MOUNTAIN QUAIL TRANSLOCATIONS IN EASTERN OREGON

Project Report: 2006

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Executive Summary

Mountain Quail populations have declined in many areas of the western Great Basin, particularly across former ranges in southeastern Washington, western Idaho, and eastern Oregon. Strategies for restoring declining wildlife populations have been largely reactive with recovery programs typically initiated only after populations or suitable habitats reached critically low levels. Restoration plans were often implemented without a clear understanding of the life history or habitat requirements of a species. Griffith et al. (1989) suggested conducting research and testing restoration techniques on species before populations reached crisis levels. Mountain Quail are an excellent candidate for translocations given the criteria proposed by Griffith et al. (1989). For example, this species is highly productive with large clutches (10-12 eggs/clutch), and has a highly varied, mostly herbivorous diet. Currently, western Oregon has abundant and easily accessible populations of Mountain Quail that could be a source for re-establishing or supplementing populations in areas of eastern Oregon where populations are rare or have been extirpated.

In 2001, the Oregon Department of Fish and Wildlife, the U.S. Forest Service, and the Game Bird Program at Oregon State University initiated a Mountain Quail translocation and research program for eastern Oregon. The goal of this project was to implement a restoration plan for Mountain Quail in eastern Oregon based on translocations of Mountain Quail from western Oregon to former ranges in eastern Oregon. A critical component of this program was the post-release monitoring of radio-marked, translocated Mountain Quail. Data from the monitoring effort will be used to refine procedures for future translocations and to evaluate the success of translocations.

In winter of 2001, 69 radio-marked birds and 47 banded but un-radioed birds were translocated from southwestern Oregon to 3 sites near the south fork of the John Day River in north-central Oregon. Radio-marked Mountain Quail were monitored from early March-July 2001 to measure survival, movements, and reproductive characteristics. In winter 2002, 93 Mountain Quail captured in southwest Oregon were released in Cabin and Jackass Creeks in the Murderer’s Creek Coordinated Resource Area (MCCRA) and the Maury Mountains in north-central Oregon (Jackle et al. 2002). Seventy-five of the 93 translocated quail were radio-marked and monitored until 30 July 2002.

In 2003, 271 Mountain Quail were captured in southwest Oregon and released in Cabin Creek, Black Canyon, Jackass Creek, and Flat Creek in MCCRA in north-central Oregon and Fly Creek in the Deschutes National Forest (DNF), northwest of Sisters in central Oregon. Seventy-five radio-marked Mountain Quail were translocated to Fly Creek on 4 March, 8 and 15 April. Fifty-seven radio-marked Mountain Quail were translocated to Cabin Creek in MCCRA near the south fork of the John Day River on 4 March and 8 April. One hundred and thirty-nine banded (without radios) Mountain Quail were translocated to Cabin Creek, Black Canyon, Jackass Creek, Flat Creek on 4 March, 8 and 15 April. Radio-marked birds were monitored until August 2003.

In spring 2004, 115 Mountain Quail were released at 2 sites in eastern Oregon. Sixty-four quail were translocated to the Deschutes National Forest and released at Fly Creek on 13 March 2004. Forty-four of the birds were radio-marked and 20 were marked only with leg bands. Fifty-one Mountain Quail were translocated to the Malheur
National Forest (MNF) and released at Wolf Creek northeast of Burns Oregon. Forty-five quail were radio-marked and 6 only banded. Radio-marked birds were monitored until July 2004.

In March 2005, 196 Mountain Quail captured in southwest Oregon were released at 3 sites in eastern Oregon. Fifty-six quail were released at Fly Creek on the Deschutes National Forest on March 12. Forty-one of the birds were radio-marked and 15 were marked only with leg bands. Fifty birds were released at Wolf Creek on the Malheur National Forest on March 9. Forty-five of the birds were radio-marked and 5 were banded only. Ninety birds were released near Fish Creek on Steens Mountain (SM) on March 9. Fifty-six of those birds were radio-marked and 34 were only banded.

In March 2006, 128 Mountain Quail were released near Fish Creek on Steens Mountain. Eighty birds were radio-marked and 48 were banded only. Mortality was higher on SM in 2006 compared to 2005 (81% vs. 43%). We located 20 nests in open sites dominated by western juniper and sagebrush. Fifteen of 20 (75%) nests successfully hatched chicks. Mean distance moved and elevation changes from release site to breeding ranges in 2006 were similar to that seen in 2005 on SM. This report summarizes data collected from the radio-marked birds on Steens Mountain during March-August 2006.
**INTRODUCTION**

Mountain Quail (*Oreortyx pictus*) are the largest of 6 species of New World quail in North America. They are secretive birds that inhabit a diverse range of habitats, but are typically associated with early seral, shrub vegetation. Males and females have identical plumage and size characteristics. Mountain Quail are the least studied of the North American quail with much of the biological knowledge based on incomplete or anecdotal data (Pope 2002).

Mountain Quail populations have declined in many areas of the western Great Basin during the past century (Brennan 1990, 1994, Vogel and Reese 1995, Gutiérrez and Delehanty 1999, Pope 2002). Their current geographic range extends south to the Baja Peninsula, north to Vancouver Island in British Columbia, and east to western Idaho and Nevada (Crawford 2000). Historically, there were accounts of Mountain Quail in every county in Oregon (Jobanek 1997). Currently, Mountain Quail are common in the Coast and Cascade Mountain Ranges of western Oregon, but are less common or have been extirpated in many areas east of the Cascade Mountain Range (Pope 2002).

The lack of information on Mountain Quail and their apparent decline in many areas of eastern Oregon prompted the Game Bird Research Program at Oregon State University (OSU) to initiate a research project on Mountain Quail ecology in 1996. This research (Pope 2002) compared the life history attributes (habitat selection, survival, reproduction, and movement patterns) of Mountain Quail in southwestern Oregon in the lower Cascades where populations are stable and abundant with a resident population near Hell’s Canyon in northeastern Oregon where Mountain Quail may be declining. An additional goal was to translocate a sample of Mountain Quail from southwestern Oregon.
to northeastern Oregon, and compare the life history of these transplanted quail with the resident populations in Hell’s Canyon and in the Cascades.

Results from this research were used to develop a Mountain Quail translocation and research plan for eastern Oregon (Pope et al. 2002) with translocations as a major pro-active component of this plan. The translocation component of this plan included the release of wild Mountain Quail (captured in the southwestern Cascades) into multiple sites in eastern Oregon. The research objectives of this phase of the plan were to monitor a radio-marked sample of quail released at sites selected in historic ranges of Mountain Quail in eastern Oregon to:

1) quantify habitat use, survival, reproduction parameters, and movements of translocated quail in areas that differ ecologically,

2) evaluate efficacy of using translocated radio-marked Mountain Quail to locate resident populations of Mountain Quail in eastern Oregon, and

3) refine and evaluate protocols for future translocations and post-release monitoring procedures.

The first phase was initiated in the winter of 2001 with the translocation of 69 radio-marked birds and 47 banded but un-radioed birds to 3 sites in MCCRA near the south fork of the John Day River. In winter of 2002, 66 radio-collared birds were released in 2 of the 3 release sites used in 2001 near the south fork of the John Day River, and 27 birds (9 radio-collared, 18 banded) were released in the Maury Mountains near Prineville. During the spring of 2003, 271 Mountain Quail (132 radio-marked and 139 banded) were captured in southwest Oregon and released at four sites in MCCRA and at Fly Creek in the Deschutes National Forest northwest of Sisters. In 2004, 115 Mountain Quail (89
radio-marked and 26 banded only) were released at Fly Creek in the Deschutes National Forest and Wolf Creek in the Malheur National Forest northeast of Burns. In 2005, 196 Mountain Quail (142 radio-marked and 54 banded only) were released at Fly Creek in the Deschutes National Forest, Wolf Creek in the Malheur National Forest and near Fish Creek on Steens Mountain southeast of Burns. In 2006, 128 Mountain Quail (80 radio-marked and 48 banded only) were released near Fish Creek on Steens Mountain. This report summarizes data collected in the field from March-August 2006.

METHODS

Release Sites 2001-2006

The 43,193 ha MCCRA (Figure 1) is jointly managed by the Bureau of Land Management (BLM) and the Oregon Department of Fish and Wildlife (ODFW), and includes the 9256 ha Phillip W. Schneider Wildlife Area managed by ODFW. Historical records indicated heavy livestock use on the Murderer’s Creek flats from 1912-1972, with public land permits allocating 50,000 AUM’s compared with 6,000 today (ODFW, unpublished report). In 1972, ODFW purchased part of Murderer’s Creek to provide winter range habitat for mule deer, control wildlife damage, and protect riparian zones. Current grazing practices combine high density, short duration grazing with a rest/rotation system. Four sites in MCCRA, Black, Jackass Creek, Flat Creek, and Cabin Creek, were selected as release locations based on vegetation complexity and diversity. Jackass Creek, a tributary of the south fork John Day River, has steep slopes dominated by western juniper (*Juniperus occidentalis*) with diverse understory shrubs, dominated by
mountain big sagebrush (Artemisia tridentata vaseyana) and bitterbrush (Purshia tridentata).

Figure 1. Mountain Quail translocation sites in Murderers Creek Cooperative Resource Area, Fly Creek in the Deschutes National Forest, Wolf Creek in the Malheur National Forest, and Steens Mountain, winter-spring 2000-2006.

Cabin Creek (tributary of Murderer’s Creek), Flat Creek, and Black Canyon, are characterized by gentle-sloped, grassy uplands dominated by western juniper and bitterbrush and riparian zones dominated by red alder (Alnus rubra) and willow (Salix spp.). Upland and ridge-top forests are dominated by stands of ponderosa pine (Pinus
ponderosa), Douglas fir (*Pseudotsuga menziesii*), mountain mahogany (*Cerocarpus betuloides*), and grand fir (*Abies grandis*). Elevations range from 701m at canyon bottoms to 2130 m on the top of Aldrich Mountain. Temperatures during 1971-2000 averaged from a mean high of 22º C in July to a mean low of 2.2º C in January. Most of the moisture in this area falls in the form of snow, and the average annual moisture accumulation for this period was 28 cm (Oregon State Climate Center, Oregon State University).

The Fly Creek translocation site (Figure 1) is 30 km northwest of Sisters, Oregon and is in an area primarily managed by the Deschutes National Forest (DNF). Fly Creek drains into the Metolius arm of Lake Billy Chinook and is 1.5 km from the edge of the Eyerly fire that burned an estimated 23,573 acres in 2002. Fly Creek is characterized by gentle-sloped, grassy uplands dominated by ponderosa pine and western juniper with bitterbrush the dominant shrub. Ridge-top forests are dominated by ponderosa pine, white fir (*Abies amabilis*), and Douglas fir with ceanothus (*Ceanothus* sp.) and manzanita (*Arctostaphylos* spp) being the primary understory. Elevations range from 600 m on the shore of Lake Billy Chinook to 1460 m on the top of Green Ridge. Temperatures during 1971-2000 averaged from a monthly mean high of 17º C in July to a low of –1.3º C in January. Annual precipitation during this period was 36 cm (Oregon State Climate Center, Oregon State University).

Wolf Creek in the Malheur National Forest (MNF) is approximately 50 km northeast of Burns, Oregon. The area is characterized by forested, steep mountain slopes dissected by stream systems. Forest habitats in the uplands are generally dominated by Douglas fir, western juniper, and ponderosa pine with understories composed of
snowberry (*Symphoricarpos albus*), mountain mahogany or bunch grasses (*Poa* spp.). Riparian areas are dominated by willow, red-osier dogwood (*Cornus stolonifera*), mountain alder (*Alnus incana*), currents (*Ribes* spp.), and black hawthorn (*Crataegus douglasii*). Elevations range from 1000-3200 m. Temperatures during 1971-2000 averaged from a monthly mean high of 19º C in July to a low of –4.2º C in January. Annual precipitation during this period was 27 cm (Oregon State Climate Center, Oregon State University).

Steens Mountain is a 50-km long fault block mountain located approximately 90 km south of Burns, Oregon. The mountain has a steep eastern face (nearly 1.5 km) and a gentle west slope dissected by steep canyons and glacial gorges. The mountain covers nearly 500,000 ac (202,343 ha), of which 187,000 ac (75,676 ha) are managed by the BLM. In 2000, Congress passed the Steens Mountain Cooperative Management and Protection Act, which designated 169,465 acres as wilderness. Elevations range from 1280-2980 m. Habitat types on Steens Mountain are very diverse and follow an elevational gradient ranging from arid sagebrush (a mix of big and low sagebrush) at the base to subalpine grassland and perpetual snow cover at the top. Intermediate vegetation zones include western juniper (1524-1829 m), mountain mahogany (1829-2438 m), mountain big sagebrush (1981-2591 m), and quaking aspen (*Populus tremuloides*) (1829-2438 m). Understories are primarily bunchgrasses. Temperatures during 1971-2000 averaged from a monthly mean high of 29.3º C in July to a low of –6.9º C in January. Annual precipitation during this period averaged 34.2 cm (Oregon State Climate Center, Oregon State University).
METHODS

Capture and Radio-Telemetry 2006

We captured Mountain Quail from November 2005-February 2006 in southwestern Oregon using treadle traps baited with grain. A total of 128 birds were captured in Douglas County and Jackson County. Captured birds were weighed, banded, identified by plumage as hatch year (HY) or after hatch year (AHY) (Leopold 1939), and blood was extracted for gender identification (Veterinary Diagnostic Center, Fairfield, Ohio) from birds selected for radio-marking. Captured quail were held in a holding facility specifically constructed for captive wild Mountain Quail at the Southwest Regional office of Oregon Department of Fish and Wildlife (ODFW) in Roseburg, Oregon. Eighty Mountain Quail were fitted with necklace-style radio transmitters that weighed approximately 4.3 g (Model PD2C, Holohil System Ltd., Woodlawn Ontario, Canada) (Table 1). One hundred twenty-eight (80 radio-marked and 48 banded only) birds were released near Fish Creek on Steens Mountain (SM) on March 15. Eighty-five of 128 translocated Mountain Quail were HY (hatch year) birds and 41 of 80 radio-marked birds were females (Table 1).

Table 1. Number of radio-marked and banded translocated Mountain Quail released on Steens Mountain in March 2006.

<table>
<thead>
<tr>
<th>Release Location</th>
<th>Date</th>
<th># Radio-marked</th>
<th># Banded Only</th>
<th>HY/AHY¹</th>
<th>Male/ Female*</th>
<th>Release Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steens Mt.</td>
<td>3/15/06</td>
<td>80</td>
<td>48</td>
<td>85/43</td>
<td>39/41</td>
<td>128</td>
</tr>
</tbody>
</table>

¹HY = hatch year, AHY = after hatch year
*Gender determined only for radio-marked birds

Mountain Quail with transmitters were relocated beginning 28 March and continuing until the second week in August. Telemetry methods included monitoring
from fixed winged aircraft, mobile tracking by vehicle/ATV, and ground monitoring. Flights were generally weekly April-August when available. We recorded, for all ground-monitored radio-marked birds, location (UTM), habitat associations (based on plant assemblages), topographic characteristics (slope, elevation, and aspect), and distance to road and water.

Nest sites were located by tracking and visually identifying radio-marked Mountain Quail that were incubating clutches. The birds were flushed off nests to count number of eggs, and we installed temperature-sensitive data-loggers (Model HOBO-pro, Onset Computer, Pocasset, MA) to determine nest attendance patterns on most nests. Data loggers measured nest temperatures with 0.2-cm thick thermistors placed under eggs, and ambient temperatures with monitors positioned <15 m from nest sites. All nests were flagged for later identification. Nests were checked and data collected from loggers once a week. We limited disturbance by observing birds from >8 m distances to confirm incubation. After hatch, eggshell membranes, shells, and unhatched eggs were counted to determine number of hatched chicks. Successful nests were defined as those in which at least 1 egg hatched and unsuccessful nests were those abandoned or depredated with no eggs hatched.

**RESULTS: POST-RELEASE MONITORING**

**Survival**

Of the 80 radio-marked birds released in 2006, 7 were never relocated or disappeared shortly after release and thus were excluded from all analyses. Of the 73 radio-marked birds located regularly throughout the study, 59 (81%) were found dead by
the end of the 5-month monitoring period. Forty-three of the 59 (73%) mortalities occurred during the first 8 weeks post release. Eighty-four percent of males and 78% of females died (Table 2).

Table 2. Proportions of radio-marked translocated mountain quail by gender that were found dead after their release on Steens Mt, Oregon, spring-summer 2006.

<table>
<thead>
<tr>
<th>Location</th>
<th>All</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steens Mt.</td>
<td>59/73 (81%)</td>
<td>31/37 (84%)</td>
<td>28/36 (78%)</td>
</tr>
</tbody>
</table>

**Breeding Range Movements**

We measured breeding range movements for the 31 radioed birds still alive on 1 May. We used 1 May because Mountain Quail pair in late March and have moved to breeding ranges by this date (Pope 2002). Of the 31 birds still alive on 1 May, 4 moved southeast (91-180°) of the release site, 9 moved in a southwest (181-270°) direction, 7 moved northwest (271-360°) and 11 moved northeast (1–90°). The mean distance moved from the release site to breeding ranges for quail on SM was 7.1 ± 1.0 km (range 0.4-19.5). Males (n = 12) moved a mean distance of 7.2 ± 1.6 km (range 1.3 – 17.3) and females (n = 19) moved an average of 7.0 ± 1.2 km (range 0.4-19.5) from the release site.

The mean elevation change from release site to breeding ranges on SM was 186.3 ± 27.6 m (range -32 – 512 m). Males had a mean elevation change of 209.9 ± 51.7 m and females a mean change of 171.3 ± 31.7 m. Twenty-seven birds moved higher in elevation with a mean increase of 217.0 ± 27.0 m. Four birds moved down in elevation to their breeding sites with a mean decrease of 21 ± 7.1 m.
Reproductive and Nest Site Characteristics

Twenty nests of radio-marked quail were located during late May and early June 2006 (Table 3). Ten nests were incubated by males and 10 by females. Mean clutch size was 10.4 ± 0.5 eggs (range 6-14). Mean clutch size for nests incubated by males was 11.3 ± 0.7 eggs (range 8-14) and for females 9.6 ± 0.7 eggs (range 6-14). Fifteen out of 20 (75%) nests successfully hatched chicks, 3 nests were completely depredated, and 2 adults were killed during incubation. Nest success was 100% for males and 60% for females. One hundred fifty of 156 (96%) eggs hatched and 6 eggs in successful nests did not hatch or disappeared. Mean hatch size from successful nests was 10.0 ± 0.6 (range 6-14). For nests incubated by males, mean hatch size was 11.0 ± 0.8 chicks (range 8-14) and for females 9.1 ± 0.9 chicks (range 6-13). Average hatch date was 27 June. Nests were primarily located under overhanging rocks, shrubs, and inside clumps of bunchgrasses. We did not flush broods from thick cover, to avoid exposing them to unnecessary risks. However, chick counts appeared high when we incidentally flushed broods.
Table 3. Band number, sex, age, clutch size, hatch size, and fate of nests of translocated Mountain Quail (n = 20) located on Steens Mountain near Frenchglen, Oregon, spring and summer 2006.

<table>
<thead>
<tr>
<th>Band #</th>
<th>Incubating Sex</th>
<th>Clutch Size</th>
<th>Hatch Size</th>
<th>Fate $^1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1290</td>
<td>M</td>
<td>9</td>
<td>9</td>
<td>S</td>
</tr>
<tr>
<td>1010</td>
<td>M</td>
<td>10</td>
<td>10</td>
<td>S</td>
</tr>
<tr>
<td>1344</td>
<td>F</td>
<td>14</td>
<td>13</td>
<td>S</td>
</tr>
<tr>
<td>1334</td>
<td>F</td>
<td>12</td>
<td>12</td>
<td>S</td>
</tr>
<tr>
<td>1109</td>
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<td>12</td>
<td>12</td>
<td>S</td>
</tr>
<tr>
<td>1275</td>
<td>F</td>
<td>8</td>
<td>8</td>
<td>S</td>
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<td>S</td>
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<td>1351</td>
<td>F</td>
<td>10</td>
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<tr>
<td>AVG</td>
<td>10.4</td>
<td>10.0</td>
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<td></td>
</tr>
</tbody>
</table>

$^1$S = successful or nests that hatched ≥ 1 chick(s), D = nests that hatched no chicks and were completely depredated (all eggs destroyed), and BD = parent bird depredated while off nest and clutch did not hatch.
DISCUSSION

Survival rates for Mountain Quail are poorly documented. Little data are available that describe mortality for native or translocated populations of Mountain Quail. The continued decline of Mountain Quail in many areas of the western Great Basin makes accurate estimates of survival critical for restoration planning and management. Mortality of translocated Mountain Quail on SM in 2006 was considerably higher than in previous releases in DNF, MNF, HCNRA, and MCCRA (Pope et al. 2004). Survival was similar between males and females (84% vs. 78%). Accurate estimates of survival are essential for developing translocation strategies for restoration plans. Without knowledge of mortality of translocated birds, the success of reintroductions as a restoration technique cannot be adequately evaluated.

Similar to Pope’s (2002) study on translocated Mountain Quail in Hell’s Canyon, and Jackle et al’s and Pope et al’s (2002-2004) reports on translocated Mountain Quail in MCCRA, DNF, and MNF, a number of translocated quail on SM moved considerable distances to breeding ranges both in 2005 and 2006. In 2006, several birds moved nearly 20 km from the release site to establish nests less than 1 km from 2005 nest locations. This is consistent with Pope’s (2002) observation that translocated Mountain Quail had the ability to locate other Mountain Quail over great distances.

Translocated birds on SM in 2005 and 2006 moved higher in elevation during breeding season, but not as high as translocated birds in Hell’s Canyon and native birds in the lower Cascades of southwest Oregon. There appeared to be a relationship between the distance of movements and elevation gain. Most birds that moved considerable distances also moved higher in elevation.
Reproductive behaviors were similar for the translocated quail released on SM in 2005-2006 and the other study areas (translocated Mountain Quail in Hell’s Canyon 1997-1998, in DNF 2003-2005, MCCRA 2002-3, and the native quail in HCNRA and the lower Cascades (1997-2000). Males actively incubated clutches and brooded their chicks without assistance from their mates. Mountain Quail demonstrated a reluctance to abandon nests even after partial nest depredation. There were no incidences of nest abandonment in 2005 or 2006.

Clutch sizes on SM in 2005 and 2006 were similar to MCCRA, HCNRA, Cascades, and DNF 2003-05. Similar to SM in 2005, males had slightly larger clutch sizes than females (11.3 vs. 9.6). Hatch size for SM in 2006 (10.0) was higher than in 2005 and higher than many other release sites experienced. Mean hatch sizes from other areas and years ranged from 7.4-10.3 chicks. Larger hatch sizes in 2006 is likely a result of fewer partial nest depredations and non-viable eggs in nests. Mean hatch date for SM (27 June) was similar to hatch dates for DNF (24 June), but earlier than hatch dates for SM in 2005 (7 July), CR (6 July) and HCNRA (5 July). The earlier hatch date on SM in 2006 may be a result of milder spring conditions. Nest success (number of nests that hatch chicks) on SM in 2005 and 2006 (81% and 75%) was similar to MCCRA (84%) and CR (83%), but higher than HCNRA (62%), MNF (66%) and DNF 2003-2005 (58%).

**MANAGEMENT IMPLICATIONS**

Translocations of wildlife to supplement or re-establish populations of native species have become an important and broadly accepted conservation technique (Griffiths et al. 1996). A survey of translocation programs estimated that nearly 90% of
approximately 700 translocations between 1973 and 1986 were game species, and gallinaceous birds accounted for a significant proportion (43%) of these translocation efforts (Griffiths et al. 1989). Few translocation efforts incorporated post-release monitoring that evaluated the effectiveness of the program or compared survival of translocated populations (Griffith et al. 1989). Game farm or pen-raised animals are usually less successful than wild birds as a source for translocations (Fellers and Drost 1995). A primary goal of this research was to coordinate management objectives with research to develop an effective and successful restoration program for Mountain Quail in eastern Oregon. Translocation programs will not succeed unless some measures of success are established and subject to evaluation. Post-release monitoring of radio-marked animals is one of the most effective methods of evaluating success.

Translocated Mountain Quail in southeastern Oregon were successful in establishing nest sites, selecting mates, and producing chicks. Nest sites were characterized by diversity in structure, topography, and habitat associations. A number of nests in southeastern Oregon were in areas with generally open or partially open canopies and limited shrub cover. Most nests were located in the upper 1/3 of mountain slopes or ridges. Few nests were located in riparian areas or associated with riparian vegetation. Many of the translocated radio-marked quail moved considerable distances from spring release sites to breeding ranges. No native or resident Mountain Quail have been observed on SM since the late 1970s so presumably all translocated quail were paired with other translocated quail or offspring from the 2005 release.

For spring 2007, we propose to release $\geq 100$ birds on SM with approximately 80 radio-marked birds. Birds will be monitored after their release to determine habitat use,
survival, reproductive rates, and movement patterns. Data collected in 2005 and 2006 will become part of a master’s thesis. Comparisons of survival and reproductive success between the translocated sample populations at each site will allow for an effective evaluation of restoration strategies. Additionally, an on-going review of release procedures will provide more effective methods for translocations and insure that the maximum numbers of birds survive until the breeding season.

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**COOPERATORS**

Oregon Department of Fish and Wildlife
Game Bird Research Program-Oregon State University
U.S. Forest Service
Bureau of Land Management
Quail Unlimited
Oregon Hunters’ Association
National Fish and Wildlife Foundation
Oregon Wildlife Heritage Foundation

**LITERATURE CITED**


