San Jacinto River Waste Pits Superfund Site Public Meeting

Hosted by GBF/HARC

January 24, 2013

J.D. Walker Community Center

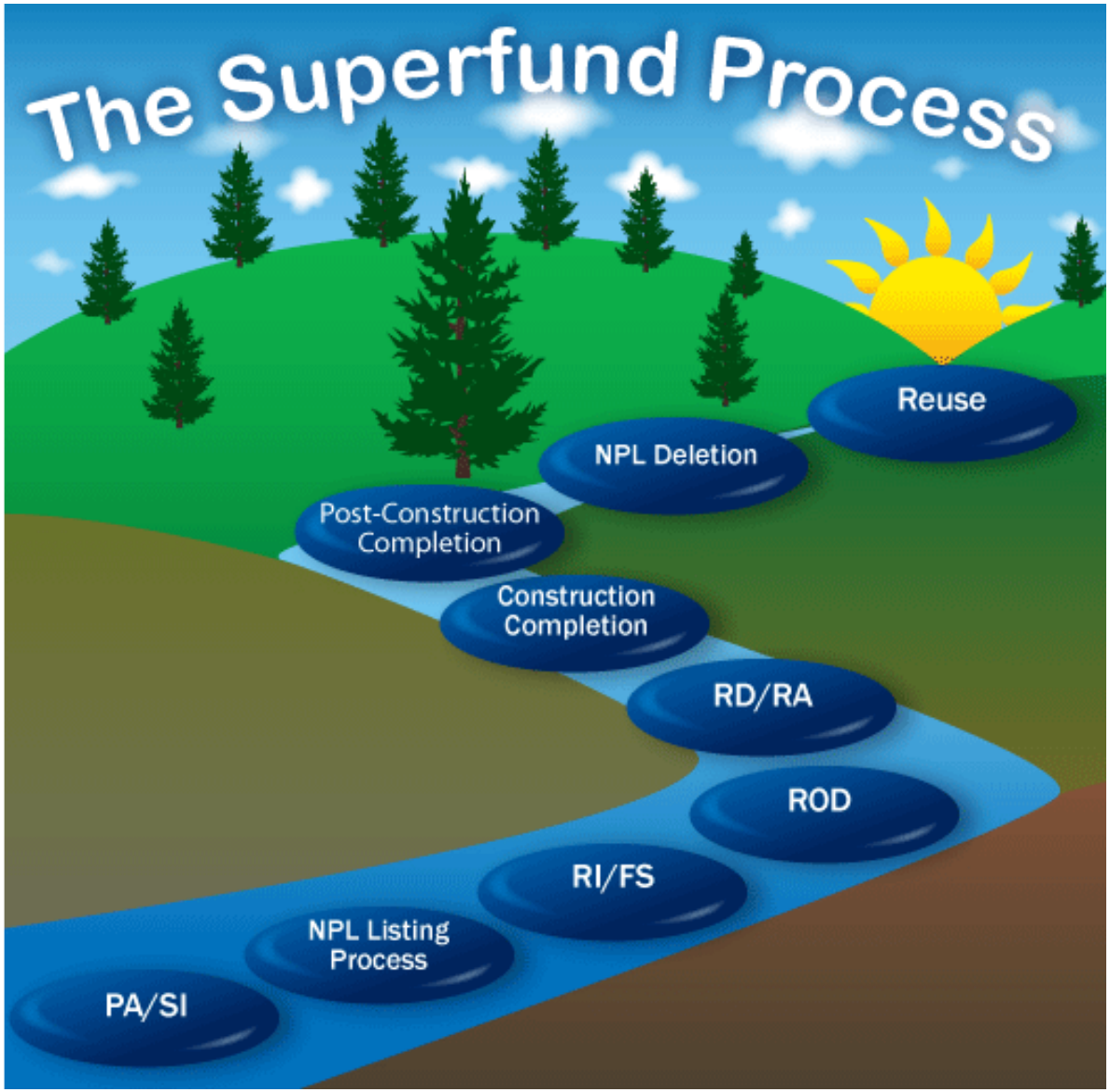
Baytown, Texas

San Jacinto River Waste Pits Background and the Superfund Process

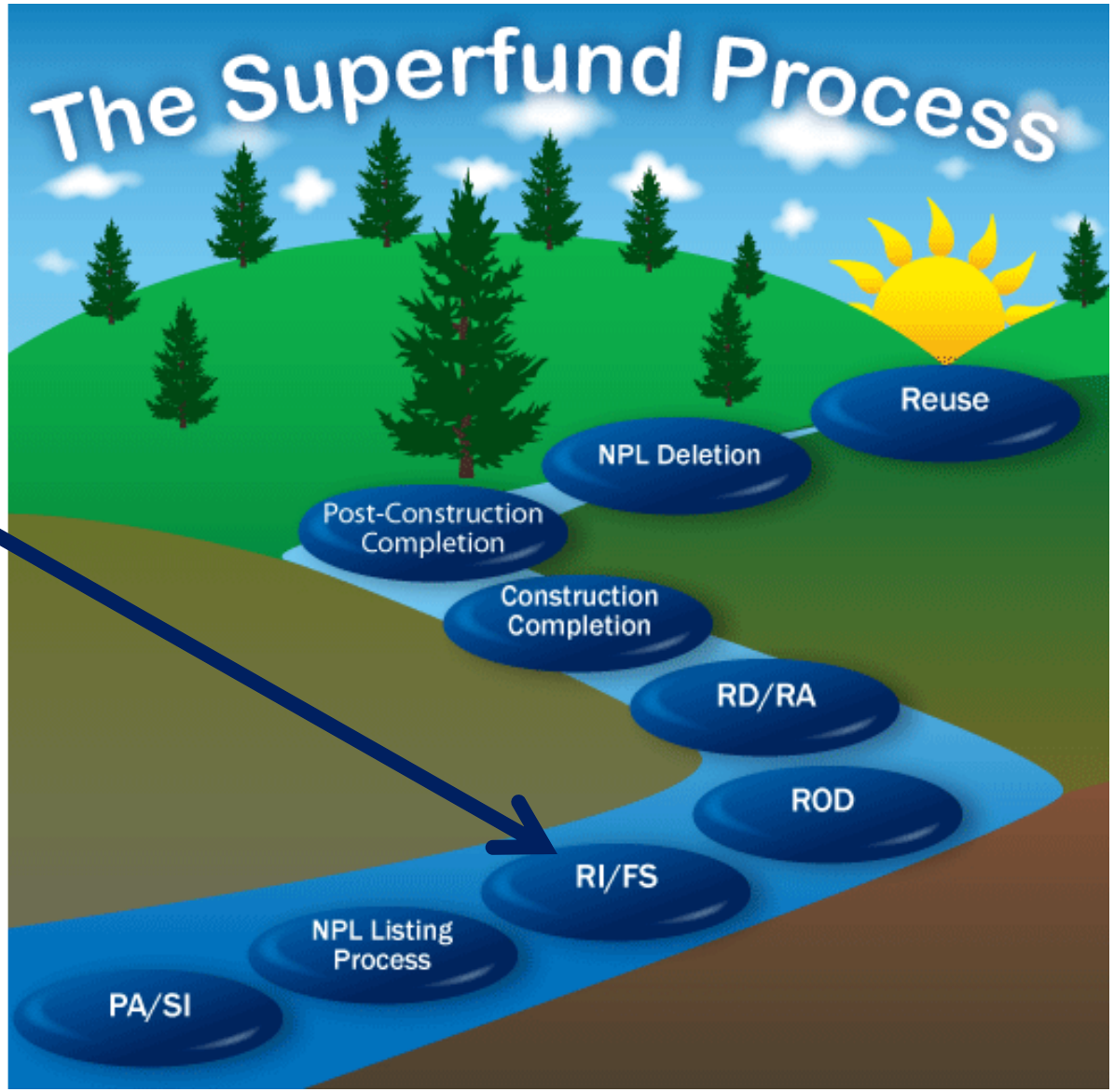
- Jennifer Ronk, Houston Advanced Research Center

Superfund Process and SJWP

Jennifer Ronk – HARC


The Superfund Process
Reuse
NPL Deletion
Post-Construction Completion
Construction Completion
RD/RA
ROD
RI/FS
NPL Listing Process
PA/SI

We Are Here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SJWP History

- pits were operated from the mid-1960's through mid-1970's to dispose of paper mill waste
- Pits went underwater sometime in the 1970's.
- In early 2005, TPWD became aware possible waste pits

History Cont.

- SJRWP, operated by McGinnis Industrial Maintenance Corporation, received wastes from the Champion Paper mill in the 1960s.
- These wastes contain dioxins, known to cause cancer, other serious illness, and birth defects. 1966

Preliminary Assessment/Site Inspection

- TCEQ began the PA/SI in summer 2005.
- Report, including sampling data analysis and other background information, was ready in early 2007.

NPL Listing Process

- Late 2007 the USEPA recommended the site be listed on the NPL
- March 19, 2008 listed on the NPL
- November 20, 2009 USEPA issued administrative order to IP and MIMC to conduct an RI/FS

RI/FS

- Currently in the middle of the RI/FI process
- RI report is scheduled to be completed at the end of February
- FS should be completed in Fall
- FS will be followed by a Proposed Plan
- There will be a public comment period after the proposed plan (Currently scheduled for Nov.)

Thank You

- Jennifer Ronk
- jronk@harc.edu
- 281/363-7927

Threats to Human Health from the Site: Pathways of Exposure

- Richard Beauchamp, M.D., Texas Department of State Health Services

San Jacinto River Waste Pits Superfund Site - Exposure Pathways Analysis

For Public Meeting 1/24/13

Richard A. Beauchamp, M.D.
Senior Medical Toxicologist
Texas Department of State Health Services
and
Agency for Toxic Substances & Disease Registry

San Jacinto River Waste Pits
Background & Contaminants of Concern

- Approximately 20 acre tract of land
- Situated on west bank San Jacinto River
- Immediately north of I-10 Bridge
- Three surface impoundments (pits)
- Received paper mill waste 1964-1973
- Contaminated with polychlorinated dibenzo-dioxins and dibenzofurans (PCDDs & PCDFs)
- Land subsided since then and two pits were inundated by water from the San Jacinto River

San Jacinto River Waste Pits (2006)

San Jacinto River Waste Pits (2007)

San Jacinto River Waste Pits (2007)

San Jacinto River Waste Pits
EPA Time-Critical Removal Action (TCRA)

- Starting in 2010, EPA fenced the site,
- Erected warning signs, &
- Installed a remote camera surveillance system
- In Feb 2011, the EPA began the TCRA
- Purpose: to stabilize the waste pits and prevent further erosion of waste pit contaminants
- EPA cleared all vegetation from the site, and
- Put down geotextile and/or geomembrane & “armor caps” over the entire site extending out 50-100 yards or more into the river.

San Jacinto River Waste Pits (2011)

San Jacinto River Waste Pits (SJRWP)
Public Health Assessment – Data Sources

- DSHS evaluated 7 on-site samples and 4 off-site samples from the Hazard Ranking System (HRS) Documentation Record collected by the TCEQ
- Also evaluated 2 on-site samples and 208 off-site samples from 84 locations in the SJR, HSC, & UGB collected by the University of Houston under the Dioxin TMDL Project (2002-2005)
- Also evaluated 9 fish & crab samples collected near the site & the I-10 bridge by the DSHS SALG (2004)

SJRWP Public Health Assessment

TCDD TEQ Levels in Sediments

Sediment Sample Collection General Location	Count	Avg (pg/g)	Min (pg/g)	Max (pg/g)
SJRWP, On-Site Samples	9	15,594	80.92	34,028
Down-Stream from SJRWP, in SJR, HSC, & UGB	59	13.75	0.739	86.16
SJRWP Site-Vicinity, SJR Near the SJRWP	31	82.24	1.997	572.5
Houston Ship Channel, Above/West of SJR	62	65.69	4.904	856.8
Up-Stream & Tributaries to SJR, HSC, or UGB	56	15.97	0.759	102.9
All Off-Site Samples	208	40.04	0.739	856.8

SJRWP Public Health Assessment

Dioxin Levels in Fish/Crabs

Fish or Shellfish Species	Count	Average (pg/g)
Blue Crab	2	3.107
Blue Catfish	2	6.04
Spotted Seatrout	2	0.233
Hybrid Striped Bass	1	1.541
Red Drum	2	0.097
All Fish Species	7	2.04
All Species	9	2.277

SJRWP Public Health Assessment

Exposure Pathway Analysis

- Living near the SJRWP Superfund Site does not necessarily equate to an exposure to site contaminants.
- Exposure requires more than just proximity to a contaminant reservoir.
- There must be a mechanism for contaminant to move from the reservoir (site) into a person's body in sufficient quantities to be of toxicological concern.
- There are a limited number of ways that toxicants get into the body: inhalation, ingestion, and skin absorption.

SJRWP Public Health Assessment

Exposure Pathway Analysis - Air

- PCDDs/PCDFs (dioxins) have very low volatility, so dioxin vapor exposures are not a concern.
- Site is in tidal area of river & never really dries out to the point where wind-blown dust would be a concern.
- Before the TCRA, site was covered with thick vegetation which also minimizes the potential for dust formation.
- But what if?

SJRWP Public Health Assessment

Exposure Pathway Analysis – Air (cont.)

- What if scenario:
- Sediment with average site dioxin level of 15,594 pg/g soil dried out and converted into dust.
- Strong wind was blowing dioxin dust from site to nearby neighborhoods at 100 µg dust per m3 air.
- Constantly, 24 hours per day, 365 days per year, for 70 years.
- Inhalation rate, 20 m3/day; body weight, 70 kg; Ca slope factor, 1.5E5.
- Theoretical cancer risk would be 6.68E-5 (roughly 1 in 14,900 people exposed)
- (15,594 x 100 x 1E-6 x 20 / 70 x 1E-9 x 1.5E5 = 6.68E-5)
- Conclusion: dioxin vapor exposures or wind-blown dust exposures are of absolutely no concern for the SJRWP site.

SJRWP Public Health Assessment
Exposure Pathway Analysis - Groundwater

- PCDDs/PCDFs (dioxins) have very low solubility, (dioxins do not dissolve readily in water)
- Dioxins attach firmly to soil/sediment particles & do not migrate significantly in groundwater.
- Only shallow (<60 feet) GW directly under site showed any significant dioxin levels.
- Deeper GW (>80 feet) on-site showed no significant contamination.
- Off-site shallow GW and off-site deeper GW showed no significant dioxin contamination.
- Conclusion: There is no evidence to indicate that GW exposures are a significant possibility for this site (even for nearby residents using private wells).
- But what if?

SJRWP Public Health Assessment

Pathway Analysis – Groundwater (cont.)

- Residents have expressed concern Re dioxins in surface water moving up-stream or crossing the river and getting into GW in Channelview or Highlands as a result of flooding or Hurricane Ike.
- In regular flooding events, water is predominantly moving slowly down-stream.
- The river "backs-up" figuratively, due to rainwater run-off flowing in faster than the river can carry it down-stream to the Gulf.
- Storm-surge during Hurricane Ike caused millions (billions?) of gallons seawater to flow up-stream, causing major flooding in the Channelview/Highlands area.
- Scouring of contaminated sediments from the site would have been massively diluted and most would have moved back down-stream as the flood waters subsided.
- Conclusion: There is no evidence to indicate that GW is likely to have been significantly affected in Channelview or Highlands as a result of these flooding events.

SJRWP Public Health Assessment

Exposure Pathway Analysis – Surface Water

- PCDDs/PCDFs (dioxins) have very low solubility, (dioxins do not dissolve readily in water).
- Dioxins attach firmly to soil/sediment particles & would appear in surface water primarily as suspended sediments.
- The highest level of dioxin found in the Dioxin TMDL Study was collected from beneath the I-10 bridge (immediately down-stream of the SJRWP site.
- This level was 3.09 pg/L of water.
- A person consuming 2 L/day of this water for a lifetime would have a theoretical increased risk for cancer of 6.6E-6 (roughly 1 in 152,000 persons exposed).
- The exposure for a person swimming in the water would be considerably lower than for drinking the water.
- Conclusion: There is no evidence to indicate that SW exposures are a significant risk for this site (even for people drinking or swimming in the water).

SJRWP Public Health Assessment

Pathway Analysis – Soil/Sediment Ingestion

- Dioxins in site sediments averaged 15,594 pg/g (highest levels were in the pits, with much lower levels along the berm).
- Off-site sediment levels around the Riverside Inn Marina and the railroad trestle are approximately 1,000 times lower.
- Risk for people visiting the site would be from transferring sediments from hands to the mouth.
- Young children may transfer up to 200 mg of soil/sediment to the mouth per day (older children & adults generally ingest 100 mg/day or less).
- Maximum exposures would be for people visiting the site 260 or more days per year for 37 years (up to before the TCRA).
- The theoretical increased risk for cancer would be approximately 2.37E-3 (roughly 1 in 423 people exposed).
- Conclusion: There is clear evidence that on-site sediment ingestion exposures could cause excessive Ca risk. Off-site/up-stream exposures, however would not produce a significant excess risk.

SJRWP Public Health Assessment

Pathway Analysis – Soil/Sediment Dermal

- Dioxins in site sediments averaged 15,594 pg/g (highest levels were in the pits, with much lower levels along the berm).
- Off-site sediment levels around the Riverside Inn Marina and the railroad trestle are approximately 1,000 times lower.
- Risk for people visiting the site would be from getting sediments on the hands, forearms, feet, and legs with subsequent dermal absorption of dioxins.
- Maximum exposures would be for people visiting the site 260 or more days per year for 37 years (up to before the TCRA).
- The theoretical increased risk for cancer would be approximately 4.43E-3 (roughly 1 in 226 people exposed).
- Conclusion: There is clear evidence that on-site sediment exposures could cause excessive risk through dermal absorption. Off-site/up-stream exposures, however would not produce a significant excess risk through dermal absorption.

SJRWP Public Health Assessment

Pathway Analysis – Fish/Crab Consumption

- Dioxins in fish & crabs caught near the I-10 bridge contained an average of 2.277 pg/g of edible fish tissue.
- Risk may result from people catching and eating fish caught anywhere near the I-10 bridge (fish may swim considerable distances up or down-stream).
- Maximum exposures would be for subsistence fishermen eating fish/crabs caught near the site 260 or more days per year for 47 years (Dioxin levels are not expected to change dramatically in the near future, due to numerous additional off-site dioxin sources throughout the SJR, HSC, & UGB waterways).
- The theoretical increased risk for cancer would be approximately 3.91E-4 (roughly 1 in 2,560 people exposed).
- Conclusion: There is clear evidence that daily consumption of fish/crabs caught from the SJR, HSC, or UGB could cause excessive risk for cancer through the ingestion pathway.

SJRWP Public Health Assessment
Most Likely Pathways for Significant Exposure

- Daily or near-daily oral contact with contaminated on-site sediments through hand-to-mouth transfer
- Daily or near-daily dermal absorption of contaminants through skin contact with on-site sediments
- Daily or near-daily ingestion of fish/crabs from the SJR, HSC, or UGB containing elevated levels of dioxins and furans

SJRWP Public Health Assessment

Eliminated Pathways for Exposure

- Airborne contaminated dust is unlikely due to heavy vegetation cover on site & low volatility for congeners with dioxin-like toxicity
- Groundwater exposure unlikely – few nearby wells used as drinking water source, shallow groundwater brackish, dioxins tightly bound to sediments, no significant dioxin migration to potable aquifer.
- GW unlikely to have been significantly affected due to regular flooding or Hurricane Ike flooding.
- Surface water ingestion unlikely – waters are brackish & dioxins tightly bound to sediments, surface water dioxin concentrations are very low.

SJRWP Public Health Assessment

- The Public Health Assessment document (Final Release) is available on-line at:
- www.dshs.state.tx.us/epitox/posted and at

- Stratford Branch Library
- 509 Stratford Street
- Highlands, Texas 77562-2547

- Pasadena Public Library
- 1201 Jeff Ginn Memorial Drive
- Pasadena, TX 77506

Review of the Clean Up Process at the Site Thus Far

-Jennifer Ronk, Houston Advanced Research Center

SJWP Clean up process

What has been done & what it means going forward

Time Critical Removal Action

- Purpose was to limit the ongoing release of contaminants into the San Jacinto River
- Waste materials were covered
- Monitoring of cap is ongoing

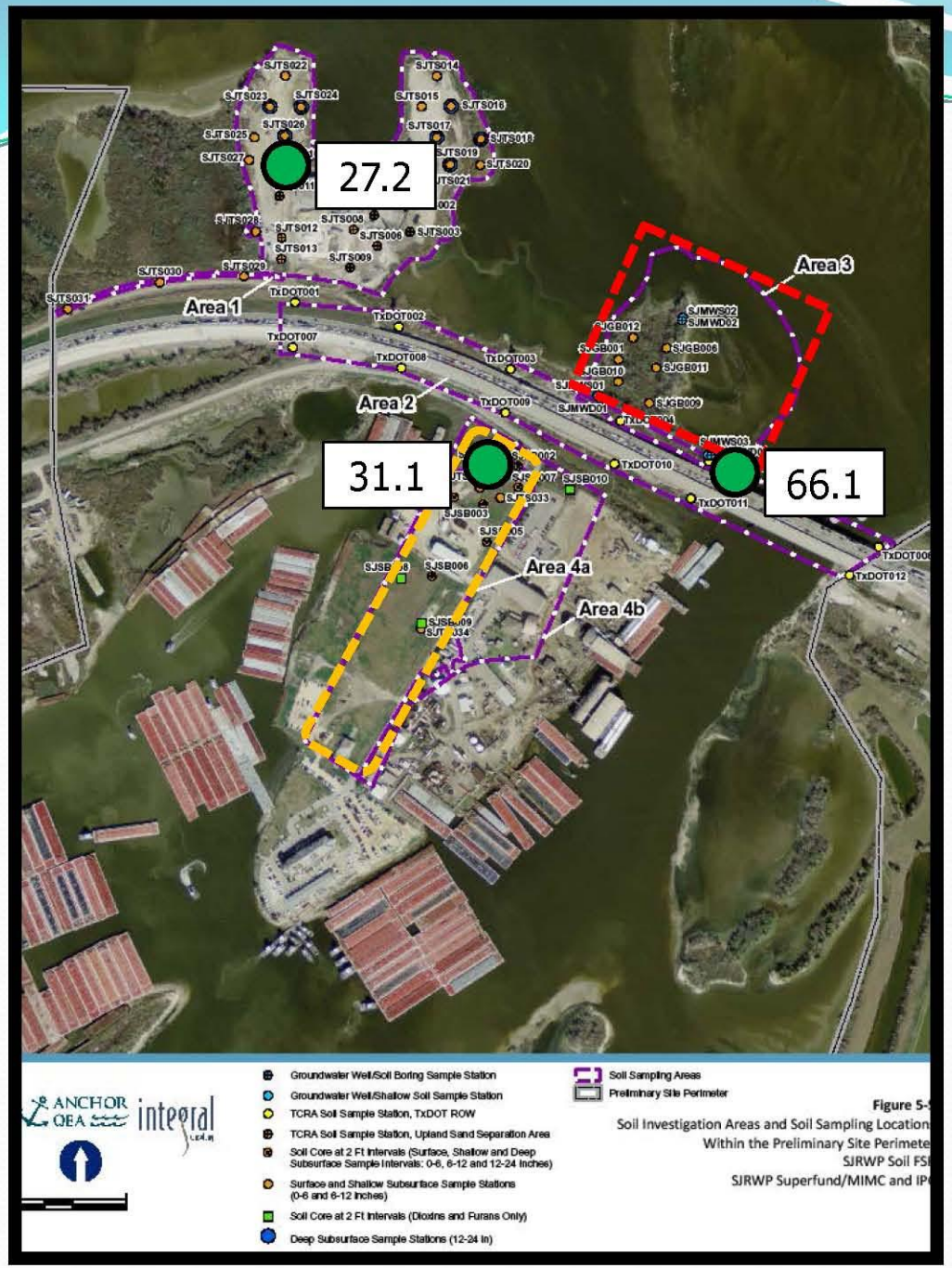
Cap Damage Reported in 2012 &2013

Cap repair with trackhoe placing rock over area with erosion

Dump truck off loading rock for placement

Remedial Investigation

- Characterize the nature and extent of contamination
- Perform human health and ecological risk assessments
- Evaluate the physical processes related to the fate and transport of Site-related contaminants
- Develop and evaluate potential remedial alternatives for the Site



San Jacinto River Waste Pits Superfund Site

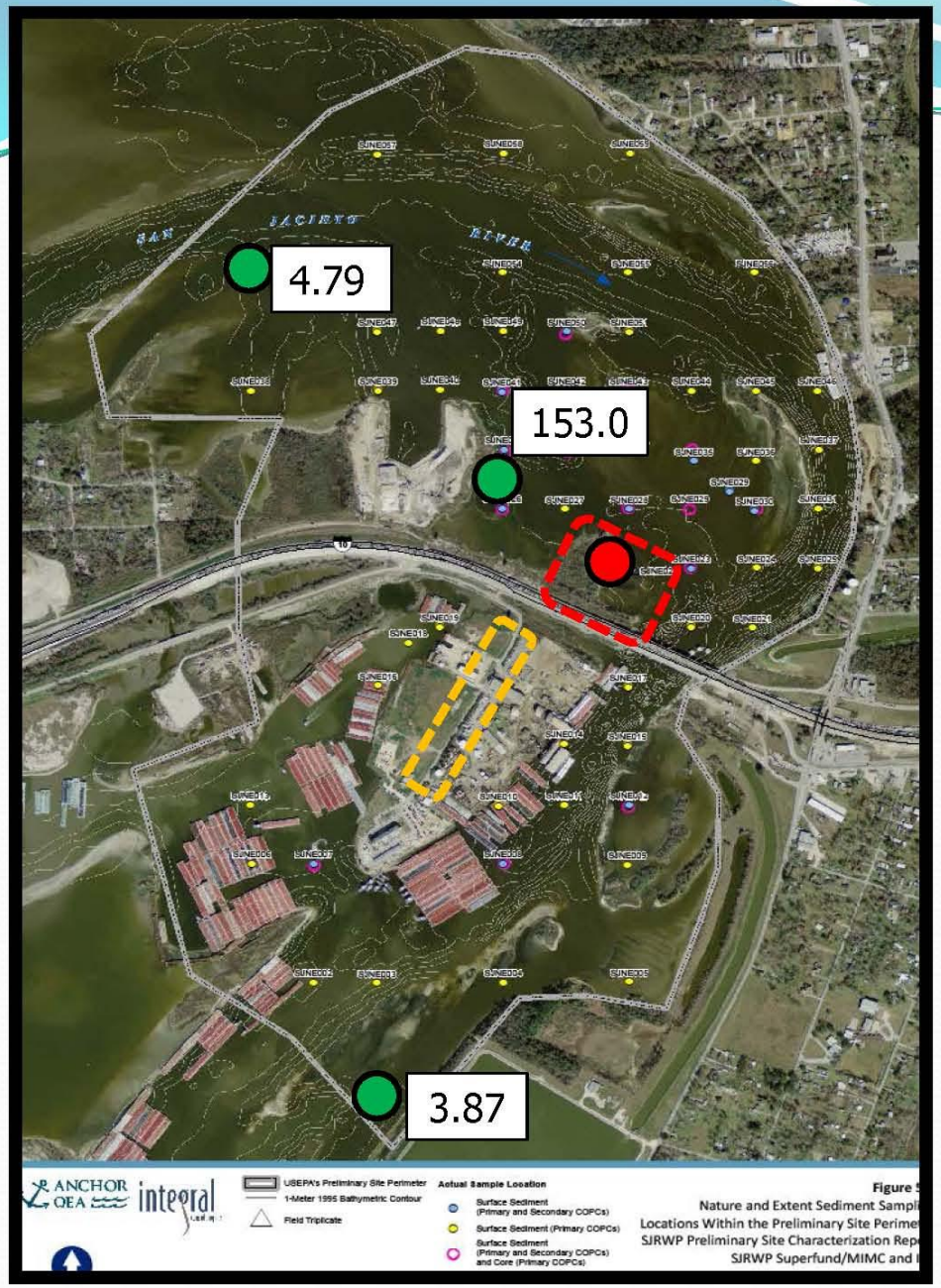
205 Soil samples within preliminary site boundary.

Waste Pits

Southern Impoundment

Surface soil - ng/kg TEQ_{DF} Dioxin

EPA United States Environmental Protection Agency



San Jacinto River Waste Pits Superfund Site

240 River sediment samples within preliminary site boundary.

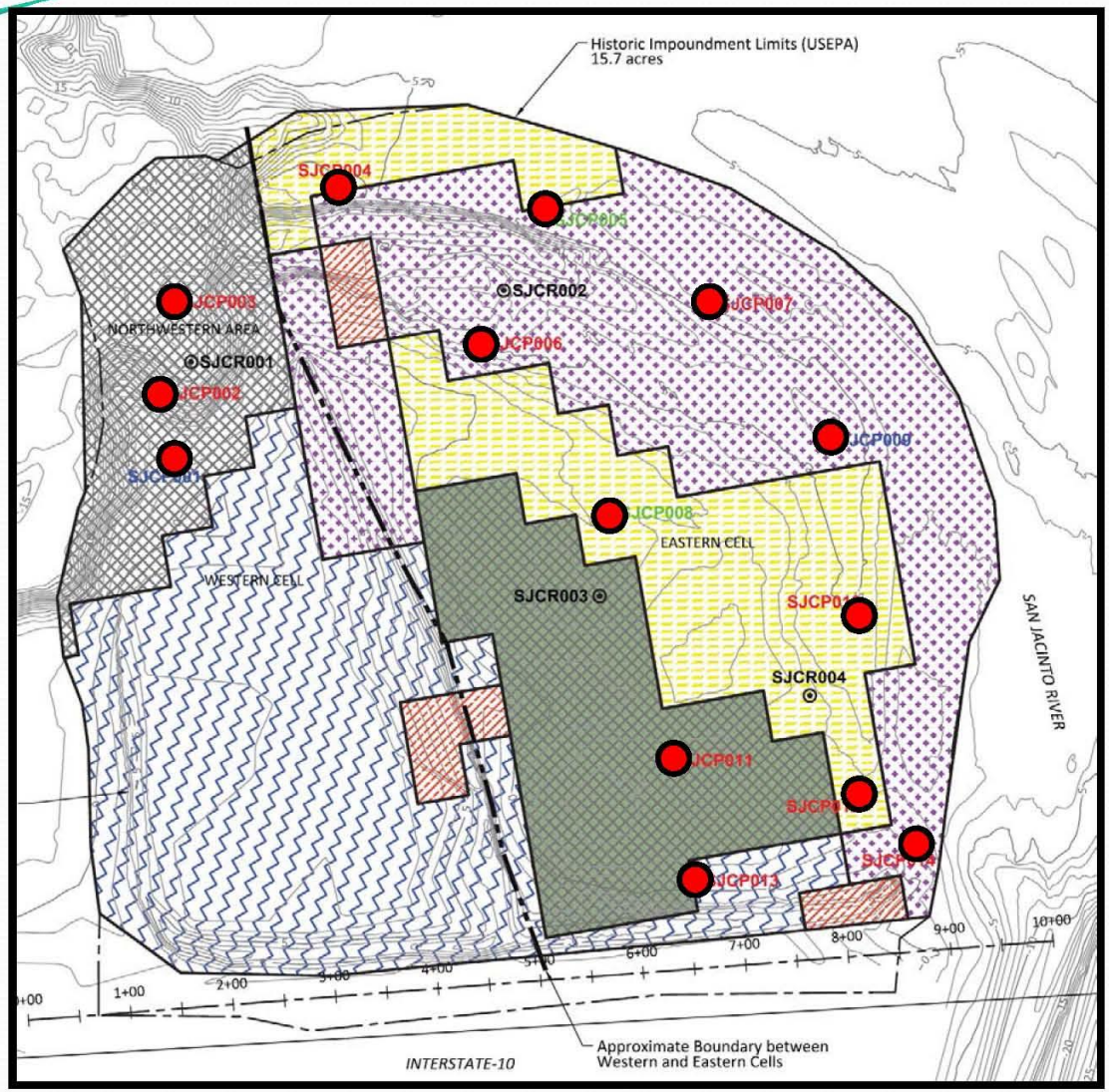
Waste Pits

Southern Impoundment

31,600 ng/kg TEQ_{DF} Dioxin

Sediment - ng/kg TEQ_{DF} Dioxin

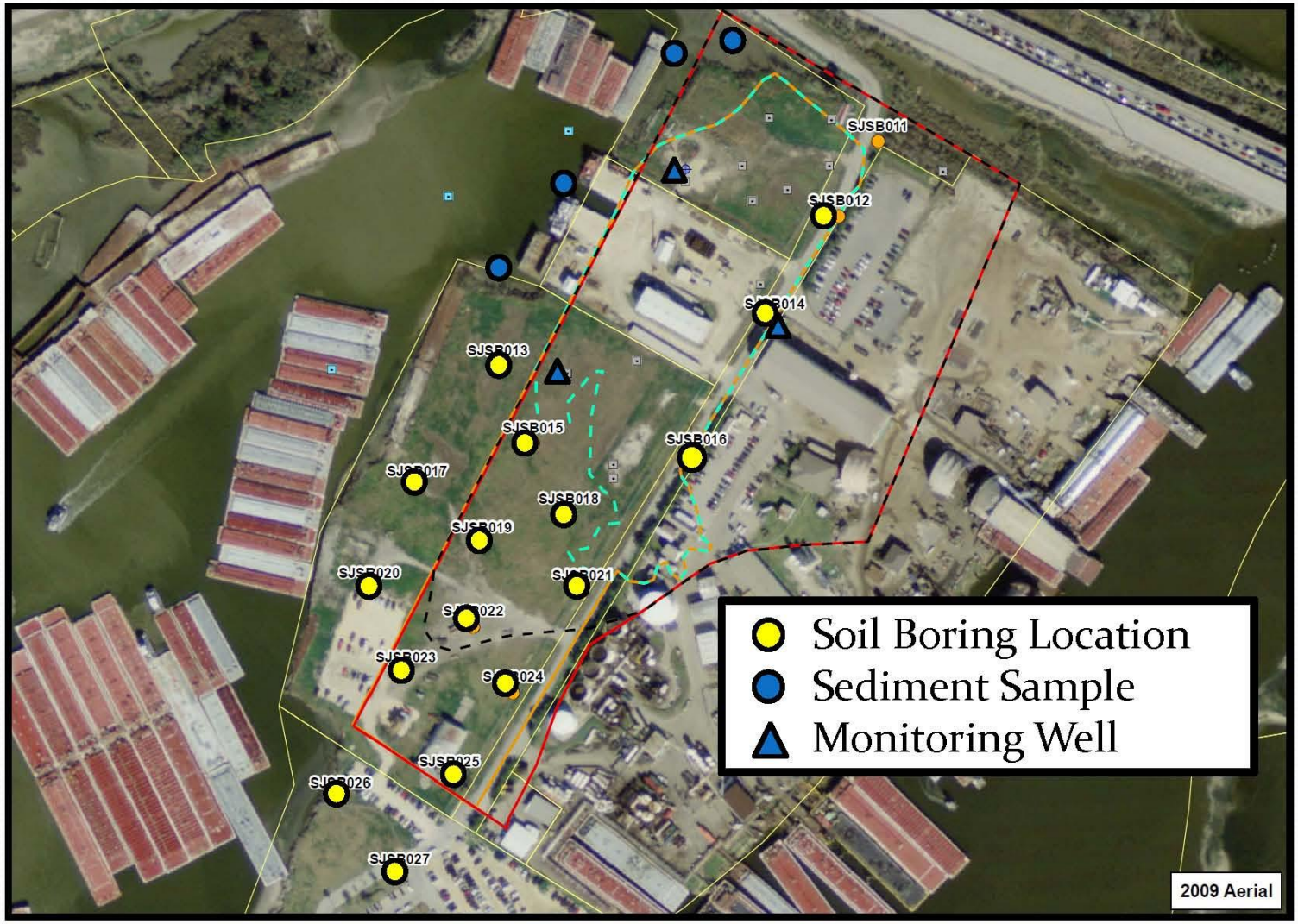
EPA United States Environmental Protection Agency



Waste Pits Cap Porewater Sampling Locations

EPA United States Environmental Protection Agency

Southern Impoundment Sample Locations



Final Remedy

- The Responsible Parties have identified possible remediation and disposal technologies.
- These will be further evaluated in the Feasibility Study.
- Options reviewed:
  - Institutional Controls – eg. access and property use restrictions
  - Monitored/Enhanced natural recovery
  - Capping
  - Treatment in-place
  - Removal and treatment
  - Disposal

What's Next

- A "Final Remedy" has not been selected
- After the RI/FS there will be a Proposed Plan
- The public will have an opportunity to comment on the proposed plan, currently scheduled for November

The Superfund Process Going Forward and How You Can Be Involved

-Scott Jones, Galveston Bay Foundation

Going Forward – How You Can Be Involved

Scott Jones – Galveston Bay Foundation

Remedial Investigation and Feasibility Study (RI/FS)

- Ask questions about the site.
- Read websites and documents – final RI in April, final FS in October.
- Participate in public meetings.
- Once the FS is completed and the Proposed Plan is issued:
  - Provide comments on plans for cleanup – November.
  - Read EPA's Responsiveness Summary to find out how the EPA plans to address major concerns raised in community members' comments.
  - Invite EPA to attend community events to discuss the site and the Proposed Plan.

Record of Decision (ROD)

- Inform EPA about how the community wants the site to be used in the future.
- Read the ROD for cleaning up the site.
- Participate in any public events on the ROD.
- Ask questions or request more information.

Remedial Design/Remedial Action (RD/RA)

- Learn about the final design for the cleanup by attending public events or reading the information EPA distributes.
- Work through your TAG to stay informed about the progress of the cleanup.
- Attend periodic public events about progress at the site. If you can't attend, read site information.
- Contact TAG or EPA with questions or comments.

Technical Assistance Grant

- Being involved means attending meeting, reading documents, and providing comments
- There is a lot of information, and sometimes it can be very technical.
- The TAG is here to help you understand the information, answer questions, and help you! We are providing summaries and independent review, but if there is something more we can do, please ASK.

Thank You!

The Broader Picture: Dioxin in the Bay System and Tributaries

-Linda Broach, Texas Commission on Environmental Quality

DIOXIN IN THE GALVESTON BAY SYSTEM AND TRIBUTARIES

Linda Broach, PhD

Texas Commission On Environmental Quality

DIOXIN SOURCES

- Combustion
  - Burning of Trash in Backyard Barrels ★
  - Municipal, Medical, or Industrial Waste combustion
  - Power generation – including cars and trucks
- Metals Smelting
- Chemical Manufacturing
  - PVC, ethylene dichloride, vinyl chloride
  - Paper and pulp mills
- Natural Sources
- Environmental Reservoirs

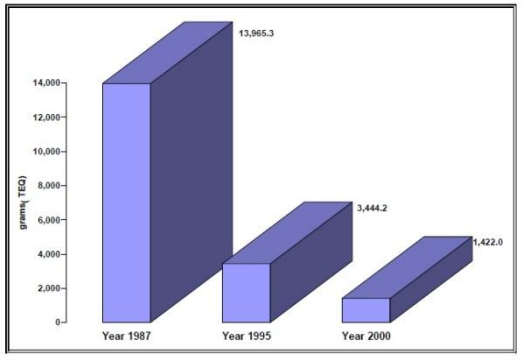


Figure ES-1. Total environmental releases of dioxin-like compounds (g TEQ) from all quantifiable sources during 1987, 1995, and 2000.

★Highest source in 2000

DIOXIN RELEASES OVER TIME

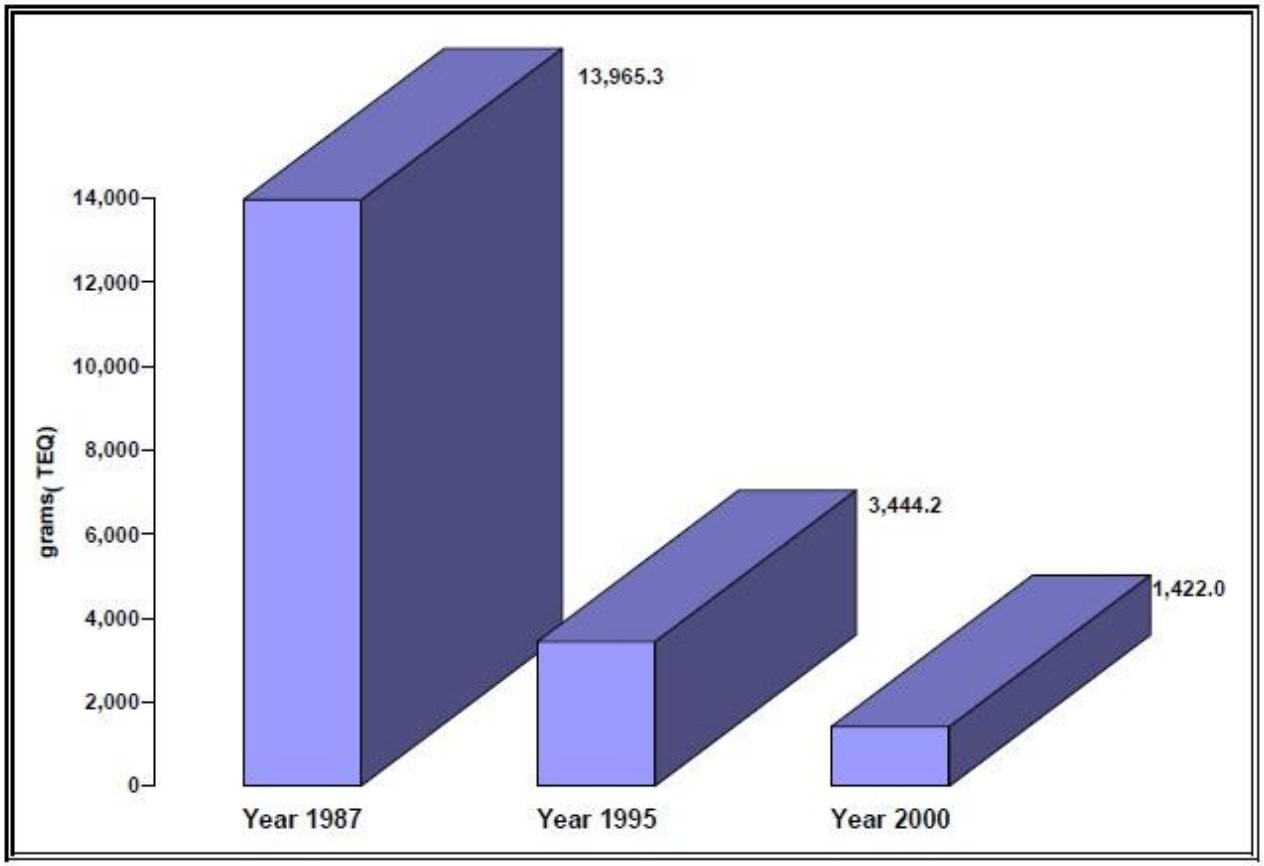
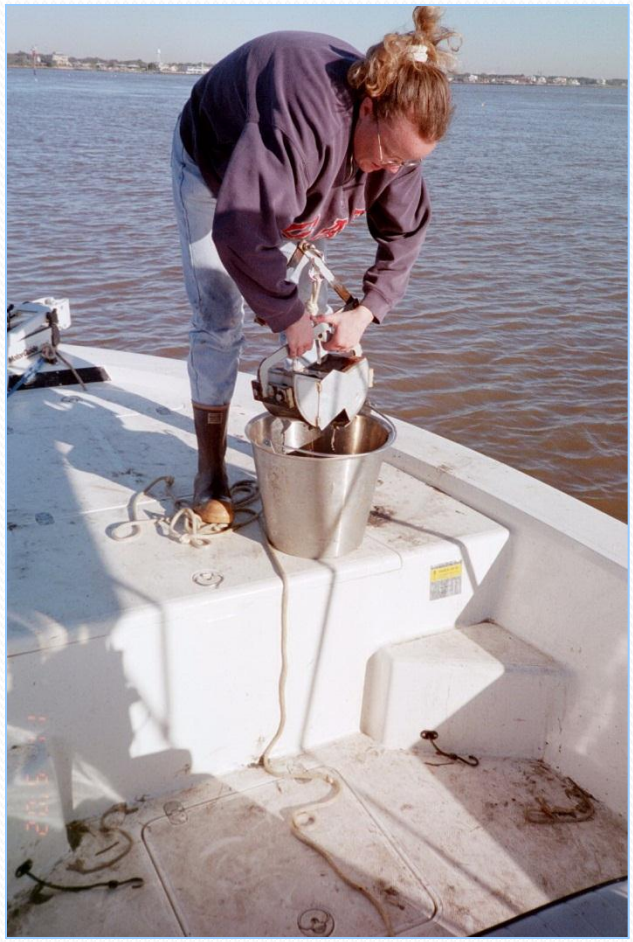


Figure ES-1. Total environmental releases of dioxin-like compounds (g TEQ) from all quantifiable sources during 1987, 1995, and 2000.

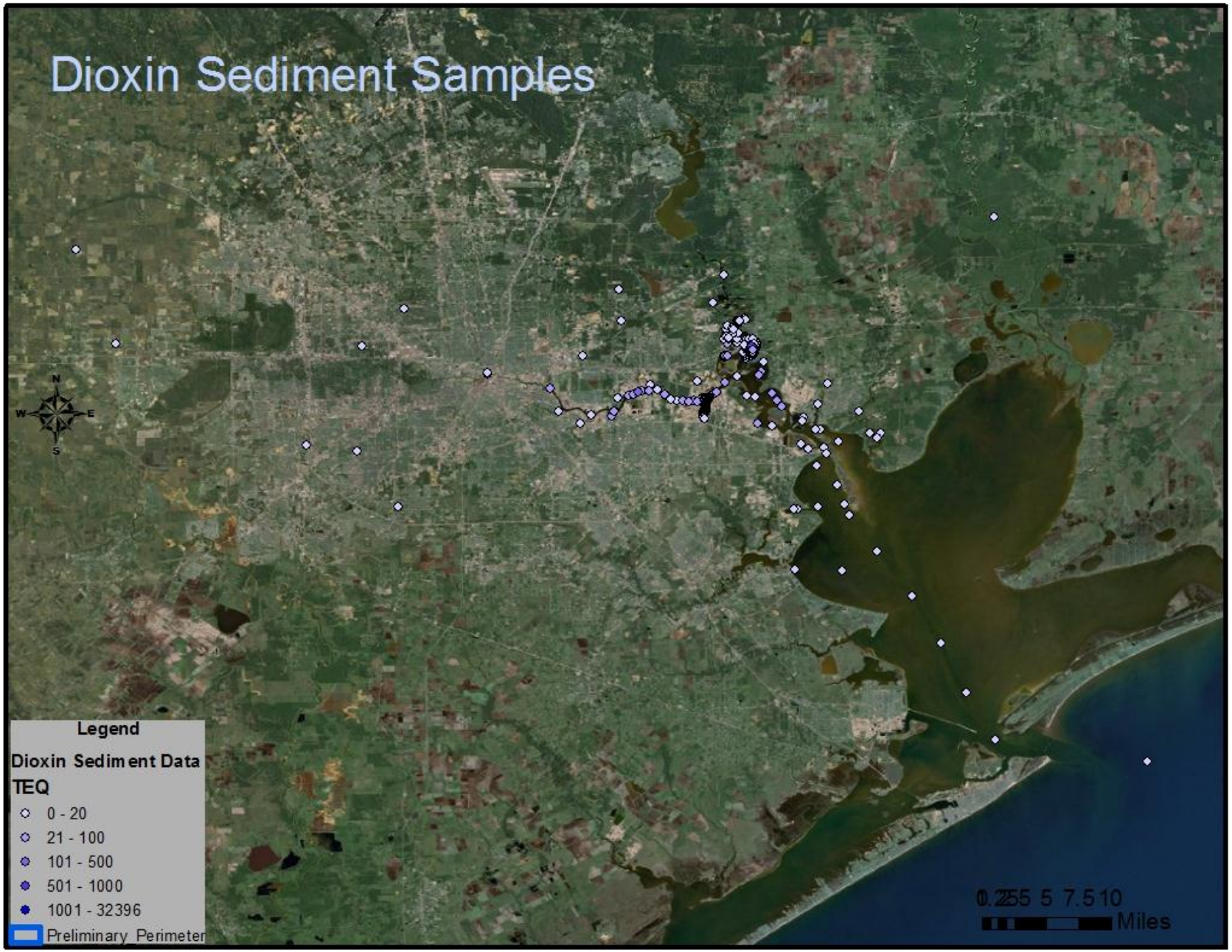
from a 2006 EPA study

SEDIMENT



Picture from University of Houston

- Much higher concentrations than in water
- More stable concentrations
- Primary source for food chain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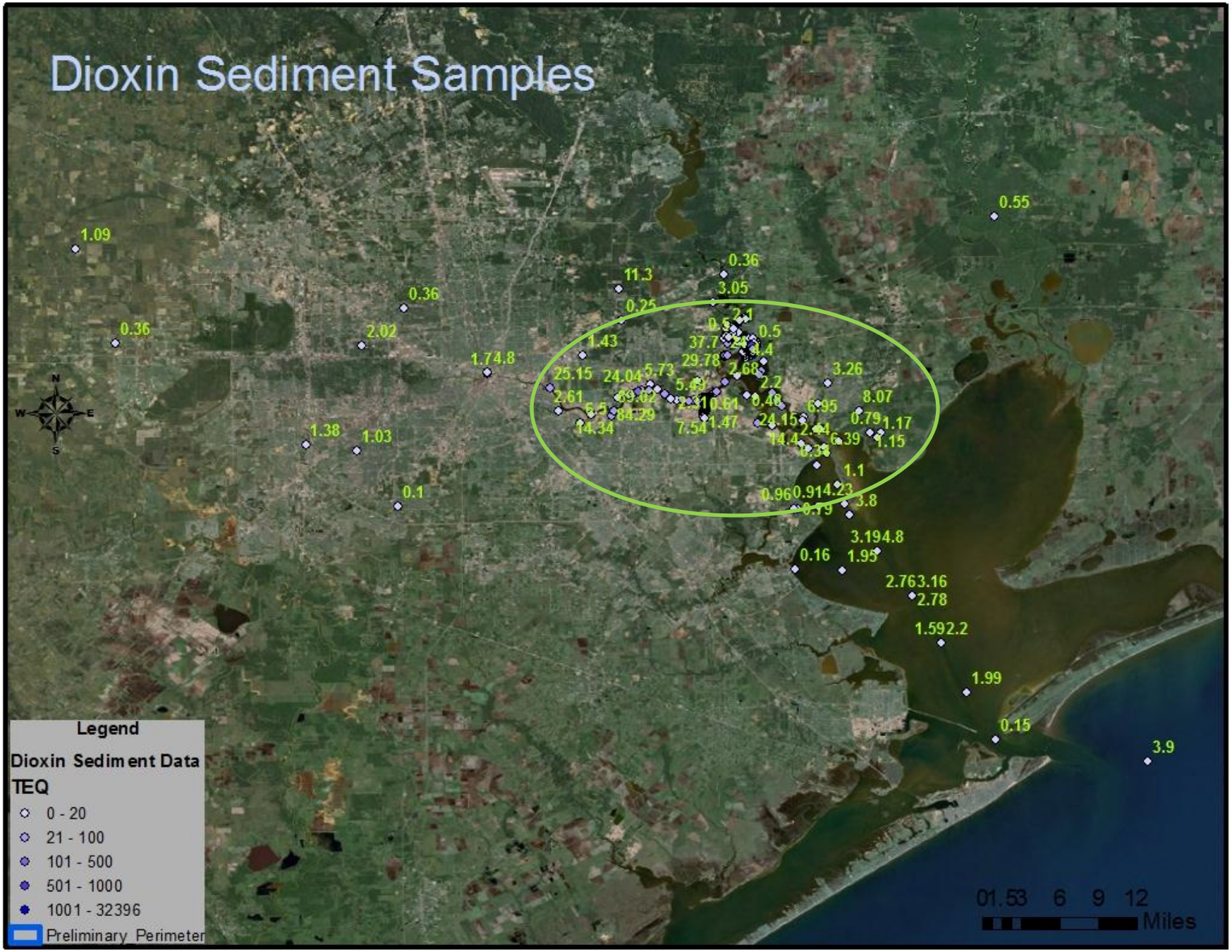
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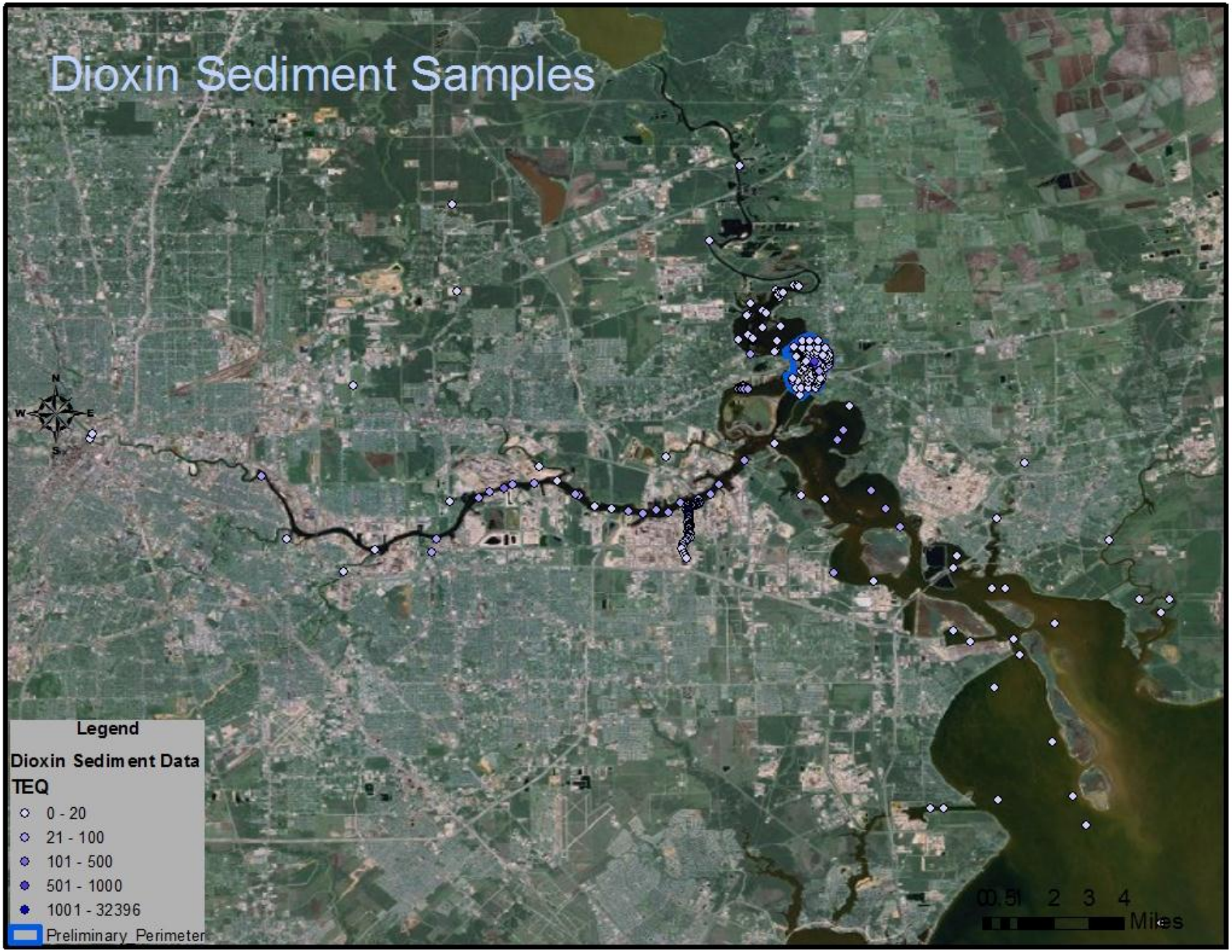
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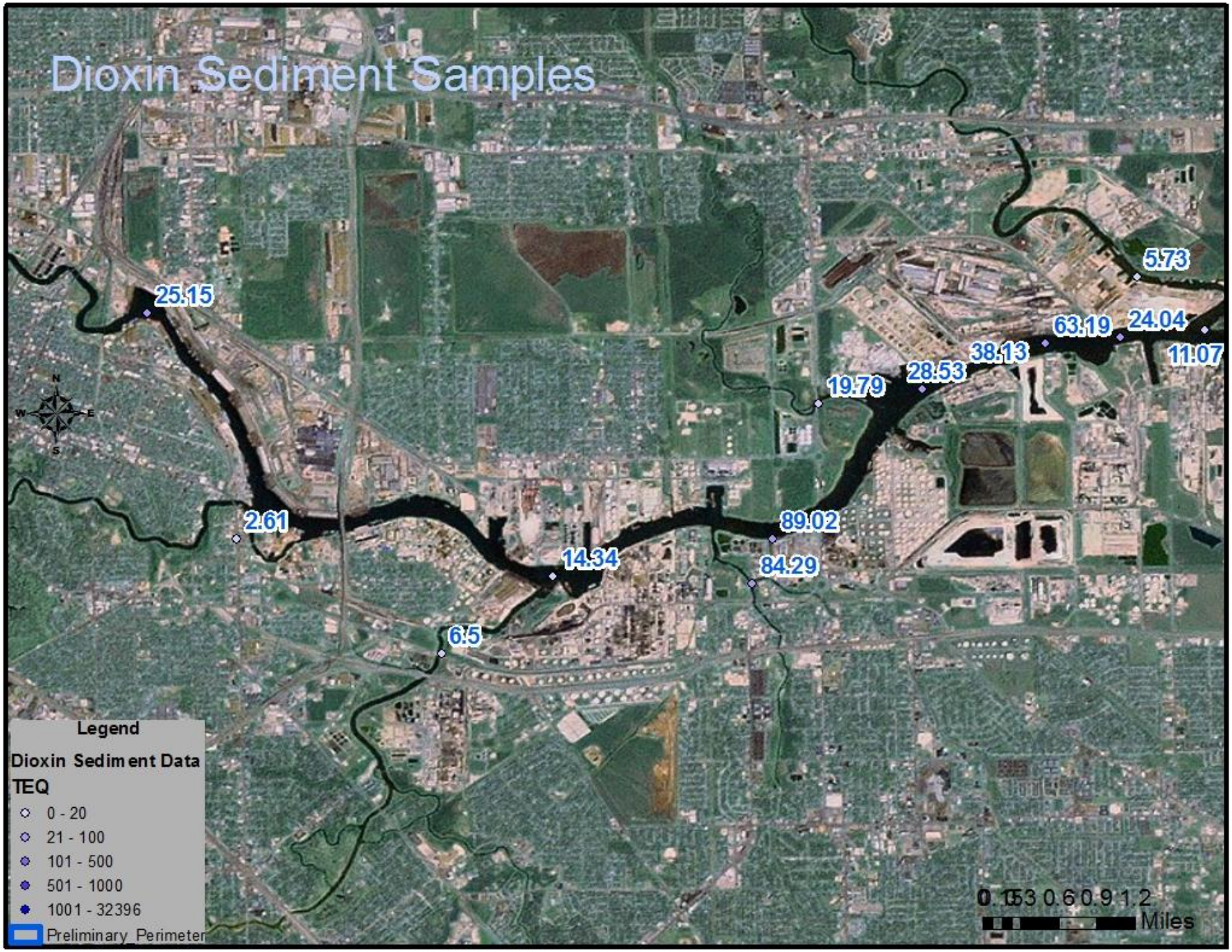
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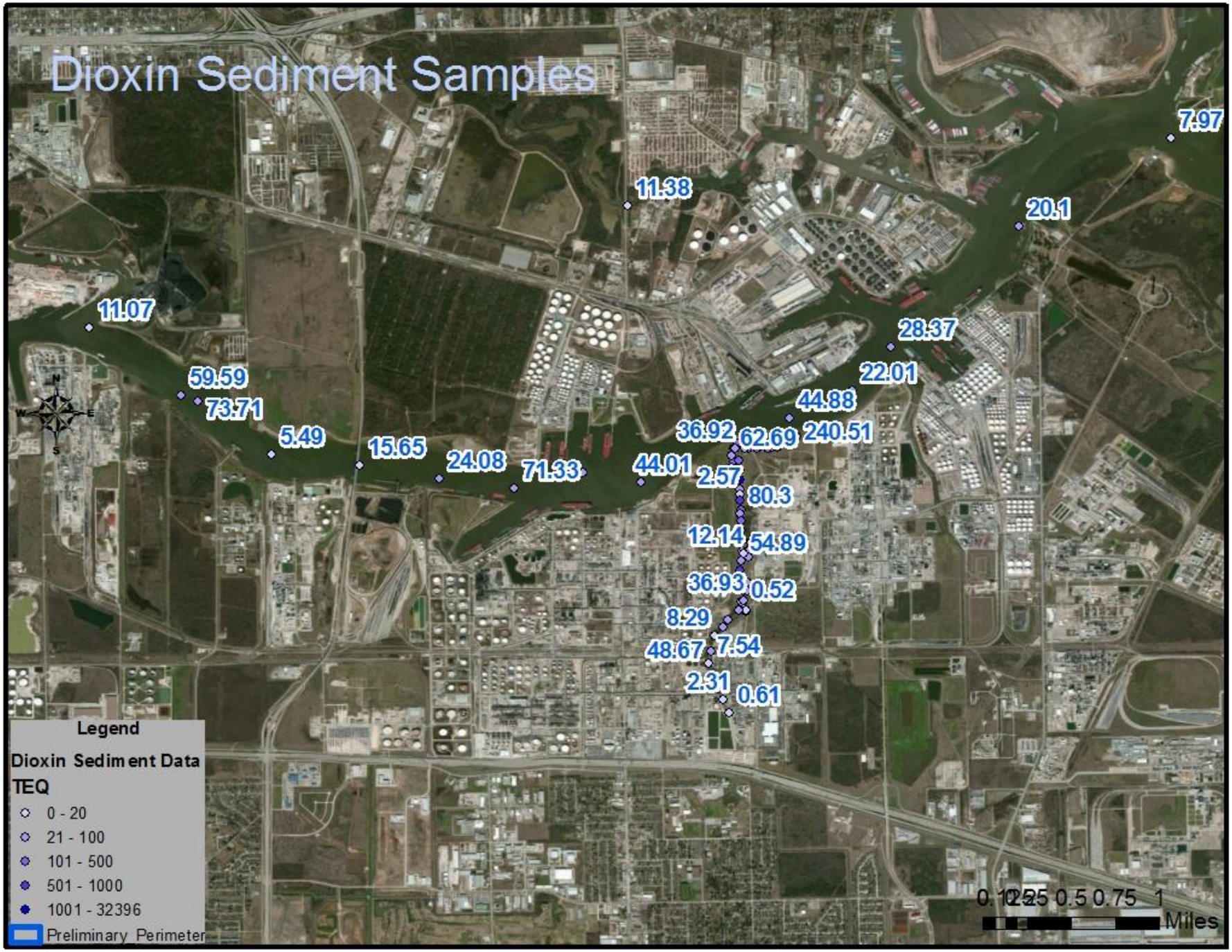
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Dioxin Sediment Samples
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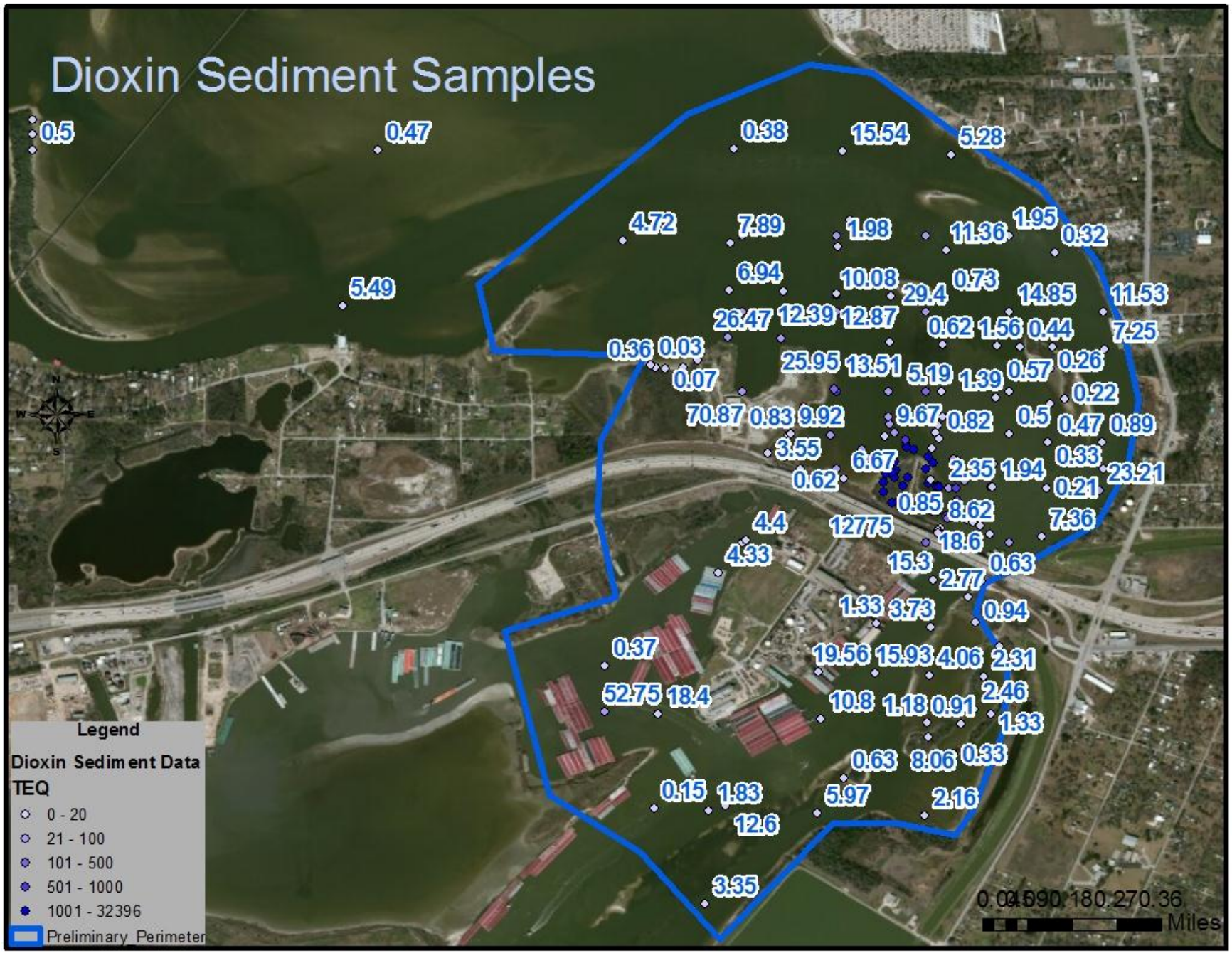
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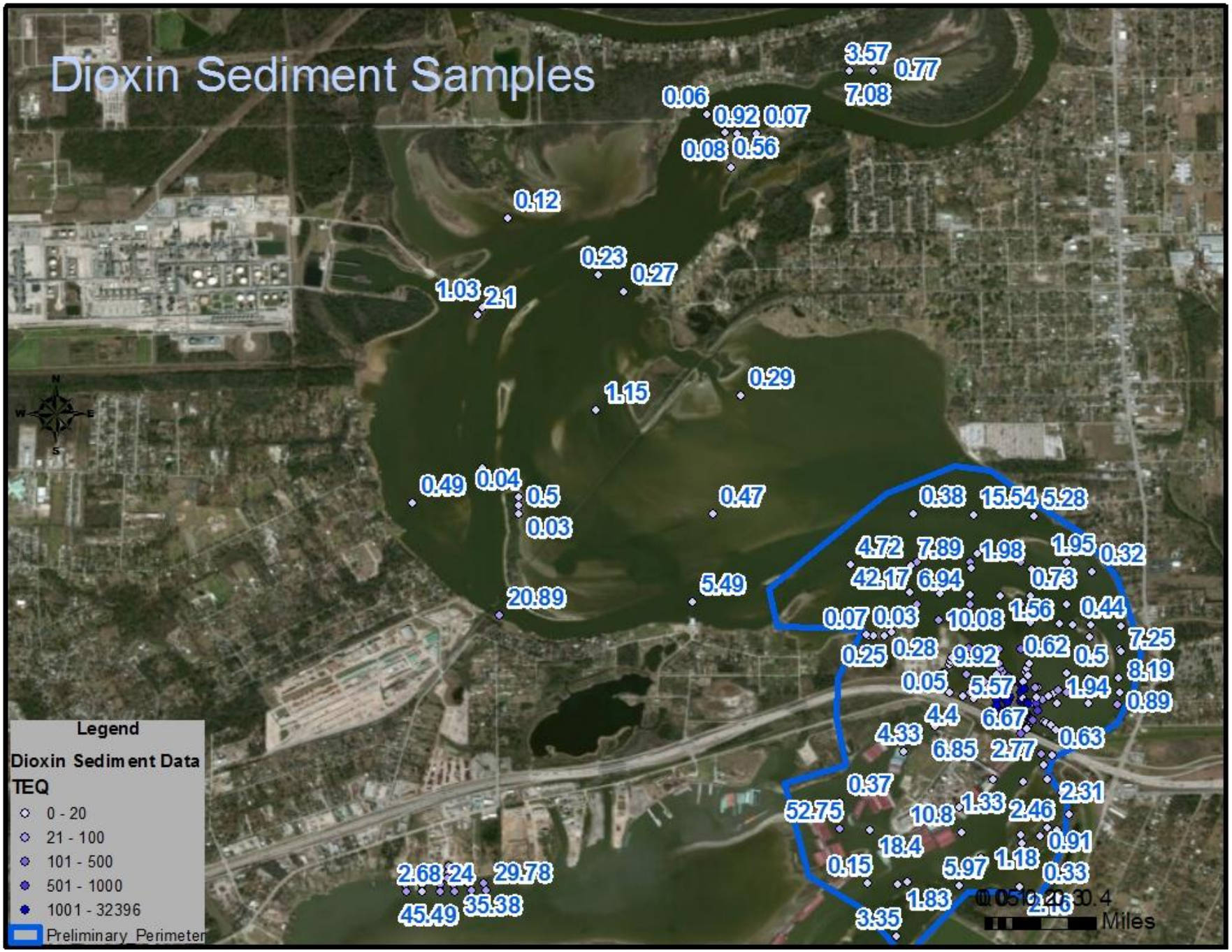
1.33
0.63
8.06
0.33
0.15
1.83
5.97
2.16
12.6
3.35
Legend
Dioxin Sediment Data
TEQ
0 - 20
21 - 100
101 - 500
501 - 1000
1001 - 32396
Preliminary Perimeter
0 0.045 0.09 0.18 0.27 0.36
Miles


Dioxin Sediment Samples
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0.77
7.08
0.06
0.92
0.07
0.08
0.56
0.12
0.23
0.27
1.03
2.1
0.29
1.15
0.49
0.04
0.5
0.03
0.47
0.38
15.54
5.28
4.72
7.89
1.98
1.95
0.32
42.17
6.94
0.73
5.49
20.89
0.07
0.03
10.08
1.56
0.44
7.25
0.25
0.28
9.92
0.62
0.5
8.19
0.05
5.57
1.94
0.89
4.4
6.67
4.33
6.85
2.77
0.63
0.37
2.31
52.75
10.8
1.33
2.46
18.4
0.91
0.15
5.97
1.18
0.33
1.83
2.46
3.35
2.68
24
29.78
45.49
35.38
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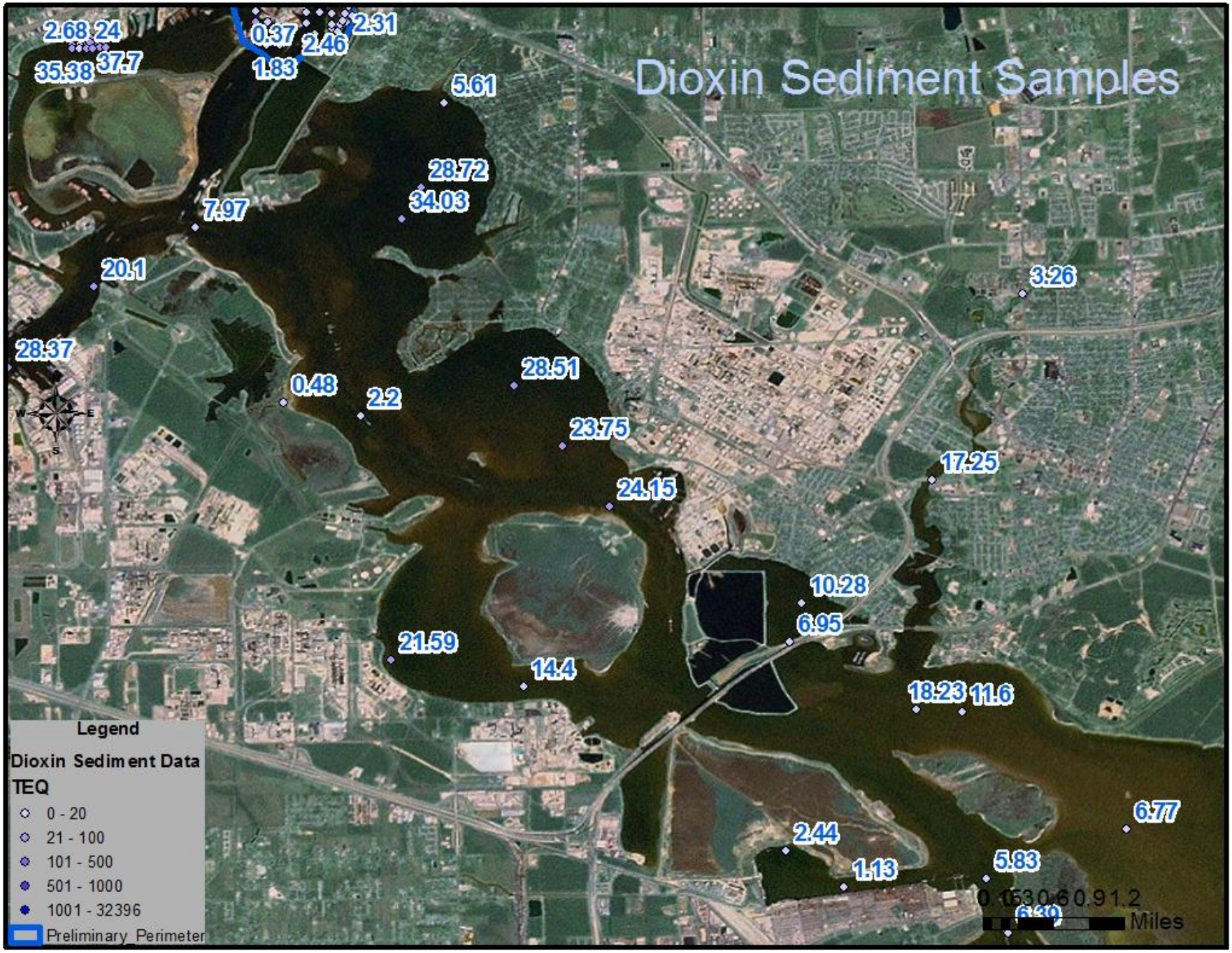
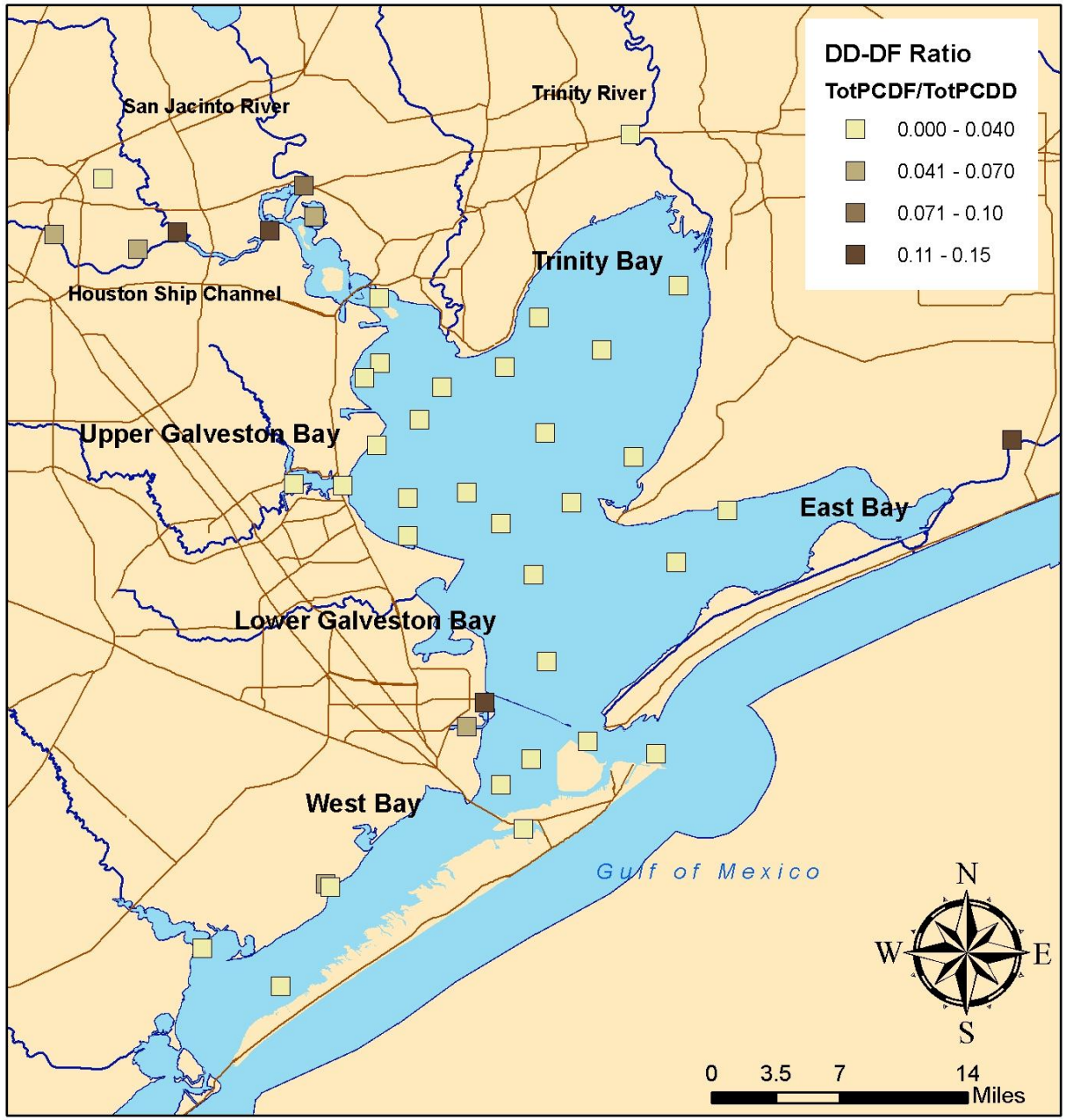
Legend
Dioxin Sediment Data
TEQ
0 - 20
21 - 100
101 - 500
501 - 1000
1001 - 32396
Preliminary Perimeter
Miles


Dioxin Sediment Samples
2.68
24
35.38
37.7
0.37
2.46
2.31
1.83
5.61
28.72
34.03
7.97
20.1
3.26
28.37
28.51
0.48
2.2
23.75
17.25
24.15
10.28
6.95
21.59
14.4
18.23
11.6
6.77
2.44
5.83
1.13
6.30
Legend
Dioxin Sediment Data
TEQ
0 - 20
21 - 100
101 - 500
501 - 1000
1001 - 32396
Preliminary_Perimeter
0 0.3 0.6 0.9 1.2
Miles


Dioxin Sediment Samples
0.48
2.2
28.51
23.75
24.15
17.25
8.07
10.28
6.95
21.59
14.4
18.23
11.6
1.15
0.79
1.17
6.77
2.44
1.13
5.83
6.39
6.34
1.1
0.91
4.23
0.96
0.79
3.8
N
W
E
S
Legend
Dioxin Sediment Data
TEQ
0 - 20
21 - 100
101 - 500
501 - 1000
1001 - 32396
Preliminary Perimeter
0 0.4 0.8 1.2 1.6
Miles

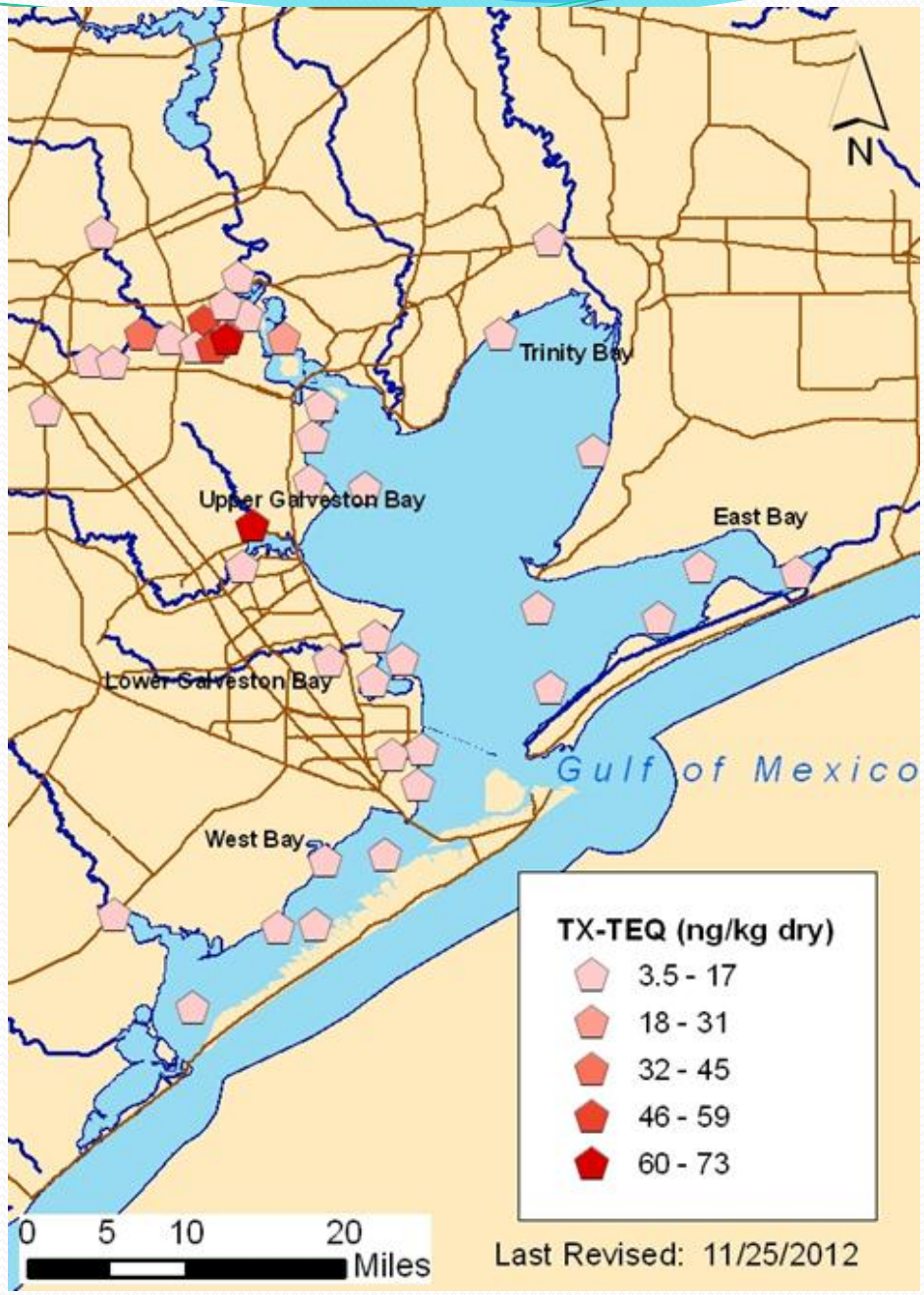
2011 sediment sample locations



Ratio of PCDFs to PCDDs for 2378-substituted congeners

The ratio of furans to dioxins (PCDFs/PCDDs) is sometimes seen as an indicator of specific, local industrial PCDD/F influence as opposed to general wide-area exposure.

2012 sediment samples



DATA SOURCES:

- TMDL DATA
  - Collected by University of Houston (Dr. Hanadi Rifai) under a contract to the TCEQ
- SUPERFUND DATA
  - San Jacinto River Waste Pits
  - Patrick Bayou
    - Collected by consultants hired by the companies involved in the superfund project. Projects are overseen by EPA with input from trustees.
- OTHER DATA
  - Small individual dredging projects, etc.

QUESTIONS??

- Linda Broach
  - 713-767-3579
  - Linda.broach@tceq.texas.gov

Seafood Consumption Advisories and Shellfish Harvest Areas

-Michael Tennant, Texas Department of State Health Services

Galveston Bay Estuary
Seafood Consumption Advisory

1990–2012

TEXAS
Department of
State Health Services

Advisory History

- **1990**
  - Consumption advisory (ADV-3) issued for the Houston Ship Channel and all contiguous waters including Upper Galveston Bay north of a line from Red Bluff Point to Five-Mile Cut Marker to Houston Point due to the presence of dioxins in catfish and blue crab.

- **1993**
  - Consumption advisory (ADV-7) issued for Clear Creek upstream and west of State Highway 3 Bridge due to the presence of volatile organic contaminants (VOCs) in all species of fish and blue crab.

- **2001**
  - Consumption advisory (ADV-20) issued for the Houston Ship Channel and all contiguous waters upstream of the Lynchburg Ferry Crossing including the San Jacinto River below the U.S. Highway 90 Bridge due to the presence of pesticides and PCBs in all species of fish.
  - Consumption advisory (ADV-21) issued for Clear Creek upstream and west of State Highway 3 rescinding ADV-7. Fish and blue crab tissue samples examined from Clear Creek indicate that concentrations of VOCs have decreased to acceptable levels. Additional analyses did not reveal any other contaminants of concern.

Advisory History Cont.

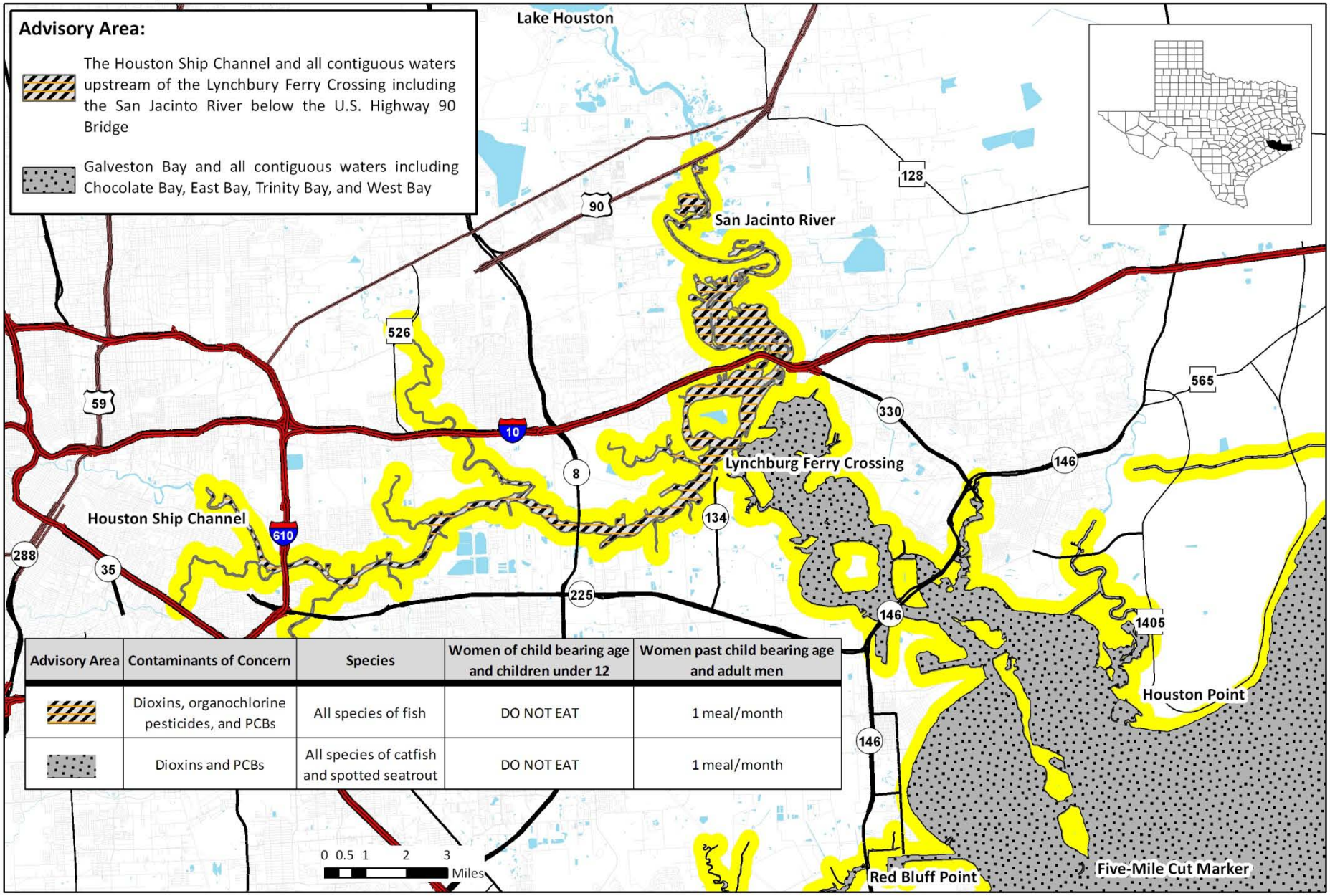
- **2005**
  - Consumption advisory (ADV-28) issued for the Houston Ship Channel and Upper Galveston Bay due to the presence of PCBs in spotted seatrout.

- **2008**
  - Consumption advisory (ADV-35) issued for Galveston Bay and all contiguous waters including Chocolate Bay, East Bay, Trinity Bay, and West Bay due to the presence of dioxins and PCBs in catfish and spotted seatrout.

- **2009**
  - Consumption advisory (ADV-37) issued for Clear Creek upstream and west of Clear Lake due to the presence of PCBs in all species of fish.

Galveston Bay Estuary (Map 1) – Houston Ship Channel, San Jacinto River, and Upper Galveston Bay

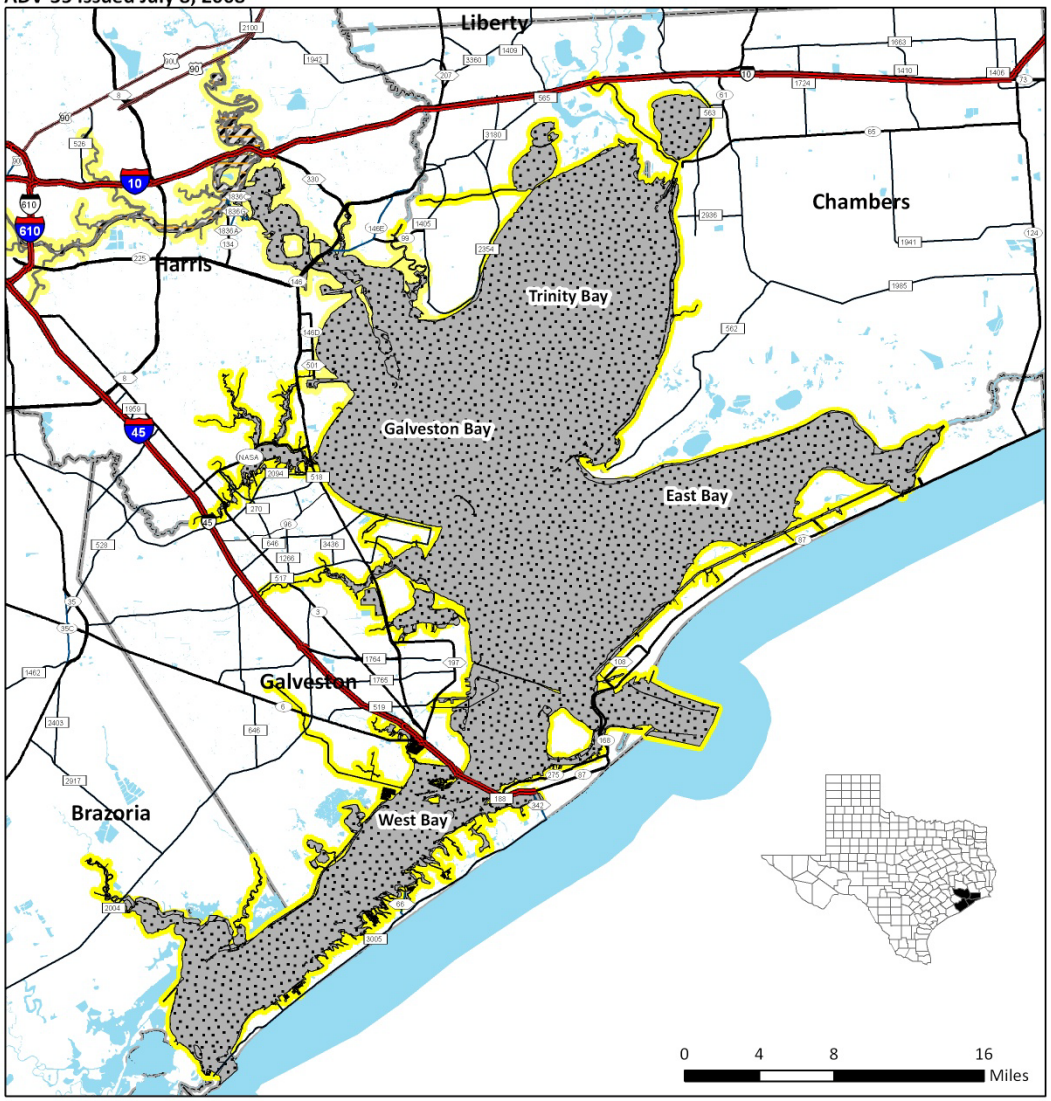
Chambers and Harris Counties
ADV-20 Issued October 9, 2001
ADV-35 Issued July 8, 2008



Advisory Area	Contaminants of Concern	Species	Women of child bearing age and children under 12	Women past child bearing age and adult men
	Dioxins, organochlorine pesticides, and PCBs	All species of fish	DO NOT EAT	1 meal/month
	Dioxins and PCBs	All species of catfish and spotted seatrout	DO NOT EAT	1 meal/month

Galveston Bay Estuary (Map 2)

Brazoria, Chambers, Galveston, and Harris Counties
ADV-20 Issued October 9, 2001
ADV-35 Issued July 8, 2008



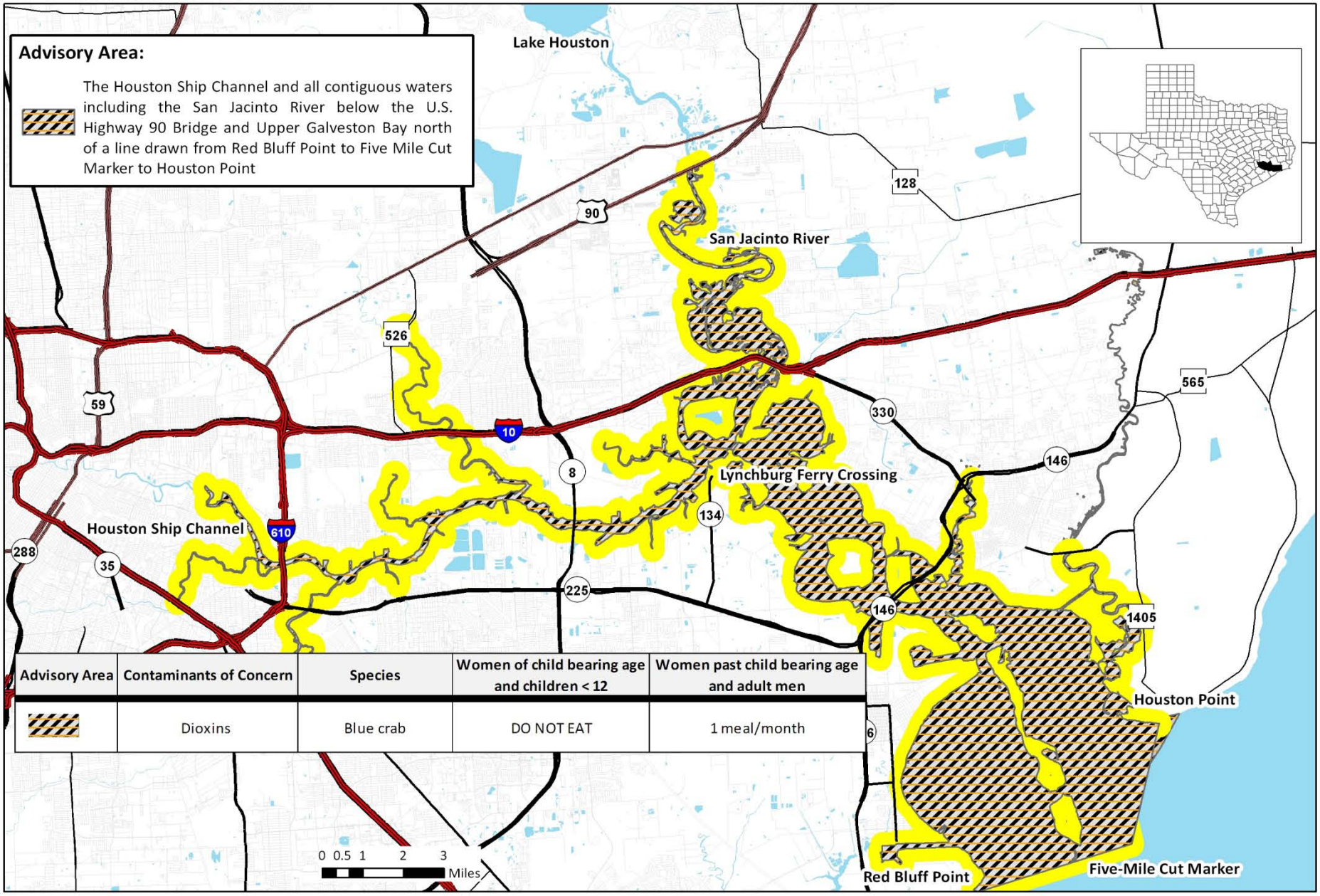
Advisory Area:
Galveston Bay and all contiguous waters including Chocolate Bay, East Bay, Trinity Bay, and West Bay

Advisory Area	Contaminants of Concern	Species	Women of child bearing age and children < 12	Women past child bearing age and adult men
	Dioxins and PCBs	All species of catfish and spotted seatrout	DO NOT EAT	1 meal/month

Galveston Bay Estuary (Map 3) – Houston Ship Channel, San Jacinto River, and Upper Galveston Bay

Chambers and Harris Counties

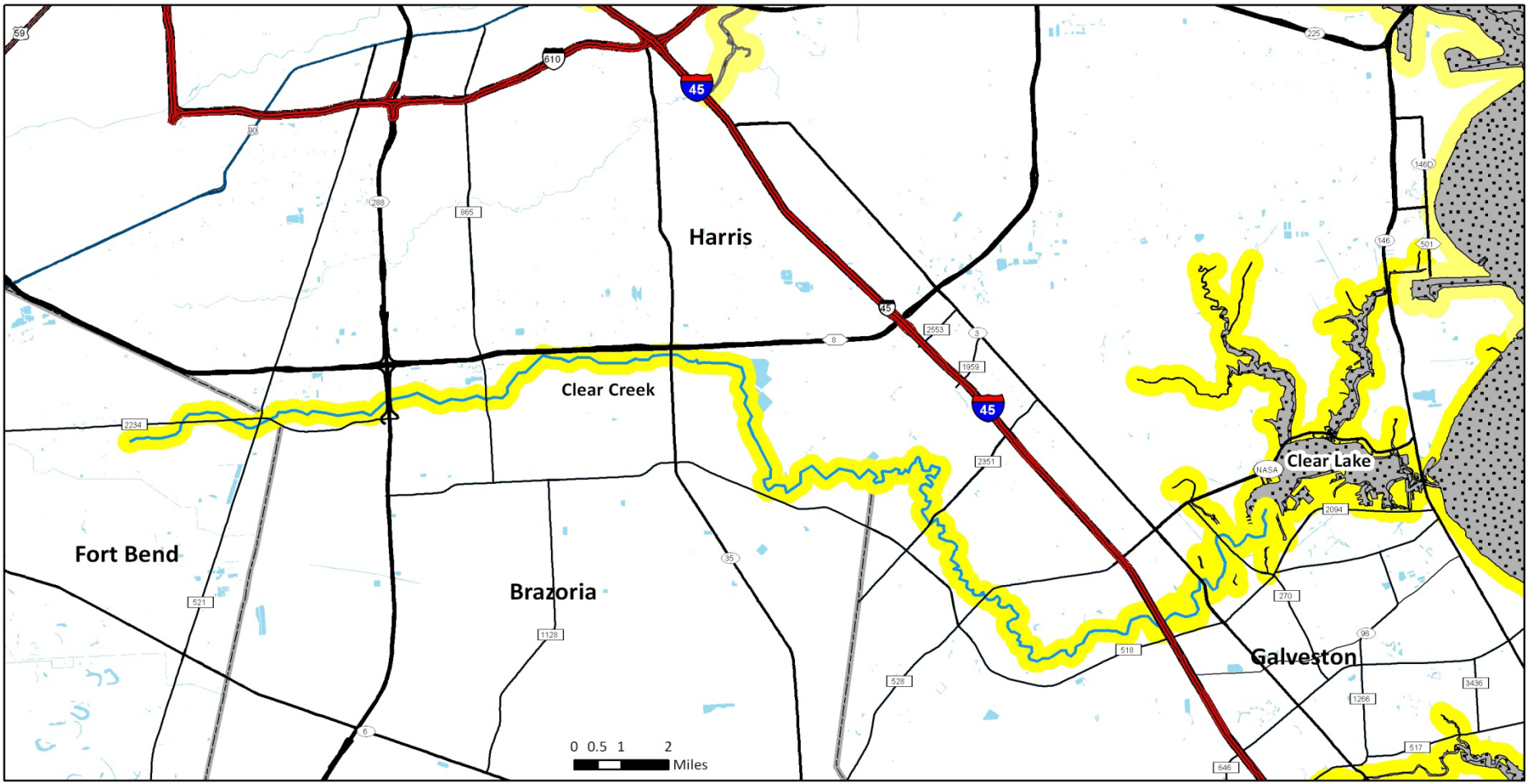
ADV-3 Issued September 19, 1990



Advisory Area	Contaminants of Concern	Species	Women of child bearing age and children < 12	Women past child bearing age and adult men
	Dioxins	Blue crab	DO NOT EAT	1 meal/month

Clear Creek

Brazoria, Fort Bend, Galveston, and Harris Counties
ADV-7 Issued November 18, 1993
ADV-21 Issued October 9, 2001 Rescinding ADV-7
ADV-37 Issued July 8, 2009



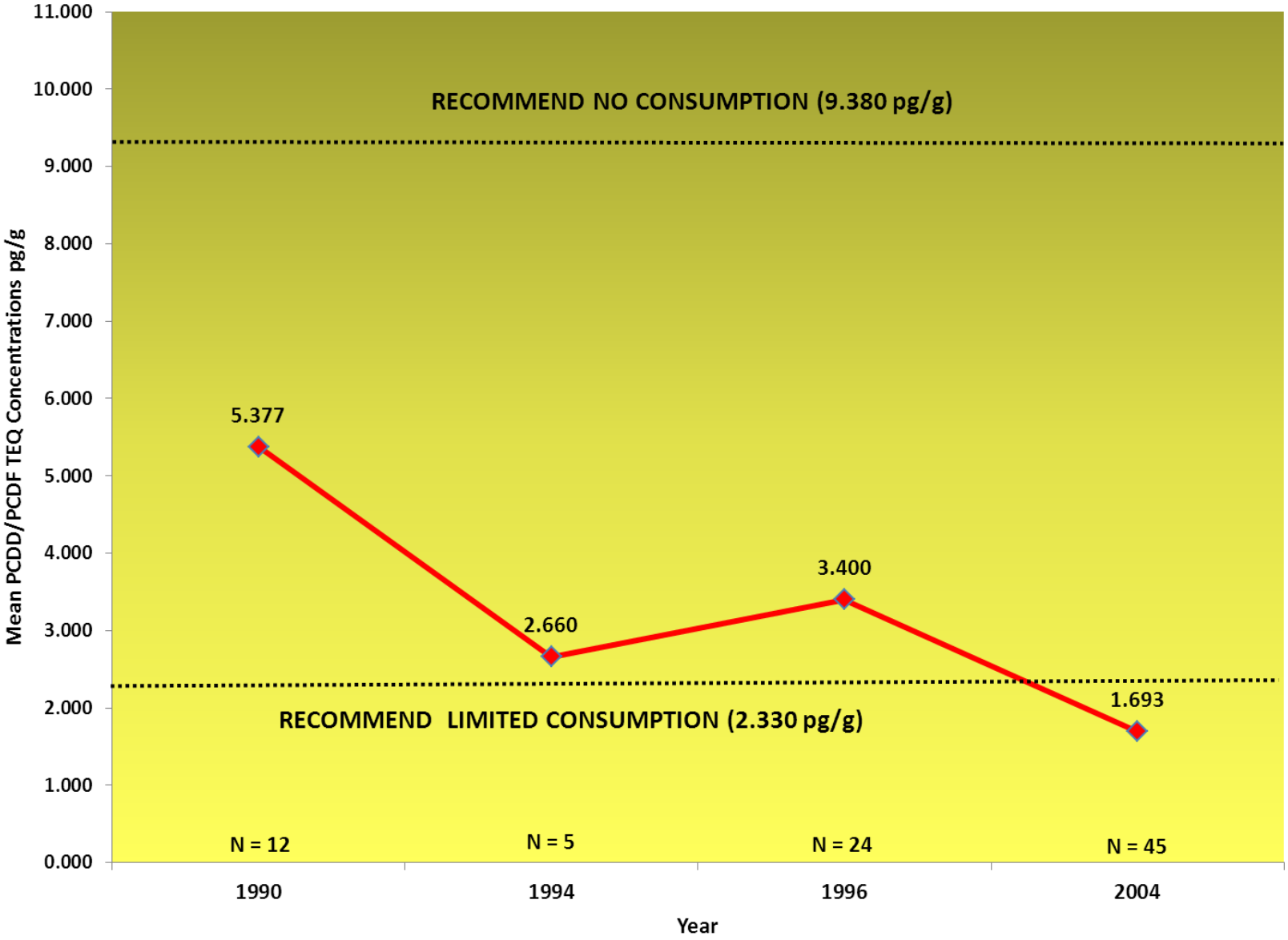
Advisory Area:
Clear Creek upstream and west of Clear Lake

Advisory Area	Contaminants of Concern	Species	Women of child bearing age and children < 12	Women past child bearing age and adult men
—	PCBs	All species of fish	DO NOT EAT	DO NOT EAT

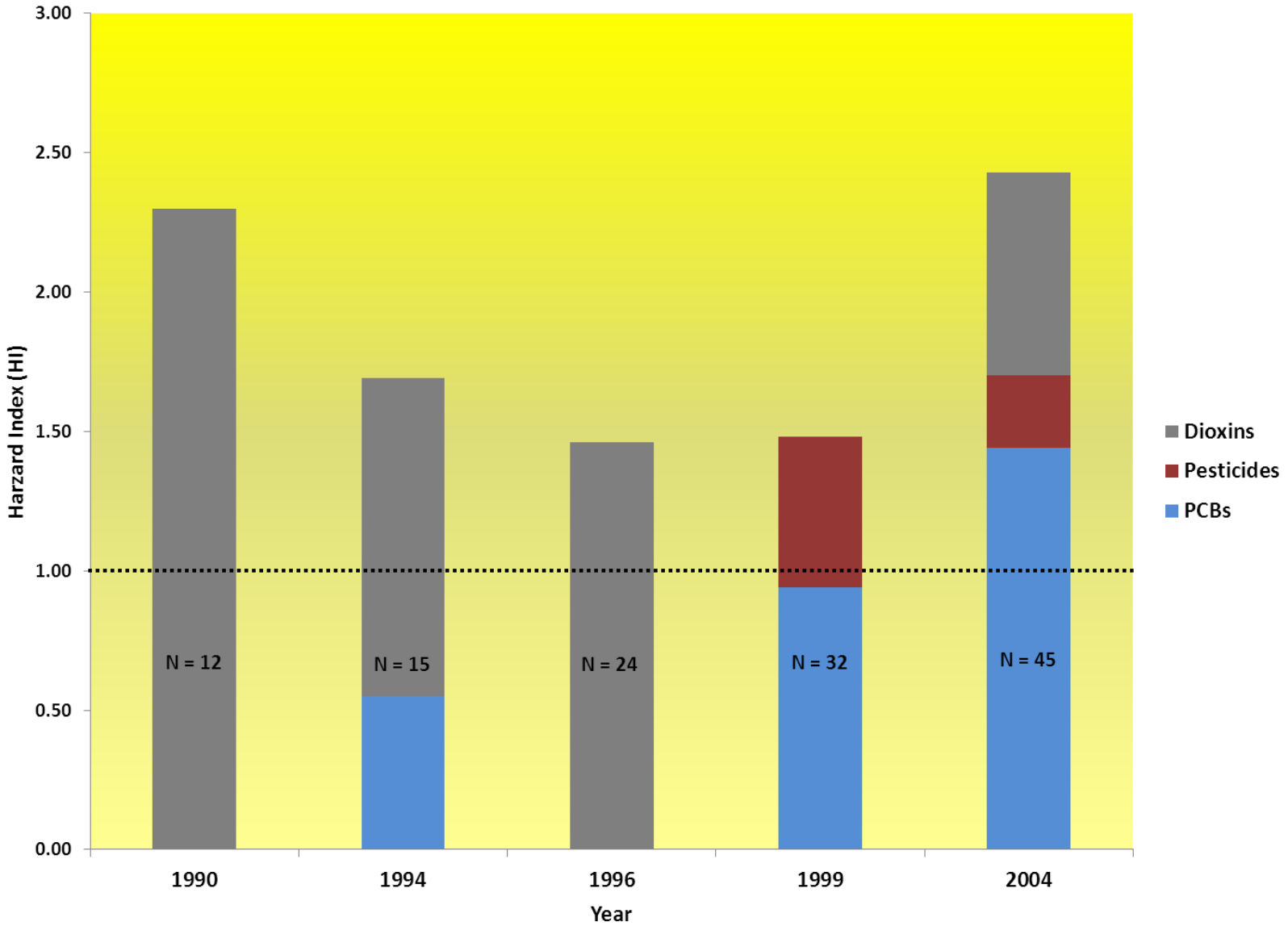
Health Assessment Comparison Values

Contaminant	Non-cancer	Cancer
PCBs	0.047 mg/kg	0.272 mg/kg
PCDDs/PCDFs (Dioxins)	2.330 ng/kg	3.490 ng/kg

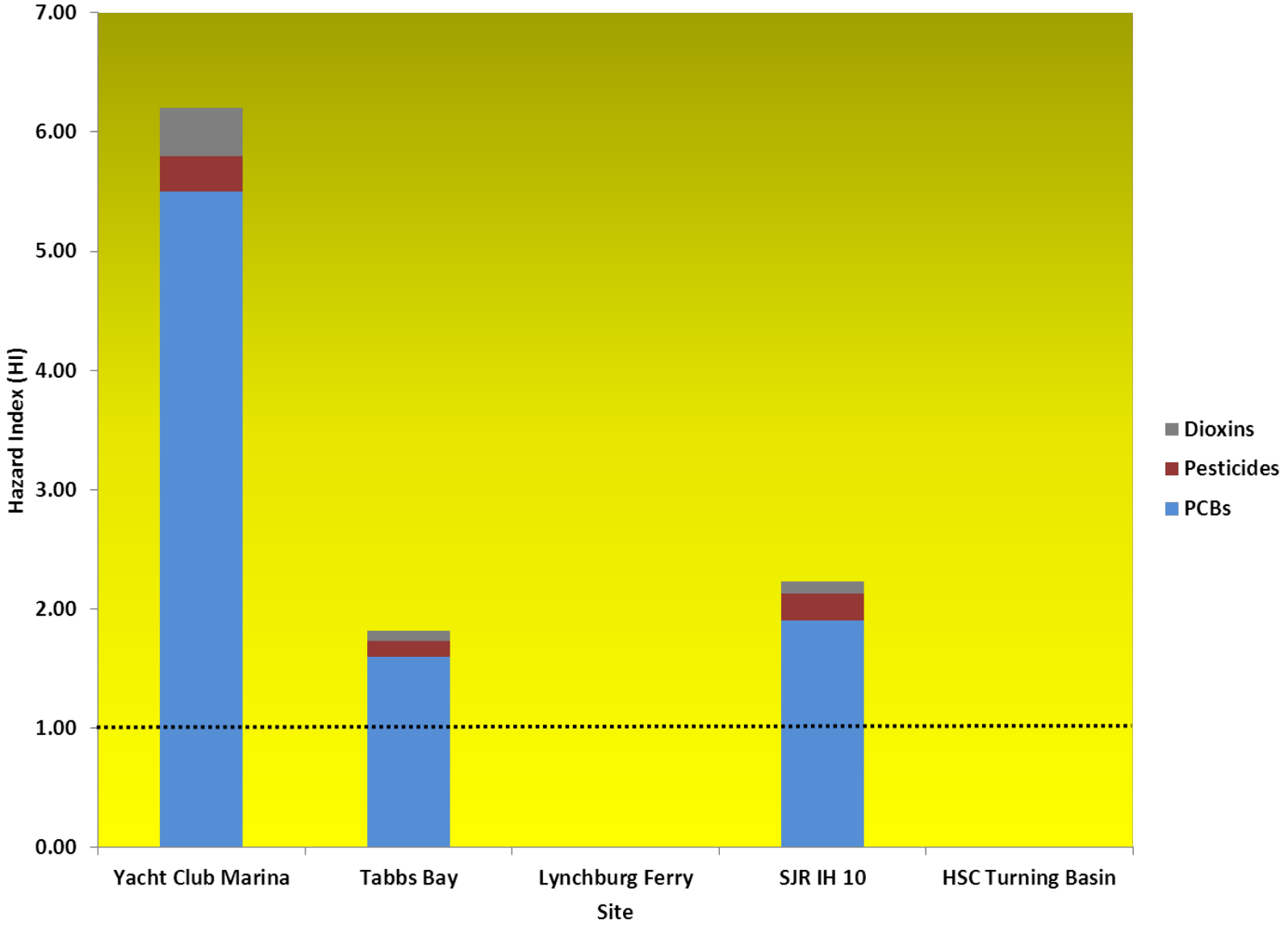
Mean PCDD/PCDF TEQ Concentrations by Year

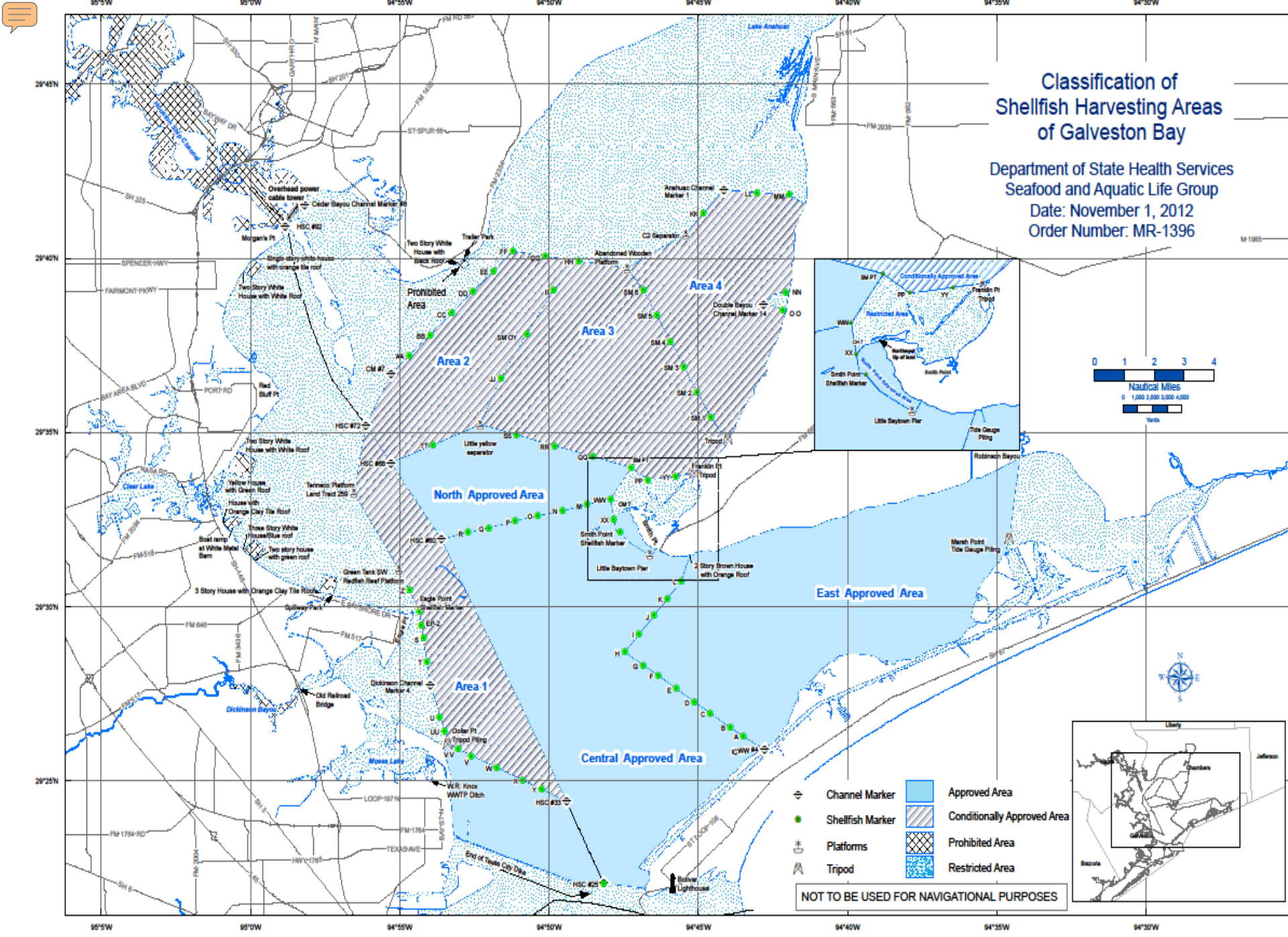


Hazard Index by Year

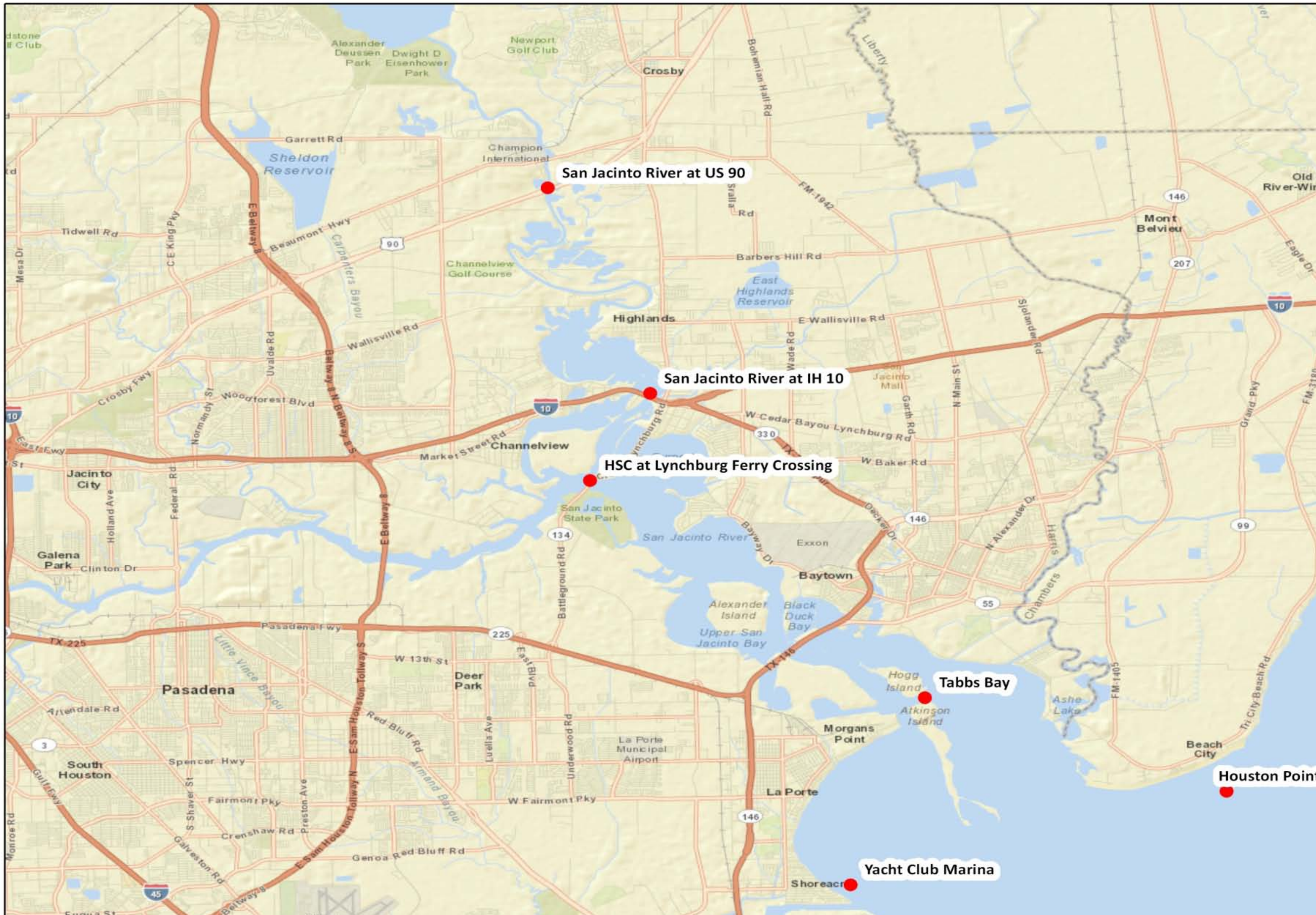


Spotted Seatrout Hazard Index by Site

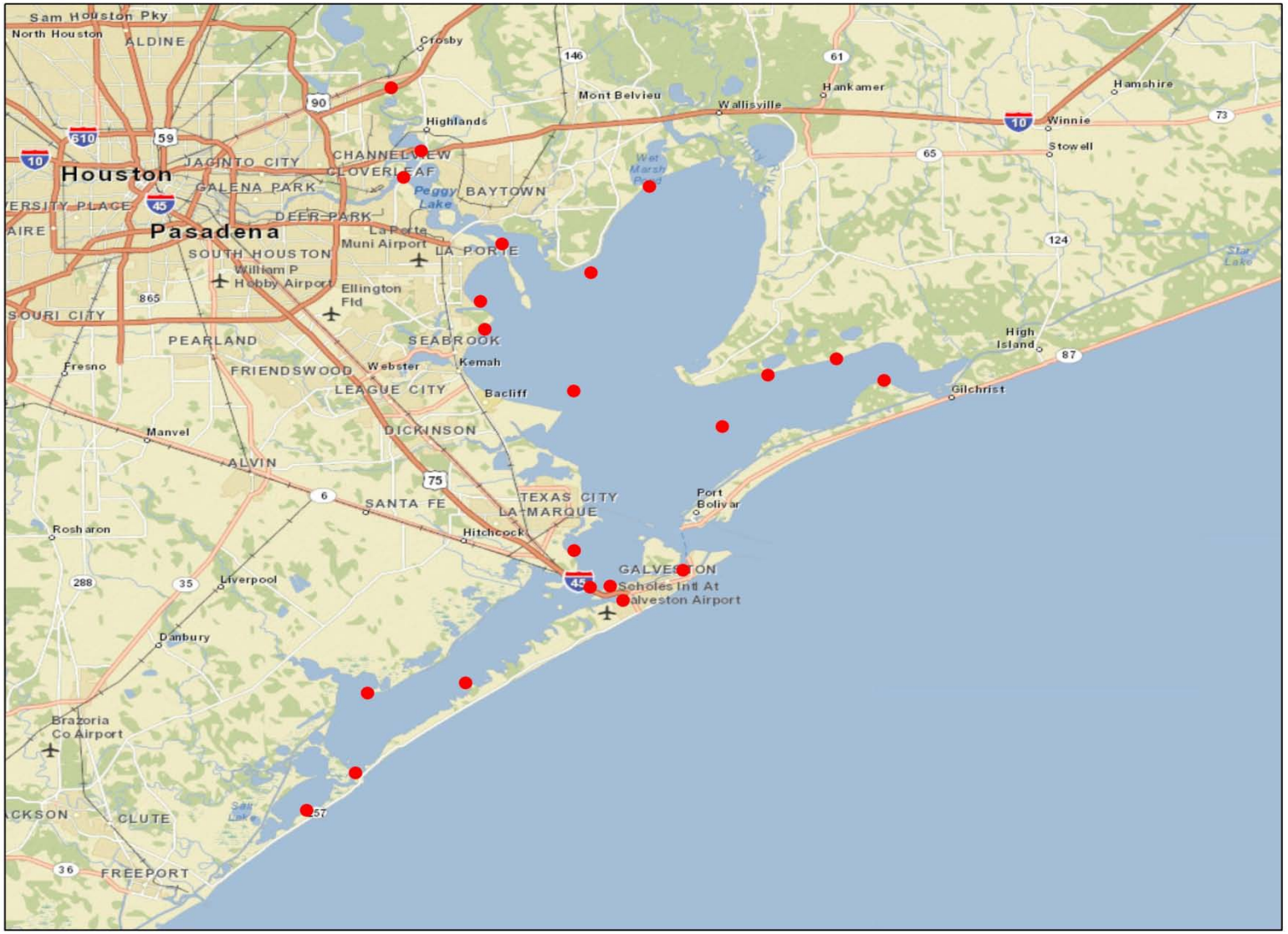



Classification of
Shellfish Harvesting Areas
of Galveston Bay
Department of State Health Services
Seafood and Aquatic Life Group
Date: November 1, 2012
Order Number: MR-1396
Area 1
Area 2
Area 3
Area 4
Prohibited Area
North Approved Area
East Approved Area
Central Approved Area
Conditionally Approved Area
Restricted Area
Nautical Miles
Channel Marker
Shellfish Marker
Platforms
Tripod
Approved Area
Conditionally Approved Area
Prohibited Area
Restricted Area
NOT TO BE USED FOR NAVIGATIONAL PURPOSES

Sample Sites 2010–2011 (Map 1)



Sample Sites 2010–2011 (Map 2)



Target Species 2010–2011

Total Samples (178)

- Alligator gar (2)
- Black drum (15)
- Blue catfish (5)
- Blue crab (4)
- Flathead catfish (2)
- Gafftopsail catfish (18)
- Hardhead catfish (3)
- Red drum (18)
- Sand trout (19)
- Sheepshead (5)
- Southern flounder (12)
- Spotted seatrout (72)
- Striped bass (3)

Sample Sites 2012

Target Species 2012

Total Samples (48)

- Alligator gar (2)
- Black drum (6)
- Blue catfish (3)
- Blue crab (8)
- Channel catfish (2)
- Common carp (2)
- Gafftopsail catfish (2)
- Hardhead catfish (3)
- Red drum (2)
- Sheepshead (6)
- Smallmouth buffalo (4)
- Southern flounder (4)
- Spotted seatrout (3)
- White bass (1)

Michael Tennant
Seafood and Aquatic Life Group
michael.tennant@dshs.state.tx.us
512-834-6757

TEXAS
Department of
State Health Services

Texas Commission on Environmental Quality
Total Maximum Daily Load Program

Improving Water Quality in the Houston–Galveston Area

A TMDL Project for Dioxin

In 1990, the Department of State Health Services issued an advisory warning people not to eat catfish or blue crab caught in the Houston Ship Channel and Upper Galveston Bay. The advisory was issued to protect consumers from health problems caused by dioxin found in catfish and blue crab.

Dioxin is a generic term for a suite of toxic and environmentally persistent compounds. Overexposure to dioxin can cause a variety of harmful health problems, including cancer, birth defects, diabetes, developmental delays, and immune system abnormalities.

The TCEQ is developing total maximum daily loads (TMDLs) to restore the safety of fish consumption in the waterways affected by the advisory. The goal of a TMDL is to determine the amount (or load) of a pollutant that a body of water can receive and still support its designated uses. The allowable load is then allocated among categories of sources within the watershed, and stakeholders work with the state to develop measures that reduce pollutant loads.

Learn more about water quality standards, monitoring, and TMDLs by reading *Preserving and Improving Water Quality*, available on our website at <www.tceq.texas.gov/goto/tmdl/>.

Houston Ship Channel and Upper Galveston Bay Watershed

The Ship Channel system is in the San Jacinto River Basin. Its various branches originate in western and northern areas of the city of Houston, and at the Lake Houston Dam on the San Jacinto River. The Ship Channel area has one of the highest densities of petrochemical facilities in the world. Facilities in the area, and the waterway itself, are important elements in the economic health of the region, state, and nation.

Houston has long been one of the busiest ports in the United States. The channel's production of materials and its inland location have been, and will continue to be, important to the military security of the nation.

The commercial navigation provided by the channel initiated and supported the historic growth of the Houston area economy. The headwater reaches, tributaries, and fringes of both the Houston Ship Channel System and Upper Galveston Bay provide recreational opportunities for residents.

The watershed includes portions of the following political jurisdictions:

- *Counties*: Chambers, Fort Bend, Galveston, and Harris
- *Cities*: Houston, Pasadena, Baytown, La Porte, and Deer Park

The Houston Ship Channel system consists of 14 classified segments, which together comprise the "enclosed" portion of the Houston Ship Channel with its major tributaries and side bays.

This project includes ten of the ship channel segments:

- San Jacinto River Tidal (Segment 1001)
- Houston Ship Channel (1005, 1006, 1007)
- Tabbs Bay (2426)
- San Jacinto Bay (2427)
- Black Duck Bay (2428)
- Scott Bay (2429)
- Burnett Bay (2430)
- Barbours Cut (2436)

Also included are three segments not considered part of the Houston Ship Channel system:

- Cedar Bayou Tidal (Segment 0901)
- Upper Galveston Bay (Segment 2421)
- Bayport Channel (Segment 2438)

Public Participation

In all its projects, the TCEQ gathers opinion and information from people in the watershed. Due to the lengthy and extremely technical nature of this project, the TCEQ convened a standing stakeholder group in the early stages. The group includes area residents and representatives of nongovernmental organizations, industry, and various local, state, and federal governments. This stakeholder group is also advising the TCEQ about two other closely related projects for PCBs and dioxin in the Houston area.

The Houston-Galveston Area Council (H-GAC) is coordinating public participation. The project is also coordinated as needed with the Texas Clean Rivers Program Steering Committee and the Technical Advisory Group (TAG) for the San Jacinto River Basin and associated Coastal Basins.

For More Information

Contact one of the people listed below.

TCEQ TMDL Program:
Jim Neece, TMDL Program
512-239-1524, jim.neece@tceq.texas.gov

TCEQ Regional Office:
Linda Broach, Region 12-Houston
713-767-3579

Public Participation:
Rachel Powers, Houston-Galveston Area Council
713-993-4559, rachel.powers@h-gac.com

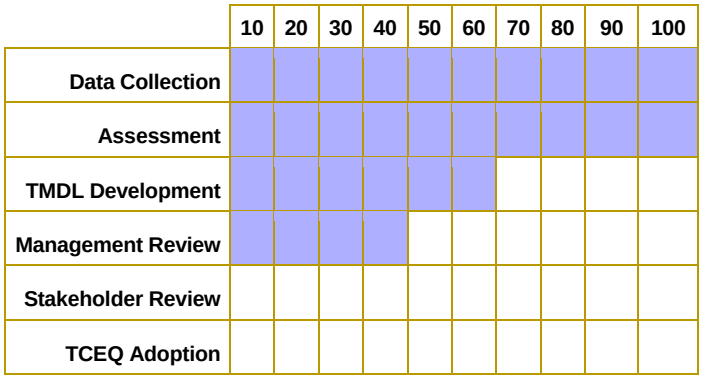
Visit the H-GAC website at:
<www.h-gac.com/community/water/tmdl/>

or the TCEQ website at:
<www.tceq.texas.gov/waterquality/tmdl/26-houston_group.html

TMDL Development Status

Start Date: 2002
TCEQ Adoption:
EPA Region 6 Approval:

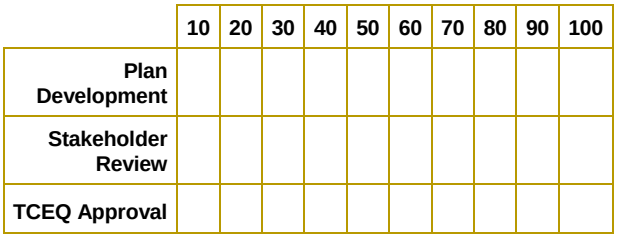
TMDL: Percent Complete



I-Plan Development Status

Projected End Date: 2014
TCEQ Approval:

I-Plan: Percent Complete



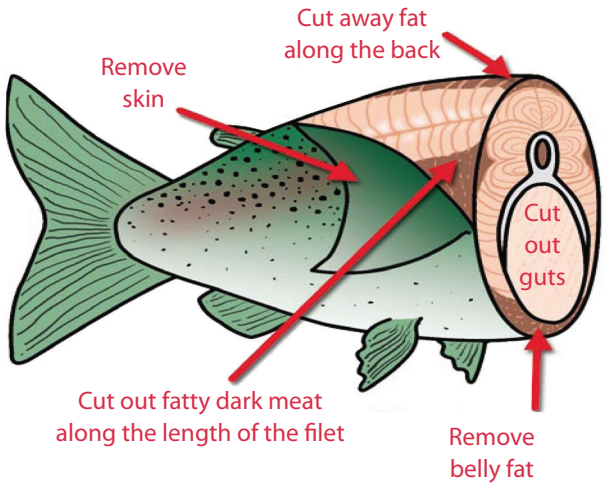
Highlights

- 1990. The Department of State Health Services issued the first Seafood Advisory for dioxin.
- 2000. The kick-off meeting of the stakeholder group was held at the H-GAC offices in Houston.
- 2002. Sampling began to support analyses of dioxins in water, sediment, tissue, watershed runoff, wastewater discharges, and air.
- 2005. Data collected by the project led to the discovery of a concentrated deposit of dioxin-contaminated sludge submerged in the San Jacinto River. That site has since become a National Priority List Superfund Site managed by the EPA.
- 2006. Sampling results indicated dioxin concentrations in water, sediment, and tissues were elevated. Preliminary analyses suggested that current sources are unlikely to be significant, and residual sediment loads are the primary issue. Subsequent sampling and model analyses continue to support that conclusion.
- 2008. Analysis and modeling for the TMDL were completed.
- 2013. Management review in process.

A Safer Way to Prepare Fish

Dioxin and PCBs are stored mainly in the fat of seafood. You can reduce your exposure to these chemicals by using these techniques:

- From fish, remove the skin, thin layer of fat under the skin, guts, belly fat, fat along the back, and the fatty dark meat along the length of the filet.
- Bake or grill fish. Throw away cooking juices.
- Don't use the whole fish, fat, skin, organs, or juices in soups or stews.
- Don't eat the soft green parts of blue crabs where toxins build up.



DO NOT EAT the skin, fat, and liver of fish and blue crabs from the Houston Ship Channel and Galveston Bay.

You could be exposed to toxic chemicals.

Solving the Problem

In response to the dioxin and PCB problem, the Texas Commission on Environmental Quality (TCEQ) and Houston-Galveston Area Council (H-GAC) initiated a total maximum daily load (TMDL) project in the Houston Ship Channel and Upper Galveston Bay to:

- Pinpoint sources of dioxin and PCBs.
- Develop an action plan to reduce dioxin.

The Houston Ship Channel Stakeholders Group is advising the TCEQ and H-GAC on this project. The group includes representatives from government, industrial facilities, agriculture, business, environmental, and community interests in the Houston Ship Channel and Galveston Bay watersheds.

For More Information

TEXAS Department of State Health Services
www.dshs.state.tx.us/seafood
512-834-6757

Galveston Bay Foundation
http://galvbay.org/advocacy_seafood.html

H-GAC Houston-Galveston Area Council
www.h-gac.com/dioxintmdl

TCEQ
www.tceq.state.tx.us/implementation/water/tmdl/26-houston_group.html

SEAFOOD CAUTION

Fish and Blue Crab

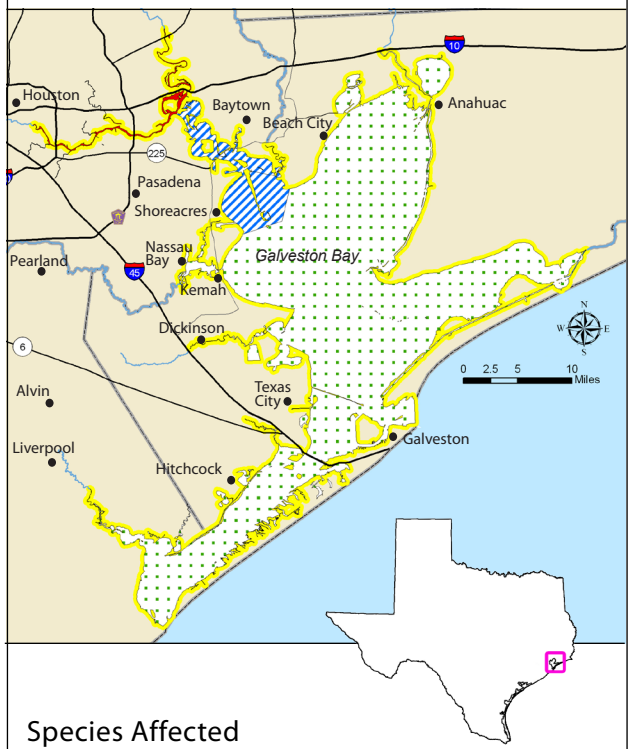
SEAFOOD CONSUMPTION ADVISORY

HOUSTON SHIP CHANNEL AND GALVESTON BAY

PCBs and Dioxin Have Been Found in Blue Crabs and Fish*

IN THE HOUSTON SHIP CHANNEL AND GALVESTON BAY

Areas of PCB and Dioxin Contamination



Species Affected

- All Species of Fish and Blue Crab
- All Catfish Species, Spotted Seatrout, and Blue Crab
- All Catfish Species and Spotted Seatrout

**According to The Texas Department of State Health Services*

Seafood Consumption Advisory

The Texas Department of State Health Services has issued seafood consumption advisories for the Houston Ship Channel and Galveston Bay.

- Adults should eat no more than one eight-ounce meal per month of seafood from these areas.
- Women who are nursing, pregnant, or who may become pregnant, and children under twelve years old, should not eat seafood from these areas.

Seafood May Contain Dioxin and PCBs

Dioxin is a term for a group of toxic chemicals found throughout the environment. Dioxin has no known constructive use and is a byproduct of certain industrial activities. Exhaust from vehicles, forest fires, and burning trash also release dioxin into the air.

PCBs, or polychlorinated biphenyls, are man-made chemicals. PCB production was banned in the 1970s, however, the chemicals continue to enter the environment through spills, leaks and improper disposal.

Dioxin and PCBs build up in fish as they filter tainted sediment or water, or eat contaminated aquatic life forms.

Exposure to Dioxin and PCBs is Dangerous

Dioxin and PCBs stay in humans and animals for years. Exposure occurs when people eat food with dioxin and PCBs. Pregnant women and nursing mothers are especially susceptible and can pass the contaminants on to their unborn or nursing babies.

Potential Health Problems from Repeated Exposure

- Increased cancer risks
- Immune system issues
- Liver damage
- Thyroid disorders
- Type 2 diabetes
- Digestive tract issues
- Fatigue and headaches
- Skin sores and rashes
- Nerve disorders (motor skill problems)
- Endometriosis and irregular menstrual cycles
- Birth defects
- Reduced fertility
- Child learning and developmental defects

Fish and Blue Crabs that May Contain Dioxin or PCBs

- Fatty fish (like catfish)
- Fish caught near industrial areas

The glands and organs of fish and blue crab caught in the Houston Ship Channel and Galveston Bay may contain high levels of contaminants and should not be eaten.

Reduce Your Exposure to Toxins

- Eat fish from a variety of water bodies to reduce risk of exposure to any one contaminant or group of contaminants.
- Eat a mix of different kinds of fish.
- Eat smaller, younger fish. (Younger fish usually have less contaminants than larger, older fish.)
- Practice "catch and release" fishing.