2008 Floodplain Surface Soil Samples

Analysis of THg

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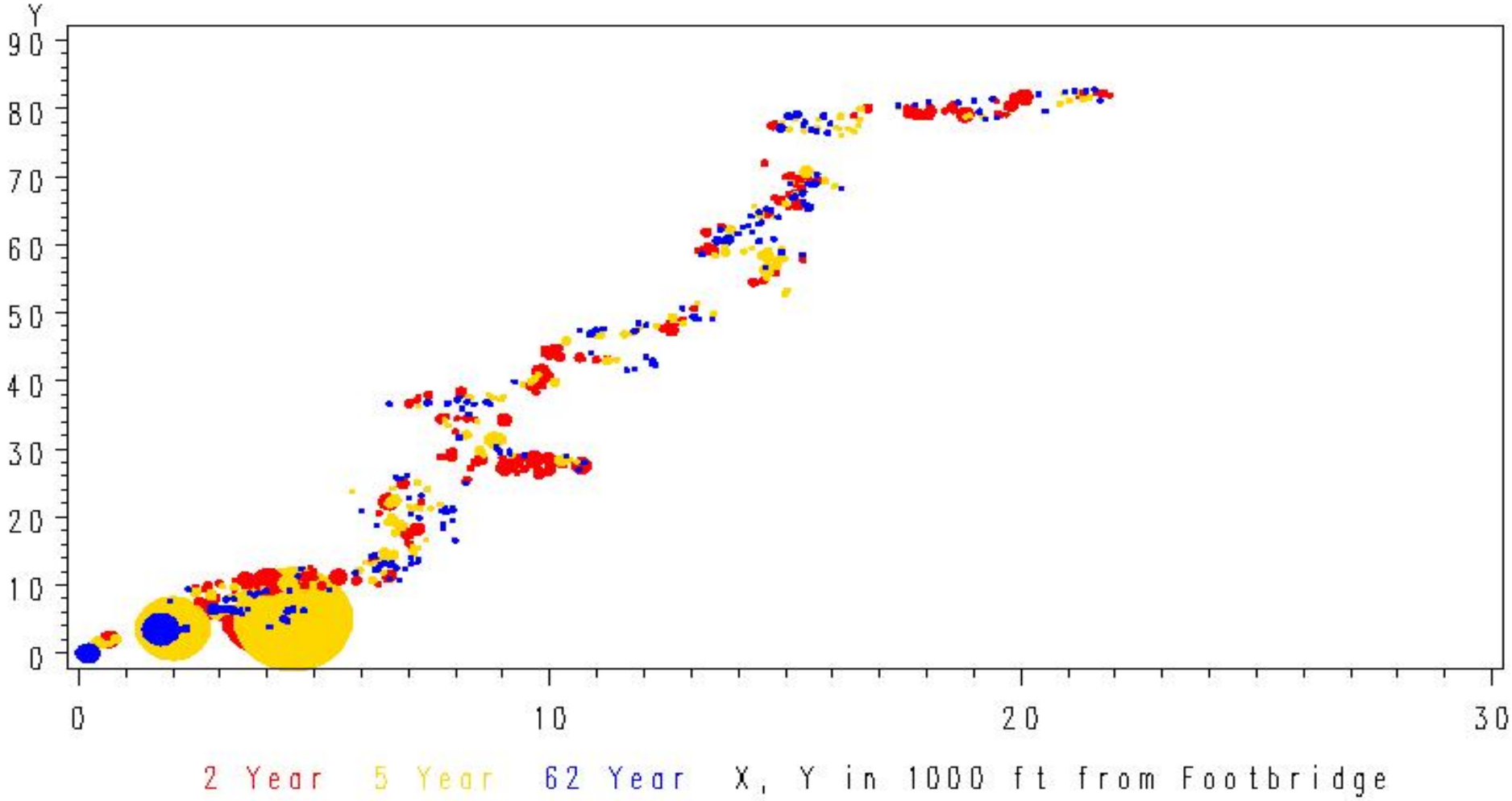
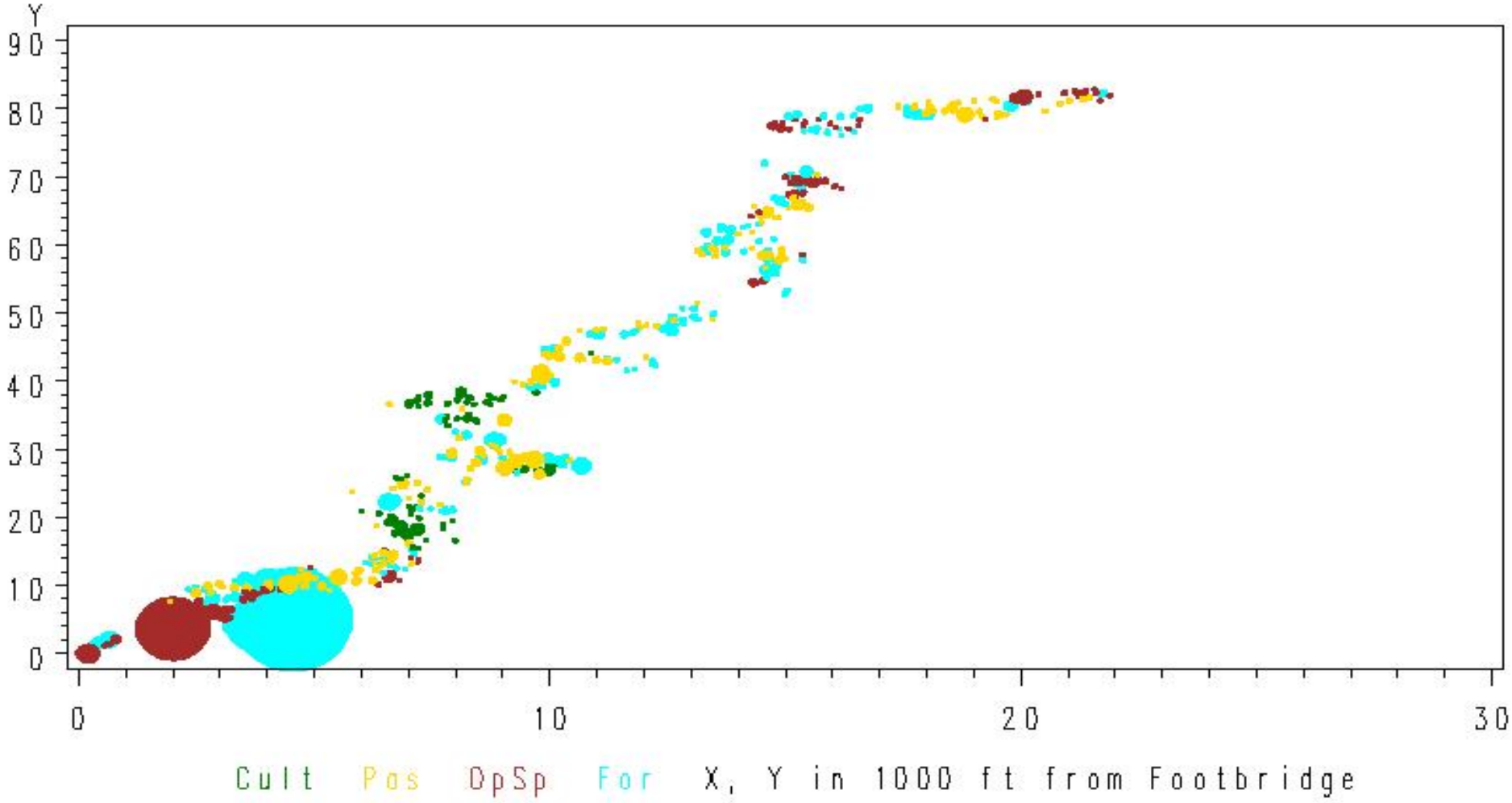
DuPont Applied Statistics Group

THg Distribution: Floodplains



Size of dot proportional to THg level, except minimum size (10ppm) used for visibility. Scatter follows physical location of samples. X and Y are NAD 83 State Plane coordinates, adjusted to zero at footbridge.

THg Distribution: Landuse



Size of dot proportional to THg level, except minimum size (10ppm) used for visibility. Scatter follows physical location of samples.

Reaches

1 Main Street to Hopeman Parkway

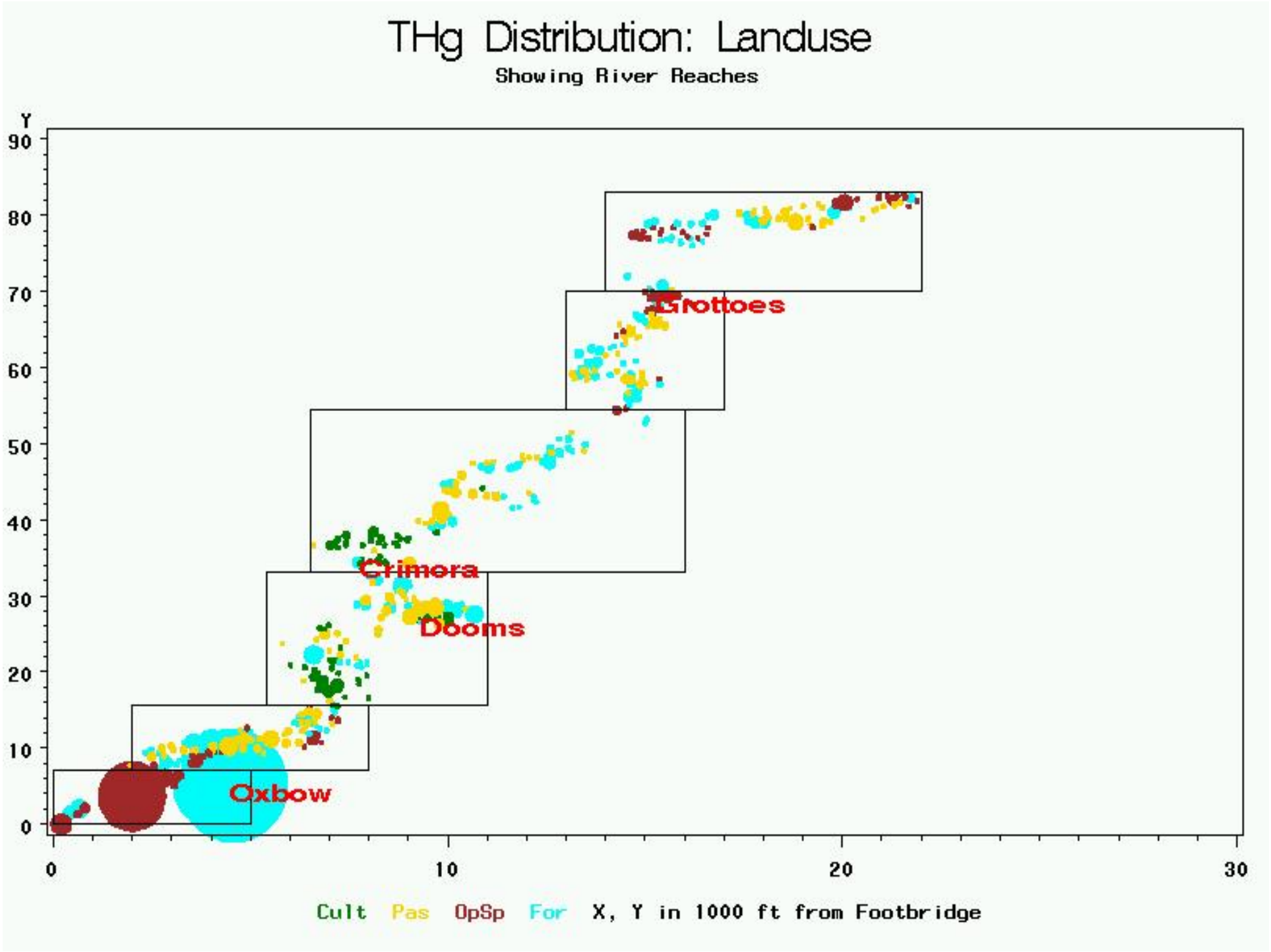
2 Hopeman Pkwy to Holsinger Farms FB

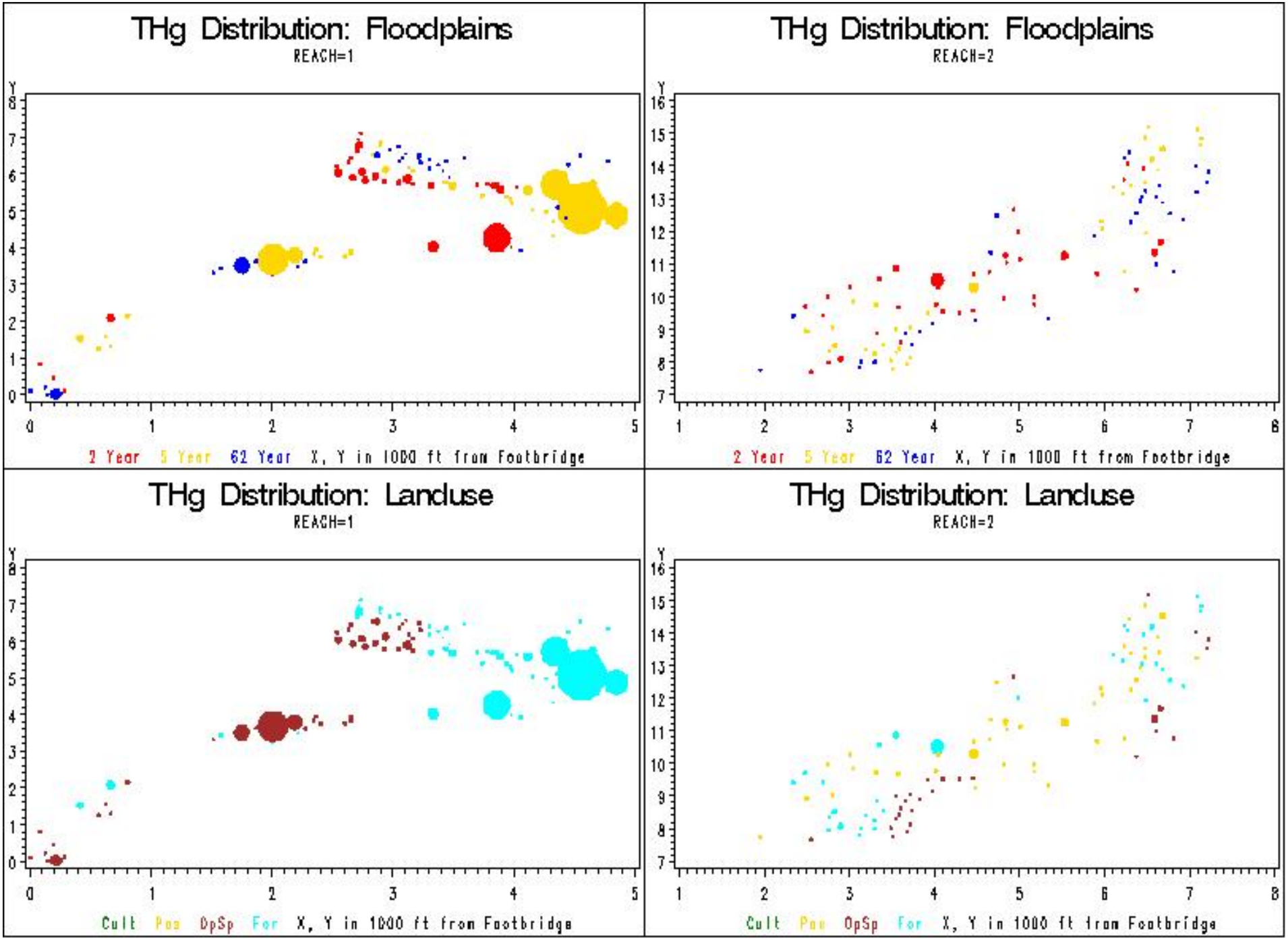
3 Holsinger Farms FB to New Hope-Crimora Rd

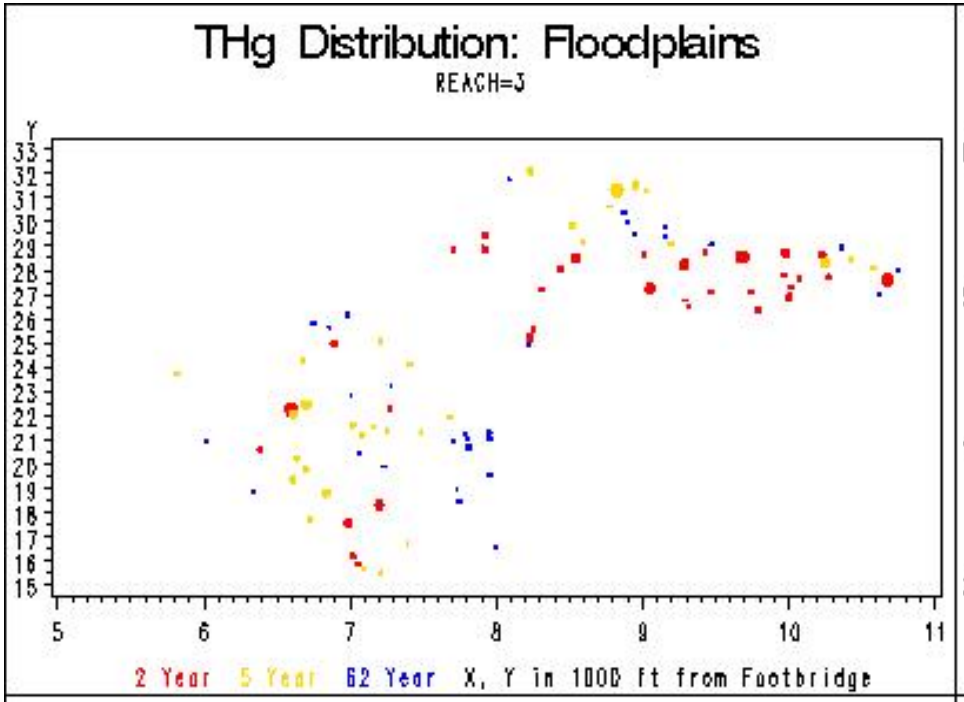
4 New Hope-Crimoa Rd to Patterson Mill

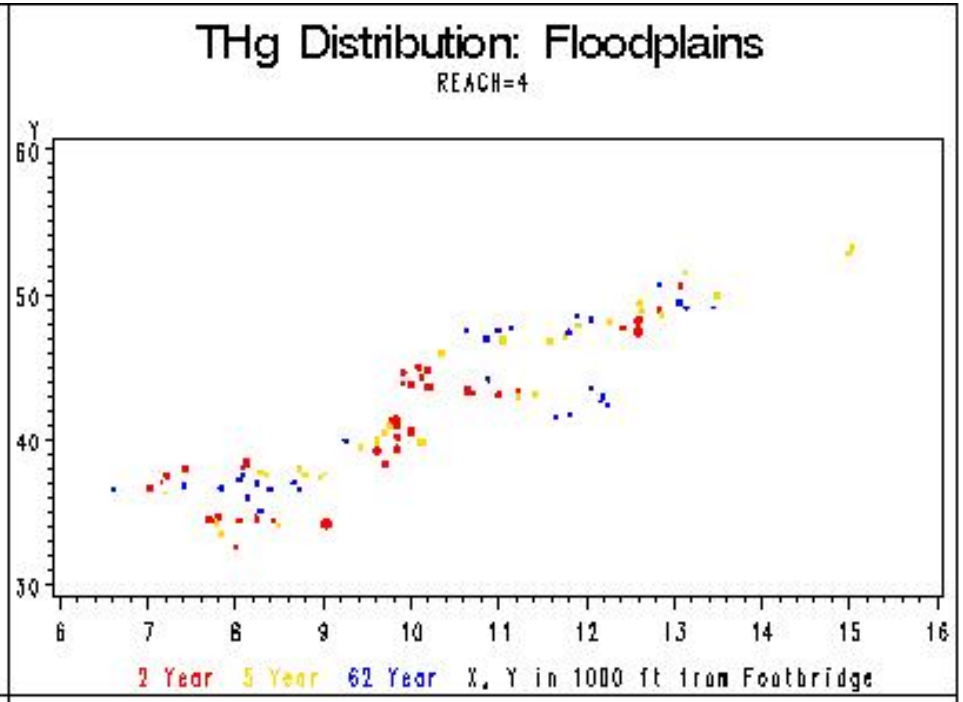
5 Patterson Mill to Grand Cavern

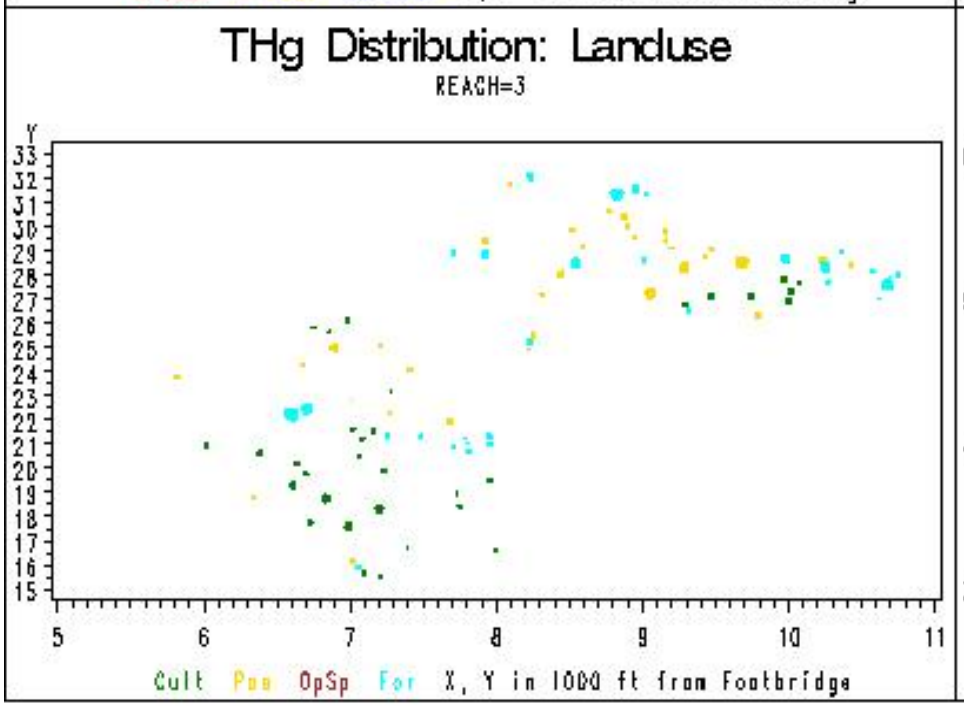
6 Grand Cavern to Port Republic Rd

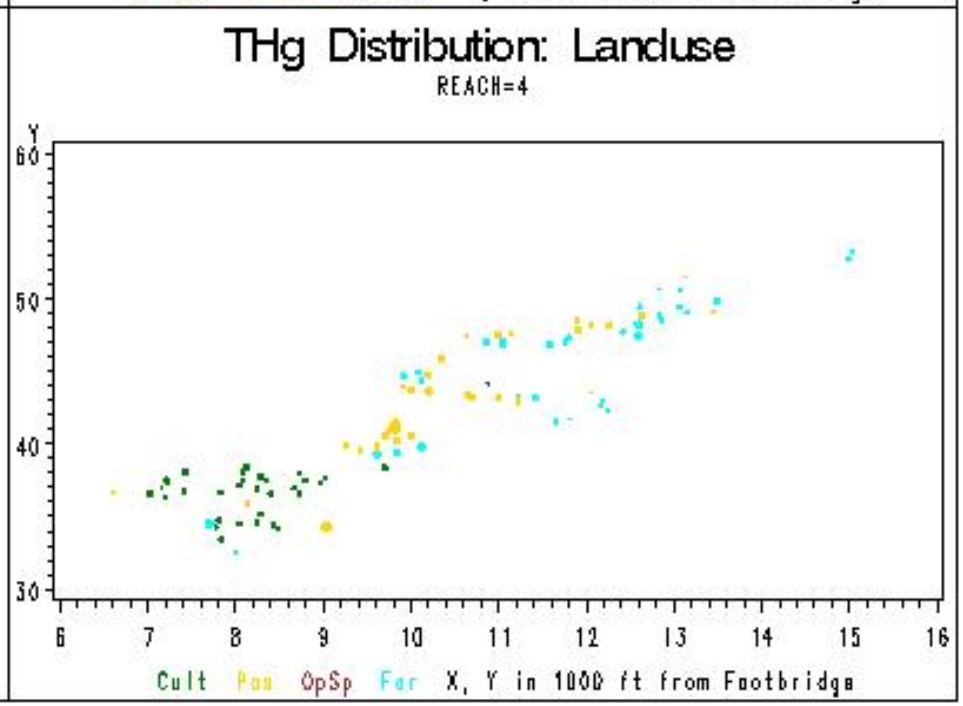

THg Distribution: Landuse
Showing River Reaches
Y
90
80
70
60
50
40
30
20
10
0
Grottoes
Crimora
Dooms
Oxbow
0
10
20
30
Cult
Pas
OpSp
For
X, Y in 1000 ft from Footbridge

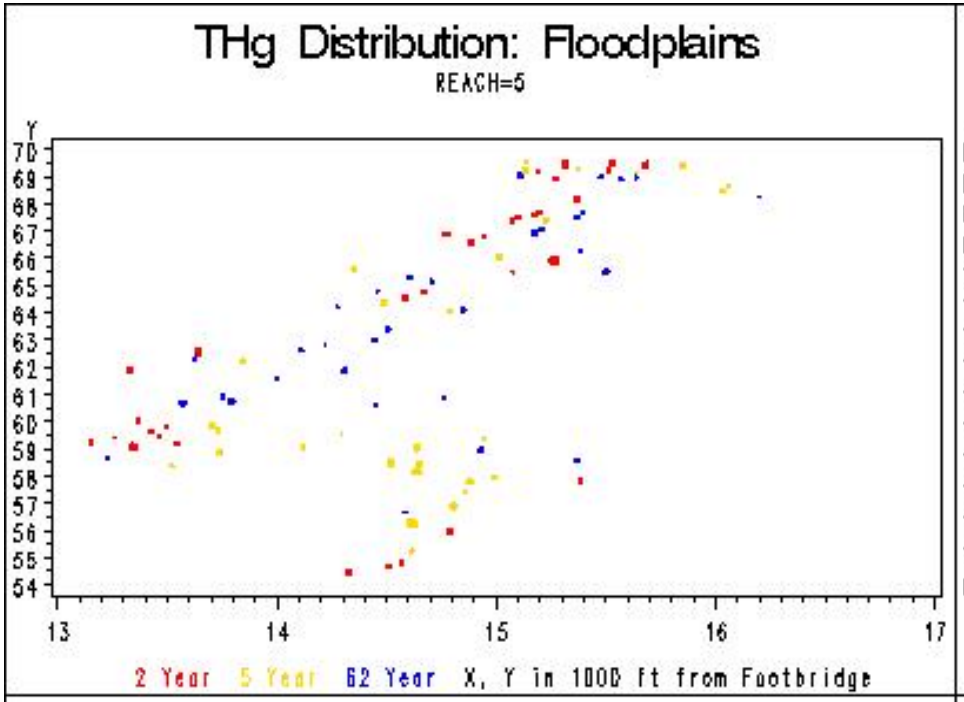

THg Distribution: Floodplains
REACH=1
Y
2 Year 5 Year 62 Year X, Y in 1000 ft from Footbridge
THg Distribution: Floodplains
REACH=2
Y
2 Year 5 Year 62 Year X, Y in 1000 ft from Footbridge
THg Distribution: Landuse
REACH=1
Y
Cult Pas DpSp For X, Y in 1000 ft from Footbridge
THg Distribution: Landuse
REACH=2
Y
Cult Pas DpSp For X, Y in 1000 ft from Footbridge

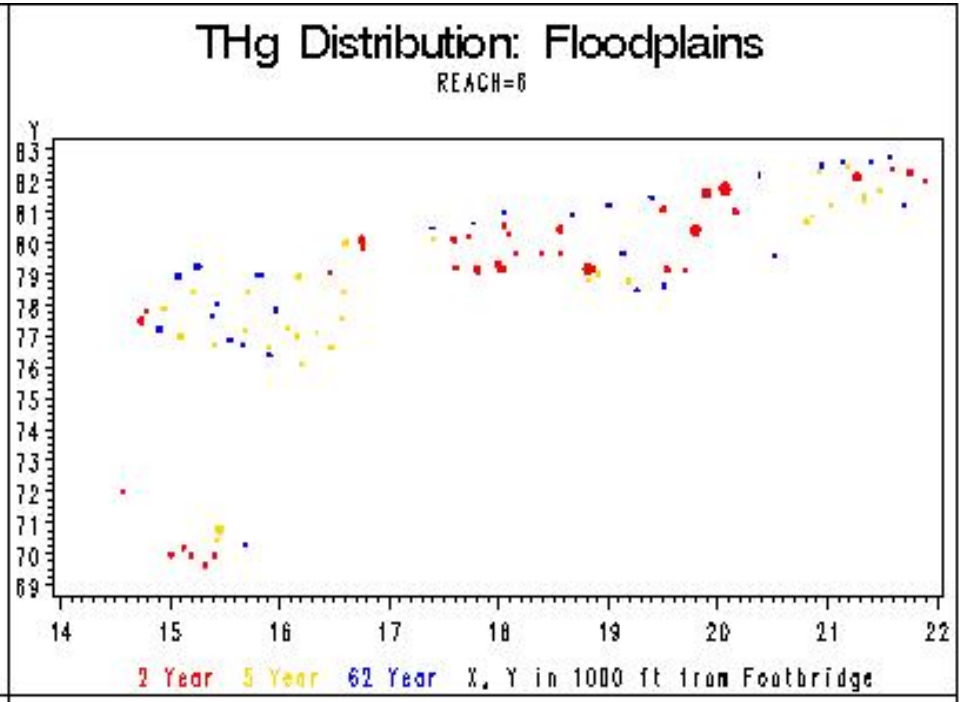

THg Distribution: Floodplains
REACH=3
Y
33
32
31
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
5
6
7
8
9
10
11
2 Year
5 Year
62 Year
X, Y in 1000 ft from Footbridge

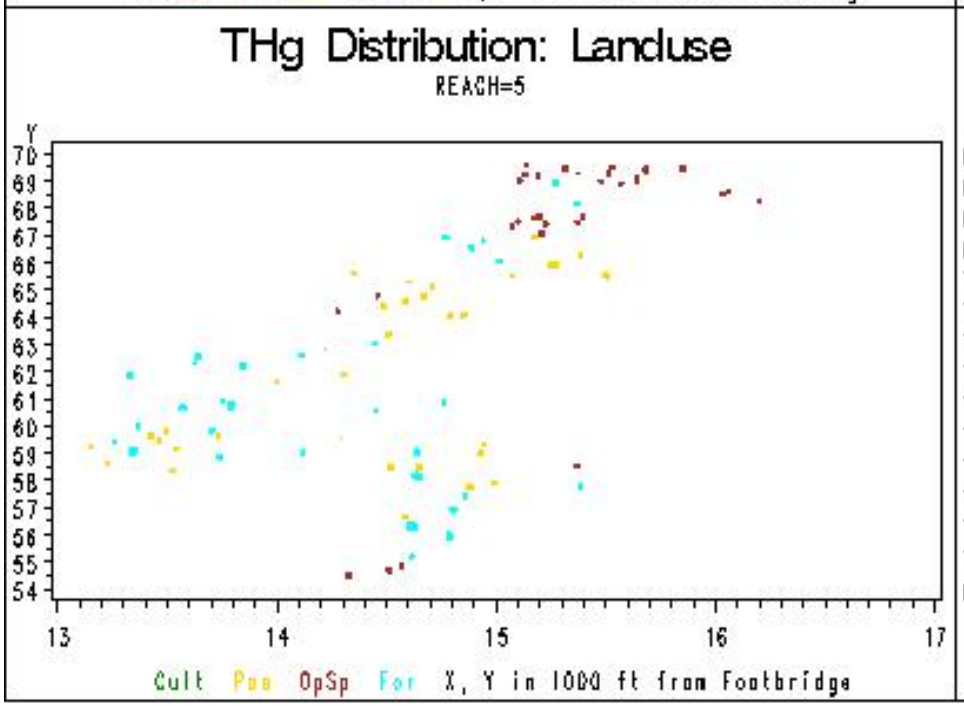

THg Distribution: Floodplains
REACH=4
Y
60
50
40
30
6
7
8
9
10
11
12
13
14
15
16
2 Year
5 Year
62 Year
X, Y in 1000 ft from Footbridge

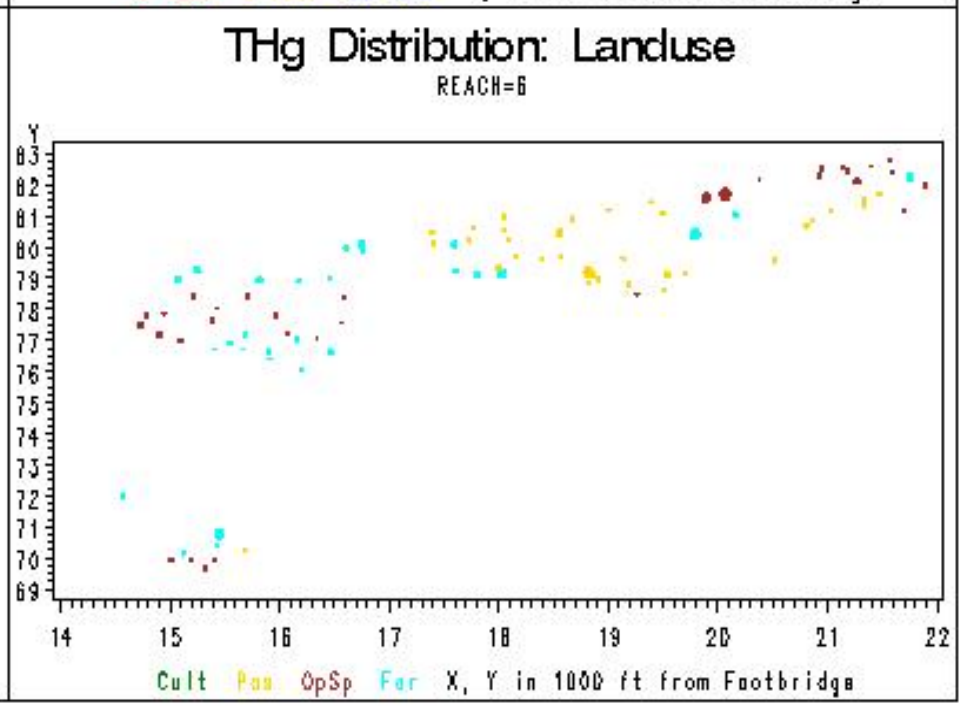

THg Distribution: Landuse
REACH=3
Y
33
32
31
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
5
6
7
8
9
10
11
Cult
Pas
OpSp
For
X, Y in 1000 ft from Footbridge


THg Distribution: Landuse
REACH=4
Y
60
50
40
30
6
7
8
9
10
11
12
13
14
15
16
Cult
Pas
OpSp
For
X, Y in 1000 ft from Footbridge


THg Distribution: Floodplains
REACH=5
Y
70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54
13 14 15 16 17
2 Year 5 Year 62 Year X, Y in 1000 ft from Footbridge


THg Distribution: Floodplains
REACH=6
Y
83 82 81 80 79 78 77 76 75 74 73 72 71 70 69
14 15 16 17 18 19 20 21 22
2 Year 5 Year 62 Year X, Y in 1000 ft from Footbridge


THg Distribution: Landuse
REACH=5
Y
70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54
13 14 15 16 17
Cult Pas OpSp For X, Y in 1000 ft from Footbridge


THg Distribution: Landuse
REACH=6
Y
83 82 81 80 79 78 77 76 75 74 73 72 71 70 69
14 15 16 17 18 19 20 21 22
Cult Pas OpSp For X, Y in 1000 ft from Footbridge

General Observations

- **Soil type (clay, sand, & silt %) and LOI correlated**
  - **Inclusion of both causes difficulties**
- **RRM adds nothing beyond river reach**
- **Wetlands analyzed separately**
  - **There were few wetlands in some reaches and floodplains**
  - **Inclusion in general analysis would cause more confusion than help**

Largest THg Values in Reach 1 Surface Samples

FP	use		Hg	X	Y	El	DIST	RRM	CLAY%	SILT%
5	Y	FOR	307.0	4565	5058	4.00	552	1.14	13.0	30.0
5	Y	OpSp	185.0	2010	3668	6.56	298	0.76	12.0	30.0
5	Y	FOR	173.0	4342	5712	4.00	705	1.25	13.0	21.0
2	Y	FOR	167.0	3860	4257	2.15	78	0.96	19.0	31.0
5	Y	FOR	143.0	4847	4878	5.05	746	1.12	21.0	41.0
5	Y	OpSp	88.0	2189	3791	8.00	391	0.79	13.5	30.5
62	Y	OpSp	85.7	1753	3502	8.00	198	0.72	21.0	32.0
5	Y	FOR	62.0	4634	5608	5.36	867	1.25	12.0	30.0
2	Y	FOR	52.4	3333	4027	4.00	72	0.89	17.0	28.0
62	Y	OpSp	47.5	211	11	10.64	188	0.00	15.0	18.0

X and Y are NAD 83 State Plane coordinates, adjusted to 0 at footbridge.
Dist is distance in feet from center of river. Ele is elevation above river (ft)
For=Forest, OpSp=Open Space, FLDPLN=Floodplain, CCP=Cultivated Crops,PAS=Pasture/Hay, Wet=Wetlands, Dev=Developed, High Intensity

Largest THg Values in Reach 2 Surface Samples

FP		USE	Hg	X	Y	Ele	Dist	RRM	Clay%	Silt%
2	Y	FOR	71	4031	10508	0.0	54	2.12	16	46
2	Y	WET	67	6038	12341	0.4	429	2.55	13	36
5	Y	PAS	39	4460	10284	4.0	117	2.10	9	28
2	Y	PAS	34	5524	11248	6.0	391	2.33	17	40
2	Y	FOR	31	3551	10865	2.6	118	2.16	12	46
2	Y	WET	29	5206	11551	4.0	202	2.36	9	26
2	Y	OpSp	24	6590	11364	2.8	163	2.40	12	46
5	Y	FOR	22	6557	14207	7.6	157	2.92	10	26
2	Y	PAS	19	4834	11278	6.0	591	2.30	9	30
2	Y	FOR	17	2896	8089	4.0	271	1.61	15	35

X and Y are NAD 83 State Plane coordinates, adjusted to 0 at footbridge. Dist is distance in feet from center of river. Ele is elevation above river (ft)
For=Forest, OpSp=Open Space, FLDPLN=Floodplain, CCP=Cultivated Crops,PAS=Pasture/Hay, Wet=Wetlands, Dev=Developed, High Intensity

Reach 1 THg Surface Samples

R	FP		use	n	MnHg	SE	max	MdHg
1	5	Y	FOR	24	40.95	14.58	307.000	15.66
1	2	Y	FOR	15	25.56	10.87	167.000	14.30
1	2	Y	OpSp	15	14.90	3.13	39.100	10.00
1	5	Y	OpSp	15	24.49	12.82	185.000	5.31
1	2	Y	WET	7	4.19	1.86	14.600	2.77
1	62	Y	OpSp	16	11.67	5.77	85.700	2.37
1	5	Y	WET	3	4.27	2.91	10.100	1.44
1	62	Y	FOR	17	1.73	0.47	5.680	0.79
1	2	Y		37	17.20	4.69	167.00	8.11
1	5	Y		42	32.45	9.55	307.00	6.17
1	62	Y		33	6.55	2.89	85.70	1.33
1			OpSp	46	16.90	4.71	185.000	5.25
1			FOR	56	24.93	7.15	307.000	3.91
1			WET	10	4.22	1.48	14.600	2.10

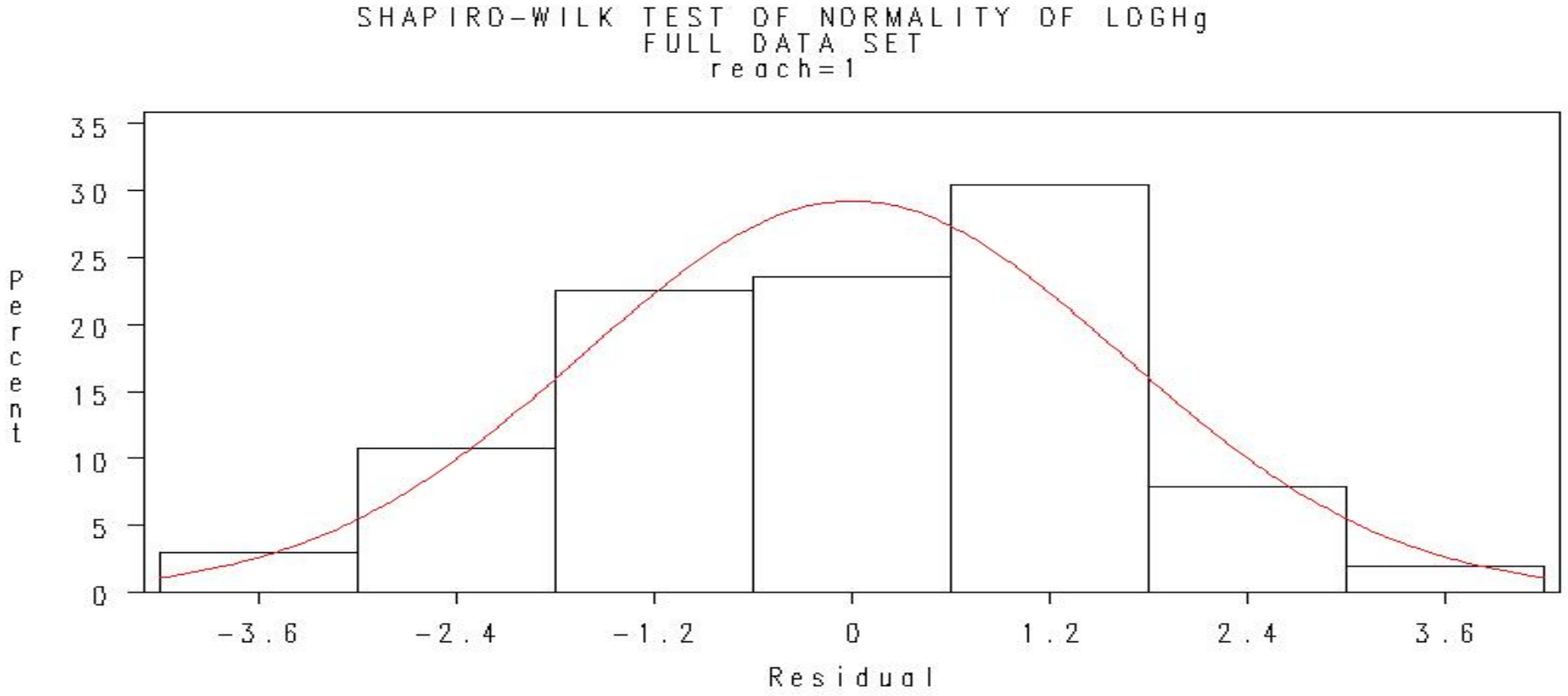
Large differences between mean & median suggest need for transform.
Estimates & confidence bounds best based on transformed data.
NOTE: Arithmetic means shown. LSMEANS used in analysis.

Outliers, Normality, Variance Homogeneity

- 8 observations identified as outliers
  - All but 1 were extremely low values
- Data were normally distributed after log-transform
  - Except Reach 3, 5 had mild non-normality (p=0.046+)
  - 5/8 outliers from reach 5, slight skew high
- Data had homogeneous variances
- Above from separate analyses by Reach

Reach 1 Normality Check

2008 FLOODPLAIN SOIL SAMPLES BY REACH



Shapiro-Wilk Test W=0.990801 Pr < W = 0.717

Levene Test L=1.02191 Pr>L = 0.09765

ANOVA for Surface Log(THg)

Reach	Effect	FValue	ProbF	SIGNI
1	FP	1.39	0.2545	
1	use	4.06	0.0468	**
1	FP*use	1.17	0.3161	
1	DISTANCE	2.13	0.1480	
1	Elevation	9.50	0.0027	***
1	CLAY_PER	0.72	0.3974	
1	SILT_PER	5.69	0.0192	**
2	FP	10.69	<.0001	***
2	use	3.07	0.0518	*
2	FP*use	1.11	0.3568	
2	DISTANCE	3.80	0.0545	*
2	Elevation	7.63	0.0070	***
2	CLAY_PER	2.96	0.0892	*
2	SILT_PER	17.85	<.0001	***

These general ANOVA results will be explained in detail.
Elevation much more significant in reach 1 than in other reaches.

ANOVA for Surface Log(THg)

Reach	Effect	FValue	ProbF	SIGNI
3	FP	40.45	<.0001	***
3	use	1.11	0.3348	
3	FP*use	4.22	0.0038	***
3	DISTANCE	7.43	0.0079	***
3	Elevation	0.35	0.5570	
3	CLAY_PER	0.83	0.3664	
3	SILT_PER	5.73	0.0191	**
4	FP	8.45	0.0005	***
4	use	1.53	0.2219	
4	FP*use	1.56	0.1936	
4	DISTANCE	2.60	0.1110	
4	Elevation	0.60	0.4403	
4	CLAY_PER	1.11	0.2952	
4	SILT_PER	1.28	0.2608	

ANOVA for Surface Log(THg)

Reach	Effect	FValue	ProbF	SIGNI
5	FP	5.19	0.0077	***
5	use	2.10	0.1289	
5	FP*use	1.53	0.2019	
5	DISTANCE	1.05	0.3090	
5	Elevation	4.25	0.0427	**
5	CLAY_PER	2.17	0.1446	
5	SILT_PER	3.99	0.0494	**
6	FP	26.12	<.0001	***
6	use	4.31	0.0169	**
6	FP*use	1.59	0.1869	
6	DISTANCE	9.81	0.0025	***
6	Elevation	1.18	0.2813	
6	CLAY_PER	0.97	0.3279	
6	SILT_PER	11.34	0.0012	***

Median Estimated THg in Reach 1

Reach	Effect	FP	use	Est	LCB	UCB
1	FP*use	2 Y	FOR	2.3	0.71	7.47
1	FP*use	2 Y	OpSp	4.9	1.53	15.68
1	FP*use	5 Y	FOR	6.2	3.00	12.79
1	FP*use	5 Y	OpSp	6.8	2.73	17.33
1	FP*use	62 Y	FOR	1.7	0.53	5.72
1	FP*use	62 Y	OpSp	7.5	2.69	21.07
1	FP	2 Y		3.3	1.26	8.91
1	FP	5 Y		6.5	3.68	11.59
1	FP	62 Y		3.6	1.46	8.96
1	use		FOR	2.9	1.80	4.74
1	use		OpSp	6.3	3.73	10.73

Median Estimated THg in Reach 2

Reach	Effect	FP		USE	Est	LCB	UCB
2	FP*use	2	Y	FOR	3.8	1.59	9.29
2	FP*use	2	Y	OpSp	1.5	0.61	3.79
2	FP*use	2	Y	PAS	4.7	2.03	11.14
2	FP*use	5	Y	FOR	0.6	0.32	1.46
2	FP*use	5	Y	OpSp	1.0	0.44	2.65
2	FP*use	5	Y	PAS	2.5	1.22	5.18
2	FP*use	62	Y	FOR	0.2	0.12	0.65
2	FP*use	62	Y	OpSp	0.4	0.16	1.08
2	FP*use	62	Y	PAS	0.5	0.23	1.19
2	FP	2	Y		3.0	1.75	5.24
2	FP	5	Y		1.2	0.80	1.91
2	FP	62	Y		0.4	0.23	0.68
2	use			FOR	0.9	0.57	1.46
2	use			OpSp	0.8	0.52	1.50
2	use			PAS	1.8	1.18	2.89

Simple Comparisons

Reach	FP	USE	_FP	_USE	RATIO	LCBR	UCBR	SIG
1	2Y		5 Y		0.51	0.16	1.65	
1	2Y		62 Y		0.92	0.17	4.92	
1	5Y		62 Y		1.80	0.62	5.19	
1		FOR		OpSp	0.46	0.21	0.97	**
2	2Y		5 Y		2.44	1.20	4.96	**
2	2Y		62 Y		7.55	3.18	17.90	***
2	5Y		62 Y		3.08	1.55	6.13	***
2		FOR		OpSp	1.03	0.48	2.17	
2		FOR		PAS	0.49	0.25	0.94	**
2		OpSp		PAS	0.47	0.23	0.97	**

Ratio is first value divided by second in original units.
So, in Reach 2, the 2 and 5 year FP median THg levels are 2.4 and 3 times that of the 62 year FP. By referring to the medians, this is seen to reflect more the low value (0.4) in the 62 year FP rather than high values in the 2- and 5-yr FPs.

Additional Comparisons R1

Label	RATIO	LCB	UCBR	SIGNIF
R1, FOR, FP 5Y/2Y	2.68	0.73	9.85	
R1, FOR, FP 5Y/2Y	2.68	0.73	9.85	
R1, FOR, FP 62Y/2Y	0.75	0.10	5.56	
R1, FOR, FP 62Y/5Y	0.28	0.06	1.21	*
R1, OPS, FP 5Y/2Y	1.40	0.28	6.86	
R1, OPS, FP 62Y/2Y	1.53	0.26	9.08	
R1, OPS, FP 62Y/5Y	1.09	0.30	3.90	
R1, 2YR, OPS/FOR	2.12	0.58	7.69	
R1, 5YR, OPS/FOR	1.10	0.33	3.68	
R1, 62YR, OPS/FOR	4.32	1.19	15.72	**

Ratio is first median value divided by second backtransformed original units (Difference of logarithms in analysis backtransforms to ratio in original units). E.g., in the forested area (FOR), the median THg value in the 5 yr floodplain (FP) is 2.68 times that in the 2 yr FP, whereas the median THg value in the 62 yr FP is only 75% that in the 2 yr FP.

Discussion of R1 Comparisons

In 5 year floodplain (FP).

- **Little difference between forest (FOR) and open space areas (OpSp), but OpSp higher**

In 2 and 62 year FPs

- **THg levels much higher in OpSp than in FOR**
- **Significant only in 62 Yr FP**

Within each landuse

- **THg levels are higher in the 5 yr FP than in the 2 yr or 62 yr**
  - **Large 5 yr OpSp value falls in Oxbow area where river has changed course**

Additional Comparisons R2

Label	RATIO	LCBR	UCBR	SIGNIF
R2, FOR, FP 5Y/2Y	0.17	0.05	0.55	***
R2, FOR, FP 5Y/2Y	0.17	0.05	0.55	***
R2, FOR, FP 62Y/2Y	0.07	0.02	0.26	***
R2, FOR, FP 62Y/5Y	0.41	0.13	1.25	
R2, OPS, FP 5Y/2Y	0.71	0.19	2.58	
R2, OPS, FP 62Y/2Y	0.27	0.06	1.08	*
R2, OPS, FP 62Y/5Y	0.38	0.11	1.32	
R2, PAS, FP 5Y/2Y	0.52	0.17	1.55	
R2, PAS, FP 62Y/2Y	0.11	0.03	0.38	***
R2, PAS, FP 62Y/5Y	0.21	0.06	0.64	***
R2, 2YR, OPS/FOR	0.39	0.11	1.38	
R2, 2YR, PAS/FOR	1.23	0.39	3.84	
R2, 2YR, PAS/OPS	3.12	0.93	10.43	*
R2, 5YR, OPS/FOR	1.57	0.47	5.21	
R2, 5YR, PAS/FOR	3.63	1.29	10.18	**
R2, 5YR, PAS/OPS	2.30	0.70	7.58	
R2, 62YR, OPS/FOR	1.45	0.43	4.85	
R2, 62YR, PAS/FOR	1.84	0.60	5.63	
R2, 62YR, PAS/OPS	1.26	0.38	4.17	

Discussion of R2 Comparisons

In all landuses,

THg level is higher in the 2 yr FP than in the 5 yr
THg level is higher in the 5 yr FP than in the 62 yr

In all FPs,

THg levels in PAS exceed those in FOR and OpSp

In 2 yr FP,

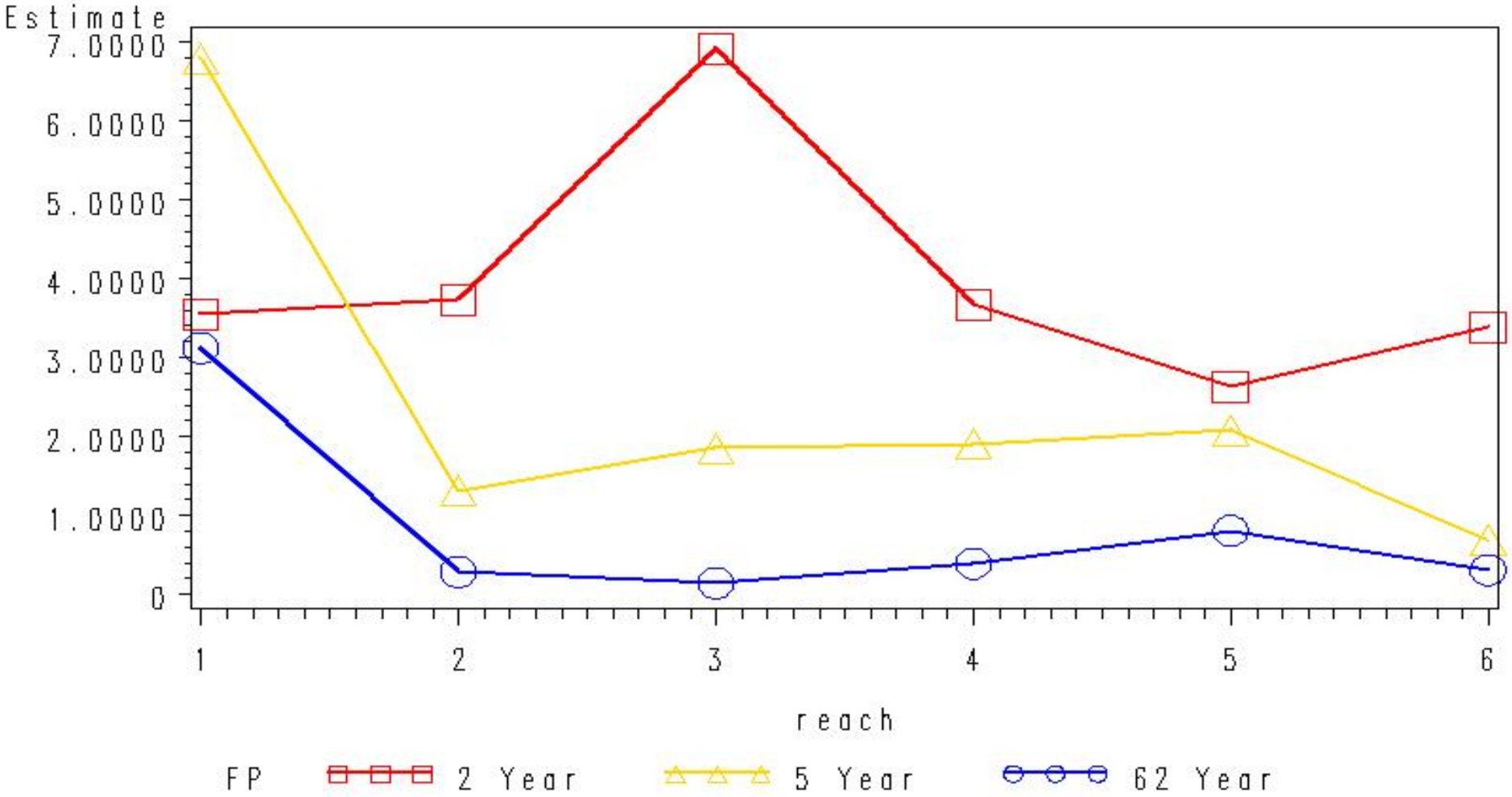
THg levels in FOR exceed those in OpSp

In 62 yr FP,

THg levels in OpSp exceed those in FOR

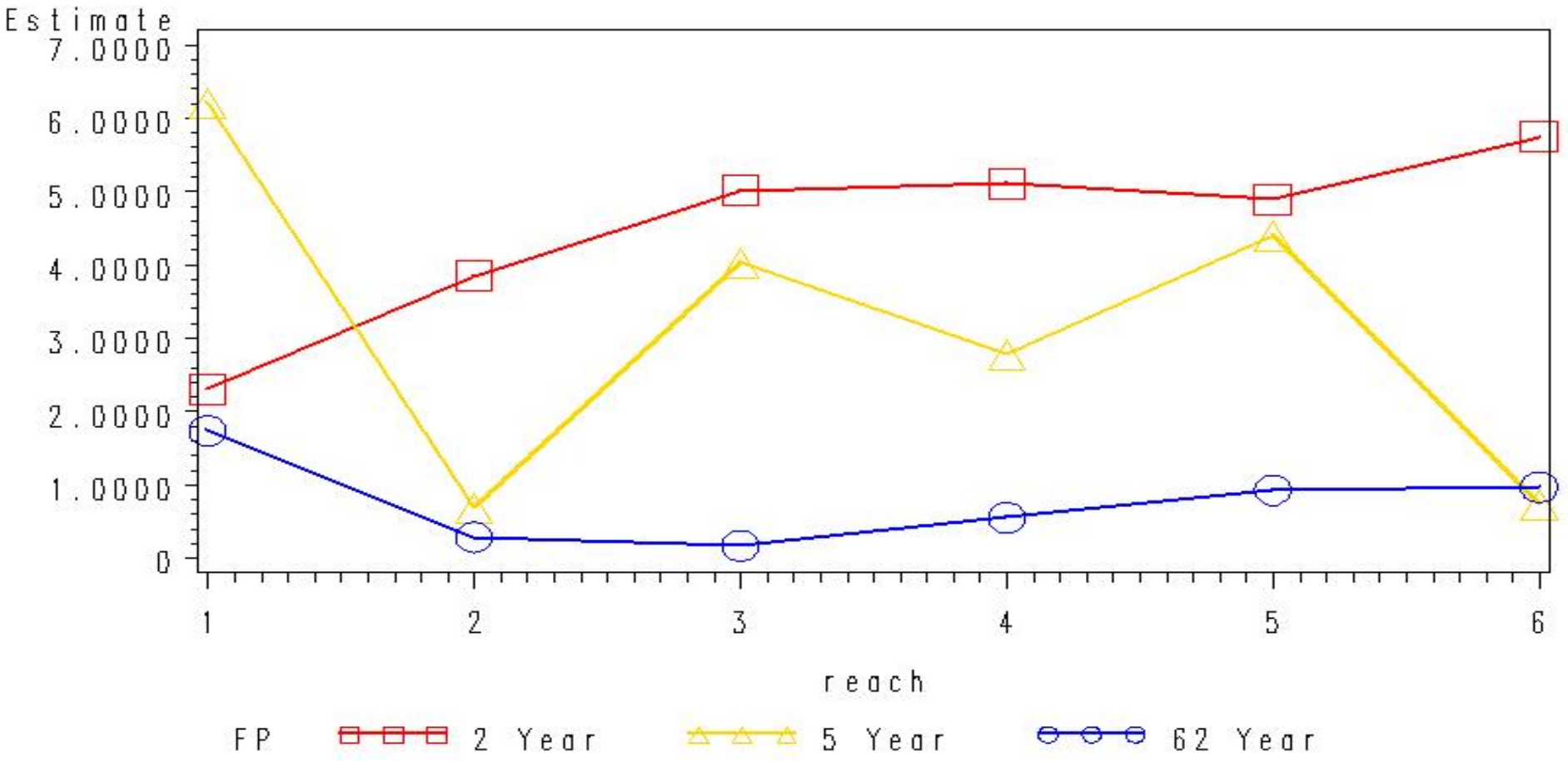
Most of the landuse comparisons within FP are not significant
Most of the FP comparisons within landuse are significant

THg in Surface Samples by FP



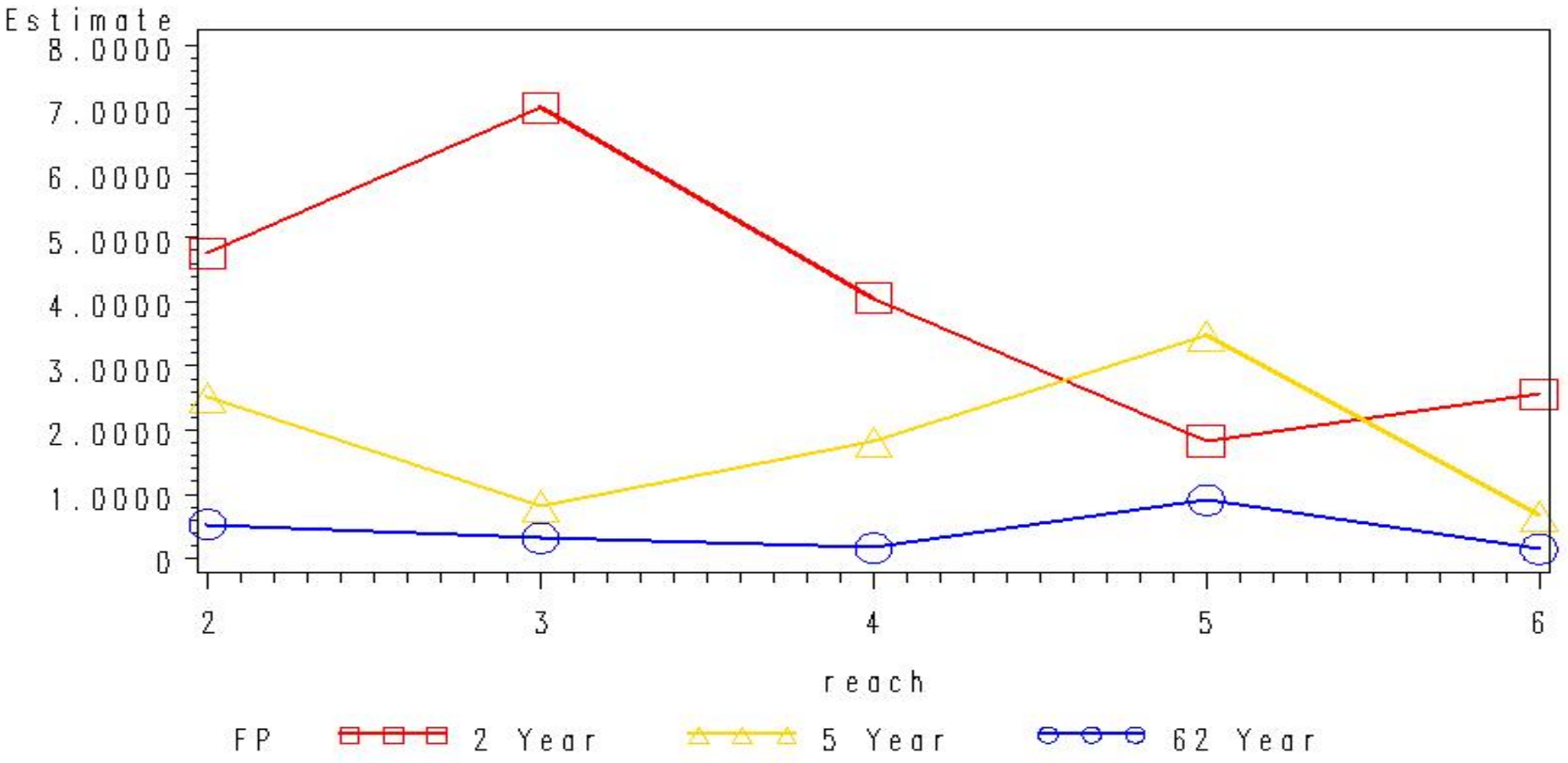
Spike in reach 3, 2-Yr FP corresponds to Dooms-Crimora spike observed in other types of samples. Small rise in reach 6, 2-Yr FP corresponds to high THg levels in Grottoes area in other types of samples

THg in Composite Samples by FP and Use



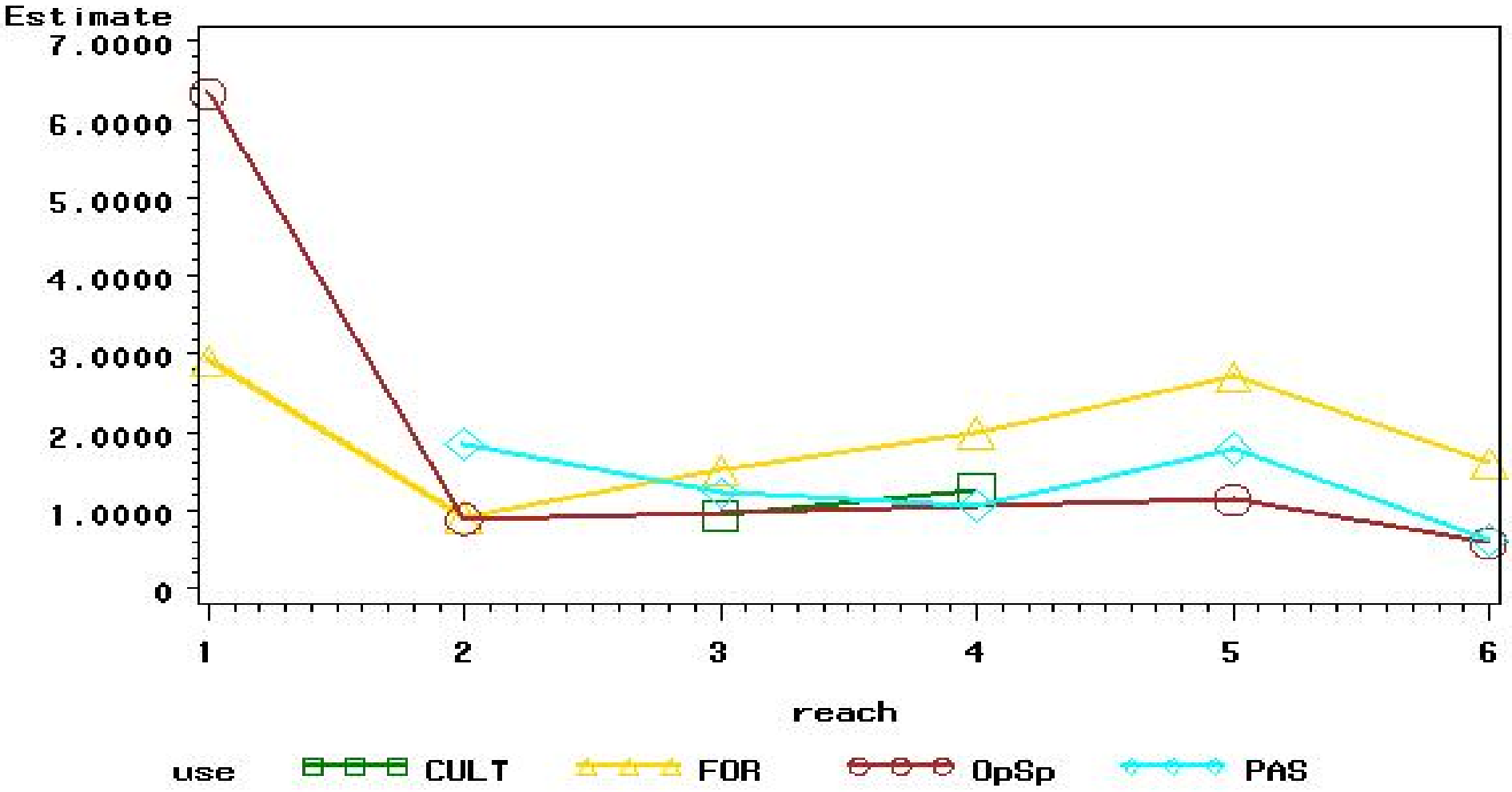
Elevated THg levels in 2-yr FP seen mostly in forested areas and pasture (next plot). THg in FOR rises through the Dooms-Crimora area, then levels off, rising again near Grottoes (R 6). Trends in 5- & 62 Yr FPs less clear

THg in Composite Samples by FP and Use



Spike in THg in pasture/hay area of 2-Yr FP in reach 3 corresponds to Dooms-Crimora spike previously observed in tissues, water, sediment

THg in Composite Samples by Use



Sharp drop in THg from reach 1 to 2. Rise of THg in forested area apparent even averaged across all floodplains

Across Reaches 5Yr FP

Label	RATIO	LCBR	UCBR	SIGNIF
5YR, CCP, REACH4/3	0.13	0.00	19.0	
5YR, FOR, REACH2/1	0.01	0.00	0.4	**
5YR, FOR, REACH3/1	0.11	0.00	4.4	
5YR, FOR, REACH4/1	0.05	0.00	2.0	
5YR, FOR, REACH5/1	0.09	0.00	1.7	
5YR, FOR, REACH6/1	0.01	0.00	0.3	***
5YR, FOR, REACH3/2	9.28	0.22	375.8	
5YR, FOR, REACH4/2	4.58	0.12	165.7	
5YR, FOR, REACH5/2	8.28	0.47	144.1	
5YR, FOR, REACH6/2	1.17	0.04	28.2	
5YR, FOR, REACH4/3	0.49	0.01	21.4	
5YR, FOR, REACH5/3	0.89	0.04	17.6	
5YR, FOR, REACH6/3	0.12	0.00	3.5	
5YR, FOR, REACH5/4	1.80	0.10	32.6	
5YR, FOR, REACH6/4	0.25	0.01	6.3	
5YR, FOR, REACH6/5	0.14	0.01	1.2	*

2 Yr and 62 Yr results similar in direction, but few significant

Across Reaches 5Yr FP

Label	RATIO	LCBRAT	UCBRAT	SIGNIF
5YR, OPS, REACH2/1	0.01	0.00	1.05	*
5YR, OPS, REACH5/1	0.00	0.00	0.24	***
5YR, OPS, REACH6/1	0.00	0.00	0.17	***
5YR, OPS, REACH5/2	0.67	0.01	26.92	
5YR, OPS, REACH6/2	0.45	0.01	18.94	
5YR, OPS, REACH6/5	0.67	0.06	6.53	
5YR, PAS, REACH3/2	0.45	0.00	22.97	
5YR, PAS, REACH4/2	0.52	0.01	17.89	
5YR, PAS, REACH5/2	1.17	0.06	19.86	
5YR, PAS, REACH6/2	0.14	0.00	3.77	
5YR, PAS, REACH4/3	1.15	0.01	69.74	
5YR, PAS, REACH5/3	2.58	0.07	88.73	
5YR, PAS, REACH6/3	0.31	0.00	15.54	
5YR, PAS, REACH5/4	2.24	0.10	47.52	
5YR, PAS, REACH6/4	0.27	0.00	8.99	
5YR, PAS, REACH6/5	0.12	0.00	1.76	

2 Yr and 62 Yr results similar in direction, but few significant

Discussion of Comparisons across Reaches

Label	RATIO	
62Y, CCP, REACH4/3	69.84 **	[very small R3 value]
62Y, FOR, REACH5/2	22.74 **	[small R2 value]
62Y, FOR, REACH6/2	11.10 **	[small R2 value]
62Y, FOR, REACH5/3	22.02 **	[very small R3 value]
62Y, FOR, REACH6/3	10.75 *	[very small R3 value]
62Y, OPS, REACH5/2	17.79 *	
62Y, PAS, REACH5/2	25.97 **	
62Y, PAS, REACH5/3	36.36 **	[small R3 value]

General tendency for THg levels to decrease down river.
Exceptions are *significant* increasing ratios listed above.
Only one of these ratios corresponds to a moderately high THg value in the more distant reach.
The other significant ratios correspond to low or very low THg values in the less distant reach.

Across Reaches 62Yr FP

Label	RATIO	LCBRAT	UCBRAT	SIGNIF
62Y, CCP, REACH4/3	12.03	2.91	49.74	***
62Y, FOR, REACH2/1	0.17	0.05	0.59	***
62Y, FOR, REACH3/1	0.09	0.02	0.32	***
62Y, FOR, REACH4/1	0.34	0.09	1.22	
62Y, FOR, REACH5/1	0.48	0.13	1.74	
62Y, FOR, REACH6/1	0.56	0.12	2.47	
62Y, FOR, REACH3/2	0.52	0.13	2.03	
62Y, FOR, REACH4/2	1.93	0.49	7.51	
62Y, FOR, REACH5/2	2.68	0.67	10.74	
62Y, FOR, REACH6/2	3.13	0.66	14.87	
62Y, FOR, REACH4/3	3.71	0.89	15.35	*
62Y, FOR, REACH5/3	5.16	1.23	21.59	**
62Y, FOR, REACH6/3	6.01	1.22	29.62	**
62Y, FOR, REACH5/4	1.38	0.34	5.52	
62Y, FOR, REACH6/4	1.61	0.34	7.67	
62Y, FOR, REACH6/5	1.16	0.24	5.56	

Across Reaches 62Yr FP

Label	RATIO	LCBRAT	UCBRAT	SIGNIF
62Y, OPS, REACH2/1	0.12	0.03	0.45	***
62Y, OPS, REACH5/1	0.14	0.04	0.48	***
62Y, OPS, REACH6/1	0.06	0.01	0.20	***
62Y, OPS, REACH5/2	1.18	0.28	4.92	
62Y, OPS, REACH6/2	0.47	0.11	1.95	
62Y, OPS, REACH6/5	0.40	0.10	1.48	
62Y, PAS, REACH3/2	0.51	0.14	1.77	
62Y, PAS, REACH4/2	0.23	0.06	0.85	**
62Y, PAS, REACH5/2	1.10	0.32	3.74	
62Y, PAS, REACH6/2	0.29	0.08	1.02	*
62Y, PAS, REACH4/3	0.46	0.11	1.82	
62Y, PAS, REACH5/3	2.16	0.59	7.91	
62Y, PAS, REACH6/3	0.57	0.14	2.17	
62Y, PAS, REACH5/4	4.69	1.26	17.41	**
62Y, PAS, REACH6/4	1.24	0.31	4.84	
62Y, PAS, REACH6/5	0.26	0.07	0.97	**

Conclusions for THg

- **Distance from river: Significant in reaches 3 and 6, marginally significant (p=0.09) in reach 4. Coefficient is negative in 5 of six reaches, reach 1 being the exception.**
  - **Thus, THg tends to decrease as distance from the river increases.**
  - **This is most evident in 2- and 62-year FP forest**
- **Relative River Mile: Not significant in any reach. (Omitted in final model)**

Conclusions for THg

- **Elevation: Significant in reaches 1, 3, 5, and 6 if LOI is not in model, but only in reaches 1 and 6 if LOI is in the model. Coefficient negative in all reaches. (When RRM not included)**
  - **Thus, THg tends to decrease as elevation above the river increases.**

Conclusions for THg

- **Particle Size: Silt% has a positive coefficient and clay% a negative**
- **Silt% is significant in 5 of 6 reaches, while clay% is significant in 1 of 6 reaches**
  - Thus increasing silt % and, less importantly, decreasing clay% are associated with increased THg

Conclusions for THg

- **LOI: LOI was significant in reach 3, 5, and 6, and with one exception, always has a positive coefficient**
  - **indicating that increased organic material in the soil is associated with higher levels of THg.**
  - **Exception was reach 2, where the coefficient of LOI was near zero.**
  - **LOI and particle size appear to represent the same relationship to THg**
    - LOI & Particle size significantly correlated
    - Only Particle size retained in final model

Conclusions for THg

- **Floodplain: significant in reaches 2, 3, 4, 5, and 6.**
  - **Ignoring landuse, THg levels were higher in the 2-year FP than 5 or 62**
    - **except in reach 1, where the highest THg levels were in the 5-year FP**
    - **Also, in reach 5 in forested area, THg levels were higher in the 5 year FP than in the 2-year**
  - **Lowest THg always observed in 62 year FP**

Conclusions for THg

- **Landuse: Significant factor in reaches 1, 4, and 6.**
  - **Highest THg levels tend to be in forested areas (4/6 reaches), with pasture (reach 2) and open space (reach 1) having highest THg levels in the other reaches**
- **Landuse by FP interaction significant only in reach 3.**
  - **In reach 3, the highest levels of THg were observed in**
    - **the forested areas in the 5-year floodplain,**
    - **but in the pasture areas of the 2- and 62-year floodplains, (albeit at a much reduced level in the 62 year floodplain).**

Observations vs Simulations

- **The planned design called for 10 samples in each of 6 reaches, 3 floodplains, and top 3 landuses**
  - **540 samples in all**
- **Power simulations assumed an average STD=1.2 ppm within each reach and decreasing variability from reach 1 to 6**

Observations vs Simulations

- **Actual samples in each of 6 reaches, 3 floodplains, and top 2-3 landuses**
  - **Limited access in some areas**
  - **Landuse areas very small in some FPs, reaches**
  - **6-23 samples in each (excluding wetlands)**
  - **625 samples actually collected**
    - **60 total wetlands THg samples from 10 areas**
      - **Wetlands areas were small, so fewer samples**
    - **11 samples from separate EPA study**
- **Variability tended to decrease from STD=1.7 in reach 1 to 1.2 in reach 6**
  - **Slightly higher than simulated**
  - **Power to detect differences in THg consistent with simulations**

Observations vs Simulations

- **Use of NAD83 coordinates for samples**
  - **Reduces variability only slightly**
  - **Good for modeling, poor for comparisons**
- **Distance from river, elevation above river, other covariates, good for comparisons *and* for modeling**