

## Space

Dusk found me at my usual place on May second, sitting by a pond next to a large damp rodent. The gathering darkness, the falling mist, and the minor-keyed song of the season's first hermit thrush, all wonderful on an ordinary day, only contributed to my melancholic brooding. Dewberry, my favorite beaver, had launched herself into the wide and wild world. Willow, her mother, the beaver sitting beside me, was due to give birth again any day. As she munched rodent nuggets, I placed my hand on her side and wondered if I could feel the kits in her cool, wet basketball-sized belly.

Willow's solitary companionship reminded me of the summer five years ago when I began my pond-side observations. For much of that summer she was the only beaver that approached me, and was the first to honor me with her tolerance and trust. That first year I awaited the arrival of kits enthusiastically. Indeed, I learned that beaver kits are fully as charming as I believed they would be. This year, however, I felt tempted to suggest to any kits inside that big belly that they think twice about coming out. Let me explain. . .

Willow's family occupies a watershed that includes a 2.5-mile section of brook that is just the right size and gradient for damming, and about six miles of smaller tributary streams with a few sites suitable for ponds. The great advantage of this stream system is that it is remote from human settlement, so the beavers can live here free from the dangers inherent in proximity to people. Because the food resources are poor, however, the beavers move to a new pond site each year, and must defend a large area to maintain the ability to relocate.

Each of the past four years, Willow has given birth to two kits. Each year, one of the kits has been taken by a predator. A reproductive rate of one kit per year cannot be considered prodigious, especially by the standards of other rodents, but because beavers can occupy such a limited portion of the landscape, it does not take long to fully occupy a small watershed. As I began to calculate how many kits might arrive in coming years, I found myself understanding the concept of carrying capacity in stark clarity. With four-year-old Ducky mated and settled in a tributary, and another pair in residence at the mouth of the brook, Dewberry will be forced to occupy the more marginal habitats, and will need to move often, always risky when a move might mean encroaching upon an

area already claimed by other family members. Will there be a vacancy for her older sibling, Snowberry, when she decides to leave home? Or her younger sibling Sundew? What if Ducky and Willow both manage to raise a kit or two this year? What if the pair at the mouth of the brook also does? And what will become of any kits Dewberry might parent in coming years? Yes, there might be mortality among the adults, but once beavers have established a territory and gathered a clan, they can live for many years in relative security. You can see why I have mixed feelings about welcoming more beavers into this brook. Of course, they can choose to leave this watershed, but then things get even riskier. Unoccupied beaver habitat may be unoccupied because the residents have been trapped, the last fate I would choose for one of my beaver friends. They might be lucky enough to find another remote brook where they are relatively safe from human interference, but such a stream is likely to be occupied already.

This is why I have been grumpier than usual about nature and its ruthlessly unsentimental principles. To admire the complexity and effectiveness of ecology is to admire a system that allows very few vertebrates to live long enough to reproduce.

There is, at the moment, an exceptional species, of course; in many parts of the world humans arrive expecting to live long and well and to die of the afflictions that take the aged. Any other death is considered grossly unfair. While it is difficult to calculate the carrying capacity of an entire planet, it is not difficult to observe some of the impacts of unfettered human survival. Even here in the relatively buffered security of Vermont, we are dealing with humanity's excesses. We are paying the piper and the fee is going up.

I recently heard an interview with Richard Garriott, a tourist on the International Space Station. From the space station he observed that very few places on this planet were unmarred by human infrastructure. From space he could also appreciate that the Earth is isolated, finite, and rendered hospitable by a very thin membrane of atmosphere.

A visceral understanding of carrying capacity could be an antidote to the toxic belief that humans are immune to limits. Richard Garriott paid thirty million dollars for his perspective. For the rest of us, I recommend adopting some beavers. Carrying capacity is not a comfortable

concept to embrace, but beaver-watching comes with many benefits. Your own learning opportunity may be paddling toward you as you read this. It might even be my good friend Dewberry. You will be able to recognize her. She has a flat tail, swims well, and gets so excited about apples she will climb into your lap to get them. If you see her, give her an apple from me.