

# The Himalayan Snowcock: North America's Newest Exotic Bird<sup>1</sup>

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Until recently, snowcocks were found only in the mountains of central Asia. The few people who had encountered them—servants of khans and emperors, turn-of-the-century sportsmen and a handful of zoologists—provided only sketchy details of their biology (Jerdon 1864; Hume and Marshall 1878). Today as a result of Herculean efforts begun by game biologists in the 1950s, a new population of Himalayan snowcocks has been established in the Ruby-East Humboldt Range of Humboldt National Forest, north of Prater, Nevada (Forsgren 1981).

In the 1950s the practice of exotic game introduction was in its heyday. Game biologists went to great lengths to acquire wild snowcocks in Pakistan, propagate them, and release their offspring in areas said by some to have too few game birds. Almost 20 years of effort resulted in the successful introduction of a new "trophy game bird" in Nevada, but a close look at the program reveals some lingering question about the wisdom of the program.

The purpose of this paper is to chronicle the history of snowcocks in America. We review the introduction effort, discuss some costs and benefits of the program, describe the present distribution and status of snowcocks in Nevada, and present some results of our recent studies of the species.

## HISTORY OF SNOWCOCK INTRODUCTIONS

The history of the Snowcock Introduction Program is an intriguing, seldom told story. In 1948 the United States Fish and Wildlife Service (USFWS) began a new program, Foreign Game Investigations (Bump 1951), whose stated objective was to seek out "new adaptable species possessing a high hunting resistance . . . so that . . . habitats thoroughly changed by man . . . or never fully occupied by native game . . . [could be stocked, and thus] provide greater hunting opportunities" (Bump 1968a). Program biologists conducted field studies on dozens of potential game birds in all corners of the globe. Informative leaflets were published for potential state collaborators, enabling them to match candidate species with local conditions (e.g., Bump 1973). Between 1960 and 1970 the program was responsible for releasing no fewer than 19 species of pheasants, partridges, quail, tinamou, and sandgrouse (Banks 1981) (Table 1). The program was a joint venture between the USFWS and participating state agencies, and the Wildlife Management Institute provided loans to purchase foreign birds. Federal funds were provided through the Pittman-Robertson Wildlife Restoration Act, which provides funds to states on a matching basis for *wildlife restoration*: generally land acquisition, research, development, and management. The federal Foreign Game Investigations Program was particularly popular in the Southeast, the arid Southwest and in Hawaii. In Nevada the objective was to enrich "60,000 square miles of [arid] habitats [54

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FIGURE 1.—Himalayan snowcock on Thomas Peak, Rudy Mountains, Humboldt National Forest, northeastern Nevada. (photo by Bland)

percent of the state] which were not permanently inhabited by upland game birds, [or were inhabited by one of] five [native] species [for which] hunting potential . . . is erratic" (Christensen 1963).

Snowcock introductions were attempted in five Nevada ranges and on Mauna Kea in Hawaii. Ironically snowcocks fell far short of the federal government's criteria of being adaptable, possessing high hunting resistance, and providing superior hunting opportunities. Furthermore, these strictly alpine birds had little chance of enriching Nevada's extensive deserts with game. But key players in the Foreign Game Investigations Program became enamored with this "giant cousin" of the chukar partridge (*Alectoris greca*). Bolstered by the overwhelming popularity of exotic chukars—by then the favorite quarry of Great

TABLE 1. A summary of birds successfully introduced outside of their natural geographic ranges in North America, primarily game birds for hunters.

SPECIES	COMMON NAME	INITIAL DATE OF INTRODUCTION
<i>Alectoris greca</i>	*CHUKAR	1893
<i>Bonasa umbellus</i>	RUFFED GROUSE	1956
<i>Callipepla californicus</i>	CALIFORNIA QUAIL	1857
<i>C. gambelii</i>	GAMBEL'S QUAIL	1885
<i>C. squamata</i>	SCALED QUAIL	1913
<i>Colinus virginianus</i>	BOBWHITE QUAIL	1910
<i>Francolinus erkelii</i>	*ERKEL'S FRANCOLIN	1957
<i>F. francolinus</i>	*BLACK FRANCOLIN	1950s
<i>F. pondicerianus</i>	*GREY FRANCOLIN	1959
<i>Gallus gallus</i>	*RED JUNGLEFOWL	1500s
<i>Geopelia striata</i>	*ZELOZA DOVE	1922
<i>Lophura leucomelana</i>	*KALIJ PHEASANT	1962
<i>Meleagris gallopavo</i>	WILD TURKEY	1880s
<i>Oreortyx pictus</i>	MOUNTAIN QUAIL	1880s
<i>Ortalis vetula</i>	PLAIN CHACHALACA	1923
<i>Perdix perdix</i>	*GRAY PARTRIDGE	1910
<i>Phasianus colchicus</i>	*RING-NECKED PHEASANT	1882
<i>Pterocles exustus</i>	*CHESTNUT-BELLIED SANDGROUSE	1959
<i>Tetraogallus himalayensis</i>	*HIMALAYAN SNOWCOCK	1933
<i>Zenaida asiatica</i>	*WHITE-WINGED DOVE	1959

\*Denotes taxa not native to North America

Basin bird hunters—program participants set out to add the “king of chukars” to hunters’ bags.

In 1961 a Reno trophy-hunter arranged to have six Himalayan snowcocks trapped near the town of Gilgit, Pakistan. The birds were transported by porter, pony, jeep, and airplane to a quarantine station in Honolulu, a journey of some 8,500 miles. Only a single bird survived the trip, but the bird so impressed the Nevada Game Commission that they requested 35 more. Nineteen of these survived the journey to Nevada and were released directly into the Ruby Mountains in April 1963. They vanished soon after. Nevada Department of Wildlife (NDW) then decided to establish a captive flock from which offspring would be released over successive years. A total of 107 wild snowcocks was imported from Pakistan. Between 1963 and 1979, 2,025 of their progeny were released in Nevada, 1,717 in the Ruby Mountains alone.

During the 1970s a series of policy shifts signaled a close to the era of exotic game bird introductions. In 1970 the USFWS terminated its Foreign Game Introductions Program. In 1977 President Carter issued Executive Order 11987, greatly restricting the use of federal funds, personnel, or lands for the introduction of exotic species. In 1979 NDW discontinued propagation and release of snowcocks. This is not to say the interest in exotic game has died. New subspecies of previously established species continue to be imported with impunity (Squibb 1987), and new populations of previously established species continue to be established by translocation within and between states.

In the mid-1980s Alberta Fish and Wildlife Division was on the verge of releasing descendants of Nevada's captive snowcocks into the Rocky Mountains, but professional and environmental groups convinced the agency to reconsider introducing the birds into a habitat that would have allowed them to spread widely (Bland 1989).

### STATUS AND DISTRIBUTION OF SNOWCOCKS

The status of Nevada's wild snowcock population has never been adequately documented. The introduction was first declared a success in 1971 (Abbott and Christensen 1971), although reports of reproduction were not substantiated until 1977 (Nevada Department of Wildlife 1980). Through the 1970s, research efforts consisted of a few searches on foot or horseback. More recently NDW biologists have begun to count snowcocks during sporadic helicopter and foot surveys for introduced mountain goats (*Oreamnos americanus*). In 1980 NDW opened a snowcock hunting season. Initially hunters were required to report the location and results of their hunt. This requirement could have provided rare data on Nevada's snowcocks, but it was soon eliminated. In 1985 NDW reported the snowcock population to number between 250 to 500 individuals (Stiver 1984). Since 1985 NDW has declined population estimates for lack of data.

The breeding range of snowcocks in the Ruby-East Humboldt Range is probably limited to elevations above 3,000 m (Bland and Temple 1990). Less than 50 km<sup>2</sup> of the Ruby-East Humboldt Range meet this basic criterion (when slope is not considered for areal calculations). Considering that snowcock breeding densities in China range from 1.3 to 2.0 individuals/km<sup>2</sup> (Huang et al. 1990; Liu et al. 1990), we can conclude the number of snowcocks in the Ruby-East Humboldt Range will never be great. In the Ruby Mountains, snowcocks appear to prefer deep glacial cirques rimmed with extensive moist meadows and sheer cliffs (Bland and Temple 1990). The spotty distribution of such cirques and alpine meadows limits the number of areas where large flocks can establish home ranges. The core of Nevada's snowcock population appears to inhabit in the Thomas Peak-Ruby Dome area of the Ruby Mountains, though coveys are regularly reported further north and south. Because Nevada's snowcocks are marooned on an "alpine island" at the center of the Great Basin, they are unlikely to disperse to other alpine habitats on their own.

### COSTS AND BENEFITS

The merits of exotic game bird introductions have long been debated. The biologist-in-charge of the Foreign Game Introductions Program once likened the critics of exotic game introductions to the "crowd of critics, of complainers, of commentators [that] darkened the face of learning [and brought about the fall of Rome]" (Bump 1968b). The Snowcock Introduction Program may well have "brightened the face of learning" with regard to snowcock biology, but the results of the program hardly reaffirm any wisdom in the introduction of exotics.

Since the snowcock introduction is nonetheless considered a success, an overall evaluation is warranted. On the positive side Nevada now has a trophy game bird that is a true challenge to bag, and one that can put a real meal on the table (snowcocks can weigh over 2.5 kg or 5.5 lb). In the words of a local snowcock hunter, snowcocks provide "a truly unique hunting opportunity." For the more hardy bird-watchers and hikers, snowcocks can also add unusual variety to an otherwise solemn mountain environment. The sight of a snowcoc

covey in flight, the alien cacophony of their calls, and the chance drama of a high-speed chase by an eagle are truly spectacular. Snowcocks generate notoriety and revenue for the state and for local businesses. Local hunting guides even offer specialized snowcock hunts. These benefits are valued highly by NDW, which depends on license sales and strives to fulfill the desires of the hunting public.

On the other hand, the Snowcock Introduction Program is said to have cost \$750,000 (Stiver 1984). The figure would probably approach \$1 million if private funds and funds not allocated directly to the project were included. Incredibly this sum was spent on snowcocks at a time when two native game birds—sage grouse (*Centrocercus urophasianus*) and sharp-tailed grouse (*Pedioecetes phasianellus*)—were in serious need of “restoration” in Nevada. The utilization of snowcocks by hunters has been limited, at best. Snowcocks are difficult to bag, and the few hunters who make the strenuous climb to snowcock habitat have collectively bagged an average of four birds each year—total. Many hunters try for snowcocks with hopes of acquiring a mountable specimen, but since snowcocks are usually shot in flight high over a deep, rocky canyon, they are often retrieved too badly mangled to warrant taxidermy (Fulton 1904, anonymous hunter pers. comm.).

Sadly, the fruits of Nevada's snowcock hunt had been foretold more than a century ago, when Hume and Marshall (1878) berated the species in their still-authoritative book *The Game Birds of India, Burma and Ceylon*. They noted:

“With a gun they do not, as a rule, afford any sport. You may get them driven over you nicely at times [by coolies], and you might sometime stalk them—if it were worth the tremendous labour such stalks usually involve—but as a rule, whenever I have seen them, the rifle is the only weapon with which a bag can be made. I went in regularly for it. . . . though to me they seemed, after many trials, almost uneatable.”

It is unlikely anyone will ever know the ecological impact introduced snowcocks have had on the unique Ruby Mountain environment or on the already diverse community of native herbivores. The small, isolated, alpine meadows on which Ruby Mountain wildlife congregate are fragile, as most alpine meadows are, and what's more, no other alpine plant community in the Great Basin is so rich with plant species (Loope 1969). Since the introduction of snowcocks went virtually unmonitored, with no prior assessment of the snowcocks' potential for harm, the condition of the environment before, during and after their introduction is largely unknown.

## RECENT STUDIES

In the opinion of one retired Nevada biologist who has observed the introduction program from its inception, the greatest merit of the project may be the opportunity it provided for studying snowcock ecology. Little was known of Nevada's wild snowcocks prior to 1981 when we began our field studies.

Our first study confirmed that snowcocks in the Ruby Mountains carry out the same daily elevational traverse that has been observed among Himalayan snowcocks in central Asia. This route takes the birds through a series of habitats, each well-suited for the behavior they engage in at particular times of day, be it foraging, loafing or roosting (Bland 1982).

Our initial observations led us to believe snowcocks face a serious ecological challenge in balancing conflicting demands for forage and cover. The alpine

plants on which snowcocks feed (grasses, forbs, and sedges) are not highly nutritious, so snowcocks must consume large quantities. To do so they spend as much as 80 percent of daylight hours foraging (Bland 1982). Under these circumstances one might expect snowcocks to spend most of their time where good food is most abundant, but snowcocks are reluctant to forage where there is good food if the topographic setting leaves them vulnerable to golden eagles (*Aquila chrysaetos*) (Bland and Temple 1990). Snowcocks can best elude eagles—their principal predators in the Himalayas (Baker 1924; Whistler 1926) as well as in Nevada—by plummeting at high speed down steep slopes and outdistancing the eagles.

In 1985 we focused our attention on the relationships between snowcocks and their habitat, food and predators. To determine the foraging potential of various habitats, we closely observed the foraging behavior of tame, hand-reared snowcocks on plots with different vegetative characteristics (Bland and Temple 1987). To determine where snowcocks were most nervous about attacks by eagles, we observed the vigilance behavior—alert visual scanning—of wild birds foraging on level versus steep ground (Bland and Temple 1988). Wild birds have learned when and where extra wariness is necessary to prevent being trapped in a compromising situation by eagles.

Our tame birds indicated that snowcocks can feed most efficiently on level or slightly sloping meadows and in particular where grasses are abundant. But by observing wild snowcocks we found they avoid level terrain regardless of the quality of food there. Wild snowcocks were more alert and spent more time scanning for threats when foraging on level ground than when they foraged on steep ground.

In light of our findings regarding the effects of predation risk on habitat use, we were able to describe what might be considered ideal snowcock habitat and, more interestingly, explain why and how it best suits them. In retrospect the unique alpine meadows and glacial cirques of the Ruby-East Humboldt Range were the key to successful establishment of snowcocks. Those few meadows which are on or near steep cliffs or slopes or are nestled high in glacial cirques provide just the right combination of food and escape terrain for snowcocks to prosper.

Our work with Himalayan snowcocks in the Ruby Mountains has given us a unique opportunity to study this poorly known bird of central Asia. In some respects we now know more about the species in Nevada than in its native range. Moreover, the story of its introduction to America provides some examples of why new laws are needed to prohibit the introduction of exotic species. We now have a better understanding of why snowcocks are inexorably tied to the topography and vegetation of alpine environments, and why their distribution is clustered even in the Ruby-East Humboldt Range. They are generalist feeders that can make a meal out of just about any meadow, but their access to food resources is restricted by birds of prey. They must always have a quick escape route at their disposal.

We do not at this time believe it is likely that there would be much support for eradicating snowcocks from the Ruby-East Humboldt Range, even though much of the area has recently been designated as wilderness area. Snowcocks were established in Nevada for economic and recreational purposes, and many feel they should be enjoyed and utilized to those ends to the greatest degree possible. We do however ask that other agencies or individuals contemplating game bird introductions or translocations reflect on the snowcock story, review their reasoning a second and third time, and especially consider the competing de-

mands for funds necessary to sustain native game species in viable, natural ecosystems.

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