



USAHA 2018

Subcommittee on Brucellosis

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Bovine Brucellosis – The Future?

Brucella abortus

Nationally and internationally regulated disease of livestock with significant consequences for animal health, public health, and international trade

Question

- Over the past several years, discussion has taken place on whether it is time to cease the mandated Brucellosis Calfhood Vaccination Program. When was the last affected brucellosis herd diagnosed in CA?

California's Bovine Brucellosis Program

- ❖ **1997** California classified "Bovine Brucellosis Free"
 - Last affected dairy herd **1996**; last infected beef herd **1992**
- ❖ **2009** USA classified as "Bovine Brucellosis Free"

California Cattle Surveillance

Year	# blood samples tested from slaughter	# adult cattle slaughtered	# blood samples tested from live cattle	# Investigation
2014-15	125,811	793,411	8,709	2
2015-16	126,349	780,458	7,244	1
2016-17	127,407	855,223	8,246	4
2017-18	113,501	917,098	9,254	8*

➤ **2012** last blood sample from CA to detect an affected herd (outside DSA in Idaho)

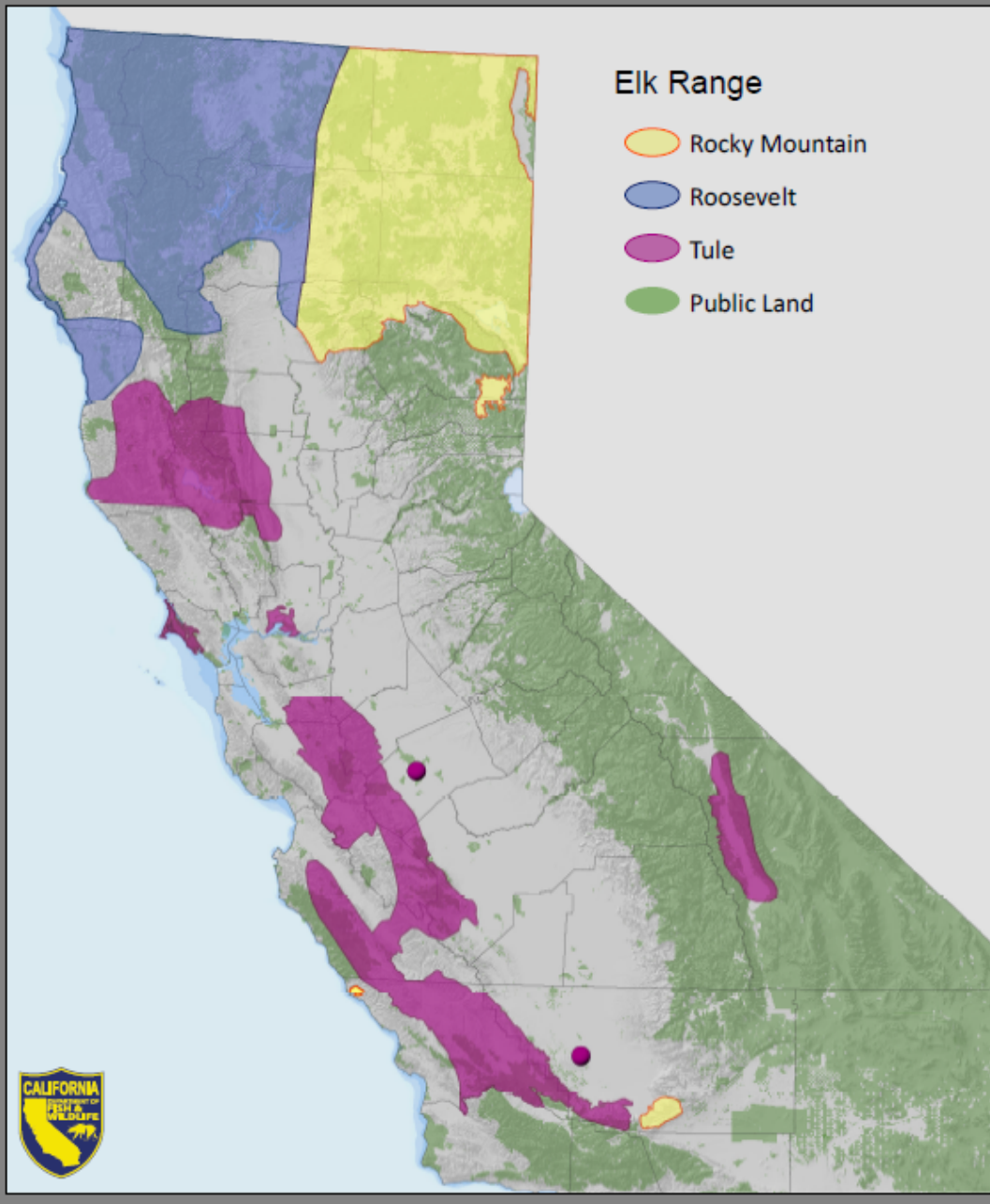
➤ **2014** ceased routine milk-ring testing

* 1 animal killed in CA, the rest out-of-state

Question

- The primary host and major transmitter of *B. abortus* to cattle are elk. What is the risk of CA elk transmitting this disease to CA's cattle population, and what surveillance testing has been performed?

Estimated Elk Distribution and Land Ownership, 2016



California supports about:

- 5,700 Roosevelt elk (*C. c. roosevelti*),
- 1,500 Rocky Mountain elk (*C. c. nelsoni*) and
- 5,700 tule elk

Total Approx. 13,000

Brucellosis Surveillance of Elk Sub Species in California: 2000-2017

Year	Rocky Mt Elk	Roosevelt Elk	Tule Elk	Total	% "total" population sampled per year
2000	3	36	44	83	0.64%
2001	6	3	44	53	0.41%
2002	7	1	24	32	0.25%
2003	0	0	13	13	0.10%
2004	0	0	2	2	0.02%
2005	0	0	59	59	0.46%
2006	0	0	38	38	0.29%
2007	0	0	15	15	0.12%
2008	0	0	23	23	0.18%
2014	0	0	36	36	0.28%
2015	4	0	86	90	0.70%
2016	13	0	13	26	0.20%
2017	16	18	47	81	0.63%
Grand Total	49	58	444	551	4.27%

No positive elk samples for B. abortus have been identified.

Question

- I have heard about *Brucella suis* causing brucellosis in cattle. Does RB51 vaccine cross protect against *Brucella suis*?
- RB 51 vaccine has **no** protective effect on the *Brucella suis* strain in either cattle or swine.

Question

- How many cattle are imported into CA from the DSA each year? What is the likely risk from the importation of DSA cattle into CA?

Permitted Cattle Movement from DSA	
Slaughter approximate 2016:	0
Slaughter approximate 2017:	120
Feeding approximate 2016:	248
Feeding approximate 2017:	45
Breeding approximate 2016:	72
Breeding approximate 2017:	229

Bovine Brucellosis Studies by UC Davis

- 2014: **Epidemiologic Model to Evaluate the Risk of Undetected *B. abortus* Infected Breeding Cattle Moving out of the DSAs**

Probability of infected breeding cattle leaving the DSAs undetected is 0.027
(one shipment in 37 years)

- 2017: **Risk of Introducing *Brucella abortus* into California from DSA, and evaluating the current Brucellosis Vaccination Program**
 - Preliminary results for the risk of an infected animal from DSA entering California and infecting local California cattle

Risk of a brucellosis outbreak in California due to infected cattle moving from the DSA is 0.001081 to 0.0003599 (one outbreak every 925 to 2,778 years (worst/best case))

- **USDA/APHIS/VS to decommission brucellosis field studies**

Question

- How would stopping brucellosis vaccination affect exports of cattle and their products to foreign countries?
- Dr. Lisa Ferguson, Director of Science and Policy at USDA Import/Exports, said that there is no country that specifically requires brucellosis vaccine, nor requires freedom of infection without vaccination, so there should not be an impact on U.S. exports.

Question

- Currently mature brucellosis vaccination is not allowed in CA other than for a welfare case-by-case basis. Would this policy change if the OCV mandate was no longer in effect?
- The RB51 vaccine is only labeled for use in heifer calves 4-12 months of age. There is a small potential of abortion and persistent infection if given to pregnant cows. That being said, we realize it is an accepted practice in some states. We would listen to discussion from industry and feedback from our legal department.

Question

- What are the pros and cons of maintaining a Brucellosis Calfhood Vaccination mandate in CA?

Maintain Calfhood Vaccination Mandate?

Pros

- Preventative brucellosis program: Risk from DSA and international shipments
- Traceability with brucellosis tags
- Can combine with herd health evaluations for efficiency
- Maintaining VCPR, required for a lot of antimicrobials
- Maintains immunity of national herd
- Source of private vet income



Cons

- Economic cost to industry of vaccination
- Risks of vaccine to people and cattle
- No brucellosis infected cattle detected in California since 1996
- Reduced animal handling
- All fifty states classified “brucellosis free”
- Negative testing of live cattle in CA since 1996
- California slaughter surveillance detected brucellosis affected herd in 2012 (Idaho herd)

Enforce or Remove Vaccination Mandate?

- Many requests for exemptions
- Many beef cattle at sales are not vaccinated
- 90,000 beef cattle vaccinated a year
- Industry enforcement?
- Producers and practitioners should decide to vaccinate or not

Special Permits for Non-vaccinates to Enter:

- Vaccinate upon arrival (if age appropriate)
- Spay on arrival
- Registered breeds: preserving/developing bloodlines (test negative)
- To registered feedlot/slaughter pen/terminal feedlot

Exemptions to vaccination frequently requested

Question

- The brucellosis vaccination tags applied to dairy heifers are a huge benefit for traceability purposes. To no longer require OCV, seems a step backwards for traceability. How does CDFA address this concern?
- As of January 1, 2017 in CA, all dairy animals leaving their birth premises are required to have official ID. This requirement would be met with RFID, silver brite or brucellosis tags.

Question

- Are there any health risks from RB51 vaccine to cattle or people?

Risks from RB51?

- Abortion, premature birth and persistent infection of the udder (and milk) following vaccination of pregnant cattle
- Human infections from vaccine “exposure”, needle sticks, aborted fetus and raw milk
- Remember, most people diagnosed with brucellosis in the U.S. are infected from eating raw dairy products produced in Mexico (usually soft cheese); some human cases of *Brucella suis* occur after hunting infected pigs.

Texas Raw Milk Contaminated with Brucella RB51 (Vaccine Strain) Affects Seven (7) States

- Pregnant woman in TX contracted brucellosis from drinking raw milk
- CDC recommended a 21 day regimen of antibiotics
- Brucellosis symptoms may develop within 5 days but can take 6 months
- In rare cases, vaccinated cows can shed RB51 in their milk
- Serology tests do not detect RB51 because this vaccine strain was developed to prevent interference with blood tests used to detect field strain infections
- Jersey raw milk herd – 43 head
- Bottled milk PCR positive for brucellosis
- All cows tested negative on RAP
- Milk samples collected from all cows for BRT and culture
- Two (2) cows culture positive for RB51

Question

- What is the risk of re-infecting U.S. cattle from Mexican cattle?

Brucellosis Risks from Mexico

- *Brucella abortus* is endemic throughout the Mexican dairy industry
- Brucellosis is endemic across Mexico
- *B. abortus*, *B. melitensis*, and *B. suis* are present
- Only Northern Sonora has Class A Brucellosis status from USDA
- Sonora, Campeche, Yucatan, Quintana Roo, Baja California Sur, and parts of Guerrero and Guanajuato have eradication programs
- Human brucellosis is common in Mexico, with most cases caused by *B. melitensis*.

Risks of *Brucella* infection to U.S. cattle

- *B. abortus* from female cattle straying across the US-Mexico border
- *B. abortus* from Mexican feeder cattle
 - “Spayed heifers” from non-free states: Slaughterhouse studies have shown that some "spayed" heifers still had ovaries
 - “Spayed heifers” from Mexico have aborted in U.S. feedyards
 - Intact feeder heifers from Mexican “free states”: Sonora feeder heifers may soon be imported intact
- *B. abortus* from Mexican-origin horses that develop fistulous withers or poll evil
- *B. melitensis* from Mexican-origin goats
 - This probably caused infection in cattle in Texas a number of years ago
 - NIES is developing importation protocols for goats from Mexico
 - Goats occasionally stray across the US-Mexican border and occasionally are smuggled across
- *B. suis* from feral swine

Question

- If CA no longer required OCV, would the RB51 vaccine still be available and at what price?
- Dr. Randall Berrier, Vice-President of Technical Services and Business Development at Colorado Serum Company, stated the vaccine production would continue based on robust international sales. Depending on the drop of usage in the U.S., the price could increase.

Brucellosis Vaccination in California

- ❖ Program for female calves
 - Proven method of disease control
 - Not prevent infection, reduces abortions
- ❖ RB51 vaccine must be administered:
 - Accredited contacted veterinarian
 - State or Federal veterinarian
- ❖ CDFA contracts ~576 private veterinarians
- ❖ Practitioners order vaccine/supplies from CDFA online
- ❖ Calves must be vaccinated between 4 and 12 months of age
- ❖ Vaccinated 836,092 heifers (725,418 dairy & 110,674 beef)
Oct 1, 2017 - Sept 30, 2018



Question

- How has a discontinued mandated OCV program in other states affected vaccine usage?
- Colorado – Brucellosis tags distributed
 - 2015 – 171,000
 - Mandated program stopped at end of 2015
 - 2016 – 161,000 (down ~6%)
 - 2017 – 172,000
 - 2018 – 107,300 (Jan. – Sept.)

Question

- If CA no longer required OCV and I wanted to ship cattle to a Western state that required Brucellosis vaccination, how would I meet this requirement?
- Vaccinate your heifer calves between 4 months and 12 months of age. The vaccine would continue to be available to contracted veterinarians through CDFA-AHB.

Question

- Official Calhhood Vaccination mandate was dropped in CA in 1969 and CA was certified as “bovine brucellosis free”. By 1975, Brucellosis infected herds increased from 39 > 60 in a 3 month period in CA. What is to prevent history from repeating itself?

CA Brucellosis Program

1969

- Vaccination of heifer calves mandatory in CA for dairy breeds and optional for beef breeds since 1948
- CA declared “Certified Brucellosis Free State” in 1969 and general funds withdrawn for vaccination services in 1970
- Federal funds for testing also withdrawn

2018

- “Bovine Brucellosis Free” since 1997
- Last affected dairy herd in 1996; last affected beef herd in 1992
- U.S. classified as “Bovine Brucellosis Free” since 2009

CA Brucellosis Program

1969

- **Mandatory vaccination plan did not change**
- 1968 – 409,383 calves vaccinated
- 1969 – 365,835
- 1970 – 319,700
- 1971 – 309,692
- 1972 – 289,856
- 1973 – 340,970
- 1974 – 325,411

2018

- All female dairy calves shall be vaccinated against brucellosis with an approved *Brucella* vaccine between the ages of 4 through 12 months
- Female beef calves, if vaccinated against brucellosis, shall be vaccinated between the ages of 4 through 12 months
- All female cattle of the beef breeds more than 12 months of age subjected to a change of ownership within California shall bear evidence of official brucellosis calfhood vaccination by the presence of an official tattoo

U.S. Brucellosis Eradication Program

1969-75 (From USAHA Proceedings)

Year	certified Brucellosis free (cBf) States in U.S.	cBf counties in U.S.	# Brucellosis infected herds in U.S.	# Calves Brucellosis vaccinated in U.S.
1969+	18/50	1,325	18,020	5.3 million
1970	20/50	1,498	15,390	4.8 million
1971	22/50	1,655	14,543	4.3 million
1972	27/50	1,761	11,579	4.2 million
1973			12,505 (8%>)	
1974			14,207 (12%>)	
1975			CA – 39>60 infected herds in 3 mths	

+ AZ, CA, NJ added as certified Brucellosis free (cBf)

U.S. Brucellosis Eradication Program in 1969

- AZ, CA, NJ – added as certified Brucellosis free (cBf)
- 18/50 cBf states
- 1,325 counties cBf (42%)
- **18,020 infected herds**
- 5.3 million calves vaccinated Strain 19
 - 25% of these in cBf states

U.S. Brucellosis Eradication Program in 1970

- 20/50 states certified Brucellosis free
- 1,498 counties cBf (48%)
- **15,390 infected herds**
- 4.8 million calves vaccinated

U.S. Brucellosis Eradication Program in 1971

- 22/50 states cBf
- 1,655 counties cBf (53%)
- **14,543 infected herds**
- 4.3 million calves vaccinated

U.S. Brucellosis Eradication Program in 1972

- 27/50 states cBf
- 1,761 counties cBf (56%)
- **11,579 infected herds**
- 4.2 million calves vaccinated
- **1973** – 12,505 infected herds (8%>)
- **1974** – 14,207 infected herds (12%>)
- **1975** in CA – 39 > 60 infected herds in 3 mo.

CA Brucellosis in 1974-75

- What happened?
 - Shortage of dairy replacement heifers
 - Imported from several western states
 - De-emphasis of vaccination by USDA/some states
 - Non-vaccinates entering in violation
 - Diversion of state personnel to VEE and END
 - Out-of-state vets falsifying import documents

Question

- What is the prevalence of Brucellosis in the Greater Yellowstone Area (GYA) and what risk does that population present to CA cattle industry?

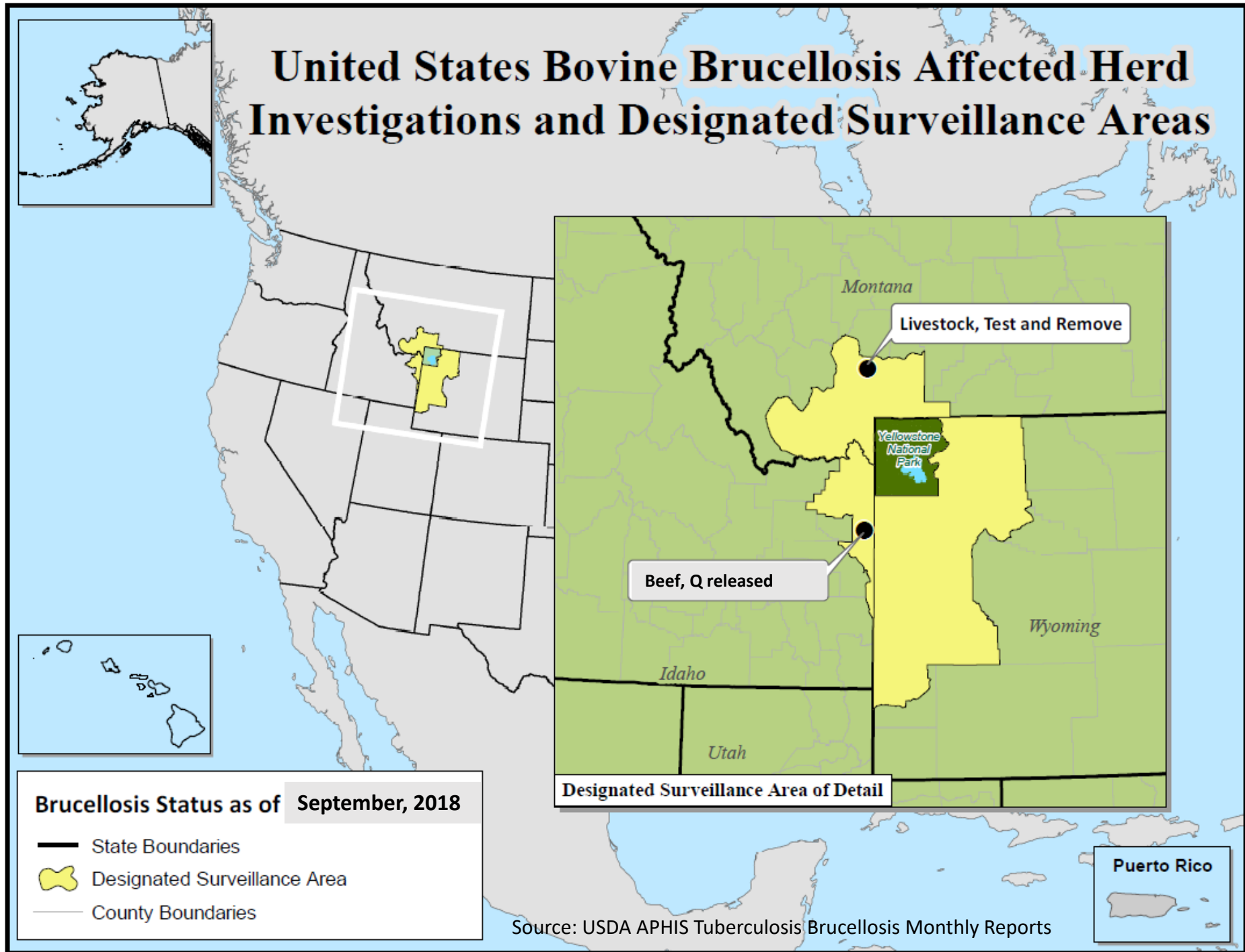
U.S. Brucellosis Eradication Program in 2012-18

- Idaho – 3 affected herds (2 beef, 1 bison)
- Montana* – 6 affected herds (5 beef, 1 bison)
- Wyoming** – 3 affected herds (beef)
- 12 affected brucellosis herds in this 6 year period, all in the DSA surrounding Yellowstone
- 0 affected herds in the rest of the U.S. during this 6 year period
- Any cattle moving from DSA to CA requires negative blood testing and vaccination

*1 MT bison herd still under quarantine from 2010

**1 WY beef herd under quarantine Oct. 2018

United States Bovine Brucellosis Affected Herd Investigations and Designated Surveillance Areas



Question

- Regulatory veterinarians and agencies do not typically deregulate? Is there a hidden agenda by CDFA-AHB?
- A decision to no longer mandate OCV will be driven by industry. CDFA will assist as needed.

Thank you,

Questions?