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## Global Complexity of Ecosystem and its Management

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### DESCRIPTION

Ecosystem management is a natural resource management approach that seeks to ensure the long-term sustainability and persistence of an ecosystem's functions and services while also meeting socioeconomic, political, and cultural needs. Although indigenous communities have used sustainable ecosystem management approaches for millennia, the concept of ecosystem management emerged formally in the 1990's as a result of a growing appreciation of the complexity of ecosystems, as well as humans' reliance and influence on natural systems. Ecosystem management, which builds on traditional natural resource management, integrates ecological, socioeconomic, and institutional knowledge and priorities through diverse stakeholder participation. Unlike command and control approaches to natural resource management, which frequently result in declines in ecological resilience, ecosystem management is a holistic, adaptive method for assessing and achieving resilience and sustainability. As a result, implementation is context-dependent and can take various forms, such as adaptive management, strategic management, and landscape-scale conservation.

The long-term sustainability of ecosystems' production of goods and services is a fundamental principle of ecosystem management, as "intergenerational sustainability is a precondition for management, not an afterthought." Ideally, there should be clear, publicly stated goals in terms of the system's future trajectories and behaviors. A solid ecological understanding of the system, including connectedness, ecological dynamics, and the context in which the system is embedded, is also required. Understanding the role of humans as ecosystem components, as well as the use of adaptive management, is also essential. Ecosystem management can be used as part of a wilderness conservation strategy, but it can also be used in intensively managed ecosystems. Strategic management in ecosystem management encourages the establishment of goals that will sustain an ecosystem while keeping socioeconomic and political policy drivers in mind. This approach differs from others in that it emphasizes stakeholder involvement, relying on their feedback to develop the best management strategy for an ecosystem. Strategic management, like other methods of ecosystem management, prioritizes evaluating and reviewing any impacts of management intervention on an ecosystem, as well as flexibility in adapting management protocols in response to new information.

F. Dale Robertson, former Chief of the United States Forest Service, coined the term "ecosystem management" in 1992. "By ecosystem management," Robertson explained, "we mean an ecological approach that blends people's needs and environmental values in such a way that the National Forests and Grasslands represent diverse, healthy, productive, and sustainable ecosystems." There are numerous additional definitions of ecosystem management, though most of them are ambiguous. Ecosystem management, for example, is informed by ecological and social factors, motivated by societal benefits, and implemented over a specific timeframe and area, according to Robert T. Lackey. Ecosystem management, according to Stuart Chapin and co-authors, is guided by ecological science to ensure the long-term sustainability of ecosystem services, whereas Norman Christensen and co-authors emphasize that it

is motivated by defined goals, employs adaptive practices, and accounts for the complexities of ecological systems. According to Peter Brussard and colleagues, ecosystem management should strike a balance between preserving ecosystem health and meeting human needs.

#### **CONCLUSION**

Ecosystem management remains ambiguous and controversial as a natural resource management concept, in part because some of its formulations are based on contested policy and scientific assertions. These assertions are critical to comprehending much of the controversy surrounding ecosystem management. Professional natural resource managers, who typically work within government bureaucracies and professional organizations, frequently conceal debate over contentious claims by portraying ecosystem management as an evolution of previous management approaches.