Regional Ambient Fish Tissue Monitoring Program

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History of RAFT

- Began in 1977 with trend stations
- Whole fish only
- In mid-1980's RAFT changed to include "edible" portions
- More useful to the states for advisory listing
- Redesigned in 2004 to include all water body types
- Added probabilistic sampling
- Continued trend sites for whole fish
- Continued sampling to support advisories

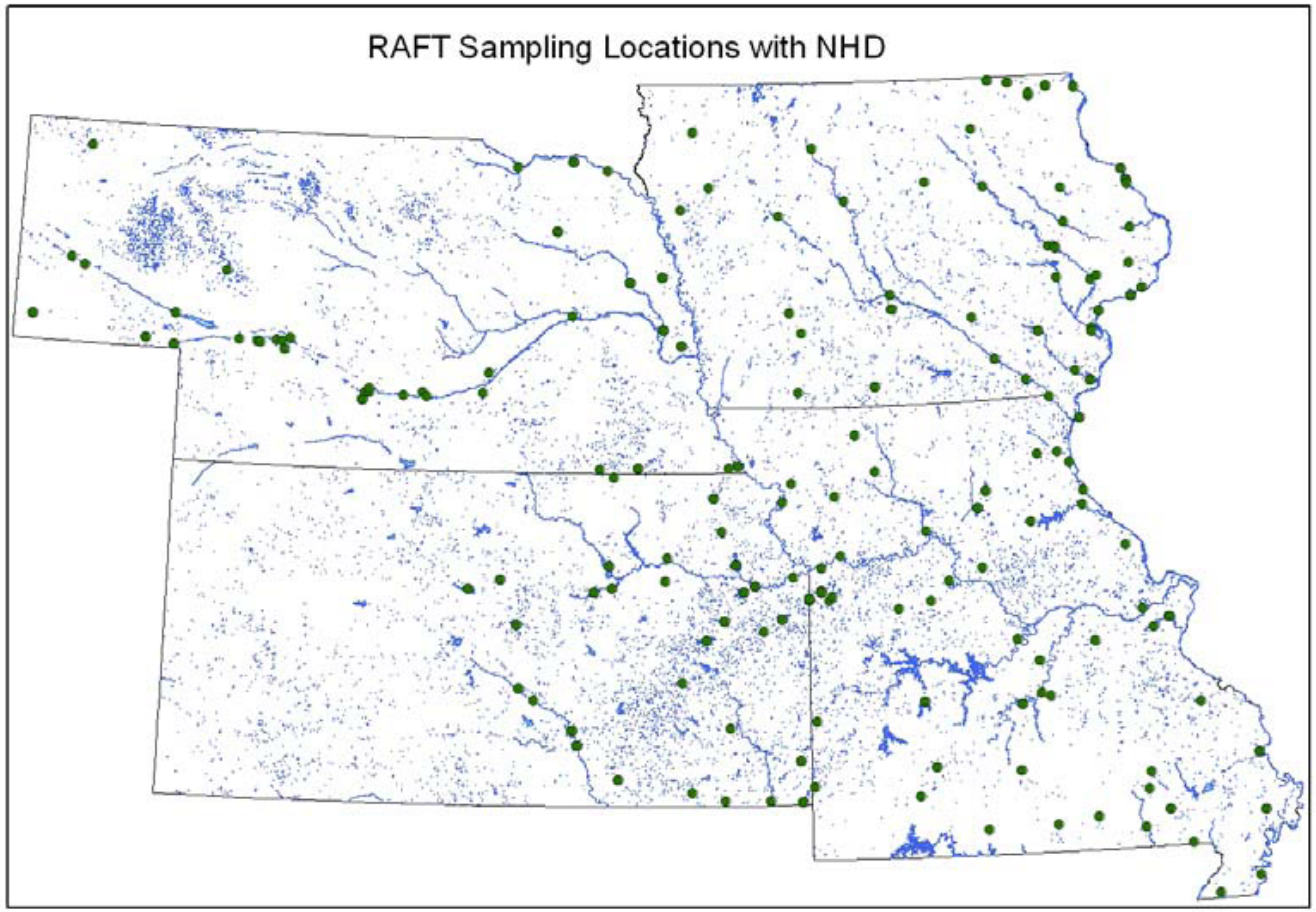
Program Goals

- Measure contaminant levels in the environment (specifically fish tissue)
- Gather data needed to assess the risk to humans
- Identify possible risks to piscivorous wildlife

RAFT Partners

- KDHE
- MDNR
- IDNR
- NDEQ
- Tribes
- Regional Lab

Geographic Area

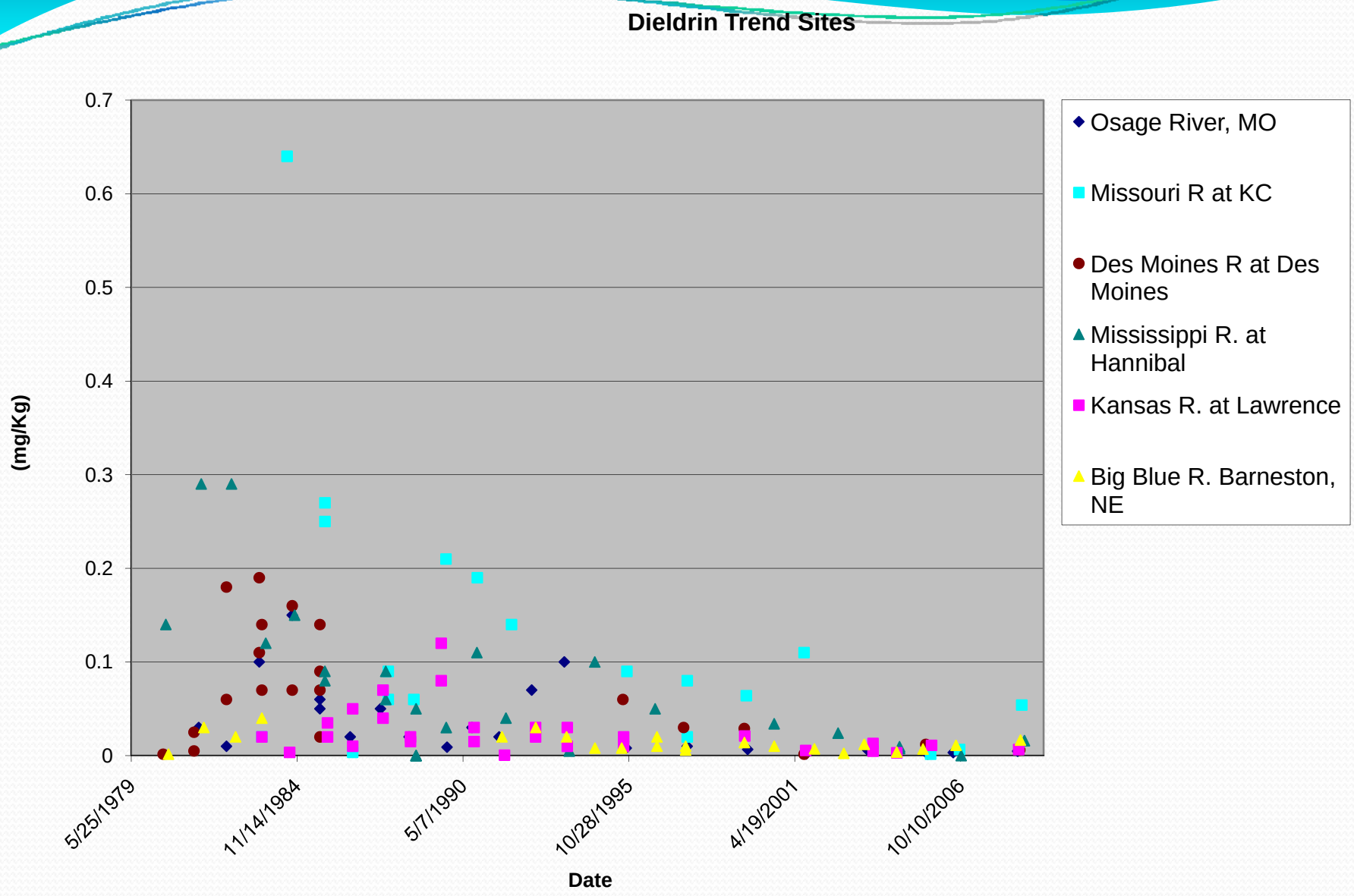


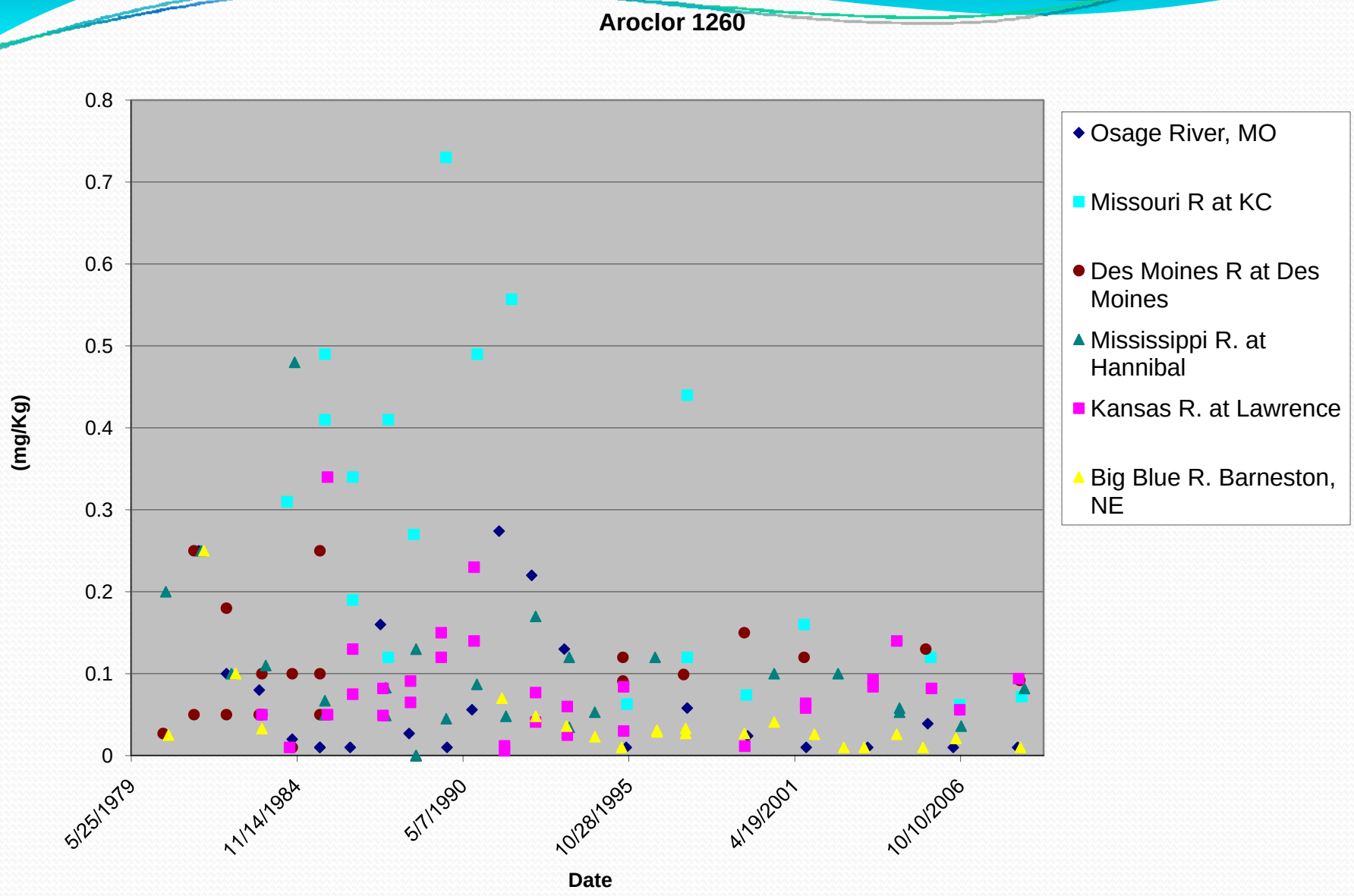
Sample Types

- Trend
- Status
- Follow-up
- Probability Based
- Targeted Water Body Types

Analyses

- Approximately 50 samples/state and recently added Tribal sites
- Whole and Fillet
- Organic – pesticides and PCBs
- Metals – Hg, Se, Pb, Cd
- Now have a database with 3678 results, 56 different species
- Predominant species is carp


Dieldrin Trend Sites
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
(mg/Kg)
5/25/1979
11/14/1984
5/7/1990
10/28/1995
4/19/2001
10/10/2006
Date
Osage River, MO
Missouri R at KC
Des Moines R at Des Moines
Mississippi R. at Hannibal
Kansas R. at Lawrence
Big Blue R. Barneston, NE


Aroclor 1260
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
(mg/Kg)
5/25/1979
11/14/1984
5/7/1990
10/28/1995
4/19/2001
10/10/2006
Date
Osage River, MO
Missouri R at KC
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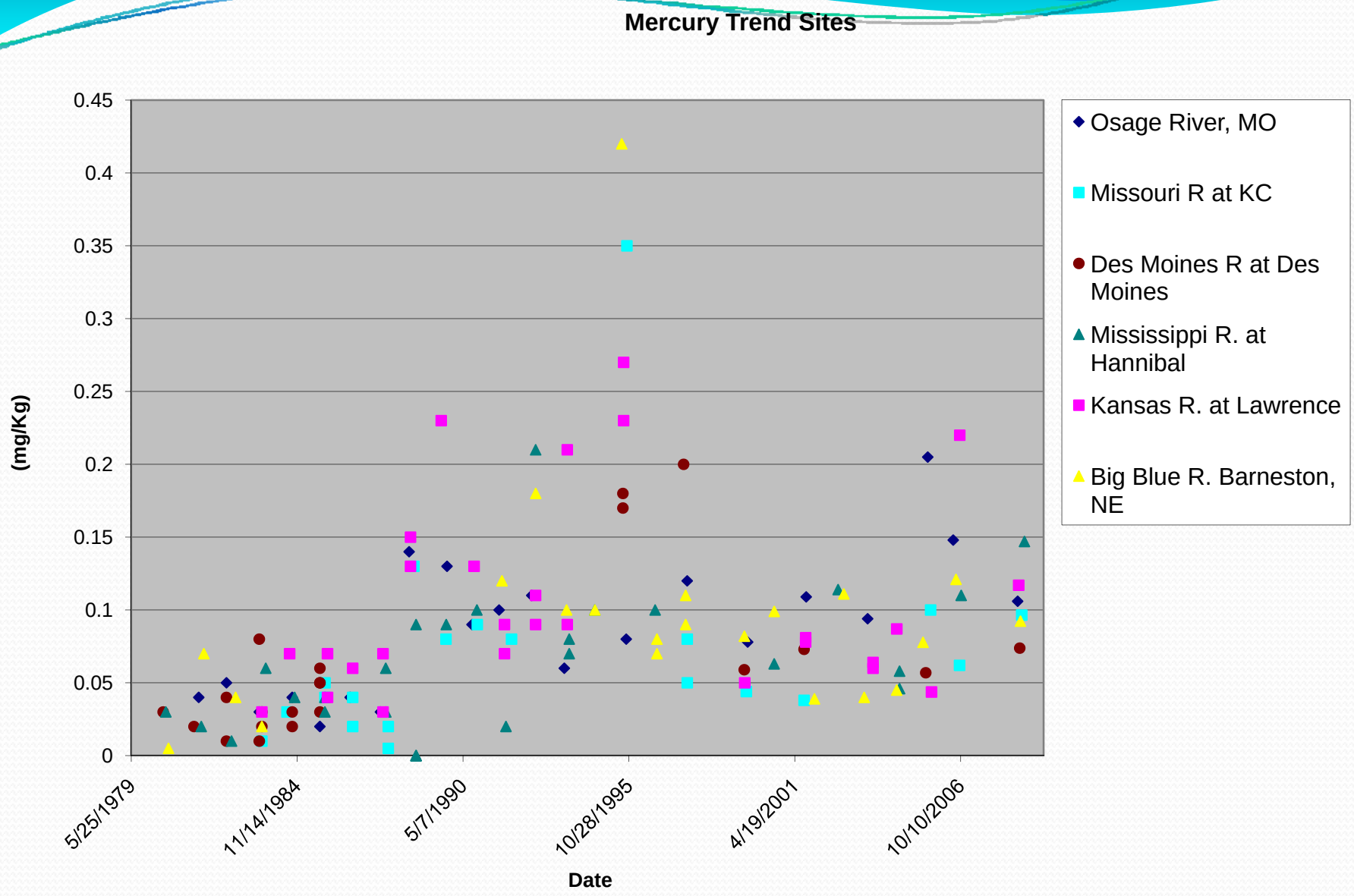
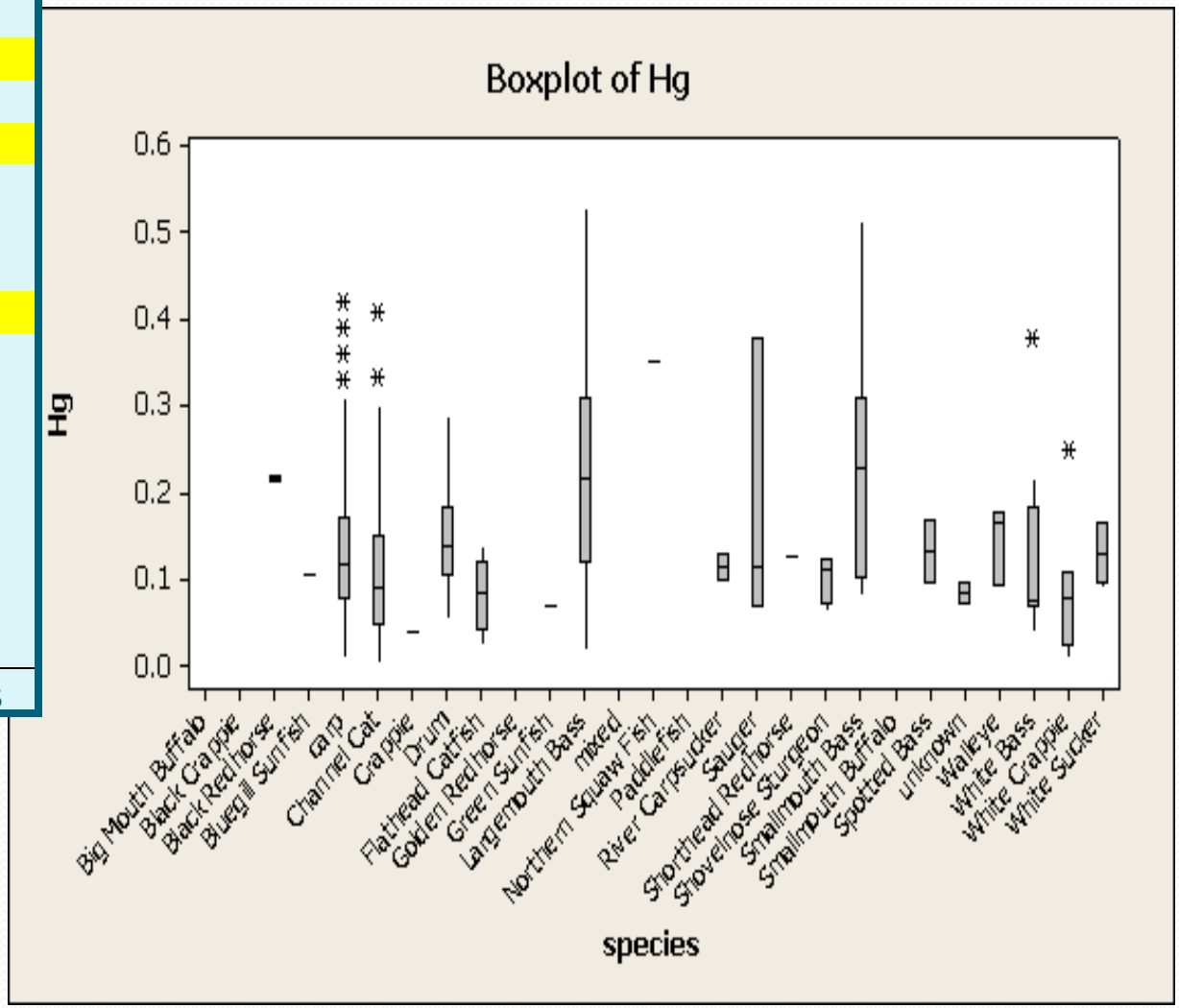

Mercury Trend Sites
(mg/Kg)
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
5/25/1979
11/14/1984
5/7/1990
10/28/1995
4/19/2001
10/10/2006
Date
Osage River, MO
Missouri R at KC
Des Moines R at Des Moines
Mississippi R. at Hannibal
Kansas R. at Lawrence
Big Blue R. Barneston, NE

Mercury

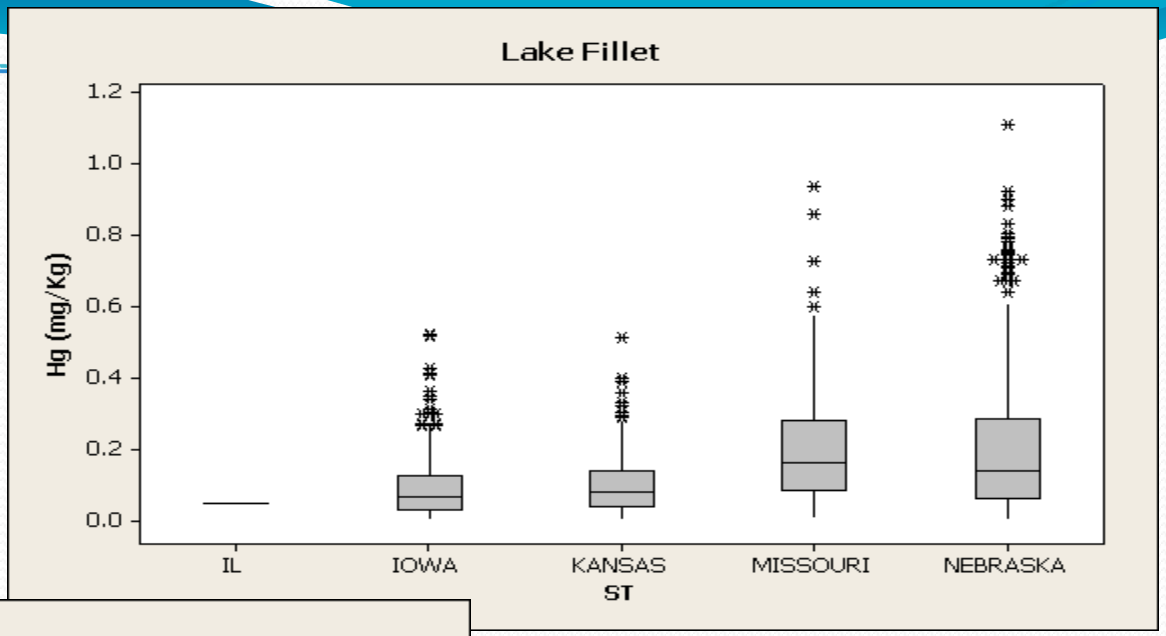
- Over 90% samples are positive for Hg
- Hg lower in rivers than lakes
- Average concentration of Hg in Miss & Mo rivers = 0.087 mg/Kg, Tributaries = 0.153
- Significant difference between Blue and Upper Iowa rivers and other tributaries

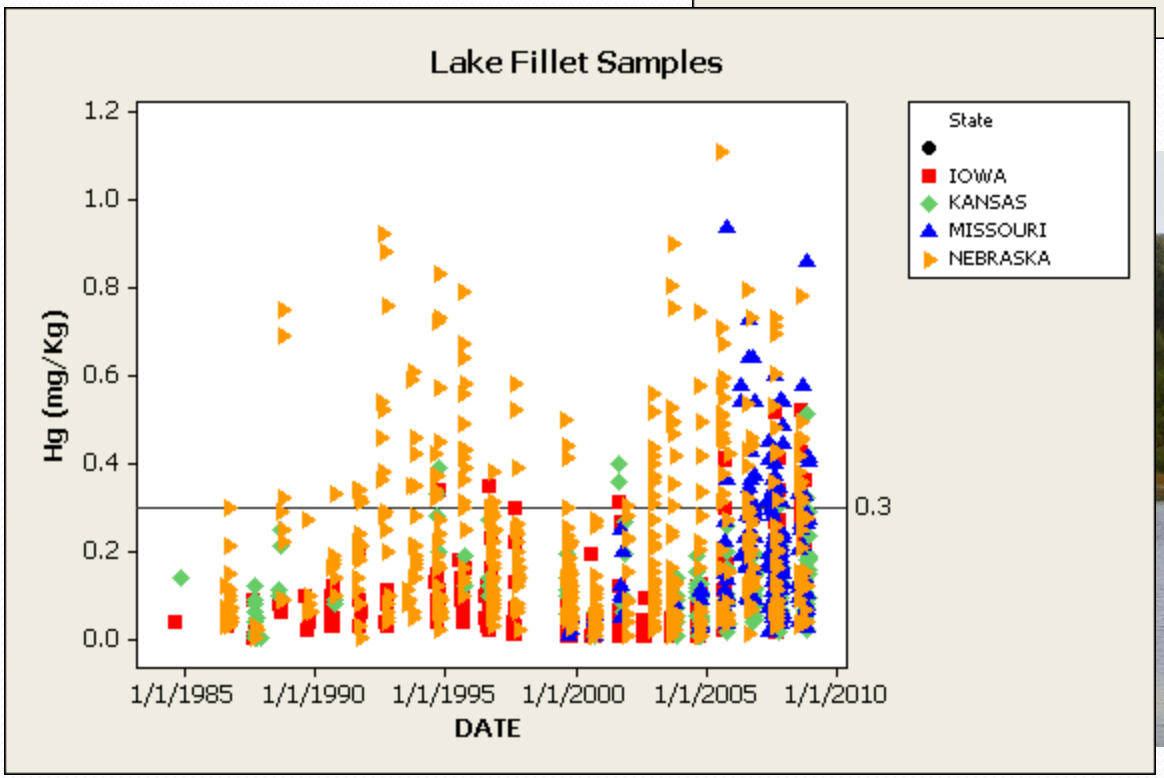
River Name	N	Mean Hg Conc (mg/Kg)
Big Nemaha	8	0.11487
Big Sioux	4	0.14805
Blue	30	0.2121
Chariton	4	0.1247
Des Moines	28	0.13921
Grand	5	0.0824
Iowa	24	0.17275
Kansas	38	0.15253
Lamine	1	0.279
Little Sioux	5	0.13058
Maquoketa	4	0.1405
Meramec	11	0.13187
Mississippi	86	0.09331
Missouri	40	0.07456
Niobrara	12	0.12807
Nishnabotna	3	0.165
Nodaway	2	0.046
Platte (NE)	16	0.10826
Salt	1	0.188
Skunk	8	0.17025
Turkey	11	0.15373
Upper Iowa	13	0.21515
Wapsipinicon	9	0.10023
Total	363	0.130525

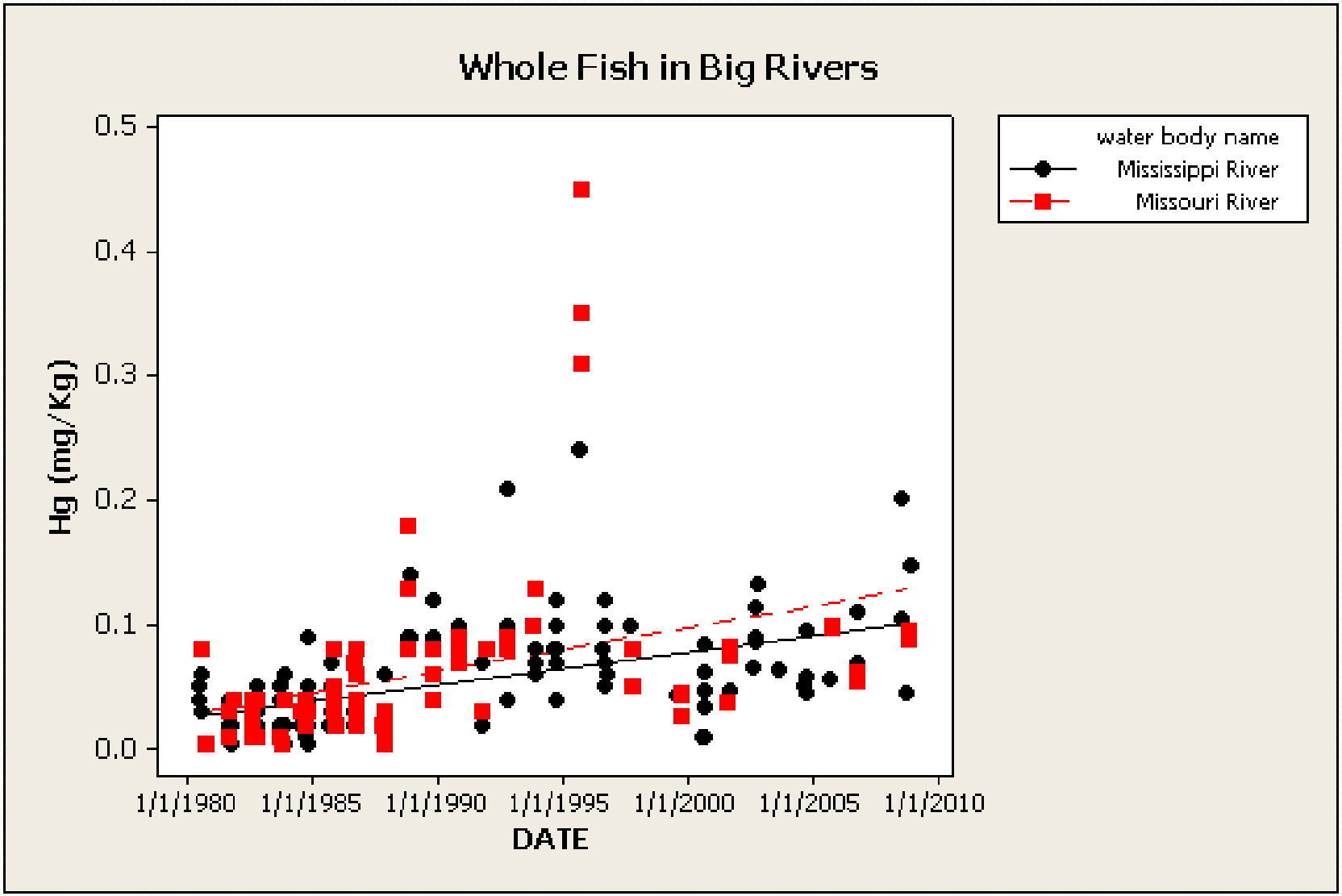
Species	N	Mean Hg Conc (mg/Kg)
Black Redhorse	2	0.2175
Bluegill Sunfish	1	0.105
Common Carp	123	0.13177
Channel Catfish	138	0.10937
Crappie	1	0.039
Drum	8	0.15063
Flathead Catfish	15	0.08527
Green Sunfish	1	0.07
Large Mouth Bass	20	0.2266
Northern Squaw Fish	1	0.351
River Carpsucker	2	0.115
Sauger	3	0.188
Small Mouth Bass	14	0.23557
Shorthead Redhorse	1	0.128
Shovelnose Sturgeon	4	0.103
Spotted Bass	2	0.13245
Walleye	3	0.14567
White Bass	9	0.14533
White Crappie	8	0.08559
White Sucker	5	0.1314
Unknown	2	0.086
Total	363	0.130525



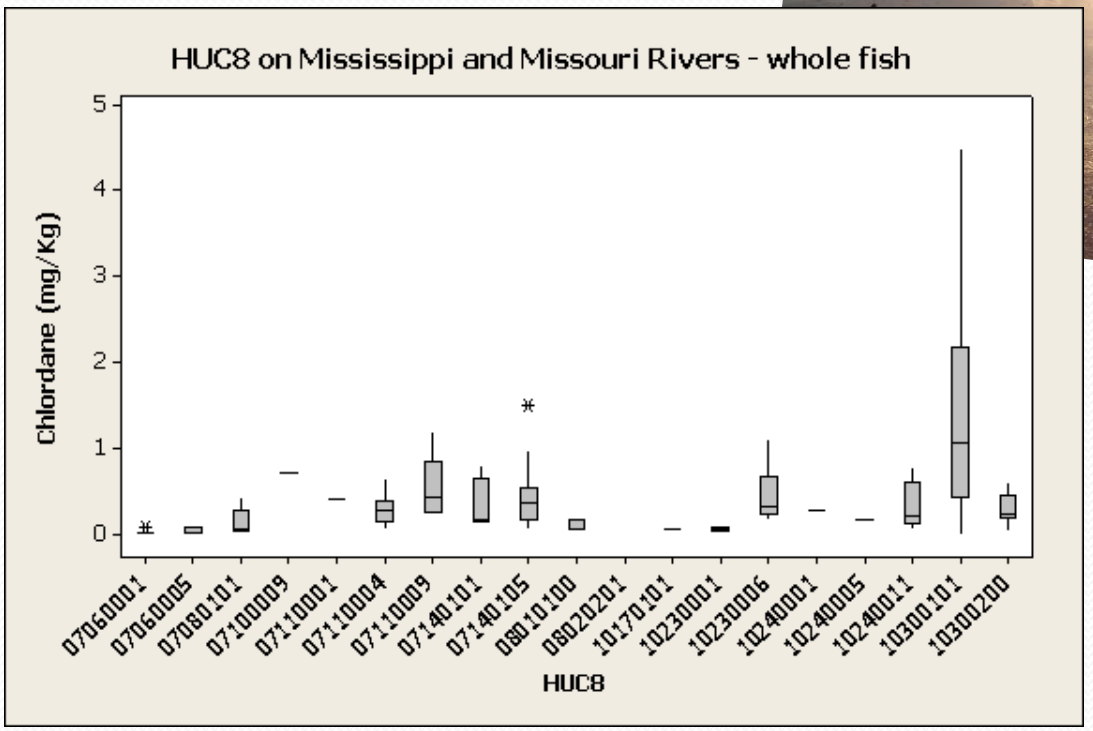
Mercury


Lake Fillet
Hg (mg/Kg)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
IL
IOWA
KANSAS
MISSOURI
NEBRASKA
ST


Lake Fillet Samples
Hg (mg/Kg)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.3
1/1/1985
1/1/1990
1/1/1995
1/1/2000
1/1/2005
1/1/2010
DATE
State
IOWA
KANSAS
MISSOURI
NEBRASKA

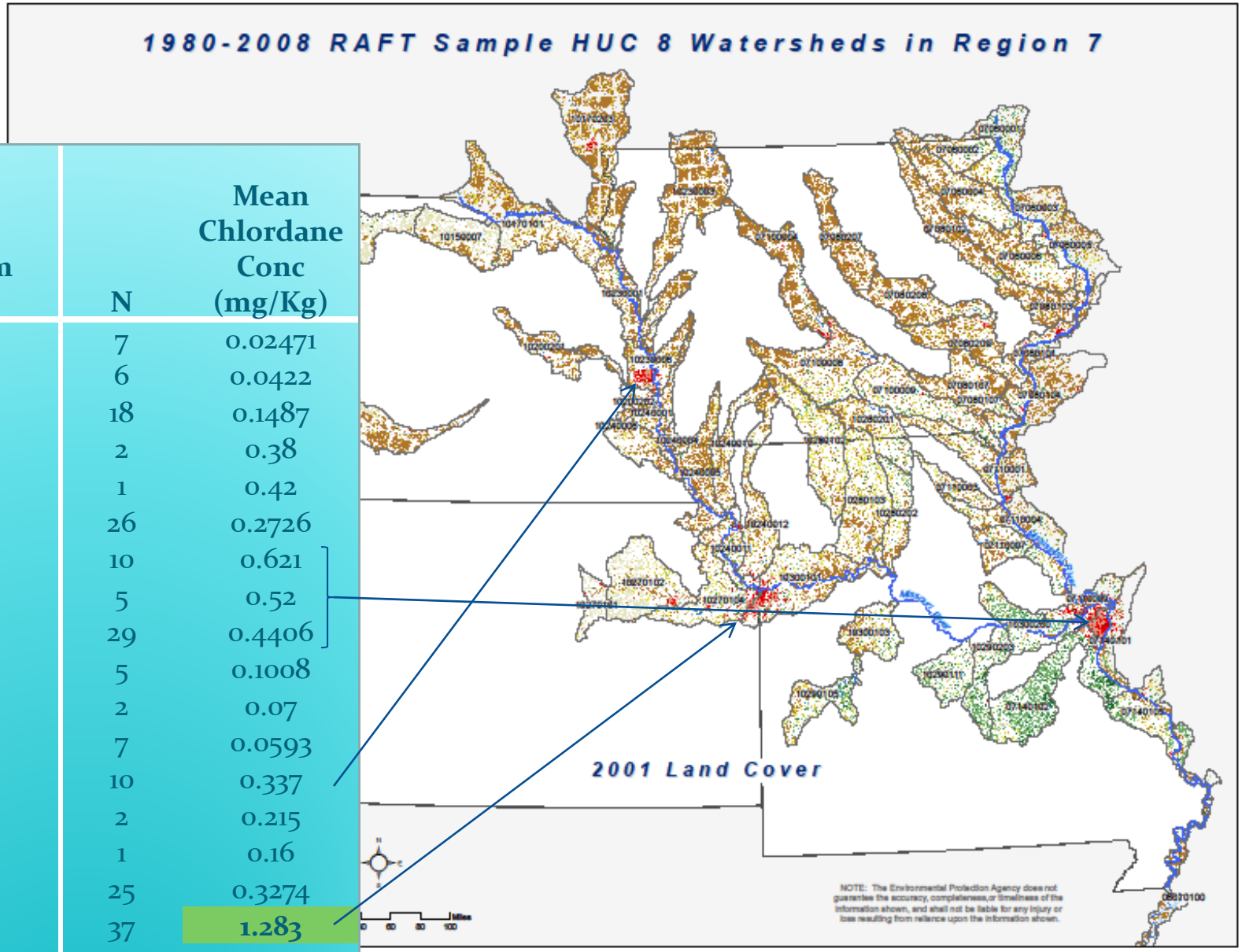

Whole Fish in Big Rivers
Hg (mg/Kg)
0.5
0.4
0.3
0.2
0.1
0.0
1/1/1980
1/1/1985
1/1/1990
1/1/1995
1/1/2000
1/1/2005
1/1/2010
DATE
water body name
Mississippi River
Missouri River

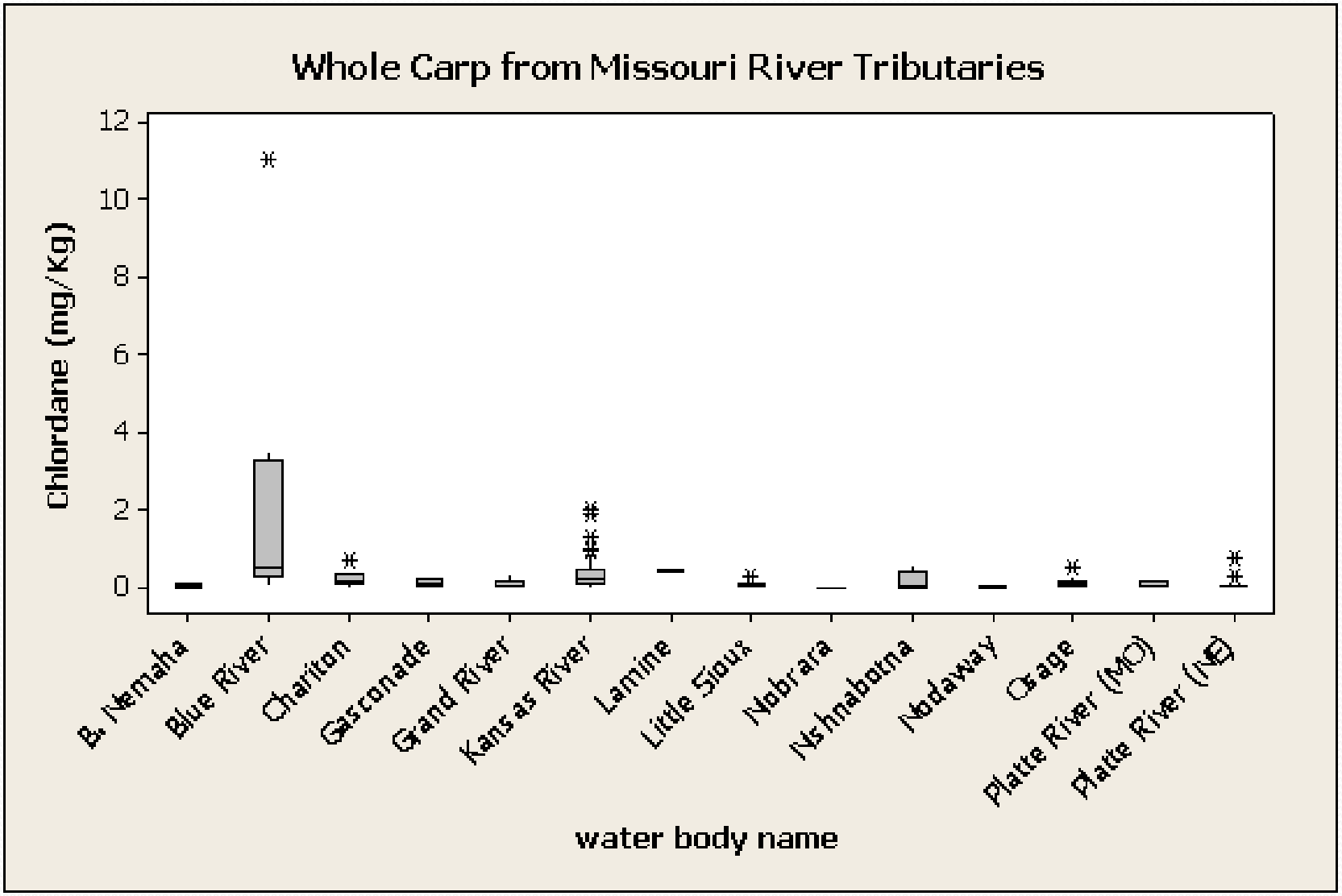
Chlordane

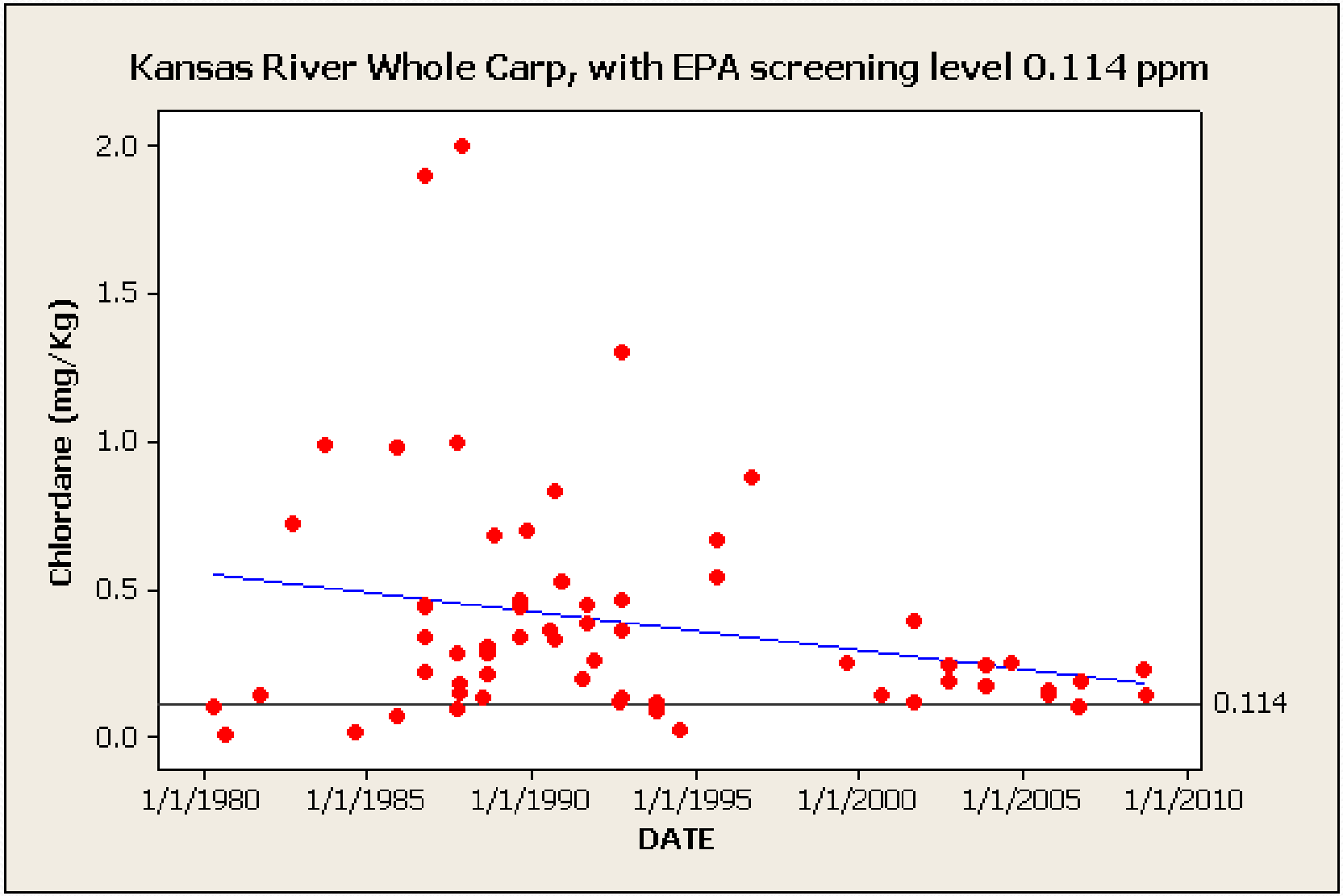


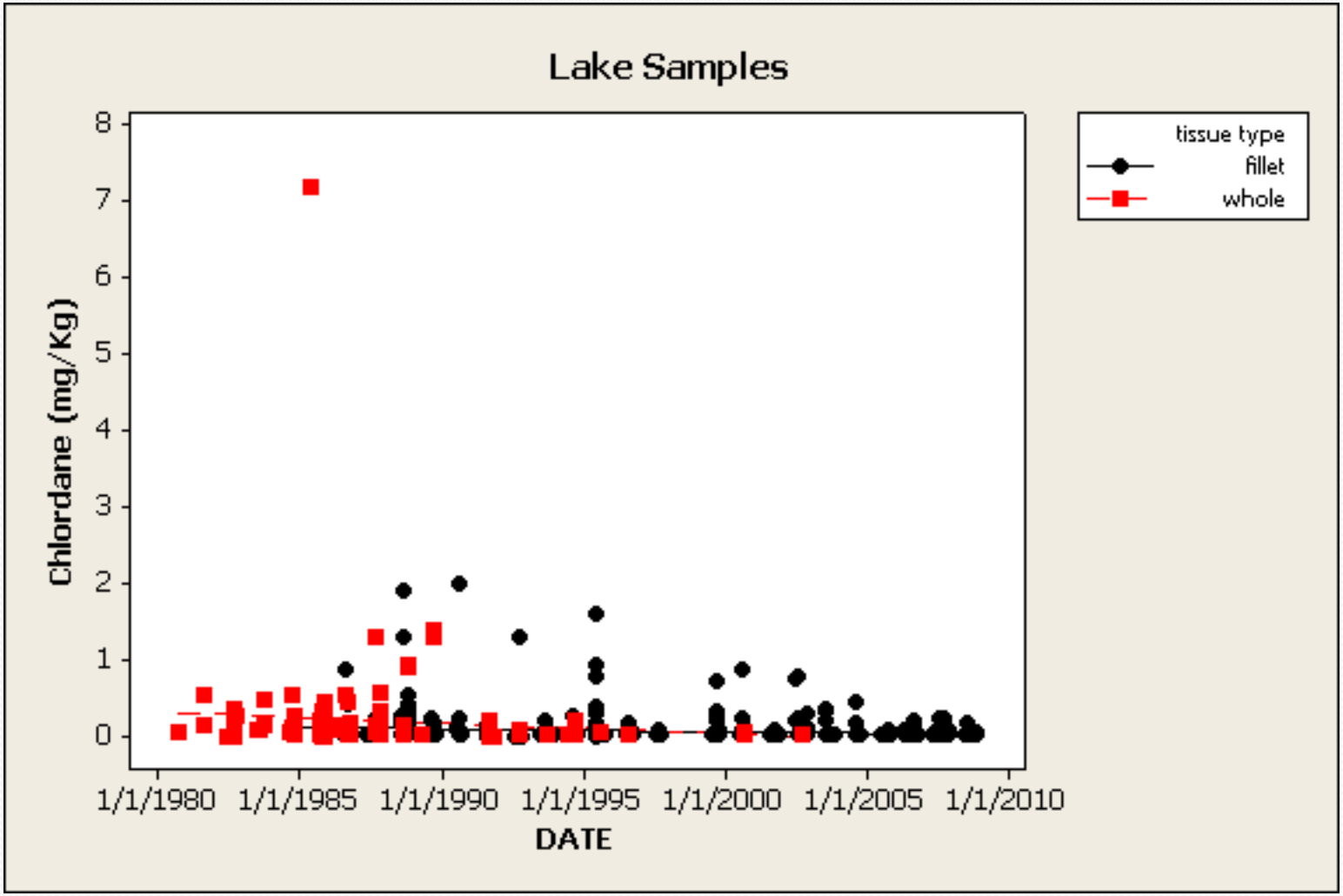
Kansas City on the Missouri River

Main Stem HUC8	N	Mean Chlordane Conc (mg/Kg)
7060001	7	0.02471
7060005	6	0.0422
7080101	18	0.1487
7100009	2	0.38
7110001	1	0.42
7110004	26	0.2726
7110009	10	0.621
7140101	5	0.52
7140105	29	0.4406
8010100	5	0.1008
10170101	2	0.07
10230001	7	0.0593
10230006	10	0.337
10240001	2	0.215
10240005	1	0.16
10240011	25	0.3274
10300101	37	1.283
10300200	14	0.3333
Total	207	0.4748



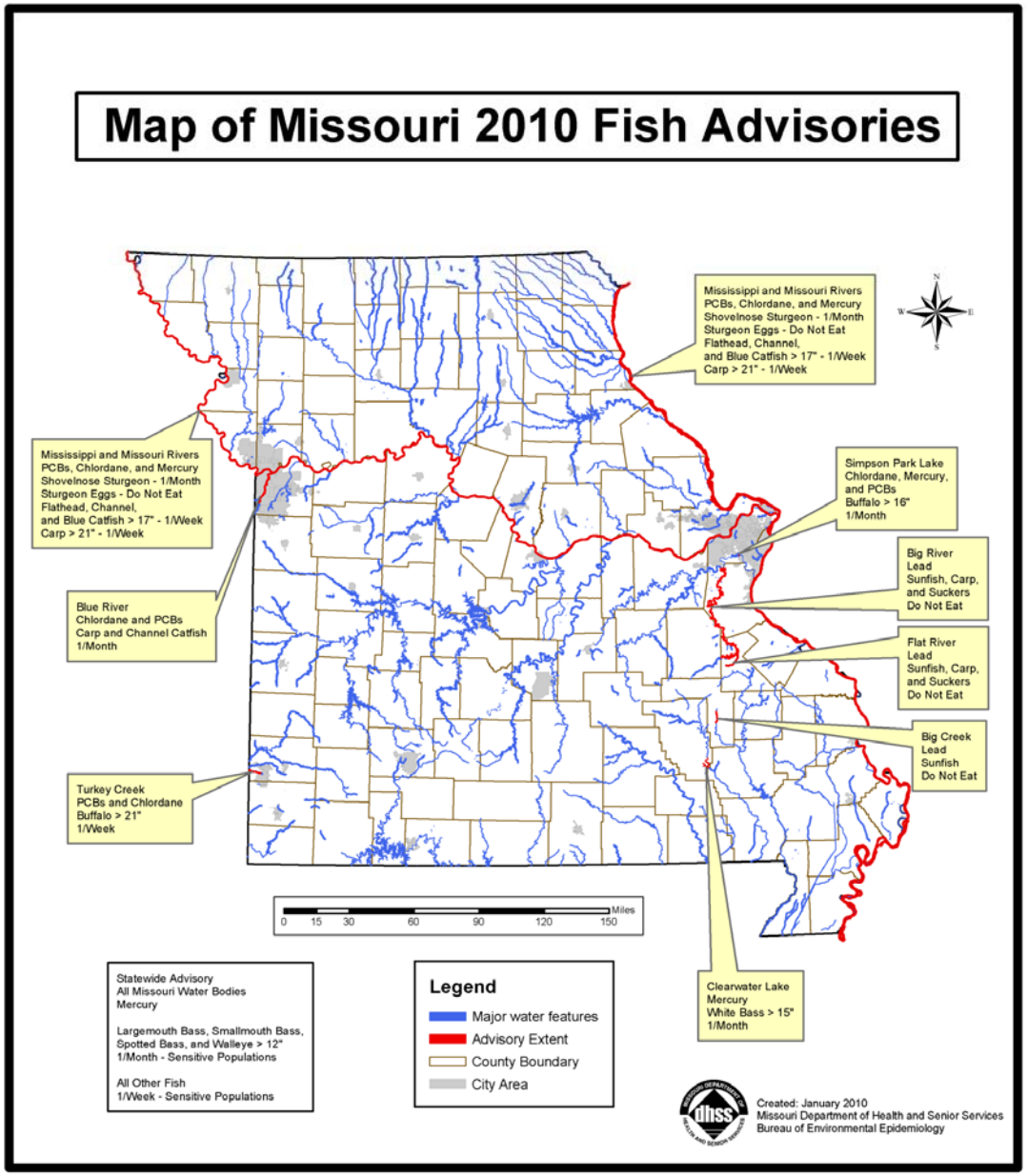

Whole Carp from Missouri River Tributaries
Chlordane (mg/Kg)
12
10
8
6
4
2
0
B. Nemaha
Blue River
Chariton
Gasconade
Grand River
Kansas River
Lamine
Little Sioux
Nobrara
Nishnabotna
Nodaway
Osage
Platte River (MO)
Platte River (NE)
water body name


Kansas River Whole Carp, with EPA screening level 0.114 ppm
Chlordane (mg/Kg)
2.0
1.5
1.0
0.5
0.0
0.114
1/1/1980
1/1/1985
1/1/1990
1/1/1995
1/1/2000
1/1/2005
1/1/2010
DATE


Lake Samples
Chlordane (mg/Kg)
8
7
6
5
4
3
2
1
0
1/1/1980
1/1/1985
1/1/1990
1/1/1995
1/1/2000
1/1/2005
1/1/2010
DATE
tissue type
fillet
whole

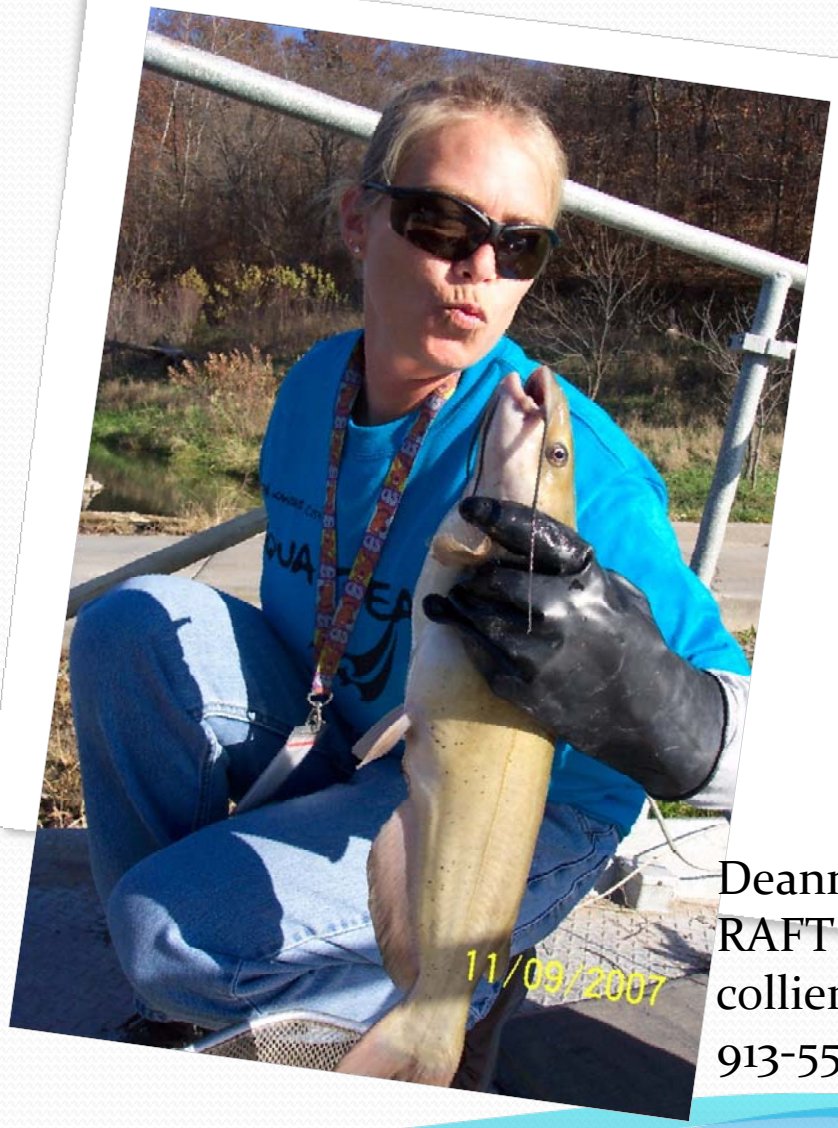
This is just an example of how the states use the data in their fish advisories. This happens to be from Missouri's 2010 Fish Advisory document available from the MDNR website at

www.dhss.mo.gov/fishadvisory/



Region VII Regional Ambient Fish Tissue Monitoring Program

- Four State Partners, plus Tribal partners
- Analysis done by EPA Regional Lab
- Primary goal is to aid states with water monitoring
- Data useful for fish advisories
- 2010 Focus will be Urban Lakes



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