DEPARTMENT OF NATURAL RESOURCES

The Importance of Radio-collared Bears

(and why we ask hunters not to shoot them)

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Bear management in Minnesota is based on multiple sources of information: statistics from the bear hunt, assessment of natural food conditions, a population model based on the ages of harvested bears (obtained from teeth submitted by hunters), and results of a long-term, active bear research program. Minnesota is lucky to have one of the longest, DNR-run bear research programs in the country. The core of this research program is radio-collared bears. Because long-term research on individual collared bears is so crucial to management, we ask hunters not to shoot collared bears.

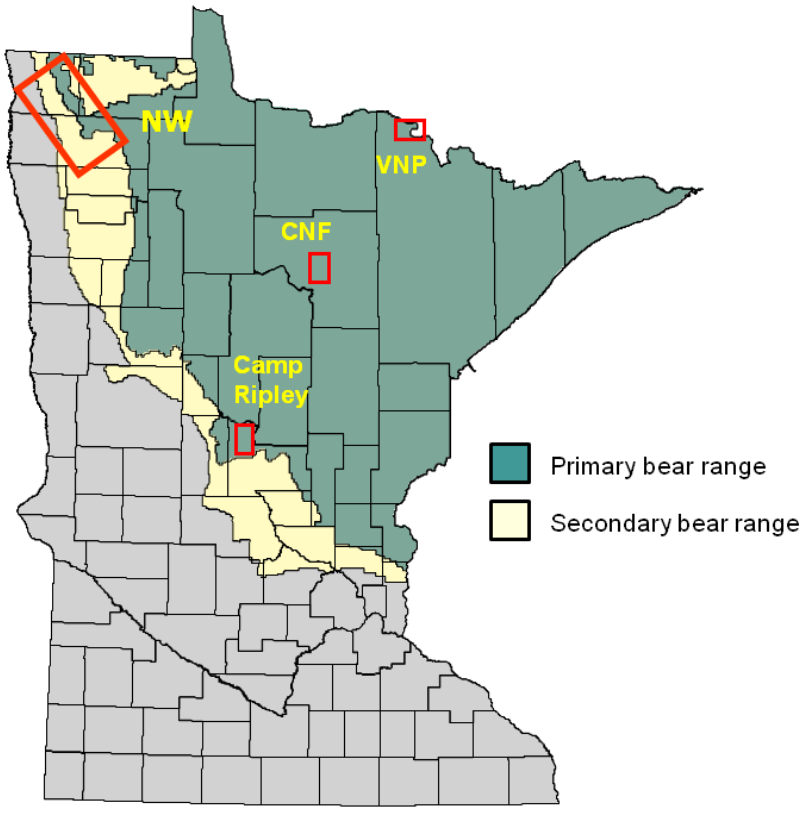
Radio-collars are not easy to see, but all bears with a collar also have large, colorful ear tags. Look for the ear tags, not the collar. Most collars now have sophisticated GPS units, and most collared bears also have a small heart monitor implanted under the skin near the heart.

Research Began in Early Days of Minnesota's Bear Management

1971: Bear classified as big game species: bear or deer license required to hunt.
1978: Bear harvest exceeds 1,000.
1979: Bears could only be taken during designated bear season (no longer during firearms deer season).
1981: Bears could only be hunted with a bear license.
Start of DNR research project with radio-collared bears
1982: Start of lottery-based quota on bear licenses.
1987: Establishment of no-quota zone along fringe of range.

Multiple Study Sites for Better Information

Bears in Minnesota occupy the northern, mainly forested part of the state. We have studied bears with radio-collars at multiple sites within this range in order to gain an understanding of how differences in habitat and human factors drive mortality, reproduction, movements, and ecology of bears.



Work is still continuing in 4 of the 5 study sites:

1981–present:
In and around Chippewa National Forest (CNF), north of Grand Rapids

1991–93:
Pine County no-quota area

1991–present:
Camp Ripley Military Reserve

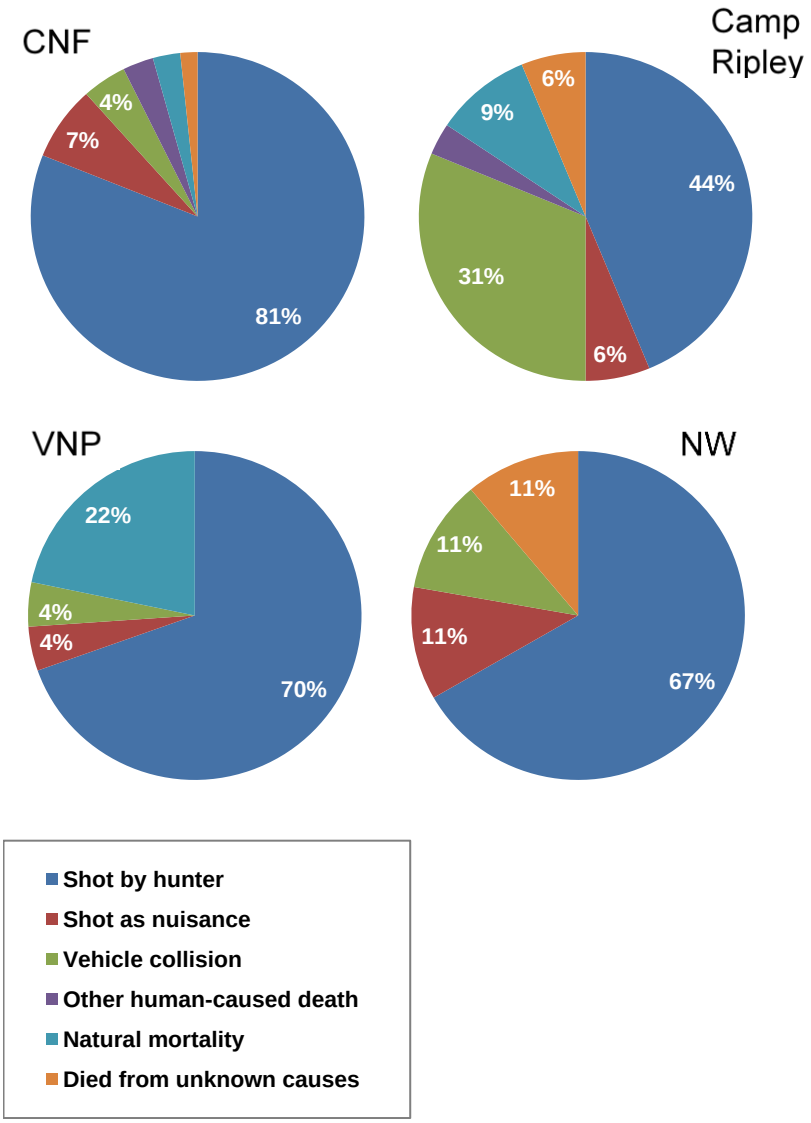
1997–present:
Voyageurs National Park (VNP)

2007–present:
Northwestern Minnesota (NW)

Research Findings Important to Management

Hunting is the main cause of mortality in all areas

About ¾ of Minnesota bears that survive their cub year eventually die from legal hunting. Bears are not hunted in Camp Ripley and Voyageurs National Park (VNP), and since the start of our study in NW Minnesota, hunters were asked not to shoot collared bears with large eartags. Despite these restrictions, legal hunting has been the dominant source of mortality for bears in *all areas*.

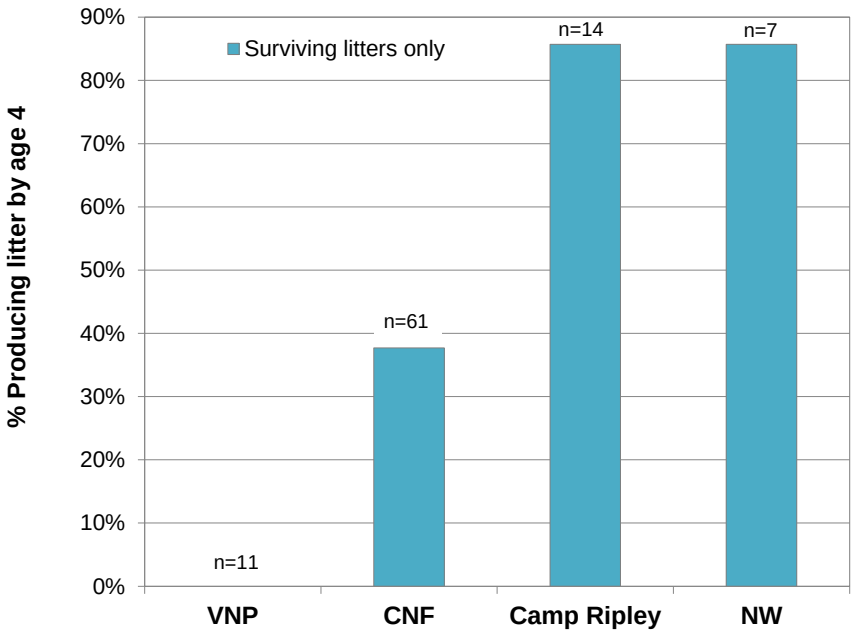


The heaviest hunting pressure among our study sites has been in and around the Chippewa National Forest (CNF), where abundant public land and easy access via numerous forest roads provide opportunities for hunters; in this area, over 80% of bears die due to hunting.

Bears in Camp Ripley and VNP are hunted when they leave the reserve or park boundaries during excursions to find better food in fall, and are drawn to hunters' baits.

Reproduction is highest along the edges of the range

Normally one might think that the "core" of the bear range would have the highest reproductive rates. But for bears in Minnesota, the edges of the range provide more food. There are more oaks along the southern fringe of the range. The northwestern part of the range has many small blocks of forest with a lot of light penetration along the forest edges — this enhances fruit and nut production. And bears also benefit from feeding in cornfields, which are rare in the core of the range.



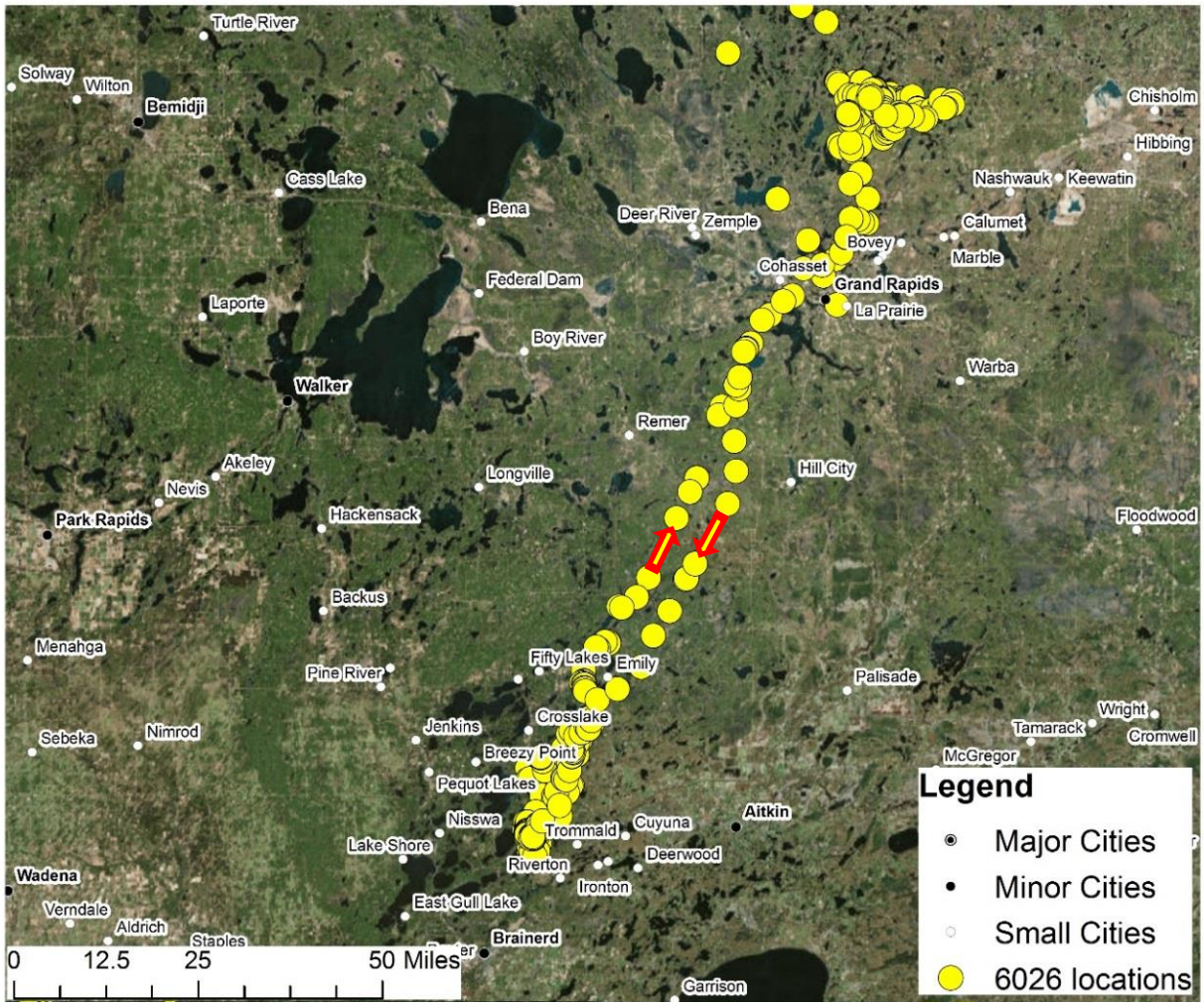
Bears that get more food grow faster, and mature earlier. 85% of bears living along the periphery of the range had their first cubs by 4 years old (some produced at 3 years old).

By contrast, none of the collared bears that we studied in Voyageurs National Park (VNP) produced cubs by age 4, and less than half did so in the Chippewa National Forest

Litter size is less affected by nutrition: litters of 3 cubs are the most common (55%) across the state, but 2-cub litters were more common than 3-cub litters in Voyageurs National Park. About 5% of litters are a single cub (mainly a bear's first litter), and about 5% are litters of 4 or 5 cubs.

Movements to fall feeding areas are extensive

Although we manage bears in separate "Bear Management Units" (BMUs), each with a separate hunting license quota (or no quota), many bears range widely across the boundaries of these units. These movements are especially extensive in the fall. Most bears that move in the fall seem to know places where food is better (often moving southward). We have evidence that even if they have never been to a feeding place before, they follow scent trails of other bears.

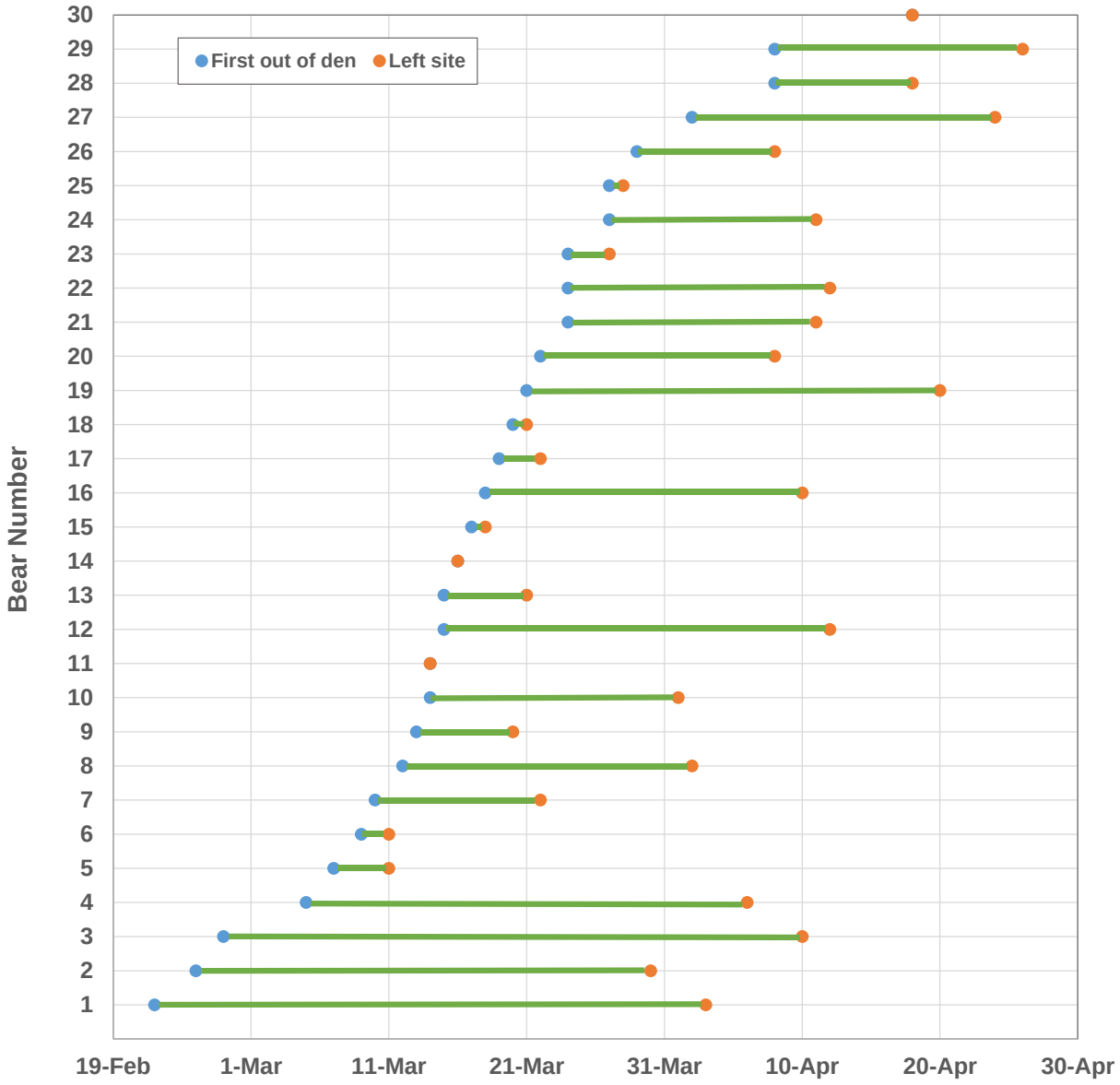


Long-range movements of 50 miles or more are more common among Minnesota's black bears than elsewhere in the U.S. We can now track the exact travel route with the GPS collars, which collect a location every 2 hours and download the data to us by satellite daily.

After feeding in an area for several weeks, bears often return following the same path, and den within their summer home range. These common movements across the boundaries of BMUs, which vary in extent, duration, and distance depending on food conditions, make it virtually impossible to obtain meaningful BMU-specific population estimates.

Collars, cameras, and heart monitors yield fascinating information about denning

Bears in Minnesota spend about half the year in winter dens. During their long hibernation, they survive totally on fat accumulated in the fall — which explains their fall feeding frenzy. We have not witnessed bears that died over winter of insufficient fat, but sometimes young, very skinny bears die in early spring, shortly after emerging from their den, before spring green-up.



Modern technology (GPS collars, trail cameras, and heart monitors) enables us to know when bears enter dens, when they start hibernating, when they start waking up, when they emerge from the den for the first time, when they leave the den site, and how far away they go when they do leave.

Remote cameras placed outside the dens of collared bears also show what bears do when they first emerge. Often, after first emerging they spend several weeks in the vicinity of the den site, going in and out of the den, before departing. During this period, they warm their bodies, increase their heart rate, rehydrate (often eating snow) from 6 months without water, and cubs gain strength and mobility. But also, they commonly rake in fresh bedding material: with earlier springs, dens get wet, and insulation from water in the den is critical.

Wet dens are not only uncomfortable, but obviously a drain on energy, and for some bears, a threat to survival. Bottom right photo above shows a wet mother removing a dead cub from the underground den; her 3 other cubs survived because she was able to build a nest for them outside the den.

Data obtained over almost 4 decades of research indicate that cub survival is high in Minnesota: about 80% of cubs make it to den with their mother when they are 1 year old (yearlings).

But increasingly we are seeing bears, including mothers with cubs or yearlings, using above-ground nests instead of underground dens, since underground dens are now more prone to flooding from early spring thaws.

Long-term monitoring of individual collared bears is essential for understanding new trends in bear behavior and corresponding survival.