

# LAKE & RESERVOIR ASSESSMENTS TAR-PAMLICO RIVER BASIN



Tar River Reservoir-May 2007

Intensive Survey Unit  
Environmental Sciences Section  
Division of Water Quality  
March 3, 2008

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## **Overview**

The Tar-Pamlico River basin encompasses a 5,440 mi<sup>2</sup> watershed drained by 2,355 miles of streams, and with 634,400 acres classified as salt waters. It is the fourth largest river basin in the state and is contained entirely within the state. From its headwaters within the eastern piedmont ecoregion, the Tar River flows 180 miles southeast towards the coastal plain ecoregion and Pamlico Sound. The river is called the Tar River from its source in Person County to US 17 in the Town of Washington, a distance of about 140 miles. From Washington to Pamlico Sound it is called the Pamlico River. The Pamlico River is entirely estuarine, while the Tar River is primarily freshwater.

Most (about four-fifths) of the basin is located in the coastal plain and is characterized by flat terrain, blackwater streams, low-lying swamplands, and estuarine areas. Streams are often slow flowing with extensive swamps and bottomland hardwood forests or marshes in their floodplains. The entire basin was designated as Nutrient Sensitive Waters (NSW) in 1989 in response to the problems associated with nutrient loading and the resulting eutrophication.

Two lakes, Lake Devin and Tar River Reservoir, were sampled in by DWQ staff in 2007. A significant drought, beginning in the spring of 2007, continued through the summer and fall months. Tar River Reservoir, the primary water supply source for the City of Rocky Mount, was reduced to historically low levels by August. Emergency actions taken by the City of Rocky Mount included augmenting the reservoir's water with water from a nearby quarry lake, enacting mandatory water use restrictions, and buying water from the City of Wilson.

Following the description of the assessment methodology used for the Tar-Pamlico River Basin, there are individual summaries for each of the lakes and a two-paged matrix that distills the information used to make the lakes use support assessments. For additional information on a particular lake (including sampling data), please go to <http://www.esb.enr.state.nc.us/>.

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## **Assessment Methodology**

For this report, data from January 1, 2003 through September 30, 2007 were reviewed. All lakes were sampled only during the summer of 2007 in May through September. Data were assessed for excursions of the state's class C water quality standards for chlorophyll-a, pH, dissolved oxygen, water temperature, turbidity, and chloride. Other parameters discussed in this report include Secchi depth and percent dissolved oxygen saturation. Secchi depth provides a measure of water clarity and is used in calculating the trophic or nutrient enriched status of a lake. Percent dissolved oxygen saturation gives information on the amount of dissolved oxygen in the water column and may be increased by photosynthesis or depressed by oxygen-consuming decomposition.

On lakes without obvious segmentation or differences in hydrology and morphology between stations, all samples taken on a particular sampling date regardless of station are treated as replicates and the average concentration is used to determine if the standards are being met. Readings of pH are the only exception as it is inappropriate to average pH values. See the matrix at the end of this report for how the stations are grouped.

A water quality standard is exceeded (denoted by CE in matrix) if data values do not meet the state's water quality standard for more than 10% of the samples where the sample size consists of 10 or more observations for the basinwide assessment period. Ideally, ten observations are needed to provide sufficient data to reasonably interpret water quality conditions within the lake or reservoir. Fewer observations increase the possibility of misinterpreting random unusual conditions as representative of ongoing water quality trends. If the water quality standard is exceeded, either in less than 10% of the data collected during the assessment period or if the sample observation size is less than 10 for the

basinwide assessment period, then the water quality standard for that parameter is designated exceeded (E in the matrix).

Additional data considered as part of the use support assessment include historic DWQ water quality data, documented algal blooms and/or fish kills, problematic aquatic macrophytes, or listing on the EPA's 303(d) List of Impaired Waters.

Lakes receive an overall rating of Supporting or Impaired when 10 or more samples per water quality criteria are collected for evaluation within the basinwide assessment period. Otherwise, the lake is considered as Not Rated. The exception is for a lake listed on the 303(d) List of Impaired Waters or where additional data indicates water quality problems not captured during sampling. These lakes are listed as Impaired along with the reason for the impairment.

For a more complete discussion of lake ecology and assessment, please go to <http://www.esb.enr.state.nc.us/>. The 1990 North Carolina Lake Assessment Report (downloadable from this website) contains a detailed chapter on ecological concepts that clarifies how the parameters discussed in this review relate to water quality and reservoir health.

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## ***Assessment by Subbasin***

### **Subbasin 030301**



**Lake Devin**

Lake Devin is a small lake located in the City of Oxford. Primarily used for public fishing, this lake originally served as the water supply source for the city. DWQ staff sampled Lake Devin from May through September, 2007.

Secchi depths were less than a meter at both of the lake sampling sites in 2007. Turbidity values, however, were not elevated. Water temperatures and dissolved oxygen in the lake were within state water quality standards despite ongoing drought conditions during the summer. Percent dissolved oxygen lake-wide was greater than 120% on June 11<sup>th</sup> and greater than 120% at the upstream lake sampling site (TAR001C) on July 16<sup>th</sup>. On June 11<sup>th</sup>, pH values at both lake sampling sites were greater than the state water quality standard of 9.0 s.u.

Elevated percent dissolved oxygen and pH measurements suggested increased algal productivity in Lake Devin. This was further supported by a lake-wide chlorophyll a value greater than the state water quality standard of 40 µg/L in June, July and August.

Total phosphorus, total organic nitrogen and total Kjeldahl nitrogen concentrations were elevated lake-wide during the May through September lake monitoring period. These nutrients were at levels sufficient to support excessive algal growth. Based on the calculated NCTSI scores, Lake Devin was determined to be eutrophic (exhibiting elevated biological productivity) in May and August, and hypereutrophic (exhibiting excessive biological productivity) in June and July. This is the first time that NCTSI scores for this lake have indicated hypereutrophic conditions. The 2007 drought may have contributed to increased concentration of nutrients within the lake as the water level decreased through the summer. Lake water circulation and flushing from storm events were significantly reduced in 2007. These processes normally reduce the build up of algae and subsequent elevated chlorophyll a concentrations. Further monitoring during more normal rainfall years is needed to determine if a change in trophic status is occurring.

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## Subbasin 030302



**Tar River Reservoir**

Tar River Reservoir is the primary water supply source for the City of Rocky Mount. Located on the confluence of the Tar River and Sapony Creek, the reservoir is open to the public for boating and fishing. In 2007, a major, state-wide drought that began in the spring had a significant impact on the water level of Tar River Reservoir. By late August, the water supply pool was down to 25%.

DWQ staff planned to monitor this reservoir twice a month from May through September, 2007, but due to the greatly diminished lake level, monitoring was stopped near the end of August. Secchi depths ranged from 0.4 meter in the Tar River arm of the reservoir (TAR015E) to 1.0 meter. Turbidity values were not greater than the state water quality standard of 25 NTU for a water supply lake in May through August, despite the dropping water level.

Dissolved oxygen values were greater than the state water quality standard of 4.0 mg/L for an instantaneous reading. Water temperatures were not greater than the state water quality standard of 32°C with the exception of readings recorded on August 7<sup>th</sup>. At the two sampling sites in the Tar River arm (TAR015E and TAR015G) surface water temperatures were 32.8 °C and 33.0 °C, respectively. Surface

water temperature at the sampling site near the dam (TAR017F) was 32.8 °C. Exceptionally hot air temperatures, usually greater than 100 °F, bright sunlight and the shallow water of the reservoir may have contributed to the elevated water temperatures. Field staff did not observe fish in distress due to these temperatures.

Percent oxygen concentrations were less than 120% in 2007 with the exception of values observed near the dam on August 7<sup>th</sup> (130.5%) and at the lower end of the Tar River arm (132.3%). The mean chlorophyll a value (43 ug/L) in the Tar River arm was greater than the state water quality standard of 40 ug/L on July 10<sup>th</sup>. Chlorophyll a values were greater than the state water quality standard in the Sapony Creek arm on July 10<sup>th</sup> (43 ug/L) and on August 7<sup>th</sup> (60.0 ug/L). Despite the elevated chlorophyll a value on August 7<sup>th</sup>, pH and percent dissolved oxygen values were not elevated.

Total phosphorus concentrations were elevated in Tar River Reservoir from May through August. Total organic nitrogen and total Kjeldahl nitrogen concentrations increased from May to August, with the greatest lake-wide concentrations for these nutrients occurring from June through August. Overall, nutrient concentrations in Tar River Reservoir were at levels capable of sustaining nuisance algal blooms. Based on the calculated NCTSI scores for 2007, Tar River Reservoir was determined to be eutrophic (exhibiting elevated biological productivity). This reservoir has been eutrophic since 1989 when it was first monitored by DWQ.

A hydrologic drought appeared in the piedmont region of the state in the spring of 2007 and continued through the end of the year. As water levels in Tar River Reservoir dropped, release levels from the dam were decreased to meet the 60 cfs target river flow in the Tar River. The determination of release amounts from the dam were made based on USGS gage readings on the Tar River at Rocky Mount. In mid August, it was discovered that the readings of this gage were incorrect, resulting in far more than 60 cfs being released from the dam. By the third week of August, the water level in Tar River Reservoir was at 115 feet msl, leaving the remaining water storage at 25%. Mandatory Stage 1 water conservation was implemented by the City and water demand dropped from 13 MGD to 11.25 MGD.



**Tar River Reservoir, August 2007**

As conditions continued to worsen, the City of Rocky Mount requested a decrease in water released from Tar River Reservoir to 40 cfs. In a meeting with the Division of Water Resources, the Division of Water Quality and the NC Wildlife Resources Commission on August 23<sup>rd</sup>, an agreement was reached to permit the City to reduce water release from the dam to 50 cfs. This 10 cfs decrease would buy the City an additional week of water supply use for the reservoir.

On September 17, 2007, a fish kill was reported in the Sapony Creek arm of the Tar River Reservoir. Approximately 500 fish (catfish, sunfish, largemouth bass, carp and crappie) were dead. The drop in the water level of the reservoir due to the drought, elevated water temperatures, and an algal bloom combined to produce hypoxic conditions that contributed to the fish kill (<http://h2o.enr.state.nc.us/esb/Fishkill/2007Pages/RA07002.pdf>).

## APPENDIX A

### TAR-PAMLICO RIVER BASIN AMBIENT LAKES USE SUPPORT MATRIX FOR 10/1/2003 - 9/31/2007

Subbasin		030301		030302	
Lakes Ambient Program Name		LAKE DEVIN		TAR RIVER RESERVOIR	
Trophic Status (NC TSI)		Eutrophic		Eutrophic	
Mean Depth (meters)		5.0		6.0	
Volume (10 <sup>6</sup> m <sup>3</sup> )		1.6		16.0	
Watershed Area (mi <sup>2</sup> )		1.2		775	
Assessment Unit Name (Gray = changes to AU description)		Hatchers Run from source to dam at Lake Devin	From Nash County SR1933 to a point 4,000 feet upstream from dam at City of Rocky Mount Reservoir	Sapony Creek from mouth of Gabe Branch to City of Rocky Mount Reservoir, Tar River	From a point 4,000 feet upstream from dam at City of Rocky Mount Reservoir to dam at City of Rocky Mount Reservoir
Classification		WS-II NSW CA	WS-IV B NSW CA	WS-IV NSW	WS-IV NSW CA
Assessment Unit		28-11-3-(1)	28-(36)	28-55-(5.5)	28-(63)
Stations in Assessment Unit		TAR001C, TAR001E	TAR015E, TAR015G	TAR017C	TAR017F
Number of Sampling Trips		5	7	7	7
<b>Water Quality Standards</b>					
Chlorophyll a	>40 ug/L	E ( 60% )	E ( 14% )	E (29%)	NCE
Dissolved Oxygen	<4.0 mg/L	NCE	NCE	MCE	NCE
pH	<6 s.u. or > 9 s.u.	E (20%)	NCE	NCE	NCE
Turbidity	>25 NTU	E (20%)	NCE	NCE	NCE
Temperature	>32°C Lower Piedmont & Coastal Plain	NCE	E (14%)	E (14%)	E (14%)
Metals (excluding copper, iron & zinc)	15A NCAC 2B .0211	ND	ND	ND	ND
<b>Other Data</b>					
% Saturation DO	>120%	Y (20%)	N	N	Y (14%)
Algae	Documented blooms during 2 or more sampling events in 1 year with historic blooms	N	N	N	N
Fish	Kills related to eutrophication	N	N	N	N
Chemically/Biologically Treated	For algal or macrophyte control - either chemicals or biologically by fish, etc.	N	N	N	N
Aesthetics complaints	Documented sheens, discoloration, etc. - written complaint and follow-up by a state	N	N	N	N
TSI	Increase of 2 trophic levels from one 5-yr period to next	N	N	N	N
Historic DWQ Data	Conclusions from other reports	N	N	N	N
303(d)	Listed on 303(d) [year listed]	N	N	N	N
AGPT	Algal Growth Potential Test 5-9 mg/L = concern 10 mg/L or more = problematic	NR	NR	NR	NR
Macrophytes	Limiting access to public ramps, docks, swimming areas; reducing access by fish and other aquatic life to habitat	N	N	N	N
Taste and Odor	Public complaints or taste and odor causing algal species are dominant	N	N	N	N
Sediments	Clogging intakes - dredging program necessary; Frequent public/agency complaints - visual observation	N	N	N	N
<b>Rating:</b>		<b>NR</b>	<b>NR</b>	<b>NR</b>	<b>NR</b>

**RATING KEY:**

S = Supporting  
 I = Impaired  
 NR = Not Rated      Not rated is used where there are <10 samples and Other Data indicate potential problems

**KEY:**

E = Criteria is exceeded in less than 10% of the measurements  
 CE = Criteria Exceeded - parameter is problematic, highly productive or exceeds the standard in >10% of samples  
 NCE = No Criteria Exceeded  
 - = Standard not applicable based on Classification  
 ND = No Data - sample not taken for this parameter  
 Y = In Other Data portion, indicates that the parameter has exceeded target or has occurred  
 N = In Other Data portion, indicates that the parameter is within target or has not occurred per available information

APPENDIX B

TAR-PAMLICO LAKES 2007 USE SUPPORT DATA

Region	Water Temp C	pH s.u.	Percent SAT	Chla (70953) µg/L	TSS mg/L	Turbidity NTU	Hg µg/L	Zn µg/L	Pb µg/L	Ni µg/L	Cu µg/L	Cr µg/L	Cd µg/L	As µg/L	Mn µg/L	Fe µg/L	Chloride mg/L	Total Hardness Calculated mg/L
PIEDMONT/COASTAL PLAIN	32	<6*	120%	40	-	25	0.012	50	25	88	7	50	2	50	-	1000	-	-
C & B Criteria	<4.0*									25					200		250	100
WS II - WS V Criteria if different than C&B					500													

\* If not part of natural conditions (i.e., swamps)

SURFACE PHYSICAL DATA													SURFACE METALS													
Region	STORET	Lake Name	AU	Date m/d/yr	Sampling Station	DO mg/L	Water Temp C	pH s.u.	Percent DO SAT	Chla µg/L	TSS mg/L	Turbidity NTU	Hg µg/L	Zn µg/L	Pb µg/L	Ni µg/L	Cu µg/L	Cr µg/L	Cd µg/L	As µg/L	Mn µg/L	Fe µg/L	Chloride mg/L	Total Hardness Calculated mg/L		
PIEDMONT	O0150000	LAKE DEVIN	28-11-3-(1)	06-May-07	TAR001C	7.7	18.9	6.9	82.9%	37	6.5	11.0														
PIEDMONT	O0152000	LAKE DEVIN	28-11-3-(1)	06-May-07	TAR001E	7.5	17.9	6.8	79.1%	28	5.5	9.3												5.1	20.9	
						7.6	18.4	6.9	81.0%	32.5	6.0	10.2												5.1	20.9	
PIEDMONT	O0150000	LAKE DEVIN	28-11-3-(1)	11-Jun-07	TAR001C	11.8	28.2	9.7	151.3%	100	12.0	27.0														
PIEDMONT	O0152000	LAKE DEVIN	28-11-3-(1)	11-Jun-07	TAR001E	11.3	27.8	9.7	143.9%	95	9.2	25.0												6.1	20.5	
						11.6	28.0	9.7	147.6%	97.5	10.6	26.0												6.1	20.5	
PIEDMONT	O0150000	LAKE DEVIN	28-11-3-(1)	16-Jul-07	TAR001C	9.3	29.0	8.7	121.0%	69	9.8	12.0														
PIEDMONT	O0152000	LAKE DEVIN	28-11-3-(1)	16-Jul-07	TAR001E	8.6	28.5	8.6	110.9%	42	6.5	8.4												5.2	19.5	
						9.0	28.8	8.7	116.0%	55.5	8.2	10.2												5.2	19.5	
PIEDMONT	O0150000	LAKE DEVIN	28-11-3-(1)	13-Aug-07	TAR001C	5.8	29.5	7.1	76.1%	45	7.8	10.0														
PIEDMONT	O0152000	LAKE DEVIN	28-11-3-(1)	13-Aug-07	TAR001E	8.5	26.1	6.2	105.0%	38	3.1	7.0												5.2	20.8	
						7.2	27.8	6.7	90.6%	41.5	3.5	3.0												5.2	20.8	
PIEDMONT	O0150000	LAKE DEVIN	28-11-3-(1)	12-Sep-07	TAR001C	6.1	25.6	7.0	74.7%	40	12	11.0														
PIEDMONT	O0152000	LAKE DEVIN	28-11-3-(1)	12-Sep-07	TAR001E	6.7	24.5	7.3	80.4%	35	10.0	10.0												5.1	22.2	
						6.4	25.1	7.2	77.6%	37.5	11.0	10.5												5.1	22.2	
						N=	5	5	5	5	5	5												5	5	
Class = WS-II NSW CA						% EXCEED =	NCE	NCE	E (20%)	E (20%)	E (60%)	NCE	E (20%)													

SURFACE PHYSICAL DATA													SURFACE METALS													
Region	STORET	Lake Name	AU	Date m/d/yr	Sampling Station	DO mg/L	Water Temp C	pH s.u.	Percent DO SAT	Chla µg/L	TSS mg/L	Turbidity NTU	Hg µg/L	Zn µg/L	Pb µg/L	Ni µg/L	Cu µg/L	Cr µg/L	Cd µg/L	As µg/L	Mn µg/L	Fe µg/L	Chloride mg/L	Total Hardness Calculated mg/L		
PIEDMONT	O2150000	TAR RIVER RESERVOIR	28-(36)	1-May-07	TAR015E	7.3	23.2	7.0	85.5%	10	11.0	15.0														
PIEDMONT	O2170000	TAR RIVER RESERVOIR	28-(36)	1-May-07	TAR015G	9.6	23.5	7.7	113.0%	30	6.8	8.6														
						8.5	23.4	7.4	99.3%	20.0	8.9	11.8														
PIEDMONT	O2150000	TAR RIVER RESERVOIR	28-(36)	14-May-07	TAR015E	7.4	21.8	7.3	84.3%	16	9.5	15.0														
PIEDMONT	O2170000	TAR RIVER RESERVOIR	28-(36)	14-May-07	TAR015G	8.6	22.5	7.6	99.3%	24	5.5	7.2														
						8.0	22.2	7.5	91.8%	20.0	7.5	11.1														
PIEDMONT	O2150000	TAR RIVER RESERVOIR	28-(36)	5-Jun-07	TAR015E	5.2	25.9	6.8	64.0%	14	17.0	23.0														
PIEDMONT	O2170000	TAR RIVER RESERVOIR	28-(36)	5-Jun-07	TAR015G	7.3	27.4	7.5	92.3%	43	8.0	10.0														
						6.3	26.7	7.2	78.2%	28.5	12.5	16.5														
PIEDMONT	O2150000	TAR RIVER RESERVOIR	28-(36)	19-Jun-07	TAR015E	8.8	29.0	8.0	114.5%	34	10.0	11.0														
PIEDMONT	O2170000	TAR RIVER RESERVOIR	28-(36)	19-Jun-07	TAR015G	8.3	29.7	8.1	109.3%	38	3.1	5.3														
						8.6	29.4	8.1	111.9%	36.0	6.6	8.2														
PIEDMONT	O2150000	TAR RIVER RESERVOIR	28-(36)	10-Jul-07	TAR015E	5.8	31.2	7.2	78.4%	43	11.0	14.0														
PIEDMONT	O2170000	TAR RIVER RESERVOIR	28-(36)	10-Jul-07	TAR015G	8.0	31.2	7.6	108.1%	42	7.2	7.3														
						6.9	31.2	7.4	93.3%	42.5	9.1	10.7														
PIEDMONT	O2150000	TAR RIVER RESERVOIR	28-(36)	24-Jul-07	TAR015E	8.1	29.2	7.3	105.7%	25	14.0	20.0														
PIEDMONT	O2170000	TAR RIVER RESERVOIR	28-(36)	24-Jul-07	TAR015G	8.6	28.5	7.1	110.9%	47	7.8	8.4														
						8.4	28.9	7.2	108.3%	36.0	10.9	14.2														
PIEDMONT	O2150000	TAR RIVER RESERVOIR	28-(36)	7-Aug-07	TAR015E	7.6	32.4	7.1	104.8%	31	12.0	13.0														
PIEDMONT	O2170000	TAR RIVER RESERVOIR	28-(36)	7-Aug-07	TAR015G	9.5	33.0	8.6	132.3%	48	9.2	10.0														
						8.6	32.7	7.9	118.6%	39.5	10.6	11.5														
						N=	7	7	7	7	7	7														
Class = WS-IV B NSW CA						% EXCEED =	NCE	E (14%)	NCE	NCE	E (14%)	NCE	NCE													

APPENDIX B

TAR-PAMLICO LAKES 2007 USE SUPPORT DATA

Region	Water Temp C	pH s.u.	Percent SAT	Chla (70953) µg/L	TSS mg/L	Turbidity NTU	Hg µg/L	Zn µg/L	Pb µg/L	Ni µg/L	Cu µg/L	Cr µg/L	Cd µg/L	As µg/L	Mn µg/L	Fe µg/L	Chloride mg/L	Total Hardness Calculated mg/L
PIEDMONT/COASTAL PLAIN C & B Criteria	<4.0*	32	<6*	120%	40	-	25	50	25	88	7	50	2	50	-	1000	-	-
WS II - WS V Criteria if different than C&B					500					25					200	250		100

\* If not part of natural conditions (i.e., swamps)

SURFACE PHYSICAL DATA

SURFACE METALS

Region	STORET	Lake Name	AU	Date m/d/yr	Sampling Station	DO mg/L	Water Temp C	pH s.u.	Percent DO SAT	Chla µg/L	TSS mg/L	Turbidity NTU	Hg µg/L	Zn µg/L	Pb µg/L	Ni µg/L	Cu µg/L	Cr µg/L	Cd µg/L	As µg/L	Mn µg/L	Fe µg/L	Chloride mg/L	Total Hardness Calculated mg/L	
PIEDMONT	O2330000	TAR RIVER RESERVOIR	28-55-(5.5)	1-May-07	TAR017C	8.9	23.7	7.4	105.2%	34	5.8	6.7													
						8.9	23.7	7.4	105.2%	34.0	5.8	6.7													
PIEDMONT	O2330000	TAR RIVER RESERVOIR	28-55-(5.5)	14-May-07	TAR017C	8.7	22.3	7.3	1001.0%	35	7.2	6.1													
						8.7	22.3	7.3	1001.0%	35.0	7.2	6.1													
PIEDMONT	O2330000	TAR RIVER RESERVOIR	28-55-(5.5)	5-Jun-07	TAR017C	8.4	27.8	7.9	107.0%	40	7.5	7.5													
						8.4	27.8	7.9	107.0%	40.0	7.5	7.5													
PIEDMONT	O2330000	TAR RIVER RESERVOIR	28-55-(5.5)	19-Jun-07	TAR017C	8.8	29.5	8.4	115.5%	33	7.0	6.3													
						8.8	29.5	8.4	115.5%	33.0	7.0	6.3													
PIEDMONT	O2330000	TAR RIVER RESERVOIR	28-55-(5.5)	10-Jul-07	TAR017C	7.7	31.6	8.0	104.7%	43	7.8	9.1													
						7.7	31.6	8.0	104.7%	43.0	7.8	9.1													
PIEDMONT	O2330000	TAR RIVER RESERVOIR	28-55-(5.5)	24-Jul-07	TAR017C	8.4	29.2	7.7	109.6%	35	8.0	7.8													
						8.4	29.2	7.7	109.6%	35.0	8.0	7.8													
PIEDMONT	O2330000	TAR RIVER RESERVOIR	28-55-(5.5)	7-Aug-07	TAR017C	8.0	32.2	7.9	109.9%	60	9.8	12.0													
						8.0	32.2	7.9	109.9%	60.0	9.8	12.0													
						N=	7	7	7	7	7	7													
						% EXCEED =	NCE	E (14%)	NCE	NCE	E (29%)	NCE	NCE												

Class = WS-IV NSW

% EXCEED =

SURFACE PHYSICAL DATA

SURFACE METALS

Region	STORET	Lake Name	AU	Date m/d/yr	Sampling Station	DO mg/L	Water Temp C	pH s.u.	Percent DO SAT	Chla µg/L	TSS mg/L	Turbidity NTU	Hg µg/L	Zn µg/L	Pb µg/L	Ni µg/L	Cu µg/L	Cr µg/L	Cd µg/L	As µg/L	Mn µg/L	Fe µg/L	Chloride mg/L	Total Hardness Calculated mg/L
PIEDMONT	O2340000	TAR RIVER RESERVOIR	28-(63)	1-May-07	TAR017F	9.0	23.0	7.4	105.0%	21	6.0	7.2											5.1	23.6
						9.0	23.0	7.4	105.0%	21.0	6.0	7.2											5.1	23.6
PIEDMONT	O2340000	TAR RIVER RESERVOIR	28-(63)	14-May-07	TAR017F	8.6	21.2	7.4	96.9%	19	5.5	5.6											5.5	28.0
						8.6	21.2	7.4	96.9%	19.0	5.5	5.6											5.5	28.0
PIEDMONT	O2340000	TAR RIVER RESERVOIR	28-(63)	5-Jun-07	TAR017F	7.6	27.2	7.5	95.7%	22	6.0	6.7											6.7	28.8
						7.6	27.2	7.5	95.7%	22.0	6.0	6.7											6.7	28.8
PIEDMONT	O2340000	TAR RIVER RESERVOIR	28-(63)	19-Jun-07	TAR017F	7.8	29.4	7.7	102.2%	25	6.0	4.4											7.6	28.1
						7.8	29.4	7.7	102.2%	25.0	6.0	4.4											7.6	28.1
PIEDMONT	O2340000	TAR RIVER RESERVOIR	28-(63)	10-Jul-07	TAR017F	7.6	32.0	7.7	104.1%	36	3.1	6.1											7.3	32.2
						7.6	32.0	7.7	104.1%	36.0	3.1	6.1											7.3	32.2
PIEDMONT	O2340000	TAR RIVER RESERVOIR	28-(63)	24-Jul-07	TAR017F	7.3	28.2	7.4	93.6%	32	6.5	6.5											8.9	33.9
						7.3	28.2	7.4	93.6%	32.0	6.5	6.5											8.9	33.9
PIEDMONT	O2340000	TAR RIVER RESERVOIR	28-(63)	7-Aug-07	TAR017F	9.4	32.8	8.7	130.5%	32	6.8	7.3											9.0	32.1
						9.4	32.8	8.7	130.5%	32.0	6.8	7.3											9.0	32.1
						N=	7	7	7	7	7	7												
						% EXCEED =	NCE	E (14%)	NCE	E (14%)	NCE	NCE	NCE										NCE	NCE

Class = WS-IV NSW CA

% EXCEED =