

Masked Shrew

Sorex cinereus (Kerr, 1792)

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CONTENT AND TAXONOMIC COMMENTS

The subspecific taxonomy of the masked shrew (*Sorex cinereus*) is somewhat unsettled (van Zyll de Jong 1980, 1991; van Zyll de Jong and Kirkland 1989). Twelve subspecies are recognized by Hall (1981) and maps therein indicate that four subspecies occur in the South. The Maryland shrew (*S. c. fontinalis*) is regarded as a separate species by Jones et al. (1997), but van Zyll de Jong and Kirkland (1989) consider it to be a subspecies of *S. cinereus*. Although Handley (1982) believed that *S. c. fontinalis* did not occur in Virginia, Moncrief and Dueser (1998) recently confirmed its existence in the state. Another of the four potential subspecies, *Sorex c. ohioensis*, is no longer considered to be a distinct taxon (van Zyll de Jong and Kirkland 1989). Therefore, we recognize three subspecies in the region: *S. c. fontinalis*, which occurs in the Delmarva Peninsula of Virginia; *S. c. cinereus*, which ranges throughout the Appalachian Mountains, and *S. c. lesueurii*, which occurs through the lower Midwest including a small portion of northcentral Kentucky along the Ohio River.

DISTINGUISHING CHARACTERISTICS

The masked shrew is a small, long-tailed soricid with the following measurements: total length, 80–111 mm; tail, 34–48 mm; hind foot, 10–14 mm; weight, 3–5 g. The dental formula of the masked shrew is: I 3/1, C 1/1, P 3/1, M 3/3 = 32 (Figure 1). This species has small ears concealed in the pelage, minute eyes, and a long, pointed snout. The pelage is dark grayish-brown dorsally and light grayish-brown ventrally. Hair length and density is greater in the winter than summer months (Rinehart-Whitt and Pagels 2000). The tail is distinctly bicolored, dark above and pale below. The masked shrew may be confused with the southeastern shrew (*S. longirostris*) and pygmy shrew (*S. hoyi*). The ranges of the masked shrew and the southeastern shrew overlap in the southern Appalachians (Ford et al. 2001). The two species are segregated by altitude with *S. cinereus* generally restricted to higher elevation, mesic forest communities and *S. longirostris* restricted to lower elevation, xeric communities and early successional stages (Ford et al. 2006). Furthermore, the two are distinguishable on the basis of bivariate comparisons of body and skull features (Junge and Hoffman 1981, Laerm et al. 1996). The pygmy shrew occurs sympatrically with the masked

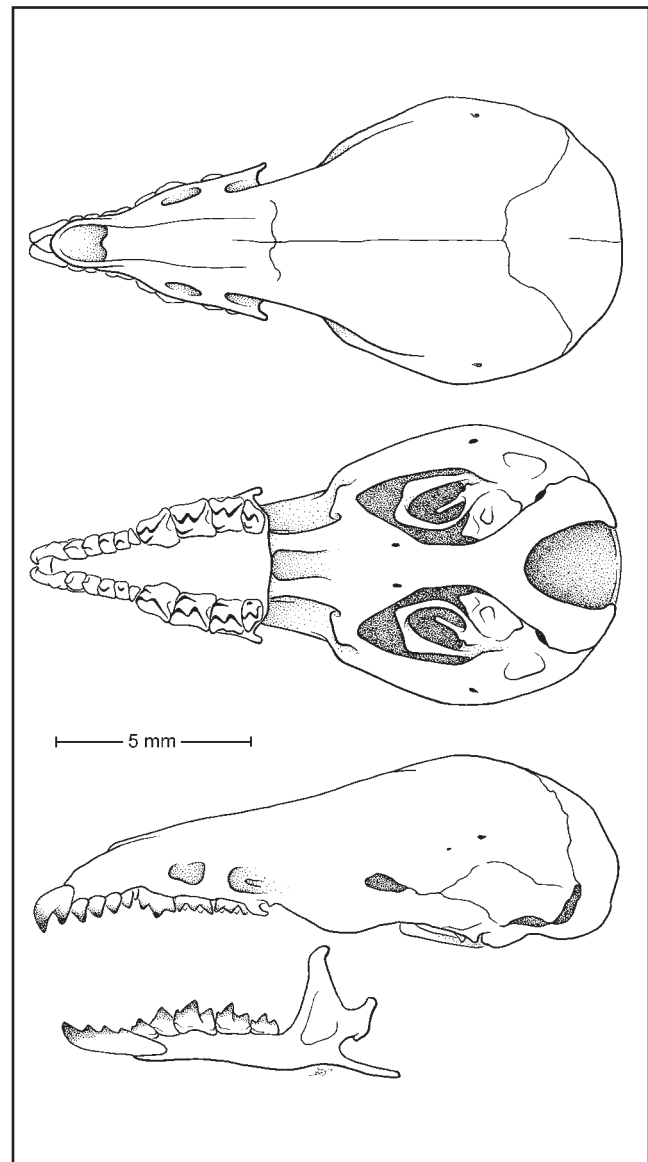


Figure 1. Dorsal, ventral, and lateral view of cranium and lateral view of mandible of *Sorex cinereus* from Giles County, Virginia (USNM 462614, female).

shrew; it is smaller and the skull is easily distinguished by minute third and fifth upper unicuspid.

CONSERVATION STATUS

The masked shrew has a global rank of Secure (NatureServe 2007). It is Secure in Virginia and Apparently Secure in North Carolina and Tennessee.

It is Vulnerable in Kentucky and Imperiled in Georgia. It is unranked in South Carolina.

DISTRIBUTION

The masked shrew has the largest range and exhibits the greatest geographic variation of any North American *Sorex*, ranging throughout the transcontinental boreal forests in Alaska and Canada into the Ohio Valley, the Appalachians, and Rocky Mountains. Figure 2 depicts the distribution of the masked shrew in the South. The species occurs throughout western and northern Virginia (Pagels and Tate 1976, Pagels and Handley 1989, Bulmer and King 1992, Pagels et al. 1994, Mitchell et al. 1997, Linzey 1998), extreme eastern Kentucky (Barbour 1951, Bryan 1991), eastern Tennessee (Conaway and Howell 1953, Smith et al. 1974, Harvey et al. 1991, 1992; Linzey 1995), western North Carolina (Conaway and Howell 1953, Johnston 1967, Gentry et al. 1968, Whitaker et al. 1975, Lee et al. 1982, Adams and Hammond 1991, Ford et al. 1999, Brannon 2000, Ford et al. 2000, 2001), extreme northwestern South Carolina (Laerm et al. 1995), and northeastern Georgia (Wharton 1968, Ford et al. 1994, 2001). In the Appalachians, it exhibits an altitudinal distribution along a latitudinal gradient. It does not occur below 400 m elevation in northern Virginia (Pagels and Handley 1989) or below 600 m in the southern Appalachians of Georgia and North Carolina (Ford et al. 2001, 2006). *Sorex c. fontinalis* is restricted to the Delmarva peninsula of Virginia regionally (Moncrief and Dueser 1998) and *S. c. lesueurii* is found only in northcentral Kentucky in Henderson and Union counties (French 1978, Bryan 1991).

ABUNDANCE STATUS

In the South, the masked shrew is the most common long-tailed shrew throughout much of the central and southern Appalachian Mountains. Kalko and Handley (1993) reported that it constituted 52% of all long-tailed shrews that were snap-trapped over a 15-year period and 77% of all small mammals recovered from pitfall traps in a one-year study at Mountain Lake Biological Station, Giles County, Virginia. In high elevation red spruce (*Picea rubens*) forest communities of Virginia, 89.4% of the soricids were masked shrews (Pagels et al. 1994). Similarly, Harvey et al. (1991, 1992) reported that 45% and 61.2%, respectively, of all soricids recovered from 2 pitfall surveys in the Cherokee National Forest in eastern Tennessee were *S. cinereus*. In western North Carolina, Ford et al. (1999, 2001, 2006) found that masked shrews constituted more than 75% of the long-tailed soricids in high elevation forests (>1,000 m). However, at the periphery of its range in northern Georgia (Ford et al. 1994, 2006) and South Carolina (Laerm et al. 1995,

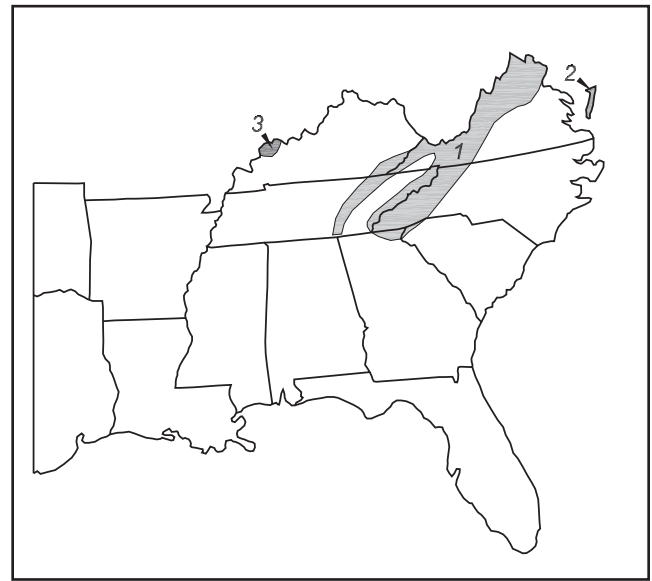


Figure 2. Distribution of *Sorex cinereus* in the South: (1) *S. c. cinereus*; (2) *S. c. fontinalis*; (3) *S. c. lesueurii*.

Ford et al. 2006), it is rare, occurring only at the highest elevations or in sheltered cove and riparian areas.

PRIMARY HABITATS

Throughout most of its range, the masked shrew is a habitat generalist (Kirkland 1991, Mitchell et al. 1997, Ford and Rodrigue 2001), although it is considered more of a high elevation, mesic cover type specialist in the southern Appalachians (Pagels et al. 1994, Ford et al. 2006). Moisture is the primary factor that influences local distribution and abundance (Pruitt 1959, Getz 1961, Spencer and Pettus 1966, Pagels et al. 1994). In the southern Appalachians, it occurs in hardwood and coniferous forests with shady, moist conditions. In Georgia and South Carolina, the presence of masked shrews indicates vegetative and faunal conditions of functional, high integrity northern communities (Ford et al. 2004). Structural features providing cover such as heavy leaf litter, fallen logs, rocks, and stumps are important, but its abundance is correlated with soil moisture capacity, organic matter, and understory vegetation rather than the actual structural components (Pagels et al. 1994, Brannon 2000, Ford and Rodrigue 2001, Ford et al. 2002). Conditions favorable to the masked shrew occur in red spruce-Fraser fir (*Abies fraseri*), northern hardwood, cove hardwood, mesic oak (*Quercus* spp.), and white pine-eastern hemlock (*Pinus strobus*-*Tsuga canadensis*) cover types with abundant rhododendron (*Rhododendron maximum*) understories. In favorable habitat at higher elevations, masked shrews are present in most seral stages (Ford et al. 2000, Ford and Rodrigue 2001). In the southern Appalachians above 1,000 m elevation, it also can occur in more xeric cover types

including pitch pine (*P. rigida*)-dry site oak, but typically only in areas with dense mountain laurel (*Kalmia latifolia*) or vaccinium (*Vaccinium* spp.) shrub layers, substantial coarse woody debris, or other structural features such as emergent rock with moist microhabitats (Ford et al. 1999, 2006). Masked shrews utilize shallow burrows or runways of other small mammals, or construct their own, beneath leafy cover and under other debris. Spherical nests a few centimeters in diameter, constructed of leaves and grasses, are located under logs, rocks, stumps, and other debris.

REPRODUCTION

Breeding occurs from April through October, and there usually are 2 litters/breeding season, one in the spring and another in the fall (French 1985). Gestation lasts 19–22 days, and 1–7 young are produced per litter. Breeding occurs after their first winter (French 1980, 1985). Few survive more than 1 year.

FOOD HABITS

The masked shrew appears to be a food generalist (Getz 1961, Pagels et al. 1994). It consumes chilopods, arachnids, larval coleoptera and lepidoptera, hymenoptera, gastropods, and possibly small vertebrates such as larval salamanders (Whitaker and Mumford 1972, French 1984, Whitaker and French 1984, Ryan 1986, Whitaker and Hamilton 1998). Because of the shrew's small size, prey items <10 mm in length dominate the diet (Churchfield 2002).

ASSOCIATED SPECIES

In the South, masked shrews are associated with insectivores such as the northern short-tailed shrew (*Blarina brevicauda*), smoky shrew (*Sorex fumeus*), and pygmy shrew. Masked shrews also share habitats with rodent species including the white-footed mouse (*Peromyscus leucopus*), deer mouse (*P. maniculatus*), southern red-backed vole (*Clethrionomys gapperi*), and woodland jumping mouse (*Napaeozapus insignis*).

VULNERABILITY AND THREATS

Outside of the Appalachians and north-central Kentucky, the masked shrew is largely absent in the South. Because the species is on the periphery of its range regionally and is linked to montane communities with northern affinities, potential threats might include global climate change or activities that further reduce the extent of northern hardwood or spruce-fir forests. Future local extirpation of eastern hemlock from hemlock adelgid (*Adelges tsugae*)

defoliation at mid-elevation riparian areas might be detrimental to masked shrews.

MANAGEMENT SUGGESTIONS

At higher elevations in the central and southern Appalachians, masked shrews are tolerant of forest management activities such as timber harvest and prescribed burning so long as cool, moist conditions are retained (Kirkland 1990, Ford et al. 2000, Ford and Rodrigue 2001). Management impacts at lower elevations or on the southernmost periphery of its range in the region are unknown, although disturbance and vegetation change could ecologically favor southeastern and pygmy shrews over masked shrews.

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