THE EXISTING ELB PROJECT-HISTORY, ACCOMPLISHMENTS AND PHASE OUT PROBLEMS

by

Benny J. Gallaway

John G. Cole

LGL Ecological Research Associates, Inc.

A presentation for the

Shrimp Advisory Panel

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Introduction

- The Gulf of Mexico penaeid shrimp fishery was and remains as one of the most valuable fisheries in the USA.
- The primary gear utilized in this fishery, at least the offshore component, is the otter trawl.
- Otter trawls capture shrimp effectively but also take a significant amount of bycatch—from red snapper to sea turtles.
- Thus accurate measures of effort and catch-per-unit-effort (CPUE) are important in management of the shrimp fishery as well as for those species that are taken as bycatch.

Introduction (continued)

- The National Marine Fisheries Service (NMFS) is responsible for estimating fishing effort and CPUE in the Gulf Shrimp fishery.
- Estimation of shrimp fishing effort, especially prior to 2004, was problematic.
- Because the number of vessels participating in the fishery was not well known and varies among years, effort was and is estimated independently of the number of vessels.
- Prior to the Electronic Logbook (ELB) program, both CPUE and landings were allocated to 210 statistical area and depth zone combinations based on non random interviews and personal judgment.

Introduction (continued)

- Contention regarding the estimates of shrimp fishing effort and associated bycatch estimates (especially those for red snapper), led the U.S. Congress in 1998 to allocate findings to the Gulf and South Atlantic Fisheries Foundation Inc. to conduct studies to address these issues working cooperatively with NMFS.

- One goal was to determine if a reliable and low-cost ELB could be developed that would accurately measure the magnitude and spatial patterns of fishing effort within a trip.

- These Congressionally-funded, cooperative studies eventually evolved into the program that is in existence today. Once the ELB approach was adopted for estimating effort, contention has been reduced to minimal levels.

History of the ELB in the Gulf of Mexico Shrimp Fishery

- LGL Ecological Research associates, Inc. won the competitive bid to develop an ELB program.
- A successful ELB did not happen overnight but resulted from a 3-yr program conducted during 1999-2002.
- A successful system was developed and was adopted and supported by industry and government.
- To make a long story short, the results of the ELB studies showed that Port Agents could not accurately allocate landings to actual areas fished and that there was severe directional bias in the allocation of landings and estimation of CPUE.

History of the ELB in the Gulf of Mexico Shrimp Fishery (continued)

- The results of the pilot program were published in the North American Journal of Fisheries Management (NAJFM) in 2003 (Gallaway et al. 2003a,b).
- Subsequently, another paper was published in NAJFM in 2006 showing an algorithm we developed provided reliable estimates of fractional catches associated with the different subareas fished within a trip (Cole et al. 2006).
- These publications were provided to the Shrimp Advisory Panel prior to this meeting.
- In 2004, NMFs adopted the ELB approach to provide them with more accurate CPUE and allocation data to assist in improving the quality of NMFs shrimp effort estimates.

History of the ELB in the Gulf of Mexico Shrimp Fishery (continued)

- Phase I (June 2004 – June 2005) and Phase II (July 2005 – October 2006) were awarded to LGL by NMFS on a sole source basis. At this time, the ELB program was not intended to replace the NMFS effort calculations, just data enabling better estimates.
- In the spring of 2006, the Gulf of Mexico Fishery Management Council (GMFMC) established an AdHoc Shrimp Effort Working Group (SEWG) to determine the level of shrimp fishing effort in the EEZ.
- The SEWG recommended the current ELB approach as the best approach and this approach was adopted by the GMFMC and NMFS. One of the reasons it was adopted was that it provided error estimates associated with CPUE allowing confidence intervals to be calculated for the effort estimates, for the first time ever.

History of the ELB in the Gulf of Mexico Shrimp Fishery (continued)

- As a result of a competitive procurement, LGL was awarded the Phase III ELB program by NMFS which ultimately started in November 2006 and after being extended several times ended in February 2012 (Funded by Congressional Earmark).

- This contract provided for a 7-month period to transfer technology and techniques to NMFs for them to take over the program with no interruption.

- When it got close to time to initiate the transfer prior to the first extensions, NMFs cancelled the Transfer Milestone and elected to use the funding to extend the program.

History of the ELB in the Gulf of Mexico Shrimp Fishery (continued)

- We have never planned to do this work forever and are ready to transfer it to NMFS at any time---
- If defensible calibration studies are conducted as has been promised.
- The planned calibration study is woefully small and not defensible---in my opinion.
- Phase IV was also a competitive procurement won by LGL, starting in March 2012 and running through 31 March 2013, after extensions.

History of the ELB in the Gulf of Mexico Shrimp Fishery (continued)

- Early in this program, we were informally informed that NMFS planned to change technology but that this change would occur only after a 2 yr-calibration study conducted parallel to our studies.
- Nothing more was heard until 5 March 2013 near the end of the contract, when the Contracting Officer advised us by telephone that the program would end on 31 March 2013.
- On 6 March this was confirmed by the following email:

  > Per our conversation on 3/5/2013, NOAA will not be exercising option year 1 of the above referenced contract. Therefore, the contract will end as of 3/31/2013. The current ELb units are to be left on the vessels and the vessel owners need to be notified that the chips won't be picked up by your company, but may be by the Government at a future time.
  >
  > Thank you.

- An unexpected, abrupt end to a previously successful project.

History of the ELB in the Gulf of Mexico Shrimp Fishery (continued)

- A week later I received a call from the Gulf States Marine Fisheries Commission (GSMFC) asking if I knew about attempts to extend the ELB program through the end of December 2013.

- I followed up with an email to NMFS, on 11 March 2013 inquiring about this possibility.

- The next week I received a phone call that yes something was in the works.

History of the ELB in the Gulf of Mexico Shrimp Fishery (continued)

- A formal proposal was submitted to the GSMFC to continue the ELB program for the period 1 April-31 December 2013.

- The NMFS contract expired on schedule, the extension was formally contracted and funded on 13 May 2013. We did not let the program lapse in April 2013 but continued the study prior to receiving a contract.

History of the ELB in the Gulf of Mexico Shrimp Fishery (continued)

- The GSMFC contract required that we continue our study in the same fashion using the same historical procedures.
- Specific effort files to be included ("at a minimum") as Deliverables were:
  1. Turtle File (i.e., eff12 new areas.csv);
  2. The regular effort table (i.e., eff6012off.csv);
  3. The 2012 effort broken up into months (i.e., MonthlyEffort2012.csv);
  4. The baseline comparison (all 3 trimesters) (i.e., eff12vBaseline.pdf);
  5. The SN file for 1012 – both a 2-depth version and a 3-depth version;
  6. The three directed effort files for the stock assessments;
  7. Other effort files as directed.

- The cost to continue the existing program was $667,557 based on option year estimates with no increases.

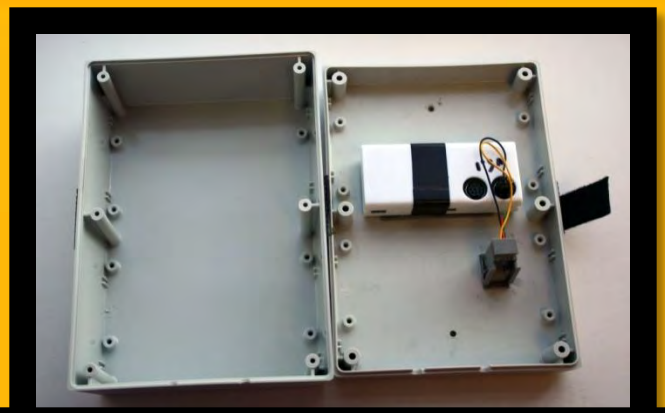
History of the ELB in the Gulf of Mexico Shrimp Fishery (continued)

- We were also requested to provide costs to conduct a calibration study between the old and new ELB units based upon a sample size of 40 paired units.

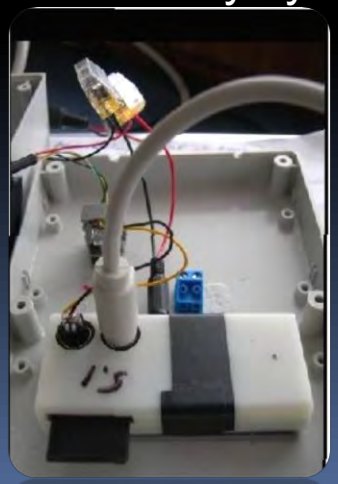
- Funds available were not sufficient to cover the cost of a study based on 40 units and the sample size was reduced to 10, the sample size that would be supported by available funds. The 10 units will not be available until July.

- This is the "careful" calibration study that will proceed the transfer to the new technology starting 1 January 2014.

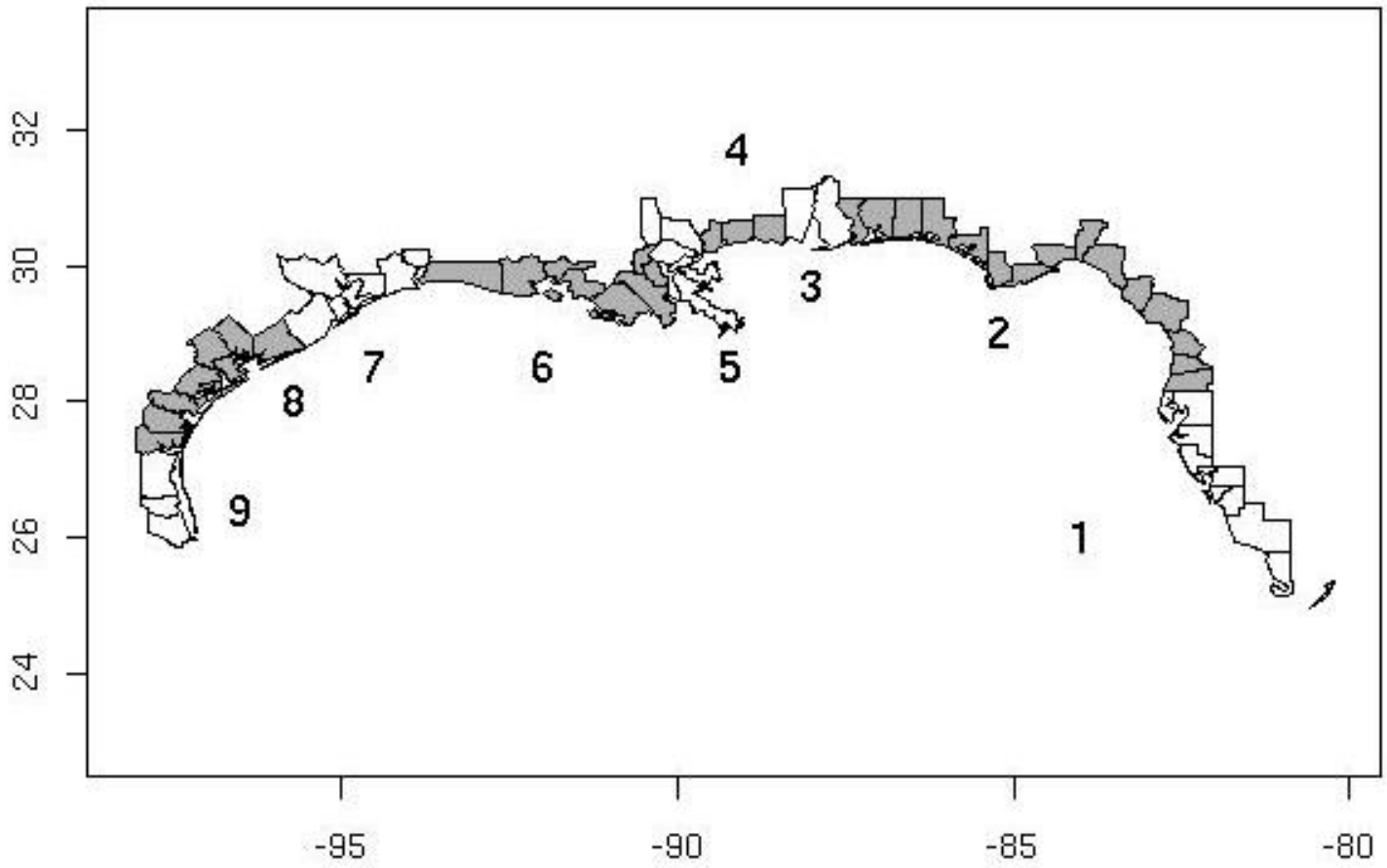
Electronic Logbook



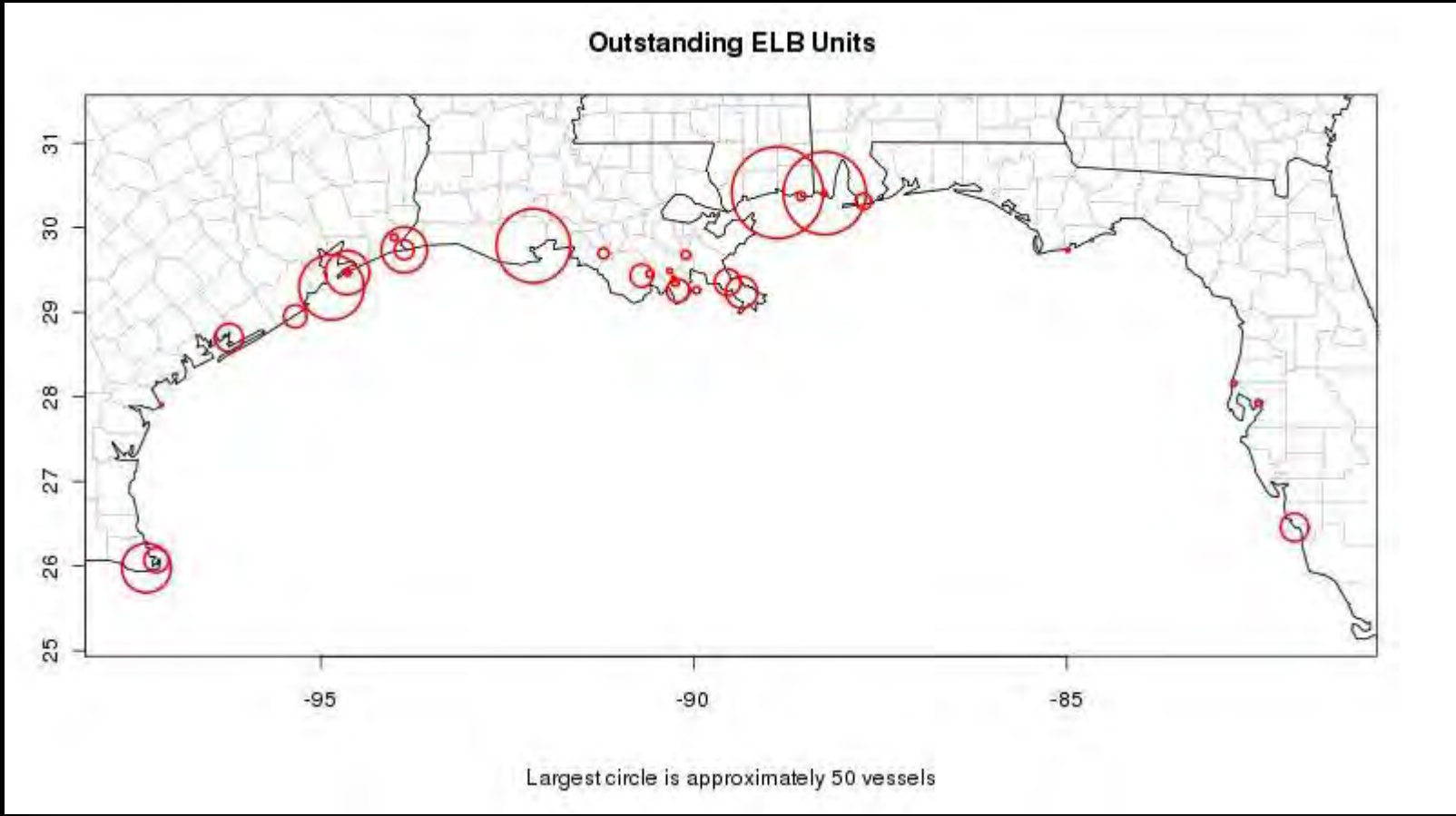
The electronic logbook we use is simple and inexpensive. It consists of a GPS unit attached to a full-function miniature computer which records and stores date/time/location data on a memory chip. It is operated off the ships power system or the vessel's battery system.



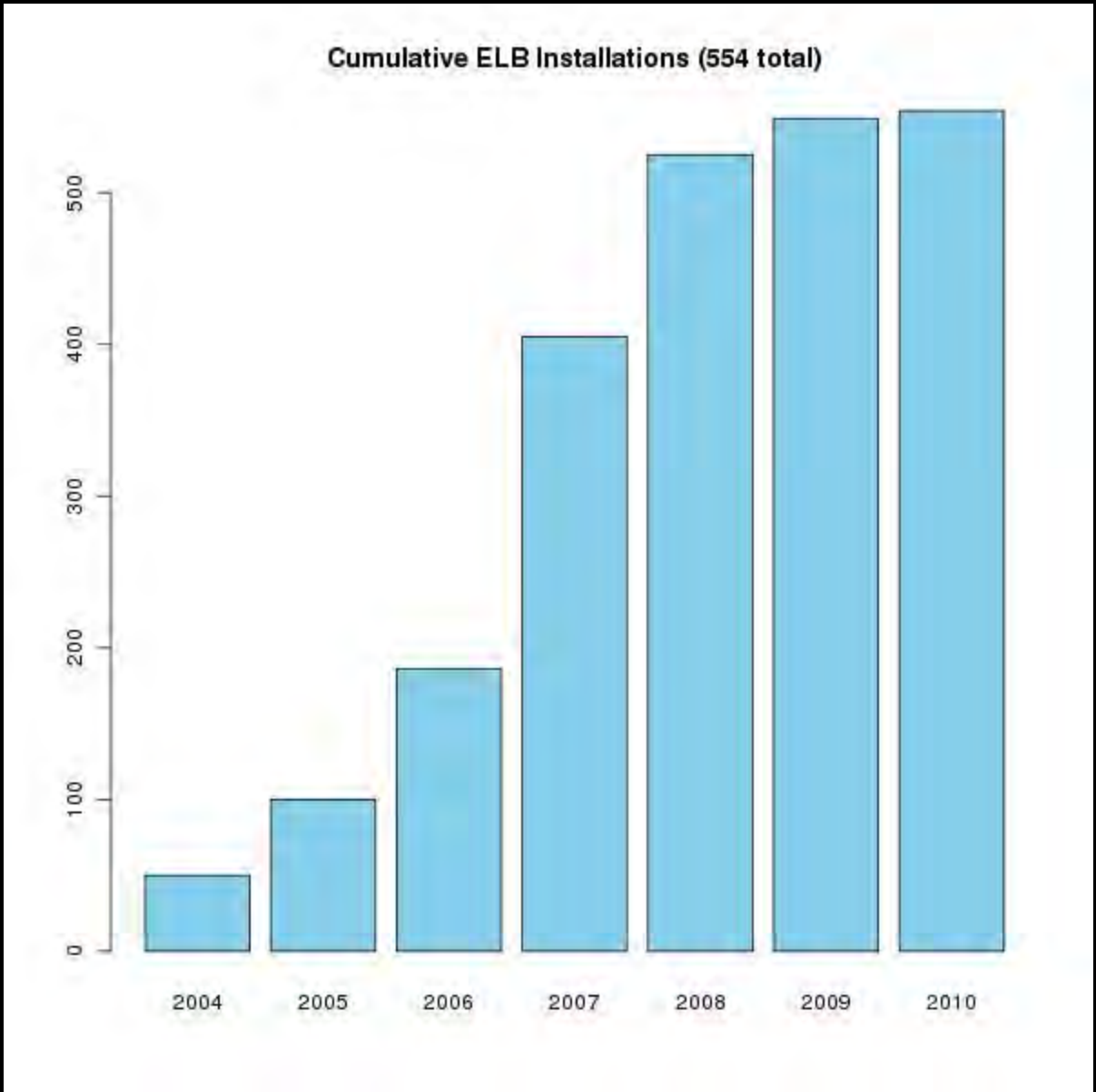
ELB Fleet Regions



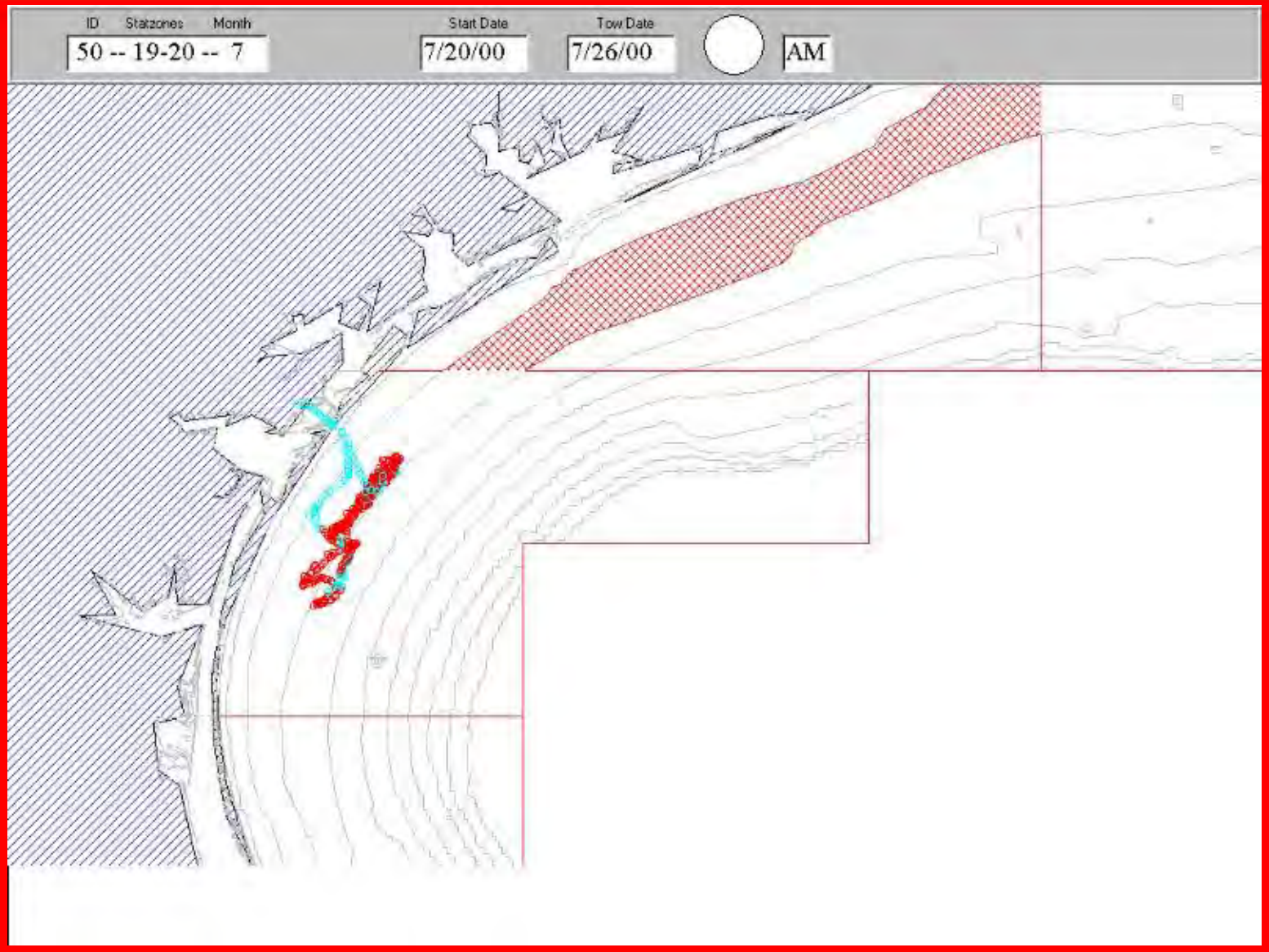
ELB Distribution



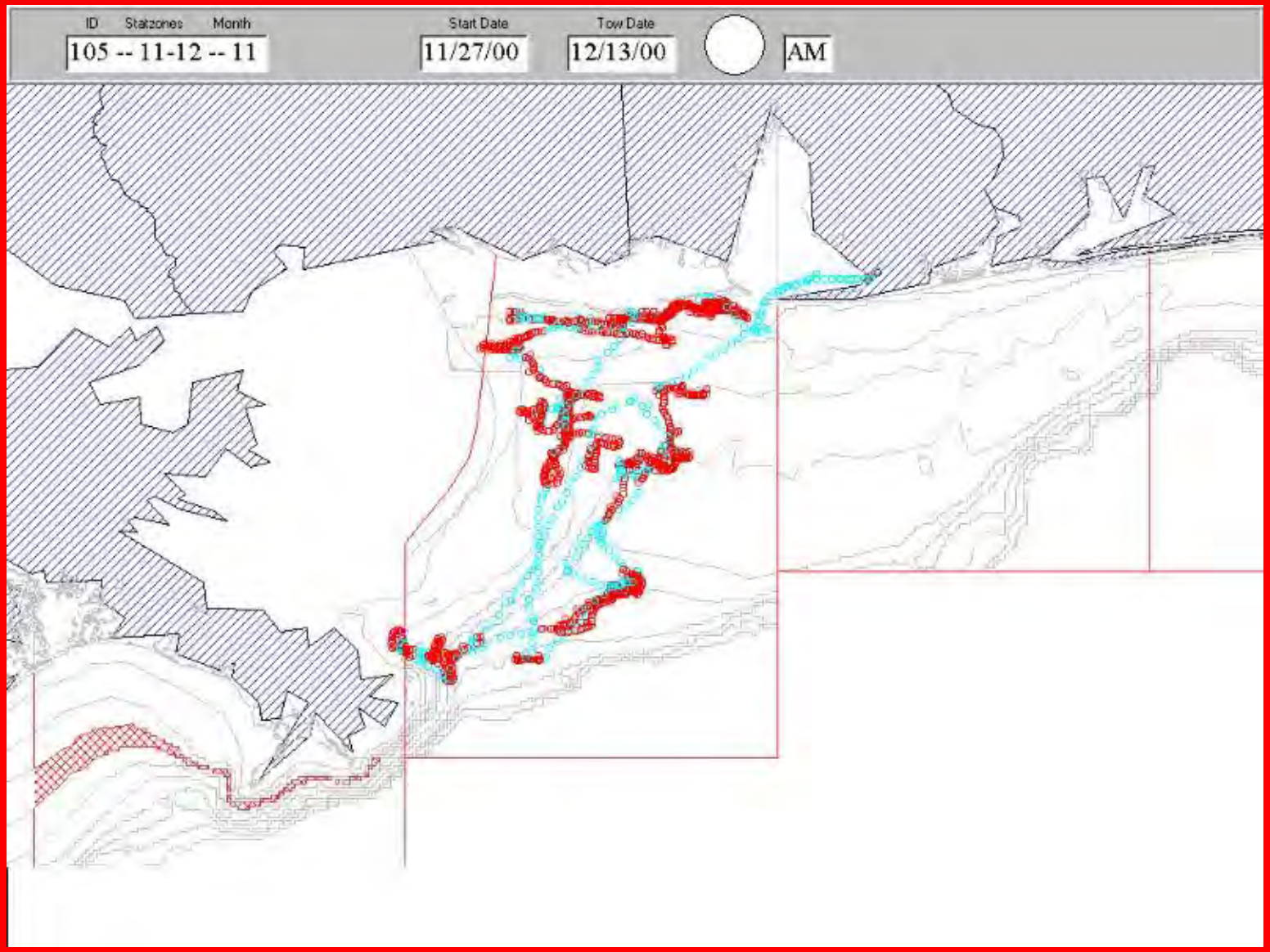
ELB Installations



Individual Trip Monitoring Comparison to Port Agent Allocations



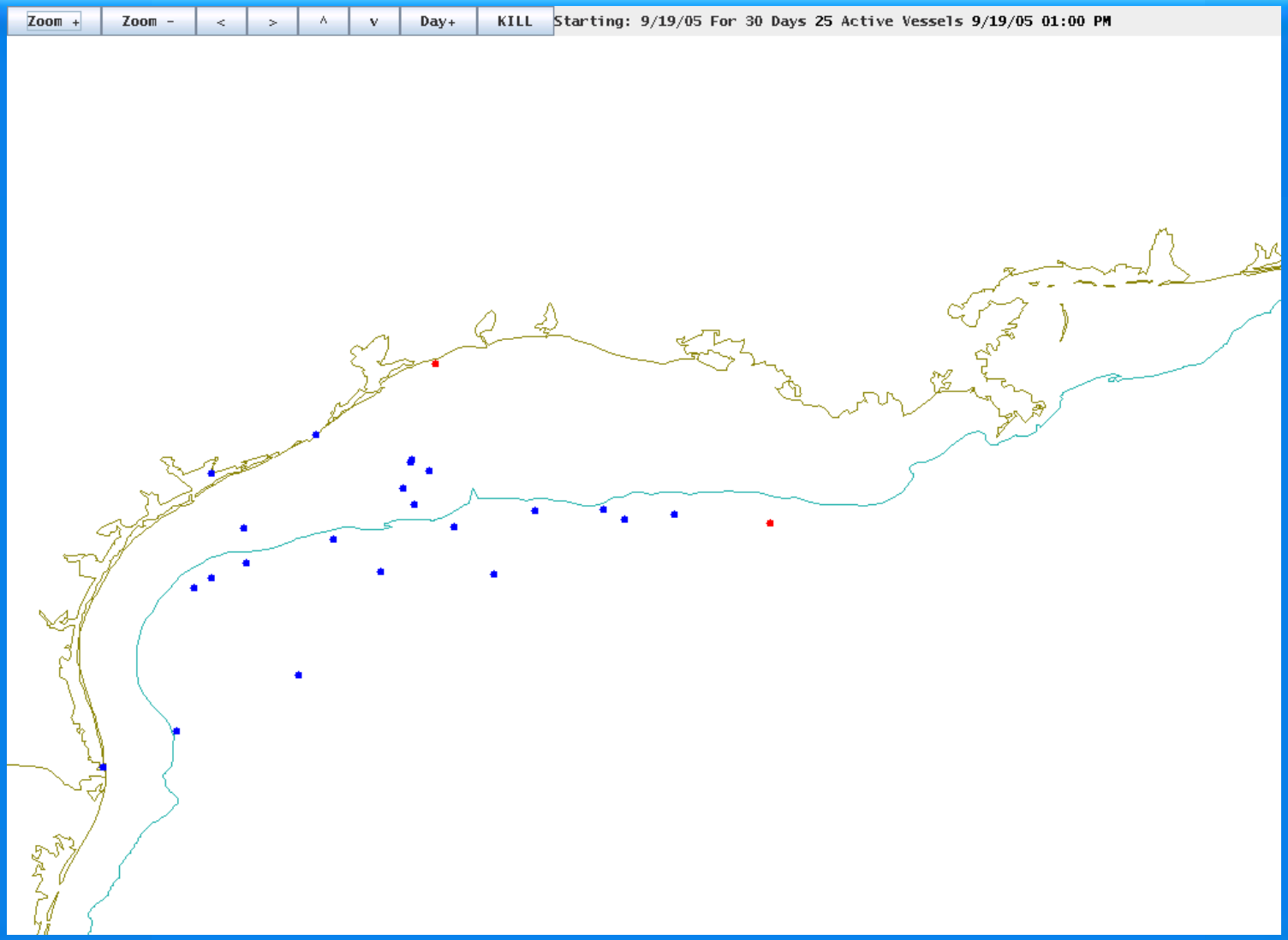
Individual Trip Monitoring and Comparison to Port Agent Allocations



Selected Program Accomplishments

- What are some of the accomplishments of the program:
  - A technique to "push" ELB CPUE and location back into the NMFS analyst File. The "push" technique allows landings ad effort data to be summarized in any manner requested and still add up to the same total effort generated in the base analysis; e.g.,
    a) Several of the stock assessments use only 2 depth zones instead of 3. We can calculate effort (with associated confidence interval) for these stratifications that still sums to the same total effort.
    b) The turtle analysis requires the effort data summarized by different month groups than the standard trimester, and using only 2 offshore depth zones. Again, these can be accommodated without loss of the benefits of using SNCELLS.
  - We can generate intra tow data in a format useful for analysis. This is a byproduct of the "doodle bugs" program (not part of the original program requirements).

Response to Hurricane Rita

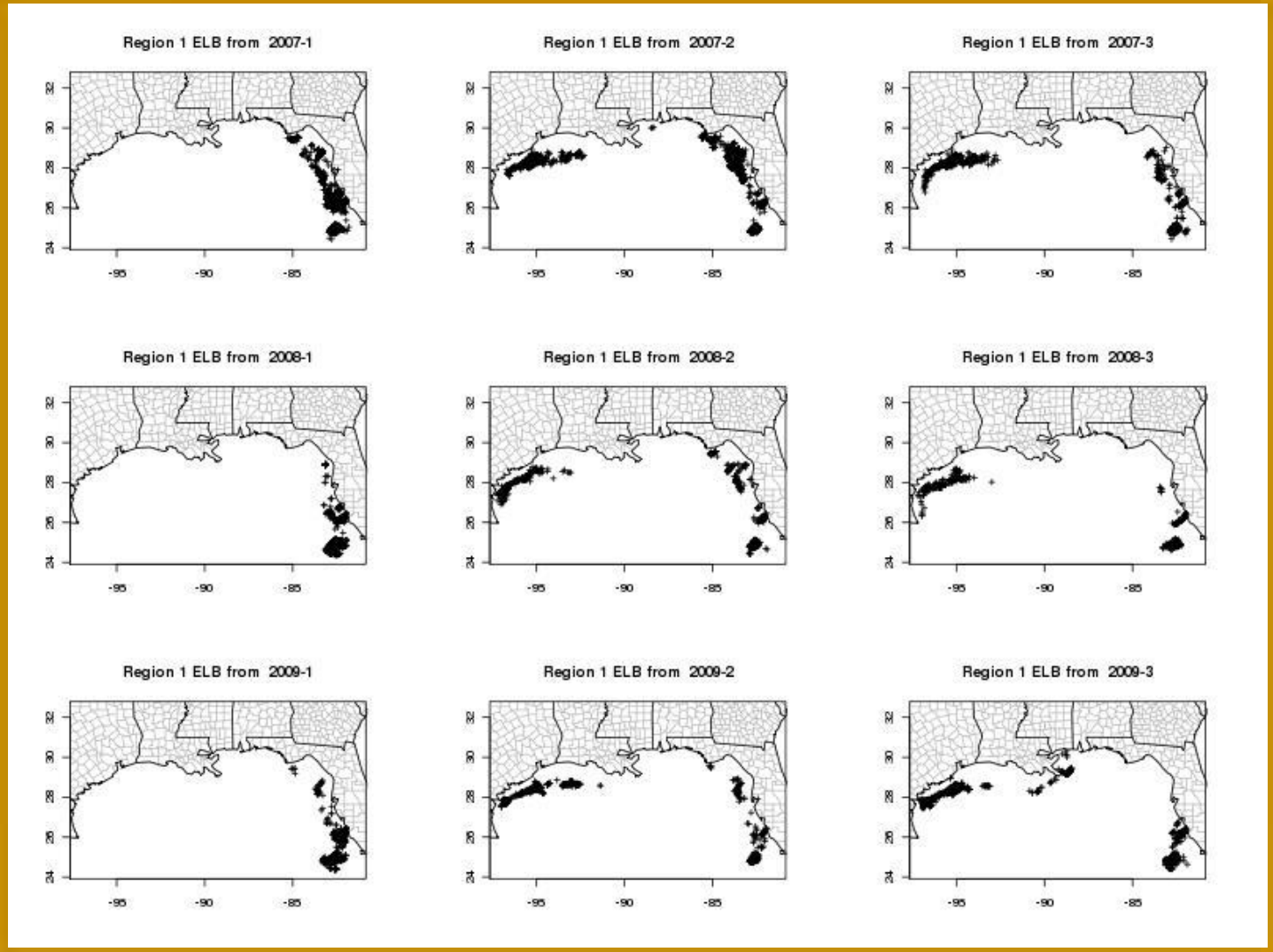


Selected Program Accomplishments (continued)

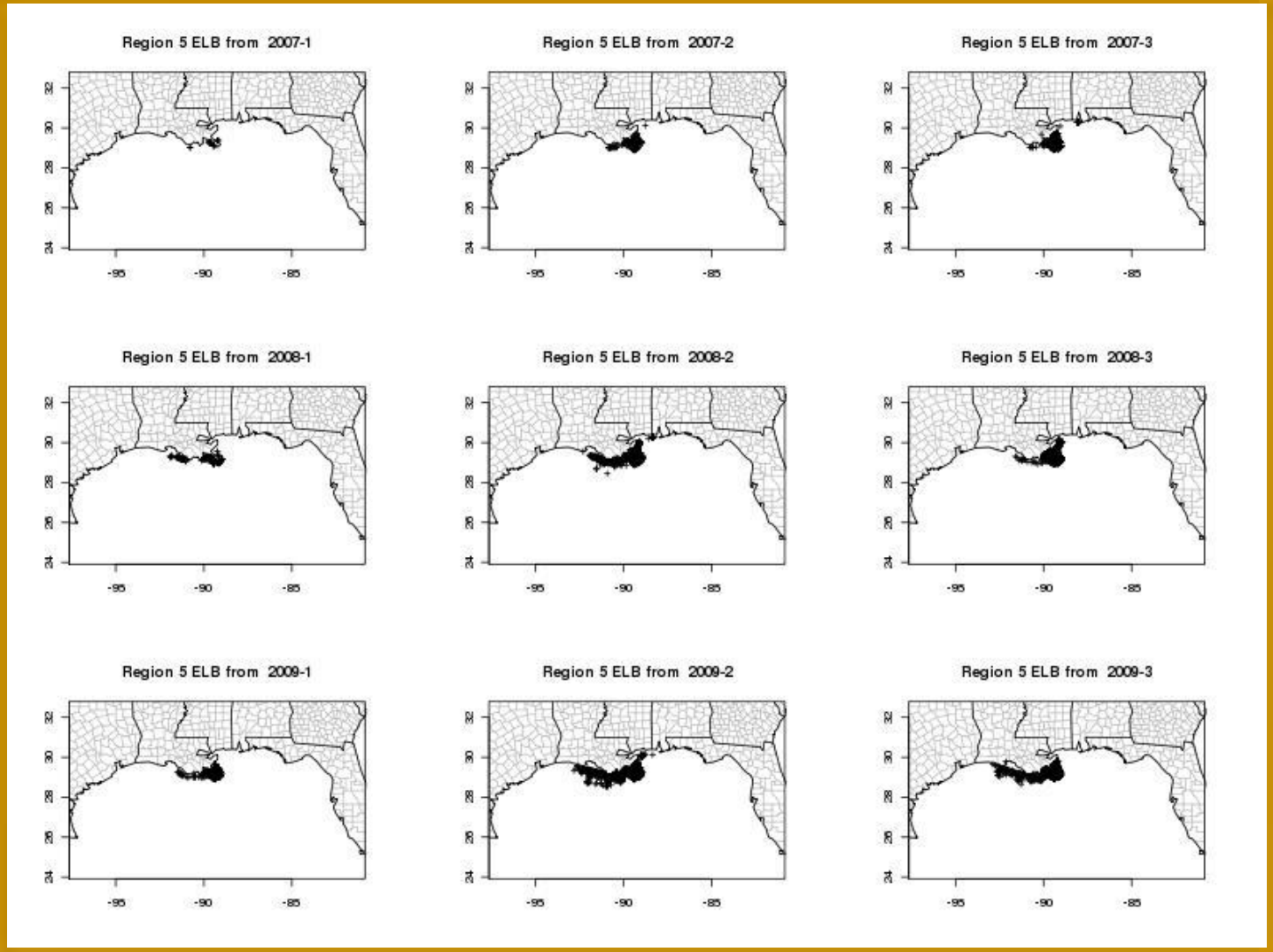
- The availability of intra tow data in a format useful for analysis was the byproduct of the development of the "doodle bugs" program, which was not part of the proposed program, but was developed to assist users, managers, and other interested parties to see how the fleet fished, and responded to various events (hurricanes, closures, etc)
- Analysis programs were developed (not part of the proposal) to create maps with starting tow location points to compare observer and ELB data from the same trip, with tables showing total effort by stat zone / depth zone for each method
- Data from the program were used to characterize the seasonal fishing patterns of the 9 regional geographic fleets
- Data from the program and landings matches were used to characterize the fishing ground for brown, white, pink and royal red shrimp
- Data from the program and landings matches were used to quantitatively analyze the affects for area closures due to
  the Deep Water Horizon oil spill on the fleets from each of the 5 Gulf states.

ELB Detected Tows 2009

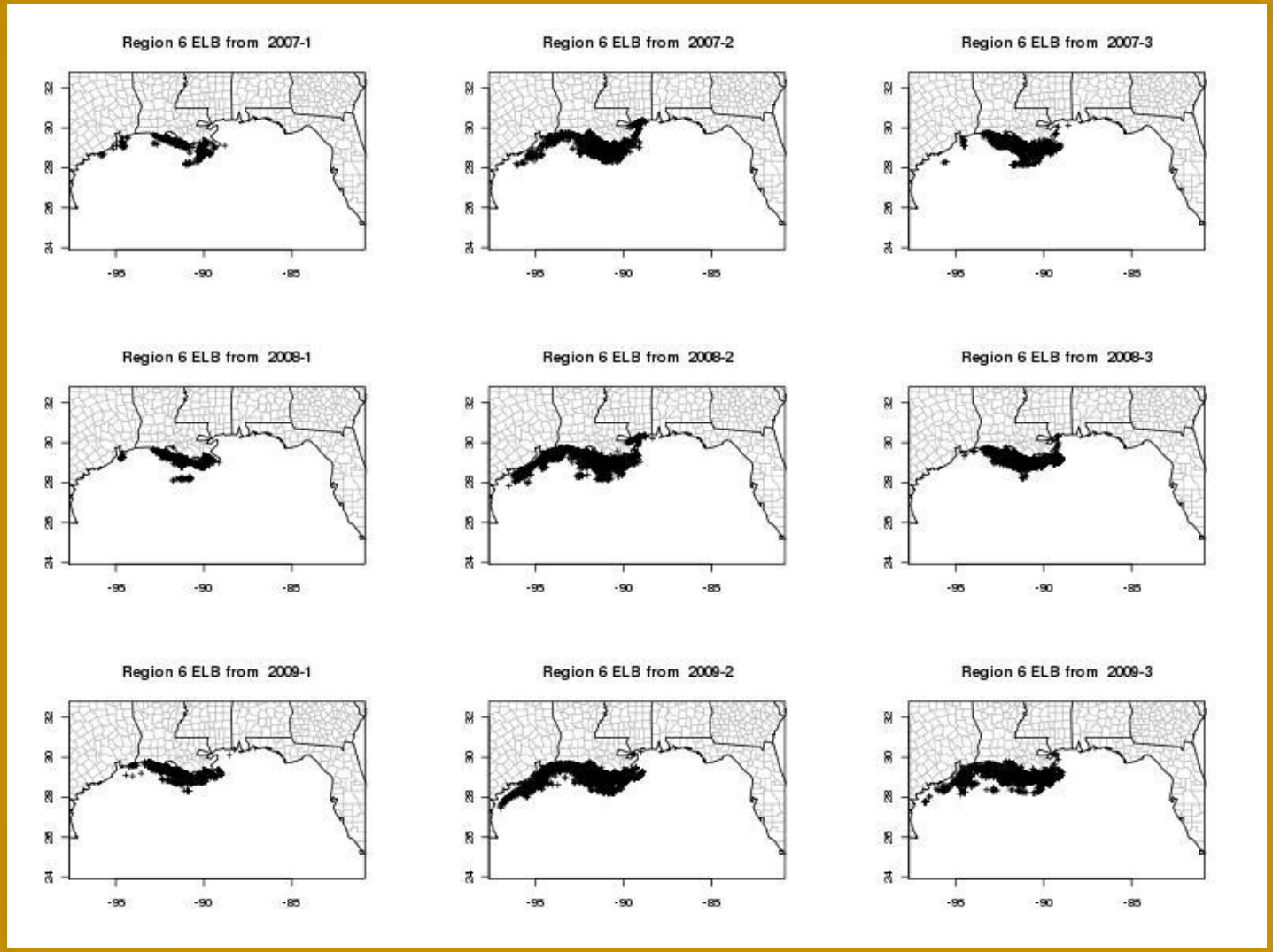
Port Region 1



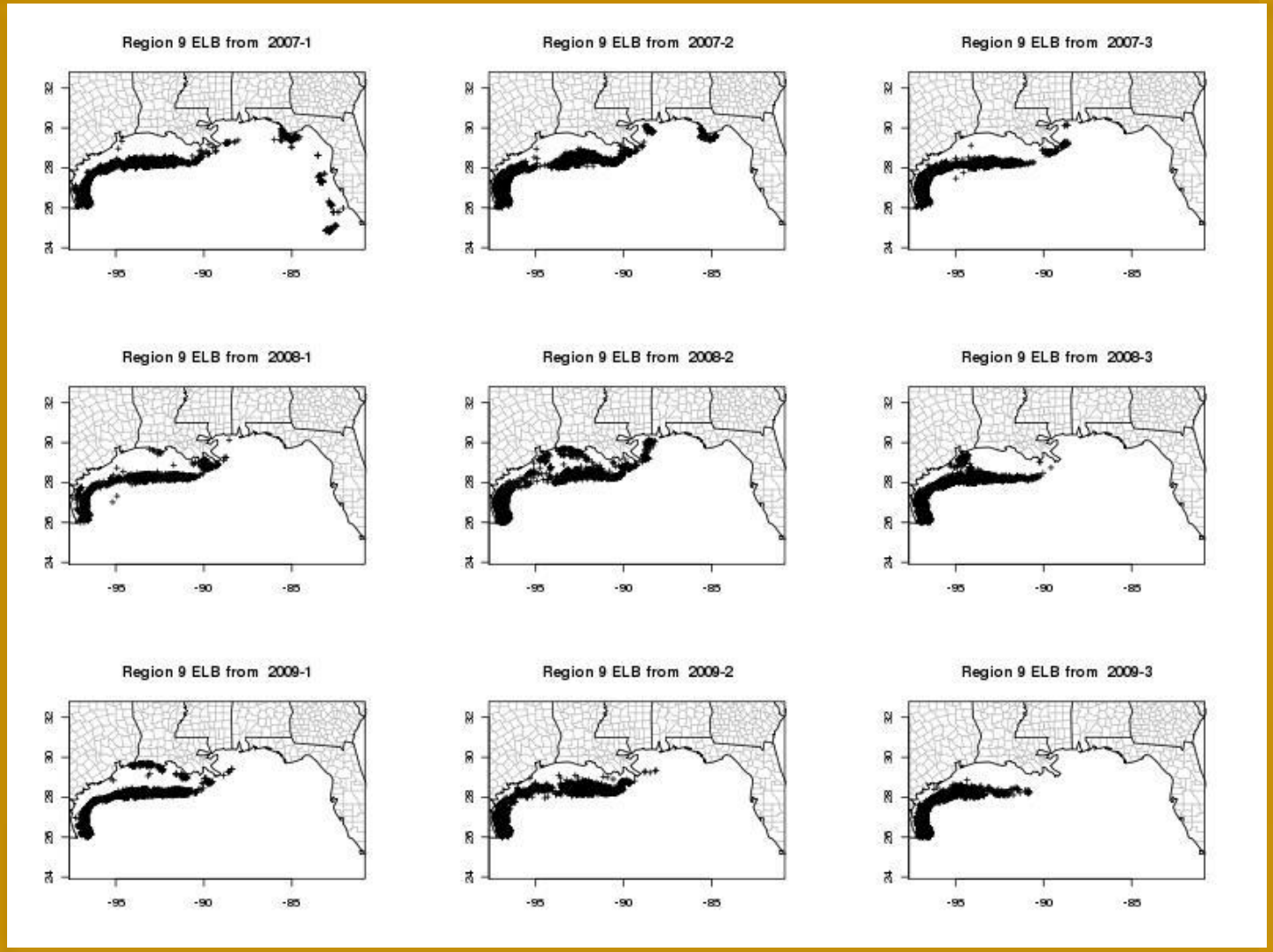
Port Region 5



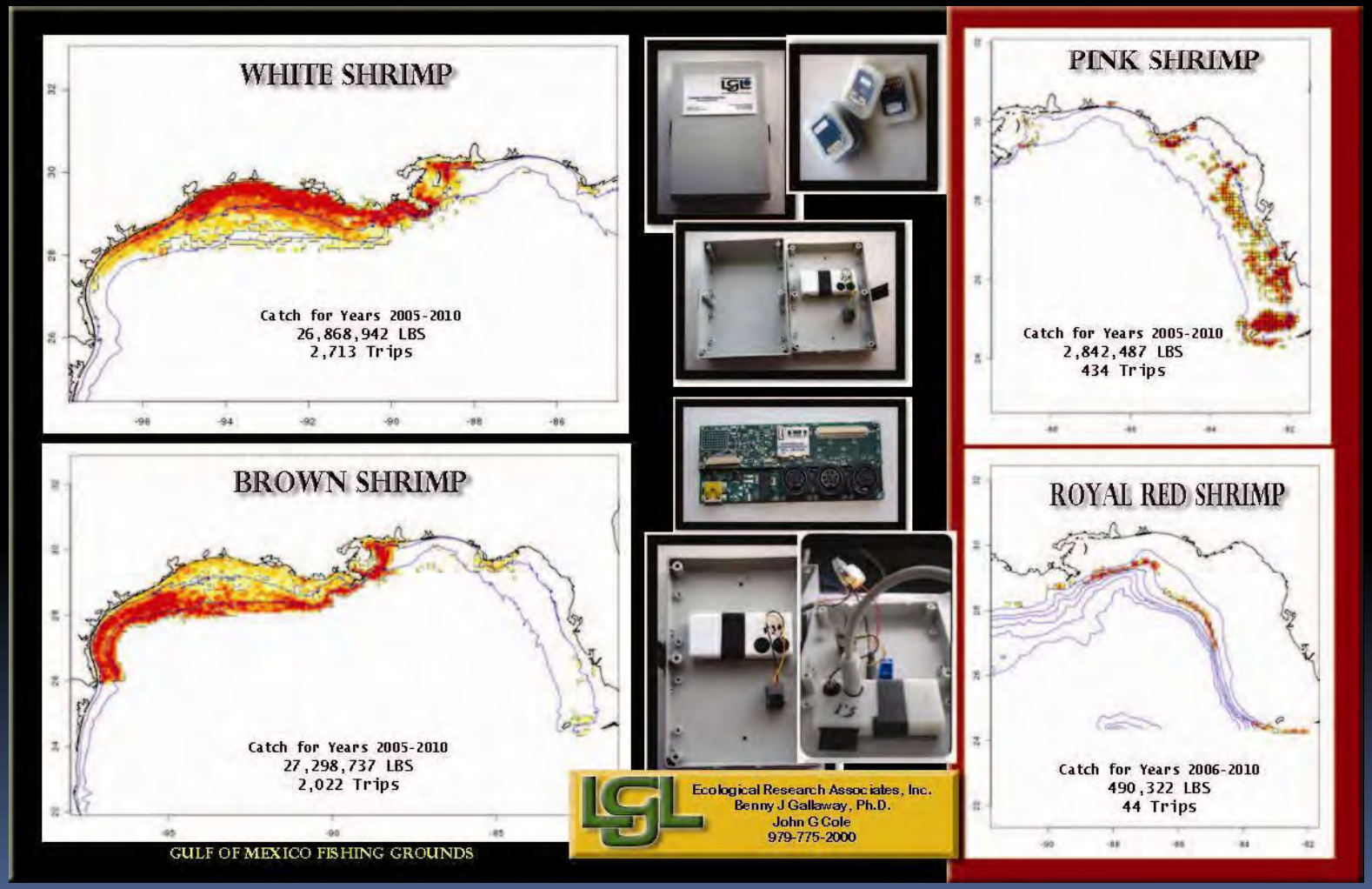
Port Region 6



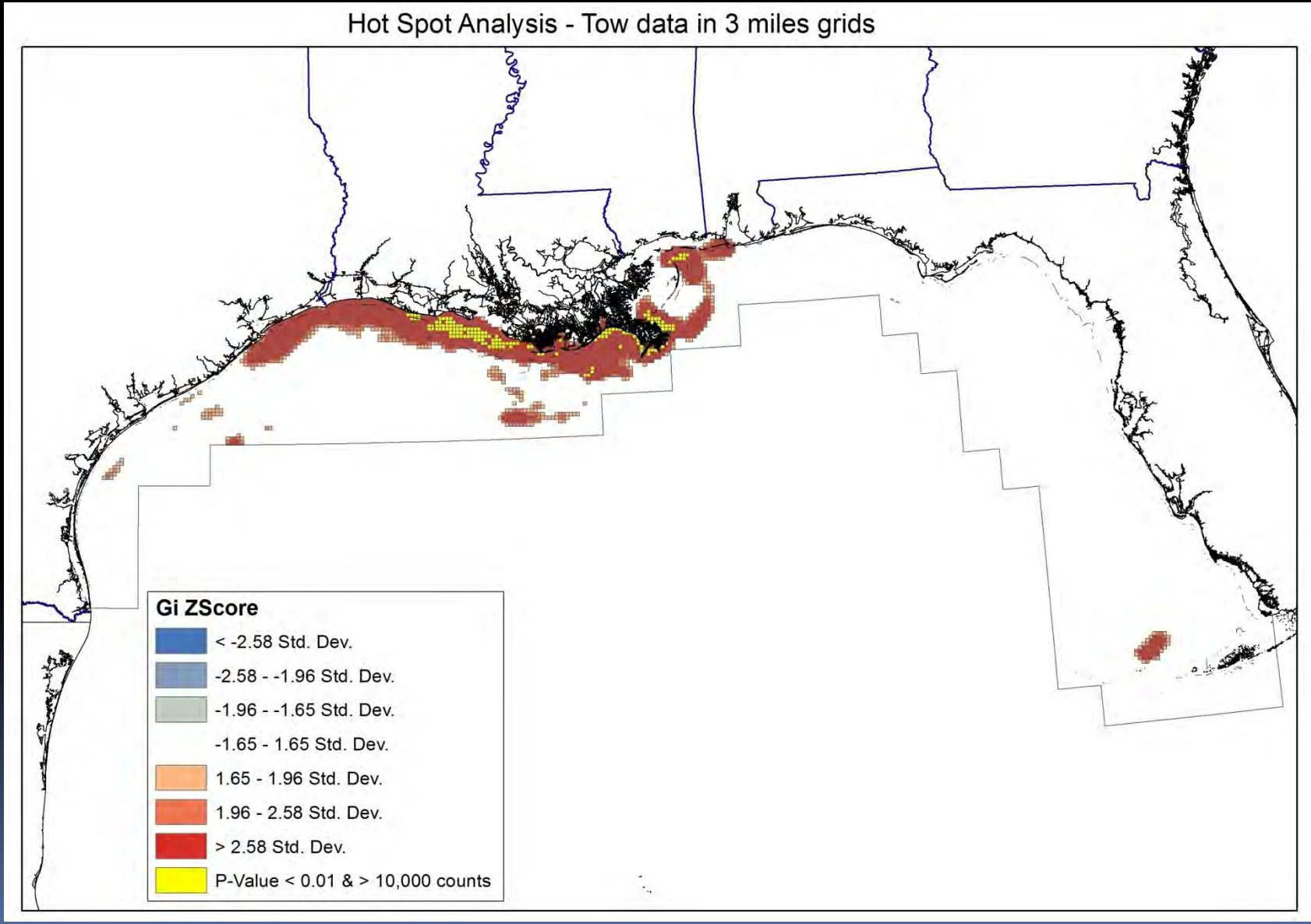
Port Region 9



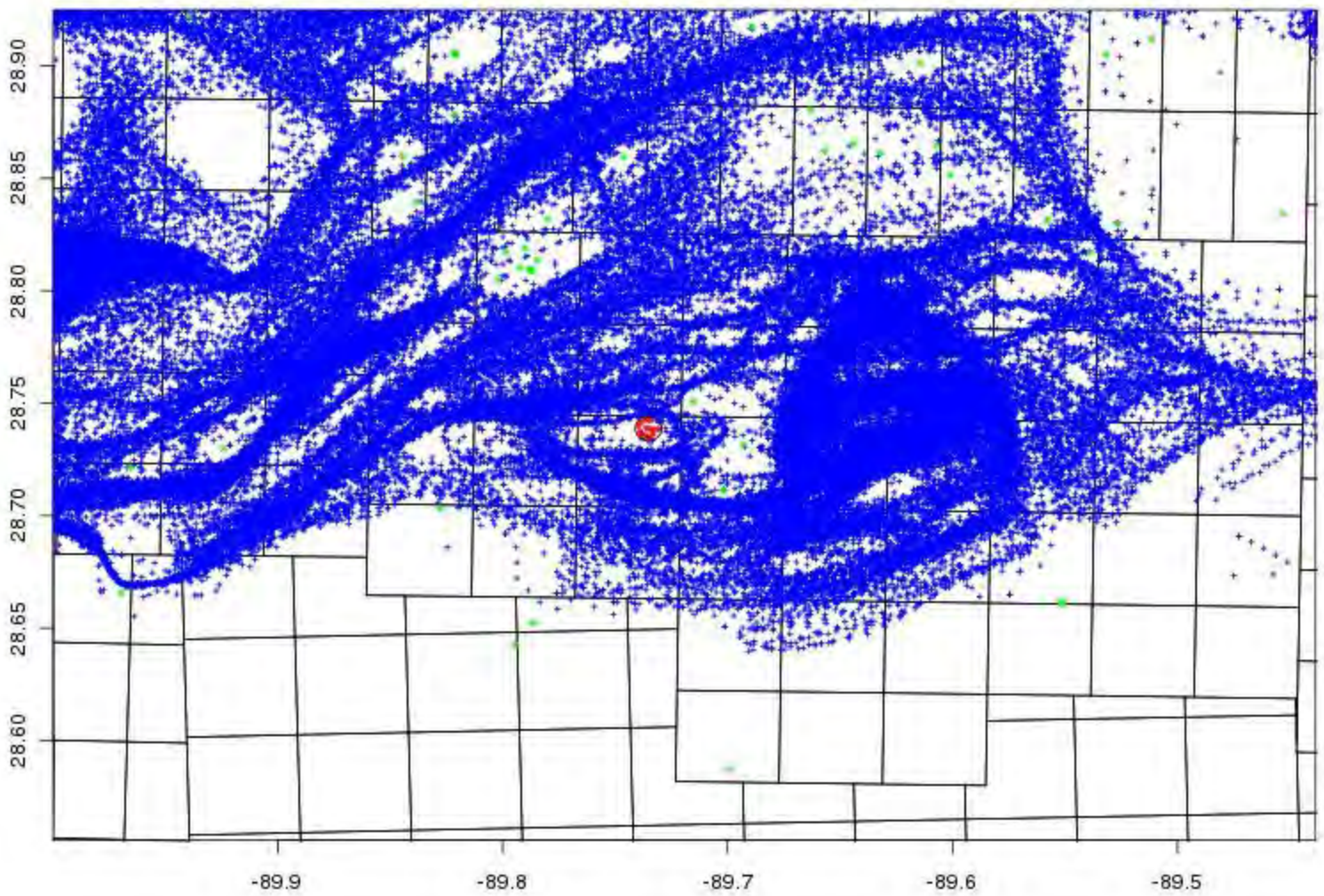
Shrimp Fishing Grounds



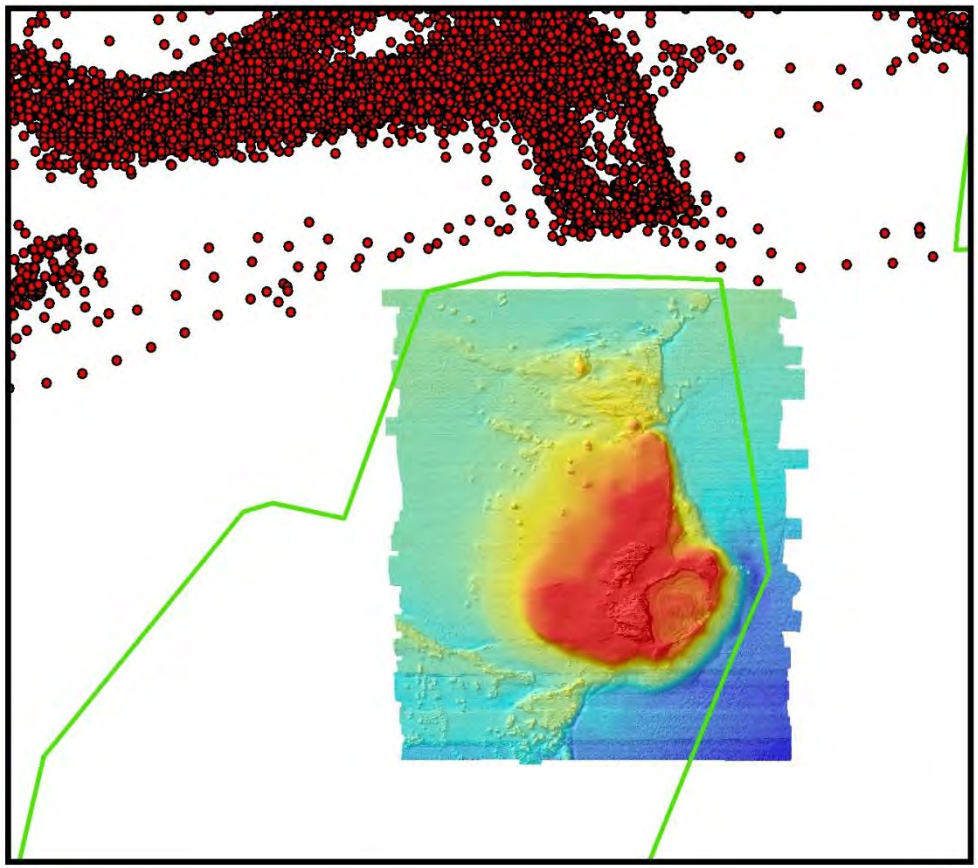
Zone of Greatest Fishing Intensity



Platforms and Tow Locations in Louisiana



Expanded Boundary of East Bank with ELB dataset



East Bank

Value

High : -18

Low : -146

ELB Points

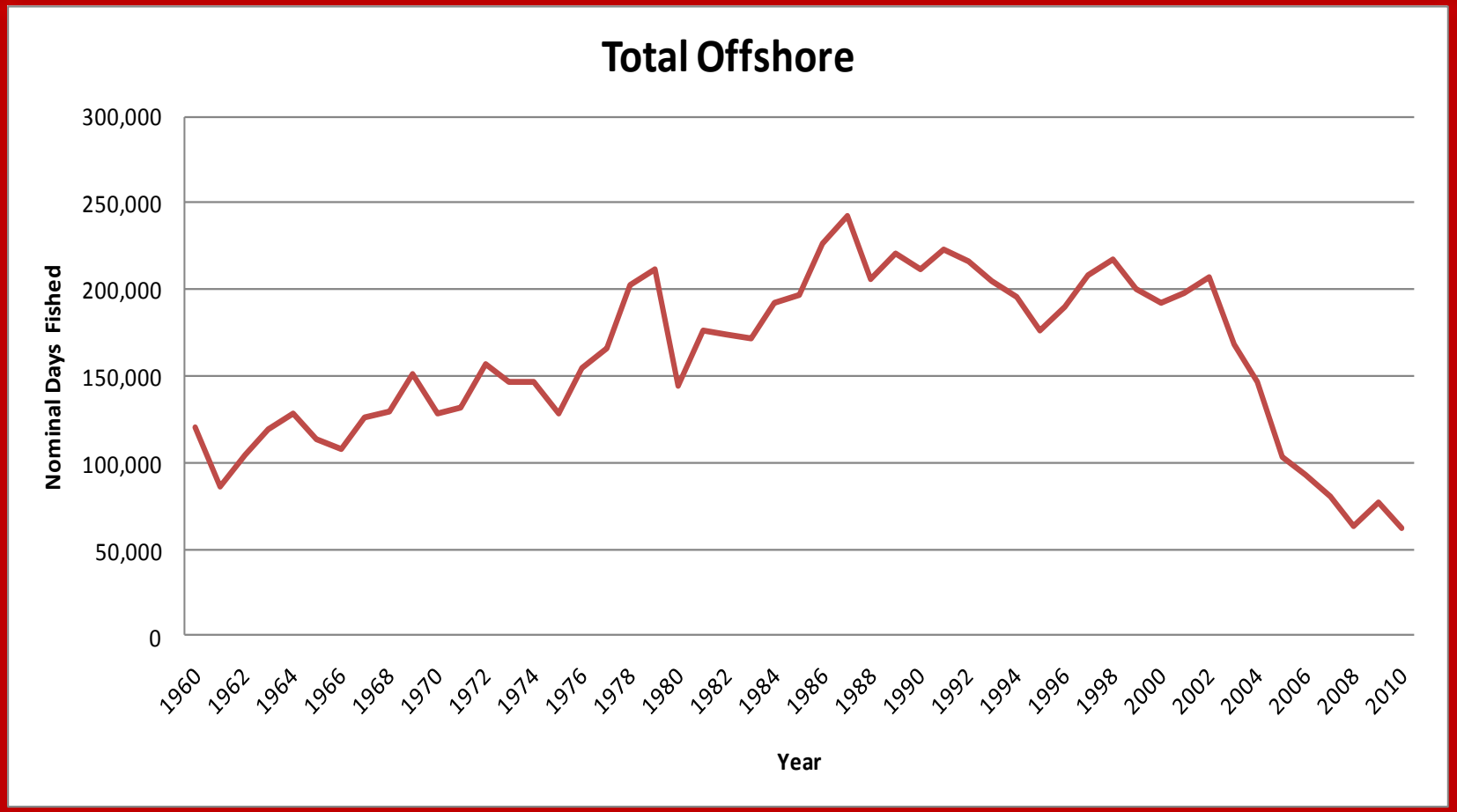
Expanded FGB Boundaries

N
W E
S

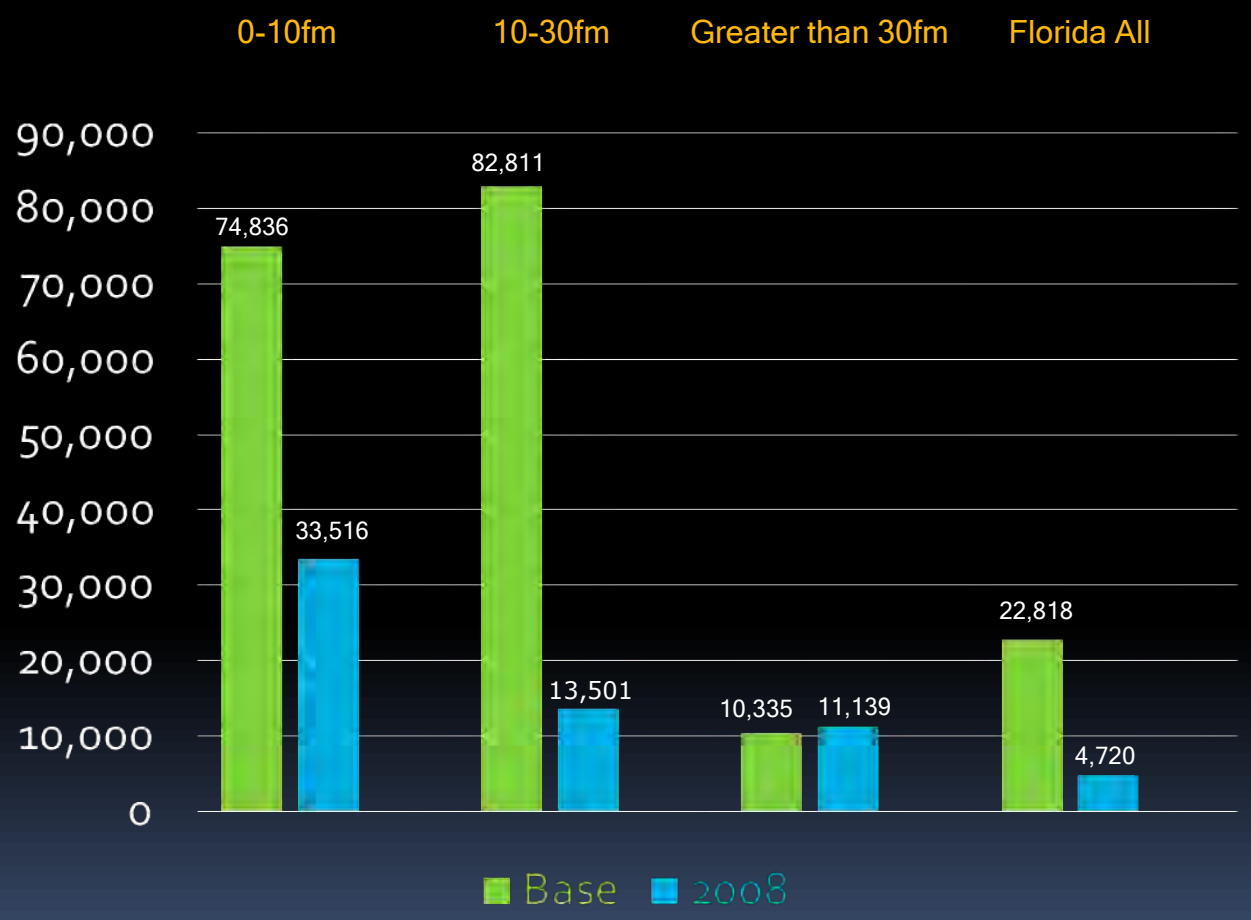
Kilometers

0 2 4 8

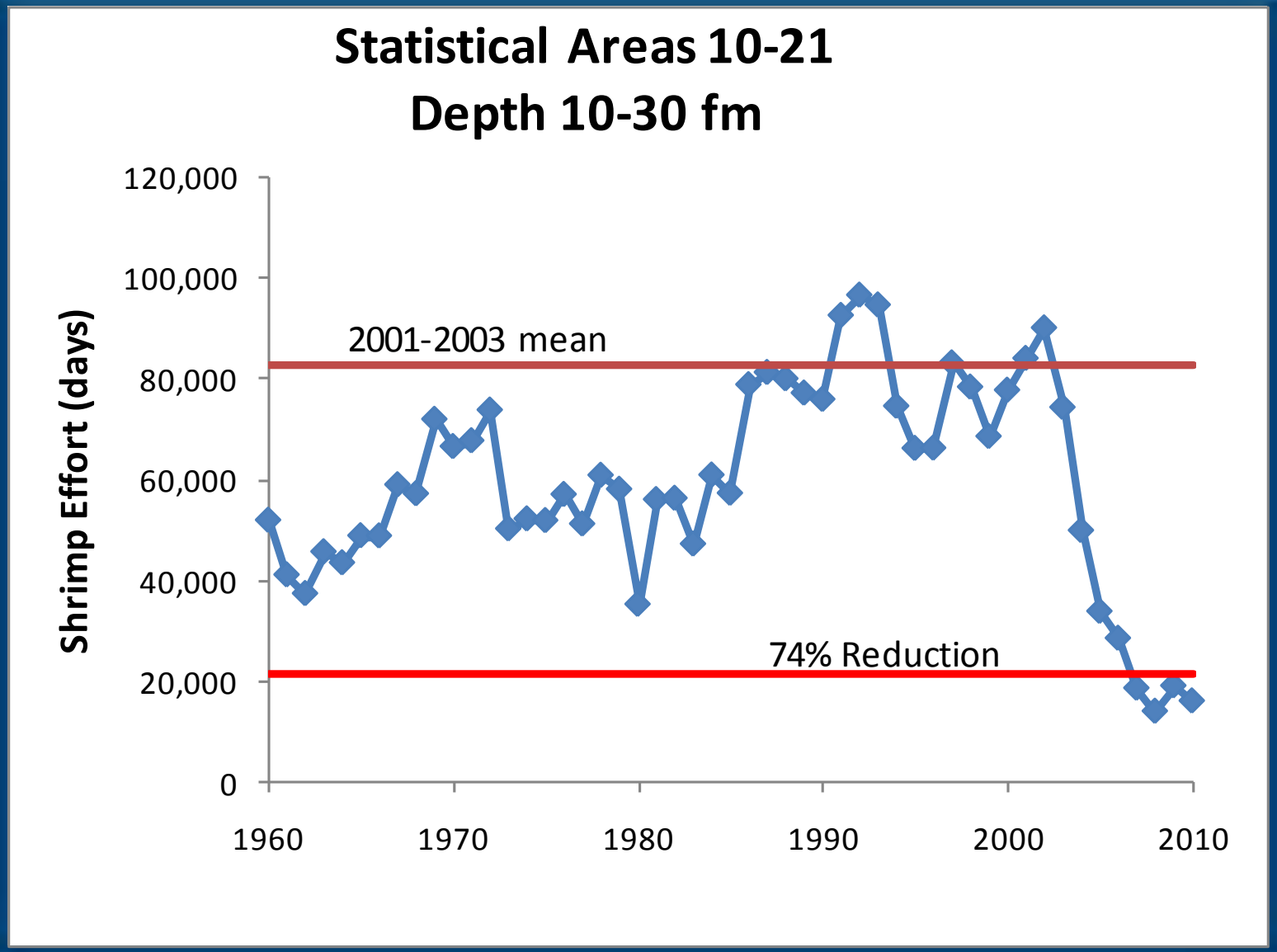
Total Offshore Shrimp Effort 1960-2010



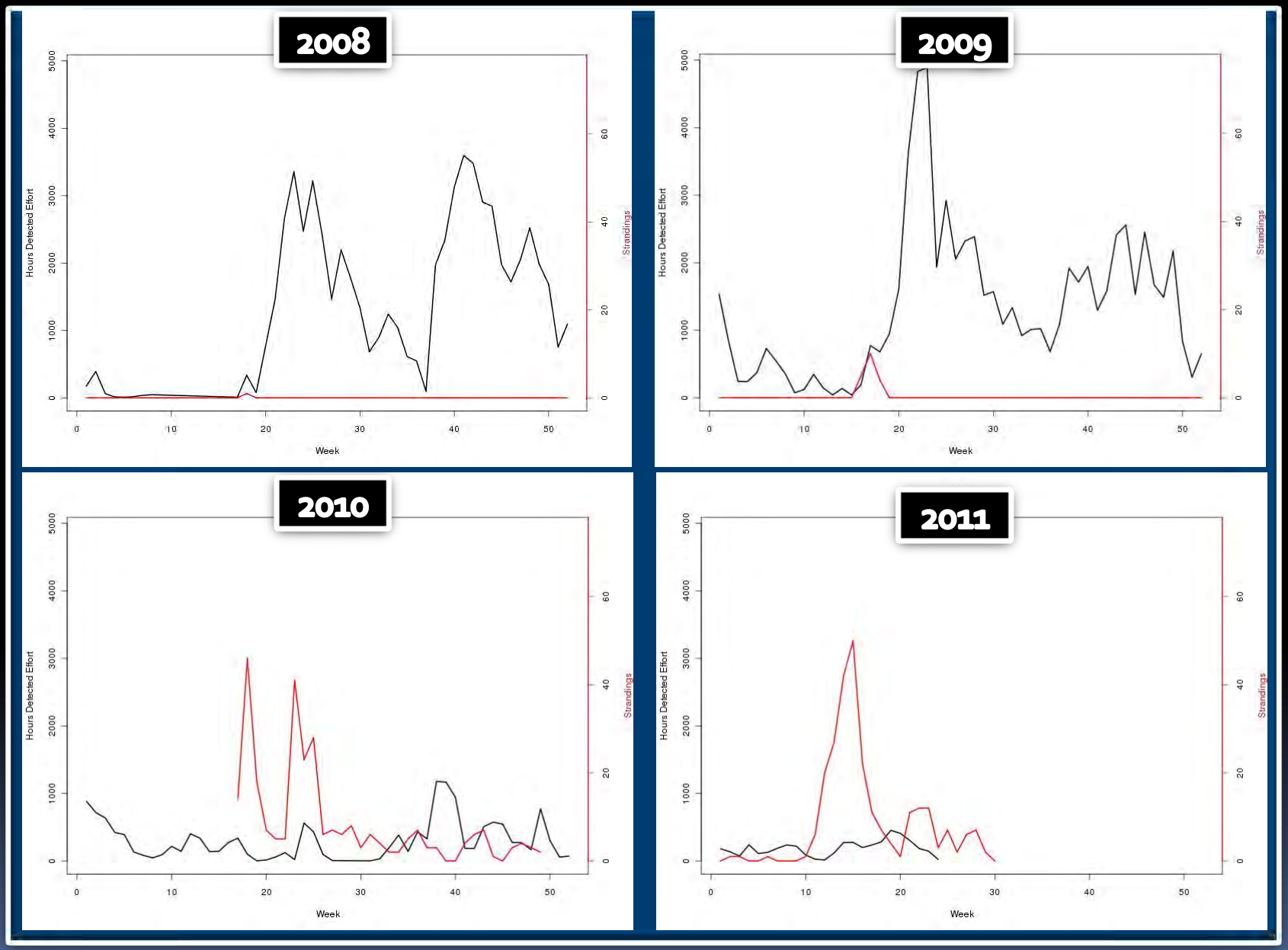
Effort Reductions From Base-2008



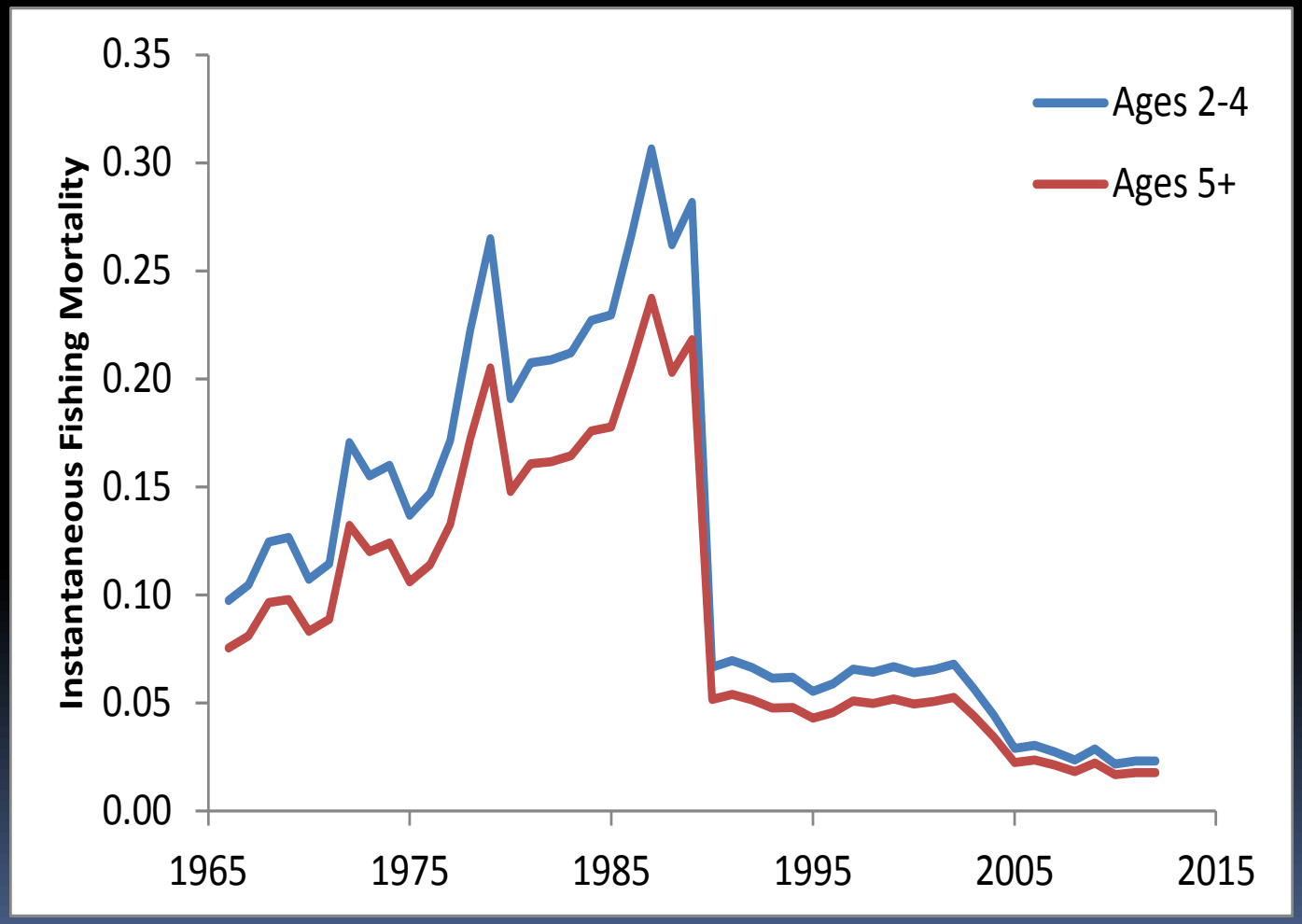
10-30 Fathom Effort Trend (1960-2010)



Weekly Turtle Strandings Versus ELB Recorded Effort 2008-2011



Kemp's Ridley Shrimp Trawl Mortality Rates



Results

Area	Logistic model ↓ % change in chances of fishing	Lognormal model ↓ % change in positive fishing effort	Two models combined ↓ % change in overall effort	Overall lower 95% CL	Overall upper 95% CL
By geographic area					
FL	58	4	63	183	-6
AL-MS-ELA	-81	-79	-96	-93	-97
WLA	-13	-14	-25	-8	-39
TX	21	1	23	63	-8
By each state's shrimping fleet					
FL	-49	-4	-50	-17	-70
AL	-18	-19	-34	14	-61
MS	-81	-64	-93	-88	-96
LA	-28	-24	-45	-20	-62
TX	39	1	40	69	16

Why has the Existing Program Been Successful?

- The ELB is rugged, simple and inexpensive, capable of being operated off the ships power system or the vessels battery system or off an independent power system.
- Installation and operational problems were worked out over a 3-yr pilot program conducted with the support of and assistance from industry. The system is unobtrusive and requires no action by the fishermen.
- It is a cooperative program with representatives on the docks working with the fishermen directly on other fishing issues (e.g., TEDs effects).
- Our field staff are bilingual, speaking Vietnamese or Spanish in addition to English depending on the region in question.

Why has the Existing Program Been Successful?

- We give presentations at Ports and Industry meetings each year along with our NMFS colleagues – it has been truly a cooperative study between Industry and Government.
- We also publish our results in peer-reviewed journals and the program was featured in a full day symposium at the 2011 Annual Meeting of the American Fishery Society.
- We work directly with NMFS staff in related studies…e.g., TED effects on small coastal sharks.
- The program has scientific credibility and fishery buy-in. Contention about effort---until now--- was a thing of the past.

What are Some Problems Associated with Implementing the New Program in January 2014?

- Industry has been cut out of the loop and will not have access to the data as before.
- Adequate calibration studies are not possible given time and funding constraints.
- A longer lead time is necessary to determine how to overcome installation and operational problems that will occur.
- It is not even certain that the new units will hold-up to conditions on shrimp boats operating in the Gulf of Mexico—they are diverse environments with one unifying feature—they are hostile places for sensitive equipment.

Selected Installation Problems

- In no particular order:
- The path to pass an antenna wire into the cabin is different on every vessel. It is often a very tight fit, and we found that we needed to use very thin antenna wire, and not have any connectors on the wire when we were snaking it through the hole. We installed the connector on the wire after it was passed into the cabin.
- Commercial shrimp boats have marine battery systems which are rated 32 volts. This means that any units that are direct wired to the system will require voltage regulators to step the voltage down from 32v to 12, 6, or 5v depending on the requirements of the unit.
- Many (most in some ports) vessels have 110v AC inverters that are connected to the generator. These units are often poorly grounded, and many times are subject to large (180-200 v) power surges when the vessel is deploying or retrieving the nets.

Selected Installation Problems (continued)

- The cabin of a steel hull shrimp boat is a hostile place for sensitive equipment. Any unit that is dropped on the floor is broken, any laptop that is dropped on the floor is broken, etc.

- Antennas need to be connected to secondary locations that will not interfere with other vessel antennas, radar, etc. These locations often are places where the crew store items, and antenna wires are often frayed or broken accidentally.

- Antennas are also subject to destruction from lightning strikes. We find that we replace external antennas around every 18 months or so, many times sooner.

Problems Associated with Lack of Regular Contact Between Agency and Fishermen

- Items of concern when there is no regular contact between program personnel and vessel Captains and crews
- 110v plugs in the cabin (when available) are at a premium. The crew usually have radios, cd players, cell phones, and other small electronic devices connected. Keeping the ELB unit plugged in comes from constant reminders to the Captains and crews about the value of the data being gathered, and the importance of the program to the fleet.
- If no one ever tests or services the box, how do you know the difference between a malfunctioning or disabled unit, and a vessel sitting at the dock without power?
- Are there going to be certified installers, or how will the vessel owner know if the unit is installed correctly and working.

Bottom Line

- The fishermen receive virtually no direct benefits, especially as compared to before, and must take on a disproportionate amount of the program costs.
- From no cost to over $1.2 million per year!
- These factors, plus the unproven and untested nature of the new technology, seem to be a blueprint for disaster.

Funding Options

Option 1. NMFS would fund the entire program.

No fund-not an option.

Option 2. Industry would fund the entire program.

No funds or way to generate funds—not an option

Option 3. NMFS and Industry share the costs.

Industry share	1,271,000	(93%)
NMFS share	96,000	(7%)
	1,367,000	

Hmmm, sounds fair

None of the proposed options seem likely, nor was a proposed option allowing vessels to choose participation in an ELB program.

Alternative Option-Solution

Continue the existing program for 2 years with funding from the States through GSMFC in conjunction with a companion calibration study supported and conducted by NMFS.

As a first step, we suggest NMFS discuss this possibility with representatives of the State of Louisiana who have expressed an interest in supporting effort studies.

There is Gulf-wide support of the existing program and this option should be explored.

Conduct the paired studies and choose appropriate program.