Use of Cover Crops to Prepare for El Nino and Increase Water Infiltration into Soils

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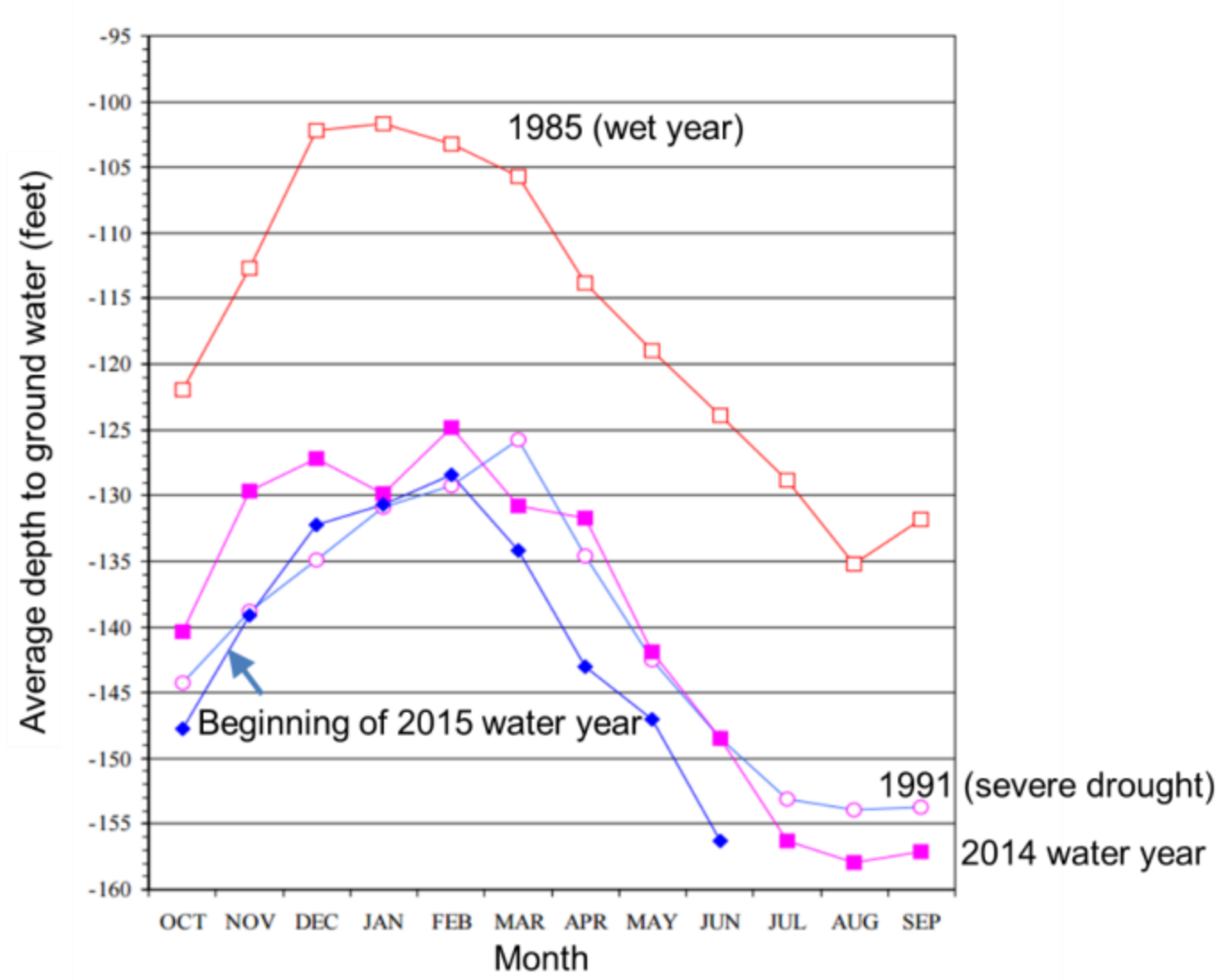
Benefits of Cover Crops to the Soil

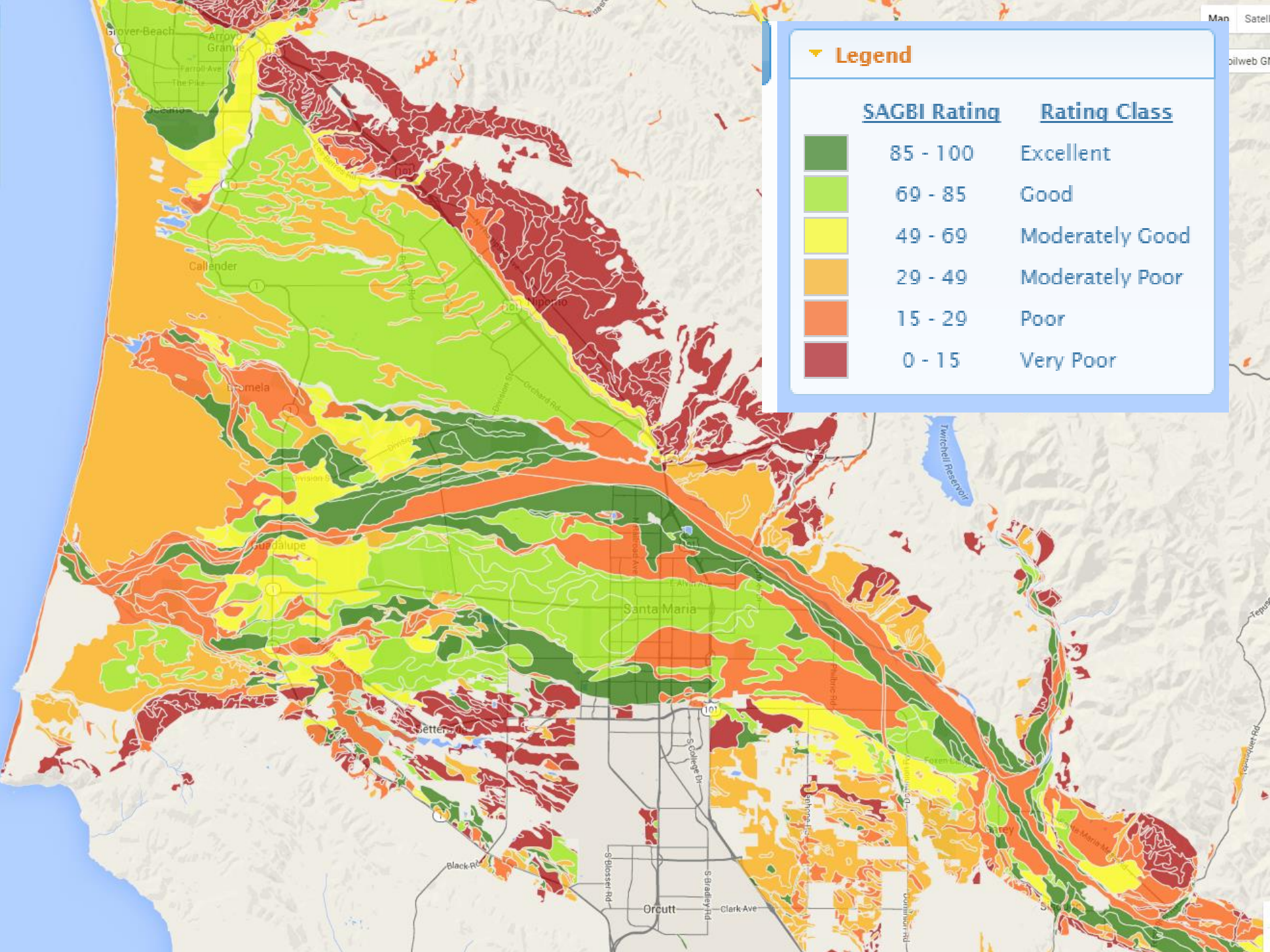
- Provide needed inputs of carbon to the soil:
  - Feeds the soil biota
  - Enhances increase nutrient cycling
- Enhances soil porosity
  - Increased infiltration and aeration
- Improves formation of water-stable aggregates (from polysaccharide gums exuded by roots)
  - Improves soil tilth and workability
  - Reduces crusting
- Nutrient cycling/scavenging
- Disease and weed suppression*

Economic Limitations

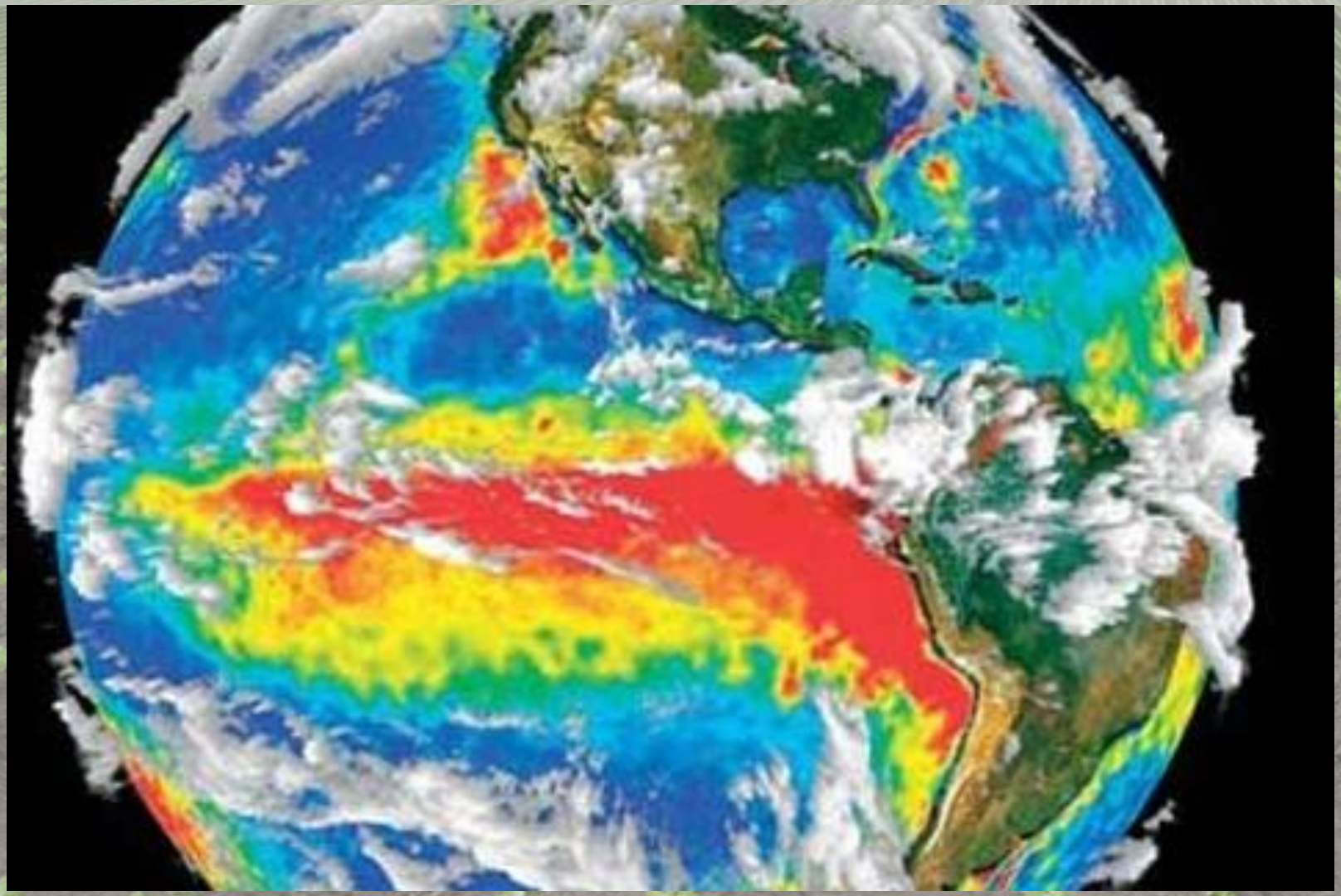
- Growers want to include cover crops, but land rents make it difficult to find opportunities to include cover crops in crop rotations
- Short-term economic considerations affect decisions about the use of cover crops
- Great pressure to cover the fixed costs of farming (e.g. land rents, overall expenses)
- Cover crops occupy time and space when a cash crop could be produced

Groundwater Situation




Legend
SAGBI Rating
Rating Class
85 - 100
Excellent
69 - 85
Good
49 - 69
Moderately Good
29 - 49
Moderately Poor
15 - 29
Poor
0 - 15
Very Poor
Grover Beach
Arroyo Grande
Oceano
Callender
Guadalupe
Santa Maria
Orcutt
Twitchell Reservoir
Clark Ave
Black Rd
S College Dr
S Bradley Rd
S Blosser Rd
Orchard Rd
Division St
Railroad Ave
Foothill Rd
Map
Satell

El Nino



Furrow Bottom Cover Crops

Furrow Bottom Cover Crop

Moss Landing 2007

- **Planted November 10**
  - **800 lbs seed/A**
  - **Barley UC603**
  - **Trios 102 (winter dormant)**
- **Management of cover crops**
  - **Barley**
    - **Weed wacked Dec 21**
    - **Treated with Poast Jan 31**
  - **Trios 102**
    - **Treated with Poast on March 2**

Cover Crop Growth

Treatment	Biomass T/A	Percent N in tops
February 14		
UC 603 Barley	1.03	4.17
Trios 102 triticale	1.07	4.73
March 7		
UC 603 Barley	0.87	3.07
Trios 102 triticale	1.78	3.57

Cover Crops for Strawberry Furrow Bottoms

February 17

Impact on Runoff and Erosion

Treatment	Suspended Sediment ppm	Phosphorus (total) ppm	Nitrogen (total) ppm
Barley	415	3.20	5.3
Trios 102	425	1.86	2.3
Control	2,380	3.62	6.5

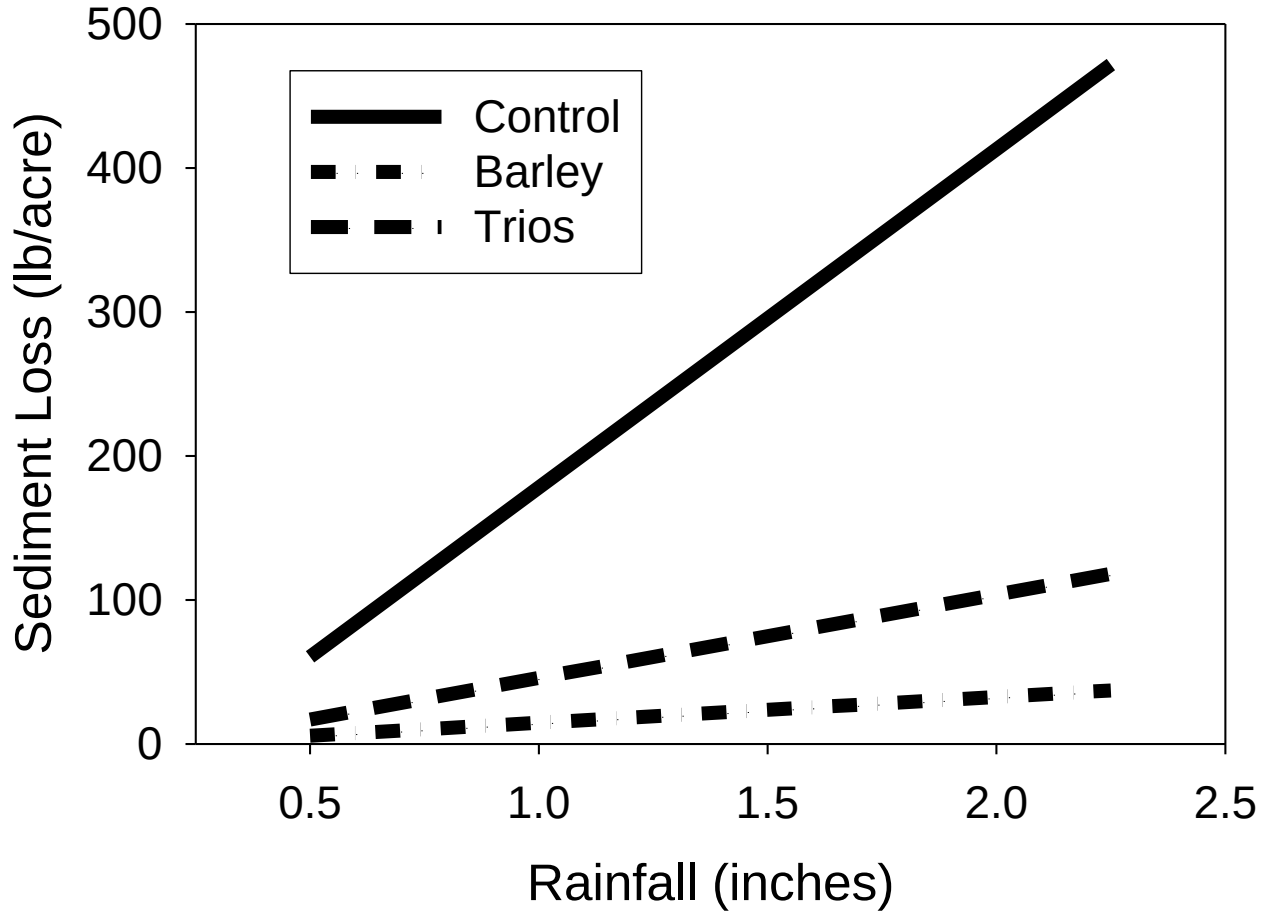
Runoff from Plots

Treatment	Inches	% of rainfall	Sediment lbs/acre inch
Barley	0.19	45	90.0
Trios 102	0.20	51	98.5
Control	0.17	45	541.9

Strawberry Yield

Treatment	Yield kg/plot
Barley	6.41 a
Trios 102	6.55 a
Control	5.85 a

Sediment Loss vs Rainfall Amount



Estimated Costs

Estimated Costs of Operations	Base cost	Material/A	Cost/A	Total cost/A (adjusted)[1]
Cover Crop Seed				
Barley	0.15/lb	100 lbs	15.0	4.2
Trios 102	0.44/lb	120 lbs	52.8	14.9
Planting			4.5	4.5
Mechanical Management				
Weed Wacking[2]		0.25 gallon (gas)	----	11.4
Cultivation			15.0	15.0
Chemical Control				
Poast	73.60/gal	2 pints	18.4	5.2
Prism (Select Max)	120.33/gal	1 pint	15.0	4.3
Spray application			13.0	13.0
Barley total costs				57.5
Trios 102 total costs				51.7

1 – furrow area is 28% of total area and material costs per acre are adjusted accordingly

2 – based on one acre per hour and $10.35/hour for general labor (including 38% overhead – from *2006 Sample Costs to Produce Organic Strawberries* by Bolda et al.)

Cover Crops for Organic Strawberries

- **Cereal or other grasses are difficult to kill mechanically and may not be a good choice for furrow bottom cover crops in organic berries**
- **Other options are mustards**
- **We are currently experimenting with using mustard cover crops and how to manage them and the weeds in the furrow**

Mustards for Organic Strawberry Production
Easier to Kill Mechanically

February 6
53 days

Cover Crops for Organic Strawberries

- **Mustards grow very fast and in a short time they can begin to rise over the level of the bed**

Summary of in-furrow Cover Crops for Strawberries