

YELLOW-BELLIED MARMOT

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Six species of marmots live in North America. Except for the woodchuck (*Marmota monax*), marmots typically occur in mountainous areas. The yellow-bellied marmot (*M. flaviventris*) occurs at higher elevations (usually above 2000 m) in the Rocky and Sierra Mountains, where it occupies rocky outcrops and talus slopes in or adjoining meadows.

Marmots hibernate from mid September to early May. Differences in altitude and latitude alter the local dates. At some low elevations, marmots may estivate for several weeks during the summer. At high elevations, marmots emerge from hibernation through the snow. At this time, food and cover are scarce and animals are easily trapped. Trapping success declines as green vegetation becomes available. Marmots gain weight steadily preparing for hibernation and spend less time feeding in late summer as time for immergence nears. Trapping success at this time is poor.

Marmot populations vary from solitary individuals to colonies of 40 or more.¹ The population fluctuates annually. Adult populations are relatively stable from year to year, but numbers of yearlings (animals in their second summer) and young vary.² Most yearlings disperse; dispersal ordinarily occurs by mid July. Young emerge from their burrows between mid June and late July; the time varies with altitude, latitude, and individual differences among litters.

Traps — Use treadle type of heavy wire mesh about 25 × 30 × 75 cm (Tomahawk Live Trap Co., #207). Traps should have a metal plate behind the treadle for placement of bait.

Set — Set traps all day in spring and fall, but only in early morning (close by 10:00 a.m.) and late afternoon in summer. Marmots may die in less than an hour in direct sunlight. One person can carry four to six traps per trip with use of a pack frame. If the traps are in one locality, one person can check up to 40 twice daily. However, if several local populations are being censused, travel time between localities reduces the number of traps that can be checked, especially in the evening. Traps must be checked as late as possible in the evening to prevent an animal from spending the night in a trap.

Bait — Use any grain or horse feed, but salted oats work best. Fill a 1-lb coffee can with oats, add salt (about 2 tablespoons) and water (until it reaches the top), close the can with the plastic cover provided, and shake to mix. Use about 1/4 cup per trap and place bait behind treadle.

Arrangement — Place one trap at entrance to burrow. Use more traps when young emerge or if observations reveal several animals sharing a burrow. Many burrows are present in a marmot habitat, but only a few are residences. Residential burrows usually have fresh feces near the entrance. Burrows occupied by adult males frequently emit a "marmot odor". A grid is useless, but traps placed in marmot trails are sometimes successful.

Marking — Attach tags in ears (No. 3 self-piercing Monel fish tag from National Band and Tag Co.). Color mark (Lady Clairol® or similar nontoxic dye) for quick visual identification. Animals molt and lose marks after mid July.

Handling — Use a cone-shaped bag fitted with a 30- to 45-cm zipper at the small end. The large end should fit over the opening to the trap and the small end should accommodate the animal's head. Place the bag with zipper up. The zipper may be pulled back to expose the ears for placement of tags. The large end provides access for sexing, etc. Record data in notebook or on data sheets on which tag numbers, sex,

date, weight, locality, and reproductive condition are noted. Be sure to have a spare bag as marmots sometimes spread the zipper apart.

Release — Release at place of capture.

Census — Recapture method or counts. If marmots are color-marked, observations in the early morning (marmots emerge at about sunrise) can provide counts of marked and unmarked animals. A simple ratio of (number marked seen)/(total number marked) provides a proportional index which may be applied to the number of unmarked animals counted to calculate the total unmarked. Caution: often only one or two animals resist trapping so that the number remaining unmarked can be overestimated.³

REFERENCES

1. Armitage, K. B., Social behaviour of a colony of the yellow-bellied marmot (*Marmota flaviventris*), *Anim. Behav.*, 10, 319, 1962.
2. Armitage, K. B. and Downhower, J. F., Demography of yellow-bellied marmot populations, *Ecology*, 55, 1233, 1974.
3. Johns, D. and Armitage, K. B., Behavioral ecology of alpine yellow-bellied marmots, *Behav. Ecol. Sociobiol.*, 5, 133, 1979.