

Georgia's Bobwhite Quail Initiative: Accomplishments 2000–2009, Lessons Learned, and Future Restoration Strategy

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Abstract: Georgia's Bobwhite Quail Initiative (BQI) has been a proactive effort to restore, improve and maintain habitat for northern bobwhite (*Colinus virginianus*; hereafter bobwhite) on private lands across 15 counties of Georgia's Upper Coastal Plain. Secondary objectives included improving habitat for certain songbirds and improved bobwhite hunting and wildlife viewing. Funding was provided through state appropriations, the sale of BQI vehicle license plates (tags) and matching grants. Landowners received over US\$1.7 million of financial incentives, and technical assistance was provided to 1646 landowners on 264,395 ha. Incentive cost was \$78.90/ha directly managed and \$31.88/ha impacted. Research, monitoring, and incidental observations showed positive response of bobwhites and songbirds to BQI practices at the farm scale. The BQI generated many additional benefits including leveraged funding for management and research, youth quota quail hunts, and increased educational outreach regarding the bobwhite decline and effective restoration techniques. Georgia's future bobwhite restoration strategy is being guided by the National Bobwhite Conservation Initiative revision process. Through this process BQI biologists are working with conservation partners to identify and prioritize spatially explicit landscapes over which to set quantitative bobwhite habitat and population objectives, focus management programs, funding, manpower, and monitoring.

Key words: *Colinus virginianus*, farmland, forestland, Georgia, incentives, northern bobwhite, landowners, Upper Coastal Plain.

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Northern bobwhite (*Colinus virginianus*, hereafter bobwhite) populations in Georgia and across the southeastern United States have experienced severe long-term declines (Sauer et al. 2007) primarily resulting from widespread changes in land use which have greatly reduced habitat suitability (Klimstra 1982, Brennan 1991, Burger 2002). In Georgia, the bobwhite decline has been cause for concern ecologically, economically, and recreationally (Burger et al. 1999, Thackston and Whitney 2001). In 1960–1961, 142,000 (SE=20,000) bobwhite hunters comprised 50% of the state's licensed resident hunters and harvested an estimated 3,365,000 (SE=888,000) bobwhites (Georgia Game and Fish Commission 1961). By the 2008–2009 hunting season, the number of bobwhite hunters had dropped to 22,423 (SE=1054) and comprised only 10% of licensed resident hunters. These hunters harvested an estimated 808,036 (SE=39,977) bobwhites, of which approximately 97% were reported as pen-reared birds (Duda et al. 2009). In much of Georgia, bobwhite densities have fallen below the level needed to attract and maintain hunter interest, and in some landscapes, particularly in the northern half of the state, viable bobwhite populations are no longer apparent.

In 1998 a “grass roots” effort through key members of Georgia's General Assembly in collaboration with the Georgia Department of Natural Resources (DNR) Board led to the funding and development of the DNR Wildlife Resources Division (WRD) Bobwhite Quail Initiative (BQI). The BQI, a pilot program to restore early

successional habitat on commercial row crop agriculture fields (ag) and associated pine stands, was Georgia's first state funded private lands wildlife habitat incentive program. Similar to private lands initiatives in Virginia and North Carolina, the BQI committed personnel to deliver technical assistance and financial incentives for habitat enhancement within designated focal areas. In contrast, BQI received greater annual funding for program delivery, did not provide incentives for habitat enhancement on pasture or hay land, and initially employed a more rigorous monitoring strategy (Burger 2002, Cobb et al. 2002). Thackston et al. (2009) detailed the BQI developmental process, implementation, and management implications. This paper summarizes 2000–2009 BQI accomplishments, lessons learned, and discusses Georgia's future bobwhite restoration strategy.

Funding

The BQI was funded through a combination of state-appropriated revenue, automobile license plate (tag) sales, and matching grants. The total programmatic cost during 2000–2009 was \$10,052,922. During 2002–2009, 436,601 BQI tags were sold generating \$7,349,287 in net revenue and accounting for 73% of total program funding. Tag revenue peaked in 2005 and as numerous other specialty tags were developed and made available to the public by 2009, annual BQI tag funding declined by 82%. In 2008, due to a decline in State General Fund revenues, BQI tag receipts became

the primary funding source. BQI funding served as a match to secure more than \$350,000 in grants and donations as well as a match for an agreement with the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service to annually fund a wildlife biologist position to deliver Farm Bill programs and practices.

Implementation

The BQI implementation began in 1999 and initially targeted habitat restoration across 17 Upper Coastal Plain counties, but due to state budget reductions was reduced to 15 counties in 2003 (Table 1). Landowner or land manager (cooperator) participation in BQI was voluntary, and financial incentives were allocated based on competitive rankings of habitat proposals. Scoring guidelines were used to define and assign point values to habitat practices (Table 2), set payment rates, and competitively score, rank, and fund habitat proposals. Cooperator contracts were for three years but were renewed and paid annually based on compliance. Habitat practice options and financial incentives gradually evolved to increase cooperator participation and better integrate bobwhite management with ag and associated pine stands. Financial incentives were not provided for conversion of exotic grass pasture or hay lands to native early successional habitat due to the high cost of conversion. Technical assistance was provided upon request to landowners inside and outside the 15-county BQI focus area and represented 85% and 15% of technical assistance contacts, respectively. A database was established for tracking cooperator participation, practice implementation, financial incentive allocation, and technical assistance.

Table 1. Direct-practice ha enrolled in Georgia’s BQI Financial Incentives by county, 2000–2009.

County	Mean	Minimum	Maximum	Total	Percent improvable ag & pine ha enrolled ^a
Bleckley	44	24	66	436	2.0
Bulloch	146	12	202	1461	2.4
Burke	122	42	171	1219	1.6
Colquitt	58	0	165	582	0.9
Crisp	27	0	47	268	0.9
Dodge	52	1	106	524	1.3
Dougherty	117	0	175	1174	3.0
Emanuel	246	2	610	2457	4.3
Houston ^b	0	0	0	0	0.0
Jenkins	60	18	112	602	1.8
Laurens	465	37	738	4652	8.0
Lee	179	4	566	1794	5.4
Mitchell	366	0	557	3658	6.2
Screven	72	0	157	721	1.2
Sumter	122	0	247	1218	2.3
Terrell	181	31	288	1808	4.7
Treutlen ^b	11	0	34	113	0.7

a. Improvable ag and pine ha were calculated through the Georgia NBCI revision process.
 b. Removed from BQI financial incentive eligibility in 2003.

Discussion

Education and Outreach

Education and outreach have been identified as important actions relative to effecting positive habitat change for bobwhites on private lands (Brennan 1991, Capel et al. 1996). BQI outreach efforts were varied and directed at generating public awareness and interest in BQI. For example, biologists made 271 presentations and conducted or assisted with 82 field days. These efforts primarily targeted landowners within the 15-county BQI focus area and typically included information on reasons for the bobwhite decline, landscape context considerations, bobwhite life history, and habitat management techniques (Table 3).

Table 2. Northern bobwhite habitat practices, point values, and incentive rates in Georgia’s BQI 2009. Habitat practice point values were used as a measure of habitat quality in the proposal ranking process, and payments were made by practice.

Habitat practice	Habitat practice point values		Practice incentive annual rate per ha	
	Per practice	Maximum	Dry	Irrigated
Field border	25	150	\$148.26	\$296.52
Hedgerow	10	40	\$148.26	\$296.52
Filter strip	10	10	\$148.26	\$296.52
Center pivot corner	10	40	\$148.26	NA
Fallow patch	4.9/ha	20	\$148.26	NA
Conservation tillage ^a	10	10	\$37.07	NA
Pine forest thinning	2.5/ha	50	\$37.07	NA
Pine forest opening	2.5/ha	50	\$148.26	NA
Pine forest linear practices	2.5/ha	20	\$148.26	NA
Pine forest burning, disking, herbicide	12.4/ha	100	\$12.36	NA
Crop field bonus points	5 to 10	20	NA	NA
Pine forest bonus points	5 to 30	40	NA	NA
Habitat connectivity	5	20	NA	NA
Reduction in funding	5 to 20	20	NA	NA
Re-enrollment bonus points		20	NA	NA

a. Conservation tillage eligibility required the inclusion of additional practices (e.g., field borders and fallow patches).

Table 3. Summary of Georgia’s BQI public information and education outreach effort 2000–2009.

Year	Programs & presentations	Field day presentations	Total audience	Professional articles & abstracts	Popular articles & interviews	TV spots & videos	Display booth man days
2000	14	2	751	1	2	3	5
2001	6	8	88	1	4	4	10
2002	2	6	1,113	5	5	2	6
2003	17	22	2,738	2	8	4	8
2004	30	11	1,650	4	19	0	7
2005	19	1	961	0	8	0	2
2006	31	3	1,266	2	11	5	2
2007	45	9	2,616	0	10	1	9
2008	68	8	2,251	0	12	1	3
2009	39	12	2,852	0	8	0	4
Total	271	82	17,086	15	87	20	56

Indirectly related to education and outreach was the hosting of youth bobwhite quota hunts on BQI enrolled farms. During 2003–2009, cooperators voluntarily hosted a total of 44 hunts which accommodated 85 youth/adult pairs who hunted 253.8 hours, found 94 coveys, and harvested 33 bobwhites. Most of the participating youth had never hunted bobwhites and both youth and adults provided positive feedback.

Technical Assistance

During 2000–2009, BQI biologists provided technical assistance to 1646 landowners on approximately 264,395 ha representing an estimated 36% of improvable ag and pine ha within the BQI focus area. Initially, staffing was adequate to meet technical assistance requests and to provide follow up consultation (Thackston et al. 2009). However, as funding declined and vacant biologist positions were not filled, technical assistance demand exceeded programmatic capabilities. Additionally, all BQI biologist positions were entry level and the program was considered to be a pilot project with uncertain future funding. This resulted in biologists frequently leaving BQI for more traditional and securely-funded positions within the WRD Game Management Section. Across all program years, the above factors resulted in BQI averaging 79% biologist staffing which reduced the effectiveness of program delivery particularly through frequent gaps in biologist/landowner communications and caused a reduction in follow up site visits to fine tune management efforts.

Enrollment

The BQI habitat practice enrollment was initially low but increased through time as practice options and financial incentive rates were increased (Thackston et al. 2009). For example, the BQI annual dry land/ha rate was established in 2000 at \$74.13 and then due to low landowner interest was increased to \$98.84 and again in 2001 to \$148.26. Enrollment increased by 87% as the BQI dry land rate increased and exceeded the \$111.20/ha USDA soil rental rate. As a result, proposal numbers exceeded available funding in 2003. During 2003–2009, cooperator enrollment and ha impacted declined slightly (Table 4) due primarily to: 1) a lack of BQI funding and increased biologist position vacancies, 2) increased USDA soil rental rates in 2008 making BQI rates less competitive, and 3) the availability of Farm Bill conservation program practices, particularly the Conservation Reserve Program practices CP33 Habitat Buffers For Upland Birds (2004) and CP36 Longleaf Pine Initiative (2006).

Cooperators could choose from any combination of 10 BQI management practices (Table 2) but the following five were used on more than 80% of the total enrolled ha: 1) conservation till-

Table 4. Georgia's BQI Cooperator and habitat enrollment and incentive allocation by contract period 2000–2009.

BQI contract period	<i>n</i> BQI counties	<i>n</i> Cooperators	<i>n</i> Crop fields	<i>n</i> Longleaf CPA ^a stands	<i>n</i> Pine stands	Direct practice hectares ^b	Impact hectares ^c	Incentives allocated
2000	14	24	69	1	0	174	1225	\$17,093.40
2000–2001	14	83	136	58	0	778	4642	\$64,030.20
2000–2002	17	93	176	57	1	1237	5555	\$78,355.90
2001–2003	17	132	289	70	24	3275	8381	\$233,827.00
2002–2004	17	108	253	24	24	3044	6524	\$221,465.40
2003–2005	15	137	292	38	23	3169	7306	\$258,544.70
2004–2006	15	130	268	32	16	2861	6024	\$253,580.40
2005–2007	15	121	237	33	17	2652	5621	\$229,304.90
2006–2008	15	118	218	32	21	2693	5404	\$218,029.50
2007–2009	15	117	207	32	24	2848	5,602	\$219,343.50

a. Conservation Priority Area.

b. Direct practice hectares are those hectares actually enrolled in BQI.

c. Impact hectares represent the total area included in the crop field or pine stand on which BQI practices were implemented.

age (other BQI practices required)–28.6%, 2) pine stand burning–19.9%, 3) managed fallow patches 0.4 to 4.0 ha in size–13.1%, 4) 9.1-m-wide field borders–11.9%, and 5) 18.2-m-wide field borders–10.7%. These practices seemed to be most easily integrated in farming and forestry operations and were the most economically appealing. In total, landowners received over \$1.7 million in financial assistance resulting in a cost of \$78.90/practice ha and \$31.87/impact ha (Table 4).

Compliance

After crops were planted and/or harvested (May–September), BQI biologists conducted compliance evaluations on 100% of enrolled practice hectares. Linear practices (e.g., field borders, hedgerows, and filter strips) posed the greatest challenge for cooperator compliance. The most common compliance issues were equipment turning, mowing, herbicide spray drift, and planting within these habitats and were particularly problematic for habitats perpendicular to crop rows. For this reason, some cooperators ultimately chose to increase linear practice enrollment parallel to crop rows in lieu of habitat establishment at the end of crop rows. The possible downside of this approach was breaking habitat continuity, which was factored into the habitat score and ranking process. Compliance issues were minimal on larger patch habitats like field corners, fallow patches, and managed pine stands.

Across all years, cooperators averaged 82% full compliance, 15% partial compliance, and 3% non-compliance. Practice compliance was assessed based on the following criteria: 1) full compliance—at least 80% practice implementation and cooperators received full payment, 2) partial compliance—less than 80% implemen-

tation but with a total habitat quality score above the minimum threshold required for entry into the program and cooperators received reduced payments, and 3) non compliance—less than 80% implementation and a habitat quality score below the minimum threshold, the contract was cancelled, and cooperators received no payment. Non-compliance decreased as BQI biologists worked with cooperators to explain practices and resolve issues, which in turn indicated the need for sufficient numbers of technical staff to work closely with participants. Cooperators were paid only after satisfactory completion of habitat practices, which likely increased compliance.

Monitoring

Rigorous monitoring is a prerequisite for efficacious adaptive management but is often reduced or eliminated when project budget reductions occur (Bormann et al. 1999). The BQI budget reductions in 2001 resulted in curtailment of BQI intensive monitoring in favor of maximizing habitat establishment and maintenance. Consequently, the monitoring strategy was discontinued in 2002 and changed to a process whereby BQI biologists began recording incidental observations of bobwhites on treatment fields while conducting habitat compliance evaluations on a random sample of control fields. This incidental observation technique provided only a coarse indicator of bobwhite presence relative to BQI implementation. It was not standardized over time or area, and did not provide an estimate of bobwhite abundance which is needed to facilitate adaptive feedback. Treatment fields averaged 1.9 quail/field ($n = 1095$, $SD = 3.89$, $min = 0$, $max = 48$) while controls averaged 0.5 quail/field ($n = 285$, $SD = 1.34$, $min = 0$, $max = 12$). These observed differences were supported by studies that found BQI habitat practices (Carroll 2000, Hamrick 2002, Cook 2004) and similar practices (Palmer et al. 2005, Conover et al. 2009) resulted in increased occurrence of bobwhites and certain songbirds (Hamrick et al. 2001, Evans et al. 2009). The high variability in observations, particularly across treatment sites, was likely a product of overall landscape context and additional research is needed to increase predictive capability relative to bobwhite population response to habitat treatments (Hamrick 2002, Cook 2004).

Lessons Learned

Observations indicate that BQI positively impacted bobwhites and certain songbirds at the farm scale. Additional benefits included leveraging significant federal and non-governmental funds to augment bobwhite management and research. The program was popular with the public, provided bobwhite conservation benefits through outreach and education, and increased public quail hunting opportunities. Compliance remained relatively high through-

out the program as biologists worked closely with cooperators to explain practice intent and proper techniques for establishment and maintenance. Conducting annual habitat practice compliance checks and paying cooperators only after practices were properly implemented were deemed critical for maintaining habitat quality and high compliance levels.

The BQI showed that financial assistance and technical assistance are necessary components for ensuring significant levels of habitat enhancement on private lands. To attract and retain cooperator participation and impact habitat at the landscape scale, financial incentives must be competitive with other available economic opportunities (e.g., soil rental rates). It is possible that program effectiveness might have been improved through a tiered programmatic structure with an employee career ladder and a more permanent funding source. This might have increased employee retention and improved technical assistance and financial incentive delivery by maintaining and/or temporally extending biologist/cooperator relationships.

The efficacy of BQI might have been improved by identifying sub-county focal landscapes, quantifying bobwhite habitat and population objectives, and maintaining a rigorous monitoring program to provide statistically valid estimates of landscape scale bobwhite abundance. This would have facilitated adaptive management and reduced uncertainty and optimized cost/benefits.

Future Bobwhite Restoration Strategy

Landscape context (Roseberry and Sudkamp 1998) and thresholds of usable space (Guthery et al. 2000) in addition to site-specific habitat quality have been identified as important factors for bobwhite population restoration and long-term viability. Thackston et al. (2009) stated that BQI was originally focused in 15 counties in an effort to concentrate habitat impacts so as to ultimately restore and support bobwhite metapopulations. However, at peak enrollment BQI impacted only about 3% and 11%, respectively, of improvable pine and ag ha restoration goals as extrapolated for the BQI counties from the Northern Bobwhite Conservation Initiative (NBCI; Dimmick et al. 2002). They further inferred that bobwhite population increases in many BQI county landscapes remained unlikely without major increases in funding and habitat improvements and that a more spatially explicit landscape analysis and focused management effort was needed.

The NBCI is being revised to identify focal landscapes of at least 2,590 ha (W. E. Palmer, Tall Timbers Research Station, personal communication). In September 2008, an NBCI multi-organizational workshop was conducted in Georgia to identify, map, and prioritize bobwhite restoration efforts to landscapes with the greatest potential for, and least barriers to, habitat improvement (Fig-

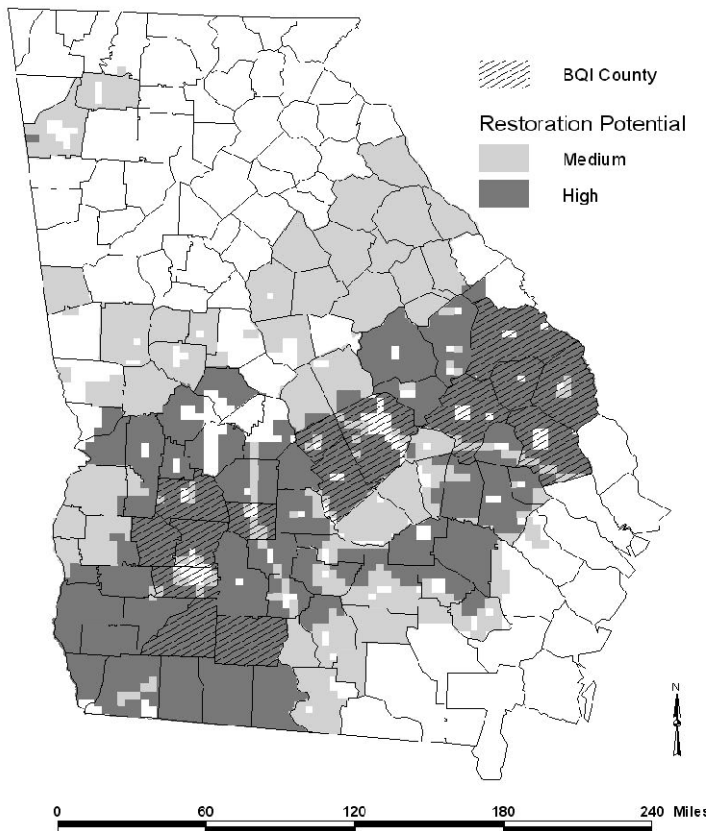


Figure 1. Georgia's NBCI Bobwhite Restoration Landscapes identified through the NBCI revision process and prioritized based on management potential and constraints.

ure 1). Current plans are to incorporate this into a Georgia NBCI step-down strategy and overlay these mapped landscapes with those identified through other bobwhite compatible conservation initiatives (e.g., Georgia's Comprehensive Wildlife Conservation Strategy, America's Longleaf Initiative, and Georgia State Forestry Assessment) so as to build synergy in habitat restoration. A prioritization process is planned to target improvable habitat areas of at least 800 ha within NBCI high priority landscapes. This minimum habitat size was set with the objective of sustaining huntable and viable bobwhite populations of at least 800 birds (Guthery et al. 2000). Intensive monitoring of habitat accomplishments and bobwhite population response will be needed within these landscapes to test assumptions, document results, and further facilitate adaptive resource management (Howell et al. 2009).

In 2010, BQI financial incentives were discontinued due to budgetary constraints. BQI biologists have begun directing and delivering technical assistance, Farm Bill conservation practices, and other programmatic resources into spatially explicit and prioritized landscapes identified in the Georgia-NBCI planning process.

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