1994

Theory and practice of sustainable landscape design: a case study of the firm of Steve Martino & Associates

Kristin Elizabeth Schwab

Iowa State University

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Theory and practice of sustainable landscape design:
A case study of the firm of Steve Martino & Associates

by

Kristin Elizabeth Schwab

A Thesis Submitted to the
Graduate Faculty in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF LANDSCAPE ARCHITECTURE

Major : Landscape Architecture
Department : Landscape Architecture

Iowa State University
Ames, Iowa

1994
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ACKNOWLEDGMENTS

I would like to extend my sincere gratitude to Steve Martino for his cooperation, time, and interest in this project. In addition to the hours of interviewing, discussing and touring his project sites with me, he personally contacted all of the selected clients, associates, and collaborators to request their cooperation in the study. All of the photographs included as figures in the case study report are from Martino's archives, unless otherwise noted in the list of figures. He also provided the many plans and sketches used to illustrate the projects.

I also wish to recognize the influence which Rob Thayer has had in the development of my thoughts on sustainability. As my undergraduate advisor at University of California at Davis, he instilled in me an interest in pushing the bounds of traditional landscape design. His thoughtful and articulate writings have continued to be a source of clarity and direction in my learning.

Both Mark Chidister and Mira Engler of Iowa State University have been important influences in the evolution of this thesis. Mark's assistance in my articulation of the thesis problem and his constructive critiques and discussions are appreciated. Mira's teaching and research in vernacular landscapes, community design, and waste landscapes have been invaluable in the shaping of my thoughts. Gary Atchison and Mike Duffy have provided needed input as thesis committee members in their respective fields of ecology and economics.

Finally, I want to thank my husband, Rich, for his technical advice and especially his personal support and encouragement throughout the process of this study, and my parents, Tom and Marsha Peltzer, for their lifelong support.
CHAPTER I: THE PROBLEM

Introduction

This thesis explores the evolving meaning of sustainable landscape design and its implications for the practice of landscape architecture. It responds to the lack of recognized criteria for applied sustainable landscape design by, first, synthesizing the literature on sustainable landscape design into a set of criteria for analyzing the practice and products of sustainable landscape design. The criteria are tested in the case study of a landscape architecture firm whose work has been suggested to exemplify state-of-the-art sustainable landscape design.

"Sustainable" is a term which has grown in use over the past few decades, as concern for increasing degradation of ecosystems and mass-consumption of nonrenewable resources mounts. It carries specific qualitative and quantitative connotations which set it apart from other terms, such as "green" or "ecological", born of the environmental movement. As such it holds more potential for emerging from the realm of ideological rhetoric into practical application.

Though the term "sustainability" has entered the professional jargon of many fields, use of the term is clouded by a lack of widespread understanding of its meaning and relevance to our daily lives. There is a tendency to think of sustainability as the ultimate panacea for our environmental and social ills. In order to transcend this association with an idealized, utopian existence we must begin with a baseline definition from which to direct the discussion. A meaning which is becoming a widely recognized starting point for the understanding and application of sustainability comes from the definition of "sustainable development" by the United Nations' World Commission on Environment and Development (WCED):

Meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987, p. 8).
This definition has implications for the variety of social, economic and political interests which comprise society. The character and form of the built landscape is a holistic manifestation of the values inherent in our social, economic and political systems; the astute observer of the landscape can read it like a historical text or a social commentary. Highways, subdivisions, parking lots, and manicured, chemically-treated lawns, for example, are a tangible testament to our value for mobility, convenience, and pastoral beauty. Landscape architecture, though a relatively small profession, has a unique potential to contribute to the diffusion of the needed change in these systems and, ultimately, our values, through its unique combination of artistic interpretation of culture and ecology, and technological and ecological expertise.

From its counter-culture beginning over twenty years ago, the environmental movement, and now the call for sustainability, has developed into a mainstream concern, symbolically underscored by the current presidential administration's environmental agenda. Within the landscape architectural profession, as well as other environmental design fields, there is increasing recognition that practice can and must change to accommodate the public's growing receptiveness and demand for environmentally sound design solutions. In addition to the public demand, there is a long-standing ethical imperative for landscape architects to apply sustainable design principles in their work. As self-proclaimed "stewards" of the land, our ideological foundations and scholarly theory in ecological and sustainable design have produced few examples of such ideology and theory in the built landscape.

While there is growing agreement on the worthiness of sustainability as a goal and a widespread call for action, it has substantially different meanings and practical implications for different groups of people (Kothari, 1990). The following discussion introduces the basic tenets of sustainability and the specific problems of its implications for the practice of sustainable landscape design to which this research responds.

**Sustainability: three basic tenets**

The WCED definition of sustainability -- "Meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs" -- can be further understood by examining other definitions:
If an activity is sustainable, for all practical purposes it can continue forever (IUCN, UNEP, WWF, 1991, p.10).

[Sustainable Development entails] improving the quality of human life while living within the carrying capacity of supporting ecosystems (IUCN, UNEP, WWF, 1991, p.10).

Sustainability implies that the use of energy and materials in an urban area be in balance with what the region can supply continuously though natural processes such as photosynthesis, biological decomposition and the biochemical processes that support life (Van der Ryn and Calthorpe, 1986, p. ix).

While these definitions produce many more questions than they answer, they share an emphasis on what can be considered the primary tenet of sustainability:

Sustainability requires that we live within the carrying capacity of Earth's ecosystems.

Miller defines carrying capacity as "Maximum population of a particular species that a given area of habitat can support over a given period of time" (Miller, 1990, p. A6). This notion of the Earth's limited ability to sustain life seems obvious, but is clearly not recognized by contemporary society. The difficulty of measuring carrying capacity, especially given our increasingly global world view, has contributed to the denial of limits. While many propose that even at a global scale humans are living far beyond the Earth's carrying capacity, the ability to be supported by a local or regional resource base has become unrealistic given our contemporary economic, political, and technological systems. Compounding the difficulty of determining carrying capacity are questions which arise from the definition itself, such as: What constitutes "support"? What is the "given period of time" that we ought to be concerned with? What scale should we be concerned with in determining the "given area"? Having definitive answers to these questions will eventually become important; the fact that they are being asked is the critical first step.

Recognizing the existence of an ecological carrying capacity and attempting to define and heed it requires the recognition of two secondary tenets of sustainability:
Human well-being depends on ecosystem survival and function.

Sustainability must consider the importance of cultural needs and values in addition to physical needs in contributing to human survival.

- both of which are best understood by looking at the relationship between sustainability and development. Human interaction with the physical environment is driven by one central activity or goal: development. Viewed in the context of the last one hundred years, development implies exploitation and unlimited growth. As such, putting the words "sustainable" and "development" together reads as an oxymoron. "Sustainability and development are superficially appealing ideas, but suggest an essential incompatibility" (Hough, 1989, p.42). This apparent conflict begs the central question in the exploration of sustainability: "Can any human activity be accurately termed sustainable?

Skeptics dismiss sustainability as an unrealistic, unachievable goal for human society. They believe that the only truly sustainable systems are those found in "natural" ecosystems untouched by human activity. The regenerative quality of such ecosystems, accomplished through the continuous recycling of physical matter, contributes to their sustainability. The processes of unchecked succession and evolution allow for gradual adaptation to changes in the environment. Classic models of ecological regeneration, succession, and evolution have become difficult, if not impossible, to recognize in environments shaped by modern conventional development standards and technology.

In answer to this skepticism, it is useful to look at the root meanings of the words "sustainable" and "development" to see whether they can, in fact, be considered compatible:

Sustain v. 1. To keep in existence or effect; maintain. 2. To supply with necessities or nourishment. 3. To support the spirits or resolution of. 4. To keep from falling or sinking. 5. To endure or withstand. 6. To experience or suffer. sustainable adj. (American Heritage Dictionary, 1987).

This definition offers several ways of considering what it means to be sustained. First, at the most basic level, the word implies maintaining an existence
Secondly, the definition emphasizes the supplying of "necessities". Much of our need to lead more sustainable lives is related to our blurred vision of what is necessary and what is simply wasteful and even potentially harmful. There is also a lack of recognition that social and emotional needs can be as real and valid as physical needs; the mention of "spirits" and "resolution" suggests the importance of these types of needs. The last three definitions suggest that the process of being sustained will not always be easy. We must be prepared to experience or "endure" some suffering or dissonance as a normal part of our existence.

A dictionary definition of "develop" likewise offers a variety of interpretations:

Develop v. 1. To bring, grow, or evolve to a more complete, complex, or desirable state. 2. To appear, disclose, or acquire gradually. 3. To elaborate; expand. 4. To make available or usable. -development n. (American Heritage Dictionary, 1987).

The use of such descriptors as "grow", "acquire", and "expand" is the very reason that development is considered by many to be impossible to sustain. Paul Hawken, in his book, The Ecology of Commerce, rejects the tendency to associate growth with development, stating: "We must be cognizant of the important difference between growth, a quantitative change, and development, a qualitative improvement (Hawken, 1993). This statement suggests, not that development must be curtailed, but that its rationale and methods must be radically rethought. To stop the processes of human development altogether may ensure that the biosphere survives, but will not sustain societies.

The human species is differentiated from other species by an innate need and ability to pursue constant improvements in its condition. While most would agree that this interest in quality of life is, indeed, a distinctly human instinct, many would question its characterization as a "need". It is this divergence of opinion which differentiates those who feel that humans have a central role as stewards of the Earth's ecosystems, from those who feel that humans have no greater significance than any other species. The latter belief is characteristic of the views of the deep ecology movement, among others. This study is premised on the former belief – that which assigns humans the privilege and responsibility for
using and managing resources in creative, innovative types of development. The environmental problems which we face are not the result of trying to create a better world for ourselves. Rather, our survival is being threatened by development which creates the illusion of a better world but which is actually making the world worse (Thayer, 1994).

Sustainable development, viewed in these ways, is about forms of human activity which do not pose development and "progress" against the survival of ecosystems, but which illustrate and respect the dependence of human development on healthy, functioning ecosystems (IUCN, UNEP, WWF, 1991). Rob Thayer, a leading authority on sustainable landscapes writes: "Sustainability requires neither the disguise or elimination of human influence" (Thayer, Sustainable, 1989, pp. 107-8). While he considers undisturbed ecosystems the absolute measure of sustainability, he suggests that there are some acceptable levels of disturbance which do not threaten long term existence (Thayer, Sustainable, 1989).

I would agree with this notion that sustainability does not preclude human influence; the fact is that humans have irrevocably influenced every ecosystem of this Earth, whether as imperceptibly as with acid rain or as obviously as with a bulldozer. This fact, however, brings into question the use of the terms "undisturbed" and "disturbed". If there are no truly undisturbed ecosystems left, what is a reliable yardstick for the measurement of sustainability? Also, how are we to determine which levels of disturbance are acceptable? Again, although these questions are daunting, the very fact that we are starting to ask them is encouraging. It suggests that we are finally beginning to recognize that we need healthy, whole ecosystems much more than we need isolated, extracted resources they produce.

The critical contribution of cultural sustenance to human survival is another broad theme of sustainability revealed by the preceding analysis of sustainable development. Human development is facilitated through the satisfaction of both physical and cultural needs; the physical being concerned with the ecological relationships between humans and ecosystems, and the cultural being concerned with the political, economic and social relationships among people. In addition to
needs, humans have value systems which greatly influence the perception of needs and often run counter to actual needs. The interconnected nature of physical and cultural needs and the conflicts which values can produce are, in fact, at the heart of our struggle to lead sustainable lives. Brown and Shaw cite numerous historical examples of the ecology-culture linkage characterized by cycles of environmental degradation followed by economic stress and ultimately, social deterioration. The intensified rate and scale of environmental damage and resource loss sustained over the last century has propelled us to an age where the values inherent in our unchanged political, economic and social systems are no longer compatible with the reality of our environmental circumstances. To avoid the fate of past societies, these values must change to reflect new priorities and recognize the power of the ecology-culture linkage (Brown and Shaw, 1982).

Earlier reference to the suggestion that there are "acceptable" levels of disturbance point to sustainability as a normative issue, involving value judgments. This suggestion that sustainability is a normative concept holds implications not only for whether an activity can be sustained, but for whether it should be sustained. Should activities which directly or indirectly perpetuate social inequities such as homelessness and inequality of women be sustained, even if they can be accomplished without the depletion of natural resources or degradation of the environment (van Vliet, 1992)? Such questions of social responsibility urge us to challenge not only our ecological relationships but our cultural relationships in the search for sustainability.

The need for translating the goal of sustainability into strategies for action

The growing interest in the concept of sustainability indicates widespread agreement on the existence of an environmental crisis and a philosophical "why" for a call to action, but they do not approach the strategic question of what to do to work out of the crisis (St. John, 1992). The book *Caring for the Earth: A Strategy for Sustainable Living* names nine key principles in response to this "what" question, which encourage lifestyles and development options that respond to environmental limits without abandoning the benefits of modern technology:
1. Respect and care for the community of life.
2. Improve the quality of human life.
3. Conserve the Earth's diversity.
4. Minimize the depletion of non-renewable resources.
5. Keep within the Earth's carrying capacity.
6. Change personal attitudes and practices.
7. Enable communities to care for their own environments.
8. Provide a national framework for integrating development and conservation.
9. Create a global alliance.

(IUCN, UNEP, WWF, 1991, pp. 9-11)

Lester Brown and Pamela Shaw's *Six Steps to a Sustainable Society* prescribes a slightly different set of strategies for our environmental woes:

1. Stabilize world population.
2. Protect cropland.
3. Reforest the Earth.
4. Move beyond the throw-away society.
5. Conserve energy.
6. Develop renewable energy.

(Brown and Shaw, 1982, pp. 12-13)

These strategies represent a beginning of the crucial link between recognizing the need for movement towards sustainability and achieving it in our everyday existence. We live in a world driven by specialized technology and reductionist scientific theory. It is critical to relate the appropriate strategies for sustainability to the technical, individual, object-level solutions which constitute the "how" of achieving sustainability in specific fields of specialization (St. John, 1992). Because our knowledge base and, consequently, our understanding of what is or is not sustainable, is constantly growing, there must be a steady monitoring of solutions for their effectiveness in achieving the more long term strategies they are aimed at. There must also be room for adjustment and flexibility in the strategies themselves.

This thesis is devoted to the translation of sustainable strategies, such as those mentioned above, into specific actions which can be prescribed through design. Critical to the usefulness of such prescriptive action is the testing of the actions to see whether they are, in fact, achieving sustainable results.
Background of the Problem

Redefining stewardship as a unifying strategy for landscape architecture

The practice of landscape architecture has traditionally been concerned with "how" (design) questions, guided by a supposed strategy of "stewardship". As in many applied fields, the concentrated pursuit of detailed answers as to how we are going to solve certain development problems has superseded critical strategizing and continual re-evaluation as to what the problems are to begin with. Just saying that we are trying to be good stewards is not enough; without meaningful strategies which relate stewardship to the changing needs of society, we can do little more than create pretty pictures in the quest to make people's lives better through our designs. While aesthetic affects are inarguably an important outcome of landscape design, the profession has encouraged a one-dimensional, shallow aesthetic, which largely ignores the many contextual conditions unique to each site and region, and often disguises a complete lack of regard for ecological function.

Much has been written about the lack of built work to substantiate landscape architects' self-proclaimed role as "stewards of the land". While stewardship remains the centerpiece of our ethical doctrine, it has become reduced to an undefined, ambiguous banner for the profession, with little contextual similarity to its use in the days of John Muir and Frederick Law Olmsted, Sr. (Scarfo, 1987). The exponential population growth and the technological explosion which have occurred since the early days of the profession have created a physical infrastructure and a culture which require a new expression of stewardship.

Scarfo traces the historical role of the land steward as it has progressed from the medieval immediate steward, an actual inhabitant of the land who interacted daily with it; through the transitional steward, or yeoman, who began the movement away from practical knowledge and inhabitation, towards formal education and management; to the present-day external steward, marked by his or her focus on professionalism and technical rationality (Scarfo, 1987). While this externalized role has certain advantages in the objective treatment of landscapes, it also removes much of the intimate, first-hand knowledge of how individual landscapes work – their ecological processes and historical contexts.
A contemporary dictionary definition of steward: "One who manages another's property, finances, or other affairs" (American Heritage Dictionary, 1987) emphasizes the business-like nature of the role which has been realized by landscape architecture. The need to respond to clients' wishes in order to make a living at designing landscapes creates further distraction from the ethical obligation to practice good stewardship.

The call for sustainability offers the opportunity to redefine our role as stewards. This opportunity was first collectively recognized by the profession in a 1966 Landscape Architecture Foundation declaration:

What is merely offensive or disturbing today threatens life itself tomorrow. . . . There is no "single solution" but groups of solutions carefully related one to another. There is no one-shot cure, nor single-purpose panacea, but the need for collaborative solutions. A key to solving the environmental crisis comes from the field of landscape architecture, a profession dealing with the interdependence of environmental processes (McHarg et al., 1993, introductory page).

As this declaration suggests, landscape architecture is a profession which has grown to involve nearly every aspect of human interaction with the environment. From regional land planning to resource conservation to site-specific design, landscape architects tap into many different scales of ecological process and levels of human disturbance. This unique perspective and opportunity to orchestrate a wide variety of activities in the landscape affords us the chance to make more comprehensive strides toward sustainability than more narrowly defined fields such as engineering and architecture. It also reinforces the idea that we need not expect each landscape to be the ultimate expression of sustainability, but that each contribution, no matter how small or seemingly insignificant, is important.

Factors affecting the application of sustainable strategies

There are few landscape architects who would argue against the need for sustainability and responsible stewardship as appropriate philosophical foundations for the profession. The degree to which these ideals are or can be manifested in contemporary built landscapes, however, is dependent on our
willingness to challenge assumptions, overcome intimidation, and exhibit real commitment to the ideals of sustainability.

Much of the profession's lack of response to these needs, I believe, can be traced to the schism which has developed between the landscape concerns of ecology, high design and social responsibility. Although the interest in high quality, artful design has been with us as long as the profession has existed, the widespread concern for ecology and social responsibility began to have real effects on the practice of landscape architecture in the late 1960's. The initial manifestations of ecological design and community or participatory design were in direct aesthetic conflict with the long-evolving standards for artful design, which were and continue to be strongly tied to the modern movement. Although the gaps are starting to narrow, the implementation of sustainability suffers from the idea that a project can effectively respond to only one of these separate issues, rather than holistically responding to them all at once. There is a tendency to hold up ecological design and the ideal of the "undisturbed ecosystem" as the model for sustainability, which seriously limits the consideration of aesthetic and social contributions in sustainable design.

The American Society of Landscape Architects has recently begun to address the lack of cohesive response to environmental issues which this schism has produced. This dialogue has led to the Declaration on Environment and Development which was formally adopted in November 1994. In response to criticism within and outside the profession that our environmental ethic exists only in word, the bulk of the Declaration is geared towards commitment to the ethic through application – translating beliefs into profession-wide planning and design strategies:

In facing the growing urgency of environmental issues confronting human societies, we must do more that sustain the Earth; we must heal, enhance and manage the life-sustaining processes of the planet and ensure the integrity and strength of the global landscape which connects them (ASLA Blue Ribbon Task Force on Environment and Development, 1993, introductory page).

As a prescription for sustainability, the declaration emphasizes the importance of "process" which is so often overshadowed by "product" in the climate
of our short-term, economically-motivated society. The complexity and holism implicit in the statement illustrates the difficulty in defining sustainable landscape design in a specific, action-oriented manner. Stemming from the difficulty in defining what constitutes sustainable landscape design is a lack of specific criteria with which to guide design decisions and measure the sustainability of built designs. There is a need to take a comparative look at the diversity and outcomes of documented approaches to begin to determine some real criteria for sustainability.

Theory versus practice

It has been observed that applied fields such as landscape design are characterized by two kinds of history: their theoretical development through literature and their development in practice. Literature and practice do overlap but do not necessarily coincide; many suggestions in the literature never reach practice and many practitioners do not publish their work. The existence of an impressive literature on certain theories within a field, such as the theory of sustainable landscape design, does not mean sustainability is emphasized to an equal measure in practice (Steiner, Young and Zube, 1988).

Since landscape architecture is an applied profession, as opposed to a scientific- or theory-based one, there is an especially critical need to examine how these criteria are being applied in practice. The writings on sustainable landscape design tend to document and analyze sustainable design solutions on a project by project basis; they do not often consider the context of the entire workings of the firms which generate them.

Dialogue among practitioners supports the need for putting our principles into action. "Landscape architects talk a good game on the environment, but they stay on the sidelines. Why are we still stuck on this issue of whether it is appropriate to be advocates?" observed Gary Mason at a recent ASLA forum on "Green Politics" (Leccese, 1992). Leslie Sauer of Andropogon Associates added her disappointment with the direction she sees schools of landscape architecture taking in educating future practitioners: "The hot thing today on the campus is theory... It's not the time for theory. It's the time for figuring how to do it and getting action" (Leccese, 1992).
Problem Statement

The preceding discussion highlights several issues surrounding landscape architects' practice of sustainable landscape design which can be synthesized into the following problem statement:

The profession of landscape architecture is plagued by a lack of unity and strategy which inhibits the fulfillment of its ethic of stewardship. Although the notion of sustainable landscape design has the potential to unify the profession and inject new meaning into the notion of stewardship, there is a general sense of helplessness and apathy in the face of the overwhelmingly unsustainable nature of contemporary technological infrastructure and culture. The diffusion of sustainable landscape design has also been hindered by growing rifts between concern for socially responsible design, ecological design, and artful design.

While much has been written and theorized about sustainable landscape design, there is a general lack of vision as to how such thoughts and theories can be translated in practice. This inertia appears to be due to the under-estimated value of small, isolated efforts and of trial-and-error experimentation. It is further aided by the intimidation created by the use of "undisturbed ecosystems" as the ultimate measure of sustainability.

There is a need to move beyond this inertia and intimidation which can best be responded to by recognizing and evaluating what is considered the state-of-the-art in the practice of sustainable landscape design. Such evaluation can serve two purposes: to refine our ideas of what sustainability means and to eliminate the view of sustainability as an unattainable goal.
Purpose of the Study

Taking the stated problems into account, the purpose of this thesis is three-fold:

1. To create an operational definition of "sustainable landscape design" by synthesizing the theoretical discussions contained in the literature.

2. To develop a set of generalized criteria for analyzing the sustainability of designed, built landscapes.

3. To apply and test the synthesized definition and criteria for sustainable landscape design through the documentation and analysis of one landscape architectural firm's notable practice of sustainable design.

The development and testing of the criteria will specifically explore whether the issues of ecological design, artful design and socially responsible design can be seen as compatible and complementary rather than competing concerns in the search for sustainability.

The purpose is not to develop a rigid model for sustainability against which every designer need compare their work, but rather, to suggest a set of values which will manifest themselves in a variety of applications specific to scale, place and people. The literature is replete with theories and definitions of sustainability. While specific designed landscapes have been documented which exemplify the tenets of sustainability (Thayer, Sustainable, 1989; Lyle, 1985; Steiner and Johnson, 1990; McCormick, 1991), there is a void in documentation of the characteristics of design practices which have facilitated their ability and desire to consistently utilize sustainability as an underlying principle of design.

Assumptions

The foundation for this study is based on the following assumptions which are supported by the literature:

- Human beings have a unique and central role as stewards of the Earth's ecosystems.
• The concept of "sustainability" means different things to different people.

• There are few firms practicing sustainable landscape design.

• An understanding of how to translate the theoretical discussions of sustainable landscape design into practice is crucial to stem and reverse the current patterns of environmental degradation.

• There currently exists a schism in landscape architectural practice between concern for ecological design, artful design and socially responsible design.

• The bridging of the schism between ecological design, artful design and socially responsible design represents the greatest potential for future landscapes which are physically and culturally sustainable.

Delineation of Research Problem

Applications of the theories of sustainable landscape design will be examined through the study of Steve Martino & Associates. This Phoenix, Arizona firm was identified through an investigation which began with an "expert referral" process. In this process, several nationally known practitioners and scholars who have written or spoken on issues surrounding sustainable design were asked for names of firms which are visibly and consistently applying sustainable design principles in their work. Figure 1.1 provides an accounting of the results of the expert referral.

The process revealed Andropogon Associates of Philadelphia as the most commonly perceived practitioner of sustainable landscape design among the experts polled. Andropogon has been the subject of national interest for their "ecological design" approach and the functional innovations exhibited by their built work, which center around drainage issues and native vegetation (Thayer, 1994; Franklin and Gilcrest, 1993; Sorvig, 1993; Leccese, 1992; McCormick, 1991; Steiner and Johnson, 1990). Steve Martino & Associates and several other firms were mentioned in addition to Andropogon, though not as consistently.
During the month of February 1993, the following questions were directed to a group of professionals who have been nationally recognized for their contributions to the understanding of sustainable landscape design:

*What is the leading firm that is doing what you consider to be sustainable landscape design?*

*Can you identify a handful of other firms that are at the forefront of this movement?*

<table>
<thead>
<tr>
<th>Name and Position of Expert</th>
<th>Firms named (leading firm first)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kristina Hill</td>
<td>Andropogon Associates, Philadelphia</td>
</tr>
<tr>
<td>Assistant Professor, Landscape Architecture, MIT</td>
<td>Cornelia Oberlander, Canada</td>
</tr>
<tr>
<td>Leslie Kerr</td>
<td>Andropogon Associates, Philadelphia</td>
</tr>
<tr>
<td>Regional Coordinator, U.S. Fish &amp; Wildlife Service, Anchorage, Alaska</td>
<td>Portico Group, Seattle</td>
</tr>
<tr>
<td>Darrel Morrison</td>
<td>Lee Cooke Childs &amp; Associates, Boston</td>
</tr>
<tr>
<td>Professor of Landscape Architecture, University of Georgia</td>
<td>Wolfe/Mason, Berkeley</td>
</tr>
<tr>
<td>Frederick Steiner</td>
<td>Andropogon Associates, Philadelphia</td>
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<tr>
<td>Professor of Landscape Architecture, University of Arizona</td>
<td>Center for Regenerative Studies, Cal Poly, Pomona</td>
</tr>
<tr>
<td>Rob Thayer</td>
<td>Jones &amp; Stokes, Sacramento</td>
</tr>
<tr>
<td>Professor of Landscape Architecture, U.C. Davis</td>
<td>Co-Design; Davis, California</td>
</tr>
<tr>
<td>William Thompson</td>
<td>Andropogon Associates, Philadelphia</td>
</tr>
<tr>
<td>Editor, Landscape Architecture magazine</td>
<td>Wolfe/Mason, Berkeley</td>
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<td>Wolfg/en, Berkeley</td>
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<td></td>
<td>Victor Childs &amp; Associates, Boston</td>
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**Figure 1.1 Expert referral results**
An initial effort was made to enlist the involvement of Andropogon Associates and they declined to participate in the study, stating the high percentage of their time already being spent on ecological education and advocacy activities as the reason.

Upon reviewing the literature on several of the other firms mentioned and on sustainability in general, I became interested in the apparent critical conflict between artful design and ecological design – that is to say, between creative form-making and the establishment of ecological functioning. The two concerns seem to be in competition with each other, and to some extent, with the concern for social issues as well. Steve Martino & Associates emerged from the group as a nationally recognized, award-winning designer with a rich portfolio of built landscapes which integrate the regional and site specific ecology of his native southwestern landscape with artful expression of human interaction and culture. The firm stood out as uniquely responding to a significant barrier to widespread application of sustainable landscape design.

Many of the firms mentioned are portrayed as either similar to Andropogon in their rather purist ecological approach (such as Wolfe/Mason), or as specializing in relatively narrow areas of design (such and Jones & Jones' reputation zoo design). Although a few of the other firms had won national design awards, it was not with the consistency and breadth of project types which Martino’s record indicates (Landscape Architecture, 1988, -90, -91, -92, -93). These factors led me to focus the study on the issue of sustainable landscape design's conflict between artful design, ecology, and social issues, and encouraged me to contact Steve Martino and solicit his participation. Appendix A contains the documentation of my study proposal and his acceptance of it.

The decision to study the firm of Steve Martino & Associates, and not simply the individual himself or selected projects of his, is viewed as critical to the value of the study. It will be essential to understand firm characteristics such as professional philosophy, background and education of firm members, and methods of collaborating with other designers and communicating with clients, as they relate to the firm’s success in sustainable design.
Definition of Terms

The discussion of sustainability is easily clouded by an array of overlapping terms. Although different interpretations may exist, for purposes of this study the following meanings are assigned to critical terms which recur throughout the text:

**Aesthetic.** Pertaining to the sense of the beautiful; artistic (American Heritage Dictionary).

**Artful design.** Design which incorporates artistic expression and interpretation.

**Culture.** The arts, beliefs, customs, institutions, and all other products of human work and thought created by a people or group at a particular time; intellectual and artistic taste and refinement (American Heritage Dictionary, 1987).

**Disturbed ecosystem.** An environment inhabited by humans.

**Ecological design.** An approach to design which utilizes the ecological processes, forms and functions of undisturbed ecosystems as models for the processes, forms and functions of the human environment.

**Ecology.** Study of the interactions of living organisms with each other and with their environment (Miller, 1990, p. A9).

**Economics.** Study of how individuals and groups make decisions about how to allocate scarce resources to meet their needs and wants (Miller, 1990, p. A9).

**Ecosystem.** Community of organisms interacting with one another and with the chemical and physical factors making up their environment (Miller, 1990, p. A9).

**Ethics.** What we believe to be right or wrong behavior (Miller, 1990, p. A10).

**Evolution.** A gradual process in which something changes, especially into a more complex form (American Heritage Dictionary, 1987). (This term will not be used in the scientific sense to refer to changing gene pools.)

**Land Stewardship.** The ethical management of human interaction with ecological processes.
Politics. Process through which individuals and groups try to influence or control the policies and actions of governments that affect the local, state, national, and international communities (Miller, 1990, A18).

Practice. The exercise of an occupation or profession; the business of a professional person (American Heritage Dictionary, 1987).

Social responsibility. The concern for equality, justice and physical and emotional well-being for all members of society.


Sustainable. Enduring, stable.

Sustainable landscape. A landscape in which human interactions with ecological processes, both direct and indirect, are capable of being continued indefinitely.

Sustainable landscape design. A design approach which balances concern for ecology, artful design, and social responsibility.

Theory. A set of rules or principles designed for the study or practice of a art or discipline (American Heritage Dictionary, 1987).

Undisturbed ecosystem. An environment uninhabited by humans.
CHAPTER II: LITERATURE REVIEW AND SYNTHESIS

Introduction

The literature review and synthesis is divided into three sections: The first part reviews of the body of literature which defines and discusses sustainable landscape design. Secondly, the literature is synthesized in an operational definition of sustainable landscape design. The definition culminates in a set of criteria for analyzing the sustainability of the general design approach and specific landscapes of a landscape architectural firm, to be used in the case study of Steve Martino & Associates.

Finally, the reader is introduced to the professional background and design philosophy of Steve Martino & Associates, which support the firm's selection as one noted for designing sustainable landscapes. With the established operational definition and criteria for sustainability in mind, this section culminates with the guiding questions used in the case study of Steve Martino & Associates.

Narrowing the Focus of a Holistic Idea

Different types of sustainability

Application and relevance to different fields  Sustainability has been applied to a wide range of economic and cultural activities and entities. "Sustainable agriculture", "sustainable resource use", "sustainable technologies", and "sustainable landscape design" fall under the rubric of "sustainable development", which was defined in Chapter One to mean: "Meeting the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 8).

The implications of the call for sustainability in the varying types of development are united by a common philosophical base, yet are decidedly unique. The challenge for sustainable agriculture, for instance, is to "reduce adverse socioeconomic and environmental impacts of farming practices and
develop profitable farming systems that conserve natural resources" (Leopold Center for Sustainable Agriculture, 1993, p. 2). While the focus on reducing adverse environmental impacts and conserving natural resources is a common theme, modern agriculture has been shaped by a long history of changing practices and values, and a complex socio-economic setting which profoundly affect the ways in which it is responding to the call for sustainability. Much of this unique context is the result of the direct relationship the farmer has with the land. This physical habitation, observation over time, and personal interaction has created a culture of farming; a way of life, which is as much at stake as are the methods of production.

Landscape architecture, as another land-based component of development, deals with many of the same processes and resources as agriculture but within a very different context. The "products" of landscape architecture are designs which orchestrate four fundamental landscape processes: hydrological cycles, the cycling of mineral matter, the succession of plant and animal communities, and the flow of solar energy (Franklin and Gilcrest, 1992). Unlike farmers, however, landscape architects do not produce designs which are generally considered necessary for human survival. Rather, the perceived purpose of landscape architecture's orchestration of landscape processes is to make peoples' lives better; to enrich lives by interpreting the evolving relationship of human beings to their environment (Thayer, Sustainable, 1989).

There are other professions which can and do provide design expertise in landscape development. Engineers, horticulturists, architects, and planners are all involved in environmental design, and are beginning to look at the issues of sustainability (William McDonough Architects, 1992; St. John, 1992). Landscape architecture has a unique a focus on connections between built and natural environments and a strong professional legacy of visionaries, such as Jens Jensen and Ian McHarg, which creates a uniquely appropriate context for applying the principles of sustainability.

While each of these abilities contributes to creating sustainable designs, artistic expression is a unique contribution which landscape architects offer towards the diffusion of sustainability — that is the widespread adoption and
implementation of sustainable principles. Rob Thayer notes that "a critical function of landscape architecture is to continually interpret the contemporary relationship of human beings to their environment in spatial, visual terms" (Thayer, Sustainable, 1989, p. 108). Sustainable design theory suggests that sustainable landscapes must rely heavily on ecosystematic function for visual expression; it need not follow that artistic skill is therefore not required. To the contrary, Thayer convincingly argues that artistic expression is necessary to gain public acceptance and desire for sustainable landscapes (Thayer, Sustainable, 1989). Jane Alexander, the recently appointed head of the National Endowment for the Arts, echoes this emphasis on the important role art plays in shaping culture: "Today's controversy becomes tomorrow's culture through art" (CBS Broadcasting, 1994).

Degrees of sustainability It is generally agreed that contemporary society as a whole, dominated as it is by a monoculture of corporate capitalism, does not operate within the carrying capacity of the earth's ecosystems and is therefore not sustainable. How, then, can we hope to achieve anything sustainable within the various sectors of development referred to above, or within our individual lives and careers, which are so embedded within an unsustainable society?

Paul Hawken, author of The Ecology of Commerce, offers an answer to this daunting question with his notion of "the opportunity of insignificance" (Hawken, 1993). He uses the case of small business' importance in the creation and diffusion of new ideas to illustrate the point that size or magnitude is not the critical factor in the ability to act sustainably or to encourage others to act sustainably. He, in fact, points out that small businesses, in their role as institutions at the economic and cultural margins, have a better chance than the large multinational corporations to foster products, ideas, and services that are sustainable (Hawken, 1993). Such sustainability in individual products, ideas and services will not create a sustainable society overnight but has the potential to gradually strengthen the degree of societal sustainability.

Landscape architecture has had its own struggle to recognize the value of small, seemingly insignificant gestures of sustainability. In a recent Landscape Architecture magazine panel discussion on sustainability, discussants were asked to cite sustainable landscapes of contemporary design. When none came to mind
which could be thought of as "entire sustainable landscapes", it was suggested that perhaps we need not always be concerned with the overall sustainability of a landscape. What may be more important at this point is to strive for revealing sustainable processes in the landscape. "It might be asphalt containing fragments of recycled rubber tires or something as simple as that. Maybe projects incorporating such practices will get more landscape architects to jump on the bandwagon . . . " suggested panel member Maurice Nelischer (Thompson, 1992, p. 60).

Thayer elaborates on this idea of recognizing varying degrees of sustainability in the landscape as a necessary step in building "the cultural elements necessary to accompany and actualize new sustainable landscapes . . . " (Thayer, Sustainable, 1989, p. 109). While we must continue to think of sustainability as holistic goal for society, we must also be capable of seizing the fragmented, seemingly insignificant opportunities which exist in individual elements and processes.

The following discussion focuses the literature review on theories relating to "sustainable landscape design" by exploring the additive results of applying the idea of sustainability to the notions of "landscape" and "design".

**Etymology:** sustainable + landscape + design

**Sustainable** Three tenets central to sustainability were identified in Chapter One:

1. Sustainability requires that we live within the carrying capacity of earth's ecosystems.

2. Human well being depends on ecosystem survival and function.

3. Sustainability must consider the importance of cultural needs and values in addition to physical needs in contributing to human survival.

These themes provide the basis for examination of the ideas of "sustainable landscape" and "sustainable landscape design" which follow.

**Sustainable + landscape** The dictionary offers a definition of the term "landscape" which is reflective of it's origins as a style of painting: "A view or vista of
scenery on land" (American Heritage Dictionary, 1987). This interpretation says much about the way in which we have developed the landscape over the last two centuries. The theory of the picturesque, with its preference for "natural" materials and absence of obvious human influence, still determines much of our collective landscape tastes (Thayer, Sustainable, 1989). Yet for all our professed regard for naturalistic landscapes, rarely do we look to a place's indigenous forms and processes for inspiration. We instead look to some picture in our mind's eye for ways in which we can transform the landscape. As our knowledge of the complex operations of the environment and how to sustain it grows, the incongruity between what we want to see in the landscape and what we know will be sustainable becomes more obvious and troubling (Thayer, Sustainable, 1989). We need a new conception of landscape; one that can be reconciled with the principles of sustainability.

J. B. Jackson's exhaustive examination of the origins and evolution of the term "landscape" results in this refined definition: "A composition of man-made or man-modified spaces to serve as infrastructure or background ["that which underscores our identity and presence"] for our collective existence" (Jackson, 1984, p. 6). This interpretation moves us toward recognition and expression of the human element in our view of landscape and implies that all landscapes are somehow touched by humanity, whether by design or by cultural evolution (Lewis, 1979). As Peirce Lewis points out in his insightful article entitled "Facing Up to Ambiguity", recognizing the expression of the human element in the landscape forces us to analyze the moral virtue (or sustainability) of this element, in addition to its aesthetic excellence (Lewis, 1982).

Another way in which the landscape has been described is as the "confluence of our ideas of nature and of culture" (Jacobs, 1991). Cultural geographers such as Lewis and Jackson have created a whole new discipline out of reading the human-made landscape – "nearly everything we see when we go outdoors" – for its clues to culture. "[Landscape] is more than the land itself; it is what people see on it and in it, how they think about it and use it (Lewis, 1979). D.W. Meinig echoes this emphasis on the importance of perception in reading the landscape in his essay, "The Beholding Eye". In it he illustrates how the same scene can be viewed in several different ways, from landscape as nature, to landscape as wealth, to landscape as habitat. The value of
reading the cultural landscape lies in the possibility of honestly confronting the incongruities in between our landscape tastes and our desire for sustainability (Meinig, 1979).

**Sustainable + landscape + design**  
The jump from sustainable landscapes to sustainable landscape *design* is perhaps the most crucial in this progression. Landscape architects are involved in a wide range of activities which can generally be divided into two distinct categories: planning and design.

Planning is concerned with the interrelationships of an organism to its environment. As such, planners examine relationships between individual and community, between city and region, and between urbanized areas and undeveloped areas (Steiner, Young and Zube, 1988). Planning is certainly necessary in the movement toward sustainability in that it represents the sum of all the parts created through design; the strategizing, as opposed to the execution. However, in the effort to promote sustainability to the realm of action, it suffers from a lack of the visibility and tangible practices and processes which characterizes built design work.

Conversely, landscape *design* considers the unique characteristics of a site and proposes physical action in response to them. If we accept the expanded description of landscape suggested above, we can say that landscape design seeks to give *form* to the our ideas of nature and culture (Jacobs, 1991). Since many of our current ideas of culture and nature are not grounded in the tenets of sustainability, our landscapes are largely unsustainable. For instance, culture dictates that the automobile is the preferred mode of transportation; our landscapes reflect this idea with their tangles of polluting roads, highways, and parking lots. This highlights the importance of design in the movement towards sustainability; landscape design can be viewed as an opportunity to reform ideas of culture and nature to reflect sustainable principles.

John Pile, in his book, *Design: Purpose, Form, and Meaning*, suggests several common misconceptions about design in general. The following design "myths" represent serious barriers to the design of sustainable landscapes:
• All design issues are matters of taste and not, therefore subject to any rational evaluation.

• Whatever most people want should be most available and should be the standard for everything intended for public use.

• Design is in some way separate from the physical reality of a thing.

• There are rules governing all aesthetic matters that can be applied to the problem of making objects beautiful. (Pile, 1979, pp. 15-19)

Pile further suggests that these attitudes have resulted in a loss of clear vision about the purposes of design activities, manifested by an era of poor quality of design achievement. He suggests that the search for purpose can be focused on three particular areas in which design excellence is commonplace: nature, vernacular design, and technological design (Pile, 1979). As will be seen in later discussion, all three of these areas are key components of sustainable landscape design.

Sustainable landscape design within landscape architecture

Although landscape architects exhibit a wide range of attitudes about the notion of sustainable landscape design, the profession has latched on to the idea with gusto. The writings of visionaries such as Jens Jensen and Ian McHarg, while not using the term "sustainable", carried many of the seeds of the new sustainable landscape literature being produced by John Lyle, Rob Thayer, Frederick Steiner, and other landscape architectural scholars. The literature has most commonly been contained in scholarly journals and magazines, though 1994 has seen the publication of entire books on various aspects of the subject of sustainability (Thayer, 1994; Lyle, 1994). In publisher John Wiley and Sons' new Wiley Series in Sustainable Design, three of the four titles are by landscape architects. This is a testament to the growing interest in sustainable landscape design and the perceived need to bring its principles into practice.

As has been mentioned, professional associations, most notably, the American Society of Landscape Architects (ASLA) and its state chapters, have taken the cause of sustainability on as a new theme to unify the profession and
substantiate its claim of stewardship. Conference keynotes and topics, competitions, workshops and charrettes, policy statements – have all been employed over the past few years to emphasize the desire of the collective profession to have its individual members adopt and practice sustainable landscape design (ASLA, 1993, Franklin and Gilcrest, 1992; Leccese, 1992).

1992-93 ASLA president Debra Mitchell was an especially aggressive proponent of sustainability in her leadership of the organization, creating a Blue Ribbon Task Force of noted scholars, experts and practitioners to produce the 'ASLA Declaration on Environment and Development'. This document is intended to "provide a conceptual framework for the implementation of sustainable development and a strategic direction for the ethics, education, and practice of landscape architects" (ASLA, 1993). It redefines the fundamental purposes of the landscape architectural profession to be: "Nurturing the processes of regeneration and self-renewal in the world's healthy landscapes and reestablishing these in the vast areas of the world's degraded landscapes" (ASLA, 1993).

While this may indeed be a worthy purpose, it represents a fundamental problem: it is not a realistic definition of what most landscape architects are consistently doing, or even what they would profess to be doing. Years of receiving mixed signals from the collective profession in the form of frivolous, inconsistent and often elitist commentary have created, not only a lack of direction, but a distrust of this kind of top-down pronouncement of what landscape architects should be about. While the proposed purpose and framework are laudable, the changes which will substantiate them must come through the recognition of the piece-by-piece contributions of individual practitioners.

**Theory of Sustainable Landscape Design**

**Emerging theoretical themes**

The main task of this study – analyzing the sustainability of a noted practitioner's work – depends on a detailed analysis and synthesis of the theory of sustainable landscape design as depicted through the literature. Theory was defined in Chapter One to mean "a set of rules or principles designed for the study or practice of an art or discipline." This meaning is differentiated from the notion of
theory as "a set of statements designed to explain a phenomena" (American Heritage Dictionary, 1987). The empirical nature of this work requires the use of theory to serve as a guideline rather than as a definitive, yes-or-no answer.

The theory, or principles, of sustainable landscape design are in a developmental stage. Because there are few accepted examples of sustainable landscapes which are integrated into the real world, there is little opportunity for testing and evaluating the relevance of the theory. While there are some key definitions which suggest its tenets, there are no hard and fast, universally accepted criteria for exactly what constitutes a sustainable design. Four definitions of sustainability are shown below. Although they illustrate consensus on the basic need for sustainable landscape design, they emphasize different facets of the concept

A sustainable landscape is one that contributes to human well-being and at the same time supports the integrity of the natural environment without depleting or damaging its resources. . . at its best, a sustainable landscape is a regenerative ecosystem (Lyle, 1987, p. 1).

Landscapes are sustainable when they exhibit economy and fitness to place. They are bioregional environments designed to respond to natural and manmade dynamics. . . .The challenge for future landscape architects will be to create sustainable landscapes that reflect both the diversity of culture and the particularity of place (McPherson, 1989, p. 136).

Sustainable landscapes will be defined as those landscapes which tend toward ideal conditions by conserving resources (i.e., soil, energy, water, air quality, wildlife diversity, etc.), as well as those which actually achieve a long-term regenerative capacity. The former are more likely to be products of intentional design than the latter, which are likely to be the unselfconscious products of long-term cultural relationships to land areas and regions (Thayer, Sustainable, 1989, p. 102).

Design for sustainability requires awareness of the full short- and long-term consequences of any transformation of the environment. Sustainable design is the conception and realization of environmentally sensitive and
responsible expression as a part of the evolving matrix of nature (William McDonough Architects, 1992, p. 3).

Several overlapping approaches to sustainable design emerge from these definitions which can be broadly grouped into the following themes:

• Ecological design
• Regional and vernacular design
• Alternative technologies
• Socially responsible design
• Waste-conscious and regenerative design
• Attitude change
• Broadened landscape perception

These are the basic building blocks of sustainable landscape design, as this thesis defines it. The literature contains a rich store of thought on these themes, not all of which is in the context of sustainability per se. Use of differing terminology can often disguise the similarity or compatibility of ideas. Each of the themes is explored for their contributions to the establishment of a synthesized definition and set of criteria for sustainable landscape design, which can then be used to analyze the practice of Steve Martino & Associates.

Ecological design The most widely recognized theme of sustainable landscape design is that of "ecology" — previously defined as the "study of the interactions of living organisms with each other and with their environment." Within the study of ecology there are many different interpretations of humankind's role in relation to other living systems, whose breadth is illustrated by the focus of two groups — biocentric ecologists and anthropocentric ecologists. While notable variations of ideology and attitude have developed within each of these groups over the years, the basic difference they illustrate is the root of much of the
disagreement over what the notion of sustainability really means, and over how it can be applied.

Biocentric groups such as the deep ecologists reject the "man-in-environment" relationship in favor of "biospherical egalitarianism" (Naess and Rothenberg, 1989, p. 28) – a relationship where all living things have equal importance and where humans do not control the fate of other species. Proponents of deep ecology are viewed by many as being interested in humans' biological and physical integration with the natural world solely for its goodness, truth and beauty (Thayer, Sustainable, 1989). This conception of the human role suggests a sort of nature-worship which challenges traditional religions' belief in the primacy of humans in the creation and existence of life on the earth. The design implications of the adoption of such a biocentric world-view would seem to be the elimination of the interpretational expression of culture and the imposition of a strict utilitarian, survival-based justification for ecosystem intervention, replacing art, as we know it, with literal visions and symbols of nature.

Some deep ecologists contrast what they are trying to accomplish with the "Shallow Ecology Movement", which consists of "the fight against pollution and resource depletion" and the assurance of "health and affluence of people in the developed countries" (Naess and Rothenberg, 1989, p. 28). Such statements suggest that ecological concern has become gimmick-ridden and socially irresponsible, indicating the level of antagonism which exists within the larger ecological movement.

I propose that neither the dogma of the deep ecologists nor the callousness of the shallow ecologists actually characterizes the majority of the public or professional population which is concerned with ecological issues. Although many of our environmental problems are the result of human domination and exploitation of ecosystems, a more anthropocentric view of ecology seems needed. Rob Thayer suggests that proponents of sustainable landscape design subscribe to an active, conscious ecological role for humans which allows humanity a central role in the deliberate stewardship of earth's resources and ecosystems (Thayer, Sustainable, 1989). Responsible fulfillment of this role involves the *application of
ecological concepts, and ecological approach, to the ordering of the human environment" (Steiner, Young and Zube, 1988, p. 36).

The "land ethic" espoused by Aldo Leopold was one of the earliest forms which the ecological approach to human development took. Leopold described well developed sets of ethics for relations between individuals and between the individual and the community, but noted that a needed ethic dealing with the relationship between humans and the land had not yet been formed. A strong emphasis on undisturbed nature was communicated by his call for the "reappraising of things unnatural, tame, and confined in terms of things natural, wild, and free" (Leopold, 1989, p. xix). Yet he tempered his value for nature with the realization that land also provides an "esthetic harvest . . . [which contributes] to culture" (Leopold, 1989, p. xix). He was very interested in extending the concept of "community" to include ecological members in addition to human members, as a means of changing the role of humans "from conqueror of the land-community to plain member and citizen of it" (Leopold, 1989, p. 240). Such ideas were revolutionary in combating the tendency to think of nature as separate from human existence.

Ian McHarg's *Design with Nature* was the first major attempt by a landscape architect to articulate an ecological approach to the design of the environment. Lewis Mumford, in his introduction to the book, characterizes McHarg's vision of the human/nature relationship as follows:

His [McHarg's] is a mind that not merely looks at all nature and human activity from the external vantage point of ecology, but who likewise sees this world from within, as a participant and actor, bringing to the cold, dry, colorless world of science the special contribution that differentiates the higher mammals, above all human beings, from all other animate things: vivid color and passion, emotions, feelings, sensitivities, erotic and esthetic delights . . . (McHarg, 1971, p. vii).

Throughout the text, McHarg brings this human passion and cultural expressiveness to light in his ecological prescription for meaningful, appropriate design. He refers to his work as "an ecological manual for the good steward who aspires to art" (McHarg, 1971, p. 29). His model for an ecological view of the human/nature relationship consists of five basic criteria: Negentropy —the evolution
to increasing levels of order; Apperception – the capacity to transmute energy into energy and thence into meaning; Symbiosis – the cooperative arrangement that increases levels of order; Fitness and Fitting – the selection of a fit environment and the adaptation of environment and organism for a better fitting; and Presence of Health or Pathology – the evidence of fitting (McHarg, 1971). This model is based on McHarg's observations of natural processes over time, and historical societal development and downfall. He suggests that we must abandon the economic determinism which drives our current value system and turn, instead, to the only true, realistic basis for values - the processes of the elements (or cycling of matter) (McHarg, 1971).

McHarg further suggests that the western view of the human role in nature – "raucous anthropocentrism"– must be tempered with the eastern philosophy of "man submerged in nature" (McHarg, 1971, p. 29). Unlike the deep ecologists, he sees potential value and truth in both conceptions.

McHarg's seminal work has been valuable both for its revolutionary content and for its role in urging others to follow him in this exploration of ecology and related social and artistic issues. His writing indicates a perception that, at that time, practicing landscape architects were extremely limited in their opportunity to use an ecological approach in their work. This was due to the apparent lack of priority placed on addressing ecological degradation, and the failure to connect ecological degradation with societal problems. Although McHarg himself was applying the approach on real projects, he cited the opportunity afforded him as a professor to pursue unsolicited projects as the source for most of his work (McHarg, 1971). The 25 years of continued ecological destruction that have ensued since the publication of 'Design With Nature' have created new societal priorities and opportunities to respond to them. Landscape architects are now being called upon to fulfill their stewardship role. Slowly the emphasis on ecological design is leaking from the classroom into practice.

It is logical that one of the first places this leak is taking place is in the region of McHarg's teaching and practice. Students of his at the University of Pennsylvania have gone on to notable practice and are now being held up as examples of McHarg's principles being developed and put into action.
Andropogon Associates, led by former McHarg student Carol Franklin, has made a successful practice out of the demand for their ecological design expertise. Franklin can be heard at ASLA seminars urging the importance of "recognition of the pre-eminent value of natural patterns", and the need to consider ecological design not simply as preservation of existing ecosystems, but as restoration of degraded ones. The firm's work emphasizes the sustainability of whole systems through the restoration and reconnection of isolated fragments (Franklin and Gilcrest, 1992).

Another contemporary visionary proponent of ecological design is Cal Poly-Pomona professor, John Lyle. He has propelled his theory on the design of human ecosystems from the classroom into a experimental project called the Center for Regenerative Studies at Cal Poly. A manifestation of his respected work in studying the flow of energy and cycling of materials through ecosystems of varying interconnected scales (Thompson, 1991), the new center concentrates on the development of sustainable technologies and new structural forms which facilitate ecological process. The project is a live-in facility for 80 students which combines solar architecture, sustainable agriculture and other waste-reducing, regenerative technologies (Sutro, 1994). This notion of regeneration has become a hallmark of his ecological approach, reflective of the growing public movement towards recycling and reuse of materials.

The growing emphasis on ecological design and its central role in promoting sustainability is nowhere more evident than in the recent dramatic changes in the work of the National Park Service. The Yellowstone fires of 1988 were an obvious sign that our methods of preservation and management of park land needed rethinking (Botkin, 1990). Years of fire suppression and fuel build-up had led to the inevitable devastation when fire finally did break out. Such evidence has prompted change in management strategies which attempt to sustain the evolving, successional, dynamic qualities of natural and cultural landscapes, rather than objectify them in a static state. Over the last few years the Service has developed a set of guidelines for the sustainable design of park facilities which incorporates a collaborative design approach, integrating architecture, landscape architecture, and habitat (Strutin, 1994). Nine areas of concern are addressed through the
guidelines, ranging from natural resources, to cultural resources, to waste disposal, to facility maintenance (National Park Service, 1992).

The Park Service is a particularly significant vehicle for sustainability in that it has the luxury of being relatively self-contained so that its work is not as subject to as many outside variables as most design projects. Consequently, the results of the new guidelines can be studied and monitored more easily. They are currently being tested on the redesign of the Everglades National Park visitor center, which was ironically destroyed by Hurricane Andrew in 1992 (Strutin, 1994). The Park Service has traditionally been a tone-setting entity for the design of public landscapes; their movement to recognize the need for change is encouragement for other public entities to follow.

Regional design The presence or absence of regional identity in the landscape has become another common measure of sustainability. As suggested previously, sustainability is strongly linked to a culture's familiarity with and responsiveness to the processes and limitations of the land. With the character of modern development growing increasingly anonymous and homogeneous, and with the growing mobility of society, our ties to the landscape have become tenuous and abstract (Hough, 1990).

While re-establishment of these ties is agreed to be essential to a sustainable future, there is a tendency to look to vernacular forms for solutions. Such inspiration can be fruitful but also misleading. The vernacular is commonly thought of as form that grows out of the practical needs of the inhabitants of a place and the constraints of site and climate (Jackson, 1984). This brings to mind idealized visions of winding cobbled streets, stone walls of colonial farmers, sod homes of prairie settlers. Such forms do create regional identity, but they are the vernacular of our cultural past.

Vernacular landscapes, past and present, result from an ever-changing framework which combines natural factors, social influences, technological capabilities, and an important influence which Michael Hough terms the force of "authority". He describes this force as the making of large scale, long-range decisions on the landscape that are imposed on the individual. Vernacular forms
which reflect sustainable principles and retain strong regional identity have resulted largely from frameworks which are more heavily influenced by natural influences. As our technological capabilities and authoritative forces have gained dominance, the resulting vernacular forms have less regional distinctiveness and therefore engender fewer meaningful ties to the land (Hough, 1990).

The early twentieth century prairie-style gardens of Jens Jensen are the ultimate historic expression of regional or vernacular landscape design. His deep passion for the Great Plains native landscape and dismay at its rapid destruction translated into designs which honor the processes and species of his regional ecology. Although the complexity and degree of environmental degradation had not yet begun generating popular dialogue on sustainability, Jensen had a strong sense that conservation of wilderness was essential to human survival (Kay, 1993). In his own words:

Through scientific developments . . . we seem to be dominated by the machine, which is trying to crush every bit of our God-given freedom to be ourselves. But the urge to be is much stronger and more powerful than all other forces put together. It will survive and express itself for the good of all mankind so long as man inhabits this earth, and his expression in the arts and crafts will be determined by the inspiration he receives from that section of the earth in which he lives and of which he is a part (Jensen, 1939, p. 24).

As this passage suggests, Jensen viewed understanding and manifestation of regional ecology as critical to our ability continue inhabiting the earth. He did not, however, advocate trying to copy nature:

. . . Untold motives and ideas are revealed to me in the out-of-doors, not to be copied, because man cannot copy nature, but from which to develop a folk song or a poem (Jensen, 1939, p. 137).

. . . The real worth of the landscaper lies in his ability to give to humanity the blessing of nature's spiritual values as they are interpreted in his art (Jensen, 1939, p. 105).

Jensen's largest and best preserved landscape, Chicago's Columbus Park, is a testament to his consideration of landscape design, not as an obligation to reproduce nature, but to provide a "social surrogate" of it. The newly, painstakingly
restored park employs the vernacular of regionally familiar plant communities and landforms in its interpretation of ecological and aesthetic values (Kay, 1993).

It is interesting to note that of the scores of built landscapes designed by Jens Jensen, remarkably few have been "sustained" for us to experience today (Kay, 1993). Despite the current recognition of ecological design as a model for sustainability, Jensen was a maverick for his time. As the industrial age took hold, Jensen's views became increasingly difficult to apply to growing dependence on machines and the "militant thought" of straight lines. The failure of the Jensen's built landscapes to be sustained is not found in their design but rather in the rejection of his inspiration.

If Jensen were alive today, he would most likely be a follower of the newest vehicle for the preservation and restoration of regional identity: bioregionalism. Beatrice Briggs, founder of the Chicago area's bioregional organization, the Wild Onion Alliance, defines bioregionalism as the "ecological art of living in place", and bioregions as "identifiable areas of the planet which are relatively self-sustaining in the ever-renewing cycle, . . . [defined] by the soft boundaries established by soil type, vegetation, hydrology and cultural groupings, rather than the clearly delineated borders of city, county, state or nation" (Briggs, 1993, p. 29). This movement responds to the loss of identity and responsibility for the environment which increased mobility, industrialized agriculture, and the mass consumption of non-renewable energy has wrought (Berg, 1993).

Peter Berg, founder of San Francisco's bioregional group, the Planet Drum Foundation, asserts that with the average American moving every three years, "people don't know where they are". In addition to restoring and maintaining natural systems, and finding sustainable ways to supply basic human needs, he suggests that we need to undertake a process of "human re-inhabitation". This involves the recycling of places that have been "used up" through unsustainable inhabitation, by re-inhabiting them in sustainable ways.

The significance of the bioregionalism movement is not only that it reinforces the importance of regional issues to sustainability, but also that it represents a growing, passionate grass roots call for alternatives. The rise of local farmer's
markets, eco-tourism, food co-ops, the "buy local" mentality, and environmental volunteerism are all evidence that ideas such as bioregionalism are no longer being dismissed as the radical rantings of the counter-culture fringe. The mainstreaming of these issues into the public consciousness will create greater opportunities for sustainable landscape design.

**Alternative technologies**

The following observation by Daniel Botkin illustrates a new conception for how technology is starting to be used to further the cause of sustainability, rather than hinder it, as the technology of the machine age has tended to do:

We are living at a time of transition from the machine-age metaphor for nature to a new perspective that blends the older organic metaphor with a new technological metaphor (Botkin, 1990, p. 155).

The "technological landscape guilt" associated with feeling bad about what machine-age technology has done to the earth has created an ever-widening gap between what we want to see in the landscape (the "ideal image") and what the landscape actually represents (the "real image") (Thayer, Technology, 1989). It has caused us to try to disguise much of the evidence of technology in our design of the landscape, enabling us to momentarily forget the guilt.

In response to the inescapable reality, a new generation of landscape forms which expose the processes of new "appropriate" technologies is beginning to emerge. In the search for visually memorable, iconic sustainable landscapes, technology is no longer automatically relegated to its former role as a necessary, but hidden, evil (Hess, 1992). The success of such efforts has been limited by what Thayer refers to as the "persistence of pastoralism" (Thayer, Technology, 1989, p. 5). The use of alternative technologies has subsequently been limited largely to isolated, self-contained landscapes, where public acceptance is less important.

Village Homes in Davis, California is one of the first recognized examples of the use of sustainable technology in an intentionally designed landscape. The design for this residential development emphasizes unconventional technologies such as solar energy, on-site storm water retention, and agriculturally productive planting. Because the landscape was developed in concert with the housing, from
the ground up, it had the advantage of starting from scratch. Street layout and design, architecture, planting— all were integrated as a system that works together. It is rare to have such an opportunity; more often the landscape designer is expected to deal with an existing technological infrastructure which is not sustainable.

Although Village Homes' technologies have been successful in providing regeneration and ecological functioning, as well as a positive affective response from the inhabitants, the landscape is faulted by some non-inhabitants for not being "visually memorable" (Thompson, 1992, p. 60). While the monotonous regularity of many conventional subdivisions can be equally visually unmemorable, they have the distinct advantage of already having gained public acceptance. The fact that this landscape is not considered by a significant number of non-inhabitants to have "desirable' visual/formal qualities does not hinder its own sustainability, but neither does it encourage diffusion of the sustainable technologies to other landscapes. This notion of diffusion is of critical importance— the creation and testing of sustainable technologies is of limited importance if they are not spread to other applications.

The science and practice of permaculture is another example of an effort to develop sustainable technology in a holistic, systems-oriented way. Based on the notion of "permanent agriculture", permaculturists propose to create and maintain "agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems" (Mollison, 1992, p. ix). Again, as with Village Homes, as far as technological merit is concerned, the permaculture idea is valuable. But as Rob Thayer points out, permaculture's exclusive attention to ethical and responsible technological design has failed to consider the "affective and emotive dimensions"— the aesthetic appeal and emotional response— of the resulting landscapes (Thayer, Sustainable, 1989, p. 104).

Another limitation is that permaculture represents a huge leap in lifestyle and attitude change. Mollison's presentation of the principles and design guidelines in Permaculture: A Designer's Manual is full of diagrams, matrices and flow diagrams which depict complex new systems required to implement permaculture. There are no contextual case studies or actual examples of existing
permaculture landscapes. This apparent difficulty in relating to existing landscapes is problematic, especially for designers who want to make a difference today.

The preceding discussion of the pioneering technological work of Village Homes and the permaculture movement emphasize the fact that the public acceptance of the new technologies is of critical importance. Thayer has studied the perceptual, functional and symbolic dimensions of landscape technology, and how these combine to influence public acceptability and valuation of landscapes (Thayer, 1992). Although his model was developed by looking at utilitarian, vernacular landscapes, it can be used to predict the public response to new technologies which may be incorporated into designed sustainable landscapes.

Within the perceptual dimension of technology, Thayer discusses the notion of visibility, which ranges from invisible (radio waves) to highly visible, or iconic (wind farms). The more invisible the technology, he contends, the easier it is for the pastoral landscape to remain the norm. The functional dimension of technology is broadly categorized into five functions, ordered from most negatively perceived to most positively perceived: transformative, energetic, transportive, agricultural and informative technologies. The recognizeability of function and relative attitude toward a function influences the acceptance of the landscape. For instance, overhead power lines, a transformative technology, constitute a source of environmental guilt and are considered visually offensive. Agricultural fields, conversely, are sentimental symbols which provide us with necessary sustenance. As such they are a visually acceptable technology. The third dimension - symbolic technology- is considered in terms of the technology's sustainability or consumptiveness. Thayer contends that the nostalgic and consumptive technologies of the past and present are slowly being abandoned in favor of the sustainable technologies which were once considered utopian (Thayer, 1992).

Andropogon Associates, mentioned earlier as a firm noted for its sustainable design work, has been held up as one of the few exemplars creating and implementing sustainable technologies on actual design projects (McCormick, 1991; Steiner and Johnson, 1990, Sorvig, 1993). Their innovations in porous paving, ground water recharge systems, and wetlands restoration have been well
documented. The relatively high degree of public acceptance which these innovations have enjoyed can be analyzed according to Thayer's model:

Perceptually, such technologies are relatively invisible, and therefore have resulted in landscapes which do not significantly challenge pastoralism. Porous paving, for instance, is not visually discernible from impervious paving; as such, it allows for a positive ecological function without requiring a change in the conventional form (Sorvig, 1993). Functionally, porous paving is both transformative and transportive, although, as suggested, its transformative nature is disguised, which reduces the potential for a negative attitude about it. Symbolically, again, porous paving represents two conflicting things: consumption and sustainability.

Technological innovations in sustainable landscape design have been primarily concentrated in the areas of storm water treatment, drought tolerant and wetland plantings, and site design for solar access and wind control. Some of these innovations are finding their way into common practice, others are suffering from some of the perceptual barriers described above. There are several other potential areas of sustainable technology that are weakly covered in the literature. The questions of how designed landscapes deal with the waste generated on a site, utilize recycled materials in their construction, utilize sustainable technology in maintenance, and respond to existing unsustainable technologies are issues which must be further explored.

Socially responsible design One of the main arguments for sustainable development has been for the preservation of future generations' ability to survive. As discussed above, ecology has been the primary vehicle for sustainability to date. However, as Richard Neuhaus argues in his book, In Defense of People, mere survival ought not to be an end in itself, at the expense of social justice and quality of life. In this 1971 response to that era's growing faith in the ecological movement as the answer to complex societal problems Neuhaus states:

The theme of survival makes impossible the search for the moral purpose of American life. When survival is king, all questions of right and wrong are irrelevant and diversionary. . . . Survival as a single guiding concept further assumes that there is nothing worth dying for and that life under any conditions is worth living (Neuhaus, 1971, p. 117).
He claims that instead of dealing with the many complex social and political problems of the day, such as poverty, war and hunger, people have turned to the ecological movement as something within their reach; a problem they can do something about:

The environmental issue was successfully packaged as a bright new thing to titillate the appetite of culture and counter-culture. In addition, there were people of serious reformist purpose who just needed a respite from their struggles. Impotence breeds a multiplicity of causes. When frustration refuses to admit defeat, it redefines the problem (Neuhaus, 1971, p. 80).

Neuhaus goes on to point out that the ecological movement has become such a popular cause that industry and big business, the consumption-oriented bane of the ecological movement's existence, has succeeded in commercializing ecology through products and services that are "good for the environment". He makes the surprising case for drawing similarities between conservationists (normally associated with liberalism) and conservatism, mainly through their tendencies for frivolous, elitist attitudes which ignore the needs of the masses (Neuhaus, 1971).

Ian McHarg, landscape architecture's noted ecological crusader, validates Neuhaus' criticism of the ecological movement with some of his views. In Design with Nature, McHarg suggests that the public plea for social justice needs a better argument than typical "bleeding heartism", and suggests that the "diagnostic and prescriptive powers of a rudimentary ecology carry more weight and have more value" (McHarg, 1971, p. 55) While there is certainly a connection between our social behavior and our treatment of the environment, they are not one and the same problem. McHarg's rather naive expectation that ecology holds the key to social justice is fuel for the antagonism which exists between the differing ideologies.

While Neuhaus' arguments can be countered with the many new dimensions which the ecological movement has developed since its simplistic beginnings in the seventies, several of his points are as salient as ever. As Michael Hough states in his article, "Nature in the City", landscape architecture must develop "an overall strategy that integrates social and environmental goals" (Hough, 1989, p. 41). He suggests that such a strategy must begin with recognizing ecological
processes which can occur in urban areas, in concert with social processes, rather succumb to the tendency to think of nature as an externality which competes with human interests. Sustainability holds the potential for becoming such a strategy.

Another more obvious foe of socially responsible landscape design is the phenomenon which Randolph Hester refers to as "elitist aestheticism" (Hester, 1983, p. 49). He suggests that aesthetic standards for landscape design evaluation are geared towards the outdated modern style, exemplified by the work of Lawrence Halprin and Hideo Sasaki. Meanwhile, new styles of landscape design based on conservation and participation have emerged in response to contemporary human needs (Hester, 1983). While the problems of elitist aestheticism have abated somewhat in the ten years since Hester's writing, the "new" styles of conservation and participation which he suggested are already becoming outmoded themselves.

Although Hester assigns coincidentally similar aesthetic attributes to the conservation and participation styles – blurred edges, the elimination of single purpose spaces, the lack of a clearly identifiable order – he presents them as decidedly different modes of design. He describes conservation-style projects as ones where "human use . . . is frequently limited because the environment is so fragile" and where "manmade forms should not dominate the natural hierarchy. Here, the designer tries to blend new structures into the natural landscape, and in some cases to mimic natural forms, not so much for effect, but for camouflage" (Hester, 1983, p. 51-2). Participatory-style landscapes, on the other hand are highly centered on human occupation. They are about people playing an active part in the design of their environment, to create a sense of place and the assurance of social justice.

While I certainly agree that a new aesthetic is needed to replace the modern style standard, Hester's model for differentiated conservation and participatory styles seems to perpetuate the divisiveness between ecology and social issues. As the similarity of the two aesthetics he describes for the styles indicates, they are critically interconnected issues and must be considered and evaluated under the unifying theme of the "sustainable" style. Only in this way will our critical environmental and social problems cease to be at odds with each other. And only
in this way can we develop an aesthetic which recognizes their inherent connections.

A final observation about the manifestation of social concern in a landscape is that such concern is most easily perceived and satisfaction derived through the *long term* relationship of people to a landscape. Village Homes, for instance, is noted by Thayer to be a place which he regards with extreme affection (Thayer, 1989). He has developed a high regard for the place and its aesthetic which revolve around the experiences of his social existence. He shares a common bond with neighbors in the ideals represented by the place, has watched his children grow up there, he envisions being there for the rest of his life (Thayer, 1994). These facts suggest that the derivation of social satisfaction depends on commitment to place; I believe social justice follows from social satisfaction. This association of social responsibility with long term relationships to landscapes presents significant challenges to our highly mobile society.

**Waste-conscious and regenerative design** At the heart of our struggle to integrate ecology, artful design, and social responsibility are the phenomena of waste and its antithesis, regeneration. Mira Engler's work in exploring the development and implications of our current "waste crisis" suggests that designers must consider this very important element of culture in the planning of future sustainable landscapes:

Waste is perhaps the most vivid and tangible symbol of today's social-environmental problems: an immoral excess resulting from a compulsive commodification and throw-away culture, a failure to evaluate and manage our impact on the world. It is clear now that the appropriate management of waste is essential to achieving a life-enhancing environment . . . (Engler, 1993, p. 3)

Engler identifies three ways in which waste is treated in the design of landscapes: the disguise or masking of waste, the reclamation of "wasted" or abused landscapes, and the amplification of the reality of a site's waste. She suggests that the tendency to disguise waste by hiding landfills under pastoral parks or in landscapes that nobody cares about perpetuates our unsustainable lifestyles. Some combination of the latter two treatments: reclamation of abused landscapes and amplification of a site's reality provide more potential to alter our
wasteful habits. Although her work looks specifically at sites which are considered "waste institutions" (those used primarily for the storing and processing of waste, such as landfills, and treatment plants), the concepts apply to the broader landscape as well; waste is one of the most basic things which all people and sites have in common.

Kevin Lynch makes the important distinction between the waste of things and the waste of places (Lynch, 1990, ed. Southworth). He talks about cultural attitudes toward whole landscapes which are abandoned or derelict, such as urban ghettos and former military reservations, and how we might begin to find new use and value for these places. Key to his thoughts on wasting is the differentiation between permanence and continuity:

If we seek to preserve things, it is a ceaseless threat. If we look for continuity and not permanence, on the other hand, then wasting might be turned to account (Lynch, 1990, p. 116).

This passage has profound implications for the search for sustainability. We cannot keep society or landscapes in a static state. Landscapes must stand the test of time by being adaptive to new cultural development. If we recognize this fact we can begin to change our attitudes about waste and begin to understand it as a manifestation of culture rather than push it aside as an unpleasant reminder of culture's failures.

The notion of regeneration is the positive transformation of thinking about waste as a dead-end process to thinking about it as a circular process of continual self-renewal. John Lyle is a recognized proponent and authority on regenerative design. In an article entitled "Looking at Landscape, Seeing Process", Lyle describes a new sewage treatment facility in Crowley, Louisiana which utilizes plants, soil, water, and micro-organisms to do the work normally accomplished by the steel and concrete of conventional sewage facilities (Lyle, 1994). Rather than using non-renewable resources to get rid of the unwanted "waste", "the plants and micro-organisms have assimilated the "waste" materials in the water as nutrients feeding their own biomass", so that "the sewage becomes a component of nature's continuing cycles" (Lyle, 1994, p. 144).
Lyle calls for landscape architects to adopt this notion of regeneration by viewing landscape as process, rather than simply as visual form. His prescription for sustainability calls for the creation of a regenerative landscape that gives deep form and cultural meaning to the sustaining processes of the Earth (Lyle, 1994, p. 144).

**Attitude change** Sustainable landscape design, comprised of the ecological, regional, technological, social and regenerative approaches related above, is not easily pursued or diffused given today's prevailing attitudes and value systems. Stuart Oskamp, in his discussion of attitudes toward the environment, suggests that "a person's value orientation, particularly with regard to nature, has a significant influence on the perception of environmental problems" (Oskamp, 1977, p. 367). Values are defined by Oskamp as "important life-goals or standards of behavior for a person – standards toward which the individual has a strong positive attitude" (Oskamp, 1977, p. 13). The ultimate need in the diffusion of sustainable principles is to shift predominant values away from competitive economic or consumptive goals and behavior which exhibit a lack of concern for ecology and community. This is not to say that economics and consumption have no place in society, but emphasizes the important distinction between appropriate, long-term, sustainable goals and short-term, exploitative goals.

While the importance of values cannot be overstated, they are not the direct motivation for behavior. Attitudes, on the other hand, do generate actions, along with related thoughts and feelings (Oskamp, 1977). As such, attitude changes about the landscape will result in more immediate changes in one's relating to the landscape. The study of attitudes has identified several theoretical approaches which can be used to explain attitude change.

Consistency theories, the most well-known of which is the theory of cognitive dissonance, emphasize the importance of people's beliefs and ideas. Cognitive dissonance occurs when one belief or idea held by a person is in conflict with another (Oskamp, 1977). Thayer discusses the positive response to cognitive dissonance which sustainable landscapes offer (Thayer, *Technology*, 1989). Unsustainable landscapes may create a perception of well-being, based on the pastoral landscape standard, while their function is destructive or consumptive.
When one recognizes such destructiveness or consumptiveness, dissonance occurs. While cognitive dissonance can encourage attitude change, it can also create a kind of benign ambiguity; a complacency that comes from believing the dissonance is unavoidable (Lewis, 1982). Another problem is that dissonance may be impaired by the failure to perceive certain functions as destructive.

Perceptual approaches to the study of attitudes "view the process of attitude change as a change in the perception of the attitude object, rather than a change in belief's or opinions about it" (Oskamp, 1977). One theory within the perceptual approach which has particular relevance to attitudes towards sustainability is social judgment theory. This theory offers an explanation for attitude change which considers both the assimilative and contrasting effects of social stimuli on a person's own attitude, or reference point for judgment. The principle of assimilation states that social stimuli, such as persuasive messages, which are within a person's latitude of acceptance will be assimilated as attitude change. The principle of contrast states that when social stimuli are within a person's latitude of rejection, contrast will result, producing either no attitude change or in some cases, change in the opposite direction (Oskamp, 1977).

Translated to the realm of landscape design, social judgment theory can be used to explain why some landscape architects may be successful in persuading their clients to go with a sustainable design rather than a conventional one. The notions of latitudes of acceptance and rejection suggest that the designer must exhibit a certain level of sensitivity to the client's "attitude latitude" in knowing just how far they can be persuaded to go towards sustainability. The principle of contrast is illustrated by the rejection which landscapes such as Village Homes can produce in some people. This landscape is such a drastic change, that it actually encourages reinforcement of unsustainable landscapes for some.

Learning approaches to attitude change offer yet another set of principles which are pertinent to the promotion of sustainable landscape design. The main features of the learning approaches are that they all stress stimulus-response connections and the importance of reinforcement or contiguity in learning (Oskamp, 1977). Stimulus-response connections in the landscape can be thought of as involving the landscape inhabitant or user in the landscape processes and
stimulating them with information about the landscape to enable them to learn from it, rather than allowing the landscape to be passive and ignored. The static nature of unsustainable landscapes does not encourage stimulation and their disguising nature often creates misplaced response.

The importance of reinforcement and contiguity to the diffusion of sustainable landscape design cannot be understated. Consistency and repeated application of sustainable principles not only create a stronger physical presence of sustainability, but generate confidence and acceptance on the part of the public.

It is critical to realize that the need for attitude change exists within the profession of landscape architecture as well as throughout society as a whole. This calls for re-examination of our own attitudes and those of our colleagues, in addition to trying to affect the attitudes of our clients.

Broadened landscape perception

The variety of approaches shows that there is, as yet, no agreement on what the sustainable landscape should look like (italics mine) (Hess, 1992, p. 40).

There is a . . . need for designers . . . to attempt to assign visible, observable character to sustainable landscapes so that the public may come to "know" them more easily and create them more frequently (Thayer, Sustainable, 1989, p. 108).

While aesthetics, defined in the dictionary as "the study of beauty" (American Heritage Dictionary, 1987), is the most common vehicle for peoples' perception of landscapes, sustainability calls for us to expand our ways of perceiving landscapes beyond their visual attributes, to include a broader range of emotions attached to ideas, places or objects. Thayer refers to all of the possible positive responses to landscapes, such as feelings of community belonging, health, and emotional stability, as "affect" (Thayer, Sustainable, 1989). He urges that we diminish the dominance of aesthetic perception, as it is but one dimension of landscape affect. The congruency between an image (the symbolic affects) and corresponding action (the functioning affects) which all serve to preserve resources and ecosystems is noted as essential to the perception of sustainable landscapes (Thayer, Technology, 1989).
I strongly agree with the need to recognize a range of possible affects which a landscape may have, though I am not as eager to diminish the importance of aesthetics, which is tied to the perception of beauty. The dictionary defines "beauty" as "a quality that pleases the senses or mind". Beauty can be perceived in all the same ways as the "affects" which Thayer mentions. What we must strive to promote is a deeper, more long-term perception of what is pleasing – one that is not based solely on fleeting glimpses of landscapes but on the experiences of living in them. But in the promotion of such a deepened perception, we cannot ignore the value of landscape qualities whose beauty and sustainability are more immediately recognizable, as an important diffusion tool.

**Barriers to Sustainable Practice**

The fact that sustainable landscape design is not being commonly practiced by landscape architects is recognized by many. "The profession pays a lot of lip service to environmental issues, but most landscape architects we talk to around the country are extremely frustrated by the lack of any real ecological substance in their work and often find themselves responsible for unacceptable environmental losses." says Carol Franklin of Andropogon Associates (Steiner and Johnson, 1990, p. 98). The reasons for the lack of application come both from within the profession and from the larger economic and cultural setting in which it is practiced. If landscape architects are to effect meaningful cultural and economic change through the examples set by their work, several obstacles must be addressed.

**Lack of agreement**

The lack of a profession-wide understanding of the implications of sustainable landscape design is evidenced in part by the disagreement over its priority as a goal. While some point to the evolving notion of the sustainable landscape as a "welcome and necessary addition to the philosophy, theory, and practice of landscape architecture" (Thayer, *Sustainable*, 1989, p. 101), others place sustainability relatively low on the list of concerns needed to be addressed by contemporary landscape architects. "I'm less worried about landscape architects dealing with sustainability," noted Linda Jewell in a recent Landscape Architecture magazine panel discussion. "I feel that we deal with things like
minimum site intervention reasonably well within the power that we have." Fellow panelist and architect, Pliny Fisk responded with a warning against oversimplification of the concept of sustainability. He argued that "one can disturb a site to the least possible degree and be causing utter havoc on Earth at the same time – basically because of what you're bringing to the site" (Thompson, 1992, p. 58).

Lack of criteria

The lack of a means to recognize or document sustainable design efforts is found in the frustration communicated by design critics. Jury member for the 1991 ASLA Design Awards, Leslie Kerr, points out: "Many projects gave lip service to the idea of ecological planning. In other cases, there was no relationship between wonderful ecological analysis and what was done at the end." On the other hand, notes fellow panel member, Gary Mason, "In awards programs, a lot of the work doesn't get recognized unless there's a graphic [or photo]. You can have an extraordinary effect on real land, and it doesn't get recognized by the profession" (Leccese, 1992, p. 57).

Schisms between artful design, ecology, and social responsibility

Sustainable landscape design represents a call for the profession of landscape architecture to unite concern for artful design with concern for ecology and stewardship (Leccese, 1992; Thompson, 1992). The concept of sustainability is also inextricably tied to issues of social responsibility and community participation in design (Van der Ryn and Calthorpe, 1986; IUCN, UNEP, and WWF, 1991). As touched on in Chapter One, the evolution of the profession has resulted in a current climate of segregation of these concerns and a legacy of design solutions which reflect this segregation. Such segregation is illustrated by the total commitment to abstract artistic expression represented by the practice of Martha Schwartz, contrasted against the complete dedication to ecological processes and forms evident in the work of Andropogon Associates. I have proposed that these schisms are largely to blame for the lack of contemporary examples of sustainable landscape design.

Thayer suggests that while the majority of the profession remains preoccupied with style, aesthetics and simply meeting client expectations, the
creation of more sustainable landscapes is the isolated task of a small "counter-cultural" fringe (Thayer, Sustainable, 1989). I would suggest that this "fringe" has become much more important and less counter-cultural than previously imagined, though not any more integrated. While the number of professionals practicing sustainable landscape design is still not significant, the models being developed from those who are thought to represent sustainable design are becoming very significant in their publicity and promotion. And what are these models emphasizing?

The expert referral process documented in Chapter One resulted in the unanimous suggestion of Andropogon Associates as the leading firm practicing sustainable landscape design. The literature about Andropogon indicates that their approach is based on a total commitment to ecological design, so it would follow that the predominant perception is that sustainable design is synonymous with ecological design. The exclusive attention to ecological processes may result in environmentally sustainable landscapes, but many in the profession would suggest that it is at the expense of culturally meaningful, artful solutions. Andropogon claims no loyalty to any single aesthetic model; that in designing "it uses whatever works, from traditional aesthetic concepts to 21st-century materials. Our goal is to create sustainable, living landscapes, but we believe in high technology and artifice, and we use all the old design ideas" (McCormick, 1991, p. 90).

Such a view epitomizes the passive attitude towards aesthetics which many landscape architects resist. Linda Jewell defends the role of aesthetics and art with the following thoughts voiced in a panel discussion on sustainability vs. art: "I think the aesthetic judgment should not sort of disappear out of all the conversation. In landscape architecture, for 25 years there's been minimal concern about very basic visual aesthetic issues. . . . There will always be situations where sustainability and aesthetics conflict. In such a situation, I'll make the decision in favor of aesthetics. I won't dump pollutants in the local stream, but I do have a point at which I will use the stone from Italy" (Thompson, 1992, p. 59).

In the struggle to reconcile these viewpoints, the need for new aesthetic standards has been suggested as an alternative to dispensing with aesthetics
altogether (Hester, 1983; Koh, 1988). Jusuck Koh proposes a model for an ecological aesthetic which supplements the traditional principles of formal aesthetics—unity and balance—with a third principle, complimentarity, which reflects both the holistic view of the world and the integrative nature of creativity (Koh, 1988). While this idea starts to indicate a greater recognition of the value of artistic design to sustainability, it still suggests that ecological rationale is the only valid contributor to the determination of landscape form.

To be sure, there are good reasons for the fear of aesthetics and artistic design as they threaten sustainable solutions. Award-winning landscape architects like Martha Schwartz and Peter Walker have exemplified a bias toward abstract aesthetic concerns and have come under criticism in recent years for the lack of sustainability exhibited by their landscapes (Thompson, 1992). In partial response to the profession's widening rift between aesthetic design and environmental planning, Walker has recently formed a new partnership with fellow visionary Bill Johnson, who, unlike Walker, gained his notoriety through his work in landscape planning. At a recent Iowa ASLA symposium themed "Focus on the Future", Walker expressed enthusiasm for the potential of his new venture with Johnson as an example of bridging concerns of planning and design through practice (Walker, 1993).

Steve Martino, though one individual, has realized the potential for bridging the related, though more specific gaps between ecological and artistic design. In his two 1992 ASLA award winning projects, Arid Zone Trees and Papago Park/City Boundary, Martino creates striking statements of beauty and revelation, using artful devices to showcase the ecological processes of the landscapes. The most telling evidence of his success is that the jury for the awards selections consisted of Martha Schwartz, Bill Johnson and Susan Child. The fact that Martino's landscapes appealed to this diverse a jury is testimony to the aesthetic success of his of sustainable designs (Landscape Architecture, 1992).

John Lyle refers to experimental ideas, such as those of Steve Martino and Andropogon Associates, which are embodied by new, perhaps avant-garde landscape forms, as "floating seeds" (Lyle, 1991). He warns that such floating seeds can produce deep forms which have profound effects on the way people view and
understand nature. Historic landscapes such as the garden of Vaux-le-Vicomte are sited as examples of lasting cultural influences which have encouraged our attitude of domination over the land. This line of thought leads to the suggestion that landscapes which we hold up as examples for the profession must achieve those kinds of deep forms which attempt to restore cohesive relationships between people and nature. He feels strongly that landscape designs which gain their formal inspiration from underlying ecological processes, whether abstractly or realistically interpreted, will aid in achieving this goal (Lyle, 1991).

These comments suggest an obligation to use our artistic design skills to promote landscapes of ecological integrity. I would add that the call for sustainability represents a similar challenge to utilize art to promote landscapes of social responsibility.

Self-imposed limits
Landscape architecture is plagued by a self-imposed narrowness of purpose which other design professions such as architecture also confess to. "Architects have seen themselves as having little input on the issues of resource control - what to build, where to build, and budget – being concerned largely with issues of aesthetics and building materials and technology" (St. John, 1992, p. 1.2) states Andrew St. John in the Sourcebook for Sustainable Design produced by the Boston Society of Architects. Landscape architects and other design professionals who take up the cause of sustainability must broaden their views of the makeup of a design practice to include ways of influencing these issues (St. John, 1992).

The call to expand our professional role was strongly echoed in the previously mentioned Landscape Architecture Magazine forum (Leccese, 1992):

The profession should play a leadership role, because the most crucial environmental issues we face are political (Jay Sherman, p. 54).

. . . landscape architects could be working [to educate] developers on the benefits of environmental and sustainable design. And most haven’t yet (Gary Mason, p. 56).

. . . landscape architects who are not designers in the classic office have a profound impact (Leslie Sauer, p. 56).
Lack of cohesive "ordinary" set of examples
   The lack of consciously designed landscapes perceived to be iconic representations of sustainability is noted as a problem in the diffusion of sustainable design practices (Thompson, 1992). Equally significant, however, appears to be the lack of a cohesive set of examples which exhibit the range of concerns relevant to sustainability, as well as a range of applications to project types common to landscape architectural practice – that is to ordinary, everyday design problems.

   The landscapes which are most often referred to in the literature as tending towards sustainability can be divided into three overlapping categories: experimental, technological, and naturalistic. The essence of this thesis is to urge that additional categories be considered in the offering of examples and that the distinctions between the categories become more blurred, showing that a sustainable design approach should not be reserved for only those projects which fit conveniently into a specific niche.

   The experimental, self-contained sustainable landscape is exemplified by Blueprint Farms in Laredo, Texas. This two-acre farm addresses a holistic set of sustainability concerns which range from waste treatment to water replenishment to agricultural systems, in addition to a strong response to the need for new architectural forms which reflect regional ecology. While the project's designers, Pliny Fisk and Gail Vittori, have considered the landscape in its global context and envision it as a first step in a community-scale application, its inward focus and association with a "utopian spirit" (Tilley, 1991, p. 65) and "heady ideas and radical exploration" (Tilley, 1991, p. 70) limit it to the realm of the experimental. While this and other needed explorations, such as Village Homes and the Center for Regenerative Studies, discussed earlier, are the seed of potential change, there is an immediate need to see such new ideas integrated into the existing landscape fabric where they can more directly influence and contrast unsustainable practices.

   The technological sustainable landscape is best exemplified by the phenomena of wind farms and sustainable agriculture methods. Wind farms are indeed a great technological innovation for the promotion of renewable energy generation, and provide strong iconic imagery for the notion of sustainability. Yet,
despite technology's essential purpose of serving human development, many of the examples of sustainable technology are places devoid of human activity, seeming to focus on and almost objectify the technology, rather than integrate it into the human dimensions of the landscape. Alan Hess' article "Technology Exposed" shows a range of responses to the discomfort with which we approach technological form-making. He documents projects which range from highly naturalistic in character, such as the Dyer Landfill in Florida, where the subtle technological forms suggests that "the best artifacts are no artifacts at all" (Hess, 1992, p. 40), to California's wind farms, with their sleek, high-tech windmills which are not at all "natural" looking and force the honest recognition of technology's importance to our lives. While confronting unsustainable technology and developing new icons for sustainable alternatives is probably one of the biggest challenges in sustainable design, the literature indicates a tendency to concentrate on these issues at the expense of the social, political and economic issues which also have profound impacts on our sustainability.

Finally, the naturalistic sustainable landscape exemplified by many of Andropogon Associates' projects exhibits the tendency to equate sustainability with pure ecological forms. Landscapes such as the Morris Arboretum and the SmithKline Beckman Research Center focus on the preservation, enhancement and re-establishment of natural habitat. Andropogon's Carol Franklin describes the firm as "ecological designers" who are battling the profession's pursuit of high-image design at the expense of natural systems. Franklin says "If a landscape architect's conventional vocabulary is bed, border, bosque and allee, the ecological designer's vocabulary includes meadow, old field, forest and swamp – forms which respond to the site and reveal pattern and process" (Steiner and Johnson, 1990, p. 98). Current debate, as indicated in the discussion of technology above, centers on the effective use of such vocabulary; there is a fine line between using such forms as inspiration and actually imitating the forms. Projects which imitate ecological form to achieve ecological function may be technically sustainable, yet do they recognize the human reality of a place and encourage integration of sustainable principles in areas which do not lend themselves to "natural" form?
We need examples which defy categorization, expand our view of sustainability, and encourage diffusion of sustainable principles to the larger landscape fabric. The response of Steve Martino & Associates to this need is the essence of the case study.

**Characteristics of Firms/Designer noted for Sustainable Design Work**

A handful of firms, such as Steve Martino & Associates and Andropogon Associates, which have taken serious business risks to remain true to their environmental convictions, have succeeded in selling their sustainable ideas to large influential clients (Leccese, 1992). These firms can be characterized as "slow radicals"; their ideas are precociously ahead of popular opinion, but are slowly shifting these opinions and affecting social change (Blau, 1984). Such modes of practice do not lend themselves to becoming large, stable, mainstream businesses; they thrive on defining the cutting-edge and having the flexibility and freedom to experiment and innovate. When such firms begin to have larger corporate commissions and wider publicity, as have Martino and Andropogon, they run into the dilemma of whether to expand or to retain this crucial flexibility and freedom.

The expert referral process described in Chapter One revealed several firms thought to be practicing sustainable landscape design whose members have been involved in teaching and research activities, in addition to applied design work. Designers John Lyle of the Center for Regenerative Studies; Rob Thayer of Co-Design; and Carol Franklin and Leslie Sauer of Andropogon Associates have each been involved in higher education as either a major or a minor function of their careers. This association with the pursuit of new knowledge and of skills in educating seems to provide added proclivity and success towards applying sustainable principles in practice.

Likewise, those entering the field of landscape architecture from a related but different profession, as exemplified by Steve Martino's architectural training, allow for a whole new way of looking at the landscape, unencumbered by professional jargon and preconceived design conventions.
Synthesized Definition of Sustainable Landscape Design

The preceding discussion of the emerging themes of sustainable design theory, considered within the context of the noted barriers to the practice of sustainable landscape design, can be synthesized into the following definition:

**Sustainable landscape design is a holistic design approach which balances the concerns of ecology, artistic design, and social responsibility.**

Synthesized Criteria for Sustainable Landscape Design

The more we attempt to define the parameters for sustainability, the clearer it becomes that there is no static "formula" for sustainability. Because many factors remain unknown, unpredictable, or uncontrollable, the recognized means towards a sustainable society change and evolve as new knowledge emerges (IUCN/UNEP/WWF, 1991). The following criteria for sustainable landscape design have been interpreted from the preceding review of the literature. They are intended, not as an absolute checklist for sustainability, but as a tool with which to analyze sustainability of both the general design approach and the specific landscapes which emanate from this approach.

Criteria for analysis of a firm's general design approach

1. **Sustainable landscape design requires commitment and innovation.** The literature contains many guidelines for sustainable landscape design and several examples of sustainable designers and landscapes. It seems to suppose that if we are told that sustainability is desirable and we are shown how it can be incorporated into our designs, we will do so; that the lack of sustainable products from landscape architecture is due mainly to lack of knowledge or exposure to the practice of sustainable design. While knowledge and skill is certainly essential, a sense of commitment to apply the knowledge and a spirit of innovation in developing the skill can make the critical difference between a career
based on sustainable landscape design and one following the path of least resistance into more conventional, low-risk practice.

2. Sustainable landscape design requires an approach which balances ecological, aesthetic and social concerns. Theory of sustainable landscape design considers each of these concerns, but the majority of the literature is primarily concerned with ecological issues. This is not surprising since environmental degradation is the most tangible source of our need to design more sustainable landscapes.

3. Sustainable landscape design requires application of an integrative aesthetic which reflects the unique ecological, visual/formal, and social concerns of the particular landscape being designed. Much of the sustainable design literature suggests that aesthetics are a non-issue; that forms should be directly driven by the unique ecological character of the site. This is in direct conflict with the vital notion of landscape architecture as an artistic expression of the relationship between human culture and nature. Aesthetics should not be used as an excuse to design unsustainably; rather the sustainable designer's primary goal is artful expression – which integrates ecology and culture.

Some proponents of sustainable landscape design denounce the dominance of aesthetics, considering it simply one of the many positive affects which designed landscapes may contribute to human well-being (Thayer 1988). While it is certainly true that other effects, such as health and oneness with nature, are important and worthy of pursuing, they do not lessen the need for attention to the visual/formal effects of a landscape. The positive effects of sense of place, pride, environmental integrity, etc. can be integrated through an aesthetic of sustainability.

4. The process of designing sustainable landscapes requires recognition and acceptance of varying degrees of sustainability. In order to maximize the potential sustainability of a project, designers must exercise tight control over those types of operational factors which are directly within their realm of influence, such as:
• Professional philosophies, personal motivation, design capabilities and education of its members
• Design processes utilized
• The firm's relationships with clients and its business strategies
• Firm structure and size

Other key operational factors also influence one's ability to design sustainable landscapes but are outside the direct control of the designer:

• Post-construction involvement in projects
• Characteristics of the firm's clients: economic motivations and needs; program requirements and preferences; philosophical beliefs; design and educational backgrounds
• Site-specific characteristics
• General economic, political and social conditions within which the firm operates

Lack of control over such external factors requires that the design process be sufficiently flexible to tailor solutions which weave sustainable principles into a larger landscape fabric which has been shaped primarily by unsustainable values and activity.

Small gestures of sustainability, while not contributing to a comprehensive sustainable landscape as idealized in theory, can be highly effective in initiating change in perceptions of landscapes and aesthetic preferences. Moving toward a sustainable society will most likely be a process of small, incremental change, not of sudden, monumental change. While iconic sustainable landscapes such as Village Homes serve as valuable symbols of change and possibility, they also succeed in turning away a significant segment of the population which resists change in strong doses.

Criteria for analysis of built landscapes

1. Sustainably designed landscapes should reflect regional and site-specific ecosystem characteristics. The use of native or adaptive plantings, indigenous construction materials, and formal archetypes (such as
wetlands, arroyos, or streams) of the ecosystem should be employed where possible. The interpretation of such elements need not be literal, though it must provide a positive functional contribution to the landscape's sustainability.

2. Sustainably designed landscapes should reflect regional and site-specific ecosystem processes. The treatment of such processes as drainage and change over time must consider the regional ecosystem context and the opportunities to tie into or enhance existing sustainable processes at the site level. Such treatment is often hindered by counter-productive regulatory policy which calls for such things as paving, closed drainage systems, and maintenance requirements which hold landscapes in a static state.

3. Sustainably designed landscapes must be maintainable with low or no chemical inputs. Landscapes which regularly require chemical inputs, such as pesticides and inorganic fertilizers, threaten the health and long term survival of both ecosystems and humans. While a landscape design may not expressly call for the use of chemicals in its maintenance, a designer must be aware of what the implications for its maintenance are, given the prevailing preference for manicured, static, controlled landscapes.

4. Sustainably designed landscapes must be maintainable and usable with low or no non-renewable energy inputs. The use of electricity, gasoline and other types of non-renewable energy sources for landscape functions such as pumping water, lighting, mowing, and motorized travel detracts from the sustainability of the landscape. Landscape functions which utilize a perpetual or renewable energy resource such as solar power make a positive contribution to a site's sustainability.

5. Sustainably designed landscapes must be maintainable without supplemental water and soil inputs. Many areas in which irrigation or recreational/artistic water features are employed in landscape design rely on a nonrenewable ground water source, rather than whatever surface water is available to the site. The additional water often requires electricity for its distribution, compounding the unsustainable effect. Sites which require imported
topsoil are, in essence, stripping the fertility of another site, rather developing their own fertility.

6. Sustainably designed landscapes must give form to the processes of waste, and maximize the regenerative capacity of the site. Landscapes play one of two roles with regard to waste. They can host potential waste-producing entities and activities, as with a park's hosting a snack bar, or a residential landscape hosting a consumptive household. Or they can produce waste themselves, either through individual items generated periodically by the site or through the obsolescence of the site itself. Sustainability calls for innovations which reduce the amount of waste produced, and which creatively deal with that waste which can't be eliminated, through recycling or adaptive reuse of waste materials and sites.

Regenerative design is a way of ordering landscape processes which not only eliminates the production of waste, but recycles materials and creates new resources to replace those which are used in the landscape. Agricultural production, solar energy production, composting and water harvesting are all examples of regenerative technologies which allow human ecosystems to be regenerative.

7. Sustainably designed landscapes must be notable for forms which artfully interpret the unique relationship between culture and ecology inherent to the site. Simply recreating nature denies human presence and influence on the landscape, yet it is also easy to use culture as an excuse to design unsustainably. One of the biggest challenges in sustainable landscape design is to come up with forms which illustrate sustainable human interactions with their landscapes. Examples of forms which achieve this are a windmill or a streetscape which uses native plantings.

8. Sustainably designed landscapes must honestly expose the technological, social and ecological processes which result from the cultural/ecological relationship. Whether such processes are sustainable or not, being exposed to them honestly reveals their implications, so that we can make more educated judgments about their contribution to human and ecosystem
well-being. Hiding an electrical transformer behind a vegetative screen allows us to use electricity with less guilt for what it may mean for ecosystems and future generations. Likewise, working side by side with one's neighbors in a community garden viscerally exposes the social and regenerative benefits of such a process.

9. **Sustainably designed landscapes should reflect those elements of the vernacular landscape — construction techniques, architectural style, land use, circulation and congregation patterns — which respond to the resource availability and climatic conditions of the region.** Contemporary vernacular forms - the highway, the suburb, theme landscapes - tend to disregard regional resource availability and climatic conditions in favor of provision for mass consumption, standardized uniformity, and insulation from climatic conditions. Vernacular landscapes which were created prior to World War II generally exhibit stronger regional and contextual characteristics due to the more limited mobility and technological capability of the times. Landscape elements such as adobe or native stone walls, wooden shade structures, and covered bridges exhibit logical ties to the places they occur, creating identity, function, and beauty. We can take inspiration from such forms to forge a new vernacular which utilizes our technological capabilities to attune resource use and landscape forms to a place's unique characteristics.

10. **Sustainably designed landscapes must generate a broad set of positive aesthetic effects — emotional, social, spiritual, and sensory affects, as well as visual effects.** This notion expands the conventional tendency to perceive of beauty only through visual qualities. While sustainable design does require a shift in attitudes about visual beauty, there is also a critical need to develop landscapes which amplify the other aspects of a landscape which might create perceptions of beauty. Places which encourage social interaction, facilitate meditation or contemplation, or which offer alluring sounds, movement or smells can strongly enhance the perception of beauty gained from visual qualities.

Visual perceptions can be gained just by passing by or looking at a picture of a landscape; the perception of other aesthetic characteristics requires more personal involvement with a landscape and is therefore less readily assimilated.
11. Sustainably designed landscapes must be economically viable or preferable alternatives to conventional design, in terms of both construction costs and long term maintenance costs. We live in a world which has come to be governed, designed, and judged in terms of immediate monetary costs. This is a difficult fact to reconcile with the need for sustainability, which requires that we consider issues according to environmental and social costs over long time periods. Given this difficulty, it is necessary, for the time being at least, to create sustainable solutions which can compete monetarily with conventional unsustainable landscapes. A common excuse for going with conventional design is that alternatives are much more expensive to construct or maintain. The diffusion of sustainability requires that this claim be proven wrong, and it is up to the designer to select materials and construction methods which demonstrate both fiscal and environmental/social soundness.

12. Sustainably designed landscapes must consider the needs of all people, not just the clients and targeted user group. Nearly every design project emanates from a program conceived of by the client or the designer specifically to solve a unique set of problems. Sustainability calls for design to break out of narrow, assumption-filled views and question the validity of the perceived problems and the implications of the solutions for all who will be impacted by them. For instance, creating a new landscape for a corporate headquarters requires that the designer understand the operations and needs of the corporation. However, sustainability calls for the designer to also consider the needs of the people this landscape may be displacing or affecting.

In a more abstract sense, sustainability calls for us to consider the needs of future generations. The social and ecological health which a landscape design encourages can addresses such long term interests.

13. Sustainably designed landscapes must be designed with the maximum amount of community participation and professional collaboration feasible. Participatory and collaborative design are important to the creation of solutions which represent a range of human and environmental interests. Community participation in design creates democratic solutions and a sense of pride and responsibility for the resulting landscape. It also creates an
important forum for professionals to influence community attitudes and perceptions of sustainability.

Professional collaboration can encourage a designer to break out of the unconscious biases and self- or profession-imposed limitations.

14. **Sustainably designed landscapes should produce a controversial reaction on the part of the client, users and public.** Controversy indicates the existence of opposing views. The diffusion of sustainability through landscape design requires that opposing views about resource use be exposed in the landscape. History is replete with examples of issues, such as civil rights, whose solutions began with the acknowledgment of controversy. In order to solve a problem as vast and insidious as environmental degradation, the consistent use of seemingly radical tactics has an important place in expanding public awareness and gradually shifting attitudes.

15. **Sustainably designed landscapes must ultimately generate a feeling of responsibility on the part of the users to manage the landscape in the spirit and intent of the design.** Whether or not a landscape is the product of community design, results in controversy, or costs the same or less to build than a conventional alternative, the ultimate determinant of its sustainability lies in how it is managed once it is built. The design process continues long after the designer’s work is done, by whoever inhabits and manages the landscape. Inherently, sustainability suggests that management should cease to be so heavy-handed; that a primary benefit of creating sustainable landscapes lies in the fact that fewer resources (including labor) are needed to maintain them. A part of this hands-off strategy of management is the recognition that a sustainable landscape must change over time and must be allowed to create its own sense of stability. Therefore there is no ultimate climax state which we should seek to maintain in the landscape, but rather an ongoing process of stable change and regeneration. A sustainable design must seek to impart this important lesson.
Sustainable Design Framework

The relationship of a firm's general design approach to the landscapes it generates is interpreted through a filter of external factors which are not directly controlled by the designer. These factors encompass general societal conditions such as our changing knowledge base, and public opinion and regulatory policy trends. They also have to do with contextual conditions, unique to each project, which are determined by client and site characteristics. Figure 2.1 contains a summary of the approach and landscape criteria discussed above, set into a framework which considers the effect of external factors.

Review of the Literature on Steve Martino & Associates

The presentation and analysis of the findings of the case study of Steve Martino & Associates will give a first-hand look at Martino's approach and his landscapes. But much of what is commonly thought, and perhaps emulated, about his firm and his work is controlled by how the literature portrays them. The fact that the firm has won several national design awards has created a popular interest in its work, prompting a wave of writing relating both to the award winning projects and the firm's unique approach. Yet, as has been suggested, the ideas that are emphasized in the literature are not necessarily representative of the firm's true focus and intent.

What does the literature tell us about his approach and his landscapes? A profile of Steve Martino & Associates can be derived from three types of written and graphic sources: local and regional magazine and newspaper articles, his own writings about his design approach, and the illustrative use of images of his projects in a range of literary and commercial applications. This profile will be compared with the profile derived from the case study in Chapter Five's conclusions.

Published literature

Regional reputation A comprehensive listing of publications which feature Martino's work shows a steady increase in interest and acclaim for his landscapes since around 1980, when he first began to be recognized in Phoenix area
Figure 2.1 Framework depicting relationship of sustainable design criteria to external design factors
publications. Along with regular reference in newspapers such as the Phoenix Gazette and Arizona Republic, the California-based Sunset Magazine began to include mentions and features of his work. Many of the stories were prompted by the recognition he was receiving from several regional design awards programs for his desert-inspired landscapes. By 1987, he had won more than 20 first place awards in such programs, which propelled him into the spotlight and earned him invitations to appear on "This Old House" and "Victory Garden". As a listing of his award-winning projects shows, though the first of his awards were for residential landscapes, he soon began to add public works projects and commercial developments to his project palette.

**National recognition** In 1988 Martino won his first national design award from the American Society of Landscape Architecture (ASLA). The project, the Douglas Residence, was praised by the awards jury for its sensitive siting of the house within the native desert site, the use of a desert-derived aesthetic which excluded "traditional lawns or yards", and its innovative planting design: "What I liked about the planting was that it didn't rely on easy composition. It works instead with subtle colorations of the plants and textures" noted one of the jurors (Landscape Architecture, 1988).

In total, Martino has won five national ASLA awards. The winning projects have shown a gradual shift in his emphasis from naturalistic residential design to interpretive expressions of the desert in complex, multi-layered projects. The Greenberg Residence, honored in 1989, was a step in this direction, in that it brought Martino's developing skills in integrating the desert with human environments into the constraint-filled suburbs. The clients, owners of an extensive art collection, sought to take their passion for art into the garden. Martino's fulfillment of this wish resulted in what was to be a trend towards greater emphasis on the detailed design and showcasing of the hardscape: "I like to use this ever-changing, evolving 'wild habitat' of a garden as a background for my hardscape designs" noted Martino in his interview for the award (Landscape Architecture, 1989).

Martino's third ASLA award, the New Times Courtyard, illustrates the application of his approach in a quasi-public urban space. The awards jury lauded
the project's rescue of an historic abandoned school and the design solution,
which "returns desert character to the city" (Landscape Architecture, 1991, p. 50).
The project expanded Martino's desert landscape efforts and innovations at
several levels. Technologically, he devised a mechanism to use collected rain
water for a Mesquite tree bosque. Politically, he intended the solution to challenge
the local business community which has proven itself to be "strongly opposed [to]
the use of native plants" (Landscape Architecture, 1991, p. 50). Culturally, he saw
this very urban site as an opportunity to show that "a native landscape is appropriate
for desert cities" and that, in fact, artful expression of the Sonoran Desert is the key
to the city of Phoenix's "struggle for an image" (Landscape Architecture, 1991, p.
50).

The perception of Martino's celebration of the desert takes on added
dimensions with the latest of his award winning projects, the Arid Zone Trees
nursery demonstration garden and Papago Park's City Boundary public art project.
Both projects were chosen in the 1992 awards program, and the jury had similar
praise for each, which revolved around their perception of Martino's integration of
three important elements: rehabilitation or re-creation of a degraded desert
landscape, simple, bold, and sculptural hardscape elements, and the meaningful
response to each site's contextual factors. The demonstration garden, which is set
in an agricultural landscape, "illustrates how desert farms [many of which are being
abandoned for lack of water] can be returned to native landscape (Landscape
Architecture, 1992, p. 58). The public art project is praised by jury member Martha
Schwartz as being "a wonderful example of how one might deal with those funny
and funky leftover, unloved epics of an intersection . . ." (Landscape Architecture,

Interestingly, the notion of drawing meaning and beauty from the cultural
and ecological context of a landscape is uniformly articulated and praised in the
magazine staff-written text, but is not as evident in the jury members' comments.
Their quoted comments about the projects are nearly all related to the more
abstract visual aspects of the works: "The placement of these objects seem to
magnify the beauty of the landscape." "There's a wonderful counterpoint between
this loose ragged desert vegetation and those very simple, handmade monoliths."
"[This is] a great bold sculpture in the land that evokes the stark, infinite distances and rugged materials of the desert" (Landscape Architecture, 1992, p. 60). The value of the ecological function they fulfill is mentioned in an off-hand way, as though this is simply an added bonus of a great example of artistic design. The writers' commentary, as well as Martino's quoted comments, seem to suggest a more holistic attitude.

**Popularized image** Feature stories on Steve Martino & Associates (Thompson, 1993; Trulsson, 1993; Trulsson, 1991; Pihlak, 1989), which respond to the growing popular interest generated by the awards publicity, build on the image suggested by the awards discussions. They refer to Martino's innovations in native plant use and drip irrigation, his concern with creating a "spirit of place", and his call for the landscape industry to rethink the notion of maintenance, which he feels currently caters to an "overemphasis on neatness" and a "popular desire for a landscape that 'doesn't talk back' . . . " (Pihlak, 1989, p. 73). All of the writings suggest that he is a design maverick, boldly creating the cutting-edge — and popularizing it — for his region.

William Thompson, in his profile of contemporary American landscape architecture written for an Asian magazine, Pronto USA, suggests that Martino's work is sustainable: "From an ecological point of view, Martino's [work] is an example of sustainable landscape design" (Thompson, 1993, p. 2). He then goes on to name several landscape architects who, in contrast, "are interested in elevating landscape to the expressiveness of a fine art . . . " (Thompson, 1993, p.2). These observations, while recognizing the ecological merits of Martino's work, reduce sustainability to a one dimensional issue, as though a sustainable landscape cannot be artistically expressive. This is a subtle reinforcement of the barrier to sustainable landscape design created by the contemporary schism between artistic design and ecology, discussed earlier in this chapter.

Perhaps in reaction to this type of stereotyping, Nora Burba Trulsson's piece on Martino reveals a recent desire to break out of the association people have of him as primarily a native species proponent. Martino is quoted: "I'm ready to do smaller-scale projects, to create gems out of leftover spaces. In fact, I'm even ready to design a house" (Trulsson, 1993, p. 9). This direction harkens back to Martino's
early training as an architect, and suggests an impatience with the artistic constraints of large-scale landscape design.

Finally, the general impression the literature gives is that the work of Steve Martino & Associates is single-handedly designed by Steve Martino himself, with very little influence from the "associates". Although one of the feature articles, "Planting Sonoran Landscapes", talks about and quotes one of Martino's horticulturist associates, Linda Grotzinger, all the awards discussions list Martino as the sole designer involved in the project. The image of the firm is very centered on the strong, almost charismatic views of Steve Martino.

**Martino's professed approach to design**

In a current one page statement of his design approach and accomplishments, Martino showcases the breadth of project types to which he has applied his "regional design vocabulary". His prominent use of such words and phrases as "committed", "consistent", "innovations", "empowered environments", "sense of place", "reality", and "meaning" relay a strong sense of the personal and professional integrity with which he approaches the design of landscapes. Interestingly, the piece does not suggest the desire, noted earlier, to downplay the strong association he has with native plant materials. It actually reinforces this association.

The statement also emphasizes the very rooted nature of his practice in the Phoenix area. All the projects mentioned are within this desert region, contributing to the image created by the published literature that Martino's approach requires a commitment to a particular region.

Of particular note is that in all of his discussion of regional ecological processes, Martino does not mention the word sustainable.

**Iconic references to Martino's work**

The appeal of Steve Martino's landscapes has reached an iconic level. The cover of the 1993/94 American Society of Landscape Architects' membership directory sports a photograph of the Arid Zone Trees project. Even more telling and strangely symbolic, is the design of the new ASLA "Designer" Mastercard. It, too, features a photograph of the Arid Zone Trees project (Figure 2.2). Created as a
Carry the ASLA Gold Card and take advantage of a special low 13.9% variable Annual Percentage Rate (APR) on cash advances.

Dear Friend:

The American Society of Landscape Architects (ASLA) has teamed up with MBNA America®, the world’s leading Gold MasterCard issuer to bring you an exciting new offer. It’s called the American Society of Landscape Architects MasterCard® Program, and it offers two uniquely designed cards with special advantages only available to professionals in the field of landscape architecture.

The ASLA Designer card offers all the benefits of a regular MasterCard® card. And the card features a beautiful photo of the Arid Zone Trees on its face, an ASLA Professional Award winning project. The ASLA Gold Card offers additional benefits, such as a higher credit limit and supplemental Common Carrier Travel Accident Insurance. As a special courtesy for the first year, both cards are being offered with no annual fee.1 Each year thereafter the annual fee will be rebated if purchases exceed $2,500 in a calendar year on your ASLA MasterCard.

Figure 2.2 Iconic reference to the work of Steve Martino & Associates
special credit card to cater to the landscape architectural profession, "The card features a beautiful photo of the Arid Zone Trees on its face, an ASLA Professional Award winning project."

, the promotional letter states. While this commercialization and generic association with money seems incongruous with the project's meaning and intent, its use can be interpreted as a back-handed complement: those who selected the image feel that it is universally appealing, in that it is visually, artistically memorable and it portrays a sense of an ecological ethic.

**Guiding Questions for the Case Study of Steve Martino & Associates**

Within the context of the study purpose and the synthesized definition and criteria for sustainable landscape design, the following guiding questions form the basis for inquiry in the case study of Steve Martino & Associates:

- What is Steve Martino's definition of sustainable landscape design?
- How do others associated with his work define sustainable landscape design?
- How do these definitions compare to the proposed definition synthesized from the literature?
- Does Martino consider his work to be sustainable? To what degree?
- Do others associated with his work consider it to be sustainable? To what degree?
- What are Martino's goals related to sustainability? To aesthetics? To social considerations?
- Is there a relationship between goals related to sustainability and those related to aesthetics and social considerations?
- What are the physical manifestations (design form) of Martino's goals related to sustainability? to aesthetics? to social considerations?
- Using the proposed synthesized criteria for sustainable landscape design as a measure, are Martino's landscapes sustainable?
• How consistently has Martino applied sustainable design principles throughout all his work?

• How has the sustainability of Martino’s work influenced the attitudes of clients, users, associates and collaborators?

• What personal and firm characteristics and experiences have led to Martino’s current approach?

• What are the methods used in this firm’s practice and in their client and consultant relations that have contributed to the sustainability of its landscapes?

These questions will lead the inquiry towards an understanding of how sustainability has been put into practice and whether the schism between ecological design, aesthetics and socially responsible design can be bridged through sustainable landscape design.
CHAPTER III: METHODOLOGY

Introduction

A case study methodology forms the basis for the remainder of this research. As Yin points out, research design is dependent on the types of questions being asked. "How" and "why" questions are explanatory in nature, rather than quantitative or predictive, and generally lend themselves to case studies, histories or experiments. Of these three methods, case study is best utilized in the investigation of real-life situations to answer questions about a contemporary set of conditions over which the investigator has little or no control (Yin, 1989).

In this study, the main question is "How is sustainable landscape design being practiced in relation to how it is defined in the literature?" Establishing this question and determining that a case study methodology is the appropriate vehicle for response, Chapter One details the rationale for the type of case (the firm) and the identity of the case (Steve Martino & Associates) selected. Chapter Two develops and culminates in a series of sub-questions, specifically aimed at the analysis of the practice of Steve Martino & Associates. The satisfaction of these questions depends on a full variety of evidence. It requires the use of interviews, observations, documents, and artifacts to establish a chain of evidence which contributes answers to the questions.

In determining whether to use a single- or multiple-case study design, the following rule of thumb was followed: A single case is appropriate when it represents a critical or unique case, or when it has a revelatory nature. Multiple cases should follow a replication logic (not to be confused with a statistical sampling logic). Each case in a multiple-case study must be carefully selected to either predict similar results or to predict contrary results for predictable reasons (Yin, 1989).

The research question at hand is premised on the study of a landscape architectural firm's notable practice of sustainable design, and the comparison of
such a practice with the theory of sustainable landscape design. As explained in Chapter One, Steve Martino's practice is notable in that it has won several awards, was named in an informal survey of experts as a sustainable design firm, and passed through an ecological/aesthetic/social concern "filter". Use of the case is revelatory in that the practice suggests a new way of considering sustainability in the landscape.

Given this demonstrated uniqueness of the case of Steve Martino Associates, a single case selection is justified. The intent is not to compare different practices' approach to sustainable design against each other through replication, but to compare an exemplar's interpretation of sustainable landscape design to the theory of sustainable landscape design. While the study is viewed as a single case design, it will be conducted as an embedded case study (Yin, 1989). This means that the analysis will include outcomes of the firm's individual projects and professional relationships, as well as documentation of the firm's overall approach.

It is important to realize that the type of generalization facilitated through case study results is analytical generalization to a broad theory — in this case the synthesized theoretical definition for sustainable landscape design, and the process and product criteria for sustainable landscape design established in Chapter Two. The statistical generalization of the results to the landscape architecture profession as a whole, or to other firms, is not possible, nor is it the rationale for this case study.

Case Study Design

Protocol

Having secured the cooperation of Steve Martino in the study of his firm (Appendix A), the plan for the data to be collected — the case study protocol — was designed. It was developed to respond to the fourteen "Guiding Questions" listed at the end of Chapter Two (which were, in turn, designed to test the synthesized theoretical criteria for sustainable landscape design). This protocol, included as Appendix B, provides a format for collection of the following types of data:
• Interviews with:
  Steve Martino
  Present or former associates or employees
  Collaborators (i.e., artists, architects)
  Clients

• Physical Artifacts (evidence found in built landscapes)
  As experienced through the visitation of built projects representing different
  stages in the firm's evolution
  Recorded through photography and sketching

• Observation
  How the firm operates - organizationally, creatively, with clients
  How built landscapes function and are used

• Documents/Archival Records
  Plans - conceptual to construction
  Specifications
  Evidence of collaboration, marketing, publicity

The bulk of the protocol is focused on the interview formats. Interviews were designed to be relatively open-ended with Steve Martino and his associates, to allow for both general information and specific project-related information to come out. The format was more structured for the clients and collaborators, to concentrate on the specific projects on which they had worked with Steve Martino & Associates.

The interviews with Martino are broken into five distinct themes suggested by the Guiding Questions:

• What is Martino's notion of sustainable landscape design and how does he apply it?

• What are the characteristics of Martino's design process which contribute to the sustainability of his landscapes?

• How does Martino evaluate the sustainability of specific selected projects?

• How does the firm structure of Steve Martino & Associates affect the potential for sustainable design? What are the economic consequences of this type of practice?
• What are Martino’s views on the stance of the profession of landscape architecture on sustainable design, and on the contribution of his work toward a sustainable society?

Careful planning was undertaken, aided by Steve Martino, to select the associates, clients and collaborators to be interviewed, as well as appropriate projects to document. The associates, clients, and collaborators were selected based on Martino’s recommendation of cooperative, insightful individuals, and on the desire to represent a variety of disciplines, public and private sector entities, and associations through different stages of the firm’s existence. The project selections were made to highlight a wide range of project and client types, and to illustrate varying degrees of sustainability. All interviewees were contacted ahead of time, both by Martino and myself, to inform them of the study purpose, request their participation, and set up appointments. The following is a listing of the individuals selected for interviewing (in addition to Steve Martino) and the projects chosen to visit and observe:

**Interviewees:**

**Associates (all are former associates):**
- Linda Grotzinger, horticulturist (with Martino for 4 yrs.)
- Ken Caldwell, landscape architect (with Martino for 1.5 yrs.)
- Joe Ewan, landscape architect, instructor and contractor (with Martino for 6 yrs.)

**Collaborators:**
- Ron Gass (Nurseryman)
- Dave Powell (Irrigation designer)
- John Douglas (Architect)

**Clients (followed by their role as client and the Martino project they represent):**
- Jayne Lewis, Papago Park Center Project Manager; Papago Park Center Streetscape (private)
- Cliff Douglas, owner of Harris Cattle Co.; Arid Zone Trees project, Douglas Residence (private)
- Nina Dunbar, Phoenix Arts Commission; City Boundary project (public)
- Jay Hawkinson, homeowner; Hawkinson Residence (private)
- Jack DeBartolo, architect and homeowner; DeBartolo Residence (private)

**Projects (all are built unless otherwise indicated):**
- New Times Courtyard
- Cardinals Training Facility
Most of the interviews were recorded on audio tapes, supplemented by written notation. Documentation of the site observations was provided for with a protocol form for key information and notes about each project, though the majority of the observation was informal and recorded via photography and sketches. Site plans, "before" photos, concept sketches, or construction documents were obtained from Martino prior to the project visits in order to become familiarized with the design elements and project context. Many of the site visits were conducted either with the client or with Martino himself, which provided additional insight.

The data were collected over a seven day period between November 3 and November 9, 1993. A detailed, but flexible schedule was developed for the data collection trip to Phoenix. Martino suggested several influential landscapes to look at in addition to the Martino projects targeted. Time was also needed to go through his drawing and photographic archives. Documentation of the schedule which was followed and the activities undertaken is included as Appendix C.

Reporting and analysis of the data

The reporting and analysis of the case study data in Chapter Four is organized to compare the design approach and landscapes of Steve Martino & Associates to the sustainable landscape design process and product criteria developed in Chapter Two. The pertinent information has been drawn from the interviews, observations, and documentation collected according to the Protocol and the Guiding Questions.
The first portion of the data presentation deals with the four process criteria, which have to do with the overall approach of the firm and how this approach affects the firm's ability to do sustainable landscape design. The majority of this information has come from the interviews and observation of Martino in action.

The second portion of the data presentation is concerned with analysis of the sustainability of a representative cross-section of landscapes designed by Steve Martino & Associates. Of the eighteen projects visited, ten have been selected and grouped to illustrate various apexes of the sustainable landscape design product criteria. Again, it is stressed that the projects have not been selected only to show the most sustainable examples of Martino's work, but rather to show a range of sustainability and a range of contexts in which it must be analyzed.

Rather than include a criteria-by-criteria analysis within the text of the data presentation, the text provides a descriptive analysis which highlights those criteria that are most pertinent to each project. A Sustainability Matrix supplements the text discussion by providing a comparative analysis of each of the nine projects' fulfillment of the fourteen product-oriented criteria.
CHAPTER IV: FINDINGS

Introduction

The purpose of this thesis, as stated in Chapter One, is, first, to develop an operational definition and a set of generalized criteria for sustainable landscape design as synthesized from the literature. Chapter Two, the Review of the Literature, culminates in this synthesis. The ultimate purpose is to use the definition and criteria to document and analyze the practice of Steve Martino & Associates, in relation to the sustainability of the firm's body of built work. It is toward this end that the findings of the case study of Steve Martino Associates are reported and analyzed here.

The pertinent information was collected using the protocol format developed in Chapter Three for interviewing the selected subjects and documenting the landscapes. The protocol was designed to provide objective answers to the "Guiding Questions", as well as to test the proposed definition and criteria for sustainable landscape design against the practice of Steve Martino & Associates.

Analysis of the findings includes evaluations of both Steve Martino & Associates' general approach to design and of specific projects which represent a broad cross-section of the firm's work. Chapter Five presents, among other conclusions, an evaluation and fine-tuning of the proposed definition and criteria for sustainable landscape design which reflects contributions made by the case-study findings to the understanding of the current practice of sustainable landscape design.

Firm history and personal background

It is essential to be familiar with the history of Steve Martino & Associates, which is not documented in the literature, to take meaning from the isolated set of interviews, observations and site visits which were conducted for this thesis. Pertinent factors in Martino's personal background also contribute to an understanding of his professional development. Information which is not directly
related to the issues of sustainability, but which contribute to the firm's approach, was gained throughout the course of the time spent with Martino and his clients and associates.

Steve Martino & Associates currently operates out of a modest one-room studio in a small commercial building on the west side of Phoenix. He has no secretary and is, for all practical purposes, practicing alone. At first glance, the only thing that belies his respected, prolific professional accomplishments are the dozens of local and national design awards scattered among the tops of bookcases and along the four walls of the room.

One would not imagine, from this scene, that only two years ago Martino's practice was housed in an upscale Scottsdale office building overlooking a lush desert courtyard of Martino's design, or that the firm had employed up to ten people as it strove to achieve that delicate balance between supply and demand for the firm's services. In fact, the one-man office is a return to the early days of Martino's practice — a period which allowed him the freedom to pursue new ideas and generate a meaningful direction for his practice.

Steve Martino's ideas are rooted in a unique personal background. He spent his early childhood in the city environs of Phoenix, during which time the city was becoming increasingly populated and removed of its desert identity. His rebellious, challenging nature and a precarious family situation eventually landed him at a reform school on a ranch in the desert. This dubious honor gave him a sudden and intense exposure to the wild desert, which created a whole new sense of the place he had always lived in, but never known.

Fully "reformed" and with a new relationship to his environment, Martino went on to study architecture at the University of Arizona. Though a serious motorcycle accident prevented him from finishing the program, he later went to work for a landscape architect and became involved in subdivision work. This exposure to the wholesale development of huge tracts of desert lands spurred his interest in landscape architecture, where he felt he could address the need for more sensitive integration of human structure and the desert landscape. He started his own practice, which he struggled to keep alive for the first few years. His early
projects consisted of residential work and small commercial developments and allowed little in the way of challenge to conventional development practice. In 1977 he moved the practice out of his house and in 1979 became a licensed landscape architect.

It was during the decade of the 1980's that Martino's approach - the blending of many influential designers and landscapes with the inspiration of the regional desert landscape - began to take form. By the middle of the 1980's his desert-derived aesthetic was making a regional impact on the urban and suburban landscape. Many designers and developers were beginning to emulate the efforts of Martino and a few other key desert landscape advocates. He began to receive local, regional and, eventually, national recognition for his landscapes. His success prompted increased demand for his work and encouraged a growth in the size of his firm. He hired landscape architects, horticulturists, and architects to allow him to take on more and bigger projects.

The shift from a mid-size, high-overhead office back to a one-person endeavor, has been largely Martino's choice. What it eventually came down to was that Martino is simply not interested in the business of keeping people employed. He found himself devoting more and more of his time to administrative work and less to the design work which first drew him to landscape architecture and for which he has become so well known.

He freely admits that, while many of the projects designed in this period have been successful and won awards, there were many projects the firm undertook which compromised its design philosophy and standards. This is really a fact of life for most mid- to large-sized firms which must keep a steady supply of work going to meet the constant overhead involved in employing a large enough professional staff to compete for big projects, but not one for which Martino has tolerance. What matters most to him is not how many people he employs, how much profit he makes, or how much he pleases the client; the art of design and the fit of design to place is what has led him to his current "lean and mean" mode of practice.
Phoenix regional character

Integral to Steve Martino & Associates' design approach is the regional ecological and cultural character of the landscape. As an introduction to the analysis of the sustainability of this approach, the ecology and cultural development of the Phoenix region are summarized in the following discussion. These unique influences, especially as regard water availability and use, will be seen as recurring themes throughout the presentation of the case study information.

Ecology

Phoenix is located in the Salt River Valley of the Sonoran Desert, a region which begins just north of Phoenix and extends south into Mexico. A temperate desert biome, it receives an average of a little over seven inches of rainfall per year and sustains average summer temperatures of 94 degrees (Reisner, 1993). This combination of low precipitation and high summer and daytime temperatures creates an ecosystem characterized by plants and animals adapted to capture and conserve scarce water. Slow growth rates and low species diversity are distinguishing features of these environments (Miller, 1989).

Plants are widely spaced, minimizing competition for water. Thorny shrubs like mesquite have taproots which reach deep into the soil to access ground water. Fleshy-stemmed cacti have shallow but widespread root systems that absorb water quickly and thick skins that prevent water loss. Other plants, such as creosote, have wax-coated leaves which reduce the amount of water lost by evapo-transpiration. The ocotillo drops its tiny leaves and remains dormant during periods of drought and then grows new ones within a period of a week after a rain. The deceptively bare soil contains a rich store of seeds, lying in wait for spring rains to bring them to life in an ephemeral show of grasses and wildflowers (Miller, 1989).

Animals, too, have evolved strategies for coping with the heat and scarcity of water. Most desert animals retreat to underground burrows during the day and emerge at the night in their search for food. The kangaroo rat survives only on the water it receives from its food and respiratory functions; insects and reptiles have thick skins to reduce water loss through evapo-transpiration.
Central Arizona soils are generally alkaline, high in salts, low in organic material and often poorly drained (Trulsson, 1991). The extensive use of irrigation in agricultural landscapes has exacerbated the salt and drainage problems in the soils. Topography of the Sonoran desert is characterized by low, rolling valleys and dramatic, sudden mountain ranges or single peaks. Drainage ways – "washes" or "arroyos" – are distinctive land forms which host a large concentration of plants which thrive on the prolonged exposure to periodic rains.

Cultural development - as seen through water use The Hohokam Indians are the first known inhabitants of the Sonoran desert. They thrived in the region from about 200 AD to about 1400 AD, in populations which at one time approached 400,000 (Reisner, 1993). The dry warm climate has preserved much evidence of their existence. This evidence indicates that, unlike the plants and animals, the Hohokam did not evolve physical adaptations to cope with the scarce supplies of water. Rather, they learned to adapt the environment to an agricultural lifestyle through the harvesting of water in an intricate system of irrigation canals. The reason for the disappearance of the Hohokam (meaning: "those who disappeared") is not known, though it is speculated that water – either over-use, or insufficient supply – is at the root of their demise (Reisner, 1993).

When the agrarian Hohokam made their mysterious disappearance, hunter-gatherer cultures replaced them. The Navajo, Hopi, Papago, Pima and other Indian cultures evolved to survive on the region's limited rainfall. The period of Spanish settlement in the Sonoran Desert from the sixteenth through the early eighteenth centuries was initiated by the expedition of Francisco Vasquez de Coronado in 1540. Subsequent Spanish occupation developed as a string of isolated missionary outposts, characterized by the attempts to convert and subdue the Indians, and the introduction of cattle ranching to the region. Again, the new culture was adapted to the region's natural hydrological cycles. The Spanish "hacienda", for instance, was developed to work with the environment. Its thick adobe walls and shaded interior arcades surrounded the oasis-like courtyard, at the center of which was the dwelling's water source – a well or fountain. The courtyard hosted a limited number of moisture-loving plants nurtured by the cool shade and immediate water source. The further away from the shade and water
source, the less water the landscape was designed to require, until it blended into the native desert (Tanner, 1990).

It was not until the mid-nineteenth century that the issue of water availability again began to significantly determine the shape of Sonoran Desert culture. American settlement was begun in earnest when the United States struck a deal with Mexico through the Gadsden Purchase of 1850. Tucson was the original seat of government for the new territory, having been the site of decisive Indian and Civil War battles. However, Phoenix, aided by its position along the Salt River and the acquisition of critical rail service in 1887, soon overtook Tucson and was named the Capitol of the Territory in 1889. The potential of the Salt River Valley for irrigation, as evidenced by the well-preserved ruins of the Hohokam canals, was recognized by early American settlers and acted on quickly. The first private irrigation company was established in 1867, beginning a trend which was to continue for nearly twenty years (Durham, 1990). The ability to irrigate thousands of acres facilitated development of a prosperous agricultural economy and prompted the migration of thousands of settlers.

The decade of the 1880's, however, brought an end to the success of the private irrigation concerns. A period of prolonged drought and intermittent flooding pointed to the lack of dependability which the natural hydrological cycles offered for the growing irrigation-dependent culture. Supplemented by pumped ground water, the region survived its desperate quest for water until temporary relief came in 1911 with the construction of the Roosevelt Dam on the Salt River northeast of Phoenix. This was the first significant federal Colorado River water development project to benefit Arizona (Reisner, 1993).

The period between 1920 and 1960 saw another phenomenal growth spurt in the Salt River Valley, generated by the injection of water from the Roosevelt and Hoover dams. The region was now irreversibly tied to a course which demanded more and more water – more than the augmented surface supply sources could provide. By 1960, four out of five acre-feet of water used by Arizonans was coming from the unsustainable use of underground aquifers (Reisner, 1993). Yet people continued to come, blindly attracted by the temperate climate, an assurance of air-conditioning, and the deceiving outward appearance as a place of abundant water.
This appearance spurred the promotion of Phoenix as a resort destination and golfers paradise. The area also became major draw for tourists, retirees and the wealthy attracted by the warm, dry climate and resort amenities.

The decades of the 1960's and 1970's were marked by increasing competition between Southern California and Arizona for the limited surface water supplies of the Colorado River Basin. Other northern rivers began to be examined for their diversion potential, but eventually a series of Federal dams for further augmentation of the Colorado River was conceived. The Glen Canyon Dam and an accompanying power plant, pumping station and 330 mile aqueduct, collectively known as the Central Arizona Project (CAP) was to be the salvation of Arizona. Despite the original hope that it would end Arizona's water trouble once and for all, the project has resulted in what Mark Reisner, author of *Cadillac Desert*, claims may be a *worsening* of the water situation in Arizona (Reisner, 1993). One reason is that it resulted in an arrangement where Arizona gets its allocation only after California's has been satisfied. More important, the cost to supply and distribute the water has made it nearly prohibitive to use.

The result of all these unexpected consequences is that Arizonans continue to deplete their dwindling ground water supply, both because they can afford to pay for it and because it is there – for now. The water "development" projects which held such promise are proving unreliable and significantly more expensive (monetarily) than the ground water. However, such very real consequences of unsustainable resource use have forced Arizona to act. Legislation currently exists which mandates the balancing of withdrawals with aquifer recharge by the year 2025 (Lawson, 1991). The need for such efforts are nowhere more evident than in the Phoenix metropolitan area, with its huge demand for both urban and agricultural water supplies. Agriculture is beginning to emphasize non-irrigated crops. Some agricultural lands are being taken out of production. Urban landscapes are no longer dominated by expanses of green lawn. The issues of whether traditional "green" golf courses are appropriate in the desert is beginning to be discussed openly.

While many other issues are as important as hydrological balance to sustainability, a forced response to this single issue is beginning to act as a catalyst
in Phoenix for broader sustainable solutions. Solutions which respond tangibly and immediately to the recognized ecological limits are also producing social and aesthetic statements about the changing culture.

**Presentation and Analysis of Design Process and Firm Operation**

Is Steve Martino & Associates' general design approach indeed reflective of the Sustainable Design Process Criteria suggested in Chapter Two? This presentation and analysis of Martino Associates' design process and firm operation is undertaken to evaluate the validity of these criteria and the sustainability of Martino's practice. The detailed inquiry into his approach included interviews with Martino and several of his clients and associates. Each of the four design approach criteria is examined below using the information gathered from these interviews, which were designed from the Guiding Questions.

**Commitment and innovation**

**Commitment** There are several forms which commitment to sustainable design principles can take, many of which Steve Martino's practice illustrates. Each form manifests different characteristics and levels of sustainability.

**Commitment to region** As discussed earlier, regional ecology and cultural characteristics are central determinants of sustainable solutions. Steve Martino & Associates has built a reputation for its work in forging appreciation for a regional identity. In a written statement used by Martino to familiarize prospective clients with the firm's approach and accomplishments, the importance of "place" is emphasized:

Committed to his vision for the development and advancement of a southwest regional design vocabulary, Phoenix native, Steve Martino has based his efforts on the underlying theme of man's relationship to the desert environment. Martino continues to pursue his primary goals of developing environments that express a sense of identity, reality and wholeness with the site; of understanding the underlying cultural and landscape character of a site and applying these lessons to its' new man-made circumstances, and of creating places that respect and intensify the unique and special feeling of the site and region. The result of this pursuit is to find inspiration in the substantive issues facing society and nature and
add meaning to a project that often transcends the client's original expectations.

Notable in this statement is Martino's clear emphasis on his being a "native" of the Phoenix area. Of the hundreds of projects Martino has been involved with over his career, very few of them have taken him outside of the southwest. Although he says he feels confident in his ability to design in regions he is not intimately familiar with, it requires much more work to get to the level of understanding needed for meaningful design. In his view, many design firms known for their work in multiple regions and countries are not doing this work: "SWA (Sasaki Walker Associates) doesn't have a clue about regional differences – they solve economic problems." While touring through downtown Phoenix with me, Martino pointed out a perfect example of this kind of "anonymous" solution: the Arizona Center, a monumental palm tree-lined promenade between two large commercial buildings designed by SWA. He noted that the project has been a phenomenal success in drawing more people into the urban landscape to shop and dine out, but fails miserably at saying anything about the place or the region; it could occur in any temperate major metropolitan area.

Although Martino hasn't done a lot of work outside his region, he has traveled extensively and notes that he has used these experiences to heighten his awareness of the different ways things are done in other places, which in turn, increases his understanding of the unique qualities of his own region.

Martino's spoken commitment to the desert region is substantiated not only by the built examples of his work, but also by the opinions of many of his associates and clients. Notes Dr. Robert Bruening, Executive Director of the Desert Botanical Gardens and Martino Associates client: "Mr. Martino is sensitive to the environment, understands the intellectual and aesthetic challenges of his work, and with his knowledge of native plant communities, will continue to innovate a uniquely Southwestern style of landscape architecture." Ron Gass, horticulturist and owner of Mountain States Nursery notes that Martino's approach has one very critical component: "Steve's personal participation in the desert sets him apart. He has a total sense of the desert. He understands the place that he's designing towards."
Long time collaborator and friend, architect John Douglas has this to say of his experience in working with Steve Martino: "I don't think he ever approached the idea of using native plants as being sustainable. He's trying to re-knit the torn fabric of the desert, piece by piece. There's a larger concern of putting the desert back together."

A final indicator of Martino's intense level of commitment to the regional landscape is his proclivity towards pro-bono work and what he terms "make-your-own-projects". The projects he undertakes without compensation are not to benefit some cause unrelated to the landscape or its inhabitants. They are related to a tangible landscape need or opportunity – cultural, aesthetic or ecological – which is only recognized through the personal stake he feels as a long term member of the regional community.

Activism Another form which commitment to sustainability can take is through activism. By activism I mean the deliberate, aggressive attempt to promote change. Although Steve Martino has made several forays into this activist realm as a private practitioner, it is not his preferred or most effective mode. His very nature resists trying to convince people of something they don't want to accept. "Public clients are frustrating. My agenda – bringing the desert back into the city – is not held dearly by public entities." In trying to work with organized community design groups to change attitudes and educate the public and instill a sense of ownership, Martino has been equally frustrated. It's impossible to gain a consensus, he complains. "People don't show up and then they complain about the outcome. I really think its more important to have friends in high places." He feels he has a naivety about politics, and basically, an apathetic attitude towards the political process, which precludes his effective participation in it.

Jayne Lewis, a private development client, noted a certain amount of intolerance on Martino's part in working with the city of Tempe on the streetscape component of her project. "The city was initially resistant to Steve's ideas and Steve is not one to schmooze. The city wanted each street to have [just] one particular tree. I thought I was going to have to peel Steve off the ceiling when he heard this!" While she has much respect for Martino's design intuition and capabilities, she felt she needed to act as an intermediary between Steve and the
city. Her strong suit is in dealing with people and patiently breaking down resistance, a talent which smoothed the reception of Martino's ideas and eventually helped to bring the city around to his approach. Martino, on the other hand, has little patience for nursing ideas along: "I want to do projects that get built", he says, in response to whether he is interested in playing an active role in changing codes and policies.

A notable activist effort in which Martino served as co-author was the publication of a booklet called Desert Excellence: A Guide to Natural Landscaping. This project was sponsored by a developer who wanted Martino and architect Vernon Swaback to create a tool with which he could persuade the community to allow him to develop a large tract of land, by creating an impression as a "good neighbor" who had respect for the character of the desert landscape he wanted to develop. Its stated purpose was to promote the use of desert-sensitive landscaping for all types of development and to dispel the view of the desert as a barren, harsh type of landscape. It's main message was that the desert should be considered an asset and not a liability for developers; that expression of the desert landscape in our development forms is a chance to create a unique, valuable sense of identity.

While creating the booklet, Martino had great hopes that it would influence the larger patterns of development, but was sorely disappointed with the developer's own short-lived interest in the design principles it promoted. Once his site plan approval was obtained, the good intentions disappeared and the developer reneged on his plans for creating desert-sensitive landscapes. Martino now feels that the project probably did more damage in the long run, as it allowed for more indiscriminate development, which has discouraged him from the pursuit of further efforts in this activist vein.

The document is primarily directed toward planting issues and planting-related water use and doesn't suggest approaches to the many other large-scale problems which are integral to sustainable development in the desert, such as energy use, density issues, or reducing dependence on the automobile.

Grassroots perseverance This type of commitment is manifested through leading by example, as opposed to leading by authority. Martino has
exhibited grassroots level commitment in his decision to remain a small firm in order to be highly selective about the projects he takes on. He talks about much of his work being "pivotal" types of projects, in which the potential is great for reaching many people through relatively small or simple, but revolutionary, designs. Such designs also carry an inherent degree of risk, which again, are most easily afforded in small, loosely structured firms. Joe Ewan, former associate of Martino's, says "I don't think HTMNB or EDAW can make the design choices that Steve can. Steve can take risks." Ewan also notes that because Martino's projects are relatively small, they result in relatively small risks, with little to lose but much to gain.

The fact that Martino has been involved in a wide range of public and private projects, reaching a large cross-section of the population, also contributes to the grass-roots effectiveness of his work. He has consistently applied his approach from projects as large as the 10,000 acre Desert Mountain development to as small the single family residence, affecting both the public perception of landscapes as well as the intensely private perceptions of people in their own homes. Key to his success at the grass-roots level is his proven ability not only to get his projects built, but to get them built according to plan. This is not to say that the plans might not change during the course of construction, but he is adamant that the strength of the designs not be diluted through their transformation into built form.

**Artistic integrity** Commitment to creating meaningful, contextual forms, or to an integrative aesthetic, is yet another way of promoting sustainable landscape design. This is perhaps the single most important element of Martino's approach. Nearly every one of the clients, associates and collaborators interviewed for the case study emphasized this attribute. Especially noted was his ability to pick up on the contextual clues of a site. Architect and client, Jack DeBartolo relates the following in response to the question of why he chose Martino for the design of his home landscape: "I'm very site driven. Regional architecture is, to me, dealing with the contextual issues. . . . [Steve] is not just plant material-driven, he's very form-driven, so he's really interested in integrating and relating the architectural form to the [site's] natural form."

Martino himself claims aesthetics as "a primary goal" for his work, and characterizes what he strives to do as "art", or the creation of "symbols that mean
something beyond nature." He talks about his consideration of both a "low 
aesthetic", which he describes as "the basic sense of the place", and a "high 
aesthetic", which he equates with "high style". In relating his hopes for the future he 
says "I'm interested in establishing and cementing myself as a high-style designer". 
At several points during the interviews he alludes to this interest as a new and 
needed shift in direction, after having spent so many years promoting the 
acceptance of the desert through his designs. Now that people are becoming more 
accepting of the desert, he sees his new challenge as transcending the appropriate 
use of materials, to try to project more of his own voice in the solutions. He seems 
to be trying to get away from more literal aesthetic interpretations and move 
towards more symbolic interpretations. The critical question of whether and when 
the emphasis on art begins to detract from the sustainability of a design, and 
ceases adding to it, however, is important and will be discussed in the conclusions.

Advancement of the profession Finally, commitment to sustainable 
landscape design may take the form of promoting sustainability specifically within 
the landscape architecture profession. Commitment to responding to the 
profession-wide frustration at our unfulfilled claim of stewardship is being 
manifested through efforts at the state and national levels of professional affiliations 
such as the American Society of Landscape Architects (ASLA). Conference 
themes, professional publications and "official declarations" by "blue ribbon task 
forces" are increasingly being directed at encouraging a unified movement towards 
sustainable design. Martino, while having been honored five times by ASLA in 
their annual design excellence awards competitions, seems to have no particular 
allegiance to the profession as a group. He sees the stewardship imperative as 
hopelessly self-serving and believes that the profession often sends messages 
which actually encourage destructiveness and insensitivity to contextual issues.

Innovation Martino's approach is defined by his innovations. He is 
intensely involved with experimentation in his projects. His distinctive use of 
drought tolerant plantings is the most celebrated and imitated of his landscape 
innovations, yet there are other ways in which he has been an innovator. Although 
he feels that the planting issue is really the least worrisome of all design 
challenges, he spent many years developing appropriate plant palettes to get to
this point. His work in transplanting vegetation directly from the desert, developing commercially available stock and seed, and establishing on-site nurseries for revegetation projects has made him an expert in the area of arid zone plantings.

Martino has also been active in experimenting with watering regimes for many of his projects. The lessons learned from his irrigation schemes for the Monroe Streetscape project in downtown Phoenix are now being applied in his work on the new Phoenix Library (Figure 4.1). As this letter to the client shows, he has collaborated with other experts and applied critical thought to a variety of issues surrounding irrigation: vegetation health, construction costs, maintenance costs, and environmental education. The results have the potential to redefine the irrigation industry over the coming years, much as his experimentation in planting has redirected the local nursery industry.

While Martino's water related efforts have been concentrated on planting and irrigation innovations, he has also begun to look at some issues of water recycling and reuse. The City Boundary project, which will be discussed in depth later, is based on capturing runoff which had been flowing to the street previously, and using it to water a portion of re-established desert. His Grand Canal Demonstration Project recycles water used in a low-volume fountain by sending it back into its original source — the canal. These innovations, though aesthetically powerful, are more symbolic and less technologically significant or practical than his work in planting and irrigation.

Along with standards geared toward a preference for exotic plantings, many of the communities in the Phoenix area have policies which require all planting areas to have some "finish". In other words, bare ground — uncovered by lawn, ground cover or some inert material such as rock — is not allowed. Martino has urged acceptance of what he refers to as "desert paving". Instead of designing areas which are distinctly divided into paved pedestrian space, lawn space, or plant space, he has created landscapes where these edges are blurred and the uses are allowed to mix. Large expanses of permeable decomposed granite or "desert paving" provide spaces which are not defined by the ground plane, but by
August 16, 1993

Mr. Jon Burke
City of Phoenix
Parks, Recreation and
Library Department
2333 North Camelback Avenue
Phoenix, Arizona 85004

re: Central Library Irrigation System, Hybrid Mesquises & Site Furniture

Dear Jon,

Wanda Ellison told me that there was concern over the excess mesquises being unattractive and requiring high sustaining maintenance. I had those same concerns and in an effort to address these I contacted the landscape design firm for the library.

I specified over 500 of the same species of mesquise for S.R.P.'s Papago Park Oasis. The belief was that there had been stability problems and had to be restricted or pruned during their second year. I reviewed the plans with the grower and the developer of the 'Colorado' thornless mesquises, Mr. Ron Gaze, and we both agreed that the design of the irrigation system was making the trees unstable (ACI provided the irrigation design as a consultant to BRY and we provided the planting and staking design also as consultants to BRY). Typically planting details show the emitters being placed at the edge of the rootball of the tree. In reality the opening of the drip lines and up even closer to the base trunk. This situation ensures that the trees roots are close to the trunk while the tree itself is growing like a rootstock. These are the trees roots will become too heavy to handle in its root structure.

We have tried to address the situation by changing the traditional irrigation layout. Originally the layout had an emitter placement detail that restricted the availability and proximity of emitters to the trees. After some research and study I changed the plan (the 3rd plan since the 1st was printed) in two significant ways.

The first was to hold the emitter approximately 4 feet away from the rootball while extending the 1/8" drip tube to the edge of the rootball. After two months of waiting the drip tubing is to be back in a distance of 5 feet from the trunk. This will be the permanent watering location.

The second change is to also have drip emitters away from the tree trunk and to eliminate the duplication of emitters where trees and shrubs meet. The purpose of this is to make the trees root to find water by having 10 to 15 feet diameter emitter-free areas around the trees. Stakes are within the same zone as the trees are and not the source of water is 50% of the area will never need to develop an extensive root system.

I believe this would greatly improve the mesquises ability to remain stable. We also have the mesquises 'double staked' with four stakes. With the above detail I would eliminate two of the stakes on the mesquises. The improved hybrid thornless mesquises was developed to be a low-water requiring species. Stakes are used by the nursery industry. How the landscape industry needs to learn how to plant them. This is what is to happen in the library's trees.

It has been over a year since we have designed the library's irrigation system. After further discussions with Ron Gaze, the trees developer and with Dr. Timmons I now have new thoughts on irrigation. Goals of the irrigation system should be:

1. Reduce the amount of water applied to the planter material.
2. Slow down the growth rate of the mesquises and eliminate the maintenance associated with its rapid growth when it is not watered.
3. Accommodate the trees and shrubs (and even turf) in a regime of intermittent but deep watering.

To achieve the above goals we now recommend the following irrigation practices:

1. Water the trees and shrubs on the same line (valve) but at different cycles. The first would be a deep-watering 'long' cycle while the second would be a shallow-watering '全日' cycle. The short cycle's purpose is to keep the trees alive while the deep watering schedule could be a few weeks apart. The third cycle delivers 8 to 10 gallons of water per tree every 3 days while the deep cycle delivers 1 gallon per shrub at 1 day 3 and day 6. A further goal is to reduce or eliminate the separate shrub watering cycles while increasing the interval between the deep waterings.

2. Eliminate the tree emitters except where trees stand alone without adjacent shrubs. The trees would remain water from the shrub emitters @ the tree cycle.

3. Some of the 1/4" poly tubing would need to be temporarily extended to the shrubs. They would be cut back to a final placement after 2 months of waiting. An option to this procedure would be to water the trees by hand 3 times (9 gallons every 3 days)

If this concept was applied to the Central Library it could significantly reduce the irrigation system cost ($13,000 to $18,000) by eliminating the following items which relate to the tree system:

1. Half of the 1/2 inch poly pipe
2. 10 electric valves
3. 15 regulators
4. Electric wires
5. 1 station controller w/ remote transmitter
6. Reduce vacuum breaker sizes
7. Reduce water meter size (if not installed)
8. Eliminate the tree emitters
9. Eliminate 2 stakes & wire per mesquise

Another turf valve would need to be added for these items

I think the next big landscape breakthrough will be in irrigation techniques, especially sprinkler. The University of Tucson is conducting experiments with sprinkler scheduling (Dr. Timmons area of interest). They have tested that they can pick up with only 20 inches of water a year. The really interesting thing is that they only water the turf 1/2 times a year.

It was only about 12 years ago that it was discovered that desert trees could be transplanted. Common wisdom said to transplant them in the winter. Only when the trees were dug in the wrong section, the summer, did it become a possibility and then an industry.

I would like to see this irrigation concept applied to the Library. One of design team's basic goals has been to make all aspects of the Library an educational benefit for the public. It would be very appropriate to introduce this innovative irrigation concept with the Library's landscape.

The landscape could become a case study for irrigation practices. Kent Keenland, of the Water Resources Department has told me in the past that he thinks he can find some funds to assist with this project and promote the educational aspects of the landscape.

The long-term benefits would be reduced water and maintenance requirements, train and condition the plant material to be water-efficient to the ultimate point of being watered possibly only once a month at it. The short-term benefit in the case of to pull some money out of the construction costs.

I hope this savings could be spent on the purchase of site benches for the library. To this end I am willing to work with the contractor, at my expense, to prepare detailed design and sketches to explain the concept eliminating the tree emitter system.

One last item. We no longer need emitters for nursery grown trees. The water seems to kill a very high percentage of them. We now specify they be hand watered during the installation & maintenance period. Eliminating the tree emitters would save another $1,000.00 or so.

If you would like to discuss this possibility further please contact me at the number below.

Sincerely,

Steve Martin & Associates

Figure 4.1 Evidence of innovation on the Phoenix Central Library project
what is happening at many different levels in the landscape. This invites people, plants and wildlife to exist together and exposes people more personally to the processes at work in the landscape. The acceptance and emulation of public landscapes like Papago Park Center Streetscape and Webster Terrace in the Desert Botanical Garden, which use this innovative surfacing, are attesting to the success of this new notion of landscape space.

A notable theme of the interviews, both with Martino and with some of his associates and collaborators, was the feeling that Martino has come to somewhat of a lull in his innovativeness. His work with planting, irrigation and other desert-related ideas is beginning to be widely emulated and diffused to the public. His motivation and satisfaction comes from always being on the cutting edge, and from pushing the envelope of acceptance. In grasping for a new direction, he is interested in becoming more involved in architecture and in art. In response to my question of whether sustainability plays into his interest in architecture and art, he shrugs. It is apparent that whatever sustainability his innovations have achieved, it has come from an underlying, innate sense of sustainability, not a deliberately, consciously applied set of rules.

Approach which balances ecological, aesthetic, and social concerns

The interview responses to this notion of sustainable landscape design involving a balance of ecology, aesthetics and social responsibility was varied and surprising. Although Martino recognizes some degree of social responsibility and a strong emphasis on aesthetic quality in his work, he doesn't directly relate these aspects of his work to its sustainability. Rather, he associates the sustainability of his projects primarily to their ecological dimensions. When asked about which of his projects he considers most sustainable, he pointed to two projects – Desert Mountain and the Cardinals Training Facility – which are notable mainly for their purely ecological interpretations and are relatively devoid of evidence of social or cultural influences and artistic interpretation.

The evidence of Martino's balance of ecological, aesthetic and social concerns lies in his body of work, which will be discussed later. The development of his approach, however, has been strongly affected by a number of influential designers and landscapes. The influences Martino mentioned in response to the
question of who his design "heroes" are indicate a rich combination of ecological, aesthetic and social forces. His aesthetic sense has been strongly influenced by the work of Mexican architect Luis Barragan. The photographs of Barragan works shown in Figure 4.2 present powerful formal qualities which Martino has employed in giving his desert landscapes structure.

The work of Frank Lloyd Wright has also been a notable inspiration for Martino. Wright's still-operating Scottsdale studio and architecture school, Taliesin, is noted for its harmonious fit with the desert, with its native rock masonry and ground hugging profile (Figure 4.3). An important dimension of Taliesin was Wright's insistence on ample provision for social interaction and extracurricular cultural activities for his architecture students and staff. He felt that appreciation for other arts – music, drama, poetry, painting – was essential to an architect's training and to life itself. His design work reflects these emphases on ecological fit and cultural expression.

With a local studio to work from during the winter months, Wright and his associates designed many buildings in the Phoenix area. Early in Steve Martino's career, he had a chance to work on the addition of a pool to a home designed by Wright (Figure 4.4). This exposure to and design involvement in a Wright project has clearly contributed to Martino's integrative attitude toward landscape and structure, and towards his approach which combines concern for ecological fit with recognition of the value of human culture.

Another architect, Paolo Soleiri, is referenced in Martino's work. Soleiri is the founder of a communal dwelling called Cosanti, also in Scottsdale, which was dedicated to the exploration of organic architectural forms (Figure 4.5). With its heyday in the socially turbulent 1960's, Cosanti was the precursor to Soleiri's current project, Arcosanti, which is to combine organic architecture and high-density communal living in a self-contained structure. It is similar in concept to the Biosphere project but with greater emphasis on social, economic and design issues. Although Arcosanti has now overshadowed Cosanti in activity and notoriety, Steve Martino recalls with excitement his occasional visits to Cosanti during the 1960's and 70's. It was a scene of intense creativity and challenge to
Figure 4.2 The sculptural, architectural influence of Luis Barragan
Figure 4.3 Frank Lloyd Wright's Taliesin
Figure 4.4 Steve Martino's contribution to a Frank Lloyd Wright residential design

Figure 4.5 Paolo Soleiri's Cosanti
convention. Designers of all types came from around the world to attend workshops and share technologies and theories about alternative form-making.

Ultimately, Cosanti accomplished relatively little in the actual diffusion of organic architecture. However, it is a place which symbolizes the need many have felt to connect lifestyles and artistic forms to ecology. Its very rough and experimental appearance speaks of its role as a seed of change; not of perfected change, but of the stirrings of awareness and rebellion which must precede change. The fact that Martino regards Cosanti as an influence suggests that this combined concern for ecological and social expression in design is important to his approach.

In addition to influential designers, there are a few iconic landscapes which Martino suggests have affected his approach to design. Pioneer Village, in the small mountain community of Carefree, north of Scottsdale, is an unlikely influence. Though essentially a shopping and dining tourist attraction filled with tee-shirt shops and southwestern souvenir boutiques, his attraction is not to the immediately obvious commercial activity which goes on there. Rather his interest is in the scale, selection, and placement of the design elements, which create a series of social spaces between the commercial spaces. These elements are representative of the regional ecology (native desert trees, exposed soil) and the vernacular architecture of the "old west" (open air stalls for retail, "hitching posts" employed to define spaces, lack of separation between planting areas and pedestrian spaces) (Figure 4.6).

Two additional landscapes mentioned by Martino are not the product of intentional design, but rather "left over" spaces which have been allowed to evolve to self-sufficient stability. The first, a vacant lot in a suburban housing development, caught Martino's eye, early in his career, as he was conducting a construction inspection on an adjacent residence. He relates that seeing this lot, with its desert vegetation thriving unaided by a water line or fertilizers and despite its being surrounded by increasing disturbance, gave him the first realization that the desert was trying to tell us something. The job he was working on consisted of an effort to destroy the desert and replace it with something that must be treated like a
Figure 4.6 Vernacular influences of Pioneer Village
"terminally ill patient" – requiring constant infusions of water, energy, and chemicals just to stay alive.

A second such "accidental" landscape, the small side yard of an art gallery, was observed by Martino over a period of years (Figure 4.7). His office was located near the gallery at one time, and as his approach to designing with a "desert-derived aesthetic" was developing, he watched this small scrap of "dead", unused space slowly become reclaimed by the desert.

These two influential landscapes achieve a high level of physical, ecological sustainability. But the reason they were singled out by Martino was that they also have a strong aesthetic appeal and they present such dramatic contrast to the landscapes of consumption and sterility which surround them. Consumption and sterility which has resulted from intentional design.

The comments of former associates of Martino's also contribute to an understanding of the balance of his approach. Architect John Douglas has collaborated closely with Martino for many years. He notes that Steve is not a purist about anything; while he takes cultural history into account and has an intimate understanding of the land, he doesn't consciously emphasize one or the other. "When you do really good design, these things (ecology, aesthetics and social responsibility) all come out".

Joe Ewan, landscape architecture instructor and contractor, had his initial training with Steve Martino and Associates. He says that when he worked for Steve, he might not have thought of their approach as sustainable, in that it wasn't strictly regenerative or ecologically pure. Since that time, and since attending graduate school at University of California at Berkeley, Ewan's conception of sustainability has changed. He suggests that sustainability must be considered contextually – in response to what surrounds the project. He further suggests that Martino's approach uses a contextual response which combines ecological design with "high style".
Figure 4.7 A "left-over" urban space, thriving through neglect
Integrative aesthetic

Martino's approach incorporates a blend of ecological, social, and design concerns. Does this approach result in an aesthetic which integrates these concerns? The case study data reveal that the body of work produced by Steve Martino and Associates represents three distinct aesthetic stages which progressively approach an integrative aesthetic.

Early in his career (during the mid-1970's), as he was casting about for direction and opportunity, Martino's work was "destructive", as he terms it. He now feels that he was just sort of following the crowd, not challenging conventional wisdom, and giving clients just what they asked for. The aesthetic which encouraged this destructiveness used lawn and exotic plantings and wiped out any reference to what had been there before – a precise, new, controlled look which respected the status quo. In essence, the aesthetic used in these landscapes was a borrowed or imitative one; very little of his own approach or experience came through. This was partly because he didn't have the luxury of being selective about his clientele, and partly because he hadn't yet developed the maturity or knowledge needed to translate his ideas into a comprehensive aesthetic expression.

The second broad aesthetic phase of Martino's career was largely concerned with ecological expression. It was during this time that he began to apply a very important skill he developed in architecture school. One of his professors, Jerry Dihelm, had used a set of writings called the "Leonardo Papers" in his teaching. The class used this example of Leonardo DaVinci's analytical skills in learning to observe how something works. It was an exercise which stuck with Martino. When he saw the desert, he saw not just a bunch of cacti and lizards, but a network of plants and animals which thrives, or "works" because each species is adapted to the unique climate, topography and hydrology of the desert environment.

One of the first examples of his application of an ecological aesthetic was the Greenberg Residence. This elegant, simple landscape has been widely recognized for spatial and formal qualities which purely express the desert. In fact, Martino tested and pioneered his "desert-derived" aesthetic in the private
residential sector. He discovered that getting an individual to submit to something other than ordinary fare is much less difficult than convincing a developer who is marketing to the masses. In addition, the period of the late seventies and eighties, which coincides with Martino's ecological aesthetic development, was characterized by a growing grass-roots effort to respond to the critical water situation, and an accompanying appreciation for the beauty of the wild desert. Homeowners eager to make a statement of responsible water use, or to simply create an environment reflective of the region they had chosen to live in, presented an opportunity for Martino to flesh out his ideas in built landscapes.

The Greenberg residence is most notable for its lush desert plantings and space-forming walls and steps. It has structure, but the structure showcases the ecological forms and does not call attention to itself. The colors and textures of the materials are neutral and match the architecture. Several such residential landscapes have won awards and created a niche for Martino which emphasizes an ecological aesthetic.

A third stage of Martino's aesthetic expression has produced such landscapes as the City Boundary public art collaboration with artist Jody Pinto, the Arid Zone Tree project, and the Jay Hawkinson residence. These landscapes, which will be discussed in detail later, introduce strong cultural elements which speak of contextual social and artistic influences, as well as ecological influences. It is as if he spent a period of time perfecting his ecological design skills in the private arena of residential design, and is now able to focus on interpreting the human element in more publicly perceived landscapes. While the period of his emphasis on ecological visual and formal quality has been aesthetically successful, the greater amplification of cultural issues has resulted in a richer, more complete aesthetic - an integrative aesthetic. Such an aesthetic results in landscapes which serve not as backgrounds, but as whole, meaningful places in themselves.

Part of the motivation for Martino's movement towards an integrative aesthetic has been the growing acceptance and assimilation of the ecological aesthetic into the southwest's collective landscape taste. As the desert landscape has come to be popularized, Martino has felt the need to find new direction and
new forms of aesthetic expression which give his work distinction. While he obviously takes pride in his earlier, more ecologically pure accomplishments, he laments the fact that much of the so-called "desert landscaping" or "xeriscaping" that has arisen from his and others' are "fashion-driven, not passion-driven." This stylized, trite use of the desert as a landscape theme has pushed him to another level of expression — towards gleaning increasing meaning from the land.

**Recognition and acceptance of varying degrees of sustainability**

When asked whether he thinks the landscape architectural profession encourages sustainable design, Martino responded: "Everyone tiptoes around the fact that everything is unsustainable." While we're busy coming up with utopian visions of how things ought to be, the world around us continues to evolve from the myriad short-term economic decisions made in the name of "progress". He pointed to the example of xeriscape — "the marketing miracle of the eighties" — as evidence of the profession's tendency to look for a quick fix for environmental problems, and also of its struggle to develop new markets for its skills. In the same breath, we hold up such totally uncontextual landscapes as Martha Schwartz's Bagel Garden as examples of successful "high design". Through the structuring and outcomes of awards programs, we have encouraged the trend toward big international design firms, which, by their very nature, oftentimes contribute to the problems of short-term economics-driven landscapes.

Martino's recognition that he is not going to change the world through one landscape's influence is evident in these statements. He can, and does, look around him and say "It's embarrassing to live in Phoenix." He has no blindness to the wholesale dependence on automobiles, air-conditioning and golf courses for the area's immediate physical and economic survival, nor is he hopeful for some miracle cure for the threat these things pose to the long-term survival of society and of the desert. But this embarrassment and disdain has not resulted in hopelessness or helplessness. Rather, it has produced a determined approach to recognizing the unique opportunity of each site to create a positive physical change and to encourage people to reconsider their relationship to the landscape.

Re-emphasizing John Douglas' observation: "Steve is not a purist. . . ."; he is not looking for that quick fix, nor total sustainability from each site. He does not
presume to be able to control all the influences on a landscape's use; he isn't trying to wipe out use of the car or suggest that people shouldn't live in suburban subdivisions. "I'm not in a big hurry" he says, in talking about his fascination with watching projects evolve and unfold. This simple statement also epitomizes his attitude about the goals of his practice. While his projects are revolutionary and controversial, they are not so wildly different that they must exist in a social or physical vacuum, as are other examples of landscape sustainability, such as Village Homes and Blueprint Farms. They are woven into the landscape fabric where they can slowly begin to affect the land around them and become a real part of our collective existence.

**Presentation and Analysis of Specific Projects**

In total, seventeen built projects were visited and analyzed during the data collection trip. Many more were discussed with Martino during the interviews and viewed through photographs and drawings. The specific projects which are presented and analyzed here were selected because they are especially well-suited to illustrate certain of the "criteria for analysis of built landscapes" developed in Chapter Two. They were also selected to illustrate the breadth of scale at which sustainability can be applied and analyzed; the projects range from private residences to a conglomeration of public and private projects centered around a large city park. Also, the combination of projects demonstrates the impact which varying degrees of actual sustainability can have on the diffusion of sustainable principles.

Although the vehicle for discussing the projects is the set of fourteen product criteria, not every criteria is specifically covered in the text's presentation and analysis. Figure 4.8 provides a comparative look at each of the projects' suggested fulfillment of each of the criteria.

**Arid Zone Trees**

**Reason for selection** This project holds special relevance to the economic issues surrounding sustainability. Steve Martino's involvement with Arid Zone Trees before it became a "project" is the key to its success and sustainability. Urban development in the southwest has undergone a dramatic transformation
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<td>Creates controversy</td>
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<td>Generates responsible management</td>
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**Key:**

- **+** positive response
- **++** multi-level positive response
- **+(-)** positive primary response w/ negative underlying attributes
- **-(+)** negative primary response w/ positive underlying attributes
- **-** negative response
- **O** not applicable

Figure 4.8 Sustainability matrix: A comparative analysis of the sustainability of each of the ten projects discussed in the text, based on the fourteen *criteria for the analysis of built landscapes*.
over the past twenty years. The Phoenix metropolitan area of today is learning to celebrate its desert locale with the gradual introduction of many species of drought tolerant plantings which are replacing the thirsty, fragile exotics of conventional development styles (Figure 4.9). Housing developments are no longer required to support endless expanses of lawn and broad-leafed evergreens in order to be considered attractive. Though the reign of palm trees and other out-of-place elements is far from over, streetscapes which use cactus and palo verde trees are increasingly common sites as you traverse the vast network of roads which dominate the urban landscape. Steve Martino & Associates is a recognized catalyst for this movement. The firm's approach to design suggested the use of native plantings before it became fashionable to do so. Many of its early projects pioneered the technical development of native plant use and the acceptance of a desert-derived aesthetic.

The lack of commercial availability of appropriate plant material was a serious barrier to the burgeoning desert aesthetic. Arid Zone Trees was begun ten years ago in response to this void, and has become a large supplier of "water efficient" specimen trees. Cliff Douglas, owner of the 65 acre nursery and its parent company, Harris Cattle Company, credits much of the decision to develop this business to his association with Steve Martino. Douglas' son, John, is an architect who had a design partnership with Steve. Cliff became familiar with Steve's work and interest in desert plants through this family connection. The Harris Cattle company was an agricultural enterprise which was looking to diversify its traditional farming base, especially in light of the increasing costs associated with irrigated crop production. While Cliff was already a devoted admirer of the native Sonoran desert and an expert agriculturist, Steve's success in designing with the desert in mind provided Cliff with the inspiration and technical landscape knowledge that he needed to start the nursery. He notes that many designers are using these plants now, thanks to a handful of people like Steve, who experimented with various species and made the public aware of their unique beauty with their designs.

So in addition to the actual design project for the entry to the nursery, there is a broad level of sustainability inherent to this place which has influenced the sustainability of the entire region. The trees from this concentrated site are planted
Figure 4.9 The epitome of conventional development: the Phoenician Hotel, Scottsdale
all over the Phoenix area, reducing or eliminating each location’s dependence on imported water and chemical support, and thereby increasing its sustainability, if only by a few degrees at a time.

**About the project**  The design project itself incorporates a different level of sustainability which is much more local. The nursery had been in operation for a few years when Cliff Douglas decided he wanted a demonstration garden in which the trees could be displayed as an entrance to the nursery. He immediately knew he wanted Steve to design the entry. In addition to his familiarity with Steve's abilities through the nursery operations, Martino had designed the award-winning landscape for his home. Martino took a long time to get around to the project, but Douglas was willing to wait.

Part of Martino's delay was due to his perception that this project, though small in scale, was an important opportunity to make a profound landscape statement. He felt that, if done well, the landscape would do more than announce the entry to a nursery, it would be a monument to the change in thinking about the desert which the nursery signifies. He pondered it a long time before he ever put pencil to paper.

The area surrounding the nursery is covered with the endless tidy rows of crop land, and the nursery itself, though containing 35,000 desert trees, bears little resemblance to a desert, with its boxed specimens lined up according to size and accessed by a drip irrigation system (Figure 4.10). The challenge was to contrast this highly industrialized agricultural environment with one which would convey a sense of how the trees can be artfully combined with other plants and how they develop and evolve in the landscape. Douglas' own home landscape is set amidst the wild desert; he and his wife wanted a landscape solution which would blend seamlessly into the surrounding desert. At the nursery, the context, as well the existing level of sustainability was much different.

The project's design (Figure 4.11) consists of two garden areas on either side of an entry drive. The vast majority of the traffic comes from the west, so the design was made to read more dominantly from this direction. The road is a lightly traveled, very straight route through which vehicles tend to travel quickly. The
Figure 4.10 The nursery operation at Arid Zone Trees: agricultural order and control

Figure 4.11 Arid Zone Trees: nursery and Demonstration Garden site plan
owner specifically wanted something that would read from the road and call attention towards this entry to discourage vehicles from entering the nursery from other points along the road. The garden areas are loosely defined by three types of structural pieces: fragments of white and orange concrete walls, a series of orange concrete towers, and the suggestion of a fence created by verdi-gris metal pipes aligned in an offset arc. The structural pieces become brilliant sculpture set among the showcased plantings. They do not dominate, but complement and call attention to the beauty and wildness of the vegetation.

**Analysis of sustainability criteria**  For a comprehensive and comparative analysis of the fourteen criteria, refer to Figure 4.8. The following discussion illustrates how the criteria overlap and are uniquely manifested in the Arid Zone Trees project create a contextually determined degree of sustainability.

**Ecosystem characteristics**  The use of the water efficient trees and other plants is the obvious fulfillment of this criteria. Also the ground surface is left in open soil as is the condition in the native Sonoran desert; there is no paving on the site at all. The fragmented walls which give sculptural definition to the site are stucco-covered concrete block. This element is least reflective of regional ecosystem characteristics. A more sustainable interpretation might have used locally available stone for the walls, or perhaps some sort of vegetative form, though would not have had the striking aesthetic effect which the color and clean edges provide.

The site itself was an agricultural ecosystem prior to the project's construction (Figure 4.12). As such it was relatively sterile and removed of any of the original characteristics it would have had as a portion of the desert valley. The design offers an artful interpretation of the desert which might have existed here at one time (Figure 4.13).

**Ecosystem processes**  The site is relatively flat. All trace of the gentle ridges and washes which once must have characterized the topography of the area have long since vanished. The project area is bordered on all sides by either the road or the flat, sheet-drained nursery grounds. This factor of isolation, as well as the small size, inhibits the re-creation of original drainage patterns and, therefore,
Figure 4.12 AZT: contrast of new desert character with remaining agricultural context

Figure 4.13 AZT: the arrangement of walls to define garden space creates an interpretation of the desert, not an imitation
the micro-climatic conditions they would create. However, the main importance of
this criteria, given the context, is the allowance for percolation of runoff which the
unpaved, open soil characteristics which the design provides. The isolation and
limited size also hinder more extensive use of this site as wildlife habitat, though its
ecological diversity does attract an abundance of birds and insects.

Change over time is allowed and welcome in this design. Part of the intent
is to show how the trees grow and to experiment with the hardiness of different
species. So while the planting is occasionally supplemented when something has
died, the landscape is left to grow and re-seed itself naturally. If anything
characterizes Martino's approach perfectly, it is his wish that all of his projects be
maintained with the philosophy of "benign neglect", and Arid Zone Trees honors
this wish.

Chemical inputs As implied above, this landscape gets practically no
maintenance, including the addition of fertilizers or pesticides. The nursery plants
do receive some supplemental nitrogen fertilizer to speed their growth and
marketability, but the tree species are specifically selected to not require any
chemical maintenance in order to survive and thrive in their native climate.

Water and soil inputs The drought tolerance of the plantings is, of course,
the main feature to be emphasized with the landscape. The project site is
equipped with a drip irrigation system, as is the entire nursery, though they are
careful to be sure that the plants don't receive too much water.

The soil, which had supported conventional agricultural crops previous to
the nursery's existence, was tested prior to planting. It had a high nitrogen
concentration after the years of fertilization, but didn't require any alteration.
Because the drainage pattern allows for gradual, even flow and percolation of
runoff, erosion is not a problem as it tends to be in channelized solutions. The
dense vegetative cover also contributes to keeping the soil in place.

Regenerative capacity The very nature of the nursery is its productivity. It
harnesses the energy of the sun, the nutrients of the soil, and the seeds of the trees
to give life to thousands more trees. Certainly other resources are required to
provide these trees – wood for the specimen boxes, fuel for the grower's trucks, water for limited irrigation, among others – but these inputs are relatively insignificant in comparison to the high output.

The project site itself is more self-contained and more neutral in its balance of inputs and outputs. The plants are allowed to reproduce freely, as mentioned above. Care has been taken to arrange pollinators as required to facilitate this reproduction. Neither the drainage runoff nor the solar energy are harnessed for any use, but then very little water or energy are required to maintain the project site to begin with.

Artful interpretation of culture ecology relationship The dependence of the structural, artful elements of the project on the ecological elements (primarily the plantings) – and vice-versa– is the key to the site's satisfaction of this criteria. The structure defines the spaces which the desert occupies and adds an element of human organization to the ecology. The desert does not exist in this agricultural region any longer, except by design; the form, which weaves structure into the new desert, implies this dependence. So it is neither a design which imitates nature, nor one which denies it; rather it creates a new nature in which culture is expressed.

Vernacular forms The structural elements of this project are what prevent the site from becoming simply a re-creation of the naturally occurring ecosystem. The strikingly beautiful walls and metal work furtively organize the views and give form to the space. The simplicity and straightforward quality of the structures suggest the practicality and familiarity of the adobe walls and live ocotillo fences so integral to the southwest vernacular. The more precise articulation of the elements and the non-regional quality of the actual materials used in their construction remove them from the vernacular, as well as from a certain degree of sustainability, but the imagery and symbolism is powerful.

Overall sustainability The multi-layer sustainability of this project which arises from the regional contributions to a regional sustainable economy and ecology made by the nursery in general, in addition to the demonstration garden itself, is significant. If the demonstration garden were an isolated landscape it
would be far less meaningful, though would still maintain a high degree of sustainability. This element of contextual influence is important to designing for and evaluating sustainability. It is not enough to look just at the landscape in question. One must be aware of the relationships between surrounding landscapes, and be able to interpolate their effects on local and regional sustainability, in addition to that of the site itself. The next set of projects to be presented and analyzed also illustrates this importance.

Papago Park Area

Reason for selection This landscape is one which actually consists of four individual Martino projects of varying scale and scope. Although each of the projects has a different client, they are all located in a concentrated area of southwest Phoenix (Figure 4.14). The area includes and surrounds a city recreation complex called Papago Park, notable for its dramatic mountain peaks that seem to pop out of the flat valley floor with its vast open space, which are in such contrast to the adjacent dense, uniform urban development. Although each project fulfills some combination of criteria for sustainability which will be discussed individually, it is the collective effect of each project's contribution to a framework and overall trend of sustainability which seems especially significant.

It is easy to become discouraged at the prospect of trying to achieve sustainability within one isolated project; here is an instance where several seemingly separate efforts are creating a subtly cohesive statement of sustainability. One can drive through the area and see the ecological processes of the desert being played out in the open drainage patterns and the evolution of the regional vegetation. Many of the human processes which the landscape facilitates — recreation, education, travel, commercial development — have taken forms which celebrate the ecology and the history of human interaction with it.

The Papago Park area is characterized by both public and private ownership. Papago Park itself is a city complex which houses the Desert Botanical Garden, the Phoenix Zoo, a municipal golf course, hiking and biking trails, and picnic, fishing and sports facilities. This diversity of use makes the park one of the most heavily used in the metropolitan area.
Figure 4.14 Martino's sketch depicting his involvement in the Papago Park area
Both the Salt River and the Grand Canal (which carries Phoenix's precious water supply) flow through the southern portion of the Papago Park area, much of which is owned by the Salt River Project, a large private water power utility. As the company's interests have changed over the years from water development to power production, their use of this land has diminished. They subsequently made the decision to develop the land for commercial and residential ground lease through a 450 acre project called Papago Park Center.

Steve Martino & Associates has been involved in many design projects for both the public and private lands. All have contributed to the unique character of the area, but the five to be discussed here have specific elements which speak of sustainability.

**Papago Park Center Streetscape**

**About the project** The purpose of this project was to develop a streetscape plan for the Salt River Project's aforementioned development project, Papago Park Center. The project manager for the client, Jayne Lewis, says that the goal was not simply to landscape the road sides, but to make a statement – to "promote responsible water use" – through a highly visible, low-water use landscape. As an entity which is publicly involved in water use issues, Lewis explains that the Salt River Project is committed to setting an example of stewardship for the Phoenix area. When asked why Steve Martino & Associates had been selected to design the project, she replies that in working with the civil engineer on the road alignment plans, she asked them for recommendations of landscape architects especially known for their skill in designing for drought tolerance. Steve Martino & Associates was the unanimous choice and Lewis notes that once she met Steve, she knew she had the right firm for the job.

With Martino's involvement, the client's original goal of promoting responsible water use soon expanded to include creating an urban identity which relates to the unique character of the Sonoran desert. Although Lewis admits that her own appreciation for the beauty and character of the desert was less than informed and enthusiastic before she met Martino, her experience with this project has made her a relentless "convert". "I see the desert landscaping as a signature for Phoenix, Arizona. I don't understand why more commercial developers don't
see it that way. I don't understand why they're bringing in these damn palm trees, because we need an identity. Phoenix' identity is the Sonoran desert. I mean it's the landscape that is so unique, that you don't find any place else."

On Martino Associates' role in fulfilling this goal: "If you want palm trees, he's the wrong person to go to, because he's just simply not going to do it. . . . I just think he could be swimming in money if he wanted to – but he doesn't want to. He only wants to do what he wants to do, and he's not going to do anything else." She relates how Martino actually tried to talk the group out hiring him in his interview. He was so strong in his feeling about what needed to be done that he practically told them "it's going to be my way or the highway", says Lewis. She was nonplused at the time, but has since come to appreciate this commitment and intuitiveness inherent to his approach.

The project consists of approximately ten miles of city owned roadside and median landscaping, which will eventually serve development of the adjacent lands owned by the Salt River Project. The design solution uses an extra wide (30 feet) landscape easement on both sides of the road to accommodate a meandering concrete path, drought tolerant trees and shrubs, and an open drainage channel (Figure 4.15). The roadway alignment was already designed by the time Martino became involved. The alignment was based on the need to create leaseable parcels and connect to existing infrastructure.

Fulfillment of sustainability criteria There are several elements of the Papago Park Streetscape project which contribute both positively and somewhat negatively to the sustainability of the area it is designed to support.

Ecosystem characteristics The reflection of desert forms can be said to have been the primary goal of the project. The comparison of streetscapes shown in Figure 4.16 is a dramatic illustration of the difference between the regional character of Papago Park Center and the anonymous, oblivious character typical of streets all over Phoenix, and indeed, the country. The plants are important contributors to Papago Park's character, but the rolling contours, walkways which respond to the terrain instead of determining it, and the decomposed granite surface instead of lawn are all involved in creating this character as well.
Figure 4.15 Typical development plan for a section of the Papago Park Center streetscape
Figure 4.16 Comparison between conventional Phoenix streetscape (above) and Papago Park Center streetscape (below)
Ecological processes The drainage is handled through an open swale system, as opposed to the below-grade schemes which characterize most urban streetscapes. This treatment reflects desert ecosystem functioning and produces the practical benefit of allowing the runoff to percolate into the ground rather than be swiftly carried off the site. With the close proximity of the Salt River to the south, the open swales and meandering progression of the path also reflect the character of the site-specific river valley ecosystem.

With respect to landscape change over time, Martino's intent for the plan, as for all his projects, is to discourage conventional maintenance and allow the landscape to mature at its own pace. He becomes fairly enraged when he sees one of his landscapes being manicured and over-watered. The landscape maintenance industry simply is not attuned to his type of landscape. They specialize in keeping the landscape in a static condition; it is not in their best interest to leave it alone. The Papago Park streetscape is now owned and maintained as a right-of-way by the City of Tempe. Although Martino has stressed the importance of monitoring the amount of irrigation and "laying off the pruning shears" to the city crews, he finds that the habit is too ingrained to be changed so quickly and landscape change is not allowed to occur freely.

Economic viability The open drainage system is definitely less expensive to construct than the piping and catch basins involved in a closed system. The costs associated with planting for this scheme compared with a conventional scheme are about even given that native, drought-tolerant nursery stock is now widely available. If maintenance were performed according to Martino's specifications the costs for keeping the streetscape would be far lower than those for a conventional scheme requiring mowing, spray irrigation, fertilizing, and pruning. Also the desert derived landscape should be capable of regenerating itself. In a conventional equivalent once a plant dies, it is gone; once the runoff reaches the catch basin, it is lost to the soil.

Encourages sustainable management As discussed above the Papago Park streetscape project suffers slightly from over-aggressive management. Although the client (Salt River Project/ Papago Park Center) was appreciative of the goals Martino had for the project, the subsequent takeover of the property by
the city represents a significant change in motivation. The client was interested in promoting its image as "stewards of the valley" and developing a unique identity for the area. The city is interested in safety, standardized procedures and policies, and keeping its maintenance crew occupied. As desert landscapes become more the rule rather than the exception in the Phoenix area, those involved with managing public landscapes will undoubtedly become more attuned to their requirements.

**Overall sustainability** The fact that this streetscape supports a future commercial development, for which there are no plans to restrict certain types of unsustainable design, detracts from its "big picture" sustainability. In discussions with Jayne Lewis, she related that the Salt River Project is trying to encourage responsible water use in future commercial tenants, but are not willing, philosophically or financially, to mandate it.

Although it provides ample opportunity for pedestrian traffic, it is a landscape which is premised on the use of the automobile. Martino had no opportunity to be involved with the street design itself, and it is hard to say what he might have done to improve on the sustainability of it, considering the larger context of the massive transportation network of which it is a part, and which threatens to choke Phoenix. Nevertheless, unlike the Arid Zone Trees project, it's very reason for being does not contribute positively to broad sustainability.

Certainly the streetscape, considered on its own, apart from the adjacent road and commercial space waiting to be developed, is a highly sustainable landscape in the ecological sense. It also has immense importance to the diffusion of an ecological aesthetic, especially in that it was done in concert with a municipal entity.

**Grand Canal Demonstration Project**

*About the project* This project was the first built component of a series of demonstration projects, planned as a marketing tool for the Salt River Project, to illustrate the options and advantages of building commercial projects in their Papago Park Center development. The demonstration projects are a unique attempt by the master developer to set the tone for future land lease clients.
The landscape consists of a linear park along a segment of the Grand Canal, which is centered on a pair of stone walls flanking a low bubbling concrete pool (Figure 4.17). The pool has a weir which feeds a ground-level channel leading toward the canal, cut through the canal service road. Before the channel reaches the canal the water drops into a drain which daylights out to the canal (Figure 4.18). The effect is mystifying and thought-provoking. Where is this water coming from? Where is it going? The setting for the pool evokes a feeling of sacredness, as though it is an alter from which the water is miraculously flowing. On the opposite side of the Grand Canal is a railroad line. The rolling of the train carrying valuable commodities down the track amplifies the symbolism of the flowing water of the canal (Figure 4.19).

In the master plan the walls and pool were to have formed the endpoint of an axial connection to the office building. The fact that the office building hasn't been built and that this monument to the canal stands alone makes for an unexpected, meditative quality about the place. There is no signage, no explanation for what it means, but the imagery is clear and powerful.

**Fulfillment of sustainability criteria** While this project is undoubtedly the least sustainable ecologically, it does respond to some of the aesthetic criteria suggested to be important in the diffusion of sustainable landscapes. The project's response to four of the most relevant sustainability criteria are documented in the following discussion.

**Water inputs** Although the planting for the park consists of drought tolerant mesquite trees which are sparingly watered with drip irrigation, a more significant water use is that of the pool and fountain. Despite the fact that the pool's water, which comes off a city supply line, is dramatically returned to its source (the Grand Canal), pools and fountains are generally not thought of as sustainable. In addition to using water and suggesting its abundance, they also use power to run the pumps and re-circulating equipment required for operation.

**Ecological processes** As suggested earlier, this landscape makes you look hard at the implications of the canal and our dependence on a clean, efficient, freely flowing supply of water, and resources in general. The controlled feeling of
Figure 4.17 Grand Canal Demonstration Project site plan
Figure 4.18 Grand Canal Demonstration Project: view from the opposite side of canal; note the "borrowed" water being returned to its source.

Figure 4.19 Grand Canal Demonstration Project: the flow of water in the fountain and canal, of consumer goods on the train.
the concrete canal and pool is reflective of the crisp, straight lines of the Grand Canal. The native soil surfaces and plantings are a sharp contrast to the hardscape, yet even these natural ecosystem elements have an orderly, linear arrangement (Figure 4.20).

**Broad set of positive affects**  Martino talks about striving for the powerful impact of "places where people whisper" – places that convey a sense of awe, wonder, surprise. This park is such a place. Though it is successful aesthetically, with its intricately detailed concrete work, axial composition and simple rhythm, its other affects are equally conducive to "whispering". A sense of mobility is produced through the flowing water, the train tracks, the pool and fountain, the marching rows of trees. A sense of guilt may be produced by directly confronting the symbol of our water consumption, the Grand Canal. (This may also provide a sense of security depending on whether the canal is empty or full.) A sense of solitude is felt. This is not a high-traffic area; you feel that not too many people know it exists.

**Economic viability**  A limitation in the sustainability of this project is the initial expense of the detailed mechanical and concrete work of the fountain, as well as the ongoing expense required to maintain it. When I visited the project with Martino, the pool was dry and the beautiful row of Mesquite trees had been damaged by vandalism. Although the aesthetic and experiential qualities of the landscape created by the water, the trees, and the quiet solitude of the site contribute to the sustainability of the project on the one hand, they also create an expense and a need for maintenance which detracts from both its short- and long-term sustainability.

**Overall sustainability**  Although this landscape has some sustainable elements – native trees, recycled water, permeable surfacing, and a jarring sense of confrontation of a symbol of unsustainability – there are several characteristics which counter these benefits. Its non-renewable energy use, difficulty to maintain, highly controlled character, and lack of accessibility or cohesiveness to other social and ecological elements seem to outweigh the benefits, in terms of sustainability. Despite its success in the pursuit of high design, it says relatively little about the concerns of ecology and social responsibility.
Figure 4.20 Grand Canal Demonstration Project: an orderly arrangement of nature
City Boundary - Papago Park

About the project Steve Martino collaborated with New York environmental artist Jody Pinto on this award-winning project for the Phoenix Arts Commission. Their team was selected from a field of five finalists who were asked to submit proposals. The purpose of the project was to commemorate the passage between the cities of Phoenix and Scottsdale, as well as to acknowledge an entry into Papago Park, which borders three cities: Phoenix, Scottsdale and Tempe. The site is within a public right-of-way and has no special provision for pedestrian access. As such, it is fairly inaccessible except visually from a car.

This landscape had become a degraded desert remnant which attracted little notice. The Arts Commission was concerned with creating a visual statement for people in passing cars that would also be environmentally sound and reflective of the park environment. They were likewise concerned with coming up with a solution which would be amenable to the large number of constituents of the park, the road, and the surrounding areas.

Nina Dunbar, project manager for the Phoenix Arts Commission relates several reasons why the Martino/Pinto team was chosen for the project. The combination of a local landscape architect known for his desert landscapes and an artist who had national and local experience in dealing with environmental issues appealed to the selection panel. Their proposal looked at the ecological and cultural issues confronting the whole 230 acre park, not just the site. (They actually created a conceptual master plan for the park, which has not been implemented.) This distinguished their approach as being more holistic and contextual than any of the others.

The solution which Martino and Pinto devised for their proposal and which was eventually built is the result of several important influences. They considered the dominance of transportation issues – the forces of the automobile and of the grid pattern of streets – and the need to break out of the grid to call attention to the boundary and gateway. Hence the work becomes a new kind of alignment, both of our thinking and of traffic. The new alignment reflects forces of nature – the sun and natural topography of the site – as well as the forces of the history of the site. They looked to successful cultural models for this history. The Hohokam Indians,
channeled the Salt River and created a canal system which allowed the first utilization of the desert as an agricultural area. The canals were rediscovered in the 1880's and were the basis for the modern system of canals and water supply of the Valley.

Martino and Pinto also took clues from the enduring federal Works Progress Administration (WPA) work which was done in the park during the 1930's. Drainage devices, wood and stone "ramadas" (shade structures) and other well-built, site-sensitive public landscape elements of that era convey a sense of cultural and ecological integration. Nina Dunbar praises this recognition of the "new" culture of Arizona, in addition to the ancient ones. "Phoenix is a very young city that's rapidly growing. It's a city that doesn't have a contemporary history yet. So it's easy to acknowledge the Hohokam . . . . there's something romantic about it. . . . . . . But looking at what happened with the contemporary canal builders or the WPA I think is going to be increasingly important to Phoenicians – acknowledging and looking at our contemporary history, and what was working and what wasn't working about that."

The forms and arrangement that result from these influences are a multi-layered reflection of ecology and culture (Figure 4.21). The structure of the work consists of a stone aqueduct which is fed by the re-graded wash coming from the high ground to the northeast corner of the site. The runoff from the adjacent mountain had previously been graded to drain into the street, leaving the site without sufficient water to support its vegetation. The recaptured water now goes from the aqueduct into a series of seven stone terraces which hold replanted and seeded desert. The terraces are built in the shape of a tree, chosen for its recognition as a symbol of rejuvenation which spans across cultures. The aqueduct is aligned to respond both to the topography and the solar alignment of the site, and to the directions of the cities of Phoenix, Tempe and Scottsdale. This alignment is reinforced with seven towering stone markers which are placed in a row perpendicular to the terminus of the aqueduct (Figure 4.22). On the day of the summer solstice the sunrise casts shadows which are directly in line with the row of towers.
Figure 4.21 City Boundary project: Steve Martino's design development sketches
Figure 4.22 City Boundary Project: a pair of towers made of indigenous stone
An aspect of the project with which the Arts Commission is particularly pleased is that it stands not only as an artwork, but one which is an integral part of the city's infrastructure. It is not intended to dominate the landscape, but to artfully interpret the culture and ecology of the landscape represented by the passing of the road and city boundary through the desert. If the artwork continues to thrive, the aqueduct will begin to recede into the desert landscape.

**Fulfillment of sustainability criteria** The preceding discussion of the key design influences and elements illustrates the overlapping, mutually reinforcing nature of the sustainability criteria to which the City Boundary project responds. The following distinct attributes are worthy of elaboration:

*Ecosystem processes* The natural drainage wash collecting the mountain's runoff which had existed prior to the original road construction was cut off and left dangling when the road was built. The scheme for widening the road and creating the artwork "infrastructure" takes the water which was wastefully being sent into the road's underground storm system and redirects it to an area where it can renew the desert or be recharged into the ground water. The original road construction is a good example of a case where minimum site intervention is not necessarily sustainable. By leaving everything but the roadbed and narrow shoulders alone, a valuable resource – the runoff – was being squandered. The new work not only reflects the site's ecosystematic drainage process, rather, the drainage process is the essence of the art (Figure 4.23).

As suggested earlier, the ultimate purpose of the artwork is not to be a permanent monument. The intent is to allow the desert to thrive and evolve and in so doing, to eventually obscure the structure so that it blends into the landscape. As Steve Martino puts it, he likes to "blur the edges" between what is built and what has evolved, between what is hard and what is soft. The only maintenance this site receives is a monitoring of plant health and replacement of vandalized elements. In addition to being impacted by uncontrolled foot traffic and the pollution from passing cars, the site is also host to a number of non-native animals which eat and destroy some of the plants which are trying to be established. Once the establishment is complete it should provide habitat for predators of some of these pests.
Figure 4.23  City Boundary project: this design development model illustrates the critical contribution of site grading to the concept
Nonrenewable energy inputs  Since the site receives minimal maintenance and requires no electricity for irrigation or lighting, the project itself fulfills the criteria. However, the fact that the project is designed to be viewed primarily from a car creates a fundamental contextual contradiction to this quality, which is interesting but not suggestive of sustainable principles. It, in some ways, reinforces the consumption of non-renewable oil by necessitating car travel (or air travel) to perceive the design (Figure 4.24). The lack of opportunity to experience the artwork as a pedestrian, and the difficulty of perceiving it even from a car, has been noted as a possible weakness of the solution. On the other hand, the lack of pedestrian access which contributes to limiting foot traffic also helps to preserve the site and respect the "carrying capacity" of the restored desert. The accessibility issue was not a factor under the control of the designers; in fact, the master plan which Martino and Pinto proposed for the park, but which was rejected by the Parks Department, contained a suggestion for better pedestrian linkages.

I have given the perceive-ability issue much thought. Now that I know the details of the formal influences and the intent of the project, I understand it better than when I first drove by it. However, even from the car, it has an initial mysterious appeal that urges exploration. While I was walking around the site after visiting with Nina Dunbar, two pedestrians wandered towards me to ask if I knew anything about the meaning of the project. It was very satisfying to make contact with these strangers through the interpretation of the design and to see them get excited by the ideas and processes at work on the site.

While this discussion has developed into something that goes beyond the issue of non-renewable resource consumption, it illustrates how inseparable the issues of accessibility, social interaction, mobility and resource consumption are to our lifestyles.

Waste and regeneration  The only waste which the project ends up with is that of the litter deposited from passing cars - it is not the producer of the waste but rather the depository for it, as are most modern roadsides. The regenerative achievements of the site are more noteworthy and tangible. As Figure 4.25 graphically depicts, water is harvested and put to productive use on this site, instead of being treated as a nuisance which must be disposed of. It has allowed
Figure 4.24 City Boundary Project: aerial view of site, illustrating the dominant presence of adjacent transportation routes.

Figure 4.25 City Boundary project: water harvesting in action.
the desert vegetation to come back to life using only the natural seasonal rainfall and native soil. It also allows for regeneration of the ground water supply by recharging the water not used by the vegetation into the underground aquifer.

Artful interpretation of relationship between culture and ecology This criteria is probably the most significant contributor to the site's sustainability. The ecological drainage processes which have been restored to the site are put to use in a technological, agricultural way, via the aqueduct and terraces, to restore the native desert. It is an illustration which connects past and present cultures' reliance on hydrologic cycles. It also symbolically connects the importance of regeneration for human consumption - agriculture - with the importance of regeneration of the ecosystem, by nurturing the restored desert environment by a means historically developed for crop irrigation.

Of special interest is the fact that the Hohokam people that once inhabited the site, and whose culture is reflected in this art, were obviously not sustained. What were the reasons?

Community participation and professional collaboration The panel which was formed to select and work with the chosen design team was composed of a wide variety of community interests. The Phoenix Parks Department, the Desert Botanical Center, the Phoenix Zoo, the city transportation departments, the Phoenix Arts Commission, and adjacent private land owners were all represented on the panel and consulted with throughout development of the project's program and solution. Although the purpose for the project was well-articulated by this panel before the request for proposals went out to the artists, the fact that it was a competitive art project with a rich variety of interests and influences encouraged a creative approach to the problem. The panel had a chance to compare Martino and Pinto's proposed solution with four other proposals which paled in their interpretive and integrative qualities. This is not to say that all projects must be labeled as "art" or be administered by large panels of community members to be sustainable, but it does suggest the value of creativity inspired by competition and community evaluation.
The collaboration between Martino and Pinto was also key to the success of the solution. While either Martino or Pinto might have devised a good solution, the richness which comes from both the outward public perception of their teamwork as artist and landscape architect, as well as the actual bringing together of their ideas and designing integrative forms, is responsible for much of the design's strength. Nina Dunbar has this to say of the collaborative chemistry between Pinto and Martino: "I know both of these people well and don't believe either one of them would have come up with this solution on their own. Of all the collaborations the Phoenix Arts Commission has promoted, I'm especially pleased with what happened between these two people for the site."

**Overall sustainability of project**  
This work exhibits a high degree of sustainability at nearly every level, from the immediate site to its broad regional context; in ecological, artistic, and social dimensions. The only criticism is its lack of perceive-ability and physical connection to the rest of the park, which hinders its more widespread potential to inform people.

**Webster Terrace - Desert Botanical Garden**

**About the project**  
The Desert Botanical Garden is known as the largest repository of desert plants in the world. It is probable that Steve Martino & Associates would have some involvement with such a place, given the recognized impact the firm has had on the acceptance and appreciation of desert plants in southwestern landscapes. But indicative of Martino's resistance to thinking about desert landscape design as simply an exercise in planting or xeriscape, his most notable contribution to the Desert Botanical Garden grounds is not about plants. It is the expression of the relationship between southwestern culture and the desert, contained in his self-promoted project, Webster Terrace.

Formerly the site of a paved employee parking lot, which was unseen by and closed to the public, the area is now anything but publicly inaccessible (Figure 4.26). Having known the horticultural director and staff and having worked on some smaller projects on the Garden grounds, Martino recognized a need for a large outdoor congregation area in relation to the historic adobe building which houses the Garden's auditorium, library and herbarium. The Garden is dominated by an extensive network of paths which provide the practical function of making the
Figure 4.26 Webster Terrace, Desert Botanical Garden
plants accessible to the public, but there seemed to be an unrealized potential for capitalizing on the architectural significance of the historic building and its juxtaposition to and integration with a "real" desert. Martino's scheme for a desert plaza as a setting for outdoor dining, concerts, lectures, meetings and quiet contemplation creates a cultural heart for the Garden. It draws people to partake of a variety of cultural activities in the desert, expanding the one-dimensional museum-like image typical of many botanical gardens. During my time in Phoenix I returned twice to Webster Terrace after my initial visit with Martino, once to attend a concert and again for a meeting. The popularity, vitality and importance of the place grew more evident with each visit.

The terrace is a simple arrangement of concrete retaining walls, decomposed granite surfacing and a plant palette dominated by lush, shady palo verde trees (Figure 4.27). Adding flexible utility to the spaces created by the walls and vegetation are moveable patio furniture and custom light fixtures designed to reflect the green bark of the Palo Verde and the soft indirect quality of moonlight (Figure 4.28). The linear walls end in rounded forms which are reminiscent of Indian *kivas* (round ceremonial structures), found in the ruins of southwestern Indian villages (Figure 4.29).

**Analysis of sustainability criteria** The project description above emphasizes this project's integration of culture and ecological characteristics and processes. Other criteria which are critical to the analysis of its sustainability follow:

**Waste and regeneration** Webster Terrace has intensified the waste-generating potential at the Botanical Garden through the addition of an outdoor restaurant to service visitors. While this in itself, is not necessarily a negative or highly significant element, the landscape design does not acknowledge this waste in any innovative way. Approximately 50 yards away from the terrace is a demonstration garden in which everything from its structure, to water use, to plantings is designed for maximum regeneration: recycled gray water for irrigation use, solar architecture, and xeriscape are all employed. Given this contextual opportunity, it seems that more could be done to tie into this theme of regeneration, in both the visible recycling of waste and in other ways, such as water harvesting and solar energy for the lighting and building.
Figure 4.28 Webster Terrace: light fixture design

Figure 4.29 Webster Terrace: vernacular influence of Indian kivas
Economic viability  The economic evaluation of Webster Terrace must first consider the implications for the site had it remained an employee parking lot, since the project wouldn't exist if it weren't for Martino's promotion. While the expense of constructing the terrace wouldn't have been incurred, neither would the increased use of the Garden which the terrace has brought. I paid a five dollar entrance fee each time I returned to the Garden. After my initial visit, I wasn't there to tour the Garden, but for an activity at the Terrace. The added revenue which the Terrace has generated from entrance fees alone has had a positive impact on the economic viability of both the Terrace and the Garden, in general.

As for an analysis of how the Terrace, as it exists, would compare in economic terms to a more conventional form of the same function, we can look both at construction and maintenance-related costs. A typical plaza designed for intensive congregation is usually paved. In fact, an older plaza on the east side of the building is paved. The cost for construction of concrete paving is at least double that of the cost for the stabilized decomposed granite used in Webster Terrace. Long term maintenance costs are also higher, considering the need for replacement due to wear or removal for access to underground utilities. While there is an occasional need to replenish the decomposed granite, it is more of minor maintenance cost rather than a major replacement one.

The cost benefits of desert plantings and their water and maintenance requirements have been discussed elsewhere.

Creates Controversy  The value of creating controversy lies in the fact that it stirs people to look at something in a new light, and possibly to change their attitudes. This project, while it certainly fulfills many of the criteria for sustainability, does not directly create controversy because of its setting within a landscape which buffers it from normal scrutiny. The Desert Botanical Garden is the one place where people should be the least likely to argue against the use of native trees or the presence of bare ground; their attitudes are already primed for acceptance.

The fact that Martino designed the project in a kind of behind-the-scenes process, rather than with collaboration or input with others, made it even less controversial. He dealt mainly with the Botanical Garden director, Robert Bruenig,
who was a relatively sympathetic client. As such, the decisions made were not part of a process in which others might have learned or challenged.

*Creates motivation for responsible management* Although attitudes about the desert are probably not significantly altered through controversy about Webster Terrace, the motivation for transferring the lessons learned here to other landscapes is important. The creation of a "living room" for the Garden invites people to see how the desert can be integrated into space for active use by people. Walking around the exhibits of the desert plants, one gets the feeling that there are distinct edges which differentiate people spaces and desert spaces. The terrace takes advantage of illustrating to the many visitors it entertains that it is possible to blur these edges; visitors leave with an appreciation, not only for the wild desert, but for how it can be managed for human habitation.

It must be related here, however, that managing the Terrace has not proven easy. The absence of differentiation between people spaces and plant spaces, coupled with the intense use the site receives has created a difficult challenge to maintain the regenerative nature of the vegetation. When we visited the site, Martino commented on the fact that many of the original plantings were gone and that he had worked with the staff to try to overcome this problem, though their success so far had been limited. This issue brings to light the very important question of how to determine a site's carrying capacity, and the very real conflicts which arise in trying to integrate ecological and cultural processes.

*Overall sustainability of project* A multi-dimensional sustainability is accomplished in this project through its provision of a social setting in which to absorb cultural and ecological processes. Though the level of attention to high design is not as intense as on other projects, the emphasis on the social and ecological components is appropriate in this context.

**Father Kino Plaza**

*Reason for Selection* This project was a pro bono job for Steve Martino. A Hispanic political activist came to Martino about doing a design for a derelict vacant lot next to an inner city church. The site is near the award-winning New Times Building Courtyard and the activist was familiar with Martino's work there. He
wanted to transform the dingy homeless hangout into a space for positive social interaction for both the church and for people off the street. A series of deals was put together between the city, the church, and Phoenix' Mexican sister city of Hermicita to plan, finance and build the project, including the provision of a volunteer Mexican Mormon work crew. Martino was called on to donate his design expertise.

Martino has become increasingly interested in the challenge of bringing the desert back into the city. While his firm has done some inner-city work, the bulk of projects have been in suburban areas. So this project not only fit his personal "rule" to do pro bono work for only those entities which truly demonstrate need (as opposed to doing this kind of work as a marketing tool, regardless of the beneficiary's need), it also satisfied his desire to increase his involvement in inner-city work.

The reasons for selection of Father Kino Plaza as a project to illustrate the application of sustainable design principles are perhaps unexpected. It does not significantly reflect ecological form, except in its use of desert trees and porous surfacing. It is not a significantly regenerative landscape in the physiological sense. It does not use vernacular forms in its structure. The project is, however, a strong statement of social concern, which this study proposes as one of three important contributing factors to sustainability. It is an intensely urban site and as such bears little, if any, traces of its original desert ecosystem characteristics. Nor do its surroundings provide any opportunity for physical ecosystem connections, being equally urban and void of desert forms and processes. Yet these types of settings are as much in need of being approached with sustainability in mind as are more suburban or rural areas, if not more so. The balance of ecology, aesthetics and social responsibility, however, must be geared toward a very different relationship between culture and ecology.

**About the project** The design for Father Kino Plaza consists of an open, sunken expanse of decomposed granite, enclosed by fragmented concrete walls, concrete steps and metal fencing and gates (Figures 4.30 and 4.31). Because the church wanted to be able to secure the plaza at certain times, it was important for it to be fully enclose-able, yet retain an open inviting appearance from the street. To
Figure 4.30 Father Kino Plaza site plan
Figure 4.31 Father Kino Plaza: view from the street
this end, Martino designed a metal gate located near the street end of the plaza, which pivots about a single metal post and can be secured in a position perpendicular to the street when not in use. In this position it becomes a sculptural element which picks up on fragments of the same fencing material used elsewhere in the enclosure.

The long and narrow dimension of the space is de-emphasized by the creation of a series of sculptural "events", which begins with a pair of ten foot high concrete columns announcing the entrance, followed by the gate, a statue of Father Kino, and ending with a small fountain in front of a concrete block wall at the far end of the plaza. The inclusion of one of Martino's whimsical trademarks: rows of 18" diameter concrete bollards set precariously at the edges of a step and the street's curb, provides a functional, yet perforated, enclosure for the plaza.

The space is further defined by a grove of palo brea trees in the back half of the plaza, along with a selection of native shrubs which occupy planters formed by the retaining walls.

Fulfillment of sustainability criteria The urban context of this site, coupled with Martino's unique design response, creates a level of sustainability in which the following criteria are most notable:

Reflects ecological characteristics It is difficult to envision an urban space without concrete or metal, yet these materials are not regionally specific, in contrast to the decomposed granite and plant materials also used in the plaza. Though this is an issue that is pertinent to nearly all of Martino's projects, it is especially interesting to consider it in this very urban context where they seem so indispensable. What would be indigenous alternatives to concrete retaining walls and metal fences in this design, and, more importantly, how would they affect the success of the design?

Adobe or stone are indigenous alternatives to concrete. The fact that either of these materials would have added considerable labor costs to the project is indicative of the difficulty in translating ecological fit into the economic equation. Standardized construction methods have made us slaves to standardized
materials. However, the additional fact that Martino wanted these particular materials and would have used them regardless of their lower cost is another issue. It indicates that his unique regard for ecology and art causes him to selectively value specific characteristics and determine that others are less important.

Technological, social, and ecological processes exposed The moveable gate, the beckoning grove of shade trees, the inviting, open image from street, the softness and permeability of the "desert paving" all contribute to this place's sense of exposure. It might have been tempting for the client to wall off the plaza and protect it from the street people and possible vandalism. They chose, instead, with Martino's suggestion, to make it a stage for community activity. When I visited the site, a homeless person was sleeping behind one of the walls. While this is an unfortunate reality of urban life, many entities, including churches, have turned their backs to these issues. The fact that this client chose to confront and expose it is important to the work's sustainability. The design that Martino brought to the project heightens the social experience of the place.

Broad set of positive affects While the visual appeal of this project is strong, the emotional and spiritual affects are equally important to the integrative aesthetic it achieves. Its progression of sculptural events creates a sense of anticipation; the open and inviting qualities evoke a feeling of social belonging; the whimsical columns and spheres are mysterious. You don't look at the space and immediately say "it's beautiful"; rather, the beauty blooms as these other affects are perceived.

Economic viability Typical of this latest stage of Martino's aesthetic development, his design is less a literal expression of the desert and more designed interpretation of it. As such, hardscape elements become focal points of the landscape, not simply supportive of the spaces and plantings. Hardscape elements such as walls, steps and metal work are generally associated with higher construction costs than planting and other soft surfaces. However, Martino has consistently worked on developing details for hardscape surfaces that are simple, economical and which use common materials in uncommon ways. This is due, in
part, to his knowledge and involvement in the construction process and to his architectural background.

**Overall sustainability of the project**   Father Kino Plaza's character as a rescued inner-city landscape, its volunteer design and labor, its collaboration of many groups to make it happen all suggest a very high degree of social concern and a strong response to the wasting of landscapes. Although the site is not highly regenerative in an ecological, material-oriented sense, it has been regenerated itself, to a form which creates flexible, new use and dispels its perception as an unwanted, degraded landscape.

**A Residential Trio: Emme, Hawkinson, and Greenberg**

**Reason for selection**   The final group of projects to be analyzed brings the evaluation of sustainability down to the level of the single residence. Three projects have been selected which illustrate the unique challenge of incorporating sustainable principles into a single, isolated residence, often floating in a sea of anonymous suburbia. Each solution is dramatically different but all share a common thread of relating site to structure and inhabitant, as well as to the physically disconnected desert ecosystem.

**Emme Residence**   The Emme residence (Figure 4.32) is a home landscape which had originally been designed as a typical suburban eccentric cross between a formal French parterre garden and the utilitarian, compartmentalized contemporary "yard", complete with fences, paved and grass play areas, and dog run. The Emmes bought the five year old home and hired Steve Martino & Associates to rework the landscape to bring the desert into their small patch of land within the subdivision. Minor renovations were made to the front to soften the appearance, but the main changes were concentrated in the rear landscape — the living room of the American garden. (Martino has a distinct disdain for the emphasis on the front yard— he contends that it has become largely used as a status symbol and serves no productive purpose.)

One has to stand on the balcony at the rear of the two-story home to fully appreciate the transformation of and the context for this landscape. Surrounded by a dominant landscape fabric of manicured, compartmentalized neighboring yards
with pools, basketball courts and lawn, the new space belongs to the desert mountain visible over the roof of the house. Although it is limited by the confining walls which announce the property boundaries and by the sheer mass of the structure, its character is not defined by walls or structure. A large lawn area and basketball court had previously been the focus of the space, with the spaces between the boundary walls and these focuses indiscriminately filled with "landscaping" (manicured, irrigated shrubs and groundcover)(Figure 4.33).

The new space is a continuous, whole landscape. The walls have been de-emphasized by being painted a light, neutral color, and the intermediate "boundary" markers – wood header board, brick border and flagstone walk – have been removed. Taking their place is an open expanse of decomposed granite with two new focal points – a "kiva" meditation circle built with native stone and equipped with a bubbling fountain, and a spa, which is burrowed into the landscape within a series of walls. Desert plantings and varied topography give further form to the spaces.

Given this basic description of the landscape design, the attribute which speaks most directly to its sustainability is its basic restoration of desert ecosystem characteristics. The fulfillment of this criteria is especially significant in that there was already an existing, functioning, relatively new landscape in place. The sole purpose of the project was not to create a landscape as an ancillary project for a new structure or to fix a "degraded" landscape, but expressly to alter an existing landscape to make it more reflective of its context and, in the end, more sustainable. This represents a major symbolic breakthrough in the perceived need for sustainable landscapes, although the relative level of sustainability accomplished may be minor.

Ecological processes of drainage and vegetation evolution have been improved through the changes, allowing for a more regenerative landscape, rather than a consumptive one. However the lack of connection available to adjacent ecological processes limits the effectiveness. Although the new landscape has significantly reduced the chemical, energy and water requirements for the plantings, there are new requirements for chemicals, energy and water for the spa and fountain. The stone used to build the meditation ring is found locally, however,
Figure 4.33 Emme Residence: view of previous conventional "yard" contrasted against new "whole" landscape
and the Emme's new desert-derived, "whole" landscape the flagstone from the old walkway might have been recycled instead to eliminate the need for a new material.

Getting beyond the rather ambiguous sustainability of the landscape's physical functions, the aesthetic and social effects are more clear. The range of aesthetic effects this landscape produces goes far beyond perception of its visual and formal beauty. The juxtaposition and contrast of the new patch of desert against the patchwork of more consumptive landscapes is jarring. The new landscape's connection to the neighboring mountain gives it a symbolic continuity which its physical existence lacks.

The activities which the garden fosters encourages a relationship between the inhabitants and the land. Basketball, for instance, was an activity which could happen anywhere — it was unrelated to anything but the hard surface and the basket-toting pole. The meditation circle, however, is a space which depends on the spatial and spiritual qualities of the garden.

**Hawkinson Residence**  This landscape occurs within another ubiquitous walled subdivision. The front yard and rear yards of the home, designed by Martino in the late 1980's, are examples of what was earlier referred to as his application of an "ecological aesthetic". The newly designed and constructed side yard is an example of his use of an "integrative aesthetic". The total landscape is selected to illustrate the contrasting effects each type of design has on sustainability.

Jay Hawkinson is an art collector. The interior of his small home holds a treasury of his favorite artists' works and has slowly been transformed into what amounts to a private gallery. While Hawkinson was very pleased with the landscape that Martino created for his front and side yards — benign, naturalistic types of spaces — the new side yard landscape is an intense reflection of his love for art, while still allowing for ecological function to take place.

The yard was already bounded by six foot high stucco walls which separate the development from the adjacent arterial road. So again Martino was faced with
the prospect of having no direct connections to adjacent ecological processes. The design he came up with (Figure 4.34) works with the walls rather than trying to deflect attention away from them. It consists of a small concrete patio leading off the kitchen dining area. The patio is shaded by a yellow canvas awning, shaped and angled to resemble a fin. The awning is supported by a series of steel posts painted magenta. The existing walls have been painted and softened by a low seat wall. A focal point for the garden is created with a small pool and bubbling fountain at the far back corner of the space, where your eye is caught by a thin slit of red Plexiglas inserted in the new rounded section of wall which backs the fountain. A sculptural counter-balance in the form of a concrete sphere is placed to one side of the fountain. Another sculptural element which defines the space is a bright blue concrete pyramid which punctuates the end of a seat wall.

The majority of the space which these forms define has a decomposed granite surface with desert plantings placed to frame views and create congregation spaces. The large central open space is graded to form a gentle bowl which allows for runoff to be absorbed by the soil rather than be carried away by catch basins.

At first glance, this landscape, though aesthetically powerful, appears rather weak in terms of its sustainability; certainly less sustainable than the front and side yards with their more pure ecological inspiration. I saw the landscape before the plantings were added, which made it seem even more dominated by abstract structure and less ecological than it is in finished form (Figure 4.35). Admittedly, the construction materials are neither recycled nor regional in character, and the landscape can only be termed regenerative in the sense that the plant materials are self-perpetuating and the runoff is allowed to percolate back into the ground. Also the site is physically and visually severed from adjacent landscapes, limiting its ecological connectivity and the aesthetic impact it could be having on passersby.

Looking at the original plans for the side yard, however, you have a different perspective on its relative sustainability. The site was planned to have been almost entirely covered with a swimming pool and the prerequisite concrete decking. The potential for sustainability of this unbuilt option for the site is much less than that of
Figure 4.34 Hawkinson Residence: concept plan and rendering of pool area
Figure 4.35 Hawkinson Residence: views of structural elements before plantings were added.
the built design. As it is, the landscape is an intimate reflection of Hawkinson's value for varied art forms — a cultural expression of who he is. Woven into this cultural landscape is a strong representation of regional ecology. Hawkinson is not a particular fan of southwest style - in art or in gardens. It is not important to him, as it was to the Emmes, that garden resemble the desert, which removes the threat of a stylized, fashion-driven excuse for the solution. The idea of a desert garden appeals to him for practical reasons; it can be lush without much fuss, and it is a good ecological fit.

Greenberg Residence The Greenberg residence, though on a larger site with less obvious boundaries than the previous two projects, is also a case of an isolated lot within a conventional subdivision. Figure 4.36 contrasts the street view toward the Greenberg residence with the view toward a home across the street. The difference is dramatic — a thriving riot of color and texture which invites exploration versus a static, predictable, flat space with very little formal definition or regional character.

One of Martino's most award-winning and written about landscapes, this design relies on the use of native desert plantings, open drainage, a series of low, elegantly detailed concrete walls and steps, and paved terraces which give structure to the spaces. The site was stripped of its desert form before Steve Martino & Associates arrived on the scene; a few short years later it looked as though the native landscape had been carefully preserved in making way for the home.

As another example of Martino's 1980's-era ecological aesthetic, the Greenberg residence exemplifies many of the ecology-based criteria for sustainable landscape design. It does not have the depth of meaning or consideration of social issues which are evident in more current Martino landscapes. It reflects ecological forms and processes, and uses a minimum of water, chemical and energy inputs.

The age of the project (7 years) provides a good look at the performance of such a landscape over time. The ecological processes have, in fact, been hard at work. The plantings have become so "lush" that the Greenbergs are beginning to
Figure 4.36 Comparative view from the street towards the Greenberg landscape (above) and the landscape across the street (below)
Figure 4.38 Greenberg Residence: out of control?
want to control them. The prickly pear cactus are especially rampant, and while Martino and I toured the site, the Greenbergs had a gardener there giving them a liberal prune, much to Martino's disgust and dismay (Figure 4.37).

Overall sustainability of the three residential projects It is interesting to evaluate the overall sustainability of these landscapes as a group because they represent both an important look at the progression of Martino's approach over time, yet they respond consistently to the problem of suburban sprawl in a very unique way. The Greenberg Residence is the oldest of the three landscapes and is the most naturalistic. The Emme Residence begins to introduce some more regional cultural elements with its stonework and kiva-like forms. The Hawkinson Residence is most strongly reflective of the owner's interests and personal relation to the landscape. This progression shows Martino's growing self-confidence in his ability to project meaning into the landscape without taking away from the ecological integrity which he values so highly.

Finally, although Martino has not chosen to challenge the larger socio-economic institutions which perpetuate the wholesale suburban development of desert landscapes, he has found an effective way to weave an element of sustainability into suburbia, which may, in fact, be the needed catalyst for new attitudes and incremental change.
CHAPTER V: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Three basic tenets of sustainability form the cornerstone of this inquiry into the applications of sustainable landscape design:

- Sustainability requires that we live within the carrying capacity of earth's ecosystems.
- Human well-being depends on ecosystem survival and function.
- Sustainability must consider the importance of cultural needs and values in addition to physical needs in contributing to human survival.

The problem

Landscape architecture is a profession which looks to the notion of sustainability as the embodiment of its ethical calling to stewardship. The development of the profession over the last thirty years has experienced widening gaps between the areas of ecological design, socially responsible design, and artistic design. Works which have been held up as exemplars have often emphasized the extreme of one or the other of these concerns. Sustainability calls for the unification of these concerns.

There is a growing body of theoretical knowledge on how sustainability is manifested through both the deliberate and unselfconscious design of the landscape. However, recognized implementations of the theory of sustainable landscape design have largely been limited to experimental projects which create segregated, self-contained landscapes with the luxury of a relatively high level of control over contextual factors, such as public acceptance and the nature of existing landscape elements. Other more mainstream examples of sustainable design tend to focus on the scientific, technological functioning of landscapes at the expense of the social, emotional, and cultural functions they must also fulfill. The lack of examples of integrated sustainable landscape design which provide for a
broad range of human needs is the problem on which this research has been focused.

The approach to this problem has involved two major efforts:

1) A synthesis of the theory of sustainable landscape design into a refined definition and set of criteria with which to analyze the process and products of sustainable landscape design.

2) Application of the definition and criteria in the case study of the practice of one firm's notable work in sustainable landscape design.

Analysis of sustainable design within the context of a firm's general approach, as well as the range of its specific projects, is critical. Just as landscapes do not exist in a vacuum, designers operate under unique sets of economic, philosophical, experiential and regional factors which affect their relative proclivity towards sustainable design. The challenge is not only to discover how sustainable landscapes are being designed, but also to see why they are being designed.

Findings

The case study of Steve Martino & Associates was conducted using the four process criteria and the fourteen product criteria synthesized from the sustainable landscape design as a framework. The main points of the case study findings can be summarized as follows:

Unspoken sustainability Steve Martino does not tend to regard his work in terms of its sustainability, neither during the design process, nor in evaluating his built designs. He resists the labeling of his work in any way except in that he would like it to be considered as art. If, in fact, his work is sustainable (as I propose it is in the conclusions which follow these findings), its sustainability must be somehow contained or nurtured by its artistic qualities. This suggests that sustainability need not and perhaps ought not to be an overt goal; that it must permeate the entire psyche of a designer, and be considered as a thought process as well a physical reality.
Commitment & artistic integrity  

Martino's general design approach stems from two attributes: long term commitment to the region in which he lives and practices, and a primary motivation to create art through his design. These attributes combine to create a unique expression of sustainability; one that is much different from that of a firm practicing in multiple regions, with a primary motivation of ecological restoration, for example.

His commitment to the Sonoran Desert region has allowed him to build a substantial network of projects which strengthen not only the sustainability of the sites they occupy, but also have an additive affect on the region as a whole. Also, he is, by now, so fluent with the processes and materials of the desert that he can devote more of his design energy to developing the artful interpretation of appropriate processes and materials.

Artful expression, often a secondary consideration in sustainable landscape design, is the first concern of Steve Martino. His consideration of ecological and social issues is an underlying constant – "Using native plants is the one thing you don't have to worry about", he says. The real source of challenge for him is to interpret the unique relationships between region, site, structure and inhabitant.

Development of integrative aesthetic  

The continuum of Martino projects is distinguished by three stages of aesthetic expression, which correspond to various stages in the development of his approach, and which manifest different levels of sustainability. The beginning of his career, during which he struggled to attract clients and articulate his approach was a period of "status quo" aesthetics and of correspondingly low sustainability. As his vision of creating regional identity in the landscape emerged, he began to assert his own interpretations and innovations, which resulted in an ecological aesthetic, evident in the straightforward, naturalistic designs of his mid-career period.

An integrative aesthetic has been the result of Martino's most recent projects. Landscapes such as the City Boundary public art piece and Father Kino Plaza illustrate this concern with weaving cultural meaning and social responsibility into the ecological functions. It is inspiring and instructive to see this progression; it is a sign of Martino's uncertain beginning as a designer, and of his
continuing evolution and search for meaning. We often see the work of a great designer only in the context of his or her most celebrated work, making their talent appear instant or magical, rather than the result of struggle and evolution.

**Involvement in articulation of problem** In 'Design With Nature', Ian McHarg laments landscape architects' essential limitation of being at the mercy of the client's "program" for a project. This is a commonly perceived barrier to the implementation of sustainable design principles, perpetuated by the pervasiveness of short term economic motivations. Steve Martino has created a career and a reputation out of ignoring this limitation. Many of his most celebrated and sustainable landscapes are the results of what he terms "make-your-own projects"; projects which he either initiated without request, or in which he was able to significantly alter the client's program. This proactive role in determining what the goals should be – which stem from the perception of the basic problem – is essential to promoting sustainability. By having involvement in the articulation of the problem, he gains access to the key to maximizing a site's sustainability. Many designers go into the design process assuming that the problem is a valid and appropriate one and that their job is simply to respond to it.

**Naturally varying degrees of sustainability** Steve Martino can be said to be selective about the projects he does, in that he undertakes only those on which he will be allowed sufficient participation in defining the initial problem. However, his selectivity does not cause him to accept or reject projects solely on the basis of their potential to manifest high degrees of sustainability. His basic design approach inherently and consistently incorporates sustainable principles in every project he does. Rather than producing a body of work that demonstrates a consistent degree of sustainability, his approach leads to a wide range of degrees of sustainability, responding to the realistic range of contextual conditions which constrain or encourage sustainability.

**Management: the case for stability through benign neglect** Just as Martino is uniquely involved in the beginning of the design process with the problem articulation, so is he concerned with that part of the design process which determines the performance of the executed design over time: management. Although most of his projects do not afford him the opportunity to be actively,
formally involved in their management, he takes a personal interest in following and guiding the maintenance of his landscapes to encourage them to evolve to a stable existence. His concern with popular maintenance practices which effectively freeze landscapes in an idealized state, is addressed through a philosophy which calls for a strategy of "benign neglect". The Greenberg Residence is a good example of this phenomenon. The clients have been happy to have the landscape grow and change up to a certain point and now they want to freeze it and maintain it in this "ideal" form, while Martino is encouraging them to let it continue to change and carry on the processes of regeneration which will create long term stability.

**Conclusions**

There are several conclusions, relating back to the study problem and purpose, which may be drawn from the findings of the case study of Steve Martino & Associates. Chapter Two's synthesis of the literature produced a proposed definition for sustainable landscape design which emphasized specific elements. Are these emphases still valid in light of the case study findings? If not, how might the definition be refined? The case study was specifically undertaken to test the proposed criteria for sustainable landscape design. Based on the refined definition, how well may we conclude that the criteria measure sustainability? How does the popular image of Steve Martino & Associates differ from the impression gained through a comprehensive examination of the firm's approach and body of work? And finally, considering whatever refinement may be necessary to the definition and criteria, is the collective body of Steve Martino's work, in fact sustainable?

**Refinement of synthesized definition**

The following definition was offered as a synthesis of the literature on sustainable landscape design:

*Sustainable landscape design is a holistic design approach which balances concern for ecology, artful design, and social responsibility.*

The case study of Steve Martino & Associates generally supports the validity of this statement, although it suggests some refinement and elaboration.
Balance? Although the analysis of Martino's work reveals strong concern for ecology, artful design and social responsibility, it also reveals that these concerns are not necessarily balanced on each project. If we want sustainability to be an approach that we can realistically apply to all of our work, we must aim for solutions which recognize the unique opportunities and constraints of each site and problem. The resulting solutions will likely emphasize one of the three concerns, but this proclivity must not eliminate the manifestation of the other concerns. Father Kino Plaza is a good example of this point. While the contextual conditions of the project have centered the solution on the concern for social responsibility, Martino's consideration of its artful design and ecological qualities, though they are secondary, have not been neglected, by any means. In fact, the effectiveness of the social function of the landscape is enhanced and made more meaningful by its artistic, ecological qualities.

The point has been made several times in this study that trying to categorize a project as one type of design or another (conservation-style versus participatory style, ecological versus artful design) is a common tendency, and one that discourages sustainability. Yet the idea of strictly balancing all concerns does not appear to be realistic or particularly supportive of sustainability, either. If sustainability is to be an approach that can be applied uniformly to all design work, each project must be allowed to maximize its sustainable potential by letting its unique context speak.

The value of ecology It has been noted that the creation of ecological processes which aim for the function of undisturbed ecosystems is held up as the ideal for sustainable landscape design. While I have expended a fair amount of effort down-playing the theories which call for a purist ecological approach, I do concede that ecology needs to be the overriding discipline for sustainable landscape design. The primary tenet of sustainability, which has to do with the recognition of ecosystem carrying capacity – the physiological limits of our existence – requires an ecological response. Although we must be aware that undisturbed ecosystems are the ideal and not the real goals, this should not prevent us from trying to aim for them. In fact, unattainable goals can provide needed motivation.
The case study of Steve Martino & Associates has illustrated that the benefits of and enthusiasm for ecological design is susceptible to disguising other problems, in much the same way that artful design has been demonstrated to do. While the restoration of a significant amount of ecological function has been attributed to Martino's landscapes, this ecological integrity, coupled with the aesthetic success of his work, has created a sense of complacency. The fact that a significant change has been made in the character of the landscape has obscured the need for other more fundamental, large-scale changes. Urban decay, suburban sprawl, increased tourism and consumption, the dominance of the automobile, and the diminishing pedestrian scale of the landscape continues, aided, in some ways by the sense that these things are being mitigated for by creating desert landscapes in the city.

In addition to large scale changes, there are also other site level changes whose need has been obscured through this same complacency. Water issues have become so important that other site-related ecological concerns such as energy production and consumption, and recycling have been largely ignored. While the importance of Martino's contributions cannot be overstated, they should be thought of as the seed for continued efforts. Martino is the first to admit that desert landscapes have become "fashion-driven" not "passion-driven", which is causing him to look for new direction in his work.

The value of artful design The struggle to achieve artful design is frequently decried as detracting from the attention to ecological and social issues, and encouraging unsustainable characteristics in a landscape. More than anything, the case study of Steve Martino & Associates has supported the fact that artful design is not only compatible with the ideas of ecology and social responsibility, but that it can increase the diffusion of solutions which respond to these concerns.

With regard to aesthetic styles, the landscapes of Steve Martino support the timelessness of some elements of the modernist style. As Martino relates, he has "made a career out of walls and steps"- forms which have taken cues from the crisp, angular styles of Luis Barragan and Frank Lloyd Wright. There is a tendency to say that because the work of modernists has occurred during a period of unsustainable
development standards, that the style itself has been to blame. This is akin to throwing the baby out with the bath water. There must be some accountability on the part of the designer to use the elements of style intelligently and contextually.

There is a critical danger of using the persuasive power of artful design irresponsibly to diffuse solutions which are neither ecologically sound nor socially just. Though I believe that there is an equal danger in using no style. Designs which imitate natural ecosystems, with no recognition of human presence, exclude people. While there are certain landscapes from which we want or need to exclude people, these are not the types of landscapes in which the majority of the profession is involved in designing. Nor are they the landscapes which are most in need of intensive design.

Value of socially responsible design During an interview with one of Martino's former associates, Joe Ewan, a discussion took place about the appropriateness of including social responsibility in the definition and criteria for sustainability. A U.C. Berkeley graduate, Ewan related how the Berkeley landscape architecture program's emphasis on social issues and community/participatory design had, at first, befuddled him. He felt that social issues were an obvious motivation for the practice of landscape architecture and that you shouldn't have to be reminded or taught to be socially responsible in your design decisions. Though he has an appreciation for the articulation of these needs now, I believe that this observation is indicative of a larger assumption on the part of the profession: that a social conscience is innate and can't be imposed through a self-conscious set of prescribed design choices. In fact, socially responsible landscapes have largely been associated with community or participatory design in which solutions are created by the landscape users themselves, shifting the role of the traditional designer to one of coordination and guidance.

I do believe that social responsibility must be an inherent part of a designer's approach, as exemplified by the approach of Steve Martino. However, as with ecological outcomes, I don't think there are many designers who intentionally make design decisions which are socially irresponsible. The ability to recognize the social implications of design has become increasingly complex and subject to an
ever-widening array of attitudes and values. Also, social responsibility does not necessarily coincide with ecological integrity. The perceived needs of growing human populations have, in fact, been at the heart of our unsustainable resource use patterns. In these respects social responsibility has become an issue which must be consciously addressed, in concert with ecological issues of resource use and regeneration.

While I do not question the value of community and participatory design as a needed component of certain types of projects, the case study of Steve Martino & Associates has revealed several ways in which the designer might be empowered to build social responsibility into his or her own solutions, as an external professional who can objectively relate social needs to ecological needs. Martino's solutions exhibit a fundamental responsiveness to social issues in their own right, as well as create the vital link between social responsibility and ecological integrity manifested in the sense of place which he forges for both the social health of the community and the ecological health of the regional ecosystem.

The actual affects of design Bob Riley, a noted cultural geographer and observer of the American landscape, makes the claim that only about 10% of our landscapes are created through formal design, and that the remaining 90% are the product of vernacular design and evolution. And of the 10% of those landscapes which are consciously designed, the designs themselves generate little, if any, of the positive use which may occur within them (Riley, 1980). If this is the case, of what significance is the endeavor to create sustainable landscapes by design?

Steve Martino's work responds to this question in two important ways. First, the body of his work has had a positive affect on certain elements of both the designed and the vernacular landscape of the Phoenix area. Although he has not been physically involved in all the landscapes which he has affected, his influence, as well as others' who have been proponents of bringing the desert aesthetic and function into the city, is present nearly everywhere you look. This affect has been felt because he has taken an active role in evaluating the nature of the problems themselves and in creating a strong visual and functional landscape vocabulary for the region. He utilizes a consistent approach which has been shown to have a
cumulative affect, rather than a "whatever works" approach, having in a piecemeal affect on the landscape.

Secondly, much of Martino's work achieves the difficult task of using appropriate technology – that which produces ecosystem functioning – in artful and culturally meaningful forms. This calls attention to the sustainability of the landscapes and does not allow them to recede into an inconspicuous, naturalistic form.

**Refined definition**  The cumulative affect of each of these observations on the proposed definition of "sustainable landscape design" suggests the following modification:

_Sustainable landscape design utilizes a holistic approach which combines concern for ecology, art, and social responsibility in solutions which optimize the unique potential of each site to communicate landscape meaning and process, and encourage appropriate use._

Such design responds to a central role of landscape architects mentioned in Chapter Two: making connections between the built and the natural environments. As noted in the analysis of the sustainability of Steve Martino's Arid Zone Trees project, it is neither a design which imitates nature, nor denies it; rather it creates a new nature in which culture is expressed.

**Validity of the proposed criteria**

The use of the proposed criteria for sustainable landscape design has been important not only to analyze the sustainability of existing landscapes but to give direction for the design of future landscapes. Through continued analysis of modes of practice and of actual landscapes, knowledge and diffusion of sustainability can increase, and, in the process, different emphases for the criteria will be created. For instance, there will hopefully come a time in the future when we will not need to think of sustainability as controversial, or requiring a major shift in attitudes and values. Despite isolated evidence of such shifts, such as Phoenix' acceptance of the use of desert vegetation, the controversy requirement recognizes the continuing need to confront and challenge. Although each of the proposed criteria have proved valuable tools in the analysis of the sustainability of Martino's
landscapes, some refinement for use in future analyses and design is suggested by the results.

**Approach criteria** With regard to the criteria for the general approach to design, the first three criteria: commitment and innovation; the attention to (rather than the balance) of ecology, artful design, and social responsibility; and the importance of a strong aesthetic which manifests these concerns are critical and must all be present to design landscapes which approach sustainability. The fourth criterion, sensitivity to degrees of sustainability, is an important by-product of another element of approach which is needed: consistency. The case study has shown that, although Martino has gone through phases in the formation of his approach, there have been consistent principles, such as the expression of regional identity, ecological function, and artistic forms, applied across the range of project types he has worked on. His work at Papago park is a good example of the value of consistency. The work can have an exponential impact if it is cohesive.

**Landscape criteria** As for the criteria proposed for analysis of individual landscapes, the most obvious problem or criticism is that they overlap so much as to make them difficult to isolate and actually "measure". The criteria "Reflects ecological processes" and "Produces forms which expose technological, social and ecological processes", for instance, are slightly different elements of sustainability, but ones which are hard to separate. The matrix developed in Chapter Four, which provides a checklist of the evaluation of each project's fulfillment of the criteria, while not a quantifiable means of measuring, helps to create an important basis for comparison with other landscapes. It also provides a framework from which, both, to study existing landscapes, and design new landscapes.

The ecological criteria, belonging to somewhat of a scientific category, lend themselves more easily to quantitative measurement than the aesthetic and social criteria, though the question of what to measure against is problematic. As was attempted in the Papago Park Center Streetscape project, a "conventional" landscape which serves a similar function is needed for a comparison, though each site's contextual factors make this less than an exact science. The aesthetic
and, to a lesser extent, the social criteria are more difficult to evaluate objectively, though this should be no excuse for not evaluating them.

**Sustainability of Steve Martino & Associates' work**

**Approach** Steve Martino's approach is conducive to the design of sustainable landscapes, as has been illustrated by his regional commitment, innovation and integrative aesthetic. However, the setting for his practice suggests that this approach is transferable to only a small, though important, segment of the profession. He is, for the most part, a lone practitioner. His work challenges convention and defines the "cutting edge". Most of the projects which his firm has designed are the result of his unique signature, though others have worked with him on them. He is aware of this, but feels that it is the result of client preference associated with his awards and name, and not his own insistence on design control.

Also, his firm has periodically struggled to stay financially solvent. This has not been due to lack of interest in his services, but because of his passionate need to do only projects which interest him and on which he will have the freedom to innovate, including a high percentage of pro bono work. While these needs are integral to the sustainability of his approach, they suggest a difficulty for larger firms who are not able to sustain such risks. The trends of increasing firm size and multi-disciplinary nature, national and international practices, and the creation of office "cultures" which nurture ideologies of their members, coupled with the ever-present need to make a living present real challenges to the profession-wide adoption of design approaches which produce sustainable landscapes.

**Comprehensive body of work** I feel that the body of Steve Martino's work represents a significant movement towards the creation of sustainable landscapes for the Phoenix area. The most important affects it has had are in the areas of reduced water use and the development of a rich sense of place based on cultural ties to regional ecosystems. It has also responded to the problems of waste and regeneration in some interesting ways, through the rescue of wasted landscapes and design which encourages the continuity of water and vegetative cycles.
The work has not addressed the larger infrastructure questions of sustainability which revolve around transportation and energy, though it has the potential to affect attitudes about such issues simply through the stark contrast it creates with its adjacent landscapes.

Neither does Martino's work challenge the socio-economic institutions which have created the conventional suburb and commercial strip, elements which are at the core of our generally unsustainable existence. Instead, Martino has chosen to concentrate on a specific set of problems and do it well and completely.

As this discussion suggests, furthering the holistic notion of sustainable landscape design can not be accomplished through one type of effort, but rather the efforts made at many different levels and dimensions. There are individuals at work in the areas of theorizing and experimentation, activism, planning, and design. Efforts range from looking at the large-scale regional and global implications of sustainability to its smallest implications for the details of individual sites. All of these efforts have inherent value as necessary parts of the transition towards sustainable development.

**Future direction: towards sustainability or away from it?** Steve Martino is undergoing a period of transition as a designer. Many of his technological innovations are becoming common practice throughout the Phoenix area and he feels a need to explore new dimensions of design. As noted earlier in the thesis, he has indicated a growing interest in architecture and other design work which would allow him to "cement" his image as a "high style" designer.

While I have no doubt that Martino could be successful in this realm, I hope that he continues to consider ecological and social issues in his work. When I inquired of his interest in solar energy, water recycling technologies or other types of architectural innovation which respond to the need for greater environmental fit, he was vaguely responsive though this didn't appear to be a direction he was excited about. It may be that his approach so inherently includes the consideration of ecological and social issues that his future work will automatically manifest such concern. Yet it seems that as he has evolved a way from his ecological aesthetic
period (as described in Chapter Four) his resistance to being pigeon-holed as a naturalistic designer may be taking him in the opposite direction, away from ecology.

**Recommendations**

**Areas of need**

The literature reveals that landscape architects are finding niches in each of the above-mentioned areas of sustainable landscape design - Rob Thayer's theory-building and experimentation, Deb Mitchell's activism in ASLA, and Andropogon's ecological design at the project level, for example. Three areas which have been less explored, and for which landscape architecture has particular potential for meaningful contribution, are the areas of planning, integrative design, and education.

**Need for planning** Although this thesis has been about sustainable design as opposed to planning, the case study of Steve Martino & Associates has illuminated the important contributions that planning could be having in facilitating the design of sustainable landscapes. Many of Martino's efforts have been aimed at the counterproductive effects which large scale planning entities often have on a region's sustainability. While Frederick Steiner and others have explored the planning implications of sustainability in the theoretical realm, there is little evidence that sustainable planning has penetrated the practice of the many landscape architects involved in planning, especially at the policy-making levels of governmental institutions. The need for sustainability represents a calling for more landscape architects to actively be a part of making appropriate policies, rather than simply responding to them with design.

**Integrative design** The straightforward, literal application of sustainable design principles concentrates on the technological, scientific, ecological aspects of implementation – those elements which are more quantifiable and which relate to the physiological sustainability of a landscape. Davis' Village Homes, Andropogon's Morris Arboretum, and Steve Martino's Douglas Residence are
examples of such implementation. A relatively pure ecological design is possible in these landscapes because they are either large and self contained (Village Homes and Morris Arboretum) or they are set in a highly connective, wild context (Douglas Residence). The relationship of the inhabitants or users to these landscapes is expressed primarily through the lens of the site's ecological character and functioning. The expression does not attempt to interpret other social, cultural or emotional ties of people to the land – it does not employ an integrative aesthetic, but an ecological one.

The more recent work of designers such as George Hargreaves and Steve Martino is beginning to incorporate such meaning into the landscape. Iconic landscapes such as Hargreaves' Byxbee Park and Martino's collaboration with Jody Pinto on the City Boundary public art project, are dramatic expressions of cultural meaning and honest admissions of our use of the land. City Boundary, however, expresses a sustainable cultural use of the land; Byxbee Park's artistic expression emphasizes the past destructive, industrial use of the land. While the park's design makes a judgmental statement about this industrial use, implying its unsustainable nature through its use of ruins, it does not offer an alternative conception for how the land might have been formerly used, or could be used in the future, more sustainably. Although such confrontation may have value in its negative re-enforcement, it can also be seen as a monument to industry and unsustainable technology.

These comments emphasize the need to deepen our implementation of sustainable landscape design to integrate cultural, social, and emotional dimensions on fragmented sites which are highly impacted by destructive human use. As we become more conversant with the language of sustainability, we must turn to the powerful tool of artistic interpretation to increase the acceptance and diffusion of it. As Martino puts it, the difference between mechanical implementation and artful interpretation is akin to the difference between "using a language to write sentences" and "using it to write music".

Education The implications of the study conclusions extend to the educational process. The discussion of sustainability, as being defined here, must not be relegated to the obligatory environmental resource planning or ecological
design course, but must be an underlying foundation for a landscape architect's academic training. Traditional courses such as landscape construction and horticulture must begin to break out of the tried-and-true standardized formats and challenge students to innovate and consider more sustainable alternatives to elements such as catch basins and the city street tree list. Students must learn to see and understand existing landscapes. They must be exposed to different approaches other than a strict landscape architectural prescription. Steve Martino's early observations and experiences with the desert and his architectural training have given him these elements independent of formal landscape architectural schooling, though I believe they are also possible in a university setting.

**Danger of using "sustainable" as a label**

Finally, the findings of the case study emphasize that sustainability is not a black or white issue. The concept of sustainability should not be used to label landscapes or pigeonhole designers. You simply cannot say that any landscape is completely sustainable; nor can you look at a landscape which does not respond to all of the criteria and say that it is necessarily unsustainable. When I developed my protocol for the case study, I tended to ask questions which inadvertently used sustainability as a label. During the interviews, it became clear that neither Martino nor the others interviewed were comfortable with the label. They were more at ease in discussing and debating the individual issues which contribute to sustainability.

This unease with the idea of sustainability may stem, in part, from the unsettling questions: "What, besides basic human existence, are we trying to sustain, and how long should we try to sustain it?" In this age of mobility, computerization, and the global economy, landscapes have become highly specialized, controlled and subject to sudden, dramatic change. As alluded to above, the areas of high productivity and regeneration have become separated from the areas of high population. Is this growing pattern sustainable? Do we, in fact, want to sustain the current levels of population in Phoenix, even though they require far larger quantities of resources than the region itself can provide? Is it enough to try to mitigate for the impact on the Phoenix area by eliminating human
impact and increasing regeneration in other regions? If the answer to these questions is no, then in our attempts to weave sustainable threads into a cloth that is fatally flawed, are we really strengthening the cloth by disguising its destructiveness?

Not having definitive answers to these questions, we must use the idea of sustainability to continually test and challenge. If the patterns described above are not sustainable, we will only know it by constant evaluation and innovation. The unconditional survival of human society can not be the aim of sustainability, or of sustainable landscape design. If we think of sustainable principles, rather, as tools with which to responsibly, intelligently and creatively approach life and the landscape, we need not be paralyzed or intimidated by the charge of sustainable landscape design.
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APPENDIX A: CORRESPONDENCE WITH STEVE MARTINO
April 12, 1993

Steve Martino
Steve Martino and Associates
225 W. University Dr. Suite #102
Tempe, Arizona 85281

Dear Mr. Martino,

I am writing to enlist your participation as the subject of a case study which I am planning for a research project on sustainable landscape design. I am applying for a Landscape Architecture Foundation research grant to fund this study and plan on producing an article for submission to Landscape Architecture magazine, in addition to my master's thesis, based on the study results. I am also hopeful that it may of a depth suitable for a research publication such as the Landscape Journal.

Over the course of six years of landscape architectural experience in California and New England, I became frustrated with both the lack of innovation and stewardship evident in the profession, and the limited role which we, as landscape architects, continually confine ourselves to. As a graduate student, I have channeled my frustration into studying those factors which contribute to practitioners' ability to push the boundaries of conventional practice and create sustainable landscapes which integrate concern for environmental, cultural and economic values with concern for artistic form-giving ("high design").

Current theoretical definitions of and guidelines for sustainability are primarily biased towards sustaining natural resources at the expense of cultural, economic and design considerations. My study will focus on deriving an operational definition of sustainability based on the "state of the art" practice of sustainable design. I hypothesize that the results will indicate a more holistic, adaptable form of sustainability is evolving in practice which integrates ecology with human values and patterns.
The literature indicates a distinct tension between ecological design/environmental planning and "high design" which has evolved through the deepening public concern for the environment juxtaposed to the growing interest in landscape design as art. While many firms have built reputations on innovative response to one end of this spectrum or the other, few can be held as exemplars of meaningful integration of both.

Your firm has surfaced as one such exemplar, through the course of an expert referral process I have conducted and as evidenced by your award-winning projects, "Arid Zone Trees" and "Papago Park/ City Boundary". Over the past couple of months I have contacted several individuals who are on the pulse of new directions in the profession in general, and knowledgeable on the subject of sustainability in specific. Your firm was mentioned by some of these "experts", mostly based on their perceptions of the two aforementioned projects featured in Landscape Architecture magazine.

I would like to learn more about your work and am interested in knowing whether you would be receptive to participating in this study and resulting articles. The study itself would involve interviewing you, key associates in your office and selected clients; visiting and photographing built projects; and reviewing graphic materials which convey information about your design process. I am sensitive to the demands of operating a private practice and would tailor these activities to cause the least possible disruption to your office schedule.

The schedule for the project is relatively flexible, but I am aiming for confirmation of my study subject for sometime before the mid-May Landscape Architecture Foundation grants deadline. I will contact you during the week of April 19th to discuss the feasibility of your participation.

Sincerely,

Kristin Schwab
DATE: April 19, 1993

ATTENTION: Krista Schuler

COMPANY: Dept. of Landscape Architecture

FAX NUMBER: (602) 294-9755

FROM: Steve Martino

PROJECT: Case Study

Number of sheets following this cover sheet: 4

COMMENTS:...
Memorandum

Steve Martino
& Associates

Date 10.15.12
To KRISTIN
From STEVE
Subject contracts/projects.

I will send a letter, along with your April 12th letter, to all the people on my list. I've highlighted the people on list as the higher priority as one.

The projects range from a small urban courtyard to a 10,000 acre development.

I will show you some of current projects which are consistent with past work but more quirky & extreme.

Kne bill thompson's article is included from "D broto"
APPENDIX B: CASE STUDY PROTOCOL

This case study protocol provides a framework for satisfying the stated purpose of "applying and testing the synthesized definition and criteria for sustainable landscape design through the documentation and analysis of one notable landscape architectural firm's practice of sustainable design."

The protocol consists of delineation of the specific questions to be answered through the case study of Steve Martino Associates. The methodology section of the thesis outlines four types of data to be collected for the case study: interviews, physical artifact documentation, observation, and archival records. The protocol provides a format or checklist for the interviews and the site observations and documentation.

The first five interview formats are thematic sets of questions for Steve Martino. The last two formats are general sets of questions; one for associates, employees, and collaborators, the other for clients.

The protocol ends with a site sustainability checklist to use in documenting the visits to selected projects.

THEME #1 – WHAT IS MARTINO'S NOTION OF SUSTAINABLE DESIGN AND HOW DOES HE APPLY IT?

1. How would you define sustainable landscape design? Is "regeneration" an important element of it?

2. What goals related to sustainability do you have for your work?

3. Do you think your work has consistently applied sustainable principles to some degree? Do many of your projects exhibit regenerative qualities?

4. Do you experience frustration in applying sustainable design principles? How so?

5. Are there any particular influences/experiences you've had in your life which instilled the value you have for sustainability? What are they?

6. Who are your design "heroes"? What qualities make them heroes for you? Which of them would you consider sustainable designers in some way or another?

7. Can sustainable landscape design be accomplished by one who lives outside the project's region? Have you had much experience designing out of your region? If not, why? If so, how do you feel about the results?
8. Has your work evolved in terms of sustainability? In what ways?

9. How do you define "aesthetics"?

10. What aesthetic goals do you have for your work?

11. Is there a relationship between your sustainability goals and your aesthetic goals? Could you describe that relationship?

12. Where does art fit into your sustainable design goals?

13. How do you define the term "social responsibility"?

14. What goals for social responsibility do you have for your work?

15. Is there a relationship between your social goals and the aesthetic and sustainability goals we have been discussing?

16. Do your goals related to sustainability apply to aspects of your daily life and the way you run your business? In what way?

17. Which of your built works would you consider to be the most sustainable examples of your work? How do your award-winning projects fit in to this ranking?

18. Do all projects have potential to be sustainable? Should all built projects strive to be sustainable?

19. What do you think of this (my) definition of sustainable landscape design?

THEME #2 – WHAT ARE THE CHARACTERISTICS OF MARTINO'S DESIGN PROCESS WHICH CONTRIBUTE TO THE SUSTAINABILITY OF HIS LANDSCAPES?

1. Why do you believe your clients come to you? Have the reasons changed since you began your practice? In what ways?

2. How involved is the client in the design process? Does their level of involvement affect the sustainability of their management of the built landscape?

3. Do most of your clients care more about the visual aspects of a project than the ecological, sensory or social aspects?

4. How involved do you get with community design collaboration? Is this important to the sustainability of the built landscape?
5. Do you prefer to be involved with management of your designed landscapes? Do you get the opportunity to be involved with management on many projects? Do you write management plans for them as part of the construction document process? How do you deal with evolution of projects?

6. On the average, what is the percentage of time generally spent on site analysis vs. conceptual design vs. construction documents? Do you always produce CD's with specs, etc.?

7. Have you identified certain contractors you will and won't recommend based on their environmental sensitivity?

8. How is the sustainability of your designs affected – positively or negatively, by regulatory codes and policies?

9. Are you at all active in trying to change these codes and policies? How so?

10. How do you feel about doing pro-bono work? What are your goals in doing it?

11. How have you continued your education beyond the university?

12. Do you do any type of professional self-evaluation? What kinds?

13. Do you ever do post-occupancy evaluations of your projects?

14. How has collaborating with artists affected your approach to sustainable design?

15. Are many of the architects you work with applying sustainable design principles in their work?

16. What effects have collaboration with other designers had on the sustainability of your work?

17. When you collaborate, do you actually brainstorm on design goals and forms together?

18. In addition to plants, what other types of materials and technologies do you employ in your design work that contribute to sustainability?

19. What are the short- and long-term economic implications of your designs? Do they cost more to build and maintain than more conventional landscapes? What are the trade-offs?

THEME #3 – EVALUATION OF THE SUSTAINABILITY OF SPECIFIC PROJECTS
THEME #3 – EVALUATION OF THE SUSTAINABILITY OF SPECIFIC PROJECTS

Projects to be discussed:  New Times Courtyard
                           Arid Zone Trees
                           Papago Park Center
                           City Boundary
                           Douglas Residence
                           Grand Canal
                           Homeless Center

For each project, Martino will be asked to give an introductory description of the project, including client profile, project program, design "players", design goals, built results, and evolution of the built landscape. The following questions may be asked to clarify or probe further:

1. What were the goals and design forms related to ecology? To social responsibility? To aesthetics?
2. How were they compatible? How did they conflict?
3. Did the finished project fulfill the goals?
4. Is the finished project sustainable? To what degree?
6. Were clients receptive to sustainable principles applied?
7. How concerned were they with visual effects?
8. Are they pleased with the built landscape? Why?
9. What level of involvement did you have in construction supervision? In management?
10. What did collaboration contribute to the sustainability of the project?
11. What level of regulatory review was required? Did it help or hinder the sustainability of the solution?
12. Does the built design reveal ecological and technological processes?
13. What did you design that wouldn't be considered standard building practice? Was it a problem to construct?
14. How much controversy did the solution generate?
15. Has project remained true to original goals through management practices and everyday use?
The following questions will be asked to collectively evaluate and compare the sustainability of the projects:

1. Which of these projects is the most sustainable? Why?
2. Which is the least? Why?
3. Which influenced the most people to appreciate ecological values? Why?
4. Which are most successful aesthetically?
5. Which encourage social responsibility in the users?
6. Are they representative of the consistency with which you apply sustainable principles?
7. What effect does the size and public or private nature of the project have on it's sustainability?

THEME #4 – HOW DOES THE FIRM STRUCTURE OF STEVE MARTINO ASSOCIATES AFFECT THE POTENTIAL FOR SUSTAINABLE DESIGN? WHAT ARE THE ECONOMIC CONSEQUENCES OF THIS TYPE OF PRACTICE?

1. What reasons did you have for starting your own practice?
2. What was your original vision of the type of firm you wanted to have? (Size, project types, professional mix, etc.)
3. What is the history of your firm's structure?
4. What has guided the changes in the structure? (economics, project types, etc.)
5. What aspects of your firm structure contribute to your ability to do sustainable design work?
6. How do you involve employees in your work? Do they ever get their own projects?
7. Is your practice financially stable? Have there been any notable fluctuations in the degree of financial success you have achieved?
8. How do you market your services? RFP's? Referrals? How has this changed over the span of your career?
9. Has your award-winning resulted in increased demand for your sustainable design services?
10. Do you ever turn away work because the client or nature of the project does not fit with your design goals?

11. Has your award-winning resulted in increased job applications coming to you?

12. What skills and talent do you look for in a potential employee?

13. Do you prefer a mix of professionals in your firm make-up? Which professions are valuable to your approach to sustainability?

14. How do you evaluate your employees' performance?

15. Has working with you had a visible impact on employees' ability and commitment to designing sustainably?

16. How do you train your employees?

17. What type of planning do you do for your firm's future?

THEME #5 – STANCE OF THE PROFESSION OF LANDSCAPE ARCHITECTURE ON SUSTAINABLE DESIGN AND PROSPECTS FOR A SUSTAINABLE FUTURE SOCIETY.

1. Do you think the profession of landscape architecture is heading in a direction that encourages sustainable design? Why?

2. Where, between the two extremes of art and ecology represented by Martha Schwartz and Andropogon Associates, would you place yourself? The majority of the profession?

3. Do you believe, as others have expressed, that landscape architecture is well-suited to act as a leading profession in sustainable design? What can we do as a profession to encourage this role?

4. Do you believe that your projects have changed many people's attitudes about ecological and regional design, and aesthetics?

5. Do you see a need for more L.A.'s to get involved in the planning and policy-making end of sustainable landscape design, as opposed to the site specific design aspect of it? Are you inclined to get involved in these activities?

6. In your association with educational programs in landscape architecture, have you seen much change in the focus on training future LA's? Have you noted change in the types of attitudes expressed in student work?
EMPLOYEE/ ASSOCIATE/ COLLABORATOR INTERVIEW QUESTIONS:

1. What is your definition of sustainable landscape design?

2. Do you think sustainability is an overriding goal for Steve Martino's design work? If so, in what ways? If not, what are his goals?

3. Do his design goals balance aesthetics, ecology and social responsibility? If not, which do they favor?

4. Do the built landscapes balance aesthetics, ecology and social responsibility? If not, which do they favor?

5. Would you consider the landscapes designed by his firm to be consistently sustainable to some degree? What general level of sustainability do they possess?

6. What do Martino and his associates do differently from other firms that contributes to the sustainability of this firm's work?

7. What management style is employed in running this firm? (level of responsibility delegated to associates, degree of collaboration among associates) How does this management style affect the sustainability of the firm's built works?

8. What effect has working with Steve Martino had on your attitudes about and skills in sustainable design?

9. Has your career course been significantly altered due to his influence?

10. What effect has award winning had on Steve Martino Associates? What affect did it have on you?

CLIENT INTERVIEW QUESTIONS

1. Why did you select Steve Martino for this project? Because of his reputation for ecological design? For the aesthetic qualities of his designs?

2. What were your initial goals for the project? Did these remain the same throughout the project?
3. How does Martino's design approach differ from that of other design professionals you've worked with?

4. Did you agree with his solution from the outset? Do you now?

5. How involved did you want to be in the design? How much were you involved?

6. How did any collaboration which occurred on the project affect the solution?

6. What are the short- and long-term economic implications of his design? Did it cost more to build and maintain than more conventional landscapes? What are the trade-offs?

7. Has his solution effected your attitudes about landscape aesthetics? About ecological design? How so?

8. Has his solution changed public or users' attitudes about landscape aesthetics? About ecological design? How so?

9. Did you have a strong "sense of place" (cultural, personal, ecological) about the project site before working with Martino? Do you now?

10. What is your definition of sustainable landscape design?

11. Were your goals for this project concerned with the sustainability of the landscape?

12. Were Steve Martino's goals for the project concerned with the sustainability of the landscape?

13. Does the project achieve sustainability? How so?

SITE SUSTAINABILITY EVALUATION CHECKLIST

Project Statistics:

Project Name and Location:________________________________________________________

Client______________________________________________________________

Size_________________________ Year of Design________________________
Type of Project __________________________________________

Site Description: ______________________________________

________________________________________________________________________

Maintained by: _____________________________________________

Lead or Consultant? Names of Other Consultants:______________

________________________________________________________________________

Associates who assisted:_____________________________________

Regulatory Review:_________________________________________

________________________________________________________________________

Criteria Checklist

Criteria for Product: 1 2 3 4 5

1. Reflects regional and site-specific ecological forms (vegetation, wildlife, water, topography, forms of sustainable human impact and interaction).
   • Regional ecological forms:
   • Site-specific ecological forms:

2. Reflects regional and site-specific ecological processes (wildlife use, drainage, evolution, seasonal fluctuation, water regimes)
   • Regional ecological processes:
   • Site-specific ecological processes:
   • Signs of evolution:

3. Minimizes chemical inputs
   • What are the chemical inputs?.
   • What are the chemical inputs on a conventional project similar in program and size?

4. Minimizes energy inputs and use.
• What are the energy inputs?
• What types of energy use does the design facilitate? Discourage?
• What are the energy inputs and types of energy use facilitated by a conventional project of similar program and size?

5. Appropriate water and soil inputs.
   • Is project irrigated? If so, how?
   • Did project require fill? Imported topsoil? Where did it come from?

6. Provides for recycling:
   • Composting?
   • Recycling bins?
   • Recycled construction materials?

7. Maximizes regenerative capacity of site (replaces some of resources used):
   • Food production?
   • Energy production?
   • Groundwater recharge?

8. How do people use the site?

9. How people regard the site?

10. How is the site maintained?
    • By inhabitants?
    • As designed?

11. How has the site affected people other than the users?
    • Neighbors
    • Passersby
    • People displaced by the project

12. Economically viable- construction method
    • Non-standard construction methods required?
13. Economically viable- maintenance costs
   - Compare to conventional project similar in program and size

   - Users
   - Public

15. Are forms related to ecosystem functions? To the relationship between humans and the ecosystem? In what ways?

16. Are ecological processes revealed through the forms?. In what ways?

17. Generates aesthetic affects in addition to visual ones:
   - Sense of place; personal or regional
   - Sounds, aromas
   - Spiritual, peaceful, reflective
   - Sense of well-being
   - Other

General comments about site: ______________________________________________________________

____________________________________________________________________________________
APPENDIX C: DATA COLLECTION SCHEDULE

The data for the case study of Steve Martino & Associates was collected during a trip to the Phoenix area over a six day period from Wednesday, November 3 through Tuesday, November 11, 1993. The following schedule documents how the time was spent:

Wednesday, November 3:
Arrive in Phoenix at 3:00 PM.

Meet with and interview Nina Dunbar, Phoenix Arts Commission (client), tour City Boundary project, 4:30 - 6:00.

Meet with Steve Martino at his office, discuss visit schedule, 6:30 - 8:00 PM.

Thursday, November 4:
Attend project meeting with Martino, consulting architect, John Chonka and the client for Mexican Wolf Exhibit project at Phoenix Zoo, 9:00 - 11:00 AM.

Tour Martino's Zoo projects, Papago Park area, Desert Botanical Garden projects; conduct interview #1 with Martino, 11:00 - 2:00.

Tour Cardinals Training Center, Emme Residence with Martino, 2:00 - 5:00.

Meet with and interview Ken Caldwell (former Martino associate), 7:00 - 9:00 PM.

Friday, November 5:
Interview #2 with Martino, 8:00 - 9:30 AM.

Meet with and interview Dave Powell (irrigation consultant, collaborator), 9:30 - 10:00.

Tour DeBartolo residence; interview Jack De Bartolo (client); 10:30 - 12:00.

Meet with and interview Cliff Douglas (client), 2:00 - 3:00.

Tour Arid Zone Trees, 3:00 - 4:00.

Tour Douglas Residence, 4:30 - 5:30 PM.
Saturday, November 6:
Meet with and interview Jay Hawkinson (client), 9:30 - 10:00 AM.

Tour Hawkinson residence, 10:00 - 11:00.

Meet with and interview John Douglas (architect, collaborator) 11:00 - 12:00.

Tour Pioneer Village and Desert Mountain development with Martino, 12:30 - 3:30.

Interview #3 with Martino, 4:30 - 6:00 PM.

Sunday, November 7:
Attend concert at Webster Terrace in Desert Botanical Garden, 10:30 AM - 12:30 PM.

Visit Paolo Soleri's Cosanti and Frank Lloyd Wright's Taliesin, 1:00 - 4:00.

Archival document search through Martino's slides and drawings, 4:30 - 6:00 PM.

Monday, November 8:
Interview #4 with Martino, 8:30 - 9:30 AM.

Tour Greenberg residence and downtown Phoenix projects: New Times Plaza, Father Kino Plaza, Monroe Street Streetscape, Phoenix Library; with Martino; 9:30 - 12:00.

Interview with Linda Grotzinger (former associate), 12:30 - 1:30.

Tour Mountain States Nursery and interview Ron Gass (nursery owner, collaborator), 2:30 - 4:00.

Archival search, continued, 4:30 - 6:30 PM.

Tuesday, November 9:
Interview #5 with Martino, 8:30 - 10:00 AM.

Meet with and interview Jayne Lewis (client), 10:30 - 11:30.

Meet with and interview Joe Ewan (former associate, collaborator), 12:00 - 1:30.

Depart from Phoenix, 3:00 PM.