Chapter 16

CHUKAR (*Alectoris chukar*) and GRAY PARTRIDGE (*Perdix perdix*)

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I. INTRODUCTION –

A. History in Wyoming – Chukar and gray (Hungarian) partridge were introduced to North America in the early 1900's. The history and movement of gray partridge in Wyoming is not well documented. We know private individuals and sportsmen's groups brought the first chukars to the Bighorn Basin in the early 1930's. The Wyoming Game & Fish Department raised both Indian and Turkish strains at its bird farm in Story from the late 1930's until 1977. The Department also periodically trapped chukars within areas of high concentrations and transplanted them to begin populations in other suitable habitats. Chukars from Nevada were released along Flaming Gorge Reservoir south of Green River in 1998.

In 1955, the first chukar hunting season in Wyoming was opened for 5 days in the Bighorn Basin. By 1999, hunting seasons for both species of partridge had been expanded to 105 days throughout the State. Annual harvests fluctuate greatly in response to partridge populations, while season length has little apparent impact on harvest. When partridge populations are low, interest by hunters and harvest decline; during periods of high populations, more hunters participate and on average, they harvest more partridge.

B. Current Status –

1. Distribution – Chukar and gray partridge are found in suitable habitats throughout the northern two thirds of Wyoming. The densest populations are in the Bighorn Basin and east of the Bighorn Mountains. Gray partridge also occupy portions of southwest Wyoming near Kemmerer. In recent years, Chukars from released stock have become established near Flaming Gorge Reservoir. A few scattered flocks are also found in Jackson Hole and Star Valley. During population irruptions, when weather and habitat conditions are optimal, gray partridge have been observed near Torrington, Wheatland, and Rawlins in southern and southeastern Wyoming.

2. Management Units – The Department has subdivided the state into 36 small and upland game management units. These units were established primarily for collecting and reporting harvest data and other management information. However, they do not represent discrete populations of partridge nor do they indicate natural breaks in their distribution.

C. Natural History Information –

1. Range of Productivity – Productivity of gray partridge has not been studied in Wyoming. Based on data collected from throughout the species' range, Johnsgard (1975) reported a mean clutch size of 15-17 eggs and an average brood size of 8 juveniles per mated pair. Rotella et al. (1996) determined density dependent factors had the greatest influence on annual recruitment of gray partridge.

   Chukar clutch sizes range from 9-15 eggs (Alcorn and Richardson 1951, Williams 1950, Mackie and Buechner 1963, Lindbloom et al. 1998). Johnsgard (1975) reported some chukar nests contain more than 20 eggs. Lindbloom et al. (1998) estimated nesting success (nests successfully hatched) was 41%. No data regarding clutch sizes or nest success are available from Wyoming, however Britt (1970) summarized brood surveys conducted in the Bighorn Basin between 1955-1959. The average brood size was 10.6 chicks. Brood data from Wyoming are comparable to data collected in other parts of the country: 13.5-14.5 chicks/brood in Washington (Galbreath and Moreland 1953), 3.5-13.3 in Nevada (Christensen 1970), 9 in California (Harper et al. 1958), and 12 in Idaho (Lindbloom et al. 1998).

   In Wyoming, surveys of chukar production were done from vehicles during the late summer period from 1957 to 1964. The average brood size was 699 young:100 adults, ranging 607 to 933:100 adults (Johnson 1957-1961, Coyner 1962-1964). Christensen (1970) reported young to adult ratios of 307:100 and 706:100 from brood counts done in 1968 and 1969, respectively.

   Both species of partridge commonly re-nest if the first attempt fails (Johnsgard 1973, Lindbloom et al. 1998). Lindbloom et al. (1998) documented third nest attempts following two unsuccessful nests. Re-nesting attempts generally produce smaller clutches and brood sizes.

2. Range of Natural Mortality –

   a. Causes of Mortality – Predators and weather are the dominant sources of mortality to partridge. Bohl (1957), Harper et al. (1958), and Christensen (1970) believed predation of adult chukars was minimal. Galbreath and Moreland (1953) had also reported comparatively little predation. However, Lindbloom et al. (1998) determined predators took 41% of radio-tagged chukars during spring and summer, avian predators accounted for 59% of that total. Predation was also a leading cause of mortality in a study of radio-tagged gray partridge (Bro et al. 1999). Raptors are the most important source of predation to gray partridge (Weigand 1980, Church 1984, Carroll 1990). Predation of chukar nests was studied and documented by Harper et al. (1958), Mackie and Buechner (1963), and Lindbloom (1998). A Study of predation on partridge has not been conducted specifically in Wyoming.

Partridge populations have often declined markedly following severe winters. Melinchuk and Ryder (1984) concluded there was a relationship between weather severity and overall mortality rates of gray partridge in Saskatchewan. Even a single, severe weather event can kill large numbers of partridge (Knapton 1980). Carroll (1990) believed weather and fat reserves influence susceptibility to predation. However, Rotella et al. (1996) were unable to explain variations in population growth rate or fall-winter mortality based on weather variables. In Wyoming, Chukar harvests have declined sharply following severe winters (e.g., 1961-62, 1969-70, 1978-79). Drought conditions in 2002-03 also led to a major decline in gray partridge populations throughout Wyoming. Poor production is thought to be the principal cause of the decline.

b. Mortality Rates – Partridge mortality has not specifically been investigated in Wyoming. Lindbloom et al. (1998) reported the annual mortality of chukars was 52% in Idaho and mortality increased steadily from March to August. Other reports of mortality rates include 66% during winter in North Dakota (Carroll 1990), 78% during winter-spring in Montana (Weigand 1980), 60-89% in New York (Church 1984), 39-49% during nesting and brood rearing in Wisconsin (Church 1980), 56% during early winter in South Dakota (Ratti et al. 1983), and 58% and 72% from fall to spring of 1983-84 and 1984-85, respectively, in Washington (Rotella and Ratti 1986). However, studies may not be comparable because techniques used to measure populations and mortality rates vary (Carroll 1990). In Addition, mortality estimates derived from radio-tagging studies can be influenced by handling and radio attachment (Carroll 1990, Lindbloom et al. 1998, Bro et al. 1999).

Carroll (1990) and Bro et al. (1999) determined body condition had a significant effect on mortality rates of gray partridge. Partridge that were heavier at the beginning of winter had a better chance of survival. Carroll (1990) also documented mortality was higher among males compared to females.

D. Incomplete Management Information – Very little research has been done in Wyoming to document habitat use, limiting factors, mortality, reproductive rates, or population characteristics of either partridge species.

II. POPULATION EVALUATION TECHNIQUES –

A. Population Surveys –

1. Breeding Call Routes – Breeding surveys of partridge tend to produce variable and unreliable results. Male partridge do not have a strong fidelity to specific breeding areas and are not strongly territorial. Chukars and gray partridge often move in response to varying habitat conditions, which can influence locations of breeding pairs from one year to the next. Breeding surveys have not been conducted for chukar or gray partridge in Wyoming. Rotella and Ratti (1986) estimated gray partridge

densities in Washington based on call surveys, but did not restrict their surveys to the breeding season.

The breeding cycle begins with pairing in late February or early March (chukars) or late January (gray partridge). Egg production begins in early to mid-April for both species (Lindbloom et al. 1998). The appropriate timing for breeding call surveys, if they are done, is from the last part of winter until early spring.

2. Brood Surveys – Brood surveys have been conducted in Wyoming to determine reproductive success and population trends of chukars. Surveys should be conducted in July and August by driving and/or walking in representative chukar habitat and other areas where chukars are commonly seen. In the past, data were generally summarized in terms of age ratios (young per 100 adults) rather than young per brood and were compiled for large areas such as the Bighorn Basin. Broods of chukars band together at an early age, making individual broods difficult to distinguish (Johnson 1962). In Oregon, data are compiled on the basis of counties, and summarize as chicks per brood, chicks per adult, and birds per mile surveyed (VanDyke, pers. comm.).

   Brood surveys were conducted in Wyoming from 1955-1964. However, sample sizes were insufficient to reliably evaluate population trends. During wet years, birds can be widely dispersed and difficult to detect. In dry years, chukars are concentrated in large groups around water.

3. Aerial Surveys – In Nevada and Idaho, trend surveys of chukars are conducted from helicopters during the first half of August (Stiver pers. comm., Hemker pers. comm.). In Nevada, transects are flown across survey blocks, at 100 ft above ground level and an air speed of 30-50 knots. Birds are counted as they flush. Birds tend to flush downhill, so hillsides are flown from the bottom up. This avoids flushing birds ahead of the plane, into the area being surveyed. Individual birds in groups of less than 25 are comparatively easy to count. Adult birds without chicks tend to fly long distances, but adults with chicks fly shorter distances, tending to land in thick cover. Young birds, especially chicks from a late hatch, may not fly at all. The number of birds observed per square mile is reported. Mark-resight experiments in Nevada indicated up to 40% of the marked birds can be observed during aerial surveys (Stiver, pers. comm.). Although Idaho does not use trend data to modify hunting seasons, the information is useful for predicting harvest success (e.g., 150 birds/mi^2 represent about 7 covey flushes per hunter per day). In Nevada, aerial counts also correlate well with hunter success (r^2 approaching .80; Stiver, pers. comm.)

B. Age and Sex Determination –

1. Rationale – Age and sex composition data are often collected to assess the status of a game bird population or to help evaluate responses to habitat treatments. Age ratio

data are most commonly used to estimate survival and reproductive success from the prior breeding season.

2. Application – Age and sex composition of partridge populations can be estimated efficiently by examining wing collections from harvested birds. Age and sex data can also be collected during trapping operations. Several methods for aging and sexing partridge in the hand are described in the sections that follow:

   a. Chukar – Siopes and Wilson (1973) determined the sex of newly hatched chukars by inspecting the cloaca. Females have a genital fold on the ventral rim whereas males have a genital protuberance in that location.

      Woodard et al. (1986) used shank length (distance from the foot pad to the top of the hock joint when legs are flexed 90 degrees between the tibia and tarsometatarsus) to determine sex of adults. Shank lengths of males were $\geq$ 61mm whereas those of females were $\leq$ 61mm. Christensen (1954) distinguished sexes based on body mass. Female chukars weigh between 462-550g and males between 536-729g. Cunningham (1959) attempted to identify sexes based on diameter of the tarsus and the middle toe length. However, these morphological characteristics provided no clear distinction because the ranges of measurements overlapped.

      Although molt patterns of primary feathers are useful for ageing several game birds, Cunningham (1959) felt this approach was too inconsistent to reliably age chukars due to effects of local and year-to-year environmental variation. Weaver and Haskell (1968) developed a key to age and sex chukars based on wing primary and primary covert characteristics (Table 1). In Idaho, chukars are considered juveniles if any white or tan specking remains on the tips of the outer coverts above primaries nine or ten; birds are adults if the coverts are solid gray (Hemker, pers. comm.). Christensen (1970) used the following size classifications to age juvenile chukars:

Size	Approximate age
downy to ¼ grown	0-4 weeks
¼ to ½ grown	4-8 weeks
½ to ¾ grown	8-12 weeks
¾ to adult size	12-16 weeks

   b. Gray Partridge – Sexes can be distinguished based on color patterns of the scapulars and median wing coverts (McCabe and Hawkins 1946, Johnsgard 1973). Larson and Taber (1980) provided diagrams illustrating the center stripe on the male scapular feather and horizontal barring on the female feather. The feathers of the female bear a wide buff stripe down the shafts and two to four buff crossbars (Johnsgard 1973). The bases of the scapulars are blackish, and only the outer parts of the feather are vermiculated. The male's scapulars are usually

yellowish-brown with fine black vermiculation across the feather and a chestnut-colored patch near the outside edge.

The rectrices of juvenile gray partridge are tipped with buff, and have subterminal dark bars and spots and dusky barring across the central feathers (Ridgeway and Friedman 1946). The outer primaries are usually pointed and coverts of these primaries are retained from juvenal plumage (Johnsgard 1973). The ninth covert is typically pointed and resembles an adult covert, but is rarely tipped with white. The feet of juveniles are yellow and change to blue-gray in adults (Ridgeway and Friedman 1946, Johnsgard 1973).

Table 1. Key for determining age and sex of chukar partridge based on primary feather characteristics (Weaver and Haskell 1968).

1a. Mottled secondaries absent…….…….	2
1b. Mottled secondaries present…….…….	Juvenile – 5
2a. Neither primary nine nor ten in stage of molt……	3
2b. Either primary nine or ten, or both, in stage of molt…….	Adult – 8
3a. Upper primary covert nine is less than 29mm……...	4
3b. Upper primary covert nine is 29mm long or more…….	Adult – 8
4a. Outer two primaries pointed at tips, only slightly faded, showing little wear …..……	Juvenile – 5
4b. Outer two primaries faded, showing wear……	Adult – 8
5a. Primary three is fully grown, is at least 4mm longer than primary two…	6
5b. Primary three is in stage of molt, not fully grown……	7
6a. Primary three is less than 135mm long……	Juvenile female
6b. Primary three is 135mm long or more……	Juvenile male
7a. Primary one is 119mm long or less…….…….	Juvenile female
7b. Primary one is longer than 119mm…..…..……	Juvenile male
8a. Primary three is 136mm long or less……	Adult female
8b. Primary three is longer than 136mm……	Adult male

3. Analysis of Data – Age and sex composition data can be useful for assessing responses to habitat conditions, planning habitat projects, and monitoring populations. Changes in age ratios can indicate adverse responses to weather events or changes in habitat conditions.

Sex and age ratios should be compared against long-term averages or data from other areas. Christensen (1970) reported chukar sex ratios (males:females) of 119:100, 95:100, and 95:100 respectively, from data collected in New Zealand (N=302), Nevada (N=176), and California (N=96). Chukar sex ratios have not been estimated in Wyoming. Christiansen (1970) reported young:adult ratios of 307:100 and 706:100 in 1968 and 1969, respectively. The following young:adult ratios were derived from brood counts conducted in Wyoming (Bighorn Basin): mean = 712:100; median = 645:100; range = 607-933:100 (Johnson 1957-1961, Coyner 1962-1964):

3. Disposition of Data – Data on age and sex composition of partridge populations should be reported to the biologist responsible for the area where the data were collected. These data should be included in annual completion reports, if applicable.

III. HARVEST DATA –

A. Harvest Survey –

1. Rationale – Harvest data (number of hunters, total birds harvested, success, and effort) are used to assess long-term population trends of game birds in Wyoming. Harvest levels can also be used to evaluate year-to-year changes in partridge distribution and relative abundance throughout the State.

2. Application – Refer to Appendix III (Harvest Survey) for a description of methodology.

3. Analysis of Data – When populations of partridge are high, more hunters participate and they spend more days hunting. When populations are low, fewer hunters go afield resulting in lower harvest. The philosophy in Wyoming has been to set hunting seasons that maximize recreational opportunity, irrespective of population levels, because harvest is primarily regulated by the density of chukar populations and the rugged topography they typically occupy (Johnson 1960, Britt 1970). Thus, harvest data have little or no utility for setting seasons. However, continuous data sets spanning several years do provide managers with insights about long-term population trends.

4. Disposition of Data – Biological Services compiles harvest statistics statewide and for each management area. These data summaries are distributed to district biologists and published in the Department's Annual Report of Upland Game and Furbearer Harvest.

IV. DISTRIBUTION AND MOVEMENT –

A. Field Observations –

1. Rationale – To effectively manage partridge populations, biologists must understand their seasonal distribution, movements, and habitat selection. Field observations recorded opportunistically can yield some general insights about production, mortality, habitat use, and distribution. This type of data can also be used to document colonization of new areas.

2. Application – All observations of partridge are recorded on Wildlife Observation (WOS) Forms (refer to Appendix I). Records should indicate the species, number seen, age (if possible), date, location, management (hunt) area, habitat type, and the birds' activity. Both species tend to be secretive therefore any distribution data can be valuable. Occasionally, partridge mortalities (e.g., road kills) are the first evidence of the species' presence in a new area. Observations of mortalities can provide important clues to detect new distributions.

   Partridge are observed most easily when they congregate as coveys. Coveys usually form in mid-summer near water sources. During winter, concentrations of birds and tracks are easily found after light snowfall. Both species frequently forage in grain fields. Hunters and landowners occasionally report seeing partridge in areas where they were not previously documented. Credible reports from such sources should be recorded.

3. Analysis of Data – Records from the Wildlife Observation System can be transferred onto base maps to provide documentation for environmental reviews and other projects. Overlays showing seasonal habitats, including breeding/nesting areas, should be completed and updated every five years. The WOS is a geographically delineated data set that can be loaded into GIS layers for a variety of applications in response to specific queries.

4. Disposition of Data – Field personnel are responsible for ensuring records of partridge observations are entered in the WOS database. Each biologist should also maintain a permanent file with paper copies of partridge distribution data. Distribution patterns of both species should be updated every five years. Current and recent distribution data should be summarized in the Annual Small and Upland Game Completion Reports.

V. TRAPPING, MARKING AND TRANSPLANTING –

A. Trapping –

1. Rationale – The most common reasons for trapping partridge are to mark individual birds and collect biological samples. Marking studies are typically done to obtain

information about movements, productivity, habitat use, and mortality rates. Partridge have also been trapped to secure wild stock for transplants into suitable vacant habitat.

2. Application – Schedule trapping at times when partridge concentrate in predictable locations such as near water sources in late summer or on wintering areas. Trapping is most effective during years of higher than average partridge populations.

   Chukars can be captured effectively in traps deployed over watering sites, but these are only successful if water is limited (Stiver, pers. comm.). Biologists have used traps baited with grain in Wyoming, but this method is generally less productive (Johnson 1960, Johnson 1961). Chukars have also been successfully captured in clover traps (Johnson 1961, Christensen 1970, Lindbloom et al. 1998). Christensen (1970) described a design for a portable funnel trap flexible enough to fit in confined areas. The trap site is enclosed with three foot tall wire fencing (one inch by two inch mesh). To form the trap entrance, the two fence ends are turned inward and brought together such that the ends open into the center of the enclosure and are tapered to about the width of the birds body for 1½-2 feet. The trap is covered with woven wire or one-inch mesh netting. The wire fence is secured with dirt or rocks placed around the outer edge, or with metal stakes driven into the ground.

   Gray partridge have been captured with both clover and funnel traps using small grain as bait (Gaither 1969, Carroll 1990). Gray partridge have also been captured at night using a strong light and handheld nets (Bro et al. 1999), but the technique was not effective for capturing chukar partridge (Lindbloom et al. 1998).

3. Analysis of Data – Trapping, marking, and transplanting operations should be thoroughly documented. Transplants should be monitored several years afterward to determine whether new populations become established. When birds are to be captured and marked, depending on the project objectives, an appropriate study design should be developed and followed to optimize data collection. Investigators should plan field surveys to record observations of marked animals and other data relevant to the study. Observations can be mapped to estimate home range sizes, and to document movements or migration patterns and seasonal habitat use. Recoveries of banded or marked birds can provide data on mortality and longevity (when birds of known age are marked), which can be useful in population analysis.

4. Disposition of Data – District or special project biologists are responsible for compiling, analyzing, and reporting results. The report should include a description of the project's purpose, number of birds trapped, their age and sex composition, types of markers applied including numbers, colors or patterns, and an assessment of any trap-related mortality. Results of surveys or monitoring should be reported annually throughout the duration of the project.

VI. EVALUATION OF HABITAT CONDITIONS AND SUITABILITY OF TRANSPLANT SITES –

A. Rationale – Projects that involve trapping and transplanting partridge can be expensive and time-consuming. Therefore, suitability of habitats at potential release sites should be investigated thoroughly before significant resources are invested. Characteristics of partridge habitats are described in the following references: Galbreath and Moreland 1953, Harper et al. 1958, Christensen 1970, Church and Porter 1990, Carroll et al. 1995, Lindbloom et al. 1998. In addition, the first step of any habitat development or improvement project is to complete an assessment of existing habitat conditions and limiting factors.

B. Application –

1. Limiting Habitats – The suitability of any area to support a population of partridge is determined by the habitat component(s) most limited in availability. Water sources can limit both chukars and gray partridge. Deep snow conditions also impact the suitability of an area to sustain partridge populations, however cold weather does not appear to harm birds if enough food is available. Nesting habitat typically is comprised of shrubs and residual herbaceous vegetation. Feeding sites contain seed-bearing plants, succulent forbs, and grasses.

   Gray partridge depend less on permanent water sources than do chukars, and are often able to obtain sufficient hydration from plants in mesic environments. Gray partridge commonly occupy areas of interspersed croplands, especially small grain fields (Church and Porter 1990, Carroll et al. 1995). They prefer rolling hills, but may seek steeper or rocky terrain for escape cover. During the late 1990's, a well-noted irruption of gray partridge populations took place throughout much of Wyoming. In several areas, the species had expanded its distribution many miles from croplands. Partridge occupying non-agricultural regions may feed on native grasses, forbs, and seeds. Comparatively little research has been done to characterize habitat use by partridge in the arid and semi-arid landscapes of Wyoming.

   Availability of water sources influences chukar distribution and habitat use (Galbreath and Moreland 1953, Harper et al. 1958, Christensen 1970). Lindbloom et al. (1998) determined chukars in Idaho predominantly used grass/forb cover types during spring, followed by rocky, shrub-dominated, and agricultural types. In summer, chukars shifted distribution to shrub habitats, followed by grass/forb, rocky, and agricultural areas. During both seasons, chukars selected rocky and shrub-dominated habitats more than expected and grass/forb and agricultural areas less than expected based on their availability. However, grass/forb habitats comprised 78% of the study areas, therefore use of that cover type would need to have been exceptionally heavy to represent its proportionate availability. Agricultural areas are not important habitat for chukars (Harper et al. 1958, Christensen 1970, Lindbloom et al. 1998).

Habitats used by chukars have not been formally studied in Wyoming. From 1950-70, chukars appeared closely tied to agricultural lands. However, the species was initially stocked in agricultural regions because access was easy and managers believed the birds would survive better in locations with additional food supplies. After the stocking program was discontinued in the late 1970's, chukars were found mainly in areas with permanent water, steep rocky terrain, and grasses.

2. Habitat evaluation techniques – Between 1940 and 1960, suitability of potential release sites was assessed based on the following criteria: 4,000-5,000 feet elevation, rugged topography, 30-60 degree slopes, ≥ 300 yards long with over-hanging ledges, presence of cheatgrass interspersed with sagebrush, few or no trees, permanent water supplies, south-facing slopes without snow through the winter, and 6-13 inches of annual precipitation. Farmland was not essential, but was thought to provide additional sources of food during winter.

3. Potential habitat improvements – Maintenance of naturally occurring water sources is important. When dependable water supplies are developed for livestock and farm use, these can also benefit partridge in arid locations. Water tanks should include ramps that provide the birds a means of accessing water and escaping from inside the tank. If water is piped from a developed springhead to other areas for livestock use, some water should be left on the ground at the original site for partridge. Water collecting devices (guzzlers) can also increase availability of water to game birds (Elderkin and Morris 1989, Bartlett 1992).

   Food plots and shrub plantings can potentially benefit partridge, but may not be practical in most arid regions of Wyoming. Carroll et al. (1995) and Church and Porter (1990) recommended planting cereal grains and sunflowers to provide additional food for gray partridge. Berry-producing shrubs are important sources of food and cover for chukars (Galbreath and Moreland 1953, Lindbloom et al. 1998). Private and federal land managers should adopt rangeland management practices that sustain shrubs as well as residual grasses and forbs that bear seed and provide nesting habitat. Lindbloom et al. (1998) discussed the importance of livestock management and its possible effects on chukar habitat.

   Prescribed burns have not been recommended to improve partridge habitat. Although cheatgrass (an invasive, exotic species) responds favorably to fire and is a food source for chukars (Galbreath and Moreland 1953), land managers generally discourage practices that increase cheatgrass cover. Both partridge species rely on a variety of shrubs for cover and food. Properly planned burns are occasionally used to rejuvenate decadent stands of shrubs. However, in many environments occupied by chukars, there is a significant risk that shrubs will be permanently eliminated due to competition with cheatgrass following a burn.

C. Analysis of Data – Historically, many of the chukar transplants in Wyoming were not successful. In most cases, it is likely the quantity or distribution of habitat was not adequate to sustain viable populations in release areas.

Where practical, habitat treatments might benefit partridge populations. Such treatments can include development of food plots, establishment of berry-producing shrubs near water sources, installation of water guzzlers, and changes in livestock grazing practices. Each location must be evaluated to identify limiting habitat components and appropriate treatments.

D. Disposition of Data – Habitat assessments should be included in a regional upland game bird and small game report (if one is compiled). Otherwise, the district wildlife biologist should retain file copies. Surplus birds may occasionally be available from within the state for transplant to other sites. If birds are imported from outside Wyoming, procedures in Chapter 10 (Importation of Live Wildlife) of the Wyoming Game & Fish Department Regulations must be followed. In some cases, stock adapted to specific ecological conditions may not be available from within Wyoming and it is preferable to import birds from other regions of the country that are more similar to the proposed release site.

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