



A Tool to Bring Back Bobwhites

BIOLOGISTS CREATE A CONSERVATION-PLANNING TOOL TO RESCUE WILD QUAIL

By Theron M. Terhune, Thomas V. Dailey, Donald M. McKenzie, and William E. Palmer



Courtesy of Theron M. Terhune

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Over the last four decades, populations of wild northern bobwhite (*Colinus virginianus*) have plummeted by more than 80 percent—largely the result of habitat loss, intensification of agricultural practices, and exclusion of fire on the landscape (Brennan 1991). Alarmed at the rapid loss of one of the nation’s keystone game birds, researchers and biologists from across the country have created a new digital conservation planning tool designed to boost the chances for bobwhites—and save the species from extinction.

Once a familiar sight on hunting grounds across the U.S., many populations of bobwhites in the eastern part of the country are now recreationally extinct, making wild bobwhite hunting a fading tradition. To protect remaining populations, more than five states that were once part of the historic bobwhite range (such as West Virginia and New Jersey) have suspended wild quail hunting. Even on some traditionally premier hunting grounds, including some Texas ranches (Brennan 2007), bobwhite quail populations are in a tailspin. “Whether the northern bobwhite will be able to persist depends on the extent to which people will implement purposeful management for these birds and their habitat,” says Leonard Brennan, research scientist with the Caesar Kleberg Wildlife Research Institute.

One such management initiative began in 2002, when the Southeast Quail Study Group—formed by the Southeastern Association of Fish and Wildlife Agencies—released a paper-based plan, referred to as the Northern Bobwhite Conservation Initiative (NBCI), designed to restore quail populations to levels comparable to the 1980s (Dimmick *et al.* 2002). Over the next decade, efforts to protect quail expanded and the Southeast Quail Study Group evolved into the National Bobwhite Technical Committee (NBTC) to reflect a broader, nationwide effort to protect and manage quail. In late 2007, the NBTC and the Tall Timbers Research Station and Land Conservancy—a research, conservation and education organization based in Tallahassee, Florida—began to upgrade the original NBCI to reflect the current state of bobwhite

quail across the U.S. and recommend pragmatic management measures to restore populations. By early 2011, they launched NBCI 2.0—a web-based plan with a geographic information system (GIS) database component that gives users information on ideal quail habitat, population numbers in a particular region, and potential management challenges in restoring populations.

How NBCI 2.0 Works

As a first step to updating existing information in the original NBCI plan and gathering new data, Tall Timbers hosted workshops for 25 states (22 individual workshops and one tri-state meeting), bringing in more than 600 biologists. They were tasked with using their knowledge of the landscape to assign its potential to restore prime bobwhite habitat. Biologists classified landscapes based on their potential for habitat management and restoration and identified high, medium, and low-priority areas for bobwhite restoration.

As part of their assessment, they highlighted potential constraints in each region, such as rapid urbanization or lack of funding, as well as land-use opportunities, such as the ability to use prescribed fire or restore longleaf pine forests—common bobwhite havens. The classification system not only required biologists to have an in-depth knowledge of land use, but also to assess other factors, such as the willingness of landowners to implement conservation action on their land (Daley *et al.* 2004, Dailey 2008), along with a state’s economic conditions and the existing support by state, federal, and non-government conservation partners. Biologists also worked closely with landowners in each region, which allowed them to estimate landowner compliance as well as response time for specific management measures to take hold.

The participating biologists entered their information (referred to as Biologist Ranking Information, or BRI) into a shared online system that fed into NBCI 2.0. To enter their data they used ArcGIS, a commercial GIS software from ESRI, to help create

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and update maps and record and analyze other geographic data. Because NBCI 2.0 is dynamic and interactive, it allows wildlife managers, biologists in the field, and other users to access the information as well as query data using their own specifications and integrate that data into management and conservation plans. The data are available in three different formats:

Web-Mapping Applications. The NBCI website allows users to visualize BRI data on an online map—showing quail restoration potential, current habitat, and management data. For example, by clicking on Maryland (see map below), users will learn about potential habitat limitations in the region, such as small farm or landholding sizes and inappropriate vegetation cover types. Users can run searches within BRI data and print out relevant maps without having to buy expensive GIS software, as long as they have a fully working Internet connection. For more extensive research purposes, wildlife management areas (WMAs) can also be incorporated directly with GIS applications to develop more detailed maps as well as extract and analyze data from the database.

GeoSpatial Data. Wildlife professionals using NBCI 2.0 can access BRI data in Keyhole Markup Language (KML) format—a file format that's used specifically to display geographic data in free applications such as Google Earth. Geospatial Data does not require users to have access to the Internet, but they will need to install Google Earth, ArcGIS Explorer, or other similar software products that support the KML format. Once that's done, they can view the BRI data locally on their computers.

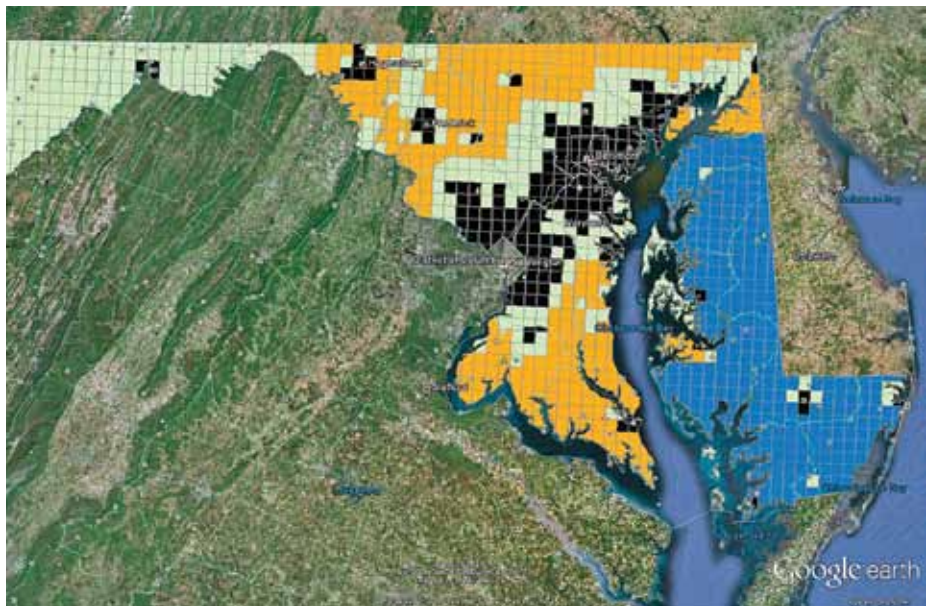
Conservation Planning Toolbox. The NBCI Conservation Planning Toolbox (CPT) is perhaps the most powerful element of NBCI. It's a suite of tools that allow for the extraction, creation, and analysis of GIS data and integration of the BRI and other spatial information to inform future conservation planning efforts. The tools allow users to remodel and summarize BRI in a number of different ways, such as with geographic boundaries or focal areas, and incorporate it into other spatially based models. Users can also apply these tools to plan and create models and imple-

ment management actions specific to a region. For example, biologists in Kansas used the conservation planning tool to redefine quail emphasis areas with the main objective of focusing dollars to have the greatest impact on public lands and surrounding private properties. Within such focal areas, biologist can then use the tools in the CPT to estimate the predicted bird response given certain habitat management measures.

Challenges along the Way

From the beginning, NBCI 2.0 has relied on recent advances in technology to capture, analyze, and display biologists' expert knowledge in a novel but pragmatic way that benefits the conservation planning community. To reach this goal, creators of the tool had to overcome a number of challenges.

A major first hurdle was lack of funding for travel among biologists as well as program development. Collecting "intelligent data" of landscape habitat features across much of the northern bobwhite historic range from 25 separate states was no small task. It not only required the involvement and buy-in of numerous organizations and hundreds of biologists, but also involved the development of an integrated geospatial solution and database for data collection, dissemination, and analysis. To offset costs,



Credit: NBCI 2.0

NBCI 2.0 data applied to a map of Maryland shows the potential for bobwhite quail restoration, color-coded to represent high potential (blue), medium (orange), low (green), or no potential at all (black). The NBCI 2.0 system not only provides similar information for all U.S. states, but also highlights potential constraints and opportunities for quail management in each state.



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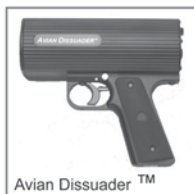
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the NBCI revision team took on all programming, database and tool development, and geospatial analysis, which saved more that \$300,000 over the course of the project.

After collecting the data, geospatial data analysis presented a second major challenge: The dataset quickly became too large and unwieldy for most conventional computer programs to handle. Again, the NBCI revision team used in-house programming and database software to overcome this obstacle. Summarizing that data into a useable format that was readily accessible was another challenge in itself.

A third major challenge that creators are currently facing is keeping the data relevant and secure, and housing and maintaining the CPT system and database while enhancing the design and adding improved user-functionality. In addition, most state biologists aren't accustomed to using spatial databases to analyze data and create reports and, as a result, the NBCI team will have to train them to use the tool.

Roadblocks in Conservation

A major objective of NBCI 2.0 is to have conservation agencies integrate it into future conservation efforts. "It is not enough to say, 'We want more quail,'" says Marc Puckett, small game project leader with the Virginia Department of Game and Inland Fisheries. "You need to know what you have at present and where you'd like to be in quail per acre." Fortunately, conservation of bobwhites and grassland birds is a priority for many states, and NBCI 2.0 is now incorporated into a number of state plans, including Missouri and Kansas. On the other hand, playing a role in landscape change can be challenging, and conservationists have in the past had little influence in this arena.

There is "no easy button" for this endeavor. It took decades for bobwhite numbers to plunge and it will take decades for significant landscape recovery and species response to occur. The range-wide future of the northern bobwhite rests on a concerted effort of numerous conservation groups working together to bring back bobwhites. The success of this endeavor will extend far beyond bobwhites, championing conservation of agricultural landscapes and grassland-type ecosystems along with their associated flora and fauna. ■



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