



Vegetable Garden Study

Augusta Forestry Center

Bill Berti and Dean Cocking
South River Science Team
November 9, 2004



Vegetable Garden Study

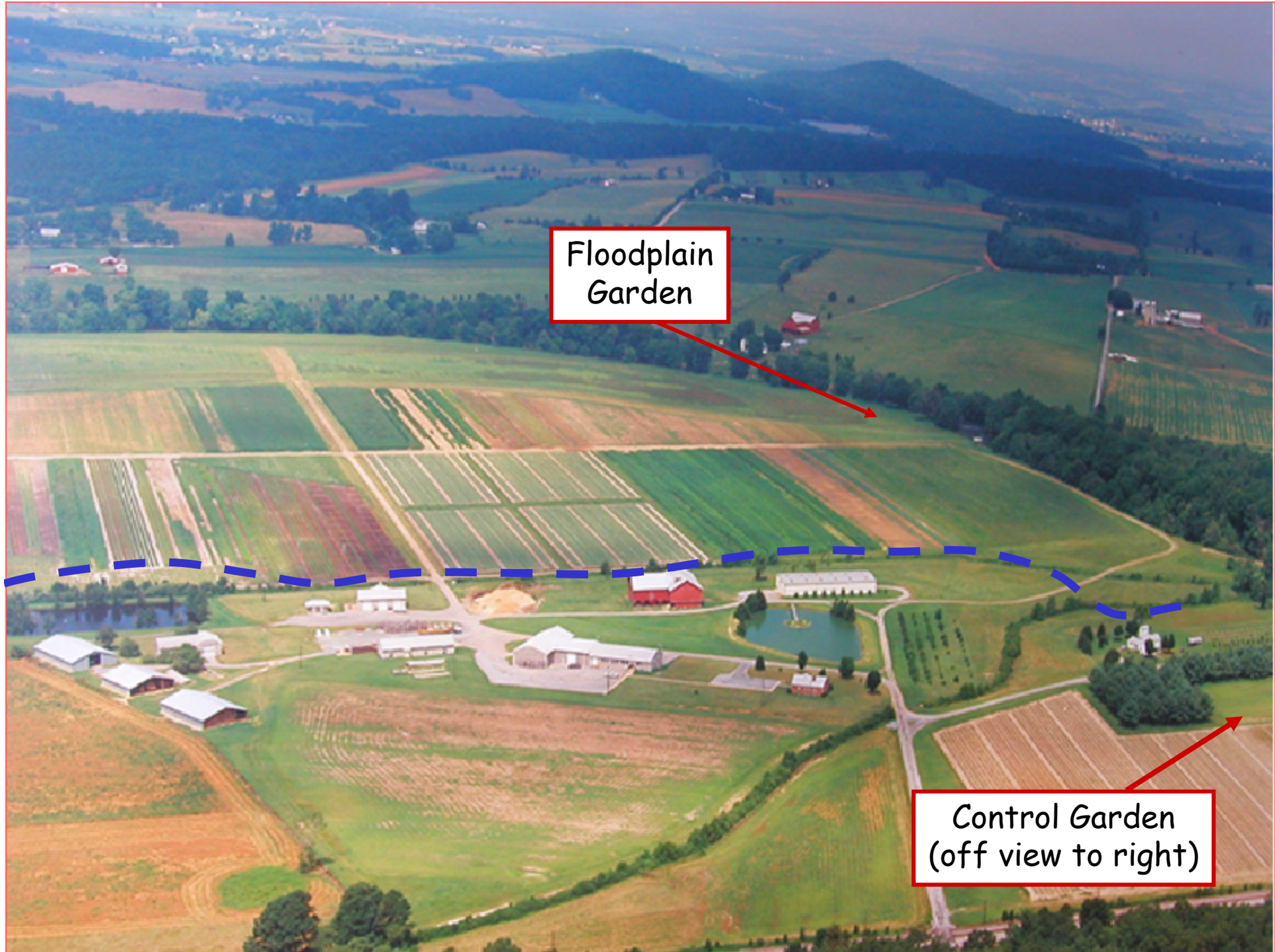
Objective -

Determine if soil-Hg is taken-up by vegetables at concentrations sufficient to be a health risk

Augusta Forestry Center - Crimora, VA



November 9, 2004



Floodplain
Garden

Control Garden
(off view to right)

Floodplain Garden - 2004

Soil Hg, mg/kg
< 10
10 to 20
21 to 30
31 to 40
41 to 50
51 to 60
> 60

South River

South River

1D 19.4	2B 35.1	2I 33.3	2E 44.6	2C 45.6	3D 55.8	3F 56.7	3H 48.1	4B 61.6	4E 67.9
1H 14.7	1I 18.3	1F 13.8	2A 20.3	2J 39.6	3G 56.3	4J 57.5	4A 58.8	4H 78.3	4I 57.9
1B 5.93	1E 4.22	1A 8.38	1C 9.58	2D 37.1	3E 45.6	3A 51.4	4D 62.6	4G 65.1	4C 61.4
1G 20.2	1J 19.7	2H 31.2	3J 48.3	4F 68.9	3B 56.2	3I 55.1	3C 54.6	2G 43.1	2F 32.9

- A Potato
- B Turnip & Beets
- C Pepper & Cauliflower
- D Cabbage
- E Onion
- F Squash
- G Radish & Carrot
- H Tomato
- I Spinach & Lettuce
- J Bush peas & Bush beans

Sampled Nov 23, 2003
mg Hg/kg soil, dry weight basis

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Control Garden - 2004

Plots in 2 x 10
Randomized
Complete Block
design with some
plots containing
two crops

IG Plot C1	IB Plot C2	IE Plot C3	I-I Plot C4	ID Plot C5
IA Plot C6	IJ Plot C7	IH Plot C8	IC Plot C9	IF Plot C10
II-I Plot C11	II-E Plot C12	II-D Plot C13	II-C Plot C14	II-H Plot C15
IIJ Plot C16	IIA Plot C17	II-B Plot C18	II-F Plot C19	II-G Plot C20

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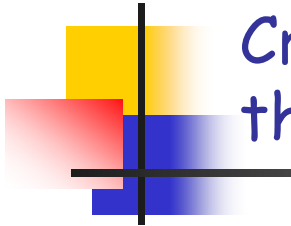
2004 Control
garden is adjacent
to (up-hill and
North of) the 2003
control garden



**After Hurricane Dianne
29-Sept-04**

November 9, 2004

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Crops were planted much earlier in 2004 than in 2003

Root
Crops

Crop list	Planted as:	Date 2003	Date 2004
Beet	Seed	-----	11-May
Radish	Seed	30-Sept	11-May
Carrot	Seed	25-June	11-May
Turnip	Seed	-----	11-May
Potato	Cut seed potatoes	-----	24-April
Red Onion	Onion sets	25-June	24-April
Scallions (onion)	Seed	-----	14-May
Lettuce	Seed	30-Sept	11-May
Spinach	Seed	30-Sept	11-May
Cabbage	Transplanted	25-June	24-April
Cauliflower	Transplanted	-----	11-May
Bush pea	Seed	-----	11-May
Bush bean	Seed	-----	11-May
Bell Pepper	Transplanted	25-June	11-May
Tomato	Transplanted	25 -June	11-May
Squash	Transplanted	25-June	11-May
Sweet corn	Seed	25-June	-----

Harvest Results



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Sample Preparation

- Harvested and stored cold
- Washed, sliced, and diced
- Shipped to analytical lab for Hg analysis
 - Samples digested and Hg measured





Crop samples all less than MDL

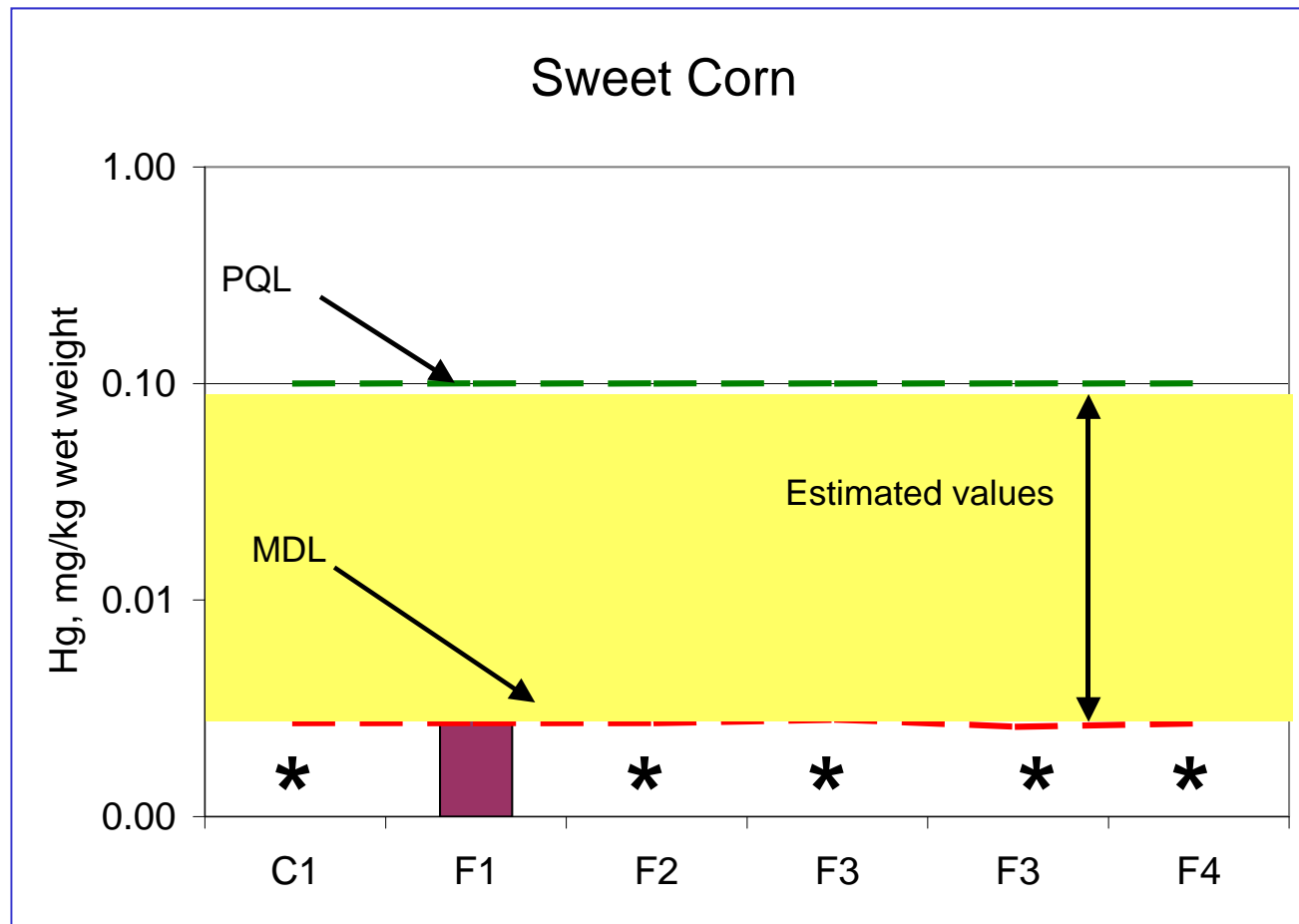
2003

- Cabbage
- Pepper
- Small squash

2004

- Bean
- Beet
- Pea
- Pepper
- Radish
- Red onion
- Potato

Crop Harvest 2003



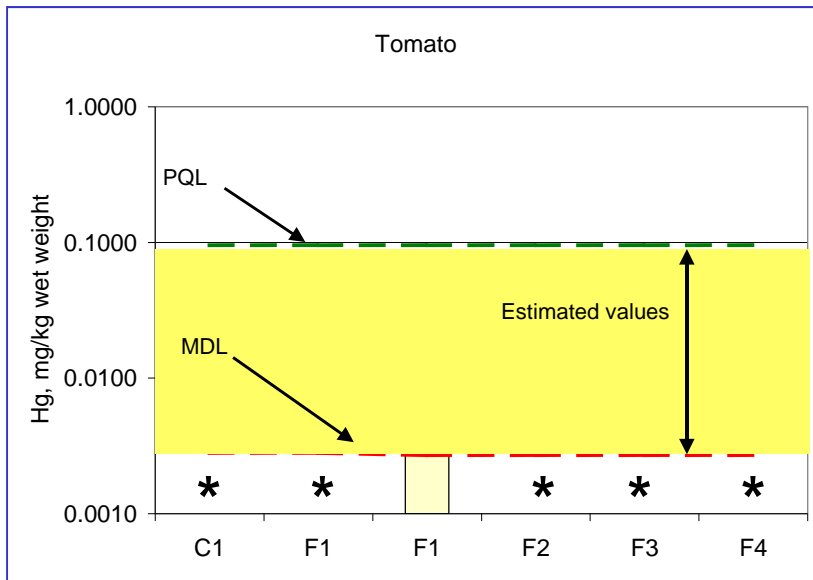
* = less than the MDL

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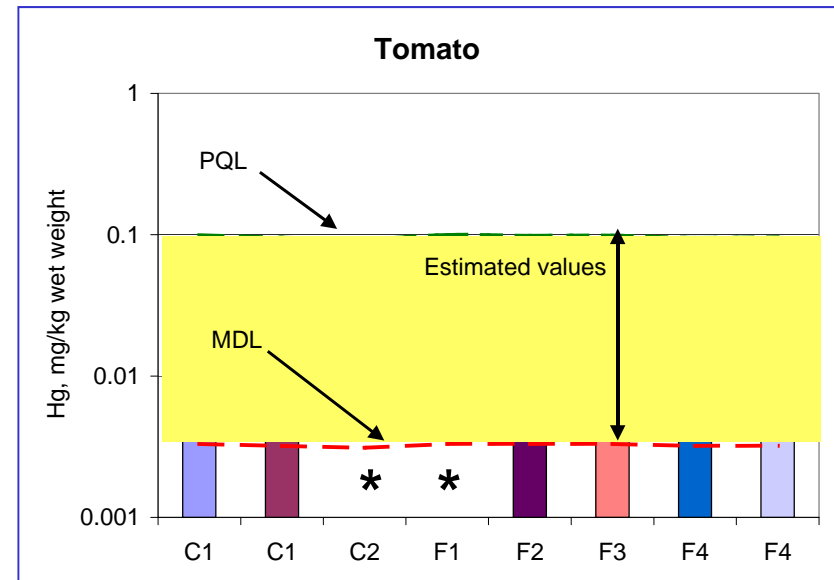
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Crop Harvest

2003



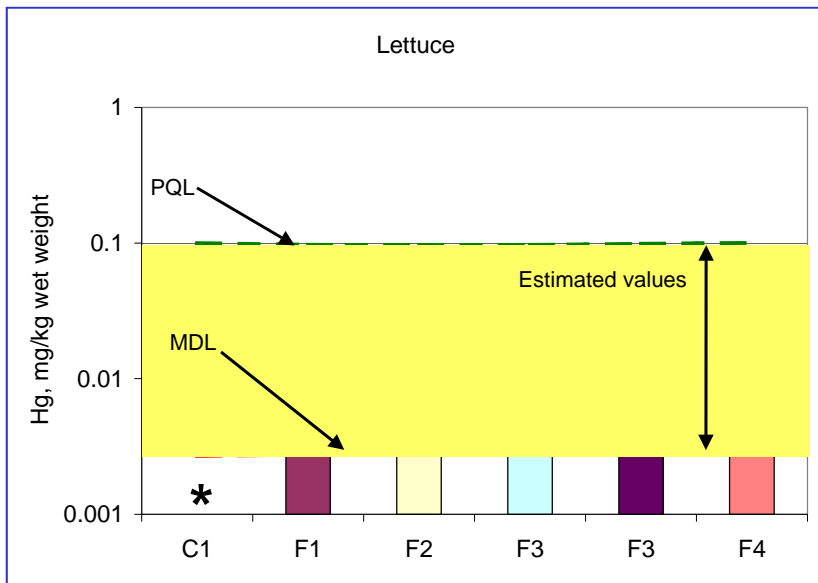
2004



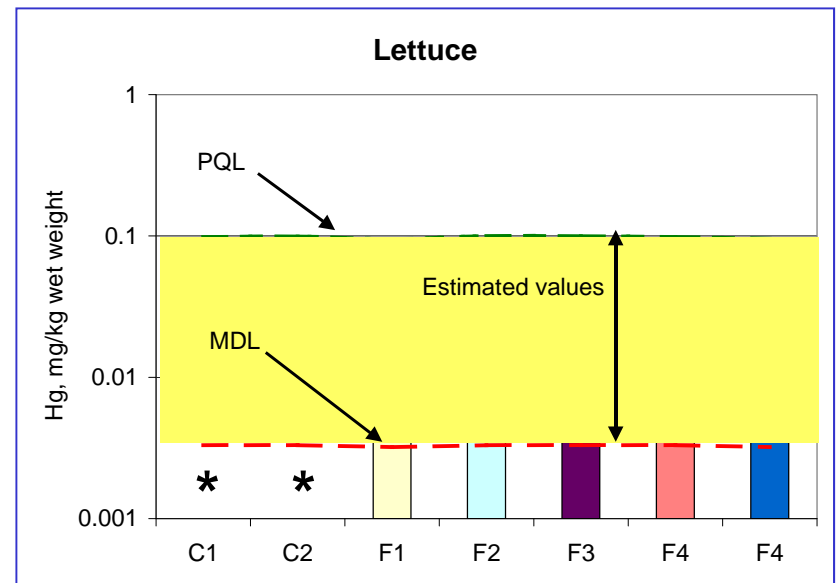
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Crop Harvest

2003



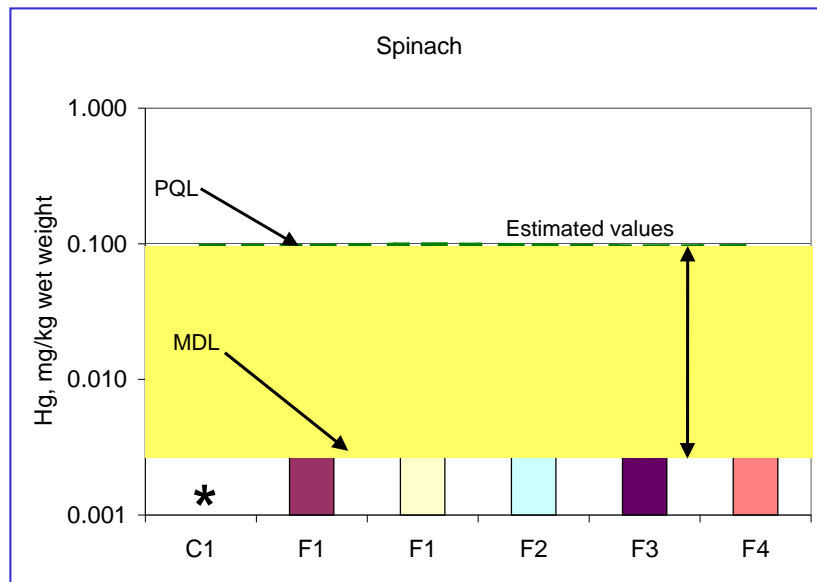
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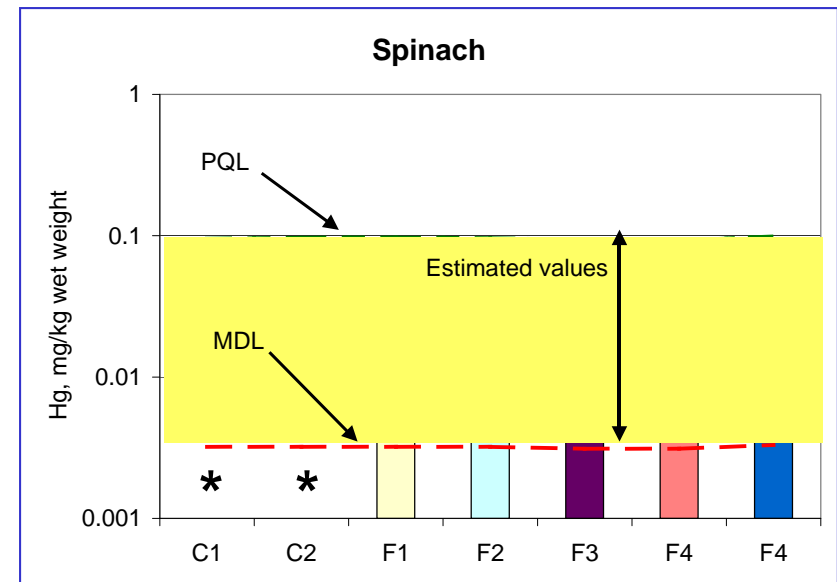
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Crop Harvest

2003



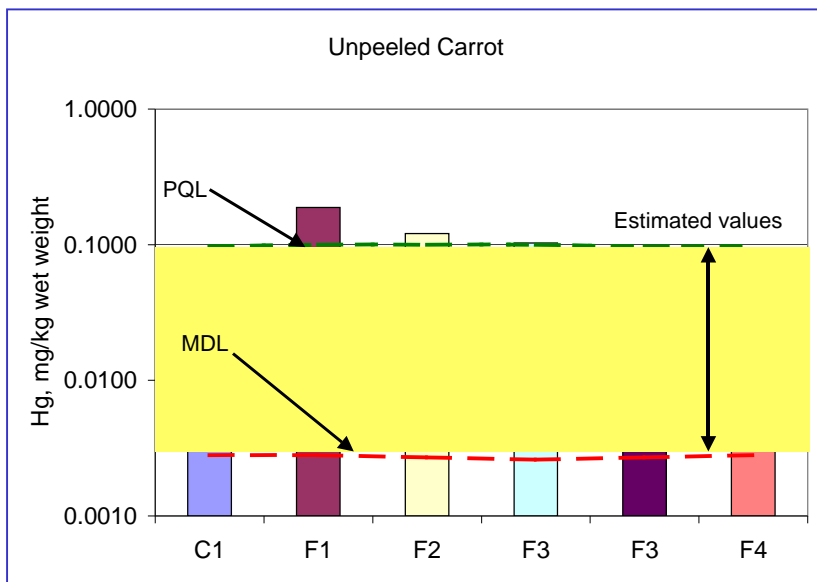
2004



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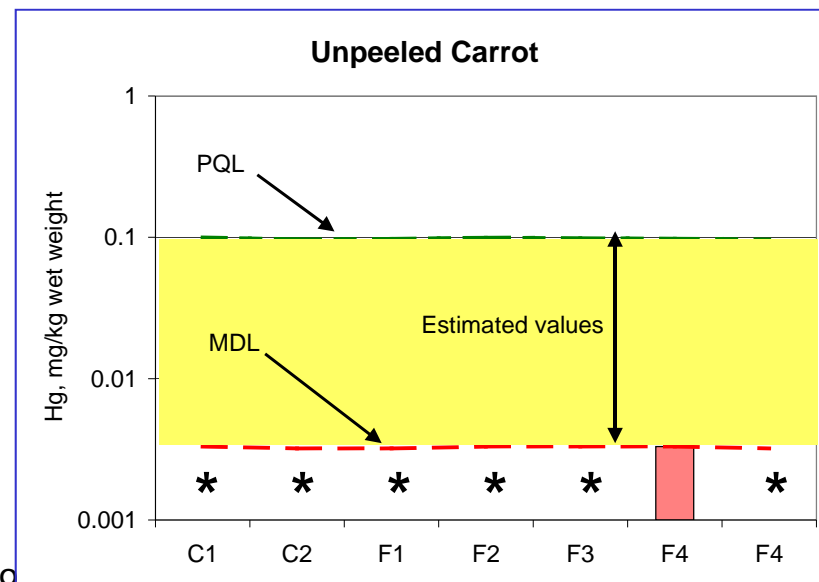
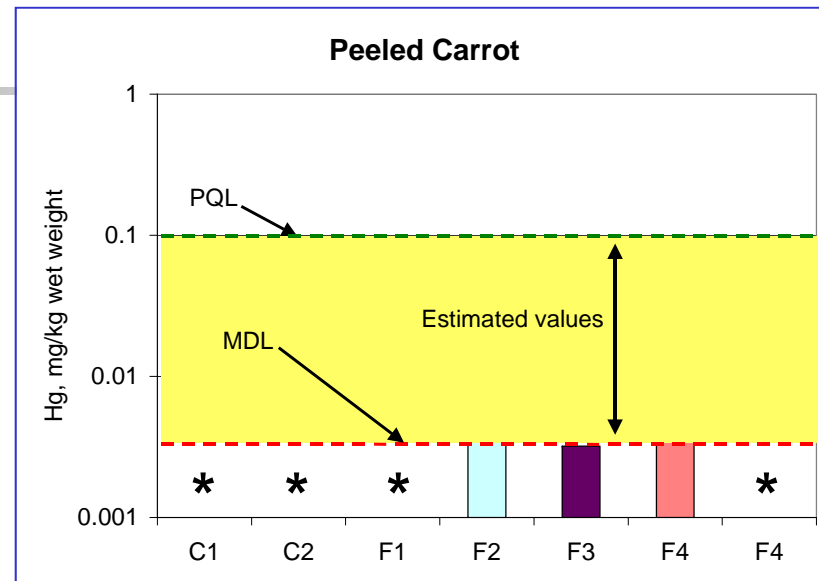
Crop Harvest

2003



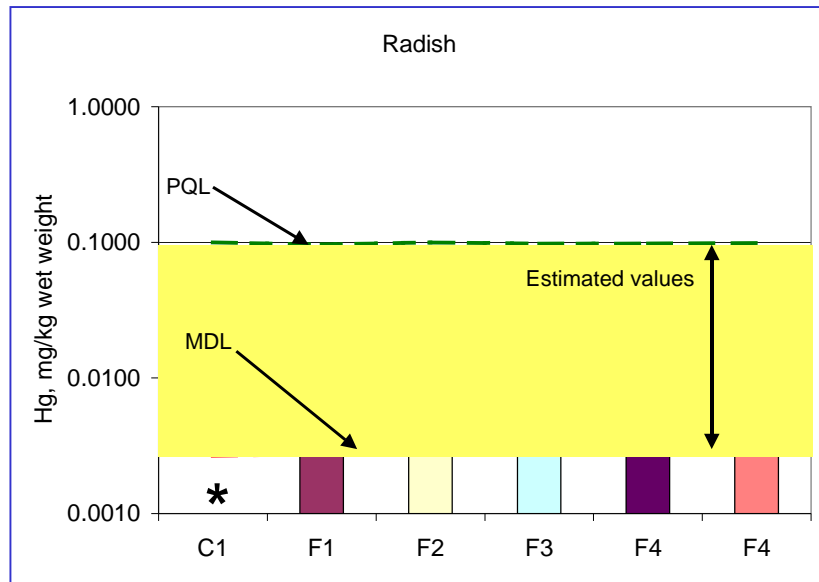
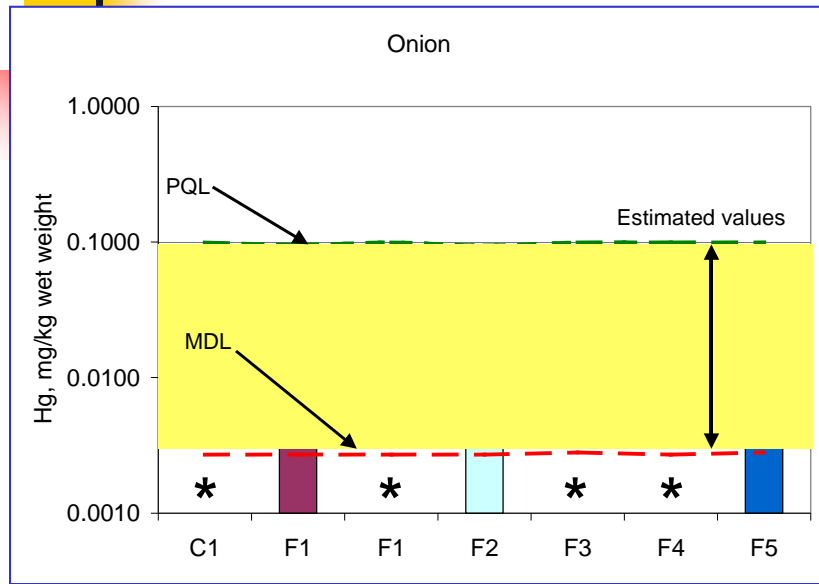
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2004

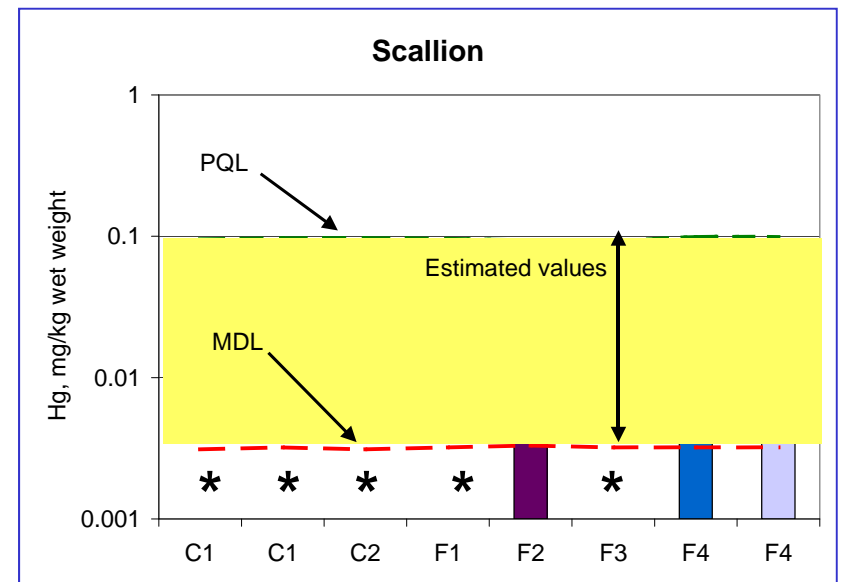


2003

Crop Harvest

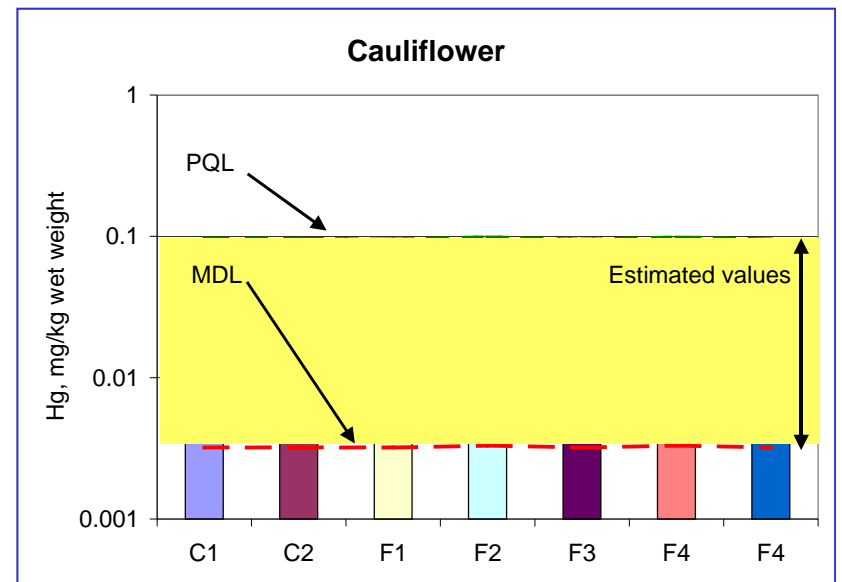
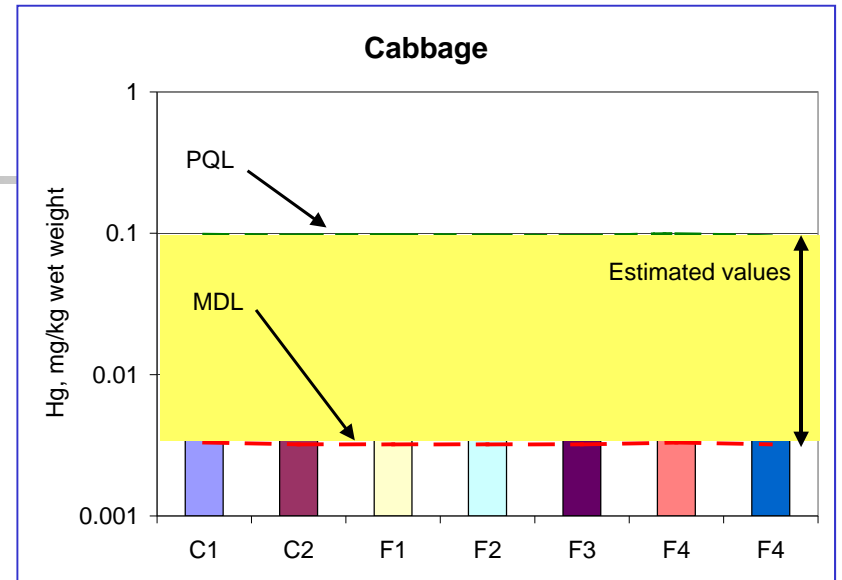
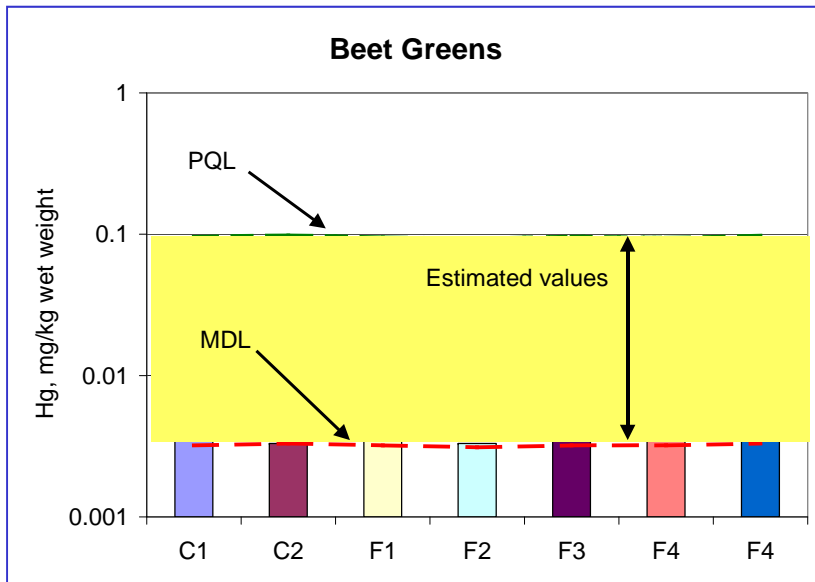


2004

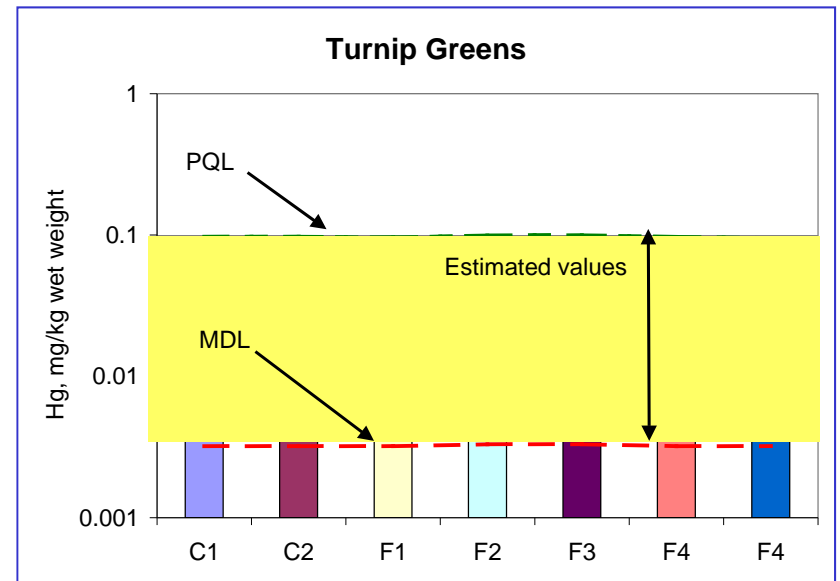
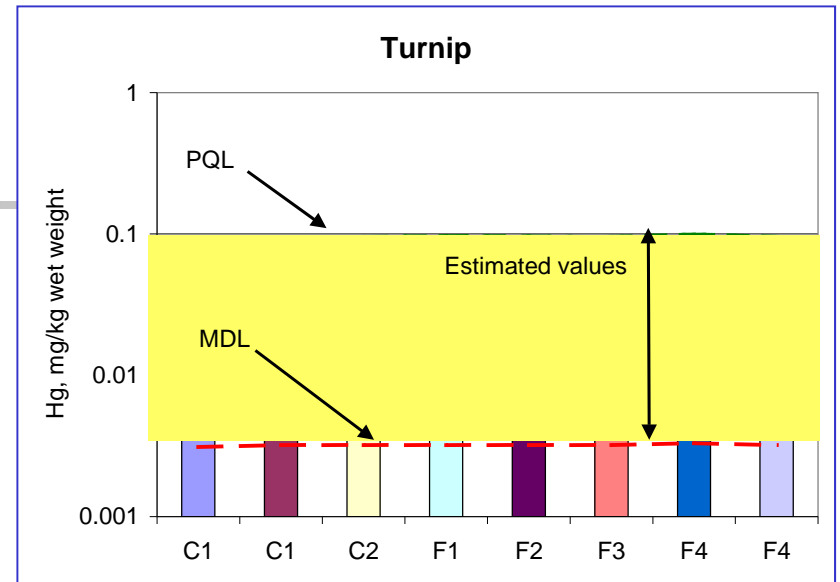
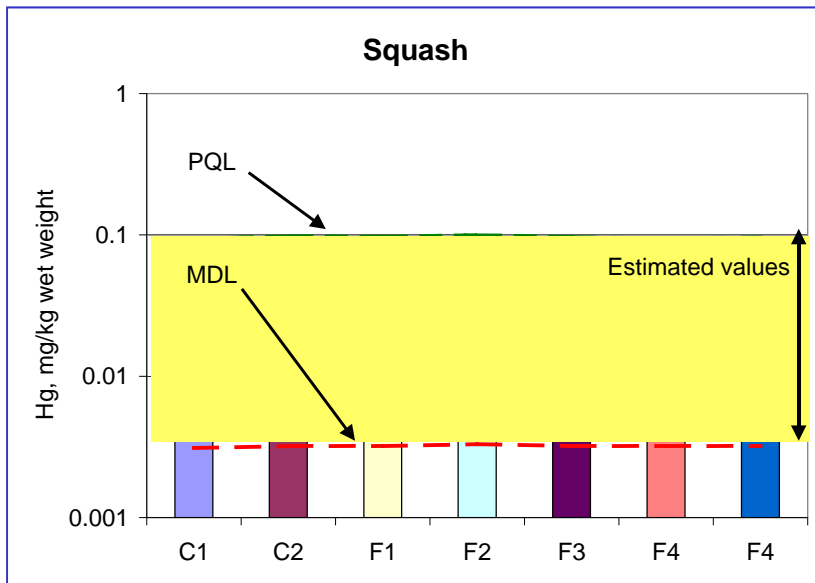


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Crop Harvest 2004



Crop Harvest 2004





Path Forward

- Harvest and analyze fall crops planted 28-Aug-04:
 - Radish, carrots, lettuce, spinach, turnips and beets
 - Determine need for lower PQL
- Collect floodplain and control garden soils for total Hg
- SETAC presentation
- Evaluate the potential health risk of consuming vegetables grown in the floodplain based on data from study
- Evaluate 2004 results and plan for 2005
 - One year of data for potato, beets, scallion, turnip, bush beans, bush peas
- Begin work on publications



Acknowledgements

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Questions???
