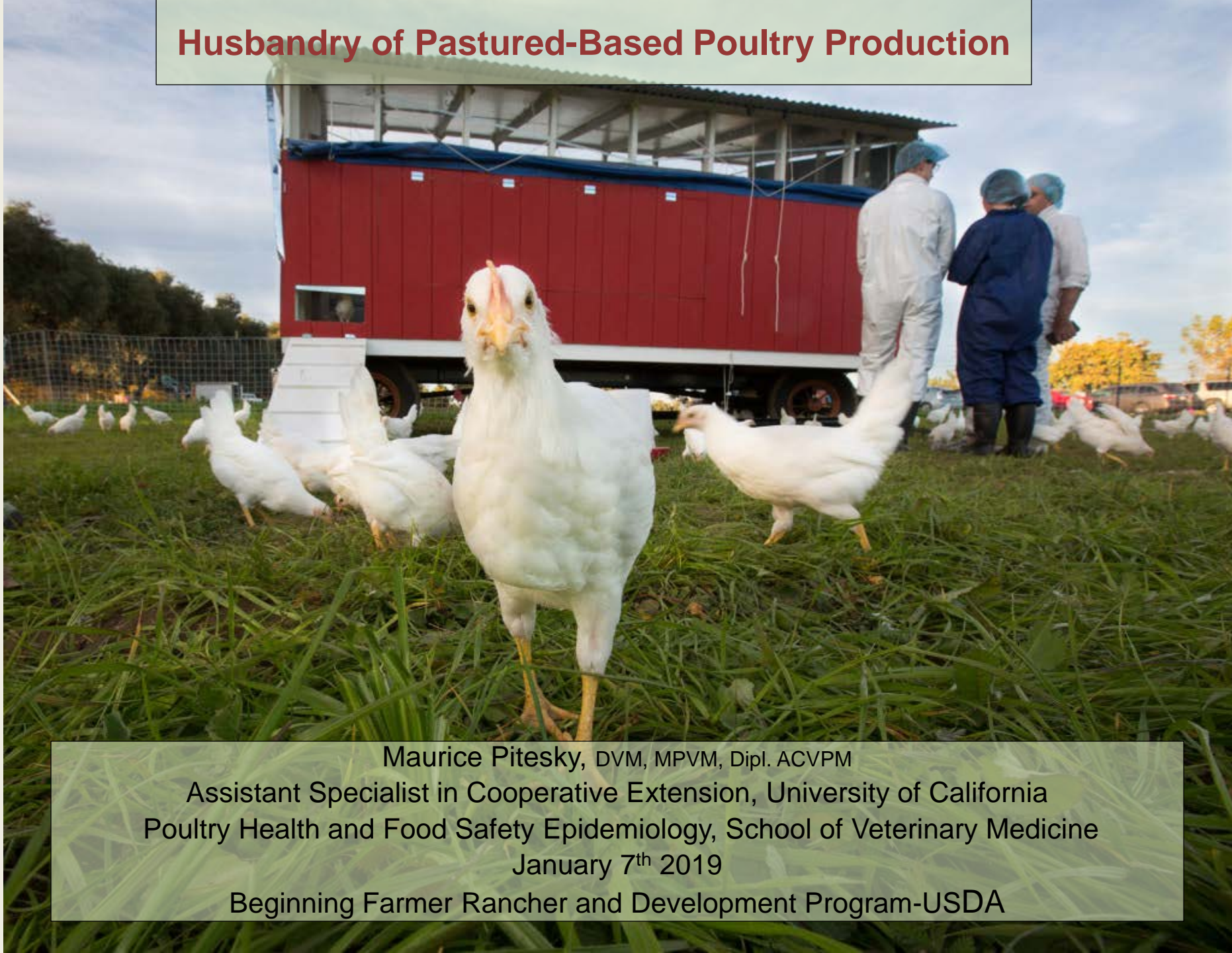


# Husbandry of Pastured-Based Poultry Production



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January 7<sup>th</sup> 2019

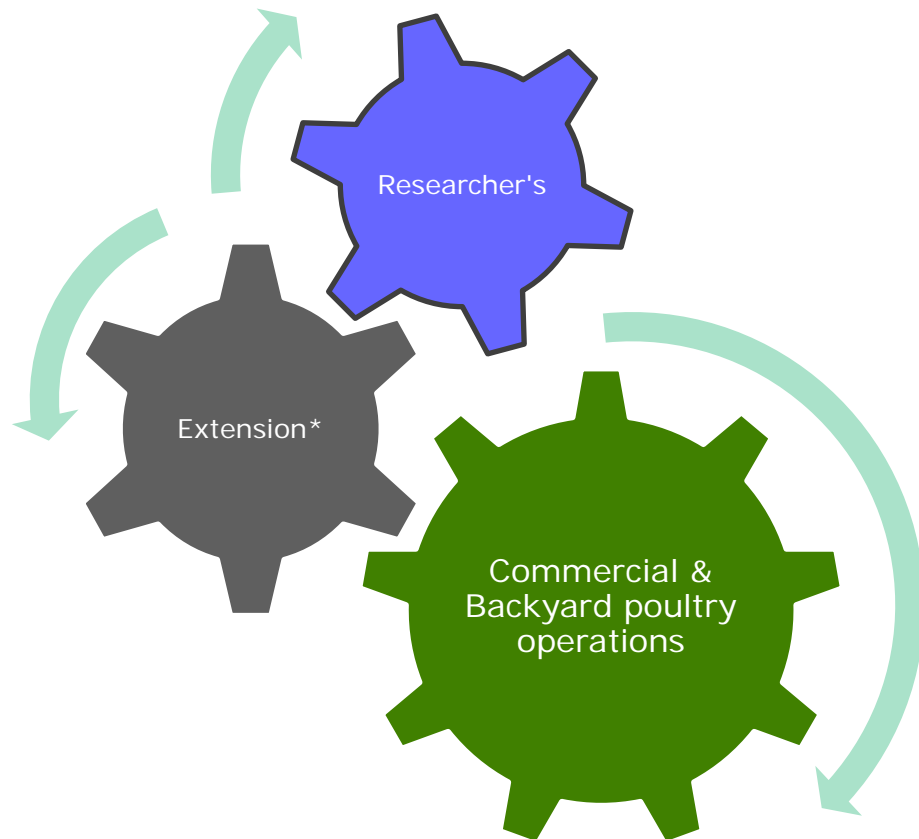
Beginning Farmer Rancher and Development Program-USDA

# Questions?



# What is Cooperative Extension?

University based research and knowledge sharing program



\* Extension specialists, researchers and Farm Advisors

Mission Statement:  
Using UC Research capabilities to help deliver healthy food systems, environments and communities

- In California:
- 200 locally based CE advisors and specialists
  - 57 local offices
  - 130 campus based CE specialists
  - 9 research and extension centers
  - 700 academic researchers

<http://ucanr.edu/>

IF you are from outside of California your state also has a CE system

# Free-Range and Pastured Poultry Resources

## UC Davis Pastured Poultry Farm

A Research, Innovation and Outreach Facility for Pastured Poultry Production

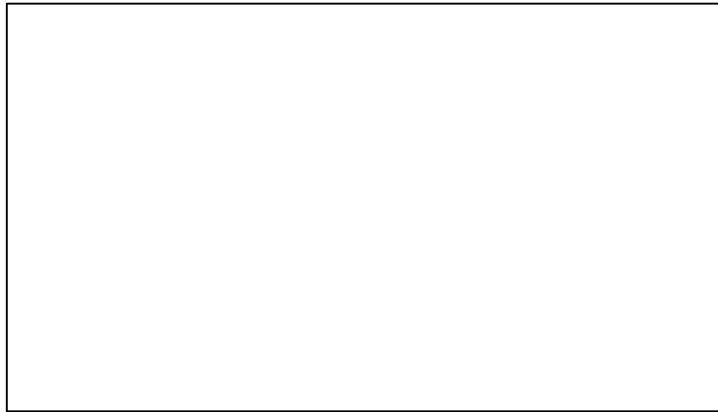
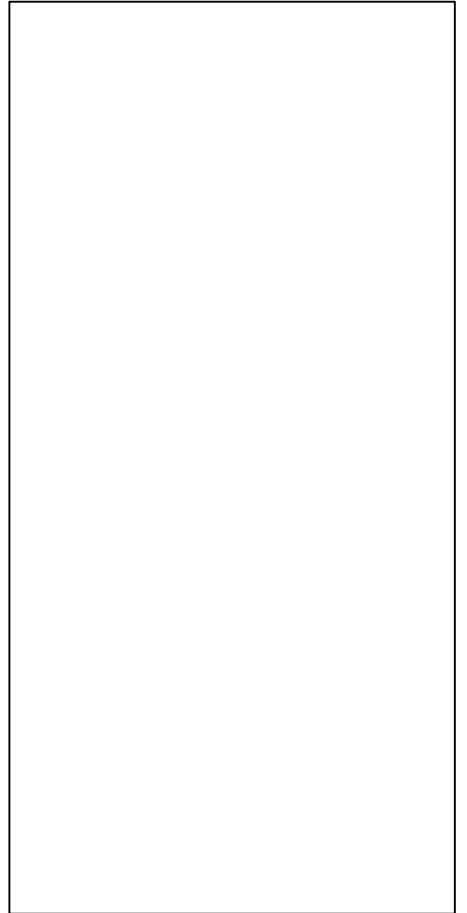
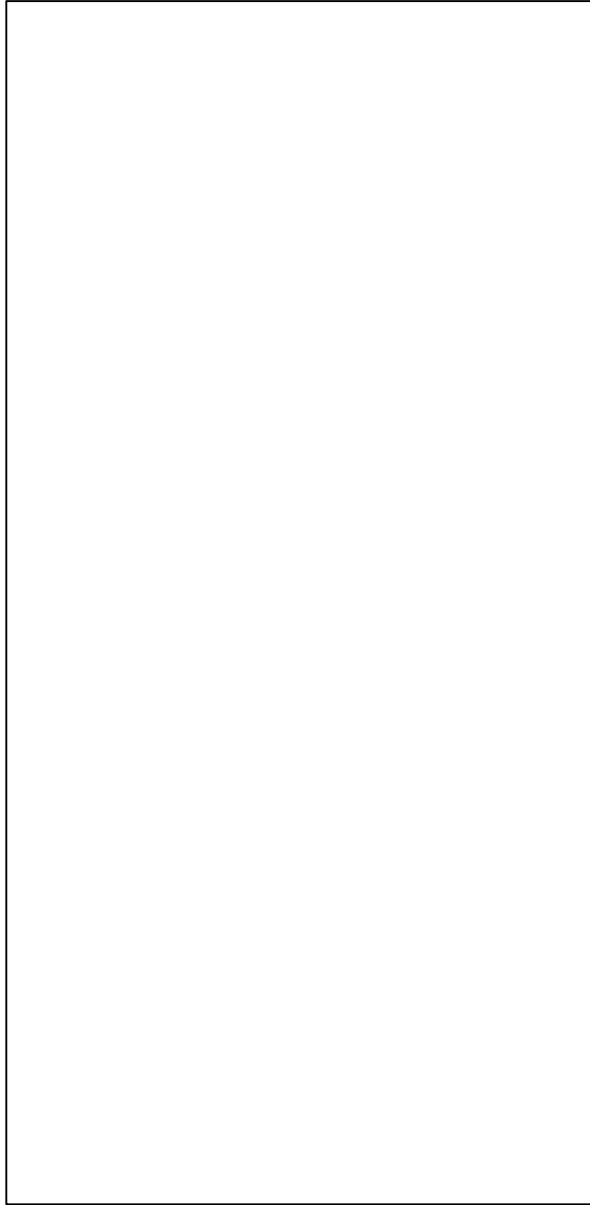
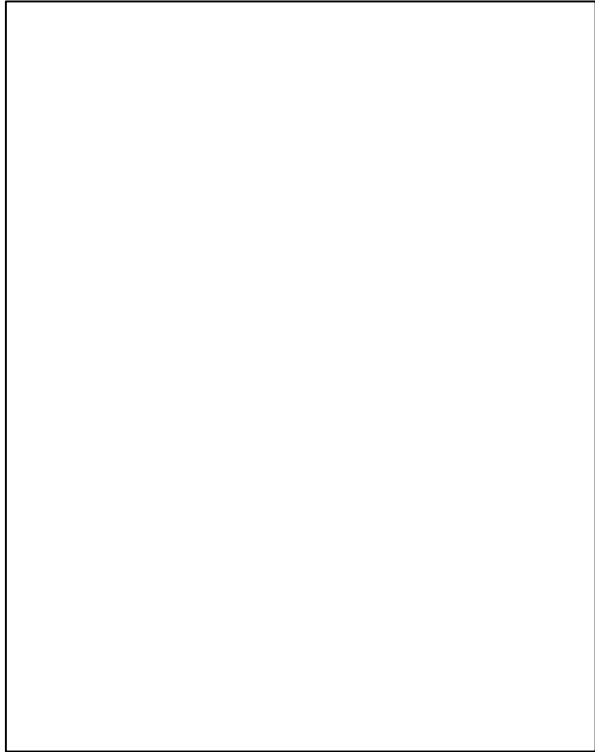
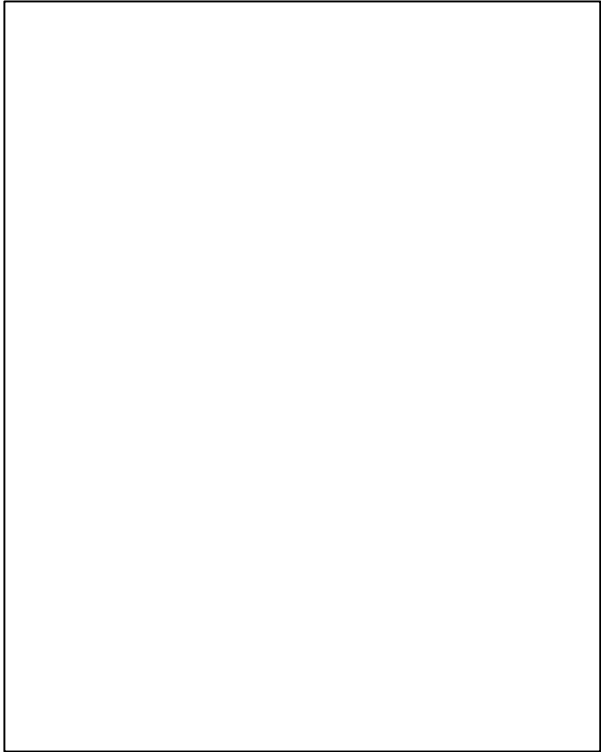


## Additional Resources

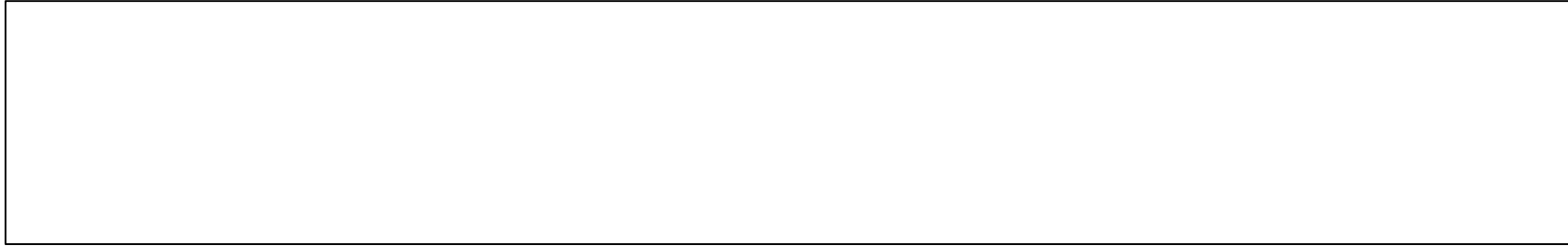
- [How to test for \*Salmonella\* Enteritidis \(SE\) in Your Backyard Coop](#)
- [Marek's Disease Pamphlet](#)
- [Building an Eggmobile](#)  
**Naomi Dailey**, PhD Student, Civil and Environmental Engineering, UC Davis
- [Brooding and Production Management](#)  
**Richard Blatchford**, Poultry Specialist in Cooperative Extension, Department of Animal Science, UC Davis
- [Common Avian Diseases in a Pasture Poultry Environment](#)  
**Maurice Pitesky**, Poultry Specialist in Cooperative Extension, School of Veterinary Medicine, UC Davis
- [Biosecurity on Pasture Poultry Farms](#)  
**Myrna Cadena, Jr.** Specialist, School of Veterinary Medicine, UC Davis
- [County Regulations Related to Poultry Production](#)  
**Vince Trotter**, Marin County Ag Ombudsman, and  
**Karen Giovannini**, Sonoma County Ag Ombudsman
- [Mixed Species and Crop Considerations](#)  
**Alda Pires**, Specialist in Cooperative Extension, School of Veterinary Medicine, UC Davis
- Poster by **Naomi Dailey**:



# Relevant Resources Continued...



# Survey Results (Resources Section)



- 96% rotate flocks on pasture and include livestock species (78%)
- Mobile coops are common (88%) with wire floors (60%)
- Predation is the most common source of mortality (52%)
- Primary challenge is feed costs (64%) followed by lack of processing facilities (40%) and lack of poultry veterinarians (12%)
- Wire floors were identified as a risk factor for Salmonella exposure in flocks that utilize wire floors
- Median pastured stocking density was 22 sq ft/hen
- Median coop stocking density was 0.5 sq ft/hen

**Table 1.** Field survey data results (selection).

Statistic	N	Mean	St. Dev.	Min	Median	Max
Coop area ( $m^2$ )	11	32.3	63.6	3.0	14.9	223.0
Number of coops	11	3	2	1	3	6
Birds per coop (no.)	11	525	1,057	12	200	3,666
Coop stocking density ( $m^2$ /bird)	11	0.07	0.1	0.01	0.04	0.4
Pasture stocking density ( $m^2$ /bird)	11	4.2	4.4	1.1	3.3	16.2
Waterers (no.)	11	7	9	1	3	30
Feeders (no.)	11	8	8	1	6	30
Nest boxes (no.)	11	416	1,061	4	103	3,600
Nest box area ( $m^3$ )	11	0.05	0.04	0.02	0.03	0.2
Nest box height from floor (m)	11	0.3	0.2	0	0.4	0.6
Birds per nest box (no.)	11	8.0	6.4	1.9	6.1	25.0
Roosts (no.)	11	37.9	48.0	1	24	168
Roost length (m)	11	5.5	4.9	1.8	3.7	18.3
Roost space per bird (m)	11	0.6	0.5	0.2	0.5	1.7
Roost height from floor (m)	11	0.4	0.1	0.1	0.4	0.7
Average temperature (F)	11	76.5	11.0	60	81	89
Average humidity (%)	11	54.0	24.5	22	47	80

# More Survey Results (Resources Section)



- Only 1/14 (7%) producers calculate Feed Conversion Ratio
- 5/7 (71%) of layer farms use supplemental light but 0/7 use a lux meter
- Cornish Cross were most commonly used for broiler production
- ISA Brown and Australorp were most commonly used for egg production

# Collecting Data is Essential for Good Husbandry

- We used Google Forms to capture data on husbandry, production, disease status, wildlife etc.
- Detailed instructions on how to set one up available on our website at: <http://ucanr.edu/sites/poultry/files/229442.pdf>

Page 1 of 1

### Coop Data Log

Please fill out this form during daily husbandry shifts. Thank you!

Name:\*

Shift:\*

Temperature inside coop (F):\*

Temperature outside (F):\*

Health check:\*

Mortality  
 Chicken(s) sick  
 Chicken(s) injured  
 Aggressive behavior  
 Underweight  
 Healthy

Animals fed?\*

Yes  
 No



Coop Data Log (Responses)

File Edit View Insert Format Data Tools Form Add-ons Help All changes saved in Drive

	A	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	Timestamp	Temperature inside coop (F)	Temperature outside (F)	Health check:	Animals fed?	Refilled feed can?	Scrubbed/cleaned water troughs?	Sanitized water troughs?	How full is the rain barrel?	What wildlife is present?	Problems or notes:	Shift:	Moved shade structures?	Number of mortalities:	Number of eggs observed:	Location of egg
1	12/3/2015 17:34:21	55	52	Aggressive behavior, Healthy	Yes	No	No	No	100%	Hawk	Doors set to manual, ramps put up. Chickens in door placed on perch.					
2	12/4/2015 9:32:52	60	56	Chicken(s) sick, Healthy	Yes	No	Yes	No	100%	None	Chickens vaccinated this AM. Kept in eggmobile until vaccinated (~9am). One chicken had really dirty neck, bald spot/abnormal feathers but no broken skin					
3	12/4/2015 14:00:10	65	60	Healthy	Yes	No	No	No	100%	None seen	All BAR					
4	12/4/2015 17:37:46	55	54	Healthy	Yes	No	No	No	100%	None						
5	12/5/2015 11:17:13	56	54	Healthy	Yes	No	Yes	No	75%	Hawk	When first drove up, all chickens in coop. After few minutes, they slowly began coming out. Did not see any disturbance or predator at time. While there, plane started flying in low circles, chickens went inside—may have been cause. When leaving, saw hawk swoop down near eggmobile.					
6	12/5/2015 17:23:56	51-53	50	Healthy	Yes	No	No	No	25%	Owls	One of eggmobile's left side panels slightly ajar. Didn't actually see the water line in the rain barrel, it was too dark but it SOUNDED like there was water in it. Will check again tomorrow at 11.	11:00 AM				
7	12/5/2015 19:05:52	42	37	Healthy	Yes	No	No	No	50%	Geese in the distance	Frost on the grass but Chickens still were very active and outside running around.	5:00 PM				
8	12/6/2015 7:34:32	55	53	Healthy	Yes	No	Yes	Yes	50%	crows		7:00 AM				
9	12/6/2015 12:12:27	64	65	Healthy	Yes	No	No	No	50%	Crows, songbirds		11:00 AM				
10	12/6/2015 18:23:28	65	59	Healthy	Yes	No	No	No	75%	Geese flying overhead	Noticed someone walking around the perimeter of our farm without dogs/flashlight. Probably nothing to be worried about but please keep a phone with you everyone!	5:00 PM				
11	12/7/2015 8:08:15	67	64	Healthy	Yes	No	Yes	No	25%	Crows, geese		7:00 AM				



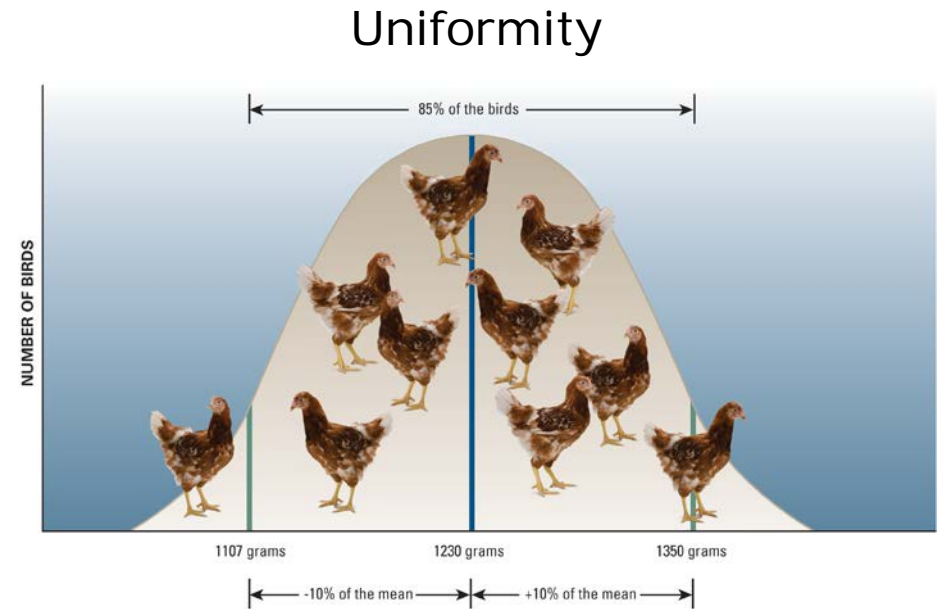
## What to Keep Records of?

Thinking about the flock as opposed to the individual

### Recommended records:

- Strain and source of chickens
- Vaccination and medication information
- Description of feeding program
- Feed consumption by days and weeks
- Lighting schedule
- Body weight and uniformity by week after 3 weeks
- Mortality by days and weeks
- Record of problems and observations
- Egg production and quality
- Weekly samples of egg weight

Annual flock checks!



Feed Conversion Ratio:

$$\frac{\text{Amount of Feed Consumed}}{\text{Amount of eggs or meat produced}}$$

Feed

Light

Air

Water

Space

Sanitation

# Free Range Vs Pastured Poultry

## Free Range:

Allowed access to the outside  
Typically have a stationary barn



## Pastured:

Mainly outside, limited indoor access  
Access to grass  
Mobile coops



This can be confusing to consumers: Production type is important to clarify because of different costs associated with raising hens: For example, operating costs for cage free are ~75 cents/dozen in cage free vs 64 cents in a colony cage

# Advantages and Disadvantages???

Feed  
Light  
Air  
Water  
Space  
Sanitation



Starter\*

Grower

Finisher

Layer\*

Maintenance



Crumble vs Pellet vs. Mash vs 'snacks'

Food sources like onions can change flavor of the eggs, while feeding meat is a good way to spread disease

Oyster Shell/Calcium source

Not just for eggs – also for bones!

# Feeders and Waterers

## Feeder Types

Pan

Bucket/Trough

Treadle/Chook



- **Waterer**

- Nipple
- Pan
- Bell



Use marbles in pans for chicks

Location of feeders/waterers?

Height of feeders and waterers



**Meat – 12-14 hours**  
**Eggs – 14-16 hours**



Incandescent vs CFLs vs LEDs?

Timers are your friend!

Why is light important:

Reducing lighting during lay will affect egg production  
Artificial light can be added in the AM or PM or both

# Laying Hen Space Requirements

**Conventional:** 67-80 square inches

**Enriched:** 116 square inches with a nest box, perch, dust bath litter substrate\*

**Cage-free:** at least 116 square inches

**Animal Welfare Approved:** 1.8 square feet per bird (in doors) and 4 square feet per bird (out doors)

**Certified Humane:** 1.5 square feet per bird (in doors) and 2 square feet per bird (out doors)





- Dry, drained, and clean!
- Should ideally be 6 inches deep
- Straw is great for nest boxes but not as a bedding material
- Rice hulls, wood shavings (don't use hardwoods like cedars)



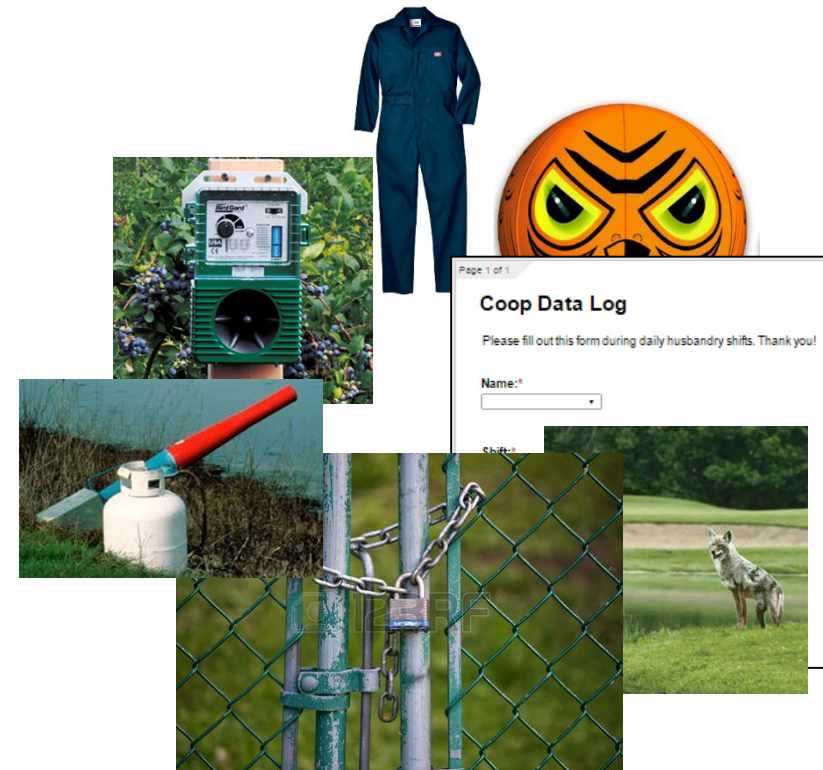
## **How do you know if your bedding is good/working?**

- $\text{NH}_3$  (ammonia)– common and made by decay of organic materials
- Causes burns in eyes and on feet (bumblefoot)
- Harmful to humans!



# Predator Control: There Is No Silver Bullet...

- Need to use a **combination** of management practices to maximize efforts.
- But keep in mind that it is impossible to eliminate risk of predators completely.
- Linking predator control with biosecurity



# Wildlife



Knowing what you are up against can help you determine what tools and strategies to use and therefore maximize your efforts.

## What About At Night?

- We used motion sensor cameras to monitor wildlife during the day and at night.
- Good to keep nocturnal wildlife in mind (ie. opossums, raccoons).



## Shade/Shelter Structures



- Birds can go underneath for shade.
- Offers protection from predators.
- For instructions on how to build, visit:

<http://ucanr.edu/sites/poultry/files/236853.pdf>

- Relatively inexpensive from \$7 (150ft)
- Easy to use/install.
- Attach to 6-8in. string and hang around farm.
- Hang strategically in trees, at eye level for ground predators and around enclosures.
- Can potentially scare your birds so they should be placed farther away from flock.
- Humane; flashes in all directions in the sun and makes a noise as it flaps in the wind.
- Need to move it to different locations regularly so wildlife won't get acclimated.
- Reviews vary.

## Coyote/Fox Decoy



- \$30-\$67.
- Also, easy to use/install.
- Humane.
- Must be moved around to be effective (consider changing position daily); birds can start to catch on.
- May be why some reviews are poor, not being used properly.
- Need about one decoy per  $\frac{1}{4}$  acre.

# Fencing with Buffer Zone

- Buffer zone between fencing and pasture can help make weak spots/signs of entries more visible and tell you about nearby wildlife.
- Good habit to walk along the perimeter of the secondary fence.





# Electric Fence

- Portable electric fences help with husbandry and predator control
- However, the portable fence should only be used as a primary fence with a larger more stable secondary fence surrounding the primary fence
- Keep the pasture low around the fence to help ensure the fence is not grounded
- Walk along the fence daily.



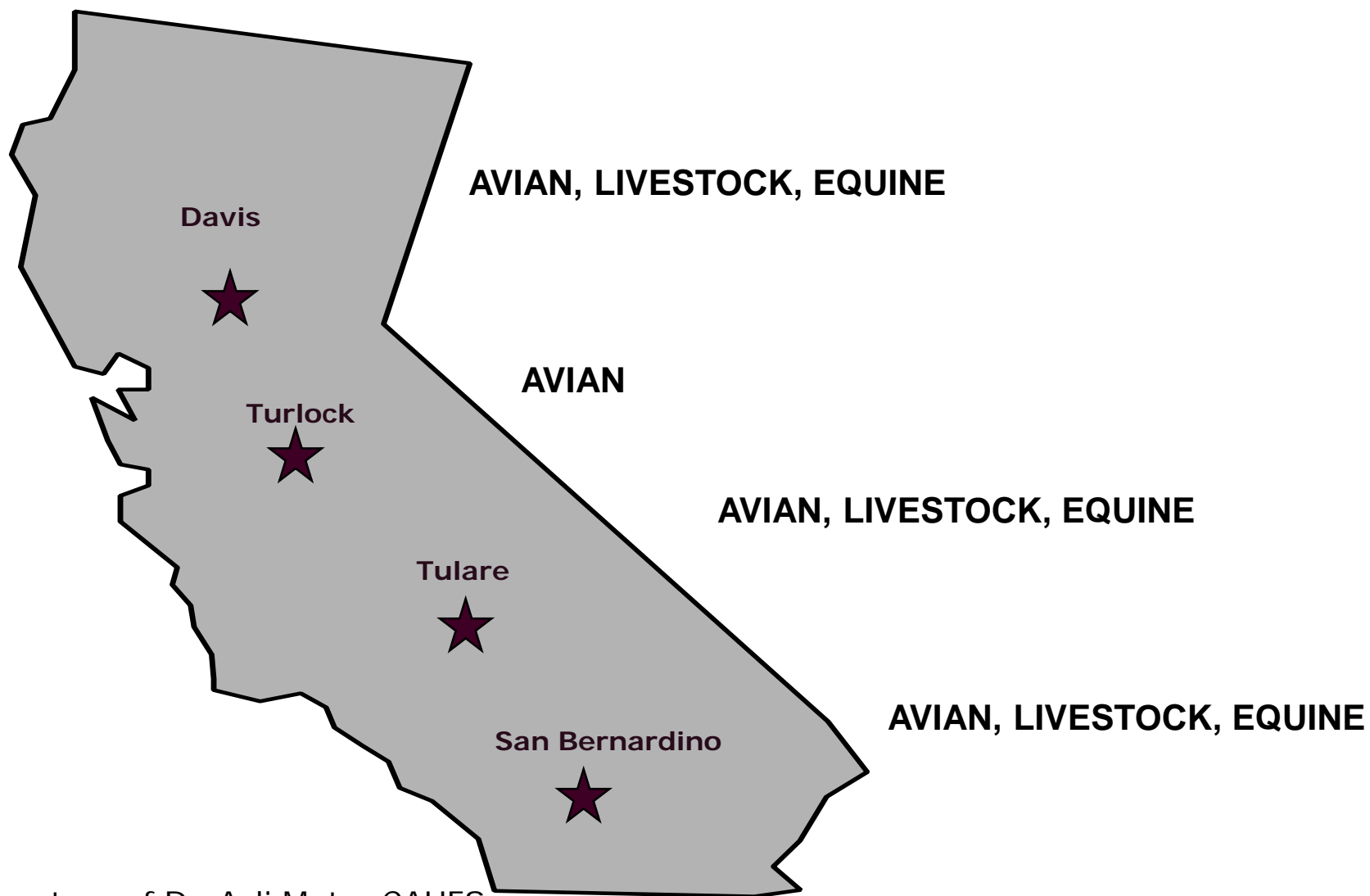


# Utilizing the California Animal Health and Food Safety Laboratory System (CAHFS)



Slides courtesy of Dr. Asli Mete: CAHFS

# CAHFS Locations & Services



Slides courtesy of Dr. Asli Mete: CAHFS

The CAHFS lab will provide some necropsy services for up to two birds at no charge for BY poultry submitted for necropsy

Poultry for backyard flock classification include chickens, turkeys, squabs and waterfowl. Total flock number must be provided and must be <1000 birds for discount necropsy.

Test Name	Specimen Type	Container/ Shipping	Fee (in state)
<b>Bacteriology</b>			
Bacterial aerobic culture	Swab, droppings	Cool	15.90
Botulism test (included in necropsy if testing an affected bird at necropsy). Samples not from affected bird (environmental) are extra	Environmental suspect material (dead animal)	Cool	91.60
Salmonella PCR and/or culture	Droppings, environmental drag swabs	Cool	14.70
<b>Biotechnology/Virology</b>			
	<sup>a</sup> = not cotton swab		
Avian Influenza virus PCR (fluid/swab)	Oropharyngeal swab <sup>a</sup>	Swab in RTT or vial - not culturette	0.00
Infectious bronchitis virus PCR	Tracheal swab <sup>a</sup>	Swab in RTT or vial not culturette	23.70
Mycoplasma gallisepticum PCR	Tracheal swab <sup>a</sup>	Swab in RTT or vial not culturette	19.00
Mycoplasma synoviae PCR	Tracheal swab <sup>a</sup>	Swab in RTT or vial not culturette	19.00
Newcastle disease virus PCR	Oropharyngeal swab <sup>a</sup>	Swab in RTT or vial not culturette	0.00
<b>Parasitology</b>			
Direct fecal exam for coccidia and parasite eggs	~1/2 ml of fresh droppings	Cool	8.80
Flotation for parasite check	5ml droppings	Cool	10.50
<b>Pathology</b>			
Histopathology (only)	Tissue	Formalin/container	39.50
Necropsy up to 2 birds, same day, same problem from backyard flock species with <1000 birds	Carcass	Cool not frozen	0.00
Necropsy for >2 birds from backyard flock species with <1000 birds; <u>and</u> ALL poultry and waterfowl from flocks >1000 birds; 1-8 birds one price	Carcass	Cool not frozen	120.00
<b>Serology</b>			
Chicken respiratory serology panel (IBV, MG, MS, AI, NDV)	Serum, 1ml	RTT or serum*/cool	8.30
Avian influenza antibody test ELISA (AI)	Serum, 1ml	RTT or serum*/cool	1.70
Infectious bronchitis virus ELISA (IBV)	Serum, 1ml	RTT or serum*/cool	1.70
Infectious bursal disease ELISA (IBDV)	Serum, 1ml	RTT or serum*/cool	1.70
Infectious laryngotracheitis ELISA (ILT)	Serum, 1ml	RTT or serum*/cool	1.70

*Cost?*  
*Why?*

---

Exotic Newcastle Disease (END)  
Avian Influenza (AI)



Slide courtesy of Dr. Asli Mete: CAHFS

Dead and/or Live birds - General necropsy:

Pathology

Bacteriology

Virology

Immunology

Histopathology


Toxicology

# Submission Process

Available on the web:  
<http://cahfs.ucdavis.edu>

or

Google - CAHFS



**California Animal Health & Food Safety  
Laboratory**  
 University of California, Davis  
<http://cahfs.ucdavis.edu>  
**Standard Submission Form**

*For Lab Use Only*

Accon #

Rec'd by: \_\_\_\_\_

Case Coordinator: \_\_\_\_\_

Accon Type \_\_\_\_\_

# of Samples \_\_\_\_\_

Date rec'd \_\_\_\_\_

Section \_\_\_\_\_

Bill to:  Vet  Clinic  Owner  Other

Carrier \_\_\_\_\_

---

Veterinarian's Name \_\_\_\_\_ Owner's Name \_\_\_\_\_

Clinic Name \_\_\_\_\_ Ranch \_\_\_\_\_

Address \_\_\_\_\_ Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_ Phone \_\_\_\_\_

Your reference # \_\_\_\_\_  Export Sample \_\_\_\_\_

Date sample(s) taken \_\_\_\_\_ Date shipped \_\_\_\_\_ (Specify test methods below) Destination (Country) \_\_\_\_\_

FAX or  Email \_\_\_\_\_  Copy to \_\_\_\_\_

<input type="checkbox"/> Cattle	<input type="checkbox"/> Turkey	Location of Animal(s) _____	# in herd	# in group	# sick	# dead
<input type="checkbox"/> Horse	<input type="checkbox"/> Chicken	(county, state)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Swine	<input type="checkbox"/> Psittacine	Animal/Group ID(s) _____				
<input type="checkbox"/> Sheep	<input type="checkbox"/> Ratite	Production Class _____				
<input type="checkbox"/> Goat	<input type="checkbox"/> Plant or Feed	(i.e. beef, dairy, calf ranch, etc.)				
<input type="checkbox"/> Rabbit	<input type="checkbox"/> Other	Duration of illness _____				

Date of death: \_\_\_\_\_ Euth?  Yes  No

History (clinical signs, nutrition, housing, vaccination, production level, etc. Use next page if more space is needed.):  
 If this is an abortion, what is the fetal trimester?  1  2  3 What is the age of the dam? \_\_\_\_\_

(continue on next page if necessary)

Treatments: \_\_\_\_\_

Disease(s) or condition(s) suspected: \_\_\_\_\_

**Animal/Specimen Information**  
(continue on back if necessary)

Lab Use	Specimen ID	Breed	Sex (F/M)	Age	Qty	Specimen Type	Test(s) Requested

CAHFS, Davis University of California, Davis W. Health Sciences Dr Davis, CA 95616 General Info: (530) 752-8700 FAX (530) 752-6263	CAHFS, Turlock University of California, Davis 1550 N. Soderquist Turlock, CA 95381 General Info: (209) 634-5837 FAX (209) 667-4261	CAHFS, Tulare University of California, Davis 18830 Road 112 Tulare, CA 93274 General Info: (559) 688-7543 FAX (559) 686-4231	CAHFS, San Bernardino University of California, Davis 105 West Central Avenue San Bernardino, CA 92408 General Info: (909) 383-4387 FAX (909) 884-5980
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Signature of Submitter: \_\_\_\_\_ Date: \_\_\_\_\_

# Packaging Samples

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- **Styro-foam container with ice packs** to keep the samples from spoiling.
- **NO Freezing!**
- **Submission Form**. It is best if you insert the submission form in a Zip-loc plastic bag to prevent the form from getting wet .



# Delivery Services

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- Federal Express (FedEx)
- United Parcel Service (UPS)
- U.S. Mail (USPS)

**Priority Service should be used when shipping perishable items.**

# Questions?

