Wildlife Management

Basic knowledge

This module is intended for forest managers and landowners involved in wildlife management. It outlines the purpose of wildlife management and describes some of the ecological processes, social imperatives and ownership models that underpin sustainable wildlife management.

Wildlife is a renewable resource that generates many environmental services. It plays a key role in regulating natural processes at all levels of the food chain and delivers “provisioning” services (such as those that produce food and income) to a substantial proportion of the world’s people. Wildlife typically provides cultural services, too, forming the basis of many traditions.

Wildlife management is the management or stewardship of wildlife resources by humans; it addresses game and non-game animals (that are potentially threatened) and their habitats. When people think about wildlife they tend to think about birds and mammals, but numerous other animal taxa, such as reptiles, amphibians and insects, are also subject to use by humans. Wildlife populations are managed for several reasons, such as to: control overabundance (and thereby mitigate human–wildlife conflicts); avoid over-harvesting; restore ecological processes (e.g. species’ reintroductions); and maintain populations at levels compatible with the sustained yield of products such as food, trophies and furs.

Wildlife may be subject to a wide range of uses, which can be classified broadly according to whether wildlife is removed from its habitat. Extractive (or consumptive) use generally involves reductions in wildlife populations by killing (e.g. hunting), whereas non-extractive (or non-consumptive) use implies no intrusive action on the wildlife population (e.g. wildlife photography).

The ability of many wildlife species to move freely over large areas can complicate their ownership and management. In differing social, political and legal circumstances, wildlife may be a public good, communally owned, government-owned or privately owned. Wildlife management may involve widely varying spatial scales, according to the biology and movement of particular species. It therefore often requires compromises between the interests and needs of different stakeholders, such as forest owners, farmers, hunters and tourists.

Sustainable wildlife management requires appropriate policies, social acceptability and good governance. It can be best achieved through the generation of benefits locally, which may include income (e.g. through commercial harvesting), subsistence (e.g. wild-meat consumption) and “satisfaction” (e.g. gained through recreation). In the right social and legal setting, local stakeholders with appropriate rights to benefit from wildlife can be excellent wildlife managers.
Wildlife management contributes to SDGs:

1. No Poverty
2. Zero Hunger
15. Life on Land
Managing ecological processes

Sustainable wildlife management requires an understanding of the main processes and interactions that underlie variations in animal populations. Natural ecosystems comprise organisms that eat other organisms and which are, in turn, eaten; this is called a “food chain” (or sometimes a “food pyramid”). Food chains are organized in “trophic” levels, the number of which varies depending on the complexity of the ecosystem. Trophic level 1 comprises primary producers such as plants; herbivores (“plant eaters”) constitute tropic level 2; level 3 may comprise predators of herbivores; and level 4 typically comprises apex predators.

Within a given trophic level, the abundance and distribution of a species result from the interplay of multiple biological processes, including competition between species (“interspecific” competition) and among individuals of the same species (“intraspecific” competition), which may be for food, space or a particular habitat. Species may also interact by way of facilitation, in which access to a resource for a given species is facilitated by the presence of another. In Africa, for example, some small mammals preferentially use vegetation that has been modified by larger herbivores such as elephants and buffalos. Understanding such processes provides the basis for balancing the needs of species through management.

Processes operating between tropic levels regulate wildlife populations in natural ecosystems. In natural ungulate communities, for example, populations are regulated by available food resources on the one hand (“bottom-up regulation”) and by predation and disease (“top down” regulation) on the other. The modification of one trophic level has a cascading effect in others. A classic case of this was observed in Yellowstone National Park in the United States of America in 1995, when wolves (Canis lupus) were reintroduced after an absence of more than 70 years. In the absence of wolves, the elk (Cervus elaphus) population had built up to the extent that they were having a significant impact on wildlife habitat, soils and woody plants. Species such as aspen (Populus tremuloides) and willow (Salix species) were generally unable to recruit young stems. After the reintroduction of wolves, elk populations decreased, the availability of woody plants and herbaceous forage increased, and the numbers of both beavers (Castor canadensis) and bison (Bison bison) increased. This illustrates the need for adaptive, ecosystem-based approaches to wildlife management.

Conciliating biological and social carrying capacities

The aim of sustainable wildlife management is to maintain wildlife numbers at economically, socially and environmentally desirable levels. Central to this aim is the concept of carrying capacity. Ecological carrying capacity is the maximum population size that can be sustained by a habitat indefinitely, given the resources available in the environment (which may fluctuate seasonally or over periods of several years due to cyclical changes in environmental conditions). Social carrying capacity is the density of wildlife regarded as acceptable in a given human community. While ecological carrying capacity reflects biophysical limits, social carrying capacity is largely determined by user perceptions. Social carrying capacity is therefore a subjective measure, but it is crucial in developing strategies to mitigate human–wildlife conflicts (HWCs), discussed below.
Managing human–wildlife conflicts

HWCs may occur when humans and wildlife coexist and have overlapping habitats (“human–wildlife interfaces”); they involve situations in which human activities put pressure on wildlife populations and, conversely, wildlife has a negative impact on humans. HWCs may occur at an international scale (e.g. across borders), and they may have a significant social impact. HWCs have increased in recent decades, especially in regions where human populations are growing rapidly and expanding into areas where previously few humans lived. For example, mega-herbivores and rodents can have major impacts on crop production; apex predators such as lions (*Panthera leo*) in Africa, tigers (*Panthera tigris*) in Asia and wolves in North America can pose direct threats to livestock and human safety; and certain wildlife species can spread zoonoses (e.g. bovine tuberculosis and foot and mouth disease). Sustainable wildlife management may involve culling programmes, which can benefit local communities both by reducing negative impacts and threats and by creating their own commercial benefits. In all cases, sustainable wildlife management requires reliable data on wildlife populations and biology as well as participatory processes in developing sustainable approaches.

An example of an HWC in the forest sector involves red deer (*Cervus elaphus*): populations of this ungulate species have increased rapidly in northern Europe in recent decades, with a corresponding impact on wild and cultivated vegetation. Ungulates can alter a forest’s structure and cause substantial productivity declines by fraying trees with antlers and stripping bark. Deer feed on tree seedlings (among other things) and, at high densities, can inhibit both natural and artificial reforestation. Because of their impacts on forest production, many forest managers consider high deer densities to be unsustainable. On the other hand, other stakeholders, such as hunters and the wider public, may prefer high densities of red deer because of their recreational value.

Another example of an HWC relevant to forests is human–elephant conflict in sub-Saharan Africa. The elephant (*Loxodonta africana*), one of the “big five” wildlife species in the region, is a cornerstone species of the African tourism industry, but it also causes problems, such as crop damage, for rural communities living near protected areas.

Numerous management tools have been developed worldwide to address HWCs, but most HWCs are strongly site- and species-specific. Low-cost preventative or deterrent strategies may work in some situations; in others, however, more invasive approaches, such as regulated harvesting and the relocation of wildlife or (in rare cases) humans, may need to be considered.

Extractive uses of wildlife

Wildlife may be subject to a wide range of uses, which can be classified broadly as either extractive (consumptive) or non-extractive (non-consumptive). The following focuses on extractive uses.

In North America and Europe, recreational hunting serves a population-regulation function and produces food for consumption. Many rural landscapes in these regions are composed of agricultural lands and production forests in which large predators (e.g. wolves) have been eradicated. Hunting is a low-cost method of maintaining wildlife populations (e.g. large ungulates and suids) at levels within ecological and social carrying capacities, and of conserving habitats favourable to wildlife. The number of hunters is declining throughout Europe and North America, however, and returning large predators to rural landscapes is controversial. The long-term outlook for wildlife management in North America and Europe is therefore uncertain.

Wildlife is the primary source of animal protein and income for more than 1 billion people worldwide. For example, wild-meat consumption is important for the food security and nutrition of people in the Congo Basin in Central Africa, where 60 percent of the population lives in rural areas and subsists on natural resources. Hunting is often an important source of income (e.g. for hunters and resellers): in some areas it is more important than the income generated by agriculture. Alternatives to wild-meat production, such as livestock raising (with its associated deforestation), or relying on imports, may have a greater environmental impact than the sustainable harvesting of wild meat. In many cases, however, wild-meat harvests are unsustainable, with the ultimate result that their economic, social and environmental benefits are likely to decline over time. In Central Africa, the overharvesting of wild meat has increased as the forest area subject to logging has expanded.

Wildlife management models and legal frameworks

The socio-political context and the legal framework governing wildlife ownership play important roles in shaping wildlife management systems. Wildlife can be a public good, communally owned, government-owned, or privately owned.

North America

The North American hunting model considers wildlife as a public good; thus, no individual owns wildlife, even on private land. This model stems from the mid-nineteenth century after the near-extinction of several species, such as the American bison. State governments (or, in Canada, provincial governments) regulate hunting seasons and quotas for game species. Any citizen may hunt for sport, subsistence (e.g.
food and fur), self-defence or property protection, provided she or he holds a proper licence. In addition to licensing, prospective hunters must purchase tags within the “wildlife management unit” in which they wish to hunt; one tag permits the hunting of one “head” of the game species in question. Tags may be assigned by lottery if requests exceed the quota for a given species.

In general, markets for live or dead wildlife are prohibited, although exceptions exist at the state or provincial level (e.g. the sale of lawfully taken fur-bearing animals). The funding mechanism for wildlife management in the United States is “user pays, user benefits”. Hunters cover wildlife management costs through by paying excise taxes on equipment and ammunition and by purchasing hunting licenses, tags and stamps. States use these funds to ensure viable populations of game and non-game species. Under this wildlife management model, non-consumptive users do not contribute to wildlife management costs, and profits from wildlife do not directly benefit rural people.

**Europe**

Wildlife is also considered a public good ("res nullius") in European countries, and hunting is regulated by law. The right to hunt and to bear a firearm is granted if applicants pass an exam and pay an annual licence. Depending on the country, some species (e.g. deer) are subject to annual or multi-annual quotas, which are regulated through the allocation of tags by the relevant authorities. In contrast to North America, the commercial hunting and sale of wildlife products is allowed in most European countries. In addition, the actual right to hunt in a specific area is granted to the landowner (either a private person or a communal area). This right may be exercised by the owner or transferred (rented) to a third party. A minimum area of land is required for hunting rights, which varies by country (e.g. 50 hectares in Belgium and 75 hectares in Germany). The leasing of hunting rights is a potentially important source of income for landowners, including communal areas (e.g. municipalities) and, in certain circumstances, the income generated by hunting is higher than that generated by timber harvesting. Under this wildlife management model, the profits from wildlife benefit rural people (either landowners or communal areas through rentals) directly, and conservation costs are covered indirectly by the entire society.

**Southern Africa**

The Southern African model of wildlife management is based on the devolution of wildlife management rights and benefits to private owners and communities. The guiding assumption behind this model is that wildlife management becomes more effective when local users are able to manage it and benefit from it. In recent decades, Namibia, South Africa, Zambia and Zimbabwe have decentralized state decision-making to local stakeholders, thus enabling them to benefit from the numerous opportunities presented by the wildlife tourism industry, especially trophy hunting (a high-value-added activity). The approach taken in these southern African countries has been particularly successful on commercial farmlands, where substantial areas have been converted to game ranches that generate profits mainly through trophy hunting but also through live animal sales, ecotourism and game meat production, among others.

The decentralization approach has been less straightforward on communal lands because communal property regimes (in which defined groups may collectively exploit common resources within a defined jurisdiction) need to be established. Community-based wildlife management approaches were initiated successfully in Zimbabwe in the early 1990s under the CAMPFIRE programme, although these were later hampered by political developments. Other countries have also adopted community-based wildlife management approaches; in Namibia, for example, communal area conservancies are proving to be highly successful.

**Central Africa**

In Central Africa, where hunting provides livelihoods and wild meat for subsistence, laws generally recognize the subsistence rights of local people but prohibit commercial activities. Wildlife management remains centralized and dominated by a protectionist ideology. In a context of failing centralized governance and complex land-tenure systems, wildlife is not managed as a collective asset, and hunting laws are either non-existent or rarely applied. Hunting is also often constrained by multiple arbitrary restrictions (in terms of hunting seasons, allowable species, quotas and modes of hunting), the relevance and implementation of which are questionable. Although hunting is not forbidden, a large majority of practices in sub-Saharan Africa are illegal. As a result of the often complex and arbitrary nature of laws governing hunting in the region, the practice is usually consigned to the informal economy, thereby depriving governments of tax revenues, minimizing the potential for adequate funding of wildlife management, and exacerbating the unsustainability of off-takes.

**Keys for achieving sustainable wildlife management**

The overarching aim of wildlife management is to achieve a triple bottom line: economic, social and environmental sustainability. Wildlife management strategies must be adaptive, and they must account for the ecological and social carrying capacities of a given area. Wildlife management is most successful when wildlife is used sustainably to generate economic returns. To ensure sustainability, biological processes need to be understood and monitored and the sociocultural interests of local communities taken into account in management decisions.
The tools and case studies provide further information on sustainable wildlife management.
Further learning


Credits

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