

Marine Invasive Species Issues in Texas

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TPWD Fisheries Independent Monitoring

Since 1975...



- ◆ 22,090 gill nets,
- ◆ 48,182 bag seines,
- ◆ 47,026 bay trawls,
- ◆ 20,946 Gulf trawls,
- ◆ 43,362 oyster dredges.

TPWD Fisheries Independent Monitoring

<u>Species</u>	<u>Bay System</u>	<u>Date</u>	<u>No.</u>	<u>Mean</u> (mm)	<u>Range</u> (mm)
Grass carp	Galveston Bay	6/1986-5/1995	5	678	610-743
	Corpus Christi Bay	11/2002-8/2007	5	275	200-575
Goldfish	Galveston Bay	6/1998	1	88	-
F. Cichlidae	Aransas Bay	11/1998	1	123	-
	Lower Laguna Madre	4/1980-10/1989	125	303	132-449
Pacific White Shrimp	Lower Laguna Madre	11/1992-10/2003	6	136	117-152
<i>Phyllorhiza punctata</i>	GOM off Sabine	7/2002	1	-	-



Commercial Shrimp Farms in Texas

Aquaculture

Shrimp

- *Litopenaeus vannamei* can be cultered along the coast
 - *L. stylirostris* – case by case and only outside Exotic Species Exclusion Zone
 - Escapement (1991 & 1997)
-
- 1,240 acres in production
 - Production ranged from 3,500 – 6,000 lbs per acre
 - 800 TPWD inspections
 - No major diseases of concern identified



Aquaculture

Algae to Biofuels



- Nation's first commercial-scale, open-pond algae farm (oil as a biodiesel feedstock); PetroSun Biofuels
- 1,100 pond acres (94 five-acre ponds, 63 10-acre ponds); total facility 1,831 acres
- Pilot algae farm in AL showed oil production of 5,000 and 8,000 gallons per acre per year
- Projected production = 4.4 million gallons of algal oil plus 110 million pounds biomass per year

Aquaculture

Algae for Health Food Supplements

- *Dunaliella salina*
- For carotenoids (beta-carotene) production, vitamin A and natural food coloring
- High lipid content; has also been used for bio-diesel production
- Hypersaline growing conditions (200 psu)



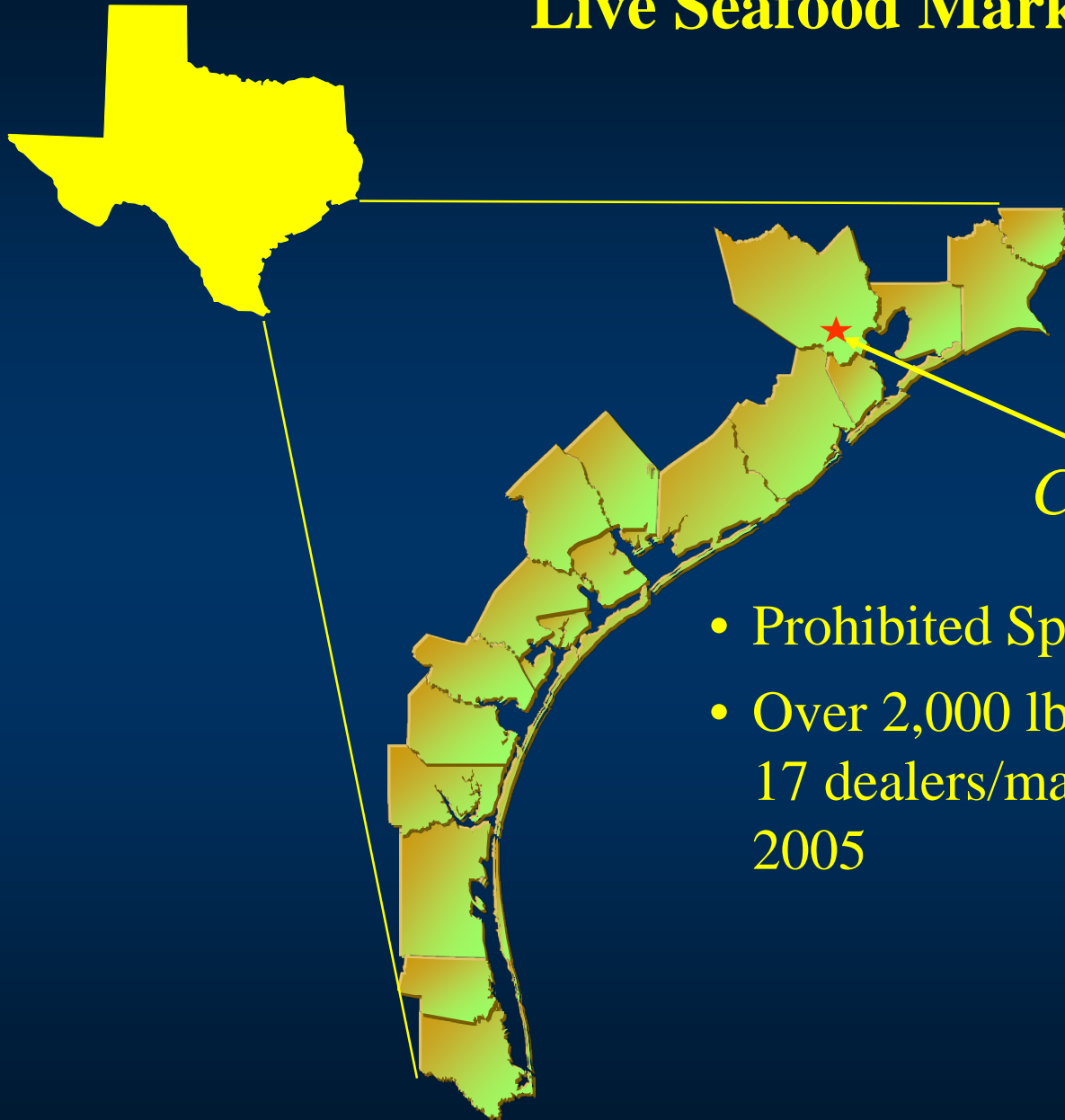
Suspected Ballast Water Introduction



Vibrio parahaemolyticus

- May & June 1998
- 416 cases in 13 states reported gastroenteritis after eating Galveston Bay oysters
- First reported case of serotype 03:K6 isolates in the US (native to southeast Asia)

Live Seafood Market



Crassostrea gigas

- Prohibited Species List since 1991
- Over 2,000 lbs. confiscated from 17 dealers/markets from 2001-2005

Olympia oyster (*Ostrea conchaphila*)



Kumamoto oyster (*C. sikamea*)



Suminoe oyster (*C. ariakensis*)

Blue mussels

Mahogany clams

Geoduck clams

Periwinkles

Quahogs

Manila clams



Live Seafood Industry



Leopard Coral Grouper
(*Plectropomus leopardus*)
(Serranidae – sea basses)

Spot Shrimp (*Pandalus platyceros*)
(Pandalidae – Pandalid shrimps)



California sheephead wrasse
(*Semicossyphus pulcher*)
(Labridae – wrasses)



Adult male (terminal phase)

Live Seafood Industry

Ocean Pout (*Zoarces americanus*) (Zoarcidae – eelpouts)



Live Seafood Industry

Shipper/Exporter: Hae Won Seafood, Inc., Ltd., Seoul, Korea
Buyer: Hong Fish Inc., Houston, TX USA

Item	Net Wt. (kg)
Live Halibut	13.2
Live <i>Urechis unicinctus</i>	5
Fresh Sea Weed	10
Fresh Green Laver	10
Fresh Sea Weed	10
Live Poulp Squid (<i>Octopus variabilis</i>)	5
Fresh Conger Eel	10
Fresh Conger Eel	7.3
Live Sea Cucumber	20
Live Sea Squirts (<i>Didemnum lahillei</i>)	10

Items appearing on Feb. 28, 2007 Packing List

Didemnum sp.



- Colonial tunicate
- Intertidal to 65m (213ft)
- Georges Bank
 - 6 sq. miles in fall 2003
 - 40 sq. miles in 2004
- 10 kg shipped into TX Feb. 2007
with other live seafood items



Hull Fouling



Dr. Ted Grosholz

Underwater view of a highly fouled ship hull showing attached fouling organisms

Locations of MARAD Reserve Fleet and Ship Salvage Facilities

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● Ship Salvage Facilities

★ Reserve Fleet Facilities

Post-Voyage Analysis of Hull Biofouling on the Vessels *Point Loma* and *Florence* after Transit from CA to TX

- Pre- vs. post-transit photographic survey – most striking observation was reduction of bryozoan mat (2-5 cm during pre-transit survey)
- 23 distinct species recorded during pre-transit survey (5 not encountered in post-transit survey).
- 51 distinct species recorded during post-transit survey. Live specimens observed for at least 25 of the 51 species.
- 2 barnacles (*Balanus amphitrite* and *Lepas pacifica*) recorded from post-transit survey only.

Post-Voyage Analysis of Hull Biofouling on the Vessels *Point Loma* and *Florence* after Transit from CA to TX

Continued....

- Of species found in Texas but not Suisan Bay, many were rare (< 5% of samples); may not have been detected in pre-transit surveys or attached during transit.
- Of the species recorded on the hulls in Texas, at least 8 were non-native to the western Gulf of Mexico. Two of these are known to be already established, however introduction of different genotypes may cause shifts in ecological characteristics and community dynamics.

Current Status - 2008

- “Vessels from Beaumont fleet may be relocated to scrapping facilities in Brownsville without scamping. This decision is based on the best available information and the lower potential risk of invasive issues between these two Texas ports. This determination could change with new information or if concerns are raised by either Louisiana or Mexico because of their proximity to the Texas ports in question.”
- “Vessels from Suisan Bay, CA and James River, VA fleets may be brought into state waters provided they are scamped before coming into the Gulf of Mexico. It is also advised that any vessel originating from the Pacific should be scamped before entering the Caribbean via the Panama Canal.”

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