The Pulse of the Park
Greater Yellowstone Elk Migrations

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YELLOWSTONE ELK MIGRATIONS

The Pulse of the Park

Bison, bear, wolf. Each animal is an emblem of Yellowstone National Park. But the true pulse of the Greater Yellowstone Ecosystem is measured by the hooves of elk, the park’s most abundant large mammal. Each spring trillions of these Przewalski’s free flow into the park to feed on high-alpine vegetation, then flow back out into the surrounding region when autumn snow falls. The movements of these elk herds—comparing what biologists Arthur Middleton calls the “Greater Yellowstone superherd”—support a unique complex of scavengers and carnivores that, outside the park, includes human hunters. This map is the first to use GPS data from collared elk to depict the herds’ migration corridors—Yellowstone’s arteries and veins.

The Hunting Economy

Hunting creates a seasonal migration of millions. Each year, tens of thousands of hunters travel across the states—Wyoming, Montana, and Idaho—to hunt the large herds, pumping millions of dollars into the area. A national policy to end wolf hunting can be an effective way to reduce hunting pressure, keep harvests in check, and maintain a sustainable number of elk.

An Unusual Hunt

Hunting is illegal in all national parks, but a limited harvest exception was allowed in 2014. In the Greater Yellowstone Ecosystem, more than 1,000 elk were harvested, but the hunt was sharply criticized.

Map: "Greater Yellowstone Ecosystem" by Chris Dietz. Cartography by Rick Braziel, John D. Bultman, andので。
A Visionary Proposal

Elk have always been vital to Yellowstone National Park and its adjacent lands. In 1882, U.S. Army Gen. Philip H. Sheridan was enraged to learn that as many as 4,000 elk had been slaughtered in a single winter for their hides. His prescient response was to ask that “the government extend this park... due east about 40 miles... [and] due south 10 miles”—an annexation that would increase “the area of the park by 3,344 square miles and would make a preserve for the large game of the West, now so rapidly decreasing.” Sheridan’s crusade eventually resulted in large areas abutting the park becoming protected forest reserves. The small map at right shows his proposed expansion, as well as the park’s original boundary and its current one.

Whose Yellowstone?

One of the greatest challenges for those who manage ecosystems in the complexity of landownership. And the Greater Yellowstone Ecosystem—a 22.8 million-acre, 55,935 square-mile mosaic of state, private, tribal, and federal lands, including Yellowstone and Grand Teton Parks—is nothing if not complex. For migratory elk, this means negotiating areas that range from protected summer grazing land to privately owned tracts. Development has been an ongoing concern here for decades.

U.S. Forest Service
17 MILLION ACRES | 44%
Forest Service land surrounds the core of both parks and remains protected migratory habitat. Nearly 11 million acres have been permanently protected as conservation reserves. Migrations are generally most threatened outside these areas.

Private Land
6 MILLION ACRES | 17%
Private landowners here tend to live in low-income areas. Nearly 11 million acres have been permanently protected or conserved, with 5 million acres in conservation reserves. Migrations are generally most threatened outside these areas.

National Park Service
2.9 MILLION ACRES | 7%
Land administered by the Park Service provides core protected habitat for wildlife in the Greater Yellowstone Ecosystem—a critical sanctuary for elk and many other species.

Bureau of Land Management
1.6 MILLION ACRES | 4%
This agency controls prime winter grazing grounds for elk. Abatements for cattle owned by ranchers under long-term lease are common. Oil and gas developments in the southeastern part of the ecosystem.

State and Local Land
1 MILLION ACRES | 4%
State and local authorities manage wildlife and forest lands, with thousands of non-federal habitat improvements and wildlife management practices.

Tribal Land
0.4 MILLION ACRES | 2%
Archaeological evidence dating back about 10,000 years shows that hundreds of generations of Native Americans have lived here. Today the ecosystem includes parts of the Wind River Reservation.
The Comeback of the Wolf

Gray wolves were reintroduced to Yellowstone National Park starting in 1995. Since then, their numbers have risen—and their impact on the landscape and on the elk they hunt has been the subject of fierce debate. Scientists have begun to understand that the wolves’ effect on the elk varies from herd to herd and year to year, depending on environmental factors such as how snow affects hunting and foraging. Biologist Doug Smith, head of the Yellowstone Wolf Project, believes the park’s wolf population needs to be set by natural factors, not human management.

The Hunting Economy

Hunting creates a seasonal migration of its own. Each year it brings thousands of visitors to the three states—Wyoming, Montana, and Idaho—that share the ecosystem, pumping millions of dollars into their economies. If natural predators are scarce or absent, hunting can be an effective tool in limiting disease, crop losses, and unsustainable grazing. Managing elk as a game species requires officials to keep the elk population in balance with the environment—and to keep these migrations from disappearing from the landscape.

**ELK HARVESTED**

<table>
<thead>
<tr>
<th>Share of 2014 elk kills in the ecosystem, by hunting district</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater Yellowstone Ecosystem (GYE)</td>
</tr>
<tr>
<td>Montana Elk hunters spent $138 million on food, lodging, transportation, and equipment in 2014.</td>
</tr>
<tr>
<td>Idaho Out-of-state hunters bought 11 percent of elk licenses in 2014.</td>
</tr>
<tr>
<td>Wyoming In 2014 state revenue from license sales was $10 million.</td>
</tr>
</tbody>
</table>

**ELK HUNTING BY STATE, 2014**

<table>
<thead>
<tr>
<th>Elk population</th>
<th>IDAHO</th>
<th>MONTANA</th>
<th>WYOMING</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATE</td>
<td>108,000</td>
<td>180,000</td>
<td>114,600</td>
</tr>
<tr>
<td>Elk harvested</td>
<td>GYE</td>
<td>2,710</td>
<td>7,510</td>
</tr>
<tr>
<td>STATE</td>
<td>20,600</td>
<td>25,735</td>
<td>25,905</td>
</tr>
<tr>
<td>Hunters</td>
<td>GYE</td>
<td>12,856</td>
<td>29,448</td>
</tr>
<tr>
<td>STATE</td>
<td>85,000</td>
<td>107,663</td>
<td>58,266</td>
</tr>
<tr>
<td>Success rate</td>
<td>GYE</td>
<td>21%</td>
<td>25%</td>
</tr>
<tr>
<td>Elk hunting fee*</td>
<td>RESIDENT</td>
<td>$43.50</td>
<td>$47.00</td>
</tr>
<tr>
<td>NONRESIDENT</td>
<td>$54.50</td>
<td>$89.00</td>
<td>$60.30</td>
</tr>
</tbody>
</table>

*Includes licenses, tags, and processing fees for 2016
**Sold only as combination license (includes other hunting, fishing)
A Visionary Proposal

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The Realm of the Elk

The Foundation of Yellowstone’s Ecosystem

People are hard to measure when it comes to years of habitat loss. National Park Service researchers are working to understand how changes in land use and climate are affecting the environment. This map shows the changes in land use and climate over the past 100 years, along with projections for the future. The map highlights areas that are likely to see the most change and impact on wildlife. The map also includes information on current land ownership and future planning for the Greater Yellowstone Ecosystem.
Spring Migration

Each spring tens of thousands of elk flow into the park to feed on high-altitude vegetation.

- Winter range
- Summer range
Spring Migration

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- Winter range
- Summer range
ELUSIVE SUMMIT

The largest unclimbed Dhaulagiri Range, which fringes the border of China, Myanmar, and India, has long been overshadowed by the better peaks of the Himalaya. Yet it contains a fascinating mystery. Rising from the dense jungle of northern Myanmar, Hakeholo (9,520')—thought to be the latest record in the world—remains unclimbed using a GPS. Last fed a National Geographic expedition concerned with the question of its height to visit.