

GROUSE OF THE LEWIS AND CLARK EXPEDITION, 1803 TO 1806

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ABSTRACT—Members of the Lewis and Clark expedition produced written descriptions of many species of wildlife, including 6 species of grouse. We reviewed the accounts of 83 grouse observations, plus summary descriptions and indirect references to grouse by Meriwether Lewis, William Clark, and 3 of their sergeants. We then assigned them to species based on described characteristics, known distributions, habitat, behavior, and/or other written clues. Fifty-nine (71%) observations were considered relatively unambiguous as to identity because of a bird's morphology and appearance, a descriptive name, a non-overlapping range, and/or other clues. These included greater prairie-chickens (*Tympanuchus cupido*), sharp-tailed grouse (*T. phasianellus*), greater sage-grouse (*Centrocercus urophasianus*), blue grouse (*Dendragapus obscurus*), spruce grouse (*Falciennis canadensis*), and ruffed grouse (*Bonasa umbellus*). Other observations were assigned to 'possible' species based on available evidence. Our evaluation of Lewis's and Clark's written descriptions differed in some cases from earlier reviews. Most notable differences involved blue, spruce, and ruffed grouse and we offer suggestions for changes. We also used journal records to compare pre-settlement (by Euro-Americans) distributions of grouse as indicated by the journal records with those today and to speculate on changes in abundance. Greatest changes have occurred in distributions and abundances of the 3 prairie grouse, species whose habitats have been most impacted by settlement. Other highlights of the expedition include the 1st written descriptions of blue grouse and greater sage-grouse and of undescribed subspecies of sharp-tailed, spruce, and ruffed grouse.

Key words: Lewis, Clark, tetraonines, grouse, distribution, abundance

In the early 1800s, Meriwether Lewis and William Clark led an expedition of exploration from the mouth of the Missouri River to its headwaters, across the continental divide, down the Columbia River to the Pacific Ocean, and returned along a similar route (Fig. 1). The principal stated objective was to seek a feasible water route from the Mississippi River to the Pacific. A secondary mandate was to document natural history and biological resources along the route. To fulfill these objectives, Lewis was given several months of schooling in natural history and other sciences prior to start of the expedition (Moulton 1986; Botkin 1995).

Collectively, Lewis and Clark and 3 of their sergeants maintained almost daily records,

with abundant observations of fauna and flora. The faunal list included 6 species of tetraonines: greater prairie-chicken (*Tympanuchus cupido pinnatus*), sharp-tailed grouse (*T. phasianellus jamesi* and *T. p. columbianus*), greater sage-grouse (*Centrocercus urophasianus urophasianus* and *C. u. phaios*), blue grouse (*Dendragapus obscurus pallidus*, *D. o. fuliginosus*, and *D. o. sierrae*), spruce grouse (*Falciennis canadensis franklinii*), and ruffed grouse (*Bonasa umbellus umbelloides* and *B. u. castanea*). Greater sage-grouse, blue grouse, and subspecies *T. p. columbianus*, *F. c. franklinii*, and *B. u. castanea* were new to science. We assigned subspecific names on the basis of current taxonomy. Henceforth, we use 'prairie-chicken' and 'sage-grouse' to refer to the greater prairie-chicken and greater sage-grouse, unless necessary for clarity.

Natural history observations in expedition journals have been reviewed by Coues (1893;

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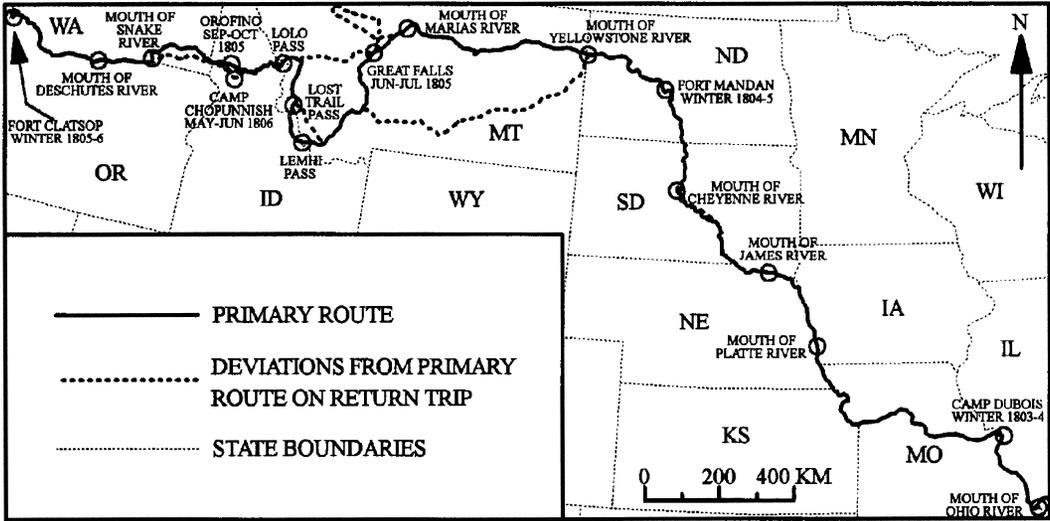


FIGURE 1. Primary outbound (westward) and return (eastward) routes of the Lewis and Clark expedition. Primary routes are illustrated with a solid line, major deviations with dashed lines, and state boundaries with dotted lines. Locations of winter camps and major delays for weather, portages, and canoe building are shown.

Vols 1 to 4), Burroughs (1961), Cutright (1969), Holmgren (1984), and Moulton (1986–1997; Vols 2 to 11), and identifications of species of grouse are not always consistent among authors. This is partly caused by the plethora of common names used by expedition members to refer to individual species, a paucity of basic information about them, in some cases inadequate or ambiguous descriptions, and misinterpretations by reviewing authors. One of our objectives is to resolve identifications we believe are questionable in the light of current

knowledge. Other objectives are to compare the probable early distributions and abundances of the different species with those today.

Except for 1 reference to ‘sharp-tailed grouse’, none of the current common or scientific names of North American grouse was used in the journals (Table 1) and this sometimes makes it difficult to identify species to which journal authors refer. For example, references to sage-grouse included mountain cock, cock of the plains, prairie hen, heath hen, prairie fowl, and long-tailed heath cock, among others; different

TABLE 1. Common names of grouse used by members of the Lewis and Clark expedition. Current spellings are used in this table.

Current common name	Names used by expedition members
Greater prairie-chicken	Heath hen, prairie fowl, prairie hen, grouse, prairie fowl common to the Illinois
Sharp-tailed grouse	Heath hen, prairie fowl, prairie hen, pointed-tail prairie fowl, pointed-tail prairie hen, grouse, pheasant, sharp-tailed grouse
Greater sage-grouse	Heath hen, prairie fowl, prairie hen, mountain cock, cock of the plains, prairie cock, fowl of the plains, long-tailed heath cock, long-tailed grouse, large pheasant
Blue grouse	Black pheasant, large black pheasant, large black and white pheasant, dark brown pheasant, large dark brown pheasant, large speckled pheasant, large domminecker (or dommanicker)
Spruce grouse	Small speckled pheasant, small black pheasant, small brown pheasant, small pheasant
Ruffed grouse	Common pheasant, pheasant of the Atlantic states, pheasant of the United States, reddish brown pheasant, partridge

names and spelling were often used by a single author. Further, heath hen, prairie hen, and prairie fowl all appear at least once to refer to otherwise clear observations of prairie-chickens, sharp-tailed grouse, and sage-grouse. It is no wonder later authors have differed in identifying some of the birds encountered.

METHODS

We examined all grouse observations of expedition members as indexed in the recent and monumental republication of the Lewis and Clark journals by Moulton (Vols 2 to 11 and 13). This work includes the unedited writings of Lewis and Clark (Vols 2 to 8) and sergeants John Ordway (Vol 9), Patrick Gass (Vol 10), and Joseph Whitehouse (Vol 11), with many insightful annotations by Moulton. Unless otherwise specified, all quotations are from that work. We also read in their entirety Moulton's Volumes 4 and 5, Fort Mandan to the lower Columbia River, to search for references that might not have been indexed and found none. We believe we have examined virtually all, if not all, references to grouse in the Moulton edition of the journals.

We summarized all observations and summary descriptions by date, observer, and species (as identified in Moulton). Journals of the different authors often included references to the same observation (up to 4 authors for 1 observation), many of which appear to have been copied from others. We treat multiple references to the same observation as 1 and in such cases lean most heavily on those of Lewis because of his position as naturalist and because he usually provided more clues to identity than others. There were at least 83 observations of grouse in the journals, plus indirect references and summary descriptions of grouse.

We visited many areas (where possible) at which expedition members had reported having encountered grouse to provide us with background on local habitats. We each then compared identities reported by Coues (1893), Burroughs (1961), Cutright (1969), Holmgren (1984), and Moulton with descriptions in the journals, known distributions, habitats, behaviors, morphologies, and plumages of the different species. We then independently assigned current species names to each observation and/or general description and resolved the few dif-

ferences we had between us after discussions of the evidence.

We sometimes used other clues to help assign identities to birds. Pattern of use of 'grouse' and 'pheasant', and occasionally other common names, revealed some distinct tendencies on the part of Lewis and Clark. Clear references to prairie-chickens and sharp-tailed grouse were most often identified as grouse, not pheasants (grouse in 31 journal entries, pheasant in 2). All sage-grouse were identifiable by other clues and were twice referred to as pheasants, in 1 instance as "large pheasants" (Clark, 18 October 1805). Clear references to ruffed, blue, and spruce grouse were referred to as pheasants in 44 entries and grouse in 1. We did not use those clues to identify birds reported only by the sergeants because they were less consistent with names. In direct quotes from the journals, we retain spelling, grammar, punctuation, and capitalizations of the authors as reported in Moulton. Items or comments in brackets are ours except that those with asterisks are from Moulton.

Finally, we compared locations of birds we consider identifiable with current distributions and speculate on changes from presettlement (by Euro-Americans) distributions and abundances. Locations must be considered general because the only information available in most cases is the approximate vicinity of campsites, with the party often covering up to 30 km or more in a given day.

BACKGROUND

A principal objective of the expedition was to find a water route across the continent and most travel was concentrated along the 2 major rivers, outbound or westward up the Missouri River and down the Columbia River and the reverse on the return journey, although Clark and some members of the party returned down the Yellowstone River to its confluence with the Missouri. Numbers and kinds of observations were undoubtedly related in part to speed of travel, faster downstream than upstream. Principal overland routes involved approaching and crossing the Rocky and Bitterroot mountains. Most exploration was concentrated in the outbound journey, with returning home the principal objective in the spring and summer of 1806. Seasons in which particular areas were

traversed are important considerations in evaluating journal entries.

The expedition was dependent upon living off the land, and while most of the party was engaged in moving canoes and supplies along the rivers, some members were regularly delegated as hunters. Lewis, especially, and Clark spent much time exploring on land while supplies were being moved by water. They and the hunters likely would have been flanking the rivers ahead of the main party much of the time, not more than 5 to 10 km from them in most cases. Except when crossing the mountains, faunal records are mainly from or near the river valleys. Other exceptions involve occasional short stops to rest, replenish food supplies, or talk with natives; over-winter sojourns at Camp Dubois, Illinois (1803 to 1804), Fort Mandan, North Dakota (1804 to 1805), and Fort Clatsop, Oregon (1805 to 1806); about 30 days while moving supplies around the Great Falls of the Missouri River, Montana; 11 days near Orofino, Idaho, while resting and building canoes to move down the Clearwater and Columbia rivers; and about 6 weeks at, or near, Kamiah and Weippe Prairie, Idaho, waiting for snow to melt so they could return east across the Bitterroot Mountains. Lewis and Clark and the hunters likely ranged farther from the river bottoms at these times.

CLUES TO SPECIES IDENTITIES

On 1st encountering a new species, Lewis and Clark usually provided at least some clue as to what it was and from which they often assigned a descriptive name. While in winter camp at Fort Clatsop, they prepared more extensive descriptions of most species seen earlier. We provide parts of these descriptions and selected quotations from the journals here that provide clues to identities. If other authors' interpretations differ from ours, we discuss why we have assigned a particular species to an observation.

Greater Prairie-chicken

Lewis was no doubt familiar with the prairie-chicken, a subspecies of the eastern heath hen (*T. c. cupido*) (Moulton 1986). Two journal entries illustrate this point:

16 November 1803.—[Lewis, near confluence of the Missouri and Mississippi rivers, 1st reference to any grouse]: "saw a heath hen or grows which

flew of[f]* and having no gun with me did not pursue it"

2 September 1806.—[Clark, near confluence of the James and Missouri rivers]: "I saw 4 prairie fowls Common to the Illinois, those are the highest up which have been Seen."

That Lewis and Clark made no effort to describe this species in detail is additional evidence of their acquaintance with it.

Sharp-tailed Grouse

Three journal entries, especially, are helpful in providing identifications of sharp-tailed grouse:

1 October 1804.—[Clark, in present Dewey County, South Dakota, a few km above the mouth of the Cheyenne River]: "worthy of remark that the Grouse or Prairie hen is Booted, the Toes of their feet So constructed as to walk on the Snow, and the Tail Short with 2 long Stiff feathers in the middle."

15 April 1805.—[Lewis, Little Knife River area, Mountrail County, North Dakota]: "I also met with great numbers of Grouse or prairie hens as they are called by the English traders of the N.W. these birds appeared to be mating; the note of the male is kuck, kuck, kuck, coo, coo, coo. the male also dubb [EC:drums]* [NB:with his wings]* something like the pheasant, but by no means as loud."

1 March 1806.—[Lewis, at Fort Clatsop; description of sharp-tailed grouse]: "The Grouse or Prairie hen is peculiarly the inhabitant of the Grait Plains of Columbia they do not differ from those of the upper portion of the Missouri, the tail of which is pointed or the feathers in it's center much longer than those on the sides. this Species differs essentially in the construction of this part of the plumage from those of the Illinois [prairie-chicken] which have their tails composed of fathers of equal length. in the winter season this bird is booted even to the 1st joint of it's toes . . . Their colour is a mixture of dark brown redish and yellowish brown and white confusedly mixed in which the redish brown prevails most on upper parts of the body wings and tail and the white underneath the belly and lower parts of the breast and tail."

These quotes provide solid support for the clarity of their observations of this species and for separating it from its closest relative, the prairie-chicken.

Greater Sage-grouse

At least 3 journal entries provide clues for identifying this species:

5 June 1805.—[Lewis, near mouth of the Marias

River, Montana, 1st contact]: "I . . . saw . . . a flock of the mountain cock, or a large species of heath hen with a long pointed tail which the Indians informed us were common to the Rocky Mountains . . ."

17 October 1805.—[Clark, vicinity of present Kennewick, Washington]: "Send out Hunters to Shute the Prarie Cock . . . Several of which I have killed, they are the Size of a Small turkey, of the pheasant kind, one I killed on the water edge to day measured from Beek to the end of the toe 2 feet 6 & $\frac{3}{4}$ inches; from the extremeties of its wings 3 feet 6 inches; the tale feathers is 13 inches long: they feed on grasshoppers and the seed of the wild plant which is also peculiar to this river and the upper parts of the Missouri somewhat resembling the whins" [identified as big sagebrush by Moulton (1988)].

2 March 1806.—[Lewis, at Fort Clatsop, description of sage-grouse]: "The Cock of the Plains is found in the plains of Columbia and are in Great abundance from the entrance of the S.E. fork of the Columbia [Snake River] to that of Clark's River [Deschutes River]. this bird is about 2/3rds the size of a turkey . . . the colour is an uniform mixture of dark brown reather borde[r]*ing on a dove colour, redish and yellowish brown with some small black specks . . . the tail is composed of 19 feathers [usually 18 or 20] of which that in the center is the longest, and the remaining 9 on each side deminish by pairs as they recede from the center; . . . the tail when foalded comes to a very sharp point and appears long in proportion to the body . . . the motion of the wings is much that of the pheasant and Grouse . . . the wings are also proportionably short, reather more so than those of the pheasant or grouse. the habits of this bird are much the same as those of the grouse. only that the food of this fowl is almost entirely that of the leaf and buds of the pulpy leafed thorn [likely sagebrush, *Artemisia* sp; Moulton (1988) identifies it as *Sarcobatus vermiculatus*]; nor do I ever recollect seeing this bird but in the neighbourhood of that shrub . . . the gizzard of it is large and much less compressed and muscular than in most fowls; . . . the flesh . . . is dark, and only tolerable in point of flavor.—it is invariably found in the plains."

Lewis's description of sage-grouse while at Fort Clatsop and measurements by Clark provide a number of unambiguous clues.

Blue Grouse

Four journal entries considered together clearly identify this species:

21 July 1805.—[Lewis, general vicinity of Canyon Ferry Dam, e. of Helena, Montana, 1st contact]:

"I also saw two fesants today of a dark brown colour much larger than the phesant of the U'States [ruffed grouse]."

1 August 1805.—[Lewis, Bull or Tobacco Root Mts, Jefferson County, Montana]: "as I passed these mountains I saw a flock of the black or dark brown phesants; . . . this bird is fully a third larger than the common phesant of the Atlantic states [ruffed grouse]. it's form is much the same . . . the male has not the tufts of long black feathers on the sides of the neck which are so conspicuous in those of the Atlantic. their colour is a uniform dark brown with a small mixture of yellow or yelloish brown specks on some of the feathers particularly those of the tail, tho' the extremeties of these are perfectly black for about one inch [birds here are *D. o. pallidus* which have indistinct, or no, gray tail bands, hence the black tips] . . . feathers of the tail are reather longer than that of our phesant or patridge as they are Called in the Eastern States; are the same in number or eighteen and all nearly of the same length, . . . [*D. o. pallidus* usually has 20 rectrices (70%) but the number varies from 17 to 22 (Zwickel and others 1991)] the flesh of this bird is white and agreeably flavored."

3 March 1806.—[Lewis, at Fort Clatsop; description of blue grouse]: "The large black and white pheasant is peculiar to that portion of the Rocky Mountain watered by the Columbia river. at least we did not see them in these mountains until I we reached the waters of that river or since we have left those mountains. they are about the size of a well grown hen. the contour of the bird is much that of the redish brown pheasant common to our country [ruffed grouse]. the tail is proportionably as long and is composed of eighteen feathers of equal length, of an uniform dark brown tipped with black. the feathers of the body are of a dark brown black and white. the black is that which most predominates, and wh[i]*te feathers are irregularly intermixed with those of the black and dark brown on every part, but in greater propotion about the neck breast and belley. this mixture gives it very much the appearance of that kind of dunghill fowl which the hen-wives of our country call dommanicker. in the brest of some of these birds the white predominates most. they are not furnished with tufts of long feathers on the neck as our pheasants are, but have a space on each side of the neck about 2 $\frac{1}{2}$ inches long and 1 In. in width on which no feathers grow, tho' tis concealed by the feathers which are inserted on the hinder and front part of the neck . . . they have a narrow stripe of vermilion colour above each eye which consists of a fleshey substance not protuberant but uneven with a number of minute rounded dots . . . it feeds on wild fruits, particularly the berry of the sac-a-commis, and much also on the seed of the pine and fir."

Confusion between this species and spruce grouse is sometimes caused by an authors' use of black and white pheasant and speckled pheasant interchangeably for the 2 species, but the confusion is eliminated when the names are preceded by 'large' or 'small' because these birds are grossly different in size. Coues (1893) and Burroughs (1961) identified this as the spruce grouse and Holmgren (1984) as the ruffed grouse, but we disagree with both identifications. Lewis described this bird as large, size of a well-grown hen—not a spruce grouse on this basis. The only clue that might indicate spruce grouse is the vermilion eye stripe for that of blue grouse is usually yellow, except in males in peak excitement during spring display, when it may be bright red. Since this entry was written in March 1806, this could easily be a lapse in memory on Lewis's part or a confusion between blue and spruce grouse, which he considered very similar except in point of size. Nor do 18 tail feathers fit spruce grouse, which almost always have 16 (Short 1967, Boag and Schroeder 1992). The bare space on the side of the neck (lateral cervical apteria), conspicuous in male blue grouse but not in spruce or ruffed grouse, is distinctive. Size of the bird, number of tail feathers, and conspicuous cervical apteria far outweigh the 'vermillion eye stripe' as clues to identity. With reference to Holmgren's identification, Lewis noted that they do not have the "tufts of long feathers on the neck as our pheasants" [ruffed grouse]. This comparison to ruffed grouse as being different rules out that species. The bird described is clearly the blue grouse, not spruce or ruffed grouse.

16 April 1806.—[Lewis, Rockfort Camp, The Dalles, Oregon]: "Joseph Feilds brought me a black pheasant which he had killed; this I found on examination to be the large black or dark brown pheasant I had met with on the upper part of the Missouri. it is as large as a well grown fowl the iris of the eye is of a dark yellowish brown, the puple black, the legs are booted to the toes, the tail is composed of 18 black feathers tipped with bluish white, of which the two in the center are reather shorter than the others which are all of the same length. over the eye there is a stripe of a ¼ of an inch in width uncovered with feathers of a fine orange yellow. the wide spaces void of feathers on the side of the neck are also of the same colour."

This entry, made on their way home, is clearly an adult male blue grouse of a coastal subspe-

cies, most likely *D. o. sierrae*, based on the location. Also, cervical apteria of sierrae males are yellow, those of interior males red; sierrae usually have 18 rectrices (Zwickel and others 1991), and their tail feathers are tipped with light grey (bluish white of Lewis). Characteristics noted here add support to the argument that the 'large black and white pheasant' described at Fort Clatsop is the blue grouse. Dark brown pheasants are likely females in most cases, perhaps large juvenile, or yearling, males in other cases.

Spruce Grouse

Two entries provide good clues for identifying male and female spruce grouse:

3 March 1806.—[Lewis, at Fort Clatsop; description of the male]: "The small speckled pheasant found in the same country with that above discribed [large black and white pheasant or blue grouse], differs from it only in point of size and somewhat in colour. it is scarcely half the size of the other; associates in much larger flocks and is very gentle. the black is more predominant and the dark bron feathers less frequent in this than the larger species. the mixture of white is also more general on every part of this bird. it is considerably smaller than our pheasant [ruffed grouse] and the body reather more round. in other particulars they differ not at all from the large black and white pheasant. this by way of distinction I have called the speckled pheasant. the flesh of both these species of party coloured phesants is of a dark colour and with the means we had of cooking them not very well flavored."

Coues (1893) identified the small speckled pheasant as a female or juvenile spruce grouse. Lewis's description of it, however, is clearly that of an adult male, not a female or juvenile. The small size, darker coloration [than blue grouse], and vermilion eye stripe (see description of female, below) identify this species and its sex.

3 March 1806.—[Lewis, at Fort Clatsop; description of female spruce grouse]: The small brown pheasant is an inhabitant of the same country and is of the size and shape of the speckled pheasant which it also resembles in it's economy and habits. the stripe above the eye in this species is scarcely perceptable, and is when closely examined of a yellow or orrange colour instead of the vermilion of the outhers. its colour is an uniform mixture of dark and yellowish brown with a slight mixture of brownish white on the breast belly and the feath-

ers underneath the tail . . . this is also booted to the toes. the flesh of this is preferable to either of the others and that of the breast is as white as the pheasant of the Atlantic coast.—the reddish brown pheasant [ruffed grouse] has been previously described—”.

Spruce, blue, and ruffed grouse caused much confusion among those attempting to identify forest tetraonines, and it is apparent from Lewis’s description of the small brown pheasant that he believed it was a different species than the small speckled pheasant, as noted by Burroughs (1961). The small brown pheasant was identified as the ruffed grouse by Coues (1893) and Burroughs and as the blue grouse by Holmgren (1984), all of which we consider in error. This is the female spruce grouse on the basis of habitat, eye stripe, size, shape, economy [presumably food habits], and habits. The reference to reddish brown pheasant clearly refers to the ruffed grouse and eliminates the “yellowish brown” bird as a ruffed grouse, as pointed out by Moulton (1990). As well, authors of the journals sometimes noted its food habits: buds and needles of conifers (presumably from crop contents), which separates it from all other species but blue grouse, the 2nd largest species encountered—see Lewis’s comment about foods of the small brown pheasant, 16 June 1806 (below).

Ruffed Grouse

There are more references to ruffed grouse in the journals than observations because Lewis and Clark often compared birds they observed or killed to ‘pheasants of the Atlantic or United States’, illustrating their acquaintance with the species. For example:

5 February 1806.—[Lewis, at Fort Clatsop]: “Filds brought with him a phesant which differed little from those common to the Atlantic states; it’s brown is reather brighter and more of a reddish tint. it has eighteen feathers in the tale of about six inches in length. this bird is also booted as low as the toes. the two tufts of long black feathers on each side of the neck most conspicuous in the male of those of the Atlantic states is also observable in every particular with this.”

One characteristic noted here, “booted as low as the toes”, does not exactly fit ruffed grouse for their metatarsi are not normally completely feathered. This feathering usually refers to attachment of the feathers on the metatarsi and

Lewis may have been referring to coverage, which may extend to or near the toes even though the point of insertion is higher. Other characteristics noted are clearly references to ruffed grouse. Lewis provided only a brief description of ruffed grouse, indicating his familiarity with it.

SUGGESTIONS FOR CHANGES OF SPECIES IDENTITIES

Here, we consider other journal entries and relevant annotations from Moulton for which we believe assigned species are in error or questionable. Comments on locations and habitats are ours.

15 December 1803.—[Clark]: “hunters [k]*illed Some grouse”. Camp Dubois (Wood River winter camp), Illinois.

Moulton (1986) suggested these birds may have been ruffed grouse. We think it likely they were prairie-chickens because of the usual use of ‘grouse’ for clear references to prairie-chickens and ‘pheasant’ for clear references to ruffed grouse. As well, this was near the southern end of the range of ruffed grouse in this region (Rusch and others 2000), where densities were likely low.

25 July 1804.—[Clark]: “Several Grou Seen in the Prarie”. Whitefish Camp, Iowa, about 17 km above the mouth of the Platte River [Clark made 2 nearly identical entries on this day, presumably referring to the same observations].

Moulton (1986) suggests these were probably ruffed grouse. Because Clark identified them as grouse, rather than pheasants, and in this quote, refers to them as on the prairie, we consider it most likely he was referring to prairie-chickens.

17 September 1804.—on this date, Lewis remarks about a “perfectly white” turkey, “booted as low as the toes”, and “of the Black Hills” [based on information received from a “french lad” who wintered with the Cheyenne Indians].

1 October 1804.—a French trader, Jon Vallie, was contacted in the vicinity of the Cheyenne River. He had wintered some 300 leagues up this river, “under the Black Mountains”, where “white booted turkeys” were living (presumably the birds noted on 17 Sep).

Coues (1893) referred to this bird as a prairie-cock and suggested it was the sage-grouse. We find no reference to prairie cock in Moulton’s

(1987) journal entries for 17 September or 1 October, for Lewis or Clark. Holmgren (1984) thought the turkey was likely the sage-grouse [but noted that it could be the wild turkey (*Meleagris gallapovo*) and, except for size, resembles white-tailed ptarmigan (*Lagopus leucurus*)]. The description as a 'white turkey' is puzzling, but with language differences, turkey could be used as a general descriptor like 'pheasant', 'grouse', and 'fowl', in which case size of the bird may be irrelevant. Identity of this bird is unclear but because of its all white color we doubt it is the sage-grouse. The location too is unclear; the 'Black Mountains' may or may not be the Black Hills of Wyoming and South Dakota as that was a general descriptor for conifer-covered mountains by early travelers in the area, including Lewis and Clark. As well, Vallie described the mountains as very high, with parts retaining snow all summer, and these were not likely the Black Hills. The next nearest mountains that might hold snow in summer are the Laramie Mountains in southeast Wyoming or the Bighorn Mountains in northcentral Wyoming, neither of which has been reported to have white-tailed ptarmigan. The nearest known ptarmigan are in the Snowy Mountains in southeast Wyoming (C Braun, Grouse, Inc., Tucson, AZ, pers comm). We consider this bird unidentifiable.

23 August 1805.—[Gass]: "They killed three prairie hens, or pheasants". Gass was with Clark's reconnaissance party, headwaters of the North Fork of the Salmon River in Idaho, perhaps near the mouth of Dump or Moose Creek; habitat was likely shrub-steppe at lower elevations, merging into montane forest with increasing elevation.

Moulton (1988) suggests these may have been sage-grouse. We think it more likely they were sharp-tailed grouse for the party was virtually always clearly identifying sage-grouse as large and different from other species [see 24 August (Clark), below].

24 August 1805.—[Gass]: "We caught some small fish to day, and our hunters killed 5 prairie fowls. These were all we had to subsist on."

24 August 1805.— [Clark]: "the party had killed Several presents and Caught a few Small fish on which they had Subsisted in my absence. also a heath hen, near the Size of a Small turkey." Gass, with other members of Clark's party, was moving up the Salmon River this day; habitat likely as on 23 August. Clark was not likely to have seen these

birds and was talking about others in his party—he was not with them this day.

Coues (1893) identified the pheasants in Clark's passage as ruffed grouse. Entries by Clark and Gass clearly refer to the same birds and that by Gass suggests they were likely sharptails, the only prairie grouse in the area other than sage-grouse, 1 of which was separately, and clearly, identified by Clark.

3 September 1805.—[Whitehouse]: "then passed down a Steep hill in to the head of a cove and branch where we camped after a disagreeable days march of only 11 miles with much fatigue and hunger as nothing has been killed this day only 2 or 3 fessents, and have no meat of any kind." Party heading north in Gibbonsville, Idaho-Lost Trail Pass area. According to Coues (1893) they camped about 10 km below Lost Trail Pass, but Moulton notes that there is much confusion as to exactly where they camped; habitat likely patchy shrub-steppe at lower elevations, merging into montane forest and open ridges at higher elevations.

These birds are not identified in Moulton, but Coues (1893) indicated they were ruffed grouse. Judging from the relatively high elevation and plant communities passed through, it seems more likely they were blue and/or spruce grouse.

6 September 1805.—[Clark]: "rained this evening nothing to eate but berries, our flour out, and but little Corn, the hunters killed 2 pheasents only". Party appears to have started from near Warm Springs, Montana, where they apparently spent the nights of the 4th and 5th. Judging from distances in Coues (1893), they probably camped somewhere near Medicine Tree along the Bitterroot River on the 6th, about 17 km north of Darby, Montana; party was now moving north along the river bottom, which becomes perhaps 1 to 5 km wide as they proceed. Lower S-facing slopes are generally in grassland merging upward into open ponderosa pine then Douglas-fir, with more Douglas-fir on N-facing slopes.

Coues (1893) identified these birds as ruffed grouse, but they could be blue grouse, or a mixed bag, especially if any of the hunters were ranging away from the valley bottom. Another possibility is sharp-tailed grouse as the party was now entering potential habitat of this species, but this is less likely since Clark identified them as pheasants, not grouse.

13 September 1805.—[Clark]: ". . . I shot 4 Pheasants of the Common Kind except the taile was

black." Party started this day near Lolo Hot Springs, headed west up the Lolo Trail, crossed the Montana-Idaho state line, and camped at Packer Meadow near Lolo Pass. Areas traversed were mostly forested, with ponderosa pine and Douglas-fir at lower elevations, spruce-fir and lodgepole pine at upper elevations; some open glades and meadows occur along creeks.

Moulton (1988) identified these birds as spruce grouse. The black tail rules out ruffed grouse and suggests spruce or blue grouse. Description of the birds as "of the common kind" (brown or reddish brown) tends to rule out the black (spruce) or blue-gray (blue) males of both species. We believe they would have been female spruce or blue grouse, or a mixed bag. Habitats traversed could be appropriate for either.

20 September 1805.—[Ordway]: "came a Short distance and found a line which Capt Clark had left with the meat of a horse which they found in the woods and killed for our use as they had killed nothing but 1 or 2 phasants after they left us." [Whitehouse made 2 similar entries this day and in 1 reported, "three prarie hens or Pheasants"]. Ordway and Whitehouse appear to have been with Lewis and the main party—they passed Hearty Meal Camp on this day and stayed at Full Stomach Camp—between Dollar and Sixbits creeks, Idaho County, Idaho. Specific habitat not known but both parties were well into the mountains and traveling at relatively high elevations, moving west toward Weippe Prairie.

Clark, with 6 others, had moved ahead of the main party on 18 September. Ordway and Whitehouse were with Lewis and talking about birds shot by Clark's party. The entire party was not united again until Lewis arrived at Weippe Prairie. These pheasants would have been taken between 18 and 20 September and may be 2 mentioned by Clark on 19 September. Considering the elevations traversed, they were almost certainly blue and/or spruce grouse. Holmgren (1984) indicates ruffed grouse were taken on the 20th, presumably these birds, and identifies 1 name used by the party for this species as 'large black and white pheasant', which clearly is not the ruffed grouse (see Lewis's description written at Fort Clatsop, above). We don't understand Whitehouse's "prarie hens" because Clark and party were nowhere near the ranges of any of the prairie grouse.

20 September 1805.—[Lewis]: "Three species of

Pheasants, a large black species, with some white feathers irregularly scattered on the breast neck and belly a smaller kind of a dark uniform colour with a red stripe above the eye, and a brown and yellow species that a good deal resembles the pheasant common to the Atlantic States." [Written on this date but appears to be merely descriptive and not related to birds seen or taken this day]. See Ordway, this date, above for location and habitat.

Cutright (1969) identified these birds as blue grouse, spruce grouse, and ruffed grouse, and Moulton (1988) apparently accepted all 3. We agree with the first 2, but not the 3rd. Judging from the area they had recently traversed, high along the Lolo Trail, and color of the 3rd bird, we believe it refers to female spruce grouse, not ruffed grouse—female spruce grouse are more yellowish brown (see Lewis's description of the small brown pheasant, above) than the more reddish ruffed grouse. Also, Lewis and Clark appear to have considered male and female spruce grouse as separate species. But, this one might be considered confusing because Lewis compared it closely to eastern ruffed grouse, which superficially resemble female spruce grouse.

16 June 1806.—[Lewis]: "I killed a small brown pheasant today, it feeds on the tender leaves and buds of the fir and pitch pine." [Clark had a similar entry referring to this bird]. Party heading east, camped this night at Horsesteak Meadow on Hungery Creek, Idaho County, Idaho, below Windy Saddle; specific habitat not known, but well into the mountains when written.

Moulton (1993) identifies this bird as perhaps a ruffed grouse. There are 2 clues here: reference to a 'small' brown pheasant and to its feeding on leaves [needles] and buds of fir and pine. Being small and feeding on conifers, a common food of spruce grouse but not ruffed grouse, suggests the former. Being brown, this was a female.

26 June 1806.—[Lewis]: "on our way up this mountain about the border of the snowey region we killed 2 of the small black pheasant and a female of the large dommanicker or speckled pheasant, the former have 16 fathers in their tail and the latter 20 while the common pheasant have only 18. the indians informed us that neither of these species drumed; they appear to be very silent birds for I never heard either of them make a noise in any situation." [Clark's entry on this date is almost word for word, a copy of that of Lewis]. Party

heading east on the Lolo Trail and camped at Greensward Camp, northeast of Hungry Creek, Idaho; specific habitat not known, but well into the mountains at upper elevations.

Moulton (1993) called the 1st birds blue grouse and the latter a spruce grouse, perhaps because Lewis and Clark at times interchanged the names, 'black pheasant' and 'speckled pheasant', for the 2 species, or because of Coues' (1893, p 870–872) misidentifications in his general discussion of species. Coues (p 1054) identified the small black pheasants correctly, as spruce grouse, but the large dommanicker or speckled pheasant incorrectly, as "the same species". Burroughs (1961) also identified the large dommanicker or speckled pheasant as spruce grouse, perhaps following Coues' lead. Two clear clues to identity are 'large' and 'small' and numbers of tail feathers—spruce grouse normally have 16, and blue grouse in this region have 20. The small black pheasants are clearly male spruce grouse and the large dommanicker or speckled pheasant is a female blue grouse. This is a case where Lewis switched names that he earlier used for species he considered nearly identical except in size and numbers of tail feathers.

5 August 1806.—[Lewis]: "we also saw on our way . . . few ducks or prairie hens." Lewis's party was moving east along the Missouri River and camped near the mouth of Prairie Elk Creek, about 6.5 km west of Wolf Point, Montana; prairie habitat, mostly now cultivated, with extensive stands of cottonwoods along the river.

Moulton (1993) suggests the prairie hens may have been prairie-chickens. The party was well out of the range of this species at this location and deep in sharp-tailed grouse range [see 2 September 1806 (Clark), above—they passed the mouth of the James River that morning, heading downstream]. Surely, the birds referred to were sharptails, not prairie-chickens.

GROUSE NOT IDENTIFIED BY MOULTON OR OTHER AUTHORS

4 September 1805.—[Whitehouse]: "we [de]*scend ed the mountain down a rough rocky way and along through a large thicket of bolsom fer timber in which we killed a dozen fessents then descended down in to a large valley on a branch and halted to dine". Party heading north and went over Lost Trail Pass this day, entering the Bitterroot River watershed—traversed elevations between about

2100 m to about 1400 m and camped near Warm Springs Creek, a few km northwest of Sula, Montana; likely passed through spruce-fir, Douglas-fir, and ponderosa pine forest in their descent, with open ponderosa pine-grassland in the Warm Springs area.

Killing 12 grouse in 1 thicket suggests blue and/or spruce grouse, perhaps in a flock or flocks, or perhaps a mixed bag, likely not ruffed grouse because of the relatively high elevations most of the day.

7 September 1805.—[Ordway]: ". . . hunters killed 1 goose 1 crain Several pheasants and a hawk." Party heading north along the Bitterroot River, camped near Corvallis, Montana; generally, the valley bottom is now grassland or cultivated, merging upward into ponderosa pine-grass on both sides of the river, then denser forest (likely Douglas-fir).

These pheasants could be blue or ruffed grouse, or a mixed bag, especially if the hunters were ranging away from the valley bottom. The party was now in potential sharptail habitat, but this species is less likely to be part of the bag since they were identified as pheasants, not grouse.

DISTRIBUTION AND ABUNDANCE

Approximate locations of different tetraonines that we believe can be clearly, or very likely, identified are depicted in Fig. 2. These provide an opportunity to compare distributions and numbers prior to the arrival of Euro-American settlers with those of today.

Greater Prairie-chicken

Distribution.—Prairie-chickens were encountered on the lower Missouri from its confluence with the Mississippi River to the vicinity of its confluence with the James River (Fig. 2A, all within the range of *T. c. pinnatus*). The northernmost limits are made clearly by Clark in 2 passages: 2 September 1806 (see above), and in a 'Postexpeditionary Miscellany', written some time after his exploration of the Yellowstone River: "The Prairie Fowl common to the Illinois are found as high up as the River Jacque [James River] above which the Sharpe tailed Grows commence 950 Ms." These put their northern limit in this area at or near the eastern boundary of Nebraska with South Dakota, far short of the historic range that extended into southern

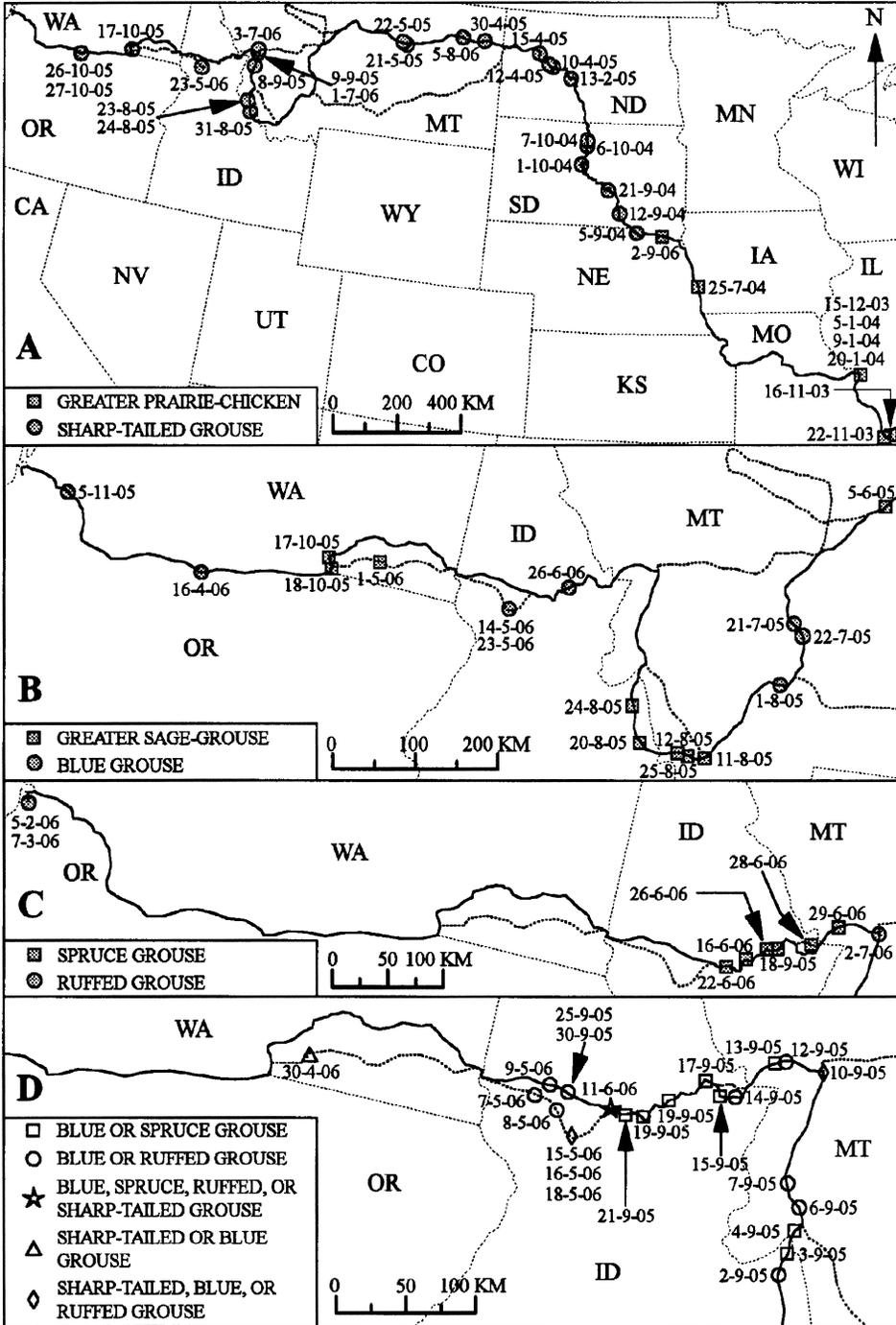


FIGURE 2. Distribution and dates of 59 clear, or very likely, identifications of greater prairie-chickens and sharp-tailed grouse (map A), greater sage-grouse and blue grouse (map B), spruce grouse and ruffed grouse (map C) recorded by the Lewis and Clark expedition, and of 24 observations in which identities were not clear and may have involved 1 or more species (map D). Dates are cited as day-month-year.

Saskatchewan and southern Alberta (Aldrich and Duvall 1955; Schroeder and Robb 1993).

Abundance.—Eight journal entries provide clues to abundance. The first 2 were made prior to setting up the 1st winter camp, Camp Dubois, Illinois. On 16 November 1803, Lewis saw “a heath hen or grows” and in the 2nd, 22 November 1803, “some heth hens or grows”, 1 of which was killed. Four entries were made by Clark while at Camp Dubois: 15 December 1803, “hunters [k]*illed some grouse”; 5 January 1804, “Two men whome I sent to hunt grouse returned . . .”; 9 January 1804, “I . . . Killed Prary fowl . . .”; and 20 January 1804, “. . . many Grouse Caught to Day . . .”. Three other entries were made as the party moved up the Missouri: 25 July 1804 [Clark], “Several Grous Seen in the Prarie” and “Several Grous Seen to day.” [these may refer to the same observations]; and 4 August 1804 [Lewis] “The prarie hen or grouse, was seen in the praries between the [mouth of the] Missouri and the river platte”. These records are too scanty on which to speculate much about abundance, but do not suggest large numbers. The only indication of large numbers is in the entry of 20 January, a time when birds might be concentrated in mid-winter flocks.

In summary, the prairie-chicken was likely common, if not abundant, along the lower Missouri River, to as far north as the Nebraska-South Dakota border, a region from which they are now largely extirpated. They expanded into North and South Dakota, where they are now sympatric with sharp-tailed grouse, following settlement by Euro-Americans. Largest current densities along the Missouri (small in relation to historic standards) are between its confluence with the James River and Pierre, South Dakota (Fredrickson and others 1999).

Sharp-tailed Grouse

Distribution.—Sharp-tailed grouse were encountered in grassland and shrub-steppe habitats from southern South Dakota to the western part of present Phillips County, Montana (Fig. 2A, all within the range of *T. p. jamesi*). In contrast to the current range (Connelly and others 1998), none were reported in the Missouri watershed above present Fort Peck Lake. They were next noted in the upper Salmon River area, in the vicinity of North Fork, Idaho, and in the Bitterroot Valley of western Montana. A

3rd possible area of occupation may have begun near Kamiah, Idaho, and extended downstream to the vicinity of The Dalles, Oregon (all within the range of *T. p. columbianus*)—they definitely occurred between the mouth of the Snake River and the Dalles. This bird was thus reported in 3 non-contiguous areas extending from South Dakota to the lower Columbia River, with major breaks occurring in the headwaters of the Missouri River and in the Bitterroot Mountains. Current range maps (Connelly and others 1998; Schroeder and others 2000a) indicate they are extirpated along the expedition’s route from the Bitterroot Valley and Salmon River westward.

Abundance.—Several of the 25 journal entries that clearly, or very likely, refer to sharp-tailed grouse provide evidence of abundance. First mention of this bird was on 12 September 1804, in the vicinity of the Bijou Hills, South Dakota, when Clark “Saw . . . a number of grouse”. On 21 September, near Medicine Creek, South Dakota, he reported, “Grouse . . . is Common in those Plains”. On 6 and 7 October, in an area now inundated by Oahe Reservoir, Walworth County, South Dakota, he and Lewis each noted, “great numbers” of sharptails.

While in winter quarters at Fort Mandan, Clark led a hunting expedition in early February. On the 13th, on returning to Fort Mandan, he reported, “Saw great numbers of Grouse feeding on the young willows . . .” Other entries from North Dakota include: “I . . . saw . . . flocks of Grouse, . . .” [Clark, 12 April 1805, mouth of the Little Missouri River area], and, “I also met with great numbers of Grouse or prarie hens . . .” [Lewis, 15 April, Little Knife River area].

On 30 April, in the vicinity of Brockton, Montana, Clark “. . . saw Great numbers of Antelopes, also Scattering Buffalow, . . . & Grows”. On 21 May, in Phillips County, at a site now inundated by Fort Peck Reservoir, Lewis observed, “the growse or prairie hen are now less abundant on the river . . . perhaps they betake themselves to the open plains . . . at this season”. Next day he added, “. . . passed the entrance of grows Creek [probably present Beau-champ Creek according to Moulton (1987) . . . this creek we named from seeing a number of the pointed tail prairie hen . . . these are the first we have seen in such numbers for some days.” Summary remarks of Lewis and Clark for May

include, "25th . . . the grouse disappear."—in the general vicinity of Two-calf Creek, Fergus County, Montana. Sharptails were not again recorded until arrival in the upper Salmon River area, Idaho, west of the continental divide. However, on the return journey, on 5 August 1806, in the vicinity of Prairie Elk Creek, Montana, Lewis wrote, "we . . . saw . . . immense herds of buffaloe . . . but few prairie hens."

Records for this 1st leg of the journey indicate sharptails were abundant along the Missouri in North and South Dakota, perhaps less so in far eastern Montana, and perhaps non-existent or in low density in the Missouri watershed above the upper end of present Fort Peck Lake. When crossing the central plains, where large mammals were abundant, prairie-chickens and sharptails were likely taken only incidentally, perhaps to add variety to the diet. They may have even been passed by in an effort to conserve ammunition and numbers reported may not reflect their abundance.

After crossing Lemhi Pass into Idaho, Clark and 13 others moved down the Salmon River to evaluate its possible use as a route to the Pacific. On 23 August 1805 "They killed three prairie hens, . . ." [Gass]; presumably in the vicinity of Moose or Dump creeks. Next day, ". . . our hunters killed 5 prairie fowls" [Gass], upstream from the day before. And on the 31st, in the Tower Creek area of the Lemhi Valley, ". . . our hunters killed one Deer . . . & Prairie fowl" [Clark].

The entire party was now again united and moved up the North Fork of the Salmon River, over Lost Trail Pass on 4 September, and entered the Bitterroot Valley, back into Montana. Moving north down the valley, they were soon in potential sharptail habitat. On 8 September, Clark "killed a prairie fowl"—camped near Stevensville. Next day, Clark "killed 4 deer . . . & 3 prairie fowls . . ."—they camped at Traveler's Rest near the mouth of Lolo Creek, where they stayed until the 11th. They "killed 4 deer . . . & 3 Grouse" on the 10th [Clark], presumably sharptails. These were the only entries for this species along the Bitterroot on the outbound journey, but on the return trip, on 3 July 1806, "we killed a prairie hen with the short and pointed tail she had a number of young which could just fly" [Lewis], between Traveler's Rest and the mouth of Rattlesnake Creek, in the

present city limits of Missoula. There is no indication of large numbers in this valley.

After crossing the Bitterroot Mountains on the westward journey, sharptails were 1st reported near the confluence of the Snake and Columbia rivers. On 17 October 1805, Clark "shot . . . Several Grouse . . ." On the 26th, he recorded, "our hunters . . . Killed five Deer . . . and a grouse." (camped near The Dalles, Oregon), and on the 27th, ". . . hunters . . . brought in . . . one grouse . . ." (near The Dalles). This puts sharptails in this region into a small area, mouth of the Snake River to The Dalles. However, on the return journey, 23 May 1806, at Camp Chopunnish, near Kamiah, Idaho, ". . . all returned from hunting without having killed any thing except a few heath hens & black Pheasants . . ." [Clark; Lewis's entry for this day involves the same birds and he mentions only "a few pheasants of the dark brown kind" (blue grouse)]. Moulton (1991) suggests Clark's heath hens may have been blue grouse and this cannot be ruled out. By this time, however, we think Clark would have clearly known the difference between blue and sharp-tailed grouse and it is possible sharptails were taken. This would extend their range westward from here to at least the Dalles.

Journal entries thus indicate sharptails were common to abundant along the Missouri River from near the mouth of the James River to western North Dakota and far eastern Montana. These areas are still occupied (Connelly and others 1998), likely at much lower densities. They were not recorded in the upper Missouri beyond Two Calf Creek, although Connelly and others (1998) show them as now occupying most of eastern Montana. They were likely common to abundant in the lower Snake River and Columbia River areas for while at Fort Clatsop, Lewis wrote, "they associate in large flocks in autumn & winter and are frequently found in flocks of from five to six even in summer . . ." This passage indicates sharptails were more abundant in the lower Columbia than indicated by daily entries, at least as far west as The Dalles. They appear to have been more sparse in mountainous areas, such as the upper Salmon and Bitterroot valleys.

Greater Sage-grouse

Distribution.—Lewis and Clark were made aware of sage-grouse by Indians at Fort Man-

dan, who indicated they would be found in the Rocky Mountains (based on location, *C. u. urophasianus*), far west of their present range (Schroeder and others 1999). The party was undoubtedly watching for them. Swainson and Richardson (1831: p 359), some 25 years later, reported, "They do not exist on the banks of the river Missouri; nor have they been seen in any place east of the Rocky Mountains.", consistent with reports by the Mandans. First encounter with this species was on 5 June 1805, in the lower Marias River area, Choteau County, Montana (Fig. 2B). If this represented reality, historic records from as far east as North and South Dakota may represent post-expedition expansion. At the very least, if this bird occupied the Missouri watershed in far eastern Montana, they likely were low in numbers.

Sage-grouse were next reported in the Horse Prairie area near Grant, Montana, just east of Lemhi Pass, and were seen again in the headwaters of the Salmon River near North Fork, Idaho, west of the continental divide. They are still present in these areas. None were then reported until the party's arrival in the Lower Snake River and Columbia River areas (based on location, *C. u. phaios*), where they are now extirpated.

Abundance.—After Lewis's 1st encounter with sage-grouse, none was noted in the journals until the party's arrival at Horse Prairie, almost 2 months later—numbers were likely low in the intervening area.

At Horse Prairie, on 12 August, Lewis "... saw several of the heath cock with a long pointed tail ... but could not kill one of them ...". On 20 August, Clark "killed a cock of the plains or mountain cock ... with a long and pointed tail ..." near Baker, Idaho [their 1st sage-grouse in the hand]. And on the 24th, his party killed a sage-grouse in the vicinity of Moose or Dump Creeks in the upper Salmon River area.

Lewis, with the main party, left Horse Prairie on 25 Aug, heading for the Lemhi Valley. He "saw ... many of the cock of the plains." Much of the day would have been spent traversing Horse Prairie, indicating sage-grouse were at least common, perhaps abundant, in this area, where densities are now apparently low. The 2 killed in the upper Salmon River area by Clark's party establish their presence there, but are insufficient to speculate on abundance.

Next contact with this bird was in the vicinity

of the confluence of the Snake and Columbia rivers. Here, on 17 October, Clark sent out "Hunters to Shute the Prarie Cock ... Several of which I have killed, they are the Size of a Small turkey ..." On the same day, Gass reported, "In the plains are ... a number of fowls, between the size of a pheasant and turkey, called heath hens or grouse. We killed a great many of these fowls ..." The next day, "Several Heath hens or large Pheasents lit near us & the men killed Six of them" [Clark], and Whitehouse commented, "Several Men of our party went out in the plains, & killed a number mor of the Priari or heath hens, which were very large". These were the last reports of sage-grouse on the outbound journey. Camp that night was near Wallulla, Washington.

On the return journey, the party was traveling overland, well south of the Snake River on 1 May 1806, in the vicinity of Waitsburg, Washington. "we Saw a Great number of Curloos ... prarie cocks ... common to the praries" [Clark].

Considering the remarks of Clark, Gass, and Whitehouse on 17 and 18 October, sage-grouse must have been at least common, likely abundant, in the lower Snake and Columbia River areas. In Lewis's description of this bird at Fort Clatsop, he noted, "The Cock of the Plains" was found in "Great abundance" [from the mouth of the Snake River to that of the Deschutes River]. Clark's 1 May 1806 entry (above) put sage-grouse about 40 km southeast of the mouth of the Snake River.

In summary, sage-grouse were 1st found when nearing the Rocky Mountains, as predicted by Indians at Fort Mandan, and were 1st reported in abundance in the extreme headwaters of the Missouri (Horse Prairie). Their presence was established in the Lemhi Valley, but with little evidence of numbers. Next encounters were in the lower Snake and Columbia River areas where they were apparently abundant, a region from which they are now extirpated. Historic records in much of eastern Montana and into North and South Dakota may reflect post-expedition expansions or low densities.

Blue Grouse

Distribution.—The party's 1st clear contact with blue grouse (21 July 1805, based on location, *D. o. pallidus*) was east of the continental

divide in western Montana (Fig. 2B), about 250 km west of their easternmost range in Montana today. This is not surprising since the party was moving along the river and prime breeding areas for this species were likely not the river bottoms; they may have been missed east of that point. Also, many blue grouse may have moved upward toward winter range by the time the expedition was passing through these areas. Clear, or likely, reports of blue grouse continued in mountainous areas well into coast forest in the lower Columbia River valley (5 November 1805; based on location, *D. o. fuliginosus*). This range is not greatly different from that of today.

Abundance.—Numbers of blue, spruce, and ruffed grouse are difficult to assess because they are locally sympatric in many areas, were often referred to only as pheasants, and were likely sometimes taken as mixed bags. These species can often be separated, however, at least in Lewis and Clark entries, because the authors usually referred to ruffed grouse as the common pheasant (or pheasant of the Atlantic or United States) and compared the other species to this bird, often described spruce grouse as small and black or brown, and blue grouse as large and black or dark brown. The main problem comes from the simple use of pheasant as a descriptor, most prevalent in writing of the sergeants, but even these references can often be tentatively assigned to 1 or 2 species from location, habitat, or elevation.

The 1st clear reference to blue grouse (2 birds), and indicating an unfamiliar species, was in the general vicinity of Canyon Ferry Dam, Montana. Lewis apparently saw blue grouse the next day, 22 July 1805, in the Winston area, referred to only as "a few pheasants"—most likely blue grouse based on location and habitat. In the vicinity of present Lahood, Montana, on 1 August, he "saw a flock of the black or dark brown pheasants; the young pheasant is almost grown we killed one of them." These are the only clear, or likely, journal entries concerning this species in the Missouri River watershed and suggest it was not common along this part of their route. This may reflect the party's not getting into higher elevations where this bird may have been more abundant.

The 1st likely records of blue grouse west of the continental divide were in the headwaters

of the Salmon River, Idaho: "nothing killed this day . . . only a few fessants." [Ordway, 2 September 1805] and "nothing has been killed this day only 2 or 3 fessants . . ." [Whitehouse, 3 Sep]. Based on locations and habitat these were most likely blue grouse but possibly ruffed grouse, or mixed bags.

On 4 September, the expedition left the Salmon River watershed, passed over Lost Trail Pass, and dropped back into Montana. Whitehouse noted a kill of a dozen "fessants", most likely blue and/or spruce grouse based on location, habitat, and number of birds killed. They camped that night a few km northwest of Sula. As the party moved down the Bitterroot Valley and out of likely spruce grouse habitat, pheasants were killed on the 6th ["2 only"—Clark] and 7th ["several"—Ordway]—most likely blue and/or ruffed grouse. They arrived at Traveler's Rest near the east end of the Lolo Trail on the 9th and headed west over the Trail on the 11th.

On 12 September, a "pheasant" was killed [Ordway] somewhere east of Lolo Hot Springs that may have been a blue or ruffed grouse, but likely not a spruce grouse because of the relatively low elevation and habitat. On the 13th, Clark shot 4 "pheasants" that we identified above as either blue or spruce grouse. The next day "2 or 3 pheasants" were killed [Gass] in the vicinity of the Powell Ranger Station (well into Idaho). These may have been any of the forest grouse, or a mixed bag—least likely is spruce grouse because of the relatively low elevation.

Clark and 6 men moved ahead of the main party to hunt on 18 September as provisions were very low, and arrived at Weippe Prairie on the 20th. On the 19th, Whitehouse recorded, "One of our Men here killed a Pheasant, .."—most likely blue or spruce grouse based on elevation and likely habitat. Speaking of Clark's party, Whitehouse wrote, on the 20th, "they had killed nothing after they left us only three prairie hens or Pheasants."—likely juvenile or female blue grouse for it would be surprising to see the diminutive spruce grouse called prairie hens; also they were still too far into the mountains for sharptails. On the 21st, 3 pheasants were killed by the main party [Ordway]. These were likely blue grouse or perhaps spruce grouse, but were least likely ruffed grouse; it could have been a mixed bag. They camped that night at Pheasant Camp, near the bound-

ary between Idaho and Clearwater Counties, Idaho, 1 day shy of Weippe Prairie.

Arriving at Weippe Prairie, all members of the party were in poor condition, having faced possible starvation in passing over the Lolo Trail. The few grouse killed, plus the odd deer, 1 horse, and a colt, were meagre fare for a party of 33. Clearly, grouse were not abundant, although some blue and spruce grouse may have moved into winter habitats and been relatively invulnerable to hunting. The party then dropped into the Clearwater River bottom near Orofino, Idaho, to rest and build canoes and were there until 6 October. A pheasant was reported killed on 25 September [Gass] and another on the 30th [Ordway], either of which most likely would have been blue or ruffed grouse. These were the last forest grouse reported until arriving in the lower Columbia River area [but the party was now moving mainly by water]. On 5 November, and approaching the vicinity of Rainier, Oregon, Clark “. . . killed a grouse which was very fat, and larger than Common.” [only 2 species inhabit this area, blue grouse (largest) and ruffed grouse (Clark’s ‘Common’)]. No blue grouse were reported during the winter stay at Fort Clatsop, perhaps because of their relative invulnerability to being seen in winter.

The next record of this species was of a male taken 16 April 1806, near The Dalles. All remaining references to possible blue grouse were made while returning to Camp Chopunnish. On 7 May, “a pheasant” [Ordway]; on the 8th, “Several . . . pheasants” [Ordway]; and on the 9th, “a few pheasants” [Lewis] were killed. During this time the party was in the general vicinity of the Clearwater River between Ahsanke and Kamiah, Idaho. Most of these birds were likely blue or ruffed grouse, based on habitat and elevations.

The party was at Camp Chopunnish 14 May to 10 June 1806. On the 14th, Lewis wrote, “Labuish . . . brought with him several large dark brown pheasants . . . Shannon also returned with a few pheasants . . .” [Clark’s entry for this day indicates Shannon’s birds were blue grouse], and on the 15th, Gass wrote, “hunters came in and had killed nothing but some grouse . . .” [most likely blue grouse for we have seen no use of this word to identify ruffed grouse by any of the authors]. On the 18th, the hunters killed “some grouse” [Gass] and on 23 May, a

few “pheasants of the dark brown kind” were brought in [Lewis].

The party left Camp Chopunnish and moved to Weippe Prairie on 10 June where they remained until the 24th, waiting for snow to recede at higher elevations. On the 11th, “Several pheasants” were killed [Ordway; likely blue and/or ruffed grouse; less likely, but possibly sharp-tailed or spruce grouse]. On the 26th, along the Lolo Trail, a female blue grouse was killed [Lewis], the last report of this species. Nowhere did the records indicate large numbers. All references that might have included more than 1 species included blue grouse as 1 of the possibilities (Fig. 2D), indicative of the wide range of habitats occupied by this bird.

Spruce Grouse

Distribution.—Unambiguous reports of spruce grouse were recorded only on the Lolo Trail (Fig. 2C), between the vicinity of Lolo Pass, Idaho, and just east of Weippe Prairie. However, they may have been included in the bag of 12 taken in the Lost Trail Pass area, likely on the Montana side of the pass. Overall, spruce grouse were encountered where one might find them today, with no obvious change in range. All sightings were within the range of *E. c. franklinii*.

Abundance.—Six numerical reports of spruce grouse were recorded in the journals—only 1 on the westward journey—although there were others of unidentified pheasants which likely included this species. Lewis observed, on 18 September 1805, “there is nothing upon earth except ourselves a few small pheasants, small grey Squirrels, . . .” [they started that morning near Indian Grave Peak in Idaho County, Idaho, and camped at Dry Camp, near Bald Mt]. There almost certainly were more encounters for Lewis (and Clark) clearly described them while at Fort Clatsop on 3 March 1806 (see Clues to Species Identities).

On the return journey, 16 June 1806, Lewis killed a “small brown pheasant”. This was east of Weippe Prairie during an early attempt to cross the Bitterroots. On 22 June, the hunters “killed nothing but one small pheasant” [Gass] somewhere east of Weippe Prairie, where they had camped the night of the 21st. On the 26th, and moving east on the Lolo Trail, Lewis observed, “on our way up this mountain about the border of the snowey region we killed

2 of the small black pheasant . . . Two days later, "we killed a small black pheasant; this bird is generally found in the snowey region of the mountains and feeds on the leaves of the pine and fir" [Lewis]. They were now on the east side of the Bitterroots and camped at 13 Mi Camp, Idaho County, Idaho, a few kilometers from Powell Ranger Station.

The last clear report of spruce grouse was on 29 June: "I killed a small black pheasant near the quamash grounds this evening which is the 1st I have seen below the snowy region . . ." [Lewis]. They camped at Lolo Hot Springs, which is out of what we would consider normal spruce grouse habitat and fits with Lewis's comment about finding the bird at such a low elevation.

Most spruce grouse were taken or seen at relatively high elevations, as indicated by Lewis's comment above. Most reports of this species involved killing only 1 or 2 individuals. Taken together, references to spruce grouse indicate they were not often encountered and usually in low numbers. However, although the authors did not note them as in flocks in their daily entries, Lewis, at Fort Clatsop, comparing them to blue grouse, wrote, "it . . . associates in much larger flocks and is very gentle." They clearly encountered more birds than documented in the daily reports.

Ruffed Grouse

Distribution.—Ruffed grouse were seldom clearly mentioned in the journals except when comparing other species to those in the eastern states. Evidence of only 3 clear contacts with ruffed grouse were found (Fig. 2C), 2 of which were at Fort Clatsop. These 3 records span the area from the mouth of the Columbia River to the Bitterroot Valley. None was reported on the westward journey or east of the continental divide, even though their historic range includes upper portions of the Missouri and Yellowstone rivers (Rusch and others 2000). If encountered, we would expect Lewis and Clark to comment on this species because of their familiarity with it. Whether this lack of observations represents a historic change in distribution or low densities is unclear. Identifications of ruffed grouse, though few, generally span the known range west of the continental divide, as understood today.

Abundance.—Each clear identification of

ruffed grouse represents only 1 bird. On 5 February 1806, at Fort Clatsop, Lewis reported, "Filds brought with him a phesant which difered little from those common to the Atlantic states . . ." and in the summary remarks of Lewis and Clark for March 1806 we find, "7th a bird of a scarlet colour as large as a common pheasant with a long tail has returned, one of them was seen today near the fort by Capt. Clark's black man . . ." On the return journey, Clark "killed . . . a Common pheasant" on 2 July 1806, near Traveler's Rest in the Bitterroot Valley. Some of the unidentified pheasants taken at lower elevations and along the Lolo Trail in Montana and Idaho were likely this species. Nevertheless, ruffed grouse couldn't have been very abundant along their route. This seems of interest because the expedition traveled in river valleys much of the time, and areas with riparian vegetation are normally prime habitat for this species.

In summary, none of the forest grouse was noted as abundant and the largest number of clear, or likely, identifications was of blue grouse, with spruce grouse next, then ruffed grouse. Many references to pheasants in forest grouse habitats may have included more than 1 species. The largest numerical reference was of 12 'pheasants' killed in the Lost Trail Pass area, with 'several' reported on a few occasions. Most references indicated 1, 2, 3, or 'a few' killed or seen in a single day. In view of the shortage of food on the journeys through the Bitterroot Mountains, we think the party would have taken any birds seen. Apparent low numbers may reflect, in part, the generally dispersed nature of these species. Unless the authors failed to mention many birds taken on this leg of the journey, we suspect a similar sized party on the same route today would likely see, and be able to kill, as many birds as taken by the expedition. Numbers of forest grouse may not have been vastly different in that area than today.

DISCUSSION

The Lewis and Clark expedition was the 2nd to make an overland journey across continental North America, preceded only by that of Alexander Mackenzie in 1792 and 1793. In contrast to Mackenzie, however, 1 mandate of the Lewis and Clark expedition was to document faunal and floral resources. The almost daily

journals of the party have provided an opportunity to view some of the fauna and flora of the Missouri and Columbia River drainages prior to movement of Euro-Americans into these areas.

A number of authors have examined journals of the expedition for their natural history contents and have not always agreed on identities of the different grouse. Some problems have been caused by the journal authors' use of different and sometimes ambiguous common names, inadequate descriptions, and their contacts with as yet undescribed species. Among 121 identifications of grouse in the journals by other authors and examined by us, 117 were for observations and descriptions we consider relatively unambiguous. Among these, we were in agreement with 94 (80%).

Clearly, the journal authors did not always record encounters with the different grouse, nor did they always provide information on abundance. As well, the number of clearly identifiable contacts for some species was relatively small. Although this causes potential problems in evaluating presettlement distributions and numbers, we believe 2 conclusions are warranted. First, the 3 prairie grouse all appear to have had significant changes in distribution from the time of the expedition. In some cases these have been expansions while in others they have been extirpations. Along with changes in distribution, numbers have declined in most cases; all 3 prairie grouse are in trouble in many areas. These are the species whose habitats have been most impacted by agriculture and other human land uses. Second, judging from the journals, we don't see similar impacts on forest grouse, likely reflecting that the Bitterroot Mountain habitats the expedition traversed are still relatively intact. Development and increased use of resources in montane areas could change this situation.

In closing, we believe Lewis and Clark provided excellent 1st descriptions of blue and sage-grouse and of some subspecies of other western grouse, for example, Franklin's spruce grouse. Although Swainson and Richardson (1831: p xiii) thought the descriptions "too vague for scientific purposes", Coues (1893) and we disagree. With careful reading, we believe all species described in some detail and many of the daily observations of grouse can be clearly identified even though not presented in

conventional scientific format. Many behavioral and other natural history observations were also insightful. In our view, Lewis and Clark made few significant errors in the materials we examined—perhaps the greatest was in identifying the female spruce grouse as a separate species from the male. They clearly recognized the differences between species and described them well considering the times and their backgrounds.

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