

# North Carolina Department of Environmental Quality

Pat McCrory  
Governor

Donald R. van der Vaart  
Secretary

January 7, 2016

## MEMORANDUM

TO: ENVIRONMENTAL REVIEW COMMISSION  
The Honorable Jimmy Dixon, Co-Chair  
The Honorable Chuck McGrady, Co-Chair  
The Honorable Trudy Wade, Co-Chair

FROM: Matthew T. Dockham, Director of Legislative Affairs

SUBJECT: 2015 Fishkill Annual Report

DATE: January 7, 2016

Attached for your information is the Department of Environmental Quality report on fish kills. This report is provided to you pursuant to G.S. 143B-279.7 (c) which requires the Department to report annually all fish kill activity within the last year, an overview of any trend analyses, a discussion of any new or modified methodologies or reporting protocols, and any other relevant information. The attached study report is submitted to fulfill this requirement.

If you have any questions or need additional information, please contact me by phone at 919.707.8618 or via e-mail at [matthew.dockham@ncdenr.gov](mailto:matthew.dockham@ncdenr.gov).

cc: Tom Reeder, Assistant Secretary for Environment, NCDEQ  
Jay Zimmerman, Director of Water Resources, NCDEQ

# North Carolina Division of Water Resources Annual Report of Fish Kill Events 2015



*Atlantic menhaden kill, Currituck and Dare Co., March, 2015.*

North Carolina Department of Environmental Quality  
Division of Water Resources  
Raleigh, NC

October 2015

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## 2015 Fish Kill Overview

As of October, investigators have reported 12 fish kill events statewide for the 2015 season (Figure 1). Kill activity was documented during the year in eight of the state's 17 major river basins and in nine counties.

Fish kills reported from inland waters were generally small in nature and widely scattered across North Carolina. Most inland kill activity resulted from chemical releases or low dissolved oxygen levels. With the exception of one larger event in McDowell County, all inland fish kills involved 1,500 fish or fewer.

DWR received only two coastal fish kill reports during 2015- both of which involved approximately 1,200 fish. The reduced coastal reporting was unusual considering that environmental conditions and storm effects that have historically produced kills were also present during the year.

According to DWR reports, the total statewide fish mortality for the year was just over 21,600. DWR records fish kill events when at least 25 fish are affected and the event is confirmed by trained investigators from regional offices and cooperating agencies.

Fish kill information for the current year is posted weekly from June to November on the DWR fish kill website: <http://portal.ncdenr.org/web/wq/ess/fishkillsmain>. This report will also be available on the DWR website after approval.

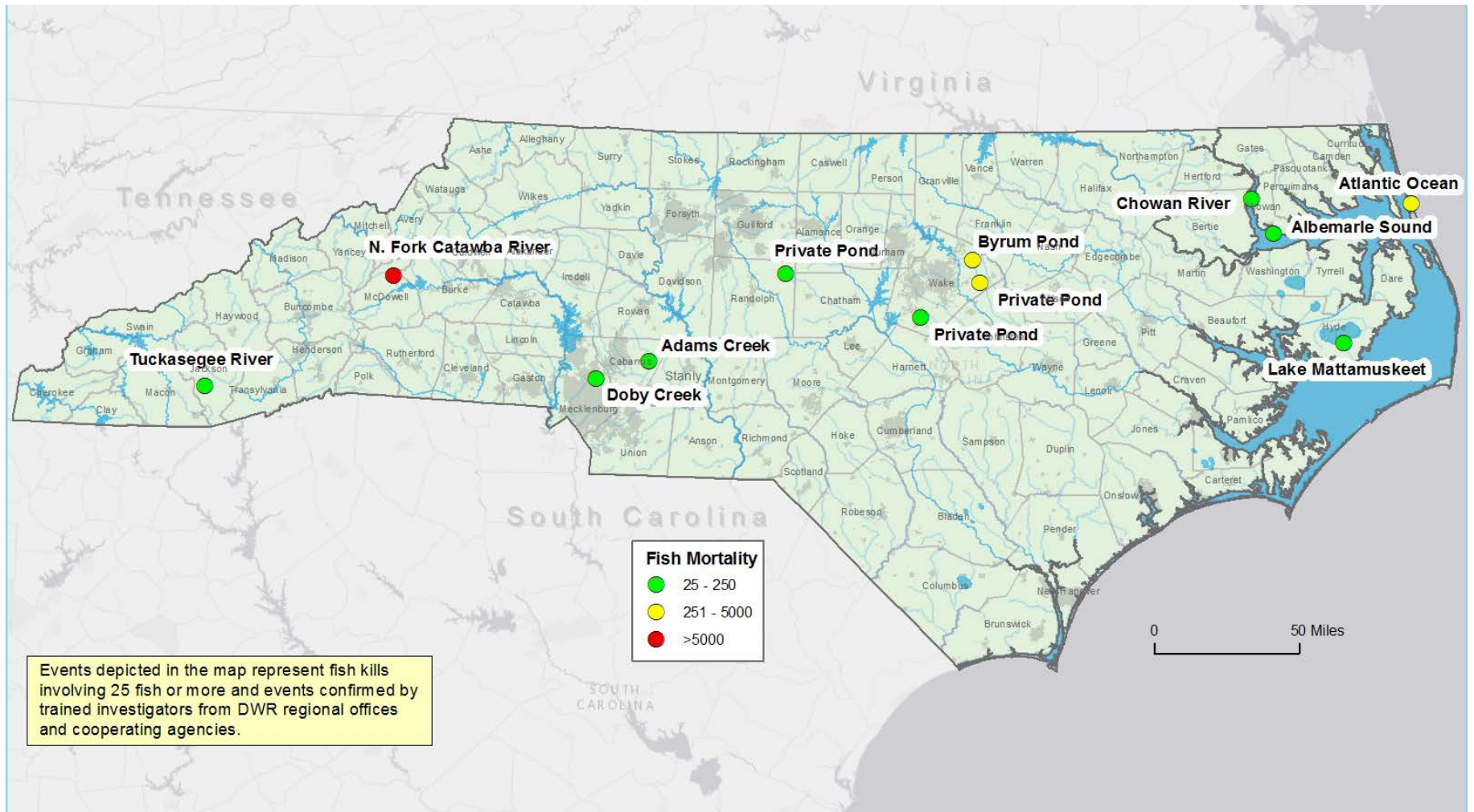
• <b>Total Reported Events for 2015</b>	<b>12</b>
• <b>Freshwater Fish Kills</b>	<b>10</b>
• <b>Estuarine Fish Kills</b>	<b>1</b>
• <b>Ocean Kills</b>	<b>1</b>
• <b>Reported Fish Mortality for 2015</b>	<b>21,615</b>
▪ <i>Ocean/Estuarine Mortality</i>	<i>1200</i>
▪ <i>Freshwater Mortality</i>	<i>20,415</i>
• <b>River Basins with Kill Activity</b>	<b>8 (of 17)</b>
• <b>Counties with Kill Activity</b>	<b>9</b>

## **Introduction**

The reporting of fish kill activity across North Carolina is based on protocols established by the North Carolina Division of Water Resources (DWR, formerly Division of Water Quality) in 1996. The protocols were developed with assistance from DWR Regional Office staff, North Carolina Wildlife Resources Commission biologists, and Division of Marine Fisheries personnel as a means to improve the tracking and reporting of fish kill events throughout the state. Fish kill and fish health investigation data are recorded on a standardized form and sent to the DWR's Water Sciences Section (WSS) where the data are compiled and reviewed. Fish kill investigation forms, laboratory test results, and supplemental information regarding fish kill events are sent to the WSS and entered into a central database where the information is managed and reported. The procedure also requires the notification of appropriate state officials and scientists associated with the investigation of such events. The protocols have proven successful in standardizing reporting methods and enhancing the quality and quantity of information reported from fish kill events.

This document is a summary of fish kill events reported to the DWR from January to October, 2015. The report is mandated under NC General Statutes §143B-279.7 (c).

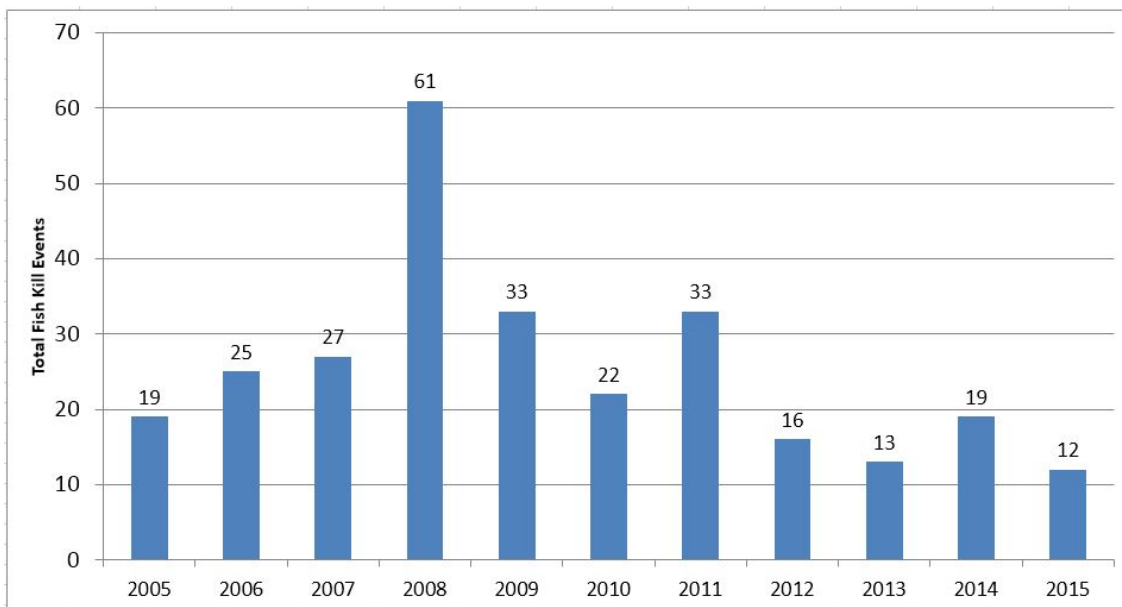
**Figure 1 : Fish kill events and observed mortality reported to NCDWR during 2015**



## Reports by Basin

Investigators reported fish kill events in eight of the state's major river basins during the 2015 season (Figure 1). Reports of kill activity in coastal waters were nearly absent with only one report each for estuarine and ocean waters. Reports received from inland river basins were also sporadic with locations scattered widely across the state. Reported events for all basins in 2015 totaled 12 - the lowest number recorded during the last ten years as well as during the period since investigation protocols were established in 1996 (Figure 2, Appendix 2).

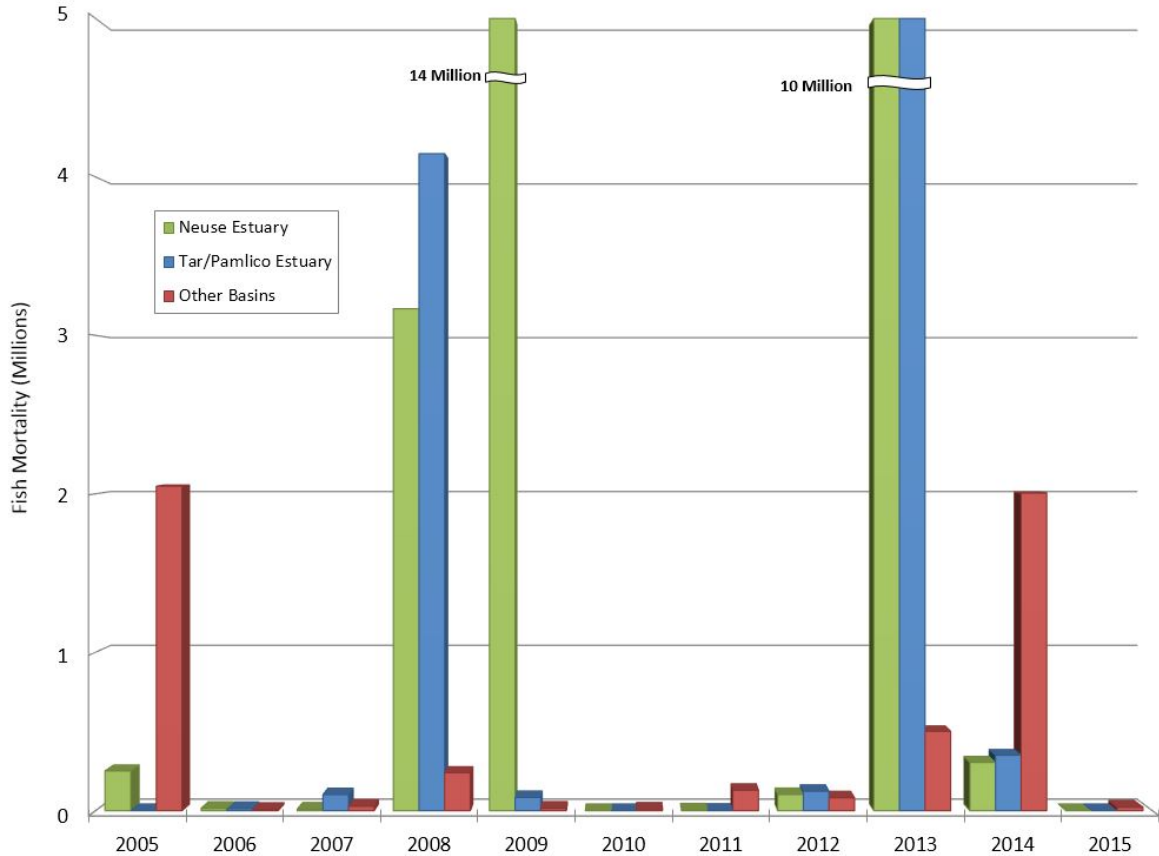
**Figure 2: Reported annual fish kill events, 2005 to 2015**



## 2015 Fish Mortality

The 2015 season produced a reported mortality total of just over 21,600 fish. As with the number of events reported for the year, the mortality total represents one of the lowest figures received since reporting was initiated in 1996. Individual events were generally considered small, involving 1500 fish or less. Only one relatively large event was recorded during the year, resulting from an industrial spill in western North Carolina (McDowell Co.) and involving over 17,000 fish. Large kills of Atlantic menhaden in the Neuse and Pamlico estuaries that have historically produced the majority of annual mortality were not observed by investigators during 2015.

**Figure 3: Reported annual mortality for fish kill events, 2005 to 2015**



**Finfish Species Reported**

Fish kill events in 2015 involved at least 24 freshwater and estuarine finfish species (Table 1). Freshwater species most frequently observed included sunfishes and largemouth bass. Menhaden have historically been the principal species in coastal North Carolina fish kills and often comprised the majority of the annual finfish mortality. Surprisingly, menhaden were reported in only two relatively small kill events during 2015.

**Other (Non-Finfish) Species**

Investigators reported some blue crab mortality during events in Albemarle Sound and Lake Mattamuskeet. Frogs, salamanders, and crayfish were also reportedly killed during spill induced events in Mecklenburg and McDowell counties. Reports for these events showed minimal numbers (<50) of these non-fish species affected.



During May of 2015 investigators reported a large die-off of rangia clams (*Rangia cuneate*) along a nine mile stretch of the Chowan River, south of Colerain. The event involved individuals estimated in the tens of millions (estimate not included in totals for this report). Water quality measurements taken at the time of the investigation were all within normal range and chemical analyses on clam tissue samples revealed no significant levels of contaminants or pesticides. A specific cause for the event has not been determined.

**Table 1: Finfish species involved in 2015 fish kill events in order of report frequency**

Species
SUNFISH
LARGEMOUTH BASS
CATFISH
BLACK CRAPPIE
ATLANTIC MENHADEN
DARTERS
MINNOWS
BLUEBACK HERRING
BROWN TROUT
CREEK CHUB
DACE
FLAT BULLHEAD
AMERICAN EEL
LONGNOSE GAR
WHITE SUCKER
NORTHERN HOG SUCKER
RAINBOW TROUT
REDHORSE SUCKER
SHINERS
SMALLMOUTH BASS
STONEROLLER
STRIPED BASS
WHITE PERCH
GRASS CARP

## **Harmful Algal Blooms Associated With Fish Kills**

Algal samples were collected by investigators in conjunction with a number of fish kill events during 2015. Some forms of algae in North Carolina waters have the potential to produce toxins capable of harming aquatic life. Results indicated all algal species identified by DWR staff were typical for local estuaries and freshwaters during the summer season. No reported fish kill events were attributed to algal toxins in North Carolina during 2015.

## 2015 Summary

### *Freshwaters:*

Kill activity reported from inland North Carolina waterbodies was light and generally small in scale during the 2015 season. Inland events were widely scattered and most often triggered by chemical spills or low dissolved oxygen levels. An exception to the trend was a fairly significant event on the North Fork Catawba River (McDowell Co.) resulting from the spill of a caustic substance. The event killed multiple fish species totaling over 17,000 (See Appendix 1).

### *Coastal Events:*

Reports of kill events from coastal waterbodies were nearly absent during 2015. Coastal trouble spots such as the lower Neuse, as well as the lower Pamlico estuary, have historically experienced adverse environmental conditions for fish populations such as low dissolved oxygen, high water temperatures, and fluctuating salinities. Consequently, these areas often produce some of the more severe kills events reported annually (See Appendix 3). Observations by DWR investigators suggest that such adverse conditions were present in these areas during the 2015 season. These included hot temperatures, obvious water stratification, and low dissolved oxygen levels in coastal swamps, wetlands and backwaters. Surprisingly, these conditions seemed to produce little or no reported fish kill activity. One significant event was reported near Aurora (Beaufort Co.) in the wake of hurricane Joaquin, but could not be confirmed by DWR staff.

Field reports and fish mortality figures provided to DWR during 2015 describe one of the least active fish kill seasons since formal reporting was initiated in 1996.

More information regarding DWR fish kill reporting as well as updates for events occurring during the remainder of the year can be found at the DWR website:

<http://portal.ncdenr.org/web/wq/ess/fishkillsmain>

Appendix 1: 2015 Fish Kill  
Summaries Listed by County

**Total 2015 Fish Kills: 12**

**Total 2015 Fish Mortality: 21,615**

### 2015 Fish Kill Events (by County)

Date	Kill Number	Waterbody	Location	Mortality	Comments
<b>Cabarrus</b>					
8/16/2015	MO15002	Adams Creek	Mt. Pleasant	100	Truck wrecked in creek on 8/14/15 , spilling motor oil, diesel fuel, hydraulic fluids and antifreeze from radiator. Due to low stream flow conditions fish downstream died off by Sunday 8/16/15. Town staff from Mt. Pleasant checked for any sewer line issues in this area to make sure there were no other impacts. No other impacts were identified.
<b>Total Kills for County: 1      Total Mortality for County: 100</b>					
<b>Chowan</b>					
7/17/2015	WA15003	Chowan River	near Colerain	200	At 14:11 hours on Friday 17 July, 2015 DMF received a report of a fish kill in the area between Nixon's Beach and the old dye factory, Chowan River, Chowan County side. No other information was provided except that there were largemouth bass, striped bass, catfish, and bream washed up on the beach between Nixon's Fishery and the dye factory. Blue green algae also observed in the water at the time of the kill.
7/21/2015	WA15002	Albemarle Sound	near Edenton	200	Low Dissolved Oxygen observed at time of investigation. Water in boat basin showed very little mixing. Prior weather was hot with little rain.
<b>Total Kills for County: 2      Total Mortality for County: 400</b>					
<b>Dare</b>					
3/18/2015	WA15005	Atlantic Ocean	Near Duck NC	1,000	Reports of dead menhaden on beach near the Duck Research pier. Hundreds to a thousand menhaden had washed up in the preceding high tide. A Marine Patrol officer investigated and confirmed menhaden washed up on the beach from the Currituck line south to the Avalon fishing pier. Seismic-type activity felt in the area prior to event. No commercial fishing operations observed in area.
<b>Total Kills for County: 1      Total Mortality for County: 1,000</b>					
<b>Hyde</b>					
10/15/2015	WA15004	Lake Matamuskeet	Central Canals	100	Main Canal at Lake Mattamuskeet,exhibited low oxygen concentrations, no struggling fish were observed during investigation and dead fish were a few days old. Dead fish in Central Canal were also a few days old but dissolved oxygen near the lake was 6.4 mg/L. Probable that most fish were able to make it to the lake to seek refuge but some that were far in the canals did not escape low dissolved oxygen. There were observations on the sound side of the water control structure at Main Canal that fish and crabs were gasping at the surface (not observed by NCWRC staff).
<b>Total Kills for County: 1      Total Mortality for County: 100</b>					

## 2015 Fish Kill Events (by County)

Date	Kill Number	Waterbody	Location	Mortality	Comments
<b>Jackson</b>					
5/30/2015	AS15001	Tuckasegee River	near Lake Glenville	200	Blueback Herring are an introduced species commonly found in the lake. On May 11, from 10 AM - 4 PM, there was a recreation release of water from the Lake Glenville dam into the West Fork Tuckasegee River. NCWRC investigators were confident that the Blueback Herring were caught up in the release, which cascades over several large waterfalls directly downstream of the dam. ARO investigators estimated on Saturday May 30, 2015 greater than 200 dead fish at the base of Cullowhee falls but additional dead fish could be seen upstream and downstream of the falls. They estimated that the fish kill extended more than 1 mile from the Lake Glenville Dam and down the West Fork Tuckasegee River. Many of the dead fish were caught in flood debris that was between 3 -5 feet above the current water level, which is consistent with the recreational water release. All of the fish were in a advanced state of decay.
			<b>Total Kills for County: 1      Total Mortality for County: 200</b>		
<b>McDowell</b>					
7/2/2015	AS15002	N. Fork Catawba River	Near Marion NC	17,300	<p>Commission staff was notified of the kill on the evening of July 1 and conducted a formal enumeration on July 2. The kill incorporated approximately 3.9 miles of the river. Staff visually identified and counted dead fish from three 100-meter segments within the fish kill reach.</p> <p>An estimated 17,275 fish were killed within the affected reach of the North Fork Catawba River from the confluence of Limekiln Creek and the North Fork Catawba River downstream to Cannon Road . Species included Central Stoneroller, Warpaint Shiner, Whitetail Shiner, Bluehead Chub, Sandbar Shiner, Eastern Silvery Minnow, Roseyside Dace, Redbreast Sunfish, Bluegill, Smallmouth Bass, Rainbow Trout, Brown Trout, White Sucker, Notchlip Redhorse, Striped Jumprock , Northern Hogsucker, Flat Bullhead , Tesselated Darter, and Fantail Darter.</p> <p>Responsible party was identified as Coats American, Sevier Facility. On the evening the fish kill was initially reported, investigators detected elevated pH levels (11+) and very low DO in an impoundment created by a beaver dam in the unnamed tributary (UT) to Limekiln Creek at a location adjacent to the Coats American WWTP. Subsequent investigation of the Coats American facility showed that plant staff were not aware of all stormwater drains around the facility draining to the UT. Floor drains in water filtration area (where caustic chemicals are used) which plant staff thought were connected to the WWTP were actually connected to the storm sewer (and eventually drained to the UT).</p>
			<b>Total Kills for County: 1      Total Mortality for County: 17,300</b>		
<b>Mecklenburg</b>					
7/23/2015	MO15001	Trib to Doby Creek	Charlotte	115	Kill event resulted from a spill of chlorinated water from new water line installation. Some fish displayed lesions and sores.
			<b>Total Kills for County: 1      Total Mortality for County: 115</b>		

## 2015 Fish Kill Events (by County)

Date	Kill Number	Waterbody	Location	Mortality	Comments
<b>Randolph</b>					
6/8/2015	WS15001	Private Pond	near Staley	200	Rainy and cool the previous week. Cows in pond at time of investigation.

Total Kills for County: 1 Total Mortality for County: 200

<b>Wake</b>					
5/23/2015	RA15001	Private Pond	Fuquay Varina	200	Investigators noticed numerous dead crappie, sunfish, grass carp and bass. Black vultures were actively feeding on dead fish so unable to get a good count. Dead fish were also observed being drug away on the shore line. Young of year fish were seen jumping out of the water and gasping. Follow up investigation performed on Tuesday. Again, multiple vultures seen feeding on dead fish. YOY seen struggling. Investigator was stopped by a home owner who told her that they had been having trouble with aquatic vegetation and about a week ago contacted Foster lake and pond management about the 'duck weed' issue they were having. The homeowner was advised to wait for the 'duck weed' to be blown to one side of the pond and to apply herbicide and place grass carp into the pond. The homeowner did this about a week ago. Fish kill was reported on Saturday 5/23 but evidence of fish starting to decay was noted. Phytoplankton samples were collected along with physical conditions as part of the investigation. Results of Analysis: Physical conditions at the time the sample was collected found very little oxygen in the pond. Analysis of the phytoplankton found very little algae (< 100 units/ml) and could not be fully completed due to the high concentration of decaying Wolffia, commonly called watermeal.
6/12/2015	RA15002	Private Pond	Wendell	1,500	Kill event caused by runoff from parking lot asphalt sealant. Asphalt was sealed during a rain event that discharged into the pond. Nearly all fish in pond were killed. NOV issued by RRO to parking lot owner and contractor.
8/11/2015	RA15003	Byrum Pond	Rolesville	500	Low dissolved oxygen appeared to be the cause of the kill, due to pond turnover, which occurred during and after a storm event on 8/7/2015. At the time of investigation, the condition of the pond seemed back to normal. No signs of spills upstream of the pond were observed.

Total Kills for County: 3 Total Mortality for County: 2,200

## Appendix 2 : Reported Fish Kill Events Summarized By Basin

Year	Broad	Cape Fear	Catawba	Chowan	French Broad	Neuse	L. Tenn	Lumber	Pasquotank	Roanoke	Tar/Pam	New/Watauga	White Oak	Yadkin	Annual Totals
1996	None	21	None	2	None	14	None	4	10	2	3	None	3	1	<b>60</b>
1997	None	16	3	2	2	12	None	3	2	None	6	None	3	10	<b>59</b>
1998	None	23	1	1	3	8	None	5	8	1	5	None	1	2	<b>58</b>
1999	1	14	3	1	1	16	None	None	2	None	11	1	3	1	<b>54</b>
2000	None	12	2	None	None	23	None	2	None	None	14	None	3	2	<b>58</b>
2001	None	5	4	1	None	37	None	None	1	None	23	None	3	3	<b>77</b>
2002	None	8	1	2	1	9	None	None	6	None	8	None	3	8	<b>46</b>
2003	None	3	None	2	1	21	None	2	2	2	6	2	None	2	<b>43</b>
2004	None	1	None	1	None	8	None	1	None	1	2	None	None	3	<b>17</b>
2005	None	2	None	1	None	9	None	1	2	1	1	None	1	1	<b>19</b>
2006	1	5	2	None	None	10	None	2	None	2	2	None	None	1	<b>25</b>
2007	1	1	2	1	3	10	None	None	1	1	5	None	None	2	<b>27</b>
2008	None	10	2	2	2	21	None	None	4	None	16	None	None	4	<b>61</b>
2009	None	3	None	2	None	15	None	None	None	None	11	None	None	2	<b>33</b>
2010	None	7	5	1	1	2	None	None	1	None	1	2	1	1	<b>22</b>
2011	None	5	5	2	None	8	None	1	3	2	4	None	None	3	<b>33</b>
2012	None	2	3	None	None	2	None	None	None	None	7	None	1	1	<b>16</b>
2013	None	2	1	None	1	4	None	1	None	1	2	None	None	1	<b>13</b>
2014	None	None	7	None	None	4	None	1	None	None	2	None	1	3	<b>18</b>
2015	None	1	1	1	None	3	1	None	2	None	1	None	None	2	<b>12</b>
<b>Total</b>	<b>3</b>	<b>141</b>	<b>42</b>	<b>22</b>	<b>15</b>	<b>236</b>	<b>1</b>	<b>23</b>	<b>44</b>	<b>13</b>	<b>130</b>	<b>5</b>	<b>23</b>	<b>53</b>	<b>751</b>

*\*No fish kill reports have been received from the Hiwassee, and Savannah basins since 1996.*



### Appendix 3 : Fish Kill Event Density in North Carolina – 1996 to 2015

