

*The following is excerpted from a series of interviews conducted with Leon Neel, a longtime forester and land manager in the Red Hills region of Thomasville, Georgia, and Tallahassee, Florida; he has also worked in the Dougherty Plain region surrounding Albany, Georgia. The interviews were conducted by University of Georgia historians Albert Way and Paul Sutter in 2004 and 2005. Along with the following introduction, several transitional notes are interspersed throughout Neel's narrative. The project was made possible with support from the Joseph W. Jones Ecological Research Center at Ichauway, and the full transcripts are available at the Forest History Society.*

# THE STODDARD- NEEL METHOD

## FORESTRY BEYOND ONE GENERATION

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**T**o the uninitiated, a stroll through a healthy longleaf pine forest is a visually stunning experience. The convergence of light and shadow, the colliding angles of towering tree trunks, and the lush colors of the understory all contribute to the aesthetic. The awed novice sees pristine woodland, a testament to the

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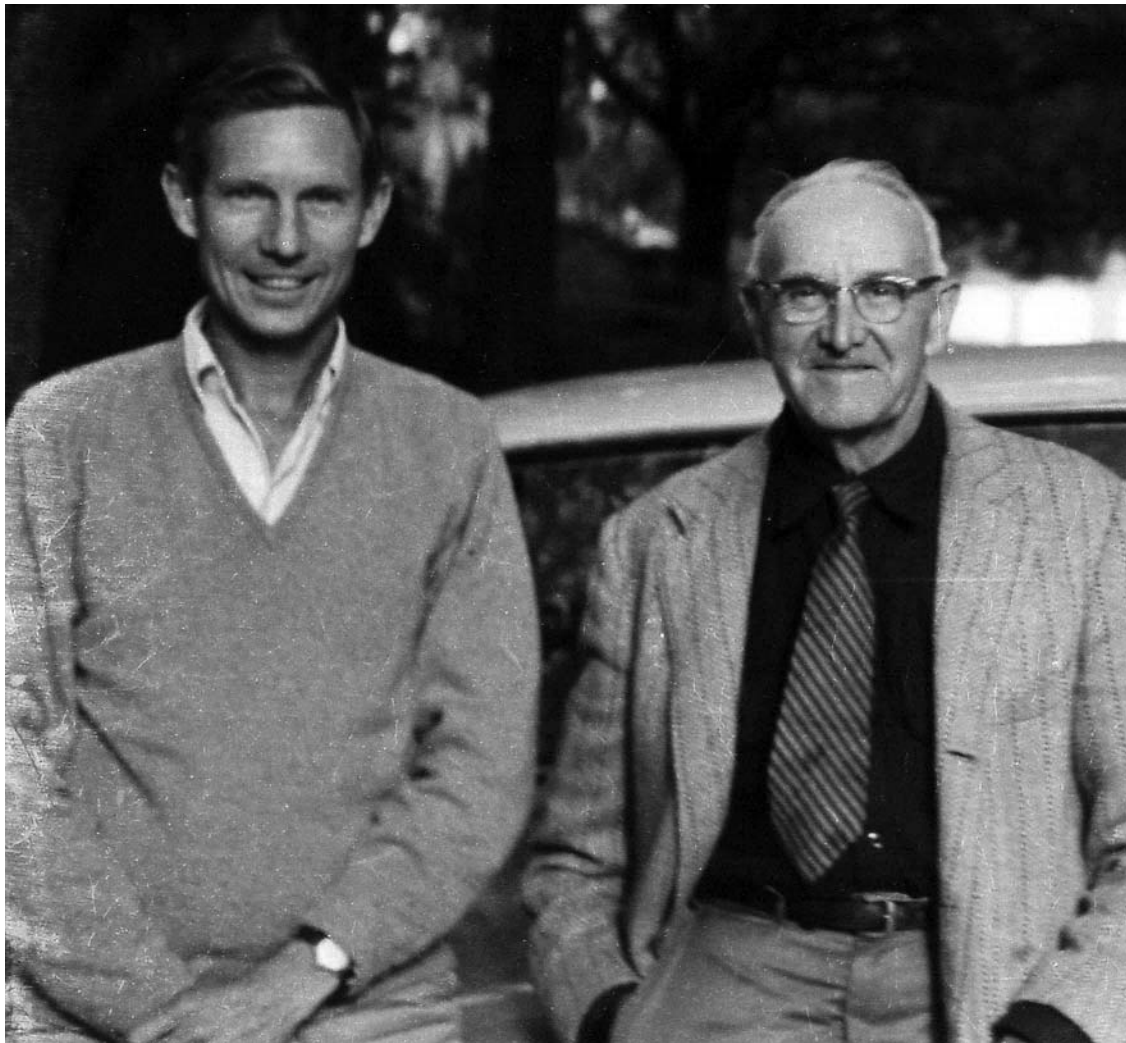
*beautiful ways of nature when left to its own devices. Leon Neel knows otherwise. He knows that in today's fragmented landscape, a caring human hand is at work—a hand that is frequently his own.*

*Neel has been managing longleaf forests in the Red Hills and Dougherty Plain for more than fifty years. These regions form the cradle of the southern quail preserve, where over the course of the twentieth century, wealthy northerners (and a few southerners) set aside more than 500,000 acres for the bobwhite quail. Neel learned his brand of forestry from Herbert Stoddard, that bird's most important chronicler. Stoddard is best known for his quail work in the 1920s and 1930s and for insisting, in the face of harsh criticism, that fire was an essential natural component of the*

*southern coastal plain's ecology. During World War II, Stoddard became a forestry consultant on the quail preserves, and he hired Neel in 1950. Together, they developed a model of ecological land management that is now known as the Stoddard-Neel method. At its most basic, the Stoddard-Neel method strives to maintain a diverse understory through the use of frequent controlled fire, and a sustained-yield, multiage forest through conservative selection harvesting. Today, thanks in large part to the Stoddard-Neel method, some forests of the Red Hills and Dougherty Plain represent the most diverse longleaf-grassland environments remaining. The implementation and practice of the method involve many specific components, but its guiding philosophy, as Neel explains, can best be expressed as a worldview based on experience in the woods.*

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BY ALBERT G. WAY



COURTESY OF LEON AND JULIE NEEL

*Leon Neel grew up in Thomasville, Georgia, and quickly adopted Herb Stoddard's strict conservation ethic after beginning work for him in 1950. When Stoddard died in 1969, he entrusted Neel with the management of more than 200,000 acres of forest land.*

I grew up on the land and in the woods. It was during the Depression, which is very important, because we depended on the land for our livelihood. We depended on the land for what we ate. So I was fortunate to be born into a family that had a land ethic, even though it wasn't a developed land ethic. They appreciated the land, and they recognized, I think subconsciously if not consciously, that what they enjoyed and what sustained them was coming from the land itself. My father did an awful lot of things. He had a little sawmill at one time, and I watched him cut a lot of trees. He didn't clear-cut, but he hadn't developed a true technique of removing trees for the long-term benefit of the forest, either. But he still didn't destroy the forest, and I wondered about that a lot when I was a little boy. It was still a selective cut. So that was the beginning of my land ethic.

My association with Herbert Stoddard allowed me to think seriously about land conservation, and to actually practice it as well. He helped me to understand that land management is an art based in science. I don't think, however, that science can teach the art, the true art of protecting the ecosystem. How can I hire a fine young person with a degree in forestry from Germany or, as far as that goes, from the Appalachian Mountains or New England or anywhere, and bring him here and expect him to automatically understand and accept the longleaf ecosystem? I still don't know much about it, either, but I know what looks good out there. When I look at something and say it looks good,

it's based on my knowledge, whatever that is, of what should be there in the healthiest condition to represent all of the ecosystem's components. One thing about ecosystem management, whatever you do out there, or whatever you don't do, it's going to affect a lot of things. Everything that Mr. Stoddard taught me boils down to what he told me in the beginning: Why destroy an ecosystem just because you want more money out of the trees? It doesn't have to be that way.

The heart of our system involves both timber and quail primarily as representatives of the ecosystem, and of the life that occurs therein. Mr. Stoddard started this work on land dedicated to quail management and quail hunting. He had to maintain the classic quail hunt, which, number one, meant open woods, beautiful woods, aesthetic diversity, all leading to a pleasant landscape experience. An emphasis was put on the forest simply because land without pine trees that you hunt quail on is not very pretty. You can hunt around fields, and that's a different landscape, but in the woodland landscape you've got to have pine trees where they belong to add to the experience.

There were several things involved in Mr. Stoddard's transition from quail expert to forestry consultant. Number one, he had to make a living. Even though they had the Cooperative Quail Study Association, which formed out of the original quail investigation, he drew very little salary from it. The landowners trusted him, and he knew those woods better than anybody. Mr. Stoddard had



Herbert Stoddard examining bobwhite quail, 1941. Herb Stoddard's monograph, *The Bobwhite Quail*, set the early standard for research in wildlife management. Along with his close friend, Aldo Leopold, he helped to launch wildlife management as a field of its own.

told them for years that they needed to thin some timber, but it was really World War II that got them thinking seriously about it. The government, of course, wanted all the lumber that they could get, right quick. They were encouraging landowners around the country, as I understand it, to cut it so they could have the lumber necessary for the war effort. Some of the local sawmill people, particularly, were trying to find good timber to cut. They had talked some of the preserve owners into cutting some timber for them, and they had truly done an atrocious job. The worst land that I've got today, as far as restoration is concerned, is land that was cut by people that should not have cut it back in the early '40s. So Mr. Stoddard saw the opportunity not only to make a living, but to do the job right.

I joined him in 1950, after serving in the Army and then finishing my forestry degree at the University of Georgia, and he taught me how to manage these forests for both timber and wildlife. I know I can manage for quail and maintain a healthy forest; we did it for years. But these days, it's tough for me to talk about quail management because so many people focus on quail to the detriment of the rest of the system. Today, quail people say you can't grow timber and quail on the same land. Quail is an early successional bird and the longleaf-grassland forest is an old, fire climax system, so they don't think you can have both.

But fire can maintain the early successional type habitat of quail while maintaining the forest as well, and you don't have to plow up native ground cover. Since we've been in business, the quail plantations have gone in several directions. Some have taken our system and turned toward real ecosystem management; some continue to focus on quail but keep a concern for the health of the forest; and some have turned exclusively to quail management and have cut most of their timber. The latter uses the excuse that you can't grow timber and quail on the same land, but what they really want to do is justify selling all their timber.

*The key to the Stoddard-Neel method is the frequent use of fire. The bobwhite quail thrives in edge habitat, essentially making it a farm bird, but Stoddard discovered early on that frequent fire in the longleaf forest made ideal woodland habitat as well. Fire suppresses any midstory underbrush, leaving the longleaf canopy with a low understory of grasses and legumes. Without fire, what many observers have come to value about the longleaf-grassland forest—the biological diversity and the aesthetic experience—would disappear.*

I think the easiest way for me to describe the importance of fire to the landscape that I work—and I'm sure ecologists could do a better job—is to simply say that most everything in the longleaf-grassland ecosystem has some adaptation to fire. That adaptation has evolved for a pretty good while, so if you take fire out, you're upsetting the system those plants and animals evolved under, which means they are lost. The natural succession is for it to turn into an upland hardwood forest—oak-beech-magnolia down here in the Red Hills. But in the absence of fire, the plants and animals of the longleaf-grassland ecosystem gradually lose their ability to survive until they are gone, and then they are replaced by other species. We have some upland hammocks here in the Thomasville area that are old-growth, some old oak-beech-magnolia hammocks on the hills. They are beautiful places, but I'm not sure that I'd want to stop fire and convert everything to oak-beech-magnolia.

We use fire for very specific purposes, and that's where management begins to get complicated. If the primary reason for owning your land is to hunt quail, then it stands to reason that you don't want to burn so that you have no ground cover during the quail-hunting season. It also stands to reason that you don't burn during the nesting season. Even though quail will renest, you cause all sorts of complications. So that's why our system developed to burn at the end of quail season, which was about March 1, and before nesting really got into high gear. Mr. Stoddard always said that any quail nest destroyed before June 1 was probably beneficial. He didn't recommend it, but it probably didn't hurt too much because they would renest, and the conditions were usually better for a larger brood after June 1. So that pretty well established the spring burn, which meant the months of March, April, and occasionally a little bit later.

*The Stoddard-Neel method is as dynamic as the landscape it manages. In recent years Neel has responded to new research on the historical timing of fire. Some forest ecologists now believe fire occurred more often in the summer months, when lightning was more likely to start a blaze. The Stoddard-Neel method has been flexible enough to take this into account. But Neel also recognizes*





*Leon Neel is seen in 1964 in an old-growth oak-beech-magnolia forest upland hammock on Mill Pond Plantation in Thomas County, Georgia, from which fire was excluded. Historically, such communities were relatively rare on the southern coastal plain due to the prevalence of both lightning and anthropogenic ignition of fire.*

*that the longleaf landscape, geologically speaking, is a relatively young environment. Native Americans burned the land for thousands of years before European and African contact, so the forest as we know it likely took shape in concert with human action. Thus, it is difficult to say whether natural or anthropogenic fire had more to do with the system's development. Such contingency requires the Stoddard-Neel method to be a goal-based management system. Neel must pay close attention to how flora and fauna react to fire in all seasons and tailor its application to make those ecological reactions meet his goals. Indeed, he has had to become a student of fire in all its diversity.*

I think it's fair to say that, over the years, the Stoddard-Neel method has evolved from a focus on quail into a land management system with a broader focus. I'm not sure that technically it has evolved any more than what Mr. Stoddard set out to accomplish, but over a period of time, our focus has changed somewhat. It's only been in recent years, when quail hunting has been deemphasized over the entire Southeast because of different land uses, that scientists and managers have begun to question, and rightly so, when and how fire occurred in the state of nature.



*Herbert Stoddard began wildlife research on Greenwood Plantation in Thomas County, Georgia, in 1924, and began cutting timber there during World War II. Leon Neel continues to manage Greenwood's forest resources today. As seen in 1964, it is perhaps the best representation of the Stoddard-Neel method as practiced in old-growth longleaf.*

Lightning was an obvious ignition for fire, and since the lightning season is in the summertime, that complicates modern management even further. I think they've pretty well proven that many plants in the longleaf forest have adapted to warm-season fire, wiregrass being the classic example. Wiregrass will only seed after a summer burn.

So as far as modern management goes, your goals have to be specific when deciding on the season of fire. If you want wiregrass to seed, then you burn in the growing season. On the other hand, a lot of legumes seed better after a cool-season fire. Or if you are restoring a stand of timber with a ten- to twenty-year rough, you need to start with cool winter fires. A hot summer fire can kill your forest in those conditions. But then again, warm-season fire hits this brush pretty hard, so under the right conditions, an experienced burner might want to blow a hot fire through there. But they better know what they're doing.

As you can tell, I don't talk like a scientist because I'm not a scientist. I know a lot of scientists out there—you ask them about the season of fire and they'll give you a very learned academic answer—but I will stake my reputation on one thing: the frequency of fire is more important than the season of fire. That's





Nighttime controlled burn on Sherwood Plantation, Grady County, Georgia, 1941. Stoddard argued vehemently that most southern rural dwellers knew the difference between controlled and uncontrolled fire. His efforts helped to legitimize traditional southern woodsburning in the eyes of foresters.

especially true on good soils. If you let a longleaf forest in the Red Hills go three, four, or five years without burning, you'll start seeing some long-term ecological effects, mainly in the form of encroaching hardwood species. I do know that the more we burn the woods, the easier the woods are to maintain, and the easier they are to manage in terms of both longleaf reproduction and biodiversity. In the absence of fire, a lot of the plants are mulched out; that is, pine needles and other debris smother out the native ground cover. Nothing can reach mineral soil except an armadillo. We have annuals out there, [and] perennials, and so it's like a big puzzle. There's not really an overall formula to manage for everything, because each acre of land has its own set of problems. Fire is such a useful management tool because it tends to most of the complexities without requiring too much thought.

*Burning southern forests in modern times is as much a political endeavor as an ecological one. Foresters in the early twentieth century considered fire a plague on the land. Herbert Stoddard had much to do with turning their logic on its head. But even today, when we know the ecological and economic benefits of burning, it is still a difficult task. Smoke from a controlled burn—not to mention the flames from an uncontrolled burn—can affect highways and residential and commercial developments. In unskilled hands, a prescribed fire can threaten life and property in the South's fragmented landscape.*

In today's world, we face several problems when it comes to the application of fire in the Southeast. All the bad publicity is in the West, which is well deserved—they have a tremendous job to work their problems out. But even in the Deep South we've had bad fires that have gotten out of control and destroyed homes. It all comes from not burning regularly. If they burn when they could, even if it cost a little money, it's not going to cost near as much as a catastrophic fire. I remember watching the Okefenokee Swamp fires of southeast Georgia and northeast Florida in the mid-50s that burned for about three years. I went over there with Mr. Stoddard all the time watching those fires go. We saw it jump two- or three-hundred-foot right-of-ways where the railroad and highway were together. We were in the middle of a severe three-year drought, but we didn't have any problems here. The quail plantations had already been burning regularly for thirty years. For instance, on the home place at Greenwood Plantation, which has a highly combustible ground cover with a heavy stand of longleaf and wiregrass, all we did was switch from day burning to night burning. A fire will burn much cooler at night, so we were able to keep right on burning through the drought.

One major problem has to do with development and the fragmented nature of today's landscape. In the past, it was real easy because we had complete freedom of choosing when to burn. Today, with the rules and regulations—and it'll get worse before it gets any better—I sit here sometimes letting good burning day

after good burning day go by because I can't get a permit. Weather conditions may be such that the smoke will not disperse straight up. It hovers close to the ground, and they don't want smoke on the highway somewhere. Or else it's too dry. There's one reason or another. The Georgia Forestry Commission is doing what they have to do. They understand that we need to burn and want to burn, and they cooperate with us real well. But still, it takes probably a third of the burning days away from us, which is a major hindrance. The more you apply the art of fire, the art of burning, the more you need those extreme days to get areas that you can't get otherwise. Conditions that are poorest for smoke dispersion or dryness are sometimes the best conditions for meeting particular land management needs.

*Fire is Neel's most important management tool, but to facilitate its use, he must keep the forest structure in proper condition. An overly dense stand will shade out the understory, depleting the fuel supply as well as suffocating wildlife food plants. On the other hand, a piece of land too sparsely populated with pine deprives a potential fire of resinous needles. Canopy composition is critical to the continued use of fire as a management tool. In this respect the Stoddard-Neel method hinges on the careful marking and harvesting of trees.*

*To hear Neel talk about marking trees can be frustrating for trained foresters. He does not use basal area to determine an allowable cut, or employ dbh (diameter at breast height) as a marking parameter, or specify a uniform target stand structure to guide the marking process. In Neel's mind, the use of predetermined formulas is a shortcut that deprives the forest of the attention it deserves. Every time he uses his paint gun, it is the result of a deliberation over the ecological effects of cutting that particular tree. Will the gap that results be too small for longleaf regeneration? Will it be too big to sustain a fire? Will it enhance the landscape's parklike aesthetic? Will it aid in accomplishing the ecological goal of biodiversity? There is no set list of questions; instead, Neel understands from the beginning that each stand of timber will pose its own questions. Each stand is ecologically unique, and each mark deserves its own thoughtful, deliberative account.*

When you start talking about harvesting on these beautiful pieces of land, you are always going to get someone who doesn't understand how cutting trees can actually enhance ecological diversity. So the first thing we have to be clear about is that disturbance events are critical to the longleaf-grassland system, and that's what we are doing when we burn the woods or cut trees. On a small scale, we can re-create lightning events, blowdowns, [and] natural mortality, but we do it gradually. We seldom ever cut a large gap, because that will occur in a forest's natural processes. We prefer to establish reproduction first in a small gap, and then with the next selection cut we'll expand that gap. That will give it more room to grow.

It's important to maintain a certain consistency in the forest canopy, but in a multiage system we don't want the same consistency throughout the forest. The diversity is what we want. We might want a thick stand of pine trees here, some intermediate ones there, all different age classes. In a multiage forest, every acre doesn't have what we would call a forest on it, at least in an ecological management system. You might have an acre

with no trees on it right now, but ten years from now it's going to be full of seedlings. And thirty years from now it'll have some nice, good trees on it. In the meantime, one of these areas that [has] a lot of trees on it won't have any, or maybe just a few. There's constant regeneration, growth, death, and decay. That's how it works in nature, and in our management system we try to keep it that way.

And this is where our harvesting really comes into play. Ecological management in the longleaf pine-grassland region requires that we take some trees. Take away a careful, controlled harvest and we lose the biodiversity. The hardest part in the Stoddard-Neel system is going out there and marking timber and making the right selection. Because whatever you take, it's going to be gone once you take it. Mr. Stoddard always said, "The trees you leave are more important than the trees you take." One thing that he impressed on me was that he treated the timber stands in perpetuity. You have the forest as an entity, and then you have each individual tree as an entity. At some point every tree in a stand over a period of time will be replaced by another tree from the ground up. In other words, you're harvesting trees at the same time you're establishing reproduction over time to replace those trees. So you keep the forest going.

Of course, because there is not a formula for marking, this is a difficult system to learn. When I first started out, all I did was tally. Mr. Stoddard wouldn't let me touch a paint gun. Over time, I learned that there are several things involved with marking trees, and you can't just check them off one by one; all the factors we look at overlap and one influences the other. At its most basic level, we always take the poorest-quality tree and leave the best-quality tree. That increases the value of the trees, so perhaps in the long run you don't have to cut as many trees over a period of time. That's one principle, but when you get into selecting trees for ecological purposes, then you have all sorts of decisions to make. In most cases it's the inferior trees that contribute to the diversity of the ecosystem. If everything was a perfect tree, you wouldn't have as much life in the forest as when you have some defective trees. So everything about this system is a balancing act. That's one thing that makes it so difficult to follow through with year after year. Most people don't give a damn about taking the time and effort to mark each tree individually. It's a lot easier to go out there and take certain groups of trees based on what a formula tells you.

Though there's not a formula, we have worked out some numbers to help with our allowable cut. Our timber cuts are based on a percentage of the total growth on the property. Stoddard, when I joined him, felt like he could take ninety percent of the annual increment and leave ten percent of the growth to build on, along with the total volume. But he was starting with a surplus of older trees that had not been culled. I worked on that figure of ninety percent for a while, but it became clear that we were overcutting from the standpoint of keeping the diversity of age classes out there. You can't really sustain an income from timber by taking ninety percent of the growth, unless you have a perfectly distributed age class system on the total property. If you get down to where you have a healthy little tree and a healthy big tree, you normally take the healthy big tree in a long-term program. But under ecological management, you can't apply that one hundred percent of the time because you have to leave some old trees. So I had to come down from ninety percent to





While much of the southern coastal plain converted to short-rotation planted pine plantations, Herb Stoddard, shown marking timber, and Leon Neel emphasized natural longleaf regeneration through selection cutting and the use of fire.

eighty, then sixty, and now we're down to fifty percent. I'm not worried about the volume increase; I'm worried about maintaining a diversity of age classes out there. So we are converting those stands to younger age classes all the time, but we don't just cut every tree over a certain dbh to do it.

*Of the critiques leveled at the Stoddard-Neel method, perhaps the most difficult to answer involves economics. Because the regime was developed on the lands of wealthy families, early on there was little incentive to generate capital. Over the past forty years or so, however, Neel has adapted the method to meet a rising bottom line. Although it is still not the most lucrative of forestry systems in the short term, Neel insists that it will meet the economic needs of environmentally conscious landowners. It just takes patience.*

If a landowner came to me right now and asked how this system would be a benefit, I would first say you have to be a conservation-minded landowner. Our first responsibility is to the ecological health of the land. But I understand that in today's world the cost of owning land is astronomical. Our system helps to underwrite those costs and with patience and time will also generate a net economic gain. We will not liquidate a client's timber,

but the system is set up to be adaptable. If we want to keep a client—which is not always the case—we can mold the system to meet the economic return that the owner demands. This system developed in a time and place when these landowners didn't need much income from the land, so we've had to adapt. When I first came along, there was very little economic demand on the timber. The landowners put more value on the aesthetics of the forests than on the money, because they could afford it.

Over the years, though, we have cut a whole lot of timber while simultaneously growing millions and millions of board feet of timber. So a landowner can make money on this system, but they have to accept its limitations. It's not like funding a business annually and expecting a certain return. If you don't like that, you can shut it down and go into another business. It's not that. One of our biggest jobs is convincing the landowner to see the forest like an endowment. You start with the principal, you reinvest the interest, and you draw a pretty good-sized dividend. The more money you have in an endowment, the more interest you're going to draw. That's how we treat the forest. We take a conservative return from the timber base while increasing the quality and volume of timber over a long period of time.

Mr. Stoddard was really able to fine-tune his timber-marking

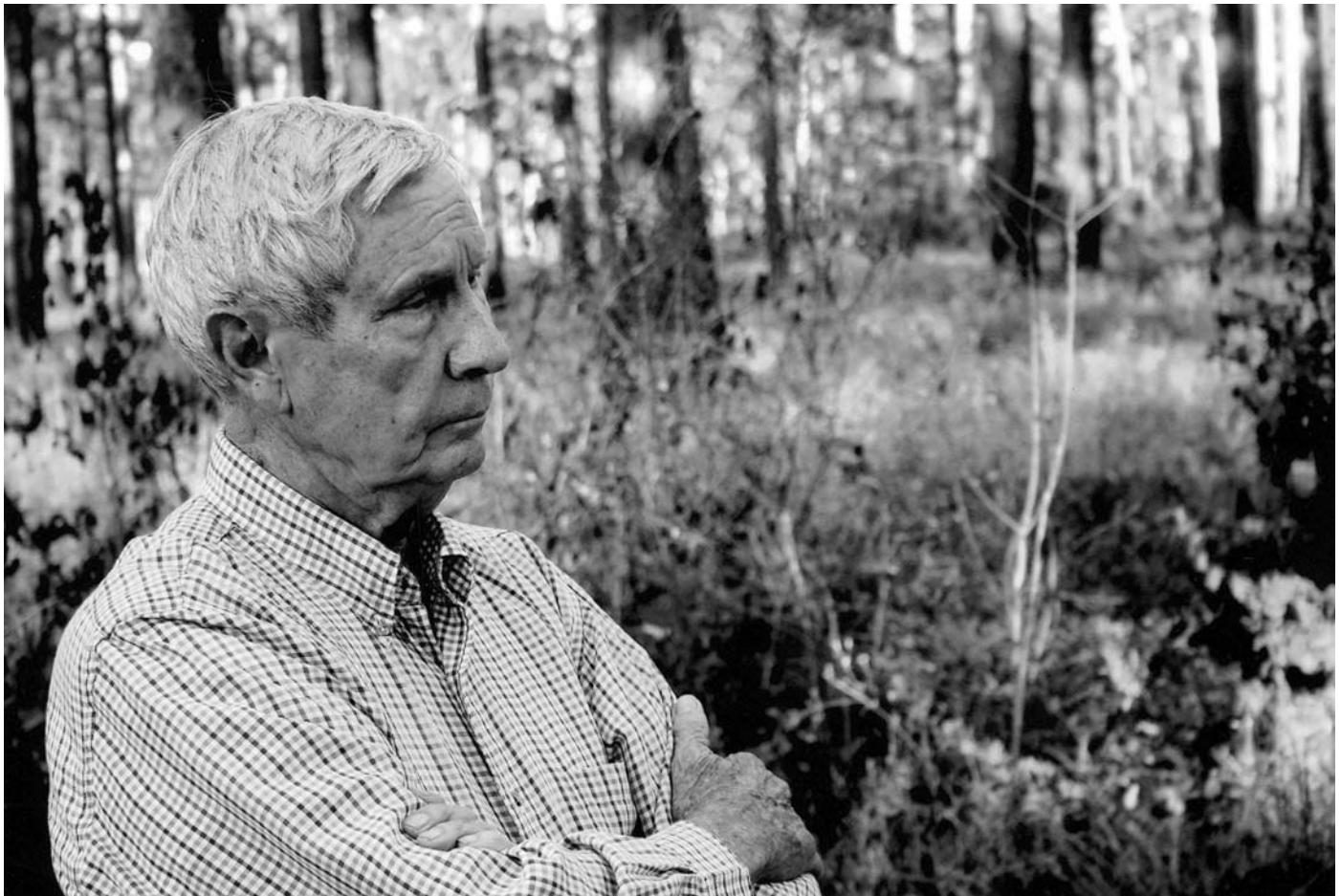


PHOTO BY JULIUS ARIAL. COURTESY OF JULIUS ARIAL

*Leon Neel's forest management is responsible for some of the most ecologically diverse stands of longleaf-grassland forest remaining on the southern coastal plain. Leon Neel is shown at Greenwood Plantation in 2005.*

system to perpetuate not only the forest itself but the quality of the trees and the species. He got a good return for the landowners, and he grew timber for the future. And we grew millions and millions of board feet of timber. Unfortunately, a lot of it was ultimately liquidated by the second-, third-, or fourth-generation landowners later on. It's a sad thing, and we recognized that possibility from the beginning. We might start with one property that had, say, twenty million [board] feet on it. Forty years later it may have sixty or eighty million feet on it, and yet we had cut a lot and made a pretty good return. In the meantime the price went up from \$20 per thousand board feet to \$400 per thousand, so there was a tremendous increase in value. Well, we've had a few in the later generations that can't stand that value being on the land. They've got other uses for it, so they liquidate it. We would not liquidate their timber for them, but they rarely asked us to because we have always worked on a commission basis. So in many different ways, we did them a favor.

*Although the future of the longleaf forest remains uncertain, Neel maintains hope that his method will play a role in its perpetuation and restoration.*

Some people say this system can't work for the majority of landowners, but I believe it can. Let's say you have a hundred acres of coastal plain woodland. If you just bought it and wanted

to maximize your timber return, you'd probably clear-cut whatever was out there, site-prepare it, and plant it in planted pines. Then you could figure on living long enough and clear-cut those to get that return. That clear-cut and plant system is so deeply embedded that it's hard for landowners to see that there are other options. There are landowners out there who have a conservation ethic and don't want to liquidate their timber, and our system can help them. Our philosophy works the same on a small tract as it does on a large one. We want to leave some for the future. That's the whole thing: our environment goes beyond one generation. That's the difficult part of life today, but let me tell you, life goes way beyond one generation. □

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*Albert G. Way is a doctoral candidate in history at the University of Georgia. He is currently completing his dissertation on the environmental history of the Red Hills, focusing on the work of Herbert Stoddard. His previous publications have appeared in Southern Cultures and Environmental History.*