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# **Produce Safety from a Grower's Perspective**

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# Fast Facts about Produce

- One billion servings in the U.S. daily
- “Fresh produce” includes over 300 fruit and vegetable commodities
  - Tree, bush, row, root crops
- Over 100,000 farms in the U.S.
  - Many times that exporting to U.S.
  - Most operations “very small”
- Many diverse growing, harvesting, handling conditions

# 73 Produce Outbreaks 2000-2010

## Attribution by Commodity

Lettuce/Romaine	15	Basil
Spinach	3	2 Basil or mesclun
Tomatoes	16	2 Parsley
Cantaloupe	7	1 Green onions
“Melons”	3	2 Celery
Honeydew	2	1 Mango
Squash	1	1 Green grapes
Cucumber	1	1 Jalapeno/serrano
Raspberries/“berries”	6	1 Snow peas
Blueberries	1	1 Unknown
		6

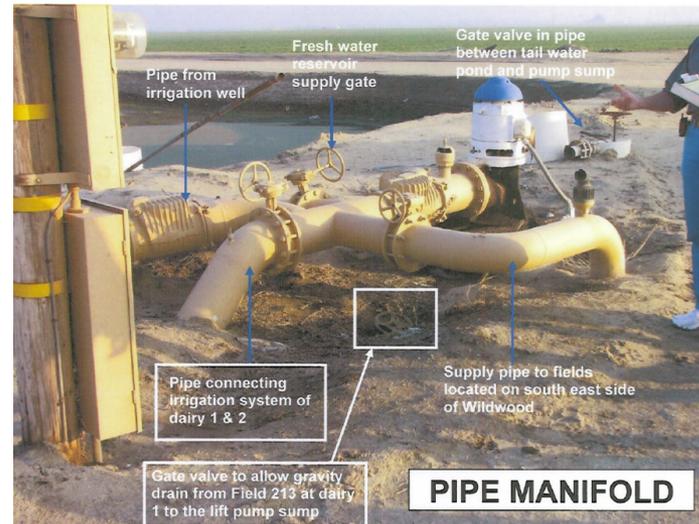
Source: FDA CFSAN

# Outbreaks Attributed to Fresh-cut

Year	Outbreaks	Illnesses
1999-2001	0	0
2002	3	230
2003	3	125
2004	3	532
2005	4	255
2006	4	436
2007	0	0
2008	3	97
2009	0	0
2010	2	22
<b>Total</b>	<b>22</b>	<b>1697</b>

Source: FDA CFSAN

# Learnings from Outbreak Investigations



## FDA News

FOR IMMEDIATE RELEASE  
 P06-131  
 September 14, 2006

**Media Inquiries:**  
 301-827-6242  
**Consumer Inquiries:**  
 888-INFO-FDA

### FDA Warning on Serious Foodborne E.coli O157:H7 Outbreak One Death and Multiple Hospitalizations in Several States

The U.S. Food and Drug Administration (FDA) is issuing an alert to consumers about an outbreak of E. coli O157:H7 in multiple states that may be associated with the consumption of produce. To date, preliminary epidemiological evidence suggests that bagged fresh spinach may be a possible cause of this outbreak.



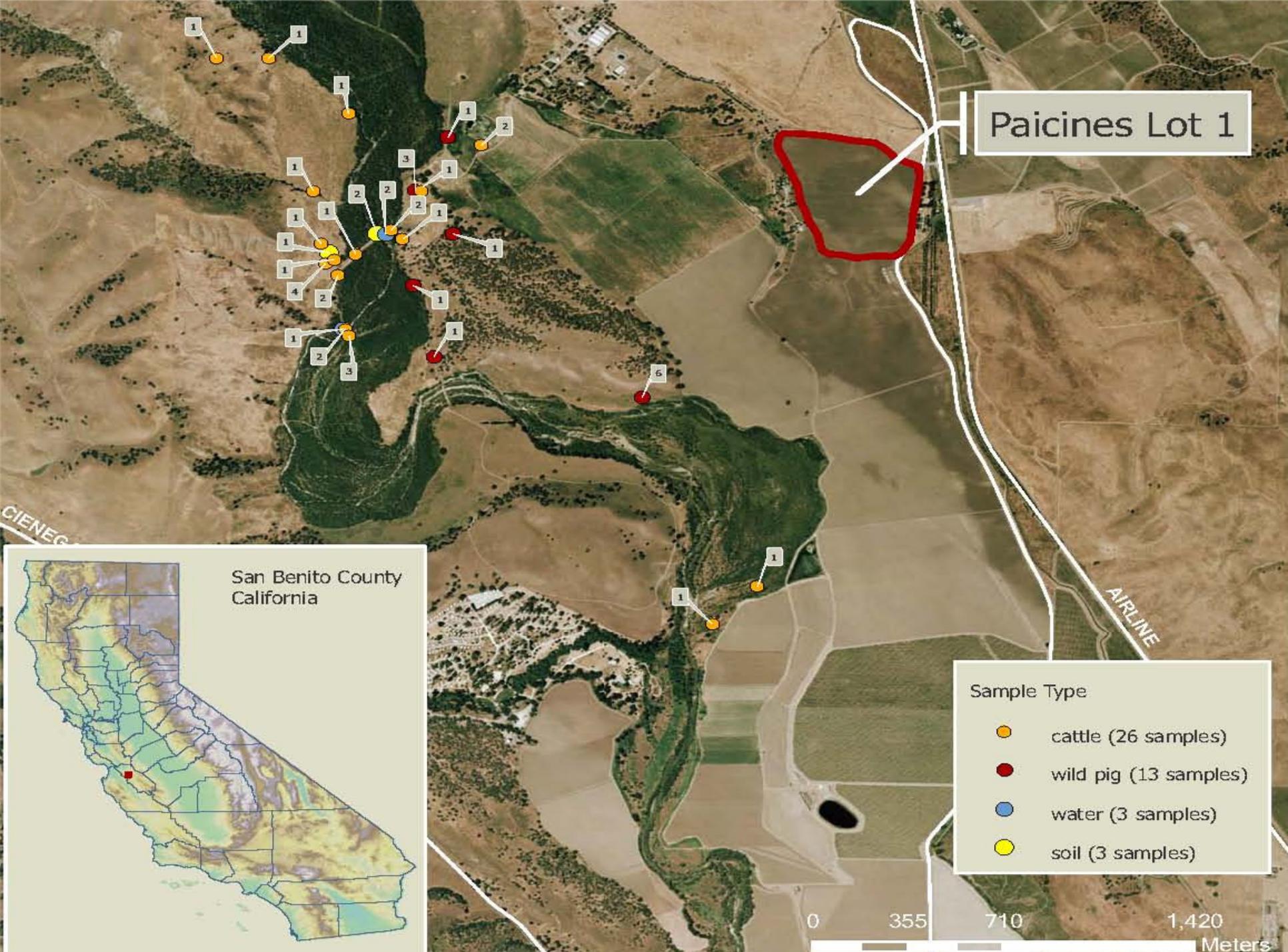
at bagged fresh spinach at this time. Individuals who believe they may have experienced symptoms of health care provider.

“FDA believes that a warning to consumers is needed. We are working closely with the U.S. Centers for Disease Control and Prevention (CDC) to determine the cause and scope of the problem,” said Dr. Robert Brackett, Director of FDA’s Center for Food Safety and Inspection Service.

While most healthy adults can recover completely within a week, some people can develop a form of kidney failure known as hemolytic uremic syndrome (HUS) to occur in young children and the elderly. The condition can lead to serious kidney damage and even death. CDC, including 8 cases of HUS and one death.

Illnesses to date include: Connecticut, Idaho, Indiana, Michigan, New Mexico, Oregon, Utah and Washington.

**“FDA advises that consumers not eat bagged fresh spinach at this time”**



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# Outbreak Speculations

“The tainted spinach was eventually traced by state and federal investigators to a 50-acre San Benito County field where it had been contaminated by a combination of cow and wild boar feces, a boar carcass found near the field and stream water containing the E. coli bacteria.”

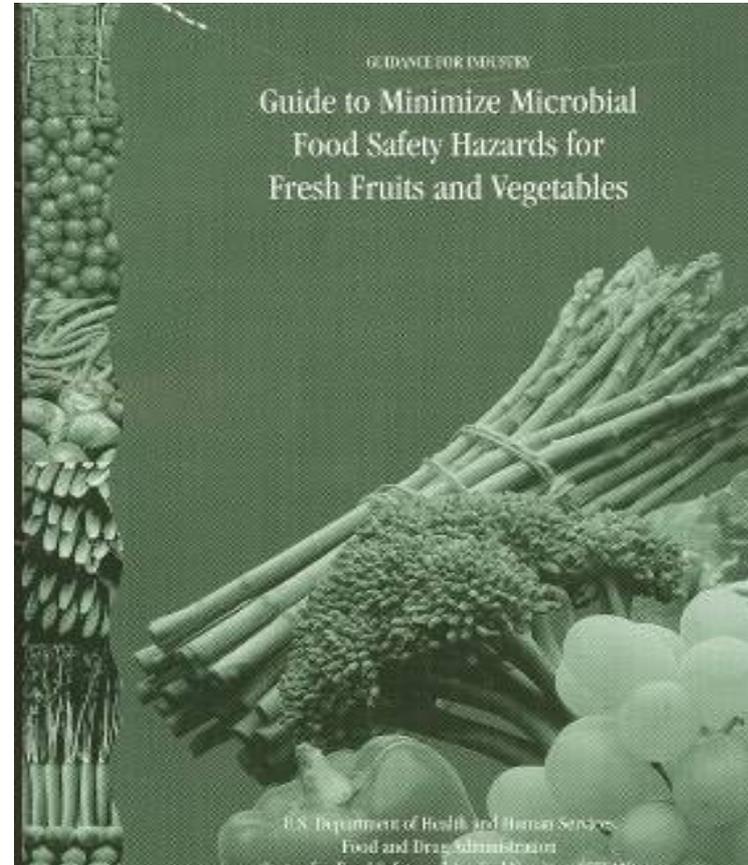
Oct 4, 2007 [http://cbs5.com/local/local\\_story\\_278005352.html](http://cbs5.com/local/local_story_278005352.html)

# So what went wrong?



# Risk Factors for Fresh Produce

- Water
- Workers
- Equipment
- Animals
- Manure
- Flooding
- Prior Land Use
- Adjacent Land Activities



# Industry Commodity Specific Guidances

## Commodity Specific Food Safety Guidelines for the Melon Supply Chain

1ST EDITION



## Commodity Specific Food Safety Guidelines for the Fresh Tomato Supply Chain

2ND EDITION



## Commodity Specific Food Safety Guidelines for the Lettuce and Leafy Greens Supply Chain



## Commodity Specific Food Safety Guidelines for the Fresh Watermelon Supply Chain



2nd Edition  
February, 2009



National Watermelon Association, Inc.



## COMMODITY SPECIFIC FOOD SAFETY GUIDELINES FOR THE PRODUCTION, HARVEST, POST-HARVEST, AND VALUED-ADDED UNIT OPERATIONS OF GREEN ONIONS



February 26, 2010

## Commodity Specific Food Safety Guidelines for the Dry Bulb Onion Supply Chain



1st Edition  
December 2010



## Commodity Specific Food Safety Good Agricultural Practices For Florida Citrus

Guidelines  
Prepared by  
Florida Citrus Packers  
Indian River Citrus League



# Limitations to Fresh Produce Food Safety

- No “kill step”
  - Food safety relies on prevention of contamination – weakest form of control
  - Contamination usually difficult to detect
  - Once contaminated, cannot guarantee decontamination
- Grown outdoors for weeks
  - Even greenhouses are not risk-free
  - Minimizing risks is best one can do

# What is Safe?

Manure as a soil amendment

- How long after manure is applied is it safe to harvest?  
To plant?
- Do all sources of manure have the same risks? (cow, chicken, fish)
- Does manure pose the same level of risk for all fresh produce? (leafy greens, apples, potatoes)
- Can manure be safely composted?
- Animal droppings in a field? Orchard?



# What is Safe?

## Animals

- Do all animals pose the same level of risk? (cows, deer, lizards, birds, insects)
- How much of an exposure is unsafe? Droppings? Direct contact? On the other side of the fence? One mile?
- When do I take action? One animal? Twelve? A flock?
- What action do I take? Limit harvest? No harvest? Destroy the field?



# Ranking Risks

- “Surface water is higher risk than well water”
  - For all commodities?
  - How much higher?
  - All surface water?
  - Regardless of how it’s applied?
  - Regardless of when it’s applied?
  - So what do I do about it?
- What is Safe?



# Food Safety Standards

- Reaction to media speculations, lack of answers: “We must do something”
- “If one is good, two is better; let’s do three to be sure”
- Do escalating produce food safety standards actually improve food safety, or just divert resources?
- Consequences: conflicting audit standards, conflicting training messages, industry and consumer confusion

# Microbiological Testing

- What to test for? Total count? Indicator organisms? Direct pathogen testing?
- What samples do I take? How many?
- Consequences to shelf-life?
- What action do I take?
  - Retest?
  - What does a “negative” mean?
  - What does a “positive” mean?

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# The Path Forward

## Research

- Focused on “what is safe?”
  - Not “is this a potential risk?”
- Under real world conditions
  - No conclusions based solely on lab studies
- Solution-directed research
  - Designed to inform/improve industry practices
  - Potential solutions must be practical
- Work with industry
  - Don’t just toss the grenade over the wall

# ***Developing Scientifically-based Consensus Food Safety Metrics for Leafy Greens and Tomatoes***

- USDA-funded Coordinated Agricultural Project
  - 8 research organizations, 22 researchers, 20 industry advisors, funded for 3 years
- Relationship between water contamination and produce contamination
- Airborne transmission associated with adjacent land use
- Risk potential of deposited compost/manure/soil
- Contamination during tomato harvesting
- Science-based, validated produce safety metrics

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## Questions?