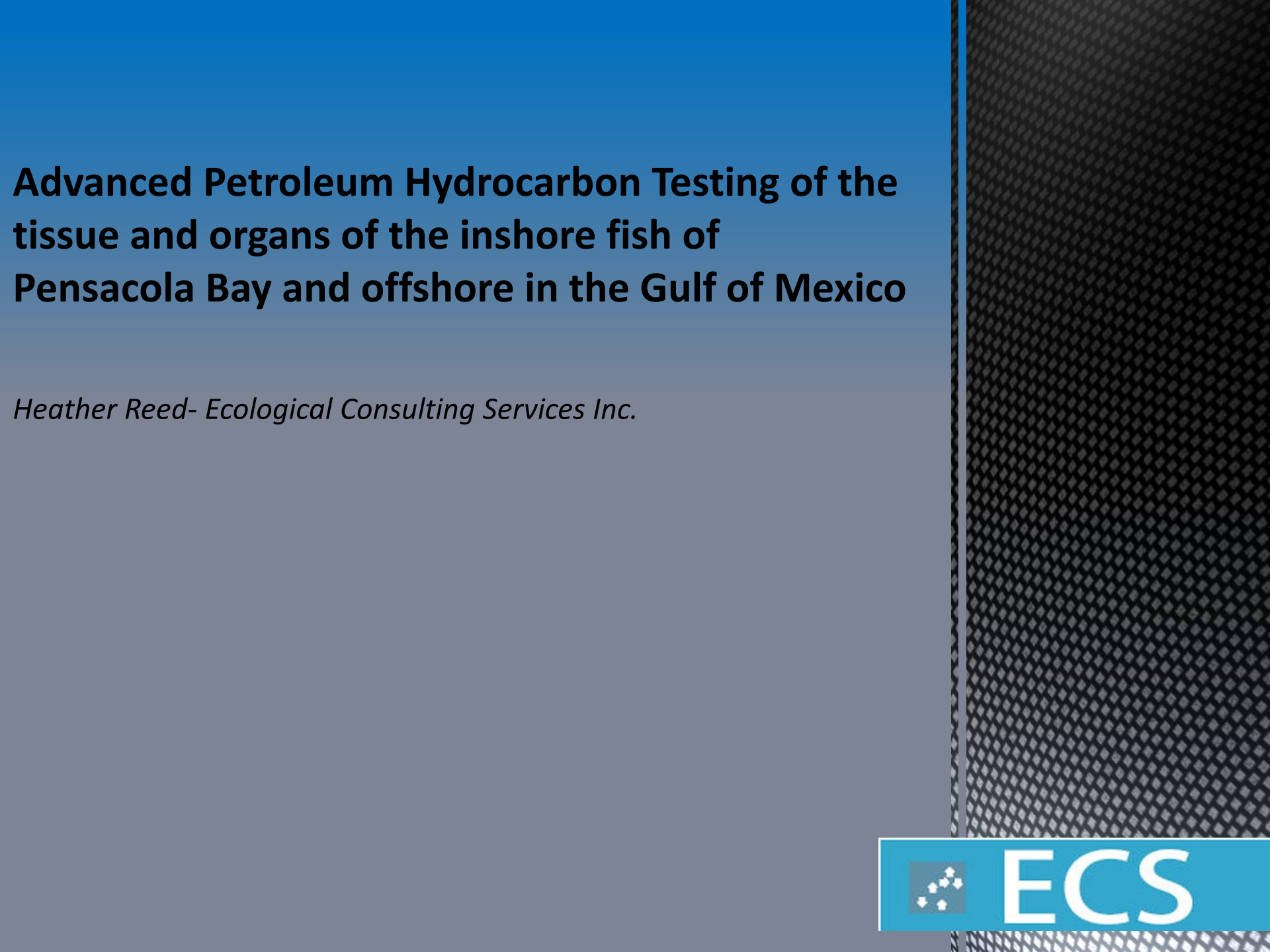
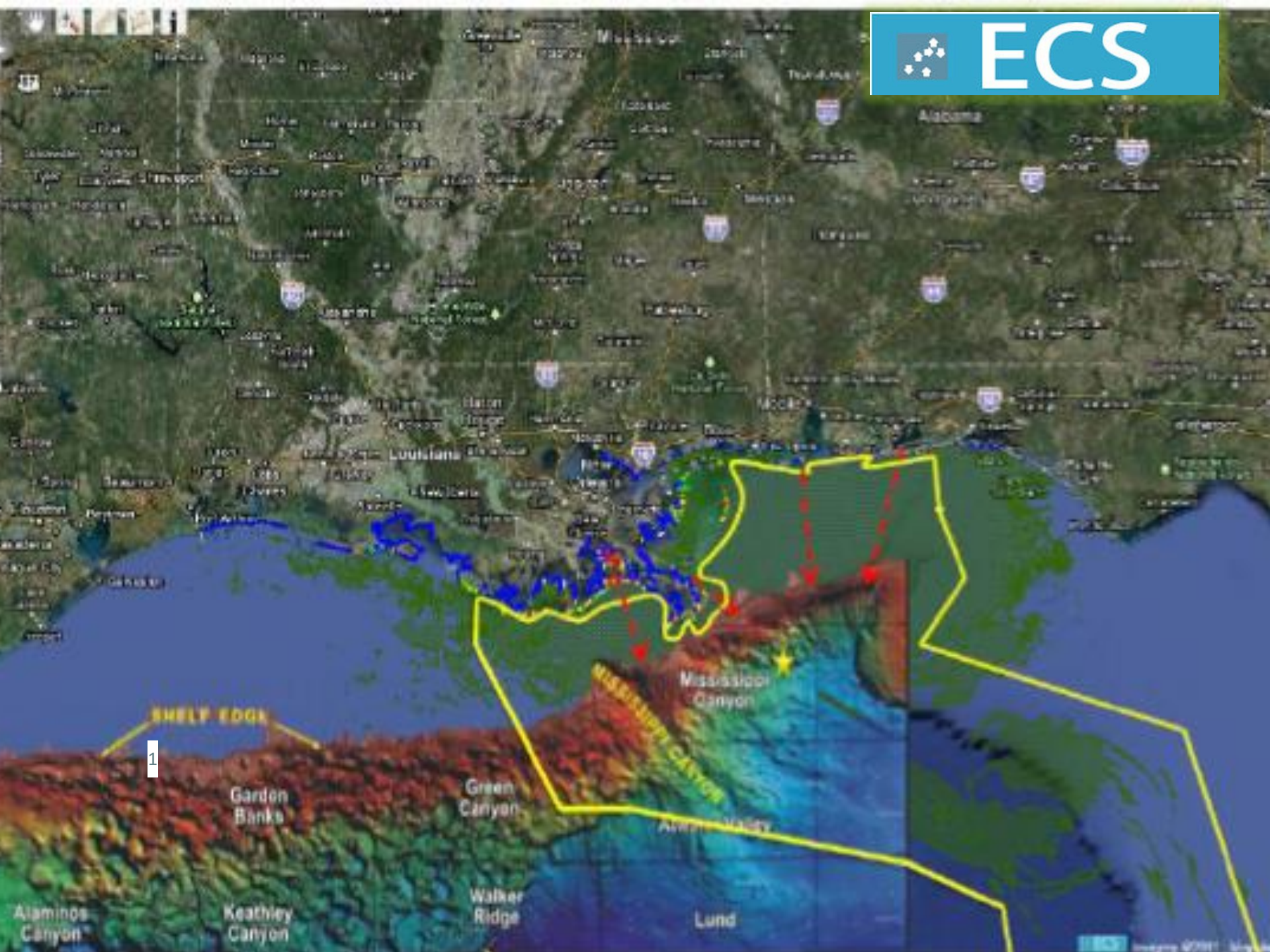
Advanced Petroleum Hydrocarbon Testing of the tissue and organs of the inshore fish of Pensacola Bay and offshore in the Gulf of Mexico

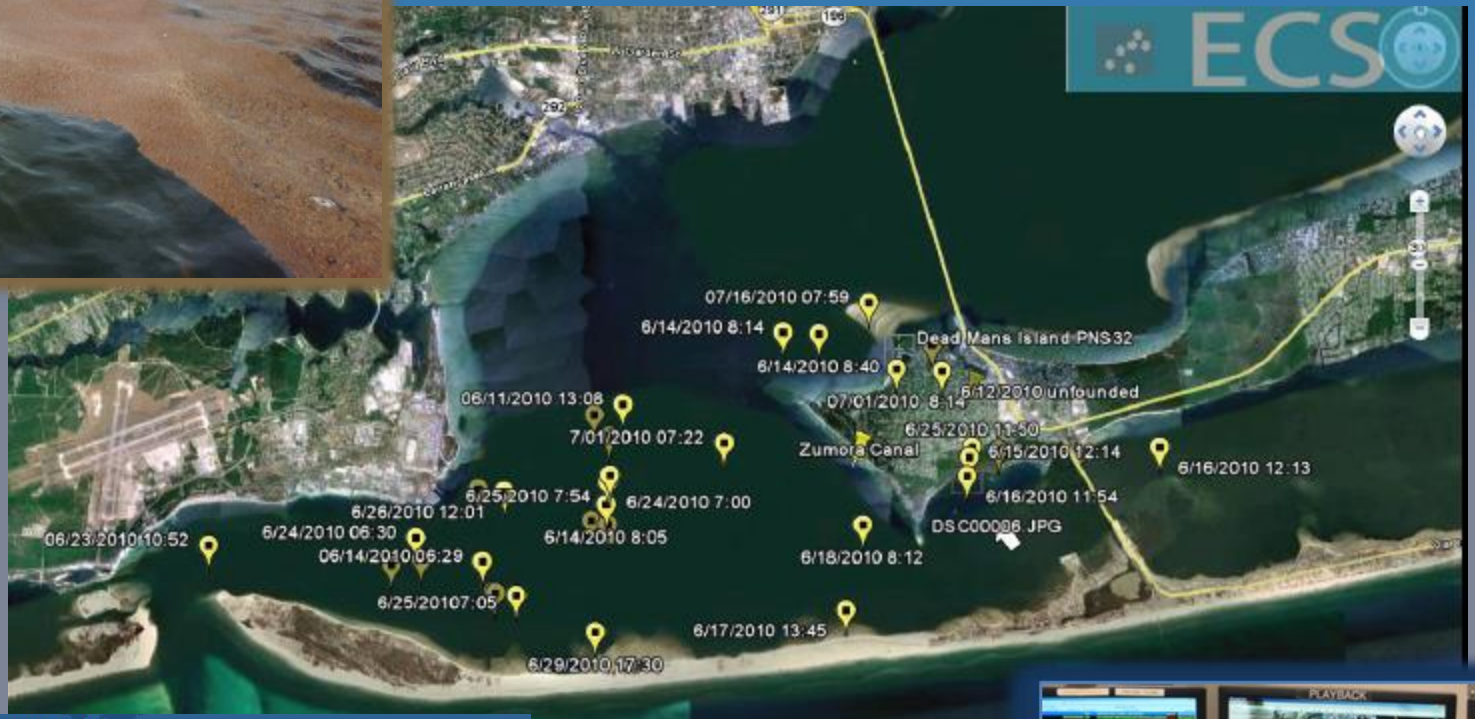
Heather Reed- Ecological Consulting Services Inc.

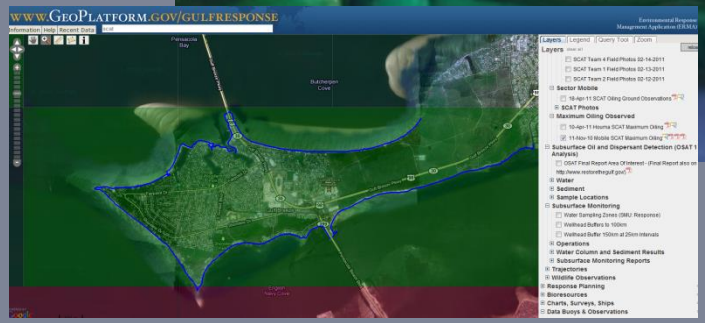



ECS
Alabama
Louisiana
Mississippi Canyon
SHELF EDGE
1
Garden Banks
Green Canyon
Walker Ridge
Alaminos Canyon
Keathley Canyon
Lund

MidWay Fire Department demonstrating how to assemble a mobile decontamination station during HAZWOPER training for the oil spill response team

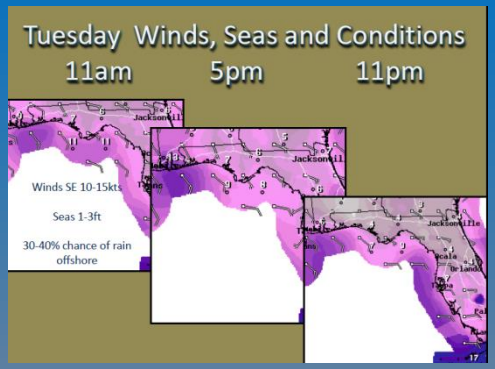
2010 Pensacola Bay
City of Gulf Breeze Oil Sightings

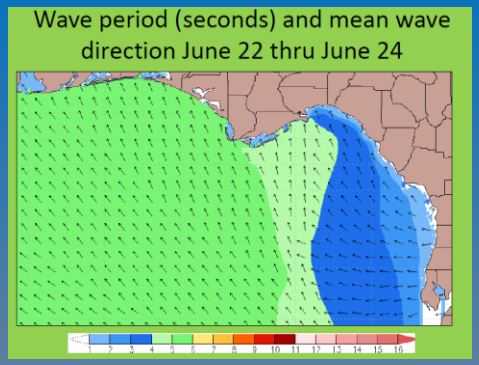


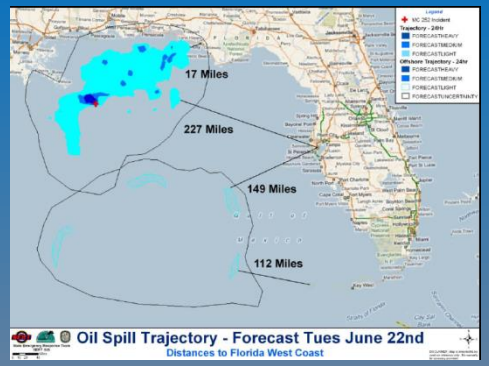


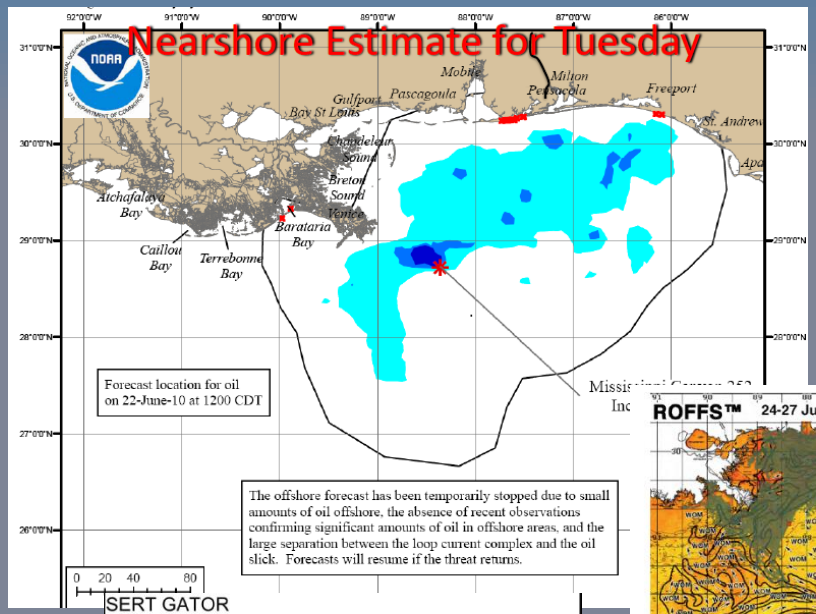
No Oil Ever? Reported June 2010- Inspected OCTOBER 2010 –
FDEP SCAT 2hrs to inspect six miles of rip rap (insufficient inspection)-Should be classified as “Not Determined”

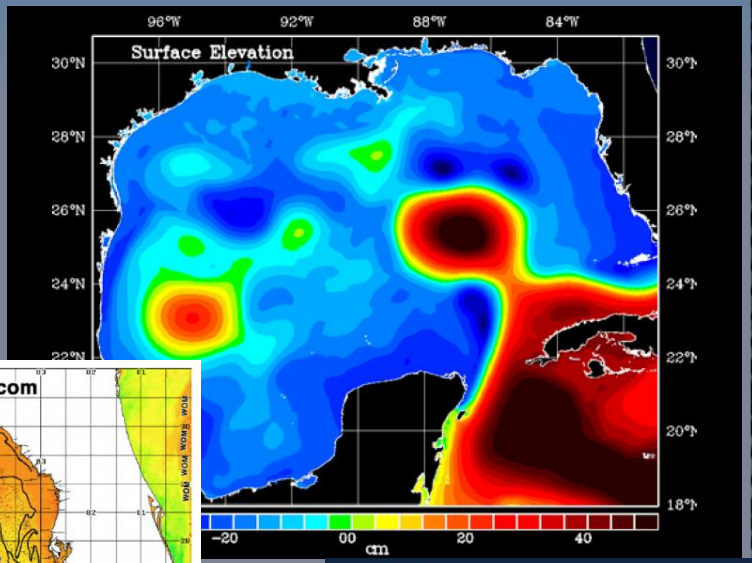
ECS


Tuesday Winds, Seas and Conditions
11am
5pm
11pm
Winds SE 10-15kts
Seas 1-3ft
30-40% chance of rain offshore

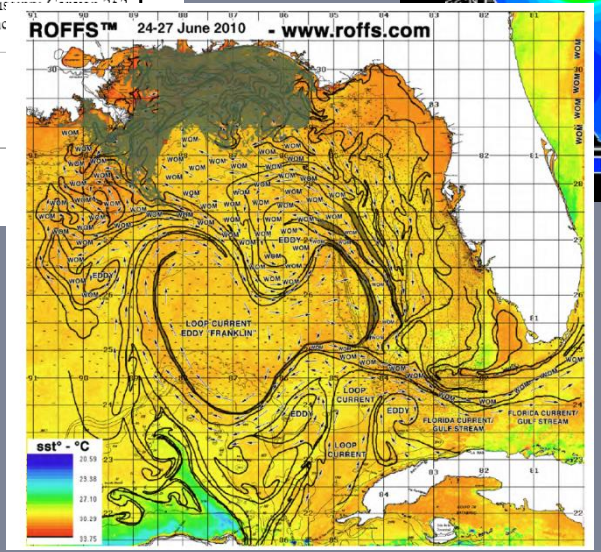

Wave period (seconds) and mean wave direction June 22 thru June 24

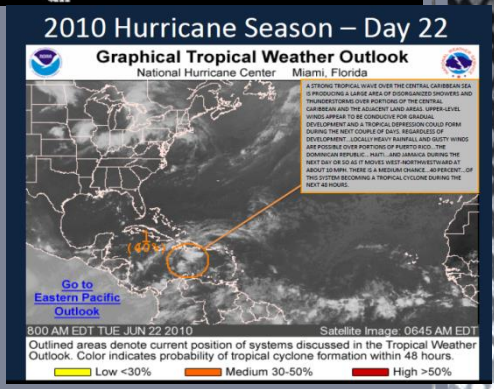

17 Miles
227 Miles
149 Miles
112 Miles
Oil Spill Trajectory - Forecast Tues June 22nd
Distances to Florida West Coast


Nearshore Estimate for Tuesday
Forecast location for oil on 22-June-10 at 1200 CDT
The offshore forecast has been temporarily stopped due to small amounts of oil offshore, the absence of recent observations confirming significant amounts of oil in offshore areas, and the large separation between the loop current complex and the oil slick. Forecasts will resume if the threat returns.


Surface Elevation
cm


SERT GATOR
Geospatial Assessment Tool for Operations and Response


ROFFS™ 24-27 June 2010 - www.roffs.com
LOOP CURRENT
EDDY FRANKLIN
FLORIDA CURRENT/ GULF STREAM
sst° - °C


2010 Hurricane Season – Day 22
Graphical Tropical Weather Outlook
National Hurricane Center Miami, Florida
Go to Eastern Pacific Outlook
800 AM EDT TUE JUN 22 2010
Satellite Image: 0645 AM EDT
Outlined areas denote current position of systems discussed in the Tropical Weather Outlook. Color indicates probability of tropical cyclone formation within 48 hours.
Low <30%
Medium 30-50%
High >50%

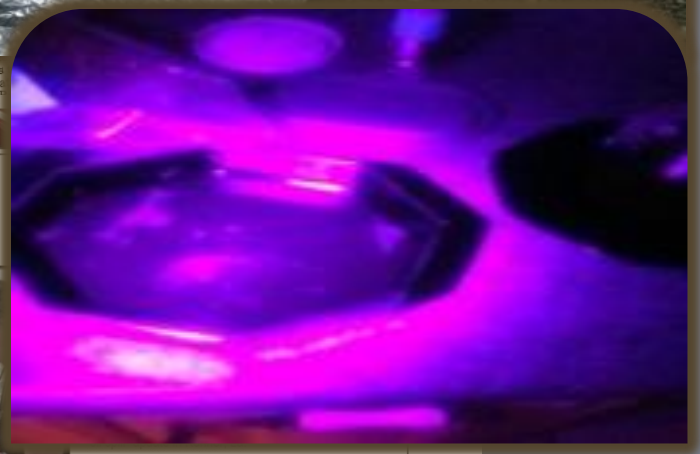
Biological Impacts and Discoveries

Cause of death of dolphin at
ort Pickens still pending

of dolphin death is still unclear,

seeking oil and recon is
actively looking for oil, as

vigilant in its effort
shores and out of its w



10 CONNECTS NEWS

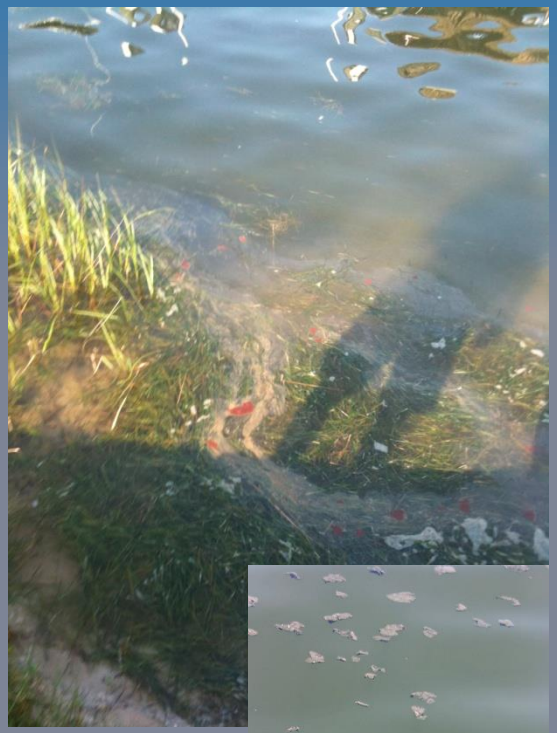
Oil still washing up on Panhandle beaches

Christopher Collette 4 days ago

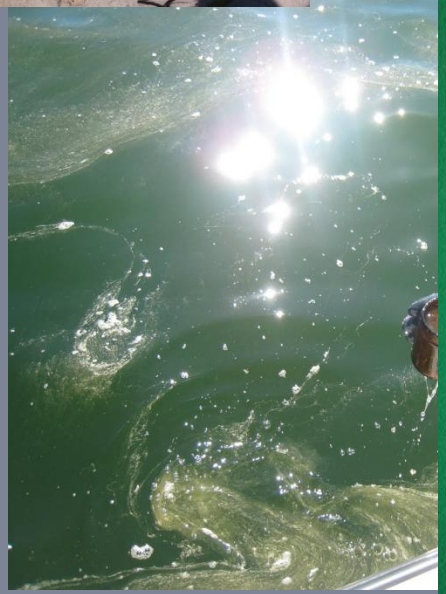
GNS

Heather Reed, a marine biologist and enviromental advisor for Gulf Breeze, leads a team of volunteer Navy divers and Gulf Breeze Coastwatchers in a search for submerged oil in the Gulf.

Lubchenco said 52 days after the oil well was capped, "extreme" monitoring of offshore subsurface oil - which could measure a little less than four Alaskan Valdez oil spills - is underway by the public and private sector, including universities in Louisiana and Florida and Woods Hole




09/09/2010 14:50



The City of Gulf Breeze Deadman's Island Restoration Project

Prior May 2010 reef
98% live oyster coverage
to
May 2012 1% live coverage

Sunken Oil

Sample: June 23 Pure Bay **Lab ID: 3520885002** **Collected: 10/22/10 14:30**

Results reported on a "dry-weight" basis

Parameters	Results	Units	PQL	MDL	DF
FL-PRO Soil Microwave	Analytical Method: FL-PRO		Preparation Method: EPA 3		
Petroleum Range Organics	462000	mg/kg	3200	2040	20
C-39 (S)	113	%	60-118		20
o-Terphenyl (S)	572	%	62-109		20

FL-PRO Soil Microwave	Analytical Method: FL-PRO		Preparation Method: EPA 3		
Petroleum Range Organics	**124000**	mg/kg	2250	1430	20
C-39 (S)	120	%	60-118		1
o-Terphenyl (S)	148	%	62-109		1

FL-PRO Soil Microwave	Analytical Method: FL-PRO		Preparation Method: EPA		
Petroleum Range Organics	20700	mg/kg	484	308	100
C-39 (S)	134	%	60-118		20
o-Terphenyl (S)	517	%	62-109		20

ECS

Chemical Analysis Report

NW-DIST-2010-10-08-01

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Florida Department of Environmental Protection
Innovation Park Laboratory
2051 E. Paul Dirac Dr.
Tallahassee, FL 32310
DOH Accreditation E31640

Field ID: PROXIMIT

Sample ID	Ref. Meth
1303465	EPA 8260C

Event Description: Proximity Sampling - Spoil Island off Ft McRae
Request ID: RQ-2010-10-04-46
Customer: NW-DIST
Project ID: DH-OIL-PST

1,1,2,2-Tetrachloroethane	0.50	U	ug/L
Tetrachloroethene	0.50	U	ug/L
Toluene	0.50	U	ug/L
1,1,1-Trichloroethane	0.20	U	ug/L
1,1,2-Trichloroethane	0.20	U	ug/L
Trichloroethene	1.0	U	ug/L
Trichlorofluoromethane	0.50	U	ug/L
Vinyl chloride	0.50	U	ug/L
Methyl-t-butyl ether	0.50	U	ug/L
o-Xylene	0.20	U	ug/L
m,p-Xylene	0.50	U	ug/L

Ref. Method and Comment:
EPA 8260C: Insufficient sample to perform second matrix spike. QC failure(s) observed.

Sample Location: SPOIL ISLAND SIDE OFF FT McRAE Collection Date/Time: 10/07/2010 12:00 PM

Field ID: PROXIMITY REP-1 Matrix: SEDIMENT

Sample ID	Ref. Method	Component	Result	Code	QC Failures	Units
1303446	EPA 8270D	Acenaphthene	120	U		ug/kg
		Acenaphthylene	120	U		ug/kg
		Anthracene	120	U		ug/kg
		Benzo(a)anthracene	550	I		ug/kg
		Benzo(a)pyrene	240	U		ug/kg
		Benzo(b)fluoranthene	240	U		ug/kg
		Benzo(k)fluoranthene	240	U		ug/kg
		Benzo(g,h,i)perylene	240	U		ug/kg
		Chrysene	260	I		ug/kg
		Dibenzo(a,h)anthracene	240	U		ug/kg
		Fluoranthene	120	U		ug/kg
		Fluorene	120	U		ug/kg
		Indeno(1,2,3-cd)pyrene	240	U		ug/kg
		2-Methylnaphthalene	120	U		ug/Kg
		Naphthalene	120	U	MS	ug/kg
		Phenanthrene	900			ug/kg
		Pyrene	240	U		ug/kg
		Biphenyl**	120	U		ug/kg
		Dibenzothiophene**	120	U		ug/kg
		2,6-Dimethylnaphthalene**	120	U		ug/kg
		1-Methylnaphthalene	120	U		ug/kg
		1-Methylphenanthrene**	1.7E+03			ug/kg
		2,3,5-Trimethylnaphthalene**	120	U		ug/kg
	FL-PRO	TRPH	2.2E+04			mg/kg
1303480	SM 2540 G (20th)	% Solid**	54.6			%

September 30, 2010

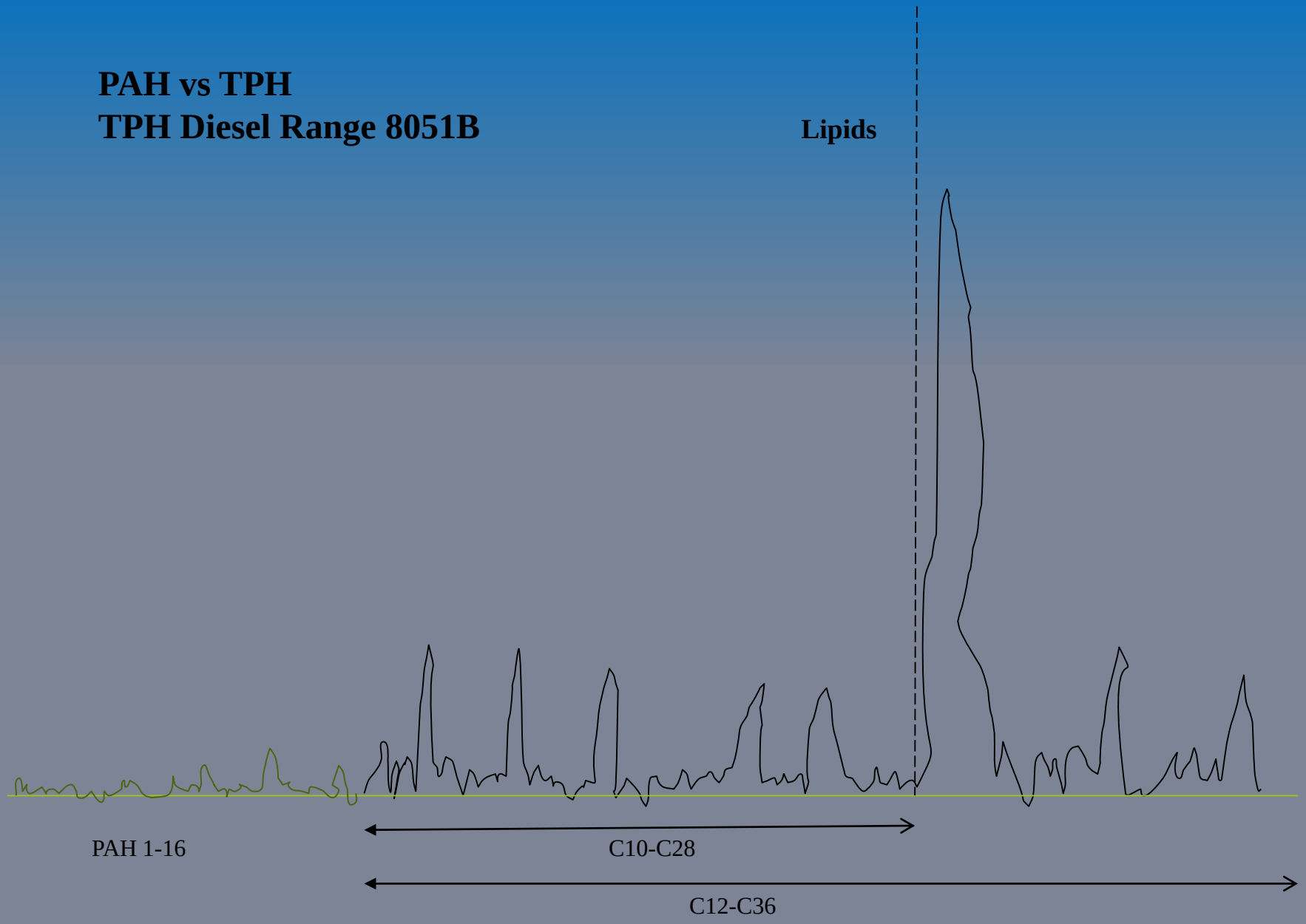
Field ID: PROXIMITY REP-1 Matrix: SEDIMENT

Sample ID	Ref. Method	Component	Result	Code	QC Failures	Units	Cert #

Ref. Method and Comment:
EPA 8270D: Detection limits have been elevated due to matrix interferences. A hydrocarbon pattern consistent to that of the Deepwater Horizon oil was observed in the sample.
FL-PRO: A hydrocarbon pattern consistent to that of the Deepwater Horizon oil was observed in the sample.

Sample Location: SPOIL ISLAND SIDE OFF FT McRAE Collection Date/Time: 10/07/2010 11:50 AM

PAH vs TPH
TPH Diesel Range 8051B



Methods

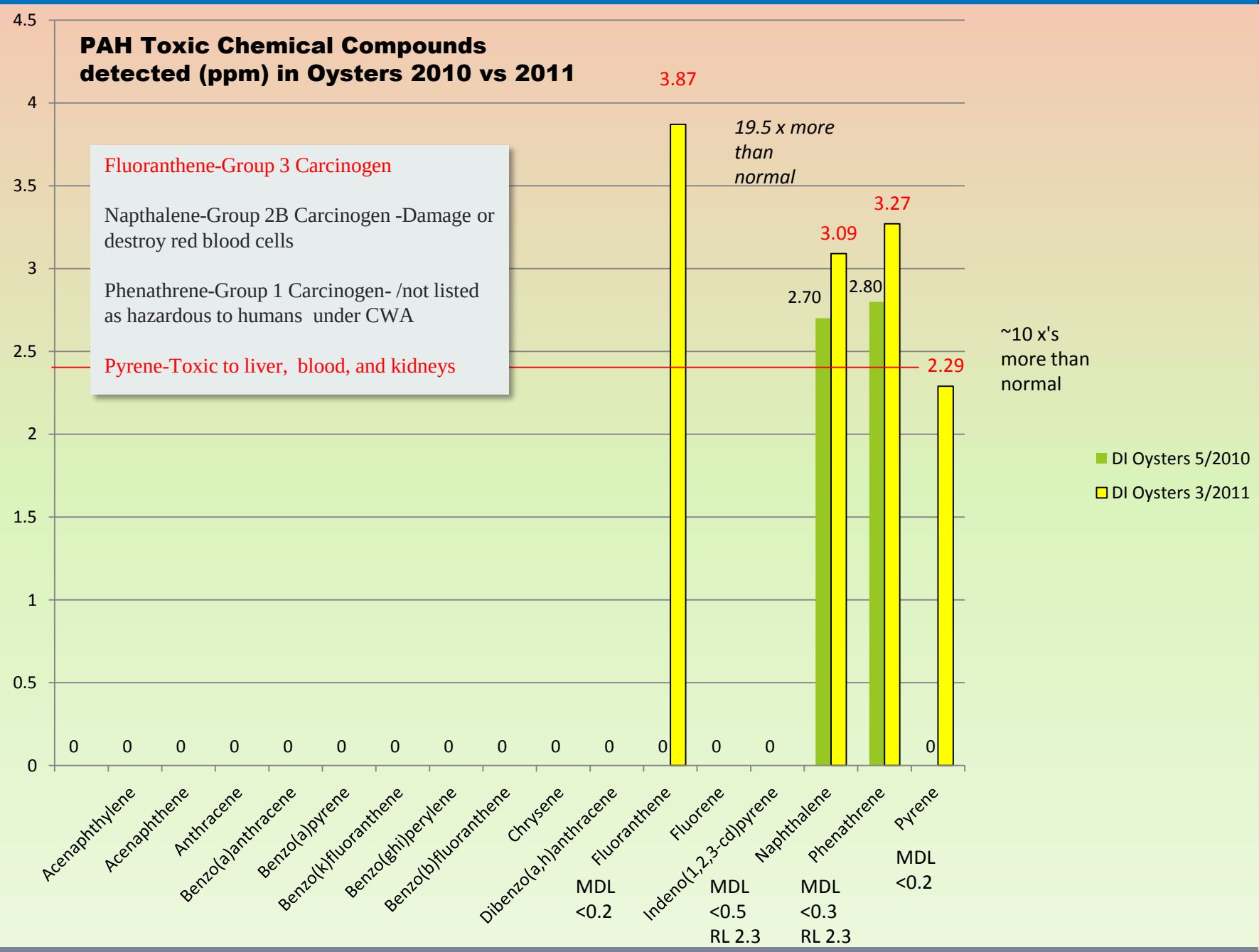
- 83 samples of various species
- Tissue and organs
- Collection NRDA methods
- Oysters 20 per sample homogenized
- Analyzed – Mixture of EPA /NOAA NMFS

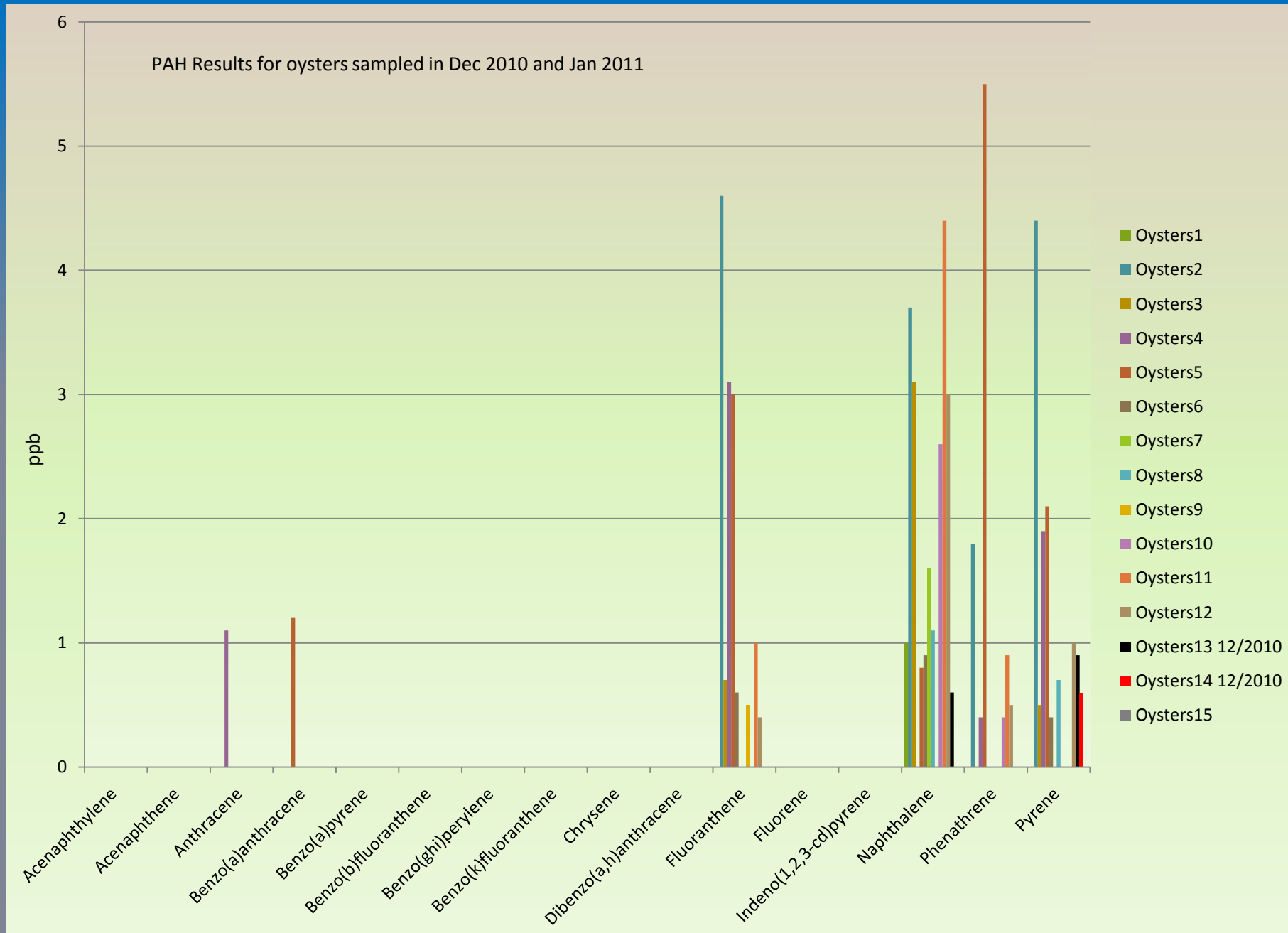
Oysters are “windows” to Water Quality

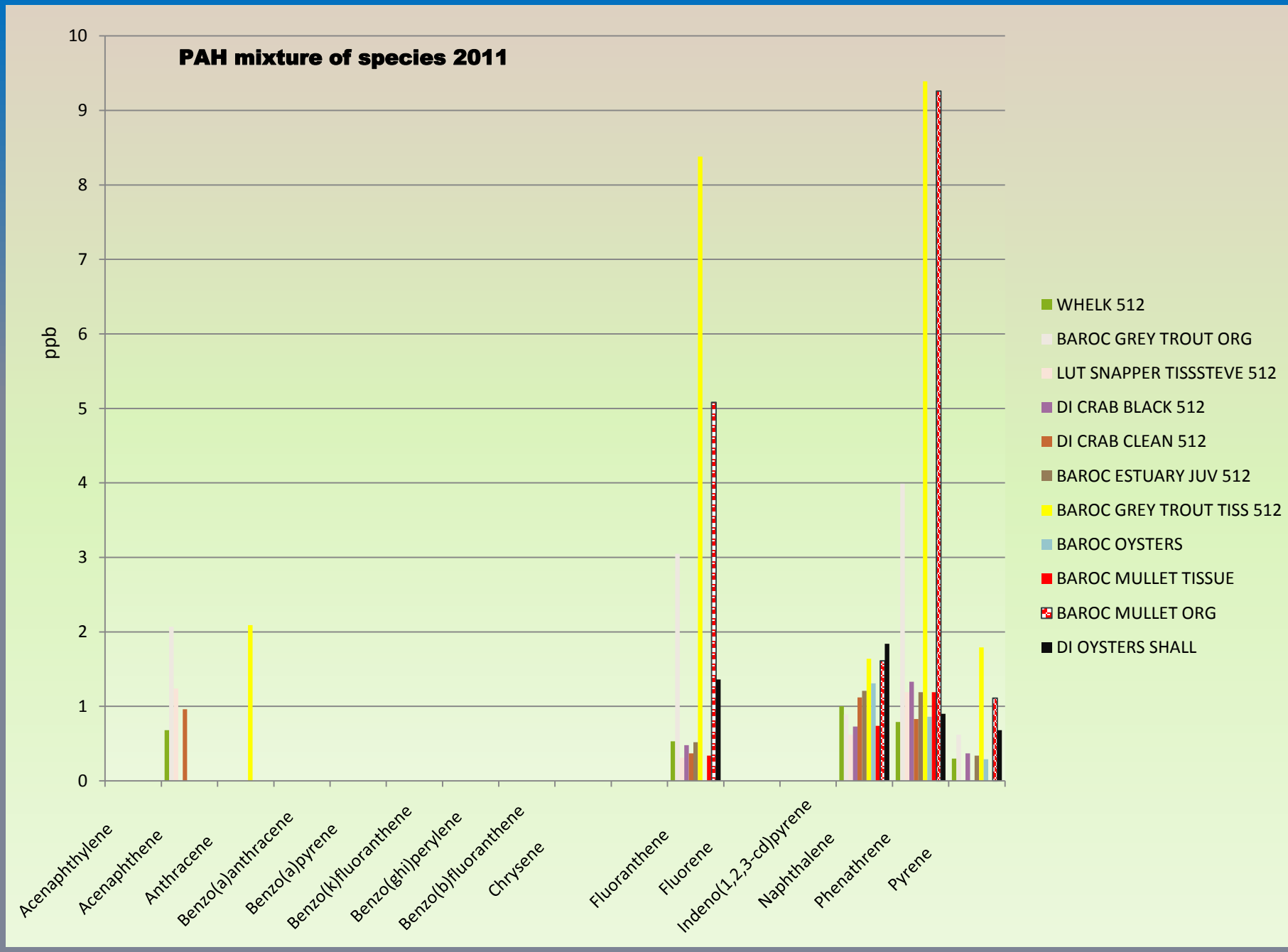
Bivalves are less complex organisms that do not have the ability to metabolize PAHs in the environment or to move from a contaminated area. All bivalves, including oysters, take up the PAHs that are in the water column. Their bodies cannot process the compounds, so the harmful pollutants accumulate in their tissues.

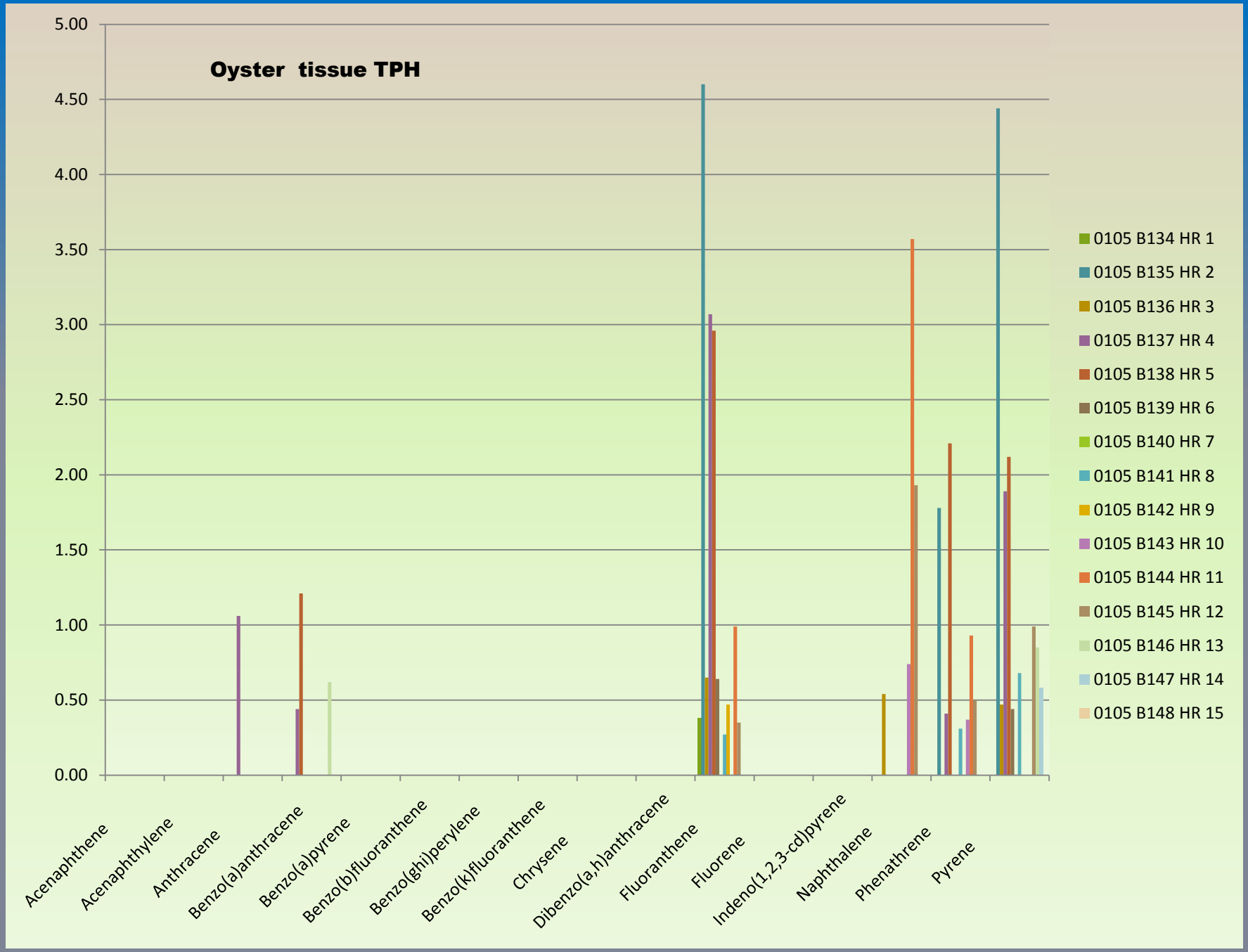
PAHs are made up of any-where between two and six benzene rings linked together. Smaller, lower molecular weight PAHs with fewer rings are more soluble; they are taken up by organisms in the water column readily, but are relatively harmless.

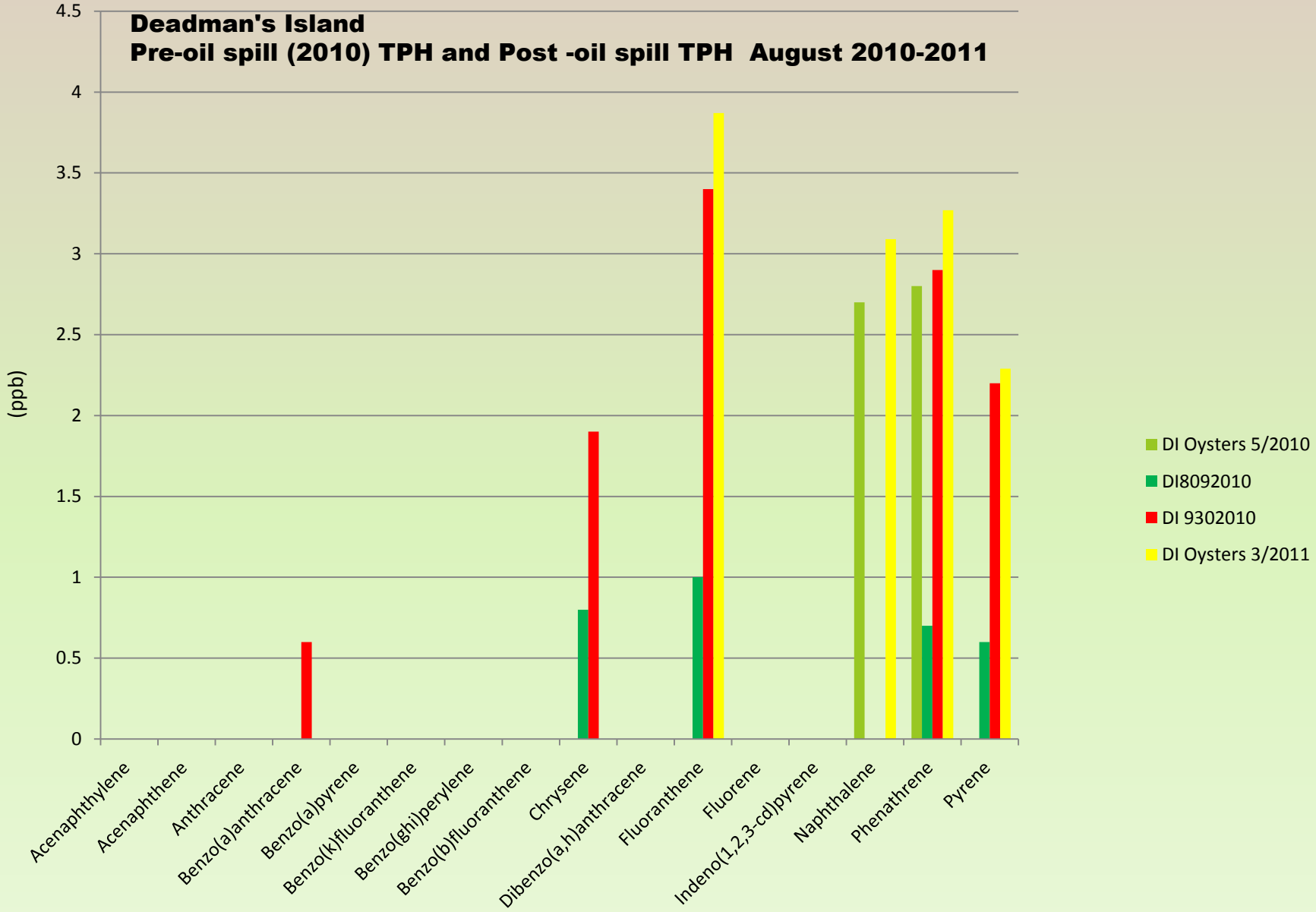
The larger molecular weight meaning PAHs with four or more rings are fat-soluble. When PAH is ingested by the bivalves, the molecules are stored in the tissue because they are hydrophobic and lipid-soluble.

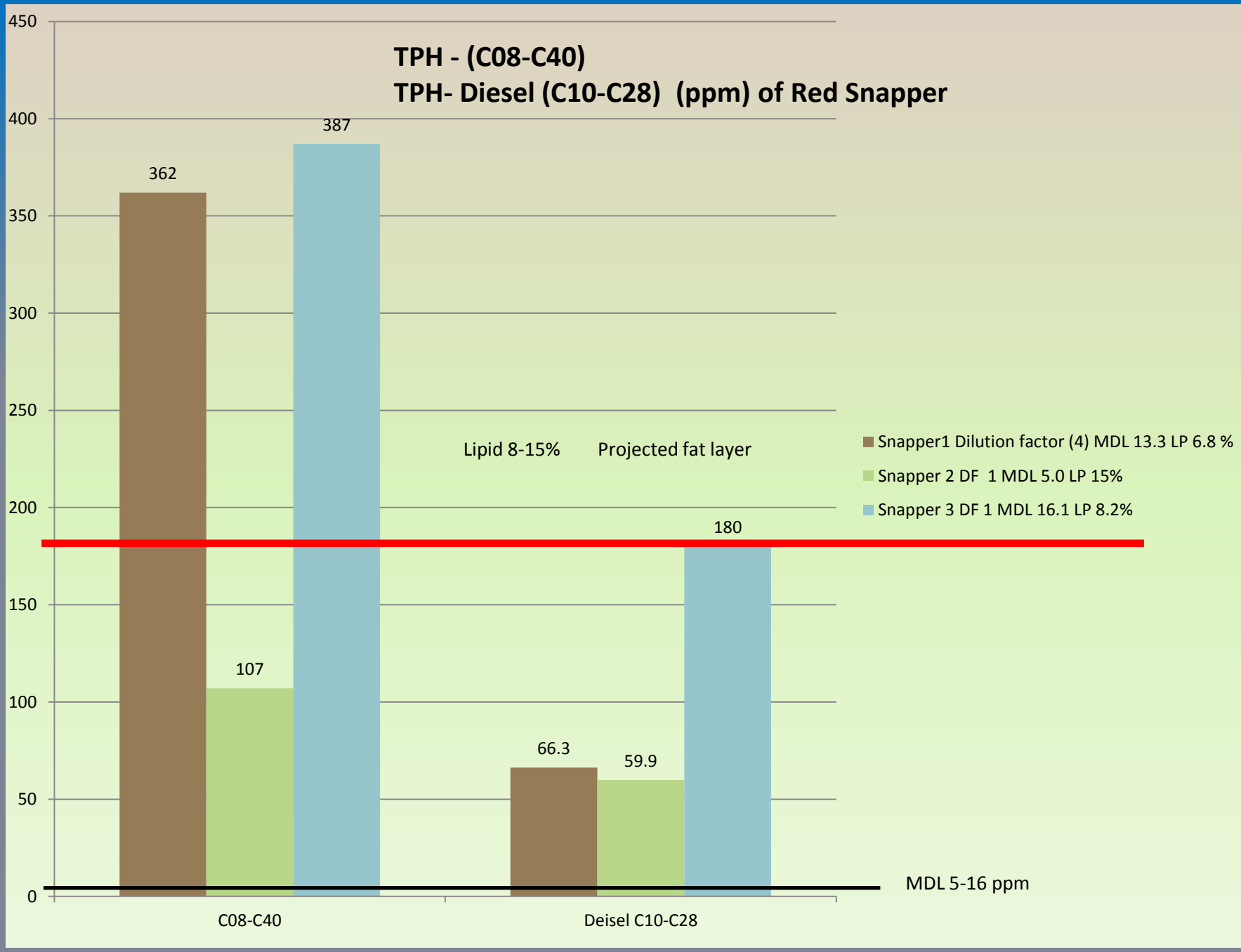

PAH Toxic Chemical Compounds detected (ppm) in Oysters 2010 vs 2011
Fluoranthene-Group 3 Carcinogen
Napthalene-Group 2B Carcinogen -Damage or destroy red blood cells
Phenathrene-Group 1 Carcinogen- /not listed as hazardous to humans under CWA
Pyrene-Toxic to liver, blood, and kidneys
3.87
19.5 x more than normal
3.27
3.09
2.70
2.80
2.29
~10 x's more than normal
0
DI Oysters 5/2010
DI Oysters 3/2011
Acenaphthylene
Acenaphthene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(k)fluoranthene
Benzo(ghi)perylene
Benzo(b)fluoranthene
Chrysene
Dibenzo(a,h)anthracene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenathrene
Pyrene
MDL <0.2
MDL <0.5 RL 2.3
MDL <0.3 RL 2.3
MDL <0.2

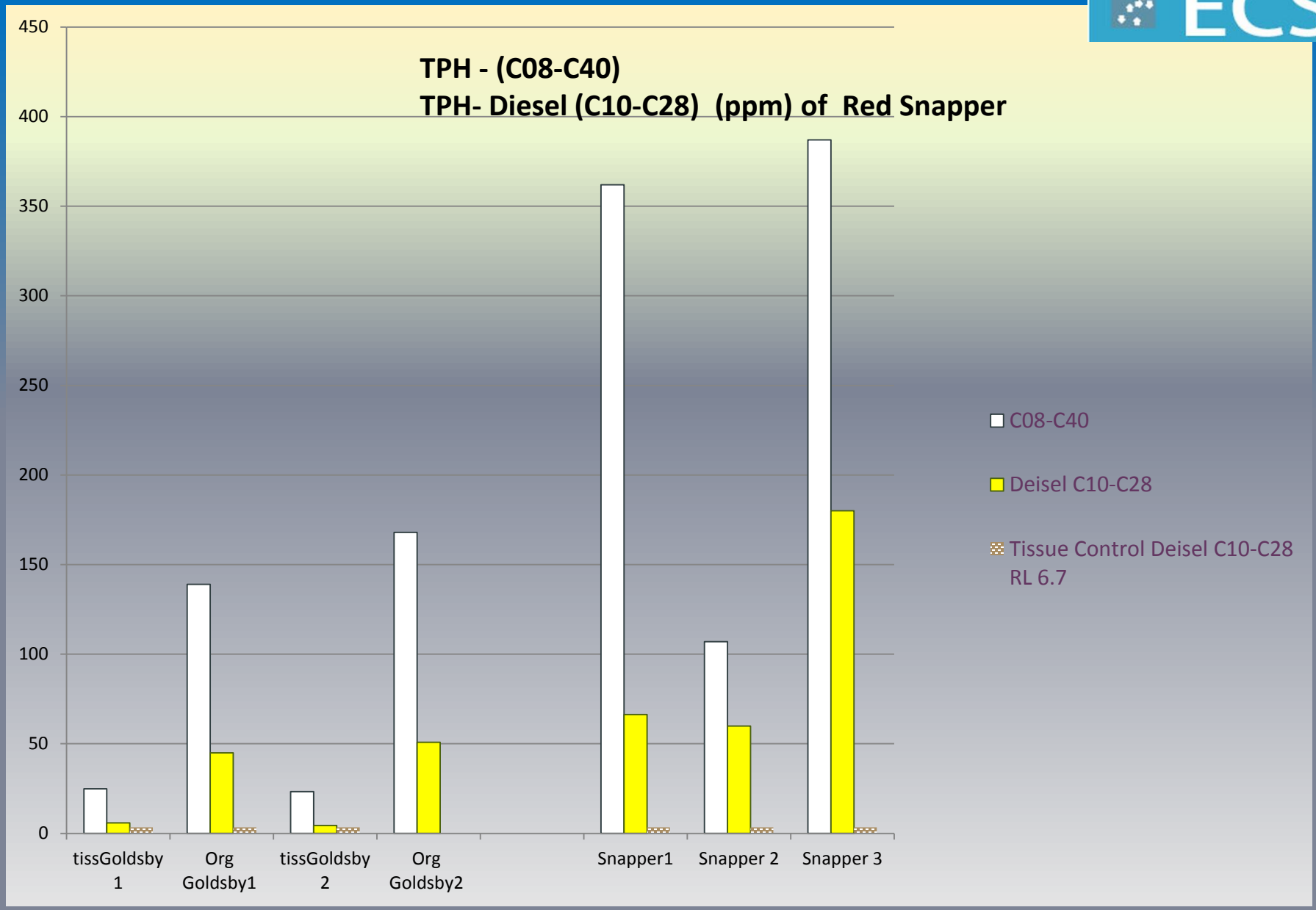

PAH Results for oysters sampled in Dec 2010 and Jan 2011
ppb
0
1
2
3
4
5
6
Acenaphthylene
Acenaphthene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(ghi)perylene
Benzo(k)fluoranthene
Chrysene
Dibenzo(a,h)anthracene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenathrene
Pyrene
Oysters1
Oysters2
Oysters3
Oysters4
Oysters5
Oysters6
Oysters7
Oysters8
Oysters9
Oysters10
Oysters11
Oysters12
Oysters13 12/2010
Oysters14 12/2010
Oysters15

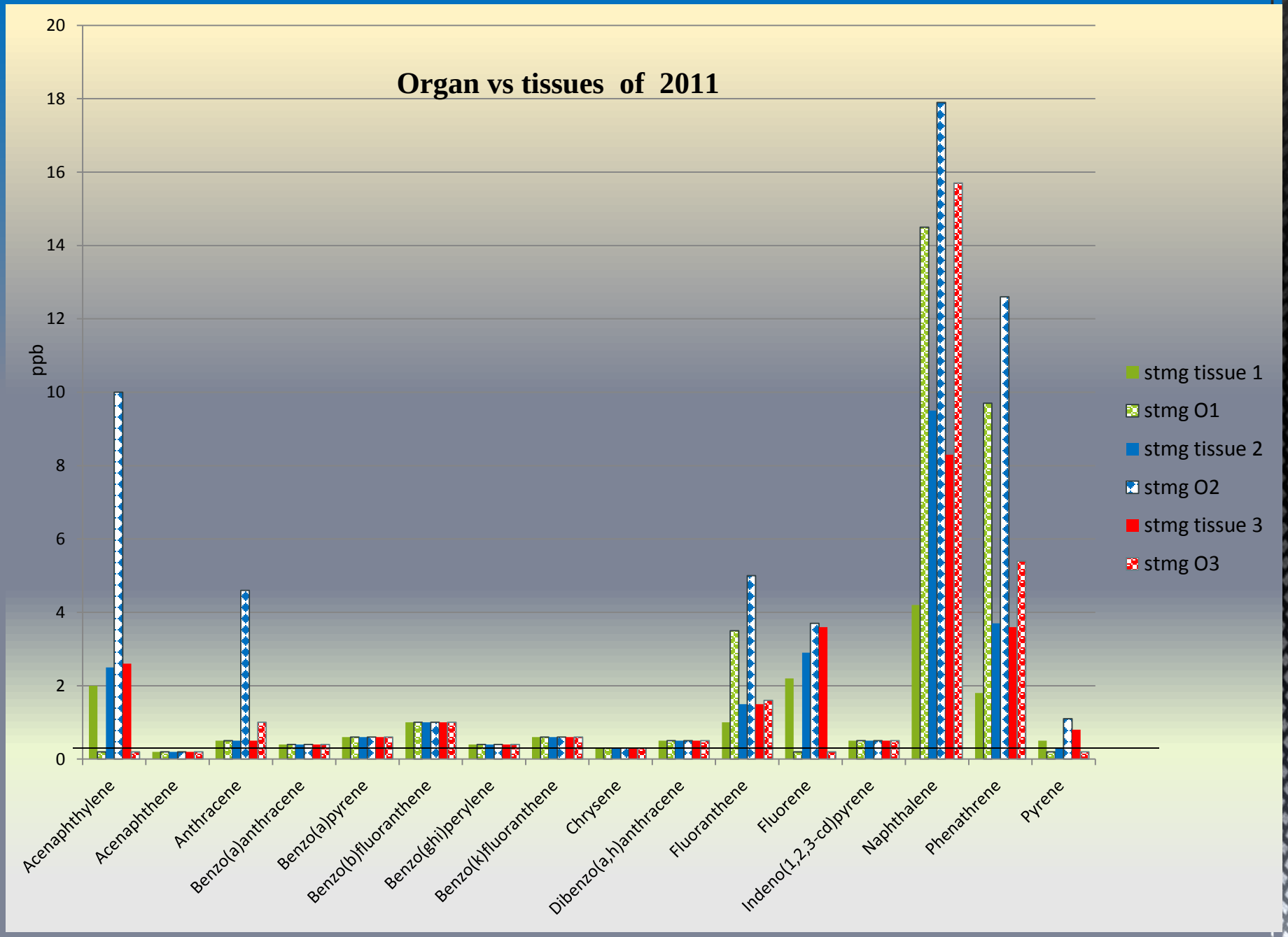

PAH mixture of species 2011
ppb
10
9
8
7
6
5
4
3
2
1
0
Acenaphthylene
Acenaphthene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(k)fluoranthene
Benzo(ghi)perylene
Benzo(b)fluoranthene
Chrysene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenathrene
Pyrene
WHELK 512
BAROC GREY TROUT ORG
LUT SNAPPER TISSSTEVE 512
DI CRAB BLACK 512
DI CRAB CLEAN 512
BAROC ESTUARY JUV 512
BAROC GREY TROUT TISS 512
BAROC OYSTERS
BAROC MULLET TISSUE
BAROC MULLET ORG
DI OYSTERS SHALL

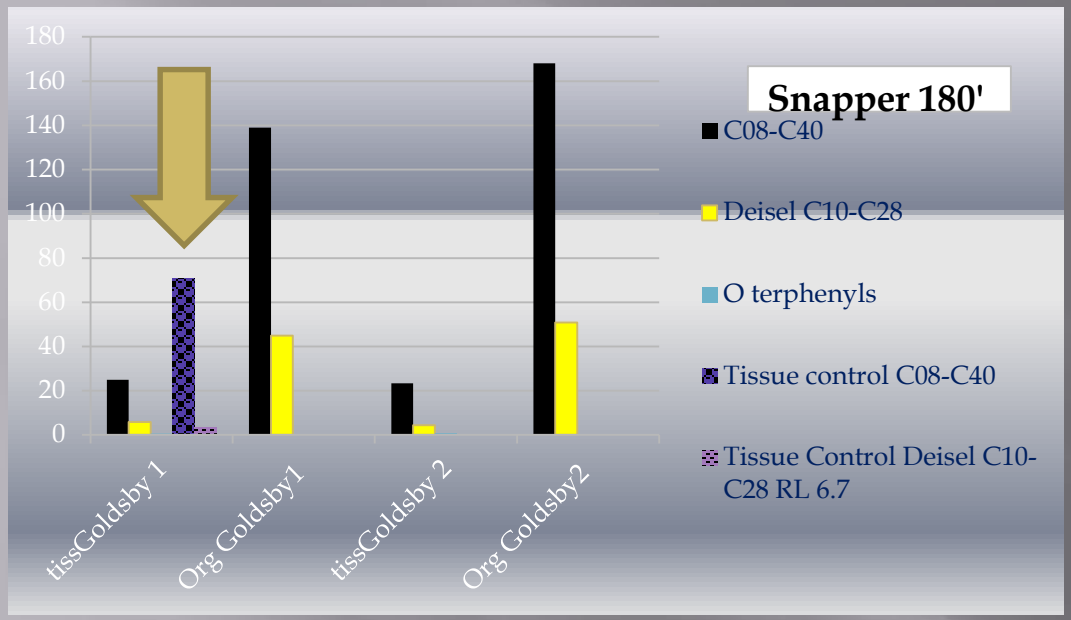

Oyster tissue TPH
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(ghi)perylene
Benzo(k)fluoranthene
Chrysene
Dibenzo(a,h)anthracene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenathrene
Pyrene
0105 B134 HR 1
0105 B135 HR 2
0105 B136 HR 3
0105 B137 HR 4
0105 B138 HR 5
0105 B139 HR 6
0105 B140 HR 7
0105 B141 HR 8
0105 B142 HR 9
0105 B143 HR 10
0105 B144 HR 11
0105 B145 HR 12
0105 B146 HR 13
0105 B147 HR 14
0105 B148 HR 15

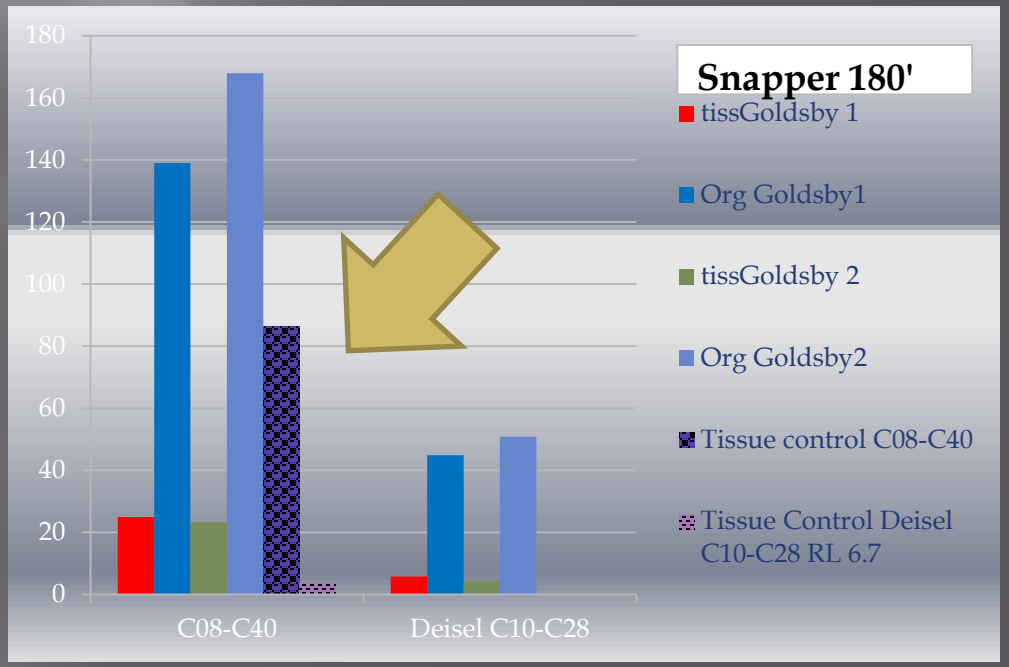

Deadman's Island
Pre-oil spill (2010) TPH and Post -oil spill TPH August 2010-2011
(ppb)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Acenaphthylene
Acenaphthene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(k)fluoranthene
Benzo(ghi)perylene
Benzo(b)fluoranthene
Chrysene
Dibenzo(a,h)anthracene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenathrene
Pyrene
DI Oysters 5/2010
DI8092010
DI 9302010
DI Oysters 3/2011

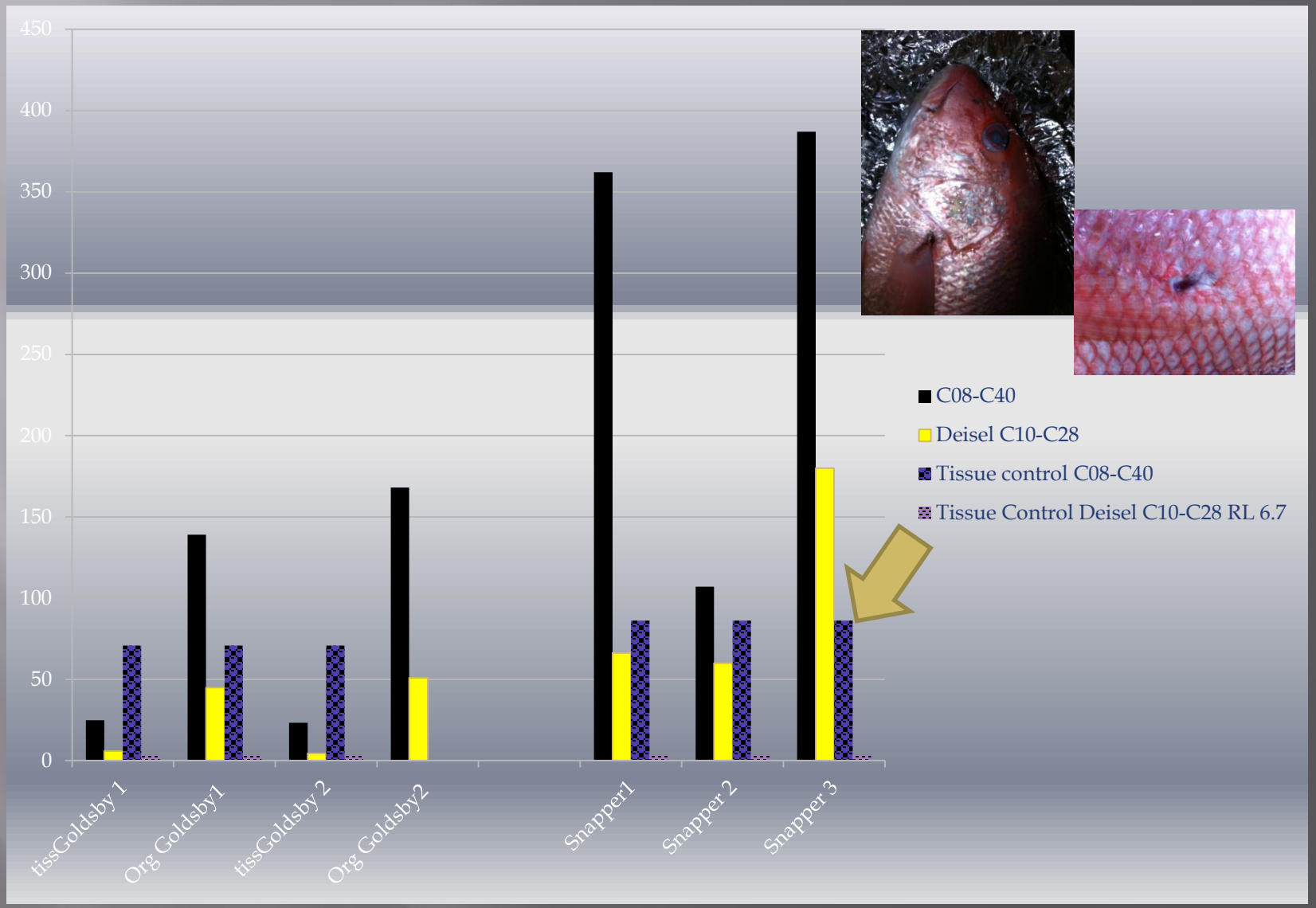

TPH - (C08-C40)
TPH- Diesel (C10-C28) (ppm) of Red Snapper
450
400
350
300
250
200
150
100
50
0
362
107
387
66.3
59.9
180
Lipid 8-15%
Projected fat layer
Snapper1 Dilution factor (4) MDL 13.3 LP 6.8 %
Snapper 2 DF 1 MDL 5.0 LP 15%
Snapper 3 DF 1 MDL 16.1 LP 8.2%
MDL 5-16 ppm
C08-C40
Deisel C10-C28


TPH - (C08-C40)
TPH- Diesel (C10-C28) (ppm) of Red Snapper
450
400
350
300
250
200
150
100
50
0
tissGoldsby 1
Org Goldsby1
tissGoldsby 2
Org Goldsby2
Snapper1
Snapper 2
Snapper 3
C08-C40
Deisel C10-C28
Tissue Control Deisel C10-C28 RL 6.7

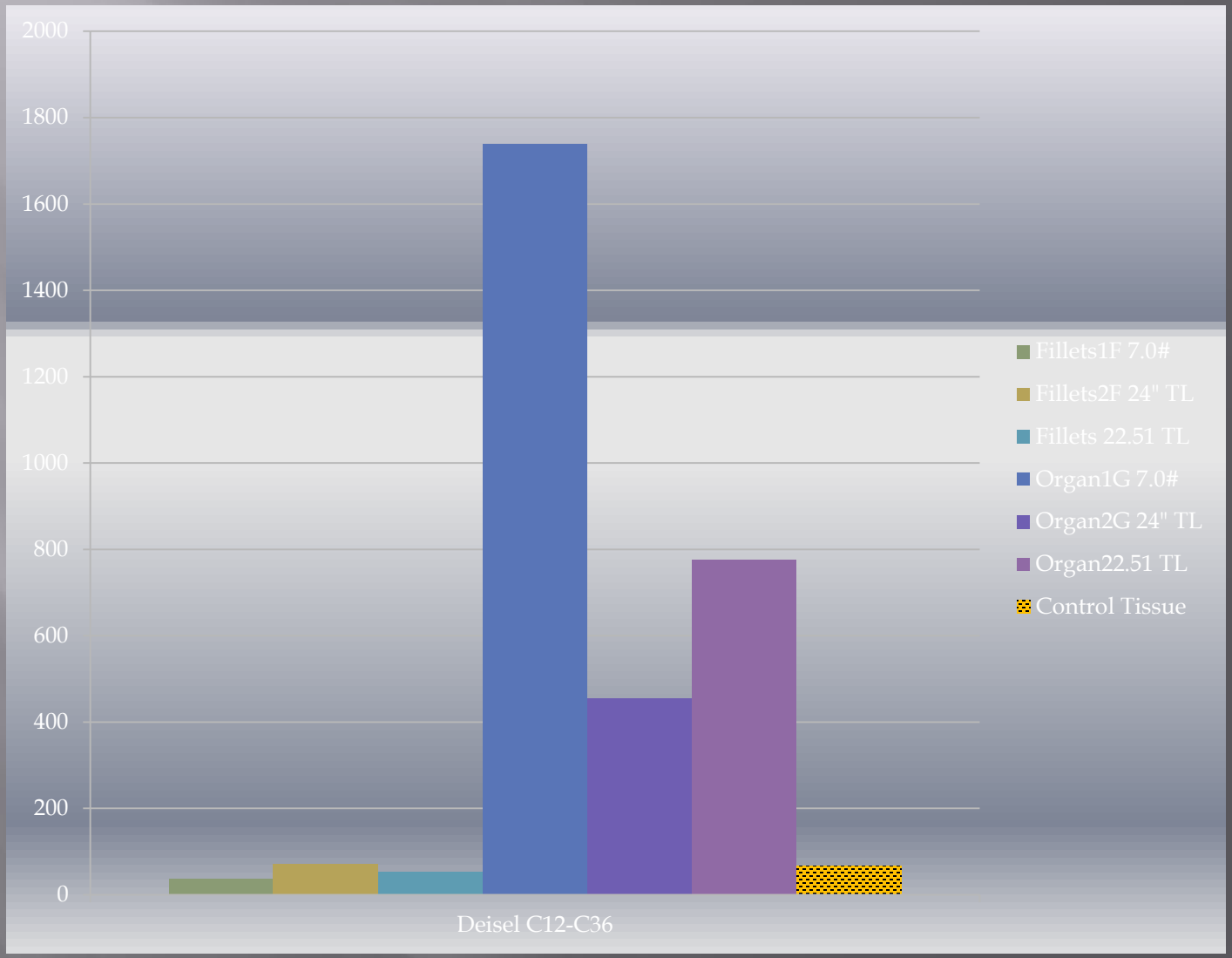

Organ vs tissues of 2011
ppb
20
18
16
14
12
10
8
6
4
2
0
stmg tissue 1
stmg O1
stmg tissue 2
stmg O2
stmg tissue 3
stmg O3
Acenaphthylene
Acenaphthene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(ghi)perylene
Benzo(k)fluoranthene
Chrysene
Dibenzo(a,h)anthracene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenathrene
Pyrene

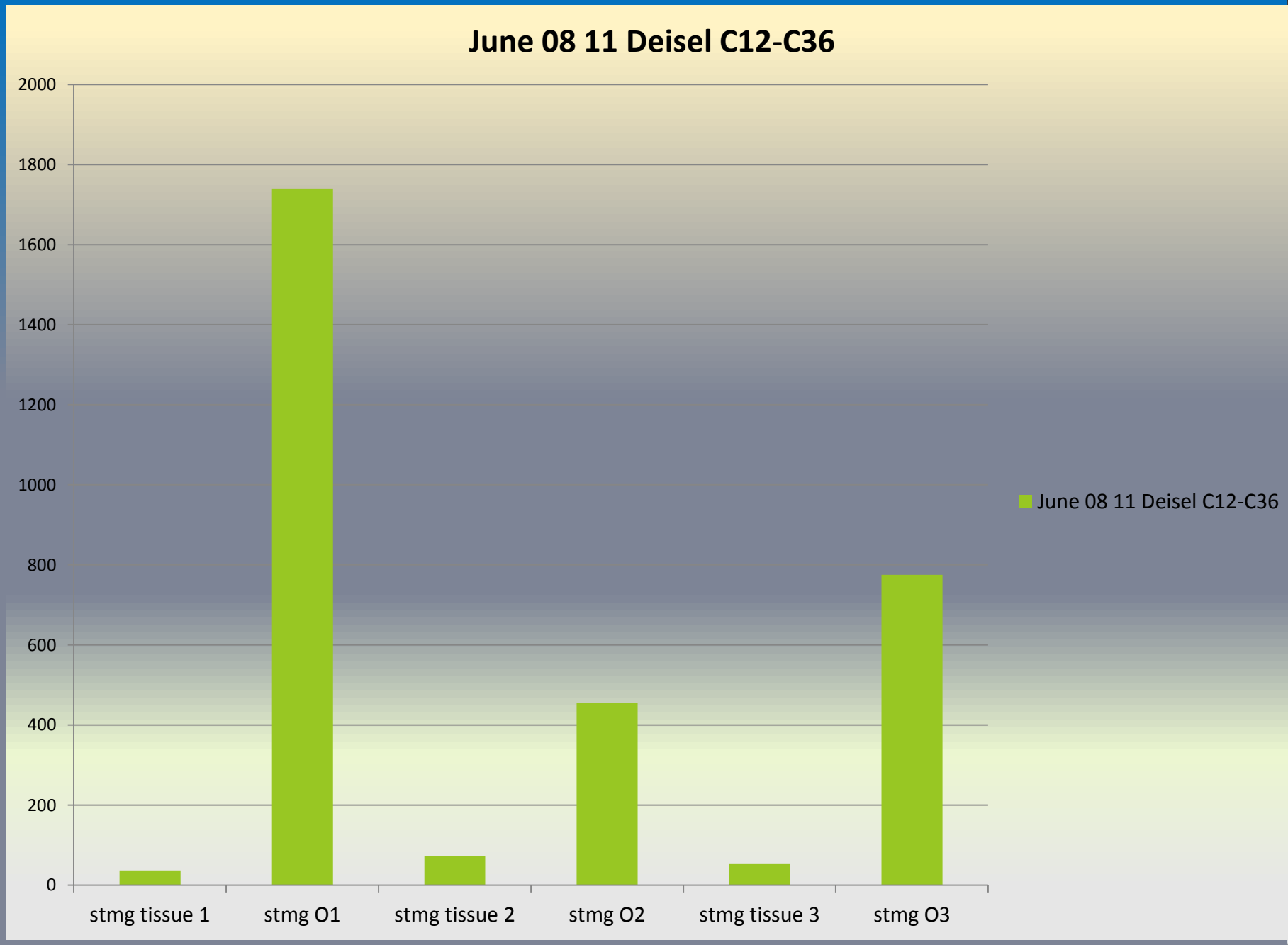

Snapper 180'
180
160
140
120
100
80
60
40
20
0
tissGoldsby 1
Org Goldsby1
tissGoldsby 2
Org Goldsby2
C08-C40
Deisel C10-C28
O terphenyls
Tissue control C08-C40
Tissue Control Deisel C10-C28 RL 6.7


Snapper 180'
180
160
140
120
100
80
60
40
20
0
C08-C40
Deisel C10-C28
tissGoldsby 1
Org Goldsby1
tissGoldsby 2
Org Goldsby2
Tissue control C08-C40
Tissue Control Deisel C10-C28 RL 6.7


450
400
350
300
250
200
150
100
50
0
tissGoldsby 1
Org Goldsby1
tissGoldsby 2
Org Goldsby2
Snapper1
Snapper 2
Snapper 3
C08-C40
Deisel C10-C28
Tissue control C08-C40
Tissue Control Deisel C10-C28 RL 6.7

CRUDE range PAH testing
Grouper




June 08 11 Deisel C12-C36
2000
1800
1600
1400
1200
1000
800
600
400
200
0
stmg tissue 1
stmg O1
stmg tissue 2
stmg O2
stmg tissue 3
stmg O3
June 08 11 Deisel C12-C36

TPH Data Results for oysters

Date Extracted: 12/08/10
Date Analyzed: 12/14/10 & 12/15/2010
Analyst: DAL
Method: SW846 8015M
Inject Volume (uL): 1.0

40GCSF
FID
DB-5

QC Criteria	
Surrogate %:	50-150
Biota SPK8	50-150

Worksheet Verified by: KEG
Date: 12-17-10
MDL (UG/L): 48.92
RL (UG/L): 100

Client Field ID	PACE #	Initial Wt. (g)	TPH C10 - C28 ug/mL	TPH C12 - C36 ug/mL	O-Terphenyl QC - Surrogate % Recovery	Dilution	Spike Added & Std Conc (mg/L)	Percent Recovery Stds. & Spikes	RPD <20%	Pass/Fail QC Criteria	TPH C10-C28 Sample Final Conc.** Wet basis (mg/kg)	TPH C12-C36 Sample Final Conc.** Wet basis (mg/kg)	Biota Wet basis MDL (mg/kg)	Biota Wet basis RL (mg/kg)
	4038459-001MS	15.0	1057.06011	6360.65875	98.2	1.00	1000	88.7	1.4	PASS	70.5	424.0		
	4038459-001MSD	15.0	1042.82782	6706.58556	105	1.00	1000	36.6		FAILED	69.5	447.1		
	4038459-001MS	15.0	286.13105	893.94486	0D	5.00	1000	142.0	11.4	PASS	95.4	298.0		
	4038459-001MSD	15.0	255.32935	797.52635	0D	5.00	1000	117.6		PASS	85.1	265.8		
Tuna LCS 2690-71		15.0	994.05443	3338.49756	92.2	1.00	1000	99.4		PASS	66.3	222.6		
Tuna LCS 2690-71		15.0	490.70206	1094.63141	0D	2.00	1000	98.1		PASS	65.4	146.0		
Tuna Mth Blk		15.0	158.57235	2289.78905	74.6	1.00					10.6	152.7	3.3	6.7
[redacted]	001	15.0	121.35564	3097.09668	84.1	1.00					8.1	206.5	3.3	6.7
	002	2.0	169.9195	3755.36017	77.2	1.00					85.0	1877.7	24.5	50.0
	003	15.0	676.97902	5678.95953	92.6	1.00					45.1	378.6	3.3	6.7
	004	15.0	10.73707	1067.93983	82.7	1.00					0.7	71.2	3.3	6.7
	005	15.0	101.01459	2559.96076	85.1	1.00					6.7	170.7	3.3	6.7
	006	15.0	305.92408	8329.61447	79.4	1.00					20.4	555.3	3.3	6.7
Tuna Mth Blk		15.0	114.53768	664.39078	0D	2.00					15.3	88.6	6.5	13.3
[redacted]	001	15.0	132.55772	863.6267	0D	2.00					17.7	115.2	6.5	13.3
	002	2.0	147.35415	1048.03397	0D	2.00					147.4	1048.0	48.9	100.0
	003	15.0	184.10343	699.68944	0D	5.00					61.4	233.2	16.3	33.3
	005	15.0	94.93806	712.03591	0D	2.00					12.7	94.9	6.5	13.3
	006	15.0	56.93157	563.20131	0D	10.00					38.0	375.5	32.6	66.7

Known Information

Oil from fish is common – oil from crude- not common

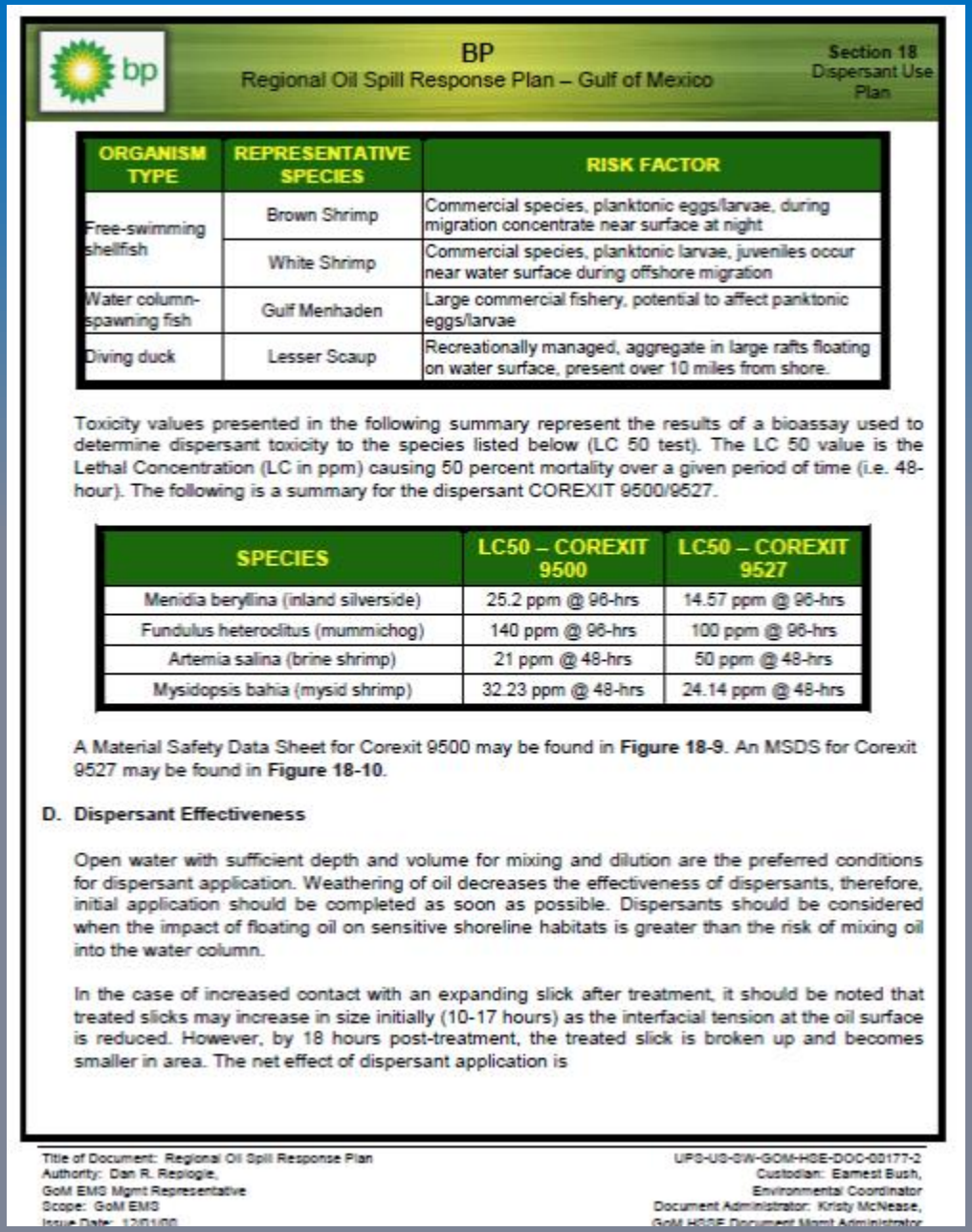
Fish oil does not contain carcinogenic hydrocarbons

Fish are not normally exposed to COREXIT –

Corexit has a half life of 45 days – you cannot see Corexit by UV lighting- many things in the Marine environment fluoresces

These tests are not longtem exposure -these are dose testing over a certain period of time

Seafood Testing needs to include TPH



ORGANISM TYPE	REPRESENTATIVE SPECIES	RISK FACTOR
Free-swimming shellfish	Brown Shrimp	Commercial species, planktonic eggs/larvae, during migration concentrate near surface at night
	White Shrimp	Commercial species, planktonic larvae, juveniles occur near water surface during offshore migration
Water column-spawning fish	Gulf Menhaden	Large commercial fishery, potential to affect panktonic eggs/larvae
Diving duck	Lesser Scaup	Recreationally managed, aggregate in large rafts floating on water surface, present over 10 miles from shore.

Toxicity values presented in the following summary represent the results of a bioassay used to determine dispersant toxicity to the species listed below (LC 50 test). The LC 50 value is the Lethal Concentration (LC in ppm) causing 50 percent mortality over a given period of time (i.e. 48-hour). The following is a summary for the dispersant COREXIT 9500/9527.

SPECIES	LC50 – COREXIT 9500	LC50 – COREXIT 9527
Menidia beryllina (inland silverside)	25.2 ppm @ 96-hrs	14.57 ppm @ 96-hrs
Fundulus heteroclitus (mummichog)	140 ppm @ 96-hrs	100 ppm @ 96-hrs
Artemia salina (brine shrimp)	21 ppm @ 48-hrs	50 ppm @ 48-hrs
Mysidopsis bahia (mysid shrimp)	32.23 ppm @ 48-hrs	24.14 ppm @ 48-hrs

A Material Safety Data Sheet for Corexit 9500 may be found in **Figure 18-9**. An MSDS for Corexit 9527 may be found in **Figure 18-10**.

D. Dispersant Effectiveness

Open water with sufficient depth and volume for mixing and dilution are the preferred conditions for dispersant application. Weathering of oil decreases the effectiveness of dispersants, therefore, initial application should be completed as soon as possible. Dispersants should be considered when the impact of floating oil on sensitive shoreline habitats is greater than the risk of mixing oil into the water column.

In the case of increased contact with an expanding slick after treatment, it should be noted that treated slicks may increase in size initially (10-17 hours) as the interfacial tension at the oil surface is reduced. However, by 18 hours post-treatment, the treated slick is broken up and becomes smaller in area. The net effect of dispersant application is

a reduction in the amount of oil on the water surface. Below are results of an effectiveness assessment of Corexit 9500 & 9527 conducted by the U.S. Environmental Protection Agency.

SWIRLING FLASK DISPERSANT EFFECTIVENESS TEST WITH SOUTH LOUISIANA (S/L) AND PRUDHOE BAY (P/B) CRUDE OIL

VENDOR LAB REPORT

OIL	COREXIT 9500	COREXIT 9527
Prudhoe Bay Crude	45.3 %	37.4%
South Louisiana Crude	54.7%	63.4%
Average of Prudhoe Bay and South Louisiana Crudes	50.0%	50.4 %

U.S. EPA OFFICE OF RESEARCH AND DEVELOPMENT REPORT

OIL	COREXIT 9500	COREXIT 9527
Prudhoe Bay Crude	49.4	51%
South Louisiana Crude	45.4	31%
Average of Prudhoe Bay and South Louisiana Crudes	47.4	41%

E. Application Equipment

The following table lists providers of dispersant application equipment in the Gulf Coast area. Each of these organizations is either an approved BP OSRO (See **Figure 7-7**) or is a primary provider of MSRC & NRC, BP's primary equipment providers.

#	Equipment	Quantity/ Type	Location	Contractor	Phone No.
1	Aircraft Spraying	(2) DC-3	Houma, LA	ASI	985-851-6391
		BE 90 King Air	Stennis, MS	MSRC	800-645-7745
		C-130A	Coolidge, AZ	MSRC	800-645-7745
		C-130 with ADDS Pack	Port Everglade, FL	CCA	954-983-9860
2	Dispersant Spotter Aircraft	Aero Commander	Houma, LA	ASI	985-851-6391
		BE 90 King Air	Stennis, MS	MSRC	800-645-7745
3	Dispersant Skid System	(1) Purpose built response vessel	Houma, LA	CGA	888-242-2007
4	Vessel Spraying	(2) 110' Crew Boat	Fourchon, LA	Ampol	800-482-6765
5	Helicopter Dispersant Application System	(1) Helo Pack	Fourchon, LA	Ampol	800-482-6765
	Dispersant skid mounted units	Crew Boat	Eureka, CA Morgan City, LA Cape May, NJ St. Croix, V.I.	NRC	(800) 899-4672

Dispersant Inventory – Gulf Coast **Figure 18-2**

Dispersant Stockpiles by Location (Updated 03/2009)

Supplier & Phone	Location of Dispersants	Type	Quantity in Gallons
Airborne Support, Inc. (ASI) 985-851-6391	Houma, LA	Corexit 9527	3,355
MSRC (800) OIL-SPIL	Slaughter Beach, DE - DBRC Site	Corexit 9527	330
	Chesapeake City, MD - MSRC Site	Corexist 9527	9,130
	Portland, ME - OSRV	Corexit 9527	330
	Perth Amboy, NJ - OSRV	Corexit 9527	330
	Chesapeake City, MD - OSRV	Corexit 9527	330
	Virginia Beach, VA - OSRV	Corexit 9527	330
	San Juan, PR - MSRC Site	Corexit 9527	900
	Kiln, MS - Stennis Airport	Corexit 9527	22,280
	Kiln, MS - Stennis Airport	Corexit 9500	3,960
	Miami, FL - OSRV	Corexit 9527	800
	Pascagoula, MS - OSRV	Corexit 9527	800
	Fort Jackson, LA - OSRV	Corexit 9527	800
	Lake Charles, LA - OSRV	Corexit 9527	800
	Galveston, TX - OSRV	Corexit 9527	800
	Corpus Christi - OSRV	Corexit 9527	330
	Galveston, TX - MSRC Site	Corexit 9500	18,980
	Coolidge, AZ - Coolide Airport	Corexit 9527	3,300
	Long Beach, CA - Tesoro Terminal	Corexit 9500	10,890
	Terminal Island, CA - OSRV	Corexit 9527	600
	Richmond, CA - MSRC Warehouse	Corexit 9527	11,500
	Richmond, CA - OSRV	Corexit 9527	605
	Everett, WA - Everett Warehouse	Corexit 9527	6,495
	Ferndale, WA - CP Refinery	Corexit 9527	6,430
	Port Angeles, WA - OSRV	Corexit 9527	605
	Astoria, OR - OSRV	Corexit 9527	605
	Honolulu, HI - OSRV	Corexit 9527	605
NRC National Response Corp. John Helscher 631-224-9141 ext. 142	Morgan City, LA	COREXIT 9527	1,320
	Morgan City, LA	SPC 1000	220
	Morgan City, LA	BIO Disperse	1,045
	Toe Beja, PR	COREXIT 9527	5,005
	St. Croix, VI	COREXT 9527	1,650
ONDEO Nalco	Sugarland, TX	Corexit 9500	11,000
Clean Caribbean & Americas	Ft. Lauderdale, FL	Corexit 9500	30,360
OSR / EARL +44 (0)20 7724 0102	Southhampton, UK	Corexit 9500	5,283
	Bahrain, MENAS Base	Corexit 9500 (1 week activation)	3,963
	Singapore, SG	Corexit 9500 (1 week activation)	8,440
		TOTAL QUANTITY (GALLONS)	174,486

F. Application Methods

There are two primary methods of applying dispersants to an oil spill. These methods involve the use of airplanes and helicopters for aerial application and the use of boats for on-water application. Below is a discussion of each application and information on the rates of application.

- **Aerial Dispersant Application**

  Aerial application is one of the methods pre-approved by the Regional Response Team (RRT). This method involves the application of dispersants from an airplane, and typically involves the use of a DC-3 or C-130 which is directed by a spotter plane. The DC-3 and C-130 have payload capacities of 1000 and 3500-5000 gallons respectively. Aerial application can be hindered by poor weather (rain, fog, rough seas, etc.). Aerial application is allowed to take place only during daylight hours, and involves the use of undiluted dispersant. As a general rule, application rates are within a range of 3 to 7 gallons per acre.

- **Marine Dispersant Application**

  The second method of dispersant application is from workboats using hand held equipment or mounted spray booms. Use of a portable fire pump or fixed fire fighting system from the workboat is recommended.

  The system should operate between 40 and 80 psi, and should deliver seawater and dispersant at a rate sufficient to maintain a spray pattern capable of reaching the oil before being carried away by wind or turbulence. The ideal dispersant/sea water mixture is 3 to 10 percent dispersant. The concentration of dispersant should be calculated based on pump capacity, boom swath width, vessel speed, and estimated volume of oil to be treated over a specified area. A treatment rate of 5 gallons per acre is typical for marine applications. Approval for marine application is generally more difficult due to the additional agencies that must be consulted for approval.

G. Conditions for Use

The objective of the Regional Response Team (RRT VI and RRT IV) FOSC Dispersant Pre-Approval Guidelines and Checklist is to provide for a meaningful, environmentally safe, and effective dispersant operation. **Figure 18-5** provides a flowchart identifying considerations of the Federal On-Scene Coordinator for approving dispersant use. Additionally, a checklist of decision/implementation elements for dispersant use can be found in **Figure 18-7**.

PAH

- "The FDA has determined, based on a large base of science, that the compounds of greatest concern to human health are the PAHs, and levels of concern have been determined for the PAHs," Dr. John Stein, a seafood safety expert at NOAA, said in an email. "The methods used for testing are designed for PAHs."

- Sniffers for PAH-2010
- Visual identifiers for MC252 (FLDEP Spring 2011)
- So far there is no MC252 oil

Oil and Grease test- why? Fastest test to make money and not find anything..

Our water quality is constantly threatened by many different sources and types of pollution. Under the Clean Water Act, every must adopt water quality standards to protect, maintain and improve the quality of the nation's surface waters. These standard represent a level of water quality that will support the goal of "swimmable/fishable" waters. Water quality standards are ambie standards as opposed to discharge-type standards. These ambient standards, through a process of back calculation procedu known as total maximum daily loads or wasteload allocations form the basis of water quality based permit limitations that regu the discharge of pollutants into surface waters under the National Pollutant Discharge Elimination System (NPDES) permit

CLEAN WATER ACT

State Criteria reevaluation every three years

(so far PAH tests show there is no need to revaluate)

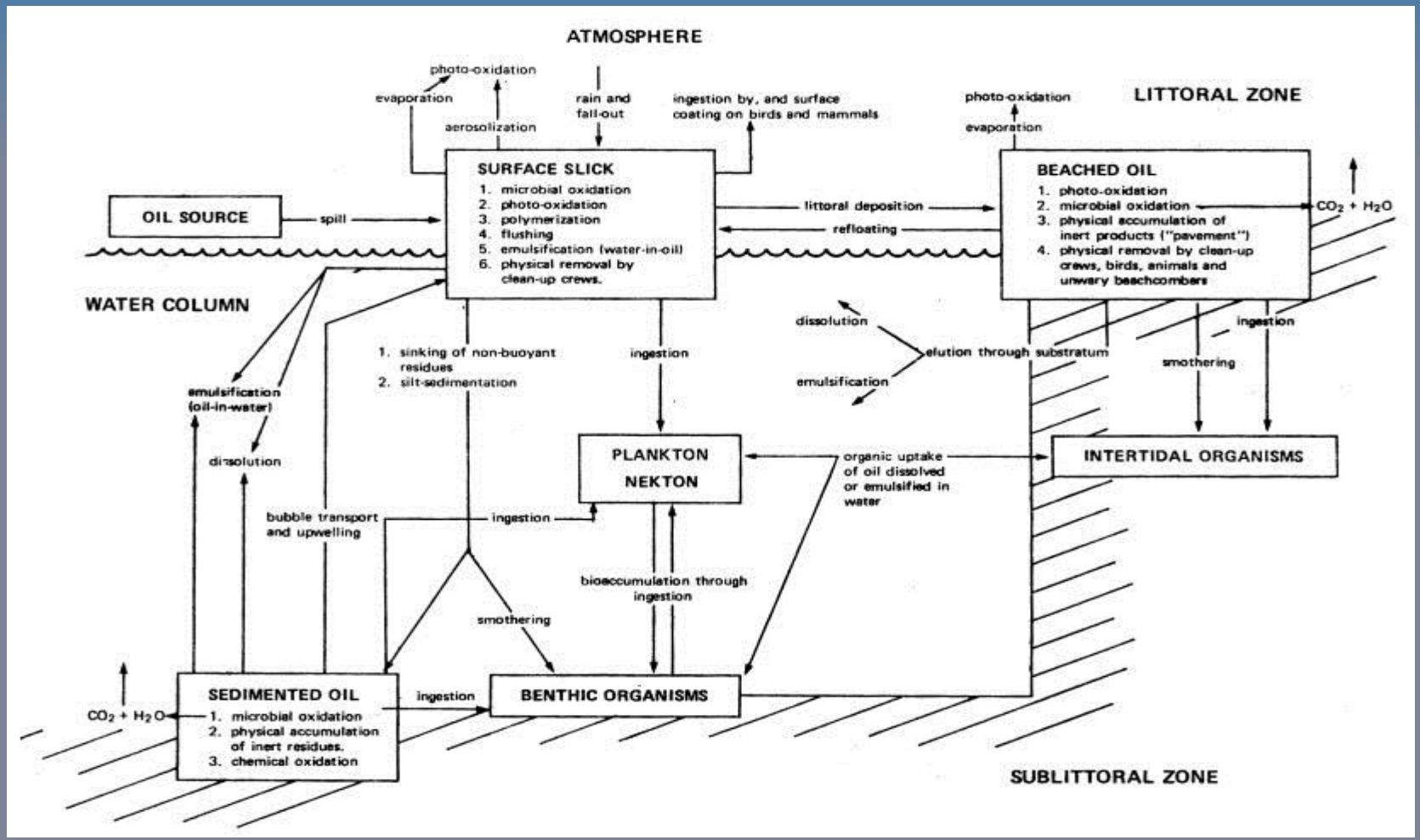
Water Quality Standards Program

Water quality standards (WQS) are risk-based (also called hazard-based) requirements which set site-specific allowable pollutant levels for individual water bodies, such as rivers, lakes, streams and wetlands. States set WQS by designating uses for the water body (e.g., recreation, water supply, aquatic life, agriculture) and applying **water quality criteria** (numeric pollutant concentrations and narrative requirements) to protect the designated uses. An **antidegradation policy** is also issued by each state to maintain and protect existing uses and high quality waters.[21]

the "best available technology" (

Clean Water Act needs to changed to include new technology and the State needs to except new technology in their methods.

- First order of effects-
- Second order of effects
- Third order of effects (Upwelling buried oil can cause the order of effects to repeat itself)



First Order of Effects

- Physical and Internal
  - Physical
  - Current Observation from Universities in Louisiana and Alabama
  - Sick Fish- Lesions and discoloration
  - Internal Toxicity
  - Supports current >C5- 35 petroleum hydrocarbon testing rather than current human health criteria of C1-C5 (PAH).
  - Organs are containing the presence of Diesel range hydrocarbons.
  - Organs are performing as needed but the processing of toxins are too high to support a healthy immune system in the fish- pathogens , diseases and cancers

Second Order of Effects

- Include changes in populations of each species with respect to size-frequency and age structure, productivity, standing crop, reproductive abilities, etc.
- Some Principal Investigators are seeing less of the key species and more of the pioneer species
- These are generally intermediate-term effects which show up in weeks, months, and for some long-lived species, years.

Third Order of Effects

- Include changes at the community or ecosystem level with respect to relationships within or between trophic levels, species composition and/or abundance, and other aspects of community dynamics.
- These changes are often the result of subtle, sub-lethal effects which may not show up for months or years.
- Disputable? Maybe but documented in other references post oil spill.

Conclusion

- PAH is not designed to find crude compounds which can effect fish long term
- Fish with TPH in their tissue show higher amounts of TPH in the organs
- Since oysters do not process PAH, they make great windows to water quality over time – until 100% mortality such as the case of The City of Gulf Breeze's Deadman's Island vertical reefs in Gulf Breeze, Florida
- TPH needs to be a priority test in Human Health Seafood Testing instead of PAH or "sniff tests"
- The order of effects may continue with ongoing upwelling so recovery in primary production may take years as demonstrated in previous oil spills.
- CWA needs to reflect new technology in reevaluation

Questions?

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