

# Challenges in Sustainable Agriculture: Tree Fruit Production Along the Wasatch Front

Dr. Jennifer Reeve

Assistant Professor of Organic and  
Sustainable Agriculture  
Utah State University



**UtahState**  
UNIVERSITY

# Overview

- What is sustainable agriculture?
- Challenges to sustainable tree fruit production
- Potential solutions
- New research in:
  - Organic stone fruits
  - Integrated stone fruits



# Definition of Sustainable Development

- “The ability to meet the needs of the present without compromising the ability of future generations to meet their own needs”

Brundtland Commission 1983

# Indicators of Sustainable Agriculture

- Economically viable
- Environmentally safe
- Socially responsible
- Adequate yields of high quality
- Resource conserving

# **Sustainable farming must be region specific**



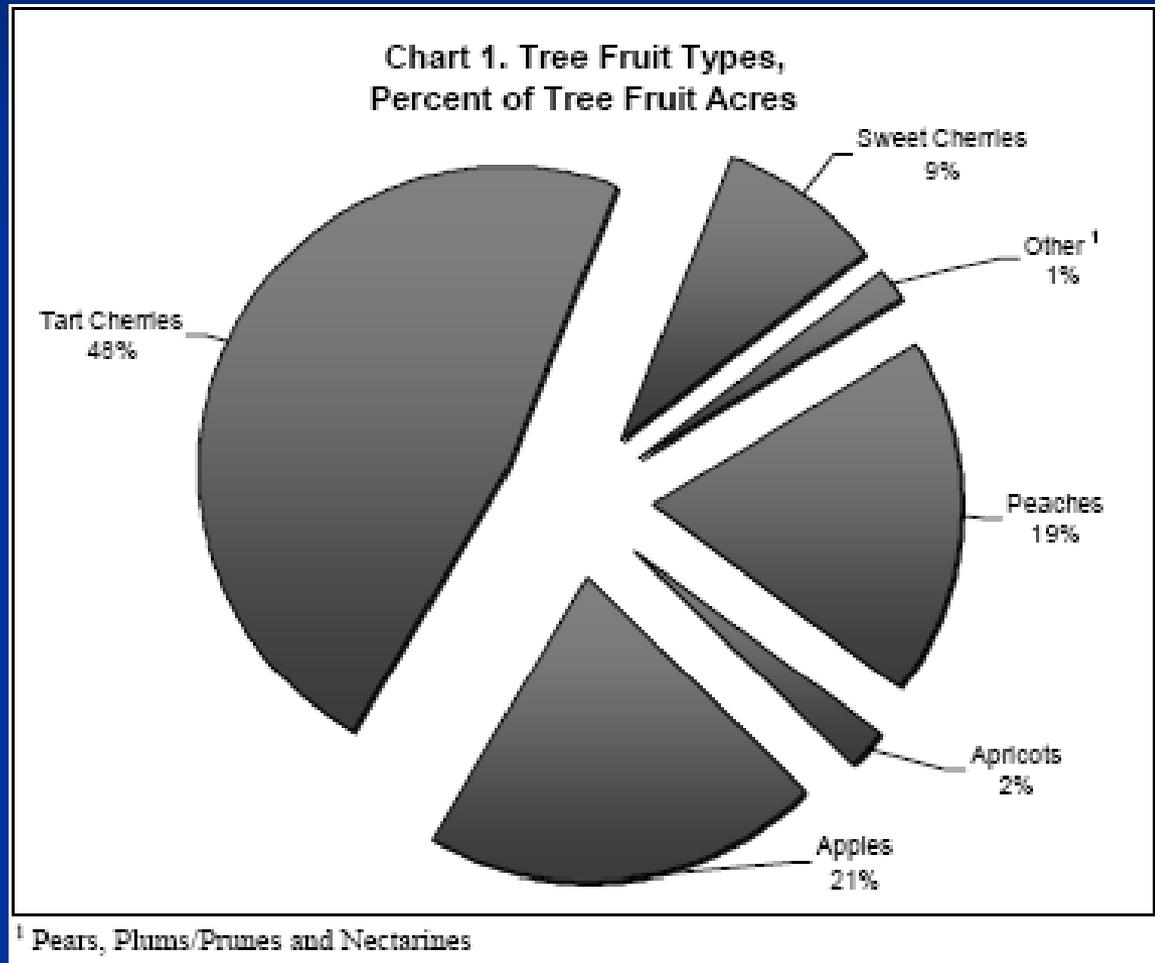
# Tree Fruit Production along the Wasatch Front

- A prime location for tree fruit production
- Rapid urbanization
- Dwindling water resources
- Rising costs of inputs
- Dwindling export markets



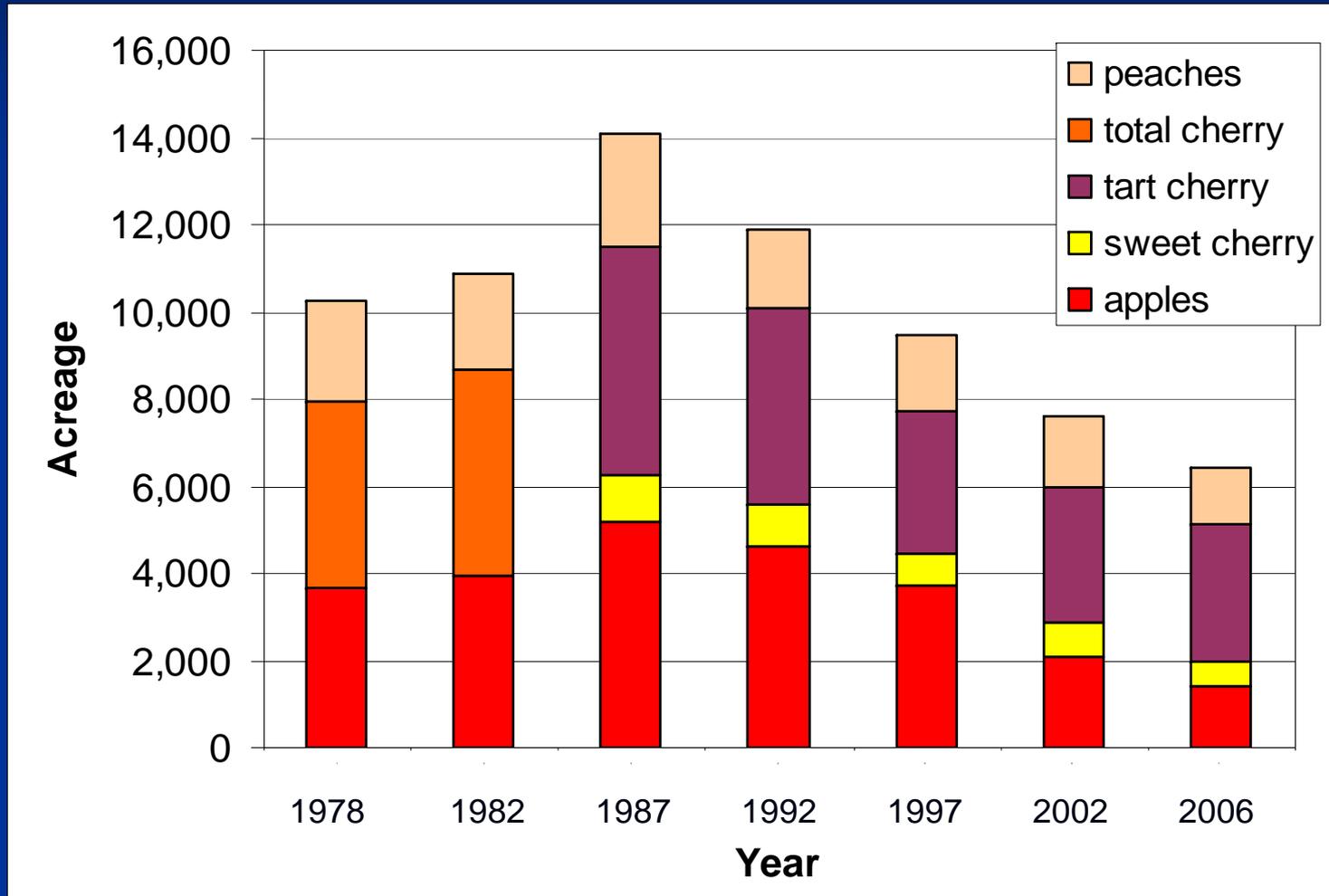
# Utah's Fruit Industry

- Tree fruit (2006)
  - 6,644 acres
  - 306 operations



Utah Fruit and Berry Survey, 2006

# Utah's Fruit Industry: Acreage

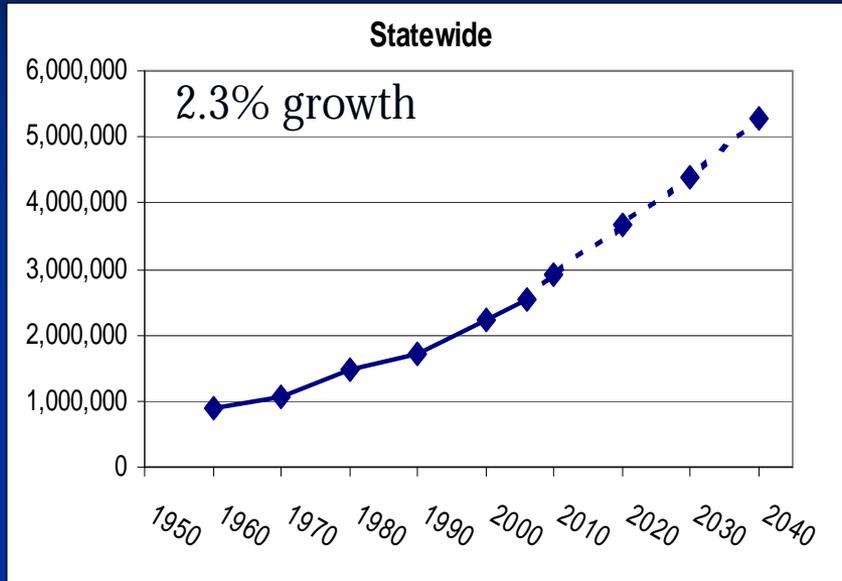


# Utah's Fruit Industry: Farm size

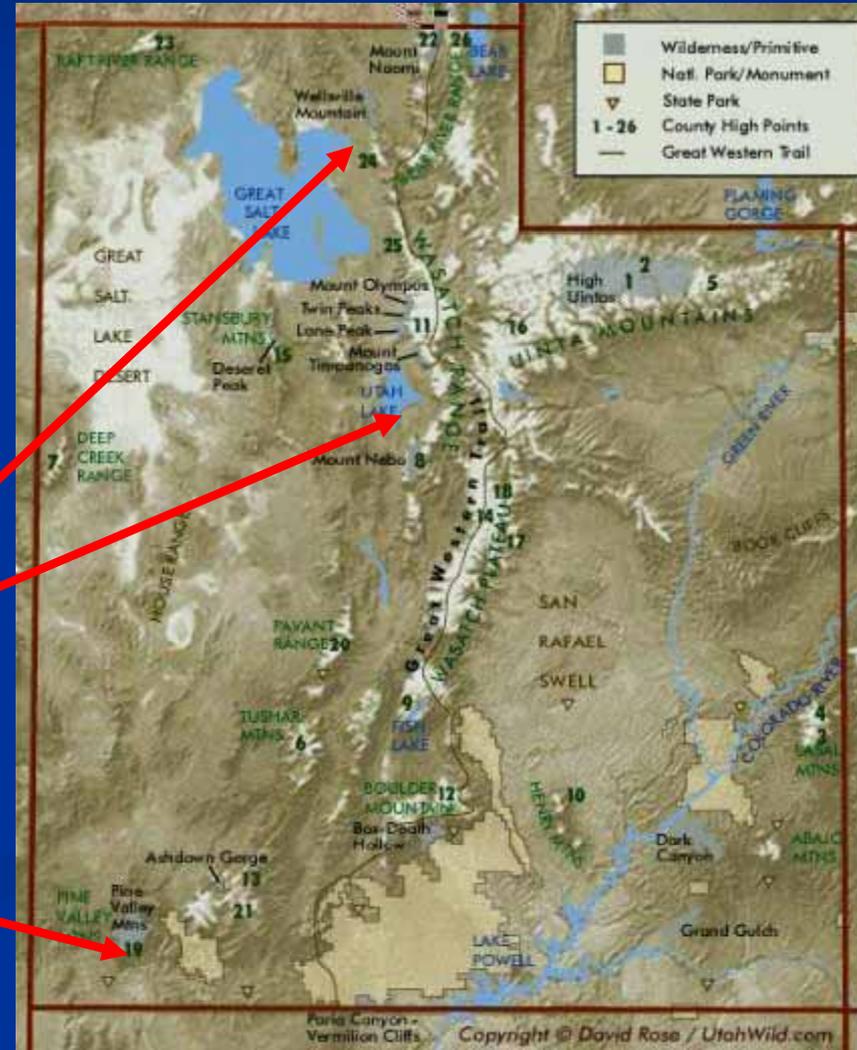
1974		Size classification (acres)					
	Total	< 1	1 - 5	5 - 15	15 - 25	25 - 50	50 +
farms	446	2.7%	23.5%	32.3%	20.0%	13.2%	8.3%
acres	9871	0.1%	2.7%	12.8%	16.5%	19.7%	48.3%

2006		Size classification (acres)					
	Total	< 1	1 - 4	4 - 10	10 - 30	30 - 50	50 +
farms	306	17.3%	38.6%	21.6%	12.4%	2.6%	7.5%
acres	6642	0.4%	3.1%	5.5%	9.4%	4.4%	77.2%

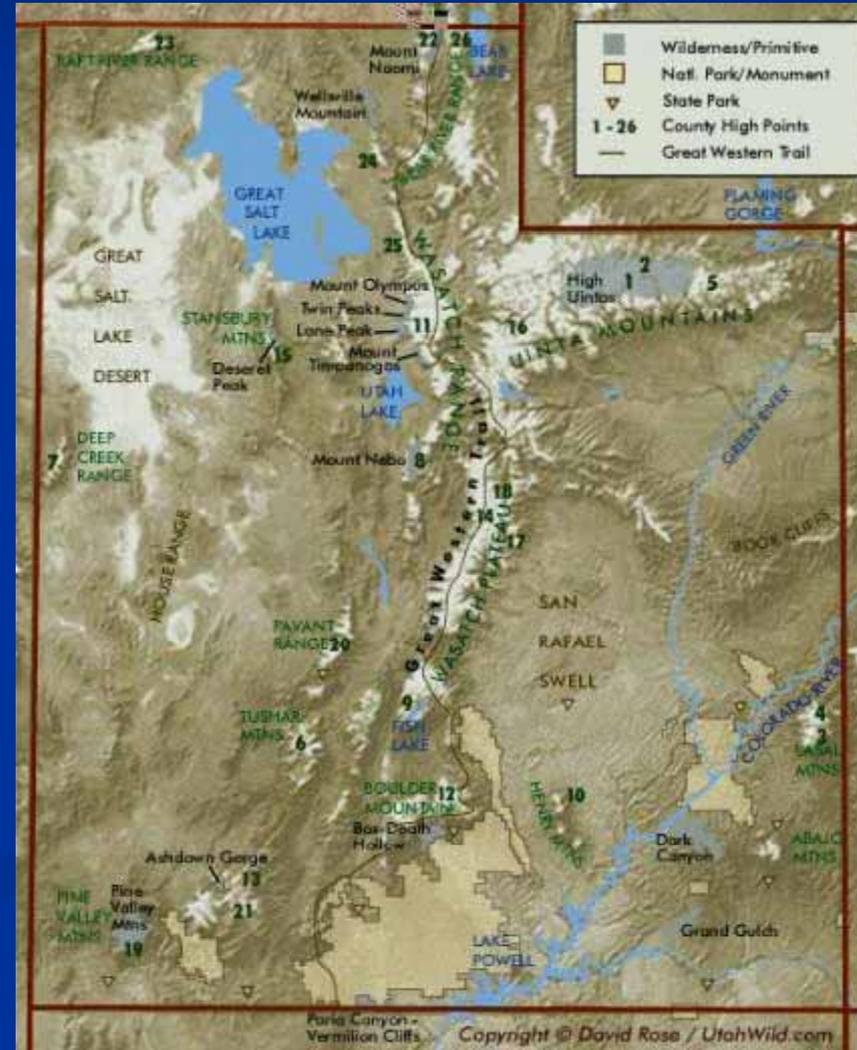
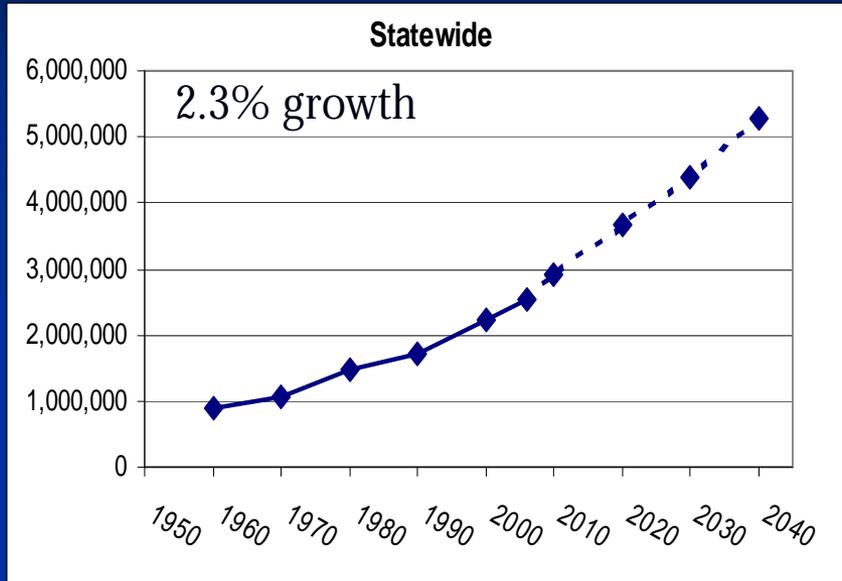
# Utah: Population changes



Fruit producing regions	
Region	Acreage
Utah County	77.9%
N. Wasatch	14.3%
Southwest	4.4%

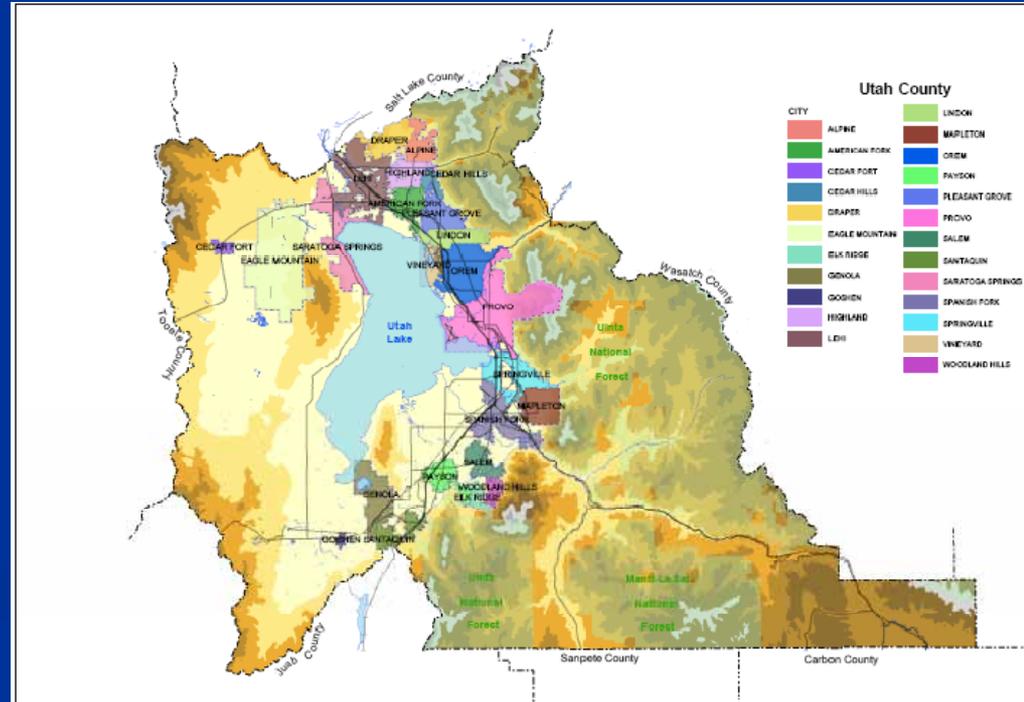
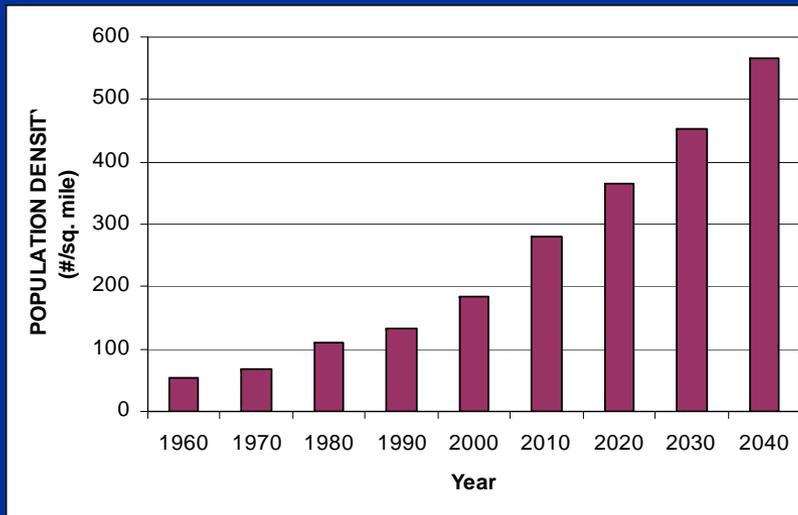
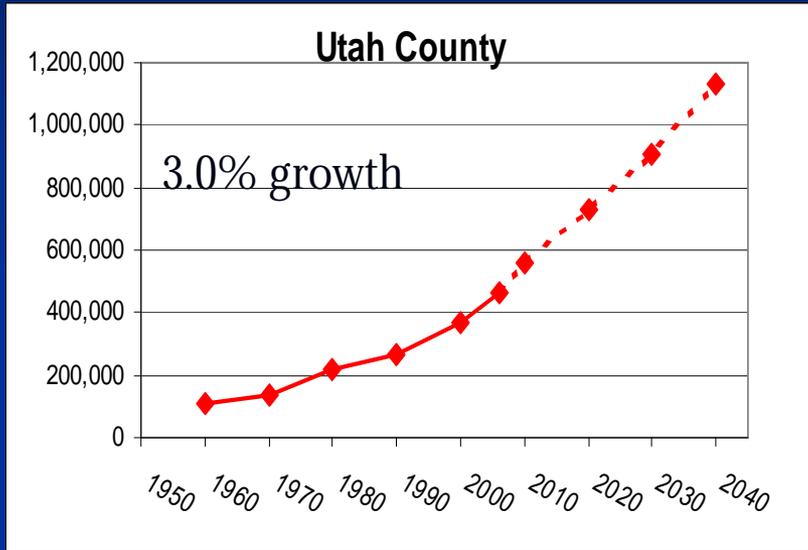


# Utah: Population changes



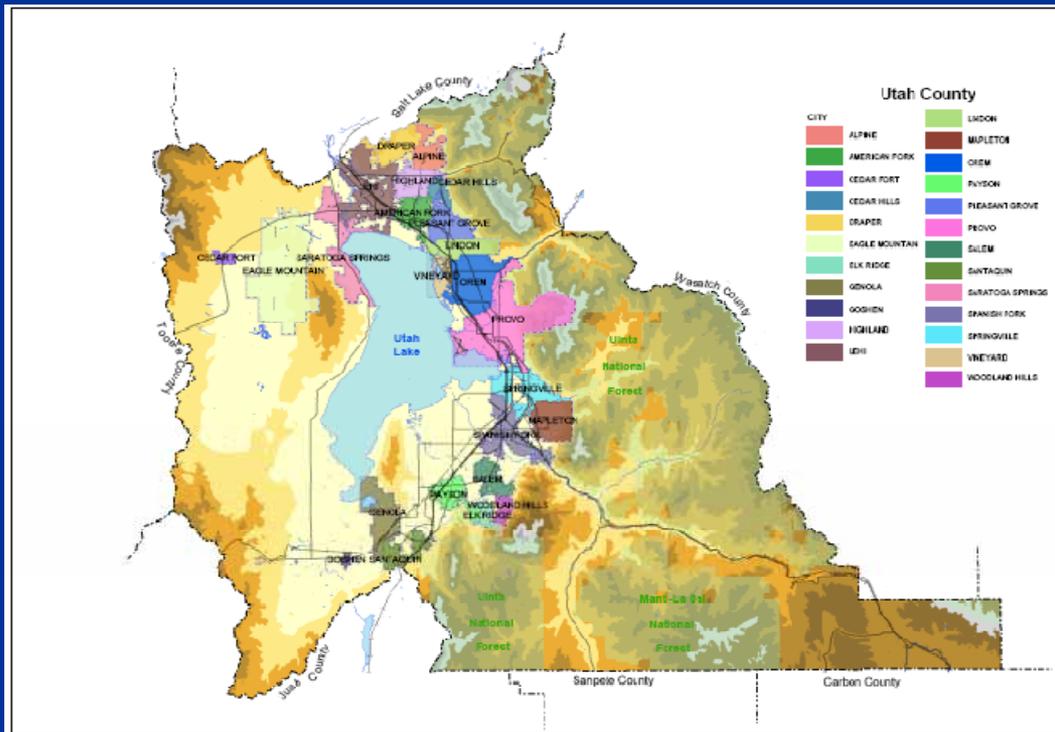
Fruit producing regions			Projected pop.
Region	Acreage		growth rate
Utah County	5178	77.9%	3.0%
N. Wasatch	953	14.3%	1.6%
Southwest	291	4.4%	5.2%

# Utah: Population changes

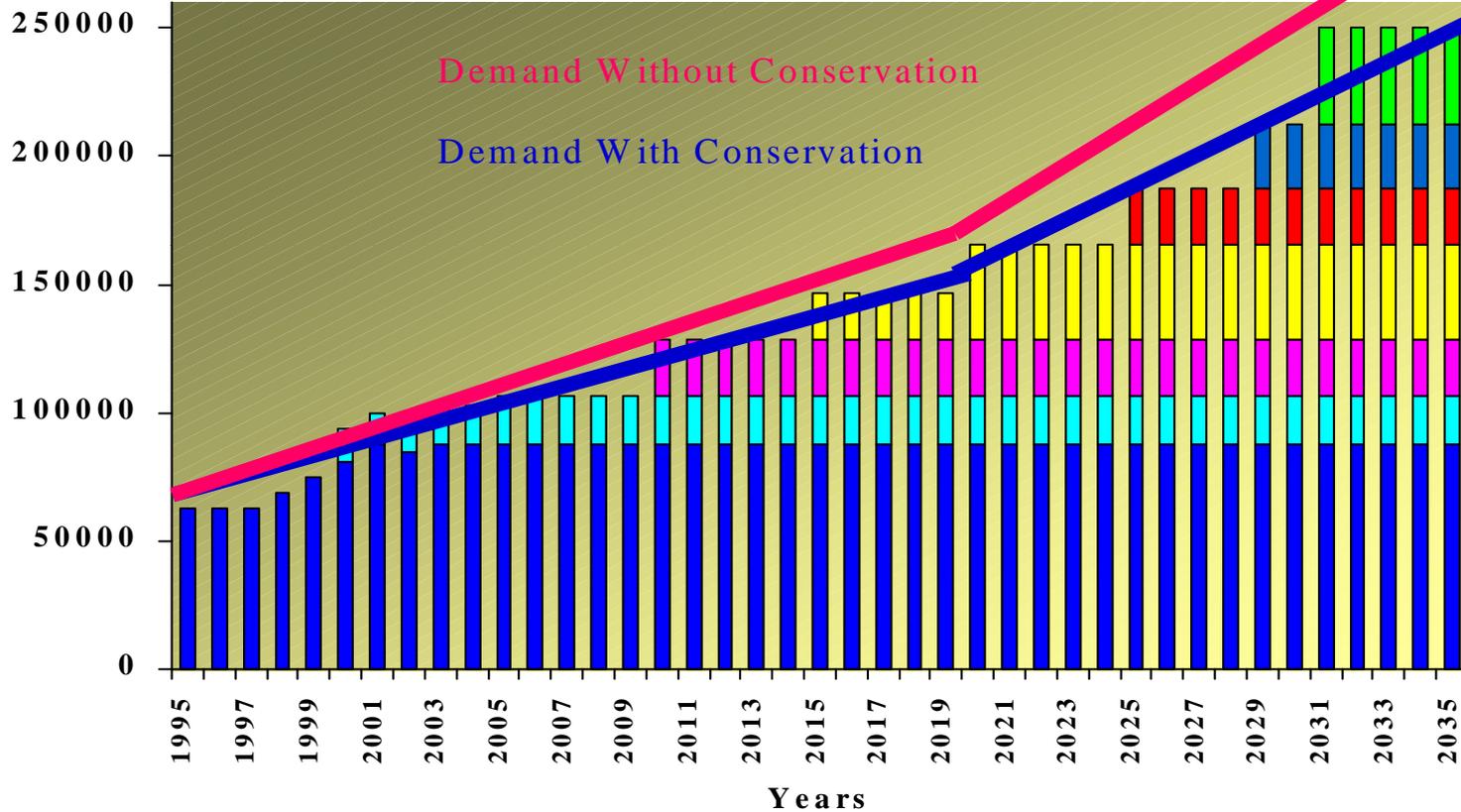


# Utah: Irrigation water supply

- Quantity (water rights)
- Quality (salinity, alkalinity)



# Salt Lake County Projected Water Supply vs. Projected High Water Demand

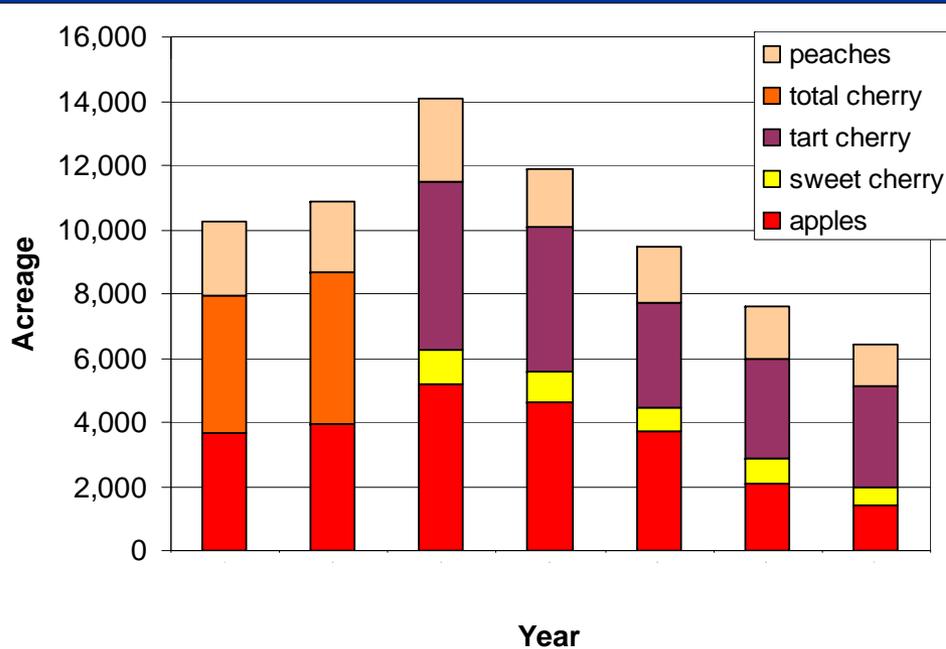


# Climate Change?



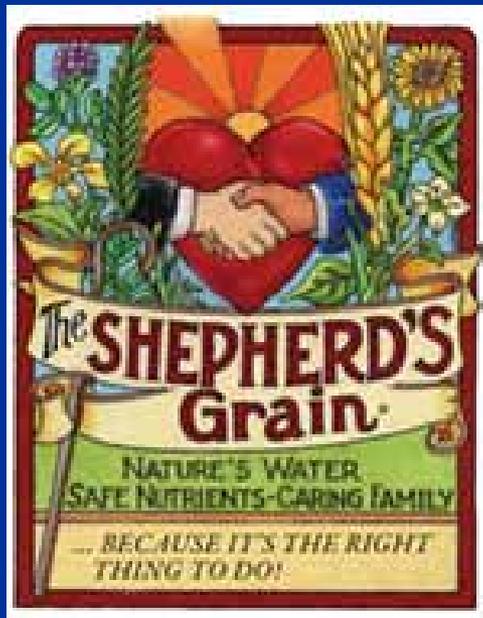
# What are the Solutions?

## ■ Labor (automation)



# What are the Solutions?

- Labor automation
- Diversification
  - Foods with a story



# What are the Solutions?

- Labor automation
- Diversification
- Direct marketing



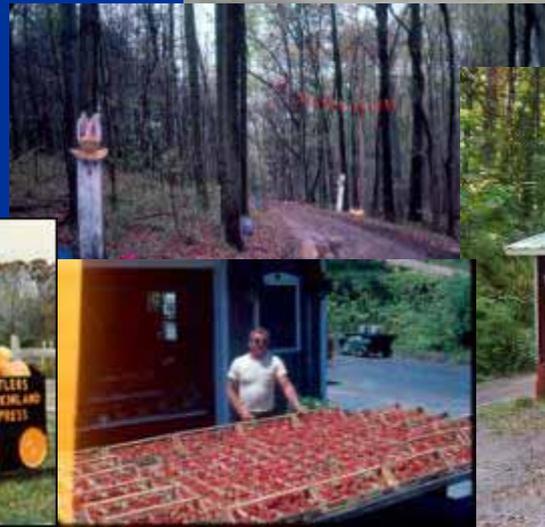
# What are the Solutions?

- Labor automation
- Diversification
- Direct marketing
- Value added



# What are the Solutions?

- Labor automation
- Diversification
- Direct marketing
- Value added
- Agro-tourism

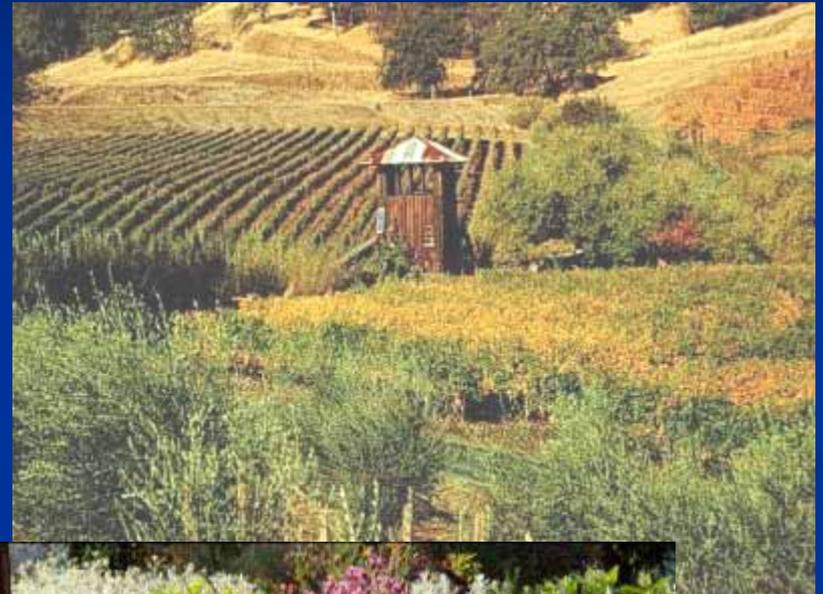


# What are the Solutions?



# What are the Solutions?

- Labor automation
- Diversification
- Direct marketing
- Agro-tourism
- Ecosystem services
  - Provisioning
  - Supporting
  - Regulating
  - Cultural



# Organic and Integrated Stone Fruit Production

- Two orchards established in 2008
- Determine interactions between:
  - Mulches
  - Fertilizers
  - Water use
  - Pests
  - Fruit quality
  - Economics



# Organic and Integrated Stone Fruit Production

- Specific research questions
  - Is compost a suitable source of nutrients for young trees? How much is needed?
  - Can we grow nitrogen in the orchard without increasing pest pressure?
  - How much water is saved through use of mulches?
  - Can we overcome competition from cover crops?
  - How do cover crops and pests interact?
  - How do we optimize fruit quality?

# Organic Tree Fruit Production

- Treatments:
  - Compost + tillage
  - Compost + fabric mulch
  - Compost + straw mulch
  - Compost + alyssum living mulch
  - Compost + straw mulch + legume alleys
  - Compost + alyssum living mulch + legume alleys

# Integrated Tree Fruit Production

- Treatments:
  - Conventional NPK + herbicides
  - Compost + herbicides
  - Paper mulch + NPK + reduced herbicides
  - Paper mulch, compost + organic herbicides
  - Conventional NPK + herbicides convert to organic once established.

# Conventional



# Paper Mulch + Reduced Herbicide



# Organic + Paper Mulch



# Tillage + Compost



# Fabric Mulch + Compost



# Alyssum Living Mulch



# Straw + Compost



# Preliminary Results



# Building Local Expertise

- Extension Service
- Grower to grower
- Students
- Field days
- Evening walks
- Web content
- Photo gallery



# Acknowledgements

Many thanks to Dr. Brent Black, Dr. Larry Rupp, Wade Butler and Brad Jaekel for graciously sharing data, and photos.

**UtahState**  
**UNIVERSITY**