

Plains Farms Need Trees

A History of the U.S. Forest Service and Agroforestry

by Andy Mason and Sarah Karle

Mary Peterson's article "There's a National Forest in Nebraska" in the Fall 2016 issue of *The Rendezvous* provides a great segue to explore another piece of lesser known Forest Service history that also originated in the Great Plains. If you know anything about the Forest Service, you know that our responsibility to manage national forests and grasslands began in earnest with the agency's founding in 1905. As a history buff (or if you worked in State & Private Forestry), you may also know that the 1990 Farm Bill contained the first ever Forestry Title, which authorized the Forest Service, in cooperation with State Foresters, to provide assistance to manage trees and forests in our cities and towns.

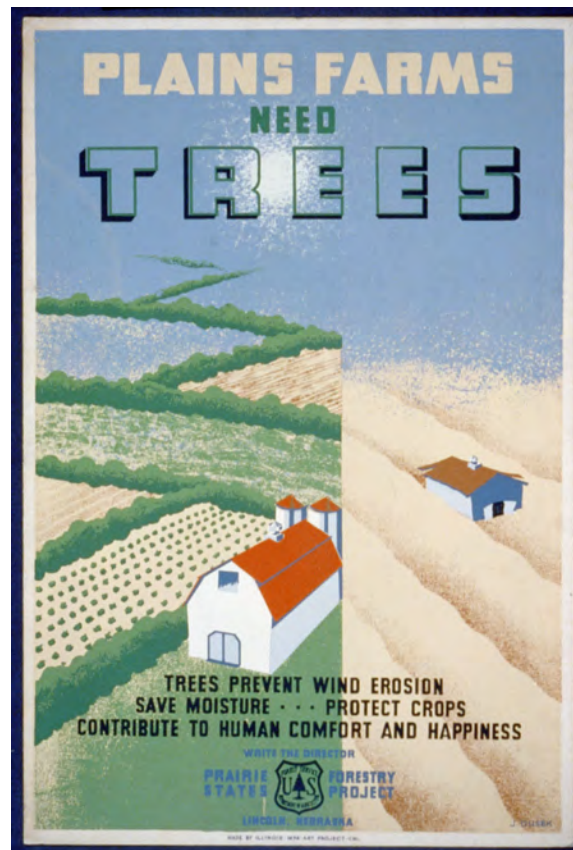
But, did you know that the Forest Service has had a long standing role in advancing the science and practice of using trees on farms that originated in the "Dirty Thirties" with the Prairie States Forestry Project (1934-42)? However, the broader concept of using "working trees" in agriculture, also known as agroforestry, only started gaining traction in the 1970s and 1980s. A commonly used definition for agroforestry today is: "the intentional mixing of trees and shrubs into crop and

animal production systems to create environmental, economic, and social benefits." In addition to windbreaks (includes shelterbelts), we recognize four other categories of agroforestry practices/systems in the U.S.: alley cropping, forest farming, riparian forest buffers, and silvopasture. Used early on to protect crop production and soil health, these practices are now designed to provide many other

services we depend on from agricultural lands.

These services include improved water and air quality, greenhouse gas mitigation especially through carbon sequestration, critical habitat for pollinators and other wildlife and aquatic species, and to diversify production. Today, the Forest Service has national agroforestry science and technology transfer responsibilities, with leadership and coordination provided by the USDA National Agroforestry Center "NAC". Located in Lincoln, Nebraska, NAC is a partnership of the agency's Research & Development and State & Private Forestry arms and the Natural Resources Conservation Service.

When asked by Tom Thompson to write an article about the history of the Prairie States Forestry Project (PSFP) and USFS efforts more broadly in agroforestry, I was very fortunate to learn from NAC's Rich Straight that Sarah Karle, Assistant Professor of Landscape Architecture, and David Karle, Assistant Professor of Architecture, University of Nebraska-Lincoln, are writing a book about the project.



Early agroforestry poster created by artist Joseph Dusek between 1936-1940 (Work Projects Administration Poster Collection, Library of Congress).

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Sarah agreed to team up with me on this article and very generously provided the following brief history of the PSFP. After that I provide a brief history of USFS-led efforts in the Great Plains (initiated by the Research Branch in 1953), which evolved into the national scope of agroforestry science and technology transfer activities led by the USDA National Agroforestry Center that continue today.

Prairie States Forestry Project (1934-1942)

In 1934 President Franklin D. Roosevelt initiated the New Deal's Prairie States Forestry Project to create "shelterbelts" of newly planted trees to mitigate the effects of the Dust Bowl in America's Great Plains. The project stretched from North Dakota to northern Texas and helped stabilize soil and rejuvenate farm communities affected by the dust storms. Under Roosevelt's Administration from 1934 to 1942, the program both saved the soil and relieved chronic unemployment in the region. The U.S. Forest Service was responsible for organizing the "Shelterbelt Project," later known as the "Prairie States Forestry Project." Paul H. Roberts from the agency's Research Branch directed the project that was headquartered in Lincoln, Nebraska.

When FDR came to office in 1933, the Great Plains and other regions were suffering from what would become an almost decade-

long period of economic, environmental, and social crises. Several large-scale factors led to the environmental devastation of the Dust Bowl and contributed to the economic hardships of the Great Depression, leading to the social upheavals that followed. As president, FDR used conservation projects as a job-creation tool against the Great Depression, and within months of becoming president, he devised the Prairie States Forestry Project. The project, based to some degree on Roosevelt's personal experience with forest management, was proposed as an ambitious "Great Wall of Trees" using shelterbelts across the Great Plains to reduce



Raphael Zon stands in front of a U.S. map showing the shelterbelt, a 2,000-mile windbreak of trees planted between crop fields. Forest Service, USDA, courtesy of the Forest History Society

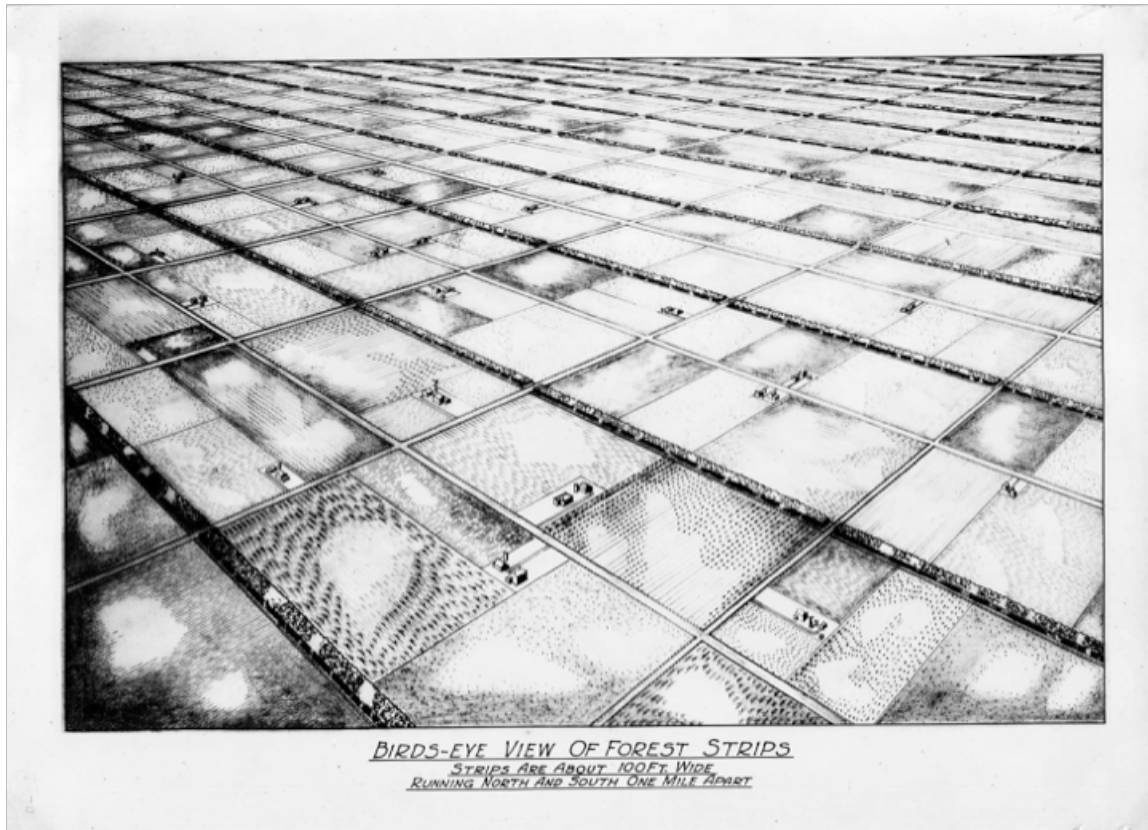
soil wind erosion, retain moisture, and improve farming conditions. Trees were typically planted in long strips at 1-mile intervals within a belt 100 miles

thick. At the time, it was believed that shelterbelts at this spacing could intercept the prevailing winds and reduce soil and crop damage. The project used many different tree species of varying heights, including oaks and even black walnut. The plan engaged scientific knowledge with shifting political ideals, including regionalism and the role of government in the conservation of private land.

Though seemingly beneficial, the Forestry Project was ridiculed from its inception. Some professional foresters expressed doubts about its chances of success, while the general public perceived it as an outdated scheme of dubious credibility to "make rain." Despite a general lack of scientific and Congressional support, the Forest Service worked across six states with local farmers, the Civilian Conservation Corps, and the Works Progress Administration to plant over 220 million trees, creating more than 18,000 miles of windbreaks on 33,000 Plains farms. Although Works Progress Administration and Civilian Conservation Corps workers planted the trees and shrubs, landowners were responsible for their long-term care and maintenance. At the height of the Great Depression, the project employed thousands of residents (notably both men and women) of the Plains states and CCC members from around the country.

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Artistic representation of shelterbelt spacing. Shelterbelt strips are planted in parallel rows following the Jeffersonian grid. Lake States Forest Experiment Station, St. Paul, Minnesota, 1934. Forest Service, USDA.

The program officially ended in 1942, but by 1944 (scarcely a decade after its inception) environmental and economic benefits from these shelterbelts, including land management practices, control of wind erosion, soil conservation, cover for game birds, and the creation of snow traps along highways, were already apparent. Since 1942, tree planting to reduce soil losses and crop damage has been carried out primarily by local soil conservation districts in cooperation with the Soil Conservation Service (now Natural Resources Conservation Service) with help in later years

from State forestry agencies aided by U.S. Forest Service programs. Today the rows of shelterbelt plantings, while diminished by subsequent changes in agricultural policies and practices, continue to communicate culturally recognized signs of human intervention and interaction with the landscape.

“Lincoln Lab” to USDA National Agroforestry Center (1953-today)

In 1953, about 11 years after the last tree was planted by FDR's Forestry Project, the U.S. Forest Service established the Lincoln

Forestry Science Lab at the University of Nebraska East Campus in Lincoln, Nebraska. Organizationally the “Lincoln Lab” was part of the new Rocky Mountain Forest and Range Experiment Station and its geographical scope was the Great Plains (all or part of 10 states). During its 39 years, the Lincoln Lab focused its research in four major projects that involved 12 scientists (project leaders shown in parentheses) and many other technical and administrative personnel:

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RM-1501 -Forestry practices for improving environments in 1953-1981 the central and southern Great Plains (Ralph Read)

RM-2206 - Diseases of nurseries, shelterbelts, and other 1961-1981

Plantations in the Great Plains (Glenn Peterson)

RM-4551 - Protection and improvement of trees in the Great 1981-1991 Plains (Glenn Peterson/Bill Rietveld)

RM-4551 - Improvement of stress- and pest-resistance of Great 1991-1996 Plains tree species (Bill Rietveld/Michele Schoeneberger)

with authorization of the “Center for Semi-Arid Agroforestry”, subsequently renamed the USDA National Agroforestry Center (NAC). From just being a research unit, the Center was now a combined program of research and development and technology transfer and assistance. The new center was stood up in 1992 with Bill Rietveld as its first director and Michele Schoeneberger as research program leader and Jerry ‘JB’ Bratton as technology transfer and applications leader. The tree stress/pest resilience research of the Lincoln Lab (a focus since inception) carried on and was in fact bolstered for several years at the new Center through the work of transferred

Center’s research expanded in 1994 to include riparian forest buffers and water quality, biomass, carbon, biodiversity and the development of tools to help design and locate these multifunctional plantings within farms, ranches and even communities. This work continues today.

NAC began in 1992 as a partnership between two USFS mission areas, Research (now Research & Development) and State & Private Forestry (S&PF) and expanded in 1995 to formally include the Natural Resources Conservation Service (NRCS). Support from S&PF and NRCS allowed the Center to significantly expand its efforts in technology transfer, thereby targeting its agroforestry publications, tools, training, etc. at the people in NRCS, State forestry agencies, and conservation districts who provide assistance directly to farmers, ranchers, and woodland owners.

Beginning in the Dust Bowl era and for 80+ years now, the U.S. Forest Service has been helping people put trees to work ‘down on the farm’. This work is now part of a globally recognized science and practice known as agroforestry. Perhaps Joseph Dusek’s 1930s era poster still says it best: “Trees Prevent Wind Erosion; Save Moisture: Protect Crops; Contribute to Human Comfort and Happiness”.



Three intact Prairie States Forestry Project shelterbelts continue to protect farmland and provide cover for wildlife.

From “Lincoln Unit History” (unpublished U.S. Forest Service paper)

The 1990 Farm Bill provided a significant program expansion

and newly hired scientists working in entomology, pathology, and ecophysiology. With the growing recognition of what agroforestry could do, the

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For more information about the history of the Prairie States Forestry Project and the challenges of the “Dust Bowl” period:

- Trees, Prairies, and People, A History of Tree Planting in the Plains States by William H. Droze (1977)
- The Great Plains Shelterbelt by Tom Croker (1991)
- The Worst Hard Time by Timothy Egan (2005)
- FDR and the Environment edited by Harry L. Henderson and David B. Woolner (2005)
- The Shelterbelt Project: Cooperative Conservation in 1930s America by Joel Orth (2007)
- Conserving the Dust Bowl: The New Deal’s Prairie States Forestry Project by Sarah Karle and David Karle (2017)

Perhaps the earliest writing about agroforestry (without using the term):

- Tree Crops: A permanent agriculture by J. Russell Smith (1929)

For more contemporary information about agroforestry in the U.S.:

USDA National Agroforestry Center: <http://nac.unl.edu/>. See also Working Trees publications: http://nac.unl.edu/Working_Trees/index.htm Agroforestry: USDA, Fiscal Year 2011-2012 In-Brief (2013)

Note from Andy Mason: Many thanks to my co-author Sarah Karle for contributing the section about the Prairie State Forestry Project. Stay tuned for the rest of the story in the book, *Conserving the Dust Bowl: The New Deal’s Prairie States Forestry Project* forthcoming in March. I also appreciate the information and review provided by two current U.S. Forest Service employees at the USDA National Agroforestry Center: Research Program Leader Michele Schoeneberger and Technology Transfer Program Leader Rich Straight.

ALSO A REQUEST FOR HELP FROM HISTORY BUFFS: Several of the books referenced above address the work of Hugh Hammond Bennett, a soil conservation advocate who certainly had FDR’s ear and would go on to serve as the first chief of the Soil Erosion Service (SRS), which in 1935 became the Soil Conservation Service (SCS) and in 1994 was renamed the Natural Resources Conservation Service (NRCS). Bennett served as chief of SRS/SCS (1933-1951). As the founder of NRCS, Bennett is as well known within NRCS as Pinchot is to the USFS community. I have done a good bit of investigation to learn if Bennett and Pinchot and/or other early USFS Chiefs ever had any significant interaction regarding the conservation issues of the day. The lives of our first SCS/NRCS and USFS chiefs had considerable overlap (Bennett 1881-1960; Pinchot 1865-1947) so certainly they knew each other? If you have any additional information about what connections there might be between Bennett and Pinchot or other early USFS Chiefs please contact me (acmason1954@gmail.com). Thanks!

Plains farms need trees! Hoosier Tree Works shared a link. 11 January 2015 · thisiscossal.com. Ancient Trees: Beth Moon's 14-Year Quest to Photograph the World's Most Majestic Trees. Between much needed rain showers this week, our California habitat specialist Jessa Kay Cruz, is managing a project to install nearly 5 miles of hedgerows and wildflower meadows throughout a 1,000 acre almond orchard. Thousands of flowering, drought-tolerant, native California shrubs are being planted, and hundreds of thousands of wildflower seeds are being sown to create nectar-rich habitat to support the bees that pollinate almonds. Tree farming is the process of planting a large number of saplings and waiting for them to grow into trees. These trees are then harvested for wood and more saplings, which can be used to grow another generation of trees. This can be repeated indefinitely, yielding a regular supply of logs without the hassle of covering large areas of terrain, therefore making wood a renewable resource. A secondary benefit of tree farming is that it allows conservation of the surrounding environment. The use of bone Great Plains Shelterbelt. Great Plains Shelterbelt (en); Plains farms need trees LCCN98517930.jpg 1,040 × 1,536; 369 KB. Plains farms need trees LCCN98517930.tif 1,040 × 1,536; 4.57 MB.