

INTRODUCTION

Much of the potential success of northern bobwhite (*Colinus virginianus*) restoration programs is dependent on management of habitat on large tracts of private land. Many states are focusing restoration on areas that have relatively high potential for landowner participation and quail habitat suitability. Moreover, to avoid habitat fragmentation, ideally all land holdings within a focus area would be involved to some degree in restoration. Efficacious selection of these focus areas requires a foundation of ecological and sociological information. Although we know much about bobwhite ecology, our skill at engaging landowners in habitat restoration at a large scale is meager. Our objective was to develop a systematic approach for using habitat and sociological data to identify potential focus areas, and to display these data as GIS layers in order to simplify management decisions. In this poster we provide a description of the steps in this process, and preliminary results of the effort to characterize landowner willingness to participate in quail habitat restoration.

BUILDING THE FOUNDATION

A primary approach to restoration is to ensure that contiguous landholdings are restored/suitable for quail, and that the total area of these focus areas exceeds minimum requirements for quail population viability. In Missouri the minimum size for a focus area is 8,000 acres.

We used models of summer quail habitat suitability developed for northeast Missouri to create GIS layers of habitat potential (Figure 1) to select focus areas. The habitat suitability in these models is derived from measures of quail distribution (Bergh et al. 2003) and habitat composition and configuration, with higher values related to small field size and juxtaposition of grasslands, crops and woody cover. The habitat suitability models are based on 30-m National Land Cover Data (NLCD).

Because NLCD data are derived from satellite imagery, 100% of the landscape can be classified as to suitability for quail. Landowner data, however, are often less comprehensive in scope for the following reasons: (1) accurate and up-to-date address lists are difficult to obtain; (2) the linkage between USDA landowner identity data and landowner spatial data is by law not available outside of the USDA; and (3) attitude surveys never achieve a 100% response rate. The nature of these issues is reviewed below.

Our survey study areas were sized so that there was a reasonable chance of finding at least one of the desired 8,000-acre focus areas. We chose 3 townships as the study area unit, or ca. 75,000 acres. We randomly selected study areas from landscapes that had a quail habitat suitability index >0.5. We studied 5 areas that averaged 74,964 acres (total = 374,819 acres).



Figure 1. Focus area selected in Gentry County with supporting data for quail habitat suitability and positive responses (yes/maybe) interest in quail co-op) from landowner survey.



Figure 2. Example of data deficiencies resulting from lack of landowner address, and from landowner not returning completed survey.

Table 1. Percentage of the landscape classified by landowner interest in quail co-op, and proportion for which there were no data because of missing landowner name or address, or landowner did not return completed survey.

STUDY AREA	ACREAGE	PERCENT OF STUDY AREA				
		NO ADDRESS	DIDN'T RETURN SURVEY	INTERESTED IN QUAIL CO-OP?		
				YES	MAYBE	NO
Gentry	76,006	6	62	7	18	6
Knox A	77,355	8	74	3	5	11
Knox B	75,677	6	79	3	5	8
Caldwell	74,692	13	59	4	8	16
Scotland	72,089	7	71	2	8	12
Average	74,964	8	69	3.8	8.8	10.6

Use of habitat and landowner spatial suitability models as tools for selecting large-scale quail habitat restoration areas on private land in Missouri.

Preliminary Report

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STEPS TO IDENTIFY LANDOWNERS AND THEIR PROPERTY

Because our objective was to create a landowner GIS layer equivalent to the habitat GIS (i.e., 100% landscape coverage), we designed the survey as a modified census of landowners. We did not distinguish among different land holdings a landowner might have, and thus we assigned a landowner's suitability score to all CLUs associated with that landowner. Our survey was a modified census because we excluded landowners who owned <20 acres in accordance with the desire of field biologists to focus on larger ownerships. In attempting to conduct a census, data deficiencies arise for several reasons, as reviewed below.

Landowner Identification

Landowner address lists are available from the USDA Farm Service Agency (FSA), county assessors, and private companies. Because land ownership changes frequently (ca. 50% of households surveyed within the USA moved within the past year; <http://www.census.gov/prod/2006pubs/h150-05.pdf>), address data are typically not up-to-date. In our study, we did not have address data for 8% of the landscape (Table 1). Further, some of the addresses we did have were incorrect, or out-of-date, with the result that 9.5% of surveys mailed (1,738) were returned as undeliverable by the USPS. Thus, 1,659 landowners actually received the survey.

Linking Landowner Identification and Location

A major challenge to evaluation of landowners is the lack of linkage between landowner identification data and landowner spatial data. Landowner spatial data are available as digital shape files from the FSA (i.e., Common Land Units or CLUs); however, because of confidentiality laws, the CLUs are not identified to landownership. Because of these limitations, technicians must be employed to manually link CLUs to landowner identity. Although this obstacle does not directly reduce the comprehensiveness of landowner studies, the higher cost of data collection reduces the geographic scope of such studies. One solution to this dilemma is to collaborate with FSA in identification of restoration areas.

Response Rate

Social science surveys typically yield usable data on <60% of the recipients who are contacted via mail or telephone. In a study of landowner interest in quail in North Carolina, Daley et al. had a 47% response rate for a telephone survey. Daley attempted to maximize response by using a pre-notice letter and by repeatedly recalling individuals that were unavailable. Our mailing protocol included a pre-notice letter, the survey (in August, prior to crop harvest), a follow-up reminder post card, and a follow-up survey to non-responsive individuals. Further, we tried to increase response rate by including a token gift with the survey—personalized address labels. We do not know if these gifts affected the response rate.

Of 1,659 landowners who received the questionnaire, 735 responded (44% response rate). This translates to having no response for 69% of the landscape (Table 1). The effect of this data deficiency on identification of suitable landowners/CLUs is illustrated in Figure 2. The magnitude of non-response observed in our study and in North Carolina is problematic in the context of using surveys to identify landowners interested in quail restoration. On the other hand, if the non-respondents are generally not interested in quail restoration, their CLUs could be labeled as 'not interested in quail co-op.' Consequently, we are conducting a telephone survey of non-respondents in an attempt to fill these 'data holes' and to learn their attitude toward quail restoration. Non-response error can be highly variable, depending on the nature of the survey instrument (length of survey, telephone vs. survey, cultural attitude toward surveys, cultural attitude toward the subject of the survey, etc.).



Missouri State Council



STEPS TO IDENTIFY LANDOWNER INTEREST IN QUAIL RESTORATION

We used a mail questionnaire to measure landowner suitability (knowledge, willingness and ability) to carry out restoration in a cooperative setting (see adjacent poster by Reitz et al. on landowner attitudes). The 31-question survey had numerous questions/answers that contributed to our evaluation of landowner suitability. The key question asked, however, was this: 'Would you be interested in joining a quail co-op?' Across all respondents, 15% chose 'yes,' 24% chose 'maybe,' and 61% chose 'no.'

STEPS TO SELECT FOCUS AREA

We transformed various landowner answers into GIS format with each CLU labeled accordingly. We worked with local field staff to study GIS maps of quail habitat suitability and the various landowner characteristics identified through the survey. Several issues were addressed in this data exploration—most importantly, did GIS maps of quail habitat suitability and landowner characteristics match local perceptions? In general the GIS maps were accurate, and further, we found that the 'yes-maybe-no' map was similar to maps created from data on landowner willingness to use quail-friendly practices.

When trying to identify a focus area, the most desirable scenario is to have positive landowner responses ('yes' & 'maybe' to co-op question, or the willingness to use quail-friendly habitat practices) clumped in areas of highly suitable habitat. In Gentry County (Figure 1), a clump of yes/maybe-type landowners coincided with highly suitable habitat, leading to relatively straightforward designation of a focus area. Because of field funding limitations, we pursued selection of focus areas only in Gentry and Knox counties—15,000 acre focus areas were selected in each county. The final steps in this process is to document actual landowner behavior (i.e., did they enroll in co-op program?), and ultimately the effect of the focus area on quail and songbird abundance.

SUMMARY

Restoration goals for minimum habitat fragmentation and the availability of 100% landscape coverage for quail habitat suitability set a standard for spatial data coverage that is difficult to achieve in social science surveys

For social science data, the greatest obstacle to classifying all CLUs (100% landscape coverage) is that >50% of people being surveyed typically do not return completed surveys

The magnitude of non-response observed in our study and in North Carolina (ca. 54%) is problematic in the context of using surveys to identify landowners interested in quail restoration. On the other hand, non-respondents might simply not be interested in quail restoration

To better understand non-response error, we are conducting focus group discussions and telephone interviews

Despite substantial deficiencies in landowner data in this study, we had enough interest in quail restoration to create 15,000-acre focus areas in each target county

Because non-response error will vary with the nature of the survey instrument and cultural attitudes, further research is needed to better understand, and to minimize, this source of error

LITERATURE CITED

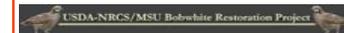
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