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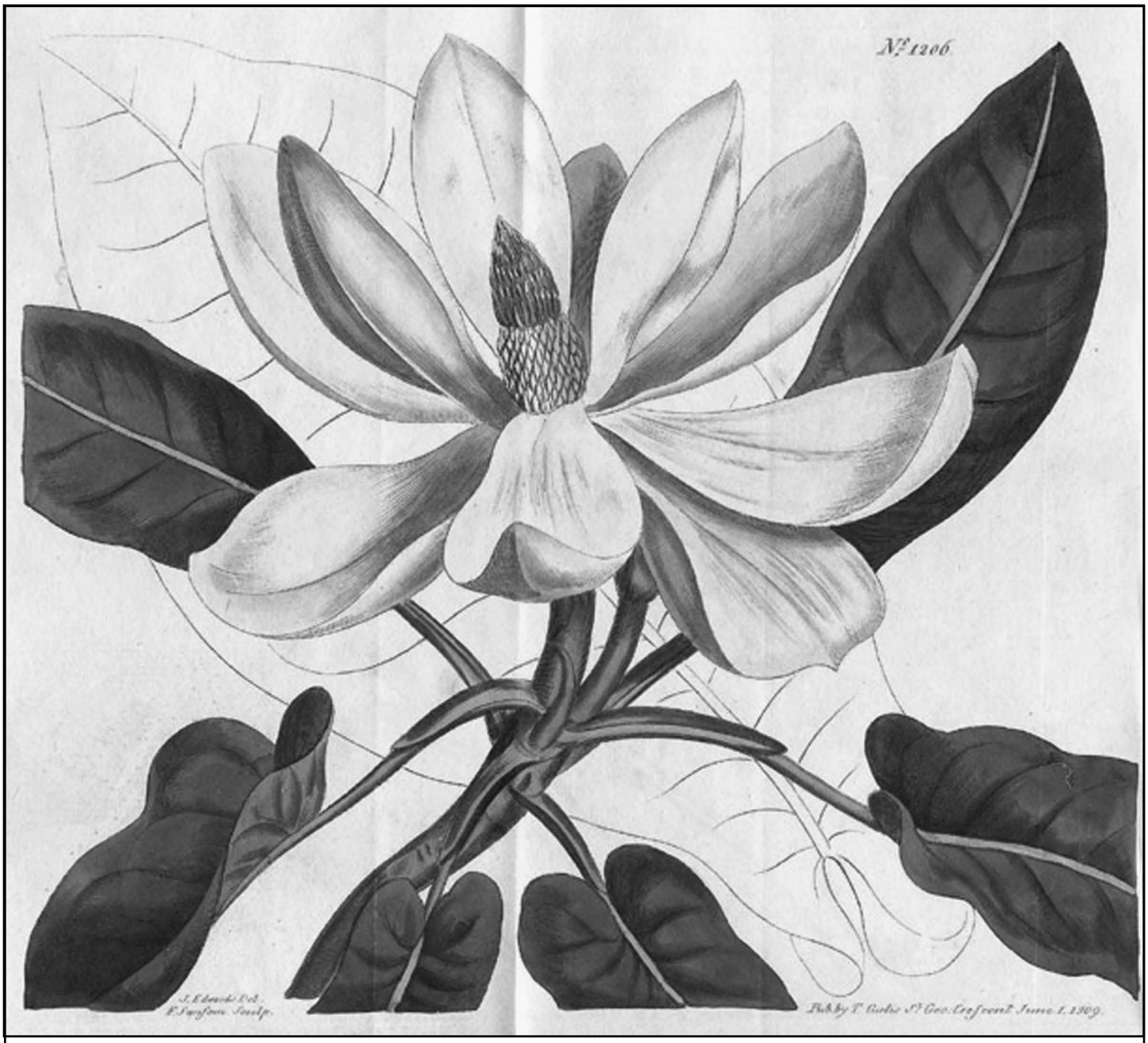

Magnolia fraseri
hand-colored engraving by Francis Sansom after Sydenham Teast Edwards. Curtis's Botanical Magazine, London, 1809.

I n s i d e

Director's Page

Buzz Williams

The campaign by American Whitewater to force the Forest Service to open the Chattooga River headwaters to whitewater boating has become one of the most polarizing issues since the Chattooga was designated as a National Wild and Scenic River in 1974. The Chattooga Conservancy's position to keep the headwaters closed to boating is drawing increasing flak from the "paddling" community as the controversy escalates. In compliance with several requests for a more detailed explanation of our position, here is a synopsis of the issue as I see it.

In June 2006, American Whitewater (AW) filed a lawsuit asking a federal court to order the Forest Service to open the headwaters of the Chattooga River to whitewater boating with no restrictions, based on their claim that the closure order that has existed since 1976 is in violation of the Wild and Scenic Rivers Act and the Wilderness Act. (The headwaters of the Chattooga Wild and Scenic River Corridor transects Ellicott Rock Wilderness.) AW claims that fair access for recreational use of the headwaters of the Chattooga River is guaranteed by these laws that define recreation as a use compatible with protecting the outstandingly remarkable values of these lands within the National Wilderness Preservation System. AW also claims that a decision by the chief of the Forest Service to uphold AW's appeal of the 2005 Revised Sumter National Forest Plan on the issue of boating on the headwaters, and which remanded the issue to lower level officials for reanalysis, bolsters their case that the headwaters should be thrown open until there is proof that their activity would cause irreparable harm.

AW's lawsuit throws all these questions to the wind. They want "access now, with no restrictions." Rather than participating in the process of determining the highest and best use of the headwaters with due consideration to protecting the resource, AW's lawsuit raises the possibilities of irreparable harm from risks unknown to other users, and to the river itself.

In response to AW's suit, the Forest Service points out that although the chief of the Forest Service ordered a reanalysis, he also allowed the closure to remain in place and did not take a position on the outcome of the reanalysis. And further, The Forest Service has asserted that AW does not have standing to argue that the closure should be lifted, since they did not take issue with the closure at anytime during the planning process, at the time allotted for public input on the issue. In regard to AW's claim that federal law guarantees their right to access, the Forest Service points out that whitewater boating is only one of many possible uses and when conflicts arise, they have the discretion to limit some use to protect the resource.

Until AW filed the lawsuit in federal court to open the headwaters to boating, I had been turning the issue over and over in an effort to come up with some way that all users could use the headwaters without conflict. The more I thought, the more potential problems came to mind, which led to a decision to support the existing closure. Nonetheless, I resolved to participate in fact-finding to explore the possibilities of coexistence of user groups. Here are some of my chief concerns: Given the rapid growth of "creek boating," how many boaters would show up in the headwaters? What water levels are feasible for a headwater run? Would there be new access points created below private property? What about the massive "strainer" hazards currently in place, and in the foreseeable future due to the inevitable die off (from Hemlock Woolly Adelgid epidemic) of nearly all the great hemlocks in the headwaters? Would search and rescue teams be permitted to create new access roads? (Check out the highway put in to Ravens Rock on the Georgia side of the river for the recovery of Rachael Trois' body.) If the Forest Service did open the headwaters to limited boating, would they have enough law enforcement capacity to enforce restrictions? (Yes, "creeking" is somewhat self-regulated, but not at higher water levels—check out Overflow Creek or the Green River on a good day.) What about conflicts with other users, beside fishermen, that use the headwaters at all levels? What about the extremely delicate river side zone teaming with rare plants and animals? What about the threat to an increasingly rare opportunity for a true wilderness experience?

AW's lawsuit throws all these questions to the wind. They want "access now, with no restrictions." Rather than participating in the process of determining the highest and best use of the headwaters with due consideration to protecting the resource, AW's lawsuit raises the possibilities of irreparable harm from risks unknown to other users, and to the river itself. As Executive Director of the Chattooga Conservancy, spokesman for the Friends of the Upper Chattooga and friend to the paddling community, and on behalf of those who put the river first: open the headwaters without regard to finding answers to these critical questions? No way.

Bartram's Mountain Magnolia

Robert Zahner

The endemic Fraser magnolia of our southern mountains was named in 1788 in honor of John Fraser, a British publisher of botanicals, who collected plants in eastern America after the Revolutionary War. The naming of this beautiful tree has been an enigma for naturalists, especially for admirers of William Bartram, for perhaps 200 years. Legends have developed that imply, or even boldly assume, that John Fraser pirated from William Bartram the credit for discovering this magnolia. I have wondered about this question myself for many years. Lately I have done some investigative inquiry, and learned some new facts that only deepen the mystery. Here is my report. It begins on the southwestern slopes of Rabun Bald Mountain, just northeast of Clayton, Georgia.

William Bartram discovered his "mountain magnolia" in north Georgia in May, 1775, thirteen years before this species was named *Magnolia fraseri*, on his only journey into the southern Appalachians. In his Travels Bartram gives a detailed description of his discovery of this new species, which he tentatively named "Magnolia auriculata," Latin for the ear lobes or lappets at the base of the leaf blades.

On this day Bartram was traveling northwest on the well worn trail from the abandoned Cherokee town of Keowee, over the mountains into the headwaters of the Little Tennessee River (Bartram's "Tanase" River). En route he had seen many specimens of the magnolia, in full bloom, but it was not until he reached today's Courthouse Gap that he stopped to study these trees. Bartram named the nearby mountain "Mount Magnolia" (today's Pinnacle Knob). Francis Harper describes and interprets Bartram's discovery, which Harper places near the cascades on today's Martin Creek

Twenty years ago I retraced this route when researching the journey of another early botanical explorer, the Frenchman Andre Michaux. The old trail through the gap is still discernible. Michaux himself plays an important role in my investigation below.

I must digress here to give some botanical protocol on "discovering" and "naming" plants. Many plants, most perhaps, are well known by local people and given colloquial names long before they are "discovered" by botanists. Cherokee Indians, early Spanish and English traders and explorers in Cherokee country had traveled these mountain trails for decades before Bartram. Certainly as they encountered unusual plants, such as the beautiful magnolia trees, they gave them names. Some have become our local common names, but in the case of the magnolia we have no record of an early name.

In the science of taxonomy, until a plant has been described botanically and given a scientific name it is considered undiscovered. Floral and vegetative characteristics are usually filed in an herbarium, and a proposed botanical name is published in a scientific paper, with the date and field location of the "type" specimen. The person naming the plant is the "authority," often today the same person as the "discoverer."

However, in the mid 18th century the authority had to have European validation, with the direct or indirect approval of Linnaean scholars for proposed binomial Latin names. This requirement became a frustrating obstacle for William Bartram, as I will explain, but not for John Fraser. After Linnaeus' death in 1778 the protocol for naming plants was gradually eased, so that by the end of the century Americans could publish their own descriptions. However, as we will see, this was too late for Bartram's collection.

In the case of *Magnolia fraseri*, the authority is one Thomas Walter, not the discoverer John Fraser. The plant name and description were published in London in 1788. The type specimen is today in the British Museum of Natural History, collected by John Fraser in 1787, twelve years after Bartram's discovery, and the type location is apparently unknown. Why is Walter the authority? Did Fraser or Walter know of Bartram's prior discovery? Why did Bartram delay documentation of his discovery? Where is the type location for the Walter/Fraser tree? These are questions that have led to the myth that Fraser and Walter might have plagiarized Bartram's authority.

Now, back to William Bartram. On his return to Philadelphia in 1776 Bartram certainly intended to publish descriptions of the many new plants that he had collected during his three year journey through the South. Among these was his Magnolia auriculata. The embargo of the Revolutionary War obviously delayed these publications, but by 1781 Bartram had completed his manuscript with descriptions of his new plant discoveries. He had previously shipped his carefully prepared and packed herbarium specimens to Dr. John Fothergill in London for publication, as required by the standards of the time.

However, Fothergill died in 1780 before he could unpack Bartram's herbarium, which then became part of Fothergill's famous herbarium which was purchased in turn by Sir Joseph Banks, of the Royal Botanic Gardens at Kew. Banks passed Bartram's request on to his botanical curator, Daniel Solander, a Linnaean trainee, to supply Bartram with his long awaited names and accurate descriptions of his new species. However, both Banks and Solander were absorbed at the time in describing the thousands of new plants from Captain James Cook's famous voyage, and when Solander died in 1782. Bartram's collection lay still unpacked in Banks' herbarium. There the dried plants lay tied in bundles for another 38 years! The specimens of Bartram's proposed Magnolia auriculata were finally transferred with his entire collection to the British Museum in 1820 where they reside today.

Bartram's Mountain Magnolia

William Bartram's Travels was finally published in 1791, but his "mountain magnolia" had already been published as "Fraser's magnolia." Harper makes clear that plantsmen of the 1780s knew of Bartram's large collection of plants new to science, including a 1783 advertisement by a Philadelphia publisher stating that Bartram had "a catalog of near one hundred American trees and shrubs of which have never yet been described." Thus by the early 1780s Bartram's discovery of Magnolia auriculata was known in America.

Enter John Fraser, British plant collector, botanical explorer, publisher in London of botanicals, and self taught botanist. Fraser made many collecting trips to eastern North America, the first in 1784, nine years after Bartram's travels in the South. Over the next 20 years he introduced into England more than 200 species of American plants, especially flowering trees and shrubs, gaining a glowing reputation as a "zealous and indefatigable collector of plants." Fraser's collecting in America was in reality a business venture, his collections destined for sale in his nursery and other commercial outlets in England.

Biographers and modern natural history writers in America portray mixed characterizations of John Fraser. Apparently there is a general impression that Fraser's botanical competence was not on a par with his contemporaries. He has been called a botanical entrepreneur and an insufferable egotist. Fraser himself reveals something of his ego, stating his determination to excel the French botanist Andre Michaux in plant discoveries, thus obtaining equal honors for Great Britain.

Leaving out the latest evidence, has there been ample circumstantial evidence over the years to form a basis for the magnolia piracy legend?

Although most of Fraser's collecting in America was after 1789, I am concerned here with his earlier visit in 1786-87, to South Carolina. On this trip Fraser met and befriended Thomas Walter, another self taught botanist and plant collector, who was in the process of compiling an extensive flora of the native plants near his home north of Charleston. Rembert suggests that Walter was stimulated into the publication of his flora by John Fraser, the publisher of botanicals, who contracted with Walter to accomplish this.

Thomas Walter evidently agreed to include in his proposed flora any plants that Fraser might collect in his travels throughout the Carolinas. Fraser reported that Walter had collected and described 640 species from coastal South Carolina, and that in this number 200 species were new to science. In Fraser's collecting trips he claimed to have increased this number to 1060, adding that many were new to science. Included in this latter number was our controversial magnolia. The combined collections and plant descriptions of the two botanists became the manuscript for Walter's Flora Caroliniana, which Fraser took to London and published in 1788.

Although John Fraser kept no field journal, in a brief account of his 1787 collecting trip, he asserts that there is not a person on the face of the earth, but himself, who knows the particular spots where his collection grows. Thus we have to do a little speculating in order to pinpoint the location of the type specimen of Fraser's magnolia.

It was during this 1786-87 visit to South Carolina that John Fraser made an acquaintance with Andre Michaux in Charleston, and the two men met infrequently over a period of six months. In the spring of 1787 Fraser proposed to accompany the Frenchman on a botanizing trip into the North Carolina mountains.

The two men traveled together for about a month in May, 1787. What conversations did the two botanists have while acquaintances in Charleston, and later in close proximity, for so long a time on their expedition? The mission of both was the same, to collect unusual plants for shipment to Europe. What would you talk about? Perhaps the best route to take into the mountains? Perhaps the possibility of encountering unusual plants? Perhaps previous botanizing in this region by others? Recently discovered documents give us important clues for answers.

There is new evidence that Andre Michaux visited William Bartram in Philadelphia on at least two occasions in 1786. The dates of these visits are crucial for my discussions that follow, as both occurred before his encounter with John Fraser in South Carolina. The American Philosophical Society in Philadelphia has documents on microfilm dated April 1, 1787, in Michaux's handwriting stating that he visited Bartram's garden between June 5 and 11, 1786, and again on September 2, 1786. On these visits with William Bartram there is no question that Michaux learned of Bartram's discovery of the magnolia, as he states in a later journal entry, in December, 1788, "...je reconnus le Magnolia qui a ete nomme montana M. auriculata par Bartram."

Now I will speculate on plausible conversations between Bartram and Michaux. Learning of Michaux's plans to explore and collect plants in the Carolina mountains, Bartram in all probability suggested the most feasible route from Charleston into the mountains, the well traveled Cherokee Trail. As mentioned above it was on this trail, near Pinnacle Knob in north Georgia, that Bartram had described his mountain magnolia 12 years previously. It is plausible that it was in conversation with Michaux regarding this route, that Bartram related his discovery of the new species of magnolia, a beautiful

Bartram's Mountain Magnolia

tree with cream colored flowers, well worth collecting seed and seedlings for shipment to France. Was this information passed on from Michaux to Fraser? Because it is so very rational, I am tempted to say, "Probably."

But the two men were not compatible companions. One of Fraser's more telling personality indictments comes from Michaux himself, in a well documented incident during the time Fraser accompanied Michaux on this 1787 exploration into the mountains. Michaux notes in his journal on May 29th that he found Fraser a superficial bore and that after some time he managed to escape from Fraser's "irritating chatter and foolish questions." Peattie makes scathing, albeit amusing, comments on this encounter between Michaux and Fraser, concluding that Fraser "intended that Louis XVI should have no flowers of which George III was deprived."

It was at a point in South Carolina near Augusta that Fraser and Michaux parted company. Michaux was delayed for several days by the theft of his horses, and presumably Fraser continued on the main trail into north Georgia. Notwithstanding the personality disparity between the two men, which emerged on the trail, it is very likely that over the six months of their acquaintance Michaux described to Fraser Bartram's discovery of the magnolia, as a beautiful flowering plant to export to England. Even though they were on similar missions in America, from Michaux's perspective they were not in competition. Fraser, however, was highly competitive, hoping to establish a lucrative business importing plants in England. He would certainly have probed the Frenchman concerning any interesting plants he would likely encounter in the mountains.

Fraser, now traveling alone, would have crossed the Chattooga River in early June, 1787, and continued on up to the pass at Courthouse Gap. Like Bartram 12 years before, he had been passing many specimens of the magnolia, although at that elevation none would still be in flower and fruits would be setting. Like Bartram before him, Fraser likely wrote his description of the species soon after encountering it, and collected fruits and leaf samples. At some point on this journey, probably on his return later that summer when the fruits were mature, Fraser collected seeds and dug many seedling specimens of the magnolia for shipment to England.

Fraser returned in late summer to the home of his new friend Thomas Walter. The two men quickly completed the manuscript for the Flora (written entirely in Latin), prepared descriptions of the many new plants, packaged many live plants for the ocean voyage, and had it all ready for shipment when Fraser left for England in October of that year, 1787. Fraser had not seen flowers of the new magnolia. At least five of the magnolia seedlings made the voyage safely and were sold in England. Many dried specimens, presumably of the leaves, were also sold.

Fraser arrived in England in March, 1788, and in four months he had published Walter's Flora Caroliniana, a remarkable 263 page volume. Six months later, in early 1789, Thomas Walter died suddenly at his home in South Carolina, without having seen his published Flora.

Walter had not seen the magnolia in its native habitat, nor for that matter, any of Fraser's hundreds of other species. Fraser himself must have written the descriptions of the plants he collected, and no doubt helped Walter with the Latin names assigned to them. We must remember that Fraser was in effect the co-author of the book. As editor and publisher of the Flora, Fraser called attention to himself by featuring a drawing of the unusual leaves and fruit of *Magnolia fraseri* in the place of honor in the Flora, as the frontispiece.

It has been understood by plant scholars since the publication of the Flora that Walter named the magnolia in honor of his new friend. This transaction had to have been agreed upon in South Carolina before Fraser departed with the manuscript. Rembert presents Thomas Walter as an honest and industrious citizen scientist, who obviously did not know of Bartram's prior discovery of the magnolia.

There is no evidence that John Fraser ever met William Bartram. It is strange that in a decade of plant explorations in America, Fraser never visited the Bartrams' well known garden in Philadelphia. William Bartram, and his father John, were the premier plantsmen of the Americas in the second half the 18th century. The Bartrams were visited often and consulted by other visiting Europeans. Fraser's behavior is certainly not consistent with his mission in America.

Fraser claimed many of his plants as "new," a term that Hooker continued to use 40 years later, when it was known that they were not new to science. For example, in England Fraser was credited with discovering *Azalea arborescens*, *A. calendulacea*, *Betula lutea*, *Rhododendron catawbiense*, and *R. punctatum*, all of which were actually Michaux discoveries. It is evident that by "new," Fraser and Hooker meant previously unknown horticultural introductions for England.

Hooker relates an interesting account of Fraser's 1799 "discovery" of the Catawba rhododendron, an account that had to originate with Fraser himself: "On the summit of the Great Roa [Roan Mountain] which divides the eastern from the western waters, on a spot which commands a view of five states, . . . it was Mr. Fraser's good fortune to discover . . . the new and splendid *Rhododendron catawbiense* . . ."

As author of the Flora, Walter was assumed to be the authority for those plants that were considered new to science at the time. Today the names of 88 species described by Walter in his Flora are still valid, including the *Magnolia fraseri*. Of the hundreds

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of new (to England?) plants claimed by Fraser to have been collected on his 1787 trip into the mountains, the only other species (genus, as it turned out) that was new to science was also named for Fraser by Walter, the rare columbo, *Frasera carolinensis*.

It is curious that Fraser did not choose to be the authority for any of his collection. He was a relatively young professional (age 38 at the time), and as we have seen, certainly ambitious and eager to make a name for himself. Having plants named for him by others was considered more prestigious, which conforms with what we know of Fraser's ego. More likely, Fraser did not collect many plants that were in fact new to science. Several species other than the magnolia and the columbo have been named in his honor: the Fraser fir, *Abies fraseri*, Fraser's sedge, *Cymophyllus fraseri*, and the rare *Lysimachia fraseri*, all native to our southern Appalachians. The fir was named by Frederick Pursh, the sedge by Antoni Andrzejowski, and the *Lysimachia* by Jean Duby, all some years after Fraser's death. As was popular in the 19th century, plants were often named to honor contributors to plant science, not necessarily the discoverers.

John Fraser is not listed in Radford, et. al., as having described and named any plant in the southeastern United States, nor in Asa Grey's Manual of Botany for eastern North America. Thus apparently Fraser never found many plants that were new to science, as we can anticipate from comments written by Andre Michaux in his journal after they parted ways in 1787: "Fraser proved to have small knowledge of natural history and insisted on loading the party down with great quantities of common plants of little value, all the while wasting precious time on trifles."

After the publication of Walter's Flora, Fraser returned to America four times until his health failed following a horse fall, about 1810. He died in 1811. For over two decades John Fraser was renowned in Great Britain as an indefatigable collector and importer of plants. His early ambition to equal Andre Michaux was fulfilled. Sargent writes, "The value of his [Fraser's] contributions to English gardens has, perhaps, never been surpassed by those of any botanical traveler."

In the 18th and 19th centuries there was a great demand in England for exotic plants. John Fraser was eager to establish a name for himself, his nursery, and his publishing business by introducing American plants into the elite English horticultural circles and estate gardens. Among his other earliest introductions, Fraser's new magnolia seedlings, and even his dried specimens, received much publicity in British horticultural circles.

So where does my investigation of the Fraser/Bartram magnolia enigma leave us? I believe my reporting here of probable conversations between Andre Michaux and John Fraser is the first to document a pathway by which Fraser could have learned of Bartram's prior discovery. Until now, I don't believe this evidence has entered the piracy myth. This fact adds fuel to the controversy, of course, and I admit that I am now inclined to believe that Fraser did in fact act selfishly.

I believe it has been Fraser's annoying egotism, a reputation nourished by many writers, that has created the assumption that surely he knew of and ignored William Bartram's plant discoveries. There is ample historical record that Fraser was desperate for recognition, leading to the supposition that he rushed into print with the magnolia. To me the question of why Fraser never visited Bartram also says something questionable about his character. Was he too insecure to meet with the American authority?

Although in America there has not been the reverence for John Fraser that developed in England, even we Bartram partisans should recognize Fraser's accomplishments, which escalated after 1788. He obviously matured over the years following his 1786-87 encounter with Andre Michaux. When the two men met again in 1791, Michaux himself comments that Fraser was more congenial. It seems that Fraser's timely acquaintance with Thomas Walter was pivotal in his career, as the publication of the Flora gained his much sought reputation among his English peers.

Although I consider this investigation interesting, and I learned new details that strengthen the old myth, my report reaches no firm conclusion. There will still be those who speculate about taxonomic shenanigans. However, it was European taxonomic protocol that thwarted the documentation of the authentic discovery of Bartram's mountain magnolia. John Fraser had nothing to do with these frustrating events, and if in truth he knew nothing of Bartram's prior discovery, Fraser is indeed vindicated. And after all, even if he knew of Bartram's magnolia, which was unpublished, Fraser (through Water's Flora) had the right to publish his own discovery, and let Linnaean scholars decide the authority.

"Mountain" magnolia, Bartram's common name for the Fraser magnolia, and Bartram's botanical name for the tree, Magnolia auriculata, are both more descriptive and far more elegant than the accepted names. Of the eight species of magnolia in North America, four have auriculate leaves: bigleaf magnolia, pyramid magnolia, Ashe magnolia, and of course, Fraser magnolia. Thus it would be fitting that any of these be named auriculata, although none are. Personally, I take my cue from the naturalists and botanical writers of the early 20th century, who, although stuck with the scientific name of *M. fraseri*, refer to the tree by its common name as "mountain magnolia."

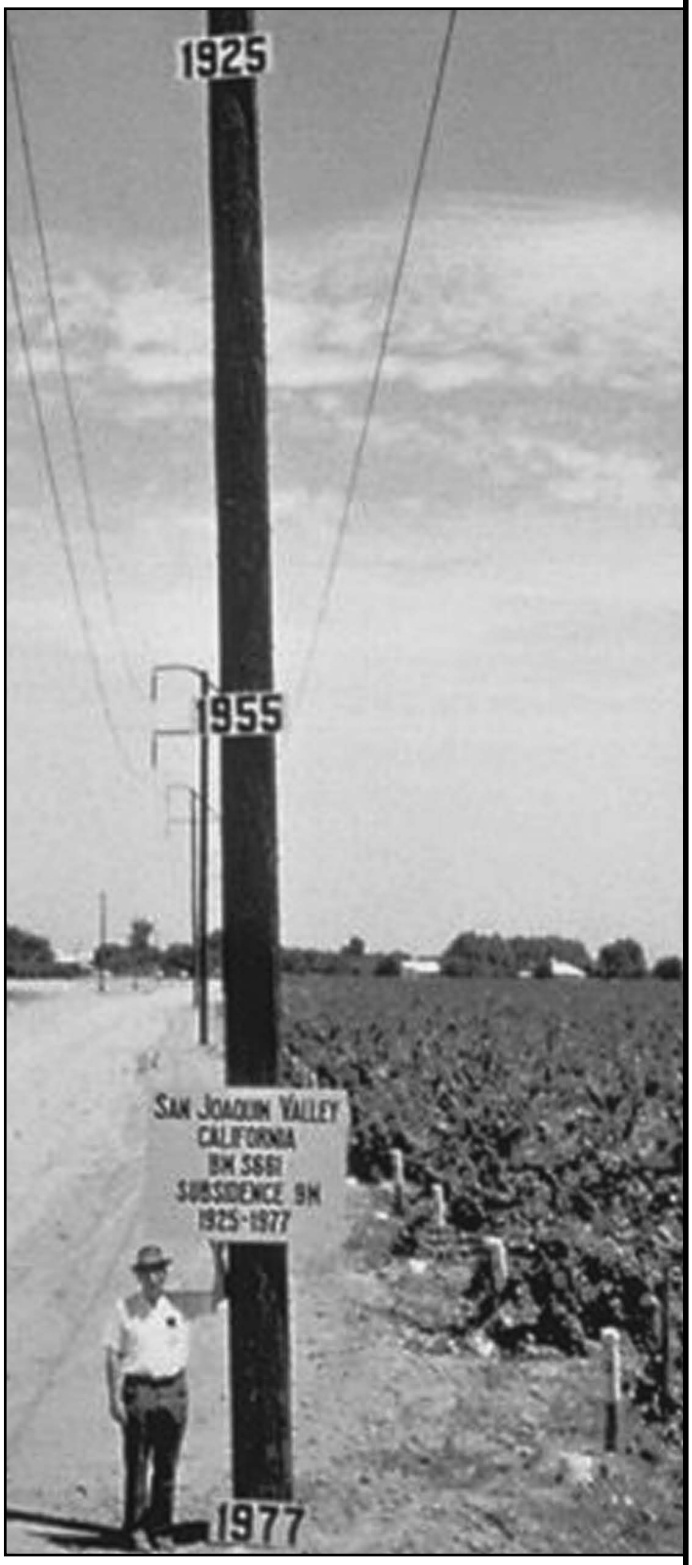
The Looming Worldwide Water Crisis

Jenny Sanders

It is estimated that by the year 2020, Georgians will face water shortages if population growth continues at present rates. This startling statistic has surfaced at nearly every water quality meeting that I have attended recently. Is it an exaggeration? Not quite. This is just Georgia's take on a bigger problem that the entire world is facing: a water crisis. Simply put, humans are running out of fresh water due to blatantly wasteful management practices and overuse. Consequently, irresponsible ground and surface water consumption has left us with lasting environmental effects such as degraded water quality and a diminished ability for the earth to replenish these water sources naturally through what is known as the hydrologic cycle and recharge.

Water moves in a series of stages called the hydrologic cycle. Most people have a basic understanding of this cycle: as the sun warms surface water in lakes and oceans, it is evaporated up into the clouds where it is cooled and then returned to the earth as precipitation (rain, snow, etc). When precipitation reaches land, about 50 percent is immediately evaporated again, beginning the process once more. At this point, there are three things that can happen to the other 50 percent. As the water seeps into the ground, it becomes available to plants and trees, which soak it up through roots and then return it back to the atmosphere through their leaves. This process is called transpiration. Secondly, precipitation can collect on the earth's surface and because of gravity, follow a path to the lowest point. As this happens, surface runoff is directed to lakes, streams and rivers. Lastly, precipitation can filter deep into the ground, recharging groundwater supplies. Groundwater is water that is stored beneath the earth's surface, often in geologic formations known as aquifers. An aquifer is a deposit of water that is trapped or contained between layers of sand, gravel or rock. The level at which this water saturates the surrounding open space between dirt particles is called the water table. For example, when a well is drilled, the point at which it yields water is usually the level at which the water table resides. Rivers and streams also rely on the water table to sustain base flows during periods of drought as the water migrates over and seeps into the riverbed to replenish what is evaporated.

The water that is in these underground aquifers was deposited hundreds, thousands, and even millions of years ago and in some cases, continues to slowly accumulate over time when recharge is uninhibited. Recharge is the process by which rainwater percolates through the ground into the aquifer, replacing the water that has migrated out to rivers or been removed by ground water pumping. Recharge occurs where there are open spaces packed with permeable materials, or matter that water can move through. For instance, sand and gravel are more permeable while rock and clay are less permeable. Aquifers recharge at a very slow rate, and pumping



A farmer stands next to a telephone pole that illustrates subsidence in the San Joaquin Valley in California, where the water table has dropped so much that the land surface actually sank 9 meters (29.53 feet) between the period of 1925 and 1977.

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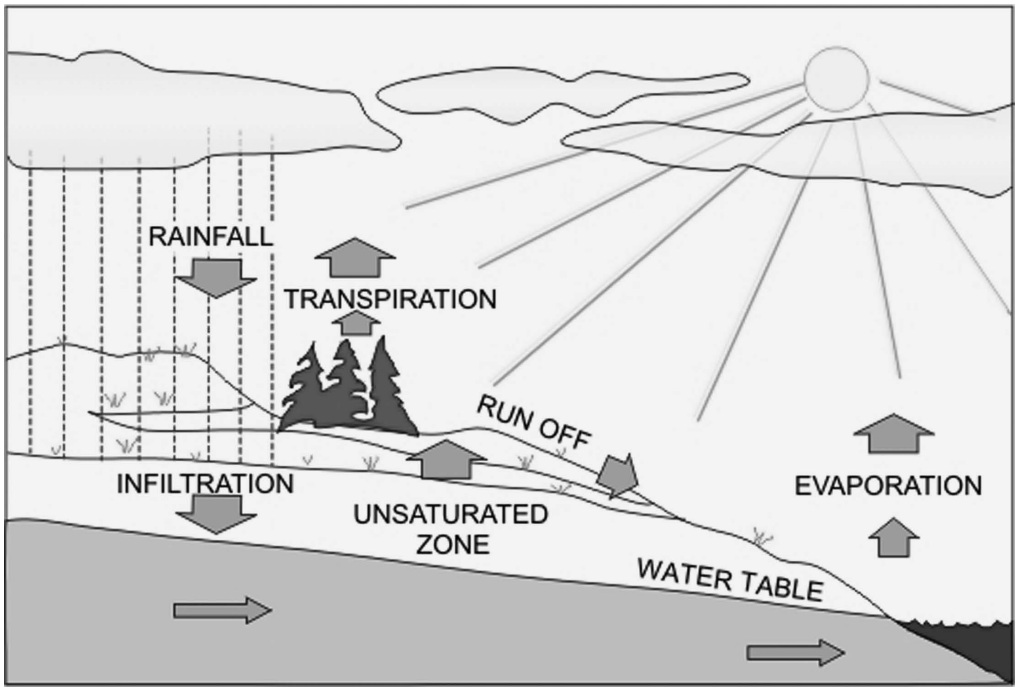

This diagram shows the movement of water as it travels through the hydrologic cycle.

the water out faster than it can naturally be replenished can cause a well or aquifer to run dry. Unfortunately, we are doing just that. Due to rapid population growth and development, we are losing our recharge areas while simultaneously draining our aquifers.

Between 1990 and 2000, Georgia's population grew by 26 percent--that's the sixth fastest growth rate in the nation. Moreover, there isn't much evidence to show that this growth will taper off or even slow in the coming years. Currently, the population is increasing by 540 people per day and these trends predict that by the year 2025 there will be an estimated 11.9 million people living in the state of Georgia. With this population increase we are losing green space at a rate of 50 acres per day to accommodate all of these people. Once this area is covered with asphalt, concrete, and other materials associated with development, it becomes impermeable and reduces valuable ground water recharge areas. Coupled with this predicament is a basic human need for water in food production and survival. Naturally, as the population grows, so does the rate of consumption.

Over the last century, there has been a shift in farming practices due to increasing periods of drought. Farmers have learned that dryland farming is less reliable and have overwhelmingly incorporated modern irrigation methods. When farmers do not have nearby surface water available for diversion, they pump it from the ground to irrigate crops. According to the University of Georgia College of Agricultural and Environmental Sciences' drought website, in the year 2000 ground water withdrawals in Georgia were estimated at 1,450 *million gallons a day*, fifty-one percent of which was used for irrigation. Georgians are also dependant on groundwater as a source for fresh water, with 41 percent of the state's population tapping into ground water supplies. This trend is not unique to Georgia but is repeated everywhere, and it has had a staggering effect on the level of water contained in our aquifers.

All over the world, water is being removed from the ground faster than it can recharge. This has been labeled "groundwater deficit" and has many detrimental impacts on the environment, in addition to sparking the looming water shortages we are facing. Repercussions range from land subsidence and "dry rivers" to saltwater intrusion into fresh water supplies in coastal regions. Land subsidence is the gradual or sudden sinking of the earth's surface when the materials in the area beneath it shift or move. Land subsidence is most dramatic when water is withdrawn from areas composed of very loose, permeable materials which compact as the water is removed. According to a report recently published by the Worldwatch Institute, "more than 80 percent of subsidence in the United States is related to the withdrawal of groundwater." Just one example of extreme subsidence can be seen in the San Joaquin Valley, where the water table has dropped so much that the land surface actually sank 9 meters (29.53 feet) between the period of 1925 and 1977. As surface waters are diverted and ground water continues to be depleted, the rate and frequency of "dry rivers" increases as well. Every year, many rivers actually run out of water and become dry before reaching their destinations. Egypt's Nile River and the Colorado River both carry very little water into their deltas anymore, and the Ipswich River in Massachusetts actually ran dry in 1995, 1997, and 1999. This phenomenon is a very serious and real problem, which poses a threat to aquatic species such as freshwater mussels and fish as well as other plants and wildlife. Moreover, if rivers that are meant to deliver freshwater to bays and estuaries along the coast never make it there, salinity levels in these important habitats will also increase. This causes a decrease in suitable breeding habitat for a variety of fish as well as reduced sanctuaries for water fowl. Another concern with groundwater pumping in coastal areas is saltwater intrusion. Saltwater intrusion occurs when the water table is drained so much that it actually starts attracting sea water inland, causing the fresh water supply there

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to become unusable. Salt water intrusion is already a concern in communities along the coast of New Jersey, South Carolina, Georgia, and some areas in Florida.

Lastly, groundwater overdrafting has been even further exacerbated by the increasing popularity of bottled water among consumers. Huge companies such as Perrier (Nestle), Aquafina (Pepsi-cola Company), Dasani (Coca-Cola Company) and Evian are building bottling plants near mountain springs and headwater areas so that they can market their products as "spring water," which fetches a higher price from consumers. By draining vast subsurface aquifers that reach beyond property boundaries, these companies are in effect stealing our groundwater, bottling it, and selling it back to us. Using clever marketing strategies, they have successfully convinced consumers that bottled water is safer and healthier than tap water, even though it is often the same water.

So, what is the solution? Conservation! Defined by the Georgia Environmental Protection Division (EPD) as "the beneficial reduction in water use, waste and loss," proper protection and management of our water resources is essential. Right now, we withdraw water from one area or watershed, transport it to our homes and use it, then dump it into a river or ocean in an entirely different watershed. We have eliminated the effectiveness, and in some cases, the possibility of natural recharge by removing water from the ground and never returning it. If we are to avoid the consequences of the dire predictions that are presently being made for the first half of this century, then communities need to begin implementing plans to reduce or eliminate overdrafting of groundwater immediately. In addition, we need to support legislation and organizations that endorse increased protection of headwater areas along rivers (since the headwaters supply the flow for downstream users) and of recharge areas for these bodies of water. One such organization is the Georgia Water Coalition, which endorses treating water as a public resource and not as a private commodity to be bought and sold. Accordingly, these changes do not come without benefits. For example, the more that we invest into protecting water sources now, the less it will cost to clean and purify the water in the long run. Additionally, if current practices continue and we let the water table drop too low, the cost of merely extracting the water from greater depths to the surface may exceed the value of the product itself as energy prices increase. There are also changes that individuals can put into operation at home to begin conserving water. You'll find a list of suggestions at the end of this article ranging from easy to extreme.

Robert Glennon, author of the book *Water Follies* and one of the reasons for my newfound interest in this subject, sums it up as he writes "water is the essence of life, the core of chemistry, the prime component of the human body; it covers two-thirds of the surface of the earth. Without it, life ceases. With it, life can flourish." If we are even remotely interested in leaving something for future generations to enjoy, then we have to look beyond our selfish desires to consume as much as we want at all costs and see the bigger picture.

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Yingling Liu, *Vital Signs 2006-2007:Groundwater Overdraft Problem Persists*. New York: W.W. Norton & Company, 2006.

San Joaquin Valley photograph courtesy of U.S.G.S. available from http:// water.usgs.gov/ogw/pubs/fs00165/Images/fig2.jpg

Water conservation tips

- *Turn off the water as you brush your teeth and turn it back on when it's time to rinse.*
- *Only run the dishwasher and the washing machine when you have a full load.*
- *Fit faucets and showerheads with water saving devices such as low-flow heads.*
- *Replace conventional toilets with dual flow systems that release more water for solids and less water for liquid waste. Consider installing a composting toilet; several models designed and manufactured for residential use are currently available.*
- *Wash your vehicle at home, and turn off the water when you are not rinsing.*
- *Resist the urge to water your lawn! Grass can develop a tolerance for drought conditions.*
- *Landscape with native vegetation. Once established, these plants require less attention and are adapted to survive in the climate that is persistent in your area.*
- *If you have to water a garden, water at night when evaporation rates are lower, and water deeply once a week to encourage deep roots.*
- *Make or purchase rain barrels to collect and store rain water that can be used to water the garden in periods of drought.*
- *Boycott bottled water. Bottled water is just water pumped out of someone else's aquifer. Besides, it's very expensive. If your car ran on the stuff, you'd be paying about $6.00 a gallon.*
- *Contact your local water authority to find out what shape the potable water pipes are in. If you live in Clayton, Georgia, call the mayor and demand that repairs be made to the city's pipes, which leak out more than 50% of the clean water as it is distributed to customers.*

Dark River of Deliverance

Doug Woodward

Wherever Waters Flow, A Lifelong Love Affair with Wild Rivers, *by Doug Woodward, is a must read for anyone interested in the history of whitewater boating in the Southeast. Doug's book is a lively and engaging account of his lifelong travels to explore wild rivers, from Alaska to our own Chattooga River. Several chapters address the Chattooga, and are filled with insightful stories about first descents, revealing and oftentimes funny stories about the filming of* Deliverance*, and the real story behind the campaign to add the Chattooga to the National Wild and Scenic Rivers System. Reprinted below with kind permission from Doug is an excerpt from the chapter in his book entitled "Dark River of Deliverance."*

James Dickey changed my life. He never knew that. And at the time I didn't even know it myself. But as surely as Dickey could put swashbuckling thoughts to paper and then morph them into his own persona, his words also became a part of who I was.

I met him only once. It was on an intimate fall evening in Atlanta, at Lewis King's Buckhead home. Dickey's friend since their early twenties, King was, in many ways, the real life model for Lewis Medlock of Deliverance. He had the skills—canoeist, archer, guitarist, athlete of note during his years at Georgia Tech. He had already lived the role. But there were differences. With a tough, wiry body, piercing blue eyes and silver hair, King bears little resemblance to Burt Reynolds, who portrays Lewis in the film version of Deliverance. And where the movie character comes across as macho and flamboyant, dominating his companions, King is modest in the extreme, making little of his personal accomplishments.

Dickey was an imposing figure of a man, and his presence filled the room. But it was much more than physical. There was a mystique about him—of things hidden, perhaps ominous—that he enjoyed perpetuating.

There were six of us at the table that night—King and his wife Joan, Dickey, Payson Kennedy, Claude Terry and myself. Payson, Claude and I had been running whitewater rivers together for years, but it was Claude's friendship with King that had brought us there.

That week Claude had asked me, "Have you read *Deliverance*? I had of course. It had caught my eye earlier that year, while I was still living in Maryland, since it appeared to be a tale of wilderness canoeing. It wasn't quite an uninhabited wilderness as it turned out, and the action wasn't all of a whitewater nature. But I read it through, at the time not having the slightest inkling of how my life would be drawn into the tale.

"Well," Claude continued, "Warner Brothers is going to film that story down here and they're looking for a river. There's a chance, too, that we might get involved in some way. Can you make it to dinner this Friday? Great! Bring your Colorado films and projector. Oh, by the way, James Dickey will be there."

Around the King dinner table, with rising excitement, we discussed logistics, equipment and sets as if we were the filmmakers ourselves. The Chattooga was the river we all knew best—the rapids, the obscure access points, where to find the right scene ("down there that river climbs them walls like a monkey")—but concluded that Alabama's Little River would better fill the bill since it had both the rapids and the towering cliffs needed for a death defying climb out of the canyon. North Georgia's precipitous Tallulah Gorge was briefly mentioned, but we considered it too difficult a venue for practical filming. Warner Brothers thought otherwise, and in the end, both the Chattooga and Tallulah would be chosen, each becoming a portion of Dickey's fictitious Cahulawassee River.

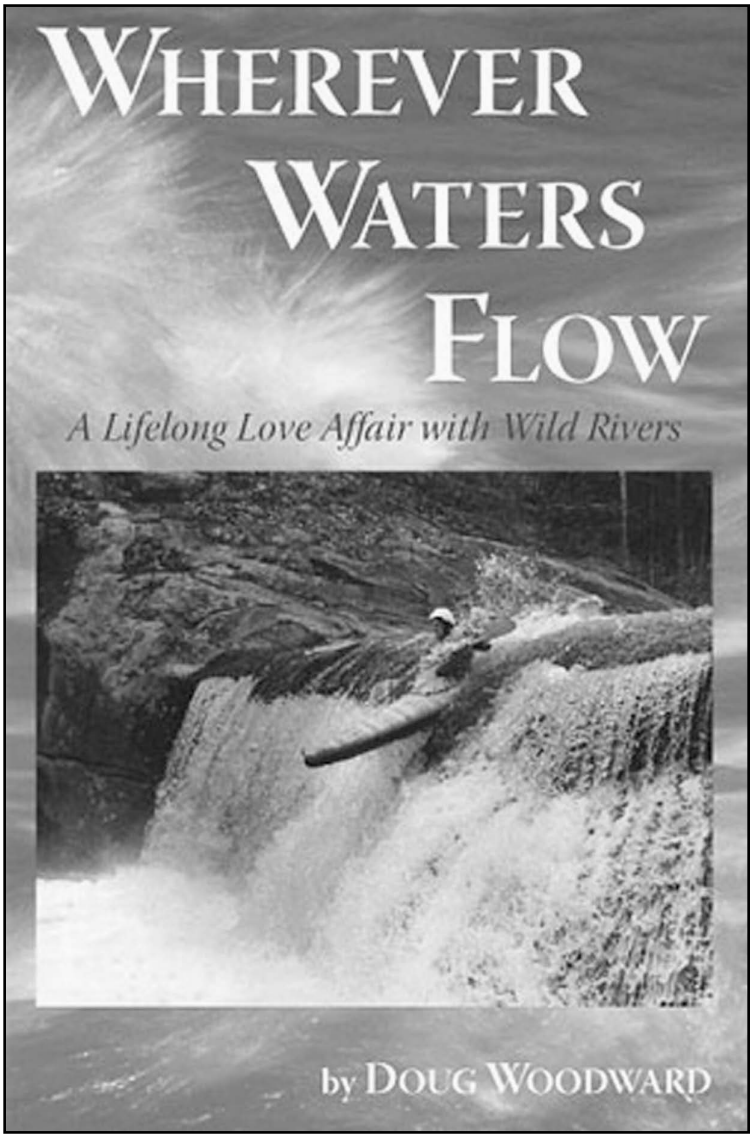
Following dinner, I set up projector and screen to take the group a bit further west. Running the rapids of the Grand Canyon by kayak had been the highlight of my year and one by one, the Colorado's big ones—Hance, Hermit, Crystal and Lava—lit up the screen. There were some oohs and aahs as angry brown water exploded in fifteen-foot haystacks and our tiny kayaks flitted here and there. But it was only an interlude to the hopes and feelings that were being given substance that night. The lights came on. Dickey and King passed a guitar back and forth, strumming a few tunes, each deferring to the other.

Dark River of Deliverance

Dickey was an imposing figure of a man, and his presence filled the room. But it was much more than physical. There was a mystique about him—of things hidden, perhaps ominous—that he enjoyed perpetuating. There were references to the canoe trip which he and King had taken years before with another close friend, Al Braselton. The trip that had spawned the imaginings which would eventually become *Deliverance*. Dickey would not describe details of that canoe trip. With a knowing smile, he would simply say, "There's a lot more truth in the story [*Deliverance*] than you might think."

King was more candid. We knew that they had canoed the Coosawattee River in northwest Georgia. Truth now eerily imitating fiction, the Coosawattee was in the process of being dammed and the valley behind it would slowly fill over the next two years, drowning all traces of the history of those whose lives were once intertwined with the river.

King later supplied what we came to regard as the facts of that river trip, now long faded into the mists of time. First, he had emphasized, "You may think of the southern Appalachians as being wilderness now, but in the thirties and forties that country was really wild. A man that was perceived as a threat to the mountain folks might just disappear—permanently. Murder was always a viable option, because few outsiders were going to go snooping around those forests looking for the missing man."



It seemed that the canoeing that day was actually done by Dickey and Braselton, while King went looking for a place downstream where he could meet the pair. Finding no road to the river, he parked and started down a path leading through the woods. Like yellow jacket sentries guarding their nest against danger, two armed men suddenly appeared and demanded to know his business. King's tale of a canoe on its way through the rapids of this river seemed absurd to the mountain men, and they thought it was far more likely that he was a revenue officer looking for their moonshine still. The older of the pair told the younger to take King to the river and "stay with him, son," words—along with their sinister undertone and unspoken meaning—that King has never forgotten.

Unsure of his armed companion's patience, and almost overwhelmed by the thought that Dickey and Braselton might already have passed that point, King waited and sweated and prayed. The canoeists had run into serious difficulties themselves in the rapids upstream, but finally hove into sight as daylight was beginning to dim. At that point, the demeanor of the mountain men changed completely. Shotguns disappeared, and there were smiles and kind words as they helped carry the canoe and gear up the hill to the truck.

Deliverance had been a Book of-the-Month Club selection early that year. Dickey had rewritten it into film a script that he dad just sold to Warner Brothers. Now, in King's living room, he held a copy in his hand. He turned to me, motioning with the script, and asked, "It's a good book, don't you think? Do you really like it?" I was startled. How could such a powerful writer, so widely acclaimed and honored, need assurance from us? As he tossed down more alcohol and the evening wore on, the question was repeated, until it became embarrassing.

Nevertheless, we left in high spirits, hoping against hope that we could become part of the adventure to come—the actual filming of *Deliverance*. Dickey and King knew that we were competent canoeists, that we knew the Chattooga, Little and other area rivers as few others knew them and that we would be good technical advisors on equipment and scenes. But they were not Warner Brothers, even though they might be in touch with them. And so that night we left with a caution born of realism.

Watershed Update

Oversight Needed: Forest Service On the Move

Get ready—the U. S. Forest Service is gearing up for some major activities in the Chattooga watershed, after a period of relative calm. Readers may recall our involvement in the Highlands Ranger District's recent White Bull Timber Sale project, where negotiations with the Forest Service were successful in preserving at least 700 acres of old growth in the Chattooga headwaters while protecting several threatened species and sensitive areas. Now, the other ranger districts in the Chattooga watershed have recently released "scoping notices" to begin the process of implementing two projects that are of great concern to the Conservancy, and we have filed comments that include the issues outlined below.

The Tallulah Ranger District in the Georgia portion of the watershed has proposed an "oak restoration project" near Dan Gap, located close to Rabun Bald, and in the vicinity of the Buck Branch Road on the south side of Warwoman Road. On the face of it the proposal would seem ecologically appropriate; however, the project is a piecemeal attempt to reactivate the very controversial Tuckaluge Timber Sale (see "Rabun Bald Roadless Area," *Chattooga Quarterly*, spring 1996), and the devil is in the details. For example, implementing the project would bring greatly increased use to the Tuckaluge Creek Road, which is already delivering significant sediment loads into Tuckaluge Creek that would only be exacerbated by heavy logging truck traffic. The Chattooga Conservancy has long maintained that this road should be decommissioned due to its steep grade (up to 25% in some spots) and its very close location to the creek. Buck Branch Road presents a similar problem with its close proximity to the branch. Directly related to this is the likelihood of violations of the federal Clean Water Act and Georgia water quality standards if the Tuckaluge Creek and Buck Branch Roads are used for logging, because both waterways drain into Warwoman Creek (tributary to the Chattooga), which is listed as "impaired" on Georgia's 303(d) list of waters not meeting their designated uses (fishing, in this case). Under the Clean Water Act, federal agencies must comply with state water quality standards, and Georgia's standards indicate that the Forest Service should not contribute to the further degradation of an impaired stream. Further, another area of concern is the fact that the timber sale unit appears to overlap with possible old growth hardwood stands that are 110-174 years old. The Conservancy advocates for full protection of old growth stands due to their relative scarcity. Then, to top it off, the Tallulah District wants to proceed with this project under a "categorical exclusion," which would eliminate requirements for full and public disclosure of their proposed activities, and further study in an "environmental assessment."

Over on the east side of the Chattooga River, the Andrew Pickens Ranger District in South Carolina has proposed a massive "prescribed burning" project that would intentionally set fire to 3,215 acres of the district. Five areas are included in the burning proposal, including 1,650 acres along the Chauga River and 1,050 acres along the Chattooga River at Sandy Ford. The Sandy Ford proposed burn would go the water's edge, within the Wild & Scenic River corridor, using the river itself as the fire line. We believe that the inordinate and excessive use of fire is not natural for the Chattooga River watershed, and also is totally inappropriate for areas within the Wild & Scenic corridor. The Chauga River burn would also go the water's edge and use a long stretch of the stream as the fire line. The unique plant communities and critical habitats in the Chauga River corridor are well known (at least 23 populations and 15 species of rare plants), and are found in the area's rich coves, mesic (wet) oak-hickory forests, and waterfall spray zones—hardly areas of natural fire occurrences. The Conservancy believes that burning here would disrupt a sensitive ecosystem, and should not proceed. Meanwhile, take a drive on highway 28 near the Chattooga's West Fork, and look at the results of a recent "controlled burn": everything in sight is blackened, and all of the trees are dead. Stay tuned for future updates on these proposals, and contact the Conservancy for more details and tips on how to get involved in affecting Forest Service projects.

Stekoa Creek Water Monitoring Project News

We recently changed the sampling regiment of the Stekoa Creek project in order to indisputably verify whether or not the amount of fecal coliform bacteria in Stekoa was exceeding the stream's Total Maximum Daily Load (TMDL) as set forth by the GAEPD. Previously, we had been sampling 13 sites just once a month due to laboratory costs. Then, we were shipping the samples overnight to be tested within 24 hours of collection. This method is approved by the EPA for monitoring purposes, but not for enforcement actions. So, at the end of May we restructured the sampling locations and began testing 5 sites once a week to meet EPA requirements while still working within our budget. This change was also made possible by a discounted rate offered to us by Environmental Management Services in Lawrenceville, GA. Since the City of Clayton's sewer pipes are believed to be the biggest source of fecal coliform pollution, 1 sampling site is placed north of the city, 2 are right in the downtown area, 1 is on a suspect tributary to Stekoa, and 1 is downstream of the city but before the wastewater treatment plant. Samples are now also tested within 6 hours of collection.

With weekly data now being collected, the numbers can be quantified into a geometric mean, which is how the TMDL is written. This translates the data into an easy-to-understand format, which is useful in the public education campaign that accompanies our water monitoring project. In this respect, we also have a new opportunity with the Clayton Tribune. Editors at the Tribune have agreed to print our data on a monthly basis

Watershed Update

as a public service. We will also have this data available on our website very soon, so please stay tuned!

In addition to modifying the sampling program, we have been following the City of Clayton's deliberations regarding the sanitary sewer system. In April, we presented a report on the state of the city's sewer lines, as depicted by Clayton's smoke test report and our water quality data. Our report detailed the fact that the smoke test showed a total of 188 defects, including 3 "emergency maintenance" issues. Our data revealed that Scott Creek (a tributary to Stekoa) exceeded the TMDL for fecal coliform nearly every sampling period. Apparently disregarding this information, Clayton's mayor proposed lifting the sewer moratorium at a city council meeting the very next month. The city's self-imposed moratorium was put into place in November 2002 and prohibited expanding the sewer collection lines until adequate repairs were made to reduce infiltration and inflow problems. Again, we attended city council meetings and spoke out against lifting the moratorium while educating council members regarding the results of our water monitoring program on Stekoa Creek. The motion to lift the moratorium was tabled at that meeting, but continues to be of concern. As such, we have promised the city that we will share our data and knowledge of potential problem areas as they become apparent in the water quality data.

On August 8th, we followed up on that promise and presented our current data to city officials. We also extended an invitation to help city workers verify which high fecal coliform readings are directly linked to the failing sewer lines, since there is some concern among city officials that the soaring fecal coliform numbers might be due to animals or failing septic systems. Duncan Hughes, a teacher at North Georgia Technical College and the watershed coordinator for the Soque River Watershed Partnership, has graciously offered to help us perform E. coli tests at the college lab. E. coli tests are far less expensive than the fecal coliform tests that are required for TMDL enforcement, and are a great way to track down pollution sources that stem from warm-blooded animals' fecal matter. So far, the city seems less than enthusiastic about this offer. Clayton's city manager has indicated that they would prefer that these tests be done in the city's wastewater treatment lab, even though the cost to the city would be higher.

In this same meeting, Clayton's mayor also claimed that all 188 leaks had been repaired and offered a letter as proof. When we investigated that claim, it was found to be false. What was verified is that 30 defects are in fact fixed. We continue to work closely with the city on this subject, and are encouraging them to prioritize the Scott Creek and Valley Street areas first.

Thank you to these recent sponsors of the Adopt-A-Sample Program

GA Foothills Chapter Trout Unlimited
Jane Nelson, The Rootcellar
Rabun Chapter & GA Council Trout Unlimited
Rabun County League of Women Voters
Upper Chattahoochee Chapter Trout Unlimited

SC Bear Bill Dies; Round II Ahead

This spring H4448 was introduced in the South Carolina legislature, and would have extended the allowances for bear hunting with dogs on state game management land in zone 1 (Oconee, Pickens, and Greenville Counties). Senators on the Fish, Game and Forestry Committee, which held hearings on the bill in May, let the ill conceived bill die in committee in response to major pressure from the Chattooga Conservancy and local citizens opposed to the bill.

The proposed bill would have allowed a six week "running season" in September and October, when bear hunters could run bear to train dogs, but would not be permitted to kill the treed bear. The bill would also have allowed a one week extension of the "party dog hunt" for bear. The Conservancy et. al. were opposed to the bill for the following reasons: 1) The six week running season would conflict with other seasonal uses on state game management lands, including still hunting for bear. While we believe that a bear dog training season is warranted, we also believe that six weeks is excessive given the current level of conflict that already exists between bear hunters and private land owners that is caused by bear dogs straying onto private lands. 2) Six weeks of running bear in September and October would result in excessive bear mortality when cubs are separated from sows, and bears at bay are illegally harvested. 3) The South Carolina Department of Natural Resources (SCDNR) has not produced clear evidence that existing bear population numbers are sufficient to support an extended bear hunting season. 4) We firmly believe that bear hunting in South Carolina should favor local hunters that practice the rules of fair chase, as opposed to high-tech hunting that utilizes radio telemetry collars, all terrain vehicles, and an armada of pick up trucks racing across game lands to intercept and kill a bear at road crossings.

"The mechanized pursuit of wildlife is high on the list of violating wildlife principles. We have invented machines to carry ourselves over land, sea and air. Evolution of animals we pursue cannot keep pace with these inventions. If we are to pursue animals fairly, we should pursue them on foot. The ethical hunter never chases or harasses wildlife with a machine." —*Beyond Fair Chase: The Ethics of Traditional Hunting* by Jim Posewitz

Even though H4448 was allowed to die an unceremonious death in committee, Senator Martin from Pickens, who co-sponsored the bill, announced in the hearing that the SCDNR should bring a revised bill to the legislature next January that would pass muster. Obviously, this one isn't over yet, but today we celebrate a victory for grass roots common sense.

Members' Page

Many thanks to all who recently renewed their membership, joined, or donated goods or time to the Chattooga Conservancy. Your generous contributions will help us continue to work on all of the important conservation issues facing the watershed.

In Memory of

Bradley Hotard

Mary Ventura

Thank you to these members who contributed at or above the sponsor membership level:

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We're a non-profit organization, and all contributions are tax-deductible.
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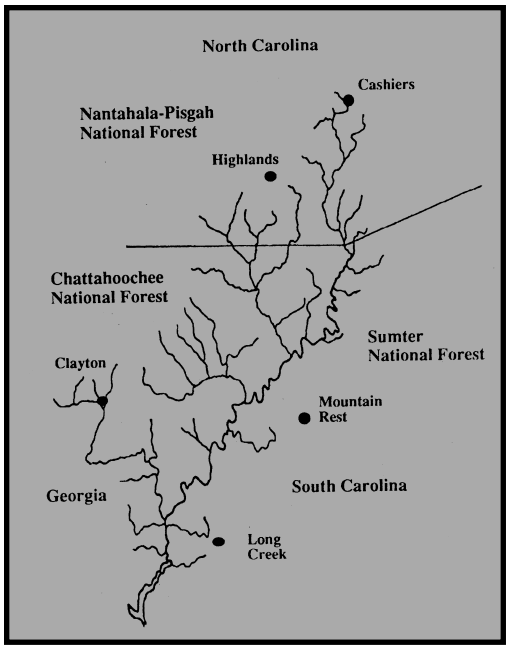
Clayton, GA 30525

Chattooga Conservancy

2368 Pinnacle Drive
Clayton, Georgia 30525
tel. (706) 782-6097 fax (706) 782-6098 info@chattoogariver.org www.chattoogariver.org

Purpose: To protect, promote and restore the natural ecological integrity of the Chattooga River watershed ecosystems; to ensure the viability of native species in harmony with the need for a healthy human environment; and to educate and empower communities to practice good stewardship on public and private lands.



Goals:

Monitor the U.S. Forest Service's management of public forest lands in the watershed, and work cooperatively to develop a sound ecosystem initiative for the watershed

Educate the public

Promote public choice based on credible scientific information

Promote public land acquisition by the Forest Service within the watershed

Protect remaining old growth and roadless areas

Promote sustainable communities

Promote conservation by honoring cultural heritage

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