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## A FIELD OF GREEN? THE PAST AND FUTURE OF ECOSYSTEM SERVICES

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### INTRODUCTION

In understanding the power and challenge of ecosystem services, it is best to start our story fifteen years ago, beneath the blazing Arizona desert sun. There, on September 26, 1991, walking through a crowd of reporters and flashing cameras, eight men and women entered a huge, glass-enclosed structure and sealed shut the outer door. Their 3.15 acre miniature world, called Biosphere II, had been designed with no expense spared to re-create the conditions of the earth (presumably, named Biosphere I). Biosphere II sought to re-create a truly self-sustaining environment, complete with designer rainforest, ocean, marsh, savanna, and desert habitats. The eight plucky adventurers, so-called "Bionauts," intended to remain inside this micro-world for two years. By sixteen months into their adventure, however, oxygen levels had plummeted 33%, nitrous oxide levels had increased 160-fold to levels causing brain damage, ants and vines had overrun the vegetation, and nineteen of the twenty-five vertebrate species had gone extinct, as well as all of the pollinators. The experiment was abandoned.<sup>1</sup>

What went wrong? With a budget in excess of \$200 million, the designers of Biosphere II had tried to establish biological systems capable of re-creating the basic services that support life itself — services such as purification of air and water, pest control, renewal of soil fertility, climate regulation, pollination of crops and vegetation, and waste detoxification and decomposition. These services of nature, known as "ecosystem services," are often taken for granted, yet are absolutely essential to our existence, as the inhabitants of Biosphere II ruefully learned.<sup>2</sup>

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<sup>1</sup> Thomas H. Maugh, *2 Years Inside a Living Lab -- Is it Science or a Stunt?*, L.A. TIMES, Sept. 23, 1991, at 1; David Tilman and Joel Cohen, *Biosphere 2 and Biodiversity: The Lessons So Far*, 274 SCI. 1150, 1150 (Nov. 15, 1996); Tim Radford, *The Buck Stops Here: How Do You Calculate the Real Value of the Earth's Life Support System*, GUARDIAN, Mar. 6, 1997, at 6.

<sup>2</sup> In addition to those listed above, other ecosystem services include mitigation of floods and droughts, biodiversity, and cycling of matter. NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 3 (Gretchen Daily ed., 1997) [hereinafter Daily].

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