Louisiana State Aquatic Invasive Species Report

October, 2007

GULF & SOUTH ATLANTIC REGIONAL PANEL ON AQUATIC INVASIVE SPECIES

Martyn E. Cohen

Pontchartrain Institute for Environmental Sciences

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Aquatic Invasives in southeastern Louisiana

- Update on Rio Grande cichlids (*Herichthys cyanoguttatus*)

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DISTRIBUTION AND DISPERSAL

Application of a Diffusion Model to Describe a Recent Invasion; Observations and Insights Concerning Early Stages of Expansion for the Introduced Rio Grande Cichlid, *Cichlasoma cyanoguttatum*, in Southeastern Louisiana.

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*Note: Some of the material in this manuscript was presented to the 11th International Conference on Aquatic Invasive Species, Alexandria, VA; February 25 – March 1, 2002 and in the following publication: Fuentes, G.N. and Cashner,R.C. 2002. A report of the Rio Grande cichlid's (*Cichlasoma cyanoguttatum*) establishment in the Lake Pontchartrain estuary in southeastern Louisiana. Southwestern Naturalist 47(3): 456-459.*

Abstract

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...Use of mollusks to monitor bacte... J.M. and Lynch J.M. (eds). ...s for environmental biotechnology. ...y for Applied Bacteriology Techni...n, UK: pp. 393-409.
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Abstract

The Rio Grande cichlid, *Cichlasoma cyanoguttatum*, is native to northeast Mexico and extends into the United States in the Rio Grande drainage. Accidental or intentional introduction has allowed for populations to become established in central Texas and peninsular Florida. Recently, *C. cyanoguttatum* has been collected in the canals and bayous of the Greater New Orleans Metropolitan Area (GNOMA). These aquatic habitats are part of the Lake Pontchartrain drainage, an oligohaline estuary in southeastern Louisiana. Since the first collection of *C. cyanoguttatum* in 1996, a single specimen taken along the southeastern portion of Lake Pontchartrain, the species has been found at numerous sites throughout the region. Successful reproduction has been verified and some populations of *C. cyanoguttatum* are established within the drainage.

We developed a diffusion model to describe the initial stages of expansion of *C. cyanoguttatum* in the GNOMA. Diffusion models are regularly used to explain natural and artificial invasions of organisms into new habitats. Results from our model provided insights about the temporal dynamics of this invasion. Based on iterative modeling of different invasion scenarios, we determined the most plausible location and time of cichlid introduction. The point of introduction is in the western section of the GNOMA and is associated with high densities of cichlids. Although these disturbed habitats have the highest densities of *C. cyanoguttatum*, it is too early in the invasion to determine if habitat quality affects invasion success (i.e., the high densities may solely reflect their proximity to the point of introduction). Advection via both anthropogenic (canal pump stations) and natural (wind and tidal currents) sources explains the rapid expansion of cichlids along the southern shore of Lake Pontchartrain. The highly modified southern shore is used

Continued on p. 16

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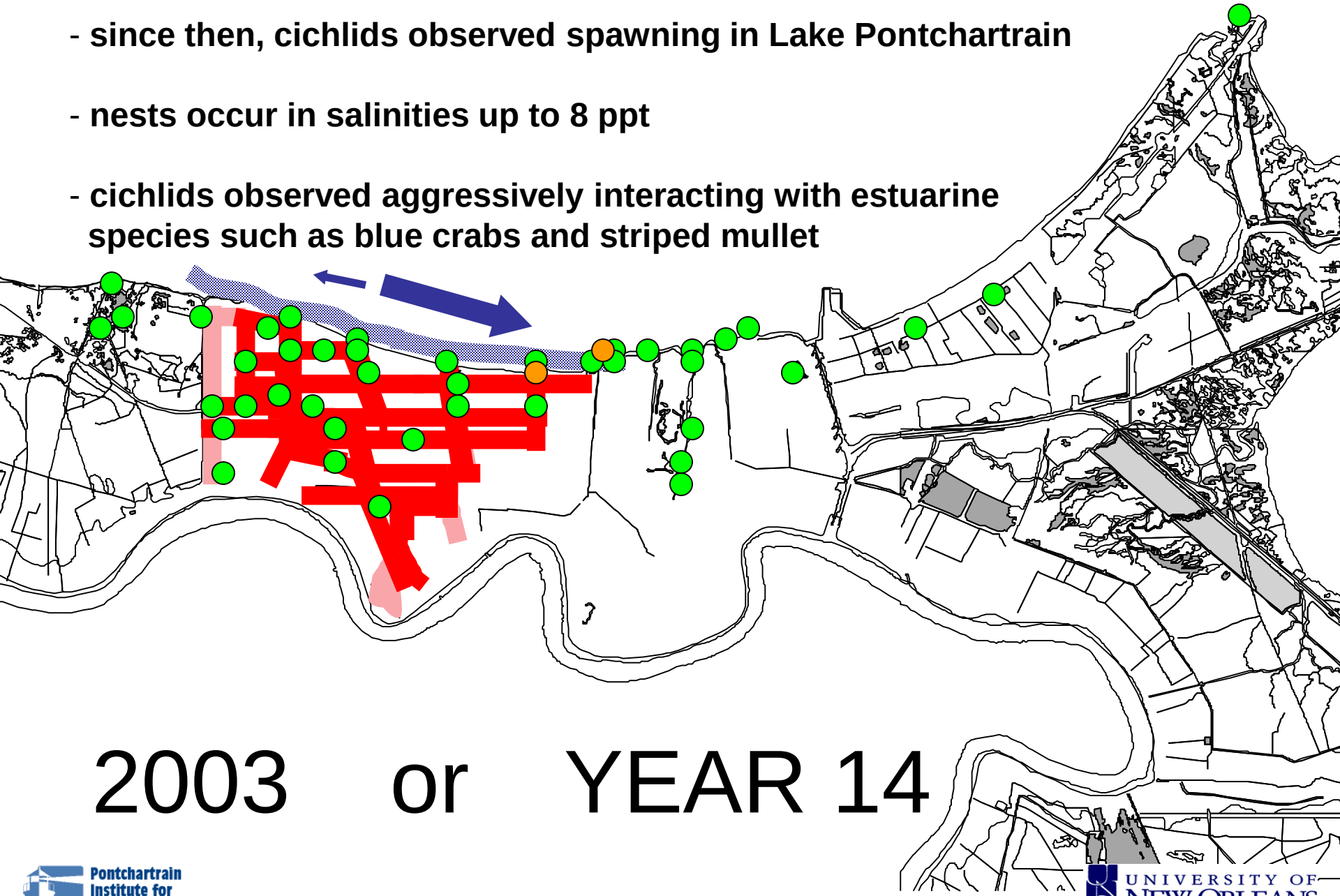
- model: cichlids moving through estuary; confirmed by trapping

- since then, cichlids observed spawning in Lake Pontchartrain

- nests occur in salinities up to 8 ppt

- cichlids observed aggressively interacting with estuarine species such as blue crabs and striped mullet



2003 or YEAR 14

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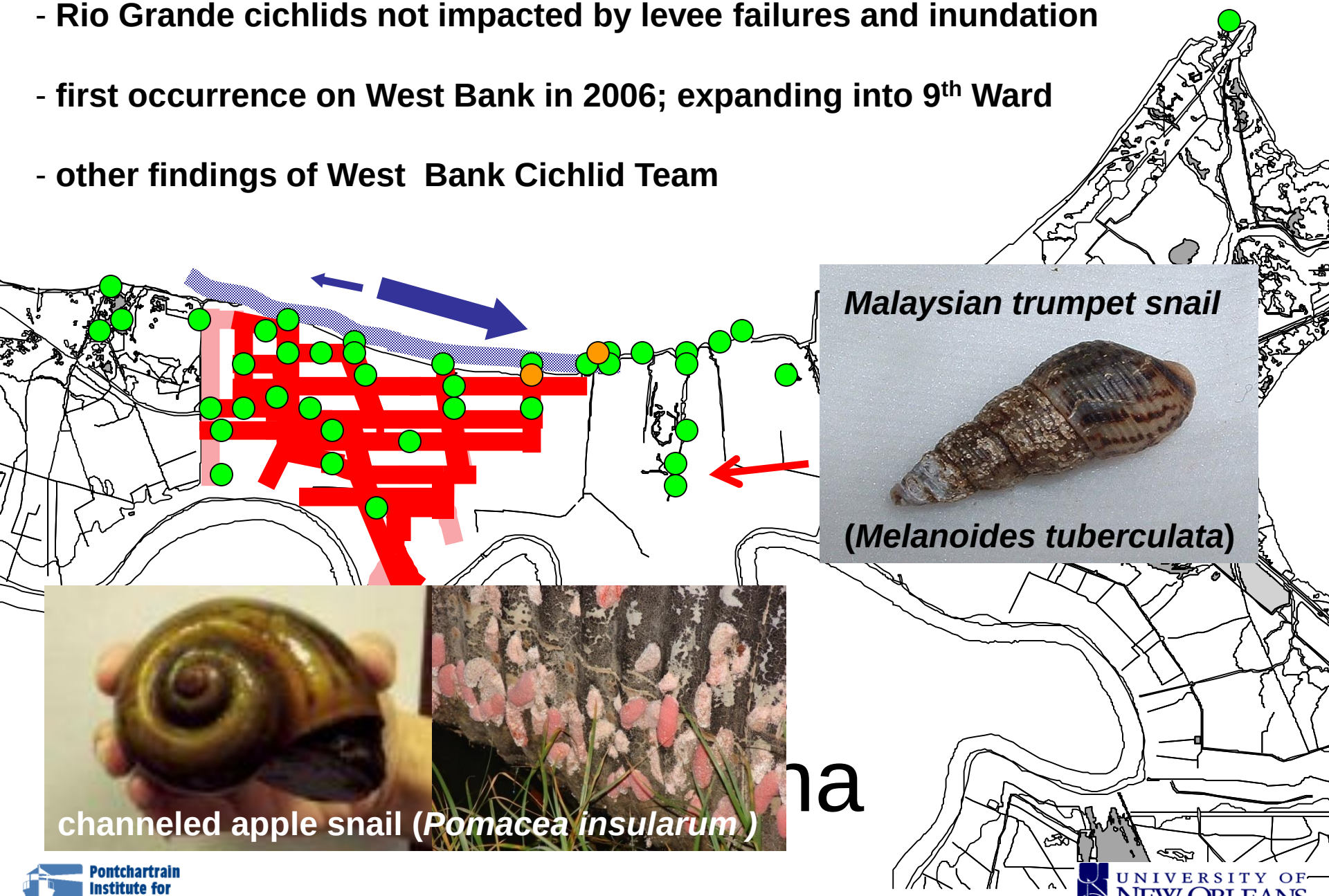
- Rio Grande cichlids not impacted by levee failures and inundation

- first occurrence on West Bank in 2006; expanding into 9th Ward

- other findings of West Bank Cichlid Team



Malaysian trumpet snail

(***Melanoides tuberculata***)

channeled apple snail (*Pomacea insularum*)

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■ The author with a holding tank for experimental cichlids.

■ A young male caught in a New Orleans canal—note the vibrant color and nuchal hump.

■ A pair of Texas cichlids guard a huge batch of fry in New Orleans. Clutches as large as 2000 can be raised by this species.

***from* Lorenz, 2007**

- **cichlid interactions**
- **bourgeois bluegill**
- ***H.c.* : aggressive as resident & invader**

Four major issues

- Update on U.S. Maritime Administration (MARAD) activities
- New record – *Penaeus monodon*
- Status report – *Salvinia* spp.
- White spot syndrome virus (WSSV) in crawfish (*Procambarus* spp.)

MARAD update

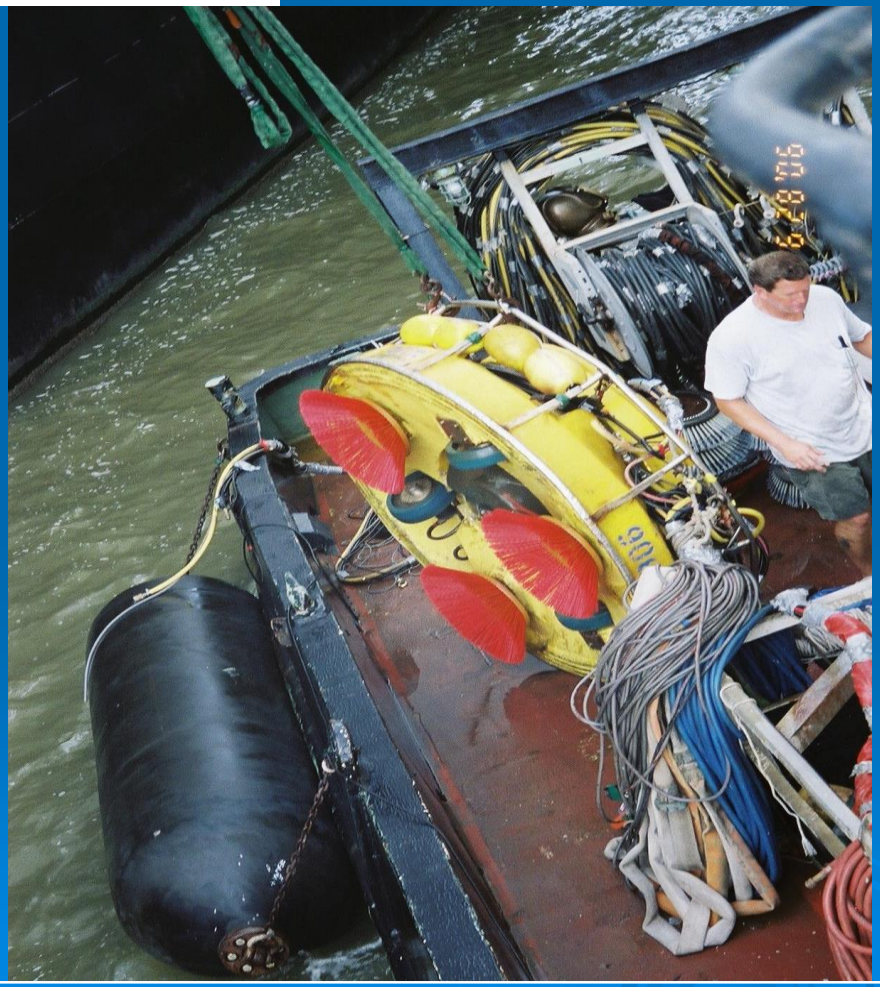
- MARAD met with LA AIS Task Force / Council in late June ‘07 along with Ship Dismantler’s Assn. and a LA scrap yard
- LA TF / Council established sub-committee to review information, develop guidelines
- LDWF used input from sub-committee and LDEQ, drafted & sent letter on Aug. 17 to MARAD outlining “interim plan” to allow transport of ships from Beaumont fleet only, under specified conditions.

MARAD Solution to Hull Cleaning Requirement

- Coast Guard and MARAD agreed that vessel scamping to remove soft marine growth satisfied the provisions of NISA.
- Scamping requirements:
  - The underwater cleaning process, therefore, should remove as much of the accumulated biological fouling as possible. However, given the poor condition of the hulls of some of the obsolete MARAD vessels slated for disposal, and the need to minimize the release of paint / coating residues, it is recognized that the cleaning operation will not remove all of the "hard" fouling.

Note: this slide excerpted from MARAD presentation to LA AIS TF / Council meeting

Typical Hull Cleaning Equipment



The machine out of the water. Polypropylene brushes are shown in red.

Note: this slide excerpted from MARAD presentation to LA AIS TF / Council meeting

Typical Hull Cleaning Equipment

Brushes turning & machine moving along hull

Note: this slide excerpted from MARAD presentation to LA AIS TF / Council meeting

LA Interim Plan for MARAD vessels

- Intended to be used to limit potential for introducing AIS until more complete assessment of biota and issues could be developed & reviewed
- Only pertains to Beaumont (TX) fleet – James River (VA) and Suisan Bay (CA) fleets not accepted at this time
- 5-point plan
  - survey ship before transport to LA waters
  - If non-native species on hull, document information on species, including potential to impact LA ecosystems
  - if non-native species with potential to impact LA ecosystems, implement mitigation measures
  - clean all external surfaces of fouling growth
  - internal areas that may hold water and organisms, including ballast tanks & bilges must be treated to minimize transport of those organisms to LA waters

Results

- MARAD had solicited bids on 4 Beaumont fleet vessels on July 23
- LA sent letter to MARAD on Aug. 17
- LA contractor bid on vessels from Beaumont, TX fleet was not allowed by MARAD in bid opening of Aug 30
- LA contractor agreed to abide by LA interim plan, but MARAD said those conditions not acceptable since LA has imposed conditions that could not be accomplished within the allotted time frame, but other bidders were eligible.
- LA contractor appealed MARAD decision
- Legal and administrative procedures still ongoing – stay tuned

Penaeus monodon(Fabricius, 1798)

- One specimen taken by local commercial shrimpers near Cypremort Pt., Vermilion Bay, LA on Aug. 23 – water depth ~ 4', a typically low salinity area.
- Local LDWF biologist called, then specimen frozen
- Photograph taken before freezing
- I.D. confirmed by Dr. Daryl Felder (ULL)
- Size: TL 207mm, CL including rostrum 82mm, CL without rostrum 47mm
- Specimen archived as ULLZ 8719
- No further records from sampling or fisherman reports

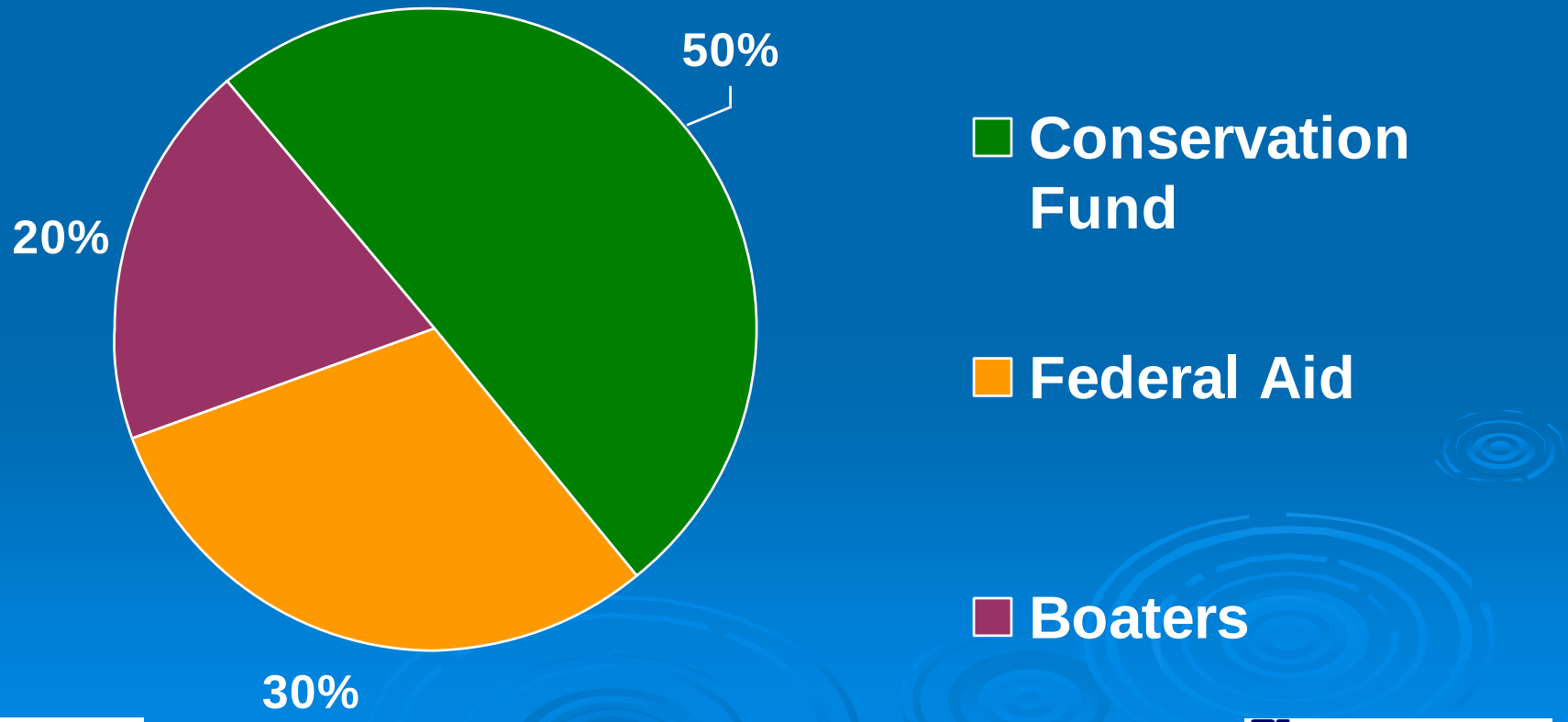
Note: photo of *P. monodon* after freezing and thawing

GIANT SALVINIA

Coverage of Salvinia in a NW LA lakeshore area

LA AQUATIC PLANT CONTROL PROGRAM

- Average budget of $2.2 million annually
- Several recent budget supplement requests in recent years, some successful



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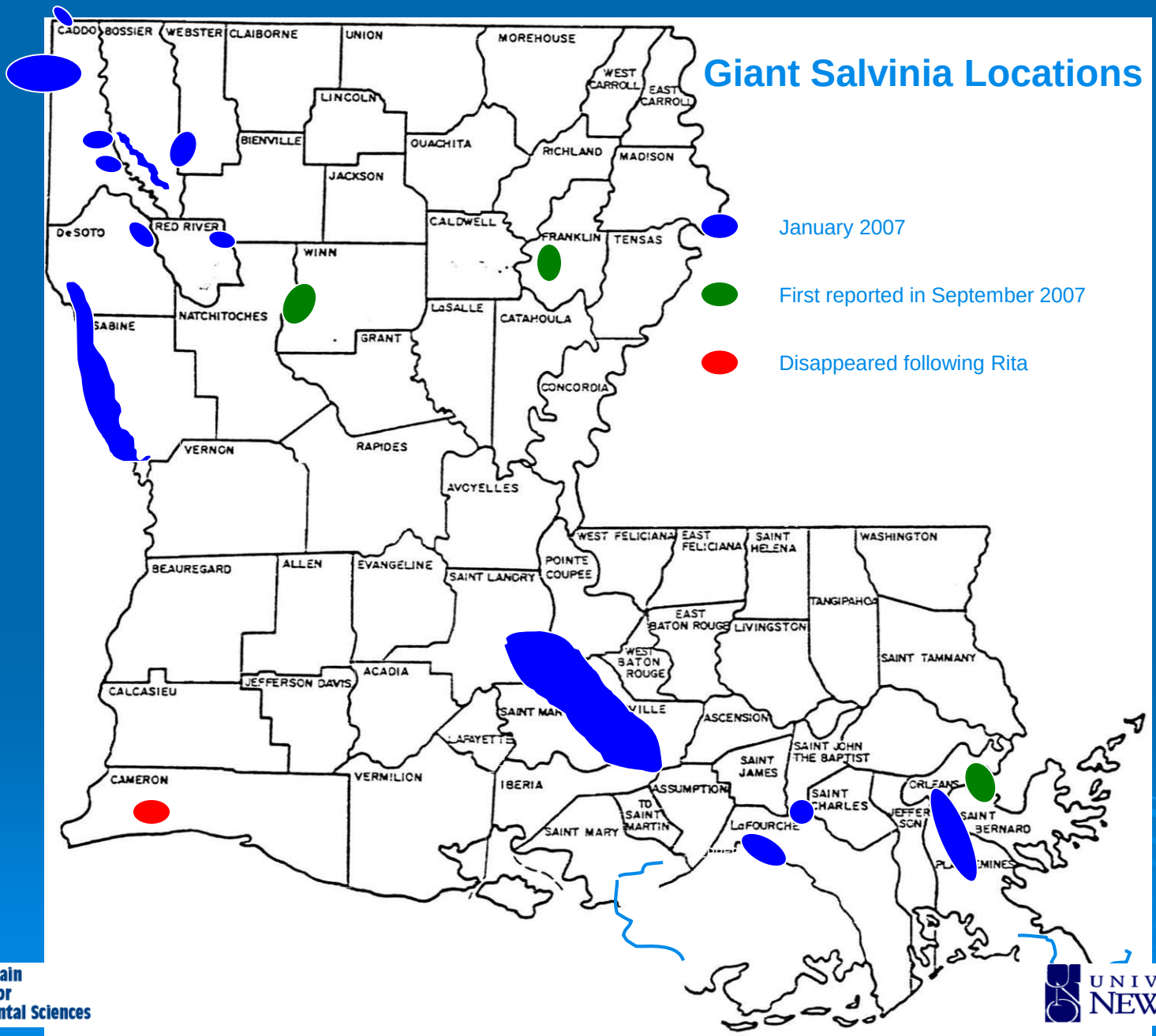
Louisiana is currently seeing an increase in aquatic plant problems WHY?

- No recent significantly cold winters
- High turnover rate of sprayers
- Increased spread of **giant and common Salvinia**. Both species of Salvinia are more difficult to control than previous exotics

Giant Salvinia

- Aquatic fern native to Brazil
- Listed a Federal Noxious Weed
- First found in Louisiana in 1998 (but eliminated)
- Next reported in 2005
- 2006 reported from NW and SW LA
- 2007 – large number of new locations, rapid growth
- Under ideal growing conditions, it can double in 3-5 days
- Can grow vertically, as well as horizontally
- Hairs on leaf impact herbicide effectiveness

Giant Salvinia Locations



January 2007

First reported in September 2007

Disappeared following Rita

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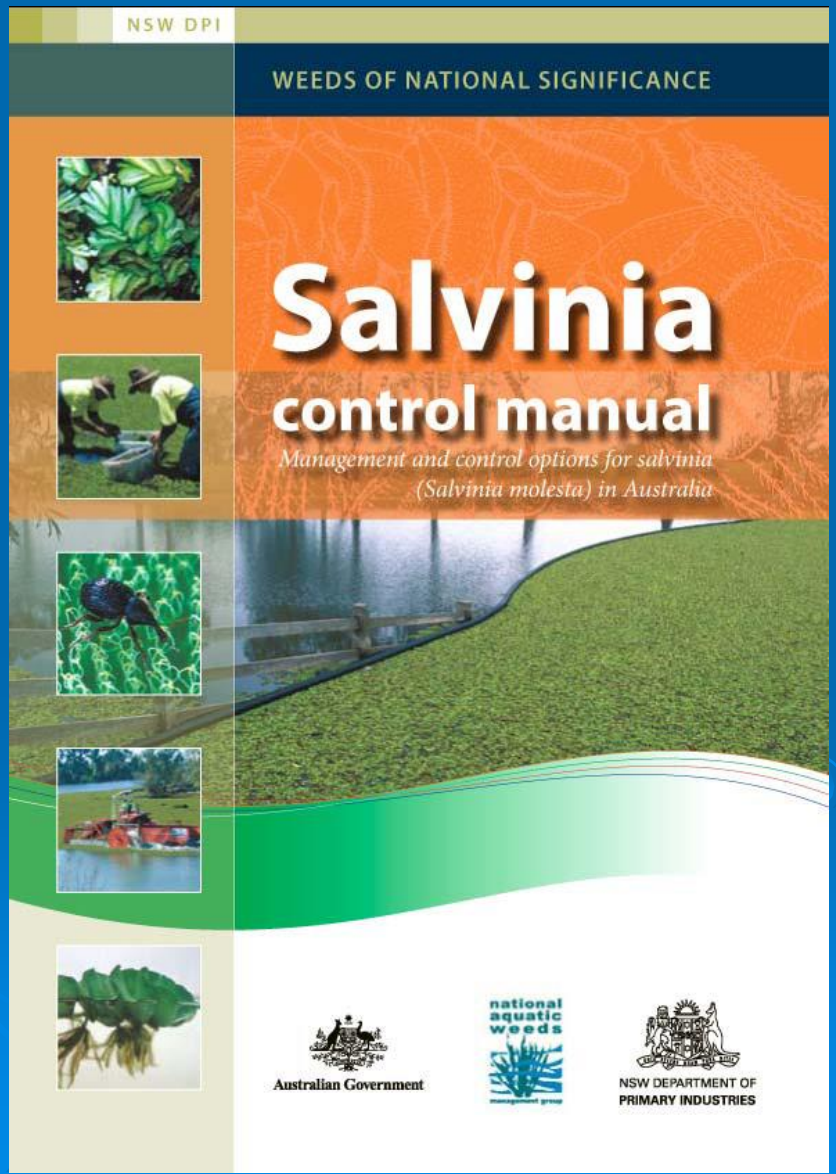
Integrated Control Methods

- Biological control
- Herbicides
- Booms and containment fences
- Mechanical removal
- Manual removal



Biological Control
Salvinia weevil

- Work well in tropical and subtropical climates, but results vary in temperate climates
- Does not control giant Salvinia in an understory or when Salvinia is multi-layered

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Mechanical

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Manual removal

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CADDO LAKE

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Extent of problem – an example Caddo Lake, NW LA

- Giant salvinia officially documented June 2006
- Peak levels in 2006 approximately 250 acres
- Treated most of the coverage several times in 2006
- Peak levels in 2007 approximately 600 acres
- Treated 640 acres so far in 2007

Problems treating Caddo Lake

- Many areas not accessible by boat due to thick stands of cypress trees
- Some of the giant Salvinia is multi-layered. Herbicide treatment only kills top layer
- Although LDWF has boats to access shallow areas, mixing herbicides with muddy water can reduce or negate a herbicide's effectiveness


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Plans for Caddo Lake

- Construct salvinia enclosures and stock weevils
- Continue the use of herbicides
- Explore options to use contract sprayers
- Increase efforts to recruit aquatic plant control personnel
- Continue to send additional personnel to Caddo Lake (when available)
- Working with the Caddo Parish Parks and Recreation, create a group to explore other options and to develop a comprehensive plan for future control efforts

Additional Plans for State-wide Control of Giant Salvinia

- Continue working with LSU AgCenter and the Corps on various control measures
- Submit budget request to increase the number of aquatic plant control personnel and funding to the program
- Attempt eradication of new infestations

Possible Methods to Reduce the Spread of Salvinia and other Exotic Plants from One Waterbody to Another

- Increase public awareness
- Maintain the list of plants prohibited from being brought into Louisiana
- Adopt additional restrictions to prevent exotic plants from spreading to new waterbodies

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Boat Wash
WASH YOUR
BOAT & TRAILER
FISH GEAR
ANCHOR & LINE
BEFORE LAUNCHING
MAINE STATE LAW
Up to a $5000 fine
for launching a
watercraft with plants.

Salvinia

You'll never get rid of it … you have to keep monitoring weevils, re-releasing if necessary, checking for regrowth, and mopping up the hotspots with herbicide … ***and keep doing all that forever.***

National Salvinia Workshop

White Spot Syndrome Virus (WSSV) In Louisiana Crawfish

Greg Lutz & Mark Shirley

LSU AgCenter Research & Extension

Sea Grant LOUISIANA

Slides on this subject are excerpted from a presentation by Greg Lutz at June, 2007 LA AIS TF / Council meeting

White Spot Syndrome Virus has been Confirmed in Louisiana crawfish

- At least 62% of samples have tested positive, everywhere from Jeff Davis parish to East Baton Rouge parish. Presence of virus does not necessarily cause mortality.
- WSSV: crawfish don't move much when dumped from the trap. They can't pinch hard and most cannot walk. Mortality affects mostly medium to large crawfish.
- There are no obvious external signs.
- Dead crawfish are noticeable in traps and shallow water.

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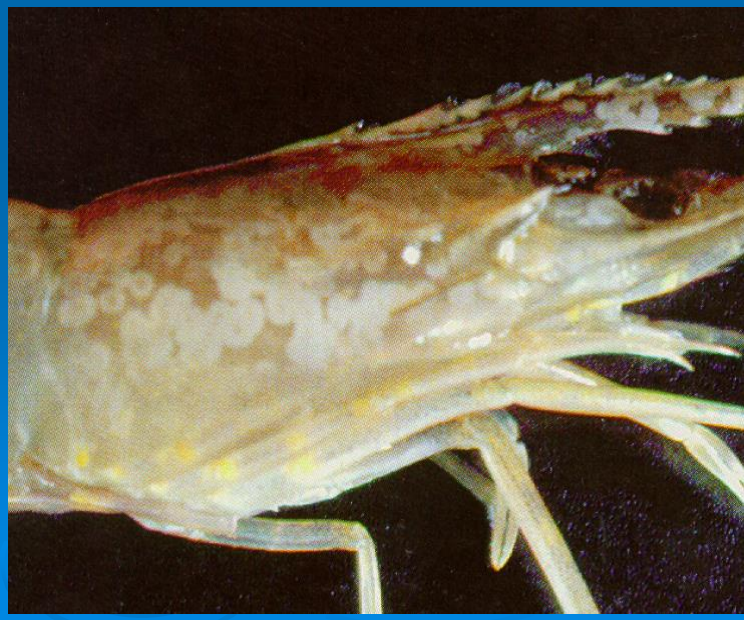
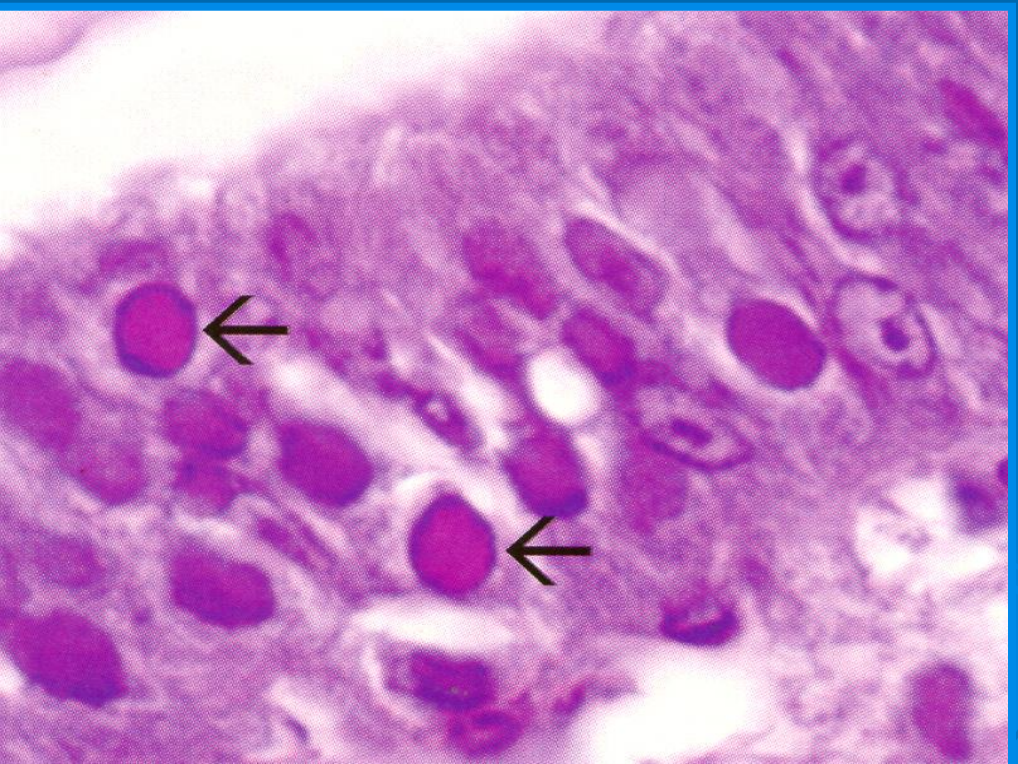
Where did the disease come from?

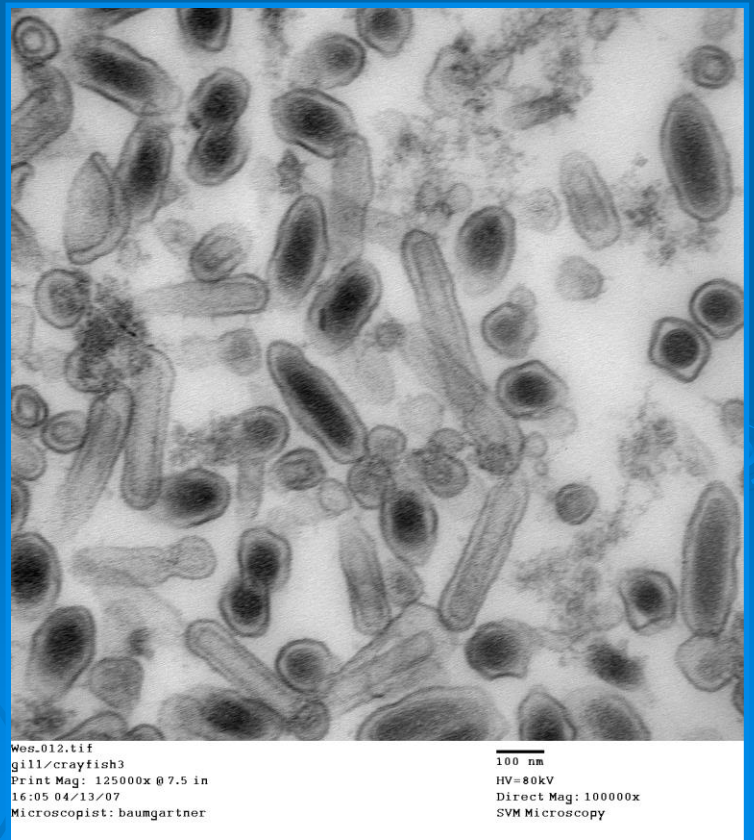
- First reported in farmed shrimp in Thailand and then China, Taiwan and Japan in 1992-93.
- Reported in shrimp farms: Texas and S. Carolina in 1995.
- Found in wild shrimp and crabs off-shore in the Gulf of Mexico and near shore in Texas, Mississippi, Georgia and South Carolina.
- Infects a wide range of crustaceans, including shrimp, crabs and lobsters.
- This is the first report of a natural infection of crawfish in the U.S.
- The exact source or our present problem is still unknown.
- Can cause 90-100% mortality of shrimp in aquaculture facilities



Can an infected pond be <u>treated</u> to eliminate the infection? - NO

- **The disease is caused by a virus.**
- **There is no anti-viral treatment or cure that is effective in a pond or rice field.**





What animals are affected by WSSV in Louisiana?

- In Louisiana the only species in which the disease has been confirmed so far is in freshwater crawfish, in ponds and the Basin.
- There are, however, numerous shrimp, crab, crawfish and other species in our coastal and inland waters which could serve as hosts.

Do we know if free-ranging crawfish in marshland and bayous are free of the disease?

The Louisiana Department of Wildlife and Fisheries have collected crawfish samples from wild habitats to test for the disease. Some have tested positive (3 out of 9 as of date of presentation).

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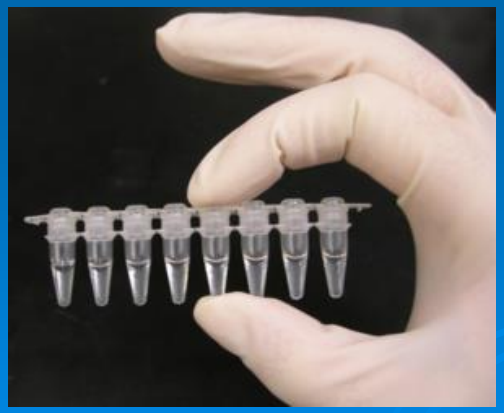
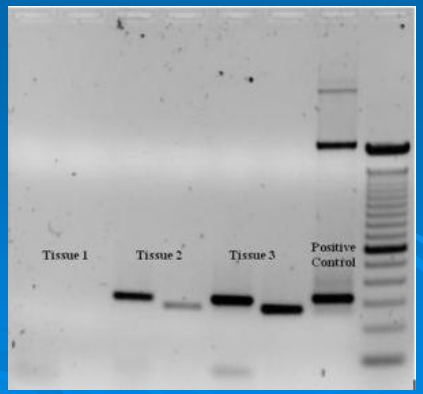
How is the disease diagnosed in crawfish?

- The virus is confirmed in crawfish by PCR (polymerase chain reaction) in which the genes (DNA) of the specific virus causing the disease are identified.





How widespread is the problem among the crawfish farmers?

- Thus far, WSSV has been found in roughly 62% of samples tested, from Vermilion Parish north to Evangeline Parish and from Jeff Davis to East Baton Rouge. Roughly 1/3 of wild crawfish samples appear to be positive, and more than 2/3 of those from farmed ponds.

Can WSSV infect humans?

- Humans are not in any way susceptible to this virus. This cannot be stressed enough!
- The consumption of infected crawfish does not endanger the health of humans.

What are the signs and symptoms of the disease in crawfish?

- There are no conspicuous external signs of the disease in the shell of an affected crawfish.
- An affected crawfish may be lethargic or weak, but there are no other signs of the disease that are apparent.
- In shrimp, WSSV causes the formation of white spots on the shell. But not in crawfish.

How has the disease spread to so many ponds and rice fields?

- Introducing infected crawfish (trapped from an infected pond or wild marshland) as stock?
- Shorebirds carrying infected crawfish from one place or the other and possibly regurgitating infected crawfish prior to digesting them?
- OTHER VECTORS… by-catch in bait?

How can the disease be spread to a pond or rice field?

- Infected crawfish migrating from one pond to another?
- Moving contaminated equipment (traps, boats, etc.) from an infected location to a clean pond?
- People carrying the virus from one place to another on their boots or personal equipment?
- This disease cannot be spread by bird droppings!

But how did this disease get into crawfish ponds in Louisiana in the first place?

- At this point no-one can say with any certainty. There are many possibilities.
- Effluents or solid waste from re-packing contaminated imported shrimp could create a risk of virus transmission to susceptible species in the natural environment.
- Virus may have been present at low levels in coastal environments for some time.

And that's all to report

until the next time