Preliminary Report on Cold Weather (January 20-24, 2025) Related Fish Mortality in Louisiana Coastal Waters

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Beginning on January 20, 2025, an Arctic blast moved into Louisiana which led to periods of freezing air temperatures for several days, with record snowfall and frozen precipitation throughout the coastal areas of the state as far south as Grand Isle, LA. Saltwater fish species begin to show lethal impacts when water temperatures fall below 40 degrees (°) Fahrenheit (F) and remain below that threshold for more than a day. The coastal waters of the state recorded water temperatures below 40° F in all basins, with some areas recording water temperatures as low as 32° F in very shallow areas, resulting in widespread fish kills. Some basins, at some monitoring stations, recorded water temperatures below 40° F for as long as four days and those waters rapidly cooled to those temperatures, in some cases in less than a day. When compared to the freeze of late December 1989, where water temperatures remained below 32° F for about 100 hours near Grand Isle, LA, this freeze was not as long in duration. While some shallow marsh ponds saw ice form around the edges in this event, the freeze of 1989 resulted in ice forming on Lake Pontchartrain and other larger coastal waterbodies, which was not the case with this event. The freeze of 1989 had statewide impacts and resulted in recreational and commercial anglers harvesting significantly fewer fish during 1990 and 1991 while populations recovered.

LDWF tracks a Winter Severity Index (WSI) for use in the Spotted Seatrout stock assessment. That index, while preliminary, shows this winter, to date, ranks similar to the winters of 1996, 2000, and 2014 in severity (Figures 1 and 2; Table 1). In the WSI, winter is considered from November and December of the preceding year through March of the following year (e.g., winter index value for 1990 is November 1989 through March of 1990). The WSI, which explains approximately 50% of the annual variability in recreational catch or approximately 69% in the variability of individual angler catch per effort, uses a relationship between the number of total days water temperature stays below 44° F (7° Celsius) (not lethal temperature, but cold issues begin) and total catch (landings and discards) or catch per angler (Table 1).

LDWF began searching for freeze related fish kills and investigating those reported to the agency or observed on social media as soon as travel advisories were lifted on Friday January 25, 2025. Very few of the freeze related kills that LDWF has observed are the result of reports to LDWF, but from proactive searches by LDWF field biologists. As of February 6, 2025, LDWF had investigated approximately 77 fish kills statewide and observed approximately 12,552 Spotted Seatrout, 6,568 Red Drum, 2,142 Black Drum, 2,657 Sheepshead, and 19,107 Striped Mullet that were dead, as well as other saltwater species. Observed mortalities of Spotted Seatrout, Red Drum, and Black Drum were highest in the Terrebonne/Timbalier Basin, while Sheepshead mortality was highest in the Barataria Basin and Striped Mullet mortality was highest in the Pontchartrain Basin. Dead fish observed by LDWF varied in size and were not limited to particular size classes; however, more Red Drum under 20 inches, more Spotted Seatrout under 14 inches, more Sheepshead under 17 inches, and more Black Drum greater than 14 inches were observed dead statewide. Dead Spotted Seatrout ranged from 6 to 23 inches, Red Drum from 5 to 41 inches, Black Drum from 7 to 36 inches, Sheepshead from 6 to 24 inches, and Striped Mullet from 6 to 19 inches.

The collected data indicates fish mortality occurred coast wide with concentrations of kills occurring in some areas where fish likely did not have time to leave shallower areas or have access to deep enough, slightly warmer, water readily available in which to take refuge. While kills were spread throughout our coast, not all coastal areas were affected and not all to the same level. While there were some concentrated areas with significant amounts of dead fish, most coastal marshes had light, but widespread scattered mortality observed for saltwater finfish. Coastal water levels were already somewhat lower prior to the Arctic blast and fish may have moved to deeper waters prior to those areas reaching critical water temperatures.

Ultimately, the impacts of this freeze event and any unobserved mortality of fish may not be evident for at least one to two years after the event through regular LDWF monitoring data which tracks relative abundances of key species. Estimates of the total number of fish killed during this freeze event may not become available with any high degree of confidence given the widespread and sporadic nature of observed fish kills and associated mortality. Anglers should expect that fishing for common and popular inshore saltwater species will be below average based upon the 2025 WSI. If impacts were greater than could be documented by LDWF, catch of popular species could be well below average. Anglers should also expect to see an increase in fish with sores and lesions as we move into spring since fish that survived will have been stressed during the freeze and will be more susceptible to diseases and infections.

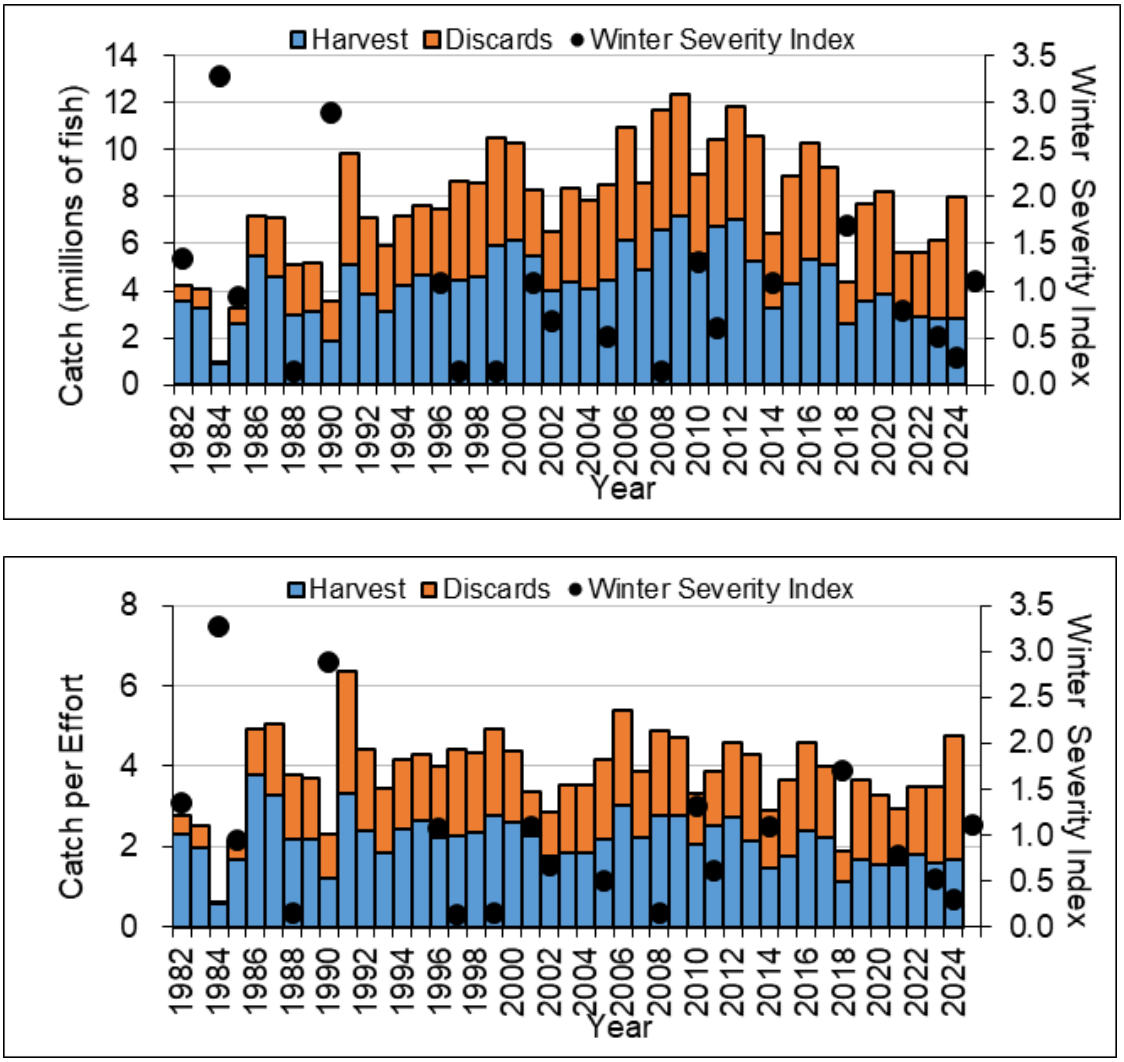
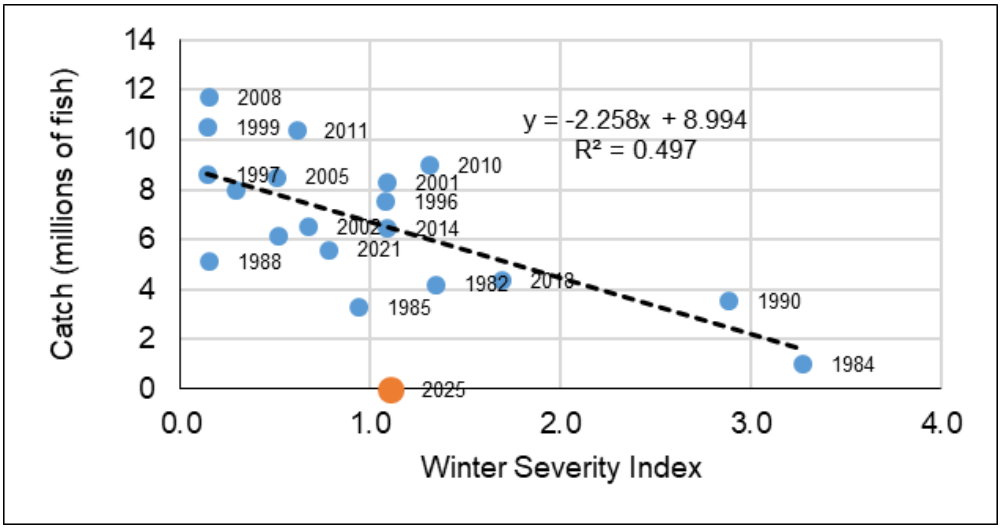


Figure 1. Louisiana recreational Spotted Seatrout total catch (harvest and discards) and Winter Severity Index from 1982-2025 (upper figure) and Louisiana recreational Spotted Seatrout catch per effort and winter severity index from 1982-2025 (lower figure).



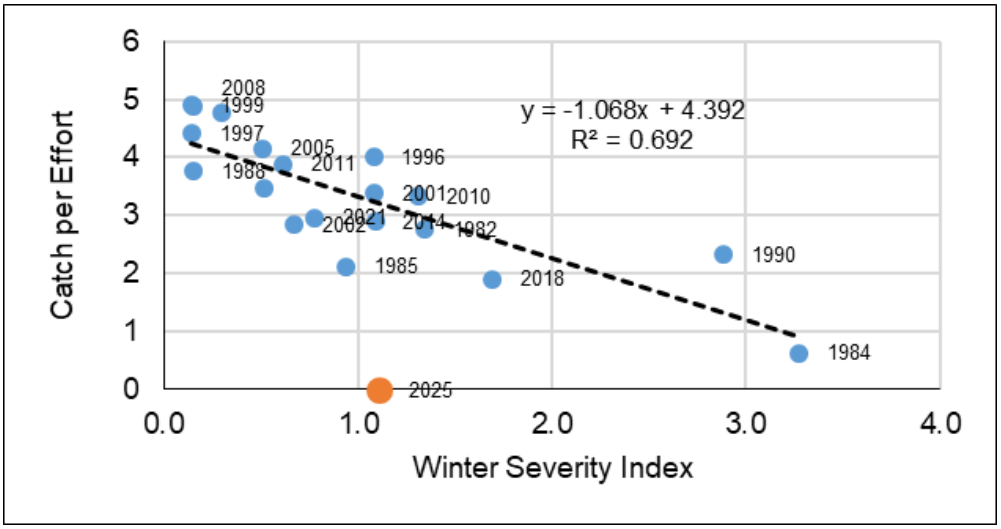


Figure 2. Relationship between total recreational catch of Spotted Seatrout and Winter Severity Index values in the years with Winter Severity Index values >0 (upper figure) and relationship between angler catch per effort and Winter Severity Index values in the years with Winter Severity Index values >0 (lower figure). The linear regression of total catch of Spotted Seatrout on Winter Severity Index values explains approximately 50% of the annual variability in total Spotted Seatrout catch and approximately 69% of the variability in angler catch per effort. 2025 catch and angler catch per effort data are not yet available and only winter severity is plotted.

Table 1: Annual Winter Severity Index values (1982-2025) derived as the product of the number of days with water temperatures <= 7° Celsius (44° Fahrenheit) in each winter and the inverse of the mean water temperature during that period.

year	#days<=7C	Wtemp_mean	WS_Index
1982	8	5.95	1.34
1983	0	--	0
1984	15	4.58	3.27
1985	4	4.25	0.94
1986	0	--	0
1987	0	--	0
1988	1	6.65	0.15
1989	0	--	0
1990	9	3.12	2.89
1991	0	--	0
1992	0	--	0
1993	0	--	0
1994	0	--	0
1995	0	--	0
1996	6	5.55	1.08
1997	1	7.00	0.14
1998	0	--	0
1999	1	6.82	0.15
2000	0	--	0
2001	6	5.51	1.09
2002	4	5.93	0.67
2003	0	--	0
2004	0	--	0
2005	3	5.90	0.51
2006	0	--	0
2007	0	--	0
2008	1	6.58	0.15
2009	0	--	0
2010	6	4.58	1.31
2011	4	6.52	0.61
2012	0	--	0
2013	0	--	0
2014	6	5.51	1.09
2015	0	--	0
2016	0	--	0
2017	0	--	0
2018	9	5.31	1.70
2019	0	--	0
2020	0	--	0
2021	5	6.41	0.78
2022	0	--	0
2023	3	5.77	0.52
2024	2	6.77	0.30
2025	5	4.52	1.10