

Who's That NAVIGATOR?

How can **timber wolves** travel across hundreds of miles of forests, swamps, lakes, and rivers without getting lost?

How can **steelhead trout** navigate the big waters of Lake Superior and find the North Shore stream where they hatched as baby trout?

How can **hummingbirds** make incredibly long and dangerous journeys for migration every spring and fall?

Without maps, compasses, or other navigational tools, Minnesota wild animals travel hundreds or even thousands of miles. To guide their way, they might read weather and sunlight. They might follow rivers, mountain ranges, or other landmarks. In addition, they might rely on special adaptations (body changes that evolved over time to help them live better in their environment) and instincts (automatic responses that are natural, not learned).

BY TOM ANDERSON





A male ruby-throated hummingbird sips nectar.

CHAMPION NAVIGATORS

Birds are champion navigators. Many species travel across entire continents. For example, bobolinks, Baltimore orioles, and ruby-throated hummingbirds are Neotropical migrants that winter in the tropics and migrate to North America to nest in spring. These birds make this journey because their favorite and necessary foods become scarce or unavailable as seasons change. For example, ruby-throated hummingbirds depend on nectar from flowers. When flowers stop blooming in Minnesota, they fly south. Some fly along the Mexican coast. Others fly across the Gulf of Mexico—up to 20 hours nonstop—to Costa Rica, Nicaragua, and other countries in Central America.

DANGEROUS FLIGHTS

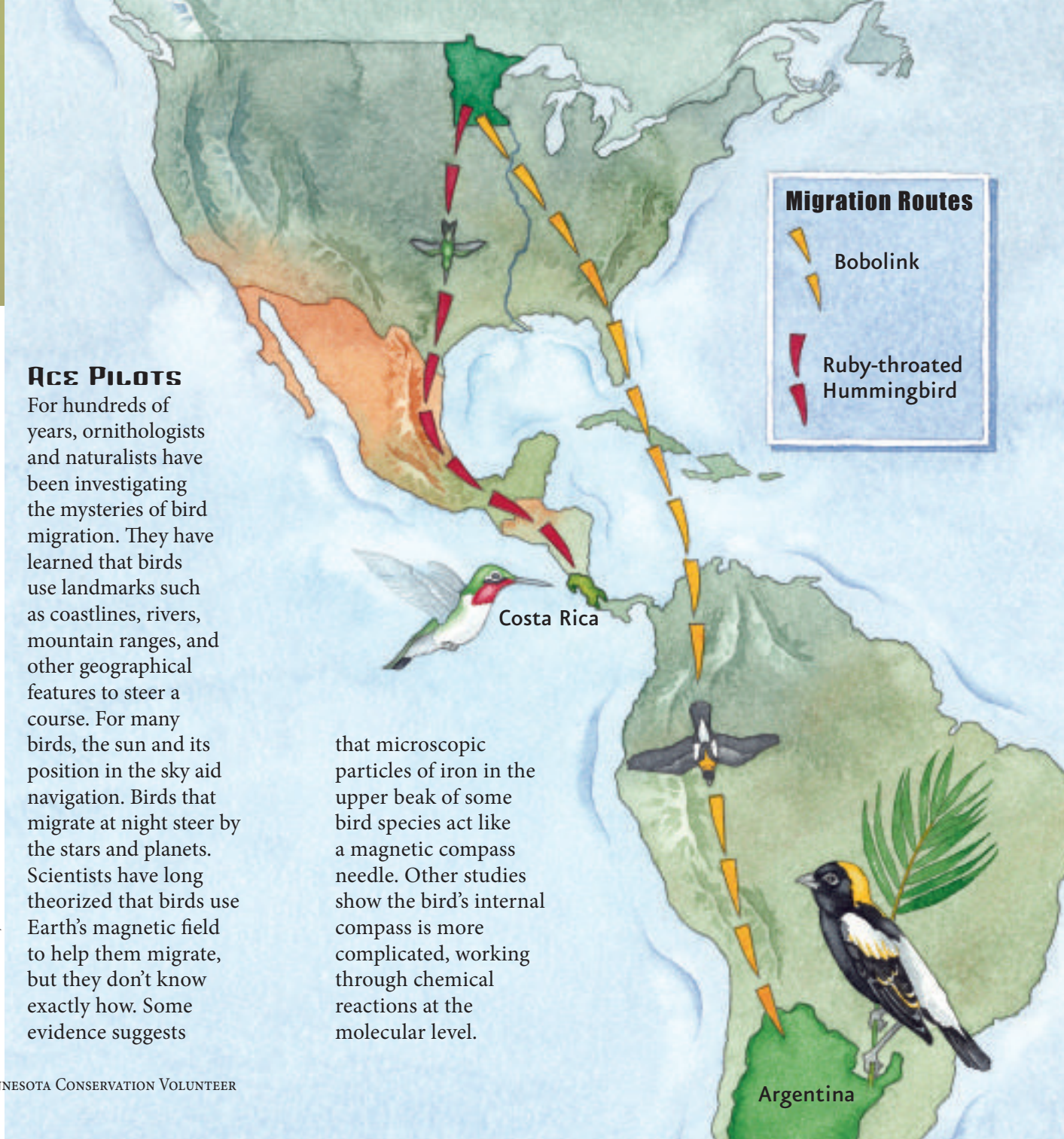
Many of the millions of birds that migrate each year die during their migration. Their journeys sometimes take them through strong winds, heavy rains, thunder, lightning, and even snowstorms. They might encounter various predators, from hawks to house cats. Tall buildings and wires from radio and television towers can be deadly for birds that navigate at night.

TOP LEFT: STAN TEKIELA, RIGHT: ILLUSTRATION BY BILL REYNOLDS

ACE PILOTS

For hundreds of years, ornithologists and naturalists have been investigating the mysteries of bird migration. They have learned that birds use landmarks such as coastlines, rivers, mountain ranges, and other geographical features to steer a course. For many birds, the sun and its position in the sky aid navigation. Birds that migrate at night steer by the stars and planets. Scientists have long theorized that birds use Earth's magnetic field to help them migrate, but they don't know exactly how. Some evidence suggests

that microscopic particles of iron in the upper beak of some bird species act like a magnetic compass needle. Other studies show the bird's internal compass is more complicated, working through chemical reactions at the molecular level.





Steelhead trout, a type of rainbow trout, migrate from streams into Lake Superior and back.

MIGRATORY FISH

Salmon and steelhead trout perform amazing annual feats of navigation between Lake Superior and its tributary streams.

Steelhead, a migratory form of rainbow trout, hatch upstream from the lake in the shallow, gravelly areas of many rivers in Minnesota, Wisconsin, Michigan, and Canada. After two years in most streams, the young fish (called *smolts*) then migrate into Lake Superior and disperse.

After living and growing in the lake for about three years, the steelhead return to their home streams to spawn. Standing at the mouth of a North Shore stream in spring, you might be lucky enough to spot several of these large fish in the shallows. A little farther upstream, you might see a steelhead leap up a small waterfall.

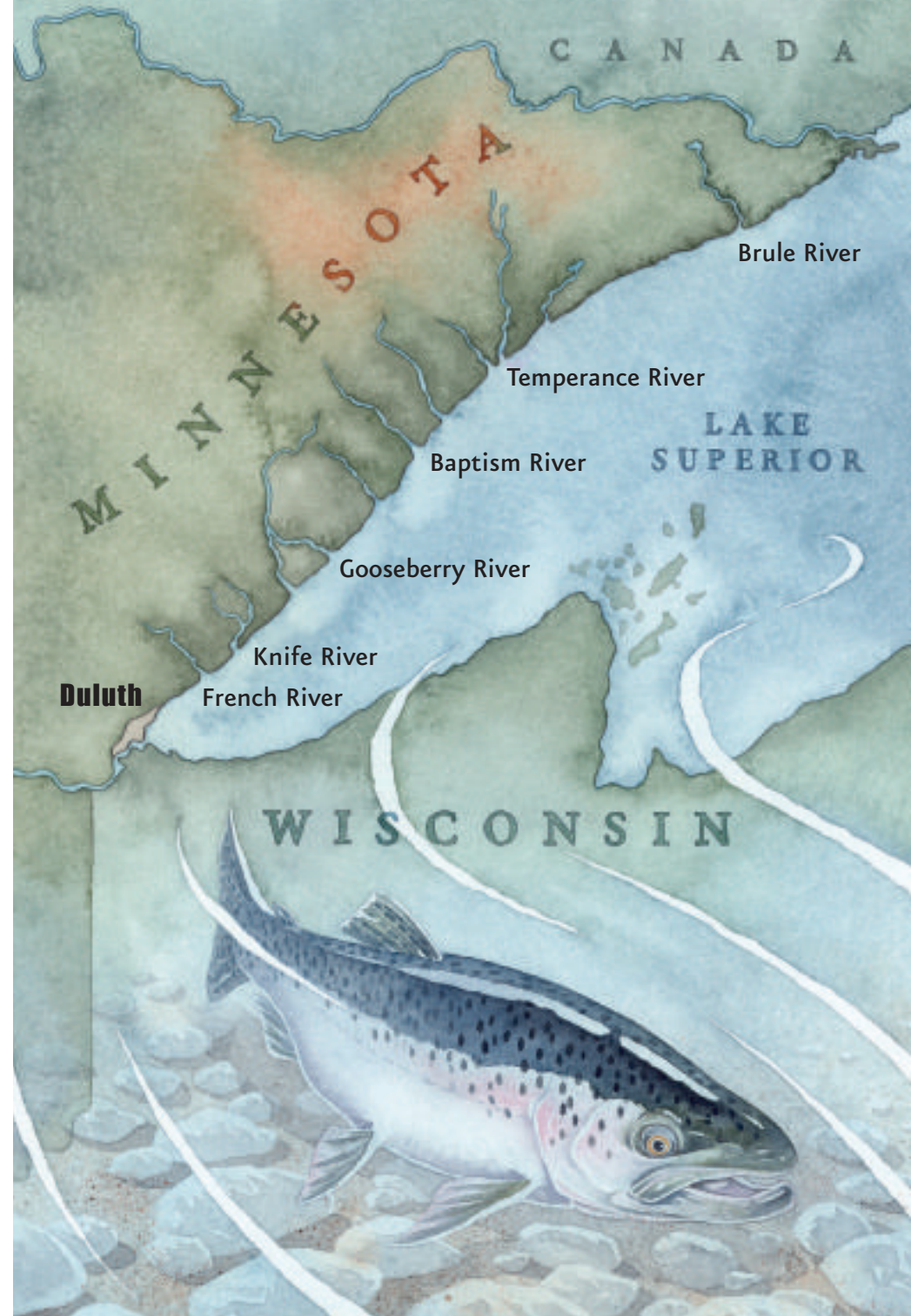
WATER PILOTS

To navigate to the streams where they hatched, migratory fish use

a variety of homing mechanisms. Some fish use the position of the sun to find the shore with the mouth of their home stream. Fish in the salmon family contain microscopic particles of iron in their brain. The iron acts like the magnetic needle in a compass, enabling the salmon to orient itself by adjusting to Earth's magnetic field.

A sense of smell helps some fish sniff out home. What smells from your childhood will you always remember? Steelhead and salmon remember the smell of the stream where they lived as young fish.

Each stream has a signature of smells in its water chemistry. It's a collection of blended chemicals from the surrounding land, like acids from decaying leaves in the stream. Just as you might follow your nose from one part of your house toward a tempting aroma coming from the kitchen, an adult fish smells its way from the lake to the stream.



TOP LEFT: E. R. DEGGINGER, DEMBINSKY PHOTO ASSOCIATES; RIGHT: ILLUSTRATION BY BILL REYNOLDS



A gray wolf crosses the Kettle River near Sandstone.

Wolf Ways

The largest member of the wild dog family in Minnesota is the gray wolf, or timber wolf. Wolves live in packs and do not migrate, but their home territories sometimes cover hundreds of square miles. Just as you learn your way around your neighborhood, wolves learn how to get around their vast home ground to find food and shelter.

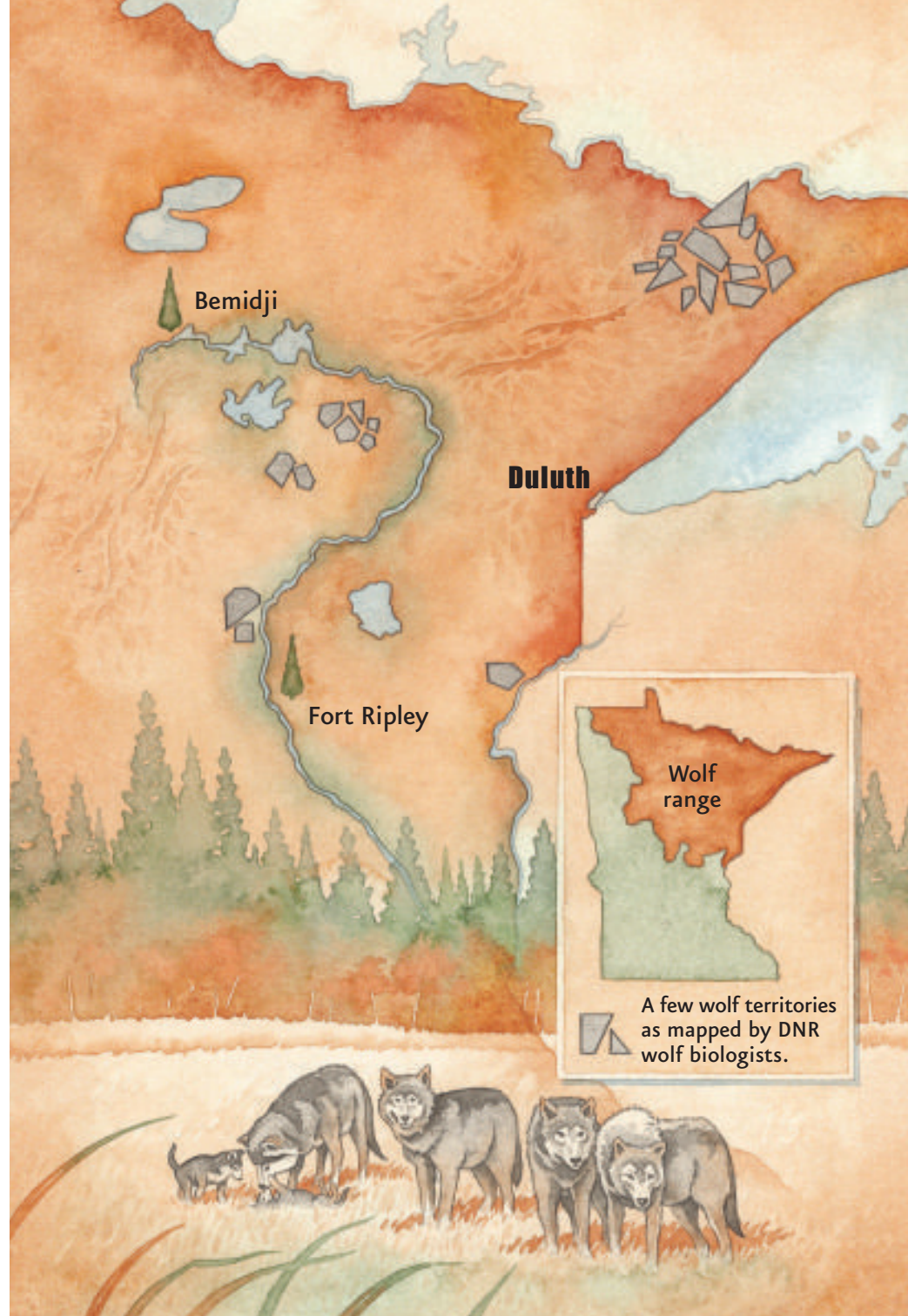
Wolves in Minnesota follow moose or white-tailed deer to hunt them. Then the wolves somehow find their way back home. They return home by *instinct*, or by a

sense of home that is part of the brain and nervous system.

Good Noses

Wolves depend on their sense of smell to find the boundaries of their large home ranges. Like your pet dog, the wolf urinates to mark its scent on stumps, rocks, or shrubs. Other wolves pass by and “read” these scent posts—they find out who claims the territory.

Wolves howl to communicate within a pack. If a wolf gets separated from its pack, howling can help it reunite with the pack and its home territory.



TOP LEFT: STAN TEKIELA, RIGHT: ILLUSTRATION BY BILL REYNOLDS



North Star

Little Dipper

Big Dipper

Find YOUR DIRECTION

Imagine you are, like a wolf, traveling and trying to find your way back to your home territory. You know that you must travel north, but you have no compass. Here are a few natural tricks for finding north, south, east, and west in the wild.


1 Find the North Star on a clear night. First find the Big Dipper, the dipper-shaped group of stars in the constellation Ursa Major. Then find the two stars on the outside of the dipper's cup. Imagine a line connecting those two stars and follow it up to the bright star known as the North Star, or Polaris, which always appears in the north.

2 Look for moss growing high on the trees. Moss prefers to grow where moisture lingers, so it tends to grow highest on the north side of the trunk where it is shaded from the sun.

3 Compare plants on a south-facing hillside to plants on a north-facing hill. Southern slopes with constant exposure to the hot, drying sun have far different vegetation.

4 Note the position of the sun on a clear day. It rises in the east

and sets in the west. In winter in Minnesota, the sun stays in the southern sky throughout the day.

S Study a thatch-building ant mound in summer. To take advantage of the sun's warmth, red-and-black thatch ants usually work more on the south side of their mound. They keep this side free of vegetation. Because it receives more ant traffic, the south side also slopes more than the north side does. 

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