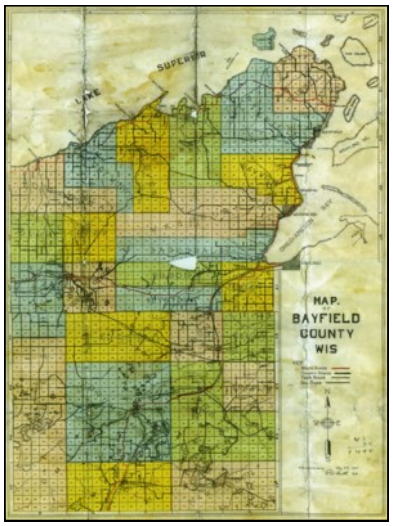
Mapping the History of Wisconsin's Forests

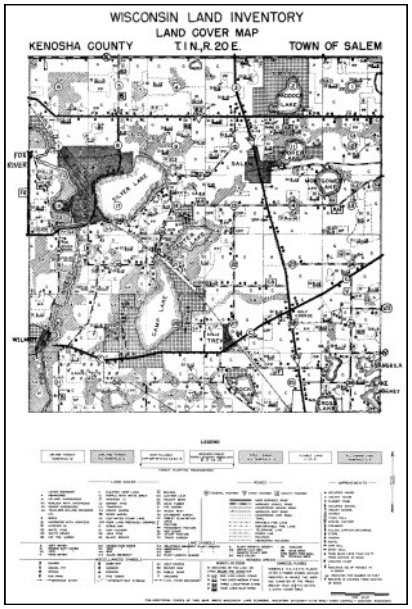
The impacts of the Great Depression in rural Wisconsin were amplified by the legacies of land use decisions made decades earlier. In northern Wisconsin most forested land had been cut, and attempts to farm this land often met with failure. By the 1920s, in some northern counties, as much as a quarter of all land could not produce enough income by farming or forestry to cover property taxes.[1] In this climate, land was being abandoned at an alarming rate.

The Bordner Survey

Remediation efforts in northern Wisconsin required accurate information about land use and land suitability for agriculture and forestry. As early as 1927, representatives of Wisconsin state government and the University of Wisconsin had agreed to collaborate on a detailed land inventory focused initially on northern Wisconsin. The effort was led by John Bordner, a Wisconsin farmer who earned a PhD in plant physiology in 1908. The first county to be completed by the Bordner Survey (technically the Wisconsin Land Economic Inventory) was Bayfield in the far north of the state. Other counties soon followed. By the mid-1940s, all counties with the exception of Milwaukee had been surveyed. Over the years the project was funded by the state and the federal Works Project Administration.



The survey's level of detail was unparalleled. Field workers, mostly trained forestry graduates, crossed the state at regular intervals, setting foot in every section of land and mapping the features they encountered. Hand-drawn maps created in the field were later combined with air photo information to produce a composite map for each six-mile by six-mile township.[2] The maps depicted agricultural and forest cover, including the types of crops grown, and the species, density, and diameter of trees. Cultural features were also recorded, including abandoned and inhabited buildings, improved and unimproved roads, telephone lines, schools, churches, sawmills, logging camps, mines, and cemeteries, to name a few. Physical features such as lakes, rivers, wetlands, beaches and shoals were also compiled. Today these maps provide a detailed inventory of physical and cultural landscape of the state at an important historical juncture.



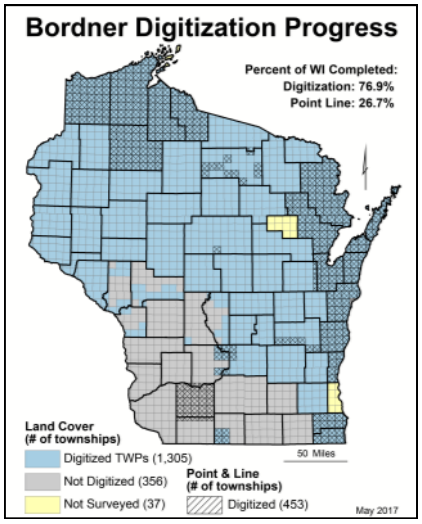
In the public policy realm, the survey's impacts were significant. In 1929 the Wisconsin Legislature passed a statewide Zoning Enabling Law to guide land use decisions in rural areas, and in 1933 Oneida County became the first county in the nation to have a comprehensive rural zoning ordinance, which created a forestry district where new agricultural development was prohibited.[1] From this point forward, rural land was better managed and much of Wisconsin's north was returned to forest through active stewardship and restoration efforts. Simultaneously, agriculture was steered toward lands best suited for this activity. The legacy of these actions carries on today through the state's county and state forest system.

Digitizing the Bordner Maps

The Bordner Survey is a unique resource without a parallel in most other states. The original paper maps have been archived by the Wisconsin Historical Society and scanned by the University of Wisconsin Digital Collections Center.[3] However, paper maps and scanned images cannot easily be used in a digital environment to perform analyses, combine with other map layers and air photos, or produce custom visualizations.

To facilitate analysis, the Bordner maps must be digitized using GIS (Geographic Information Systems) software. The digitizing process converts paper maps and scanned images into intelligent digital datasets that contain geographical coordinates to make mapping and spatial analysis possible. At the University of Wisconsin-Madison, the Forest Landscape Ecology Lab (FLEL) in the Department of Forest and Landscape Ecology[4] has been working for several years on this digitizing effort. More recently, the State Cartographer's Office, also at UW-Madison, has joined the project.[5]

Funding is required to digitize the Bordner maps and produce a high-quality GIS database. To date, we have received funding from UW-Madison and the National Oceanographic and Atmospheric Administration (NOAA) through Wisconsin's Coastal Management Program. By the summer of 2017, we will have digitized point, line, and area features for a significant portion of the state. We are also working on an online data viewer that will allow users to visualize and interact with the database.

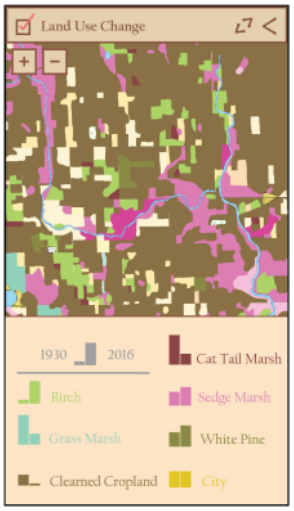


Goals and Objectives

We are currently seeking funding to complete the Bordner digitizing effort and make the database accessible online in standard GIS formats. This will significantly extend the benefits of the database by making a digital GIS version — not just scanned images — available to citizens, state agencies, the private and non-profit sectors, educators, researchers, and others.

There are many potential uses for the Bordner database. For example, there is currently no way to systematically identify plots of land that contain old growth forest. This poses a challenge to efforts to preserve and manage these areas appropriately. However, with modern GIS technology, these areas would be readily identifiable using Bordner data in conjunction with other historic and contemporary GIS datasets of the state, including: the 19th century General Land Office survey, already digitized by FLEL[6]; the archive of 1930s air photos hosted by the SCO on their WHAIFinder application[7]; modern land cover data[8]; and the statewide digital parcel dataset.[9]

Our ultimate vision is a GIS portal that allows users to access and visualize a host of historic databases statewide. We believe that Wisconsin is positioned to be a leader in the delivery of digital historic GIS data. Not only does the state possess rare and valuable resources such as the Bordner Survey, but in addition there are untapped collections of historic maps in the Wisconsin Historical Society archive, the Robinson Map Library at UW-Madison, the American Geographical Society Library at UW-Milwaukee, and state agencies such as the Board of Commissioners of Public Lands. These maps provide endless possibilities for GIS-based display and analysis, and our goal is to help facilitate these uses.



Sources Cited

1. John Koch, Touching Every Forty, Wisconsin Magazine of History, 2006.
2. https://www.library.wisc.edu/steenbock/wisconsin-land-economic-inventory-the-bordner-survey-land-cover-maps
3. http://digital.library.wisc.edu/1711.dl/EcoNatRes.WILandInv
4. http://labs.russell.wisc.edu/landscape
5. http://www.sco.wisc.edu
6. http://dnr.wi.gov/wnrmag/2009/08/insert.pdf
7. http://www.sco.wisc.edu/whaifinder/whaifinder.html
8. http://www.sco.wisc.edu/wisconsin-geospatial-news/wiscland-2-project-complete-data-now-available.html
9. http://www.sco.wisc.edu/find-data/parcels.html

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