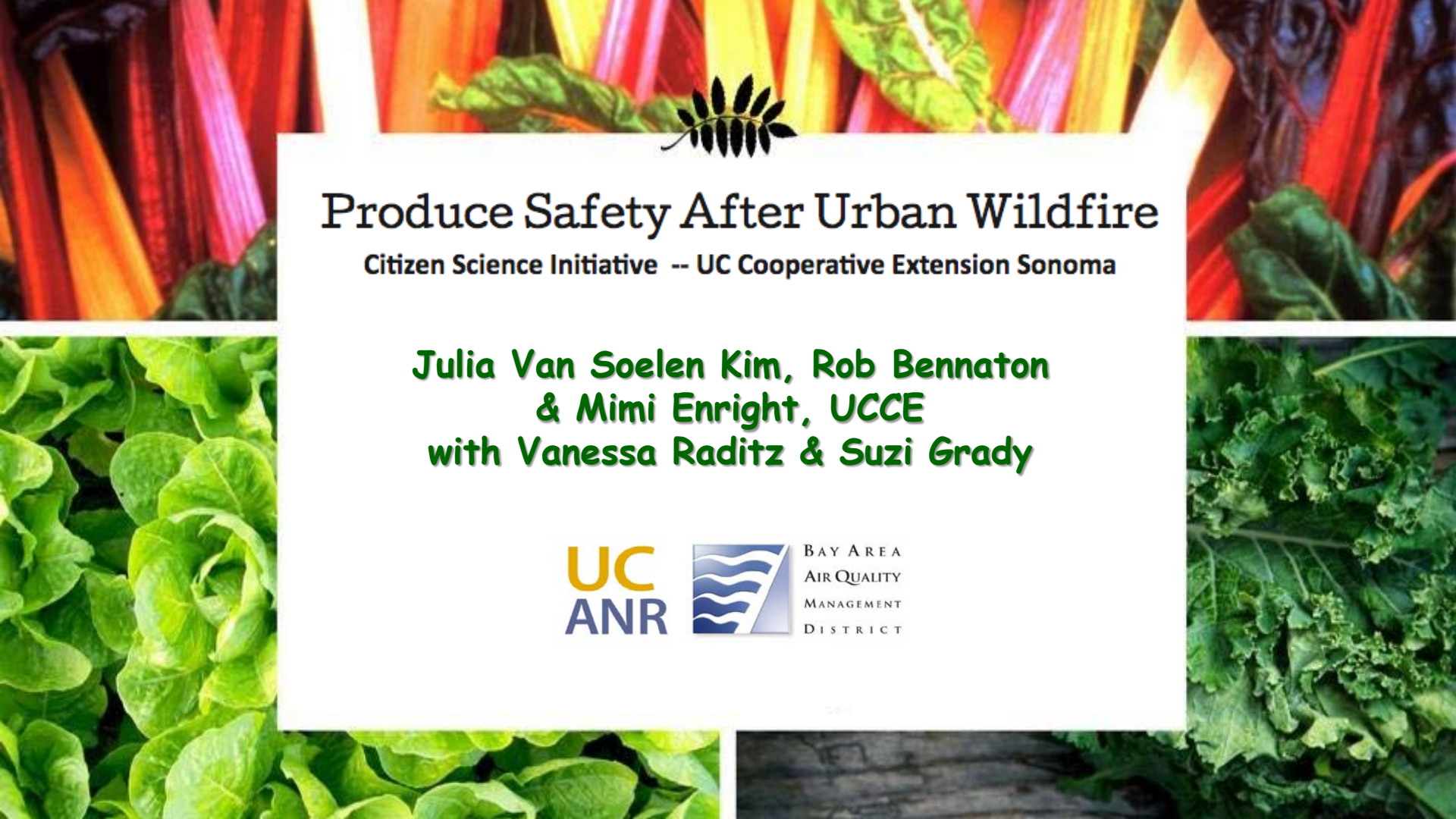

Produce Safety After Urban Wildfire

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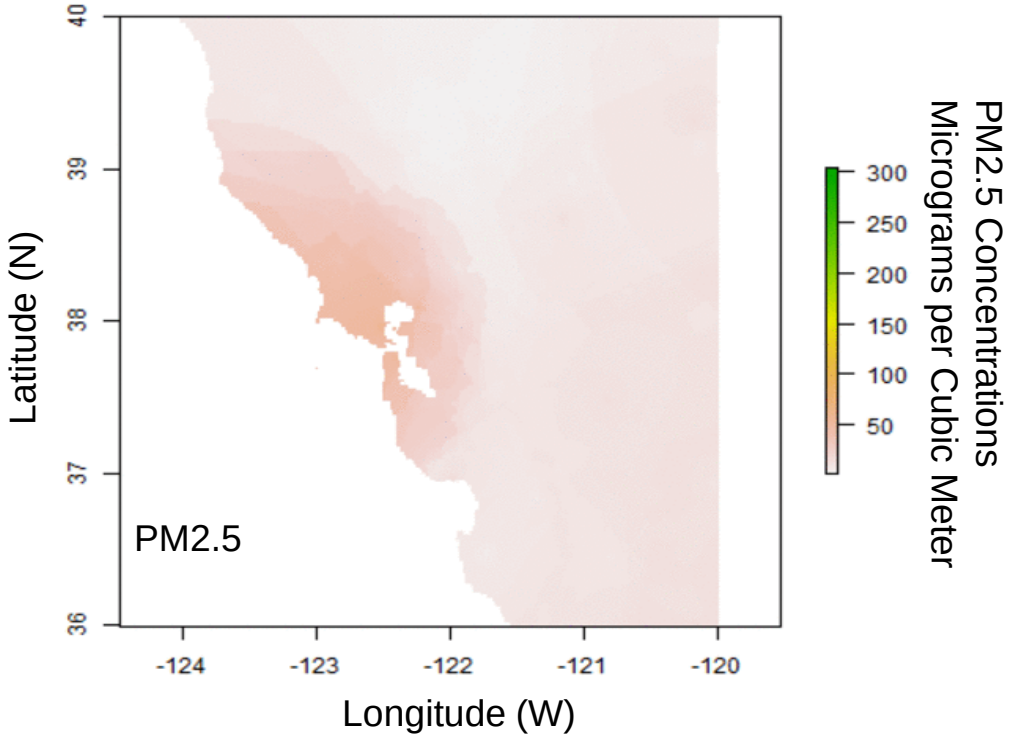
1/4 of Sonoma County residents surveyed in 2018 (n > 2000) were concerned about the produce -safety due to fire

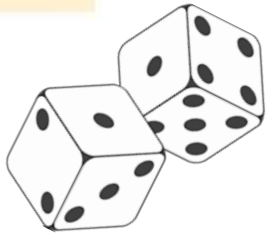
Smoke Can Carry Chemical Contaminants

“Smoke” Measured as Particulate Matter (PM) Carries Other Chemicals



What is "Unsafe?"

LIKELIHOOD OF HEALTH OUTCOMES



Chemical Toxicity (Type, [ ])
Chemical Persistence in Body
Chemical Exposure-Duration in Environs
Individual Condition(s) / Personal State of Health

Summary

- Study sought to determine whether produce safety was impacted after wildfire smoke deposited ash on soil and produce.

- Results: Produce safety was not significantly affected by the fire (in limited term).

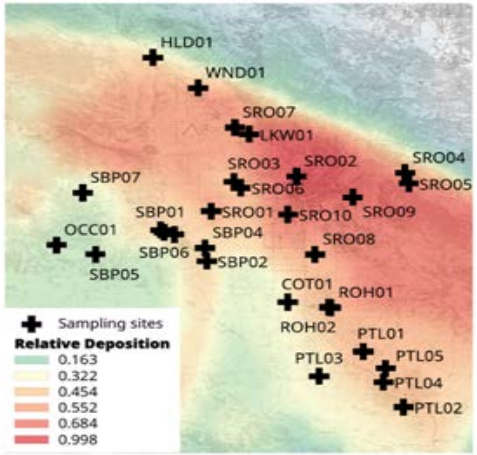
- Cumulative analysis suggests eating trace contaminants on produce does not provide a significant increase in chemical exposure during a single urban wildfire event. More testing is needed.

- Common-sense best practices can reduce exposure (short & long term).

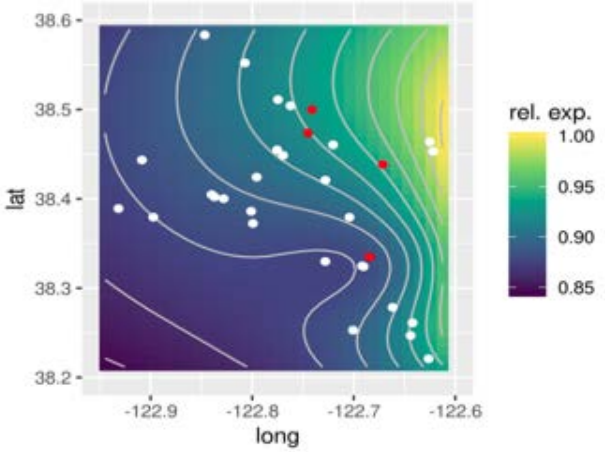
- Community workshops started April, 2019.

Analysis & Testing

1. Meteorological Deposition Models



2. CARB Air Pollution Monitors



3. Proximal Fire-Distance

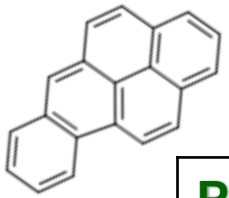
Background & Methods

IN JUST A MONTH - DURING ONGOING FIRES

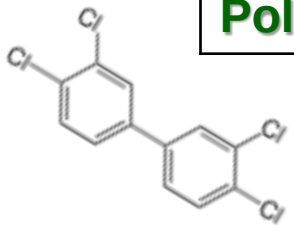
15+ Volunteers - 25+ Sites (5 Tested) - 200+ Samples

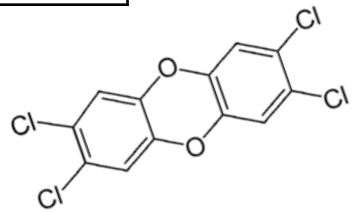
5 Sites / 3 Sets of Composite Samples (Only 2 Tested)

Chemical Groups Analyzed



Polycyclic Aromatic HydroCarbons (PAHs)	**Heavy Metals**
Polychlorinated Biphenyls (PCBs)	**Dioxins & Furans**





What is "Unsafe?"

Proposition 65 and Soil Screening Levels (Soil Screening Levels from OEHHA & EPA):

Both Methods Result in Over-Estimates of Risk

Results

PRODUCE SUMMARY: ***Low Concern, More Testing Needed***

- **No detectable PAHs or PCBs.**
- **No detectable Dioxins and Furans in 12 of 13 samples.**
  Sample w/ Detectable Levels: [Dioxins] @
  < CA Prop 65 "No Significant Risk Level."(NSRL)
- **No detectable Prop 65-regulated heavy metals in 12 / 13 samples.**
- **One sample w/ Ni @ [ ] > Prop 65 NSRL.**
- **No detectable levels of lead, arsenic, mercury, or chromium.**

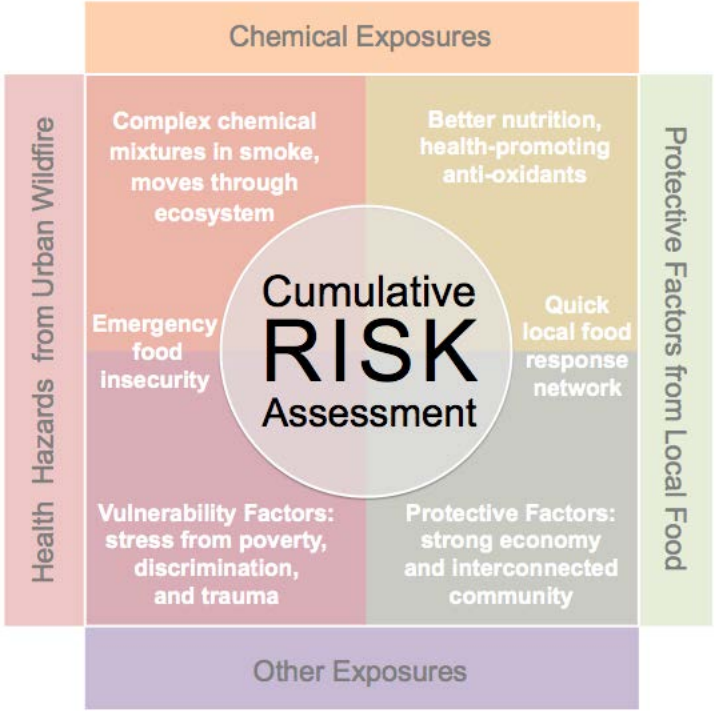
Results

SOIL SUMMARY: ***Low Concern, More Testing Needed***

- **[Heavy Metal] Soil < Sonoma's post-fire clean-up goals.**
- **No Detectable PCBs.**
- **Site closest to Santa Rosa fires Had Highest [Dioxins], at > EPA and OEHHA soil screening levels.**
- **We Cannot Verify Pre-Fire Contaminant Concentrations.**

Cumulative Risk Assessment

Cumulative Risk Assessments interpret risk as per **exposure, vulnerability** and **protective factors.**



So, is it safe to eat the produce?!

Of all Post-Fire Concerns,
Produce Safety can be a Low Concern.

Knowledge ~ Risk-Assessment
and decisions for considering:
Family Proximity to Fire and Any Vulnerabilities
(e.g. pregnant, kids and elders, disabled)

Reduce Risk Via

Best Practices for Reducing Probability of Exposure

Test Your Soils	Contain & Amend Your Soils/Other Practices	Wash/Rinse Your Produce

Why are soil contaminants a concern in urban areas?

Contaminants Can Be Spread through Dust Particles in the Air:

Why are soil contaminants a concern in urban areas?

Contaminants Can:

-Inhibit Plant Growth

-Affect Human Health!

-Persist in Soils Long Term

-Persist without Us Knowing

Plant/Crop-Contaminant Exposure Pathways

Through Plants Roots → Plant Root Uptake

(In Plants=Lab tests) (Plant-Internal/Now what?)

On Plants' Parts/Leaves → Topical

(ALL Plant/Leaf Surfaces (Plant-External/Wash Dust)

(=Lab Tests/Not Visible to Naked Eye)

If contamination found, how manage soils?

Use Best management practices based on case.

Where to start?

Understand/Interpret:

- **Site History**
- **Soil Test**

  Map Your Sample Sites in Advance of Sending to Lab!!!!

- **Remediation versus Best Management Practices**

Best Practices: Recognize Potential for Contamination → Know Risks

- **Research Site History**
- **Test Soils: Dont Guess! Research! Investigate! Do Soil Tests!!**

- **Buy Organic Materials Review Institute (OMRI)**

- **Wear Gloves & Practice Good Hygiene/Boots**

Best Practices:

Raise Beds	→	Import Clean Soils/Make Raise Beds
Amend Compost/OM	→	To Bind Soil Contaminants With with P & Dilute Contaminants
Mulch	→	To Prevent Airborne Soil Dust & Prevent Up-splash
Sub-Surface Irrigate	→	To Prevent Up-splash/Spreading Particles

Best Practices:

Adjust pH	→	Neutral pH → Optimal pH Growth/Nutrition
Promote Good Drainage	→	Soil Contaminants Concntrate @Slopes-Bottoms/Allow H20 Infiltration
Post-Harvest→ Produce		Soak in Vinegar/Wash & Peel Root Crops

DURING A WILDFIRE

SAFETY TIPS FOR LOCAL FOOD GROWERS

PROTECT YOUR LUNGS

Inhaling smoke has very severe health risks

WASH PRODUCE WITH RUNNING WATER

Remove outer leaves or peel if you see ash

NUTRITION BUILDS RESILIENCE

Low risk of harm from produce exposed to smoke

TAKE EXTRA PRECAUTIONS

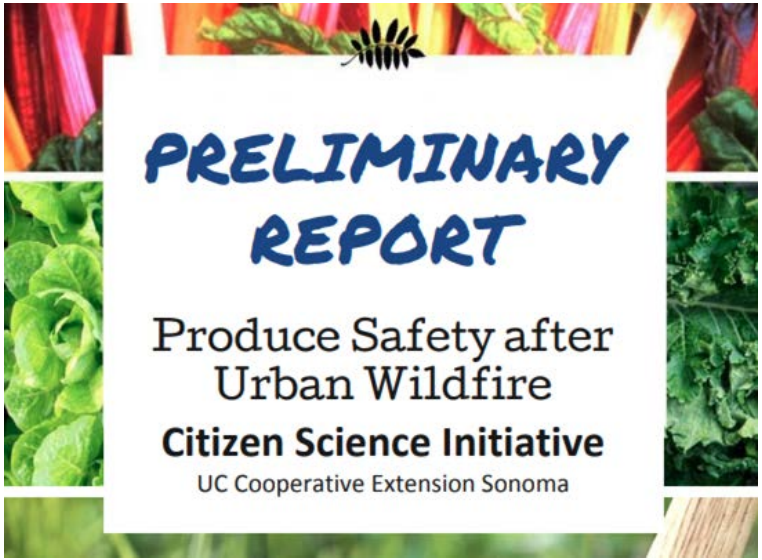
Children – Elders – People with Respiratory and Heart Disease

Resources

Website with resources and reports:
http://cesonoma.ucanr.edu/Produce_Safety_after_Urban_Wildfire/

Join GoogleGroup for Updates:
https://groups.google.com/forum/#!forum/produce-safety-after-urban-wildfire

Recent article on our work:
https://psmag.com/environment/is-it-safe-to-eat-local-produce-after-a-wildfire



Thank You!

Thank you to ANR for the Opportunity Grant – Seed $.

Through ANR Grant, we Leveraged the Bay Area Air Quality Management District $.

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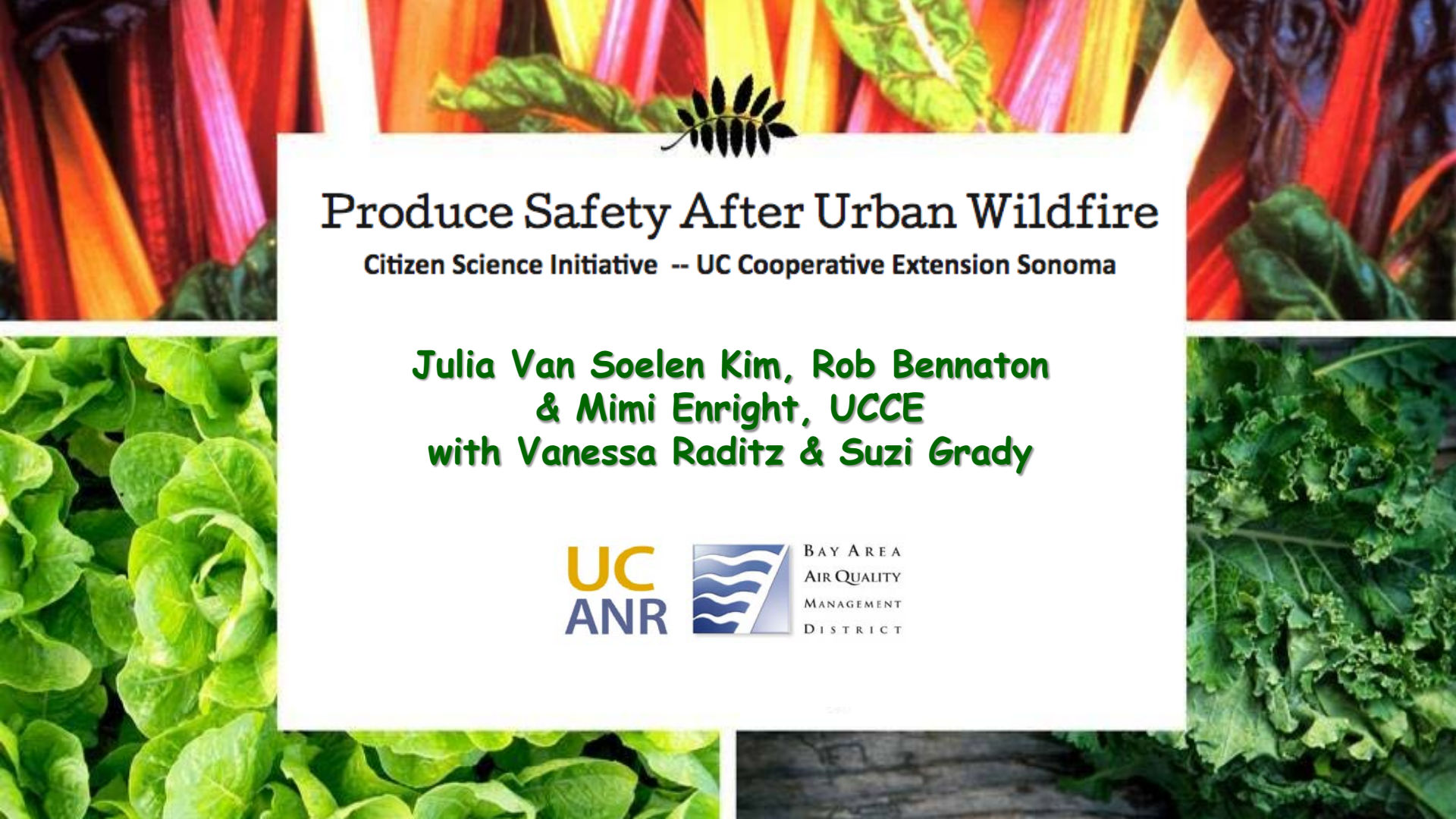

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