**North Carolina Nutrient Removal Program**

North Carolina’s nutrient removal program covers both nitrogen and phosphorus and affects eight water shed basins where total maximum daily load (TMDLs) have been established for both total nitrogen and total phosphorus discharged. The major basins are the Neuse, Cape Fear, Catawba, Roanoke, Tar-Pamlico, White Oak, Yadkin and the Chowan).

There are a total of 69 NPDES major (>1 mgd) wastewater treatment facilities in North Carolina that have nitrogen discharge limits. Of the 69 facilities, 57 are municipal wastewater treatment plants and 12 are industrial. The industrial facilities are mostly pork and poultry processing plants with their own wastewater treatment facilities.

The basins with nutrient limits are as follows:

1. The Neuse River basin is the largest with 24 wastewater treatment plants with nitrogen limits.
2. The Cape Fear basin has 18 wastewater treatment plants with nitrogen limits.
3. The Tar-Pamlico has 11 wastewater treatment plants that are covered under a group mass based limit of 889,400 pounds per year total nitrogen.
4. Catawba basin with 8 wastewater treatment plants
5. Yadkin with 4 wastewater treatment plants
6. White Oak with 2 wastewater treatment plants
7. Chowan with 1 treatment plant
8. Roanoke with 1 treatment plant

The nutrient limits for most basins are established as an annual mass loading of nitrogen and phosphorus. The mass based loads are established for each discharger based on the individual plant design flows and published as an annual mass loading in pounds per year. The mass loading baseline uses the facilities permitted flow with a 30% reduction from the baseline. 17 wastewater treatment plants also have a monthly concentration limit for total nitrogen.

Of the 69 wastewater treatment facilities with nitrogen limits 14 facilities are presently using supplemental carbon for nitrogen removal. Methanol is used at the largest facilities including the City of Raleigh and Smithfield Foods pork processing facility. Other carbon sources used are glycerin, reclaimed acetic acid, waste sugar from a soda bottling company at one treatment plant and reclaimed methanol at one treatment plant.

The majority of treatment plants 55 out of 69 treatment plants are achieving the annual mass based load nitrogen permit limits without a supplemental carbon source. This is due to the mass based nitrogen permit being calculated based on the facilities permitted flow. Most wastewater treatment plants in North Carolina are operating well below their permitted flow so that the equivalent concentration needed to meet the mass limit is >6 mg/l. This removal can in most cases be achieved consistently without the use of supplemental carbon. In addition in the Tar-Pamlico basin all of the wastewater treatment plants share a combined group mass based nitrogen limit that further reduces the overall removal requirements for anyone individual treatment plant.

It is anticipated that more treatment facilities will be required to use a supplemental carbon source in the future as plant flows increase. This will increase the required nitrogen removal treatment level to achieve the annual mass based load requirement.