



RESEARCH ARTICLE

Birds and Ecosystem: A Critical Review

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ABSTRACT

Birds are fascinating creatures of nature. We feel pleasure and happiness to see them. Children mad about birds and much more. From the ecosystem point of view, birds are very important. They serve us in many ways which may be not noticed by common man and other than biological persons. They do play important role in food chain and food web. Vultures are best scavengers to clean earth. This review article is about to explore and show how birds are doing their services silently for ecosystem and for us.

Key words: *Birds, Ecosystem, Environmental Indicators*

INTRODUCION

Birds are important because they keep systems in balance: they pollinate plants, disperse seeds, scavenge carcasses and recycle nutrients back into the earth. But they also feed our spirits, marking for us the passage of the seasons, moving us to create art and poetry, inspiring us to flight and reminding us that we are not only on, but of, this earth. -Melanie Driscoll, Director of bird conservation for the Gulf of Mexico and the Mississippi Flyway. The sheer ubiquity of birds makes them almost unavoidable (Millennium Ecosystem Assessment Findings, 2005; Whelan *et al.*, 2008).

TRADITIONAL VALUE OF BIRDS

Birds are present throughout almost every habitat across the globe. No matter where you go, there is always evidence of birds even if you don't see the animals themselves. Things like holes pecked in tree bark by woodpeckers or the remnants of a nest are indicative of the presence of birds. While such marks left behind by these animals may seem insignificant, in many cases the activities of birds can have large consequences for the ecosystems they inhabit, making them incredibly important in the overall functioning of various ecosystems (Gangoso, *et al.*, 2013).

By contributing in such an important way to ecosystem health, birds can provide a number of direct benefits to humans. The Millennium Ecosystem Assessment, a study initiated by the United Nations, coined the term "ecosystem services" to describe these kinds of services. According to this panel, ecosystem services fall into four broadly defined categories and as we survey the diversity of birds across the globe, we find many ways in which the activities of birds provide services in each one of these (Costanza, *et al.*, 2006).

BIRDS SUPPORTING SERVICES

Actions within this category are those that are required for all other ecosystem services to be produced, such as nutrient cycling and the formation of soil. This category can be thought of as a foundation of processes without which other ecosystem services could not be produced. Birds can help in these services by nutrient cycling, which has been documented in many habitats. By spreading activities through different habitats, birds can move nutrients from one place to another, which is particularly relevant in places where plant growth is limited by nutrient availability. A

study on the islands in the Gulf of California showed that when birds roosted on them, the guano deposits they left behind provided nutrients to plants on the island. As a result, islands with seabirds had plants that grew taller and faster and were much more productive than those on islands without birds. Because the quality of these plants impacts the number of consumers and the structure of the food web, these birds exerted a bottom-up effect on the food web by regulating primary productivity (Whelan, *et al.*, 2008).

Birds are also capable of stimulating primary productivity in other ways, which supports the functioning of ecosystems, an example exhibited by birds in salt marshes. In Alaska, lesser snow geese and Canada snow geese stopover in salt marshes during spring migrations. While they are foraging in these marshes, they trample the ground, which tears up leaf litter and incorporates it into the soil. The smaller particle size and increased contact with the soil promotes greater decomposition, freeing nitrogen from the leaf litter and allowing it to cycle through the ecosystem (Perveen, *et al.*, 2010).

In the southeastern United States, cordgrass is the dominant plant in salt marshes. The salt marsh periwinkle is a major predator of cordgrass and in the absence of predation; these snails can overgraze the grasses and completely convert a productive marsh into mudflats. Predation of snails controls their numbers, which regulates primary productivity of salt marshes. Several species of birds such as oystercatchers, curlews, and plovers are predators of these snails and exert top-down population controls, which prevents overgrazing. In terms of the dollar value of services provided to humans, wetlands are considered one of the most valuable habitats, providing an array of important services like shoreline stabilization and water filtration. The presence of birds in these habitats ensures ecosystem functioning, allowing humans to gain the maximum benefit from these valuable ecosystems (Anderson and Polis, 1999).

Many of the support services mentioned above can also be classified as provisioning services, our next category. Provisioning services encompasses products that we harvest from ecosystems and we can find many examples of activities in this category by examining how birds can positively impact the raising of crops and livestock (Perveen, *et al.*, 2010).

MUTUAL RELATIONSHIP

Mutualistic relationships between birds and livestock can also be beneficial to humans. Many birds perch on livestock like cattle and forage on insects that live on them. Cattle egrets are particularly well known for making a living this way, and although they are native to Africa, their range has expanded dramatically concurrent with increases in the clearing of land for farming. While the birds benefit from a readily available food source, the animals on which they forage benefit from the removal of harmful parasites. In many parts of the world, people rely on cows for food and for milk. When infested with ticks, cows can become anemic and milk production flags. In Pakistan, birds are capable of effectively preying on these parasites, leading to healthier and more productive cows. This predation by birds is even more effective than pesticides in some cases. Through these interactions, humans gain a benefit by not spending money on expensive pesticides and by having more productive and healthier livestock (Zacheis, *et al.*, 2002).

In this category, we group the benefits that are gained from the regulation of ecosystem processes. This includes services such as carbon sequestration, waste decomposition, and air purification. As with the other categories, there is no shortage of bird contributions to services in this arena (Greenberg, *et al.*, 2000).

Birds are important scavengers in many ecosystems, removing the carcasses of dead animals. While vultures are probably the best known for this, many types of birds opportunistically scavenge on this food source when it is available. In the Serengeti of Africa, vultures are capable of consuming hundreds of pounds of dead meat per kilometer annually and in Yemen, vultures can remove up to 25% of the organic waste produced in towns by humans. Scavenging by birds is an important mechanism of waste disposal in many areas and prevents the outbreak of diseases than can occur

through the accumulation of animal carcasses. In India, declines in vultures led to increases in feral dogs as there was less competition for carrion as a food source (Anderson and Polis, 1999).

By germinating the seeds of trees, birds can contribute to the reforestation of deforested lands, diminishing the costs of restoration. In oak forests in Sweden, the cost of replacing the seed dispersal services of Eurasian jays in oak regeneration is an estimated \$9,400 per hectare. Birds provide a valuable service in the expansion of forests, which sequester carbon and perform a number of other services that stand to benefit humans (Costanza, *et al.*, 2006).

Birds also serve a number of cultural roles and factor heavily into religions across the globe. For example, eagles are considered sacred messengers that carry prayers to the spiritual world in many Native American religions. Eagle feathers are believed to have holy powers and capturing eagles to remove the feathers is part of a sacred ritual. In many religions, vultures are considered deities that play a large part in their mythology and traditions. While it is difficult to place a dollar value on services within the cultural category, they are just as important because the spiritual enrichment and appreciation of nature that birds provide is an essential part of the human experience.

BIRDS ARE ENVIRONMENTAL INDICATORS

This intangible value comes from knowing our world is still large and healthy enough to support a variety of bird species. Birds are recognized as one of the most important indicators of the state of the environment. Because they are sensitive to habitat change and because they are easy to census, birds are the ecologist's favorite tool. Changes in bird populations are often the first indication of environmental problems. Whether ecosystems are managed for agricultural production, wildlife, water, or tourism, success can be measured by the health of birds. A decline in bird numbers tells us that we are damaging the environment through habitat fragmentation and destruction, pollution and pesticides, introduced species, and many other impacts. Birds are a part of the balance of nature. There is strong interdependence between all living things in the gigantic web of life and the removal of even the smallest form of life may in time endanger the entire structure. The conditions of clean air, food, healthy plants and safe places to raise young that make good homes for birds and other wildlife, also make good homes for people; a habitat good for birds is a good environment for people. In addition to the joys they bring to people's lives, birds are also valuable for economic reasons. Birds have ecological value as important elements of natural systems (Markandya, *et al.*, 2008).

INSECTS CONTROL BY BIRDS

Birds provide insect and rodent control, plant pollination, and seed dispersal which result in tangible benefits to people. Insect outbreaks can annually destroy hundreds of millions of dollars of agricultural and forest products. Purple Martins have long been known as an effective means to substantially reduce insect pest populations without the health and environmental costs (not to mention the economic costs) of harmful pesticides. Birds play a critical role in reducing and maintaining populations of insects in natural systems. Birds eat up to 98% of budworms and up to 40% of all non-outbreak insect species in eastern forests. These services have been valued at as much as \$5,000 per year per square mile of forest, potentially translating into literally billions of dollars in environmental services. Many farmers know the role birds play in helping to control agricultural pests. Birds can destroy up to 98% of over-wintering codling moth larvae, a major pest of apples worldwide (Whelan *et al.*, 2008).

BIRDS AND FERTILIZATION OF FLOWERS

These types of birds are called "pollinators", meaning that they help to fertilize flowers, especially by cross-fertilization. "Pollinators are attracted to the flowers by colors, scents, and nectars" (Answers, Yahoo.com, anonymous). The structure of the flower makes sure that the bird or other pollinator gets a dusting of pollen to take to the next flower it visits. The flower may be

ornamental- valued for its appearance or agricultural valued for its food production, like tomato and squash flowers. Without birds and other pollinators (bees, wasps, flies, bats, etc.), certain plants would not be able to reproduce themselves or provide us with foods such as apples, peaches, and strawberries (Gangoso, *et al.*, 2013).

SOME BIRDS PROVIDE PEST CONTROL

Many birds eat insects, providing humans with pest control. The insects eaten by birds include aphids, mosquitoes, Japanese beetles, European corn borers, and other bugs. Other organisms that birds eat include worms, spiders, and snails. If you attract bug-eating birds like bluebirds and chickadees to your garden, then you don't need to use insecticides. The birds will eat up the pests you don't want: grasshoppers, beetles, crickets, and caterpillars. Throughout history, birds have helped humans by saving crops from pest damage or destruction. According to one website, birds have saved potato fields, fruit orchards, cranberry bogs, wine grapes, and wheat crops. Birds also eat forest pests, which helps save trees needed for lumber or to hold the soil on steep hillsides (Johnson, *et al.*, 2010).

SOME BIRDS HELP TO CONTROL WEEDS

Bird species such as finches, towhees, crows, blackbirds, and sparrows eat weed seeds. This makes them partners with humans in controlling unwanted plants. Seed-eating birds will consume seeds of nettle, grass, crabgrass, pigweed, and ragweed. In addition, bird-friendly landscaping uses native plants, which use less water and are more resistant to diseases than exotics you bring in. Native plants require less work from you to maintain them. Your local university extension service and magazines such as Organic Gardening offer sources for lists of native plants that will grow well in your climate zone. Native plants will also help to attract bees to your garden (Gangoso, *et al.*, 2013).

SCAVENGING BIRDS REDUCE DISEASE OUTBREAKS AND RECYCLE NUTRIENTS

The scavenging birds include vultures, crows, eagles, ravens, ospreys, kites, magpies, falcons, condors, owls, and gulls. The scavenging birds quickly and effectively dispose of carcasses of dead animals they find, especially road kill. Getting rid of carcasses reduces the chances for diseases to spread. The activities of scavenging animals are seen today in suburban and rural settings. They dispose of the bodies of animals such as deer, skunks, opossums, and raccoons that are killed by cars as the animals try to cross the road. The scavenging birds are not choosy about what they eat. They will consume meat from any dead animal, as well as garbage dumped by people along roads or in fields. The fruit-eating birds consume seeds as they eat apples, raspberries, cherries, elderberries, blueberries, and strawberries. All fruits that are suitable for human consumption are also nutritious for birds. Birds will also eat other types of fruit that are not typical human foods, as well as damaged or overripe fruit that would not be good for humans. Robins, bluebirds, chickadees, scarlet tanagers, blue jays, waxwings, and mockingbirds are some of the species of birds that love to eat fruit (Costanza, *et al.*, 2006).

CONCLUSION

In the last but not least we can conclude this review to give a message to the researcher to explore and highlight the role of birds in ecosystem management which in turn beneficial to us. Generally modern researches belongs to money making market like medicine and targeted researched funded by companies. But we as a part of ecosystem cannot ignore the value of birds. It is the need of time to concentrate on ecosystem balance with the help of natural creatures like birds.

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