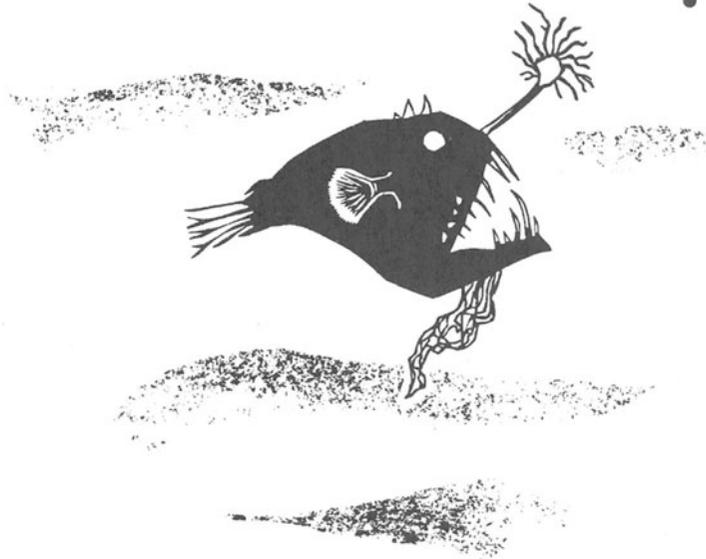


SECTION



BROAD BRUSHES AND TAXONOMIC
TOURS: SUMMARIES OF THE
STATE OF THE NATURAL WORLD



One of the most maddening aspects of the science of conservation during the last two decades has been the inaccurate, misleading, and unreliable statistics about extinctions and habitat loss promulgated to those writing about conservation. Ecologists included. Some conservationists have both freely offered dire “facts” about the loss of rainforests or coral reefs, and bemoaned how little we actually knew. In the last decade, however, a number of conservation biologists have gone to work and produced reliable, up-to-date, and referenced statistics on the state of the natural world. Thus one piece of good news proffered in this section is that we now have solid data on the past and present fate of many plants, most vertebrates, and some invertebrates on continental scales.

In this section we collected five works from ecologists with nearly two centuries of field experience collectively. Two chapters provide paradigmatic examples of aquatic habitats and their denizens; one chapter speaks to the extraordinary flora of Australia and how a 7,682,300 km² chunk of real estate can be unique in a number of ways; another chapter provides a fascinating look at recent reptilian extinctions and why habitat patch size matters; and a final chapter illustrates the still deplorable state of our knowledge of insect biodiversity. There are generalizations to be made from this survey, and they illuminate.

The most common thread woven by our contributors throughout this section is that threats to biodiversity include the same rogues gallery just about everywhere. Some taxonomic groups and some habitats are indeed in reasonable shape, being still abundant in numbers or area. But many regions have endured great declines in species richness, losses of endemic taxa, and concomitant physical degradation.

Most specific to aquatic environments, pollution can be egregious and acute, as the *Exxon Valdez* incident clearly illustrates. Ruckelshaus and Hays explain that even the most closely watched environmental disaster on the west coast of North America did not provide unambiguous data on the impacts of the oil spill to the large marine mammal populations in Prince William Sound. Pollution in aquatic environments is also insidious and chronic, and may be a bigger problem to the maintenance of biodiversity than large, acute oil spills. Sublethal pollutants cause fishes to disappear gradually for a host of reasons, including stress-related diseases. While providing a less tractable statistic than dead sea otters washed ashore, depressed reproductive outputs coupled with crippling heavy metal and pesticides loads in aquatic organisms worldwide may be far more harmful than a single dramatic event like an oil spill.

Another recurrent theme throughout this section is the devastating effects humans have had on a great many taxonomic groups and ecosystems. According to Case and his colleagues, the background rate of reptilian extinctions in recent times has been exaggerated in the presence of humans. For small islands, evidence suggests that humans have increased local extinction rates by an order of magnitude. In aquatic systems, marine or freshwater, habitat loss coupled with overfishing has clearly led to a number of extinctions of fish species. The problem is exacerbated by the inherent difficulties of obtaining reliable population estimates, statistics that traditionally provide an early warning of species in decline. Ruckelshaus and Hays cogently explain that human effects are particularly pernicious for species with complex life cycles that encompass both marine and freshwater

habitats, such as Pacific anadromous salmonids (*Onchorynchus* spp.). Leidy and Moyle provide additional examples for many threatened fishes, with some of the most chilling “horror stories” about biodiversity loss stemming from even “helpful” human meddling. The loss of perhaps 200 species of cichlids due to the introduction of the predatory Nile perch (*Lates niloticus*) into Lake Victoria to “improve” the fisheries needs only to be told once to make the point that humans have irreversibly altered aquatic ecosystems on a landscape, indeed continental, scale.

Hopper’s contribution on the flora of Australia, however, resonates with a unique perspective. Australia is the “oldest, flattest, driest, and most isolated continent.” While it shares the same threats to its flora and fauna as other islands (and other continents), loss of biodiversity is particularly disheartening here because, for example, the continent contains about 10% of the world’s flora, with endemism hovering at 85%. Hopper suggests that the state of Western Australia alone holds more species of threatened plants than most countries of the world, due primarily to habitat loss and the invasion of exotic species.

An accounting of insects also provides a sobering look at large-scale phenomena. However, data are slim, as Schulz and Chang reveal that only 6% of our conservation literature is aimed at 80% of our planet’s biodiversity. While the absence of natural history information and habitat fragmentation are problems endured by all the taxa in this essay collection, the crux of Schulz and Chang’s message is that some problems are particularly vexing to successful protection efforts of insect biodiversity. Such problems include fluctuating population sizes over orders of magnitude not seen in most other taxonomic groupings, the plaguing issue of management scale, and the uncertainty that seminatural landscapes can provide suitable habitat.

Some satisfaction should be derived from the knowledge that, to some degree and for some species and ecosystems, we now know what we have as well as what we don’t have. But to paraphrase Daniel Boorstein, former librarian of Congress, the greatest obstacle to our progress in conservation is not our glaring ignorance, but the illusion of knowledge about the natural world. The contributors herein hold no illusions about the scope of their surveys and the generalizations that result, but offer them instead, as simply a place to start.