June 29, 2015

To All Concerned:

FORECAST FOR THE 2015 BROWN SHRIMP SEASON IN THE WESTERN GULF OF MEXICO, FROM THE MISSISSIPPI RIVER TO THE U.S. - MEXICO BORDER.

Each year at this time, scientists at the National Marine Fisheries Service (NOAA Fisheries) Southeast Fisheries Science Center's Galveston Laboratory forecast brown shrimp production from the western Gulf of Mexico for the upcoming year (July 2015 – June 2016). The data for the forecast comes from the NOAA Fisheries Galveston Laboratory, NOAA port agents, National Climatic Data and Weather Centers, Texas Parks and Wildlife Department, U.S. Army Corps of Engineers, and the commercial shrimp industry. Pre-season estimates of juvenile brown shrimp abundance and growth are obtained by monitoring the inshore shrimp fisheries in Texas and the inshore and nearshore fisheries in Louisiana. Environmental variables are further assessed to quantify the amount and type of habitat available for growth and survival of young shrimp. Collectively, these measures provide an estimate of the size of shrimp stocks prior to their movement into the offshore fishery.

The 2015 Texas and Louisiana indices of brown shrimp abundance indicate below average production in offshore waters of the northwestern Gulf of Mexico from July 2015 through June 2016. The Galveston Bay bait index forecasts a below average year at 18.0 million pounds from offshore Texas waters. The Louisiana indices also indicate a below average brown shrimp season west of the Mississippi River to the Texas-Louisiana border (24.8 million pounds). When combined, an annual brown shrimp production estimate of approximately 42.8 million pounds can be expected in the western Gulf of Mexico during the 2015–2016 season. This is below the 1960–2013 historical average of 56.5 million pounds for the two-state area.

Peak recruitment of postlarval brown shrimp into Texas and western Louisiana estuaries occurs during February through early April. Salinity, temperature, and tidal height have been identified as important factors affecting the fate of young shrimp entering the estuaries. The amount of favorable nursery habitat appears related to the distribution of high salinity waters as well as to tidal height in interior marshes. Bay water temperatures greater than 68° F in April and May have been observed in years of above average production. This year, Texas and Louisiana experienced several weather fronts during the spring with record high rainfall, notably in May, that subsequently led to large freshwater discharges into the estuaries (Tables 1 through 3). Moreover, Texas' four-year drought ended in one month with May 2015 being documented as the wettest single month on record. This unprecedented flooding in Texas, and to a lesser degree in Louisiana, most likely concentrated young shrimp at the mouth of bays and out of the nursery habitats required for optimal growth and survival. These extreme environmental factors may impact our forecast of harvest of brown shrimp this year since it is unknown whether survival of shrimp was reduced or shrimp just moved out of our sampling area, because of the reduced salinities.

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Environmental Model

      The Environmental Model predicts the annual harvest related to the historical production
(Table 3). The model uses Galveston air temperature during mid-April, rainfall during early
March, and bay tidal height during late April and early May. These components are additive in
the model; thus higher values indicate higher catch. The heaviest contributing factor, the
temperature during mid-April, was above average this year (72.3°F). Rainfall during early
March was slightly below average during the monitoring period (0.5"). Tidal height was above
average during late April and early May (5.75'). Based solely on the environmental parameters,
(with the exclusion of the brown shrimp abundance indices) the model suggests above average
production off Texas.

Catch per Unit Effort (CPUE) in the Inshore Texas Fishery

      Texas bay commercial brown shrimp catch rates and size composition data for May 2015
were obtained from NOAA Fisheries port agents (Table 4). Data were not available for all Texas
bays. Several regulatory changes went into effect in Texas this year. Two notable changes for
the commercial bay fishery included an increase in the catch limit from 600 to 800 pounds and
extended fishing times from 2 p.m. to 30 minutes after sunset. In Galveston Bay, heavy river
runoff hampered the catch, effort, and shrimp size in some areas, while possibly helping them in
other areas, such as the channel and the mouth of lower Galveston Bay where young shrimp
were concentrated because of favorable salinity in that area. Galveston Bay reported a higher
than average catch rate with catches comprised of smaller shrimp (81–100 count/pound). Catch
rate in Matagorda Bay was higher than the 1986–2014 historical average this year (Table 4);
however, effort was concentrated in the last weeks of May with fewer landings on which to base
the estimate. The brown shrimp size composition reported from Matagorda Bay was dominated
by 71–80 count/pound shrimp. No landings were reported in San Antonio Bay for the month of
May.

Galveston Bay Production/Baxter Bait Index

      For the past five decades, the Galveston Bay Bait Index is consistently our most reliable
estimate of subsequent brown shrimp production off the Texas coast. The index is derived from
monitoring the Galveston Bay bait shrimp fishery during late April through mid-June (Baxter
Bait Index; Table 5). This year, recruitment into the commercial bait fishery was observed at the
onset of the sampling period. Juvenile shrimp were abundant; however, due to excessive
rainfall, environmental conditions did not remain as favorable towards the end of the sampling
period. The overall size of sampled shrimp remained small (Figure 1). Using the Galveston Bay
Bait Index model, 18.0 million pounds of brown shrimp is predicted for 2015–2016 catch in
Texas offshore waters. This is below the historical average of 25.7 million pounds for 1960–
2013 period.

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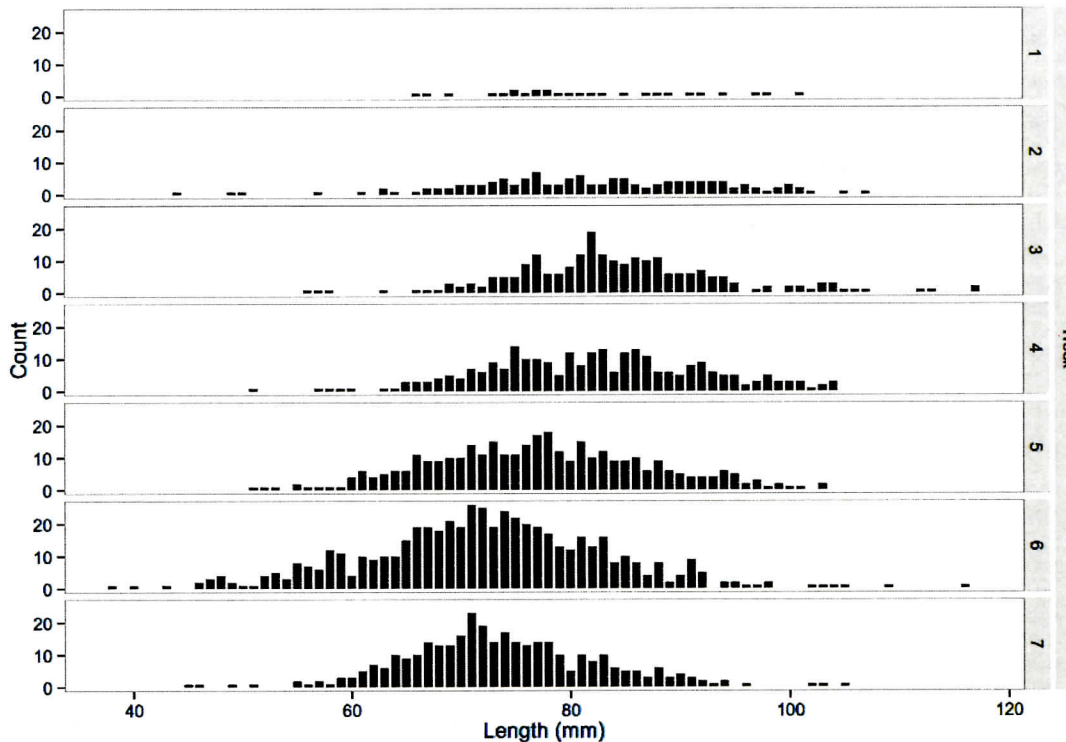
Figure 1.— Bait shrimp lengths for the 2015 seven-week Galveston Bay monitoring survey (April 19–June 6).

Louisiana Inshore - Offshore Production

  Catch information from NOAA Fisheries port agents in Louisiana on inshore and
offshore fisheries in May is used to estimate production from May through April the following
year (Table 6). Using brown shrimp catch data (4.6 million pounds), we predict a harvest of 24.8
million pounds for Louisiana west of the Mississippi River during the 2015–2016 season. This is
below the 1960–2013 historical average of 30.8 million pounds. Mississippi River discharge
was approximately 922 thousand cubic feet per second in April, higher than recorded in the past
six years.

Prediction Summary

  The 2015 indices of juvenile shrimp abundance indicate a below average year of brown
shrimp production in offshore waters of the western Gulf of Mexico during the July 2015–June
2016 season. If you would like more information regarding this forecast, or for other marine
fishery information, please contact us at 409-766-3500, or visit our web site at
http://www.galvestonlab.sefsc.noaa.gov.

Sincerely,

James Nance, Ph.D.
Laboratory Director

attachments

Table 1. Rainfall and air temperature during 2015 for selected areas.
Source: NOAA, National Climatic Data Center and National Weather Service, June 15, 2015.

	Year-to-Date Rainfall (Inches)	Rainfall (Inches Above/ Below Historical)	Departure: Above or Below Historical Monthly Average Air Temperature (°F) and Precipitation (inches)							
			JAN		FEB		MAR		APR	
			Temp	Rainfall	Temp	Rainfall	Temp	Rainfall	Temp	Rainfall
TEXAS										
Brownsville	21	12	-5	2	-3	0	-3	4	2	0
Corpus Christi	31	19	-5	1	-3	-1	-3	4	2	5
Houston	31	10	-3	0	-4	-3	0	3	3	3
Port Arthur	37	13	-2	1	-3	-3	2	5	4	8
LOUISIANA										
Lake Charles	40	15	-3	2	-4	-2	2	3	3	10
New Orleans	38	10	-1	1	-4	-3	4	2	5	7

Table 2. Salinities and water temperatures in West Galveston Bay during April and May, 1982-2015.
Source for salinity and temperature data 1997-2015: Texas Parks and Wildlife Department.

Year	TX Offshore Catch (Millions of Pounds)		Salinity (PPT)			Water Temp (°F)	
			APR	MAY		APR	MAY
1982	21.6		24	20		76	77
1983	18.1		24	28		66	74
1984	24.1		28	32		78	82
1985	30.3		21	25		79	82
1986	27.1		27	28		75	78
1987	27.2		32	31		84	79
1988	22.5		25	25		78	79
1989	30.3		26	25		77	83
1990	33.3		15	18		NA	84
1991	32.9		15	15		74	81
1992	24.7		15	21		73	82
1993	21.1		20	19		73	74
1994	25.5		21	20		78	79
1995	23.5		18	19		70	78
1996	22.3		30	29		77	81
1997	17.0		13	16		70	78
1998	27.0		22	30		71	86
1999	22.0		28	28		82	86
2000	31.1		31	29		81	82
2001	24.6		17	24		74	81
2002	23.3		21	24		75	82
2003	25.3		23	21		71	80
2004	21.5		14	10		72	77
2005	20.3		23	28		73	75
2006	25.2		29	30		77	79
2007	19.1		23	19		70	80
2008	21.2		24	24		75	81
2009	31.7		29	21		72	76
2010	20.2		23	25		68	81
2011	25.6		31	28		78	79
2012	21.9		21	22		78	80
2013	21.9		29	26		77	77
2014	18.1*		26	31		73	75
2015			16	17		73	82

*Preliminary

Table 3. Environmental Model prediction of the trend in catch of Texas brown shrimp offshore production (July-June).

Year	Direction of Prediction Relative to Average	Air Temperature (°F)	Rainfall (inches)	Tidal Height (feet)	TX Offshore Catch (Millions of Pounds)	
1990	+	68.3	0.83	5.69	33.3	
1991	+	73.2	0.11	5.87	32.9	
1992	-	66.6	0.48	4.90	24.7	
1993	-	66.9	0.86	5.41	21.1	
1994	+	71.2	1.26	5.57	25.5	
1995	+	72.7	1.07	5.38	23.5	
1996	-	70.3	0.70	4.88	22.3	
1997	+	68.3	0.37	5.47	17.0	
1998	-	68.5	0.48	5.14	27.0	
1999	+	70.8	0.24	5.34	22.0	
2000	+	70.3	0.07	5.42	31.1	
2001	+	74.3	0.49	5.19	24.6	
2002	+	74.1	1.24	6.18	23.3	
2003	+	68.9	0.17	5.55	25.3	
2004	+	69.1	0.16	5.07	21.5	
2005	+	72.9	1.67	6.10	20.3	
2006	-	67.0	0.01	5.22	25.2	
2007	+	68.8	0.00	5.60	19.1	
2008	+	68.9	0.89	5.61	21.2	
2009	+	69.9	0.01	5.61	31.7	
2010	+	68.9	0.50	5.37	20.2	
2011	+	75.6	2.55	5.61	25.6	
2012	+	74.4	1.05	5.50	21.9	
2013	-	67.5	0.17	5.38	21.9	
2014	+	67.2	1.02	5.44	18.1*	*Preliminary
2015	+	72.3	0.5	5.75		

Table 4. Estimated average May inshore commercial shrimp catch in pounds per hour (heads-on) for selected Texas Bays, 1986-2015.

Year	Selected Texas Bay Systems Pounds/Hour (heads-on)					TX Offshore Catch (Millions of Pounds)
	San Antonio	Corpus Christi	Aransas	Matagorda	Galveston	
1986	40	20	40	40	48	27.1
1987	45	20	41	45	50	27.2
1988	75	38	46	33	45	22.5
1989	29	25	26	18	31	30.3
1990	64	54	62	55	63	33.3
1991	41	38	56	31	23	32.9
1992	14	25	19	12	23	24.7
1993	44	32	28	32	28	21.1
1994	53	50	54	51	32	25.5
1995	38	45	38	ND	22	23.5
1996	40	32	43	30	18	22.3
1997	35	48	52	25	31	17.0
1998	56	48	37	37	26	27.0
1999	47	32	35	34	33	22.0
2000	45	32	29	32	42	31.1
2001	60	45	35	60	34	24.6
2002	44	35	38	19	16	23.3
2003	43	35	53	32	26	25.3
2004	NE	31	9	45	19	21.5
2005	53	36	30	33	9	20.3
2006	41	ND	ND	19	27	25.2
2007	47	ND	ND	47	14	19.1
2008	21	ID	21	NE	18	21.2
2009	74	<50	62	61	16	31.7
2010	59	75	105	46	25	20.2
2011	45	33	33	16	21	25.6
2012	ND	ND	ND	83	30	21.9
2013	85	ND	ND	41	30	21.9
2014	48	ND	ND	18	16	18.1*
Historical Average	**48**	**38**	**41**	**37**	**28**	
2015	NE	ND	ND	77	37	
Dominant Count				71-80	81-100	

*Preliminary   NE - No effort.   ID - Insufficient data.   ND - No data.

Table 5. Texas offshore brown shrimp catch predictions (millions of pounds) based on Galveston Bay bait index values. Average catch (July-June) from 1960-2013 was 25.7 million pounds.

| Year	Predicted Catch	Actual Catch	Difference
1960	29.1	34.0	4.9
1961	20.0	13.2	-6.8
1962	21.5	17.3	-4.2
1963	29.0	24.6	-4.4
1964	22.6	18.6	-4.0
1965	25.6	26.4	0.8
1966	-	31.1	-
1967	39.0	42.7	3.7
1968	22.0	27.9	5.9
1969	26.3	24.7	-1.6
1970	33.7	30.7	-3.0
1971	37.1	34.4	-2.7
1972	38.0	35.4	-2.6
1973	19.4	23.2	3.8
1974	23.8	25.8	2.0
1975	-	23.7	-
1976	23.8	25.7	1.9
1977	30.5	34.4	3.9
1978	25.5	27.7	2.2
1979	-	16.5	-
1980	26.7	26.6	-0.1
1981	29.3	41.3	12.0
1982	21.5	21.6	0.1
1983	17.8	18.1	0.3
1984	22.9	24.1	1.2
1985	29.0	30.3	1.3
1986	25.3	27.1	1.8
1987	25.7	27.2	1.5
1988	25.9	22.5	-3.4
1989	23.1	30.3	7.2
1990	-	33.3	-
1991	23.1	32.9	9.8
1992	24.1	24.7	0.6
1993	26.8	21.1	-5.7
1994	27.1	25.5	-1.6
1995	29.1	23.5	-5.6
1996	25.1	22.3	-2.8
1997	28.2	17.0	-11.2
1998	25.8	27.0	1.2
1999	24.5	22.0	-2.5
2000	30.0	31.1	1.1
2001	23.7	24.6	0.9
2002	26.6	23.3	-3.3
2003	21.6	25.3	3.7
2004	22.5	21.5	-1.0
2005	23.3	20.3	-3.0
2006	23.8	25.2	1.4
2007	25.9	19.1	-6.8
2008	21.8	21.2	-0.6
2009	24.7	31.7	7.0
2010	23.2	20.2	-3.0
2011	22.2	25.6	3.4
2012	27.4	21.9	-5.5
2013	26.0	21.9	-4.1
2014	23.5	18.1*	-5.4
2015	18.0		

*Preliminary
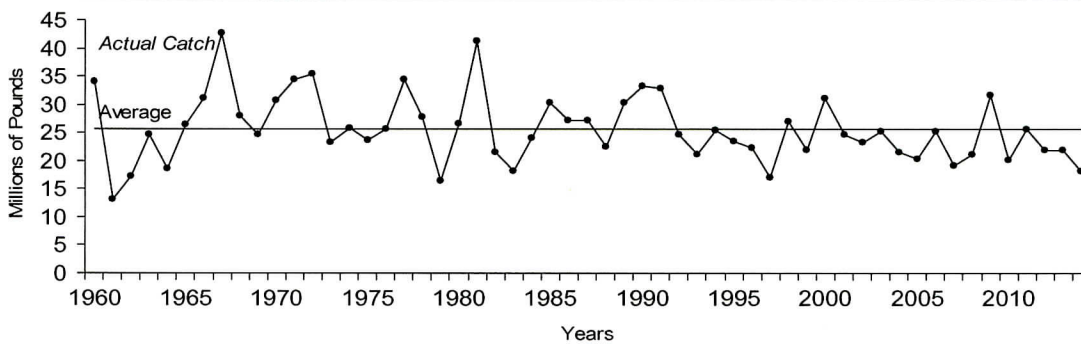
Table 6. Louisiana inshore and offshore brown shrimp prediction (millions of pounds) based on May catch index values. Average catch (May - April) from 1960-2013 was 30.8 million pounds. Acreage with salinities greater than 10 ppt is in millions of acres. Mississippi River discharge is thousand cubic feet per second in April (TCFS).
*Source: Louisiana Department of Wildlife and Fisheries and U.S. Army Corps of Engineers.

Year	Predicted Catch	Actual Catch	Difference	*Acreage > 10 ppt	*Discharge (TCFS)
1960		15.6			
1961		9.2			
1962		7.3			
1963		16.9			
1964		9.6			
1965		17.7			
1966		18.7			
1967		29.5		2.3	
1968		25.4		1.9	
1969		25.2		1.6	
1970		28.1		2.1	
1971		30.7		1.9	
1972		32.2		1.8	
1973		17.9		1.0	
1974		20.6		1.2	
1975		18.1		1.3	
1976		37.5		1.6	510
1977		49.1		1.8	665
1978		45.9		1.5	856
1979		36.7		1.2	1288
1980		23.8		0.5	1002
1981		44.3		2.8	313
1982		33.0		1.5	779
1983		24.9		0.9	955
1984		33.3		1.6	1048
1985	40.3	33.7	-6.6	1.8	924
1986	50.0	44.1	-5.9	2.5	546
1987	32.9	40.0	7.1	1.5	694
1988	30.2	34.3	4.1	1.4	681
1989	43.7	37.6	-6.1	1.8	893
1990	60.0	45.9	-14.1	1.2	809
1991	35.4	32.0	-3.4	1.0	936
1992	26.3	28.2	1.9	1.6	555
1993	-	27.7	-	0.8	1098
1994	31.7	24.6	-7.1	1.2	958
1995	36.5	31.7	-4.8	1.6	505
1996	31.8	35.3	3.5	1.9	592
1997	25.5	29.3	3.8	1.0	1155
1998	40.3	34.2	-6.1	1.4	926
1999	45.0	42.7	-2.3	1.8	683
2000	47.1	43.9	-3.2	2.5	590
2001	62.4	42.1	-20.3	1.7	692
2002	39.0	36.2	-2.8	1.5	985
2003	42.0	44.7	2.7	1.4	507
2004	41.2	37.5	-3.7	0.7	552
2005	21.0	31.0	10.0	0.9	664
2006	37.8	39.7	1.9	2.3	427
2007	32.9	36.1	3.2	1.9	636
2008	29.2	22.2	-7.0	1.5	1363
2009	29.2	33.3	4.1	NA	767
2010	22.0	20.2	-1.8	NA	~800
2011	31.2	39.0	7.8	NA	845
2012	31.8	31.8	0.0	NA	567
2013	29.0	34.2	5.2	NA	622
2014	29.7	22.7*	-7.0	NA	699
2015	24.8			NA	922

*Preliminary