

## CHAPTER 6

# WATER QUALITY CONCERNS, GOALS AND RECOMMENDED MANAGEMENT STRATEGIES FOR THE FRENCH BROAD RIVER BASIN

### 6.1 BASINWIDE MANAGEMENT GOALS

The French Broad basin has experienced significant population growth and development over the past 20 years and that growth is expected to continue. From an economic standpoint, this is viewed very positively by businesses, local governments and others. However, as the population grows, so will the volume of wastewater that will need to be treated. In addition, land development accompanying population increases will generate additional nonpoint source pollution.

The long-range goal of basinwide management is to provide a means of addressing the complex problems of planning for increased development and economic growth while enhancing and/or restoring the quality and intended uses of the French Broad Basin's surface waters.

In striving towards the long-range goal stated above, DEM's highest priority near-term goals will be as follows:

- identification and restoration of the most serious water quality problems in the basin (Section 6.2.1),
- protection of those waters known to be of the highest quality or supporting biological communities of special importance (Section 6.2.2), and
- management of problem pollutants, particularly toxic substances, sediment, nutrients, biochemical oxygen demand and fecal coliform bacteria in order to correct existing water quality problems and to ensure protection of those waters currently supporting their uses (Sections 6.2.3 and 6.3 through 6.8).

### 6.2 MAJOR WATER QUALITY CONCERNS AND PRIORITY ISSUES

#### 6.2.1 Identifying and Restoring Impaired Waters

*Impaired waters* are those rated in Chapter 4 as partially supporting or not supporting their designated uses. A list of those impaired waters has been compiled in Table 6.1. Table 6.1 includes those streams which have been monitored. Monitored streams are those based on biological or chemical data collected between 1987 and 1993. The table includes the current and future water quality management strategies for these waters.

*Current Management Strategies*, as presented in the table, include several categories of recommended or ongoing point or nonpoint source pollution control strategies. These are described below. *Future Management Strategies*, in Table 6.1, includes those followup actions needed to assess the effectiveness of current strategies or to identify further studies or investigations needed to identify the causes of impairment.

The first category of current management strategies includes specific strategies for a particular water body that have either been recently implemented or are now underway. For example, there

*Chapter 6 - Goals, Concerns and Recommended Management Strategies*

**Table 6.1 Recommended Strategies for Impaired Streams in the French Broad Basin**

Sub-basin	Name of Water Body	Current Mgmt. Strategy	Future Management Strategy	Reference Sections	NPS Priority	
01	W. Fork	Issue gen. permits for trout	Review trout farm general	6.6.1	Medium	
	Fr. Broad	farms	permits and farm operations			
02	Mud Creek	PS (consolidate discharges), NPS	Relocate, expand & upgrade Hendersonville WWTP	6.3.4, 6.6.4	High	
	Bat Fork Cr	Remove GE discharge, NPS	Monitor	6.4.4	High	
	Clear Cr	NPS (possible pesticides)	IS	6.3.2	High	
	Hominy Cr	NPS	CEP, monitor	6.3.4, 6.5.4	High	
	Gash Cr	Upgrade WWTPs	Monitor	6.6.4		
	Fr. Broad R.	NPS	Level C model study	6.5, 6.6.1	High	
	Swannanoa	NPS	Monitor	6.6.1	High	
	Newfound Cr	NPS (agriculture, sediment)	CEP, monitor	6.4	High	
05	Walters Lake	PS (upgrade Champion), NPS	Monitor, develop nutrient budget	6.3, 6.5	High	
	Pigeon River	PS (upgrade Champion)	Monitor	6.3		
	Richland Cr	PS (upgrade Dayco), NPS	Monitor	6.3	High	
	Lk Junaluska	NPS	CEP, monitor	6.5	Medium	
	Jonathon Cr	PS (consolidate discharges), NPS	Monitor	6.6.2	Medium	
<b>DEFINITIONS</b>						
NPS	Includes all existing agricultural, urban, and local NPS control programs, summarized in Table 5.1.					
PS	Areas where specific point source control strategies are needed to address water impairment					
CEP	Continue Existing Programs. Many programs are in their initial phases. More time is needed to monitor their effectiveness toward restoring these waters.					
IS	Investigate Sources. Involves cooperative efforts between government agencies to identify and prioritize where BMPs need to be implemented.					

are plans that are in place to remove or upgrade existing wastewater treatment plants, but the plants have not yet been removed or the upgrades not completed. Even where pollutant reductions have been achieved, it may take some time for the effects to be measurable, particularly in the Pigeon River and Waterville (Walters) Lake. The future management strategy for this category of current strategies will typically be to conduct periodic monitoring to assess the effectiveness of the strategy.

A second category of current management strategies includes ongoing programs for planned expansion and regionalization of wastewater treatment plants (WWTPs) to reduce pollution loading to waters of the French Broad Basin. Under these programs, many small dischargers in the basin are currently in the process of connecting to new sewer lines particularly with Henderson and Buncombe counties to remove point sources from small tributaries. As in the above example, the future strategy will be to monitor the waters to assess the effectiveness of these efforts. A good example of a successful program of this type is in the Swannanoa River. Monitoring data have shown marked improvements in water quality resulting from new interceptor lines and removal of smaller discharges and septic systems.

## *Chapter 6 - Goals, Concerns and Recommended Management Strategies*

A third category includes broad-based nonpoint source pollution control programs many of which are in relatively early stages of implementation. These programs, described briefly in Chapter 5 are wide-ranging and are grouped under general nonpoint source categories such as urban development, construction, agriculture, forestry, mining, onsite wastewater treatment and wetlands protection. Agricultural programs such as the NC Agricultural Cost Share Program, which provides farmers with financial assistance to install best management practices (BMPs), and the Farm Bill (Food, Agriculture, Conservation and Trade Act of 1990), which among its provisions reduces government funding subsidies for farming on highly erodible lands, are examples of potentially effective ongoing programs which should reduce water quality impacts of certain agricultural activities over the long run. Another agricultural-related strategy is a new set of regulations pertaining to concentrated animal waste operations (NCAC 2H 0.200). These rules require existing operators of large operations to develop and implement waste management plans by 1997. The planned management strategy for this category of current strategies is to allow these programs to continue and to conduct monitoring.

Where water quality problems have been identified but the source(s) is not evident, investigation of the source(s) will be necessary before any specific actions can be outlined. Water quality monitoring will be an important component of this strategy. An example of ongoing investigations to identify and address water quality issues in the French Broad Basin is the Clear Creek study. DEM is sampling Clear Creek to determine the source of impairment. A management plan for Clear Creek is to be developed based on the outcome of the stream study.

In other waters where the causes of impairment have been identified, new programs are expected to be implemented in the next several years. The state is now in the process of implementing an NPDES permit program for urban runoff for municipalities greater than 100,000 population that will not apply to any discharges in the French Broad basin based on population size. However, Asheville is implementing a stormwater management program on its own. Many streams impacted by urban runoff in subbasin 02 are expected to benefit from this program.

The list of impaired streams in Table 6.1 cannot be considered a comprehensive list of all streams where water quality improvements are necessary. This list includes just those impaired streams that have been identified through water quality monitoring conducted by DEM as presented in Table 4.2 of Chapter 4. DEM has monitored less than half of the stream miles in the basin, therefore, some impaired stream segments may not yet have been identified by DEM. Stream segments where water quality issues may exist but specific data have not been obtained to evaluate water quality have been identified by public comment, State and Federal agency comment, and other sources. For example, the following streams were identified at regional workshops as having impairments due to excess sedimentation: Corner Rock Creek, Puncheon Fork, Roaring Fork, Hurricane Creek, Right Fork Cane Creek and Little Creek.

Monitoring of these streams is recommended. The lack of resources at the state level to conduct more widespread monitoring, especially in smaller streams, enhances the value of localized monitoring efforts such as those conducted through the VWIN (Volunteer Water Information Network) sampling program. VWIN is being conducted by citizen volunteers in Buncombe, Henderson and Madison counties. Technical assistance is being provided by the University of North Carolina-Asheville Environmental Quality Institute.

The *NPS Priority* column in Table 6.1 indicates DEM's recommended priority rating for nonpoint source management of impaired streams under Section 319 of the federal Clean Water Act. Monitored streams have been prioritized in Table 6.1 for nonpoint source controls which may be implemented through programs such as Section 319, the Agriculture Cost Share Program and the Forest Practice Guidelines Related to Water Quality. A schedule of priority from high to medium has been established to help direct the resources of the programs so that nonpoint sources problems can be addressed and water can be protected from degradation.

**High priority streams:**

- monitored streams that have an overall use support rating of "nonsupporting," (Figure 6.1)
- monitored streams that have a "partial support" rating but have a predicted loading of one or more pollutants that is high, (Figure 6.1)
- streams that are unusually sensitive as documented by special studies (discussed in Section 6.2.2, below, and depicted in Figures 2.6 to 2.9 in Chapter 2):
  - High Quality Waters
  - Outstanding Resource Waters
  - Water Supply I; Water Supply II; Critical Areas of WS-II, WS-III, WS-IV
  - Coastal Shellfish Waters (Class SA) with a Significant Shellfish Resource (SSR) closed due to pollutants (as identified by the Division of Environmental Health).

**Medium priority streams:**

Monitored streams that have an overall use support rating of "partially supporting" (Figure 6.1). Shellfish Waters (Class SA - coastal waters only) that are closed due to pollutants and that do not have a SSR are also considered medium priority streams.

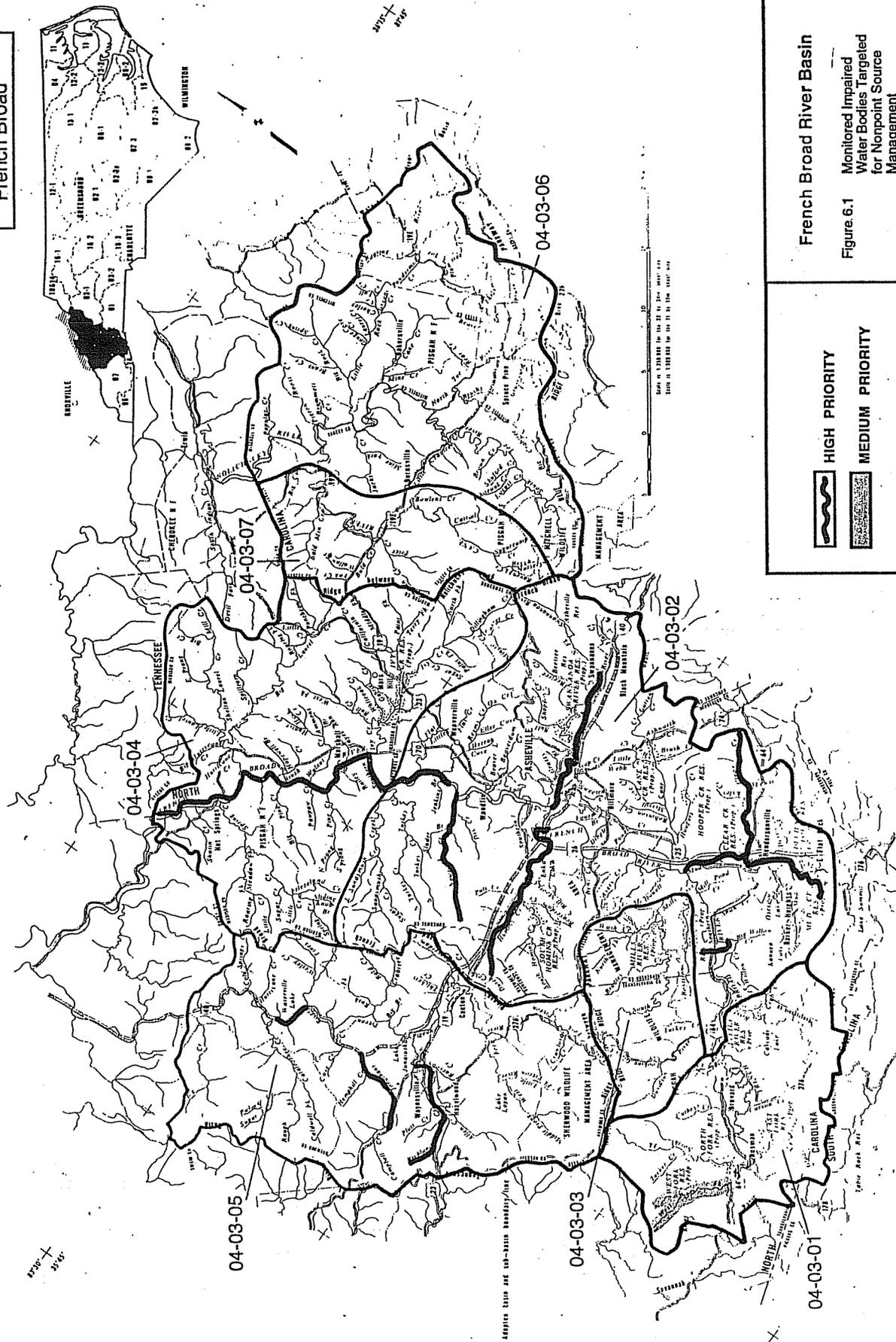
The United States Fish and Wildlife Service has also identified Unique Aquatic Communities (UAC) that the Division could consider as sensitive resource waters for the purpose of prioritizing for 319 grant funding. These areas usually encompass waters which provide habitat for threatened and endangered species.

**6.2.2 Identification and Protection of High Resource Value or Biologically Sensitive Waters**

Waters considered to be biologically sensitive or of high resource value may be afforded protection through reclassification to HQW (high quality waters), ORW (outstanding resource waters) or WS (water supply), or they may be protected through more stringent permit conditions. Waters eligible for reclassification to HQW or ORW (see Appendix I) may include designated critical habitat for threatened or endangered species (as designated by the NC Wildlife Resources Commission), waters having Excellent water quality or those used for domestic water supply purposes (WS I and II). The HQW, ORW and WS classifications generally require more stringent point and nonpoint source pollution controls than do basic water quality classifications such as C or SC (Appendix I). Designated HQWs/ORWs in the French Broad basin are presented in Table 2.8 in Chapter 2.

In addition, where waters are known to support state or federally listed endangered or threatened species or species of concern, but where water quality is not Excellent and where no critical habitat has been designated, consideration will be given during NPDES permitting to minimize impacts to these habitat areas consistent with the requirements of the federal Endangered Species Act and North Carolina's endangered species statutes. Possible protection measures may include dechlorination or alternative disinfection, tertiary or advanced tertiary treatment, outfall relocation, backup power provisions to minimize accidental plant spills, and others. The need for special provisions will be determined on a case-by-case basis during review of individual permit applications and take into account the degree of impact and the costs of protection.

French Broad



French Broad River Basin

Figure 6.1  
Monitored Impaired  
Water Bodies Targeted  
for Nonpoint Source  
Management

N.C. Department of Environment  
Health, and Natural Resources  
Division of Environmental Management  
Water Quality Section

HIGH PRIORITY

MEDIUM PRIORITY

(Priority ratings discussed on p. 6-4)

## *Chapter 6 - Goals, Concerns and Recommended Management Strategies*

**Table 6.3 Potential ORW and HQW Waters in the French Broad River Basin**

04-03-01:	French Broad River from source to SR 1129
04-03-02:	Laurel Branch (upstream sampling needed) Sandymush Creek
04-03-03:	Mills River North Fork Mills River
04-03-04:	Ivy Creek Big Laurel Creek Hickory Fork
04-03-05:	Cold Springs Creek upper Jonathan Creek
04-03-06:	Big Rock Creek
04-03-07:	Cane River

### **6.2.3 Managing Problem Pollutants to Maintain Water Quality Standards and Existing Uses**

In addition to restoring impaired waters, protection of other waters which currently meet their standards and are considered supporting of their uses is a basic responsibility of the state's water quality program and a primary goal of basinwide management. Protecting standards and uses requires controlling the causes and sources of water pollution. Existing point and nonpoint source programs are outlined in Chapter 5. Toxicants, sediment, nutrients (in lakes), oxygen-demanding wastes, or biochemical oxygen demand (BOD), and fecal coliform bacteria are problem pollutants of most concern in the French Broad Basin. Toxic substances (including metals, ammonia and chlorine) are addressed in section 6.3. Sediment control is discussed in section 6.4. Nutrients are addressed in section 6.5. Point-source oriented control strategies for oxygen-demanding wastes are further addressed in section 6.6 and fecal coliform bacteria strategies are found in Section 6.8.

The management strategies outlined below are the results of comprehensive evaluations of all previously summarized data. It is the intention of DEM that the following recommendations serve the public of North Carolina for long-term planning purposes. General nonpoint source management strategies are discussed thoroughly in Chapter 5. Point source controls are implemented through limiting wastewater parameters in NPDES permits.

## **6.3 TOXIC SUBSTANCES**

### **6.3.1 Assimilative Capacity**

Toxic substances, or toxicants, routinely regulated by DEM include metals, organics, chlorine and ammonia. These are described in Chapter 3.

The assimilative capacity of receiving waters, that is the amount of wastewater a stream can assimilate under designated flow conditions (7Q10 for aquatic life based standards, average flow for carcinogens), available for toxicants in the French Broad Basin varies from stream to stream. In larger streams where there is more dilution flow, there is more assimilative capacity for toxic dischargers. In areas with little dilution, discharge facilities will receive chemical specific limits which are close to the in stream water quality standard. Toxicants from nonpoint sources also enter a waterbody during storm events. The waters need to be protected from immediate acute effects and residual chronic effects.

A review of the ambient station data in the French Broad Basin indicates that while most ambient stations where metals data are collected show levels of copper, zinc and iron above detection, and

## *Chapter 6 - Goals, Concerns and Recommended Management Strategies*

in some cases above the designated action level instream, biological data for these stations show no instream impairment. Copper, zinc, and iron occur naturally in North Carolina's waters, therefore action levels have been developed rather than standards. Action levels are not limited in the effluent of a discharge facility unless there is a federal guideline limit for the parameter or if the facility is failing toxicity and the cause is known to be the substance regulated by the action level.

### **6.3.2 Control Strategies**

#### **Basinwide Strategies**

Point source dischargers will be allocated chemical specific toxic substance limits and monitoring requirements based on a mass balance technique discussed in Appendix III of this report. Whole effluent toxicity limits are also assigned to all major dischargers and any discharger of complex wastewater. Thirty-three discharge facilities are required to conduct effluent toxicity tests (See list in Appendix II).

Nonpoint source strategies to be implemented through the industrial NPDES stormwater program should also be helpful in reducing toxic substance loading to surface waters. The industrial stormwater program emphasizes controlling the source of pollutants, reducing the potential for the stormwater runoff to become contaminated. One example of a method to control the source of pollutants is to cover stockpiles of toxic materials that could pose a threat to water quality. In addition, stormwater runoff programs implemented as part of the state program (WS, ORW, HQW) should reduce toxic substance loading to surface waters as well.

#### **Subbasin 04-03-01**

There are three major industrial discharges in this subbasin.

Mitchell-Bissell Industries  
Ecusta  
E.I. DuPont

West Fork French Broad River  
French Broad River  
Little River

#### **West Fork French Broad River**

Mitchell-Bissell (0.3 MGD) is a metal plater which discharges to the West Fork of the French Broad near HWY 64. A special benthic survey was done in 1992 to determine if the HQW classification was accurate given the presence of an industry. Samples were taken at two upstream sites and one downstream site. The first upstream site was rated Excellent but showed impact from the trout farms upstream. The site above Mitchell-Bissell received an Excellent water quality rating and is classified HQW. The downstream site was also rated Excellent but showed impact due to Mitchell-Bissell. This site had the lowest overall abundance of pollution intolerant species. The study concluded that the HQW classification is justified. Thus, there should be no additional pollutant loading permitted to Mitchell-Bissell per the anti-degradation regulations.

#### **French Broad River**

Ecusta, a division of P.H. Glatfelter, manufactures fine papers from flax straw and currently has no chemical specific limits in the permit. Since Ecusta's primary effect on the water quality is related to oxygen depletion rather than toxicants, further discussion may be found in Section 6.6.

#### **Little River**

E.I. DuPont (2.0 MGD) produces X-ray film and discharges a resilient wastewater to the Little River above High Falls and Cascade Lake. The benthic data show impairment below E.I. DuPont. Above Cascade Lake, the ambient data show metals violations. There is some recovery above Cascade Lake but there is impairment near the mouth of Little River due to erosion and agricultural runoff.

**Subbasin 04-03-02**

Subbasin 02 is the most heavily developed and industrialized subbasin within the French Broad River basin. There are five major discharges of toxicants listed below.

<u>Discharger</u>	<u>Receiving Stream</u>
1. General Electric	Bat Fork Creek
2. Hendersonville WWTP	Mud Creek
3. Cranston Print Works	French Broad River
4. BASF	Hominy Creek
5. CP&L/Asheville	French Broad River

Nonpoint source pollution is also a potential contributor to toxicity problems. Clear Creek, for example, exhibits Poor biological quality with pesticides being a suspected cause. Streams with toxicity problems in this subbasin are described below.

**Bat Fork Creek**

General Electric Lighting Systems manufactures outdoor commercial and industrial lighting fixtures. GE has a history of failing toxicity tests but has been passing recently and is scheduled to send its process wastewater to the Hendersonville WWTP for treatment. This will remove the discharge of process wastewater (0.5 MGD) from Bat Fork Creek which is currently rated as Poor. However, the stormwater discharges from the site will continue to be permitted through the stormwater program and will be monitored for a number of priority pollutants. Limits will be developed as needed.

**Mud Creek**

Hendersonville WWTP is a major municipal treatment system with an industrial pretreatment program. The facility is limited for a number of chemical specific parameters and monitors for a number of others. In addition, the facility is required to test quarterly for chronic toxicity. This plant has been permitted to expand to 6.0 MGD with a discharge to Mud Creek which will allow the WWTP to accept GE's process wastewater and extend sewer service to a larger area of Hendersonville. The city is currently investigating the possibility of expanding to 7-14 MGD and relocating the discharge to the French Broad River.

**Clear Creek**

Clear Creek has been rated as Poor biologically though there are few discharges in the upper reaches. Studies are underway to determine if pesticides from apple orchards are contributing to the degradation of aquatic life. Development of a pesticide control program will be recommended if appropriate.

**French Broad River**

The French Broad River is not currently listed as impaired due to toxics although a regional approach to wastewater control is recommended as a result of the continued development pressure from Brevard to Asheville. In order to better protect water quality in the French Broad River, connecting industrial discharges to a municipal system is recommended. Two major point sources of toxics to the French Broad River in subbasin 02 include the following:

Cranston Printworks bleaches, dyes, and prints textile fabrics and discharges 4.0 MGD of process wastewater to the French Broad River. Federal guideline limits should protect for chronic toxicity. The facility is limited for a number of priority pollutants. These limits will be reevaluated upon development of a field calibrated model to determine if there is interaction with other facilities on the French Broad River.

## *Chapter 6 - Goals, Concerns and Recommended Management Strategies*

CP&L operates a coal-fired electric power plant which discharges up to 1.9 MGD of wastewater including coal pile runoff and stormwater to the French Broad River.

### **Hominy Creek**

BASF discharges 4.0 MGD to Hominy Creek a tributary of the French Broad River near Asheville. BASF is an organic chemical manufacturing facility with a resilient wastewater. The toxics limits will be re-evaluated at permit renewal and instream monitoring recommended. Hominy Creek is rated as Poor below BASF's discharge. The field staff and region reports that there are impacts due to tomato farming, erosion from highways, as well as impacts from BASF. There is a strong change in habitat from rocky to sandy below NC 151. Staff reported that the uppermost site, though rated Good, is impacted with an unknown source. Further investigations are needed to identify the cause and source.

### **Subbasin 04-03-05**

#### **Pigeon River**

As a result of a series of process improvements in the late 1980's, Champion reports that there has been no measurable level of dioxin in the mill since 1989. By 1994, Champion completed a \$330 million modernization program. An important component of the modernization was to completely replace chlorine as a bleaching agent with chlorine dioxide and oxygen delignification to further ensure no inadvertent formation of dioxin. This new process which has been installed by Champion is the technology on which EPA has based its new effluent standards for the industry to adopt by 1998. Champion is also experimenting with a new patented technology called Bleach Filtrate Recycling (BFR™) which, if technically and economically successful, could facilitate further improvement in the mill's color (see Section 3.2.6) and effluent quality.

Annually, since 1990, Champion has collected fish from below the mill discharger and into Tennessee. Each successive sampling has shown improvements. As a result, the state has now partially rescinded the fish consumption advisory it originally issued in 1988 for all fish in the Pigeon River. The new advisory, issued by the State Health Director in late 1994, applies only to carp and catfish.

Benthic sampling in 1992 indicated Good water quality at NC 215 (above the mill) and Fair quality at SR 1642 (downstream of the mill near Clyde). These are both improvements over past sampling results. NC 215 is upstream of Champion Paper and may be impacted by farming, particularly tomato farming. Liming at farms has a short-term effect on instream pH. The SR 1642 site near Clyde has been upgraded from Poor to Fair for the first time, possibly resulting from improvements in Champion's effluent quality.

#### **Richland Creek**

Richland Creek has recovered from Poor to Fair water quality since improvements to handling of wastewater and stormwater at Dayco have occurred. Lake Junaluska, just upstream of the mouth of Richland Creek, is impacted by nutrient and sediment loading. Nonpoint sources are suspected.

### **Subbasin 06**

The landscape of the North Toe and lower South Toe rivers are dotted with mines. An updated inventory is needed to determine the effect of both active and inactive mines.

The North Toe River below the feldspar and quartz mines is impacted by fluoride and sediment. The mines use hydrofluoric acid in the production of feldspar and quartz. A 1986 biological survey showed that water quality was increasingly degraded below each mine. As a result, a survey of fluoride use at the 4 mines in the Spruce Pine area was conducted and a reallocation of fluorides loading was done. The permits for these discharges were reissued in 1993 with the

## Chapter 6 - Goals, Concerns and Recommended Management Strategies

loading reallocated between 3 discharges: Unimin Corporation (formerly IMC), The Feldspar Corporation and K - T Feldspar. There is also a proposed feldspar mine which may discharge fluoride to the South Toe River downstream of the ORW classification area.

Biological monitoring in 1992 indicates that water quality below the mines has improved from a Poor rating in 1986 to a Good-Fair rating. Additional discharges of fluoride will require a reallocation of fluoride loading among the existing discharges.

<b>FACILITY</b>	<b>LOCATION</b>
Unimin Corporation	North Toe River
Unimin Corporation	Brushy Creek
Feldspar Corporation	North Toe River
K-T Feldspar Corporation	North Toe River

### 6.4 MANAGEMENT STRATEGIES FOR CONTROLLING SEDIMENTATION

Sedimentation is the most widespread cause of stream impairment in the French Broad Basin as indicated in section 3.2.4 of Chapter 3. It is a widespread nonpoint source-related water quality problem which results from land-disturbing activities. The most significant of these activities include agriculture, land development (e.g., highways, shopping centers and residential subdivisions), timber harvesting and mining. For each of these major types of land-disturbing activities, there are programs being implemented by various government agencies at the state, federal and/or local level to minimize soil loss and protect water quality. These programs are listed in Table 6.3 and are briefly described in Chapter 5.

**Table 6.3 State and Federal Sediment Control-related Programs (with Chapter 5 Section References in Parentheses)**

- o Agricultural Nonpoint Source (NPS) Control Programs (Section 5.3.1)
  - North Carolina Agriculture Cost Share Program
  - NC Cooperative Extension Service and Agricultural Research Service
  - Watershed Protection and Flood Prevention Program (PL 83-566)
  - Food Security Act of 1985 (FSA) and the Food, Agriculture, Conservation and Trade Act of 1990 (FACTA) (Includes Conservation Reserve Program, Conservation Compliance, Sodbuster, Swampbuster, Conservation Easement, Wetland Reserve and Water Quality Incentive Program)
- o Construction, Urban and Developed Lands (Sections 5.3.2 and 5.3.3)
  - Sediment Pollution Control Act (Section 5.3.3)
  - Federal Urban Stormwater Discharge Program
  - Water Supply Protection Program
  - ORW and HQW Stream Classifications
- o Forestry NPS Programs (Section 5.3.6)
  - Forest Practice Guidelines Related to Water Quality
  - National Forest Management Act (NFMA)
  - Forest Stewardship Program
- o Mining Act (Section 5.3.7)
- o Wetlands Regulatory NPS Programs (Section 5.3.8)

The sediment trapping and soil stabilization properties of wetlands are particularly important to nonpoint source pollution control. Several important state and federal wetland protection programs are listed below.

  - Section 10 of the Rivers and Harbors Act of 1899
  - Sections 404 and 401 (Water Quality Certifications) of the Clean Water Act

*Chapter 6 - Goals, Concerns and Recommended Management Strategies*

DEM's role in sediment control is to work cooperatively with those agencies that administer the erosion and sediment control programs in order to maximize the effectiveness of the programs and protect water quality. Where programs are not effective, as evidenced by violation of instream water quality standards (section 3.2.4), and where DEM can identify a source, then appropriate enforcement action can be taken. Generally, this would entail requiring the land owner or responsible party to install acceptable best management practices (BMPs). BMPs vary with the type of activity, but they are generally aimed at minimizing the area of land-disturbing activity and the amount of time the land remains unstabilized; setting up barriers, filters or sediment traps (such as temporary ponds or silt fences) to reduce the amount of sediment reaching surface waters; and recommending land management approaches that minimize soil loss, especially for agriculture.

Some control measures, principally for construction or land development activities of 1 acre or more, are required by law under the state's Sedimentation and Erosion Control Act administered by the NC Division of Land Resources. For activities not subject to the act such as agriculture, erosion and sediment controls are carried out on a voluntary basis through programs administered by several different agencies. A federal Farm Bill program administered by the USDA Soil Conservation Service provides an incentive not to farm on highly erodible land by taking away federal subsidies to a farmer that fails to comply with the provision.

The NC Agricultural Cost Share Program administered by the NC Division of Soil and Water Conservation provides incentives to farmers to install BMPs by offering to pay up to 75% of the average cost of approved BMPs. Listed below are 10-year cumulative totals, through January 1, 1994, of acres affected, tons of soil saved and total contract amount. The cost share figures include a wide array of BMPs including, but not limited to, conservation tillage, terraces, diversions, critical area plan, sod-based rotation, crop conservation grass, crop conservation trees, filter strip, field border, grass waterway, water control structure and livestock exclusion structures along streams.

Table 6.4 NC Agricultural Cost Share Program Statistics for Erosion Control in the French Broad River Basin (Cumulative totals through January 1, 1994)

<u>SUBBASIN</u>	<u>ACRES AFFECTED</u>	<u>TONS OF SOIL SAVED</u>	<u>TOTAL CONTRACT AMT.</u>
040301	4,126	4,387	\$309,706
040302	12,503	96,399	\$880,007
040303	1,620	22,954	\$133,868
040304	9,169	11,208	\$589,677
040305	5,372	43,362	\$479,969
040306	7,442	18,763	\$732,706
040307	3,425	4,134	\$304,682
<b>TOTALS</b>	<b>43,657</b>	<b>201,207</b>	<b>\$3,430,616</b>

Despite the combined efforts of all of the above programs for construction, forestry, mining and agriculture, there were still 266 miles of streams in the French Broad Basin estimated to be impaired by sediment, thus pointing to the need for continued overall improvements in erosion and sediment control. Further recommendations for improving sediment control are presented below.

- Promote more effective implementation and maintenance of erosion and sediment control measures by contractors, farmers and other land owners.
- Evaluate effectiveness of enforcement of existing sediment control programs. Implement improvements that can be made with existing resources and/or identify additional resource needs.
- Encourage more widespread adoption of erosion and sediment control programs by local governments in rapidly developing areas.

## Chapter 6 - Goals, Concerns and Recommended Management Strategies

- Promote public education at the state and local level on the impacts of sedimentation and the need for improved sediment control.
- Evaluate existing sedimentation and erosion control rules and statutes for possible strengthening. Consideration should be given to strengthening erosion control requirements. Examples include limiting the area of disturbed land on a given site and reducing the time period for reestablishing vegetation on denuded areas than currently required.
- Evaluate loopholes in interagency efforts to enforce sediment control measures, particularly as they relate to forestry and agricultural activities.

All or portions of the following streams have been listed in Table 4.3 in Chapter 4 as being impaired or threatened by sedimentation and should receive priority as sediment control programs are implemented. The list below includes only streams that have been monitored by DEM. It therefore represents only a portion of those streams throughout the basin that are adversely affected by sedimentation.

Stream	Subbasin	Stream	Subbasin
Little River	01	Spring Creek	04
Hominy Creek	02	Richland Creek	05
Flat Creek	02	Lower Jonathan Cr	05
Swannanoa River	02	North Toe River	06
Newfound Creek	02		

### 6.5 MANAGEMENT STRATEGIES FOR NUTRIENTS

Control of nutrients is necessary to limit algal growth potential, to assure protection of the instream chlorophyll *a* standard, and to avoid the development of nuisance conditions in the state's waterways. Point source controls are typically NPDES permit limitations on total phosphorus (TP) and total nitrogen (TN). Nonpoint controls of nutrients generally include best management practices (BMPs) to control nutrient loading from areas such as agricultural land and urban areas. In general, excess nutrient loading is only a problem in slow-moving waters and areas with long retention times. In the French Broad Basin, only lakes appear to be subject to eutrophication. Localized problems are described below.

#### 6.5.1 Subbasin 04-03-03

##### Mills River

Van Wingerden International is under a Special Order by Consent (SOC) due to wastewater from its greenhouses which discharge TN = 100 mg/l to a nearby pond. The SOC is a legal agreement between the company and the state which stipulates an enforceable time schedule for correcting the problem.

#### 6.5.2 Subbasin 04-03-05

##### Lake Junaluska

Lake Junaluska receives runoff from the surrounding area. The lake acts as a retention basin which controls flows and sediment input to the Pigeon River. Due to recent dredging for sediment removal, nutrient levels in the lake and resultant blooms have been reduced. A progressive program to implement nonpoint source controls is needed to lessen nutrient loading and the need for future dredging.

##### Waterville (Walters) Lake

The Waterville Hydroelectric Project is owned and operated by Carolina Power and Light and is located on the Pigeon River. The powerhouse is located near the NC-TN line approximately 12 miles below the dam. A 6.2 mile water conduit tunnel delivers water from the lake to the

powerhouse, bypassing this section of the Pigeon River below the dam. The headwaters of the lake are located 20.7 miles below the Champion International discharge. Walters Lake receives runoff from animal operations, cropland and urban areas. In addition, Waterville Lake is impacted by refractory BOD and nutrients from Champion's discharge. Lake water quality problems include algal blooms, chlorophyll-a violations, and DO violations. A nutrient budget will be developed prior to the next basin plan to examine point and nonpoint sources of nutrients to the lake and to be incorporated into a lake management strategy.

## 6.6 RECOMMENDED MANAGEMENT STRATEGIES FOR OXYGEN-DEMANDING WASTES

Oxygen-demanding wastes are described in Chapter 3. Biochemical oxygen demand (BOD<sub>5</sub>) and ammonia nitrogen (NH<sub>3</sub>) are generally the types of oxygen-consuming wastes of greatest concern. Therefore, NPDES permits generally limit BOD<sub>5</sub> and NH<sub>3</sub> in point source discharge effluents to control the effects of oxygen depletion in receiving waters.

In most surface water systems throughout the State, the lowest concentrations of dissolved oxygen usually occur during summertime conditions when temperature is high and streamflow is low. During these periods, point source discharges have their greatest impact, while nonpoint input is generally low. Nonpoint loads are typically delivered at high flow during and after storm events, but may have residual effects on water quality through runoff and sediment oxygen demand. Modeling of oxygen-consuming wastes, typically performed under low flow scenarios, accounts for the residual effects of nonpoint sources and is used to establish appropriate NPDES permit limits. Where the residual BOD is significant, management of nonpoint sources to reduce loading is recommended by implementation of best management practices. The choice of model, North Carolina's empirical model or the field calibrated, QUAL2E model, used is determined by the amount of data available for a given stream reach (APPENDIX III-A). The empirical model is routinely used to determine wasteload allocations in the absence of intensive water quality studies of the discharge reach.

**Table 6.5 General Recommended Strategies for Expanding and Proposed Discharges in the French Broad Basin**

HOW and ORW Waters throughout basin: Discharges to these waters will receive limits in accordance with the Division's Antidegradation Policy (15A NCAC 2B .0201).

All new and expanding facilities not located on HOW, ORW or zero flow streams: Limits for BOD and NH<sub>3</sub> are based on North Carolina's empirical model and following standard procedures, particularly for interacting discharges.

French Broad River Watershed (other than HOW, ORW, and zero flow streams)

A QUAL2E model will be developed for the French Broad River from Brevard to Asheville. Upon its completion the model will be used to evaluate new/expanding discharges on the mainstem. Where there are documented water quality problems, the model may be used for reallocation of existing wasteload allocations for the next basin plan.

Pigeon River Watershed (other than HOW, ORW, and zero flow streams)

For the Pigeon River, the existing QUAL2E model will be used for new/expanding discharges to the mainstem from Canton to Waterville Lake. The model will be re-calibrated in the future due to significant changes in wastewater from Champion.

### **6.6.1 French Broad River Watershed (Subbasins 04-03-01 through 04-03-04)**

No dissolved oxygen (DO) water quality standard violations in the French Broad mainstem have been documented through DEM's ambient monitoring stations nor by NPDES instream self-monitoring data from dischargers along the river. However, data do indicate that DO concentrations are depressed below the Ecusta Company's discharge. To evaluate the river's water quality, an empirical, desktop model (Appendix III-A) was developed from Mitchell-Bissell Company's discharge to below Asheville, a reach of about 60 miles.

For the next basin plan, a field calibrated model will be developed for the French Broad River from Brevard to Asheville. Data from a 1978 dye and reaeration study will be supplemented with data from a 1993 reaeration study by EPA. Additional field studies to extend the model from Brevard to Asheville will be recommended.

The field calibrated model should more accurately predict the current water quality conditions than the empirical model. Previous water quality evaluations were done using an empirical model with velocities from the 1978 study (at more than twice the 7Q10 flow). In addition, the 7Q10 flow was entered for the Davidson and Little Rivers. However, the Davidson River is used as a water source for Ecusta except under very low stream flows. Thus, the 7Q10 flow may not be accurate. The Little River is impounded by a FERC licensed hydropower dam. The current minimum release is 10 cfs (the 7Q10 flow is 18 cfs). A new minimum release is being negotiated; USFWS seeks 15 cfs while Cascade Power is asking for 2 cfs. Future modeling efforts will account for flow withdrawals and minimum releases.

The benthic data for the mainstem of the French Broad River shows Excellent water quality in the headwaters with a steady decline in quality downstream. Downstream of Ecusta's effluent, the river is rated Good. Near Asheville the rating is Good/Fair and near Marshall the rating fluctuates between Good/Fair and Fair. The dissolved oxygen levels improve at the downstream sites so it is likely that the impairment is not attributable to oxygen-consuming wastes. The nonpoint sources should be inventoried. More detailed information on these models and subbasin water quality is provided below.

#### **Subbasin 04-03-01 (Upper French Broad River from Headwaters to the Davidson River)**

##### **Upper French Broad River**

The French Broad is formed by the West Fork, North Fork and East Fork French Broad Rivers. The uppermost North Fork and most of the East Fork and a section of the West Fork are classified as HQW. Excellent water quality ratings were confirmed by 1992 benthic sampling of the North and West Forks as well as the French Broad at Rosman. However, sampling below trout farms in 1983 showed moderate to severe impacts on the benthic community. There are at least nine trout farms in this subbasin; most discharge to HQW tributaries to the headwaters. A special study of trout farms is recommended to determine if the current permit conditions are adequate to protect water quality. This study should include water quality surveys to determine whether water quality has improved since 1983. It should be noted that the High Valley Trout Hatchery is upstream of Brevard's water treatment plant and has not been able to implement management controls due to accessibility problems (steep slopes) below the Hatchery.

In addition to the trout farms, there are seven minor sources of oxygen-consuming wastes to the headwaters of the French Broad. Due to concern over the presence of discharges within and upstream of the HQW boundary, a special study was done in 1993 which confirmed that though these discharges are present, Excellent water quality exists. The HQW regulations will apply.

## *Chapter 6 - Goals, Concerns and Recommended Management Strategies*

An empirical model was developed for this subbasin review. This model covers 22 miles from the West Fork French Broad to the confluence with the Davidson River. The wastewater inputs total 0.435 MGD for an instream waste concentration of less than 3% based on headwater flow. No DO sag is predicted. Therefore, no specific point source management strategy is recommended. Though Ecusta and the Brevard WWTP are part of this subbasin, they are modeled with the discharges to the French Broad in subbasin 02. The small domestic discharges near Brevard should be considered for tie-in to the Brevard WWTP.

### **Little River**

An empirical model for DuPont's discharge to the Little River shows a DO sag to 6.4 mg/l just below DuPont. The CBOD is not fully assimilated prior to entering Cascade Lake. Two other discharges to the Little River watershed do not interact and cause no DO sags. The minimum release from Cascade Lake and nonpoint sources will be investigated prior to completing a field calibrated analysis of the French Broad River for the next basin plan.

### **Subbasin 04-03-02 (Middle French Broad River and Tributaries from Davidson River to Buncombe/Madison County line)**

A field calibrated model was developed for the French Broad River between Ecusta and HWY 64 in 1980. Data from this model were used to update DEM's empirical desktop model. EPA conducted a reaeration study for this reach of the French Broad in November 1993 during 7Q10 conditions. A revised field calibrated model is planned for the next basin plan. In the meantime, the empirical model will continue to be used. French Broad subbasin 02 includes the mainstem from the Davidson River to below Asheville.

### **French Broad from Ecusta to Asheville**

An empirical model has been developed for the French Broad River from the Brevard WWTP to the Swannanoa River, covering 60 miles from the Brevard WWTP to upstream of the Buncombe MSD in Asheville. At its permitted limits, Ecusta is the dominating discharge in this reach at over 20% instream waste concentration. The other major in this subbasin, Brevard, is over 10 times smaller than Ecusta. Empirical modeling indicates that the DO standard should be met unless stream flows above Ecusta fall below the 7Q10 due to withdrawals by Ecusta. Since there are no known DO problems on the French Broad below Ecusta, this empirical model will continue to be used with the standard procedures to determine permit limits for oxygen consuming wastes until a field calibrated model is developed for the area. A study plan for the French Broad from Brevard to Asheville will be developed.

### **Gash Creek**

A study of Gash Creek in 1986 confirmed that discharge limits had been overallocated due to a diversion of the stream for irrigation by the Etowah Golf Club. Thus, stream flows have been reduced by 90%. Based on the Poor water quality rating, the new flow information was used to revise the wasteload allocations. A revised model was done at 1/10th the previous streamflow and limits were revised upon permit renewal. In addition, a number of permits have been rescinded as the facilities had not been constructed and municipal sewer service is now available. The only remaining discharges are:

Etowah Sewer Co.  
Henderson Housing Authority  
Nicholson MHP

With a cumulative instream waste concentration (IWC) of 70%, the effluent dominates the stream under summer low flow conditions. A follow-up water quality survey is recommended to determine if there has been improvement since the limits have been revised. An empirical model was run to the French Broad but background conditions were not reached at the mouth of Gash Creek. A DO sag to 5.6 mg/l was predicted 0.4 miles below the Etowah Sewer Co. A more

## *Chapter 6 - Goals, Concerns and Recommended Management Strategies*

complete evaluation will be done in conjunction with a detailed study resulting in a field calibrated model of the French Broad River.

### **Mud Creek**

Due to continued Poor biological quality ratings and the proliferation of discharges, a field calibrated model was developed for Mud Creek in 1992. Discharges to Mud Creek, Allen Branch, Cherry Branch, Featherstone Creek and Clear Creek were included in the model. New and expanding discharges to this watershed will be required to meet advanced treatment with limits of 10 mg/l BOD5 and 2 mg/l NH3-N. The Hendersonville WWTP dominates the assimilative capacity of Mud Creek below Clear Creek. A copy of the modeling report is available from DEM.

Based on the modeling results, Hendersonville may relocate its discharge to the French Broad River. The City and County should work together to reduce the total number of discharges. Clear Creek is rated biologically Poor though there are few discharges in the upper reaches. The City has extended a sewer interceptor up Clear Creek to Cherry Branch and Allen Creek, and discharges have begun to connect to it. An interceptor has also been constructed part way up Bat Fork Creek which serves East Flat Rock Development, East Henderson High School and Blue Ridge Technical College. General Electric is sending most of its process wastewater to the City of Hendersonville's wastewater treatment plant through a separate pump station and sewer line.

Empirical models have been developed for tributaries to Mud Creek upstream of the field calibrated model area. Clear Creek outside Hendersonville has only two permitted discharges. Neither have a significant impact on the assimilative capacity. Standard procedures will be followed to allocate oxygen-consuming wastes. A comprehensive empirical model of Bat Fork, Devils Creek, King Creek, and Dunn Creek has been done. With all existing discharges, the model predicts no DO violations on these tributaries but there is residual BOD further downstream where the tributaries flow into Mud Creek. Four of the discharges are scheduled to tie on to the Hendersonville WWTP. With the remaining six discharges, background conditions will be reached at the mouth of Bat Fork. City sewer service is available for the two discharges to Britton Creek and connection to the City is strongly encouraged.

### **Cane Creek**

There are four small discharges to Cane Creek, as well as two small discharges to tributaries. An empirical model done to evaluate interaction among discharges shows no DO sags from the discharges. The empirical model will continue to be used to determine wasteload allocations.

### **Hominy Creek**

Hominy Creek is currently on the list of impaired streams. A major industry, BASF, which is permitted at 4 MGD (actual flow is 2 MGD), discharges to Hominy Creek and contributes to the impairment in the lower reaches. Hominy Creek was sampled by the Biological Monitoring Group in 1992. Three sites were sampled; two above BASF and one downstream. The survey showed the water quality becomes progressively more impaired at each station: Good, Fair, Poor. An empirical model of Hominy Creek indicates a DO sag to 6.1 mg/l one mile below BASF but no violations of the DO standard. In addition, background water quality is not achieved prior to the confluence with the French Broad River. Instream concentrations of CBOD are quite high. At this time the empirical model will be used for wasteload allocations. A field calibrated model of the French Broad in this area will be developed for the next basin plan which will more closely examine the impact of BASF on Hominy Creek and the French Broad River.

### **Swannanoa River**

In the past, there were a number of direct discharges to the river, however, ongoing sewer interceptor construction along the river is resulting in the elimination of discharges with wastewater being sent to the Buncombe County Metropolitan Sewerage District plant. Though water quality

## *Chapter 6 - Goals, Concerns and Recommended Management Strategies*

remains impaired due to urban runoff, there has been improvement in the benthic community from Poor to Good-Fair.

### **French Broad from Asheville to Sandymush Creek**

The Buncombe County MSD discharges 40 MGD of secondarily treated wastewater to the powerhouse flume upstream of a hydropower plant that it owns and operates. A minimum continuous release is maintained but it is lower than the 7Q10. At DEM's ambient monitoring station at Alexander, downstream from the discharge, benthic macroinvertebrate water quality data has shown a decline from Good-Fair in 1987 to Fair in 1990 and 1992. During much of this period, the Buncombe MSD was operating with relaxed limits under a Judicial Order of Consent (JOC) which required expansion and improvements to the WWTP and discharge. The JOC expired in 1990. The WWTP's permit and compliance record will be closely evaluated since the instream waste concentration below Asheville is approximately 20% and the area is used for recreation.

### **Subbasin 04-03-03 (Davidson and Mills Rivers Watersheds)**

#### **Davidson River**

Much of the Davidson River is classified as HQW. Within the HQW section there is one discharge on Looking Glass Creek. Near the mouth there are three discharges to Davidson River and Turkey Creek. Connection of the Schenck Job Corps Center discharge to the city of Brevard WWTP is strongly encouraged.

The Davidson River is used as a water supply for Ecusta, a Division of P.H. Glatfelter. In 1980, a biological survey indicated severe problems below the withdrawal point. Ecusta withdraws 29 MGD for industrial use. Water is withdrawn until the streamflow drops to 30 MGD (46.5 cfs) or almost to the 7Q10. Thus the stream may be stressed by low flows on a regular basis. The lower Davidson River will be re-evaluated as part of a field study for the next basin plan.

#### **Mills River**

South Fork Mills River and its tributaries are ORW. The North Fork and part of the Mills River above Hendersonville's water supply intake are WS-I and WS-II. All benthic studies have reflected Excellent water quality. An empirical model shows no DO sag and no interaction among discharges. Permit limits for oxygen-consuming wastes will be determined in accordance with standard procedures and HQW rules. However, updated USGS flows suggest that many of the tributaries of Mills River are zero flow and unsuitable for receiving wastewater. New and expanding discharges may be denied.

### **Subbasin 04-03-04 (Lower French Broad River Mainstem and Tributaries from Buncombe/Madison County line to Tennessee)**

#### **French Broad River**

This subbasin contains the lower French Broad River drainage area and flows into Tennessee. Significant discharges include CP&L in Marshall, Marshall WWTP (0.4 MGD), and the Hot Springs WWTP (.08 MGD). Since there is no interaction between the relatively few discharges, permit limits for oxygen-consuming wastes will be determined in accordance with standard procedures. The water quality is impaired, however, and fluctuates between ratings of Fair and Good/Fair at the Marshall ambient monitoring station. The impairment is attributed to upstream point and nonpoint sources.

#### **Ivy River**

The Ivy River from its headwaters to Adkins Creek is classified as WS-II, HQW but has been exempted from the water supply watershed protection rules limiting local development. The only significant discharge is the Mars Hill WWTP which discharges 0.425 MGD of treated wastewater

## *Chapter 6 - Goals, Concerns and Recommended Management Strategies*

to Gabriels Creek. The only other discharges in the watershed are the Greater Ivy Community Center and Ohio Electric Motors. The empirical model and HQW rules will be used to allocate new and expanding discharges.

Benthic sampling has been done near the headwaters and mouth of the Ivy River. Near the headwaters there is Excellent water quality while at the mouth there is Good quality. Little Ivy River near the mouth is also rated Good.

### Laurel Creek

There are a number of discharges within this watershed. Trout farms dominate Big and Little Laurel Creeks and will be further studied as discussed in subbasin -01. The remaining discharges are spread out over the watershed and if properly run should cause no significant impact. Big Laurel has been rated Excellent at its mouth while Shelton Laurel has been rated Good at its mouth. The upper watershed particularly Hampton Creek and Wolf Laurel Creek is under development pressure from resorts. Blue Mountain Golf & Country Club discharges to Wolf Laurel Branch and Skistok, Inc. will discharge to Hampton Creek. Another facility, English Wolf Lodge has received a permit for pump and haul. The empirical model will be used to allocate new and expanding discharges. Benthic surveys of this area are recommended.

### **6.6.2 Pigeon River Watershed (Subbasin 04-03-05)**

Subbasin 030405 contains the Pigeon River basin from its headwaters to Tennessee. The watershed includes both impaired waters and a large portion of HQW and ORW waters. There is one major lake, Waterville (Walters Lake), created on the Pigeon River by CP&L for hydropower production.

#### West Fork Pigeon River

The Middle Prong of the West Fork is classified HQW from its headwaters to Lake Logan based on an Excellent water quality rating. There are no significant discharges of oxygen-consuming wastes in this watershed. Bethel Junior High School discharges to Bird Creek to class WS-III Trout waters.

#### East Fork Pigeon River

The East Fork is classified HQW from its headwaters to Bee Branch based on an Excellent water quality rating. As discussed for subbasin 01, trout farms (3) can be a source of impact and should be studied further.

#### Pigeon River

Though there are few discharges to the Pigeon River, water quality has been significantly affected due to Champion International's effluent which dominates the river. Champion has made significant operational changes to reduce loading to the river since 1989. Effluent flow has been reduced from 48 MGD to 29 MGD. Stringent limits were recommended based on the results of a field calibrated study done by VERSAR in 1989. Limits were based on instream oxygenation and best available technology for wastewater treatment. Champion discharges a heated, high strength effluent. Champion also employs sidestream aeration at two sites below the plant to improve instream DO levels. The wasteload allocation results in DOs of at least 5 mg/l within the Pigeon River but may not adequately protect Waterville Lake downstream. The travel time from the discharge to Waterville Lake is approximately 2 days which may not be enough time for the decay of BOD within the river. As a result, Champion's effluent remains in the lake to be broken down. Waterville Lake is impacted by refractory BOD and nutrients from Champion's discharge. Lake water quality problems include algal blooms, chlorophyll-a violations, sedimentation, DO violations, dioxin contamination, and color impacts. The ongoing improvements to Champion's wastewater treatment plant should result in improved water quality in Waterville Lake and the Pigeon River below the lake. Currently, water is drawn from the mid-level of the lake and

## *Chapter 6 - Goals, Concerns and Recommended Management Strategies*

discharged through a hydroelectric facility downstream of the dam. As a result, the anoxic lake waters are impacting the river below the lake.

A field calibrated model commissioned by the US EPA indicates that Champion dominates the DO levels in the Pigeon River. Improvements to the municipal discharges, Clyde WWTP (0.21 MGD) and Waynesville WWTP (6 MGD) did not cause significant improvements in DO and were not recommended by VERSAR. However, since Waynesville is a significant discharger, future expansion requests may result in more stringent limits than are currently applied to this discharge. The remaining interacting discharges within this drainage area will be adequately managed through application of the field calibrated model.

Together Champion and Waynesville comprise 54% of the wasteflow to the Pigeon. Improvement to effluent and stream quality has been observed as Champion has implemented new treatment methods. Waynesville makes up 17% of the wasteflow and meets secondary treatment limits. If Waynesville requests expansion of its WWTP, improvements to its treatment will be required. The remaining discharges are insignificant at this time. A field study and new model calibration are recommended for the future once long term improvements to the paper mill effluent are observed.

### **Beaverdam Creek**

The Canton water treatment plant discharges to Rough Creek, a tributary of Beaverdam Creek. Rough Creek has been classified WS-I, HQW above the Canton water supply and HQW downstream.

### **Richland Creek**

Empirical modeling of Richland Creek and Factory Branch indicates that oxygen-consuming wastes are not impacting the streams or Lake Junaluska. However, connection to municipal sewerage is recommended for new and expanding discharges to Factory Branch.

### **Allen Creek**

A tributary to Richland Creek, upper Allen Creek is classified WS-I for protection of Waynesville's water supply and is subject to HQW and WS-I regulations. Any future upstream discharges must protect these classifications.

### **Jonathan Creek**

The Maggie Valley WWTP on Jonathan Creek has been permitted at 1 MGD. Though this plant has been sized to become the regional facility for the area; there are still a few discharges remaining in the upper reaches. Two of these facilities, Woodland Village and Hemlock Village, are scheduled for city sewer service. Biological monitoring shows Good water quality. The empirical model shows no DO sag but background water quality is not achieved prior to the confluence with the Pigeon River. Impact on the Pigeon is expected to be minimal.

### **Cataloochee Creek**

Cataloochee Creek and its tributaries are classified as ORW based on an Excellent rating of aquatic life, thus restricting any future proposed discharges to the creek.

### **Big Creek**

Big Creek and its tributaries are classified as HQW based on an Excellent rating of aquatic life. There are no significant discharges in either watershed and any future proposed discharges would need to be able to meet stringent limits so as to maintain the existing high water quality standards in the creek in accordance with the established regulations.

### **6.6.3 Nolichucky River Mainstem (04-03-06 through 04-03-07)**

No DO problems in the Nolichucky watershed have been documented through DEM's ambient monitoring network nor by NPDES instream self-monitoring data. There are a few discharges of oxygen-consuming wastes in the watershed. In addition, water temperatures are low and flow is available to assimilate wastes. Thus, no field calibrated models have been done. Permit limits for oxygen-consuming wastes will be determined in accordance with standard procedures.

#### **Subbasin 06 (North and South Toe River Watersheds)**

##### **North Toe River**

There are a few domestic discharges in this basin; most discharges are from mineral process industries. The largest municipal discharge is the Spruce Pine WWTP (0.8 MGD) which is expected to continue to expand. Smaller municipalities include Bakersville and Newland. There is no interaction between domestic discharges. The most significant discharges in the basin are quartz, feldspar and mica mines which contribute to the sedimentation of the North Toe River, but which have no oxygen-consuming wastes. The empirical model will be used to determine permit limits for new and expanding discharges.

##### **Little Crabtree Creek**

A tributary to the South Toe, Little Crabtree Creek and its tributaries George Fork and Allen Branch include 4 existing and 1 proposed discharge. An empirical model of these discharges shows no interaction between discharges and water quality at background conditions prior to confluence with the South Toe River.

Yancey County and the Town of Burnsville have proposed a new regional facility which will serve this area and eliminate the individual discharges. The proposed 300,000 gallon per day municipal wastewater plant may discharge to the South Toe River approximately one mile below the ORW classification line. The plant will include textile waste and will tie in the four small facilities nearby. A new feldspar mine has also been proposed for this reach but is not expected to have any oxygen-consuming waste components.

##### **Lower North Toe River**

The North Toe River below the South Toe River has no direct discharges. The only discharge is Tipton Hill School which discharges to Racon Creek. Part of the North Toe River may be upgraded to Class B waters since the waters are used for whitewater rafting.

##### **Nolichucky River**

The Nolichucky River is formed by the confluence of the Cane and North Toe Rivers. There are no discharges to the Nolichucky River or its tributaries. The river may be reclassified to B waters due to recreational usage. A reclassification study is planned for the summer of 1995.

#### **Subbasin 07 (Cane River Watershed)**

Subbasin 07 contains the watershed of the Cane River, a tributary of the Nolichucky River. The river is classified WS-II Trout from the headwaters to the Town of Burnsville's water supply intake. These waters are subject to the Water Supply rules for WS-II waters and the HQW management strategy. The only significant discharge in this reach is the Burnsville WWTP (0.8 MGD). An empirical model including the two existing discharges has been developed and permit limits for oxygen-consuming wastes will be determined in accordance with standard procedures. The Burnsville WWTP discharge, along with the DOC-Yancey County discharge is located downstream of the water supply area. There is interaction between Burnsville and DOC-Yancey Co., but no DO sag is predicted.

## **6.7 MANAGEMENT STRATEGIES FOR STORMWATER CONTROL**

A number of studies, including the Nationwide Urban Runoff Program (NURP) sponsored by the US Environmental Protection Agency, have shown that urban stormwater runoff, and the pollutants it carries, can be a significant contributor to water quality impairment. The North Carolina Division of Environmental Management (DEM) has identified 75 miles of streams in the French Broad River Basin as being impaired by urban stormwater. DEM administers a number of programs aimed at controlling urban stormwater runoff. These include: 1) programs for the control of development activities near High Quality Waters (HQW) and Outstanding Resource Waters (ORW) and activities within designated Water Supply (WS) watersheds and 2) NPDES stormwater permit requirements for industrial activities and for municipalities greater than 100,000 in population (see Section 5.3.2).

### **6.7.1 HQW, ORW and Water Supply Watersheds**

The French Broad River Basin includes a significant number of streams and lakes that are assigned these sensitive water classifications. As described in other parts of this plan, these waters carry with them specific management strategies to protect their uses, including measures to control stormwater runoff from urban development (Section 2.5.3 and Appendix I). The HQW and ORW requirements in this basin are implemented by DEM through its Asheville Regional Office. Any development activities subject to the HQW or ORW requirements must submit plans and receive stormwater approvals from these regional offices. The water supply protection requirements are implemented by all local governments that have jurisdiction in a water supply watershed. There are 25 local governments in the French Broad basin that have developed water supply watershed protective ordinances for watersheds in the basin. Development activities covered by water supply protection requirements must be reviewed and approved by the appropriate local government.

### **6.7.2 NPDES Stormwater Management**

Throughout the basin, various types of industrial activities with point source discharges of stormwater are required to be permitted under the NPDES stormwater program. These include discharges related to manufacturing, processing, materials storage areas and construction activities with greater than five acres of disturbance. All of those areas requiring coverage must develop Stormwater Pollution Prevention Plans (SWPPP) to minimize and control pollutants discharged from their stormwater systems. These SWPPPs are subject to review and modification by the permitted facilities and DEM to assure that management measures are appropriate.

### **6.7.3 Recommendations for Controlling Stormwater Impacts by Local Governments Not Subject to NPDES Stormwater Requirements**

Local governments throughout the French Broad basin that have a population of less than 100,000 are strongly encouraged to evaluate the potential impacts of stormwater runoff and develop stormwater management programs for control of these sources of pollutants. In this process a few program areas consistent with existing municipal NPDES programs are recommended as starting points for stormwater management. These include:

- Mapping of the local government's storm sewer system and outfall points, and developing procedures to update this information.
- Evaluating existing land uses in the local government's jurisdictional area to determine where sources of stormwater pollution may exist. In addition, local government activities and programs should be evaluated to determine where existing activities address stormwater management in some way, or could be modified to do so.

## *Chapter 6 - Goals, Concerns and Recommended Management Strategies*

- Developing educational programs to alert people to the activities that may contribute pollutants to stormwater runoff and how they can change their practices to minimize or eliminate these problems.
- Developing programs to locate and remove illicit connections (illegal discharge of non-stormwater materials) to the storm sewer system. These often occur in the form of floor drains and similar connections. In practice, stormwater management programs represent an area where local governments can develop their own ideas and activities for controlling sources of pollution.
- Reviewing local ordinances pertaining to parking, curb and gutter and open space requirements. Many of these local ordinances could be modified to enhance water quality protection from urban stormwater runoff impacts.

### **6.8 MANAGEMENT STRATEGIES FOR FECAL COLIFORM BACTERIA**

Fecal coliforms are bacteria typically associated with the intestinal tract of warm-blooded animals and are widely used as an indicator of the potential presence of pathogenic, or disease-causing, bacteria and viruses. They enter surface waters from improperly treated discharges of domestic wastewater and from nonpoint source runoff. Common nonpoint sources of fecal coliforms include leaking or failing septic systems, leaking sewer lines or pump station overflows, runoff from livestock operations and wildlife.

Table 4.6 in Chapter 4 indicates that there are 74 miles of streams impaired by fecal coliform bacteria, although the actual number of miles is probably significantly higher. First, in developing the use support ratings in Chapter 4, a Good or Excellent biological rating for a specific monitoring site would outweigh a fecal coliform measurement, at that same site, that was above the stream water quality standard. There are six stream segments in Table 4.2 that are considered supporting or support-threatened that have elevated fecal coliform levels. Secondly, fecal coliform measurements are taken only at the 29 ambient monitoring sites in the basin, so there are potentially many hundreds of miles of streams that are not monitored for fecal coliforms that may be impacted. The fecal coliform standard of 200/100ml was found to be exceeded at least 20% of the time over the past five years at 12 of the 29 ambient stations in the basin.

Several recommendations for addressing fecal coliform contamination are presented below.

- Proper maintenance by homeowners of onsite waste disposal systems such as septic tanks. Best management practices (BMPs) for onsite waste systems are presented on page A-VI-10 in Appendix VI.
- Proper maintenance and repair of sanitary sewer lines by WWTP authorities.
- Elimination of direct unpermitted discharges of domestic sewage wastes (also known as "straight pipes") from homes.
- Proper management of livestock to keep wastes from reaching surface waters. BMPs for controlling fecal coliform bacteria from livestock are listed on page A-VI-2 in Appendix VI.
- Encouragement of local health departments to routinely monitor waters known to be used for body contact recreation (e.g., swimming and tubing). DEM classifies such waters as B (see section 2.6 and Appendix I). There are 177 miles of streams in the French Broad basin with a B classification.

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*Chapter 6 - Goals, Concerns and Recommended Management Strategies*

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