Preliminary Analyses of Economic Losses Caused by Hurricane Katrina to Louisiana's Fisheries Resources
Louisiana Department of Wildlife and Fisheries
September 7, 2005

Summary: Louisiana fishery losses caused by Hurricane Katrina

Category	Direct Loss of Available Resource	12 Month Potential Production Loss at Dockside	12 Month Potential Production Losses at Retail Level
Crab	N/A	$ 12,297,617	$ 81,776,427
Freshwater Fish	N/A	$ 189,019	$ 1,256,934
Menhaden	N/A	$ 14,050,883	$ 93,435,257
Oysters	$206,811,000	$ 44,577,072 *	$ 296,427,648 *
Saltwater Fish	N/A	$ 11,836,588	$ 78,710,687
Shrimp	N/A	$ 81,054,864	$ 538,996,879
Recreational Fisheries	N/A	N/A	$ 199,517,744
Total	$206,811,000	$ 164,006,043	$ 1,290,121,576

* Oyster losses are for two (2) years.

This analysis uses available data and several independent approaches to quantify, in economic terms, the impact of Hurricane Katrina on Louisiana's fisheries resources. All approaches assume that the impact is limited to Orleans, Jefferson, St. Bernard, Plaquemines, St. Tammany and lower Lafourche parishes. For oysters, we were able to estimate the direct loss of resource on the public grounds by using recently developed estimates of stock size on these grounds prior to the hurricane and previous studies of hurricane related oyster mortality (Hurricane Ivan, 2004; Hurricane Andrew, 1992).

For all commercial species including oysters we were able to estimate loss of production in terms of dockside value by assuming that commercial production would be disrupted for various lengths of time (i.e. 6 months, 12 months, 24 months). For both commercial and recreational fisheries we were able to estimate the retail value of lost sales resulting from the potential disruption of these fishing activities for various lengths of time (i.e. 6 months, 12 months, 24 months). We also address magnitude and potential impacts to fishery related infrastructure and habitat resources.

This analysis uses LDWF trip ticket landings and value data averaged over the past five years (2000-2004) as well as LDWF commercial license data to estimate initial losses to the commercial finfish, shrimp, crab and oyster fisheries. The 2004 recreational license database provided the basis for the recreational finfish analysis.

Direct Loss of Available Resource

Oysters

Due to the severe impacts of the hurricane on area infrastructure and equipment, post-storm field assessment of oyster mortality is not possible at this time. Previous studies of hurricane-related oyster mortality ranged from 10% (Hurricane Ivan, 2004) to 100% (Hurricane Andrew, 1992) on the public oyster grounds. Post-storm mortality on private leases following Hurricane Andrew exceeded 75%. Because of the size and strength of Hurricane Katrina, we estimate 99% mortality of oyster resources on both public and private areas from Bayou Lafourche east to the Louisiana/Mississippi state line.

Annual assessments of available oyster resources are conducted on public areas, but not on private leases. Over the last three years, 62% of all Louisiana oyster harvest came from private leases. Assuming that oyster resource availability is distributed 62% and 38% from private and public areas, respectively, and 99% mortality, direct loss of oyster resources is as follows:

Public Grounds	$78,577,572
Private Leases	$128,233,428
Total	$206,811,000

Previous investigations of oyster resource damage following hurricanes have documented heavy sediment and vegetative overburden on reefs. As reefs are buried, firm settlement substrata are no longer available for larval recruitment and reefs must be rehabilitated and rebuilt to reestablish oyster populations. In response to earlier hurricanes, the Department has successfully rehabilitated hurricane-impacted oyster reefs using funds appropriated by Congress.

The area of impacted oyster reefs on the public grounds totals 33,852 acres; private oyster leases comprise an additional 270,677 acres. The LSU Ag Center estimates that 30% of the leased acreage is covered by reef thus reef area totals 81,203 acres. Using the reef compensation rate of 187 cubic yards of cultch material per acre impacted and a cost of $40 per cubic yard of cultch material, reef rehabilitation costs it would cost:

Public Grounds	$253,212,960
Private Leases	$607,398,440
Total	$860,611,400

Shrimp, Crab and Finfish Fisheries and Recreational Fisheries

There are no data currently available to estimate direct losses to these resources.

Potential Production Losses (Dockside Value)

Oysters

The average annual dockside value of oysters over the last five years in the impacted area averaged $22,288,536. As it generally takes oysters between two and three years to grow from larvae to market size, a two-year impact to oyster harvest is expected at the minimum.

Fishery	6 Months	12 Months	24 Months
Oysters	$11,354,791	$22,288,536	$44,577,072

Shrimp, Crab, and Finfish Fisheries

Dockside landing values in the impacted area were estimated based on average landings of shrimp, crabs and commercial finfish between 2000 and 2004, over periods of 6 and 12 months. During the 6-month period between September 1 and February 28, and in an annual period, this area produces landings with values as follows:

Species Category	6 Months	12 Months
Crab	$5,092,813	$12,297,617
Freshwater Fish	$54,652	$189,019
Menhaden	$3,806,250	$14,050,883
Saltwater Fish	$5,319,153	$11,836,588
Shrimp	$29,554,270	$81,054,864
Total	$43,827,138	$119,428,971

Recreational Fisheries

There are no data currently available to estimate potential production losses to these resources.

Retail Value of Potential Production Losses

These losses do not include direct losses to the resource base, only losses to the industry in terms of lost sales related to fishing activity.

Oysters

The total estimated economic oyster losses at the retail level are as follows:

Fishery	6 Months	12 Months	24 Months
Oysters	$ 75,506,843	$148,213,824	$296,427,648

Shrimp, Crab, and Finfish Fisheries

Fishery	6 Months	12 Months
Crab	$ 33,866,078	$ 81,776,427
Freshwater Fish	$ 363,424	$ 1,256,934
Menhaden	$ 25,310,719	$ 93,435,257
Saltwater Fish	$ 35,371,188	$ 78,710,687
Shrimp	$196,529,345	$538,996,879
Total	$291,440,753	$794,176,185

Recreational Fisheries

Recreational finfish fisheries losses were estimated to be $200 million, based on retail value estimates in the affected area for a 12-month period. Recreational finfish fisheries do not have values comparable to dockside values for the commercial sector, so estimates of the retail value of the recreational fishery were used. These losses do not include direct losses to the resource base, only losses to the industry in terms of lost sales related to fishing activity. These calculations were based on the numbers of recreational license holders in that area as a fraction of the statewide license base, and with retail estimates based on a study by Southwick and Associates estimating 2003 values for recreational fishing in Louisiana. Values for a 6-month period were not calculated since that would require additional assumptions regarding distribution of trips that could not be reliably estimated from the Southwick study. Also of note regarding the value of this area to the recreational sector is the fact that approximately 63% of the 515 charter and guide vessels registered in Louisiana are registered in those severely impacted parishes.

Parish	Fishing Licenses	Retail Value
St. Bernard	15,921	$19,810,788
St. Tammany	33,374	$42,273,996
Orleans	9,252	$12,640,357
Jefferson	65,836	$85,058,147
Plaquemines	20,373	$19,495,632
Lafourche	16,220	$20,238,825
Total	160,976	$199,517,744

Infrastructure

The value of damaged infrastructure supporting these fisheries is difficult to quantify. Infrastructure losses here are characterized as lost or damaged vessels, docks, ice plants and processing facilities but also include roads and bridges, trucking, cold storage facilities, boat ramps, launches, marinas, bait and tackle shops. Due to the wide-spread displacement of local residents, labor shortages may also limit the ability of infrastructure to quickly recover and repair and/or re-build. Some perspective of the dimensions of the damage to the infrastructure may be suggested by the fact that 33% of the Wholesale/Retail Seafood Dealers licensed in Louisiana are based in the impacted parishes described above. The following table lists the number of wholesale/retail seafood dealers, number of commercial fishermen, number of commercial fishing vessels and charter vessels licensed in 2004 within each impacted parish.

Parish	Wholesale / Retail Seafood Dealers	Commercial Fishermen	Vessels	Charter Vessel
Jefferson	143	1485	1296	79
1/2 of Lafourche	36	659.5	511	30
Orleans	69	343	260	3
Plaquemines	58	1137	1360	157
St. Bernard	51	740	773	43
St. Tammany	69	403	225	13
Total	426	4767.5	4935	325
Fraction of State	32.5%	35.1%	48.8%	63.1%

(note: w/r dealer fraction does not include non-resident dealers)

One menhaden plant in Plaquemines Parish was severely impacted by Hurricane Katrina. The plant was flooded with several feet of water, and the fleet of 11 boats was beached. Based on a report published by the company, they employ approximately 270 personnel, mainly in Plaquemines Parish. They report that they land about 30% of the total Gulf menhaden landings. Using information from the LDWF economic impact study, they estimate that their total economic benefit to Louisiana is $155 million, with $116 million in retail sales, $25 million in wages and earnings, $17 million in total landings.

Habitat

Hurricane Katrina made landfall first near Empire, and then crossed the delta into the Breton and Chandeleur Sounds to the east. These are areas of shallow-shelf estuarine waters including extensive oyster reefs, large marine and estuarine SAV beds, and wetlands. Although reconnaissance flights are currently being scheduled, there is not as yet any estimate of the magnitude of wetland loss, or of geomorphological changes which may affect fishing grounds. Debris deposited by the hurricane over traditional fishing areas is expected to threaten both gear and the navigability of water ways. Large

quantities of debris deposited in coastal waters by the Hurricane Katrina may affect shrimp trawlers, boaters, swimmers and beach goers along the coast. Underwater obstructions not only are a serious threat to human life and property, they are costly. In Louisiana the Fisherman's Gear Compensation Fund paid out over $20,000,000 in claims for damage to gear and property from the inception of the fund in 1980 to 2002 (Ballard, 2002). In 1997 Louisiana began an Underwater Obstruction Removal Program to remove debris from Louisiana's coastal waters. Each obstruction cost an estimated $600 to $15,000 to remove.

After Hurricane Andrew made landfall in Florida in 1992, concentrations of ammonia, dissolved phosphate, and dissolved organic carbon increased. Phytoplankton blooms resulted and combined with increases in turbidity and low dissolved oxygen and additional contaminant loads from runoff and hydrocarbon spills resulted in fish kills along off southeastern Florida. Runoff to fresh water systems increased organic loading resulting in massive fish kills in the Atchafalaya Basin in Louisiana after Hurricane Andrew. The Louisiana Department of Environmental Quality estimates that releases from Hurricane Katrina included two large oil spills (68,000 bbls at Venice, LA and 10,000 bbls at Chalmette), releases from 25 major sewerage treatment centers and many smaller ones, as well as runoff from countless fuel storage tanks, and household and industrial chemical stores (gasoline, diesel, antifreeze, bleach, human waste, acids, alcohols, etc.). Fish kills and losses of crustacean and molluscan species are expected to result. In addition, health concerns regarding eating seafood harvested from these polluted waters may increase as more is understood about the magnitude and constituents of concern of pollutants. We understand that EPA and the LDEQ have water quality monitoring plans for surface waters in the city of New Orleans and Lake Pontchartrain.

In addition, the Breton and Chandeleur Sounds which were directly in the path of Katrina are the most extensive sea grass beds on the Louisiana coast, including turtle grass, shoal grass, manatee grass, widgeon grass, and star grass. They provide unique marine habitat along the eastern edge of the Mississippi delta. Lakes Pontchartrain, Catherine, and Borgne are also home to aquatic vegetation, and recent studies of grass beds in Lake Pontchartrain have shown an upswing in the coverage area. High wind and wave action as well as increased levels of turbidity and pollution are expected to impact these beds.

The reefs constructed under Louisiana's Artificial Reef Program, which primarily utilize obsolete oil and gas platforms, have shown very little movement or damage after other large hurricanes such as Ivan and Lili, however inspections have yet to take place after Hurricane Katrina. The system of buoys marking the Artificial Reef site off Grand Isle has not responded since the Hurricane and is expected to be damaged beyond repair. Replacement costs are anticipated at over $500,000. Damage to Louisiana's offshore oil and gas infrastructure has yet to be determined, but it may be extensive with many platforms expected to be destroyed or damaged by the storm, particularly in the South Timbalier, Grand Isle, West Delta and South and Main Pass areas. Many of these may have the potential of being accepted into Louisiana’s Artificial Reef Program.