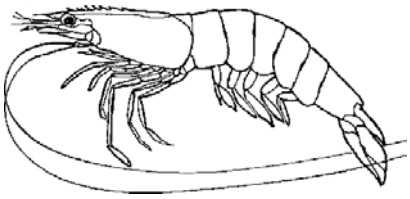

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Fisheries Science Center
Galveston Laboratory
4700 Avenue U
Galveston, TX 77551

409.766.3500

July 1, 2014

To All Concerned:

FORECAST FOR THE 2014 BROWN SHRIMP SEASON IN THE WESTERN GULF OF MEXICO, FROM THE MISSISSIPPI RIVER TO THE U.S. - MEXICO BORDER.

Scientists at the National Marine Fisheries Service (NOAA Fisheries) Southeast Fisheries Science Center's Galveston Laboratory have prepared the following information on prospects for the upcoming brown shrimp season (July 2014–June 2015) in the western Gulf of Mexico. 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, Louisiana Department of Wildlife and Fisheries, 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.

This year, the 2014 brown shrimp abundance indices point to a below average year of production in offshore waters of the western Gulf of Mexico. The Galveston Bay bait index forecasts a below average year at 23.5 million pounds from offshore Texas waters. The Louisiana indices indicate a below average brown shrimp season west of the Mississippi River to the Texas-Louisiana border (29.7 million pounds). When combined, an annual brown shrimp production estimate of approximately 53.2 million pounds can be expected in the western Gulf of Mexico during the 2014–2015 season. This is below the 1960–2012 historical average of 56.5 million pounds for the two-state area.

Postlarval brown shrimp begin entering estuaries in Texas and western Louisiana in mid-February, depending on environmental conditions, and continue through July. Several waves of postlarve may enter the estuaries; however, peak recruitment occurs from February through early April. A wide array of environmental and biological factors affects the fate of young shrimp entering the estuaries. Three environmental variables: temperature, salinity, and tidal height, have been correlated with subsequent shrimp production.

This year, below normal rainfall amounts and record low temperatures persisted in the winter and early spring in coastal areas of both Texas and western Louisiana (Table 1). Recruitment of brown shrimp into the bays occurred several weeks later; similar to recruitment in 2013, but substantially later than historical recruitment seasons. Moderate salinities (Table 2)

and slightly above average tidal heights (Table 3) provided adequate marsh habitat for juvenile brown shrimp; however, record low water temperatures observed in Galveston Bay (Figure 1), the result of several weather fronts, were not conducive for optimal shrimp growth which occurs in waters greater than 68° F.

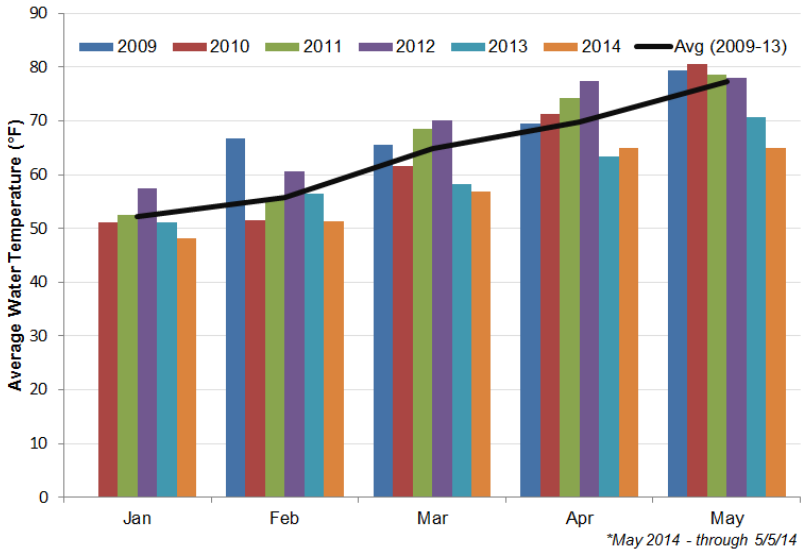

Figure 1—Average (2009–2014) January through May monthly water temperatures from Eagle Point, TX (Station ID: 8771013 at 29.481° N/ 94.917° W). Source: http://www.ndbc.noaa.gov/station_history.php?station=eptt2

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 water height during late April and early May. These components are additive in the model, thus higher values indicate higher catch. The greatest contributing factor and key component, temperature during mid-April, was below average this year (67.2ºF). Rainfall recorded at 1.02 inches during the monitoring period was above the 54-year historical average (0.6), but did not have a negative impact on salinity levels in the system during the monitoring period. Moderately high tidal heights during late April and early May were recorded at approximately 5.44 feet. Based solely on the environmental parameters of the model (with the exclusion of the brown shrimp abundance indices) the model suggests environmental conditions needed for optimal growth and survival of brown shrimp in Texas yields average production.

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

Texas bay commercial brown shrimp catch rates and size composition data for May 2014 were obtained from NOAA Fisheries port agents. Data were not available for all Texas bays. Recruitment into the bays was late this year and peak catch rates may not have captured during the May survey period. While San Antonio Bay experienced slightly above average production, Matagorda and Galveston Bays had catch rates below the 1986–2013 historical average (Table 4). The brown shrimp size composition reported from Matagorda Bay was dominated by 51–60 count/pound shrimp. Galveston and San Antonio Bay catches were comprised of smaller shrimp (71-121+ count/pound).

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Galveston Bay Production/Baxter Bait Index

For the past five decades, the Galveston Bay Bait Index has been the most reliable estimate of subsequent brown shrimp production off the Texas coast. It 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 approximately four weeks late and not present at the onset of the sampling period. Initial recruitment was not observed until the 3rd week of sampling (2nd week of May). For this reason, our monitoring survey was extended. Moderate recruitment was observed with peak catch rates > 40 pounds per hour measured during the first week of June. The overall size of shrimp remained small throughout the survey period. Using the Galveston Bay Bait Index model, 23.5 million pounds of brown shrimp is predicted for 2014–2015 catch in Texas offshore waters. This is below the historical average of 25.8 million pounds for 1960–2012 period.

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). Due to delayed recruitment of brown shrimp this year, this survey was also extended. Using brown shrimp catch data (7.4 million pounds), we predict a harvest of 29.7 million pounds for Louisiana west of the Mississippi River during the 2014–2015 season. This is below the 1960–2012 historical average of 30.7 million pounds.

Prediction Summary

The 2014 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 2014–June 2015 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.
Acting Laboratory Director

attachments

Table 1. Rainfall and air temperature during 2014 for selected areas.
Source: NOAA, National Climatic Data Center and National Weather Service, June 17, 2014.

	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	
TEXAS			Temp	Rainfall	Temp	Rainfall	Temp	Rainfall	Temp	Rainfall
Brownsville	5	-4	-3	-1	-2	-1	-3	0	0	-1
Corpus Christi	7	-5	-2	-1	-1	-2	-3	0	1	-1
Houston	20	-2	-4	-2	-2	-1	-4	-1	0	-2
Port Arthur	14	-11	-4	-4	-2	2	-3	-1	0	-1
LOUISIANA										
Lake Charles	20	-5	-6	-3	-3	1	-4	-2	0	-3
New Orleans	27	-2	-6	-2	-1	1	-3	1	0	-2

Table 2. Salinities and water temperatures in West Galveston Bay during April and May, 1982-2014.
Source for salinity and temperature data 1997-2014: Texas Parks and Wildlife Department.

Year	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		26	31	73	75

*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)	Water Height (feet)	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	

*Preliminary

Table 4. Estimated average May inshore commercial shrimp catch in pounds per hour (heads-on) for selected Texas Bays, 1986-2014.

Year	Selected Texas Bay Systems Pounds/Hour (heads-on)					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*
Historical Average	**48**	**38**	**41**	**38**	**29**	
2014	48	ND	ND	18	16	
Dominant Count	110+ / 71-80			51-60	121+	

*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 1960-2012 was 25.8 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		

*Preliminary

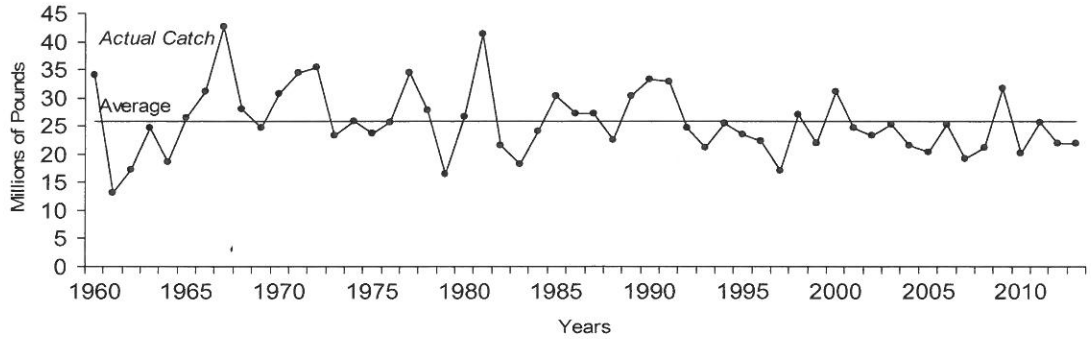
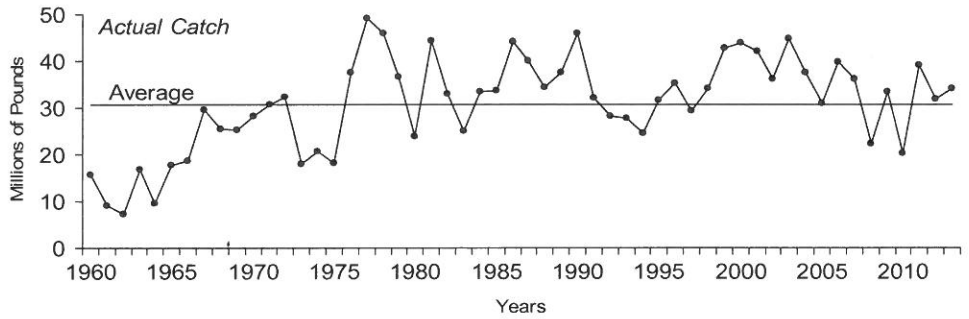


Table 6. Louisiana inshore and offshore brown shrimp prediction (millions of pounds) based on May catch index values. Average catch (May - April) from 1960-2012 was 30.7 million pounds. Acreage with salinities greater than 10 ppt is in millions of acres. Mississippi River discharge is thousand cubic 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
*Preliminary	2013	29.0	34.2*	5.2	NA	622
	2014	29.7			NA	699