



WASHINGTON STATE
UNIVERSITY

TFREC

Tree Fruit Research and Extension Center



At-A-Glance

WENATCHEE TFREC

CROPS

Apple
Pear
Sweet
Cherry

SYSTEMS

Conventional
Organic
New
Technologies

RESOURCES

400+ acres
of research
orchards
USDA-ARS
Postharvest
Research Facility

PEOPLE

12 faculty
27 staff
14 post-docs
13 grad
students

TFREC Faculty



Achour Amiri
Plant Pathology

*Postharvest Tree
Fruit Diseases*



Elizabeth Beers
Entomology

Tree Fruit IPM



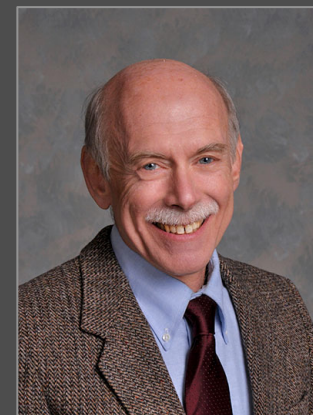
Tianna DuPont
ANR

Tree Fruit Extension



Kate Evans
Horticulture

Pome Fruit Breeding



David Granatstein
Emeritus

*Sustainable Organic
Agriculture*



Lee Kalcsits
Horticulture, EC[‡]

*Tree Fruit Environmental
Physiology and Management*

[‡] Endowed Chair of Tree Fruit Environmental Physiology & Management

* Endowed Chair of Tree Fruit Physiology & Management

[†] Endowed Chair of Postharvest Systems



TFREC Faculty



Stefano Musacchi
Horticulture, EC*

*Tree Fruit Physiology
and Management*



Tobin Northfield
Entomology

Tree Fruit



Louis Nottingham
Entomology



Marcy Ostrom
ANR/Small Farms

*Small Farms &
Community Food Systems*



Sara Serra
Horticulture

*Tree Fruit Physiology
and Management*



Carolina Torres
Horticulture, EC†

Postharvest Systems

‡ Endowed Chair of Tree Fruit Environmental Physiology & Management

* Endowed Chair of Tree Fruit Physiology & Management

† Endowed Chair of Postharvest Systems

TFREC Staff | Administration



Chad Kruger
Director



Darla Ewald
Office Manager / HR



Megan Welker
Office Assistant

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TFREC Staff | Physical Plant & Farm Operations



Jerry Moreland
Facilities Manager



Trish Mulvaney
Maintenance



Micah Cawdery
Maintenance



Cameron Burt
Farm Manager



Francisco Figueroa
Columbia View
Orchard



Mike Mitchell
Sunrise Orchard

Not pictured: Evan Mendonca, Sergio Alfaro-Rameriz, Daniella Reyes, and Willy Stockman

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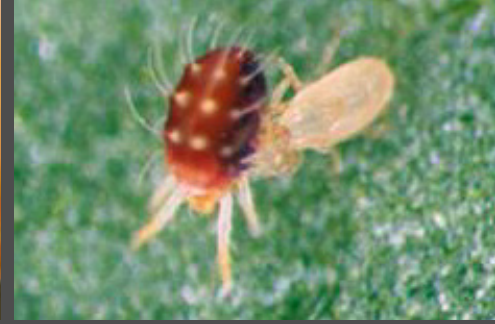
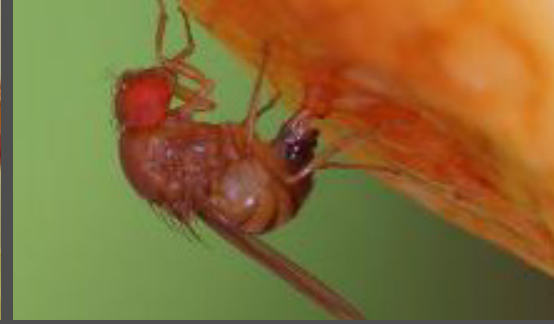
Pome Fruit Pre- and Post-Harvest Pathology



Achour Amiri

- Conduct basic and applied research on major diseases of pome fruit
- Develop solutions to enhance disease management and increase packout
- Study the epidemiology and etiology of major pathogens in orchards and storage rooms
- Use traditional and molecular approaches to understand mechanisms of fungicide resistance development in major pathogens
- Investigate the effect and impact of postharvest environments on disease development

Tree Fruit IPM



Elizabeth Beers

- Focus on multi-tactic IPM solutions to tree fruit pest problems to stabilize agroecosystems
- Address emerging issues with invasive species such as spotted wing drosophila and brown marmorated stink bug
- Develop and maintain integrated biological control through studies of non-target effects
- Assess impact of classical biological control agents and non-target effects on native species
- Test new candidate materials and techniques such as Sterile Insect Release and exclusion netting for potential in IPM programs

Tree Fruit Extension

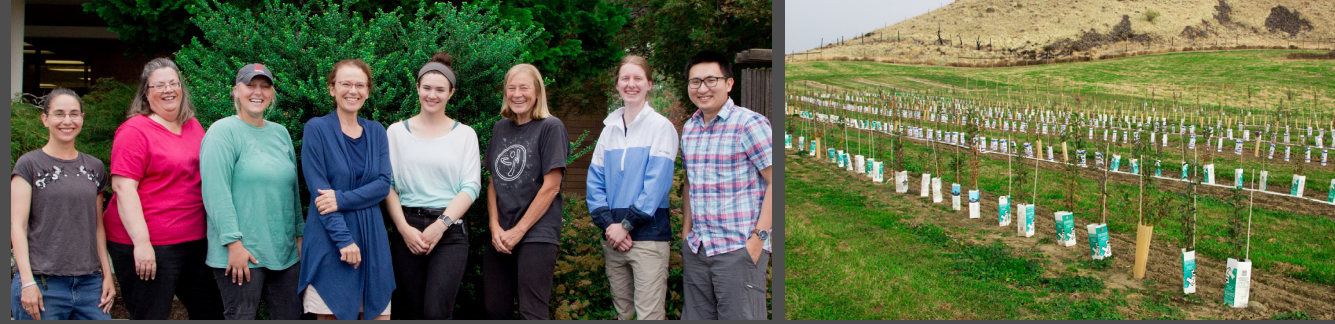


Tianna DuPont

- Orchard Integrated Pest Management (IPM)
- Fire Blight Management
- Quick decline, Little cherry disease, Replant disease education
- Orchard management education

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Pome Fruit Breeding

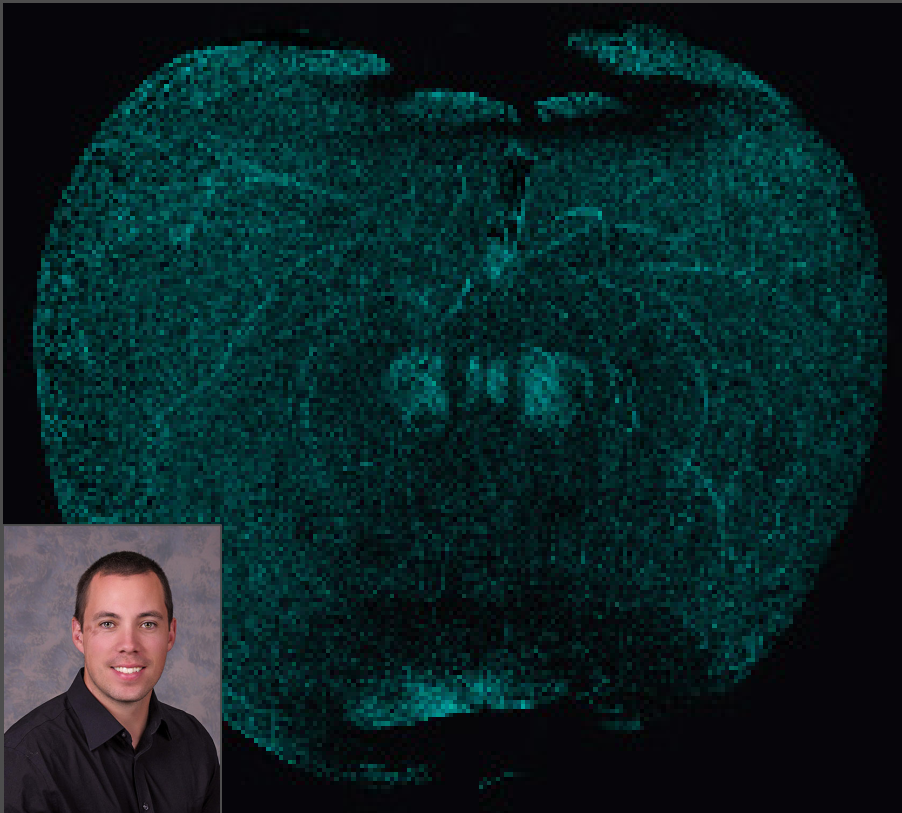


Kate Evans

- Dwarfing rootstocks for pear to facilitate efficient high-density plantings in the Pacific Northwest
- New improved apple varieties, selected for the major production regions of Washington state, and available to Washington growers.

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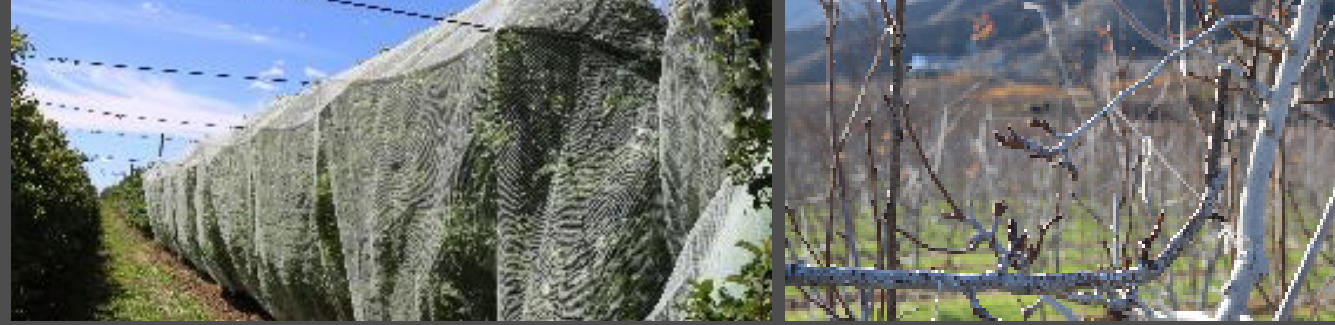
Tree Fruit Physiology



Lee Kalcsits

- Apple sunburn management: evaporative cooling, netting and gene expression
- Evaluation of netting to optimize light and fruit surface temperature
- Interactions between rootstocks and the environment
- Mitigation of bitter pit in Honeycrisp
- Deficit irrigation for water management and improved fruit quality

Tree Fruit Physiology and Management



Stefano Musacchi

- Innovative orchard design for apple and pear suitable for mechanization and automatization.
- Evaluation of new rootstocks for apple and pear.
- Orchard management: optimization of growth, pruning, production capacity, fruit quality, harvest time in apple and pear.
- Precision crop load management in apple.
- Apple thinning with net (bee exclusion).
- Manchurian crabapple replacement: finding alternative pollinizers.
- Dry matter in apple and pear: consumer preference and willingness to pay.

Tree Fruit Entomology



Tobin Northfield

- Applied insect ecology
- Biological control
- X Disease and vector control
- Population dynamics
- Theoretical ecology

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Tree Fruit Entomology



Louis Nottingham

- Pear Integrated Pest Management
- Cultural pest controls: reflective films, and overhead washing
- Augmentation biological control of pear psylla with earwigs
- Pest management effects on insect behavior

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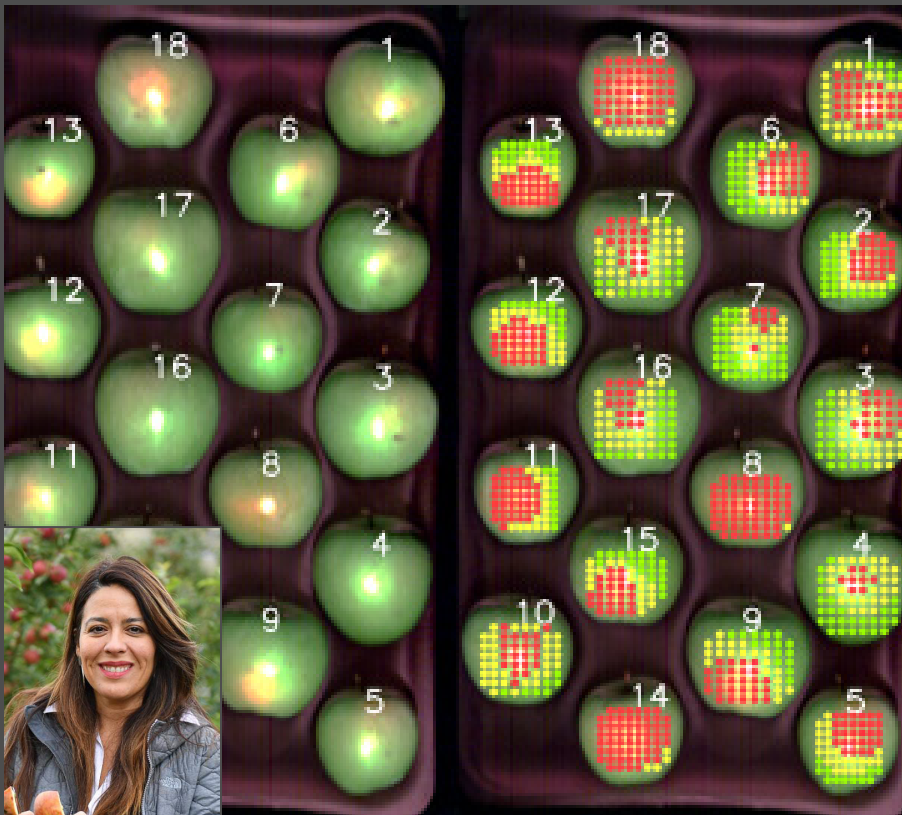
Tree Fruit Physiology and Management



Sara Serra

- Non-destructive dry matter assessment to sort pears and apples at harvest.
- Consumer preference and willingness to pay based on at harvest sorting pears and apples.
- Apple flower biology, pollination and fruit development.
- Photosensitive netting for apple orchard and effects on the light quality and quantity.
- New rootstocks evaluation for apple and pear orchard.
- Precision crop load management for consistent production in apple orchard.

Tree Fruit Postharvest Systems



Carolina Torres

- Effect of abiotic stress and climate on fruit quality and physiological disorders development using a system approach
- Non-destructive techniques to predict fruit quality as a sorting and predictive tool postharvest
- Handling technologies and postharvest systems from apples, pears and cherries

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International Faculty, Staff & Students /// TFREC





TFREC Graduate Students

Noah Willsea
Horticulture

Marcella Galeni
Horticulture

Jeremy Roberts
Entomology

Manoella Mendoza
Horticulture

India Cain
Horticulture

Emma Steele
Horticulture

Jonathan Puglisi
Plant Pathology

Peter Smytheman
Entomology

Joseph Mellow
Plant Pathology

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2020/2021 Mike and Kathy Hambelton Fellowship

Mike and Kathy Hambelton
Fellowship Donors

Jonathan Puglisi
Plant Pathology

Marcella Galeni
Horticulture

Erica Casagrande-Biasuz
Horticulture

Andrew Griffin
Horticulture

Molly Sayles
Entomology

Abby Clarke
Entomology

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FACILITIES AND RESOURCES

Main Campus

- 422 total acres
- 30 acre central plant
 - 4 acre research orchard
- Research laboratories and office buildings
- Greenhouses
- Shop
- Student housing

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FACILITIES AND RESOURCES

Columbia View Orchard

- 92 acre research orchard located near Orondo (Douglas County)
- 46 acres shared with USDA-ARS
- Encircled by an electrified deer fence
- Home of the WA 38 Mother Tree



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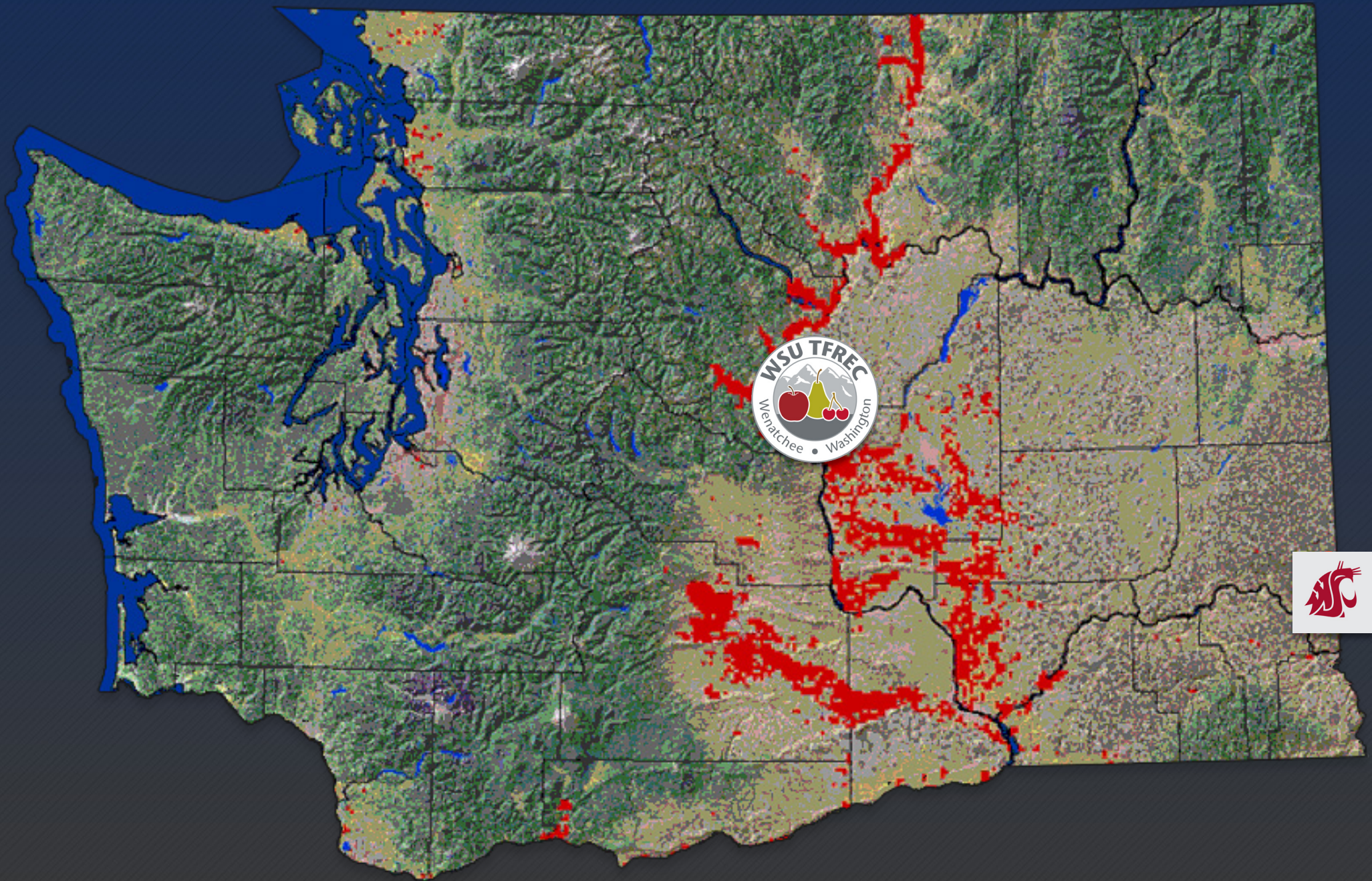
FACILITIES AND RESOURCES

Sunrise Research Orchard

- 300 acres (150 acres with water rights)
 - 80 acres dedicated to research
 - 60 acres available for lease
 - Secured equipment compound with modular units for research and educational activities
- Located on WA-28 south of Rock Island Dam
- Purchased in 2006



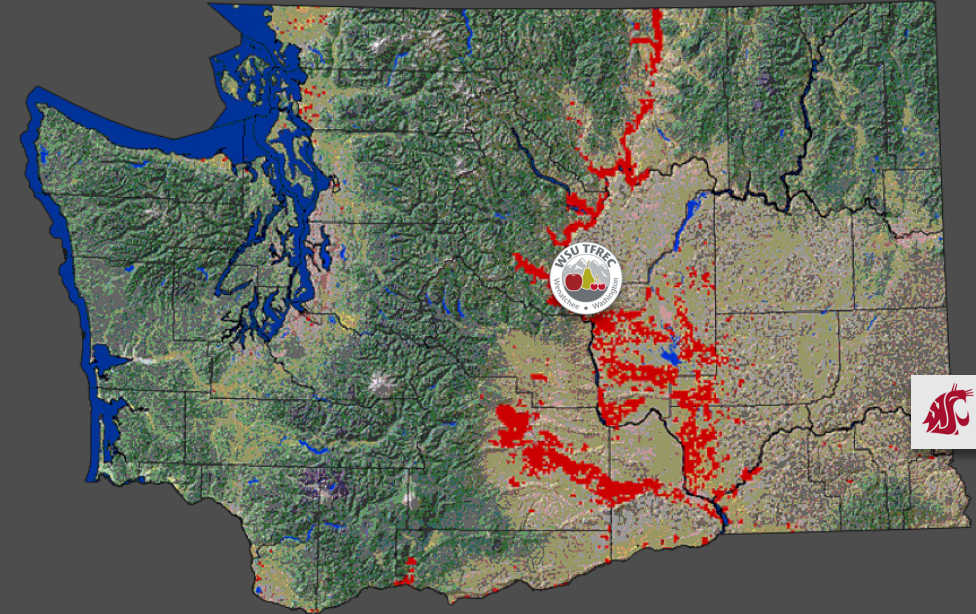
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QUICK FACTS

Washington Tree Fruit Industry

- \$10B annual value
- 1/3 of fresh fruit grown in Washington for export
- ~233,400 total bearing acres of tree fruit¹
- ~170,000 bearing acres of apples¹
- Washington leads U.S. in utilized production¹
 - Apple (65%; 16% organic²)
 - Pear (49%; 16% organic²)
 - Sweet Cherry (71%; 6.7% organic²)



¹ 2018, USDA/NASS

² 2018 Recent Trends in Certified Organic Tree Fruit in Washington State

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\$32M Tree Fruit Endowment

- Represents the largest single gift in WSU history
- Time-limited special project assessment from Washington tree fruit growers
- Supports the WSU Wenatchee & Prosser Research and Extension Centers
 - Endowed Chairs | \$12M
 - Information & Technology Transfers | \$12M
 - Research Facilities & Orchard Operations | \$8M
- Partnered Management with Endowment Advisory Committee

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