The Mitchell River Benthic Study
Results From Season 2

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This study was intended to provide a look at how stream restoration affects benthic insects and other organisms living on the bottom of the river. These aquatic animals are very sensitive to water quality and have been studied extensively as water quality indicators. They also form important links in the aquatic food chain leading to fish (and fisherman) and are an indication of both the water quality and biological productivity of a stream.

Samples have been collected for two years of a five-year study. The results from the first two years give some subtle indications of what might be important results and trends.

The data from the analysis of year two samples (2004) indicates that we had collected about the same total number of species as last season (141 this year vs. 142 in 2003). Also, more total organisms appeared to be collected at each of the restoration sites, compared with last year, in some cases twice as many individuals. The number of species per site also increased with most cases 2 or 3 times the number found last year.

All sites had unique species not found in any other site sample. Mickey restoration had the highest number of unique species at 14 and Brendle restoration had the lowest at 2. All the others (six projects) had 4-5 unique species.

A cursory look at the five most common species in each sample showed that the most common species found in all samples was the same, accounting for about 25% of all individuals (Ephemera sp.). Since this indicates a group of hard to distinguish species, researchers don't know at the moment how many species are lumped into this classification. The next most common species was Stenonema pedemotonum, which was number 2 in Wood, Darmel and Harris restoration sites, number 3 in Everhart and number 9 in Brendle. Polyphemus flavum ranked number 3 in 4 samples. The remaining common species include Plautus sp. in 2 samples, Eurylophella sp. in 2, Epeorus rubidus/subpallidus in three, isoperla species in 3 and Cheumatopsyche sp. in two.

The distribution of functional feeding groups within the five most common species of all samples includes scrapers (42%), collector-gatherers (20%), shredders (15%), filtering collectors (10%), and predators (10%). All samples had at least four different types, indicating a diversity of aquatic food web within the restoration reach.

From just these two year's data, researchers can see that the water quality is generally good, the benthic communities appear healthy, and diverse and the basic components of the aquatic food chain have recovered in the stream restoration reaches.
Saving Freshwater Mussels

by Robert B. Nichols
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A hundred years ago, poor logging and agricultural practices, few controls on industrial pollutants, and little sewage treatment, extirpated mussels from many North Carolina streams. Today, many of those problems in our streams have been reversed, but the mussels have not always returned. Mussels have a complicated life cycle that does not allow them to quickly come back to a stream. Introducing mussels can help raise biodiversity and restore aquatic community functions.

In 2001, the North Carolina Wildlife Resources Commission (NCWRC) began a project to put mussels back into streams from which they had disappeared. One of these streams was the Mitchell River, a North Carolina treasure, that is home to several rare aquatic and terrestrial species, clean water, and trout fishing, but despite all of these good qualities mussels are virtually absent above the Kapps Mill dam. The NCWRC mussel relocation project was just one more conservation project aimed at stewardship of the Mitchell River. The Surry Soil and Water Conservation District and the Friends of the Mitchell have done many stream restoration projects in the watershed and have worked to get conservation easements and to fence out cattle. The NCWRC project objective was to restore mussels to the upper Mitchell River above Kapps Mill dam by reintroducing the Eastern Elliptio and the Variable spike, Elliptio complanata and Elliptio icterina.

On a cool, fall day during October 2004, NCWRC biologists, Rob Nichols, Jason Meador, Nolan Barish, Ryan Heise, Angie Rodries, Kin Hodges, and Kevin Hining, in cooperation with Jamie Tilley and Dick Everhart with the Surry Soil and Water Conservation District, collected 302 native freshwater mussels from sites below the dam. Each mussel was then hand planted with their ventral side down into the substrate, so that they could immediately begin siphoning and feeding in their new home. Two weeks later, biologists returned to check on the mussels and saw that they were all siphoning, a sign that they were acclimating to their new surroundings. Biologists have plans to return each year to see how the mussels are doing. The NCWRC hopes to continue to work alongside other agencies, conservation groups, and landowners, to do conservation projects in the Mitchell River.

Properly Designed Access Roads

We have all heard and witnessed the muddy creeks and the disparaging remarks about the logger who is destroying our environment, or the foreigners who have moved in, and are building roads indiscriminately up the mountain side. The truth is most loggers are good stewards of the environment and most people moving into the area want to live here because of the pristine beauty of our natural resources.

It is a fact that poorly constructed access roads often cause severe erosion and stream sedimentation that benefit no one. Ultimately, it is the landowners responsibility to make sure the road is properly constructed. The North Carolina Division of Forest Resources gives guidance to help landowners get the road they need through careful planning, design, and supervision. Whether landowners do the planning themselves or hire a professional, knowledge about planning, layout, and construction of access roads is valuable. Brian Elum, County Forest Ranger in Surry County often consults with landowners to be sure the planning stages do take place. He suggests landowners or anyone considering constructing an access road look at the following web site that offers very comprehensive steps to the planning, design, and construction of access roads: http://www.dfr.state.nc.us/stewardship/roadguide/stew_roadguideintro.htm

Kapps Mill dam. The mussels were layered in moist burlap and placed in coolers and then moved to sites without mussels above the dam. Each mussel was then hand
Restoring Water Quality on the Mitchell

by Jamie Tilley
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Over 2,661 miles of streams in North Carolina are currently recorded as impaired according to the draft combined 305(b)/303(d) report (May 2004). This is a total of 11,043 miles of streams that are assessed in North Carolina. Only about 30% of North Carolina streams are assessed. The two common pollutants in the South Fork Mitchell River watershed are fecal coliform and sediment. Fecal coliform is a major source of pollution coming from cattle having access to these streams.

Surry Soil and Water Conservation District (SWCD) in partnership with Clean Water Management Trust Fund (CWMTF) was able to address water quality problems using Best Management Practices (BMPs) in the Mitchell River watershed and its degraded tributaries. This was accomplished by targeting specific farms in need of cattle exclusion and restoring stream banks.

Eight BMP Livestock restoration projects were completed. Each livestock restoration project entailed the acquisition of an appropriate donated conservation easement or long-term agreement. Surry SWCD worked with landowners up-front to secure conservation easements or long-term agreements, before proceeding with BMP quality improvement projects on their properties. Surry SWCD was able to install 5 wells, 19 heavy use areas (Figure 1), 19 watering systems (Figure 2), and fencing for cattle exclusion (Figure 3) totaling over 15,300 ft.

Surry SWCD also planned and installed 11 additional livestock BMP systems on farms in the Mitchell River and South Fork watershed, exceeding project goals and objectives. Surry SWCD was able to do these additional BMPs installing 3 stream crossings, 5 wells, 14 watering systems, 18 heavy use areas, and fencing for cattle exclusion totaling over 23,000 ft. The funding sources used were dollars from Ag Cost Share, Division of Water Resources, and Environmental Quality Incentive Program. The additional money used with CWMTF funding was over $120,000. Surry SWCD also monitored the water quality to see if it improved after these systems had been installed. Surry SWCD continues to provide follow-up reviews to ensure that the projects are operating properly and being managed accordingly.

Surry SWCD also wanted to document that cattle exclusion was beneficial to the water quality in these watersheds. Surry SWCD started a fecal coliform and Total Suspended Solids sampling at 7 sites. Five of the sites were BMP projects and two control sites. The sampling data proved that over time when cattle were excluded from the river and streams, the bacteria levels drop and the water quality improved. These samples were taken by grab sampling (Figure 4). The bar graphs below show a before and after at the Snow site (Figure 5, 6). These sites were used for BMP monitoring.
Underwater Tank – The Snapping Turtle

by Joe Mickey
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North Carolina Wildlife Resources Commission (NCWRC)

Have you ever been wading in the Mitchell or Yadkin River and suddenly seen a large, dark object moving under water or been surprised when fishing when you caught a large, rather aggressive turtle? You probably just encountered a snapping turtle *Chelydra serpentina*. The snapping turtle is North Carolina's largest freshwater turtle. Its large head, long tail, and short temper make identification easy. The snapping turtle gets its name because they defend themselves by snapping aggressively when molested or handled. They are considered top level predators and are important animals in aquatic ecosystems.

If you encounter a snapping turtle, as a defense they often elevate their hindquarters, gape open their jaws, and then suddenly lunge with a snake-like strike. They may also secrete a strong-smelling musk from glands along the sides of the body when irritated. In the water they are less aggressive and will usually retreat to a safe place when confronted by a large animal or human.

Snapping turtles are omnivorous (opportunistic feeders) feeding upon just about any small animal slow enough to be captured. Much of their food is scavenged and vegetation comprises a high percent of their diet. To ambush their prey, they will often lie buried in the mud with only their eyes exposed, but they will also forage actively along the bottom, using both sight and smell to detect food. They do not chew their food, they swallow small prey whole. Larger food items are bitten into chunks that can be swallowed. A healthy snapping turtle can often survive for months without food.

Large snapping turtles have few predators other than humans. However, their eggs and young are preyed upon by many predators, including some mammals, birds, alligators and large fish. Large snapping turtles can be very dangerous if not handled properly. Their powerful, sharp-edged jaws can inflict considerable injury. If a snapper is to be handled, it is best lifted carefully by its long, strong tail and held well away from one's body.

So the next time you encounter a snapping turtle, observe it and then let it return to its home to be observed again another day.