
Golf Course Benefits

Introduction

The purpose of these projects is to document and quantify the influence of golf courses on people, other biological organisms, and environmental factors. The studies include research pertaining to the influence of golf courses on:

- Local soil and climate, pollutants that affect air quality, soil stabilization and watershed management, and noise modification
- Biological diversity of flora and fauna in urban and urban-agriculture fringe areas
- Psychological and physical well-being of people, and the importance of landscape aesthetics to humans

Spectrum Research, Inc.

Golf Course Management and Construction: Environmental Issues - Dr. James C. Balogh and Dr. William J. Walker

Golf Course Management and Construction: Environmental Issues was published by Lewis Publishers, Inc. in June 1992. The book presents a comprehensive summary and assessment of the technical and scientific research on the environmental effects of turfgrass management and, to a smaller extent, golf course construction. The book is intended as an introduction to the concepts of the non-point source environmental impacts of turfgrass management for turfgrass scientists and specialists, landscape and golf course architects, developers of turfgrass systems and golf courses, golf course superintendents, environmental scientists, and land use regulators.

The book is organized into eight chapters. The introduction provides an overview and historical perspective regarding turfgrass management and environmental quality. The second chapter discusses the relationship of turfgrass management to the critical issues of water resources. This chapter focuses on the issues of water use, water quality, soil and water conservation, and movement within the hydrological cycle. Chapters three and four provide a comprehensive scientific review and assessment of the literature regarding the environmental effects of nutrient and pest management practices. The fifth chapter provides an introduction to concepts necessary for development of integrated management systems for turfgrass. Chapter six covers the direct and indirect effects of

golf course management and construction on wildlife and aquatic organisms. The seventh chapter is an introduction to the critical issues of conservation and protection of wetlands which has emerged as a critical environmental concern of the 1990's. Chapter eight contains tables of aquatic and terrestrial toxicity tests related to the effect of chemicals used for turfgrass management.

Each of the chapters includes a section on research and information needed to resolve the issues surrounding the positive and potentially adverse effects of turfgrass management. In less than one year *Golf Course Management and Construction: Environmental Issues* has sold nearly 2,000 copies. This comprehensive review has received numerous positive comments and is necessary reading for those heavily involved with the environmental issues confronting golf courses.

Texas A&M University

Quantification and Validation of the Beneficial Contributions of Golf Course Turfgrasses - Dr. James B. Beard and Dr. Robert L. Green

The value of most industries is measured by income derived from products or services. However, this is not entirely germane to a major portion of the diverse turfgrass industry. Rather, the value encompasses a range of beneficial contributions to our environment and quality-of-life that are not easily quantified in monetary terms. Thus, the objective of this study was to conduct a detailed assessment of the research literature to obtain a valid scientific base source of information documenting the benefits of turfgrasses.

Over 400 scientific references were identified, obtained, and assessed. Some were difficult to obtain as they were in obscure reports. Much time was spent in conducting over 170 personal phone calls with individuals involved in the actual research. In addition, much time was devoted to assessments of the scientific soundness of the research, including the experimental methodology, actual conduct of the experiments, and valid interpretation of the results. An extremely diverse range of technical subjects were addressed. Scientists knowledgeable in these individual specialties were contacted to confirm the validity of the research papers being considered for citation.

A total of 116 scientific papers were identified as most germane to the objectives of this project. The principle charge from the USGA Environmen-

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tal Research Committee was to develop a scientifically based paper on the benefits of turfgrasses targeted for publication in a peer reviewed scientific journal. The paper was completed and reviewed by fourteen key world-respected scientists representing the broad range of technical subjects addressed. It also was reviewed by Texas Agricultural Experiment Station personnel, approved for publication and submitted to the Journal of Environmental Quality.

The topic areas include: (a) turfgrass evolution; (b) history of turf use; (c) turfgrass functional benefits including soil erosion control and dust stabilization, ground water recharge and surface water quality, organic chemical decomposition, carbon sink, heat dissipation, noise abatement, glare reduction, decreased noxious pests, allergy related problems, safety in vehicle operation, security for vital installations, and wildlife habitat; (d) turfgrass recreational benefits; (e) turfgrass aesthetic benefits including improved mental health via a positive therapeutic impact and contributions to social harmony and improved occupational productivity; (f) contemporary issues such as water conservation and ground surface water quality preservation as related to pesticide and fertilizer use.

This has been a rewarding and enlightening project and a new perspective has evolved concerning the environmental issues challenging the golf courses. This position paper, and other USGA projects, are needed first steps to address environmental issues. However, the lasting solution will be achieved from the golf course industry and environmental groups working together to achieve common goals and objectives.

The Earth Fund

On Course with Nature - Dr. Donald F. Harker

This project has adapted information on ecoregions across the United States for use in naturalizing landscapes around golf courses. The result of this effort will be the *Landscape Restoration Handbook* which will be published in June 1993. By increasing the natural areas around the golf course, it is hoped to increase or preserve wildlife habitat.

Earth Fund researchers look at golf courses as valuable green space within the urban environment. Golf courses, however, are not regularly cited in scientific literature concerning wildlife habitat, and more often receive negative attention in popular

press. This project surveyed the literature on natural areas and established woodland size, vegetation structure, and other information to encourage wildlife usage of golf courses. The United States is already divided into natural ecoregions and the book developed from the project describes how to recreate or manage the natural vegetation on the site.

Lists of native plant species and nurseries in the United States that produce these materials was incorporated into the book. The landscape side of the problem, or the "how to do it" principles, are a major portion of the book. Careful attention to recommendations on adapted plant materials for a region was emphasized. A detailed map of the United States indicating the natural ecoregions and plant communities was developed and will be included in the book. Landscape architects and horticulturalists can use this map and then go to a nursery to select suggested plant species. Currently, native plant species do not have something similar to this approach, and the project will help a great deal to meet this need.

From an urban planning perspective, the book could help develop scenarios for natural corridors through urban areas by linking golf courses, parks, and larger tracts of land. The concept of 'sustainable development' and 'quality of life' also were covered. The *Landscape Restoration Handbook* will be available in June 1993.

The Institute of Wildlife and Environmental Toxicology

The Effects of Golf Course Activities on Wildlife - Dr. Ronald J. Kendall

The Institute of Wildlife and Environmental Toxicology (TIWET) at Clemson University has conducted numerous studies on the environmental effects of pesticides used on golf courses. TIWET, with USGA funding, initiated research in golf course management practices to institute environmentally sound approaches based on knowledge of chemical use, fate and effect. Resulting information will aid in the development golf course management practices that provide satisfactory playing surfaces, without damage to the environment.

The basic objective of the project was to understand the "golf course ecosystem." This includes an understanding of how birds, fish, and plants respond to golf course chemical inputs, as well as pesticide and nutrient behavior in water, soil, and