Impact of irrigated, small-acreage vegetable production on water resources in the Palouse region

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USDA

REACCH
Regional Approaches to Climate Change – PACIFIC NORTHWEST AGRICULTURE

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Local Food Production

- Benefits:
  - Decreased fossil fuel emissions
  - Resilient to food chain disruptions
  - Opportunity for dietary diversity
  - Autonomy
  - More nutrients
  - More flavor
  - Supports the local economy

Local Food in the Palouse

- Healthy farmers market
- Moscow Food Co-op
- Palouse Food Coalition
  - Connect local farmers with buyers in the community
  - Hold educational events
  - Hold trainings

Palouse Water Resources

- Decreasing water levels in the aquifer
- Lack of management

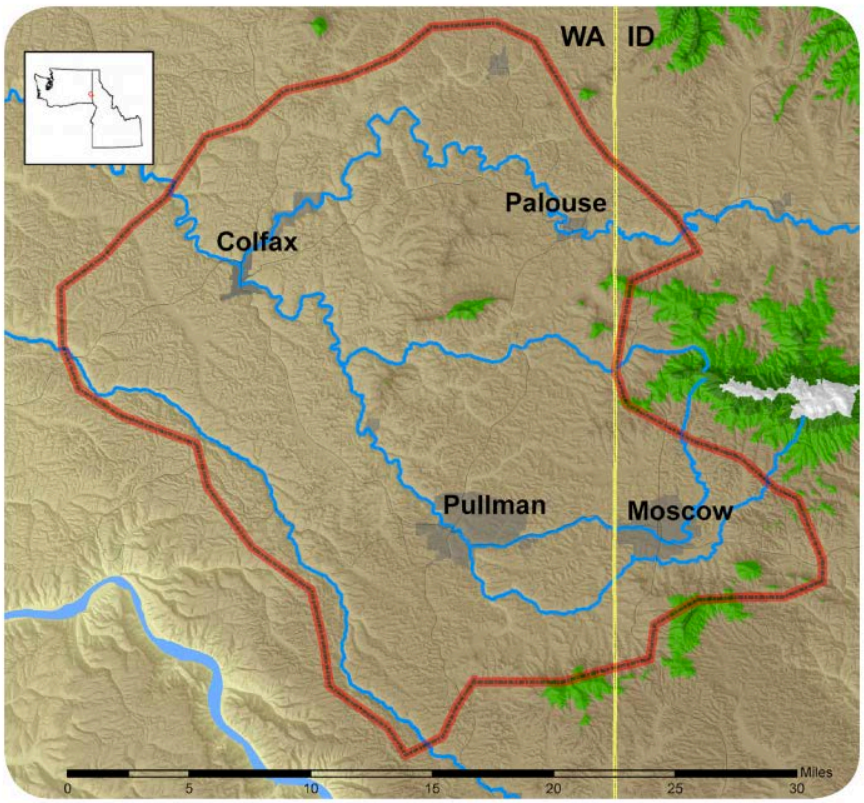


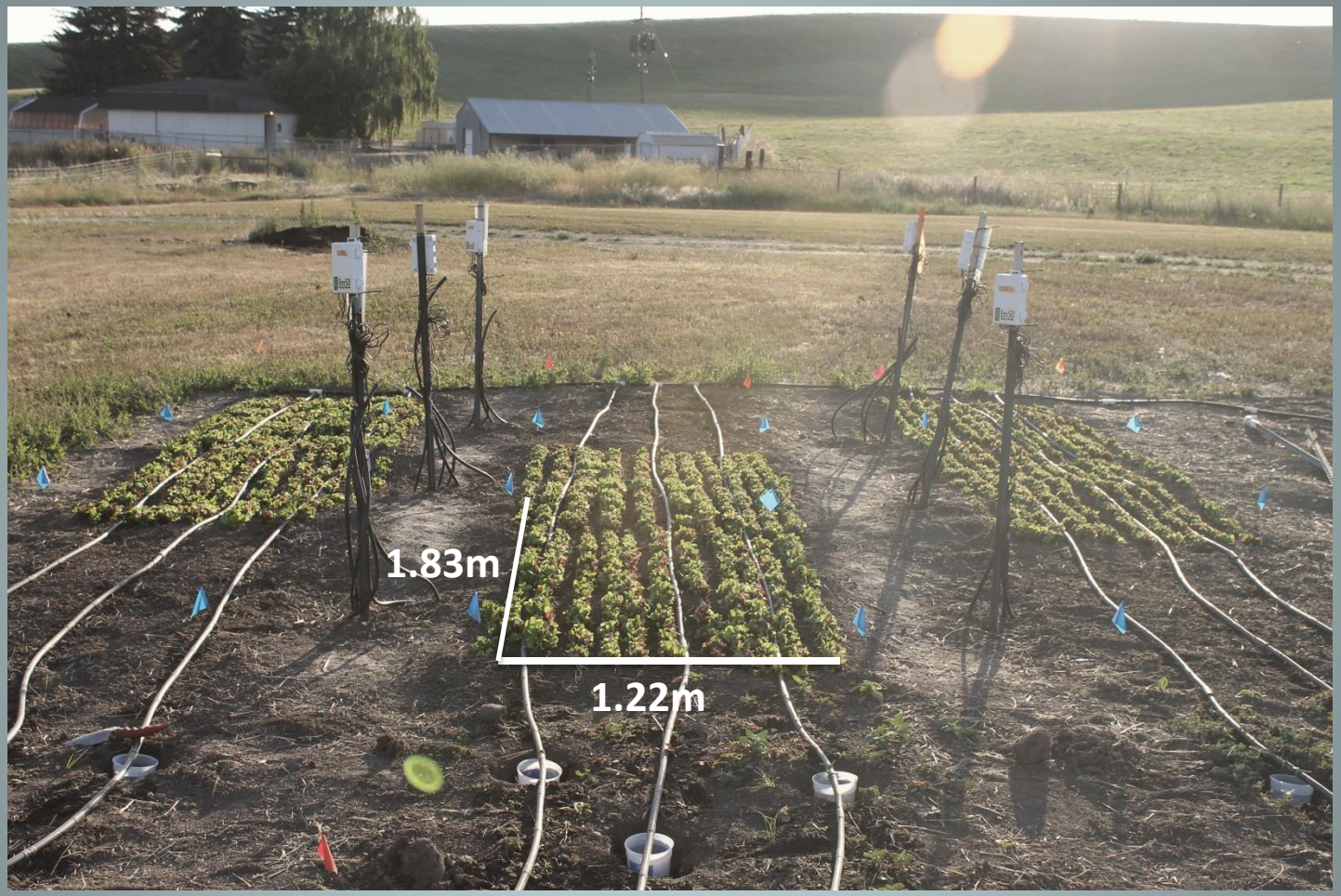
Figure 2 : Working Boundary for the Palouse Ground Water Basin

PBAC 2014 Annual Report

Transformation and Objectives

- How much water does it take to grow lettuce in the Palouse?
- How can we integrate water efficient practices with water management?

Methods



Rep 1	D1	D2	BS
Rep 2	BS	D2	D1
Rep 3	D2	D1	BS

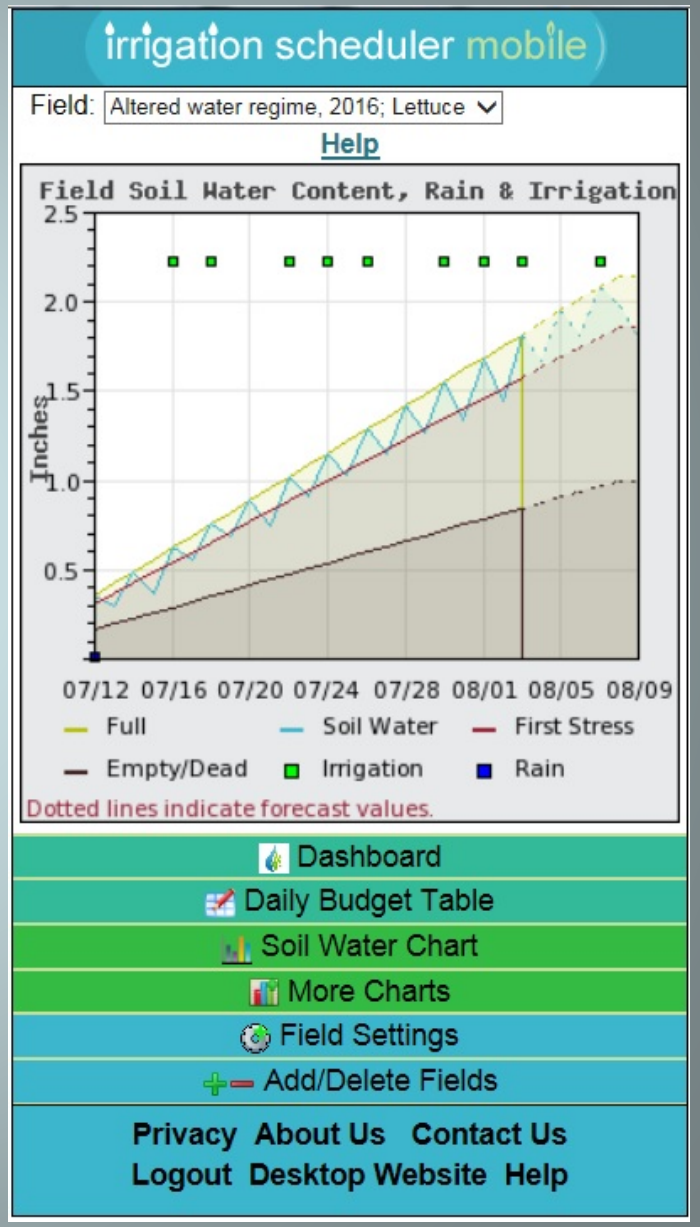
Irrigation Scheduler

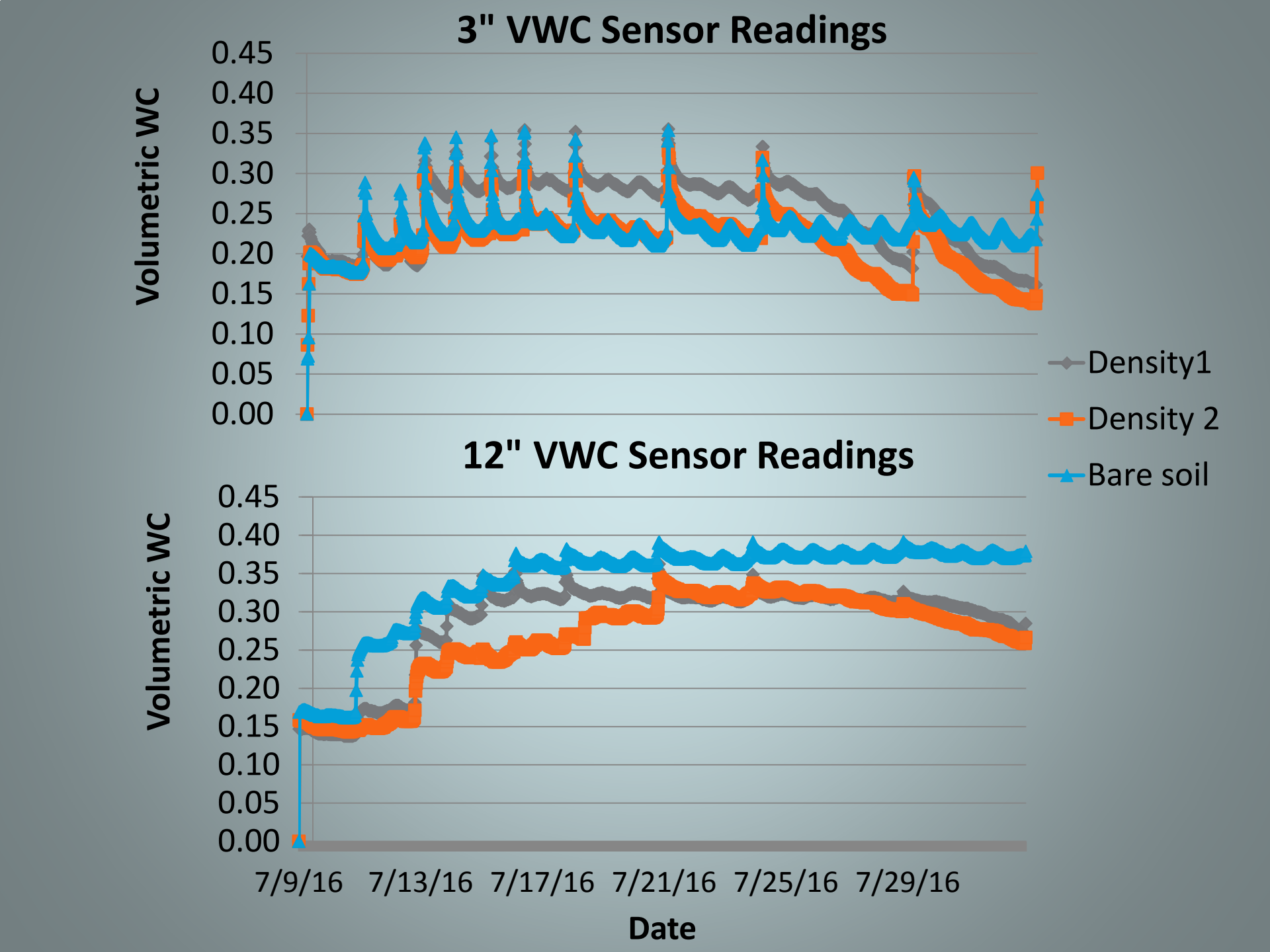
Water Balance Equation

$$P + I = ET + SS + D$$

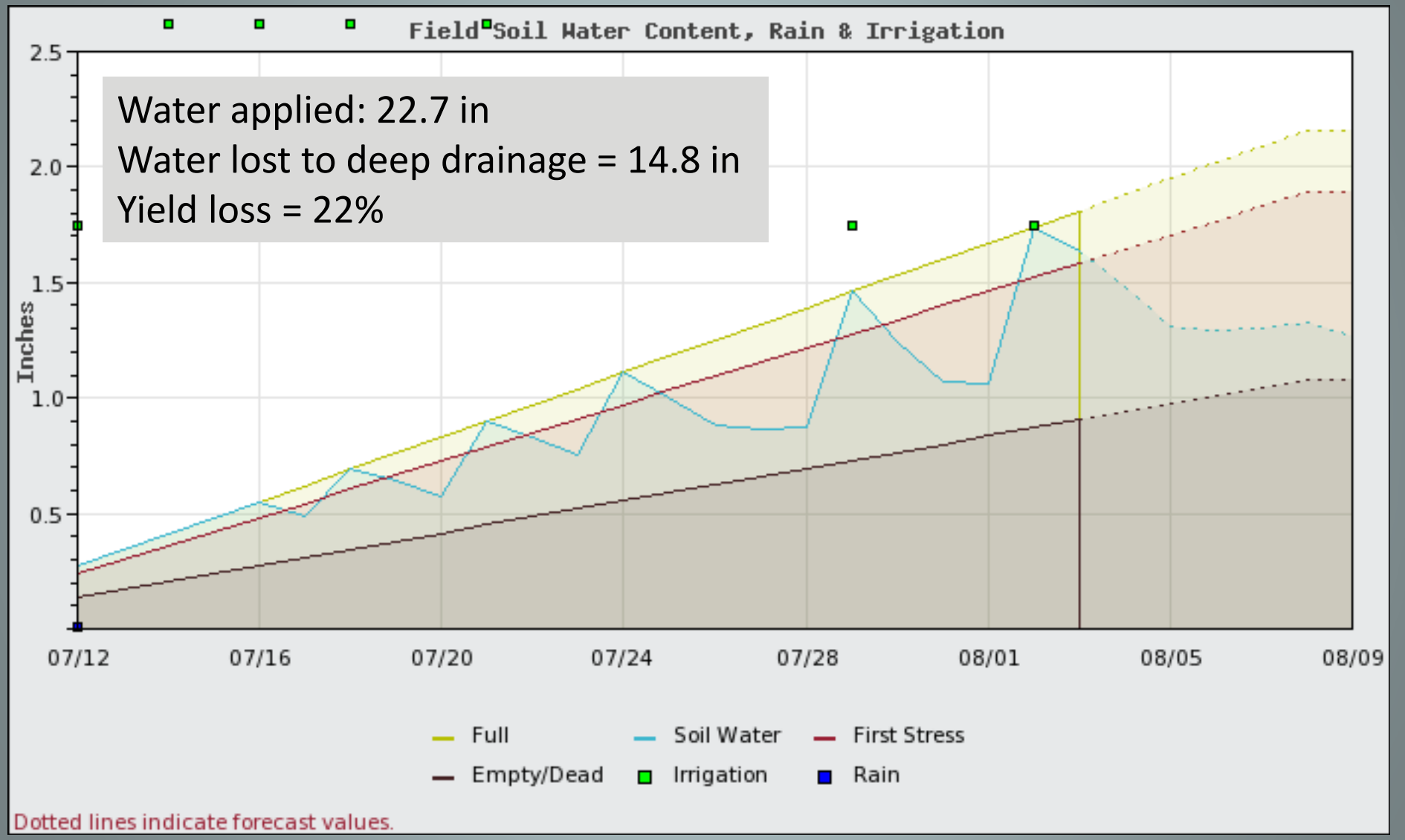
Some assumptions:

- All irrigation infiltrates
- **Water at root zone is available**
- Water moves quickly through soil (and lost quickly)
- All rainfall goes towards satisfying calculated ET demand

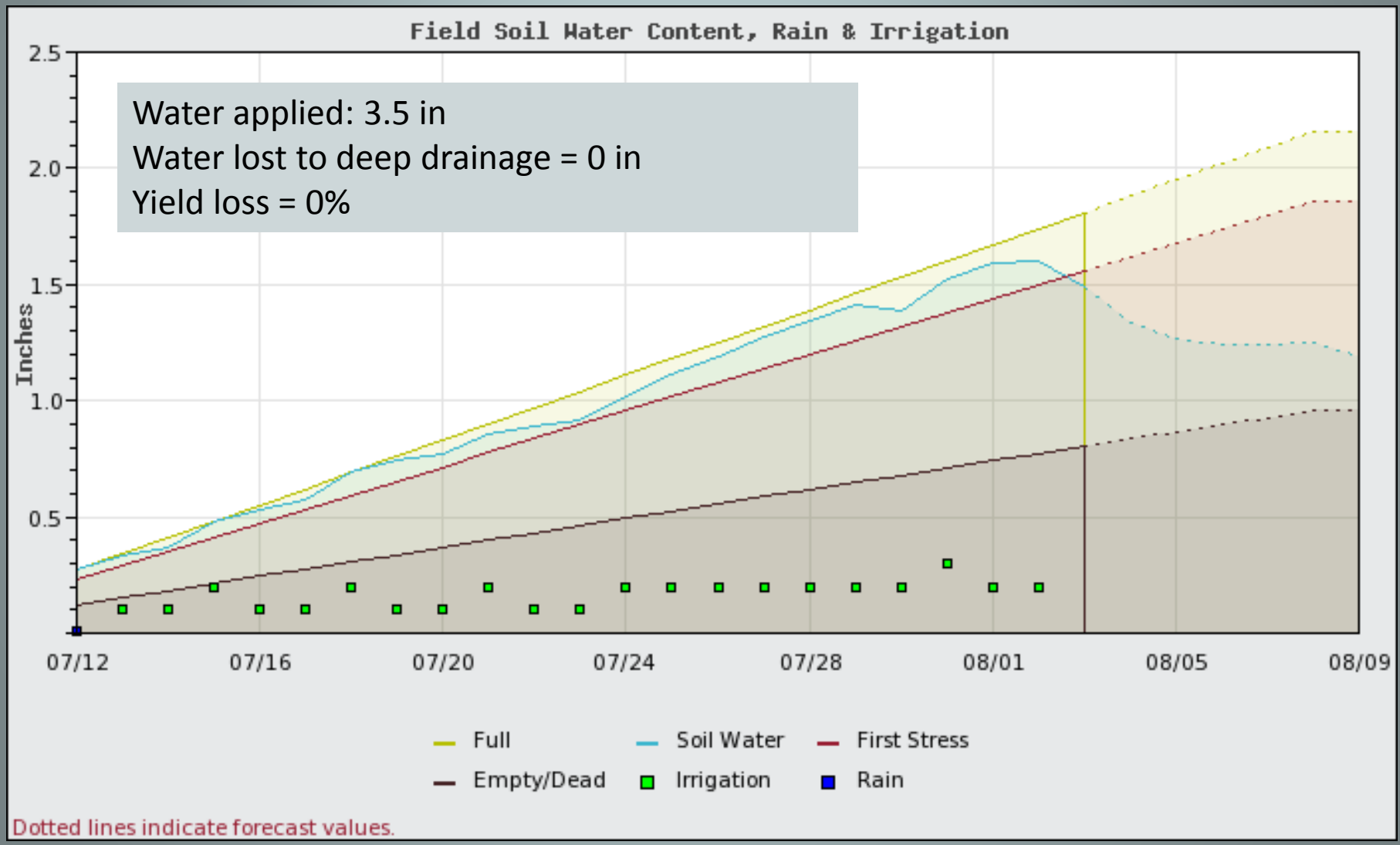



3" VWC Sensor Readings
Volumetric WC
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Density1
Density 2
Bare soil
12" VWC Sensor Readings
Volumetric WC
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
7/9/16
7/13/16
7/17/16
7/21/16
7/25/16
7/29/16
Date

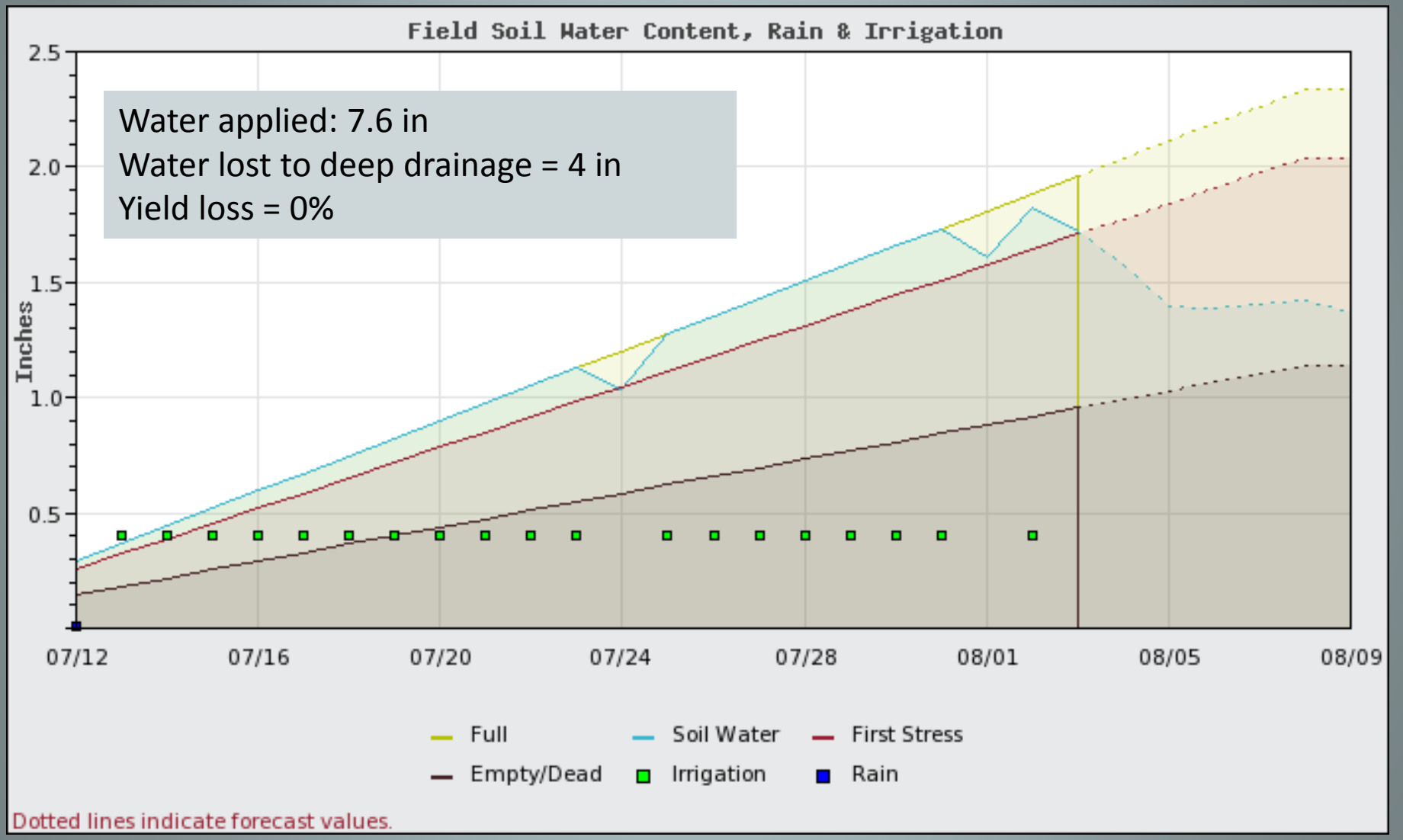
Typical Irrigation



Optimum Irrigation



Practical Irrigation



Conclusion

- Lettuce should not use a substantial amount of water, IF irrigation is managed wisely
- The “water cost” could be offset by conservation elsewhere
- Irrigating shallow rooted crops is challenging
- Growers need to start monitoring the total inches/gallons of water applied
- Growers should not irrigate their fields equally
- Role for extension faculty in providing irrigation education
- Other crops and other on-farm uses of water

Acknowledgments

Ian Leslie

Anita Falen

University of Idaho

REACCH program for this opportunity and the Award #2016-67032-25012 and Award #2011-68002-30191 from USDA National Institute of Food and Agriculture for funding this research