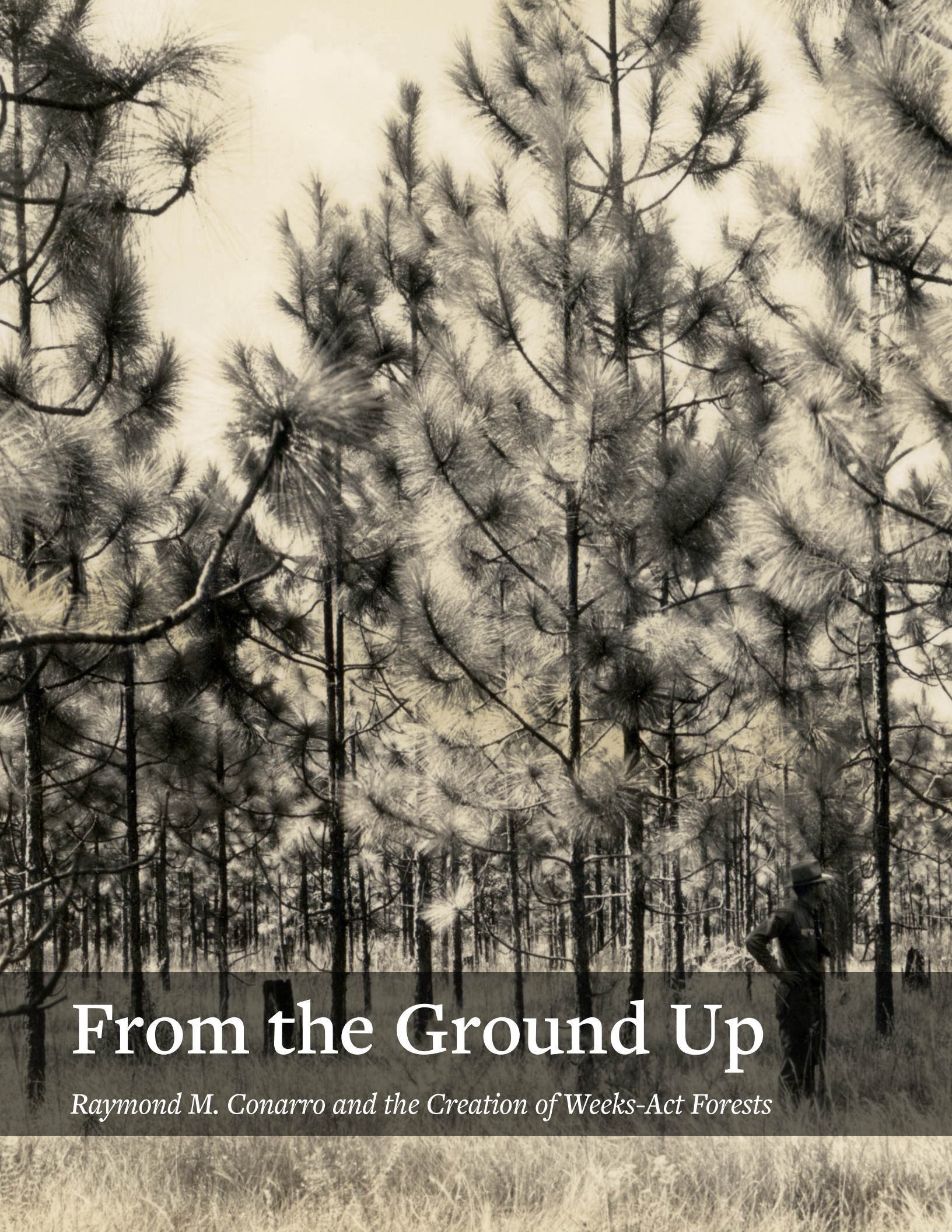

From the Ground Up

Raymond M. Conarro and the Creation of Weeks-Act Forests

U.S. FOREST SERVICE PHOTO 310739. FOREST HISTORY SOCIETY FH5238

Ray Conarro and others advocated for allowing fire in longleaf pine forests. This parcel on the DeSoto National Forest was photographed in 1935, the same year Conarro received permission to begin experimenting with what he later termed "prescribed burning."

How is it a forester from Penn's Woods was responsible for establishing national forests in Mississippi and introducing the phrase and concept of "prescribed burning" to the South?

BY CHAR MILLER

Something about land-inspector E. J. Schlatter's October 1933 report did not make sense. Raymond M. Conarro, who had arrived in Mississippi two months earlier to purchase lands that would become the state's first national forests, was more than a little surprised to hear Schlatter recommend eliminating an estimated 60,000 acres from the proposed Leaf River Purchase Unit. They were projected to be part of the DeSoto National Forest, but Schlatter thought otherwise. When Conarro asked why, Schlatter responded that the acreage in question "was completely denuded and that there was no evidence of restocking."[1] Conarro, who had been crisscrossing the state in search of large tracts of land that would form the nucleus of Mississippi's six national forests, suspected that Schlatter had been less than thorough in his analysis. Besides, as forest supervisor, Conarro's charge was to purchase as much land as possible, so "from an administrative standpoint" he opposed Schlatter's decision. Schlatter did not back down, and headed to regional headquarters in Atlanta to deliver his findings. "After thoughtful consideration of about five minutes duration," Conarro later recalled, he sent a telegram to regional forester Joseph Kircher urging him

not to accept Schlatter's assessment until Conarro had had a chance to conduct his own survey.[2] Minutes later, Conarro and a colleague were driving to the Leaf River site.

The speed with which Conarro read the situation, and then acted on his perception that something did not add up, is consistent with what he did when he arrived at the disputed acreage. He got down on his hands and knees and began to pull tufts of grass from one side to another. As he did so, he found what he was looking for. Longleaf pine seedlings were everywhere. Conarro estimated that the land acquisition crew had missed millions of them over the 60,000 acres, and that Schlatter "had not investigated the acquisition crew's work and had made up his mind on the basis of the crew's reports." With that, Conarro asked the regional forester for a rigorous, on-the-ground inspection under the aegis of the chief of the Regional Lands Division, which was granted. The final judgment confirmed Conarro's opinion that "Schlatter's recommendation was not based on fact."[3] Evidence mattered.

Especially when the job required Conarro to supervise the complex task of building a national forest from scratch and to juggle innumerable moving parts. Key among these was assessing the value of lands across the state; negotiating with their owners for an agreed-upon price; and securing the requisite deeds in advance of purchase. Detail-driven and diligent, organizational adept and unflappable, Conarro managed this process with dispatch. Between August 1, 1933, when he formally started working in Mississippi, and June 30, 1934, "we had examined, and the National Forest Reservation Commission had approved, land purchases in excess of 600,000 acres. This was and still is, the largest area ever purchased, or under purchase agreement, by any one Forest in such a short period of time."[4] Those first eleven months of Conarro's service in Mississippi, Regional Forester Kircher noted in 1940 when he announced that Conarro was being promoted to Chief of Forest Fire Control in the South, were legendary. "His job in the administration of the [Mississippi] national forests . . . especially in fire prevention and the restoration of tremendous acreage of burned and cut-over lands, has been outstanding in state and federal records."[5] Conarro, an agent of the Weeks Act, helped green up Mississippi.

HOME GROUND

Although the Mississippi terrain that Conarro tramped over had been devastated by fire, intense logging, and overgrazing, he was all too familiar with such battered landscapes, having grown up in Warren, Pennsylvania. Born there in 1895, Conarro came of age in this industrial boomtown, located in the northwestern part of the state, and which hugged the confluence of Conewango Creek and Allegheny River. Driving the local economy was innumerable cut-and-run logging operations that were able to strip even the most remote forests on the Allegheny Plateau because of an expanding highway and railroad network. By the early 1920s, when Conarro started with the Forest Service, the once thick stands of hemlock and beech were gone. As Gifford Pinchot noted in 1920 while directing the state's department of forestry, the once-large forests "have become small, the dense have become open, and the productive have become waste. . . . This is the Pennsylvania desert."[6]

The area was also known as Petrolia, and Warren was one of the epicenters of the world's first oil boom. Derricks were everywhere and they pumped thousands of barrels of oil annually; a goodly portion of that output found its way to the ten refineries in Warren that lined the banks of the town's two waterways. Employment was high, and outside investors racked up millions of dollars in profit. But environmental problems abounded, turning northwestern Pennsylvania into a sacrifice zone. Its air was toxic, rivers polluted, forests decimated, and the upper watersheds denuded. Each spring rains and snowmelt roared downhill to flood Warren and other river-hugging towns. Each summer, fires roared through the slash and other debris that careless loggers had left behind. Warren's growth and development had come at a substantial cost, as it did for the larger region, which, environmental historian Brian Black argues, became "the vanguard of sprawling refinery-scapes, toxic waste dumps, and the coal strip mines so prevalent a century later."[7]

These intertwined disasters formed the backdrop to Conarro's childhood and adolescence. Yet they also proved to be the source of his professional career. In 1921, he left his machinist job at a local iron works and signed on as a field assistant assigned to appraise land on offer to the Forest Service for potential inclusion in what would become the Allegheny National Forest. However minimally paid—Conarro received "the princely salary of $50 a month"—his work was critical to the larger mission to the 1923 establishment of a national forest in the cut-over Allegheny Plateau.[8]

That the federal agency was interested in a national forest in the region is not surprising. It had access to Weeks Act funding to buy up acreage in the headwaters of the creeks, runs, and streams that drained the rough, elevated terrain. An array of powerful people, ideas, and institutions helped identify the need for Pennsylvania's only national forest. But a lowly forest assistant was no less crucial to this process. Conarro had been hired by Loren Bishop, the new supervisor of the Allegheny who had transferred to

FOREST HISTORY SOCIETY PHOTO COLLECTION, R9_395717; U.S. FOREST SERVICE 395717

Cleared location for pressure plant on the Allegheny National Forest, taken in 1939.

Warren from his post as supervisor of Florida's Choctawatchie National Forest. As Bishop and a small crew of surveyors evaluated the Allegheny River drainage and identified the proposed boundary of the new forest, he advertised his interest in purchasing large tracts of land within the newly determined demarcation. The response revealed not only who were the largest landowners but also suggested why they were willing to sell. Logging operations dominated the list, and also lining up to talk with Bishop were a pair of chemical companies and South Penn Oil Company. Their collective interest in offloading their property from local tax rolls was a sign that the extractive boom that had drawn them to northwestern Pennsylvania had waned; but when they sold the land, they retained their subsurface mineral rights. The federal agency did not want them, according to Bishop: "Such rights are in no way necessary to the satisfactory working out of the National Forest program, and the vendors are encouraged to retain and develop them."[9] Subsequent forest supervisors would find that the presence of so many oil-and-gas operations would complicate effective stewardship of the forest. Later, when Conarro became supervisor of the Mississippi National Forests, he remembered Bishop's decision, and did the exact opposite.[10]

The real work began once Bishop had proposed sales totaling 200,000 acres. The agency authorized him to hire land assistants, including Conarro, to appraise the land. Beginning in late December 1921, Conarro helped assess the first of these properties, three tracts located within the west branch of Tionesta Creek. Because some sections had burned the previous spring, the team "spent considerable time studying area recovery and damage by the fire," to better account for the land's current price and future value. Over the ensuing months of arduous labor covering upwards of 300,000 acres, all but two of the land examiners had left. Conarro, who gained considerable insight into the economics and ecological aspects of forestry, remained.[11] His persistence meant he was at forest headquarters in Warren when the news broke on September 24, 1923, that President Calvin Coolidge had invoked the Weeks Act (1911) and the Organic Act (1891) to formally designate the Allegheny National Forest.[12] With that announcement, Conarro was appointed the sole district ranger for the 187,000-acre forest. The local boy had made good.

SOUTHERN FORESTS AND FORESTRY

So effective would Conarro be on the Allegheny that in 1927 he was named the assistant supervisor of

the Ouachita National Forest, which now spans the eponymous mountain range in western Arkansas and a smaller segment of eastern Oklahoma. The region had been heavily logged between 1906 and 1909, an intensive, large-scale harvesting that stripped off yellow pine and other valuable species and led to considerable erosion that damaged water quality.[13]

Conarro, who was coming from one of the newest national forests, and had never been south of the Mason-Dixon line, thus entered a different natural and human landscape. Established in 1907, the Ouachita was then the only shortleaf pine forest in the agency's inventory, and Conarro had had no experience with this species, the soils it grew in, or the sustaining climate. New, too, was the mounting tension between the Forest Service and local populations over rangers' attempts to control local communities' once-unfettered access to the region's forests and grasslands and the resources they contained. Arkansas was not Pennsylvania.[14]

A quick study, Conarro's work aligned with a key focus on the Ouachita: fire control. From Wilbur Mattoon, a former Ouachita forester, he would have learned about the role that fire played in the regeneration of shortleaf pine.[15] Conarro did not miss the traveling fire-education program that his colleague, Ranger James Wait, set up in 1925; Wait drove from one site to another in a government truck with the slogan "When the forests burn, you and your children lose" painted on its side. Later, in Mississippi, Conarro would promote a similar mobile-educational scheme focused on fire prevention, in which rangers drove what were dubbed "forestry showboats" to make the rounds from one public school to another, attracting crowds with movies and music.[16] The perceived need for this education was the same in both states—fires were a routine occurrence in Mississippi and Arkansas. The summer of 1929, Conarro's second on the Ouachita, was a dangerous fire season. Amid a lengthy drought, more than 35 major fires erupted on the Ouachita, the most significant of which torched an estimated 12,000 acres.[17] Cutting fire breaks, building lookout towers where possible, and organizing personnel and requisite resources to fight these and other outbreaks would been central to Conarro's work as the assistant supervisor.

The same would be true of his subsequent efforts on the Cherokee National Forest, to which he transferred in 1931 to become its assistant supervisor. The lands purchased were like those in the Ouachita Mountains: heavily culled, poorly managed, and fire-scarred. One Forest Service land examiner wrote in 1914 that most of his time was not spent assessing the value of land that would make up the Cherokee but fighting fires, "cattle owners and others being determined to burn the range."[18] Like the Allegheny, the Cherokee developed from two sources of willing sellers—large tracts from logging companies and other extractive industries (including smelters); and smaller lots from subsistence farm families. The impact of these purchases was evident in county-by-county data: in those jurisdictions that the Cherokee substantially overlay, the population had declined steadily since the forest's 1920 establishment. That said, the number of fires did not appear to decrease throughout the 1920s and 1930s: "Firefighting continued to engage the activities and funds of most Southern Appalachian forest supervisors."[19] As an assistant supervisor on the Ouachita and Cherokee, Conarro's normal workflow included managing the impact that firefighting had on the staff and budget. Among his innovations was the development of a chart that tracked fire-behavior data and correlated it with personnel requirements, for which he was commended: "His skillful attack on fire control problems and his grasp of fire prevention work won for him the unstinted praise of his superiors."[20]

That commendation—and the managerial abilities it praised—may have been a reason why in the immediate aftermath of Franklin D. Roosevelt's election in November 1932, Conarro was detailed to a special, short-term project. His charge was to make "a survey of the Tennessee River Basin downstream from Knoxville to the Ohio River," to be completed before the president's inauguration in March 1933.[21] For the president-elect, this was a vital river system. During the campaign, in fact, Roosevelt had linked the Tennessee with three other river systems in the country that he expected, if elected, would be developed at public expense and for the public good. To a large crowd in Portland, Oregon, in September 1932, the candidate offered what he called "a clear picture of four great government power developments in the United States—the St. Lawrence River in the Northeast, Muscle Shoals in the Southeast, the Boulder Dam project in the Southwest, and finally, but by no means the least of them, the Columbia River in the Northwest." However impressive the dam-and-hydropower infrastructure might be, the fact that it would be publicly owned—and not owned by private profiteers—was for Roosevelt its overriding purpose: "Each one of these will be forever a national yardstick to prevent extortion against the public and to encourage the wider use of that servant of the American people—electricity."[22] He brought the audience to its feet with this galvanizing promise: "Never shall the Federal Government part with its sovereignty or with its control over its

power resources, while I am President of the United States."[23]

Muscles Shoals, a key break point on the Tennessee River in northern Alabama, had been selected for a hydroelectric plant in World War I. The energy it would generate would power two nitrate plants. Although the dam would not be completed until after the war, industrialist Henry Ford recognized its potential and proposed to buy the dam and related facilities, thereby controlling its electricity and future nitrate production. Presidents Coolidge and Hoover were in support of privatizing Muscle Shoals, but progressives, including Senator George Norris of Nebraska and Gifford Pinchot, attacked any such monopolistic controls of a public utility.[24] Franklin Roosevelt agreed, and in a January 1933 visit to the site laid out the broad outlines of what would become the Tennessee Valley Authority. "Muscle Shoals gives us the opportunity to accomplish a great purpose," he declared, a basin-wide planning project that would "take in all of that magnificent Tennessee River from the mountains of Virginia down to the Ohio and the Gulf." And that would tie together "industry and agriculture and forestry and flood prevention . . . over a distance of a thousand miles so that we can afford better opportunities and better places for living for millions of yet unborn in the days to come."[25]

Tucked within Roosevelt's idealistic message was the roadmap that Conarro followed, tracing the river's course through the Volunteer State—from Knoxville, he drove southwest to Chattanooga and then swung into Alabama and passed Muscle Shoals, before curving north to Kentucky and the confluence with the Ohio River. He read the land and noted its problems and potential, a survey that served two purposes. The first was to ground truth state maps that identified "the agriculture and forest land of the Basin together with the apparent capacity of the soil to produce annual agricultural crops." The second was for Conarro's findings to be "used as data in the establishment of the Tennessee Valley Authority."[26] There was a personal takeaway, too: Conarro believed that the landscape-scale assessment he conducted along the Tennessee "proved to be good training for the tremendous task of Mississippi land purchases I was soon to assume."[27] Put another way, his TVA work was a mature expression of the lessons he had learned on the Allegheny, Ouachita, and Cherokee national forests—and the self-confidence he had earned. As land inspector E. J. Schlatter would discover on a hot August afternoon in Mississippi in 1933, Conarro knew what he was talking about.

Ray Conarro served as the forest supervisor of the national forests in Mississippi from August 1, 1933, to June 30, 1940. This undated photo appeared in his "Recollections."

RECOVERY

It was a good thing that Conarro also liked to talk and negotiate, because to build a Weeks Act forest from the ground up required a lot of negotiations. By their nature, these forests were political. Under the terms of their founding legislation, each state legislature had to pre-approve the possibility of federal purchases of land. In 1926, the Mississippi legislature gave its consent "to the acquisition by the United States by purchase or gift of such land in Mississippi, as in the opinion of the Federal government may be needed for the establishment of a national

forest or forests in the region, not to exceed 25,000 acres."[28] Two other steps were required: the newly established Mississippi Forestry Commission must agree to any potential purchases, and in deference to county boards of supervisors, the commission required the Forest Service to seek each county's consent. Adding to the impact of this requirement on Conarro's time was the reality that most of the purchase units he developed crossed multiple county lines. The Bienville Purchase Unit, which consisted of three subunits, was located in eight counties, the Biloxi was in three, the Chickasawhay in four, and the Leaf River in six. Once he received approval from the National Forest Reservation Commission to purchase the designated lands within these and other purchase units, Conarro met with each county board to secure its consent.[29]

He also conferred routinely with and had the backing of the state's congressional delegation. Congressman Wall Doxey was especially active in support of the national forests and served on the national forest commission; in one instance, he directly challenged a Forest Service decision not to bring the Holly Springs Purchase Unit to the commission's attention. Conarro recounted about the Holly Springs Purchase Unit that when Doxey discovered that Forest Service Chief Ferdinand Silcox "did not believe it had National Forest character," the congressman requested all Conarro's documentation and internal reports. With these in hand, Doxey placed the unit on the commission's agenda and then "insisted on its approval." Conarro shared Doxey's assessment of Holly Springs' value: "I personally believe that this Unit meets all of the Weeks Law and the Clarke-McNary Amendment requirements as well or better than any other Purchase Unit."[30]

Senator Pat Harrison, chair of the Senate finance committee, was another of Conarro's powerful allies. In particular, he interceded with President Roosevelt to provide additional funding for land purchases country-wide that the National Forest Reservation Commission would disperse (Doxey, for example, while serving as a commissioner, secured more than $3.5 million to buy one million acres for the Mississippi National Forests.)[31] Harrison was equally adept at channeling money to the state to establish thirty-four Civilian Conservation Corps camps, an investment of nearly $61 million that had a profound effect on the enrollees and the land. Twenty-five of these camps were under Conarro's purview, and the thousands of men—White and African American—planted millions of trees, built miles of new roads and fire breaks, erected hog-proof barbed wire fences and fire-lookout towers, seeded countless gullies and ravines, and established the W. W. Ashe Nursery. This latter facility, which annually produced millions of seedlings, ensured the rapid buildup of plantation forests, a hybridizing supplement to the natural regeneration of Mississippi's pineries.[32]

Even before Conarro and his staff hustled to develop Mississippi's national forests, he made certain to avoid a mistake that supervisor Loren Bishop had made on the Allegheny. "Having been born and raised in the oil and gas field section of Pennsylvania and employed in this same area the first six years of my Forest Service career, I became fully convinced that the oil and gas interests were not conducive to good forest management," Conarro wrote.[33] Those powerful companies and the mineral rights they maintained (and the unabridged right of access to them) further complicated the physical integrity of the Allegheny National Forest. When Conarro left the forest in 1927, "the area acquired and under purchase agreement was in the neighborhood of 300,000 acres," but that figure was misleading. "In this acreage only 134 acres were owned, or would be owned outright (fee simple) by the Government." The inholdings fragmented the forest, as did the complex structure of who owned what: "Some individuals and companies owned both oil and gas rights," but not all. In other cases, the oil rights were "owned by an individual or company" while others controlled the gas rights.[34] These complicated conditions, in which more than 90 percent of mineral rights were in private hands (and still are), has continued to trouble the forest's mission and management.[35]

Conarro was convinced that he could preemptively assert greater control over mineral rights that ran with the lands he planned to purchase for the Mississippi National Forests. In consultation with the regional forester, he prepared a mineral-reservation clause in the option-to-buy proposals that granted sellers a ten-year term to drill on the land they were selling. Because none of "the purchase units produced either oil or gas prior to the expiration of the ten-year expiration dates of mineral rights on over 800,000 acres of land owned by the Government . . . suddenly the Forest Service was in the oil and gas leasing business." By Conarro's estimate, that clause, which granted the federal agency the right to sell to the highest bidder any subsequent request for a prospecting permit, generated upwards of two million dollars annually. In 1947, however, Forest Service Chief Lyle Watts, and Clinton Anderson, who was President Truman's secretary of Agriculture, decided to give responsibility over mineral rights to the Bureau of Land Management. Watt's reasoning, which echoed that of Allegheny supervisor Bishop's twenty years earlier, was that the Forest Service "was a forestry organization, not a

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A Civilian Conservation Corps crew, equipped with dibbles and seedlings, planting trees on Mississippi National Forests in the 1930s.

mineral managing organization." Conarro's rebuttal was sharp: "The managing of underground minerals is, of course, land management, as present-day Forest Officers well know." What was worse, he fumed, was that the actions of Watts and Anderson caused Mississippi to lose "revenue of millions of dollars each year, and made it possible for oil and gas interests to obtain drilling rights simply by applying for such rights."[36]

As shrewd was Conarro's conviction that the Forest Service's aggressive fire-suppression policy needed to change. From the agency's beginning, fire was such an anathema that its leaders committed to full-on suppression in the 1930s with the so-called "10 A.M. Rule," requiring that all fires, once spotted, be put out by the next morning.[37] This policy ignored the observational and experimental evidence that indicated that some species required fire to regenerate. Among these was the longleaf pine, one of the dominant forests in the South, and whose fire adaptation English settlers and travelers had noticed since the eighteenth century.[38] Forest scientists like H. H. Chapman at Yale's forestry school had demonstrated the need for fire in longleaf forests.[39] Making the same case was federal Bureau of Animal Husbandry's S. W. Green. Since the early 1920s, Greene, in collaboration with the Forest Service's Southern Experiment Station, had been using a parcel of land in Pearl River County that abutted what would become the DeSoto National Forest. There, he assessed the relationship between fire, grass and grazing, and longleaf pine, discovering that once longleaf seedlings reached "post size," routine applications of fire would regenerate the associated grasslands without damaging the trees.[40]

Conarro noted that Greene's findings were "quite controversial among foresters, especially state fire protection agencies" because the "use of fire in woodland for any reason was taboo." That prohibition began to crack after Chapman set up a panel of likeminded fire researchers at the 1935 annual meeting of the Society of American Foresters, with Greene as one of the panelists. That same year Conarro, along with the supervisors of national forests in Texas and Louisiana, received permission from the regional forester to conduct controlled-fire experiments. Conarro, for example, "set up three areas of from 1,000 to 1,500 acres each, had plots established and plans made for periodic burning and study of results," an internal report noted later. "These plans were carried out and much valuable data collected. Conarro's vision and personal action to see that the experimental program was aggressively pursued contributed very importantly to the development of this important technique of longleaf pine management."[41]

Soon thereafter, Conarro, after being appointed chief of fire control for the Forest Service's Southern

Region in 1940, went public with his commitment to integrate fire into the management of national forests from Virginia to Texas, Florida to Kentucky. In a 1941 talk delivered to the Society of American Foresters, Conarro asked whether there was "a place for fire in the management of our southern forests?" His was a rhetorical query, because the answer was "obviously yes, providing [fire] is used strictly in accordance with a plan developed from facts determined by a survey and analysis correlated to available knowledge concerning weather influence and fire effects." Likening this approach to that which physicians utilized when assessing strategies for their patients' healthcare, Conarro adapted a medical term to describe this new form of fire-management—"Prescribed Burning." He coined the phrase because of what it defines ("burning to a prescription which prescribes the area to be burned, the degree of burn, the method and the time, simple, concise, effective"); and how this definition leaves "no room for criticism, for controversy, for misunderstanding." That last point may have been more optimistic than warranted, but he expected that the concept of prescribed burning would take the heat out of inflammatory claims that all fire anywhere was the enemy of forestry. "We should no longer consider that fire is 90 or 95 percent, or any other great percentage, of the South's forest problem, but that it is an effective tool, a vehicle upon which sound forestry practices can well rely."[42]

By arguing that henceforth forest management could not proceed without fire, Conarro put his peers on notice. Thirty years later, fire ecologist Gordon Langdon thought that the article marked "a subtle change in the philosophy of writers before 1941, when the term 'prescribed burning' was introduced by Ray Conarro, and of those writing subsequently."[43] Conarro's insights went beyond the theoretical, fire historian Stephen Pyne has noted: the forester's words took root. In 1943, the Florida National Forest gained agency approval to utilize prescribed burning, and fifteen years later, the National Park Service used fire to restore portions of the Everglades.[44]

SYSTEMATICS

Conarro's growing influence was not simply because he created a new term, no matter how smart, but because of his ability to think systematically. These qualities would be on full display when in 1943 the regional forester tapped him to assess work-plan procedures for rangers and supervisors. Conarro drew on his experience as a ranger and administrator to develop an array of new methods, and then traveled to every southern forest to educate his peers on their application. His wide-angled perspectives led the Washington Office to bring him north to develop best practices for communication, engineering, and automatic data processing.[45] During a 1955 detail to the Chief's Office to assist in compiling the national work-load data, for example, Conarro observed the methods then in use "to accumulate and record the statistical and expenditure data for the national forest road and trail system." His observations led to questions about the processes, which in turn grew into a critique: Current practices were "time consuming from the standpoint of manpower required and lapsed time in securing the required data." The remedy led Conarro, "on his own time," to devise "a method of doing this job with data processing machines." The resulting alterations in work-loads and flows were adopted across the agency and became one reason why in 1958 the Forest Service nominated him for a USDA Superior Service Award.[46]

There would be other honors. In 1968, six years after Conarro retired from the Forest Service and returned to Mississippi to work as a forest consultant, he was the recipient of two lifetime achievement awards. He was awarded the inaugural Silver Smokey from the National Association of State Foresters, the U.S. Forest Service, and the Advertising Council, given for outstanding wildfire prevention service regional (multistate) in scope for work over at least a two-year period.[47] From his professional colleagues in the Society of American Foresters' Gulf States chapter, he received the Distinguished Service to Forestry award.[48]

More significant than these nods to his professional accomplishments was what had happened to the denuded Mississippi forests he first encountered in 1933. By the early 1960s, the six Mississippi National Forests sustained much healthier, and more resilient and biodiverse ecosystems. On the DeSoto, this included some sections along the Leaf River where Conarro had uncovered thousands of longleaf seedlings hidden beneath the rough grass. In 1940, he oversaw the establishment of the 42,000-acre Leaf River Wildlife Management Area, which subsequently would be abutted by the Leaf River and Black Creek wilderness areas, designated in 1984. Conarro's prescription for good forest management, which required a judicious tending with fire, had helped bring these lands back to life.

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33. Conarro, "The Beginning," 4.
34. Conarro, "The Beginning," 4.
35. Christopher Johnson and David Govatski, *Forests for the People: The Story of America's Eastern National Forests* (Washington, DC: Island Press, 2013), 253–60; Dave Fredley, "Surface and Mineral Rights and the Weeks Act," *Forest History Today* Spring/Fall 2011: 32–39.
36. Conarro, "The Beginning," 4. The context was more complicated than Conarro allows. "Mineral Leasing Act for Acquired Lands" (1947) emerged in response to the Truman administration's reorganization in the Department of the Interior that created the Bureau of Land Management by combining the General Land Office and the Grazing Service. Because this was an administrative initiative, USDA Secretary Clinton Anderson and Forest Chief Lyle Watts acquiesced in the transfer of the mineral lands that the Forest Service had acquired under the Weeks Act and other mechanisms.
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40. S. W. Greene, "The Forest that Fire Made," *American Forests*, 37:10 (October 1931): 583–84, 618; S. W. Greene, "Effect of Annual Grass Fires on Organic Matter and Other Constituents of Virgin Longleaf Pine Soils," *Journal of Agricultural Research* 50:10 (October 1935): 809–22.
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42. Raymond M. Conarro, "The Place of Fire in Southern Forestry," *Journal of Forestry*, 40:2 (February 1942): 131.
43. O. Gordan Langdon, "Effects of Prescribed Burning on Timber Species in the Southeastern Coastal Plain," in *Prescribed Burning Symposium Proceedings*, April 14–16, 1971 (Charleston, SC, and Asheville, NC: USDA Forest Service: Southeastern Forest Experiment Station), 34–35.
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45. R. M. Conarro and H. K. Lawson, "Report on Communication Study," August 1944, 1–16; National Museum of Forest Service History, accessed at: http://forestservicemuseum.pastperfectonline.com/archive/EE910473-511B-45E6-A08E-539102899035.
46. "Nomination for a Superior Service Award," February 12, 1958, in Raymond M. Conarro Biography File, Forest History Society, USFS Collection–Biographical Index, https://foresthistory.org/biographical-index/.
47. Award description is from "Smokey Bear Awards: Award Levels," https://smokeybear.com/en/awards/award-levels. Conarro was one of three recipients of the inaugural Silver Smokey.
48. Conarro's consultancy was under the aegis of the Mississippi Forestry Commission, and for the organization he wrote the *Fire Prevention Contractors' Handbook* (1963). It served as the foundation for M. L. Doolittle and G. D. Welch, "Fire Prevention in the Deep South: Personal Contact Pays Off," *Journal of Forestry*, 72:8 (August 1974): 488–90; see also Hamlin L. Williston and R. M. Conarro, "Fire Breaks of Many Uses," *Fire Control Notes*, 31:1 (Winter 1969–70): 11–13.