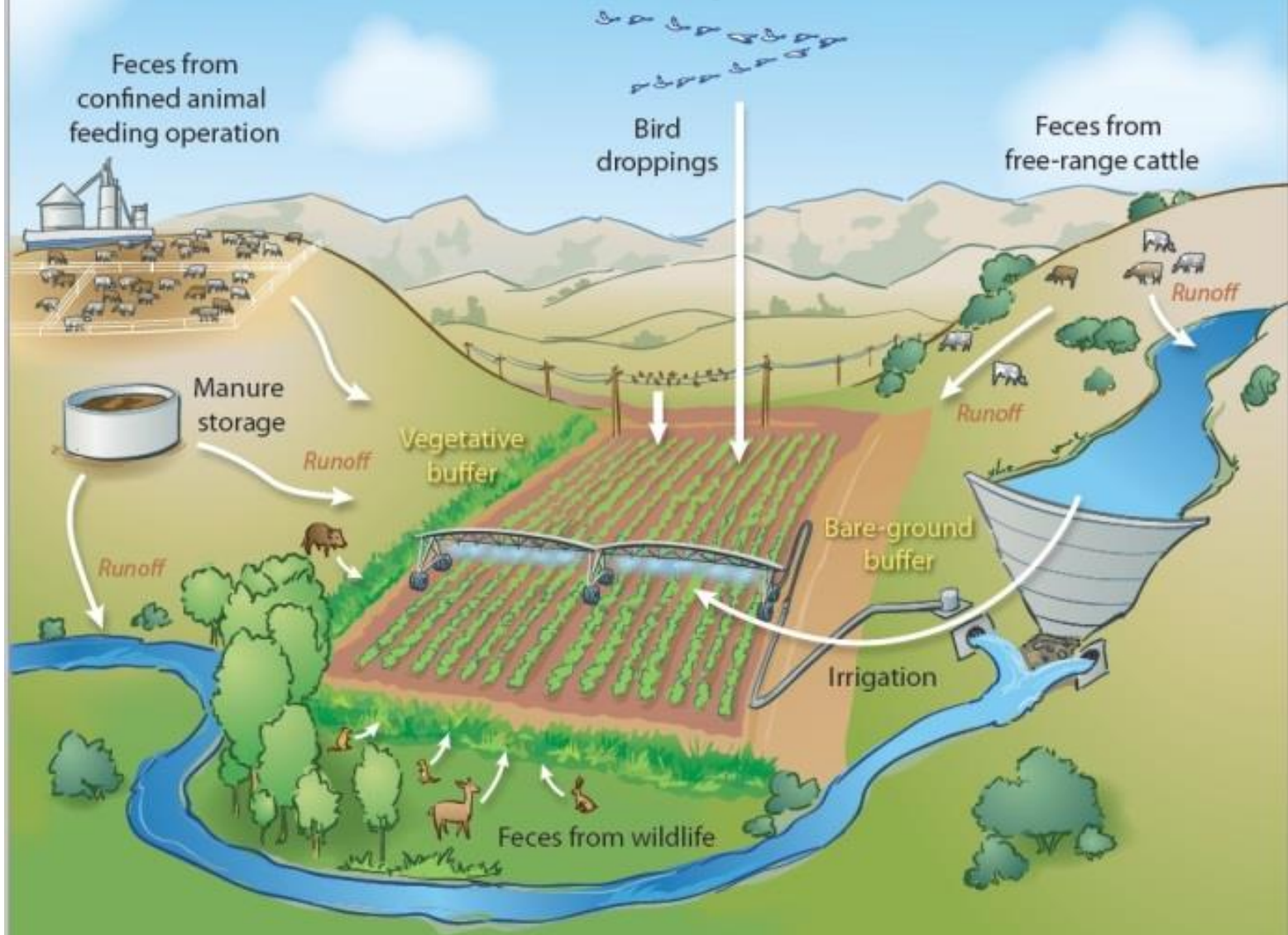
- Can carry human pathogens
 - e.g., *E. coli* O157:H7, *Salmonella*, *Listeria monocytogenes*
- Can spread human pathogens
 - By depositing feces in fields
 - By spreading fecal contamination as they move
- Are very difficult to control
 - Birds and small animals travel unnoticed
 - If fencing is used, even the best fence can be breached
 - Complete exclusion is not possible







Managing Food Safety on the Farm Can Be a Complex Issue!





Wes Kline, NJ Agricultural Experiment Station

- **Leave produce with bird droppings**
- **Ideally, Harvest dry produce if possible**
- **Remove from field as quickly as possible**



Wildlife on the Farm



- Can be a natural and valuable part of the landscape and farm environment
 - **Co-management is promoted by FSMA-PSR**
- Depending on species, management options may be limited by county, state, or federal law
- May be resident or transient (e.g., migrating species)
- Wildlife with close association to human activities may pose greater risks
 - e.g., seagulls feeding at dumps, starlings feeding in cattle feedlots



Assessing Risks: Wildlife

- Do you find wildlife feces in your produce fields?
 - How often? Is it widely distributed? Is it in contact with produce?





Assessing Risks: Wildlife

- Do you find wildlife feces in your produce fields?
 - How often? Is it widely distributed? Is it in contact with produce?
- Is your farm in an area that large numbers of animals visit (e.g., flocks of migrating birds, herds of deer)?
- What management practices can limit wildlife contamination of produce fields and water sources?





Co-Management: Striking a Balance

- Farmers must address food safety requirements, but should keep the conservation of natural resources in mind
- Farmers also have stewardship, aesthetic, and business objectives of their own
- **Co-management** considers both food safety and conservation of natural resources



Co-Management Considerations



- Some conservation practices support wildlife and may
If you stop the practice of maintaining
wild habitat, and remove it instead, animals will increasingly seek food, water, shelter, and mates IN the field!
(e.g., vegetation and water sources)
- Removal of conservation practices can damage natural resources (e.g., soil, water, wildlife) and may not mitigate hazards posed by domesticated and wild animals





Skills to Support Co-Management

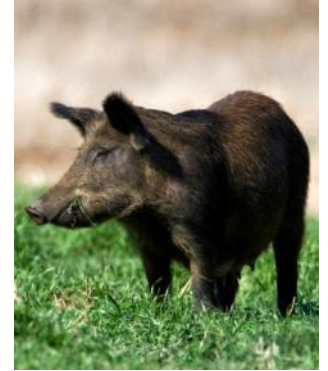
- Review the risks and benefits of practices as they relate to food safety and conservation
 - e.g., bare ground buffer and hedgerow vegetation
- Consider impact on conservation when implementing produce safety practices
 - Unintended consequences
 - Direct conflicts between produce safety and conservation





Monitoring Wildlife Activity

- **During the growing season:**
 - Monitor for feces and evidence of intrusion
 - Evaluate the risk of fecal contamination on produce (e.g., tree vs. root crop)
 - Consider past observations and wildlife attractants
- **Immediately prior to harvest**
 - Monitor for fecal contamination, signs of animal activity (e.g., trampling, rooting, feeding, tracks)
 - Assess risks and decide if the crop or a portion of the crop can be safely harvested



Detering Wildlife





Detering Wildlife

Decoys

Fencing & Netting





Detering Wildlife

Visual Deterrents



Noise Deterrents

Tactile Repellent

Relocation





Risks Associated with Wildlife-Livestock Interactions

2-3% of birds and rodents in the Yuma growing region carry *Salmonella* and/or shiga toxin-producing *E. coli*.





Wildlife & Livestock Interactions

- Pathogens may be transferred between livestock and wildlife
- Pathogen loads in domesticated animals may be species specific and impacted by animal management practices on the farm
- Shared grazing lands and water sources may offer contamination pathways among species





Domesticated Animals on the Farm

- Domesticated animals, such as livestock and pets, may harbor human pathogens
- Domesticated animals are sometimes used in fields
 - As working animals
 - As wildlife management (i.e., dogs)
 - To graze crop residues/culls
- Assess the risk if animals are allowed or are likely to enter your production fields





Assessing Risks: Domesticated Animals

- Are domesticated animals allowed in the field while the crop is present as part of the production process?
 - Are they working animals?
- Are workers aware of cross-contamination risks from fecal contamination of hands, clothing, shoes, and equipment after handling animals or fecal material?
- Are production fields rotated into grazing land?
 - If manure is present on the ground, one recommendation is to extend the period of time between when animals were grazed and when produce can be planted



Assess Risks BEFORE Planting

- **Assess the field location**

- Topography, wind patterns, water movement

- Previous uses (e.g., grazing, landfills, manure applications)

- Impact of domesticated animals



- **Assess adjacent land uses**

- Animal production, compost, or manure storage

- Residential, commercial, or other land uses

- **Assess wildlife risks**

- Number, movement, likelihood of fecal contamination



Working Animals



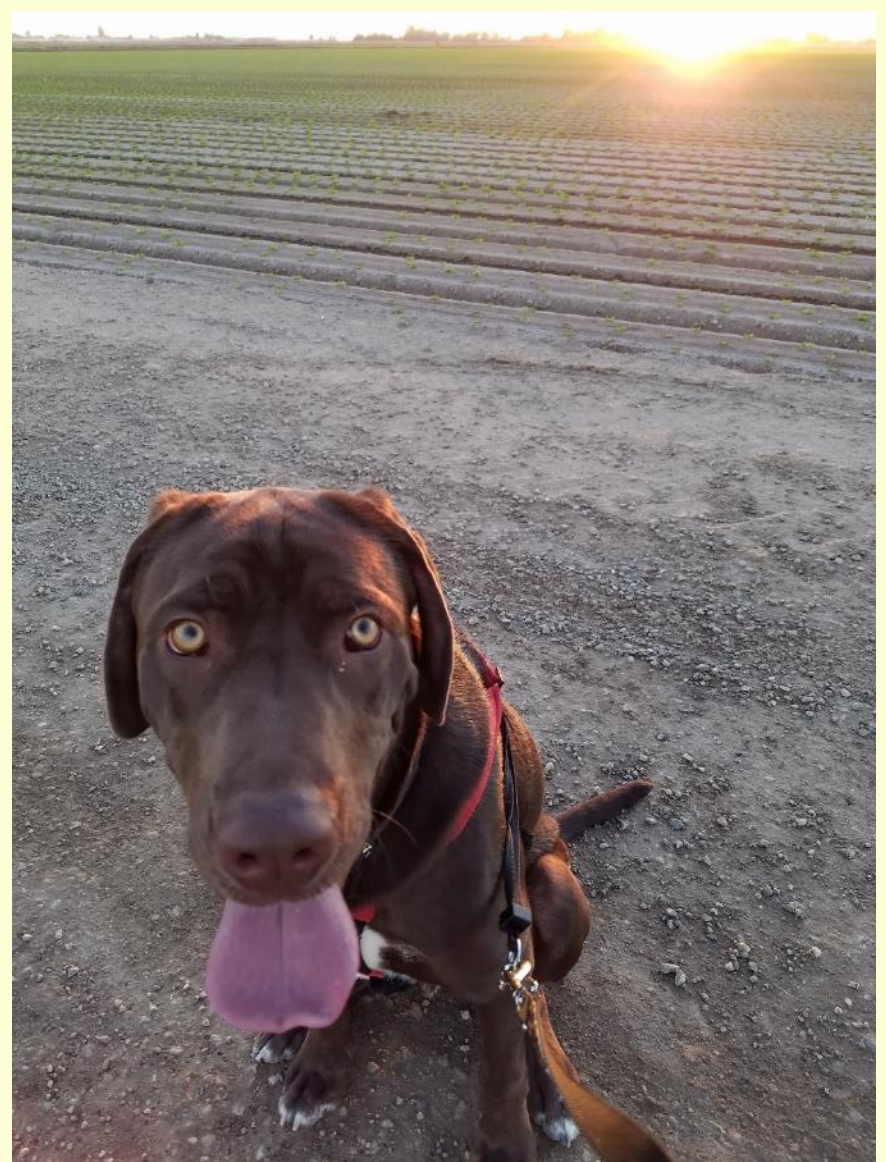
- The best way to minimize risk is to not allow working animals in the field when the edible portion of the crop is present
- If working animals need to be used close to harvest:
 - Establish paths to minimize contact with growing areas
 - Have an SOP that outlines practices to take if an animal defecates (poops) in the field near or on produce
- Anyone working with the animals should understand risks and be trained to minimize risks
- Develop SOPs for animal and manure handling
 - e.g., handwashing, cleaning and sanitizing tools, practices to complete after handling animals

Wildlife and Animal Management

- **Identify/assess risks wild and domestic**
 - Proximity to wooded areas or water that attract
 - Grazing farm animals – run-off into fields?
 - Prior harvest – look fecal contamination
 - How often do you see animals?
- **Methods to minimize – deterrents**
 - Animals desensitized to noise and decoys
 - Fencing may not practical



Pets and Produce Don't Mix





Pets

- Should be excluded from produce fields
- Visitors to the farm should be instructed to leave their pets at home
- Farms with petting zoos should have handwashing sinks available and signage instructing visitors of the food safety policies



On Farm Petting Zoos – Not a good idea!!



Farms/zoos tied to dozens of illnesses in US and Europe over last 20 years



- Since 2000, US petting zoos /farm visits : 32 outbreaks of E. coli, Salmonella and Cryptosporidium
- Between 1996 and 2010, CDC received reports of approximately 150 animal-to-human disease outbreaks in public settings

Petting Zoo fun!

- UK: Farms/Events found liable
 - 2009 E. coli 0157:H7 outbreak
 - 93 sick, 76 children under age 10
 - Several children acute kidney failure



What went wrong at Lambing Live:

- Uncontrolled access to lambs
- Children rolled in feces-covered straw
- Animals densely packed
- Hand washing basins meant for visitors used to clean animal feeding dishes
- 2-year old died



Petting Zoo fun!

■ 2004 – North Carolina State Fair

- E coli 0157:H7
- 187 people sick
- 15 with HUS



■ 2015 – Washington Fair Grounds

- E coli 0157:H7
- 60 people sick
- 40 people at event
- 20 secondary – i.e. siblings
- Manure bunker nearby



■ 2016 – Oak Leaf Dairy, Lebanon CT

- Goats – E. coli 0157:H7
- 34, 28 children 10 months -14 years w/ 18 < 5 years



Petting Zoos: Pathogens

- Pathogens can spread by:
 - Petting – farm animal contact
 - No hand to mouth activities (eating, drinking, toys, pacifiers, **thumbs**)
 - Some animals transmit more than others – young animals (calves), young poultry, any ill animals.
 - Foot traffic
 - Sawdust and soil
 - End up on hand rails, rafters, water bottles and snacks, strollers
 - Small children, immunocompromised, elderly – higher risk
- Risks not always addressed with handwashing
 - Provide adequate handwashing – immediate wash after contact
 - If no running water, sanitizers better nothing but CDC has no efficacy
- Liability – is it worth it?





Pre-Harvest Assessment

A process to assess fields before harvest to help determine if:

- Fecal contamination is present, or signs indicate a risk (e.g., tracks, trampling, rooting, feeding)
- Fresh produce has been contaminated and cannot be harvested
- Corrective actions, such as no-harvest buffer zones, are necessary
- Harvest can safely proceed





Pre-Harvest Assessment is NOT Enough





Corrective Actions: What To Do If There's Contamination

1. Do not harvest any produce that may be contaminated
2. Determine if no-harvest buffer zones around the contamination are sufficient to reduce risk to allow harvest of the uncontaminated produce
 - Suggested no-harvest buffer zones vary from a 0-25 foot radius, depending on the crop, climate, contamination event, and harvest equipment
3. Consider other corrective actions that could reduce contamination risks





Corrective Actions Continued

4. Make a decision about what to do with the contamination
 - Remove, leave, bury, or use other strategies
 - Consider risks that could result from these actions (e.g., cross-contamination of equipment with feces)
5. Document all actions
 - Monitoring, deterrence, and corrective actions





Worker Training: Establishing Your Front Lines of Defense

Workers must receive training to:

- Recognize and not harvest contaminated produce
- Inspect and correct problems with harvest containers and equipment or report issues to a supervisor, so they do not become a contamination source

Workers must:

- Take measures to not harvest contaminated produce
- Wash hands after handling animal feces or any time hands may be contaminated

Workers should:

- Report food safety concerns to a supervisor



Recordkeeping

Records must be kept for:

- Worker training

Records should be kept for:

- Pre-plant land assessments
- Monitoring for animal activity
- Actions taken to reduce the risks related to animal intrusion into crop (domesticated animals and wildlife)
- Pre-harvest risk assessments
- Intrusion and contamination events
- All corrective actions taken





Example of Recordkeeping

Wildlife and Domesticated Animal Monitoring Log

Name of operation:

Please see the food safety plan for overall wildlife and domesticated animal management, monitoring, and corrective actions. Attach any relevant pictures, maps, or other notes about the monitoring or intrusion event to this recordkeeping sheet.

Date	Field or location	Wildlife activity or intrusion event noted (yes or no)	Corrective actions taken	Date corrective actions implemented	Initials

Reviewed by:

Title:

Date:



Summary

- Feces and urine from domesticated and wild animals can contaminate produce fields and water sources
- Conduct pre-planting and pre-harvest assessments
- Presence of animals in the environment does not necessarily mean that produce is contaminated
- If animal intrusion occurs, fields must be monitored during the growing season for evidence of contamination
- Steps should be taken to reduce risks from animals
- Co-management should be used to balance food safety and conservation goals
- Document all actions taken to reduce risks from animals and adjacent land uses