DC Fish Tissue Study Findings and Fish Consumption Advisory

Fish were collected in April – September 2013 by the Fisheries and Wildlife Division staff at DOEE.

US EPA Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories

Volume 1: Fish Sampling and Analysis
Volume2: Risk Assessment and Fish Consumption Limits
Volume 3: Overview of Risk Management
Volume 4: Risk Communication

The study to determine the contaminant concentrations in the fish collected was conducted by Dr. Fred Pinkney of the US FWS Chesapeake Bay Field Office through a grant from DOEE.

Collection is based on:

- Desire to maintain consistency with past collections
- Availability of species known to be consumed
- US EPA target species recommendations
- Angler recommendations based on known consumption

Species collected:

- American Eel
- American Shad*
- Brown Bullhead*
- Blue Catfish
- Carp
- Channel Catfish
- Largemouth Bass
- Northern Snakehead*
- Striped Bass*
- Sunfish
- White Perch*

* Not collected in previous fish tissue study

Sample preparation and analyses are based on US EPA's *Guidance for Assessing Chemical Contaminants Data for Use in Fish Advisories, Vol. 1, Fish Sampling and Analysis, 3rd ed.*

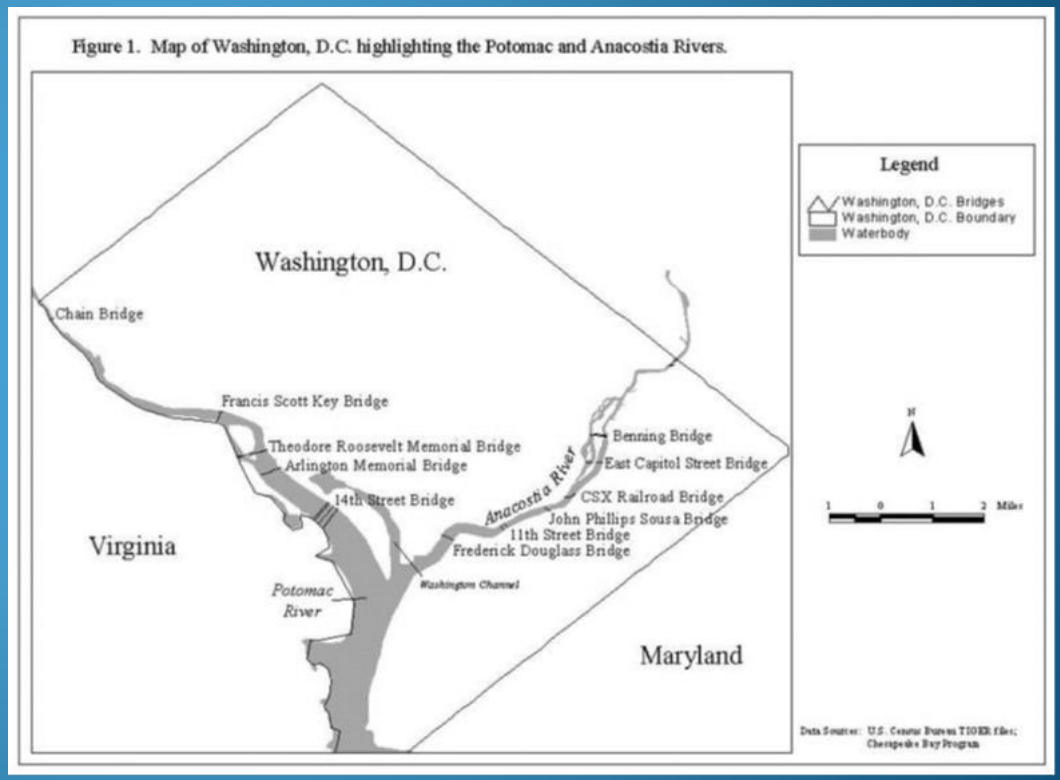
Sample Collection Locations

Anacostia River:

- Upper-New York Avenue Bridge (DC/MD line) to CSX Railroad Avenue Bridge
- Lower-CSX Railroad Bridge to the mouth of the Potomac River

Potomac River:

- Upper-Chain Bridge (Montgomery County MD line) just below the fall line, to 14 Street Bridge
- Lower-14 Street Bridge to the Woodrow Wilson Bridge (Prince George's County Maryland line)



Samples for Analysis

Based on the US EPA (2000) Fish Advisory guidance, within each composite, the shortest fish should be at least 75% of the longest fish and the average lengths within 10%.

Skin was removed for fish without scales (catfish and eels). Fish with scales, skin is left on and fillets include belly flap and dark muscle.

Location	Species	Length range (mm)	# in composite
Lower Anacostia	American eel	277-286	4
	Blue catfish	476-503	4
	Carp	479-517	4
	Channel catfish[a]	432-440	4
	Channel catfish	435	1
	Channel catfish	440	1
	Channel catfish	434	1
	Channel catfish	432	1
	Largemouth bass	326-335	4
	Sunfish[b]	152-163	9
Upper Anacostia	Brown bullhead	265-307	7
	Blue catfish	498-582	4
	Carp	555-615	3
	Channel catfish	394-436	4
	Largemouth bass	362-372	3
	Northern snakehead[a]	566-607	3
	Northern snakehead	606	1
	Northern snakehead	607	1
	Northern snakehead	566	1
	Sunfish[b]	146-168	10
Lower Potomac	American eel	286-325	4
	American eel	610	1
	American shad	494-508	4
	Brown bullhead	244-310	6
	Blue catfish	426-520	6
	Carp	519-536	4
	Channel catfish	399-449	6
	Largemouth bass	326-374	6
	Sunfish[c]	166-190	8
Upper Potomac	American eel	555-625	4
	Brown bullhead	276-310	2
	Carp	565-635	5
	Channel catfish	423-467	6
	Largemouth bass	349-396	6
	Northern snakehead	765-787	3
	Striped bass	542-562	3

Composite Samples and Collection Location

Species	Collection Location	Captured by Location	Total No. of Fish Captured	No. of Samples
American Eel	Anacostia River	4		
	Potomac River	9	13	4
American Shad	Anacostia River	0		
	Potomac River	4	4	1
Brown Bullhead	Anacostia River	7		
	Potomac River	8	15	3
Blue Catfish	Anacostia River	8		
	Potomac River	6	14	3
Carp	Anacostia River	7		
	Potomac River	9	16	4
Channel Catfish	Anacostia River	8		
	Potomac River	12	20	8
Largemouth Bass	Anacostia River	7		
	Potomac River	12	19	4
Northern Snakehead	Anacostia River	3		
	Potomac River	3	6	5
Striped Bass	Anacostia River	0		
	Potomac River	3	3	1
Sunfishes	Anacostia River	19		
	Potomac River	18	37	4
White Perch	Anacostia River	0		
	Potomac River	10	10	1
Total No of Fish Captured		157		38
Cost of Prep & Analysis (does not include DDOE resources)		$85,956.00		

Analytes Tested

Trace Elements (Metals)	
Aluminum	Lead
Arsenic	Magnesium
Barium	Manganese
Beryllium	Mercury
Boron	Molybdenum
Cadmium	Nickel
Chromium	Selenium
Copper	Strontium
Iron	Vanadium
	Zinc

Organochlorine Pesticides	
p,p'-DDE	dieldrin
p,p'-DDD	endosulfan II
p,p'-DDT	endrin
o,p'-DDE	heptachlor
o,p'-DDD	heptachlor epoxide
o,p'-DDT	oxychlordane
alpha-BHC	alpha-chlordane
beta-BHC	gamma-chlordane
delta-BHC	cis-nonachlor
gamma-BHC	trans-nonachlor
aldrin	mirex
pentachloroanisole	toxaphene

Analytes Tested

PAHs (polycyclic aromatic hydrocarbons)	
acenaphthalene	dibenzothiophene
acenaphthene	fluoranthene
anthracene	fluorene
benzo(a)anthracene	indeno(1,2,3-cd)pyrene
benzo(a)pyrene	naphthalene
benzo(b)fluoranthene	perylene
benzo(g,h,i)perylene	phenanthrene
benzo(k)fluoranthene	pyrene
benzo(e)pyrene	1-methylnaphthalene
biphenyl	2-methylnaphthalene
chrysene	2,6-dimethylnaphthalene
dibenzo(a,h)anthracene	1,6,7-trimethylnaphthalene
C1 fluoranthenes and pyrenes	1-methylphenanthrene
C1-C3 fluorenes	C1-C4 chrysenes
C1-C4 naphthalenes	C1-C3 dibenzothiophenes
	C1-C4 phenanthrenes and anthracenes

Analytes Tested

PCBs (polychlorinated biphenyls)
PCB- total and
Aroclors 1242, 1248, 1254, 1260, 1268

PCB congeners	
#1,#7/9, #8/5, #15,	#118, #119, #126,
#16/32, #18/17,	#128, #129, #130,
#22/51, #24/27,	#135, #136, #138/160,
#25, #26, #28, #29,	#141/179, #146,
#30, #31, #33/20,	#149/123, #151,
#39, #40, #41/64,	#153/132, #156,
#42/59/37, #44,	#158, #167, #169,
#45, #46, #47/75,	#170/190,
#48, #49, #52, #53,	#171/202, #172,
#60/56, #63, #66,	#174, #175,
#67, #69, #70, #72,	#176/137, #177,
#74/61, #77, #81,	#178, #180, #183,
#82, #83, #84, #85,	#185, #187, #189,
#87/115, #92,	#191, #193, #194,
#95/80, #97, #99,	#195/208, #196,
#101/90, #105,	#197, #199, #200,
#107, #110, #114,	#201, #205, #206,
	#207, #209

Laboratories Performing Analyses

All analyses samples were contracted by the USFWS Analytical Control Facility using:

- Texas A & M University Geochemical and Environmental Research Group, College Station, Texas -analyzed samples for lipid and moisture content, over 40 polynuclear aromatic hydrocarbons (PAHs, including alkylated compounds), 23 organochlorine pesticides, total polychlorinated biphenyls (PCBs, including Aroclor analysis), 119 PCB congeners, and polybrominated diphenyl ethers (PBDEs). Analytical methods- Extracts analyzed by GC/MS for PAHs, ECD/GC for organochlorine pesticides and PCBs

- ALS Global Environmental, Kelso, Washington – analyzed metals. Analytical methods- Hg-cold vapor by AAS, As and Se by AAS, Cd and Pb by Graphite furnace AAS, remaining metals- Al, B, Be, Cr, Cu, Fe, Mg Mn, Mb, Ni, etc., by ICP

Contaminants of Concern

PCBs, PAHs, Chlordane and other chemical contaminants continue to be found in certain fish species caught in the Anacostia and Potomac Rivers.

- PCBs exceeded the guidance values most frequently and by the greatest amounts.
- DDT, chlordane, dieldrin, and heptachlor epoxide occasionally exceeded guidance values.
- Concentrations of metals (including mercury), PAHs, and PBDEs did not exceed guidance values.

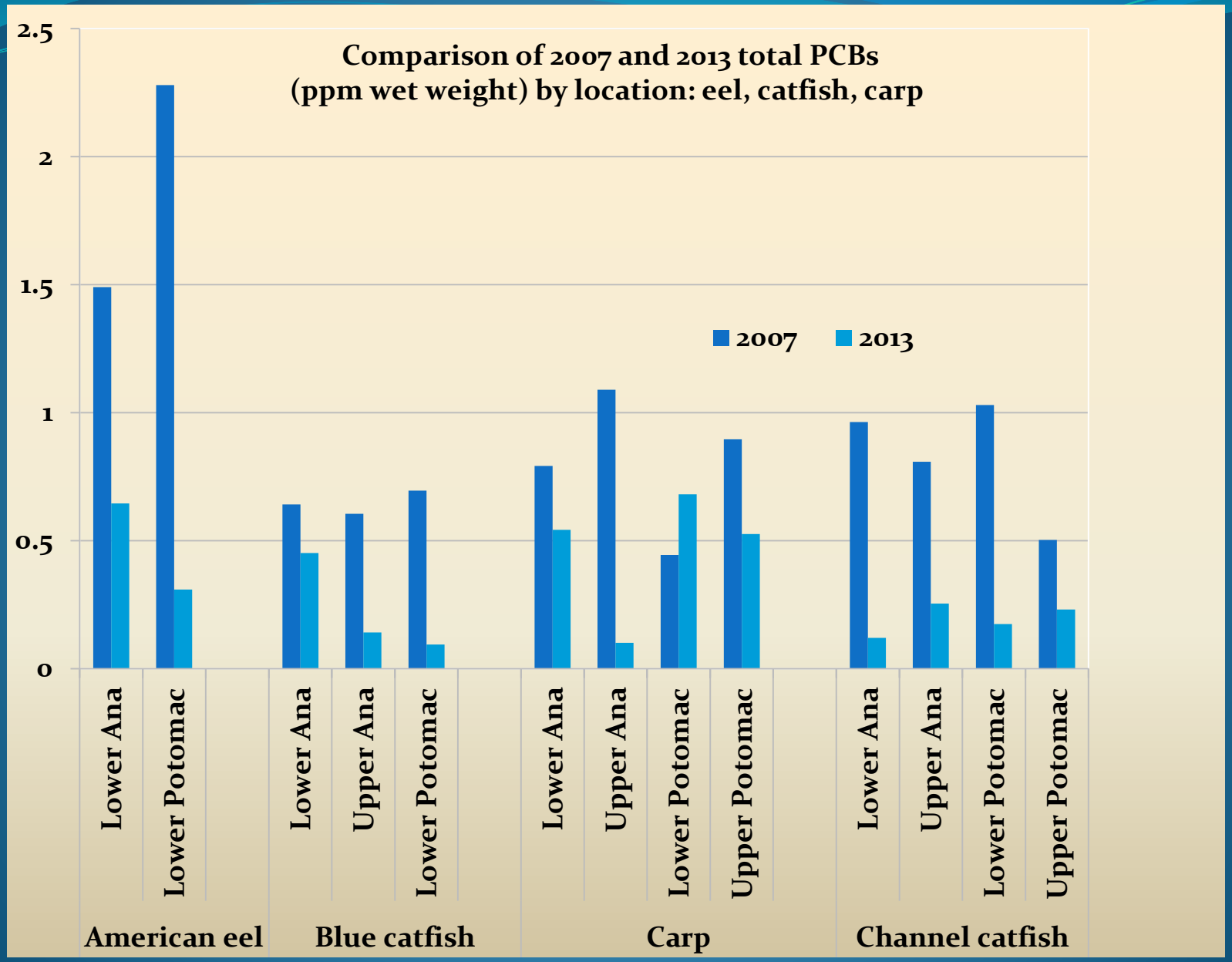
Summary Results
for contaminants of concern that exceed the US EPA screening value

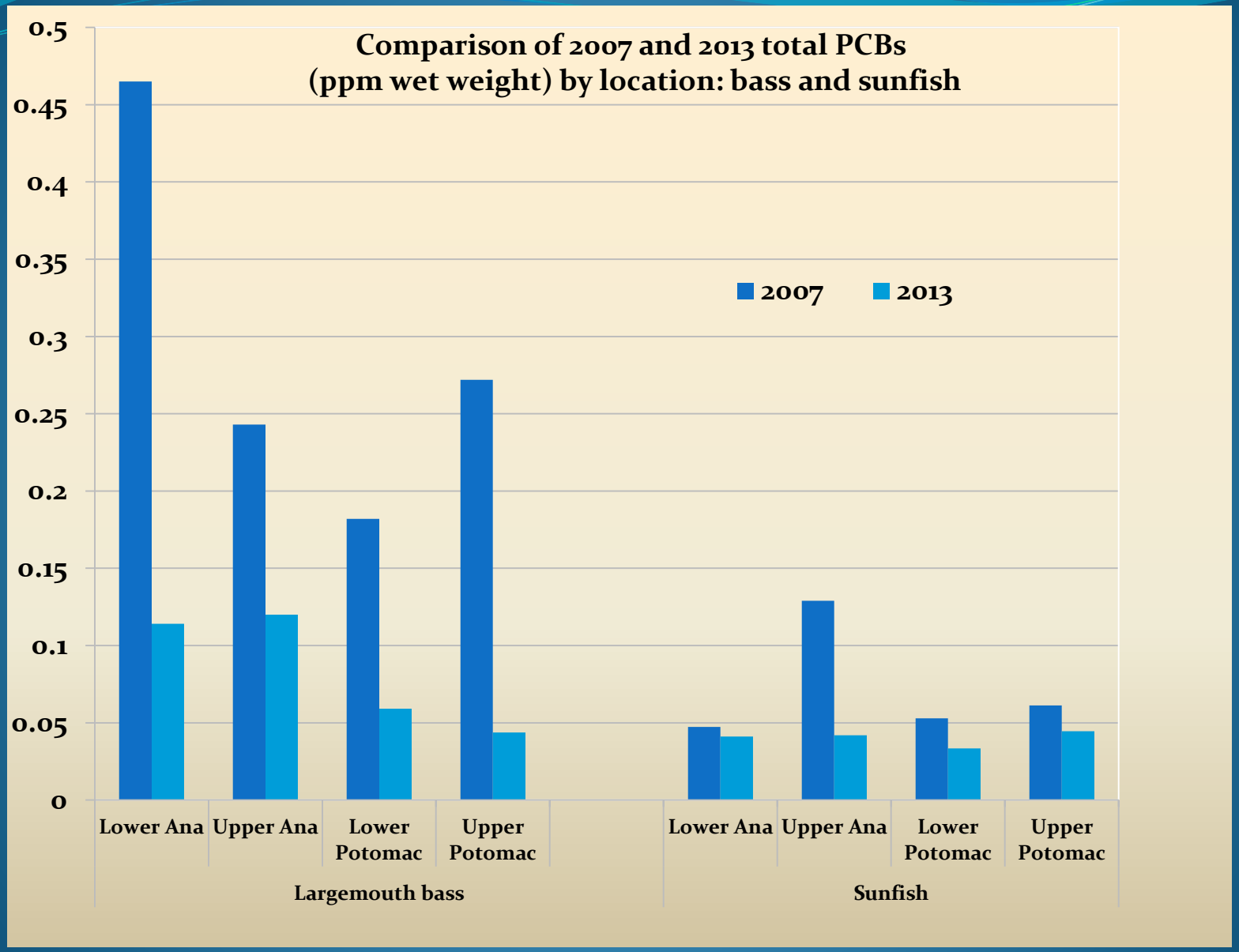
* All values are in ppm

Highlighted values exceed the screening value

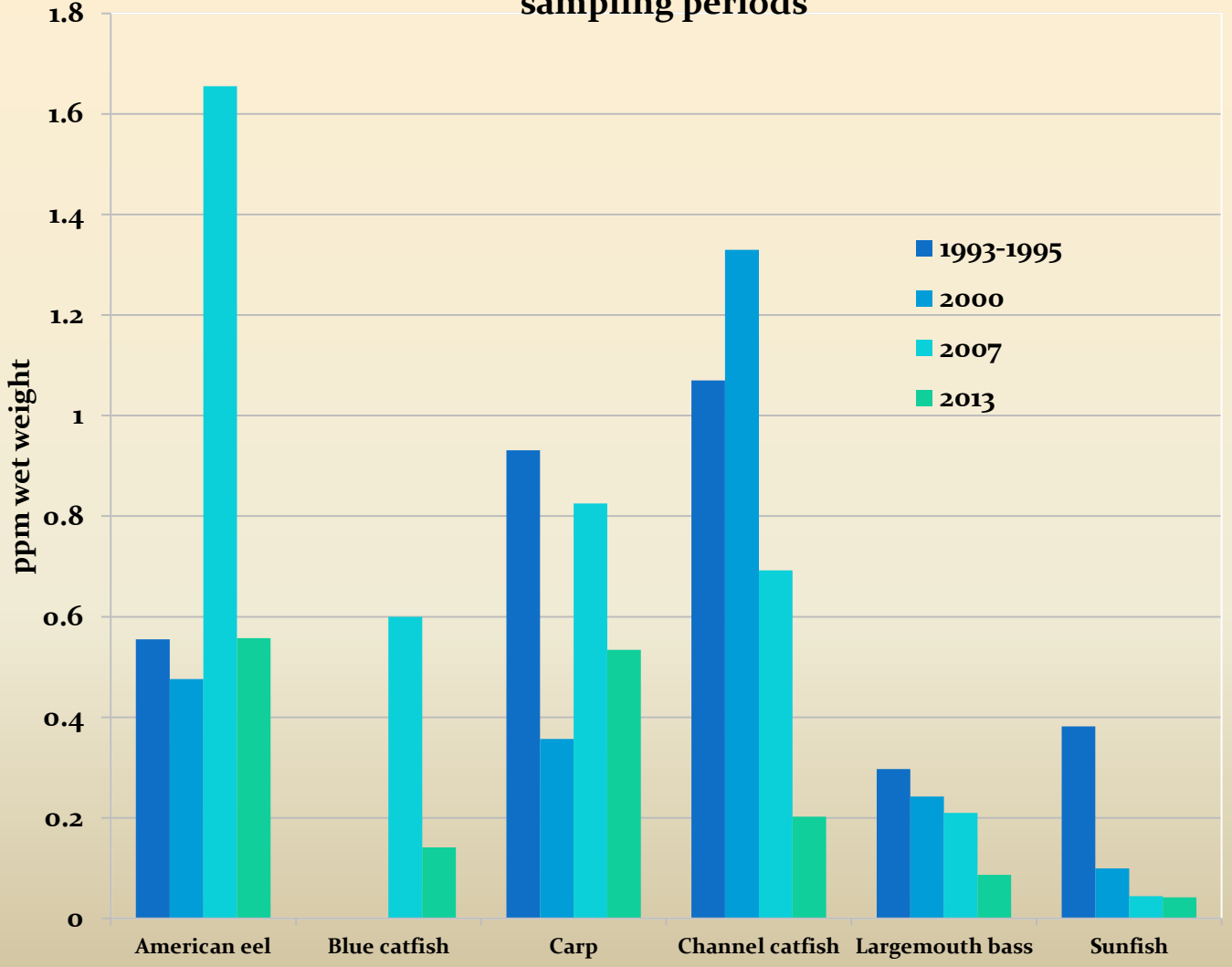
Screening value- the concentrations of chemicals in fish or shellfish tissue that are of potential public health concern and evaluation of human health risk should be conducted.

	Median Values*				
Fish Species	**Total PCBs**	**Total Chlordane**	**Total DDT**	**Dieldrin**	**Heptachlor epoxide**
American Eel	**0.557**	**0.11**	0.113	**0.0152**	**0.00494**
American Shad	**0.052**	0.008	0.013	**0.0027**	0.0008
Brown Bullhead	**0.141**	0.018	0.022	0.002	0.0011
Blue Catfish	**0.056**	0.01	0.01	0.0012	0.00059
Carp	**0.534**	0.059	0.062	**0.0072**	0.00296
Channel Catfish	**0.192**	0.026	0.035	0.0019	0.00083
Largemouth Bass	**0.087**	0.013	0.012	0.001	0.00031
Northern Snakehead	**0.056**	0.007	0.01	0.0017	0.00111
Striped Bass	**1.609**	0.054	**0.412**	**0.0378**	**0.0069**
Sunfish	**0.042**	0.004	0.005	0.0007	0.00036
White Perch	**0.068**	0.004	0.012	0.001	0.00068
Screening Value	**0.02**	**0.114**	**0.117**	**0.0025**	**0.00439**

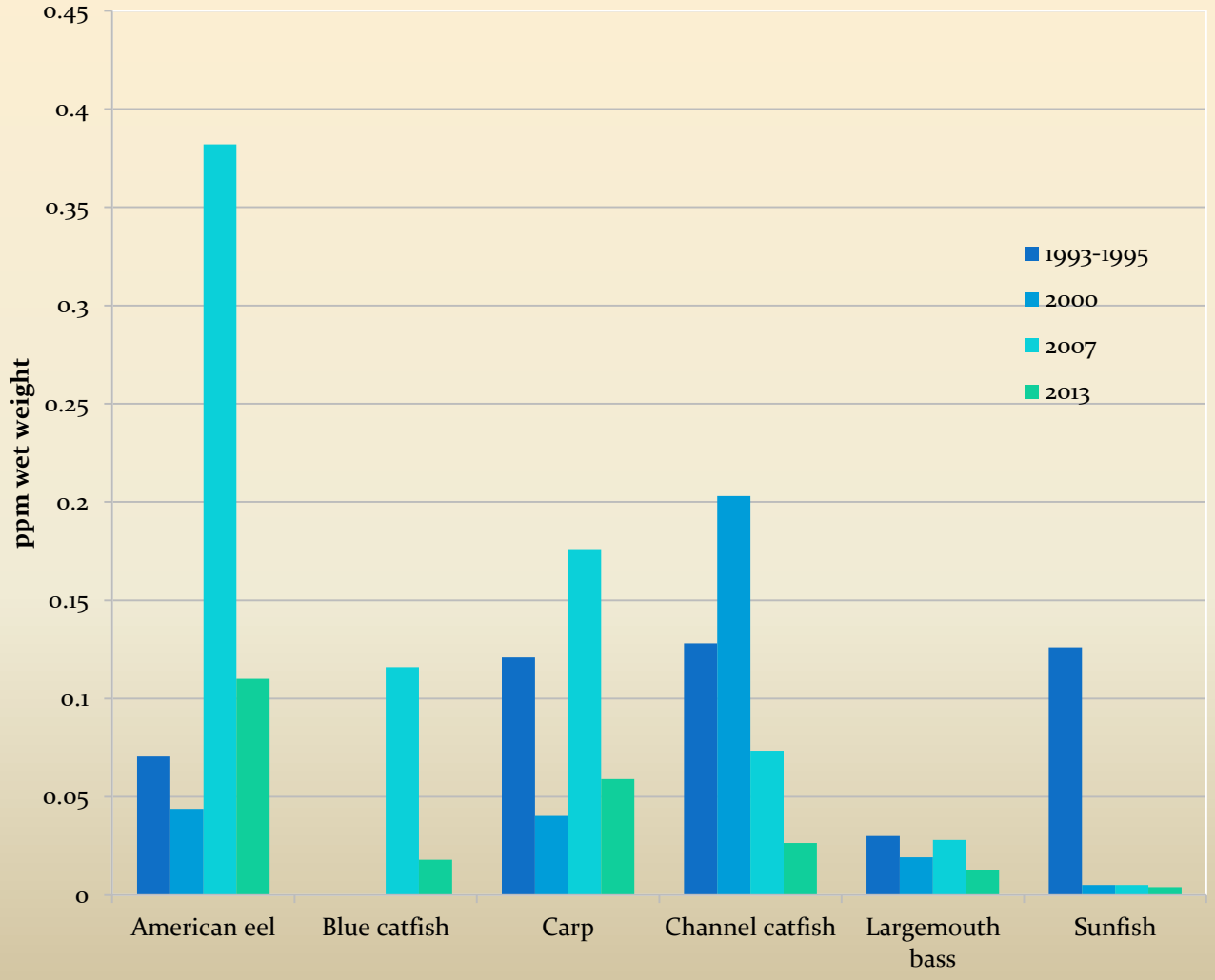

Comparison of 2007 and 2013 total PCBs
(ppm wet weight) by location: eel, catfish, carp
2.5
2
1.5
1
0.5
0
2007
2013
Lower Ana
Lower Potomac
Lower Ana
Upper Ana
Lower Potomac
Lower Ana
Upper Ana
Lower Potomac
Upper Potomac
Lower Ana
Upper Ana
Lower Potomac
Upper Potomac
American eel
Blue catfish
Carp
Channel catfish


Comparison of 2007 and 2013 total PCBs
(ppm wet weight) by location: bass and sunfish
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
2007
2013
Lower Ana
Upper Ana
Lower Potomac
Upper Potomac
Largemouth bass
Lower Ana
Upper Ana
Lower Potomac
Upper Potomac
Sunfish

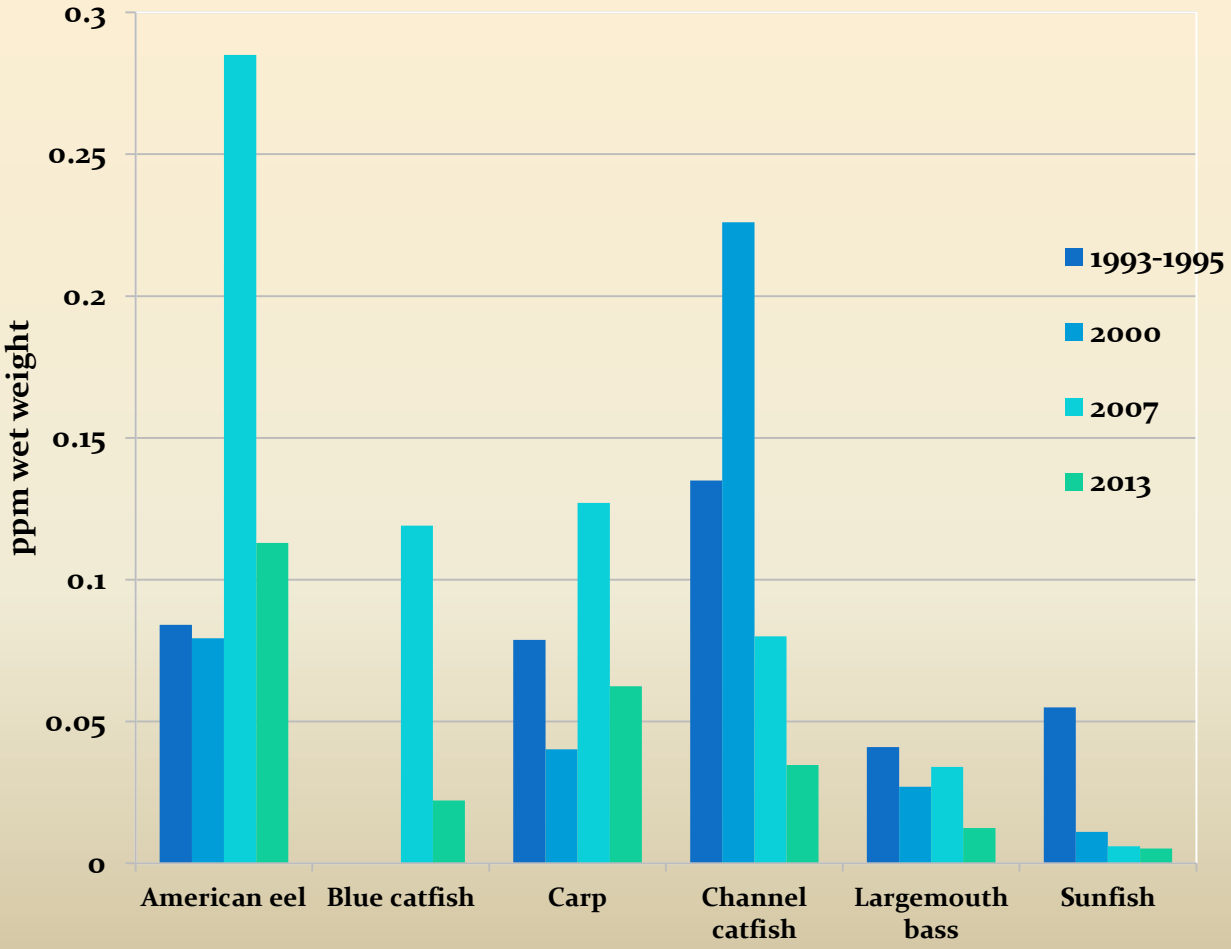
Comparison of median total PCB concentrations in composite fish samples from the waters of the District of Columbia for four sampling periods

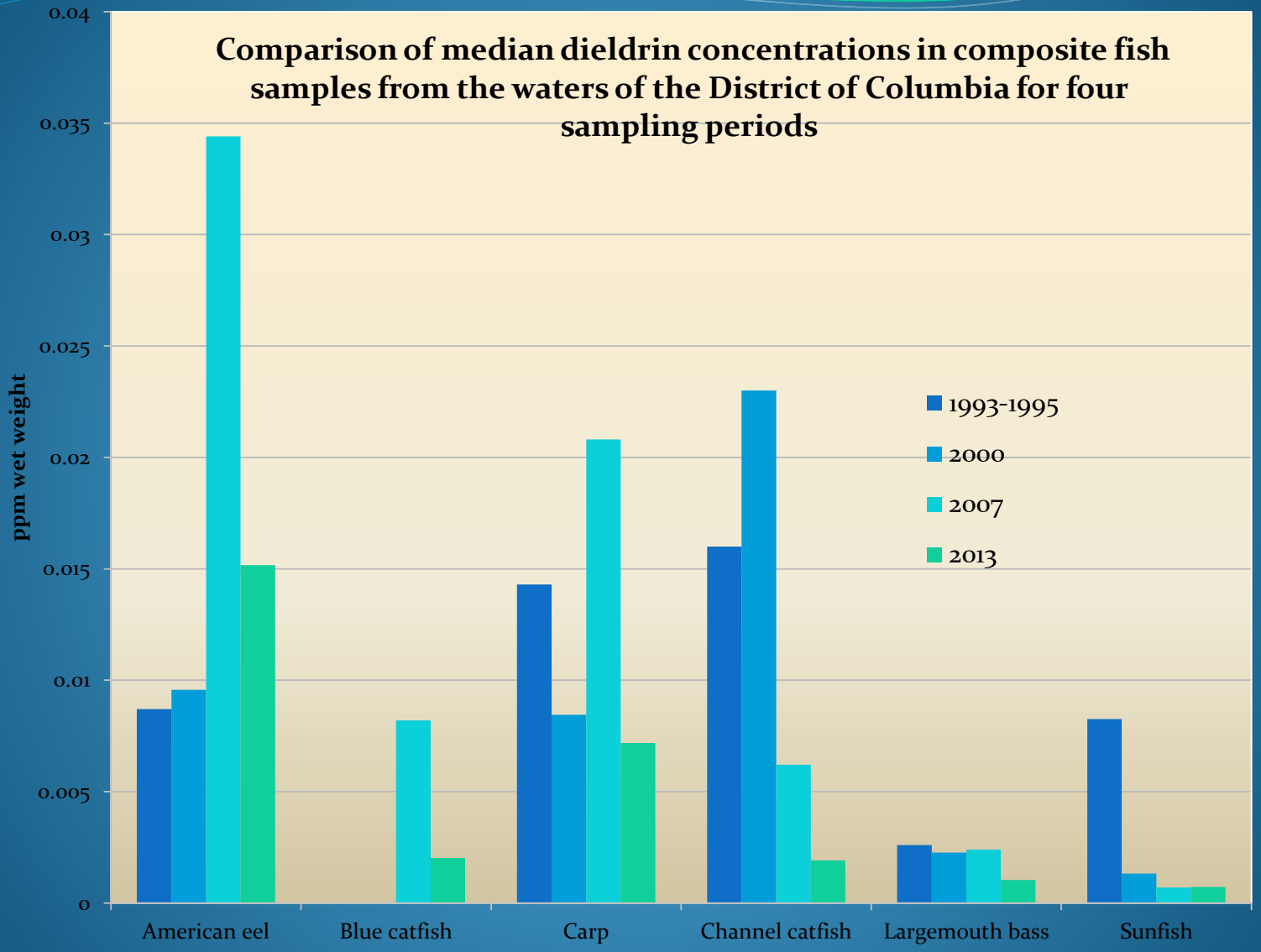


Comparison of median total chlordane concentrations in composite fish samples from the waters of the District of Columbia for four sampling periods



Comparison of median total DDT concentrations in composite fish samples from the waters of the District of Columbia for four sampling periods




Comparison of median dieldrin concentrations in composite fish samples from the waters of the District of Columbia for four sampling periods
ppm wet weight
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
1993-1995
2000
2007
2013
American eel
Blue catfish
Carp
Channel catfish
Largemouth bass
Sunfish

2016 DC Fish Consumption Advisory

The fish consumption advisory for the District of Columbia is limited to fish caught in the Anacostia and Potomac Rivers.

It does not cover fish purchased at grocery stores, farmers' markets, restaurants or fish markets.

COMMERCIAL FISHING IN THE DISTRICT OF COLUMBIA

Fish Consumption Advisory Information

2016 District of Columbia Fish Consumption Advisory

DO NOT EAT:
Do not eat eel, carp, or striped bass (rockfish, striper) caught in District waters because they are the most contaminated by chemicals like polychlorinated biphenyls (PCBs).

American eel

Carp

Striped bass (rockfish, striper)

RECOMMENDED CONSUMPTION LIMITS

If you do eat fish caught in District waterways, please use the recommended limits below:

FISH SPECIES	RECOMMENDED CONSUMPTION LIMIT - One serving = eight (8) ounces uncooked fish*
Sunfish	No more than **four** servings per month for adults
Blue catfish	No more than **three** servings per month for adults
Northern snakehead	No more than **three** servings per month for adults
White perch	No more than **three** servings per month for adults
Largemouth bass	No more than **two** servings per month for adults
own bullhead	No more than **one** serving per month for adults
Channel catfish	No more than **one** serving per month for adults

*If species are mixed, once the lowest limit is met, eat no more DC caught fish for the month. Limit consumption of all other fish not listed.

Consumption Recommendations

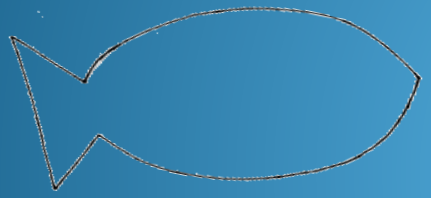
2016 Fish Consumption Advisory
For
Waters of the District of Columbia

Most Safe

Least Safe

Fish	Children <6 years 3oz portion	Women <50 years 6oz portion	General Population 8oz portion
 Sunfishes	Up to 2 meals/month	Up to 4 meals/month	Up to 4 meals/month
 Blue Catfish	Up to 2 meals/month	Up to 3 meals/month	Up to 3 meals/month
 Nothern Snakehead	Up to 1 meal/month	Up to 3 meals/month	Up to 3 meals/month
 White Perch	Up to 1 meal/month	Up to 3 meals/month	Up to 3 meals/month
 Largemouth Bass	Up to 1 meal/month	Up to 2 meals/month	Up to 2 meals/month
 Brown Bullhead	Up to 1 meal/month	Up to 1 meal/month	Up to 1 meal/month
 Channel Catfish	Up to 1 meal/month	Up to 1 meal/month	Up to 1 meal/month
 Carp	Do Not Eat	Do Not Eat	Do Not Eat
 Eel	Do Not Eat	Do Not Eat	Do Not Eat
 Striped Bass	Do Not Eat	Do Not Eat	Do Not Eat

*If species are mixed, once the lowest limit is met, eat no more DC caught fish for the month. Limit consumption of all other fish not listed.



Questions?