WILDLIFE SESSION

THE SURVIVAL OF PEN RAISED QUAIL IN THE WILD: A PRELIMINARY REPORT

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Investigations concerning the survival of pen raised bobwhite quail (*Colinus virginianus*), when released in the wild, are being made near Elizabethtown, Kentucky. These investigations have been made during 1946 and 1947, and are now entering their third, and final, year. The investigations were carried out during 1946 by Mr. R. D. Gregory, Project Leader, who established and cover-mapped the ten study areas and made the first releases of game farm quail on them. Since January, 1947, the project has been under the direction of the writer. The following report represents an attempt to summarize briefly the information which has been secured during the past two years.

METHODS AND MATERIALS USED

In order to test the effects which releases of artificially propagated quail may have on bobwhite populations and to determine the survival of game farm birds under various conditions, ten areas, approximately 1000 acres each in extent, were established and cover-mapped in 1946. Four of these areas are refuges, while six of them are open to hunting at the discretion of the landowners. An attempt was made to locate half of these areas in good quail habitat and half of them in poor quail habitat. The areas were identified, when established, by a symbol which was assigned to them as indicated in Table 1. Releases of pen raised quail are made in

Table 1. Description and size of study area.

Symbol	Description	Extent in Acres
	Areas in Good Quail Habitat	
GSR	Stocked Refuge	1,430
GSH-1	Stocked Hunted Area	956
GSH-2	Stocked Hunted Area	950
GCR	Unstocked Refuge	850
GCH	Unstocked Hunted Area	973
	Areas in Poor Quail Habitat	
PSR	Stocked Refuge	950
PSH-1	Stocked Hunted Area	1,015
PSH-2	Stocked Hunted Area	1,080
PCR	Unstocked Refuge	1,154
PCH	Unstocked Hunted Area	875
Total Extent Ten Areas		10,233

the spring and fall on two of the refuges and four of the hunted areas. Two refuges and two hunted areas remained unstocked as check areas.

A total of 1,078 game farm quail have been released in the fall and spring on the six stocked study areas. Five coveys, each consisting of six male and six female quail, twelve to fourteen weeks old, were released on each of the six stocked study areas in the fall of 1946 and 1947. Five coveys, each consisting of three adult male and three adult female birds, were released on each of the six stocked study areas in the spring of 1947 and 1948. The dates on which quail were liberated on the various areas are given in Table 2.

Table 2. Quail released on stocked study areas.

Area	Date (1946)	Number Released	Date (1947)	Number Released	Total Released
Fall Releases					
GSR	10-2-46	60	10-8-47	60	120
GSH-1	9-4-46	60	9-24-47	60	120
GSH-2	9-11-46	60	9-26-47	60	120
PSR	10-8-46	60	10-3-47	60	120
PSH-1	9-17-46	60	10-1-47	60	120
PSH-2	9-25-46	60	10-8-47	60	120
Subtotal		360		360	720
Spring Releases					
GSR	5-22-47	30	5-18-48	30	60
GSH-1	5-1-47	30	4-27-48	30	60
GSH-2	5-28-47	30	5-4-48	30	60
PSR	5-28-47	29	5-11-48	30	59
PSH-1	5-22-47	29	5-14-48	30	59
PSH-2	5-14-47	30	5-21-48	30	60
Subtotal		178		180	358
Total		538		540	1,078

The methods used to determine the survival of released quail and to estimate the effect which releases have had upon quail populations have been direct observation, recovery of released and native banded birds by live-trapping and hunting, and censuses of the quail populations present on the study areas.

Throughout the course of the investigation it has been necessary to rely considerably upon direct observation to determine the survival of released quail. During the first two months following release, it has been possible to identify coveys of released quail from those of native birds by the tameness and by the slower, shorter and more direct flight of the pen reared birds. It has seldom been possible to identify game birds in this manner longer than two months following release, nor can game farm birds be distinguished satisfactorily from native quail in this manner when in coveys containing both released and native birds.

In order to secure an accurate estimate of the survival of the released quail, a total of 172 birds have been live-trapped on the stocked areas during the winter months, and 95 birds, mostly cocks, have been trapped during the summer months. The methods used to live-trap quail were essentially those used and

described by Stoddard (1931). Additional information has been secured concerning the survival of the released quail from bands turned in by hunters. The information secured in this manner has been limited, however, due to the small number of bands secured from this source.

Censusing has been the principal method used to determine the effects which releases of game farm quail may have had upon quail populations on the study areas. Three censuses have been made annually: a pre-hunting season census in October and November, a post-hunting season census in January and February and a spring census in March and April. The primary census method used has been repeated hunting with a dog until it was believed that all of the coveys present on the areas had been flushed and the numbers of birds in them counted.

RESULTS

The Survival of Fall Released Quail

The estimated survival of the fall released pen reared quail, at the time of the pre-hunting season census (about November 1), of the post-hunting season census (made during January and February), and of the spring census (about April 1), is summarized in Table 3.

Table 3. Survival of fall released pen reared quail.

AREA	Estimated Survival					
	November 1		Jan.	Feb.	April 1	
	1946 [a]	1947 [b]	1947 [a]	1948 [b]	1947 [a]	1948 [b]
GSR	24	24	–	20	20	10
GSH-1	10	0	–	0	0	0
GSH-2	11	10	–	0	0	0
PSR	17	8	–	5	0	3
PSH-1	23	22	–	0	5	0
PSH-2	16	32	–	10	3	8
TOTAL	101	56	–	35	23	21

[a] Estimated survival of the 360 birds released in the fall of 1946.
[b] Estimated survival of the 360 birds released in the fall of 1947.

The game farm quail present on the areas at the time of the pre-hunting season censuses were usually identified by their behavior. The number of birds so identified probably represent a conservative estimate of the released quail present at that time. The number of released birds present on the areas at other times was determined by direct observation or by band returns secured through live-trapping.

A few birds survived throughout the summer on some areas. One 1946 fall released male was shot during November, 1947, on area PSH-2. One female, which had been released on area GSR in the fall of 1947, was live-trapped with a native cock on the area on May 8, 1948, while a male released on the same area at the same time was live-trapped three times on the areas during the summer of 1948.

Hunters turned in ten bands which had been taken from 1946 fall released quail during the 1946-47 hunting season. Twelve of the 1947 fall released birds

are known to have been shot by hunters during the 1947-48 hunting season. Three of these 22 bands were taken from birds which had left the stocked areas prior to the hunting season.

The data presented show that at the time of the pre-hunting season census, made thirty to fifty days after the birds had been released, about 28% of the birds released in the fall of 1946 and nearly 27% of the birds released in the fall of 1947 were still present on the stocked areas. Nearly 8% of the 1946 fall released quail were still present on the stocked areas about April 1, 1947, while nearly 6% of the 1947 fall released birds were still present on the areas which were stocked about April 1, 1948. Hunters are known to have shot nearly 3% of the 1946 fall released birds and slightly more than 3% of the 1947 fall released quail. About 92% of the 1946 fall released quail and about 94% of the 1947 fall released birds failed to survive on the stocked areas until the following spring. A few of the birds which did survive until spring remained on the areas on which they had been liberated throughout the summer.

The Survival of Spring Released Quail

Very little data were secured regarding the survival of the adult birds released in the spring of 1947. Apparently most of them dispersed from the release site soon after being liberated. During the period June 19 to July 3, 1947, eight native quail and three spring released males were live-trapped on the stocked areas. During the remainder of the summer, fourteen other birds were live-trapped on the stocked areas, but none of them were released quail. None of the spring released birds were shot during the 1947-48 hunting season and probably none of them survived on the areas at that time. As far as could be determined, none of them nested on the stocked areas.

Observations of the pen reared quail released in the spring of 1948 showed that the birds dispersed widely, most them leaving the areas within a few days after being released. This dispersal apparently was initiated by the antagonism exhibited between the cocks in the presence of the females. That this dispersal can be very rapid is shown by the fact that one pair of covey released on areas PSH-1 was observed walking along a road, one-fourth of a mile from the release site, one hour and fifty minutes after being released. These birds had already left the project area.

Occasionally, when the covey was released in a particularly favorable site, it was observed that one or two of the birds remained at the release site. Of seventy adult quail live-trapped on the stocked areas during the summer, 1948, three cocks and one hen were birds which had been released in the spring. These four birds were all trapped near the release site. Although traps were set near almost all of the other release sites, no other spring released quail were captured.

Because of the almost immediate dispersal of the adult spring released pen reared quail, it appears that these birds have had only a very transitory effect upon the quail populations present on the stocked study areas during the two years which this experiment has been conducted. As yet, no evidence has been secured which would indicate that any spring released quail have nested on the stocked study areas.

DISCUSSION

Stocking as a management procedure has two objectives. Releases may be important as an addition to the wild breeding stock and they may, in addition, furnish game for hunters. The feasibility of any stocking program depends upon how successfully and economically these objectives are met.

As has already been stated, about one fourth of the 720 pen reared quail, released in the fall of 1946 and 1947, survived on the areas until the hunting season following release. If all of the releases had been made on areas open to hunting, all of these remaining birds would have been available as game to hunters. These surviving game farm birds may have represented an addition to the total number of birds present on the areas before they were stocked. About 7% of the birds released in the fall were present on the areas the following spring and may have provided additional breeding birds to the areas. If we assume that it costs $1 to produce a quail for fall release, it follows that each bird which was added to the fall population costs about $4, while each one added to the spring breeding stock costs about $15.

Spring released birds have had no value as game for hunters but a very few of them may have remained on the stocked areas as a supplement to the wild breeding stock.

The effect which any of the pen reared birds may have had, as breeders, upon the quail populations the following fall appears to have been very small. As can be seen from Table 4, there was more than a sufficient number of native quail on all

Table 4. Total number of native quail using stocked areas.

Area	Pre-hunting Census (1946)	Spring Census (1947)	Pre-hunting Census (1947)	Spring Census (1948)
GSR	121	70	102	44
GSH-1	21	20	30	17
GSH-2	0	0	23	4
PSR	50	55	58	5
PSH-1	37	20	21	20
PSH-2	51	52	96	35
TOTAL	280	217	330	125

of the areas, except GSH-1, in the spring of 1947 to produce all of the native (all birds present on the areas except 1947 fall released birds) quail found on the areas in the fall of 1947. Since there were no birds on area GSH-1 in the spring of 1947, it would seem, from the population data, that the spring released birds nested there, and were the parents of the quail found on the area in the fall. However, it is known that at least one pair of native quail moved on to the area after the spring census was made and that this pair nested successfully. It is believed that a sufficient number of other native birds could have moved onto the area to provide the 23 native birds found there in the fall of 1947. It is doubtful, therefore, that the additional breeding birds provided, as a result of the stocking done on this project, have had any material effect upon the fall populations of quail present on the stocked study areas.

SUMMARY

The data which have been presented show that about one-fourth of the pen reared quail which have been released in the fall have survived on the areas on which released, until the hunting season following liberation. About 7% of these birds survived on the area on which released, until the following spring. While these surviving birds have probably represented an addition to the total number of quail which were present on the areas before they were stocked, these releases can not be considered to have been economically feasible. Neither the fall released quail which survived on the areas until the following spring, nor the spring released quail appear to have had any appreciable effect upon the numbers of quail present on the stocked areas the following fall. The releases made in this experiment have, so far, failed to demonstrate that the liberation of pen reared quail is a satisfactory method of increasing bobwhite populations on specific areas already supplied with native birds.

LITERATURE CITED

Stoddard, H. L. 1931. The bobwhite quail: its habits, preservation and increase. Charles Scribner's Sons, New York. 559 pp.