Inviting Spontaneous Use into Urban Streams

by

Chia-Ning Yang

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Committee in charge:

Professor Louise A. Mozingo, Chair
Professor Randolph T. Hester, Jr.
Professor G. Mathias Kondolf
Professor Leonard J. Duhl

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Abstract

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Urban stream restoration, as a new form of environmental movement and with all the hope emanating from it, has a missing piece. Activities such as catching frogs, skipping rocks, listening to water or swimming, although have been the essential joy of a nearby stream to many, have never been embraced by planners and designers. This dissertation names such activities “spontaneous use” and establishes it as the service philosophy of urban stream restoration. The dissertation involved two steps: first, to delineate the content and significance of the spontaneous use in today’s urban context; second, to search for ways to place it at the center of urban stream restoration, both on the physical and cultural planes.

This dissertation began with an extensive survey project conducted at Marsh Creek in Brentwood, California to gain a snapshot of the current human-stream relationships. The project encompassed an adult household questionnaire survey, in-depth interviews with selected adults, and school drawing exercises with children. The results demonstrated the crucial role of the spontaneous use in forming creek experiences, values

and advocacy, but revealed the paradox between the deep adult appreciation for the creek and the omnipresent "idyllic" mode of conception.

Observation and interaction with children at Marsh Creek and the other case-study sites—Sonoma Valley, California and Kochi, Japan—further provided a rich spectrum of spontaneous uses and their habitat requirements. These results enable planners and designers to envision a layer of geomorphology codified with human ecology.

Information from the fieldwork was then linked with the theories and techniques in stream restoration. By examining the potential conflict and applicability between the spontaneous use and the modus operandi in watershed management, urban stream planning and design, I proposed strategies to incorporate spontaneous use with other restoration goals.

Finally, three cultural barriers against the spontaneous use need to be confronted: growing up in a harmful status seeking society; danger and the liability concerns; and aesthetics imposed by nature ideology in vogue or loss in the past. This work addressed them through theoretical construction and argued for participatory planning and design as the means to fit spontaneous use of urban streams into the cultural landscape.

Acknowledgements

Rather than the last chapter, this section is the real conclusion to me of a long stretch of working period. Retrieving the past images and relishing the rich human associations grown out of this research are extremely rewarding as I write this final piece.

It has been my honor to have Louise Mozingo as the chair of this dissertation. A caring and compelling educator, she has invested countless hours into this work and imparted to me her unique passion and sensitivity to the landscape. Randy Hester, who demonstrated how an excellent designer and professor can meanwhile be a spontaneous player without reserve, has been a constant source of inspiration for me. Matt Kondolf and Len Duhl have provided their insights and warm encouragements throughout the course. My deep thanks to each of them.

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Chapter 1 Introduction:

A Search for a Philosophy in Urban Stream Restoration

> *"Since the public trail along the canal service road was opened in the seventies, tens of thousands have taken their pleasure there. But even before that, in the days of its unofficial access, I was not alone in finding it. Laura's dad, Charles, rafted significant portions of the canal, and his children tubed, biked, chased frogs and crawdads, swung, dived, and swam all summer long. It was all against water department rules, but "without the canal I don't know what I would have done," Laura told me, "or what growing up would have been like." She spoke for many kids and many ditches when she wrote, "During those hot and long summer days, I would have been bored stiff if it weren't for that High Line Canal." (Pyle 1993, p. xvi.)*

1.1 Research Inquiry

In the past century, various regions in the world traced a more or less identical pattern in the transformation of urban waterways. The progress of damming, burying, channelization and diversion left unmistakable records, while its compound impacts on the quality of urban living are not easy to calculate, particularly in terms of the dwindling of the once-common daily interactions with nearby streams. The above quotation cited from Robert Pyle's retrospective essay *The Thunder Tree* illustrates how a watercourse can provide a lifeline of rich experiences for city-bound youth.

Pyle expounded on his roots and life-long attachment with an irrigation ditch, the High Line Canal in Colorado. The canal was his sanctuary, playground, imaginary wilderness, and birthplace as a naturalist. It also served as lover's lane, research site, and holy ground of solace. To a prominent ecologist as Pyle, however, the value of High Line

Canal does not lie on its ecological condition. He observed that when people connect with nature, it happens *somewhere*. Almost everyone who cares deeply about the outdoors can identify a particular place where contact occurred" (Ibid., p. xv). Such valued places are usually "the secondhand lands, the hand-me-down habitats," but it is where the alchemy occurs. It is through close and intimate contact with a particular patch of such humble places that we learn to respond to the earth, to see that it really matters (ibid., p. xvii-xviii).

This dissertation names such daily interactions with nearby streams *spontaneous use*, where *spontaneous* is defined as "*coming or resulting from a natural impulse or tendency; without effort or premeditation*" (Webster's College Dictionary, 2001 version).

Spontaneity is a condition not hampered by matter, energy, space and time. In spontaneous use, the interaction with the stream environment is free of barriers in matter, energy, space and time that do not associate with the stream environment.

- Matter: Users do not need to bring in expensive or complicated equipment to carry out the activities.

- Space: They do not need to overcome miles of distances or severe physical difficulties to arrive to the spot of intended use.

- Energy: Users generate their own energy or make use of the energy within the stream environment. They do not have to rely on electricity, gasoline and other imported energy forms.

- Time: Users are not pressed by time for other scheduled activities when engaging in such uses. They are "okay to spend some time." Their minds also stay in present time.

By the end of 1990s, stream transformation in the United States struck a new direction—this time people want the old streams back. Fundamentally the idea of *restoration*[1] contains a simple notion of retrieving lost valuables, yet as a form of environmental movement it is still striving to gain authority from the orthodox pedigree of preservation (Gobster and Hull 2000, Throop 2000). In addition to technical challenges, restoration of urban streams encounters the lack of clear goals, imagery and agreed-upon modes of user behaviors. In the proliferating projects of urban stream restoration, we see an unprecedented cross-disciplinary cooperation among environmental scientists and engineers and ever-flourishing citizen involvement, yet we do not see flocks of spontaneous users return to the streams. To the contrary, spontaneous users are often excluded purposely or unwittingly (Figure 1.1).

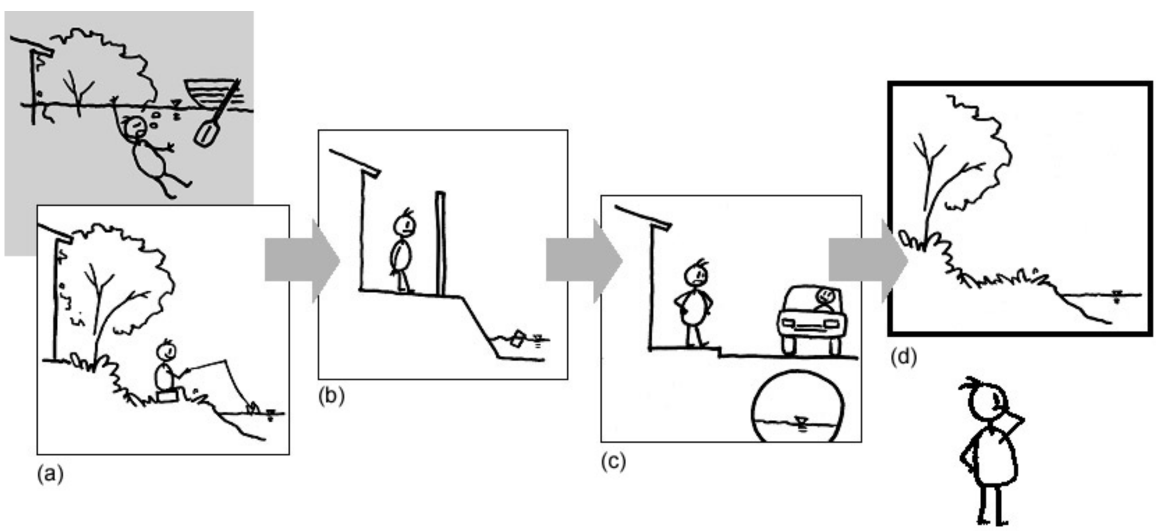


Figure 1.1 (a) The age of intensive stream interaction—enjoyments and disasters were derived from the same source. (b), (c) The progress of urban stream transformation and user exclusion. (d) Restoration and a new era of alienation—spontaneous users are left out of the scene

[1] In this dissertation, *restoration* is broadly defined as "intentional human practices to actively create or manage areas for their desired natural qualities," a definition slightly modified from Gobster and Hull's work (2000, p. 11)

A basic reason for this condition may be that urban stream is not a traditional realm for environmental planning and design professionals. Landscape architects, who regard serving public perception and providing joy in outdoor open space as the heart of the profession, have been oddly quiet in asserting their traditional priorities in restoration projects while remaining more active in the tamed waterfront development projects estranged from ecological processes. Recreation planners, on the other hand, have been concentrating their energy on remote rural streams to develop tourism or cope with hordes of backcountry vacation seekers.

Urban stream restoration, as a new form of environmental movement and with all the passion and hope emanating from it, demands a central philosophy to respond to its challenging context and compelling implication to our sustainable future, both ecologically and culturally. In urban stream restoration, what kind of waterways should we provide to our citizens, particularly our kids, owners of the alchemy that derives value from the "secondhand habitats?" If the "wild and scenic rivers" serve the wilderness purists best and the waterfront resorts take care of the comfort recreationists, what is the social role for the majority of the urban streams that can never be genuinely wild or completely tamed (Figure 1.2)?

The a priori answer is spontaneous use. The purpose of this dissertation is to establish the spontaneous use as the central mission of urban stream restoration. The task is mainly two-fold. First, the idea and significance of spontaneous use in current urban stream context requires delineation. Although it is the subject of much nostalgic expression, we do not know much about its patterns in today's cities. Second, once the significance and patterns are clarified, we need to search for ways to lay it down at the center of urban stream restoration, both on the physical plane through planning and design and on the cultural plane through education and action.

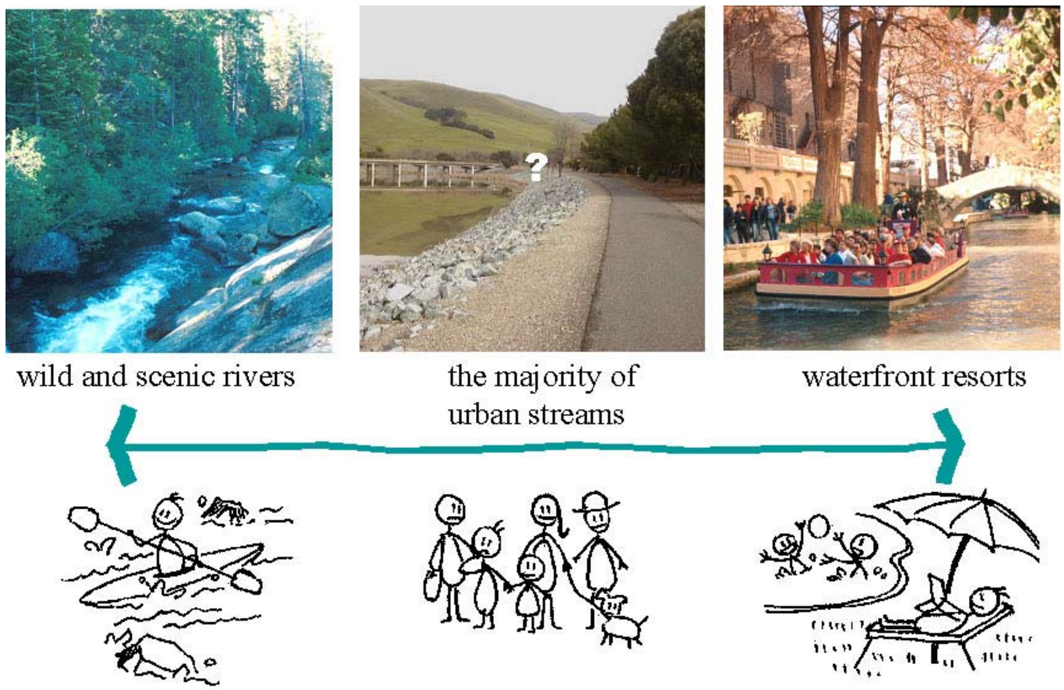


Figure 1.2 Planning and design professionals need to establish a service philosophy for the majority of urban streams that can neither be genuinely wild nor completely tamed

1.2 Outline of the Work

The following chapters are structured to pursue my inquiry to understand the spontaneous use and advocate for it in urban streams (Figure 1.3).

Chapter Two reviews literature of the transformation, restoration and user needs of urban streams. This review substantiates the research questions of this work and forms the background knowledge necessary for the development of the rest of the chapters.

Chapter Three provides a snapshot of the current human-stream relationship in urban areas and hypothesizes the spontaneous use as the type of use that motivates a healthier human-stream relationship through the positive feedback of use, conception and value. Using Marsh Creek, a typical suburban waterway in Brentwood, California, value, conception and use are explored through a series of surveys. The adult household questionnaire survey followed by in-depth interviews with selected survey respondents elucidates the use patterns, images and emotional responses of adult residents to Marsh Creek. School drawing exercises with children of different ages, on the other hand, expose the relationship between children and the creek that is far more dynamic than adults.

Chapter Four further investigates the spontaneous use in two respects: its experiential qualities and its environment-behavior relationships. The primary subject inevitably becomes children and the fieldwork extends to Sonoma Valley, California, and Kochi, Japan along with my base site in Brentwood, California to acquire a broader sample in terms of both physical and cultural environments. Observation and interaction with both the kids selected from drawing exercise participants and those encountered on-site generate the typology and habitat analysis for spontaneous uses.

Chapter Five employs information obtained from the fieldwork as yardstick to develop principles and strategies to plan and design for spontaneous uses. This chapter also reviews concepts and techniques available in the watershed management, physical planning and design aspects in current urban stream restoration, analyzing their conflicts and applicability to the scheme of spontaneous uses. It demonstrates that planning and design can initiate from the stance of the spontaneous use, with full potential to correspond to flood control and habitat enhancement goals in urban stream restoration.

Chapter Six confronts culture-generated values and conceptions that tend to hinder spontaneous uses and therefore a healthy human-stream relationship in cities. Reflecting upon issues encountered in previous chapters, this chapter presents theoretical construction on growing up, danger and beauty. It also suggests action and education in participatory planning and design as the way for landscape architects to effect cultural intervention.

Finally, Chapter Seven summarizes this work and poses a new prospective for urban stream and urban nature in general, starting from the simple and powerful concept of the spontaneous use.

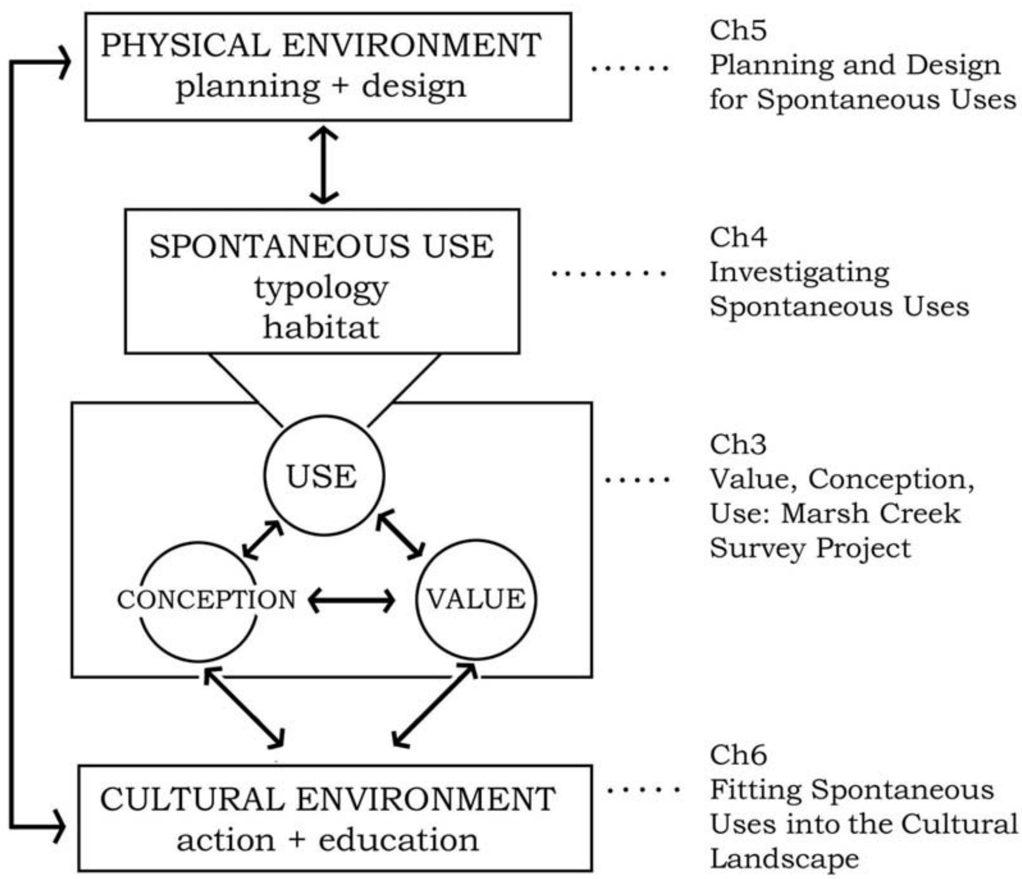


Figure 1.3 The structure and chapter composition of this work

Chapter 2 Background: Urban Streams in Transformation

This chapter reviews and rearranges literature on three topics crucial to our central theme of spontaneous uses at urban streams: the processes and consequences of urban stream transformation, the user needs for urban streams and urban nature in general, and the movement of urban stream restoration. The review intends to place the inquiry of this work within the broader context of the continuing endeavors by environmental planners and designers to conciliate the city and nature. From this review I will elicit a few background discourses to be relied on throughout this work: spontaneous use is all but obliterated in the course of urban stream transformation up to the present; spontaneous use embodies an essential mode of nature interaction yet remains overlooked in the planning and design of urban streams; with user interfaces properly devised by planners and designers, urban nature restoration as a form of environmental movement has immeasurable potential for its promise to "infill nature" in cities.

2.1 Urban Stream Transformation

As Palmer (1986) has aptly put it: "Take away the manipulation of rivers, and someone would have to rewrite the books about this nation" (p. 13). Urban streams, in particular, have become the contested terrain for various players with various ambitions. To understand urban stream transformation through the past century is to illuminate the diverse views and asserted public goals of the land developers and a batch of professionals. Further, to examine the compound result of urban stream transformation on human-stream relationship and thus quality of life is to trace the apparent dwindling of the spontaneous use.

2.1.1 Players in Urban Stream Transformation

Since water resource investments result from the political process of decision making and resource allocation, land developers naturally play an essential role in urban stream transformation. The professionals—engineers, recreational planners, ecologists and scientists, city planners and landscape architects—have all shaped or reshaped these precarious water courses with their particular value systems and disciplinary tools. Their views toward a stream, however, can be wildly different (Figure 2.1).

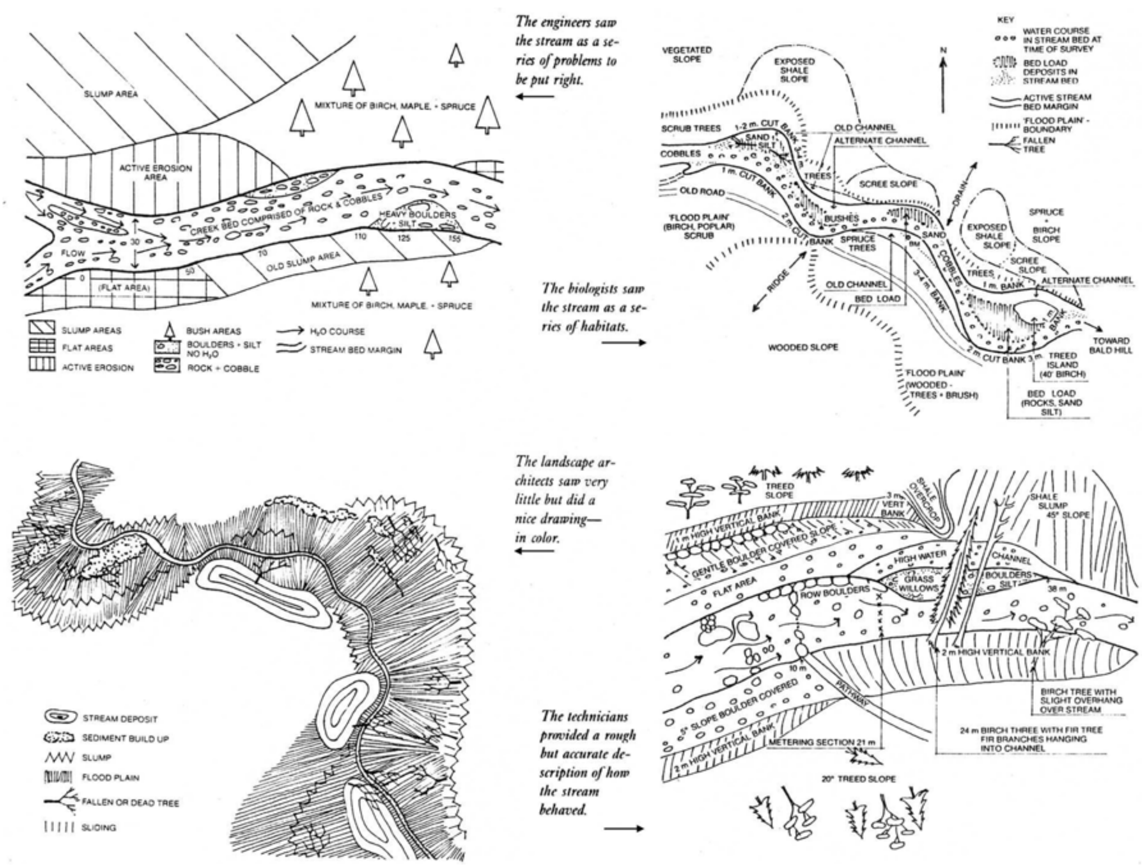


Figure 2.1 R. W. Newbury's experiment: observations of the same stream by student from different professional backgrounds (from Hough 1990, p. 70-72)

This section reviews how urban streams have been transformed through the hands of developers and professionals (Table 2.1).

Table 2.1 Players in urban stream transformation

	Land Developers	**Engineers**	**Ecologists/ Scientists**	**Recreational Planners**	**City Planners**	**Landscape Architects**
Stream Aesthetic	amorphous	geometric	primitive/ organic	primitive/ quantitative	geometric/ systematic	formal/ pastoral
Public Goals	local economic development	flood control; water resource development; transportation development	environmental preservation; eco-system service	accommodation of recreational needs; provision of diverse settings	water resource development; nonstructural flood control	creating aesthetic and valued environments
See Flood as …	hazard	foe	vital process	hazard	hazard	hazard
Transfor-mation of Urban Streams	initiate and support projects for resource development and flood control (indirect)	culverting, channelizing, straightening, riprapping, clearing vegetation, damming, diking, reclaiming, diverting, separating with transportation structures	restoring habitats, reshaping channel forms, repairing bank, daylighting, improving water quality	introducing recreational facilities: trails, campgrounds, ballparks, picnic areas	zoning and regulating development, managing runoff (indirect)	trails, landmarks, monuments, pastoral parks, urban plazas, recreational channels

Land Developers

Almost all sectors of traditional resource-bonded interest groups—industrial, commercial, farming, logging, ranching, and mining—have played significant roles in shaping streams in the United States.

Bromley and Barrows (1974) emphasized the role of local developers in two ways: they initiate most of the water projects, and they work in coalition with local agencies to provide essential capital to bargain the projects through higher levels. Traditionally, land developers successfully controlled water projects through a common pattern. Developers and water agencies supported each other and gave the projects enough credibility. Along with government agencies, they were able to effectively control information and confine possible conflict to small geographic areas. Moreover, the way they promoted water projects were "in tune" with community norms (Ibid.). Economic growth and development were widely shared values in most communities.

Through the early decades of the 20th century rivers and streams have been dominated by industrial uses such as transport, supplying water for cooling towers, factory operations, discharging wastes and generating hydraulic power. In northeastern states, the narrow, steep river valley and abundant waterfalls formed an ideal space for the location of a water-powered mill or forge at the beginning of the industrial era (Jones and Battaglia 1989). In California, large-scale stream transformations started with hydraulic mining. Tens of millions of cubic meters of rock and earth were excavated annually from 1853 to 1884. Since the 1930s, large quantities of water were dammed and diverted to Central Valley for agricultural irrigation. In 1980, 86% of manageable water supply in the state was allocated to agriculture use, and since a great amount of water withdrawn for irrigation do not return to streams, channels in downstream urban areas have only a trickling of flow (Nichols et al. 1986). Grazing, logging, and commercial developments have also transformed urban streams directly or indirectly through flood control works, deforestation, increase of runoff, and change of water quality.

The industrial, agricultural, and land development values tend to be the values that dominate the uses and management of streams until today, and they are achieved mostly through the hands of engineers.

Engineers

Engineers embody values such as safety, efficiency, and pragmatism. They are the single most powerful profession for stream transformation through the "public" goals of flood control, water resource utilization, and transportation development. Hydraulic engineers are most concerned with modeling the behavior of flows under conditions where the variables are controlled. Due to the convenience and capacity of calculation, they tend to image streams as geometric entities, and traditionally treat anything other than pure water and Euclidean channel shapes with "sensitive adjustment" in formulas.

The structural flood control approach of culverting, channelizing, riprapping, and clearing vegetation from stream channels formed a vicious circularity to propagate itself in three ways. First, increasing runoff caused by developments and hard drainage systems directly contributed to more flood damage by creating much higher peak flow in the channel. Second, wherever a segment of hard structure is built, it intensified flow energy and makes upstream or downstream segments vulnerable. Third, since the structure created a false sense of security, it attracted more people moving into the floodplain. Another larger structure would soon be justified because benefits were computed on the basis of damages avoided. As a result, while billions was spent on flood control since the 1930s, damages continued to exceed construction costs (Bromley and Barrows 1974).

Another route engineers use to transform urban streams was through the construction of transportation works. To maintain navigability, debris was removed and channels constantly dredged. After the waning of inland navigation, the land along these linear corridors continued to be the most available location for railroads, highways, and superhighways (Jones and Battaglia 1989).

Ecologists/ Environmental Scientists

Plant and wildlife biologists view streams as an organic compound of habitats. They often describe streams as sequences of riffles and pools. A cross-section image of a stream is usually presented with an extending series of main channel, slough, natural levee, floodplain, all the way to undisturbed upland forest. They perceive streams to its finest details of leaf and stick detritus, moss on boulder, and to the unseen processes such as the food chain and nitrogen cycle. Diversity is an absolute value that dictates their riparian landscape aesthetics, as demonstrated by Luna Leopold's (1969) "uniqueness ratio." Here the uniqueness is defined by multiple physical, biological, and human impact factors, reflecting the implicit assumption that aesthetic value is primarily a function of ecological criteria.

For traditional biologists, unspoiled nature is the true laboratory, and their own research may be the only human activity not counted as "impact." They consider preservation as an indubitable "public" goal. Adding a spatial structural perspective, landscape ecologists view streams as "corridors," a crucial element in landscape to allow movement of species and therefore to maintain bio-diversity and long-term genetic diversity (Dramstad et al. 1996). For urban stream corridors, "eco-system services" such as filtering out pollutants, cooling the air, helping to reduce flood damage, are added to the list of goals (Smith and Hellmund 1993).

Ecologists have long realized that to maintain a viable ecosystem in order to achieve any of the above functions, a stream needs floods, which is rarely accepted in cities. Developers and water agencies may desire these "eco-system service", but they cannot afford losing lands or risking floods. As a result, although ecologists were institutionalized into the planning process after the 1960s, they remain “second-class citizens” in affecting the design of urban stream channels. In most cases, they can only “witness the loss of the nation’s biodiversity instead of directing its recovery” (Riley 1998, p. 90).

In the past decade, ecologists led various restoration projects to reshape streams degraded by structural flood control methods or unwise land-use. According to Kondolf (1996), general goals of restoration projects include channel stabilization, erosion control, restoring natural meanders and bed morphology, channel relocation, habitat enhancement, and water quality improvement. In cities, the chance of large-scale channel reshaping is limited, but increasing projects are taking “radical” approach to daylight creeks once driven into pipes and remove not-functioning dams upstream (Pinkham 2000).

Recreational Planners

The participation of recreational planners in urban stream transformation is limited and indirect. In effect, the association of this profession with streams arose largely in the context of backcountry recreation boom, particularly after the passage of Wild and Scenic Rivers Act in 1968 and the suggestion of National Water Commission that recreation be elevated to a high priority in water resource management (Bromley and Barrows 1974).

To determine scenic river designation or recreation development potential, quantitative assessments were developed by recreational planners. For example, the RIVERS Method was developed to assess 67 variables for each mile of river and evaluating the potential for 16 recreational activities (Chubb 1977).

Traditional approaches to river recreation planning in the country focused on strategies for accommodating the swelling number of visitors. Planning responded to escalated use pressures with construction of new facilities and other support services. But added services in turn drew more people into rural streams (Knopf 1983). Planning then switched to restrain the access and to emphasize the "diversity" of experience. An effort to provide "diversity" for recreation planning is the Recreation Opportunity Spectrum (ROS) widely used by federal agencies such as USFS and NPS (Schroeder 1987). A main presumption of ROS is that people choose the settings and experiences they want based on a single imagery index of "naturalness" ranging from "primitive" to "modern" (Clark & Stankey 1979).

Although countryside streams attracted most of the attention of the recreational planners, recreational developments were achieved in cities where channelization was avoided due to sound floodplain management. For example, along the American River Parkway in Sacramento, California, floodplains were used to accommodate facilities not necessarily related to the river, such as tennis courts, campgrounds, picnic areas, swimming pools and ballparks (HCRS 1979).

City Planners

Traditional city planners tend to adopt the same value system as engineers. They view streams primarily as water resource and tend to evenly distribute and stabilize its provision. Although concerned with appearance, to some degree, planners working in the map also share engineers' geometric aesthetics—the irregular courses of streams were usually hazardous zones that required adaptation of blocks and additional work of calculation, and small watercourses were often obliterated to save the trouble.

Although early government towns addressed streams in symbolic ways such as aligning the urban axes to them (Jones and Battaglia 1989), the participation of city planners to shape urban streams has been rather limited. Yet when the nonstructural flood control started to be emphasized in the 1970s, city planners have been able to indirectly influence streams and their relationships with people by means of floodplain zoning, floodplain insurance, subdivision regulation, building and housing codes, and sanitary codes with special flood hazard provisions (Bromley and Barrows 1974). These planning actions are crucial for ecologists, recreation planners, and landscape architects to exert their influence in urban stream transformation.

In recent years, city planning has moved forward to re-examine the relationships between development and hydrologic cycle by addressing runoff management and non-point source pollution control. Planners now emphasize increasing pervious surface on streets, parking lots, driveways, etc. and adopting open drainage and swale systems. They also encourage ground and rooftop retention and combine retention ponds with open space system (BASMAA 1999).

Landscape Architects

A traditional tenet of landscape architects is to view landscape with abstract formal aesthetic terms, typically composed of forms, lines, colors, textures and their inter-relationships (Daniel and Vinning 1983). For example, Burton Litton viewed riparian landscape in terms of three aesthetic criteria—unity, variety, and vividness (Litton et al. 1974). Although visual aesthetics are usually the paramount “public” goal, designers also emphasize the cultural and historical significance of urban streams as well as people’s use experiences.

Except for the stellar works such as the Back Bay Fens and the Muddy River by Olmsted in the late 19th century, landscape architects did not have much chance to participate in urban stream projects. However, in the 1960s and 1970s landscape architects asserted their influence when cities initiated projects to redevelop urban waterfronts to revitalize downtown economies, attract tourists, and provide recreation opportunities for urban residents (HCRS 1979).

These projects usually boasted multi-functional characteristics and for designers, they provided several chances to affect urban streams. The first was to enhance physical and visual connection with streams by placing walkways along them and connecting public spaces, or by promoting vistas and facing commercial fronts to the streams (Jones and Battaglia 1989). The second focus was on heritage preservation through placing monuments and preserving historical sites, since the riverside was considered suitable for symbolic statements. Still another chance was to transform floodplains to open spaces to accommodate civic activities such as exhibits, concerts, fairs or sports. The design of these open spaces was often based on "contextual correspondence," which usually resulted in a pastoral park or an architectural plaza image. Again, the flood seemed to be a conflict point to many of these purported uses. This is demonstrated by the fact that the use of endurable and water resistant materials and construction was addressed as a critical need (HCRS 1979).

2.1.2 Impacts of the Urban Stream Transformation on Quality of Life

Compared with the asserted "public goals" in urban stream transformation, its impacts or implications on human-stream relationship are less visible and seldom delineated. With the varying efficacy of different "public" goals at different ages, the compound result on the quality of civic life however points to an everlasting trend of losing intimate contact with urban streams. This phenomenon can be explained in the following aspects.

Deprivation of Nature in Urban Streams

Land developers, working with early engineers and city planners, have erased most urban creeks or transformed them into concrete stormwater drains. It is estimated that 70% of natural riparian vegetation has been lost in the United States and more than 90% of the riparian wetlands of California have been cleared (Riley 1998). Magnificent riparian woods, fascinating views toward water were obliterated regardless of their meanings and values attached by people, not to mention the small stream creatures, patches of dirt, shallow ponds or brooks of water that require more subtle attention.

Both Relph and Lynch provided clues why some professionals may not value the "commonly valued." According to Relph (1976), the crux is that engineers and planners conduct their works through an abstract, placeless way. The space of modern urban planning is primarily the two-dimensional maps and plans that are seen as empty and objectively manipulatable. The geometric model of engineers is the ultimate form of what Relph called "abstract space" where "all the concrete differences of our sensory experiences are eliminated" (ibid., p. 26).

Lynch (1980) argued that most of the players who shape our living environments simply are not concerned with the sensory quality of the place. The big builders, public and private, are not directly linked to the ultimate users but are only indirectly responsible to them, through sales or votes. Planners and engineers have only conscious thought on separate, simplified, technical requirements. The managers of stream channels (usually also engineers) are daily threatened by disasters, accidents, rubbish, breakdown, and disorder, and quite naturally obsessed with surfaces that are easy to clean or to mow, fences, warning signs, solid pavements, and the ubiquitous visibility and access which simplifies control (ibid., p. 11-12).

Degradation of Nature in Rural Streams

Ironically enough, nationwide environmental movement against large-scale public projects and wholesale middle-class flight from the inner city to backcountry, as manifested by the suburban sprawl and the vacation-oriented recreation boom, began at the same period of 1960s and 1970s. The pit hole of embracing remote nature while forgoing cities is exactly how come we can "win so many battles but still lose the war" (Register 2002, p. 16).

Losing urban streams and other natural environments in cities is no doubt one powerful propeller for the recreationists' flight to suburban and rural streams. Although recreational planners strove to accommodate more tourists and maintain the quality of experience at the same time, they did not change the fact that backcountry leisure is a consumptive activity.

Recreational planners have spent great amount of effort trying to decide "carrying capacity" in national parks or wilderness areas. Catton (1983) argued that intense recreational use levels produce irreversible physical and biological changes such as soil compaction and erosion, human waste, water pollution and the increase of pest. Edington and Edington (1986) documented impacts to the ecosystem by recreation with a particular stress on the prominent impacts of the use of motor-powered devices. They concluded that these physical pursuits could damage not only individual plants and animal populations, but also the whole ecosystem. Nash (1982) called wilderness appreciation a classic instance of irony in our time, and admonished that wilderness could well be loved to death.

Visual and Physical Segregation from Streams

Visual and physical segregation necessarily accompanies structural flood control works. Channelization and the incision caused by hungry water make urban streams truly dangerous and hazardous places that need to be fenced off and access controlled for only maintenance need. Of course, their abhorred visual appearance also forces residents and business to turn their backs and erect barriers against them. Moreover, layers of transportation structures, scrap yards with rampant rubbish and weeds readily segregate rivers from most attempts to approach them.

On the other hand, "restored" streams are as well often inaccessible because of deliberate intent to segregate human impact. Although social functions such as recreation are sometimes acknowledged as part of the functions for restoration projects, ecologists and even designers basically take a highly defensive perspective. For example, Smith and Hellmund's *Ecology of Greenways* (1993) purports to be a guideline for multiple aims of wildlife corridor, water resource, and recreational use; however, the only chapter concerning recreation is about "minimizing conflict between recreation and nature conservation."

Simplification, Bias, and Placelessness

Since the 1970s, studies in stream recreation planning focused on the emotional effects of particular activities such as white-water canoeing, fishing and camping (Catton

1983). The logic of Recreation Opportunity Spectrum suggests a typical city-nature dichotomy and was criticized as not acknowledging the undesignated settings or activities that are not labeled “recreational” (Kaplan and Kaplan 1989). The required process of visual assessment for resource planning has also been criticized as unreliable, failing to achieve meaningful standard measures, and driven not by theory but by the needs of planners for results to influence environmental policy (Porteous 1996). These methods necessitate a very narrow definition of landscape, leaving out immeasurable, ephemeral features that in reality are largely responsible for the aesthetic experience (Hough 1990).

Recreational uses in wild and scenic rivers have also presented apparent user bias. The National Recreation Survey and other available evidence suggested that stream users, particularly canoeists (floaters/rafters), were drawn disproportionately from professional or white-collar segments of society (Hecock 1977).

Furthermore, place value studies criticized that efforts made to attract tourists to local communities in recreation developments often deter or displace local use (Hough 1990, Relph 1976). According to observation and streamside interviews, Merriam and Knopp (1977) found that local users of a small town stream frequented particular locations for years without using a canoe or boat. Use patterns such as gathering for celebrations, bank fishing, swimming and car washing were easily disturbed by the introduction of recreational development.

A great number of recreation studies focus on motive (Knopf 1983, Schreyer and Lime 1984, Williams et al. 1990). The identified motive categories (escape, achievement, social recognition, exploration, etc.) do not include those orienting to “people-place relationships.” It implies that attachment, familiarity, or symbolic ownership is not relevant in leisure activities. In effect, O'Leary et al. (1974) suggested that leisure activities are social activities; leisure settings are not necessarily unique to users, rather, they are the backdrop of interchangeable "water activity clusters". As a result, it seems fair to say that the stream recreation planning at vogue facilitates "placelessness."

2.2 User Needs for Urban Streams

Traditional design theories are largely untested statements of designers' personal faith and their outcomes are seldom rigorously studied. Environment-behavior studies arose in the 1960s as a response to the criticism of the traditional approach of design as art instead of environmental design with user needs as the essential concern. The contribution of environment-behavior research, according to Lang (1991), is to the development of positive theory for design and an understanding of normative theories. Compared with other subjects in urban landscape such as parks and plazas, we know little about user needs for urban streams, as demonstrated by the fact that almost no design theory or guideline address urban streams.

This section reviews the user needs for urban streams and urban nature in general on three aspects: value, conception and use (focusing on spontaneous uses). The three compose the axes of the relationship between people and places. They will be used repeatedly throughout this work with the following definitions:

- Value is relative importance and favorable regard. It is how important something is and how much one favors it. As a result, it implies the amount of commitment (time, effort, money, etc.) one is willing to exchange for something.

- Conception means the understanding or mental impression resulting from perception. It may or may not conform to the true state of what perceived; therefore, it also means what is real to the person who perceives.

- Use contains various kinds of interaction with the physical environment, including viewing, listening, and all other sensory and body engagements in the environment.

2.2.1 Value

A number of studies have strongly suggested nearby nature to be a significant source of life satisfaction. Fried (1984) found the strongest predictor of community satisfaction was the ease of access to nature, while even by comparison with such major variables as marital and work satisfaction, community satisfactions made a notable contribution to life satisfaction. For lower social class positions, the satisfaction with the physical setting was even more powerful in explaining life satisfaction than was the case as social status increased. Black et al. (1985) also found that having nature nearby was valued as evenly important with safety, transportation, and good schools.

Kaplan and Kaplan (1989) argued that large open spaces although are useful, are not necessary preferred or valued. On the other hand, natural areas such as fields or woods or a pond or marsh, even if not used frequently, are often appreciated for their "thereness." Ulrich and Addoms (1981) also suggested that little-users and even non-users of a residential park appeared to derive substantial psychological benefits—the knowledge that one could enjoy such an area if needed is in itself a source of satisfaction.

The literature also consistently indicates urban residents' general affection toward wildlife. In a study of wildlife experience in urban parks, Dick and Hendee (1986) found

92% of their sample reported that encounters with wildlife had enhanced their experience in urban parks. Gilbert's study (1982) of wildlife perception along an urban creek corridor in Washington found that those living along the creek had the greatest knowledge and appreciation for urban riparian wildlife.

At San Leandro Creek, a channelized and ecologically degraded urban creek, Lewis (1995) found the presence of wildlife still evoked overwhelmingly positive feelings for residents living by the creek. He also pointed out that the creek provided what Kaplan and Kaplan (1989) identified as the characters of a restorative environment: being away, extent, fascination, and compatibility. For both past players and current creek side residents the creek entailed a feeling of being removed from the city, and might evoke a cognitive connection to the larger world.

Nearby nature is repeatedly the most prominent theme in sacred place studies for people of all ages and in both reminiscent and present-time landscapes (Hester et al. 1988, Cooper Marcus 1992, Olds 1989, Owens 1988). The same is emphasized by studies focusing on streams. Ryan (2000) found that people had a strong attachment to the nearby stream corridor. This attachment was revealed in many ways: natural areas by the stream were participants' favorite places, places that they were eager to show others, and places that they would miss if they moved away from the area. His earlier study (1998) supported the role of place identity by pointing out that within a mile around a rural river, residents' preference and value for landscape types were highly influenced by the landscape types they lived in themselves.

Streams or other water bodies often compose the most valued places of children. Examining boys' use of outdoor places in Cambridge, Massachusetts, Michael

Southworth (1970) found striking importance of water areas among all observed outdoor places. The Charles River was the single most valued place, followed by ponds or lakes; swimming pools were less valued than “natural water areas.” Documenting children’s experience of place in a Vermont town, Roger Hart (1979) also found that rivers were at the top of the list of places visited on the expeditions and frequently selected as the most valuable places during the interviews. Robin Moore’s experiment (1986b) of remodeling an elementary schoolyard (Washington Environmental Yard) in Berkeley demonstrated that a small constructed aquatic setting could evoke overwhelming affinity among children. In both drawings and questionnaires surveyed to children, two little ponds and a little stream almost occupied all the top ranks on the lists of drawn and mentioned elements.

2.2.2 Conception

A large number of studies intend to search for general tendencies in landscape preference on “natural” scenes by visual assessment (Zube et al. 1975, Zube and Pitt 1981, Daniel et al. 1979, Ulrich 1983, Kaplan & Kaplan 1989, etc.). These studies generally conclude that “natural” scenes are preferred more than scenes with built objects; unblocked but not too widely open view is preferred; lawn and water are usually highly regarded.

Nevertheless, studies also revealed the fact that conflicts in attitude and ideology are wrapped within the “general affection” toward nature. For example, the notion of “order” and “messiness” seems highly related to the sense of safety. Schroeder (1987) pointed out that heavily forested environments were perceived as the most scenically attractive but the least safe sites, and open athletic fields were perceived as least scenic but most safe. Ulrich (1983) suggested that when people are familiar with a specific environment, cognition replaces emotional reactions in guiding behavior. The review by Kaplan and Kaplan (1989) on studies addressing visual preference over groups with different culture, familiarity and knowledge showed a wide range of variety. The dominant theme boiled down to nature itself: “The differences among groups have reflected [different] concerns… They have not, however, reflected that nature does not matter” (Ibid. p. 114-115).

A number of studies that discuss the conception to urban streams reflect the same notion of conflicts within the general affinity. Investigating people’s attitude on the Chicago River, Gobster and Westphal (1998) pointed out that nearby residents were usually aware of the river in their neighborhood but knew little about the river as a system. Those who lived away from the river tended to have the lowest levels of knowledge and awareness. According to Parker (1998), residents living adjacent to an urban stream tended to perceive the stream as their personal “backyard,” and expressed their individuality through territorial behavior, cultivation, control and order, and an attempt to keep the “wild” of nature at a distance. Although they valued the creek in similar ways, their ideal visions for their backyards were radically different. Parker considered these self-expressions as often adversely influencing the health of riparian ecosystem. Kaplan’s survey (1977) on residents living along an urban storm drain also suggested that in general, preferences were highest for scenes with a sense of spaciousness and orderliness. Black et al. (1985) found that although residents by an urban creek valued the wildlife a lot, their most "idealized" image of the creek to live by was the Japanese style ornamental landscape.

After examining the preference and "perceived suitability for development" in an urban riparian landscape, Simcox and Zube (1989) found that people had a tendency to conform to the existing context. Although nature-oriented uses were favored overall, people considered settings already encroached by development less "suitable" to be maintained as open space and were more tolerant of new developments.

Studies report streams to be associated with three types of fear. Social fears such as for the "undesirables" and crime are particular high in "unkempt" settings (Kaplan 1977). Physical fears for drowning or falling are usually expressed by children through parents' warning (Hart 1979, Simmons 1994). The biological fear includes snakes, poison oaks, "poisonous fish", etc. (Simmons 1994). However, familiarity or knowledge does form an important factor causing fluctuation in perceiving urban streams. For example, the above study of Kaplan's (1977) stated that a "wild" looking scene with heavy undergrowth and scrubby weeds by the drain was not favored by residents in other regions, but was highly preferred by people living nearest it.

2.2.3 Use

Not surprisingly, studies on spontaneous uses in urban streams are mostly found in essays featuring reminiscence of childhood memories or children's outdoor environment research. These studies commonly pointed out the importance of water elements in children's outdoor space.

Southworth (1970) documented Cambridge boys' uses of the Charles River as primarily fishing, swimming, throwing rocks, jumping off the trestle and social gathering. At a neighborhood pond, duck watching and frog and turtle catching became the most popular activities.

Moore (1986b, 1987) compared the use of biotic and abiotic play settings by students at Washington Environmental Yard. Uses at the constructed aquatic system included vigorous activities of fishing, fish saving, boat competition, dam building, throwing objects into water, and many other spontaneous interaction. Compared with the old yard areas, the designed natural zone provided most balanced use by both sexes and stimulated both social interaction and competitive activities.

In Hart's investigation (1979) in Vermont, he described some place-specific uses of the streams. For instance, rope swings were usually built alongside the rivers where there was a moderately shelving bank away from a sturdy tree. Fishing sites usually had relatively deep water and offered easy casting. But whatever their places were, the children each claimed to have the best spot. Hart stressed that children engage in building and moderating landscape as a way to develop personal competence and personal order. He observed dams across streams, pulley systems in trees and bridges, and "river houses" built by children. However, usually river uses were subject to strong restrictions by parents. Most of Hart's observations of children breaking range rules and being punished were in relation to these two rivers.

Both Hart (1979) and Moore (1986a) eloquently argued to provide places for seclusion and quiet use of children. They both found children at different ages sometimes spend hours dabbling, watching, resting, or engaging in quiet social interaction. Such activity is not highly energetic or easily observable, and is commonly recorded as "passive" by observational studies. However, Moore (1986a) asserted that it is at such times that children make most intimate and prolonged contact with the social and physical phenomena around them, and such activity is developmentally significant (p. 204-205). Hart (1979) observed that such places very frequently carry water, dirt or sand. Another common quality of these places to be alone is the presence of animals.

Studies also commonly identified wastelands—railroad areas, vacant lots, abandoned houses, as an extremely attractive setting for spontaneous users (Hart 1979, Southworth 1970, Moore 1986a). Brown and Reetz's study (1976) on stream swimming indicated that most of the observed outdoor swimming occurred in streams that were not regularly monitored by the local health department for water quality. The majority of respondents were not aware of existing standards for swimming and their choices were largely based on convenience. Lewis' thesis (1995) on San Leandro Creek highlighted the value of the creek served as a secret hiding place and unsupervised play area. Boys used to swim naked with no risk of being observed. The creek also witnessed many "first-time" events. All his interviewees who played there appreciated this quality of non-supervision. He also observed that the creek used to be, but does not appear to be any longer a space dominated by boys.

2.3 Urban Stream Restoration

Currently in all parts of the United States, professionals and citizens are eager to protect the remaining urban streams; to respond to development pressures; to bring back vegetation and aquatic life in urban streams; to feature streams as important pride to communities; to use streams for environmental education; and even to dig them up from the underground (Riley 1998, Pinkham 2000).

In a way, urban stream restoration responds to some of the impacts of earlier stream transformation identified in **2.1**. First, it directly addresses the deprivation of urban nature. Daylighting and local restoration efforts have been documented to bring about conspicuous improvement on local biodiversity, and even unlooked-for results to support endangered and threatened species (KKKKK 1994). Urban stream restoration also contributes to the more “pristine” areas as William Jordan (2000) spelled out. First, it provides an alternative to the consumptive use of remote natural areas. Second, it results in the upgrading of natural areas through connecting them or expanding their scales. And third, it creates an enlarged constituency for conservation of those wilderness areas.

However, so far the value of urban stream restoration is considered primarily as a way to physically enhance the degraded stream environment; it has not taken care of user needs in any active forms. The meaning of urban stream restoration can not be fully appreciated without placing it in the broader framework of the planning and design of urban nature and regarding it as a form of environmental movement. By pinpointing the challenges confronting urban stream restoration, this section reveals spontaneous use as the missing piece in urban stream restoration and discusses the role of landscape architects in filling in the missing piece and restoring the human-stream relationships.

2.3.1 The Planning and Design of Urban Nature

Throughout the post Industrial Revolution history there was a constant awareness in the environmental planning and design profession to combat the alienation of people from the natural environment. The European gardens of the 17th and 18th centuries had been designed according to rules prescribing the relationships between nature and art – to heighten the idea of naturalness with forms suggested by nature but not to rely on what nature actually provided (Cranz 1989). Translated to visual presentation, they have a consistent look of asymmetrical, gently rolling topography, a mixed landscape of trees and meadows, and a scattering of rustic structures. This pattern has guided the park movements in the U.S. at the later half of the 19th century and its influence extends the work of American landscape architects to the present.

The modern movement started at the 1890s was also very much concerned with the segregation of citizens from nature. According to Lang (1991), it had two recognizable groups—the "Anglo-Americans" and the "Continentals." Exemplifying the Anglo-American group is Ebenezer Howard and his idea of the Garden City. Open spaces in several forms were major design elements of the Garden City, as incorporated into the prototypal community of Letchworth in England. Howard's idea was used extensively in a host of post-World War II new towns and suburban developments across the world. The Continental school includes Le Corbusier and the Bauhaus reformers. They envisioned healthful environment full of open spaces and active recreational opportunities. Since the 1950s and 1960s, its model has been applied to urban renewal and public housing schemes across the world (Ibid.).

Although the integration of nature and city is a frequently cited goal in utopian ideas of pastoral parks, modern movement, and the following new towns and suburbs, they are criticized of having two major problems. On one hand, the architectural ideal of large expanses of open spaces simply did not work. The ambition to create a morally correct world with oversimplified assumption on human needs was challenged by critics such as Jane Jacobs (1961) and Edward Relph (1976) as to destroy the urban fabric and create placelessness. On the other hand, these ideas are considered as merely trapping elements of nature such as trees and lawns, but are built with little regard for the processes of nature (Spirn 1984). As they grow older and as sprawl encompasses them, they exhibit many of the same environmental problems as earlier cities.

In short, earlier ideals to reconcile nature and cities failed for the absence of input on user needs and a lack of systematic concept empowered by ecology. It was not until the end of 20th century that planners and designers, equipped with new ecologies (e.g. landscape ecology and urban ecology) and informed with user needs, became rather competent to deal with urban nature in an intellectual way. In the past two decades urban planning and design has been responding to the above conditions through various system-wise theories and practices in shaping and organizing cities.

The parameters of a healthy city suggested by World Health Organization (Duhl and Hancock 1988) include a clean, safe, high quality physical environment and a sustainable ecosystem; a strong, supportive and participatory community; access to a wide variety of experiences and resources; a diverse, vital and innovative economy; a sense of historical, biological and cultural connectedness; a city form that makes all of these possible and a high health status with good public health and sick care services. Except for the last item that belongs to traditional notion of health in medical science, these criteria actually share common spirits with what is called for in the "new urbanism" and the "ecocity."

Promoters for the new urbanism have in common called for higher densities, new traffic patterns (public transportation and pedestrian network), a hierarchy of public domain and a diverse population. In short, these assertions are a reverse to the classical suburban "American dream" (Katz 1994). Similar ideas are promoted by the "ecocity" or "sustainable region" with an additional emphasis on community production, the use of regenerative energy, and a shift of living style toward sustainability (Register 2002, Urban Ecology 1996).

To combat suburbanization, the above schemes regard infill development as the central motto, which dedicates itself to rebuilding robust inner cities while absorbing the momentum of sprawl. Many strategies have been evolved to provide economic incentives for developers, homebuyers and business owners. Yet if desire for nature is a leading factor that draws people to the suburbs (Jackson 1985), reversing sprawl necessitates the *infill of urban nature*. Similar to infill developments, the infill of urban nature requires sensible adjustment to existing site conditions. It tucks a piece of land into existing ecological and social contexts and contributes to the overall quality of the urban and regional system. The significance of urban nature restoration manifests under this light: it provides just such a chance to infill nature in cities.

2.3.2 Urban Nature Restoration as Environmental Movement

If defensive wilderness preservation epitomizes environmental movement of earlier generations, then urban nature restoration constitutes a new breed of environmental movement—at least potentially so. Graber (1976) proposed the logical process of how wilderness ideology develops from a single concept to a full-fledged environmental movement through a few components. First, the ideology has a core ethic: wilderness as Wholly Other. Second, its elite supporters—wilderness purists—have developed and disseminated wilderness imagery, which lends form to the inner feelings of a broader group. Third, a code of use is derived from the same ethic and imagery to guide individual behavior in wilderness. Through these components, purists and their adherents forged strategies in political action, namely wilderness preservation through park expansion and development control.

Examining this process, Graber pointed out the limits of wilderness preservation as an environmental movement. Since the wilderness ethic basically denies environmental changes caused by human, it forces its supporters into a negative and reactive political stance. Furthermore, even the movement itself is self-defeating, for the cultivation of public support leads to the popularity of wilderness and destruction of its very value as sacred space (ibid. p. 114).

In contrast to the old preservation scheme, urban nature restoration has established a different approach of political action, as witnessed by the rapidly growing citizen groups involving in community-based environmental stewardship programs. At urban streams, volunteers now actively participate in planting, rubbish cleaning, monitoring water quality, stream habitat, and even taking hydrologic data. The rapid development in volunteering is demonstrated by the Environmental Protection Agency water monitoring program group list, from 44 in 24 states groups in 1988 (Riley 1998) to 832 groups in 50 states in 2003 (EPA 2003a).

In such way, community advocacy in urban nature restoration is regarded as an antithesis of the traditional sponsorship in preservation. In contrast to the traditional norm of biological sustainability that emphasizes the enclosure of a preserve that is extensive enough to remain viable by itself, Nassauer (1997) presented the notion of "cultural sustainability," meaning the survival that depends on human attention. She asserted that the stewardship on a widely shared basis is not only possible but also necessary to achieve sustainability of urban nature.

Similarly, Jordan (2000) argued that environmentalism after the 1960s has generally failed to conserve nature in our crowded and increasingly democratic world. Preserves provide only an extremely limited repertory of ways to contact nature. It results in a smaller constituency and a kind of "elitism that accommodates those inclined by nature to the experiences of observation and appreciation, but has less to offer the mechanics, nurturers, healers, hunters, gatherers, artists, craftsmen, pilots, planners, leaders, and ditch-diggers among us" (ibid. p. 31). He declared that with restoration rather than preservation as a model, "millions of people will spend more time creating intimate wild places in their own neighborhoods and less time visiting—and consuming—nature in remote wilderness areas" (ibid. p. 33).

As compelling as the above assertions of Nassauer and Jordan may be, it is not clear how urban nature restoration is supported by a well-recognized set of ethic, imagery and behavior mode. Although Grese et al. (2000) suggested regarding stewardship activities as legitimate recreation opportunities as well as a way of getting essential work done, stewardship is more appropriately considered as political action, a valuable product of healthy relationship between residents and urban nature, not a service philosophy on what urban nature is restored for. Because of this incomplete foundation, two primary problems with urban nature restoration exist in practice: the confusion of goals and the overlook of community interfaces. As will be illustrated in the next two sections, landscape architects could have played an essential role in addressing both problems.

2.3.3 Restoration Goals

Everybody wants more nature, but there has been a constant struggle and confusion at the core concept of restoration. Just as "nature", not much consensus on the definition of "restoration" has been reached. Landscape ecologist Vittorio Ingegnoli clarified restoration as bringing back an ecological system to a supposed original state. However:

> *"This is theoretically impossible, as suggested by non-equilibrium thermodynamics. Thus, the correct possible operations can be:*
> *-Rehabilitation: bring back to a normal life a subject (a landscape or its units) altered by a pathologic disease.*
> *- Reclamation: bring back a wasted landscape unit or an ecotope to a useful condition, a site of cultivation or a marsh vegetation from heavy pollution, etc.*
> *- Reconstruction: construct again an ecotope or a landscape unit completely devastated.*
> *- Recovery: return to a former state of health, leaving an ecological system free from out of scale disturbances."* (Ingegnoli 2002, p. 266-267)

However, in practice, we continue referring various efforts of planting, cutting, cleaning, grading, stocking, removing structures, inserting structures, adding and reducing materials to enhance the unsatisfactory environmental conditions as restoration. Although restoration has become a catch-all phrase, the term manages to communicate these various efforts collectively.

The term controversy stems from a goal uncertainty, even when goals are only considered within the physical science realm. The fact that we as the causative agents are constantly changing and controlling nature in order to help it eventually leads to the value questions of "what goals should we pursue?" and "how to prioritize these goals?" There is no best goal prescribed by nature, as declared by Hull and Robertson (2000):

> *"Today, nature is understood to be constantly changing, often in random and unpredictable ways. Balanced, stable, and permanent states of nature do not exist. Instead of one nature, we find that many possible, equally likely, equally valid natures could have existed at a given place and point in time. There is no value-free basis for picking one of these many possible trajectories of change and evolution to serve as the undisputed definition of what is natural and hence serve as a value-free goal for management and policy." (p. 101)*

In other words, looking for "original" may be informative, but it can also be confusing and misleading. In contrast, urban ecologists set a normative goal for ecosystem restoration in cities:

> *"[T]he aim of urban nature conservation is not so much the prevention of extinction of species but rather the preservation of diversity."* (Starfinger and Sukopp 1994, p. 103)

The problem is, currently in stream restoration, flora/fauna mapping and habitat surveys are considered to be insufficient and projects have been carried out without sound information (Mason 1995, RSPB et al. 1994). Detailed habitat needs only exist for a few star species, such as salmonoid in fish, cottonwood in plants, and otter in mammals. On the other hand, we have also known enough to make choices—e.g., a coppicing regime that favor young trees or old trees will promote different wildlife species. Ecologists know that every spatial structure in a stream environment plays a role for at least some species—we cannot avoid making decisions on what species to promote.

For example, in bank treatment, it is believed that the intermediate stage in plant succession (dominate by grasses, low brushes and small willow species) is most beneficial for fisheries (Garcia de Jalon 1995). However, otters prefer building holts in mature ash and sycamore root systems leaning out over the channel and old growth at bank would treat them well (Mason 1995).

Out of the physical science realm, social and cultural values play a slim role in restoration goals. "Recreational function" has appeared in almost all texts concerning restoration planning, but consistently in a perfunctory way. The standard textbook such as Restoration of Aquatic Ecosystem starts with these sentences: "Aquatic ecosystems perform numerous valuable environmental functions. They recycle nutrients, purify water, attenuate floods, augment and maintain streamflow, recharge ground water, and provide habitat for wildlife and recreation for people" (NRC 1992, p. 1). Then from the next sentence, it starts to enumerate human impact on the system. Recreation is part of the impact—a consumptive activity in the context of "fish and game". It is only treated as a justification for restoration when its value can be converted to monetary terms in cost and benefit analysis. Here the focus necessarily narrows to the licensed activities such as fishing and boating. In short, current justification for stream restoration utterly ignores uses close to home and their large societal values.

2.3.4 Inter-Disciplinary Integration and the Role of Landscape Architects

According to Riley (1998), serious gaps between engineers and environmental professionals currently remain in water agencies. Yet the development of stream restoration so far *is* a process of inter-disciplinary integration between these two professions.

Numerous studies demonstrate the vast amount of experiments and an ongoing accumulation of knowledge. Geomorphology provides the basis of form-making mechanism of the river that links traditional engineering and biology. This base of knowledge has been applied in projects to artificially control the streamflow for cottonwood seedling recruitment (Mahoney & Rood 1998) and to supply the appropriate salmonoid habitat, even as specific as to the form and size composition necessary for the spawning gravel (Kondolf 2000a. b). Structures such as spur dikes, rock weirs and drop works have long been used to control the flow direction, water surface elevation, and maintain or create preferable bed forms (Haltiner et al. 1996, FISRWG, 1998). Bioengineering technologies have been developed to provide varied needs for slope stabilization and habitat rehabilitation (Gray and Sotir 1996).

The gaps between landscape architecture and engineering/environmental professions in stream restoration are nevertheless prominent. On one hand, traditional design strategies such as those developed for gardens or plazas do not incorporate the riparian natural processes and frequently show conflicts with floods. This has made waterfront resort projects where flood or riparian ecosystem is not of concern remain the prime venue of landscape architects. On the other hand, when designers do involve in restoration projects, their works commonly appear to be passive in seeking out ways to enhance people's use experiences. These difficulties coincide with the two foci of academic discussion on ecological design at large: 1) the discovery, development, and application of technology; and 2) its effects on users' conception, values and uses, and the strategy to integrate it into culture.

John Lyle, in his seminal books *Design for Human Ecosystems* and *Regenerative Design for Sustainable Development*, laid out a set of principles and demonstrated from regional to detailed site scales how ecological design technology can actually work (Lyle

1985, 1994). Anne Spirn compellingly argued to conceptually connect the wilderness and the city with the same natural processes operating through them. Her book, The Granite Garden, pioneered in bridging sciences accumulated in urban nature and positive design intentions (Spirn 1984). Similarly, Hough (1995) provided examples and discussion to demonstrate how to realize diversity and ecological soundness in the landscape. The focus of these books is on informing the problems confronting cities and to rationally transform knowledge and technology into landscape design. Understanding users' need is not the primary focus.

The ecological design projects such as Sea Ranch by Halprin, Woodlands by McHarg and Village Homes by Corbett, have acquired various degrees of success in terms of workability and satisfaction of users (Spirn 1984, Corbett 1981, Thayer 1989). They remain, however, high-style experiments that are seldom known or appreciated outside of the planning and design professions. This gap between knowledge and actual application intrigues the second aspect of ecological design.

Nassauer clearly expressed her concern: "Within landscape ecology, knowledge of biological and physical phenomena has grown rapidly, so rapidly that many landscape ecological solutions to landscape-management problems have been offered only to be impeded or disregarded because they did not fit their cultural context" (Nassauer 1997, p. 4). She argued that "Science may give us normative criteria for new landscape patterns, culture will give us the realized design" (Ibid, p. 6). Her strategy is then two-folded: to reveal rather than to obscure human effects in scenic landscape, and to modify the "landscape of care" to incorporate the indigenous ecosystems in a culturally familiar way.

A mowed strip and flowering plants, for examples, will provide cues of care necessary to frame the ecosystem (Nassauer 1995).

By emphasizing the power of aesthetic experiences to capture attention and constantly refresh our interest in the environment, Louise Mozingo (1997) criticized the tendency of ecological restoration projects to ignore the need for beauty. She argued that precisely because of its importance, ecological design “deserves to be beautiful” (ibid.).

The signature-based design proposed by Woodward (1997) suggests designers combine natural and cultural processes by using patterns epitomized from vernacular landscape of a region. These patterns, such as ‘plants form waterstains at the toes of slopes,’ occurring as the manifestation of local geomorphology, climate, biology, and human activity, are signatures of a place. They are crafted to a place, become familiar, and are missed when they are gone.

As opposed to pioneers in ecological design that pursues large areas for implementation, both Woodward and Nassauer chose private yards as a start point. This choice demonstrates their ambition to present a different paradigm to grow ecological design into the soil of culture. In urban stream restoration, landscape architects among the multiple professionals involved are charged with the responsibility to take care of user needs and elevate restoration to a new cultural plateau. With the spontaneous use as a pivot, this research proposes a vocabulary necessary for landscape architects to develop that role.

Chapter 3 Value, Conception, Use: Marsh Creek Survey Project

This chapter provides a snapshot of the current human-stream relationship in cities. Using Marsh Creek, a typical suburban waterway in Brentwood, California as my base site, value, conception and use are explored through a series of surveys: the adult household questionnaire survey, in-depth interviews with selected survey respondents, and school drawing exercises with children.

The interaction of value, conception and use are to a large degree parallel to the "Affinity-Reality-Communication triangle" initiated by L. Ron Hubbard (1988b). The three corners of this triangle are inter-related, and "desiring any corner of the triangle, one must include the other two" (ibid. p.55). Applying this concept to urban creek environment, we have a circular relationship working like this: Without some value and a certain amount of ideas on what the creek is one would not use the creek. Without physical and sensory interactions with the creek and any concept about the creek, one would not value it. Without some favorable regard to it and without any interaction with it, one would not know what the creek is.

Since this research takes an environmental planner and designer's stance, the starting point is naturally the use. My basic hypothesis is: creek use may have various forms and shapes, but not all of them contribute to the same extent to a heightened value or a more accurate conception toward the creek. To enhance value and conception, the use needs to possess qualities of direct, reciprocal communication. I assume spontaneous use to be the type of use that motivates a healthier human-stream relationship through the positive feedback of use, conception and value.

3.1 Marsh Creek at Brentwood, CA

For this research I sought a stream that currently supports a variety of spontaneous uses as my base site. This requires that the stream has to be in or close to a residential area; it needs to have some amount of fluvial processes present; the major mode of use is not vacation-oriented; and it has not been designed in a rigid way so as to prevent spontaneous uses. The stream transformation sequence discussed in last chapter made my search a laborious job—I was looking for a narrow window after urbanization and before complete channelization or recreational “revitalization.” As much as I would like to find a base site in a denser urban setting, most waterways in the older Bay Area have been buried underground with only sporadic openings. Although these remnants of creeks have triggered great interests of restoration in many communities, their current forms of interactions are limited mostly to stewardship activities instead of spontaneous uses. Simply to search for spontaneous uses without having to step into low-density countryside, I found myself moving toward suburbs. Eventually, I encountered Marsh Creek in Brentwood, a city that is rapidly shedding its rural flavor (Figure 3.1).

Selecting Marsh Creek as the principal site of my research has two major implications. First, Marsh Creek and its users provide a snapshot to understand the current scene of human-creek relationship in suburban America and allow us to reflect on the role of spontaneous use in urban streams. From a more action-oriented viewpoint, it is my hope that the particular findings about Marsh Creek and the exploration of spontaneous uses in general will facilitate the City of Brentwood and the community searching a new path for participatory planning and design in urban stream restoration.

Despite the lack of effective groups stewarding the creek and of restoration sites on the reach of Marsh Creek within the city, signs suggest that this will soon change. In fact, my initial engagement with Marsh Creek started in autumn of 2001 when Natural Heritage Institute (NHI), a Berkeley-based NPO on environmental conservation and restoration, cooperated with a graduate studio class in the Department of Landscape Architecture and Environmental Planning at UC Berkeley to conduct inventory and planning/design proposals for the creeks in Brentwood.

Figure 3.1 A typical subdivision in the city of Brentwood, California

3.1.1 Stream Dimensions

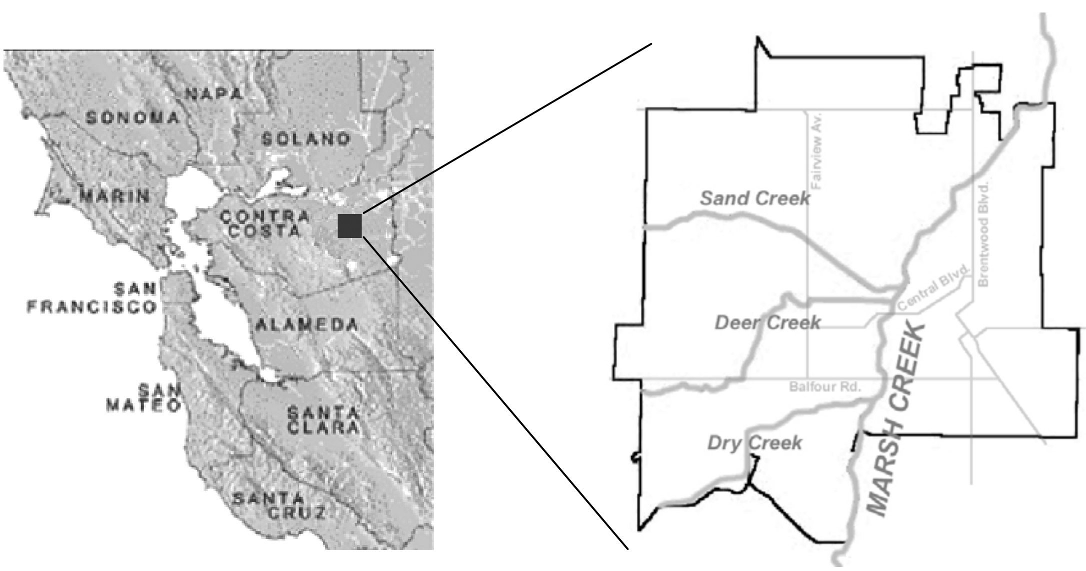


Figure 3.2 Location of Marsh Creek in Brentwood, California

The Marsh Creek watershed drains $128mi^2$ of the north side of Mt. Diablo and includes the cities of Oakley, Brentwood, and part of Antioch in eastern Contra Costa County (Figure 3.2). Its main stream extends for approximately 30miles from its headwaters in Mt. Diablo to its mouth at Big Break.

Marsh Creek and its tributaries—Sand Creek, Deer Creek and Dry Creek—weave through the heart of the city of Brentwood. Within the city, Marsh Creek flows across an expansive floodplain and has a slope of about 0.003 to 0.002. The Mediterranean climate in this region is characterized by mildly cold, wet winters and hot, dry summers, with an average of 12.4 inch of annual rain but extreme rainfall variation from year to year. The streamflow also varies dramatically over the year and inter-annually (NHI & DSC 2002, p. 18-20). The modeled 100-year flow for Marsh Creek is 3526 cfs below junction with Sand Creek (ibid., p. 21). All the creeks in Brentwood used to have seasonal flows before the great irrigation projects took place in the 1920s, but Marsh Creek and Sand Creek have now become perennial due to return flows from nearby agricultural and urban lands.

From the beginning of and through out the 20th century, flood control efforts have been transforming the creeks (Figure 3.3). The flood events in the 1950s particularly compelled the county flood control district and the Soil Conservation Service to implement a major flood control program that straightened and channelized the creeks, removed almost the entire riparian vegetation, and constructed two flood control dams on Marsh Creek and Dry Creek upstream of the city.

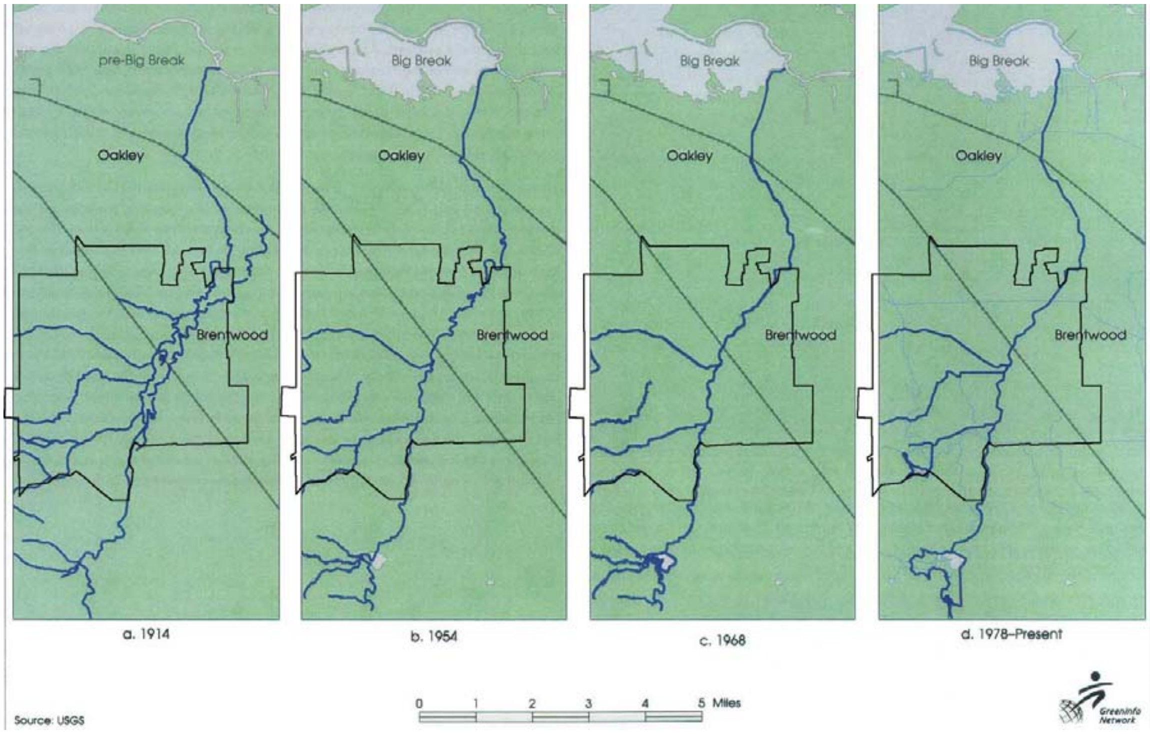


Figure 3.3 The change of Marsh Creek channel plan form, 1914-present (adapted from NHI & DSC 2002, p. 15)

Today, over 90% of the creek channels present a denuded trapezoidal channel form typical of many urban streams. (Figure 3.4) The only exception is Marsh Creek at the southern end of the city. A 2,000 ft reach neighboring the Creekside Park has preserved some of its pre-urban channel features and riparian vegetation and an additional 3,500 ft reach north of the park has adopted 2-stage channel where vegetation was re-introduced (Figure 3.5, Figure 5.33). Remaining open almost through the entire reach in Brentwood, however, is a saving grace for Brentwood's creeks due to the relative short history of the surrounding developments.

Figure 3.4 The typical condition of Marsh Creek as it flows through Brentwood

Figure 3.5 Two-stage channel at Marsh Creek, Brentwood

3.1.2 Urban Dimensions

Brentwood has its peculiarity on the national demographic map. Located at the inner end of the Bay-Delta, it is literally the suburban front of the sprawling Bay Area. Being one of the most rapidly growing towns in the country, Brentwood has more than tripled its population during the last decade. As to the year 2000 the population of the city is

23,302 and the density is 2001.2/mi^2 (2000 Census). Figure 3.6 shows the progress of urbanization in Brentwood.

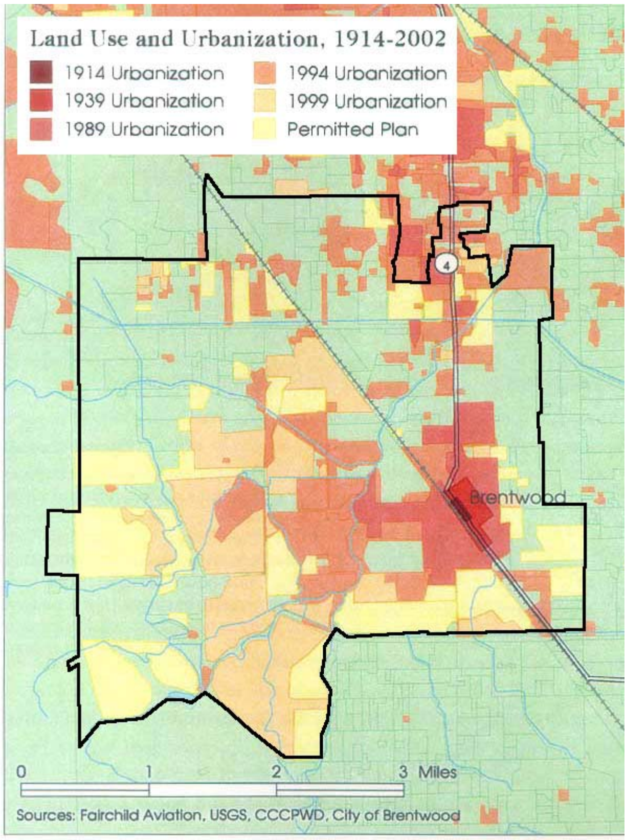


Figure 3.6 Urbanization of Brentwood, 1914-2002 (adapted from NHI & DSC 2002, p. 24)

The fact that about 40% of Brentwood residents live within one-fourth mile, or 5 minute walking distance to the creek channels and that 32% of its population are under the age of 17 implies the tremendous potential of the creeks as “nearby nature” and a backbone of ecological education for city-bound children.

Regarding the creek as an asset, the City has taken initial steps to develop its recreational and educational potential. In 1991, in anticipation of rapid growth, the City adopted a “Creek Trails and Revegetation Master Plan” that features a trail system along Marsh Creek and Sand Creek, with a paved bike path at the right bank and an unpaved equestrian path along the right bank (KVA & RABA 1991). Further, the plan has required developers to provide creek access and leave green creekside buffers and space for creekside trails.

The backbone of this plan was carried out. Currently, Marsh Creek mainstream has a bike trail that is part of East Bay Regional Park District trail system. The public trails are connected with neighboring subdivisions through public streets paralleling to the creek and trails, cul-de-sacs accesses, or “feeder trails” (Figure 3.7).

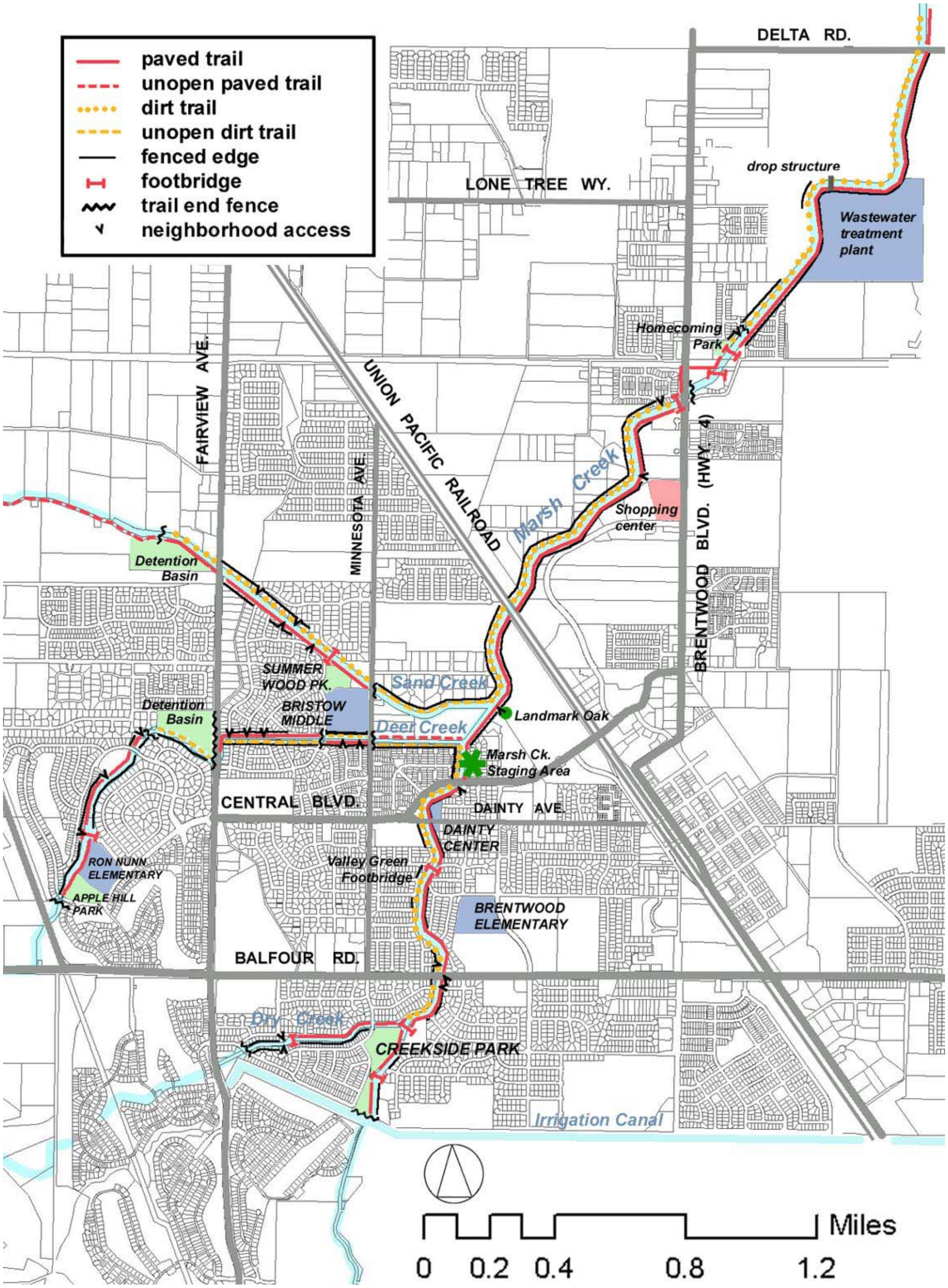


Figure 3.7 The trail system and major features along Marsh Creek in Brentwood

3.2 Household Questionnaire Survey

The first step of the Marsh Creek Survey Project uses adult-oriented household questionnaire survey to generate a broad understanding of how adult residents value, conceive of, and use Marsh Creek. Using the City's GIS database, the sample is 2,000 households randomly selected from residences located within 1/4 mile from creek channels and the old downtown section. These households were divided into four geographic zones (Figure 3.8). A metered return envelope was enclosed with the survey and a postcard reminder followed a week after the survey went out. Using a common coding file, seven student assistants and I coded and entered the results into an Excel® database. I then performed analysis using Excel®, SPSS® (statistical software) and ArcMap® (a desktop GIS software). For detailed processes including the survey design, pretest, sampling, mailing, coding and analysis, see Appendix A.1.

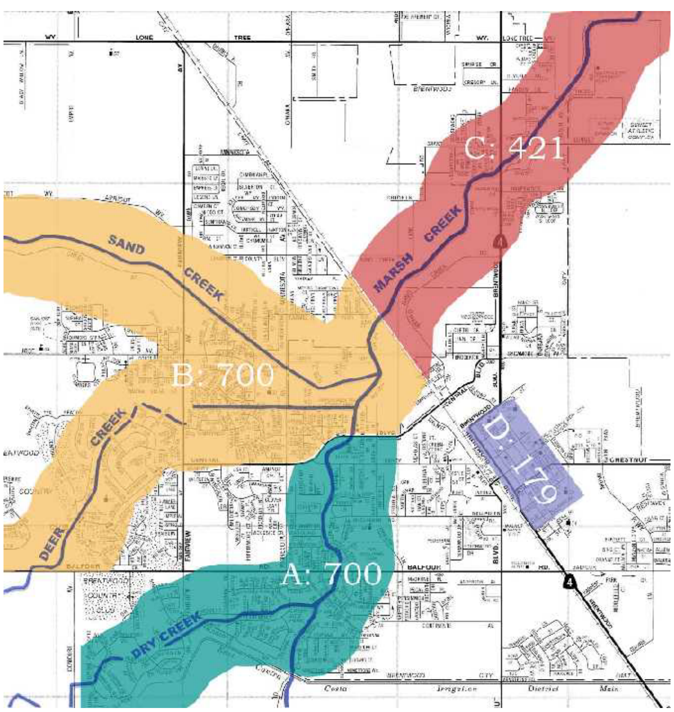


Figure 3.8 Sampling area and sample distribution

3.2.1 Response

Of the two thousand sample households, 317 responded. 156 packages were returned as wrongly addressed. This unusually high rate of wrongly addressed mailings presents a picture of the dramatic residential flux into or within the City. As a result, the effective sample was 1844, with a 17.2% response rate.

The response of a household survey by itself can be regarded as a legitimate index of the interest to the survey topic. While the effect of proximity on creek interaction will be detailed later, it is important to note that even within the 5-minute walk range, the distance has notably affected the interest to responding the survey. Table 3.1 indicates that response rate tapers off in units located farther from the creek channels.

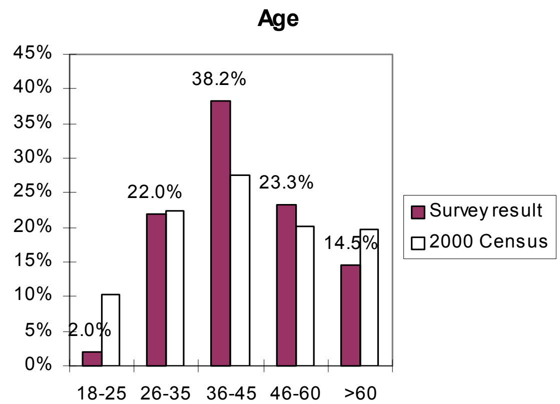
Table 3.1 Distance from the creek vs. response rate

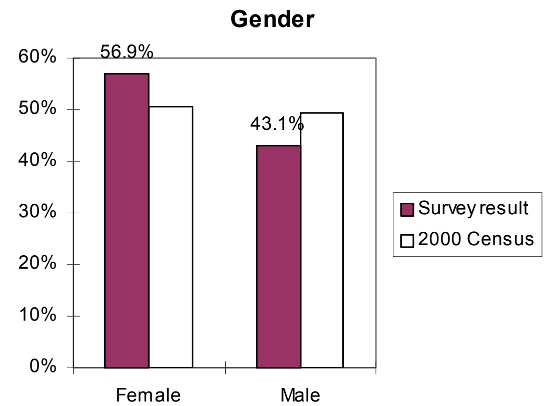
Distance from the creek	Effective Sample	Response	Response rate
< 300 ft	376	90	23.94%
300-600 ft	488	85	17.42%
600-900 ft	390	61	15.64%
900-1200 ft	256	39	15.23%
1200-1320 ft	166	20	12.05%

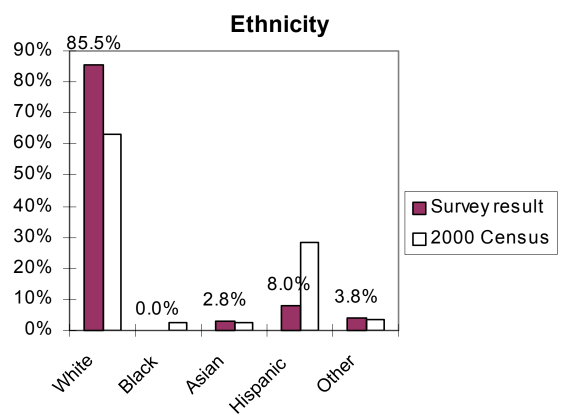
Figure 3.9 shows the demographics of respondents compared with the 2000 Census figures. A few biases were anticipated upon the design of the survey. First, the community has nearly 30% of Hispanic population who largely settled in Zone C as farm and orchard labors. The English survey would deter their participation. This explains the rather low response of Hispanic and low-income groups as well as Zone C[1]. Also understandable are the under representation of households with less than one year of residence and young adults under the age of 25. New residents may be busy settling down

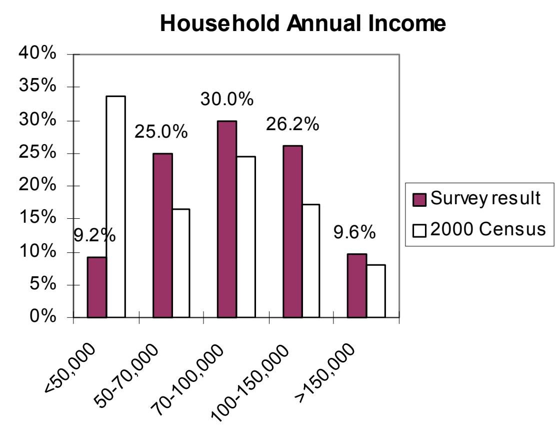
[1] The response rate of Zone C was 11.2%, significantly lower than Zone A (20.6%) and Zone B (18.4%).

and less flexible in time; even more likely, they have not been included in the City's GIS database. Young adults who have not started families were not likely to be reached by the survey.









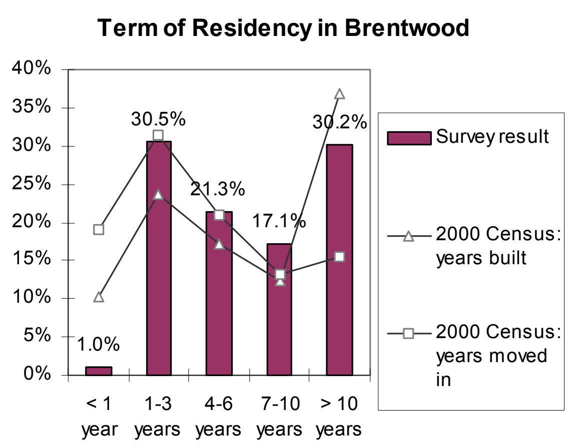


Figure 3.9 The demographic of respondents compared to citywide breakdown.

Although these issues need to be addressed when using the data for citywide planning and design, they do not effect the general understanding of the creek-community relationships in a typical suburban context.

In the next three sections the results and analyses for each question in the survey are arranged into the three components of the study, i.e. value, conception and use. For the actual content and layout of the survey, refer to Appendix B.

3.2.2 Value

Q2) How important were the following factors to you when you decided to live in Brentwood? (5-point scale)

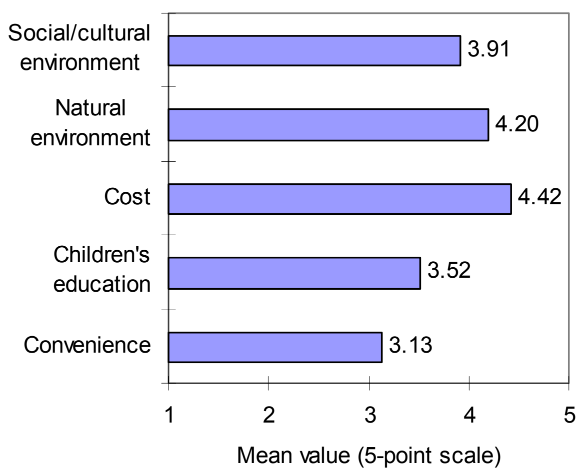


Figure 3.10 The relative importance of housing factors considered by Brentwood residents

Although the relatively affordable housing and living expenses was the major attraction for people who chose to live in Brentwood, “natural environment” scored almost as high as “cost” as a factor (Figure 3.10). In addition, the high frequency of comments such as “small town,” “farming” or “rural feel” for the “others” option indicates that the general setting of the “old” Brentwood—the pattern of small residential and commercial patches surrounded by extended stretches of fields and orchards functions as an important magnet for current citizens. This fact was also stressed in the 1999 Brentwood Visioning Report conducted by the City, which identified the small town character as the community's most prized asset (MIG 2000).

Q3a) When you were considering where to live in Brentwood was the creek a factor in your decision? (yes/no)

Q3b) If yes how did it influence your decision?

Only about one fourth of the respondents took the creek into consideration when deciding where to live in Brentwood. However, later analysis indicates that many more people started to know and appreciate the existence of the creek after they settled down. Among those who did initially consider the creek as a housing factor, more than 95% considered it as a great or mild plus. This indicates that Marsh Creek could have a highly positive effect on the real estate value.

Q4) Living in Brentwood, how much do you value the following features in or around the city? (5-point scale)

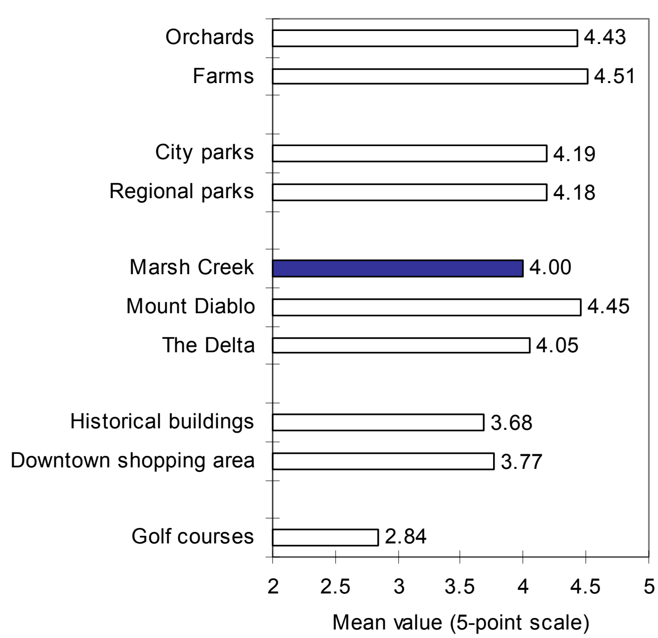


Figure 3.11 Landscape values of Brentwood residents

While Marsh Creek was considered valuable in general, it was not treasured as much as cultivated landscapes (farms/orchards) or tended public landscapes (the parks). Mt. Diablo stood out in people's mind among the geographic landscapes possibly due to its landmark quality. The day-by-day view toward the distant Mt. Diablo constructs it as a sacred symbol for many Brentwood dwellers. The Delta was also slightly more valued than the creek. Considering that Mt. Diablo is miles away and the Delta is not visible within the city, their values may derive from ideological identity (distant beauty or ecological importance) rather than through actual contact. In contrast, Marsh Creek is the only listed geographic feature within the city boundary and accessible by most citizens on a daily basis. The comparative low value may mean that its potential as nearby nature has not been fully exploited in its current situation.

Q7) What, if anything, makes Marsh Creek valuable to you? (5-point scale)

Table 3.2 Causes of the creek value and the return

Cause of creek value		Provided statements	Mean value (5-point scale)
Conceptual identity	Nature	It is a viable piece of nature	4.37
	Beauty	It is pretty	3.66
	Ownership	I feel like it is "my creek"	3.12
Connection	Existence	Simply knowing it is there	3.80
	Place attachment	There is a place that I value particularly	3.23
	Convenience	It is close by and accessible	4.05
Use	Nature	Place to be close to nature	3.84
	Escape	Place to refresh myself from the pressure of life	3.29
	Exercise	Place for exercise or recreational activities	4.02
	Commute	Alternate commute route to school or work	2.33
	Single use	Place to enjoy quiet time alone	3.36
	Small group use	Place I spend time with family/friends	3.45
	Social use	Place to meet other people	2.46

The provided statements of choice can be grouped into categories reflecting the various sources of creek value (Table 3.2). The result indicates that people identified the creek first and foremost as a viable piece of nature. Not many valued the creek for its beauty, and still fewer felt the ownership for it. When testing this part of the survey, questions were raised on whether “my creek” be a proper way to express ownership—some were concerned it may have a bad, dominative connotation. However, as it is used in “my street” and “my community”, it simply denotes deep attachment, belongingness and responsibility. The fact that many hesitated to refer Marsh Creek as “my creek” faithfully reflects that the creek was not highly possessed by its people. It may be used and appreciated, but not many have invested enough efforts toward it to adopt it symbolically and emotionally. Parallel to this observation was the lack of place-specific experience as a way to connect to the creek. Not many had a particularly valued place at the creek, though many valued it by “simply knowing it is there.” This indicates a broad consensus to treasure the creek as community resource, but place attachment is either lost or not yet developed in many residents.

For the values based on actual use, “exercise or recreational activities” scored the highest, followed by “to be close to nature.” What was identified as the primary motive in vacation-oriented recreation studies—the factor of “escape” (e.g., Knopf 1983)—was not that conspicuous here. Neither was the trail considered an alternate commute route by many. As to the type of user groups, the results suggest that people did not regard the creek as a public social place, rather, as a place to enjoy solitude or close relationships. The creek therefore may play a role quite different from a street plaza or a community park, where the fundamental value would lie on social interaction.

Q16) What actions would you be interested in taking to improve the conditions of Marsh Creek? (Check all that apply)

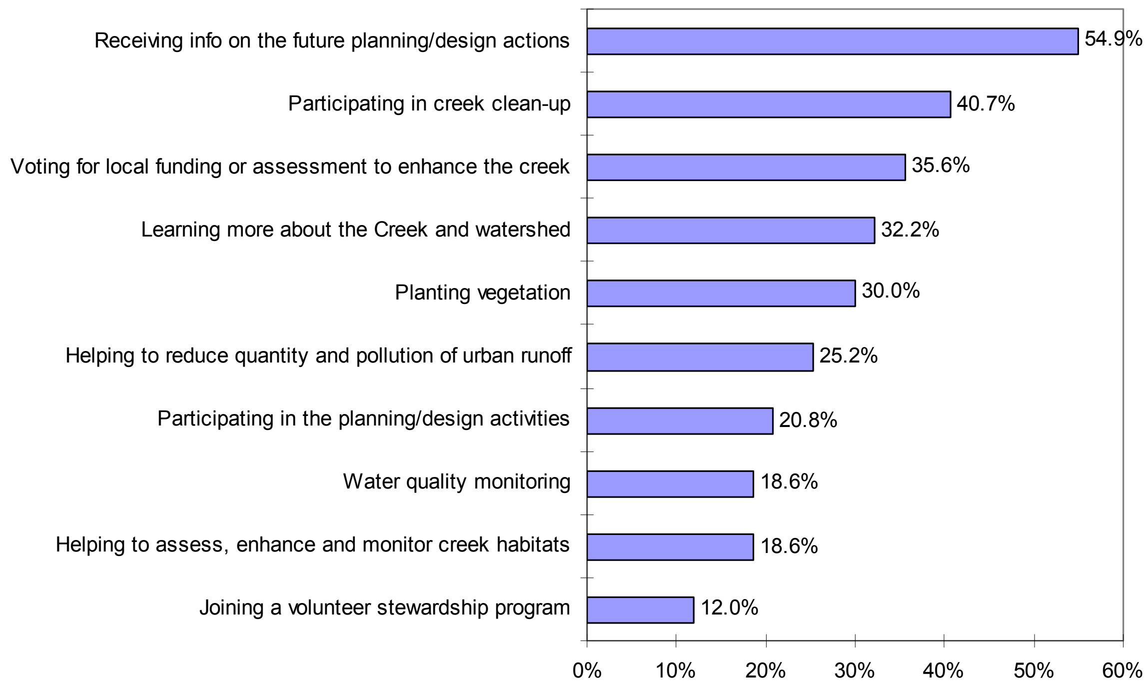


Figure 3.12 Oral commitment on actions to enhance the creek

Over 70% of the respondents replied that they would like to at least do “something” to help the creek. In addition to the individual’s attachment and responsibility level toward the creek, the oral commitment for action may have to do with the degree of comprehension people have on these actions. Items such as “Joining a volunteer stewardship program” or “Helping to assess, enhance and monitor creek habitats” may sound both laborious and technical and have lower support (Figure 3.12). This result elucidates the areas for outreach to raise public awareness.

To provide an index to evaluate the individual’s commitment level, I assigned a point to each listed item of action according to the time and energy the action is likely to consume (Table 3.3). The sum of the points across the entire list of actions generates an Oral Commitment Point. The result makes clear that the majority of the respondents congregated at the low end of the measurement. Half of the respondents had their points no greater than 5, showing that to many the value toward the creek was not yet transferred to commitment and action.

Table 3.3 Point assignment to creek enhancement actions listed in the survey

Actions	Points
Receiving information on the future planning/ design actions	1
Voting for local funding or an assessment to enhance the creek	2
Participating in creek clean up Planting vegetation Learning more about the creek and the watershed Helping to reduce the quantity and pollution of urban runoff	3
Participating in the planning/ design activities Helping to assess, enhance and monitor creek habitats Water quality monitoring;	4
Joining a volunteer stewardship program	5

3.2.3 Conception

Q5) How would you describe Marsh Creek to someone who has never been to Brentwood? Use up to 5 words: (open)

Table 3.4 Words (including synonyms) used to describe Marsh Creek

Modifiers	%	Modifiers	%
Peaceful (quiet, calm, serene, tranquil, etc.)	10.1	Trail (path)	4.4
Beautiful (scenic, pretty, etc.)	8.5	Pleasant (enjoyable, interesting, etc.)	4.3
Natural (nature)	6.5	Nice (great, good, etc.)	3.6
Dirty (littered, polluted, garbage, etc.)	6.0	Wildlife (animals, etc.)	3.4

"Peaceful" (and synonyms such as quiet, calm, serene, etc.) and "beautiful" (and synonyms such as scenic, pretty, etc.) are the two foremost characteristics that people perceived of Marsh Creek. "Natural" and "wildlife" form the next major characteristic of the creek. These clearly communicate the essence of Marsh Creek in people's mind.

Although the modifiers were mainly positive, “dirty” and its synonyms also appeared frequently (Table 3.4). The content and significance of these qualities can be further understood from later analysis.

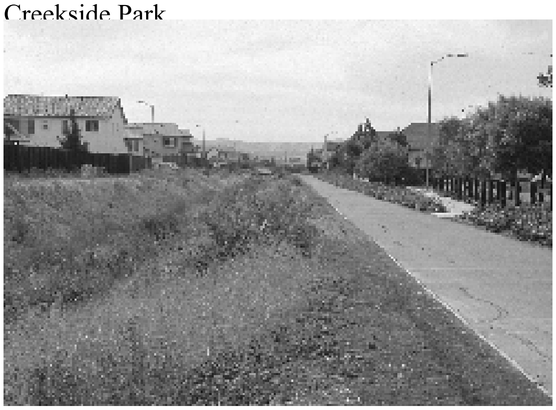
8) For the 12 scenes of Marsh Creek shown, scan through and check those familiar to you. Indicate how you like it (5-point scale), **and then explain why** (open).

(a) Marsh Creek by the wastewater treatment plant

(b) Marsh Creek by the homecoming park

(c) Marsh Creek on Crescent Dr. close to Creekside Park

(d) Marsh Creek by Applewood Ct. toward south



(e) Deer Creek by Cherrytree Ct.

(f) Marsh Creek by Summer Cir.


(g) Marsh Creek at the south of Brentwood Blvd.


(h) Marsh Creek in Creekside


(i) Deer Creek by Rutherford Cir. (Apple Hill development)


(j) Marsh Creek at Central Blvd.


(k) Marsh Creek trail staging area


(l) Deer Creek by Allbrook Ct.

Figure 3.13 The twelve scenes in the survey and their locations (not provided in the survey)

Twelve scenes of Marsh Creek at different sections were presented in black-and-white photos to investigate visual preference toward the creek (Figure 3.13).

The most popular scene (**h**) shows a channel section that seems "wild", with least human intervention. It also complies with Appleton's "deflected vistas" (1975, p.91) or

Kaplan and Kaplan's factor of "mystery" (1989, p.55). Following that were the pastoral scenes showing the mix of tall trees, creek channel and a modest portion of the neighborhood (scene **f, c** and **g**). Conforming to the result of earlier research on nearby nature (e.g. Nassauer 1995), respondents disliked images conveying neglect or barrenness (scene **d, e, j** and **l**). Right next to the staging area, scene **j** ironically was least favored for its lack of vegetation and the bulky concrete bridge (Figure 3.14).

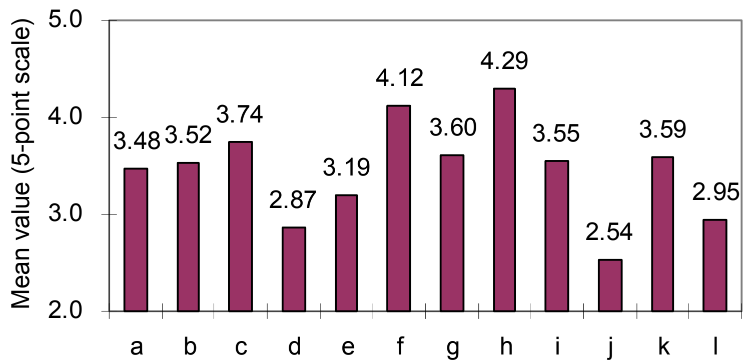
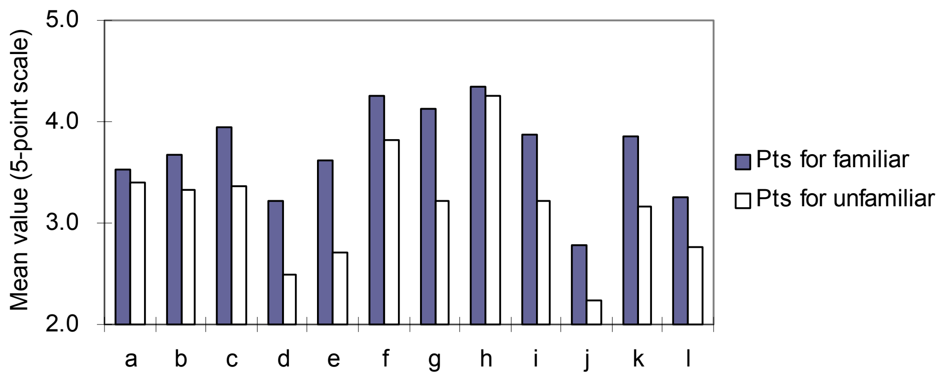


Figure 3.14 (left) Visual preference of the twelve scenes

Figure 3.15 (below) Effect of familiarity on scene preference



Familiarity raised the valuation for every single scene (Figure 3.15). For scene **g**, **e** and **i,** familiar users enjoyed the scenic and peaceful quality more, while negative comments such as "dirty," "look like a ditch," "overgrown" were mostly from people who were not familiar with the place. "Near my home" was one powerful reason for preference, almost always resulting in higher-than-average points. On the other hand, houses out of one's own home range usually became negative items, intruding the creek and render it "less natural." Such division was obvious for scene **b** and **e**.

Content analysis was conducted for the "why" comments in terms of elements mentioned as positive, needed or negative. (See Appendix C for a summary of content analysis for each scene.) The comments concentrated on vegetation and built elements, where vegetation seemed to be the most potent element determining the popularity of the scenes. Trees were ubiquitously desired, and grass was more prone to negative remarks. Contrary to later analysis in the "use" part, wildlife received least attention in visual analysis. This suggests that using solely the 2-dimensional landscape photos to estimate landscape preference can miss a significant portion of the quality derived from the actual use experience.

From the comments given, criteria employed to evaluate the scenes were grouped into "cultural aesthetics," "activity potential," "personal experience" and "ecological status." The majority of the "why?" comments expressed aesthetic tastes according to the visual clues in the images, and were thus grouped as "cultural aesthetics." It is basically how the scenes *look*—clean or dirty, natural or unnatural, countryside or urban, etc. Garbage obviously played a crucial role on people's preference toward a scene. In a good portion of the cases, respondents did not mention any element in particular, but wrote comments that have to do with "clean/unclean." The criterion of "activity potential" includes comments concerning what they *could do*—convenience, access, good or bad for certain uses, etc. "Personal experience" is used when the respondents provided information based on their experiences, use habits, or referred to their own homes. "Ecological state" denotes comments concerning ecological health and habitat values.

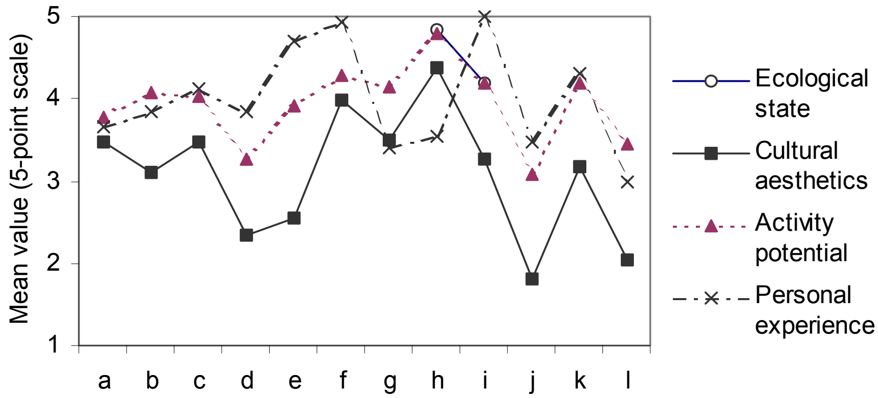


Figure 3.16 Effect of evaluation criteria on visual preference

In general, people who judged the scenes using "activity potential" or "personal experience" gave the scenes higher value than those who used "cultural aesthetics" (Figure 3.16). Since only about 3% of the comments were identified to use "ecological state" as the evaluation criterion, statistic comparison was not meaningful for many scenes. However, for scene **i**, it was obvious the scene was much valued with an ecological viewpoint than with cultural aesthetics.

With above stated, the deviation for each scene judged with the same criteria or familiarity is quite large (1.0-1.5 points), showing that although a general trend could be traced, there remained great variety within each group. In fact, it was fascinating to observe how respondents, all from the cultural aesthetic viewpoint, would comment on the same scene differently: "Natural! Great!" "Too unkempt" and "Too man-made." It was also common for a respondent to shift from one type of criterion to another while going through the scenes.

Q9) To your knowledge, does Marsh Creek have any of the following problems? Indicate on the five-point scale. (5-point scale)

Interestingly, it was others' behavior and attitude toward the creek that posed the greatest problem: "dumping/garbage" (Figure 3.17). Garbage in the creek is an acute visual sign of lack of care, which can be associated to a number of other problems. Statistical analysis indicates that the perception of dumping and garbage is considerably associated with the perceptions of "water pollution" (Somer's d = 0.414) and "presence of crime" (Somer's d = 0.365). Although neither crime nor water pollution are necessarily connected with garbage in legal or scientific terms, immediately solid wastes in the creek are seen as "the wrong thing at the wrong place." In other words, garbage tends to undermine the image of the creek more than the real harm it may cause to the health of the creek. As a result, it may precipitate the negligence of the creek.

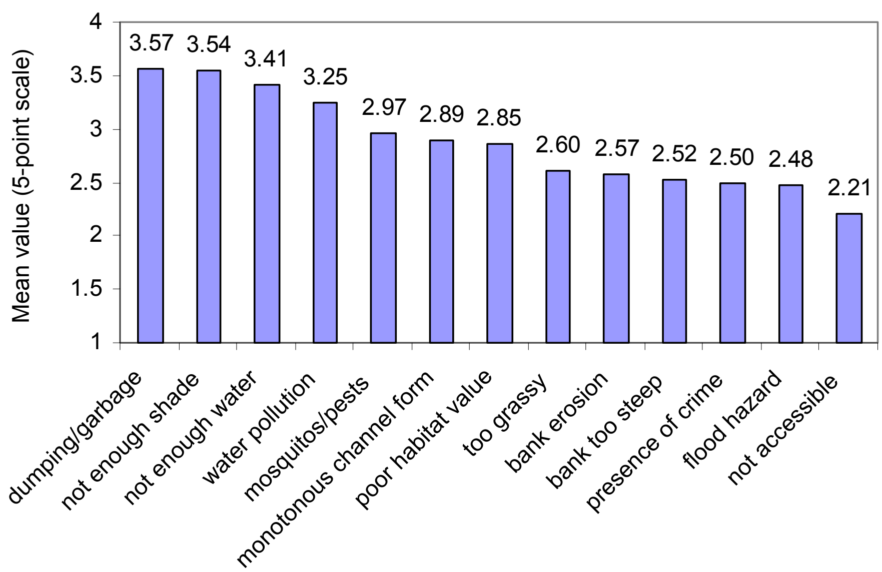


Figure 3.17 Conception of problems of Marsh Creek

Q10a) Do you allow your kids to play in the creek channel?

Q10b) If no or with restriction, why? (open)

One third of the respondents did not have kids at home. Among the rest, those who would not allow kids to play in the creek at all and those who allowed playing at the creek with some restriction had an equal share (46%); 7.8% would allow kids playing at the creek without restriction (Figure 3.18).

The reasons for restriction were overwhelmingly due to safety concerns. “Physical safety” (drowning, falling, etc.) and “pollution safety” (water quality and garbage induced incidents such as stepping on broken glass or nails) composed the major share of adults’ unease. In addition, “social safety” has to do with strangers, fast traffic and crime; “biological safety” contains fear toward snakes, insect bites and the like. “Safety in general” includes all those stating “kids too young,” though just how young is too young seemed a wide parameter among the respondents (Figure 3.19). Interestingly, the frequent non-safety related reason was “not to disturb the wildlife” or “rather leave the nature alone,” where kids were regarded as a threat to the creek environment.

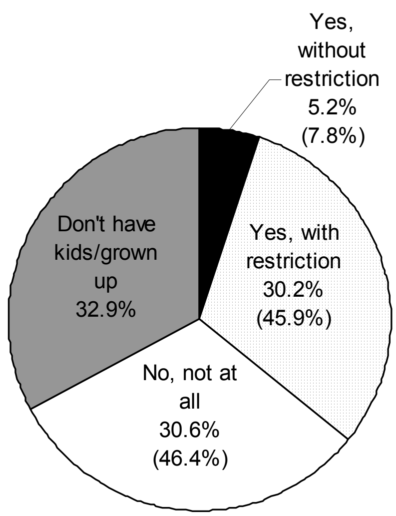


Figure 3.18 Attitudes to kids playing in the creek. Number in ( ) denotes ratio not counting the category “Don’t have kids/grown up”

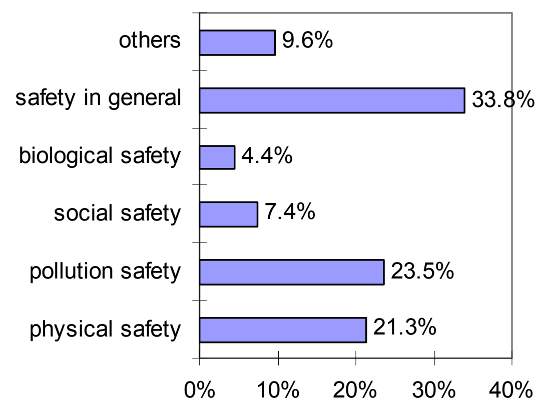


Figure 3.19 Reasons given for creek play restrictions

Q14a) If changes were made to enhance Marsh Creek, what are the AREAS or QUALITIES of the creek that you think MUST be changed or improved? **Q14b) What AREAS or QUALITIES of the creek do you think MUST be preserved?**

Table 3.5 Qualities that must be changed or improved for Marsh Creek

More trees/shade	30.4%	Enhance and restore native vegetation	6.5%
Clean up trash	29.9%	Trail repair/maintenance	6.5%
Overgrown vegetation control	9.8%	More landscaping	6.0%
More water	9.8%	Enhance security/ patrol	4.3%
Enhance wildlife habitat	8.7%	More parks and amenity	3.3%
Extend/ connect trails	7.6%	More flowers	3.3%
More benches/rest spots	7.6%	Natural debris removal	3.3%
Water quality	7.6%	Improve the look of the channel	3.3%

Consistent with the findings in Question 9, the leading comments to be improved are "more trees/shade" and "clean up trash," each mentioned by around 30% of the respondents. "Overgrowth control" and "more water" compose the next group, each mentioned by 10% of the responses (Table 3.5).

Surprisingly, almost one third of the respondents put down "All of it!" as areas or qualities to be preserved (Table 3.6). These people at the same time gave various comments in Question 14a. This seemingly contradictory result reconfirms the value of the creek as a symbolic entity for many. It suggests that the "good" things about the creek is not so easy to delineate—when they enjoy the creek, they enjoy the whole set. It is also saying that although more can be done about it, people treasure whatever quality or places already associated with the creek.

Table 3.6 Qualities that must be preserved for Marsh Creek

All of it	31.8%	Trails	5.1%
Wildlife and habitat	30.6%	Flood capacity	3.8%
Natural setting/look	10.2%	Accessibility	3.8%
Farmlands/orchards/open space	8.9%	Water level/amount	3.2%
Water quality	8.3%	Safety	2.5%
Natural vegetation in general	7.0%	Grass/shrub	2.5%
Trees	6.4%	Bridges	2.5%

When content did get mentioned, “wildlife and habitat” became the dominant message, mentioned much more than “natural setting/look,” “farmlands/orchards,” “water quality,” and “natural vegetation.” This list provides an insight to what people mean by “peaceful,” “beautiful” and “natural,” the key describers of the creek in Question 5. Compared to these elements, the trails, bridges and other facilities were less mentioned, which suggests that although people experience the creek through the use of these facilities, they per se are not conceived as the essence of the creek.

A quarter of the responses included specific areas to be improved while only 6% of the response included specific areas to preserve—a fact that corresponds to the lack of place attachment identified earlier.

15) Please use a few sentences to write down your ideal image for the future Marsh Creek. (open)

Table 3.7 Leading themes in respondents’ ideal images of a nearby creek

Clean	31.5%	Facilities (bench, lighting, etc.)	9.7%
Natural/ pastoral	25.0%	Connected trails	8.9%
Trees	21.8%	Clear water	8.1%
Wildlife/habitat	19.4%	Beautiful	8.1%
Flowing/more water	16.1%	Open/away from homes or structures	6.5%
Safe	12.9%	Relaxation	6.5%

Although envisioning a future image and transforming it into text was not an easy task for many, a clear trend of the respondents’ ideal images for Marsh Creek could be identified. The five dominant themes were “Clean,” “Natural/pastoral,” “Trees,” “Wildlife/ habitats” and “More/ flowing water” (Table 3.7). It was typical to use 3 or 4 of these themes together in describing an ideal image. These themes composed harmoniously a rural creek image, regardless its urbanizing context. “Clear water,” “Beautiful” and “Open” further reinforced the image. Aside from a few exceptions, the respondents presented a surprisingly consistent view in their ideal creek images. This issue will be discussed further in **3.3.**

3.2.4 Use

Q6) How do you experience Marsh Creek in your daily life? (Choose all that apply)

In addition to going to the trail purposely, residents experienced the creek through walking around the neighborhood, driving to work or shops and watching or hearing it in their own houses or yards (Figure 3.20). Only 12% reported that they did not experience the creek in their daily life. The fact that most people experienced the creek in public realms rather than private properties reaffirms its value as a public asset serving the entire city, a feature contrasting against most other creeks in the region that flow through private properties. It also suggests that in addition to the creek channels and trails per se, neighborhoods interfaces or viewpoints from main crossing streets are also points to craft creek awareness.

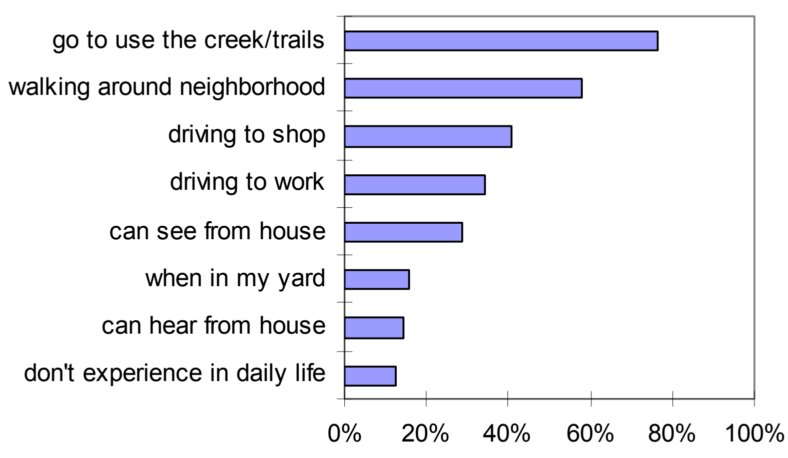


Figure 3.20 Modes of experiencing Marsh Creek in daily life

Q11a) What activities do you enjoy doing most at Marsh Creek? Write down up to 3 activities: (open)
Q11b) How often do you engage in the 3 activities? (Choose only 1 for each)
Q11c) With whom do you enjoy the 3 activities? (Choose all that apply)

Question 11a) was intentionally open-ended to gain an overview of the use profile and thus avoid limiting the answers with stylized categorization. The response therefore contained a wide variety of types and detail levels. The majority (74%) of the reported items could be categorized as "moving along on the trail," including walking, biking, jogging, roller skating, horseback riding, etc. Particularly, walking and biking together occupied 60% of the total entries. About 16% of the answers fell into the "dynamic interaction" category. These included all the fish/crawdad/frog/tadpole/bug interaction, bird watching, various plays and exploration with water, rocks, and trees. The rest was categorized into "static interaction," referring to activities that usually occur at specific base-points with rather static content such as "relaxing," "thinking," "reading," "family gathering," etc. (Figure 3.21).

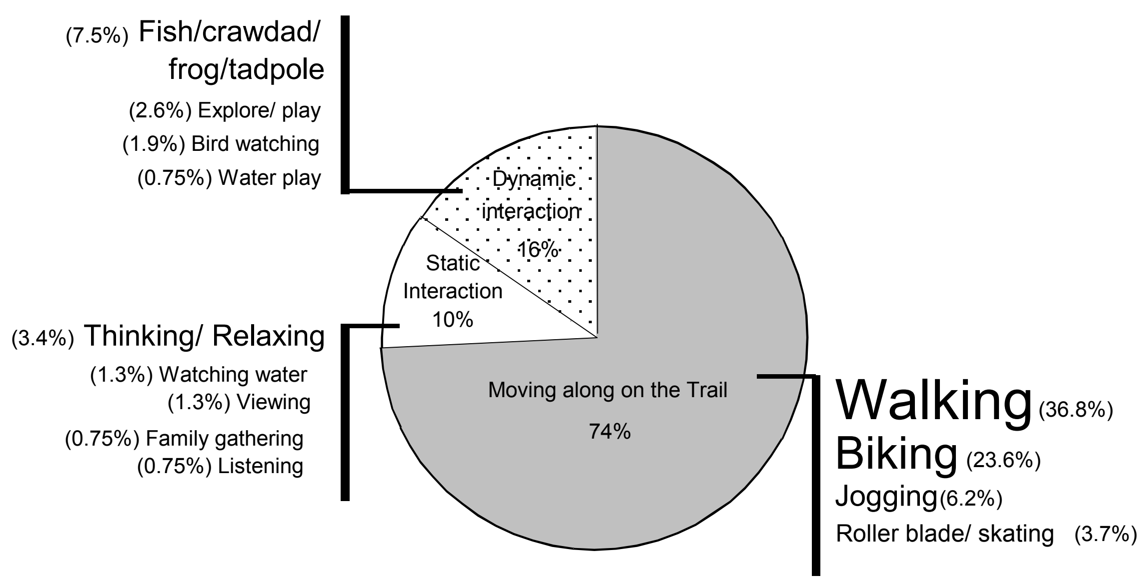
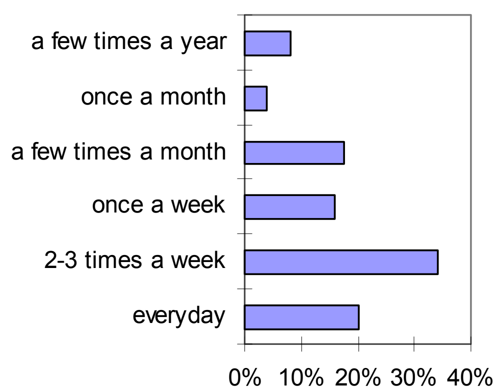


Figure 3.21 Composition of creek use given by adult residents for the open-ended question

Among those who answered Question 11, more than 70% used the creek at least once a week for some enjoyed activity (Figure 3.22). This frequency would be considered high for any kind of public outdoor facility. According to use type, static interaction was engaged most frequently, and dynamic interaction occurred least frequently.

Respondents used the creek mainly with their children and spouse, on their own, with one or two friends or even with the pets, but seldom as a group (Figure 3.23). Although the tabulation of the total activity entries indicated that most creek uses were with children, a further analysis revealed that frequent uses (2-3 times a week and above) happened alone or with spouse. This is due to the fact that many uses with children were "dynamic interactions," which were less frequently engaged by adults.



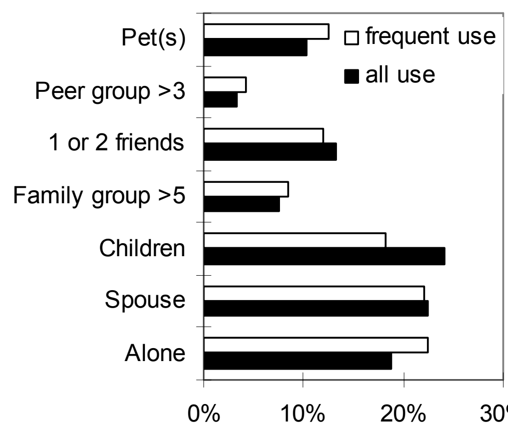


Figure 3.22 Adult use frequency at Marsh Creek **Figure 3.23 Adult use company at Marsh Creek**

Q12) Take a minute to think about one of your most wonderful experiences associated with Marsh Creek. Be sure to include the place, the activities, the participants, the environmental features, and your feelings.

This open-ended question inquired deeper engagement with the creek and was answered by only less than 40% of the respondents. From the answers, use content, use company, elements mentioned and the "cause of memorability" were analyzed.

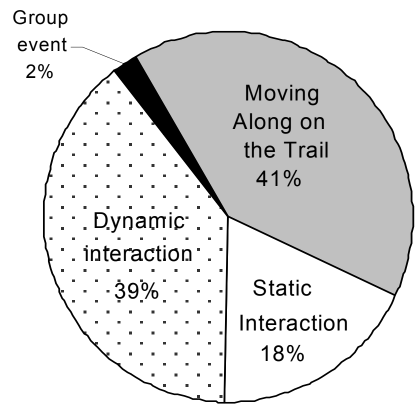


Figure 3.24 Use content in wonderful experiences

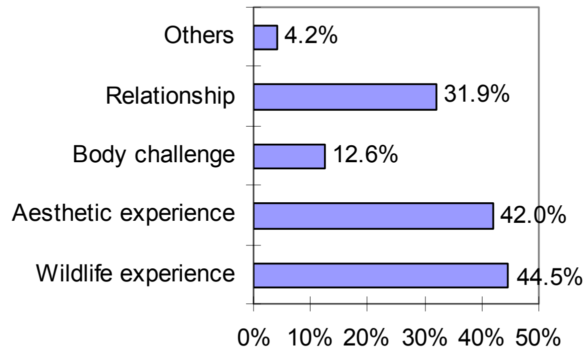


Figure 3.25 Cause of memorability in wonderful experiences

Uses contained in memorable experiences included much larger portions of "dynamic interaction" and "static interaction" than appeared in Question 11. Walking or biking alone usually does not become memorable events. Rather, it is the combinations with the other two types of use that comprise wonderful experiences (Figure 3.24).

"Cause of memorability" was classified along the following categories. "Wildlife experience" contains the wonder of life as the essence of the memory, which may include the sudden encounter of creatures with shear amazement, intellectual appreciation or sought-out events. "Aesthetic experience" embodies the keynote of beauty and comfort in nature, ranging from "good road good weather" sort of general comfort to magnificent view or intensive moments of solitude. "Body challenge" can be strenuous workout or a sudden interest to test one's body out. "Relationship" can be moments shared with loved ones or the social interaction with other people.

The analysis reveals the primary themes composing wonderful experiences at the creek are "wildlife experience" and "aesthetic experience" (Figure 3.25). Relationship" and "body challenge" are usually concurrent, but they do not tend to be the cause of memorability by themselves.

The recall of creek experiences seemed to resort to a different channel of conception than the judgment of photographic scenes. Element analysis demonstrates that although vegetation was singularly effective in determining the visual preference, wildlife was the most mentioned element in recalled wonderful experiences (Table 3.8). Birds (egret, heron, hawk, crane, owl, geese, red-wing black bird, etc.) were mentioned most; crawdads, frogs, tadpoles, fish and otters were also common.

For the company of use, it was clear that wonderful experiences occurred with children the most, followed by being alone, but much less with the spouse, pets or groups. This also poses an interesting contrast with the activities reported in Question 11.

Table 3.8 Elements mentioned in visual preferences vs. wonderful experiences

Mentioned elements	% in visual preference	% in wonderful experience
Built elements	36.7	20.4
Vegetation	36.8	8.6
Wildlife	3.2	51.2
Water	6.2	8.0
Channel	6.1	3.1
Others	10.9	8.6

Figure 3.26 shows the location and content of wonderful experiences. Note that the memorable spots or routes all occurred along the Marsh Creek mainstream with the spots concentrating at a few nodes, such as Creekside Park, Dainty Center, and around Highway 4. Particular diverse experiences appeared at Creekside Park—people appreciate the abundant wildlife and vegetation as well as built facilities and community activities there. As another focal point, the little zoo of Dainty Center forms a unique setting where kids can interact with both the pet animals and the creek creatures. Memorable routes concentrate at reaches with undeveloped orchards and fields (e.g.,

Central to railroad track, north of HWY 4) where solitude and transcendental experiences appear to be the main theme.

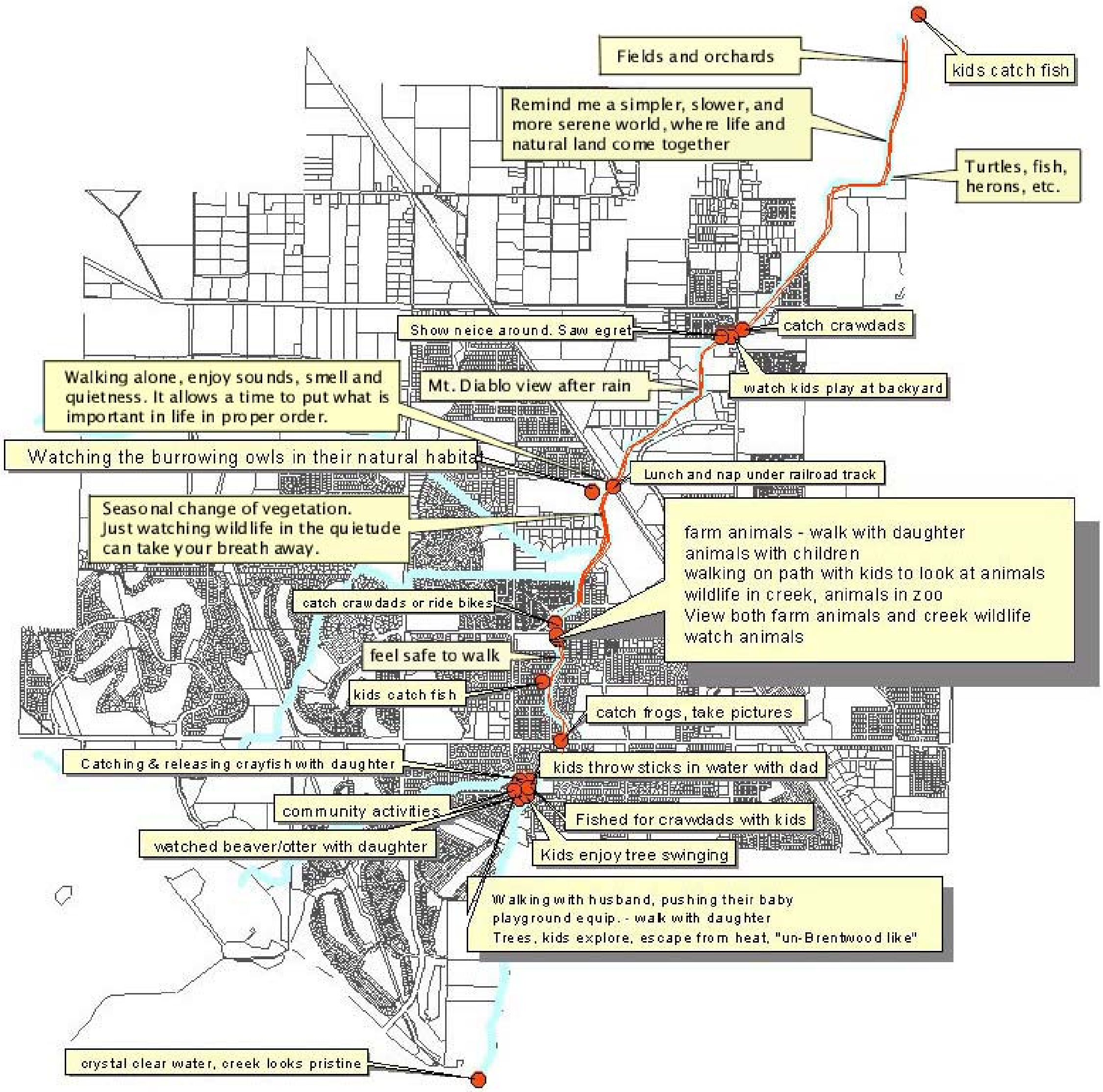


Figure 3.26 Annotated map of places with wonderful experiences

Q13a) Look at the map. Please first locate your home with an "x", then mark the spots or the routes along the creek (highlighted) you experience or use most. Mark up to 3 spots or routes on the map, then letter them (A, B, C). **Q13b) For each of the routes or spots you marked on your map (A, B, C), indicate how you use them. Check all that apply and add any additional activities in your own words where it says "other".**

Over 70% of the respondents completed this question. The spots and routes and their associated activities were transformed to geographic associated data in ArcMap® to enable analysis of spatial distribution. Figure 3.27 shows the major activity nodes and their content of use. Note that except Creekside Park, all important nodes concentrate around road crossings and footbridges.

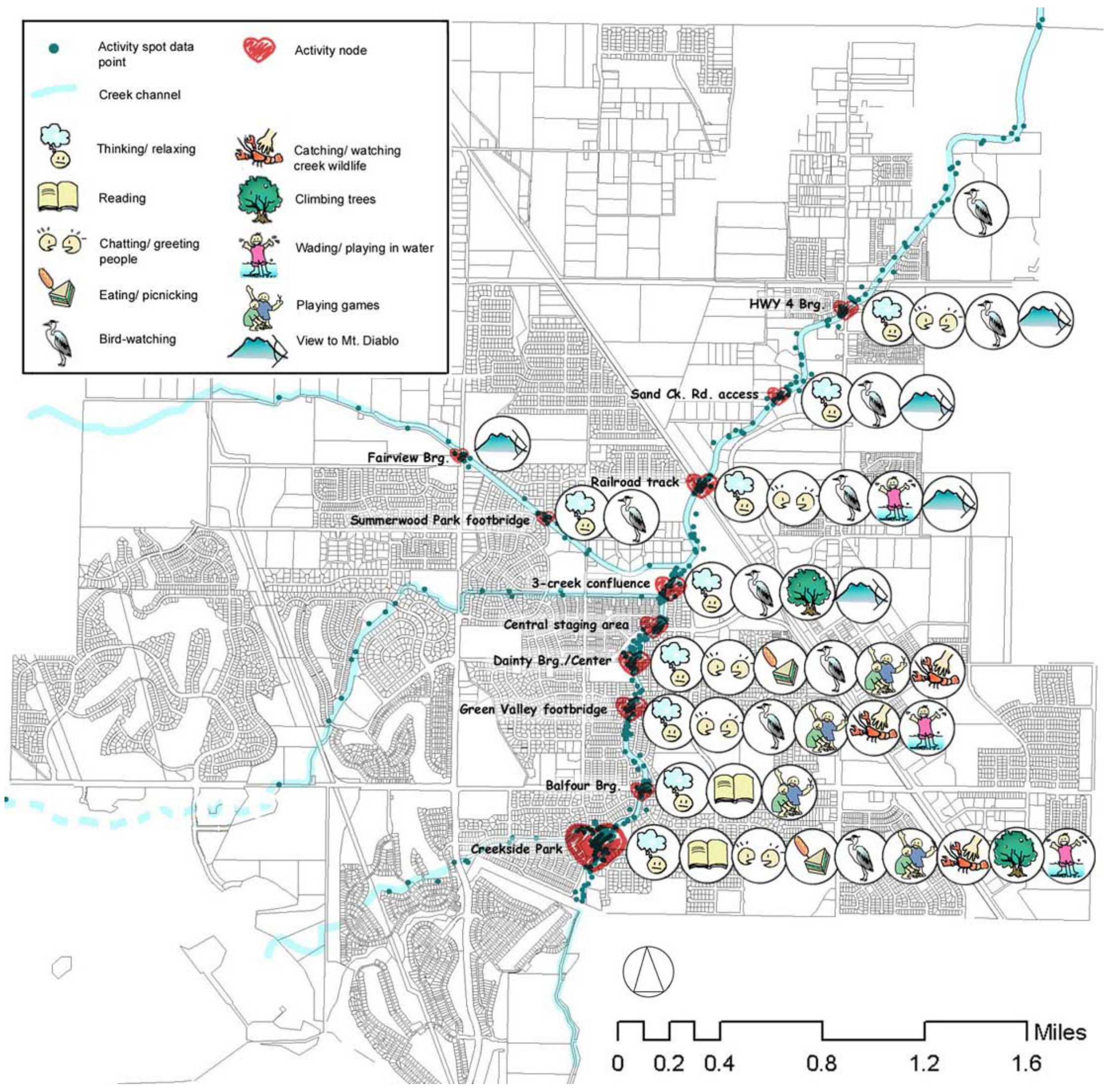


Figure 3.27 Spatial distribution of uses along Marsh Creek

Trails at different parts of the creek had very different popularity (Figure 3.28). The Marsh Creek main trail was traveled most frequently, particularly the section between the railroad track and the Marsh Creek-Sand Creek confluence. This section locates at the center of the trail and still has open fields at both sides of the creek. In addition, the railroad trestle seems to function as a landmark where trail users from both the north and the south chose to end their routes.

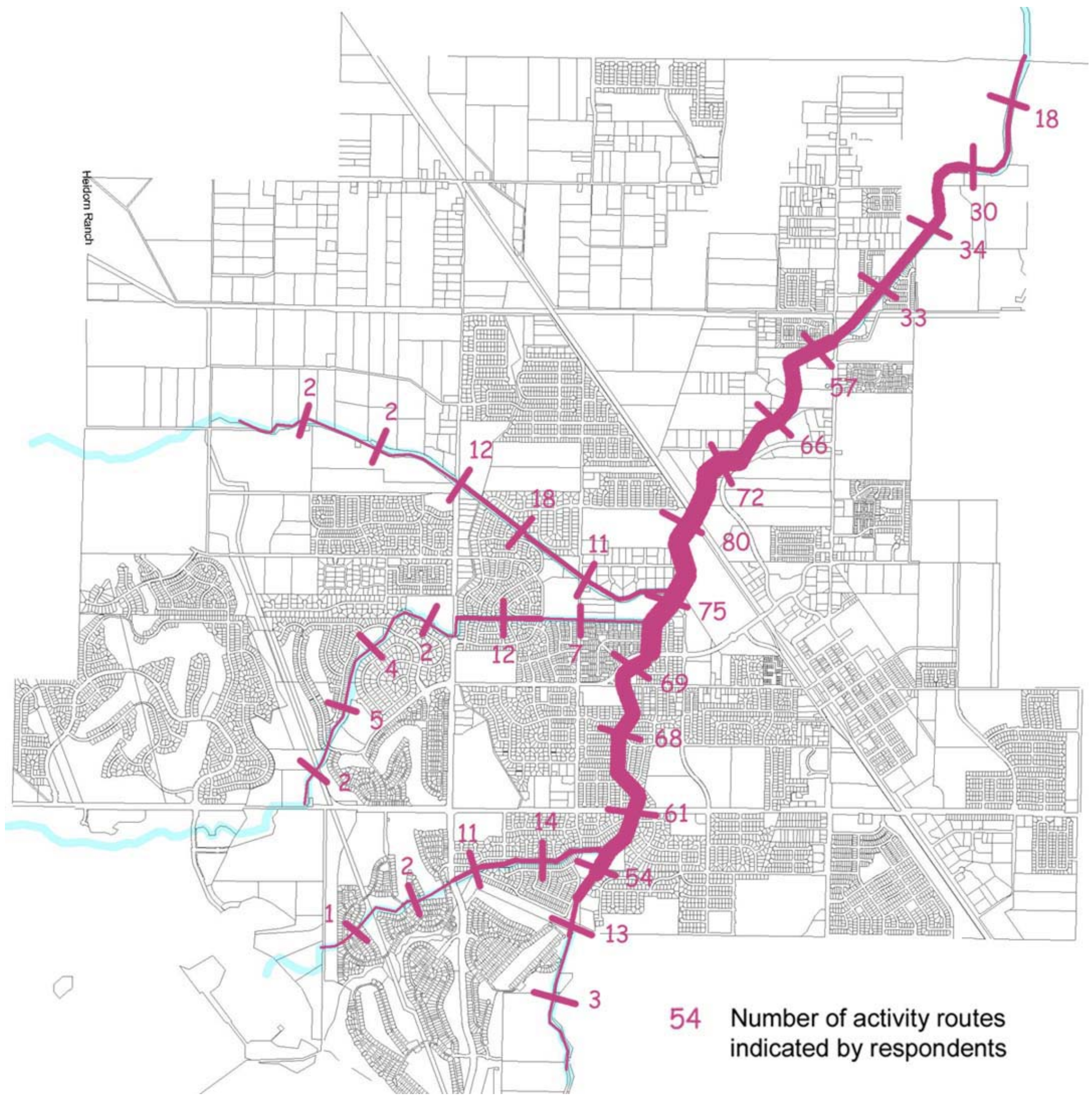


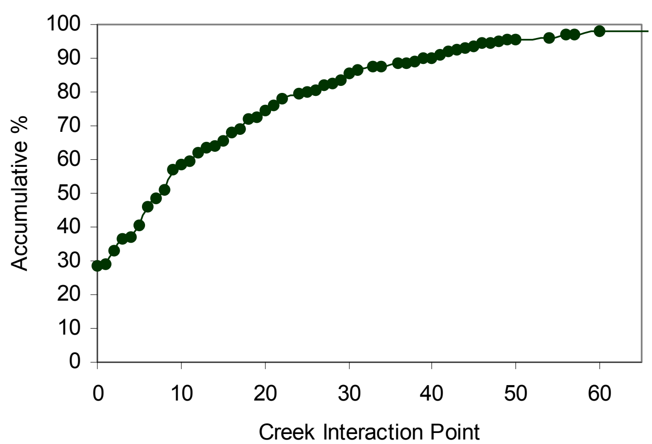
Figure 3.28 Use paths and travel frequency at Marsh Creek

Many reasons may account for the dramatic difference between the use of mainstream and the tributaries. Except for having a trail connecting to the Delta and attract wildlife with its more diverse channel form and vegetation, Marsh Creek has comparatively more “openings” to its neighboring subdivisions (see Figure 3.7). Sand Creek and Deer Creek appear to have almost no use even with frequent cul-de-sac accesses because the trails are cut off into short sections and much of the channel is fenced off from the neighborhood. In addition, both the Deer Creek and Dry Creek channels were frequently referred to as a “ditch,” since they are overgrown with grass with almost no flow during summer.

In Question 13 b), I assigned a factor (0-5) to each activity provided on the list according to the intensity of creek interaction (Table 3.9). The sum of one’s activities in all entries thus provides a Creek Interaction Point, an index of spontaneous interaction with the creek. Different ranges of the point generate the Level of Creek Interaction. Figure 3.29 demonstrates that most people had little or no interaction with the creek.

Table 3.9 The Creek Interaction Factor for various uses

Use examples	Creek interaction factor
Use park or golf course facilities, driving by	0
Biking, skating, watching others, chatting with friends	1
Viewing, walking, jogging, eating, reading	2
Thinking, playing games	3
Bird watching, tree or rock playing	4
Fishing, catching creek creatures, playing in water, planting, building	5



Point	Level of Creek Interaction
0	No interaction
1-8	Little interaction
9-20	Some interaction
21-40	More interaction
>40	Intensive interaction

Figure 3.29 Distribution of the Creek Interaction Point

3.2.5 Univariate Analysis

Creek Interaction Level and Use Frequency

Two indexes are relevant to the central theme of spontaneous use in this research: Use Frequency the Level of Creek Interaction. The Level of Creek Interaction was significantly associated with the availability of wonderful creek experiences, creek values, and the Oral Commitment Points. These associations were evenly strong for people who did or did not consider the creek as a housing factor, indicating that interactive uses may raise creek commitment and value in general. However, when use frequency is plotted against creek experiences, values and commitment, the associations become much weaker, although still positive (Table 3.10, Figure 3.30). Therefore, it is the use content rather than frequency that effectively contributes to the forming of creek experiences, values and commitment.

Table 3.10 Pearson correlation of creek interaction and use frequency with measurements of creek value, experience and commitment (with non-users excluded from the analysis)

		Level of Creek Interaction			Use Frequency		
		All	Creek not a housing factor	Creek was a housing factor	All	Creek not a housing factor	Creek was a housing factor
Marsh Creek value	Pearson	.250(**)	.187(*)	.267(*)	.175(**)	.128	.134
	Sig. (1-tailed)	.000	.015	.014	.004	.062	.122
	N	205	135	68	227	145	77
Wonderful experience	Pearson	.272(**)	.220(**)	.362(**)	.27	.038	.019
	Sig. (1-tailed)	.000	.005	.001	.341	.323	.434
	N	211	140	69	233	150	78
Oral commitment level	Pearson	.362(**)	.283(**)	.405(**)	.125(*)	.141(*)	.078
	Sig. (1-tailed)	.000	.000	.000	.028	.043	.248
	N	211	140	69	233	150	78

** Correlation is significant at the 0.01 level (1-tailed).
* Correlation is significant at the 0.05 level (1-tailed).

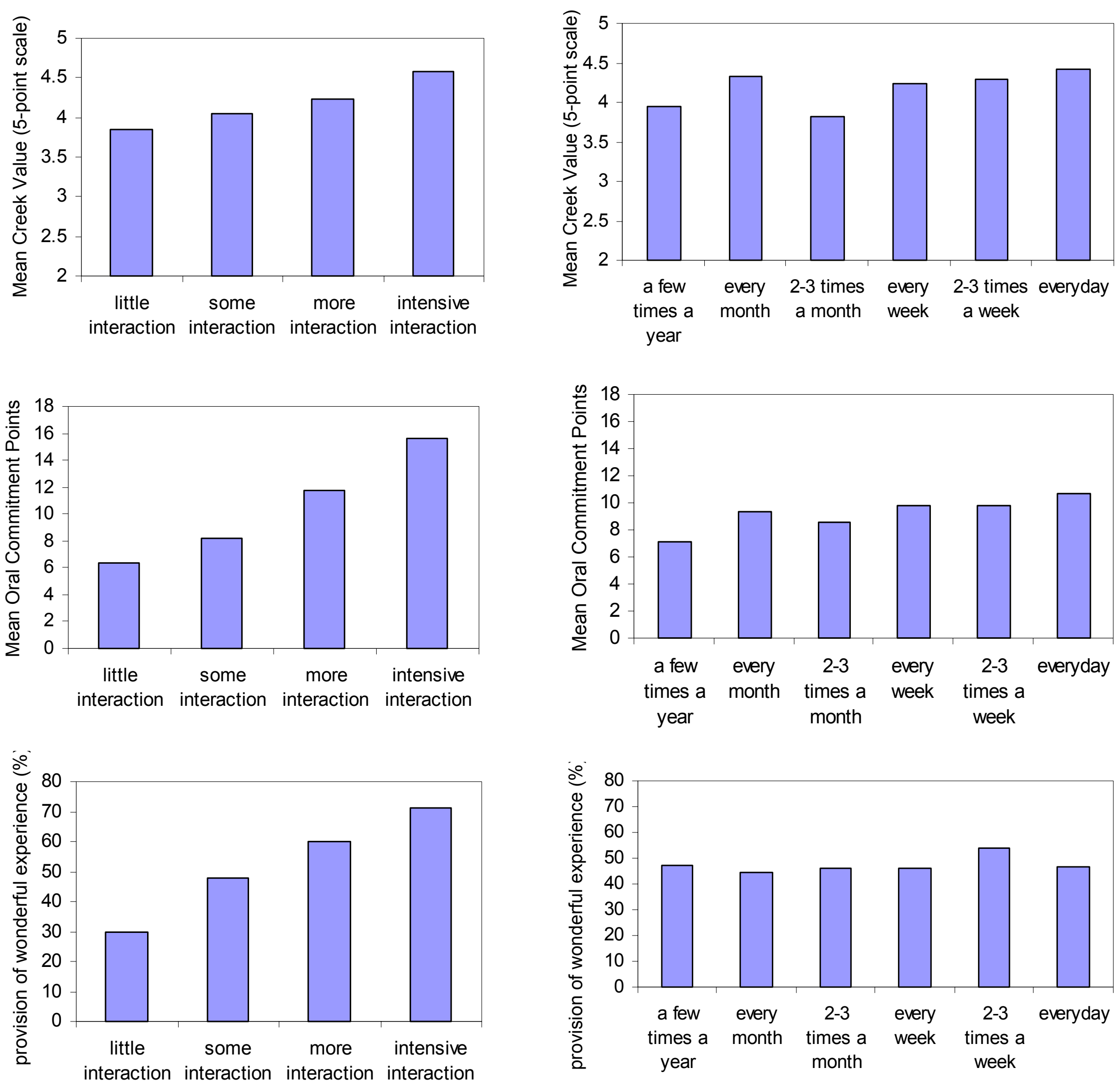


Figure 3.30 Effects of creek interaction (left) and use frequency (right) with measurements of creek value, experience and commitment

Further, interactive users valued the creek more across all factors listed in Question 7, with the association especially strong on place attachment (Somer's d = 0.36) (Figure 3.31). In general, they gave higher valuation to all the photographic scenes and particularly seem to be more tolerate of "weedy" scenes such as **e, g,** and **i**.

In terms of the conception of creek problems, the differences among interaction levels are less conspicuous, although interactive users tended to consider mosquitoes and pest less a problem. Judgment criteria in visual preference were also quite consistent among different levels of creek interaction.

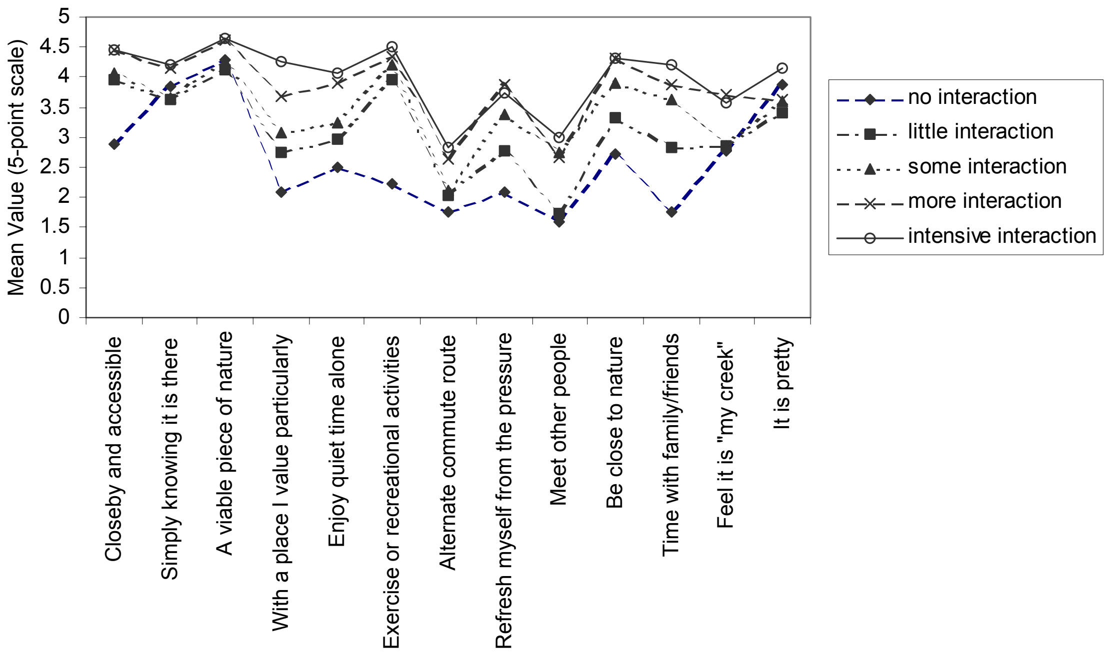


Figure 3.31 Level of Creek Interaction and causes of creek values

Attitudes toward Kids Playing in the Creek

Adult attitude for kids playing in the creek is another important index, since this single factor determines the spontaneous play of kids and therefore the overall amount of such uses in the community. The analysis indicates that parents were much more likely to approve their kids playing at the creek if they could see the creek from their houses, yards, or walking around the neighborhoods. They also had less concerns on mosquito/ pests, dumping and crime. Just as Level of Creek Interaction, this attitude has significant associations with various aspects of creek value and commitment. Adults who were more permissive of kids playing in the creek valued the creek highly, particularly in terms of place attachment, solitude and sense of ownership. They themselves were highly interactive creek users and were more willing to commit to creek enhancement efforts.

Four general demographic factors are also tested for their effects on various aspects of the creek value, conception and use: distance from home (measured in a straight line to the closest point of the channel), zone, age and gender. The main results (statistically significant) are summarized below.

Distance

- The creek was only an effective factor in the housing decision for respondents living within 300 ft from the creek. Over 40% of this group took the creek into housing consideration, while only around 20% of the residents living 300 ft to 1/4 mile from the creek did the same.

- Residents living farther than 300 ft from the creek had more difficulty experiencing the creek from their properties. Within 900 ft, or 3 min walking distance, about 70% of the residents were still able to experience the creek in their neighborhoods, yet when the distance was over 900 ft, the chance dropped to less than 40% and the ratio of "don't experience in daily life" increased.

Zone

- How subdivision developments treat the creek significantly affects how residents interact with it. Zone A and B were developed during a similar periods with most communities less than 10 years old. However, residents in Zone A experienced the creek much more in their own properties and neighborhoods than Zone B residents, who depended more of their contacts through driving to work or shops.

- Residents in Zone A and C recognized the scenes of their areas much better than respondents living out of the areas; however, Zone B residents did not indicate higher familiarity for scenes in Zone B. The way the subdivision was laid out in relation to the creek may have caused scenes in Zone B to be rather vague and anonymous to its residents. It also explains the fact that Zone B respondents showed lowest place attachment, ownership and almost all other aspects of creek values.
- Parents in Zone A had distinctly higher tolerance toward their kids playing in the creek. They were also the most concerned group about the "dumping/garbage" problem in the creek. In effect, kids playing by or in the creek were a scene easily encountered in this zone, suggesting that the creek is much more kids-friendly here.

Age

- Young adults (18-25 years) displayed a stronger trend in social use of the creek. They valued the creek as a place to "meet other people" and for "time with family/friends" much more than older users.
- There was a strong negative relationship between age and Creek Interaction Points, showing that older users interact with the creek in less diverse and interactive ways.

Gender

- Females in average possessed higher value toward the creek. They regarded almost all factors in Question 7 more important than males did, particularly "a place to spend time with family/friends," "a viable piece of nature" and "to be close to nature."

- Females tended to be more concerned about neatness and safety issues such as "water pollution", "mosquitoes/pests" and "presence of crime." On the other hand, males considered "monotonous channel form" a more serious problem.
- Females tended to use the creek with children more and had in average higher Creek Interaction Points.

3.3 Adult Interviews

Twenty adults who demonstrated high levels of appreciation for and interaction with the creek in the survey responses were selected for one-to-one interviews. The selected group has 10 females and 10 males with a balanced age and income profile. The main purpose for the interviews was to delve into the following aspects not easily reflected in a questionnaire format.

- The modes and condition of creek appreciation: What are the details of the experiences provided in the survey or otherwise recalled? I prompted the subject to recall the sight, sound, smell or motion in the experience, and asked about the effect of the environmental factors such as water, plants, wildlife, channel, built structures in the experiences.
- Past creek and ideal creek: How has Marsh Creek changed during the subject's residency in the city and how does the change effect one's feeling and use of it? Does the subject have valuable streams before Marsh Creek? How does the past creeks influence the current creek value and conception? And, how would this particular group envision their ideal creeks?

Interviews consisted of an indoor discussion and an outdoor tour to the subject's creek use spots. Each interview took 1-3 hours to complete. For the indoor part, a set of loosely structured questions was asked concerning the above aspects. After the indoor discussion, the researcher walked or biked with the subject to the creek use spots where the subject explained or demonstrated their uses and shared their feelings. The subject was also given a one-time use camera to take whatever scenes they were interested in. (See Appendix A.2 for detailed processes.) This section presents themes emerging across the interviews as a whole and examines them from the existing literature.

3.3.1 Idyllists

The interviews discovered a range of modes in creek appreciation, but the dominant mode, which almost every subject displayed to a degree, is nevertheless what I call "idyllists". Idyllists are more or less idealists. They can be defined as *the nature lovers whose personal ideal images of living environment contradict the sustainable future of the collective populace*. To explain them, it is again necessary to mention the two powerful threads of nature ideologies: pastoralism and the wilderness.

Pastoral parks were promoted as an anti-urban ideal that dwelt on the relief from the evils of the city and the escape to the country. For example, the purpose of Olmsted's Central Park was to create a pseudo-rural countryside, "to supply the hundreds of thousands of tired workers, who have no opportunity to spend their summers in the country, a specimen of God's handiwork…" (F. L. Olmsted cited in Platt 1994, p. 23).

Wilderness ideal seeks the untouched wild nature as the only perfect physical and moral paragon. Graber (1976) cites the discovery of John Hendee to define the characteristics of wilderness purists: spartanism, craft aspects, anti-artifactualism, primevalism, humility, aversion to social interaction and escapism.

These two views, which both emerged as urban phenomenon, have now become sufficiently confused that many have mistaken the cultivated landscape for the "original" nature, and an image intended to be "as natural as possible" can be indeed full of human intervention. The "idyllist" here is such a mix—it portrays the majority of the suburbanites who pursue the spirit prescribed by wilderness purists (although not much spartanism or craft aspects) but dwell in the middle of the fast eroding pastoral scene.

Solitude: Escape and Healing

Idyllic mode involves solitude in a humanless condition as a basic form of creek interaction. Knopf *et al*. (1973) argued that the choice of recreation environments and/or activities is strongly influenced by problem states that are not resolved in non-recreational environments. Their survey in three recreational fishing spots pointed out that "temporary escape" from stressful conditions ranked particularly high among other motivations such as achievement, exploration and experiencing natural settings.

For Marsh Creek, although "escape" was not salient a factor of creek value in the survey, it became unmistakably central in the interviews. Bert's change of use habit illustrated this desire. Bert is a medical researcher at a university and an amateur marathon runner. When he first moved to Brentwood 16 years ago, he was not aware of Marsh Creek. But the then dirt trail soon became an ideal place for his training, and the "no trespassing" signs did not at all deter him, until the paving and assignment as part of EBRPD trail system around 1990.

> *"That was a big change, because then people really started using it…. I used to go running with my dog… never encounter the other dogs. Now, people bring, you*

know, unfriendly dogs…. And that's actually changed my use of the trail. When I take the dog now… I go to the end of the trail, and that's—you're not supposed to go on that part—there is a canal, we call it the canal trail… you never see anyone over there…. But I kind of stopped going the other way… I think sometimes it's because of so many people on the trail—I know which I can't complain about, but sometimes I kind of like to be alone when I'm running, so, just for privacy…."

When documenting the effects of wilderness contact from a long-term survey on participants of an outdoor wilderness program, Kaplan and Talbot (1983) noted a prevailing aversion to urban environment of buildings and streets, which seemed flat, ugly, and boring by comparison. People showed concern that the positive impacts and the vivid memories of the experience would quickly fade away; individuals sensed the benefits of the experience, yet felt disoriented in their everyday surroundings and would plan for another 'get away' experience.

Although having a pseudo-wilderness setting close to home may not solve the source of wanting to escape, Marsh Creek furnishes a home-range "quick escape" that saves the trouble of remote fishing trips or wilderness programs, a fact deeply appreciated.

For Jason, a medical supply salesman, a walk along the creek alone helps to "decompress" himself. Several years ago his wife came down with life threatening cancer. Since then, he has worked two jobs.

"There've been times when, you know, I need a space. I have three kids and three cats and a dog and it's like, okay, I need a walk! So, it's just a great place to go decompress if you've had a hard day of work…that's the one thing I love about Brentwood… you can get in your car, damn you're out in the country, miles away, …. And I throw on my shoes and just walk down the creek and I'm also miles away….just down at the creek."

Down at the creek, wildlife and the enclosure of vegetation were particularly effective to evoke Jason's imagination of being away to his "old Mississippi":

"You hear the frogs… the buzz of insects in certain areas. …When you're around the woodsy areas and you just hear it—it just sounds like what you'd hear around the Mississippi river—just a smaller scale. There's a Huck Finn feeling when you are walking through—especially for the kids. …And birds out here you don't normally see…I don't know the names. … That's what I like about the river—make you feel like you're farther away than you really are…."

To many subjects, the creek is "a peaceful place to wind down after work," a regular site for healing. At the same time, the creek is also valued as an alternative to the distant and inefficient vacation destination, as demonstrated by Jorge's comment.

"Sometimes I just got there alone,… you just get removed from the everyday Bay Area hustle-bustle… and get back in tune with nature. That was a big thing for me, just be relaxing, and it's nice to have that quite in my backyard.… It attracted us here to this piece of property. … My wife was like 'Well, let go to Tahoe to get out of the city.' But it was like, well, we don't have to go all the way to Tahoe, we could just cruise the creek for a while and it will only be two hours or so—while just driving to Tahoe is like 6 hours or 8 hours."

In an empirical study to characterize aesthetic experiences through college students' diaries, Chenoweth and Gobster (1990) concluded that such experiences occur most often as a result of interactions with natural objects, and tended to occur in familiar places, although they often occur unexpectedly. Marsh Creek provides such a context, and many idyllists had an aesthetic experience as the defining moment in their relationships with the creek. To Katy, who has resided for over 30 years next to Marsh Creek by Central Blvd., the creek supplied "very spiritual experiences." For example, she distinctively remembered a Thanksgiving morning in the early 1980s:

"It was very cold but very foggy and misty so you couldn't see very far… and it was very, very quiet. You almost feel like you're in the world all by yourself. …And you hear the geese flying overhead, honking. And it just like—timeless. You don't hear cars, you don't hear people. …You feel the dampness of the mist and the coldness of the air and, all your senses… it was the wildness and sort of the desolation about it and the loneliness about it that I really value. I love that."

Anti-artifactualism

Aside from open criticism against human-made objects, idyllists expressed anti-artifactualism through two tendencies: the fact that built structures were used without being seen and the belief that the state before perceived changes was the "natural creek."

Katy, for example, considered the early 1980s as a time when "nothing has been done to the creek." To her what made Marsh Creek "man-made" were the trail paving and channel widening that took place in the late 1980s: "…They widened it, and they dug it out, so it's not the original creek; it's sort of man-made now." However, the channelization and the current course of Marsh Creek were completed by the 1960s.

The element that most typically reflects idyllist penchant for built structures is the dirt trail. The aesthetic appeal of the dirt path seems to surpass practical inconvenience, as expressed by Jack, a construction engineer and long-distance runner:

" I know it's not good for sure at the winter time cuz it gets all muddy but I prefer the natural state than a man-made paved trail." ["Is that an aesthetic thing or for your knee jogging?"] *"It's more of an aesthetic thing."*

But not all idyllists detest pavement or built facilities to the same degree. Some have contradictory feelings about them and some consider them necessary. Although the trail development took Bert's solitude away, he agreed that it also made easier for his kids to ride bikes and for them to explore extended reach of the trail together. Lorna, a young mother of a two-years old, likes the pavement because it makes pushing strollers a lot easier. She also feels safer walking there since more people frequent it. She would like more lighting, fearing that the creek could turn into an area where "teenagers cause trouble." Such fear is common among female users, even though aesthetically they would much prefer no signs of human construction. Luisa, an owner of a preschool, enjoys walking and thinking alone on the little dirt path by the creek, but she opts the paved trail for walks in early morning, when she feels safer seen by people.

Because the aesthetic need and the use need can be in conflict, idyllists are sometimes capable of utilizing the human-built structures and then drive them out of the mind, as demonstrated in Luisa's interview. Her wonderful experience occurred after filling out the survey. The survey inspired her to call a regional park and arrange a naturalist coming to tour the preschoolers around the creek by the Creekside Park.

Luisa vividly recalled the wind, the trees functioning as windbreak, the slippery and steep banks, etc. But she claimed that there were no human-built structure at their spot—their purpose was to "look at the nature-built structures." She admitted that they walked across a footbridge to get to the spot, "but that was not in the particular scene I was enjoying." Asked how it influenced her experience, she replied: "the lack of it was the benefit." But later at the tour, Luisa inadvertently mentioned that they were standing on the "cement and rock area"—the riprap—so they could get close enough to the creek and scoop the tadpoles without getting too muddy (Figure 3.32).

The plank footbridge that Luisa excluded from her experience was embraced by many other idyllists. But in another experience of Luisa, a tree house became the beloved theme for it may have conformed the primitive and rustic image. Some idyllists' censoring standard of what "built structures" are allowable can be more sensitive than others, but such mental framing of vision are common.

Figure 3.32 The riprap spot was used by Luisa and the kids to contact water without getting muddy but it was excluded from her recall

Ava is an executive during her 60-hour work week and an amateur painter and horse back rider during the weekend. Her creek experiences inspired her in doing a series of watercolor works for this area: "Just some little paintings to capture the egrets, turtles, muskrat, little waterfalls--they are artificial, of course." In her mind, each little painting would have a little creature as the central theme, with grass and water "completing the picture." She was aware of the built structures and the straight, deep channel, but "that's not what I focused on" and those features would not go into her paintings.

Concrete structures are commonly abhorred by idyllists. For Eli, a 26 year-old auto mechanic who grew up in Brentwood, concrete surface needs to be concealed. He complained that the "cement features" were too dominant even since he was a kid.

> *"That area [staging area]… it doesn't look that nice to me. Really cement structure there…. They can grow ivy to cover the bridge, or even paint a small mural, plant some shrubberies… just the view of the creeks and everything, not the houses, at least… your vision is in a certain area—you can kind of get a feel of seeing a creek."*

Doris is a nurse who has been living in Brentwood since 1985. Her idyllic viewpoint is mixed with her hands-on interaction with the creek. She and her kids used to go down the “cement culvert” under the HWY 4 bridge for crawdads. She thus had conflicting feeling for this spot:

> *“Probably it’d be nicer if we were in a different area…. You would hear the traffic, and it’s kind of eerie going into the culvert because it was darker and damp and a little scary. It probably would be nicer if we were away from there, open, just trees and everything around, but that’s where we used to go—that’s where the crawdads were.”*

Sentiment of Loss

Since most solitude creek experiences were embedded in the rural quality of the old, small-town Brentwood, the rapid development inevitably evoked sentiment of loss. In November 2001, the *San Francisco Magazine* carried a poignant article that epitomized Brentwood dwellers’ development complex:

> *“The people who move to Brentwood… come here in pursuit of the very thing their presence is destroying: small-town charm, fresh air, country roads, vistas of farmland and untamed hillsides. Most of all, they come in search of a three-bedroom, two-bath home for less than $300,000…. So many people believe so ardently that Brentwood should stay a farming town, and yet a thousand small decisions are making it harder and harder for agriculture to survive there.”* (Slater 2001, p. 93)

During the course of interviews, the long-term residents unanimously deplored the disappearance of field and orchards, while some new comers bragged about their luck to secure a plot close to openness or left-over greenery. Marsh Creek to the idyllists is a pursuit of “Why It’s Not My Back Yard?”, almost as peculiar as NIMBY.

Luisa used to have a “refuge” down by the creek where she regularly went to read, think or pray (Figure 3.33). She became a little bit emotional talking about the continual loss of orchard trees. She realized that her house used to be orchards, too, but the community at the other side of the creek took away her personal sacred place.

> *"When there is no trees, there is no shade, no refuge. …You know when you go to Santa Cruz or Los Gatos you can just go hug the trees and it's just everywhere…it's just so—I don't know, it's so—nice… It just gives more moist to the whole area; here it's just cold and stark, and house, house, house, house."*

Figure 3.33 Luisa walking on the dirt path to her old solitude spot

Figure 3.34 To Luisa the spot is now ruined by the sight of new development and a barking dog

Since the development across the creek, although the spot is still there, "the whole feeling of that spot is gone." She did not go there alone any more; instead, she made her own garden on the side of the house a substitute. She showed me how the willow tree that was just planted 3 years ago has grown taller than the house and created a shady corner where she put a chair. She laughed and said maybe the willow grew so fast because it knew her loss at the creek. At the creek tour, Luisa showed me the yellow houses across the chain-link fence at the top of the channel (Figure 3.34). Indeed, solitude was not easy because when we approached, a dog started to bark furiously. But at one particularly large backyard with lawn extending up against the channel, Luisa expressed her envy in a quiet whisper: "I wish it were mine."

People have different ways to cope with the loss or impending loss of solitude. While Bert retreated to the yet undeveloped trail and Luisa constructed her side yard into a little sanctuary, people who are approaching retirement or with more ends are thinking of leaving. In the tour, Ava pointed out the new Sand Creek Road that was going to cross her friend's ranchette and the soon-to-be commercial area right through her regular route of horseback riding. She was trying to be cheerful although her discontent was obvious:

> *"No, we know it's coming; we know it's coming. It's just too bad…. I spent an hour and half in the commute traffic and my husband does, too. I come to a place where I want to have peace, not a lot of people around me. … Someday when they've got the school yard behind me, and all the houses in front of me and back of, depend where we are in our life… we'll probably leave. Because I don't want to be in the middle of town, ever. It's not peaceful for me."*

To Doris, the sentiment did not seem easy to clarify. On one hand, she was an active participant in community affairs and considered the change as positive to the community:

> *"Actually it's probably easier to use it now than we used to—we basically used it when there was no trails to follow…. Now it's--I mean, I think it's a good thing that we turned it into the nation, I think it's great…. I like how it connects the whole community together, wasn't always like that…."*

And yet talking about her personal feelings, she expressed loss due to the increased housing and traffic on the trail just like other idyllists. Doris's ultimate dream is similar to that of Ava—to leave in search for the next ideal country life before development in Brentwood become intolerable. She told me how Brentwood reminded her of her hometown Downers Grove in suburban Chicago, where she lost her childhood creek. The developments of both traced an identical path of American bedroom communities.

> *"You said Downers Grove and nobody ever knew where it was…. Now, even out here when we say Downers Grove everybody says 'oh, yeah—I know that place!' …*

And it seems Brentwood is the same kind of scenario, you know, with a lot of golf courses, with some really nice houses out there. They remodeled downtown Brentwood—put up these old-fashion lights and that's what they did to my downtown, too, years ago. So… I was like 'wow, this is too uncanny.'… We didn't move here for that reason. We are talking about the built-up Brentwood to be 60-70,000 people in the next 10, 15 years. … So we'll be moving. (Laugh)"

Doris wanted land and horses; after her kids getting out of college, she hoped to buy land, which will be no longer affordable in Brentwood. Her calculation for retirement was to move to Forest Hill, another nice yet small community. She did not think it would become another suburban front because right now people are moving out of it. "I think it's a little too far from Sacramento to people to use it as a commute area—it's about over an hour from Sacramento." But currently, she herself commutes that long.

Katy's interview gave me a chance to examine some other aspects of what exactly was lost. Katy skipped parts of the survey. To her the creek had changed so much she did not know how to describe it to outside friends; she considered the areas or qualities to be preserved were gone already.

One event was symbolic for Katy's perception of creek change. An over-100-year-old valley oak across the street was toppled after the trail was planned. Katy was informed that the oak had its heart rot and the branch might fall and hit somebody. "Ever since that everything just went downhill," said Katy. The tree bore numerous family memories: it was a bird and bat watching spot; it bore a bee hive from which her daughter learned the bitter lesson never to poke it with a stick; it was the center for the family's holiday gatherings. Later, I happened to come across a "tree evaluation" report conducted in 1990, which described a valley oak at the same location of Katy's lost oak. The report noted the oak as possessing relatively high liability, and suggested it be removed if a trail is to be installed there. Then it gave the oak a monetary value as $9.62 (KVA & RABA 1991). I never asked Katy how she would put a value to the lost oak—she might never be able to do that.

Katy was born in the town north of Brentwood, she has lived along with Marsh Creek through her entire life and so has her husband's family. I soon realized that not only Katy, the whole family had a distinctively intimate relationship with the creek. Their stories were way beyond the little space provided in the questionnaire.

> *"Everybody in my family, my nieces, my nephews, my sisters, my brother… everybody, when they talk about our house they talk about the creek. Because that's their memories too of coming. When we had a family occasion, a family dinner or Christmas, whatever… we would have our holiday meal or whatever here, but then we would end up walking to the creek, just to look at it, just to go for a walk, and see what we find."*

Katy's daughter once flipped upside down into the creek when riding a little three-wheeler and caused a great fuss. When her son started high school, for about 3 weeks he was in a hideout by the creek. Katy recalled how she fount it out by tailing after him when he left for school.

> *"He went down the path at the creek, and there was an old abandoned trailer. He and his friend had been going to that old trailer every day and stay in there until the school was out and he walked home like he got home from school! That's a funny memory now, but boy at then I was going to kill him! It's terrible! He also had a fort out of bamboo—you couldn't see inside, but there was a secret entrance. It's stocked with food and magazines, everything! …They thought that [the creek] belonged to them, so, they made it their own."*

To Katy, part of what was lost was the occasional disorder and turmoil the creek threw in her life. "Exciting" was frequently used to describe the life by the creek. She told me a story about a woman dropping her child off at the Dainty Center but accidentally went over into the creek and the car floated all the way down.

> *"She wasn't hurt or anything, but it was just like a big exciting thing! Here's this lady drove in the creek and be floated down! ...It was always exciting--some kids made a raft and they floated down the creek…. If the neighborhood kids were going to have a fight, there is the rival; 'I'm going to meet you at the creek after school!'—you know, everything was at the creek. …. The creek is* our place*!… Everybody is always telling creek stories, because there's something always happening at the creek."*

High water in channel was also an important event. Katy experienced two floods at the beginning of the 1980s. Her family was temporally evacuated, which was again, "exciting." Whenever the creek rises high in winter, Katy and her family would always "cross our fingers and hope it will overflow." Many other subjects described high water events in a similar tone—they were "pretty intense" and "interesting," and the flood control works took away part of the fun of high water.

In fact, "watching the water" appeared in the survey response as a major form of use. Water level in the creek seems to afford a sort of index in life—it signifies certain processes and reassures our understanding to them. Through it and the shift of some wildlife and vegetation species, users grab the rhythm of the creek:

> *"When the water starts to fill in the winter you can hear the frogs.…You can hear them stop croaking when you walk by and start up when you leave, sensing your presence."* (Jack)

> *"I believe at one time, there was a farmer over here that grew basil. And then, somehow—we had a really bad flood one year, and then the next year basil just grew everywhere down at the creek…."* (Jean)

These indicators of creek processes to human life—the fluctuation of water level, the shift of bed materials, the responses of flora and fauna—according to my subjects have been dwindling, particularly on the reduced contact with wildlife. Jean, an owner of a wine store at downtown Brentwood, recalled the wildlife encounters in her Creekside Park neighborhood:

> *"Gosh, we saw ducks and the egrets,… snakes—not so much now but when we first moved in we saw lots of rattlesnakes…. Uh, the next door cat brought home a king snake last summer. Gophers, we see the water rats… it's probably muskrats…. Then of course just regular little field mice, frogs. …Raccoons, I know that's connected with the creek, but we had a lot of troubles with raccoons-- they get into our garage and eat our pet food… My neighbor saw a coyote on their porch once … and the coyote actually track him on the other side of the creek channel…. That was a couple of years before. … I used to see jackrabbits there, but I haven't seen jackrabbits since they built the houses."*

Regarding the change of the creek, Jean's attitude contained a sort of aplomb partly because the Creekside Park area has not lost much of its wildlife during her ten years of living here. She has taken it for granted, as part of her general comfort in life. But in Katy's neighborhood the change was more dramatic. She recalled:

> *"There would be a migration every autumn of caterpillars—the orange and black striped caterpillars, my mom called them 'wollyworms', and, you'd almost have to like drive your car zigzag to miss…. Now you barely ever see caterpillars anymore. We used to read in the newspaper—'it's going to be a snake year', 'it's going to be an extra dry year, so be careful, there is going to be a lot of rattlers.' We had a year when the rattlesnakes climbed up our driveway…. There's the excitement of the unknown…. It's nature. Now it's too predictable!"*

If I could laugh about idyllists' misconception toward the present-time Marsh Creek, I could never deny their feelings on the dwindling of experience per se. Except for the loss of solitude, what channel widening, paving, pollution or developments brought about, is a loss of the opportunities to sense the animated world and the rhythm and randomness in life.

Idyllic Images and Past Creeks

Almost all subjects possessed one or more valued streams in their past—be they urban or rural, nearby or distant. These past experiences are extended, combined, or selectively transformed to shape the ideal creeks in their minds. As the survey findings, the ideal images for the idyllists are very consistent. Whether they are modeled from past streams in the east coast, mid-west or the Bay Area, they almost always include enclosure of woods, running water and abundant wildlife.

For instance, Luisa's ideal creek preserved rocks and trees in her childhood creek in Chicago but eliminated its steep bank. The contact with water and wildlife that she valued in her solitude spot at Marsh Creek was combined into the scene:

> *"It would be shallow enough to go to the edge, to be able to see the fish and wildlife; rocky enough to make the sound of the water; plenty of trees to provide the shade and privacy and seclusion."*

Jason's childhood creek was the upper Marsh Creek in Concord. He likened the upper Marsh Creek to the "old Mississippi River," with "a lot of vegetation, a lot of shade, a lot of charm… just kind of mid-western." Despite the geographic differences, he expressed earnest desire to have the look of the upper reach replicated in the city—the oaks, big rock formations, and hills.

Where Bert grew up in Sacramento there used to be a drainage canal. He somehow ridiculed the experiences of playing there:

"It was not really a creek—a lot of them were actually drainage pipes…. We'd climb into those and go under the streets; we were just kids, you know, we never know better; until it gets really small and we couldn't go any further and we'd come back out. Now I think they are all enclosed and there's no way to get into them… probably not healthy to do that…."

Instead of his first childhood creek, Bert's ideal image was more directly shaped by another creek which flew by his cousin's house in Novato, California. Bert was full of envy recalling that area. The creek winded through the undeveloped parklands and came down the hillside with abundant waterfalls:

"They had very *big houses and lots of plains—it's a very expensive area…. Salamanders, frogs, fish and birds, you know, for two little boys it was just like paradise. It literally flows right by their house!"*

Not surprisingly, loss is also omnipresent to the valued streams before Marsh Creek. Over the generations creeks are owned and then lost through developments, pollution, or simply by one's moving away from them.

Benny is an insurance company salesman who moved to Brentwood 2 years ago. As opposed to Marsh Creek, his childhood creek in suburban New York had year-round flow, dense riparian woods and was surrounded by low-density housing. He did not know what happened to his childhood creek, but emphasized how he missed that kind of shady places. He would now bring his family to Muir Wood, Tilden Park and other coastal areas for vacation just to experience the feeling to be enclosed by foliage.

To Doris, the loss of her childhood creek in suburban Chicago was why she filled out the survey. She appealed in the survey forcefully: "Please don't let that happen to Marsh Creek." During the interview, Doris was almost eager to share with me her creek:

"Yes—yes, it was wonderful! You go down there walking over these bumpy hills, you get to the creek, it was very 'solitude'. …There were more pooled areas… with much more trees…much more secluded than this…. We pretty much grew up at the creek. My god, we would—you know, as a kid we would do all kinds of things. You play hide-and-seek, you build forts, digging—it's on the middle of nowhere, so we could dig holes, and we would swim…. There was a small waterfall we would just slide down it with our bodies; and sometimes we fish, we skip rocks. Just when I got older in high school, I go there by myself, just to be by myself, you know, boyfriend problems, you go, cry… or you go with your boyfriend, the creek is a great place to go to kiss and stuff … (laugh). …The trees would go over in the creek, the branches… I remember sitting there for hours! *It was… it was just really pretty!*

"Unfortunately development took place, and they leveled it up, and now you wouldn't even know where it is… it's all paved, they put culverts in, they bypass it… it's gone*! Every now and then when I go home, I'll see … there is one area where you see water going under the road, but* that's it*. I don't know how you would make a creek like that go away … it's gone!"*

But Doris has obviously captured numerous images for her creek and at the back of her mind that creek was never gone for her. It formed her present-time ideal image—rustic, with rocks, waterfalls, and pooled areas. Her ideal creek would be enclosed by woods and penetrated by modest dirt paths, and there she would be riding on a horse:

"It heads up to the water, it drinks the water, and up you go, up you go, riding up somewhere, probably be a long path."

Although interactions with the past creeks may be diverse, the desired use at the ideal creeks usually converge to solitude.

As a boy Benny explored miles of the creek with friends, caught frogs and salamanders, and built things with the "clay dough" from the bank. His ideal creek directly succeeded the setting of his childhood creek, but the use he envisioned became very quiet and modest: "where you could do just a little bit of fishing along it—I mean nothing major, but just a little bit of fishing there…."

Eli is the only subject who grew up playing in Marsh Creek at Brentwood. Looking back, it became almost difficult for him to recall a particular memorable experience. In his mind the creek was a patchwork of memories: "Each little place kind of has different things that I would think of when I was there." By his grandmother's house at Dainty Avenue he caught and "spit" a lot of crawdads. By the train tracks there were the "Huckleberry Finn kids" swimming; farther down the north there was a spot for bike jumps; by a shallow irrigation canal there was a bamboo hut, and at the southern end was the canal and an old pump station that he explored.

Although Eli had profuse hands-on creek experiences as a child, he now claimed that "there are things you did as a kid you wouldn't do later on." Pollution seems to play a crucial role in this change. Worried about water quality, he stopped eating crawdads from Marsh Creek and swimming in another creek nearby. Eli wanted to "just kind of grab a piece of woods and put it within the city." His ideal creek was, in a nutshell:

> *"To be able to walk through it and not feel like you're surrounded by what you're really are—so much houses and civilizations."*

3.3.2 Other Modes of Creek Appreciation

Aside from idyllists, other modes of creek appreciation include stewards, educators, observers and hands-on users. An individual can have multiple modes of nature appreciation, depending on mood and circumstance. In general, these modes differentiate themselves from idyllic mode in that they tolerate or even enjoy social engagement while using the creek; they tend to perceive development as something to be confronted, not necessarily detested; their creek conceptions can accommodate human-built objects; and their ideal images contain more variety.

Stewards

Stewards are those who have transformed creek appreciation to an action-prone responsibility. As individuals, their uses contain actions to make the environment approach to the ideal scene in their mind: picking up garbage, feeding, weeding, planting, and even stopping uses that they consider undue. Some of my subjects demonstrated how a sense of attachment can develop into actions.

Jorge runs a non-profit organization in the Bay Area. He associated taking care of the creek with "being good neighbors." When the family went for a walk, they would typically bring a plastic bag and pick up trash along the way.

> *"I become more fond of the creek since moving here, I think I have taken ownership of the creek….*

Dick is a firefighter and a father of two young kids. Earlier this year, he purchased some willow and maple saplings online and planted them along Dry Creek bank at the end of his street. Not certain if this conformed to "whatever rules of the City," he did not indicate "planting" as his activity on the survey. Dick said he simply wanted a nice environment for his kids—and he saw other people do the same. In the tour, he took a "before shot" for the trees he planted and plan to do an "after shot" 15 years later.

> *"You know, they'll grow, and my daughter and the neighborhood kids can play under it, and* they *grow…."*

In Dick's Dry Creek neighborhood, a Safeway supermarket was under way. The area was designated as residential, but was recently rezoned. A neighborhood group was formed immediately. Although it did not stop Safeway it did at least prevent the fast-food store and a gas station from happening. Dick's action was based on his intuition on the importance of the "sign of care" and the consequences when it is not present.

"When there is a neighborhood supermarket, some people may bring the shopping cart home with them, then there are teenagers, they will load the cart with stuff, they dump it in the creek. Well, here is the creek, here is the store, that's what going to happen! … If it looks like a junky area, people won't have a problem leaving their trash there, but if it looks nice, landscaped, like somebody cares about it, then even teenagers will not be apt to throw stuff into it."

Dick considered himself "pretty much grew up in the creek." Although his childhood creek is now in a pipe underground, he seemed to have an attitude toward "positive" design. To him it is not enough to leave things along—"You got to keep adding, creating habitats, make it nicer." His ideal image was also picturesque but it contained certain practical concerns. To him it is important to keep the water flowing and mosquitoes down to supply the use of the big population. He also wanted the City to plant more trees but keep the grass down, since "during the summer time sometimes it just looks like the whole place is going to burn."

Although a vocal creek group has not formed in Brentwood, there are sporadic actions on the local neighborhood level to enhance the creek. For example, Jack was working with some neighbors to improve an area around the connector trail to the creek by applying for city grants. In addition, he actively participated in creek cleanups held by the City. A memorable but not pleasant experience Jack gave was when he stepped on a nail during a cleanup:

"There were several forts that kids had made on the branches of the trees, primarily dilapidated forts… kind of attached haphazardly. …So we were taking the boards out of the creek from the forts and that is when I stepped on a nail and it went into my

foot…. I limped up the bank and the City staff had some first aid kit…. And later on little girls walked through the creek, complaining that I-- I've torn her fort apart. And I said I just stepped on a nail, you shouldn't build forts in the creek anyway—it's dangerous!"

Jack's story showed that steward actions were not free of conflicts against other forms of use. If what he dismantled was the tree house that no less than a dozen of my subjects (mostly kids) missed with great regret, he has really done a disfavor to them as well as to himself; since if he did not pull it apart, it might not have been "dangerous."

Educators

Educators regard being able to relay their own creek wisdom to the young a primary value of the creek. These subjects are usually eager to share with others their experiences and establish their values toward nature to the young.

As a mother and a former instructor of Boy Scouts and Girl Scouts, Tina explored various education opportunities of the creek. She made "periscopes" out of coffee cans and plastic wraps with the kids for watching the creek bed. She once intentionally allowed the kids to bring a crawdad home. The quick death of the crawdad became a valuable lesson on what happens "when you take an organism out of the wild." Her vivid recall of a time when she fished crawdads with her kids reconfirmed the therapeutic value of the creek, even when not in a solitude condition or an idyllic setting:

"We spent hours in the creek, being wet and learning a lot. …There were bushes and the trees to my left and housing complex at the other side. …I can see the bottom of the creek. At one part there are rocks, but then it's also goopy and muddy at another part…. There's a mossy pungent smell.…There's a slight chilling wind that makes you feel tingly. And hearing the leaves rustling-- it was a very calming sound, and even the bikes riding across the wooden planks on the bridge was a relaxing sound—

it has a way of belonging to the scene. Kids were screaming and laughing…. I think this is the best anti-stress medicine anyone could ask for."

Tina had a childhood creek in Campbell, California where used to go down to a tunnel with her girlfriends, yelling and lighting firecrackers. Although her ideal image contained an aesthetic standard similar to most idyllists, she stressed creek access for all ages and education programs such as monthly nature walks led by naturalists.

Jack used the soil by the creek to teach his kids the bond with land and how developments replace agriculture. Dick used two pointed weed tips to make "little scissors" for his daughter and enjoyed a moment that brought his childhood back (Figure 3.35). Such on-site education are extremely satisfying for many adults. It makes them feel they are doing their jobs; it fulfils a sense of succession, as Jorge commented:

"I think a lot of those things, probably they are going to think about when they are at my age… and say, 'oh yeah, remember at that time, we explored the creek with Dad, we did this, we did that,' like I have remembered most experiences going fishing and camping with my Dad. So there're memories that nobody can take away…."

Figure 3.35 Dick demonstrating how to make "little scissors" with pointed weed tips. He emphasized that there is "a neat feeling" by relaying such skills

But not everything educators relay may go through the lens of an ecologist. In the interview, Dick fondly recalled how he brought home a crawdad from Northern

California to teach his daughter about “restoration.” He and his daughter came to the creek, chose a possibly “good habitat” (secluded, less used by people and with more vegetation) and released the crawdad with great satisfaction. Yet this kind of releasing is considered extremely hazardous by ecologists, for it may spread exotic species.

Observers

Observers are the users equipped with a higher-than-average capacity to sense the life force in the animated world. Such users are keen to phenomena of change and subtle movements of wildlife that seem “invisible” to others. Among Brentwood adult subjects, I found only Walter regard observation as the primary way to appreciate the creek.

Walter is a retired engineer who volunteered for 7 years at a local wildlife museum. Watching wildlife while strolling down the trail was his daily association with the creek. At the creek tour, he was able to spot a two-inch frog from 40 some feet away. He attributed this faculty to the training at the museum:

> *“Walking down there is like walking in a zoo…if you really stop and look. I learned from working in the museum you have to learn to look. ...I’ve learned from a period of seven years, to look. And I find there are a lot of things that people would go right by and never see…. So, to me it is really fascinating to see what is going on.”*

Walter would stop for 15 minutes to look at how a great blue heron poise on one foot at the shallow area and swoop in for crawdad or fish. He shared a trick in bird watching:

> *“You don’t look straight at them—look at them out of the corner of your eye and walk by, look straight ahead, but once you get by and by about 10, 12 feet, you can turn around very slowly…. They will look at you, but they won’t fly, because they know you already passed by and you are no threat to them.”*

For two years Walter traced an otter family. His observation informed him where the mating spot was, how long they traveled, and how they came out of the creek to hunt for eggs in people's yards. His first encounter with the otters was a surprise—they had made the discharge pipe of the wastewater treatment plant their nest. Then about three weeks later when he saw workers cleaning out the pipe, he yelled at the crew, maintained the hole and rescued a female and her cubs.

Walter had a rather neutral way in looking at "artificial" objects. In fact, he seemed to get particular satisfaction on how the otter made use of the treatment pipe. He believed the pipe a fine habitat for them because he saw them "coming down and testing the water from the discharge…. It *is* good water, and animals know where the good water is."

Marsh Creek is Walter's first valued creek. His ideal creek had a lot more trees shading over the creek. Meanwhile, he was the only subject who thought the bank should discourage human access:

> *"It is not safe for people to go into the creek and not good for the wildlife either, so it's best to have banks that do not encourage too much interaction."*

Hands-on Users

Many subjects reported their experiences of bringing the kids or dogs to the creek. They emphasized how much fun it was for the kids to catch wildlife, climb trees or wade in water. But few of them provided illustration on how themselves felt about hands-on play. In fact, only Simon revealed spontaneous play as his current mode of creek interaction. Simon is an electrical engineer who has lived for 17 years in an old subdivision next to Marsh Creek. He threw crawdad parties (what he called "crawdad festivals") a few times a year, in which everybody went down to the creek and caught their own meal. They then came back to the house and cooked the crawdads together. He explained that parties were always held at midnight:

"The best time to do it is about at 1am in the morning, because there used to be lots of farms around here… water would rise up during the day due to irrigating, and then drop down at night time. So when the water drops, it's the perfect time… then you just go down there and you could just pull them out like that."

This tradition made Simon quite aware of changes of water level in the channel. He noticed a significant drop in flow over the past year and was concerned with its impact on the crawdad harvest. He was also familiar with where crawdads would thrive:

"[They] sit behind rocks, where water still, tucked behind a rock…pockets of the standing spots where the water is not swirling…."

Although just as other idyllists, Simon described his ideal creek as a place to get away from the "rat race" and enjoy solitude, he was clearly more of a participant than a spectator of spontaneous play. With his sons, he dashed right down into the trapezoidal channel and cut back and forth over the creek. To him the 45 degree channel form "is little of a pain in the neck to get down—but it's ok." He climbed up a tree house and crawled in the 36" drainage pipe, sat on the cross brace under the railroad bridge and explained how he liked to dandle his feet in water. Built structures for him seemed to be just a legitimate part of the creek. When talking about his childhood creek in Pleasanton, California, he even emphasized a swimming spot where "a cement drop-off landed into a pool" and a major road overpass that provided the shade.

3.3.3 Conflict of Images

Although the subjects presented a highly consistent ideal image and identified features such as luxuriant woods, year-round running water, bountiful wildlife and easy access as “natural” or “original” to Marsh Creek, such a scene poses a significant gap with the prescriptions of restorationists.

Little record exists as to how Marsh Creek looked like before the fields and orchards overspread the Brentwood area. But in 1853, the beginning of large-scale cattle grazing and wheat farming, a writer who traveled through Sand Creek stated:

> *“[O]n the wash of Sand Creek, when the soil had been flooded, the oats were so tall that the antelope and cattle made trails through and underneath them, and it was possible for a horseman to lap the heads of oats together over his shoulder while sitting on his horse.”* (KVA & RABA 1991, p. 20)

A watershed report (NHI & DSC 2002) pointed out that as most Mediterranean streams, the creek had always been intermittent until the great irrigation projects took place in the 1920s. The historic maps from the late 1800s and early 1900s indicated that Marsh Creek used to have multiple channels and regular channel migration; it would lose all its surface water when it hit the unstable sand dunes before reaching the Delta. The report further accused the availability of year-round water as a primary culprit for the decline of native species and the thriving of exotics.

> *“Perennialization …enabled the intrusion and subsequent success of bullfrogs, whose young metamorphose over a period of two years and would not survive in a seasonal aquatic habitat. Unlike the anadromous fish native to marsh Creek, largemouth bass and many other predatory non-natives also depend on year-round waters for successful habitation and recruitment of young. Perennialization of lower Marsh Creek has eliminated the one habitat factor that favored natives such as California red-legged frogs, western pond turtles, and juvenile Chinook Salmon over the exotic generalists….”* (ibid., p. 45)

Yet currently in Marsh Creek, the most contacted species—crayfish, bullfrogs, bluegill and largemouth bass are almost entirely exotic generalists. Many residents were delighted with any contact with wildlife and considered the reduced contact a loss. Similar situation exists for vegetation. Although some subjects are aware of the differentiation of native or introduced plant species, “looking natural without overgrown” was a popular criteria for vegetation preference.

Although steward Dick mentioned more than once the “indigenous plants,” he admitted with laugh that he did not really know which plants are indigenous. To him, creekside is an “interface,” a place where nature and people meet:

> *“Just because the oak trees and weeds are indigenous does not mean we can only have that. This is an urban/suburban setting, we should have a better mix here.”*

The contrast of the issues concerned by the residents (as in Question 9 of the survey) and those presented by restorationists is also remarkable. The watershed report (NHI & DSC 2002) did not mention garbage but detailed the effects of former mercury mining upstream as well as urban and agricultural runoff on water quality. While residents considered the water level too low, restorationists are concerned rather about the altered flow regime than the amount. Residents regarded “mosquitoes/pests” as more serious than “monotonous channel form” and “poor habitat value,” both major issues to the restorationists. Only “not enough shade” was a factor greatly concerned by both groups. When the timing comes for restoration projects to occur in Brentwood, these gaps will need to be addressed in a participatory context so that controversies raised by restoration projects elsewhere (Gobster & Hull 2000) can be prevented.

3.4 School Drawing Exercises

Since children do not respond well to the heavily text-oriented questionnaires, a parallel to the adult household survey for Brentwood children was the drawing exercises conducted in 4 schools and 6 classes that range from the second to the eighth grade (about 8-14 years old). The class size varied from 13 to 28, and in total 122 kids (58 girls and 64 boys) participated in the exercise.

Because of its proximity to Marsh Creek, Brentwood Elementary was chosen for the sampling of 2nd and 4th grade classes. The 6th grade class was sampled in Edna Hill Middle (the only 5th and 6th grade school) and the 8th grade class in Bristow Middle (the only 7th and 8th grade school). The private Willow Wood School (also known as Dainty Center) that abuts Marsh Creek was sampled as well because not only does it abut Marsh Creek, its mini zoo was a side show along the paved trail. Both of its primary classes were sampled, one with 2nd and 3rd graders and the other with 4th to 6th graders.

The drawing exercises lasted for 50-100 minutes. In each exercise the kids first practiced using their "mind's eye" to recall images of their homes and then their experiences at the creek. The kids were then asked to draw a good time they had at Marsh Creek, including what they see, feel and what they do there. Those who have no experience with the creek or who finished the first drawing early were directed to draw a dream creek in their minds. Myself and one or two assistants then talked with each kid briefly to get information on frequency and content of their creek uses. The procedure of the exercises is detailed in Appendix A.3.

3.4.1 Aggregate Data

Use patterns

The activities appeared in the drawings and mentioned during the short interviews were tabulated using the same categories developed in adult household survey. The result reveals a dramatic contrast between the ways children and adults use the creek. Among the 206 activities mentioned by the 122 participants, it is clear that children's uses are overwhelmingly in the form of "dynamic interaction" (69%). "Moving along on the trail" only takes up 15% of the total reported activities, as opposed to 41% in the wonderful experiences of adults and 74% in activities given freely by the adults. "Static interaction" consists of 10% of children's uses (Figure 3.36). However, since we have observed that this type of activities tend to not be considered as a form of use until prompted by the researcher, we can estimate that the actual ratio for this type of use would be higher.

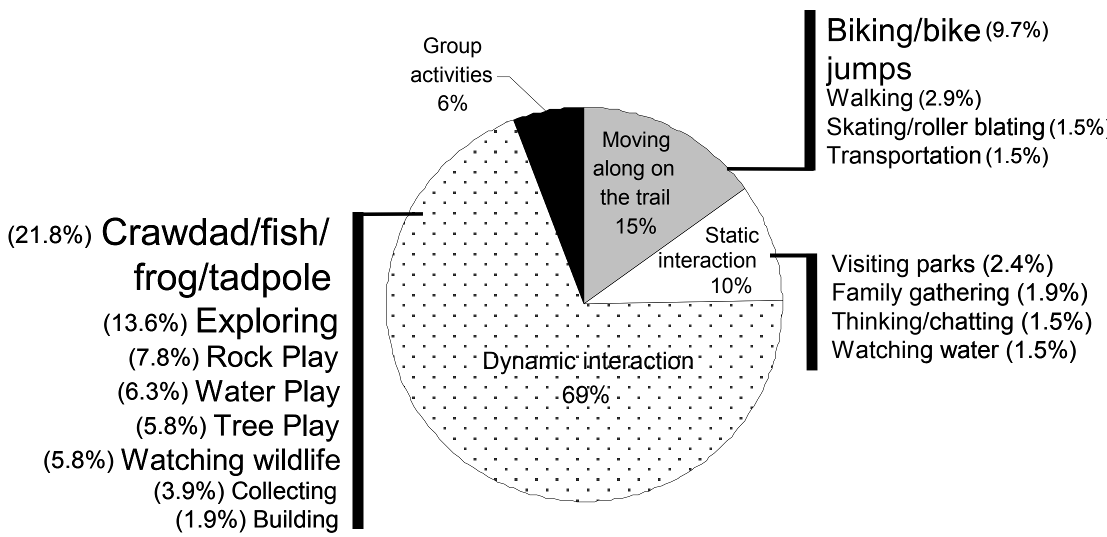


Figure 3.36 Brentwood children's use of the creek

One third of the kids (33%) use the creek more than once a week and are referred to as "frequent users." The level of interaction here is subjectively determined by the content of use provided in the drawings or thru the interviews, and the users are simply divided into "interactive users" and "non-interactive users". Almost half of the kids (48%) are interactive users, who use the creek through direct contact with wildlife, vegetation, water, bed material or other elements in the creek environment. Compared with the fact that 70% of the adult survey respondents are frequent users and about 60% of them have little or no interaction with the creek, it is clear that children do not go to the creek as much as adults, but they certainly get down to the creek channel and interact with it more.

In terms of use company, children most often go to the creek with one or two best friends or siblings, followed by with parents. Only 7% of the kids would go to the creek alone because it is usually not allowed and considered less fun (Figure 3.37).

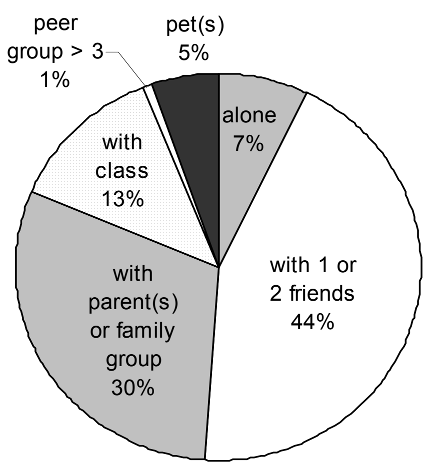


Figure 3.37 Brentwood children's creek use company

Creek Uses vs. Conceptions

The drawings give a wide range of accuracy and variety of the depicted creek environment. If spontaneous uses enhance the correct conception of the creek, users with higher frequency or level of interaction would demonstrate on the drawings better understanding of the creek environment. The accuracy of drawing, however, did not allow for statistical investigation for several reasons. Although we tried to ask where the rendered place is, many young kids did not have the vocabulary to express this clearly. The drawings sometimes do not associate to one place and one time but represent a combination of impressions received from the creek over a length of time and across a range of places. Moreover, creek features vary along with changes induced by people or wildlife or water fluctuation. The trend of the relationship between use and accurate creek conception can however be traced through simply looking at the drawings.

An index of creek conception that can be examined rather easily with content analysis is the "variety" shown in the drawings[1]. Different forms of vegetation and wildlife, as rendered on the paper and confirmed by the interviewers, were counted as different "species." Similarly, different bed or bank materials (rock, gravel, sand, mud, riprap, debris, etc.) and channel irregularities (island, inlet, bank ledge, etc.) were counted for channel features and different textures or annotations used to express various depths and flow speeds for water features. I also tabulated the number of human built structures (paths, bridges, pipes, houses, fences, tree house, etc.), tools and possessions (bikes, fishing pole, buckets, etc.) and the number of people (with identities shown in the drawing) to understand how different types of users regard them differently.

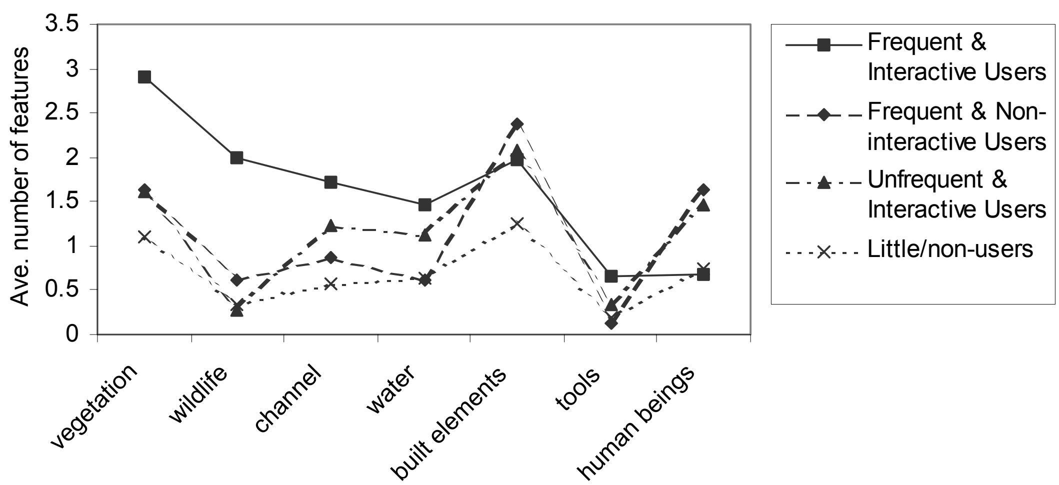


Figure 3.38 Children's creek use and the variety in the drawings

[1] Of course the variety expressed in the drawings would vary to a great degree according to where it was being drawn, since both users and non-users came randomly from different parts of the city, this effect can be considered slight.

As shown in Figure 3.38, the result indicates that kids who use the creek both frequently and interactively (spontaneous users) rendered a much higher variety in all the four measurements: the number of vegetation "species", wildlife "species", water features and channel features. This result supports the hypothesis that the spontaneous use does significantly enhance the understanding of the creek environment.

Spontaneous users also showed most tools and personal possessions in the drawings, indicating that they do use tools to support their uses. Frequent but non-interactive users drew the most built elements, since they tend to stay up on the trail or use the facilities in the parks. They also put down most people on the paper, showing the importance of the social aspect to their uses. Interestingly, spontaneous users drew least number of human beings, which seems to indicate that their focus when using the creek is largely on the environmental features instead of their company.

Age effect

Both the frequency and interaction of creek use peak at the 4th grade. Second graders are in general considered too young to play in the creek. At the sixth grade use starts to drop, and 8th graders have lowest use[2] (Figure 3.39). The same trend extends to the presence of wildlife, vegetation, water features and channel features. Wildlife particularly had all but disappeared from the drawings of the 8th-grade class (Table 3.11). Even the crawdad hunters did not put crawdads in their drawings, instead, they tend to compose realistic scenes and use notes to explain their uses.

The phenomenon that human figures decrease quickly with age should not be explained within the boundary of creek drawings. It seems that older kids are more

[2] The data may under-represent the use slightly since the sample of 8th grade class happen to accommodate new-comers, with a quarter of the students who moved to Brentwood within the last year.

reluctant to draw people because they are bothered more by the realism of their works. However, it also seems to parallel a change of use company. Young users most commonly go to the creek with parents or family groups. At the middle age of childhood, one or two best friends become the primary use company, and at the 8th grade, lone users have increased to the same amount as best friend groups (Figure 3.40).

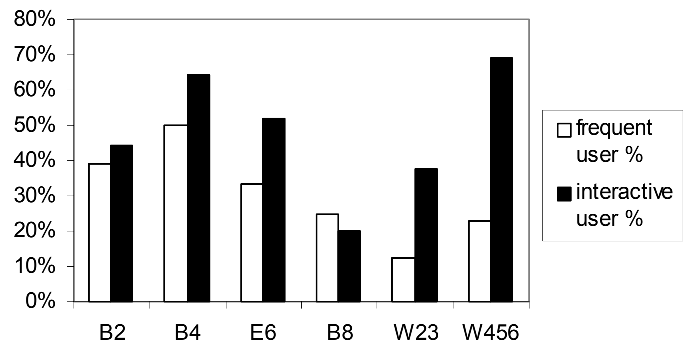


Figure 3.39 The effect of age and school on use frequency and interaction

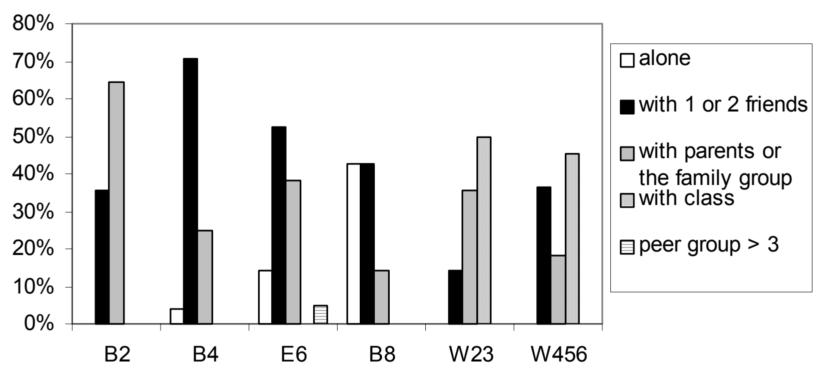


Figure 3.40 The effect of age and school on use company

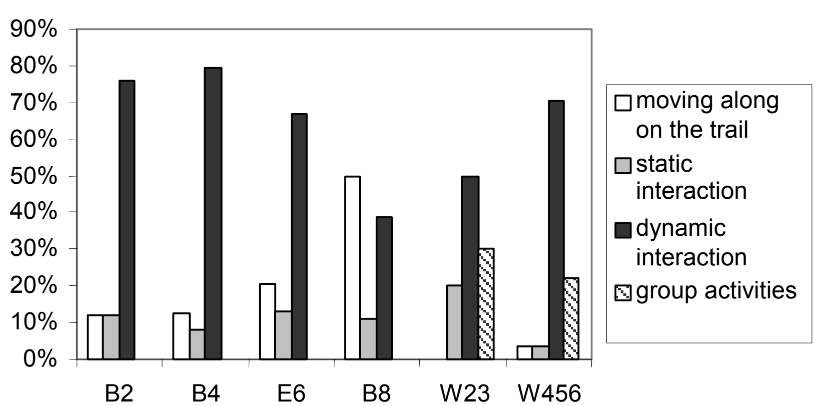


Figure 3.41 The effect of age and school on use content

In terms of the content of use, “dynamic interaction” decreases from the 4th grade on up, and “moving along on the trail” increases along with age. The 8th grade marks a turning point where “moving along the trails” for the first time exceeds “dynamic interaction” (Figure 3.41). The factors that may effect the rather abrupt change of creek use patterns at the age of 12-14 will be discussed in Chapter 6.

Table 3.11 Drawing content analysis by classes (average number of features per student)

Class	vegetation	wildlife	channel features	water features	built elements	Tools	human beings
B2	1.89	0.67	0.89	1.06	2.28	0.39	2.56
B4	2.89	2.04	1.64	1.43	1.43	0.71	0.89
E6	1.89	0.52	1.41	0.89	2.26	0.33	0.63
B8	0.80	0.00	0.65	0.60	1.55	0.15	0.15
W23	1.69	0.63	0.56	0.81	1.13	0.19	1.63
W456	1.08	0.54	0.85	1.15	2.23	0.31	1.00

School effect

Before the exercise I was expecting rich results from the Willow Wood School because of its commitment to alternative education. The school has plenty of features that attract education-minded parents. It has only some thirty students, the curriculum is known to be flexible and innovative, and the classrooms are laid out like cozy homes. Most of all, the school seems dedicated to environmental education in all possible aspects—the campus has an aviary, a little zoo where they keep farm animals next to the creek, a row of aquaria in the hallway and an outdoor eco-pond. Aside from creek cleanups every year, the school even arranges innovative events such as frog catching and crawdad fishing festivals. I spent some time observing the kids during the lunch break--the little school ground was bustling with activities. The kids all spoke well and appeared sanguine and confident. Both the principal and I were certain that the exercise will be fruitful in exploring the creek uses.

But the result was quite contrary to my expectation. I was very puzzled observing that although the classes were allotted longest time for the exercise compared to other survey classes, many kids could not put much down on the paper. Most of the drawings exhibited plainness or irrelevance and the kids seemed to have much less knowledge or concept about the creek compared to the other classes of the same age (See Table 3.11). Moreover, their dream creeks tended to be more materialistic and distorted.

Toward the end of the exercise, the puzzle was gradually cleared up by talking to the kids individually. I learned that aside from the events organized by the school, most students in fact have very little contact with the creek. They mostly come from wealthy families, and more than two-thirds of them live out of Brentwood in other suburban towns, where they don't have access to nearby waterways. They are sent to school in the morning and picked up in the afternoon by the parents. Many of them are told by parents to keep away from the creek.

Consequently, frequent users composed only 12.5% of the 2nd and 3rd grade class and 23% of the 4th to 6th grade class, much lower than the other sampled classes. Although the percentage of interactive users seems high, it was largely due to the organized activities by the school (Figure 3.39). Although some drawings did reflect the result of environmental education as will be discussed in **3.4.4**, almost none of them exhibited the richness and accuracy of observation demonstrated in the works by spontaneous users in the 2nd, 4th and 6th grade classes in public schools.

3.4.2 Marsh Creek Drawings

When looking at individual drawings, the differences between spontaneous users and non-users are unmistakable. Children with little or no experience on Marsh Creek usually still had some sort of concept about it and struggled to put it down on paper. Young kids without use experience often mistook the very idea of a creek with a pond and used a rectangle or circular water body to express the creek.

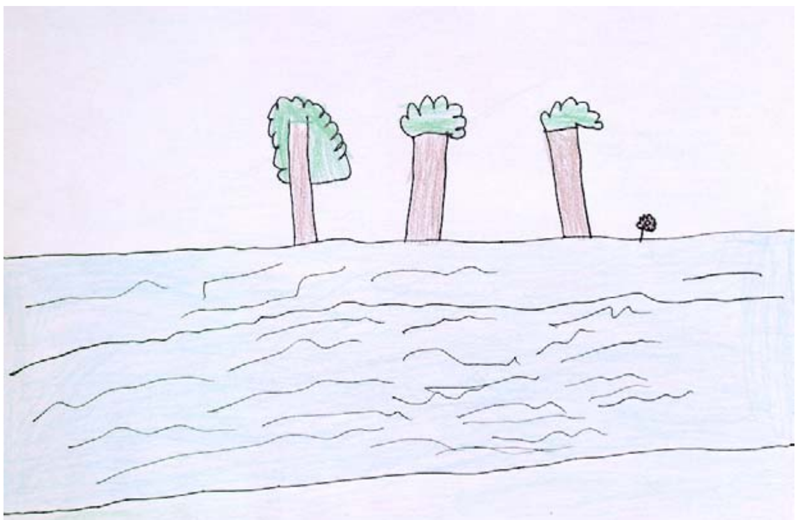


Figure 3.42 Drawing from a 2nd grader who had never been to Marsh Creek; he imagined the creek would look like this

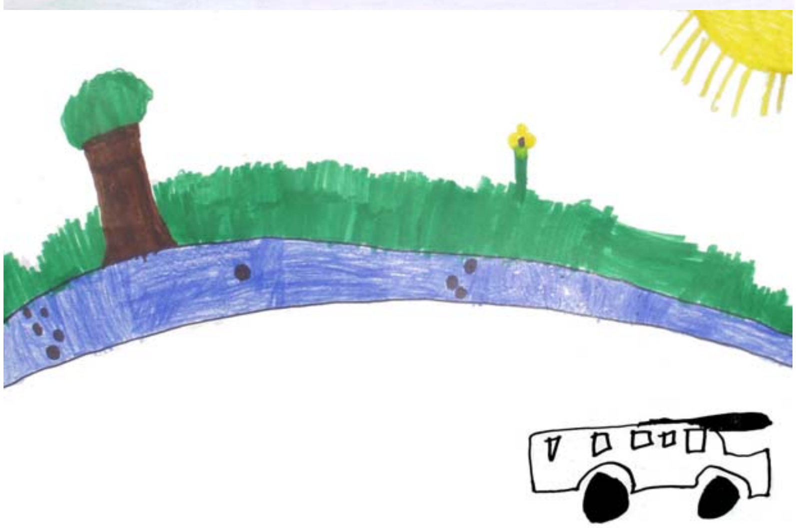


Figure 3.43 Drawing from a 4th grade non user who has only seen the creek in a car

Generally speaking, the drawings of the non-users convey a thin place identity. They either displayed plain nothingness or were strewn with stereotyped elements such as the sun, clouds or trees as remedy (Figure 3.42, Figure 3.43). Such users also may have little idea as to what they could do at the creek. A 2nd-grade boy when asked what he would like to do if he did get a chance to go to the creek, puzzled for a while and answered that he "just want to look around." This lack of idea may be remedied by age, yet at the eighth grade a non-user can possess a very false image toward the creek (Figure 3.44).

Figure 3.44 Drawing from an 8th-grade non-user who imagined Marsh Creek in ways similar to a goldfish bowl. "Relaxing" is her use, if she did go there

Users who only occasionally use the trail or park without contact with the creek may do a fair job depicting items such as trails, bridges, fences, houses or play equipments. Their drawings may truthfully or recklessly reflect what the creek looks like in a distance or from a car. But in either case, the drawings would not contain much detail on the creek channel, wildlife or vegetation (Figure 3.45 to Figure 3.48).

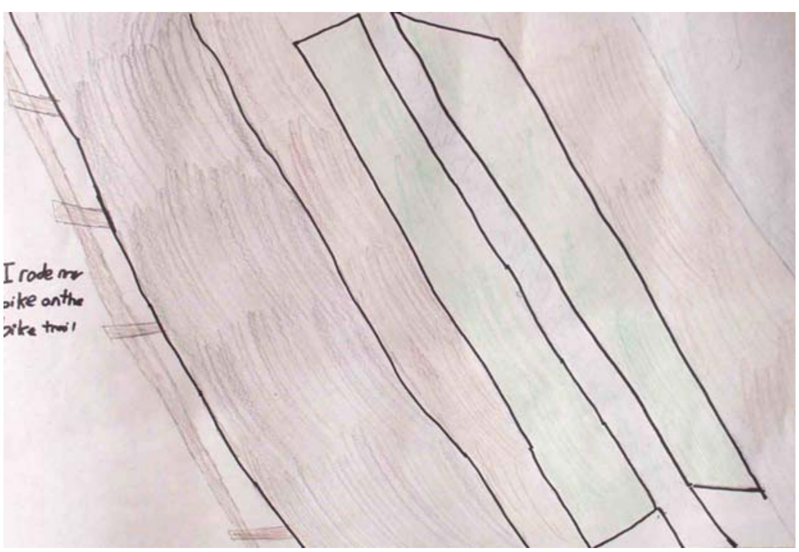


Figure 3.45 From an 8th-grader who occasionally rides his bike on the trail

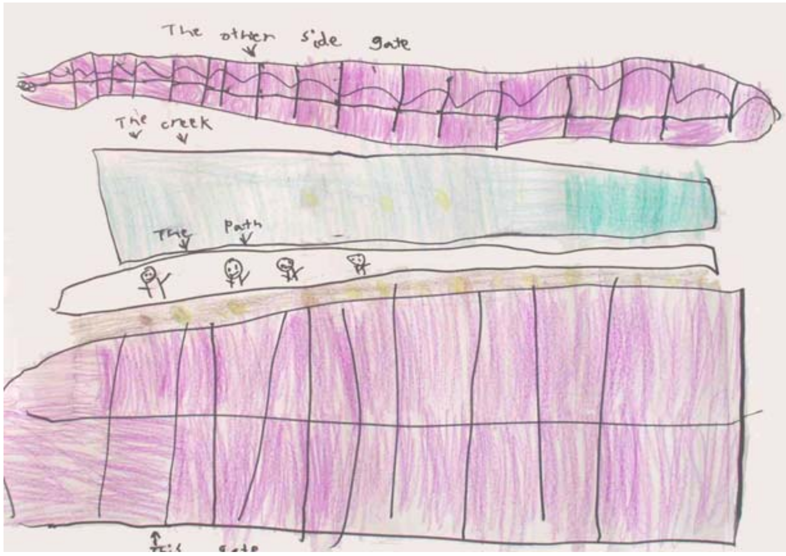


Figure 3.46 From a 3rd-grader who occasionally uses the trail but is not allowed to go down the creek

Figure 3.47 From a 2nd-grader who uses the trail and equipment at the park but does not go by the creek

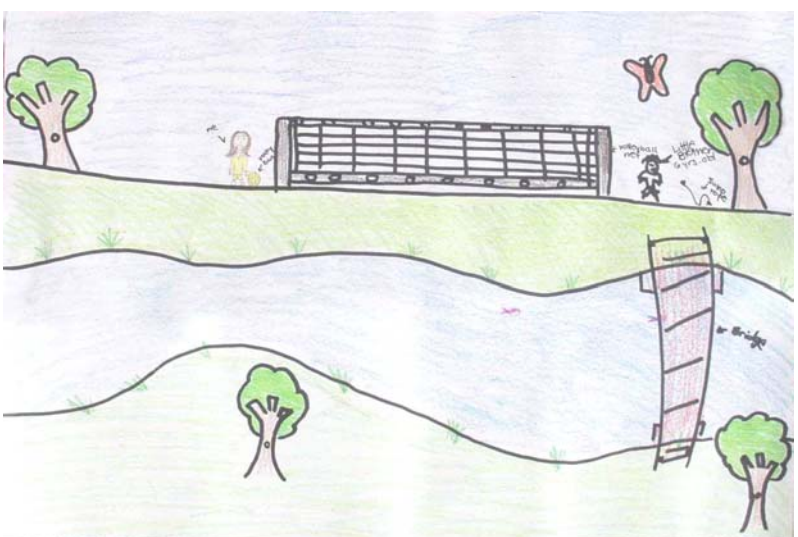


Figure 3.48 From a 6th-grader who plays valley ball and jump rope at the park, but does not have much contact with the creek

On the other hand, kids who use the creek both frequently and interactively demonstrated rich knowledge on the details of the landscape, including habitat features. For example, Stella, a 4th grade spontaneous user, put down on her drawing not only diverse wildlife species and environmental features, but also ecological relationships such as a raccoon praying on crawdads at the thicket by the water (Figure 3.49). In the same class, Erica's work reflected her passion and keen observation of animals. Her drawing astonishingly displayed 21 species she found at the creek, all rendered in a liberal but vivid way (Figure 3.50).

Figure 3.49 Stella's (4th grade) favorite place at the creek where she observes animals almost daily

Figure 3.50 The drawing of Erica (4th grade) is crowded with 21 wildlife "species" she found at the creek. She goes to the creek everyday

Many spontaneous users' drawings included much detail on topography and geomorphology. Taylor, a 6th-grade girl, used several different colors and textures to denote the hills, the "rock claming road", the ramp for bike jumps, and the eroded bank (Figure 3.51). She had clearly adapted this spot with her naming and uses of the different parts. In her drawing she explained how all the geomorphologic features are meaningful:

> *"Sometimes we ride our bikes on the ramp and down the trail; also we rock climb down and up the rock climbing road; we slide down the hills on my sled; when it is hot we jump off the rope into the water; and we build a bigger dam in the middle of the creek….[spelling corrected]".*

Similarly, Kristy named her spot "Shallow Creek" and showed the deep and shallow areas, muddy and gravel reach, the swift flow over rocks, the dirt paths and the "down creek" direction although she was only 7 years old (Figure 3.52).

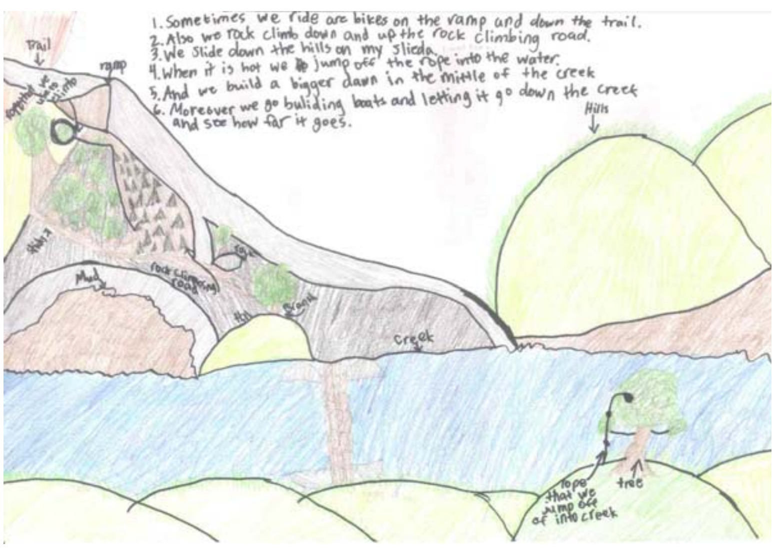


Figure 3.51 Taylor's (6th grade) drawing and annotation give a detailed account to her use at her Marsh Creek spot

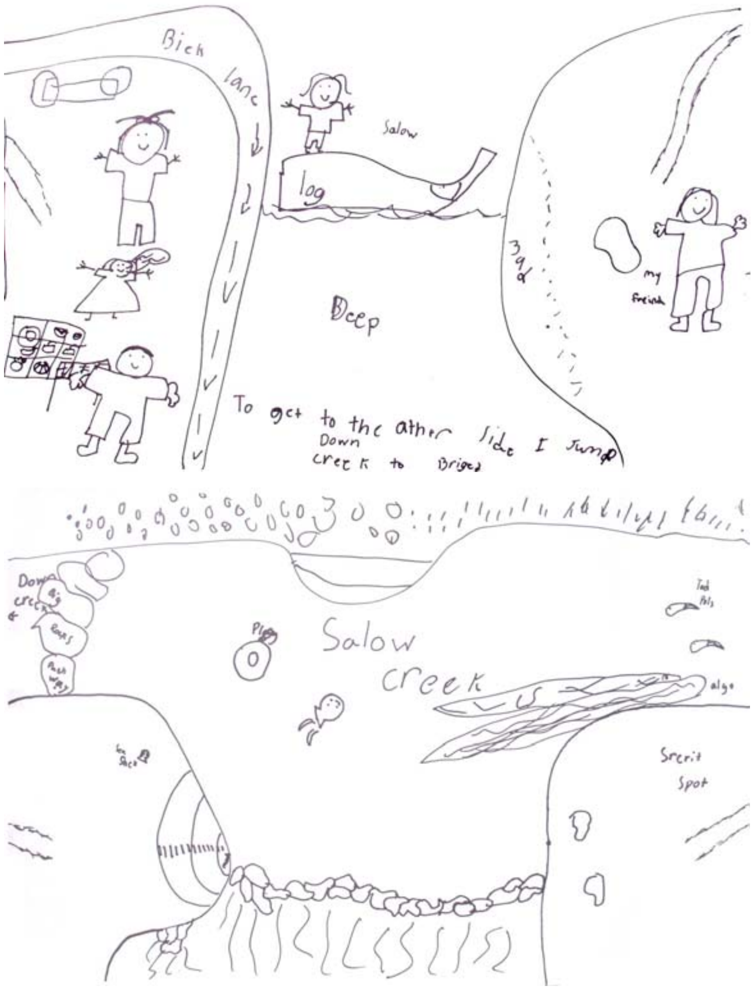


Figure 3.52 Kristy (2nd grade) used two drawings for her "secret spot"—Shallow Creek. She denoted deep and shallow parts, muddy and rocky areas, the "rockway," the "bench" she made, etc.

The power of certain moments when the creek interaction makes a deep impression in the mind was fully illustrated by some spontaneous users. In Jeff's drawing, a crawdad has just clutched his bait and got pulled up the water surface (Figure 3.53). Joyce's work went further into the moment—he perfectly caught the split of a second when the rock he skipped got to the third bounce, where the overlapping ripples and splashes have pushed apart the moss and scared away a tadpole and some minnows (Figure 3.54).

Many spontaneous users (usually older kids) did not show in graphics their own activities but they often had very exact impressions of their favorite spots. For example, Ben made a realistic drawing of his favorite spot at the railroad track, including the height limit sign, the pavement and the somehow dirty water (Figure 3.55). In Shirley's drawing, she showed a short section of the creek in detail—a spot where she came alone or with her friend (Figure 3.56). In contrast, Naomi's drawing would look very abstract. But we soon understood it was in fact a close-up shot of her and her brother's secret culvert base, where they bring in a portable radio, play guitar or read books (Figure 3.57).

Figure 3.53 An exciting moment for Jeff (4th-grade) who goes to the creek with friends every week

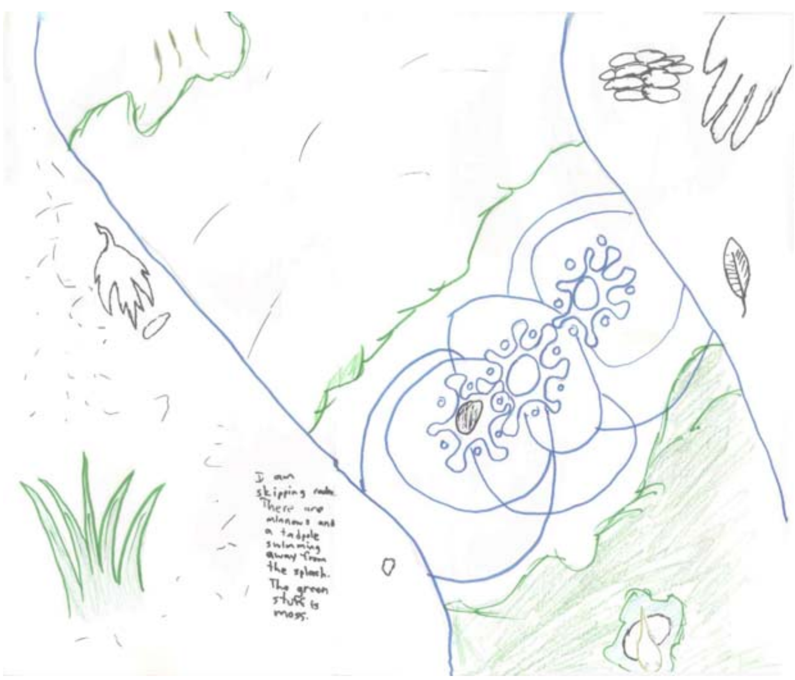


Figure 3.54 Joyce (4th grade) depicted a memorable moment at the creek: "I am skipping rocks. There are minnows and a tadpole swimming away from the splash. The green stuff is moss" At the upper-right corner by his hand is a pile of the "skipper rocks"

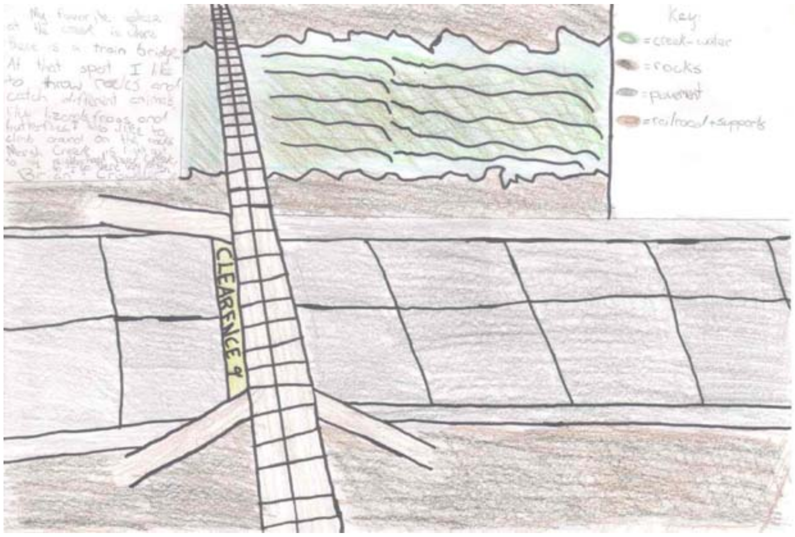


Figure 3.55 Ben's (6th grade) favorite spot at Marsh Creek. At the upper left corner he wrote: "My favorite place at the creek is where there is a train bridge. At that spot I like to throw rocks and catch different animals, like lizards, frogs and butterflies. I also like to climb around on the rock. …"

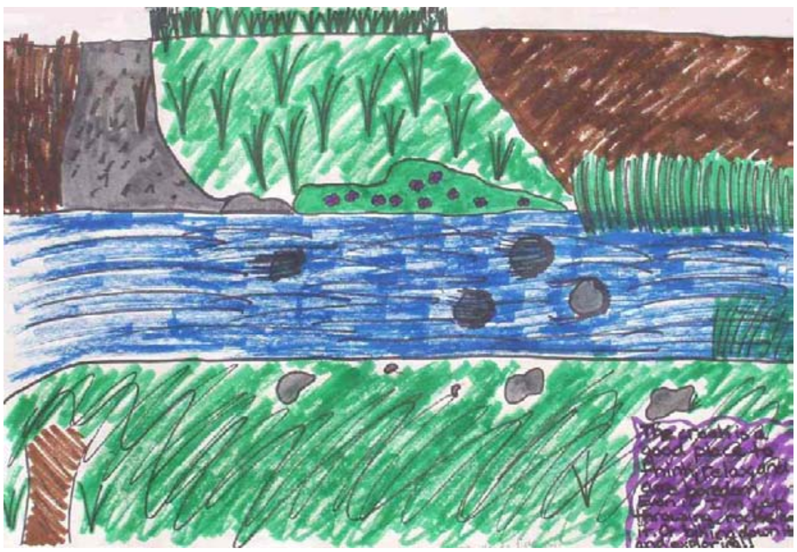


Figure 3.56 Shirley (8th grade) explained clearly the solitude function of her favorite spot: "The creek is a good place to think, relax, and cure boredom. Even if I'm just throwing rocks in it or biking down it…"

Figure 3.57 Naomi (4th grade) shows the secret base of her and her brother—the culvert pipe

During the exercises, it was usually easy to judge from the progress whether the kid was a creek user, for they in most cases could quickly decide what they wanted to draw and expressed them in a fairly clear way. However, there were cases where the creek users could not put down effectively what they wanted to express or their works became a combination of imagination and reality or they adopted certain rigid way of drawing so the result bore no semblance to the place at all.

3.4.3 Dream Creek Drawings

Spontaneous users or not, young kids' dream creeks are often full of whimsical collages from contexts unrelated to the stream environment. Although the desires to see animals, swim or play at the tree house are common, they are often mixed with the themes of urban materialism (TVs, ice creams, soda machines, manicure/pedicure stand, money per se, etc.), amusement parks (looping water chutes, play equipments, etc.) or futurism (cloning machine, flying saucer, etc.) (Figure 3.58 to Figure 3.60).

Figure 3.58 The dream creek of a 2nd-grade girl who seldom goes to the creek.

Figure 3.59 The dream creek of a 2nd-grade boy who uses the creek frequently

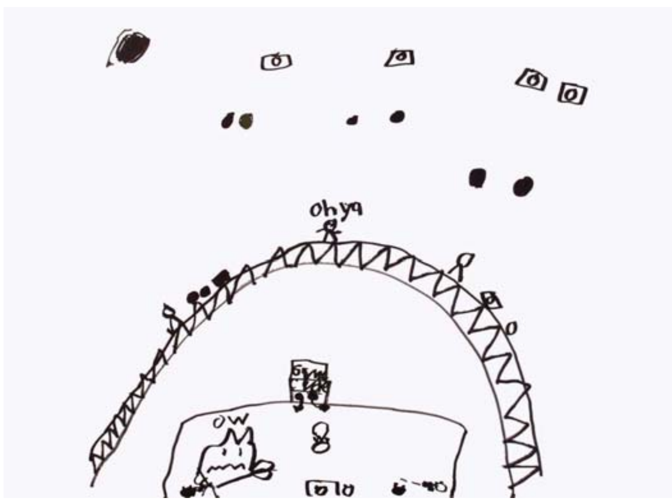


Figure 3.60 The dream creek of a 3rd-grade non-user. This drawing includes raining money, flying apple pies, and a TV in the creek

At the age of the 6th grade, dream drawings of the creek users may still contain amusement park or urban materialism. However, they tend to preserve the fun elements currently enjoyed. For example, Keith's dream creek preserved the bike jumps and the footbridge from his first drawing and added the food stands, water chutes and other amenity items. The sign "Only Swimming" and the recycle bin communicate his protest against the creek's current situation (Figure 3.61). Tim's first drawing illustrated his favorite fishing spot upstream Marsh Creek. In his dream creek, 50 years later people will be riding "hover car" to Brentwood, yet he will still fish at the same spot (Figure 3.62).

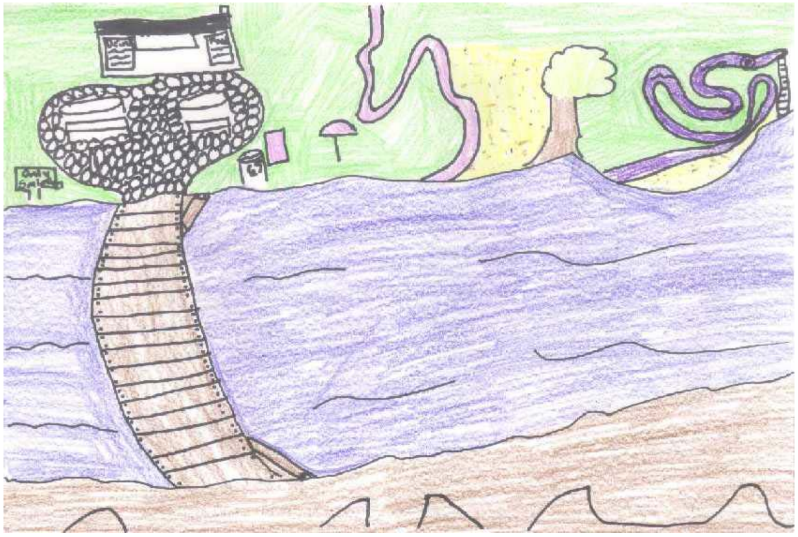


Figure 3.61 Keith combined original and invented features into his dream creek

Figure 3.62 Tim emphasized in this drawing: “At the creek in 2050 I still like to fish here." The barn and garage at this spot will be replaced by a pretty cottage

Yet for the 6th grade little or non-users, pastoral scenes became prominent in their dream creek drawings with the grassy fields, neat looking trees, little bridges, and rocks in the water (Figure 3.63). At the 8th grade, dream creeks continued to be pastoral, with the additional elements of tents, horses and campfires from the experiences of camping trips at remote scenic streams (Figure 3.64). Thus, it can be supposed that by 8th grade, many kids have adopted the viewpoint of the prevailing nature ideology, which may be to some degree more real than the fanciful scenes dreamed by the young kids, but not much so.

The ideal scenes of non- and little users hint to us on the forming of creek conception devoid of actual contact. Since the sampled eighth grade happened to be mostly non-users and that many creek users did not have time to do the second drawing, a parallel comparison of spontaneous users and non-users could not be done. However, considering the idyllic mode observed from the adult interviews, creek users may be able to enjoy only a few additional years of direct observation and interaction before they shift into the overspreading wilderness/pastoral viewpoint.

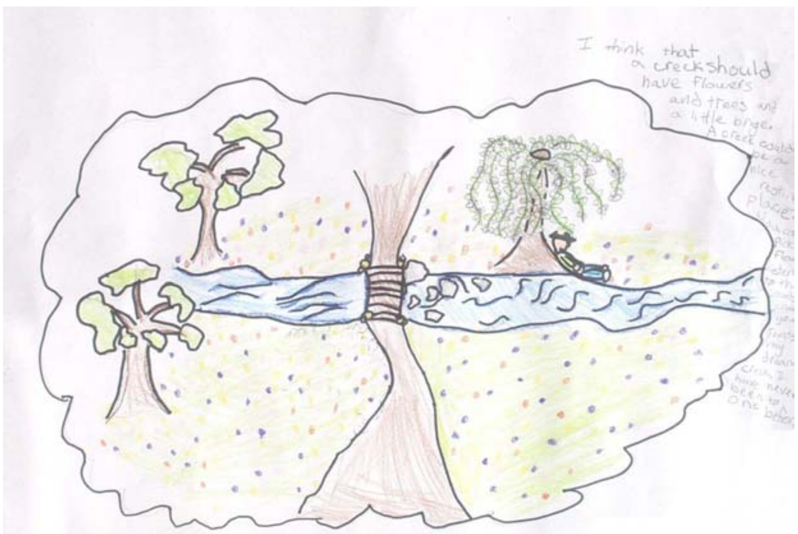


Figure 3.63 A 6th-grade girl explained her dream creek: "I think that a creek should have flowers and trees and a little bridge. A creek could be a nice resting place. You could pick flowers and listen to the sounds around you. That's my dream creek. I have never been to one before."

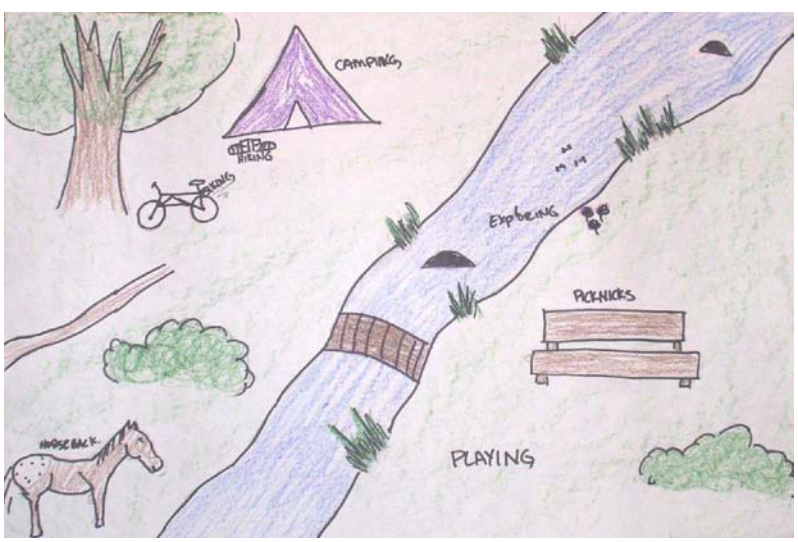


Figure 3.64 The dream creek of an 8th-grade girl. The camping trip is a popular theme for both boys and girls at this age

3.4.4 Environmental Concerns

Garbage and dumping is not only the number one concern for adult residents in Brentwood, it appeared the same way in the children's drawings. Although kids were directed to draw a "good time" at the creek, a number of kids rather stressed their negative impressions to it.

Marco (2nd grade) walks or rides his scooter around the Creekside Park area about once a week. His work demonstrated his mental acuteness and an unusual dexterity in drawing, but meanwhile posed an irony to the stretch of the creek that is beloved by many. The drawing poignantly showed the garbage ridden channel when it is dried up in summer, exposing the riprap and reducing the creek to little scattered ponds. He dramatically thinned out the trees on the banks and purposely put the houses and fences at one corner. He also showed how the creek became out of reach where it gets surrounded by the orchards (Figure 3.65). When asked whether he gets down to play, Marco was full of contempt "Play there? It's full of garbage!!"

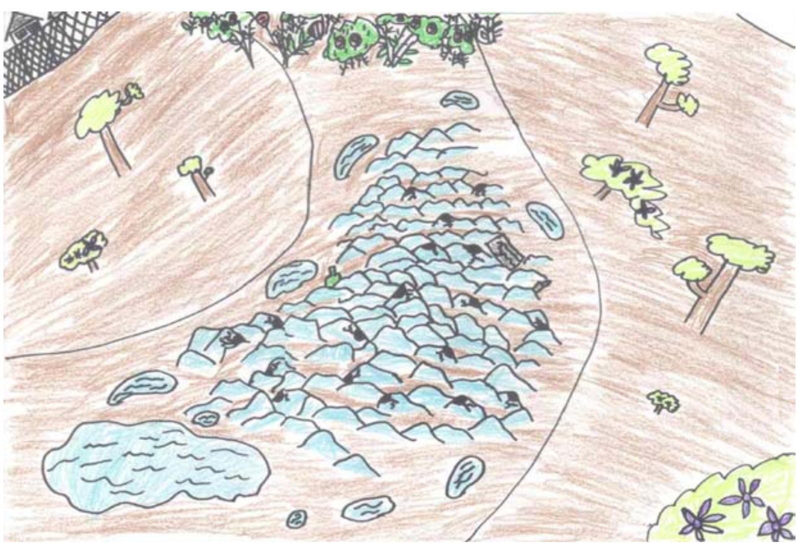


Figure 3.65 Marco (2nd grade) conveyed his discontent at the garbage ridden stream bed in the Creekside Park

Similarly, the 8th-grader Pete conveyed the degraded situation of a creek from his past experience. Pete just moved to Brentwood and had not gone to Marsh Creek. He therefore drew a creek he saw during a school hike to Diamond Canyon in Oakland. The creek came out of a huge pipe and he was very impressed by the sight of a truck dumped in the channel (Figure 3.66).

Figure 3.66 Pete (8th grade) drew a sight as he was impressed by the dumping at a creek in Oakland, CA

On the other hand, environmental education seems to have created an effect to the extent that some kids showed in their ideal creeks the scenes of group clean-up or elements of recycling bin or "no-dumping" sign. However, lacking of creek interaction, there was almost a disturbing preachy quality in these drawings. For example, in Paul's dream creek drawing he stopped the waste water discharge from some plant into the creek, put a trash can by the trail, had a kid say "no more trash!" and showed a single fish and a single bird in the creek (Figure 3.67). But Paul is a trail user instead of a creek user and his other drawing of Marsh Creek conveyed drabness common to non- or little-users. I suppose his education contained more prescriptive behavior codes than the wonder and joy available in the creek.

Willow Wood School kids particularly demonstrated a tendency for habitat concerns. What was common in these drawings was a desire to alienate human uses from the wildlife. Teresa's dream creek had several ponds connected by some "thin water". She explained that if the creek is straight, the fish would "crowd together." She created the crawdad ponds and fish ponds that are directly connected, but the pond for human use (boating) was separated so "they won't destroy the habitat." She also wanted a flat trail for walking and biking, where there was a "funding box or fountain so people can donate money to help the creek" (Figure 3.68). Nichole's dream creek had a big pond that serves as her family's private swimming pond. Smaller "water ponds" and "mud ponds" connected to it are for fish and crawdads, separately (Figure 3.69).

Figure 3.67 The dream creek of Paul (6th grade) shows his desire to get rid of trash and pollution and displays some effect of environmental education

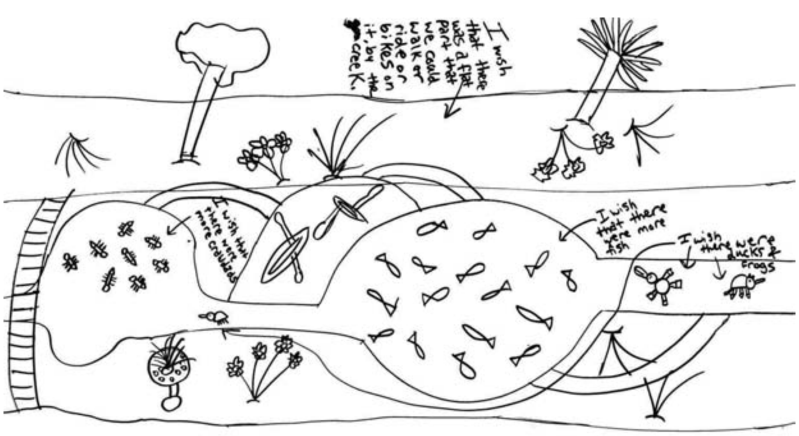


Figure 3.68 Teresa (5th grade) designed her dream creek where fish and crawdads and people have separate "ponds"

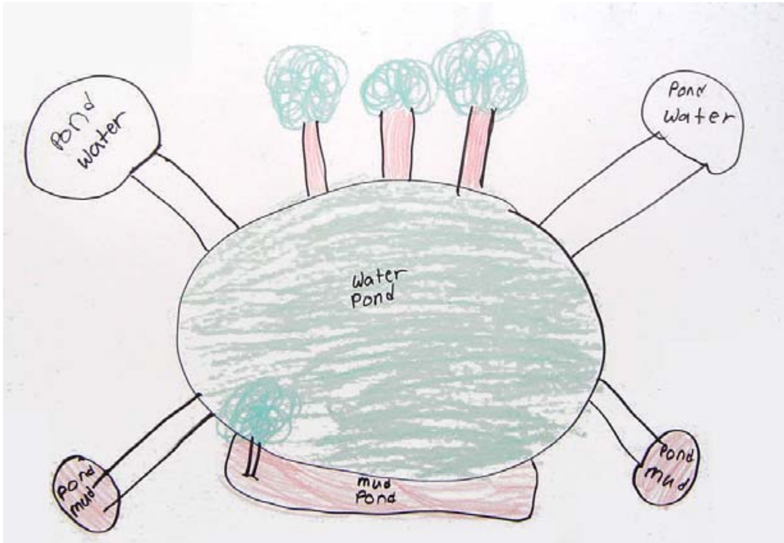


Figure 3.69 Nichole's (5th grade) dream creek is private—it consists of a big swimming pond and smaller ponds as wildlife habitats

3.5 Summary: Human-Stream Relationships in Today's Cities

The knowledge gained from the Marsh Creek survey project in Brentwood can function as a guidepost in understanding the current human-stream relationship in urban or urbanizing areas in the United States. The project has also in part corroborated the hypothesis set out at the beginning of the chapter: spontaneous use plays a crucial role in motivating a healthier human-stream relationship through the positive feedback of use, conception and value.

The adult household survey substantiated a host of factors concerning creek value, conception and use reviewed in Chapter 2, such as the importance of proximity to creek use, the symbolic value of the creek's existence, and the predictors and variation in landscape preference. Moreover, it generates new information that is particularly important in considering the role of the spontaneous use:

- In general, the creek is valued as "nature" both conceptually and through actual use. But for most adults, such value is devoid of sense of ownership and place attachment.

- As a trend, visual preference is enhanced by familiarity and by adopting judgment criteria other than “cultural aesthetics”, such as “use potential” or “personal experience”.
- Although the current uses of the creek verify it as part of people’s daily lives, most of them are routine exercise on the trail with little creek interaction.
- It is the reciprocal engagement with the creek environment that gives rise to “wildlife experience” and “aesthetic experience”, the two major themes of creek memories. Similarly, “moving along the trail” rarely serves as a memorable experience without “dynamic interaction” or “static interaction” being present.
- Users with higher creek interaction levels not only value the creek more, they are also much more likely to possess wonderful creek experiences and commit themselves more to creek enhancement efforts. Compared to the content of use, frequency of use has much weaker effect on these desired ends.
- Parents are much more likely to approve their kids playing at the creek if they can see the creek in the houses, at the yards or walking around the neighborhood. The approval rate is notably higher at the area where subdivisions hold a more friendly relationship with the creek channels.

In short, spontaneous interaction with the creek brings about positive creek experiences, which in turn raise the individual’s creek value and advocacy. The survey, however, did not reveal obvious effects of spontaneous use on the creek conception.

Conception has other sources than actual experiences, such as culture and knowledge acquired by education. The effect of culture as a powerful agent in shaping creek conception is further explored in interviews with selected respondents. Here I discovered the dominant mode of adult appreciation toward Marsh Creek—the idyllist. Mixing and succeeding the centuries-long pastoral and wilderness ideals, idyllists enjoy the creek essentially through solitude; they have anti-artifactual tendency; they express a severe sense of loss toward the development and the change of the creek. The fact that these subjects had higher-than-average creek interaction indicates that the effect of spontaneous use in forming conception can be tampered by culture and limited in extent.

Almost all subjects had valued creeks in their past. These creeks were never of the category of recreational development, but creeks as "nearby nature" with which the subjects interacted freely. Even though ideal images were presented as amalgam of the personal past creeks, altogether they formed a very consistent image as if being filtered by the cultural lens. Between restorationists and residents there were remarkable gaps on the ideal images of water, vegetation, wildlife and access.

Although the idyllist viewpoint remains distorted at times, to label it as simply romantic would be unfair. The therapeutic effects or spiritual gains the residents acquired were undeniable. Neither is the loss they felt pure sentiment—they have observed the substantial decrease of wildlife and environmental quality and witnessed the dwindling of experience per se. The strong idyllist tendency and misconceptions among those with the greatest appreciation to the creek presents a paradox. On one hand, they are the reliable advocates for stream restoration efforts; on the other hand, their view of the creek tends to be what is not and what "cannot" be. Even if we reduce how much solitude a creek can afford to a technical design issue, the idyllist image is something we have to confront, since if pastoral/wilderness ideal is continuously poured into the suburbs, no splendid design may resolve the dilemma of sprawl.

School drawing exercises discovered that as opposed to adult residents, children's use of Marsh Creek is almost entirely through dynamic interaction. The creek drawings demonstrated the clearly positive relationship between spontaneous use and creek conception. Spontaneous users rendered with much higher variety and demonstrated rich knowledge on the details of the landscape, including habitat features. In contrast, the drawings of non-users displayed lack of understanding of the creek and a thin place identity. Environmental education was reflected in the drawings of non- or little-users as slogan or as efforts to alienate human users from protected habitats, without evidence in heightened understanding of the creek environment.

Moreover, non-users' dream creek drawings hint to us on the formation of creek conception devoid of actual contacts and the infiltration of cultural ideals. Young kids' dream creeks were full of whimsical collages from contexts unrelated to the stream environment. By the 6th grade, pastoral scenes started to dominate the dream creek drawings. At the 8th grade, dream creeks remained pastoral, with the additional elements from the experiences of camping trips at remote scenic streams.

In Brentwood, creek interaction peaks at the 4th grade and tapers off with age. Considering that many adult idyllists used to be spontaneous users, it is possible that spontaneous players today may not enjoy the keen observation and carefree interaction for many more years. What happens as far as the relationship with streams is concerned during the process of "growing up?" What cultural factors prevent adults or children to benefit from the full potential of spontaneous use in motivating healthy human-stream relationship? These issues will be further discussed in Chapter 6.

Chapter 4 Investigating Spontaneous Uses

This chapter examines the environment-behavior relationship of spontaneous uses at urban streams, with a particular emphasis on children's play activities. For as observed in Chapter 3, it is children's spontaneous play that best demonstrates the reciprocal interaction of human with the animated stream environments. In addition to Brentwood, this investigation extended to two other case study sites—Sonoma Valley, California and Kochi, Japan. Observation and interaction with both children selected from the drawing exercise participants and those encountered at each site generated the typology and habitat analysis for spontaneous uses. It is my purpose that the typology and habitat needs discovered here may facilitate planners and designers to read the potential for spontaneous uses of a site when conducting their jobs in restoration projects.

4.1 Introduction of Case Study Sites

The selection of case study sites generally followed the same criteria for the base site. The primary goal of case studies is to broaden the subject matter of documentation and collect as diverse patterns as possible. In this regard Sonoma Valley, which contains a series of small towns, served well as another Bay Area site. The condition of creeks, riparian land ownership, access and use patterns all pose interesting contrasts against Brentwood. On the other hand, I happened to be familiar with Kochi, Japan, a city with waterways frequented by its residents. It provided promise to enrich the physical and socio-cultural contexts of this investigation.

At both Sonoma Valley and Kochi, I repeated the procedure of school drawing exercises followed by creek tours led by selected play experts. This parallel of research procedure allowed for inspection on the effect of physical and social factors on the observed use forms and habitat patterns. The investigation, however, is not a controlled experiment for parallel analysis; nor is it intended for a cross-cultural comparison in any precise sense, although such efforts may be valuable after a general picture on spontaneous use is constructed.

4.1.1 Sonoma Valley, California

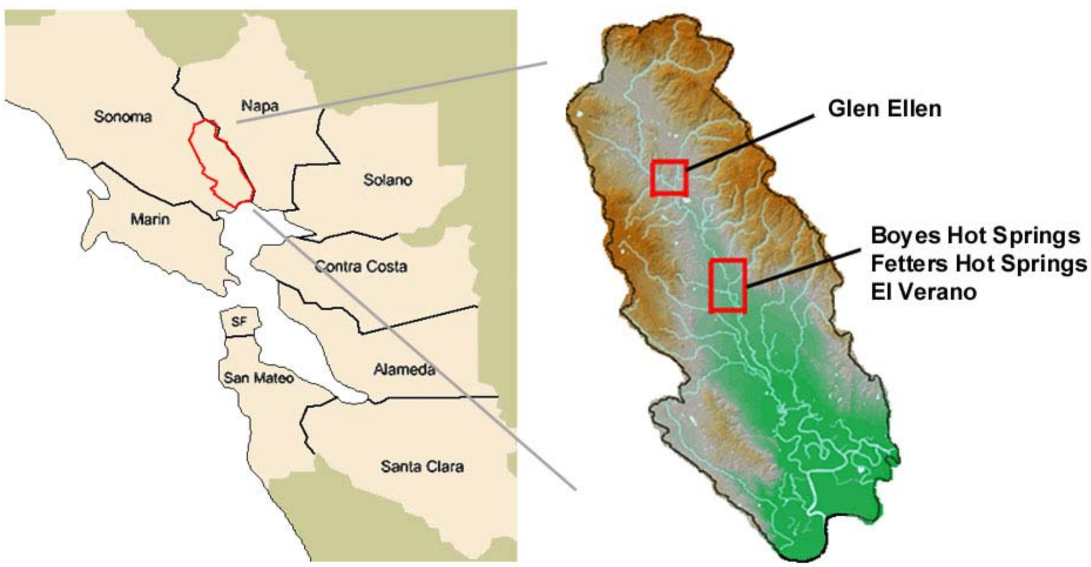


Figure 4.1 Location of study sites in Sonoma Creek watershed, California

The Sonoma Creek watershed covers over 250 mi^2 of land in southeastern Sonoma county, a known wine country (Figure 4.1). The creek flows 28 miles through woodlands, wineries, and a series of small townships before it drains into the north part of the San Francisco Bay. The field work focused on two areas: Glen Ellen (17-18.5 mile, Figure 4.3) and the Fetters-El Verano region (13-15 mile, Figure 4.4). The creek slopes about

0.005 at Glen Ellen and 0.004 at the Fetters-Boyes-Elverano section. Although the valley still belongs to Mediterranean climate, it has an average annual rainfall of 29 in (McKee et al. 2000). The sufficient rainfall supports the year-round flow in the mainstream channel and makes it a much "larger" creek than Marsh Creek (Figure 4.2). The 25-year flood flow is estimated to be 8,880 cfs at Boyes Hot Springs (ibid.).

Figure 4.2 Sonoma Creek at Boyes Hot Springs

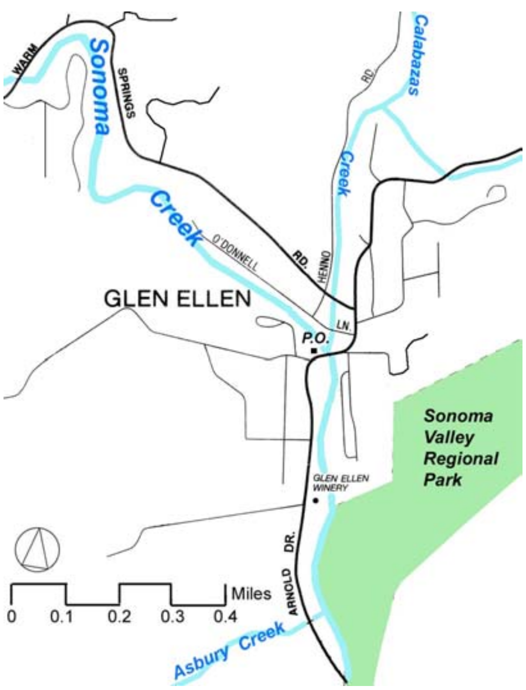


Figure 4.3 Study area in Glen Ellen

Sonoma Creek has long been known as one of the few Bay Area trout streams. The watershed does not have big dams and most of the mainstream has not subjected to channelization. However, the developments of orchards, dairies, vineyards and houses over the past century have caused serious channel erosion, loss of water and introduction of exotic species (McKee et al. 2000). Reduction of trout since the 1960s caused the State Fish and Game to eventually close the entire Sonoma Creek and its tributaries above tidewater to fishing. In recent years, residents in the watershed have exhibited notable vigor in restoration and education efforts. In addition to several wetland demonstration projects and invasive plant eradication, schools have implemented watershed education programs. However, aside from a few public parks, the creek and its tributaries flow through private properties. No public trail has been constructed along the creeks. Creek uses concentrate in the parks and scatter in individual backyards.

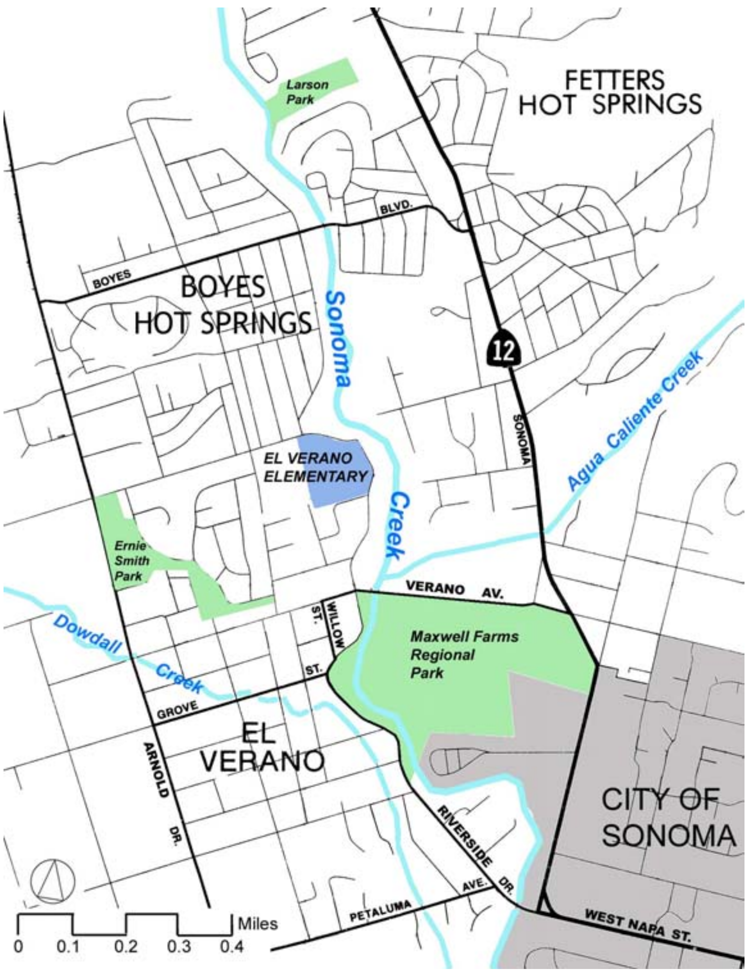


Figure 4.4 Study area in Boyes Hot Springs, Fetters Hot Springs and El Verano

In the Census 2000, Glen Ellen has only 992 residents and a low population density of 473/mi^2. Compared with 1990, the town lost 17% of its population. Yet it is under great development pressure of a different sort. Since land price for vineyards is higher than housing, during the past decade the area has attracted both big producers to expand existing vineyards and newcomers to buy small-acreage recreational vineyards.

The towns of El Verano, Boyes Hot Springs and Fetters Hot Springs have traditionally accommodated the working class of the vineyards and present different social dynamics from Glen Ellen. Over one-third of the population are Hispanic. Together the towns have a 14% population increase during the decade 1990-2000. As of the year 2000, there are 13,124 residents and the population density is 5100/mi^2.

4.1.2 Kochi, Japan

Figure 4.5 Location of Kochi, Japan

Kochi is one of the major cities in Shikoku Island of Japan (Figure 4.5). As of 2000, it has a population of 330,600 and a population density of 5900/mi^2 (2280/km^2) (Kochi City 2000). Demographically Kochi is a rather stable city, with a low influx of population as a general trend (4.3% over the last decade). The rainy season in spring and frequent typhoons in summer and fall bring about an annual rainfall of 2,665mm (105 in), one order more than that of the San Francisco Bay Area.

Most of the creek tours and informal observation occurred at Kagami River, the largest waterway traversing the center of Kochi (Figure 4.6, Figure 4.7). The river is 31.1 km (19.3 mi) long, with a basin area of 170 km^2 (65.7 mi^2). In terms of the stream mile and watershed area, it is much smaller than Sonoma Creek or Marsh Creek, yet due to the abundant water supply, it has the largest channel and greatest flow. The 100-year flow at Sou-An Temple is 1,500 cms (52,900 cfs). From the Spook Rock to the Riffle of Moon Bridge, the channel is about 300 ft wide and the slope ranges from 0.003 to 0.001.

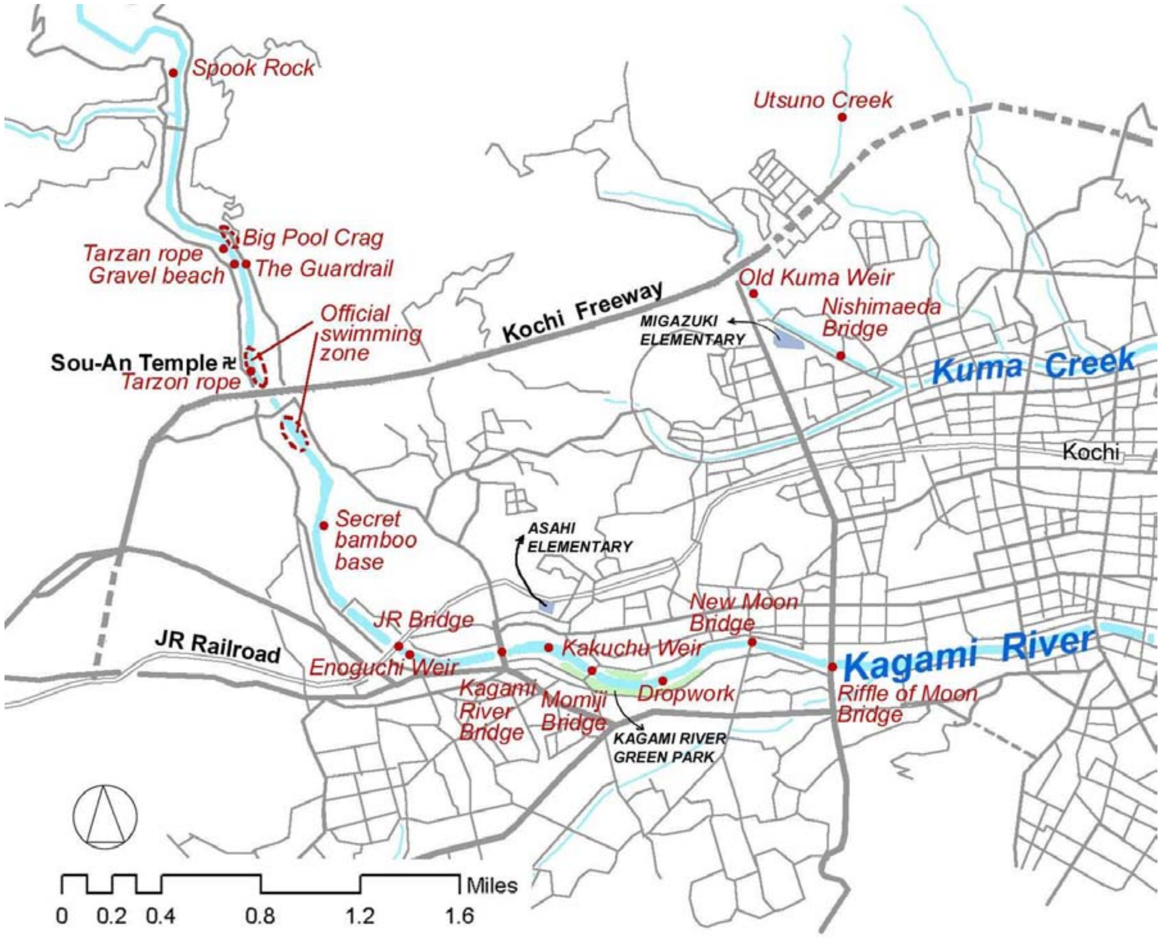


Figure 4.6 Study area in Kochi City

Kagami means mirror in Japanese, indicating that the river water is clean as mirror. The river has a long history of human association—for centuries it has provided drinking water for Kochi and nearby towns and supported tremendous amount of spontaneous uses. It is known to be where a samurai hero swam daily in his childhood in the mid 19th century. Moreover, it had cultivated a number of national swimming champions before Kochi owned any official swimming pools. In fact, the city built its first swimming pool in the 1930s to commemorate the Olympic championship won by a 15-year-old river player (KCRU 2003). The river also gave Kochi the reputation to be one of the last cities for native ayu (sweetfish) fishing. During urbanization, the City sacrificed the other six streams in Kochi to preserve the water quality of Kagami River by making the sewer construction in its draining neighborhoods the priority (ibid.).

Figure 4.7 Kagami River at downtown Kochi

After a number of severe floods in the 1960s and 70s, the City hurried flood control projects. Concrete embankment and levee walls now frame much of the river within the city. Ayu fishing has also declined dramatically after the construction of Kagami Dam. Yet Kagami River remains very alive as a "citizens' river"—almost the entire length within the city is publicly accessible. Spontaneous uses are particularly dense and diverse within the 3.5-mile reach from Spook Rock to Riffle of Moon Bridge.

A questionnaire survey similar to the Marsh Creek version was conducted in Kochi at a much smaller scale. Parents of a 5th-grade class in Asahi Elementary School and employees of a local environmental consultant firm composed the sample (49) for the Japanese survey (with photographic and map questions omitted). Due to the differences in sampling, the survey does not serve for strict comparative study with Brentwood. But it does generate contextual information that would otherwise be easily overlooked. The most striking contrast revealed in the Kochi survey is a fundamental difference on stream use pattern (Table 4.1). Over half of the reported uses belong to “dynamic interaction,” among which “swimming,” “fishing” and “playing in water” are the leading items. “Group activity” forms another major use category, for the traditional Kagami River Festival, summer firework shows and annual cleanups are part of the river’s identity.

Table 4.1 Adult use of nearby waterways in Kochi, Japan and Brentwood, California

Use Category	Kochi	Brentwood
Moving along on the trail	17.21%	74.3%
Static interaction	12.9%	9.7%
Dynamic interaction	51.4%	15.9%
Group activity	18.6%	0%

4.1.3 School Drawing Exercises in Sonoma Valley and Kochi

In Sonoma Valley, 52 students participated in the school drawing exercises at two fifth-grade classes, one in Dunbar Elementary at the north of Glen Ellen and the other in El Verano Elementary. In Kochi, 72 students took part in the exercises at a 5th-grade class in Asahi Elementary (by Kagami River) and a mixed 3rd to 5th grade class in Mikazuki Elementary (by Kuma Creek). Below summarizes the findings from these exercises when compared with the results from Brentwood (4th- and 6th-grade classes).

In both case study sites, it is reconfirmed that spontaneous use contributes to the understanding of vegetation, wildlife, channel and water features. In either sample, the drawings of frequent or interactive users demonstrated much higher variety than those of non-users. In all the three regions, “dynamic interaction” was the dominant form of use; “static interaction” occupied 10 to 15%; and “moving along on the trail” was not regarded an important form of use, whether public trails were available or not (Figure 4.8).

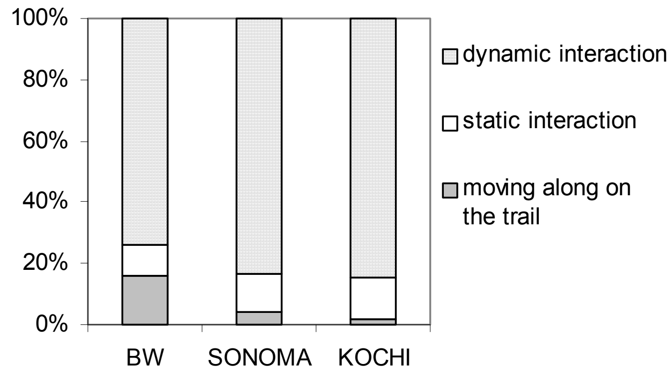


Figure 4.8 Categorized use in the drawing exercises in Brentwood, Sonoma Valley and Kochi

The content of use apparently reflects the different physical features of the three sites (Figure 4.9). Water plays (swimming, diving, wading, etc.) were highest in Kochi, followed by Sonoma, but rare in Brentwood. Kochi kids also engaged most in rock plays (skipping, throwing, collecting, etc.) since gravel bars were more common there. Tree plays however occurred much more frequently in Sonoma and Brentwood, since few trees were left along Kagami River. Further, the environmental regulation and education in Sonoma Valley have likely influenced the wildlife interaction of the kids. Sonoma kids reported less catching and more watching than kids in Brentwood or Kochi.

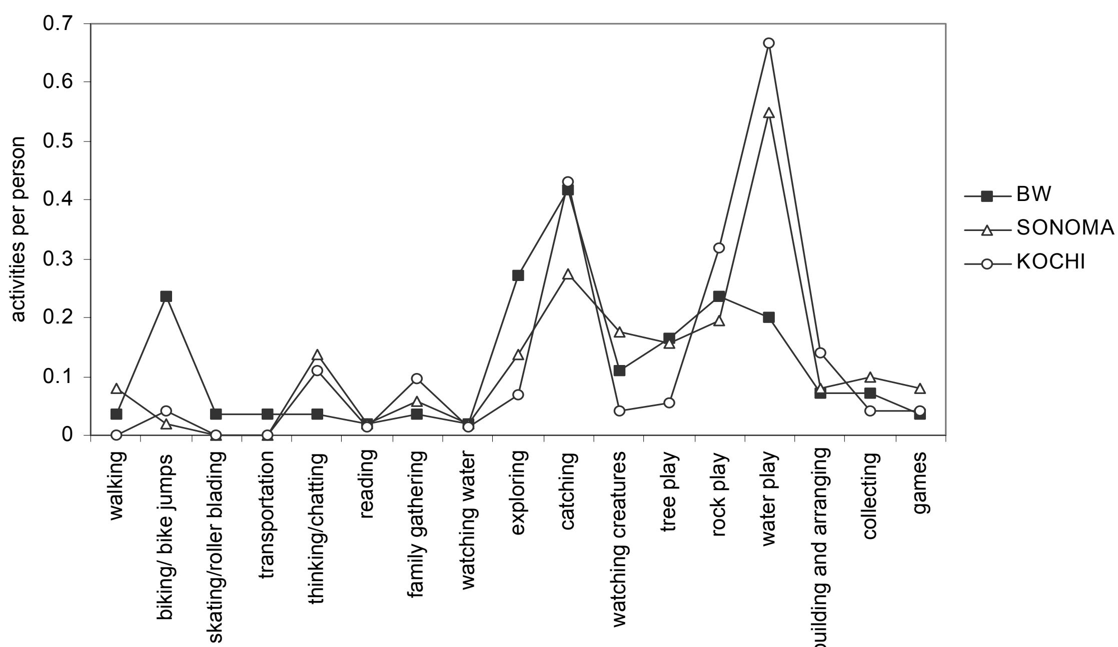


Figure 4.9 Content of use as reflected in the drawing exercises in the three sites

4.2 Typology and Habitat Needs

Trying to systematize spontaneous uses may sound like an oxymoron, since such uses do imply the free-flowing interaction with landscape that may easily overflow any set typology. Yet these activities are neither random nor purposeless. We found users engaging in these activities with various purposes: to refresh oneself, to acquire loot, to establish territory, etc; but overarching to these apparent purposes is the desire to experience through direct interaction with the landscape and lives therein.

The typology here begins with a conceptual model of territory. According to their different modes of interaction, I then categorize the uses to quiet and secluded use, adventure, wildlife contact, loose part contact, water contact, moving along on the trail, and social gathering. For each category, the mode of interaction, experiential reward and habitat requirements are articulated along with anecdotes in my fieldworks.

4.2.1 Territory

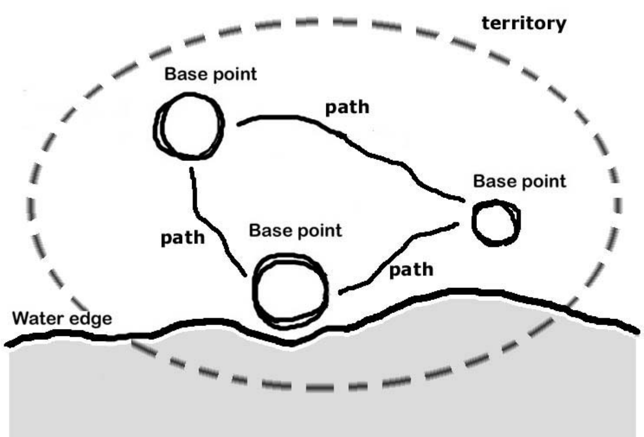


Figure 4.10 A conceptual model of spontaneous use at riparian space

A few terms can be used to provide a conceptual model in describing the habitats of spontaneous users (Figure 4.10). A *base-point* is a node where activities occur. Base points have diverse functions: for catching, for entering water, for placing tools and possessions, for long-term or short-term stay, for gathering, etc. *Paths* are ways to connect base points, but they are not only for passage. Traveling the paths is often a primary part of the use. *Territory* is the activity range which the user has fully adopted. It may consist of only one base-point or a complicated network of base-points and paths, on the shore and in the stream. At base-points or on the paths, spontaneous users seek contact with wildlife, loose parts, water and whatever present in the stream environments.

Establishment of Territory

Territory has to be established. On its establishment the individual or group assumes ownership and place attachment evolves. One can simply find a spot and claim it to be one's territory in order to establish it. Naming and frequent using make the ownership stronger. To a large degree establishment of territory is a desired goal for planners and designers since it brings about care and awareness for actions.

I was lucky to witness the process of territory establishment by two girls at Marsh Creek. I was stood up by a subject that afternoon, so I decided to check out the Delta Road Bridge at the north boundary of Brentwood. If the girls and the laughter were not there, the bridge would be a very desolate place. It was stark concrete, dark and gloomy.

But Jane and Sara (both 12) had just established the bridge as their secret spot and had visited here a couple of times. They were excited to find the quiet place where no one else would come. The girls were best friends, meaning they knew *everything* about each other. They played, read, danced, and sang under the bridge, but mostly they would just chitchat, talking about a neighbor girl they both hate, sharing their family stories, making fun to each other. That day they for the first time crossed the creek on foot and were enormously delighted. The bed was riprap covered by a thick layer of algae and mud.

They carefully walked through with bare feet and screamed when feeling the cool water and slippery algae. They kept a beach ball by the water edge and laid a few rocks around it as protection. When Sara hit the ball to water, it made a crisp and resounding sound. When they quieted down, the thundering roars of the passing cars also made them thrill: “Will we be found by somebody?” “Would that be your dad’s car?” Mussel shells, a shiny stone…, anything there became a big discovery (Figure 4.11, Figure 4.12).

Figure 4.11 Jane and Sara under the Delta Road Bridge in Brentwood

Figure 4.12 Jane made a toy by fastening an deflated balloon to a string—when she ran on the narrow concrete edge the balloon would skip along the water surface like dancing

In short, at the establishment of the territory, albeit the base-point was so limited of fun elements as normally conceived, the kids clearly were making use of every bit of what they could find. After all, having a secret spot with a best friend by the creek is such a big deal all by itself.

Ownership of Territory

Different uses have their own needs for territory size. Adventurers can cover miles of distance in a trip, and observers can spend time intensively within a tiny piece of land. What seems most important is the sense of ownership for the territory.

Before the tour, Julian asked me if it was okay that her creek was pretty dry now. She seemed concerned I would not acknowledge her creek. Once assured it was not my concern, she and her younger sister rushed gleefully across their neighbor's field to an irrigation ditch by an unpaved street. The "creek" was about 10 feet wide and 6 feet deep (Figure 4.13). To cross it, we had to climb down and up using a knotted rope. "It took some practice at the beginning," said Julian, who now could do it with great proficiency. She had adopted this place to the degree that she "knew" the individual plant or animal here. On a clump of trees, "there used to be a bird here singing beautifully but she's gone somewhere…. I think she was hatching because her songs changed." A few yards away was a rope swing, which they could swing over on the ditch and feel scared. The slim shape of the tree was not ideal for swinging and they had to be careful not to bang themselves on the trunk. But it was "theirs" (Figure 4.14).

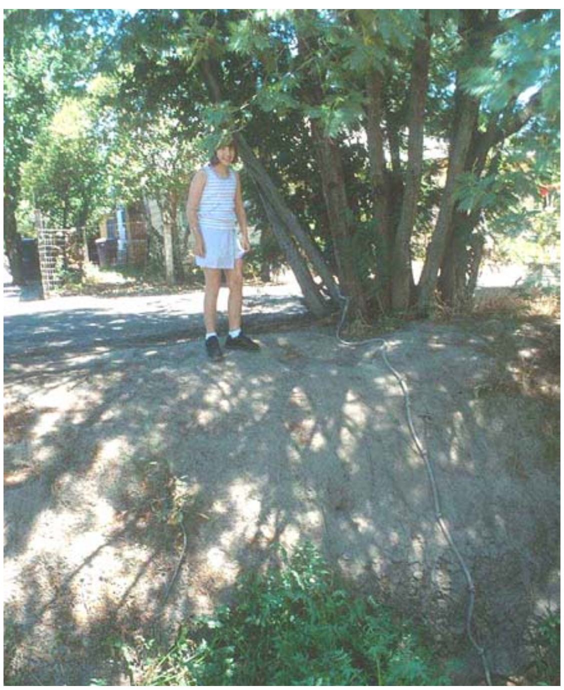


Figure 4.13 Julian and her "creek" at El Verano

Figure 4.14 The swing at Julian's creek

In scarcity of good base-points, most of my subjects know that territory has to be shared. For example, the “secret spot” which Kristy (2nd grader in Brentwood) named “Shallow Creek” was in fact wildly popular for Brentwood kids. At the tour, she had to admit that her spot was no secret—when we got there it was occupied by some older kids. But ten minutes later the spot became empty, so Kristy led us to occupy it.

Sharing of territory happened frequently in the creek tours and was seldom a problem. The kids have a tacit consent that their ownerships are not exclusive. At Creekside Park in Brentwood, by both using a characteristic tree as a base-point in their territories, two girls of different age became friends. Even in the “backyard spots” in Sonoma Valley, a territory can be commonly owned by kids from different backyards.

Where the density is high, sharing becomes a necessity. In Kochi, a base-point is normally shared by a big group of kids who began to know each other through engaging in the same kind of activities. For example, I saw two groups of middle school kids swimming and diving under a bridge at Niyodo River (a river near Kochi City). They claimed that they did not know each other, but both groups called a black dog “John” and treated him as a buddy. Later, John’s owner showed up and it became clear that since there would always be some kids there, she developed a routine to entrust John to the kids while she was visiting neighbors or doing chores. When she came back to pick him up, John would have played to his content and got cleaned by the river water.

It was fascinating to see this kind of community spirit developing along with spontaneous uses. But sharing only works when the uses are not mutually exclusive. Solitude users and couples simply back out the burdensome social engagement.

Similarly, quiet fishing and vigorous water contact cannot share the territory (Countess et al. 1977).

Conflicts also tend to happen when the activity is primarily engaged on building the territory. In Sonoma where a vacant lot provided “public” access to the creek, a few trees used for building bases became a source of conflict among two girls and some 10 boys.

“Every summer begins with a big tree house fight,” Rose’s grandmother complained with a bitter smile. The tree house of problem was originally built by a father for the girls because the boys had another one on a nearby tree. However, he built it so well that the boys came to use it as well. The two groups had different use patterns: the girls would just bring their lunch to the tree house, talk and “play ladies,” as the grandmother put it; while the boys just built and tore down and rebuilt. During the past years “girls only” and “boys only” signs were erected (Figure 4.15), and the intensity of the fight was testified in the creek tour—when Rose and her brother came to the tree house, they immediately started to yell to each other. Their 5-year old brother wanted to climb up and participate very badly, but his siblings were busy arguing and utterly ignored him. Obviously, base-points also serve as a status symbol for older kids. According to the grandmother, the fight would always settle down by the end of summer.

Figure 4.15 David on one of the tree houses where the territory fights took place (Glen Ellen, California)

Diversity in Territory

In addition to sense of ownership, most territories derive their attraction from the diversity within them. I have learned not to ask a kid why s/he plays at a certain spot. For one thing, the reasons were always obvious once I looked at how they play, or even better, played with them. For another, even if asked, the responses had always been typical: “I don’t know” or “there’re things to do here.”

Taylor, the 6th grade girl who gave a detailed account in her drawing (Figure 3.51), introduced me her spot behind Clayton Property. Clayton Property is a trailer park development along Marsh Creek Road 7 miles out of Brentwood’s southern boundary. The development did not take the creek into consideration and chain-link fenced the entire length of its back off the creek. But Taylor and her friends had no difficulty accessing, since other users had made several breaks on the fence. I followed Taylor and three other kids on a well-worn dirt path down to the creek valley and confirmed the elements in her drawing one after another (Figure 4.16).

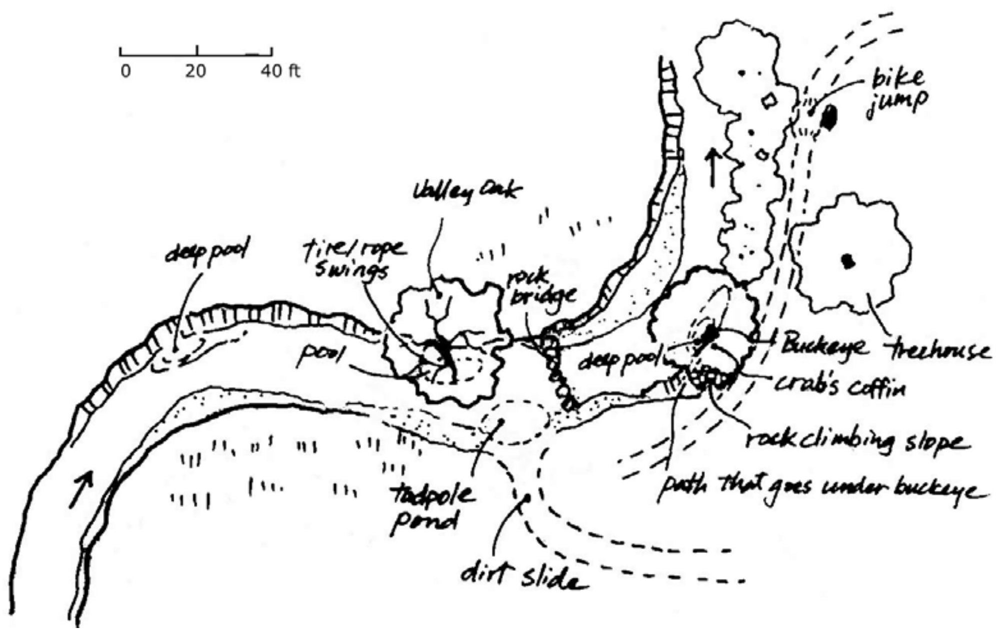


Figure 4.16 Taylor’s territory behind Clayton Property upstream Marsh Creek

Figure 4.17 Tire swing by the pool in Taylor's spot

Figure 4.18 The rock bridge and tadpole pond in Taylor's spot

Figure 4.19 The buckeye base-point

Figure 4.20 The crab's coffin under the buckeye

A big bump and a deep pit before the path made a sharp turn was the "bike ramp." Another dirt path cutting down from the steep aspect of the hill was the card-board slide spot. The big valley oak across the creek with a tire swing and a rope swing, both perfectly hung over a pool, was where she dived in on hot days (Figure 4.17). Next to the oak was a shallower spot where Taylor and her cousin built the "rock bridge" for access to the oak. Right by the rock bridge was a gravel beach with a shallow inlet known as the tadpole pond (Figure 4.18). In May, an astonishing number of tadpoles and newly transformed frogs were swarming here. Every kid easily caught some tiny frogs smaller than their fingertips. In fact, they were jumping all over the places that we had to be careful not to step on them.

By the "rock-climbing hill" was the big buckeye, a central base-point in Taylor's territory where she would at times come alone and "do nothing." The buckeye was at full blossom, bearing its generous canopy low over the water surface where the creek made a sharp turn and scoured the bank into a deep pool. The way it was holding the bank almost looked like the single tree deflected the flow away. Under the tree was refreshingly cool and shady. It was a perfect hiding spot—I hardly noticed it until I bent down and saw the narrow path right next to the eroded bank. All the kids wanted to stay under it, but the spot was so narrow it only accommodated 2 or 3 kids at one time (Figure 4.19). Here Taylor's cousin showed me the "crab's coffin"—he had enshrined his dead pet under a bowl decorated with cartoon stickers behind the twisted buckeye roots. He cautioned me not to touch it (Figure 4.20).

4.2.2 Quiet and Secluded Use

On the left bank of Marsh Creek upstream Highway 4, a small grove of cottonwood formed a shady spot. Two 7th-grade girls were sitting there, chatting. There was no bench, but an elevated manhole shaft provided perfect seating. In the hot and windy afternoon, the air was cool and damp under the rustling shade of cottonwood.

The girls would not go down to the channel because the water was too dirty for them. They may have grown a little bit detached from the creek physically, yet to them a manhole under cottonwoods, the breeze, the occasional glance of egret and heron, and the noise from smaller kids playing down at the creek, were simply satisfying (Figure 4.21).

Figure 4.21 Base-point for quiet use at Marsh Creek

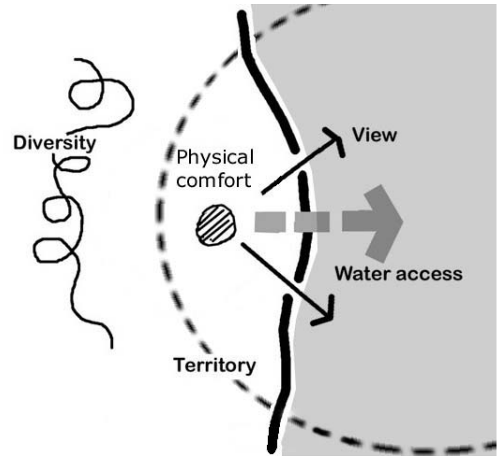


Figure 4.22 Habitat requirement for quiet and secluded base-points

Users who appreciate the stream environment in a transcendent way, go to the stream for a temporary escape, enjoy close relationships with significant others and those who pursue quiet reading, thinking, etc., are commonly attached to a specific base-point. Their range of activity (footprint) may seem small, but their territory demands are high and specific.

The selection of a base-point may include many considerations—physical comfort, level of access, strength of territory, local diversity, sounds, views and access to water, to name a few (Figure 4.22). Such users usually stay for hours and thus require a certain level of comfort—seating, foothold and shade are usually important. Seats by water, whether a rock, tree roots, a trunk, or a soft grassy spot where water can be touched is particularly appealing (Figure 4.23). Yet more than anything else they need privacy, or visual/auditory seclusion from supervision other users or. A detoured or at least not conspicuous access is essential; a back screen is usually preferred (Figure 4.24).

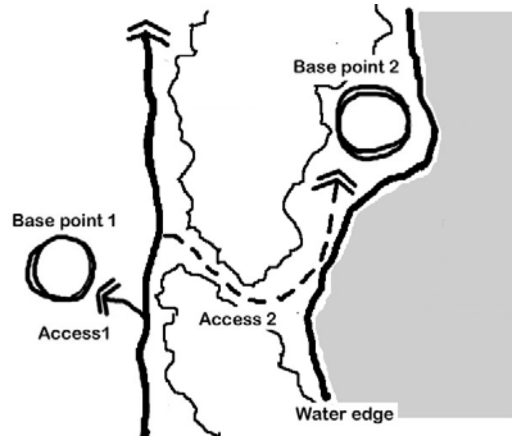


Figure 4.23 (left) Proximity to water is an important factor to quiet and secluded users

Figure 4.24 (above) Access to base-points determine the privacy level of use

The view toward dense foliage, open field or expression of water surface, the sound of trickling water, the appearance of wildlife and easy access to water all tremendously enhance the value of quiet and secluded base-points, for such elements are what bestow the healing power of nature.

Both Searles (1960) and Wohlwill (1983) suggested that it is the non-responsive characteristic of nature that permits it to serve as a refuge. That is to say, when one needs to outflow the anger, grief, stress, confusion and other negative emotions, the creek simply listens and accommodates; whereas such is not easy in a social engagement or an indoor setting where things can remind the source of stress. Yet this concept makes a doll or a doormat just equally restorative. Empirically, there is a second stage involved in "temporary escape" that makes an animated setting a much more effective healing environment. After a sufficient remedy of the outflow of free emotion, one starts to look outward and observe the surroundings. The admiration of life forms likely composes an important factor in healing.

While adults pursue solitude, most kids tend to share quiet and secluded spots with their friends in forms of chatting and drama playing. But undoubtedly kids also need solitude at times. Take Julian and Mandy for example, the sisters were sometimes at odds. Julian complained to me that her sister was so noisy that she sometimes had to get away by hiding in her creek. Sitting on the rock at the bottom of the ditch, she would get a view of the field when the wild oat was tall. She felt secure. But the ditch was also Mandy's hiding spot. In fact, it was first found by Mandy when she claimed to "run away" after a big fight with Julian. (She apparently did not proceed beyond this attraction at the end of the neighbor's field.)

Quiet and secluded base-points are easily lost, partly because the high demand on privacy is fatefully in conflict with the urbanization trend. The threat of development to the secluded base-points seems to be identical for both adults and kids. For Jane and Sara, a great charm and weakness of the Delta Road Bridge spot is its surrounding open fields. Sara overheard from her dad that a few hundred more houses have been planned behind her house. The girls wailed and moaned over the news, for "there is less and less places to go." They pointed to the house construction across the bank and said, "now they are going to see us here!"

Another reason may be that planners and designers seldom heed to create these spots in public space. Promoting cheerful social concourse for adults at parks or plazas and cheerful playgrounds where all kids should be friends together has become an obsessive goal. Although only a small percentage of users indicate solitude use in the surveys or drawing exercises, from the interviews or creek tours it became clear that many people at certain times do need such space. There is a limit in satisfying the idyllic solitude users, particularly the mobile bikers or joggers who demand a long range of visual territory, yet up to the designer's genius solitude niches can be created in a small space.

4.2.3 Adventure

After interviewing Katy, my Brentwood adult subject, I went out with her five grandsons for a creek tour. These kids were a very mobile group. Heading north along the channelized section of Marsh Creek, I found them seldom stay on the paved trail. The 1:1 grassy bank was nothing to them; they could dash down and climb up in a few seconds. They knew where to cross, where to go alongside the water and where to come up. Their movements were irregular and volatile, shifting over all parts of the creek (Figure 4.25).

The kids had a "fort"—a riprapped area where Marsh Creek and Sand Creek meet. Nothing was really built, it was just announced so. Here they caught crawdads, collected some junk. They would catch minnows with bare hands (and their T-shirts) and found a cup to contain them within just 5 minutes. All drainage pipes were also key spots. They went in and out, screaming, shouting, scaring each other. One kid invented a new trick with a big aluminum pipe. He stood on his skateboard and slid from side to side along the circular grooves of the pipe, testing how high he could go (Figure 4.26). The quacking noise soon attracted the other kids and it became a new game, added to the basic practices of target shooting or hopping across. At the big oak tree they occupied the tree house and played the rope swing; at the train trestle they swiftly climbed up the track, ran over and came down from the other side; then they got into water for more crawdads. They were finally stopped by Katy when attempting to venture to "the shortcut to McDonald." Then I noticed, with that many activities, we had only spent 1.5 hours at the creek.

Figure 4.25 Hopping across: those with less skill would land in water and get their feet all wet

Figure 4.26 (left) Ted trying out the new trick in the pipe

Adventure is the action of connecting known parts to unknown parts in the landscape; it is the expansion of cognitive and physical territory. An adventurer's territory presents a system of base-points interconnected by diverse, usually three-dimensional paths (Figure 4.27). Such territory is what Robin Moore (1986a) gracefully named "flowing terrain":

> *"…their movement choreographed by the landscape, as their body responded to its every opportunity"* (ibid., p. 56).

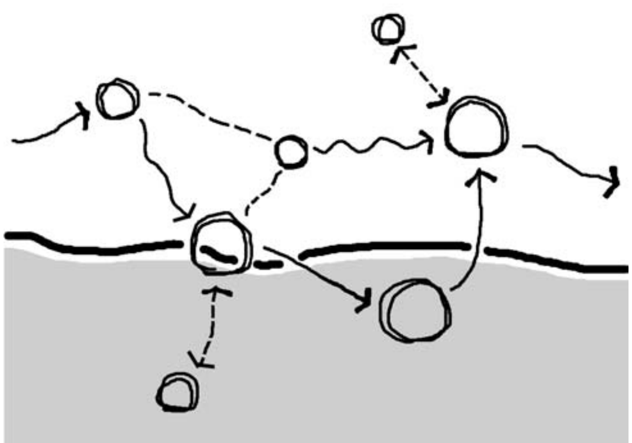


Figure 4.27 The territory of adventurers—an expanding network of paths and base-points

In this mode, paths are as important destinations as base-points—adventurers walk, bike, swim, leap, climb, creep, cross, etc. to conquer a new piece of landscape. The movements are seldom routines, but they routinely explore and enlarge their territories. Such desire was indicated by their comments for their ideal creeks: “I don’t want it to change at all… only I hope it goes to a big river…;” “I want the channel wider, and I want it connected to more places… like the Delta, the river….”

Adventurers’ Paths

The choreographic quality of paths differ greatly with their materials. My adult subjects favored paved paths mostly for practical concerns and dirt paths for aesthetic reasons. However, for kids dirt paths are almost always favored—with practical reasons. Aside from the lack of impatient bikers and runners, a dirt path provide a lot more “affordances” (features that invite interactions; Gibson 1977). Having to chase kids down the dirt path often, I was always amazed by their jump at a mound, leap at a muddy puddle, digression to the water edge, bending backward to pass under a low branch or crouching down to stare at a gopher hole or test the warmth of the dirt (Figure 4.28). The mounds, puddles, low branches or gopher holes—all of which barriers on a typical paved trail; all of which tempting invitations for sensuous experiences of a dirt path.

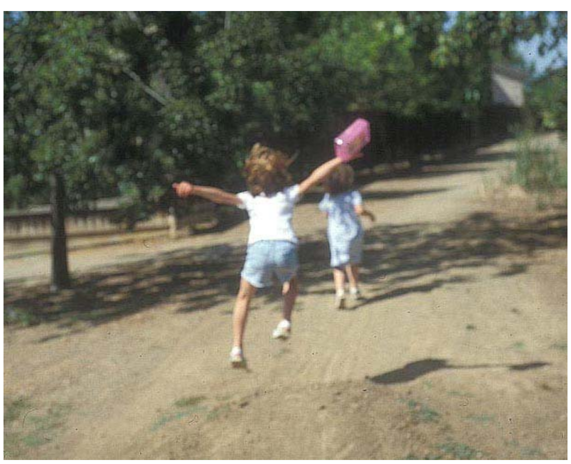


Figure 4.28 Kristy leaping at a dirt mount by Marsh Creek

Figure 4.29 At Marsh Creek, the dirt trail to the south of Dainty Bridge is a highly visible stage for bike feat

Adventurers on wheels make good use of all opportunities to perfect their skills. Dirt paths are easily molded into mounds and pits, and “bike jump” has become a repetitive pattern whenever they are present. Crossing the flow is also an indispensable part in adventure, with a great variety. Adventurers constantly pay attention to spots where they can cross and if necessary, adapt them to their needs. In smaller streams users search shallow and narrow spots with stepping rocks to set foot on or to build a bridge from; in large rivers swimming across is a common game; when a rope and a tree is available, they swing across; when a slope is present and the flow is not too wide, bikers or skateboarders fly across on the wheels (Figure 4.30, Figure 4.31).

Figure 4.30 Although the bank seems steep for skateboarding, vegetation on the slope allows riding down at a manageable pace

Figure 4.31 Joe describing how he and friends would dash down on skateboards, jump up at a board devised by the water edge and fly over the creek

Since testing out body function is part of the pursuit, a certain amount of physical barriers become desirable. The debris piles in Marsh Creek at Creekside Park functioned this way. When the creek dried up in summer, Jody and Karen would explore the channel bed and climb over one after another high debris piles. The piles may incur some scratches, but they also screen off the less active users to access to the base-points behind them (Figure 4.32).

Figure 4.32 Jody and Karen on their way to the "big hole" base-point

Figure 4.33 John coming out of a short pipe through the levee at Marsh Creek

Figure 4.34 Simon's sons in the 36" drainage pipe at Marsh Creek

Drainage pipes and various "tunnels" are extremely attractive to adventurers: they make loud eerie echoes, they are secret hide-outs, they signify definite connection to somewhere, and they are somehow off-limits (Figure 4.33, Figure 4.34). In a Marsh

Creek tour, Simon's kids claimed that once they went all the way through a pipe to the shopping center across Central Avenue (about 1500 feet). When they heard that some people may want to get rid of the pipes when improving the creek, they vehemently objected, "No way! These are the best part of the creek!"

Adventurer's Base-points

Base-points in adventurer's territory are often qualified by the provision of challenge through interaction with wildlife, loose parts and water, which will soon be discussed. But two forms of base-points that adventurers value particularly are "home-base" and "lookout." To Katy's grandsons, the Central Avenue Bridge just 30 seconds from Grandma's house was their home base—a starting point for their almost daily journey to the north or south reach of Marsh Creek and where they would keep their loots or leave their bikes or skateboards temporarily (Figure 4.35).

A lookout provides physical challenge and satisfies adventurer's desire to make sense of a broader landscape. The big valley oak standing out handsomely on the flat and open land of Brentwood is such an example (Figure 4.36). Although it was within private property, the thin wire fence had long been left broken, signifying a tacit consent among the property owner and all users that the tree was there for the public use. The oak carried with it a platform and a rope swing. Its trunk leaned heavily to south-west and allowed even young kids to climb up easily. The lookout was covered nicely with blankets and cushions. The kids enjoyed the shade, breeze, and an open view to Mt. Diablo (Figure 4.37). I was informed in another tour that the lookout was originally an elaborate tree house with roof and walls built by a particular group. But because of its visibility and immense attraction, it could not possibly belong to any particular group alone.

Figure 4.35 The kids catching crawdads at their home base under Central Avenue Bridge

Figure 4.36 The landmark oak is a tremendously popular base-point for adventurers (photo by Katy)

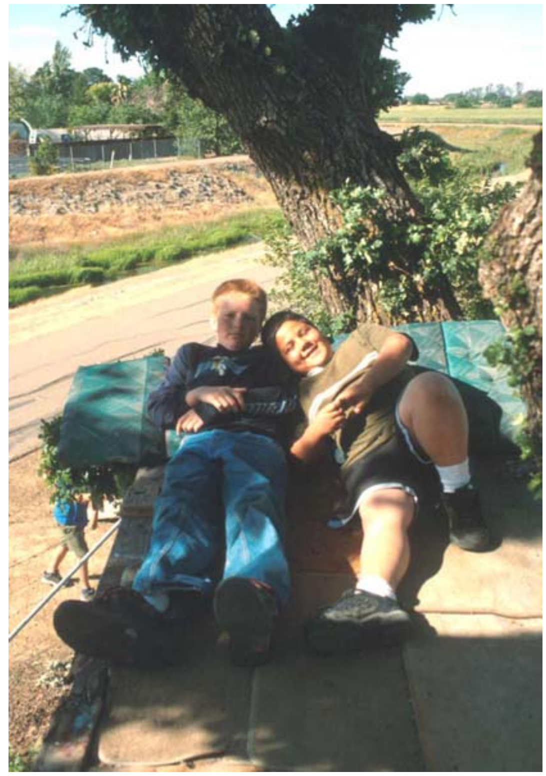


Figure 4.37 John and Andy on the lookout of the landmark oak

Knowing the structure and qualities of adventurer's landscape, planning and design can facilitate such use by actively encouraging or passively allowing connections of tributaries, various paths and routes, built structures and utilities attendant to stream environments. Adventurer's paths need to be graded with different levels of barriers, otherwise there will be no fun in exploring and the fight over the few highly accessible base points will be intense.

4.2.4 Wildlife Contact

That day 7 year-old Kristy for the first time saw a crawdad when her father caught one under the Valley Green Footbridge at Marsh Creek. "Oh, so *that* is a crawdad! I heard about it but I've never seen one before." Kristy was trying to be composed. She was leading the tour and being the big sister in front of her two 5 year-old sisters and a 3 year-old brother. Yet I could tell she was quite nervous; she stared at the crawdad for a long time before trying to touch it (Figure 4.38). She finally did, and following her, the little sisters and brother all came to greet the crawdad before Dad set it free.

Figure 4.38 Kristy's first contact with a crawdad

Contact with wildlife often starts with a "wow" experience. The wonder of nature and the power of the animated world come to us at these uncalculated moments. Catching and observing are both responses to the charm of creek creatures by spontaneous users, although they are two distinct modes of interaction. Proficient catchers and observers are a knowledgeable group. They can identify a large numbers of species and know when and where to find them. A typical conversation between two 4th-grade boys catching in front of the embankment of Kagami River went like this:

> *"A shrimp—a shrimp!" "Where?" "Right there, where the net drops!" "Oh yeah, it's huge!" "uh… I can't reach it!" "Shit! It's gone!"*

Then similar situation went on with “A dace!” “Ayu!” “Crab!” “Goli!” The only thing that would not get them excited was minnows—they were all around the blocks. They knew how to tell the fish—ayu has a black back; dace is kind of reddish, with rainbow color at the side; goli stay on the rock and its mouth is like a sucker, etc. Sometimes they bring the captures back for cooking:

> *“If it’s goli you need to kill it when it’s still very alive… You can’t wait until it becomes weak—that would taste bad. The skin of dace is tough but the meat is good…”*

No one learned about fish identification—they just caught things and brought home, and somebody would let them know what things were. One of them once wore a goggle swimming there and met a goli longer than his face in front of his eyes. Ever since he would not forget how a goli looks like.

Jimmy, the young angler I met in Brentwood, knew that bass hide in tule stands and feed small fish sucked in by the flow at rock weirs. He knew where was a tree trunk under water and where were the sandy areas with a better chance to get catfish. He was 16, yet he had learned about fishing from his father and other anglers for 10 years. The knowledge starts from “wow” experiences and deepens with daily contact thereafter. While experienced friends and parents are important information source, even without such support, my subjects commonly demonstrated a burning desire to know about the animals they just encountered at the streams.

Catching

Although in some cases catching does serve as a means of livelihood, usually catching is based upon affinity toward the target and a sense of achievement. Fish, frogs, tadpoles, shrimps, crawdads, crabs, insects and much more are fascinating creatures for the users to match wits with. Catchers' habitats are as diverse as those of their target species and their spots correspond directly to the existence of the quarries (Figure 4.39). They usually have a much higher tolerance on physical comfort or access level and are highly adaptive to their environments. In fact, it is not uncommon to see catchers thriving at the least "user-friendly" spots (Figure 4.40).

Figure 4.39 A catcher stuck his head into concrete block of a dike for long-arm shrimps at Niyodo River in Kochi

Figure 4.40 The dearth of foothold does not deter the kids from catching. Here in Kochi a few kids moved in one direction to chase the fish into their friend's waiting net.

Except the premise that the target to be present, some catchers do have specific habitat demands. For example, anglers usually take care of themselves in terms of physical comfort, such as bringing a foldable chair to sit on or wearing a straw hat for shade. However, light reflection would make faint motion on water surface difficult to see and they would avoid using the east bank during the late afternoon catch. Enough clearance for casting is also necessary so the line does not entangle.

But fishing pole and bait is only one specialized form. Ways of catching are numerous, even for the same target species. In Kochi, ayu spearing employs traditional hand tools such as "Chan" (gun halberd) and "Tsungake" (hand spear). Tsungake is a simple and graceful tool. It is a bamboo rod about 2.5 meters long, with a rubber strap at one end and hooks at the other. When spearing, the catcher wears the strap around wrist and holds the middle of the rod. Once letting go, it shoots out more than a meter. “Chan” has a barrel made of bamboo and an iron halberd fastened to a rubber band. The halberd is usually made of bicycle spoke and therefore limits the range to 30cm. It is used to catch less nimble animals such as carps or long-arm shrimps (Figure 4.41, Figure 4.42).

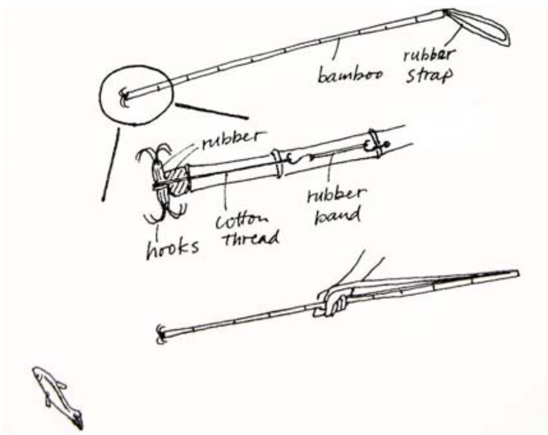


Figure 4.42 “Tsungake” for ayu spearing

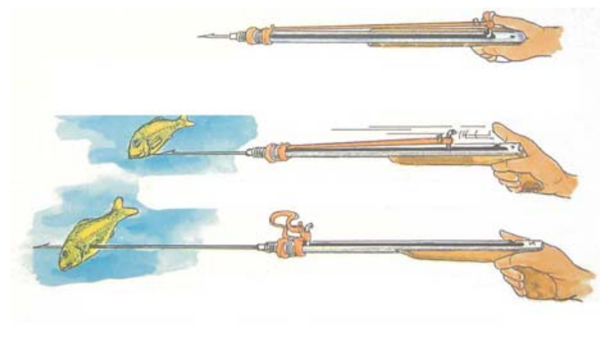


Figure 4.41 “Chan” for carp or shrimp spearing (adapted from Haraga 1996, p. 80)

Spearing is a physically intense activity—one has to move fast, constantly balance the body in the current and precisely estimate the direction and speed of the fish. But the sense of achievement when an ayu is speared is beyond description. Since visibility under water is crucial to spearing, after rain catchers usually need to wait for two to three days for the water to clear out.

At the extreme catching is a fully developed art supported by a breadth of industries. To move in the current effectively when spearing, my Japanese friends wore diving gears and sinkers. An orthodox ayu rod fisherman I met on Kagami River displayed his boxes of elegant, hand-made lure hooks, numbering to at least a hundred. Such elaborate forms of catching are beyond the realm of this study, although it should be emphasized that they often start with the cruder forms of netting or bare-hand catching.

Downstream of Balfour Bridge at Marsh Creek I saw a group of kids catch with a constructed system. They toppled down tule to form a "filter" so the water could be cleaner and the fish more visible. A few yards downstream the remnants of a rock weir formed a local neck. Here the kids placed a white board-paper in order to better see the fish. With this devise, one kid would tramp from the broken tule, chasing minnows downstream toward the neck, while the other kid waiting at the neck and scooping the fish with his hands. This system seemed to work nicely and they caught some 20 minnows with a few "walks" (Figure 4.43, Figure 4.44).

Figure 4.43 One kid walking toward the neck of flow while another waiting to scoop fish

Figure 4.44 Minnows caught this way

Crawdads are the most popular quarries in California sites because they thrive in nutrient-rich perennial waters and are rather easy to catch. Little pieces of crawdad wisdom are wide-spread among kids, such as they move backward; you should grab them behind the shoulder; they cling on grass and hide under overhung banks; etc. Although once in the stream crawdads are never difficult to catch, various methods have been developed to explore the fun. The most common way of crawdading is a to use a string fastened with a piece of lunch meat such as salami, bologna or sausage, waiting for the crawdad to cling on it then draging it up slowly (Figure 4.45, Figure 4.46).

Figure 4.45 Girls getting a crawdad with the string-and-ham method

Figure 4.46 Crawdad is the most popular species for catching in my California sites

Jimmy showed me a few more ways to get crawdads. An easiest way is picking up the tumble weed ball fallen by the water edge and simply giving it a good shake—some small ones would come off. A more refined way is to build a netting trap and leave it in water. Then a sophisticated version of the string-and-ham is the "sock ball" method:

> *"You cut the front end of the sock and stuff lunch meat, clam, whatever you want into it, fasten it up with string then put it into water to make it mushy…. This way the crawdads can get a better grip and tangle with it, instead of taking a piece of meat and run away."*

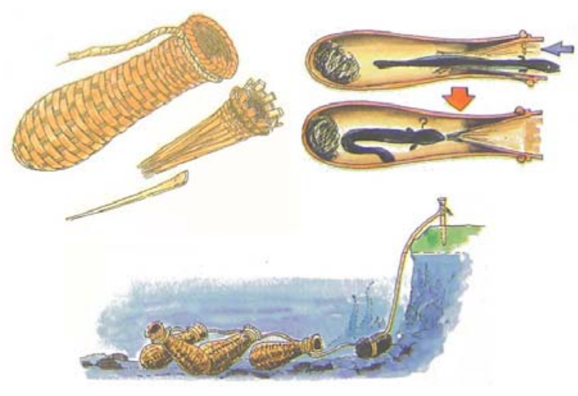


Figure 4.47 Eel creel used in Japan (adapted from Haraga 1996, p. 89)

Figure 4.48 Crab basket used in Kagami River is similar to the crawdad trap used in Brentwood

Many ways of catching are obviously transcultural. Where American crawdads appeared in Japan as exotics, Japanese kids would use a piece of cooked fish that is common in their breakfast for the bait. Kids in both areas also jump into water or throw in a big rock suddenly to catch the fish that temporarily "pass out". The two areas also evolved similar traps for catching (Figure 4.47, Figure 4.48).

The "French" bullfrog and tadpole is another attractive target species for catchers. The adults eat just about any bait and the tadpoles are big and slow, making them satisfying quarry for catchers (Figure 4.49, Figure 4.50). Fish fry, small frogs and tadpoles that crowd in shallows or temporary ponds are also highly visible and can be scooped up by even beginning catchers.

Figure 4.49 (above) A bullfrog hooks up the fishing line at Marsh Creek

Figure 4.50 (right) Don holding a bullfrog tadpole

Most spontaneous catchers do not intend to kill; instead they want to look at and play with the captures longer. Catchers often store the fish or crawdads temporarily in a container or a little pond enclosed with sand or rocks. After they enjoy them enough, they would set them free and watch them escape back to the stream with satisfaction.

However, a portion of the captures would become pets to be enjoyed at home until their quick fated ends or when an adult finally orders them out. Many kids have learned from experiences which animals “work better” as pets. For example, Stella knew minnows would not survive with tap water or even stagnant creek water, but tadpoles are easier. Tadpoles and crawdads both make good pets because they are “fun to watch”—tadpoles metamorphose and crawdads molt their skins. Snakes, lizards, turtles, even baby birds were caught and petted. They sometimes become a crucial part of the catcher’s daily life and stories associated with them were nothing less than legendary.

Observing

> *“There are all kinds of nature here!… Eight weeks ago there was a big flood, and there were all kinds of stuff—otters, muskrats, snakes… all kinds of stuff!”*

Figure 4.51 Jewel checking little organisms on the snack bag

I met the 11 year-old Jewel when she came to Marsh Creek for her regular creek inspection. Jewel seldom tried to catch; rather, she just came to see “if the animals are alright” (Figure 4.51). Jewel pointed out various things to me as though giving an outdoor lecture—the troop of ants, mussels, dragonflies, spiders, silver ladybugs, water strider, turtle eggs, and the animal parts such as snail shells or crawdad parts. “Oh, and don’t pull the grass upward like this, cuz you’d get cut at your finger.” She then pulled a deserted jacket out of water with a stick to “help the animals”—to see if anything stuck inside and couldn’t get out.

If catchers are more physically active and focus on certain target species, observers are usually interested in all life forms they see, from little bugs to big animals such as otters and raccoons that are beyond the catching range. They interact with the stream with a highly intensive but unintrusive way.

While catchers did not bother to use the prepared cameras because they were too busy catching, observers usually tried hard to take photos for every animal they saw. Little minnows in water and butterflies perching on the grass were transient models that suited poorly to the simple one-time-use camera, yet the blurred and seemingly meaningless shots witnessed their passion (Figure 4.52).

Figure 4.52 (above) Joyce taking a shot for butterfly

Figure 4.53 (right) In Sonoma Creek, Kate enjoyed the sensation of fry suckers sucking her toes. Sucker is a particularly amiable species for wildlife contact

Observers and catchers have similar habitat requirements—the environment needs to support a certain density of wildlife and a meaningful human/wildlife interface. Though the former is a widely-claimed goal in restoration and greenway projects, the latter is usually discouraged. From spontaneous users, a *meaningful* wildlife/human interface provides plenty of chances for close-up observation and hands-on catching, without the need of specialized equipment beyond what can be made at home or got from a grocery store. Examples of such interfaces are water edges framed by vegetation or porous structures where different species hide, or shallow reach by gravel bars where fry amphibians and fish hatch (Figure 4.53). It is important that water edges being designed to sustain a dense wildlife population and meanwhile remain accessible by users. When physical access is not feasible, good visual access needs to be assured from the bank.

In Brentwood, many reported wildlife contacts happened around the Wastewater Treatment Plant. When biking by this area, Bert and his daughters would often be prompted to dismount by some hints of wildlife presence. They encountered turtles, blue herons, egrets, and one time a huge fish of at least 2 feet long. “There must be something there because we always saw *lots of stuff* there,” wondered Bert.

That big fish is likely a Chinook salmon blocked by the five-foot drop structure which restorationists are ready to bust. But what contributed to the rest of their wildlife contacts is probably the rock weirs laid out regularly in this reach. The weirs form a series of artificial riffles and pools that house various species and significantly enrich the otherwise uniform stream habitat (Figure 4.54).

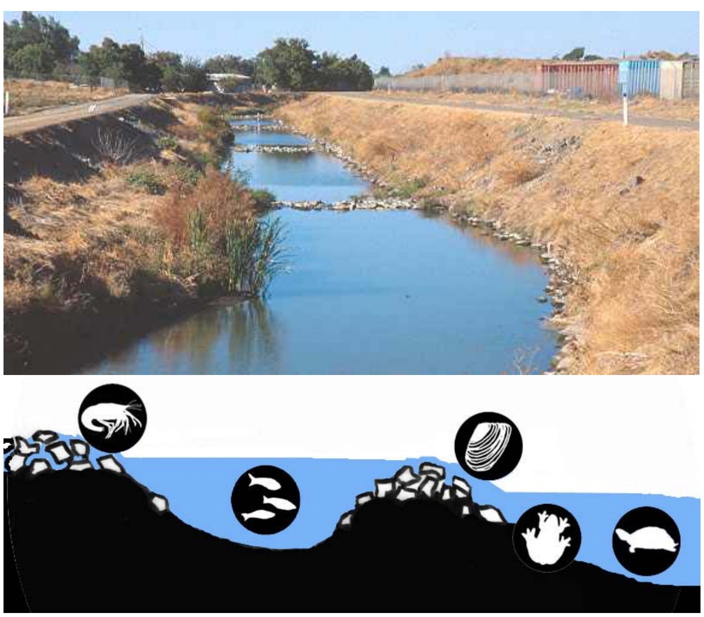


Figure 4.54 The artificial riffles and pools house several species and provide rich wildlife contact. (Up: the stretch of Marsh Creek by Wastewater Treatment Plant. Down: species observed)

The treatment plant discharge, although was considered by many as a primary pollution source, may also be contributing to the winter habitat due to the heat and nutrient concentration it generates. At least the discharge pipe served shelter to an otter family, as illustrated in Walter's interview.

Big pools are also key spots for wildlife contacts. In Marsh Creek, 40 yards up the Valley Green Footbridge is a rather unnatural bulk (probably first dug out as a swimming hole) that Stella referred to as "the lake." In her opinion, everything there is bigger—crawdads, fish, and the "mumbo jumbo monster tadpoles." However, the edge here was too steep for her to reach the animals with her little net (Figure 4.55). Upstream the lake is a long boggy area surrounded by cattail and sedge. Here big catfish and bluegills were found and the record crawdad catch was reported: 55 crawdads were caught by two boys in an afternoon (Figure 4.56).

Figure 4.55 Stella trying to reach her net into "the lake" at Marsh Creek

Figure 4.56 The bog area has a high amount of biomass and wildlife contacts

Even a tiny habitat can bring about meaningful wildlife contact. Julian and Mandy's little creek had a pond no wider than 5 feet wide. Here they found fish up to 1.5 inch, tadpoles, mudsuckers and toads (Figure 4.57). In addition, the constructed wetland in Earthie Smith Park in El Verano was where Julian once found 30 little frogs and pollywogs under a rock. “Rocks make shady spots and retain water for the tadpoles,” explained Julian. For her, small places are more enjoyable because “you can keep track of the animals easier– like when you flip the rock over you can see the frogs”.

Figure 4.57 Julian and Mandy waiting for a toad to come out at the wet section of the ditch

4.2.5 Loose Parts Contact

While playground has long been a focus in urban design, it is Simon Nicholson’s *Theory of Loose Parts* (1971) that best described the essence of good play environments:

> *“In any environment, both the degree of inventiveness and creativity, and the possibility of discovery, are directly proportional to the number and kind of variables in it.”*

Indeed, the value of creeks and rivers for spontaneous use depends largely on their provision of loose parts. At least four categories of common uses rely on the contacts with rocks, plants, junk, and other kinds of loose parts in stream environments: building, collecting, drama play and clever craft.

Building

By Kagami River, I sneaked into the secret bamboo base somehow nervously in a quiet cloudy morning before typhoon. The base had an ingenious location—it was shortly off the levee end where the concrete embankment adjoined the wooded hill slope (Figure 4.58). Except the few households living behind the levee, it seemed no one would come to this dead-ended road. The entrance was almost an animal hole between the concrete bank slope and the coppice (Figure 4.59); but once I got in, a narrow and clearly defined path led ahead until it suddenly opened up to a small clear-cut. A knife, a saw, and a rope segment were left on the floor. Bamboos were crafted into a ladder and a diving board up on the high branches of an oak (*Quercus glauca*) (Figure 4.60).

Figure 4.58 (above) The secret bamboo base is located 50meters upstream off the levee end by Kagami River

Figure 4.59 (left) End of levee and the entrance of the base (arrow)

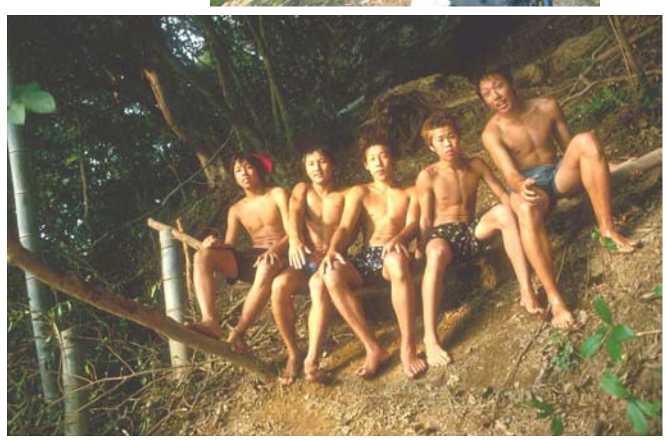


Figure 4.60 (left) The oak was constructed into a diving board

Figure 4.61 (above) Owners of the base sitting on the constructed “bench” on the 45-degree slope

A few weeks later, I went to the base again and met its owners. Four or five teen-age boys came here almost everyday. They would sit on tree braches, teasing and joking around. When one of them felt like getting in the river, one after another, they would all dive from the tree and swim across the river. The boys went to the same junior high school in Kochi. As other kids, they had club activities and rules about going home for dinner. But the group had an unusual spirit of DIY. After my first visit, they further built a long bench and a "bobbing branch" for swinging (Figure 4.61).

All the "big" projects (tree houses, huts, bases, dams, bridges, ponds, etc.) and the small projects of arranging rocks and sticks are rooted from an innate attempt to create an impact on the landscape. Through building users claim their ownership and adapt the stream environments to themselves.

In Creekside Park, the wooded channel is the most popular building zone along Marsh Creek. Swings and tree houses usually appeared on valley oaks or California black walnuts which provide low and sturdy limbs to climb and work on (Figure 4.62). However, even 15 feet up on a blue gum existed a fort, which ironically became the only fort left after an annual creek cleanup because the adults could not reach it. A boy informed me that in the past, the tree houses were quite fancy. Someone even put a sink in one of them, although the water system was never hooked up.

Short of old trees for tree houses, other forms of base-point building can still occur. By Balfour Bridge in Brentwood, for example, there was an underground fort about 3 feet deep by the main dirt trail. The fort had a solidly constructed wooden roof and a peeking hole that connected to another deep trench (Figure 4.63).

Figure 4.62 (above) A popular swing in Marsh Creek channel at Creekside Park

Figure 4.63 (right) The underground fort built on dirt trail and how it was used

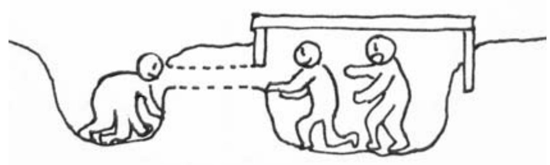


Figure 4.64 (left) On gravel beach, it is common to see various rock arrangements left by builders

Figure 4.65 (above) A built swimming hole in Sonoma Creek

Built base-points seldom stay the same. After all, the process is all important, as testified by many kids who build and destroy and rebuild. However, many building activities do have practical purposes such as rock bridges to enlarge territory, little ponds to store animals or to cool fruits and pools for swimming (Figure 4.64, Figure 4.65). The results of spontaneous building are often not durable enough to survive through the floods and other disturbances. But in some cases, they were built so well that they remained for years even in high-energy streams.

In building, we also see the desire of builders to enhance the stream through projecting their own views of how the landscape should work. Slightly upstream the spot where kids caught minnows by tramping, Don and Rich introduced me to their system under construction. They fitted in a shopping cart at the opening of the control rock weir had an opening at the middle and here as a bridge and dam. They tucked planks and algae in the cart to make it less permeable. Downstream of it they spread a blue insulation felt probably dumped from a nearby construction site, and further downstream they stood a few large planks into a U-shape (Figure 4.66, Figure 4.67). Don explained to me:

> *"Here is the way it works: the creek—it's not very clean—it goes through this dam, it's like a filter, than the pool, then another filter—well, not really a filter, a waterfall, then it'll get clean…"*

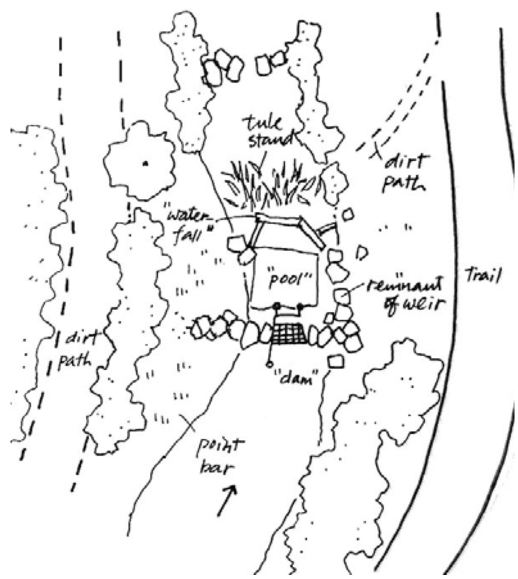


Figure 4.66 Don and Rich working on the "dam-pool-waterfall" system for cleaning the creek

Figure 4.67 Plan view of the system

Collecting

Aki demonstrated to me how she used to play with her best friend at a small gravel bar in Kuma Creek. After a fish was caught, they would dig into the bar for a few inches to make "the home of the fish" then decorate it with rocks:

"We'd collect bigger rocks with interesting shapes to frame the pond, like this one—looks like a Shinkansen [Japanese bullet train]. *The pond looks sort of earthy, so we'd find little colorful rocks to lay at the bottom. You see, it looks a little prettier now."*

Aki also demonstrated how to make little pieces of artwork with rocks. She fastened a grass stem around a long rock and slipped wild flowers between them. They would play cooking by cutting plant stems with rocks. Rock collecting also became a competition: one of them would name the number and color of rocks to be collected, and the other had to follow the command exactly—yellowish rocks would not pass for orange ones. In addition, many colorful rocks were for drawing, and the dark concrete embankment became the best drawing board. "But no matter how much you draw, you splash some water it will all be gone!" explained Aki (Figure 4.68).

Figure 4.68 Aki demonstrating how she and her best friend used to draw with collected rocks

Collecting allows one to discern treasures from the basically chaotic stream environment. Once purposely rummaged or fortuitously encountered, bed materials, plant parts and various junk are used in other activities such as drama play or building. They may also show up in one's yard or room as little displays and start to bear memories.

Gravel beach is an indispensable resource for rock collectors. Similar to Aki's demonstration in Kochi, my California subjects collected white and soft "chalk rocks" to write and draw, ground yellow, brown and orange rocks (sandstone) to make dyes, sought "arrowhead rocks" (obsidian) for sculptures (Figure 4.69) and many other shiny rocks for home decoration. At Sonoma Creek, while her kids were skipping rocks, Kay was busy stuffing teal-colored rocks into her pockets (Figure 4.70). She was trying to make a fountain in her yard paved with these beautiful stones:

"Some stones look plain, but under water they show this splendid color and glitter! Every time I come here, I couldn't help but picking up these stones…."

Figure 4.69 Kate marking where she found the "arrowhead rock" with a chalk rock

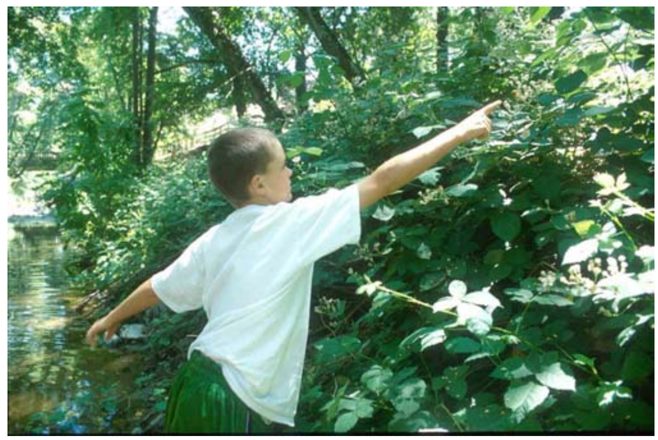
Figure 4.70 Kay collecting the shiny green-blue stones in Sonoma Creek

As one of the most favored bed materials, clay provides additional potential for handcraft. Whenever it is available, kids would collect it to make plates and cups. Mud ball fights and gray make-ups are some other forms of clay play (Figure 4.71). The variety of use with gravel, sand and clay are unlimited. Planners and designers need to regard them as resources. Unfortunately, since bank erosion is at odds with engineers, and large amount of gravel is mined away or detained behind dams, both gravel bars and clay outcrop have become scarce in the stream environments.

Plant parts such as nuts, berries, leaves, cones, flowers and branches are collected for food, medicine, crafts and various creative plays (Figure 4.72). Games are developed according to the quality of collected objects. For example, Karen and Jody would collect "oak balls" (galls) in a bucket and throw them to the creek from a footbridge to see whose would sink first, for the hollow galls with wasp holes would only sink gradually.

Figure 4.71 (left) Sachi's clay work "snowman bathing"

Figure 4.72 (below)In California, blackberry picking for pie or smoothie is particularly popular among both adults and kids



Junk scavenging is another common form of collecting. Some of the collected objects are recycled for practical uses, such as a net or a fishing buoy; others are simply picked up because they are "cool," particularly those that seem to tell stories and facilitate drama plays.

Drama Play

On the embankment of Kuma Creek, I was puzzled to see young kids throwing a mass of black and shiny thread toward the creek and pulling it back. "We're fishing," one of them explained. The waste video tape down at the creek appeared useful to them, so they fastened small rocks at the end of the tape and became fishermen (Figure 4.73). "Have you got any yet?" asked I. "Well… not yet." The kid replied halfheartedly. There were many things he had to concentrate on: it was windy and the tape snapped and tangled around; when he finally threw it out beautifully the bait (rock) would slip off. I suddenly realized that fish really did not matter. Watching them throwing the waste video tape again and again did give me an exhilaration similar to watching a graceful net-casting or rod-swaying (Figure 4.74). They *were* fishermen at that moment and some beautiful motions of fishing must have touched them earlier.

Figure 4.73 "Fishing" with found video tape and rocks in Kuma Creek

Figure 4.74 The boy throwing out the video tape as a fisherman's net-casting or rod-swaying

In drama plays, players are conductors; repertory is boundless. In this use mode, kids interact with the stream environments through imaginative transformation of the landscape and its elements according to the script.

In Roger Hart's research (1979), constructed "river house" was the most common form of base-point. In my study sites, they were less dominant, especially in California. A possible factor is that many potential spots have become homeless camps (real river houses) that discourage spontaneous players. But in Creekside Park, I met a 12 year-old girl striving to maintain her base-point by "playing homeless."

When I saw Sally, she was just starting to decorate her kitchen. She carefully took out her creek collection from a plastic box. There were a pine cone, a few oak galls, a section of pipe and a big animal bone! Sally tried to scare people away by displaying her collection along the water and put the bone at the entrance of the dirt path: “They’ll think there’re some homeless people living down here so they won’t dare to come….”

“They” more or less meant adults or older teens. My 7 year-old subject was welcomed for she and Sally had known each other by going to the same spot and using the same tree. (And she helped to explain to Sally who I was, so I was “okay”.) Sally spread a comforter on the ground, arranged a rusted can and some curious items on the horizontal trunk, collected dry sticks and laid them over a dirt pit for the stove. Then she was satisfied that “now it really looks like a home” (Figure 4.75, Figure 4.76). She proudly told me that everything was found here at the creek. I asked her whether she would bring the stuff home. “Never. They were found here—they stay here.” But before she replied, I notice that it was a dumb question—it *was* her home.

Figure 4.75 (above) Sally’s stove in her drama house by Marsh Creek

Figure 4.76 (right) The shelf in Sally’s kitchen displayed various found items at the creek

Clever craft

Clever craft is the skillful manipulation of materials found in stream environments. For a craft to be invented and refined, the initial insights toward the materials and the passing around or competing among players are necessary. It is therefore a cultural index for spontaneous uses. Where local stream interaction is blooming, various crafts are inevitably developed and often forwarded from generation to generation. Clever crafts are usually quite precise in terms of materials. The succession of a tradition therefore depends utterly on whether the right materials are available.

Rock skipping is a transcultural craft. In Japan, it is called “Mizukiri,” meaning slicing through water surface. In Taiwan, it is called “Da-Shui-Piao”, meaning shooting “water plates.” The moment of rock-skipping depicted in Joyce’s drawing (see Figure 3.54) occurred at Marsh Creek where the flow was no more than 5 feet wide. To demonstrate for me, Joyce found a spot that was close enough to water and had just enough space to stand on, facing a relatively wide water surface (Figure 4.77).

Figure 4.77 Joyce’s spot for rock-skipping at Marsh Creek is scrimpy, with few pebbles available and too narrow a water surface

The round and flat rocks good for skipping had to be collected from the dirt path and they were usually under-sized. At the first throw Joyce made a beautiful 4-boucer, yet he could never match up the first skip that day. He finally gave up and instead showed me how his young brothers would “skip a rock” by dropping a cobber on the sheet of algae, making a hole with a nice “glub!” “The good thing about my brothers’ skip,” he commented, “is that they can use any rock and it will work.”

Compared to Joyce’s stingy base-point for rock skipping, kids in Sonoma Valley or Kochi are much luckier. Dan’s spot in Glen Ellen had a pebble beach and substantial calm stretch extending for more than 300 yards—it was a paradise for skipping rocks (Figure 4.78). We could easily skip more than ten, listening to the rock rubbing over water and watching the hops accelerate then vanished at the far end of the calm. We skipped and skipped. It was very difficult to end the tour in this situation.

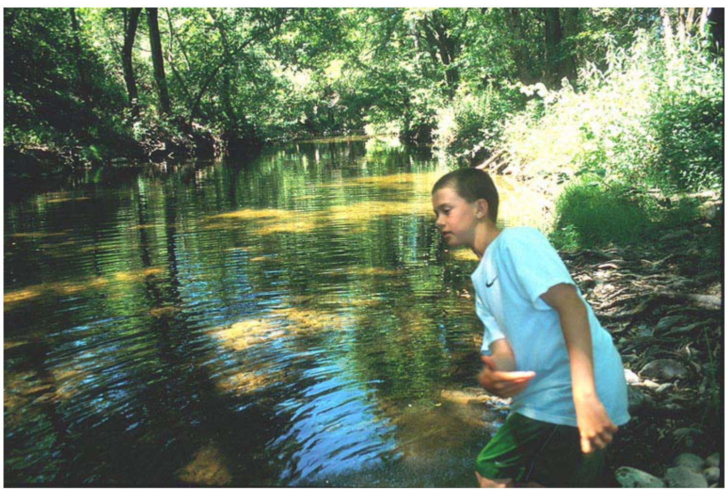


Figure 4.78 Dan’s base-point at Sonoma Creek is a paradise for rock-skipping

In Japan, bamboo is probably the most versatile material for crafts. In addition to all the catching tools made of its stalk, its sprout is collected for food and its leaves are used to make bamboo-leaf boats for competition (Figure 4.79, Figure 4.80). When Aki tried to show me how to make a bamboo-leaf boat, she used a reed leaf that looked alike, only to discover that it did not work. The nut gun is another common bamboo craft. They are often made of Metake, a species growing on stream banks. A player would make a set of 3 or more guns at once with different barrel sizes for different bullets. Nuts of camphor trees, hackberries, elms and various grass seeds all provide proper bullets (Figure 4.81). Every part of these simple crafts corresponds to the stream environments in Kochi.

Figure 4.79 (left) In Japan, bamboo leaf boat is a traditional clever craft associated with streams

Figure 4.80 (above) Kids learning how to make bamboo leaf boats from the grandmother

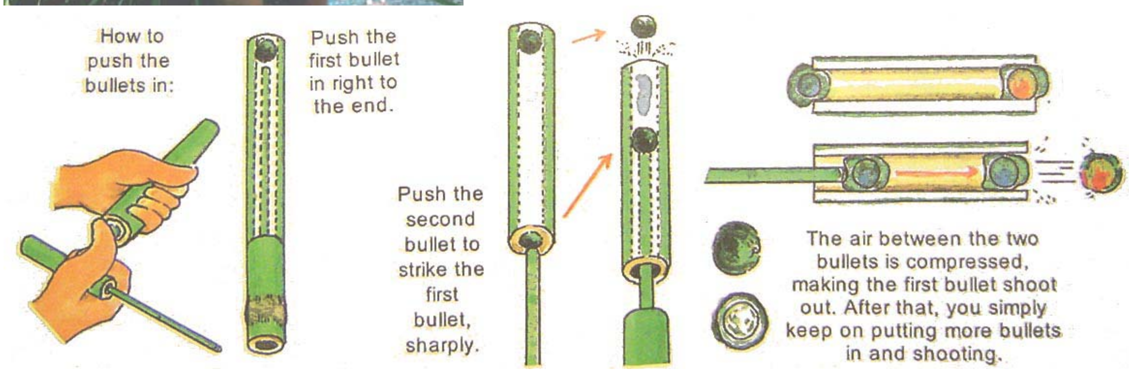


Figure 4.81 The mechanism of nut gun. If a BB gun bullet is used instead of plant nuts, the bamboo will crack and it simply does not work (from Haraga 1996, p. 26)

In California, users would apply algae to skin rash. In Japan, kids used the fluid of smashed mugwort to heal scratches and defog goggles. Deer grass in Sonoma was used for whistle flutes. Foxtail stalks in Kochi were used to make knots to trap frog while with the same mechanism, palm leaf stalks were used to trap shrimps in Taiwan. The list goes on and on. Similar crafts may parallel across cultures, but to work at all, they have to stem from the local stream habitats.

4.2.6 Water Contact

At the popular swimming hole in Sonoma Creek at Glen Ellen, David inadvertently revealed his secret: "…now I don't swim here—I have another spot!" Predictably, he could not get away without telling his sister and friend the lot. To get to David's secret spot, we went down the steep bank from an entrance on Arnold Drive, carefully avoiding poison oak and finally came to a circular pool enclosed by tree branches, deer grass and ivy. It *was* a cool spot—all the other kids agreed. Without further introduction, David took off his shirt on the clay rock and jumped in (Figure 4.82). "Woooow! It's cold! So cold! Super!!" The rest of us could not resist such seduction and we all jumped in. The clay rock when wet became a slide, providing another way to set-in. We swam in the circular pool, then dived across a "gate" formed by low branches of ivy, and ahead the creek opened up to a big pool.

Figure 4.82 David boasting noisily how cold the water is and how good he feels

Flowing water is the essential charm of a stream. Whether it is gentle dabbling or violent diving, spontaneous users yearn for the coolness, wetness, softness, and various other body sensations of physical contact with water. Different forms of water contact require specific ranges of flow speed, water depth and particular relationships between base-points and paths. The access to water edge, the shape of water edge, and a "dry base-point" are essential to all water contacts. By dry base-point is meant the place where possessions are left temporarily and where one dries the body after water contact. For "thrilling" water contacts such as flushing and diving, routes that connect back to the set-in points are indispensable to support their repetitive characteristics.

Paddle/splash pond

For little kids and users who do not hope to get too wet, a shallow and calm area where one can stick feet in or splash around with bare feet is very satisfying. In general, these uses require a depth of less than 1.5 ft and flow speed less than 0.7 ft/s. Gentle shores and backwaters provide such flow conditions (Figure 4.83).

Figure 4.83 Girls splashing each other at the shallow reach of Kagami River

The action range of paddling is seldom large, usually only a few yards from the water edge and the dry base-point. In large streams, some hint of boundary is preferred than a vague expanse of water. Paddlers need gentle and easy access to water. Grassy banks make dry points distant and are always less preferred as set-in spots. Bottom material is another important factor for paddling. Sandy or clay bottoms provide comfortable footholds; gravel, algae and organic deposits also enrich the experiences.

Swimming

Swimming occurs mostly in reaches where water is deeper than 1.5 ft and flow less than 1.5 ft/s. Swimmers in general need a gentle and gradual water edge. In Creekside Park, Marian used an "island" (a little peninsula) as her dry base-point. A few cottonwoods held the "island" in place and formed a pool around it. In spring, water could be up to a meter deep. The size of the pool allowed Marian to play with 3 or 4 friends here. They would go down with goggles, shoes and regular clothes on, swimming or playing a tag game called Marco Polo (Figure 4.84).

Figure 4.84 (left) Marian's "island" and swimming spot in Marsh Creek

Figure 4.85 (above) The root ledge pool in Sonoma Creek at Glen Ellen provides a good set-in spot for swimmers

"Root ledge pool" is another form that commonly creates swimming spot. It is seen at banks where tree roots check the erosion and form a "ledge." Entangled roots usually form a gradual ladder to access the pool. Rose and David, for example, had a spot in Glen Ellen where they could access a pool from tree roots (Figure 4.85).. However, since riprap was thrown here to protect the bank, the sudden change of the depth sometimes causes the swimmers to hit the blocks and get hurt.

Swimmers also require “stopover base-points” to take a rest in large or speedy swimming areas. Island bars, piers, or any structure that provides a shallow plane for foothold in the middle of flow serve for such purposes (Figure 4.86). Also, warm surfaces such as big rocks, pebble beach, concrete blocks, asphalt roads, etc. are valuable dry base-points (Figure 4.87).

Figure 4.86 A group of swimmers use the island bar as a stop-over base point in Kagami River

Figure 4.87 Kids drying out their bodies on the asphalt pavement in Kochi

The Kagamigawa Bridge in Kochi might look gloomy, yet the conditions for swimming were complete. Water was calm and clean-looking, concrete blocks offered set-in and dry spots, piers provided stopovers to hold on and catch one’s breath, and by the blocks, fish swarmed. Three young kids swam back and forth across the width of the river. They even took advantage on the calm water and dramatic setting to play “dead body”, scaring the occasional passers-by (Figure 4.88, Figure 4.89).

Figure 4.88 (left) Kagamigawa Bridge, a wide and calm area for swimming

Figure 4.89 (above) Kids playing "dead body"

Flushing

"Flushing" means to trust the high-speed flow (> 1.5 ft/s) to transport one's body. It is an activity that makes clever use of flow speed and bed forms. There are different versions of flushing, but they all follow similar principles.

The most common form of flushing is to use riffles. At a drop work in Kagami River, the flow hit the left bank and turned sharply away, forming a concentrated stretch of riffle that was thin and swift—an ideal spot for flushing (Figure 4.90). Sachi and I chose a spot with some depth (about a foot) and lied down. Then if we floated the body enough we would get flushed away; otherwise the back would rub through rocks, which Sachi called "back massage". At any point if we wanted, we could "jam the brake" and sit up. However, after getting flushed for 15 or 20 meters, we would approach to the crest of riffle and the body would eventually be caught on a big cobble. Once Sachi discovered this simple but sensuously rich play, she could not stop. She got flushed, sat up, and immediately ran back to the original set-in point for another flush (Figure 4.91).

Figure 4.90 The drop work creates erosion at the left bank in Kagami River. Although a poor work from an engineering view point, the area becomes a rich water contact zone

Figure 4.91 Sachi playing “flushing” at the riffle created by the drop work

Figure 4.92 Flushing making use of the concentrated flow and local bed variety formed around the piers (Kagami River, Kochi)

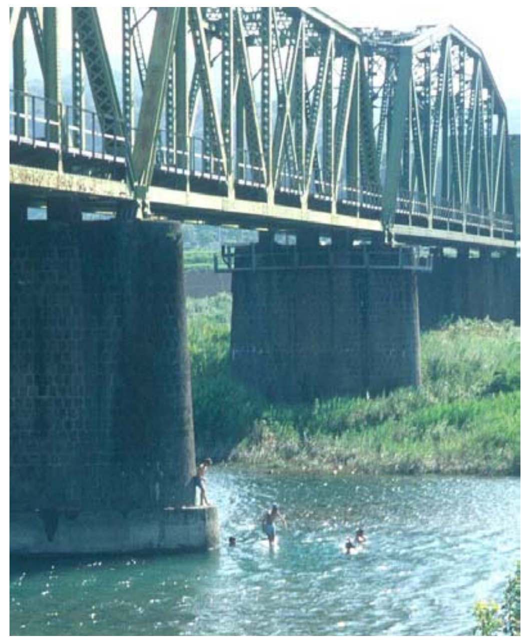


Figure 4.93 Diving and flushing at Niyodo River, Kochi

Hard structures in the streams such as bridge piers usually form concentrated currents that add fun to swimming. Under the New Moon Bridge in Kagami River, the smooth wall of a concrete pier created a high-pressure spot at its upstream end. Here a group of swimmers strived to hug the concrete pier and resisted the flow until they finally had to let go (Figure 4.92). The railroad bridge pier in Niyodo River was another example. The upstream end of the pier was deeply scoured, forming deposition at the downstream end. Here kids would climb up the footing platform from the back of the pier, dive into the scour pool at the front and get flushed downstream (Figure 4.93). In either case, users would get flushed down for only some 10 meters since the variety of flow speed occur only around the structures. This condition forms effective play loops.

Diving

I arrived at Kochi in early July, the end of the rainy season and the beginning of the genuine summer. This afternoon, Kagami River was yet to calm down in the wake of two days of rain, but divers seemed to be impatient. On the narrow biking/walking trail downstream the New Moon Bridge, five middle school boys passed me in a hurry. They stopped by a stairway that connected the trail to the levee top road, laid their bikes against the concrete wall and started to remove their uniforms noisily until with only pants on. After a short discussion, one of them posed himself on the sloping levee wall, ran down across the trail with full speed, flipped himself forward at the edge of the trail and plunged in the river (Figure 4.94, Figure 4.95). And soon one after another, the boys all repeated the same sequence and leaped into Kagami River. After a few dives, they climbed up the top of the stairway resting, chatting, and watching passersby under both sides of them (Figure 4.96). I started to talk to them. One boy said, “Sometimes I dive headlong in; sometimes I dive from that bridge.” That 9 meter-high New Moon Bridge? I did not believe it. “It’s true! Come, I’ll show you!” Two boys biked 100 meters up, ran up the bridge, climbed over and stood outside the sidewalk handrail. Passers-by slowed down to watch, but nobody stopped them. I was quite nervous when they let go their grip of handrail. But there was an indescribable thrill and satisfaction watching the doughty actions in front of me. Little did I know that this afternoon was just the start of the diving series I observed in Kagami River.

Figure 4.94 (upper left) Some 15 kids gathering at the 4th stairway—a magical diving spot

Figure 4.95 (above) Using the levee wall for the run-up

Figure 4.96 (left) Kids taking the stairway as a dry base-point

In hot days, the sudden impingement of cool stream water on body is one of the most thrilling and compelling ways to experience a stream. Diving is of course associated with deep pools. The diving height, according to the diver's skill and nerve, is almost limitless. (Diving from 15 meter-high tree top was observed.) However, the depth of pool is the primary limiting factor. In public diving pools, it is customary that diving board height to water depth is roughly 3 to 2 when the diving board height is greater than 5 meters. When the height reduces, the ratio becomes smaller. A dive from pool edge normally requires a minimum depth of 1-meter (see e.g., NSPI 2003). In stream environments, a pool deeper than 2 meters is rare and considered enough for a moderate-height diving.

In addition to a diving base-point and enough water depth, a good diving spot has a few more features: a landing base-point that has a gentler water edge; a path to connect landing and diving base-points into a loop; choices for different levels of divers; and "extra features" to make diving fun and challenging.

During the one and half months I stayed in Kochi, almost every sunny afternoon I would meet divers on Kagami River. Kochi divers were loud and eye-catching, mostly boy groups. For many of them I believe the show-off quality of diving was at least as important as its sensuous experience. But without a doubt these kids knew how to discover the fun of diving. From a high spot, diving is much more than the moment of water contact. During the one second or so before hitting water surface, the diver enters into another world, as J. B. Jackson described of speed-oriented recreational activities:

> *"The new landscape, seen at a rapid, sometimes even a terrifying pace, is composed of rushing air, shifting lights, clouds, waves… our nerves and muscles are all of them brought into play."* (Jackson 1957, p. 25)

Diving in Kochi was so diverse that when I finally compiled a "diving map" for Kagami River, there were 15 spots, all with different diving flavors (Figure 4.97). Diving from the trees, one experiences the thrill of shaking footholds; diving from a rope swing, there is the challenge of arm strength, body balancing technique and the timing to let go; diving at the "4th stairway", the challenge is to leap forward enough to avoid the concrete foundation sticking out beneath the mean water level.

The rock outcrop is a traditional icon for stream diving for the good reason that it gives steady foothold, creates a deep pool, and most importantly, the irregular shape provides divers choices of diving height. This feature allows divers to practice and enhance their courage and skill in a gradual way.

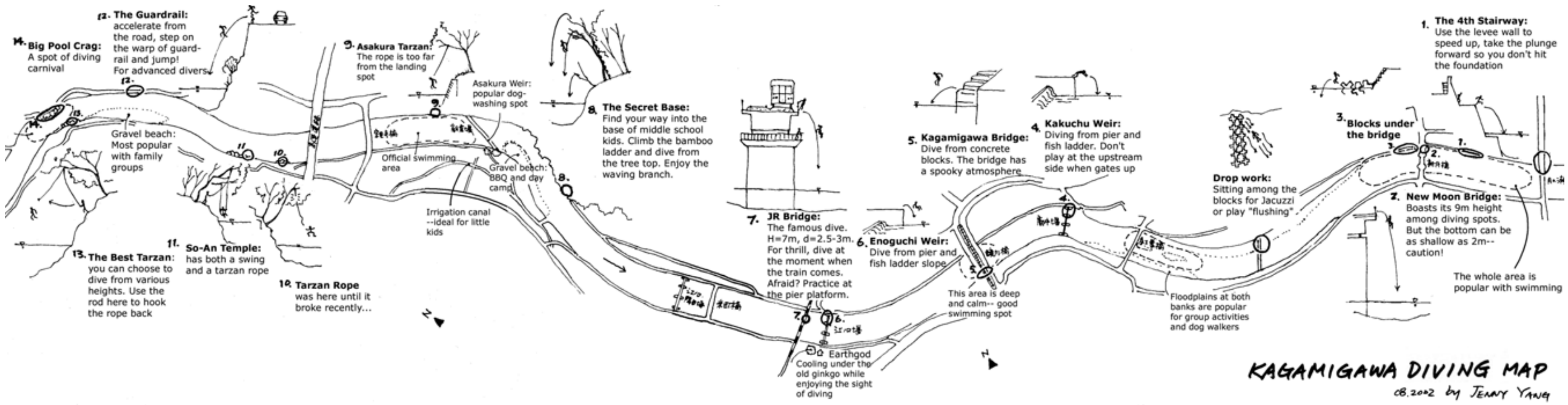


Figure 4.97 A map of the diving base points on Kagami River, Kochi

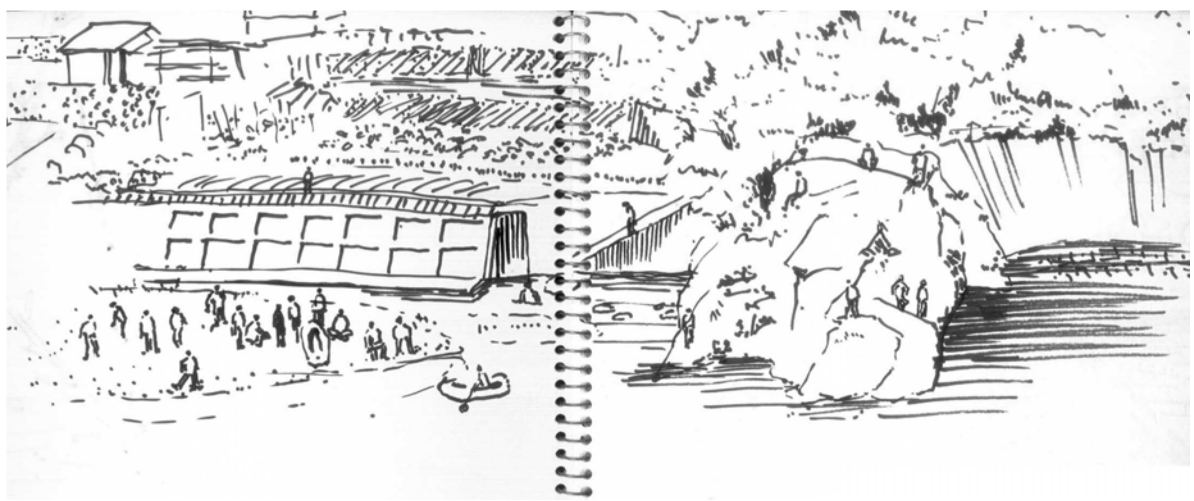


Figure 4.98 The legendary Spook Rock is the upstream most diving spot within Kochi City, accessible by bikes from downtown

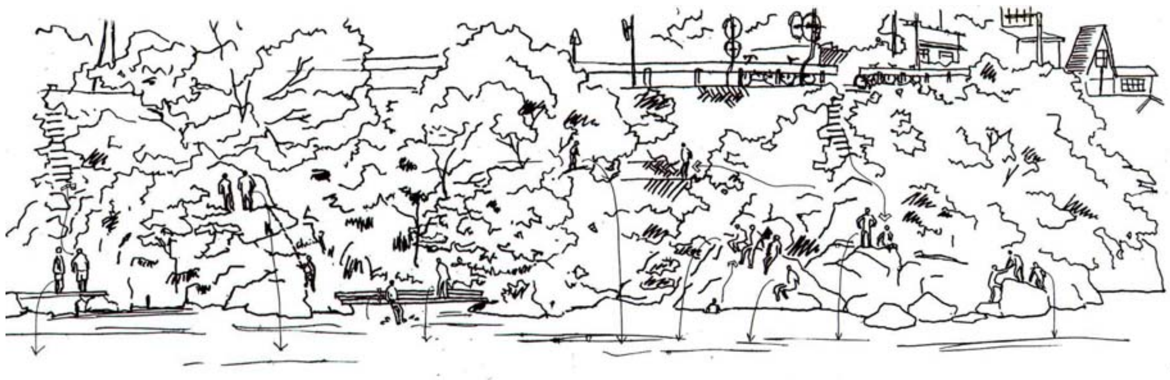


Figure 4.99 At the Big Pool Crag, the variety of diving and routes of connection are dazzling

The *Spook Rock* is a landmark diving rock located further upstream Kagami River. Here different diving points were numbered by local kids. Number 3, the toe facing downstream was only about 1.5 meters high; number 2, the knee protruding out toward the opposite bank was about 3 meters; and number 1, the head, was a cliff rising straight up about 7.5 meters at the upstream side (Figure 4.98).

The *Big Pool Crag* is a 50-meter stretch of rock outcrop under a road. It is a diving-carnival sort of spot, with a splendid array of continuous and assorted jump-off points. During weekends, it easily attracted a few dozen users to cling around and bounce off it. Although the crag was a delighted given from the river's geological formation, the spot had gone through much user adaptation. From the road, early fishermen built two sets of precipitous concrete stairways on the rock. Chains or ropes were fastened to assist climbing up the steep aspects. Even benches were constructed above water surface to serve those who wanted to have a comfortable repose (Figure 4.99).

But only truly skilled ones would come to "*The Guardrail.*" I had heard many kids refer to it as a favorite diving spot before I finally witnessed and understood what it was all about. Where the mountain rose sheer from the left bank at the boundary of Kochi City and Kagami Village, the road closed in on the river. By coincidence or not, here the guardrail had a warp. Divers would accelerate from the other side of the road, step on the warp of the guardrail, then spring themselves forcefully forward to avoid the rock outcrop and vegetation and plunge into the deep pool (Figure 4.100). But even the precipitous-looking cliff here contained a loop for the divers. After the dive, they would climb up the rock and follow a determined route back up the road. The guardrail had an opening 10 meters away and a pot was placed under the opening as a step so shorter kids could climb up without too much trouble (Figure 4.101).

Figure 4.100 Diving from the guardrail

Figure 4.101 Route going back to the diving spot

Where Japan Railways (JR) crosses Kagami River is another landmark (and probably the most famous) diving spot in Kochi. The *JR bridge* was widely championed by divers for good reasons. The access to the railroad track was fortuitously connected by a ramp, the levee, a stairway, a sloping street, and an remnant abutment from the old bridge. Once familiarized, this route can be traveled within a minute (Figure 4.102). Kids would climb up the track and wait for the train to come. When the siren alarmed and the train finally came into sight, they got all excited, flipping over to the outside of the fence, holding or standing on the rail, and right before the train passed, they let go and dropped (Figure 4.103).

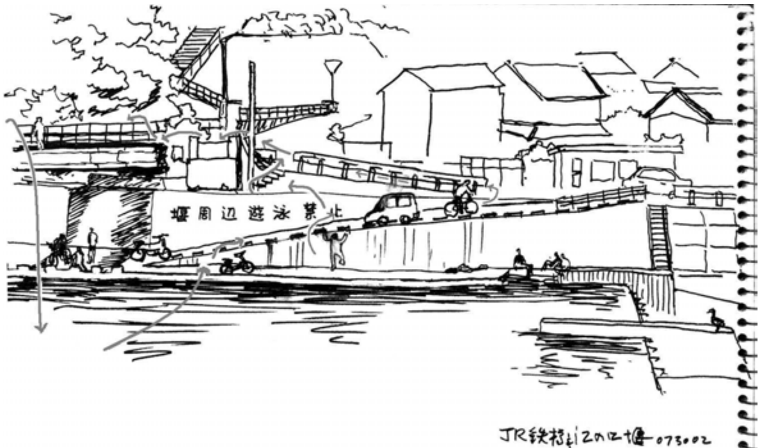


Figure 4.102 (left) Loop of diving activity

Figure 4.103 (lower left) The JR railroad bridge

Figure 4.104 (lower right) The sightseeing spot across the river

This might look heroic (particularly since there were kids who liked to hang their bodies under the bridge until the moment train passed above them), but the process had a lot more mental thrilling than real danger. The bridge had a moderate height of 7 meters and the pool was over than 3 meters deep; divers had plenty of time before the train's arrival; and the "let go and drop" process had little to do with physical skill or strength. The maintenance platform at the waist of the pier even provided an option of a lower height. But it was dramatic! The visibility of the spot added charm to it, too. On the opposite bank was an ancient ginkgo shading a bench and a little earthgod shrine by the trail. Neighborhood olds gather here—taking care of the shrine, chatting, playing chess, while enjoying the grand spectacle across the river (Figure 4.104)

4.2.7 Moving Along on the Trail

Paved trails allow users to move along the stream smoothly and encounter the variety of scenes in an effortless way. Trail uses such as walking, jogging, biking and skating usually contain practical purposes that do not associate with the stream environment. As a result, they are antipodal to adventures. Instead of an interconnected web of paths, these uses embody only a simple path and maybe some stopover base-points with general amenities such as shades, views and seats (Figure 4.105, Figure 4.106).

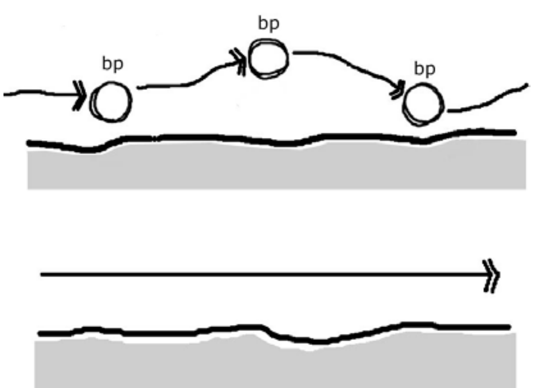


Figure 4.105 Moving along on the trail has a much simplified structure compared to adventures (up: some interaction; down: little interaction)

Figure 4.106 A big cottonwood by the trail of Marsh Creek offers a precious stopover for this long and hot stretch and becomes a spot for socialization

Speed of moving and purpose of use determine the level of interaction. At one end we have bikers with headphones or joggers with pedometers to whom the stream is a vague background rolling over and by whom any stops and surprises are shunned away. At the other, we have ambulant observers who make frequent and intensive stops—the routes may be routine, but experiences seldom are.

4.2.8 Social Gathering

Social gathering involves human interaction as the main purpose, for which the stream environment provides a pleasant backdrop.

Organized gatherings such as picnics or camping are not considered spontaneous because they often consume too much time and energy and stream interaction is often regarded as secondary. However, stream planning and design has been devoted on promoting them. Such users are dependent on driving and parking spaces for all the tools and equipment they carry. To reduce automobile impacts to the streams, space for social gathering is often separated from the stream and equipped with tables, barbeque grills and tap water access. By the time picnickers and campers load the equipment back into the car, they may not have experienced much of the water, wildlife, and loose parts of the stream. At gravel beaches of larger streams, organized social gathering has greater chance to combine with other spontaneous uses, although it is still dependant on car accessibility (Figure 4.107).

Figure 4.107 Family groups on the popular gravel beach at Sou-An Temple in Kagami River. The beach has road parking and a ramp that allows cars to ride in

In contrast, casual gatherings are quick and easy. Food is grabbed and the family hits the trail walking or biking. The base-points are not bound at specific facilities, but are still featured with easy access, physical comfort, views and contacts to water. A sense of territory remains important, but casual gathers do not need as much privacy as quiet and secluded users (Figure 4.108).

Figure 4.108 Although the Creekside Park provides plenty of picnic tables, this "rocky area" at the tip of the bypass channel was chosen for casual picnicking for its proximity to the creek, the shade, and the broad view to the park and its activities

The most casual social gathering happens among users who share the same territory. In Kochi, most of the big groups using the same spot were not formed purposely. It took several unrelated kids to individually invite their one or two friends to meet at a spot, and when they noticed they had become a big group. Within such unorganized groups knowledge on catching and clever crafts is passed around, competitions of swimming and diving spring, and dramas evolve.

4.3 Summary: Why Bother with Spontaneous Uses?

Juxtaposing the above typology with the modus operandi of current restoration or greenway projects, it is hard to miss that the planning and design of urban streams has been quite hostile to spontaneous users. Projects seem to cater exclusively for the most unintrusive and innocuous forms of use— moving along the trail and organized social gathering. Although nature observation is a widely claimed goal, there has been little innovation to encourage meaningful wildlife contact.

This section serves as a tentative conclusion before we move on talking about planning and design for spontaneous uses in the context of stream restoration. The empirical results from this fieldwork combined with former research regarding the functions and meanings of urban nature give rise to five grounds to promote spontaneous use as the central theme of urban stream restoration.

Therapeutic Value

The restorative power of urban nature has long been recognized, but not until recently have social sciences generated enough evidence for it. Researches conducted in hospitals demonstrated that the view of greenery from window or exposure to plants and wildlife contributes significantly to the recovery of patients (Verderber 1986, Ulrich 1984, Ulrich and Simons 1991). Therapeutic effects of wilderness experiences, such as renewed awareness to life and satisfaction for solitude and physical challenges, are considered to be also evident in urban nature experiences (Kaplan and Talbot 1983, Kaplan and Kaplan 1989). Through field studies with youths (Owens 1988, Hester et al. 1988), outdoor experiments with preschoolers (Kirby 1989) and visualization/ autobiography workshops with adults (Cooper Marcus 1992, Olds 1989), environmental designers have concluded that refuge in a natural setting is sought after by people of almost all ages and backgrounds as a primal source of nourishment and rejuvenation.

Reinforcing these findings, my research has verified that for an urban stream, therapeutic value is substantial to say the least. While kids also seek quiet seclusion from time to time, among adults healing through solitude has formed the central source of appreciation to urban streams.

Developmental Effect

The importance of natural environment to child development is advocated in literatures of education, psychology, anthropology, geography, and the design field. Joseph Chilton Pearce (1977) argued that development can take place only on the foundation of sensory contact with the world of things and processes, without which "no earth matrix can form… and no basis for abstraction and creativity can arise" (p. 28). Edith Cobb (1977) described the essence of children's interaction with the natural world through the concept of *genius loci*. She concluded that a major clue to mental health lies in the spontaneously creative imagination of childhood. Robin Moore (1986a) employed educator Karl Scherler's notion of competence-through-play and argued that spontaneous play produces environmental competence.

This research corroborated the above theories. The frequent comments such as "there are always things I can do here" and "I never get bored" from kids are the tribute to the bountiful loose parts and ever-changing "life" quality of creeks and rivers. Through spontaneous interaction with nearby streams, children acquire competence-through-play, *genius loci,* and in general, healthy development.

Raise Environmental Awareness

Environment can be seen as a teaching medium, "[o]nce learned, it becomes a mnemonic device reminding one of appropriate behavior" (Rapoport 1982, p. 67). As a theme lying at the heart of environmental education, various sources have agreed on the significant relationship between exposure to nature during childhood and environmental awareness as an adult. As David Orr (1992) contended, ecological literacy is driven by the sense of wonder and affinity for the living world; without which, literacy of any sort will not help much.

Such concern is verified by field survey results. Reviewing a number of studies, Chawla (1988) concluded that concern for the natural world is shaped through opportunities for direct contact with nature. For example, one study asked 45 dedicated conservationists to describe formative influences. Another presented similar questions to 22 environmental educators. In both studies, the most frequent responses were many free hours spent outdoors in natural habitats in childhood or adolescence. Research also pointed out that both the current and childhood living environments of adults affect landscape taste as well as the understanding and personal interest in wildlife (Kellert 1984, Schroeder 1987). Children's experiences with vegetation directly enhance their environmental awareness and appreciation (Harvey 1989).

Results from this research highly collaborated with the above notions. Child spontaneous players displayed a higher understanding to the stream environment than those with environmental education but without actual creek contact. Adults who experienced spontaneous uses posed higher value at urban streams and are more willing to extend help in creek enhancement efforts. The forming of stream conception, although tampered by culture and limited in extent, is still significantly linked with the experiences of spontaneous uses.

Form Place Attachment and Preserve "Wilderness"

As reviewed in Chapter 2, the backcountry recreational boom shares the same mechanism with urban sprawl—both rooting from the yearning for nature not being fulfilled nearby the residence (Nash 1982). Only when we begin to make progress in resolving the inadequacies of people's non-leisure environment can we hope to take some of the pressure off and successfully maintain the resources in the leisure environment. As de Grazia's (1970) remark: "Only the city can save the wilderness."

Proposing spontaneous use operates exactly along the direction of infilling urban nature. A nearby stream is popularly regarded as "a quick escape" and "the saving grace of the city"; it generates place attachment and provides a magnet for people to stay in the city. Through restoring urban streams and serve them for spontaneous uses to the highest possible extent, we may quench the yearning for 'wilderness.'

Interact with the Stream Processes

Most spontaneous uses are choreographed by the creek environments and therefore corresponding to the stream processes. An action as simple as skipping a rock requires a stretch of calm water and a gravel bar where one finds the rock with the right shape and size. Just as the salmon spawning bed, the rock skipper's habitat depends on a subtle balance of fluvial processes. This I consider is the primary reason why spontaneous uses are more effective in raising stream value and commitment than non-spontaneous ones. Meanwhile, it is this intricate relationship with the processes that attunes spontaneous uses to the outlook of an ecologically healthy urban stream system. Based on this relationship, planners and designers have the incentive to truly coordinate with restoration scientists and engineers. If we know enough about the habitat requirements of spontaneous uses, we may regard them as a layer of human ecology; a matrix may be woven for spontaneous users and stream organisms to cohabit.

Chapter 5 Planning and Design for Spontaneous Uses

Rarely do we have a chance to plan or design a stream to shape the city. But if it happens, like the recently urban renaissance in Milwaukee or Houston, what could we do to embrace spontaneous uses? More commonly at the reach scale, if a new development provides opportunities for revising the stream, what could we do to incorporate spontaneous uses? Or, as mostly seen, in a project focusing on a small section of daylighting or dechannelization of urban creeks, what opportunities do we have to design for spontaneous uses?

This chapter generates links between the knowledge we now have on spontaneous uses and the theory and techniques developed in fields surrounding stream restoration—geomorphology, hydrology, landscape ecology, bio-engineering, etc. By examining the potential conflicts and applicability between spontaneous use and the modus operandi in watershed management, planning and design of urban streams, we may find encompassing strategies to embrace spontaneous uses in urban stream restoration.

5.1 Watershed Management

To a large degree, urban stream restoration is to make things go right in a piecemeal way. It is to do some good on the mistakes piled up in the past. The stream of concern is usually constrained by the surrounding land use and defined by altered hydrologic cycle, geomorphologic process, pollution, and flora/fauna conditions that can only be addressed by watershed-wide intervention. It would be interesting to list the parallels of the impacts on wildlife and on spontaneous users due to watershed mismanagement. For the point of illustration, I will use dam as an example. The version of spontaneous users' accusation of dams would be:

"Because of the lack of flushing flows, crucial gravel bars become covered with silt, inducing colonization of vegetation and forming a floodplain that even the most persistent anglers cannot penetrate. With sediments trapped behind dams, bars and beds become armored with boulders, leaving no gravel proper for skipping, building and collecting. Incision caused by the hungry water after dams makes channels inaccessible gorges, lowering down groundwater, causing loss of riparian woods and loss of favored spots for adventure and quiet meditation. Reduced low-flow degrades water quality, deprives swimming holes, making once bountiful water surface a trickling afterthought, and causing loss of diving and fishing spots…."

In the development of restoration science, professionals have reached a consensus that the first priority is to restore the watershed processes, not to build the habitats directly. Past examples have repeatedly demonstrated that when the key processes are reinstated, wildlife species sooner or later come back. To a large extent this is also true for the spontaneous use, except when it comes to cities, passively undoing a deed may not be an option. Instead, devising better human systems to mitigate the past mismanagements is the crux to watershed survival. From the spontaneous use's viewpoint, I will examine watershed management strategies that adapt nature into cities.

5.1.1 Flow Regime and Urban Hydrology

In many urban areas, a fundamental problem spontaneous users are facing is the reduced in-stream flow by increasing water use out of the channel. In-stream flow deficit is not a new problem. Ecologists have long been promoting in-stream flow rights to guarantee a base flow (such as the 7-day minimum flow) necessary for fish habitat (Petts et. al. 1995). Recreational planners occasionally devise ways to determine base flow necessary for boating and swimming (Whittaker 1993, Watson 1985). In recent years, restoration scientists demand dam discharges to better approximate natural flood regimes. Small (about 2 year) and medium (about 10 year) flushes are called for to facilitate vegetation recruitment and sustain healthy riparian habitat (Mahoney and Rood 1998, Smeltzer and Kondolf 1999). However, these efforts focus on rural streams or the few urban streams where species of conservation interest are found.

Spontaneous users in urban streams do not have water rights; yet according to my fieldwork observation all the above-mentioned flow scales are important to them. Low flow is when users frequently contact the stream and when the stream conception is formed. High flow is necessary to maintain the riparian ecosystem for daily contact; more importantly, it is essential for the sake of experiences. As noted in prior chapters, users treasure the dramatic quality of high water events. The bank-full discharge (1.5-2 year flood) cleans gravel bars, changes the look of the channel and brings about special catching experiences. The 10 year scale flood moves the channel bed, changes dramatically the image of riparian landscape, creates secondary flows, destroys some paths and base-points, and furnishes new challenges and opportunities for users to re-adopt the environment.

Although considering the individual and societal benefits enumerated at the end of Chapter 4, the spontaneous use should be asserted as a beneficial use for in urban streams and entitled a date priority (since it often predates development), it does not necessarily have to become one more competitor for the scarce water resource in cities. More appropriately, it can form a joined force to pursue flushes and base flow for in-stream lives in urban stream restoration.

The urban hydrologic watershed is a complicated network where water is routed to and intercepted at various terminals with a series of extractions and intakes along its course (Figure 5.1). To bring flow back to the stream channels requires strategic adjustments within this existing system.

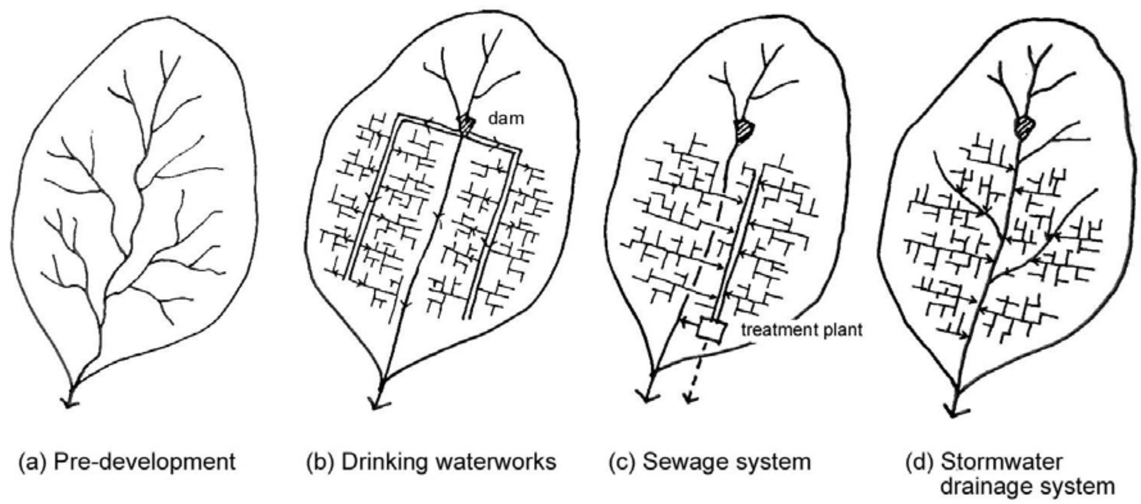


Figure 5.1 (a) The pre-development watershed. (b)-(d) Urban watershed with intricate layers of systems that penetrate into our daily life

Dam discharge constitutes the only source for flushes, but for base flow, more means can be explored. Current urban hydrology does not pay attention to in-stream flow management. For example, sewage after secondary or even tertiary treatment is allowed to be put into a pipe extending to the sea in many coastal cities. Lyle (1994) pointed out that treated wastewater is the largest potential source for augmenting present supplies. Through direct groundwater recharge or landscape and agriculture irrigation, reclaimed water can be routed back to aquifer to supply base flow. For in-stream flow augment, it is important that these recharge sites be strategically selected at upstream groundwater infiltration zones so the spontaneous users at the upstream end of the city can also enjoy the enhanced base-flow. The saving of water use will also allow more flushing flows during small and middle floods, when most reservoirs skimp discharges.

Similarly, recycling gray water within the neighborhoods or individual properties will reduce the volume of sewage. Rapid storm runoff is another fundamental cause of lowered in-stream flow. Due to its compound impacts on flooding and water quality, increasing emphases are being paid to runoff treatment and reduction. All these measurements will aid spontaneous users to keep water in streams.

5.1.2 Stream Balance and Geomorphology

While water is gradually recognized as a circulating resource that must be carefully managed, the awareness of sediment being the same kind of resource is surprisingly low in watershed management. Yet spontaneous users and in-stream lives require plenty of sediment, the right sediment regime and the right composition of sediment sorted by flow. In California, increased runoff combined with reduced sediment load make downcutting routinely the plague for middle and small urban streams. The channel geometry of an incised stream sustains itself to be further incised. When there is no bedrock or coarse substrate as the case in many lowland streams in California, downcutting can go on without a stop (Haltiner and Beeman 2003). For spontaneous users downcutting first and foremost severely handicaps access (Figure 5.2). Even when the stream can be reached, the lack of gravel bar and gravel bed deprives a whole sector of loose part and wildlife contact.

Figure 5.2 Creek access ruined by downcutting (San Anselmo Creek, California)

In restoring in-stream habitats, lack of sediment is usually a cumbersome barrier to overcome. On the upper Sacramento River, gravel was purchased and deliberately dumped for use by spawning chinook salmon. From 1988-2000, California Department of Fish and Game committed $22 million on artificial spawning gravel enhancement in the upper Sacramento River, with purchasing gravel from the mining industry for deliberate release back to the river as a main strategy (Kondolf 1995). Although securing sediment for spontaneous use may be no less important, we do not expect such costly measures to happen on small urban streams; nor is it necessary to make spontaneous users a competitor with mining and construction industries.

A look at the urban lithologic process (Figure 5.3) reveals where efforts can be made to reclaim sediment back to urban streams. Large amount of sediment is trapped behind dams. Aging dams that will need to be removed sooner or later presents the greatest opportunity to regain sediment. Removal of concrete dams in stages can potentially release sediment gradually and aggrade the channel over time. If the dam has low level outlets, sediment pass-through strategies should be actively pursued along with planned flushing (Kondolf 1995).

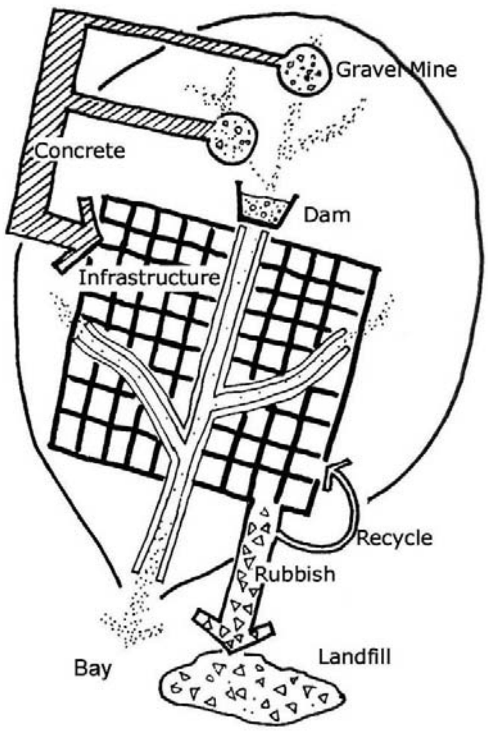


Figure 5.3 The urban lithologic process intercepts gravel from upstream, transforms it to concrete and asphalt, consumes it in urban infrastructure, and disposes it to landfill, leaving urban stream channels hungry of coarse sediment and a desert for spontaneous users and other in-stream organisms

Another source of in-stream sediment comes from reducing the need of construction aggregates and reclaiming gravel and sand from waste concrete. While many claim water rights, the concept of "sediment rights" is yet to be formed. Currently gravel mining is the only use with a right. Large amount of concrete debris that originates from stream bed goes straight into landfills. In 1998, the country uses about 2.2 billion tons of aggregates on construction, of which 1.0 billion tons are from streambed. Recycled concrete supplies only 5% of the total aggregates and only less than 3% of recycled aggregate is returned to streams–in the form of riprap (USGS 1999). Confronting the in-stream sediment rights and the shrinking gravel resource and landfills, we will have to develop ways to recover gravel and sand from concrete and return them to streambeds while shifting our infrastructure away from the current natural aggregate dependency.

Reshaping the channel can to a degree achieve local stream balance. Usually in the incised urban streams in California, the approach is to widen the channel and create a floodplain at the new elevation to allow sediment deposition during high flows (Haltiner and Beeman 2003). Reclaiming dredgings presents another opportunity. If sediment supply is not cut off upstream but flushed downstream along with the increased peak flow, excessive deposition and channel aggradation is likely to occur at the downstream end of the watershed (ibid.). In this case, constant dredging is necessary and the disposal of spoil creates another hazard. In combination with channel reshaping to prevent further incision, these dredgings occurred downstream could be returned to stream bed so the channel can gradually aggregate to a level that it regains geomorphologic balance. In Britain, for example, material from dredging and bank grading is being reused in the same stream system for environmental gain. Gravel is collected for riffles, rocks for weirs, sand for access road and silt for berms (RSPB et al. 1994).

5.1.3 Water Quality Standard and Pollution Control

The perception of water quality tolerable for in-stream activities may vary greatly among users. But a certain fact is, if a stream is accessible at all, water quality perception is the most crucial criteria for in-stream uses to happen. How is the general condition of the water quality of the small and middle urban streams that spontaneous users get in contact? Is there health risk, say, for Marian to soak her body in Marsh Creek?

Unfortunately, we do not seem to have data to answer these questions. According to the Environmental Protection Agency document (Sachar and Currey 1999), two-thirds of the nation’s surveyed waters today are safe for fishing and swimming. Yet the “surveyed waters” have largely left out the spontaneous users’ habitats. Although EPA does intend to include all possible surface waters into its water quality regulation, currently only 37%

of the nation's streams are monitored by government agencies (Riley 1998, p. 311). In California, both Marsh Creek and Sonoma Creek are not on the Clean Water Act water quality monitoring list. The recent CWA amendment has required municipalities to acquire National Pollutant Discharge Elimination System (NPDES) permit for their stormwater. This new permit system, being source-control oriented, has the potential to greatly improve water quality in all urban streams. However, citizens do not know if the resulting water quality is suitable for certain contact because we do not have adequate water quality standards for spontaneous uses.

In monitoring water quality, state agencies designate beneficial use categories periodically and work on keeping water quality within standards that are considered suitable to support these uses. In California, the State and Regional Water Quality Control Boards defined 25 categories of beneficial uses, including two for recreational uses: REC-1 for body contact uses where incidental ingestion is possible, such as swimming, wading and diving; REC-2 for non-contact uses (with no risk of water ingestion), including picnicking, sunbathing, hiking, etc. (CERES 1996)[1].

While the common standards for swimming pool water is equivalent to drinking water, standards for recreational uses of surface water only focus on bacterial pollution such as the counting of E. Coli (EPA 2003b). Such standards are out-of-date, since today's urban water pollution has diverse sources, from pesticide to heavy metal.

The 2002 human health water quality criteria promulgated by EPA includes 15 numeric toxics criteria to "protect human health from the harmful effects of pollutants in ambient water" (EPA 2004). However, this new standard is made for fishing, with water

[1] Per this category, all urban streams in California with potential spontaneous uses should have been designated as REC-1 or REC-2 waters for water quality management purpose. However, this is rarely true.

or organism ingestion as the only concern and bio-concentration of toxics as the sole methodology. It does not address the risk of skin contact or eye contact with these potentially harmful substances. As a result, a REC-1 stream can have very foul water. An article on Sierra Club newsletter suggested, “if you're swimming in an alleged "whole-body contact" stream and you get a mouthful of water—spit it out!” (Midkiff 1998).

Consequently, we hear a lot of cautions against water contact and encounter a great many worried parents and children; some of them may be excessive, but nobody can be certain. Water quality standards for urban streams with potential spontaneous uses should have more choices than the crude bacteria counts and drinking water standards. Based on the common spontaneous use forms, a more comprehensive but realistic criteria should be established. For example, to have a four-level criteria corresponding to organism ingestion, whole-body contact, partial body contact and a minimal tolerable level for perception without body contact. The monitoring, whenever feasible, should recruit help from community groups. The criteria should intend to maximize use within manageable risk instead of to intimidate users. For example, certain amount of heavy metal may be allowed if it is not an “eat what you catch” stream. BOD or Total Suspended Solids may not be of much concern for partial body contact. On the other hand, oil and grease may not cause health problem when contacted, but the degree of visual and sensory discomfort should be considered. Spontaneous users will benefit from a flexible but reliable water quality standards as well as the ongoing rigorous efforts to reduce point and non-point pollution in urban streams.

5.1.4 Wildlife, Landscape Ecology and Urban Ecology

My fieldwork indicated that the sight of a salmon, the glimpse of a coyote, the sound of a burrowing owl, and even the smell of a skunk enriches every interaction with the stream. The presence of many wildlife species in urban streams is supported by a sound habitat base in the watershed scale. To increase bio-diversity so as to saturate the need of spontaneous users, it is necessary to preserve this habitat base.

Landscape ecology provides a set of patterns and principles for environmental planning from the four basic spatial categories in the landscape mosaic —patches, edges, corridors and matrix. (Dramstad et al. 1996). These patterns and principles can address both natural and human-generated impacts and be applied to both the landscape and the neighborhood levels (ibid.). However, in stream restoration and open space conservation, these rather neutral principles can be employed to reinforce city-nature dichotomy. A healthy watershed, based on the popular viewpoint in applying landscape ecology, is one with large patches of upland forests, open fields or major water bodies interconnected with thick riparian corridors. Urban lands become the passive "matrix", like a background noise, to be filtered out not to be embraced. Yet the recent development in landscape ecology indicated that the scheme of connectivity should not stop at an upper level of landscape elements, since the pattern of patches, edges, corridors, and matrix is only as clear as the target species is concerned:

> *"Many zoologists have observed that relatively few organisms perceive the landscape in a similar biological way, because of the existence of stenotopic and euritopic taxa. ...So the landscape seems to disappear, evanescing into a sort of fuzzy-edged mosaic."* (Ingegnoli 2002, pp. 54-55)

In other words, although an egret may perceive the entire length of the stream as a corridor for its motion, a raccoon moving back and forth from the stream and human neighborhood needs different corridors. Therefore, although open space preservation at urban edge and along waterways constructs a crucial framework, to create a sound and diverse habitat base for spontaneous users we can not forgo the matrix in-between.

Urban ecology emerges in the late 1960s and 1970s when some biologists, being concerned with the fact that generations of humans were growing up in cities, with little experience in the natural world, started to give attention to wildlife habitats in cities. (Adams 1994). They found with surprise many niches rich of life. For example, it is found that the species richness of many plant and animal taxa in cities is greater than in the surroundings and larger cities have higher number of species than smaller ones. (Starfinger and Sukopp 1994). Studies also confirmed bird species from cliffs (e.g. the endangered peregrine falcon) nests on the ledge and roofs of skyscrapers; species from caverns lives in cellars (ibid.). Particular diverse flora were found at wastelands, abandoned lots, and old river embankment (Brandes 1995).

In the US, the small, community-based urban stream restoration projects are constantly facing doubts on its value in contributing to the larger ecosystems. However, European examples show that when considered as part of the whole picture, small restoration efforts can sum up to major achievement. In Germany, habitat preservation is based on a much smaller scale—biotope (the smallest unit of landscape with uniform ecosystem features). Ten years ago, more than 160 cities in Germany had prepared biotope mapping projects (Starfinger and Sukopp 1994). Based on the mapping results, urban habitat conservation and development plans became the backbone of town planning for the decades to come (Godde et al. 1995). For instance, the long-term urban habitat management goal for Dusseldorf was stated this way:

> *"The smaller sites should become larger, and barriers eliminated by the effects of linking corridors. The concept can only be successful when all land-use forms even in the town itself become sustainable*" (ibid., p. 170).

Therefore, the most promising ecological scheme to bring about diverse wildlife contact in cities is to follow the landscape ecology principles yet extend them into the entire woof and warp of the city with biotope concept. Not only the streams, the individual yards, buildings, vacant lots, parks, streets, etc., can all be part of the scheme. Wildlife habitats can permeate every corner of the city and become its infrastructure.

5.2 Planning Strategies

Suppose a thriving habitat exists in the core of the city and yet is unable to be appreciated by its surrounding neighborhoods, from the spontaneous use viewpoint it would be a wasted resource. A living stream in this sense is one with a living ecosystem and a living human-stream relationship. The former has to do with the integrity of the hydrologic, geomorphologic and ecologic mechanisms. The latter, considering environmental factors alone, boils down to a few qualities that affect the interface of potential users and stream environment: density, proximity, scale and land ownership. But first it is necessary to examine the current concept of urban stream planning.

5.2.1 Buffer and Greenway: The Riparian Corridor Concept

In physical planning of urban streams, the width of the riparian corridor is usually the foremost thing to be decided. Numerous studies in environmental sciences have recommended corridor width criteria for various environmental functions. However, most of these studies are conducted in non-urban settings where streams are surrounded by silviculture, agriculture, or riparian old growth. For example, Cacho (1998) summarized 42 studies, among which only two specifically addressed urban development. The suggested numeric values vary greatly: 8-57m for protection against temperature change; 9-45m against logging pollution; 5-50m against agricultural pollution; 8-100m against urban runoff; 31-67m for provision of large organic debris; 8-550m for wildlife habitat protection; and 2-100m for water quality protection in general (Ibid., p. 34-39).

In practice, planning rarely conducts site-specific studies on the possible land cover types, configuration and widths for expected environmental benefits. It becomes normal for planners to pick some numbers from the existing literature and negotiate for the maximum possible corridor width. In California this value is usually 30-50m (NHI 2002).

“Buffer zone” or “greenway” essentially convey the same concept—they only differ in meanings according to contexts. The very idea of buffer implies lessening interaction between two systems—in this case, to reduce human impact to waterways. It is commonly filled up by restorationists with woody plants and shrubs; at best, a trail would be added at its outer edge. To a user strolling on the trail (usually on the shade-less levee top), there is not much happening (Figure 5.4). Albeit all the environmental benefits it may create, at one extreme ecological buffer can be just as destructive in driving out spontaneous users as the past culverting and channelizing schemes. Natural resource may be close to home now, yet it remains a forbidden land.

Deriving from as early as Olmsted’s parkways in 1860s, the *greenway* used to have civic amenity as its central value. The well-loved greenways, such as Big Chico Creek in

Chico, California and Platte River Greenway in Denver, Colorado, owed their successes not only to the foresights of administrators and planners to preserve open space along urban streams, but to the fact that corridors were intentionally exploited as parks for citizens' nature experiences.

Figure 5.4 A creek restoration project in a residential neighborhood in Petaluma, California. Users are invited to "enjoy the trail" (left) while the trail is separated from the creek by dense buffer vegetation (right)

Along Big Chico Creek, the Bidwell Park is a magnificent legacy of the Bidwells, Chico's founding parents. The wildly popular Five-Mile and One-Mile Recreation Areas were devised in 1918. The Sycamore Pool at One-Mile has a short reach of hardened banks, sandy bottom, a drop work upstream and a weir downstream. Kids can swim in cold, unchlorinated water chasing fish around. The City over the decades have continued to expand the park. Today, Bidwell Park covers eight linear miles of Big Chico Creek and boasts the second largest municipal park in the country (BCCWA 1999).

The rehabilitation of Platte River Greenway started in 1973. Through promoting the river for walking, bicycling and boating, the heightened awareness among citizens occasioned a strong constituency for consecutive water quality improvement projects (HCRS 1979). Inside the channel, check dams were placed to create white water "staircases"; weirs and rocks were carefully arranged to create pools, riffles and eddies ideal for boating; even a boat chute was constructed to permit boats to pass a dam.

Yet in this age of restoration, greenways tend to define themselves as nothing more than a shaded trail, with explicit efforts to confine users on the trail[2]. When users can only contact a stickleback from the explanation plaque, the gain from the creek outing may only be a new name—"something like a sticky-back." On the other hand, the genuine enthusiasm of restoration biologists talking about a stickleback is always impressive. Not coincidentally, they are the ones who rightly enjoy the most profuse wildlife contact—they catch, admire, measure, and release fish on a daily basis. When talking to lay people, my biologist friends found with dismay that people don't care much. "Well, we shouldn't let them mess things up." Forgetting what triggered their own sense of wonder, we have thick buffers, exclusive preserves, and a sort of eco-elitism.

From the viewpoint of spontaneous use, what would be some possible criteria to determine a corridor width?

1) Sense of stewardship: The Marsh Creek survey indicated that visual and auditory accesses from the neighboring properties play a crucial role in the general perception of the creek and the attitude on kids playing in it. For a small creek, if planners expect the batch of residents living next to it to play the important role of forming stewardship and keeping a constant watch at the creek, we can assume that the creek should be within the visual and/or sonic reach of these residents. For example, if visual access is to be simplified by only considering the channel geometry, we can theoretically derive the "maximum" corridor width to form sense of stewardship (Figure 5.5).

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[2] For example, a community-oriented greenway handbook published by NPS admonished: "Whatever combination of uses… it is important that they be restricted to planned and maintained trails. It is often tempting to cut one's own path to get a view or to walk alongside a friend." (Labaree 1992, p. 44)

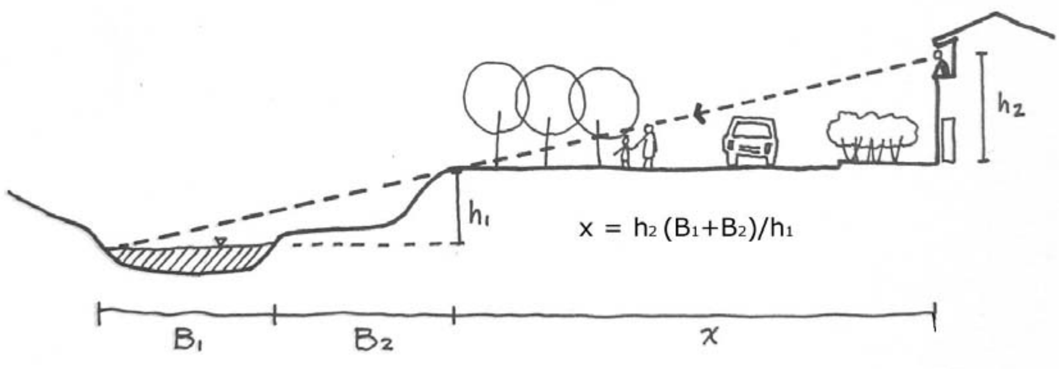


Figure 5.5 The maximum bank top corridor width (x) to encourage stewardship based on visual access from neighboring properties can be determined by channel geometry

2) Proximity: As revealed in Chapter 3, distance from home is a sensitive factor determining the presence of spontaneous uses. Although if the corridor is designed to provide diverse experiences, it can be extensive without becoming a barrier, at big rivers the wide expanse of floodplain can easily deter users.

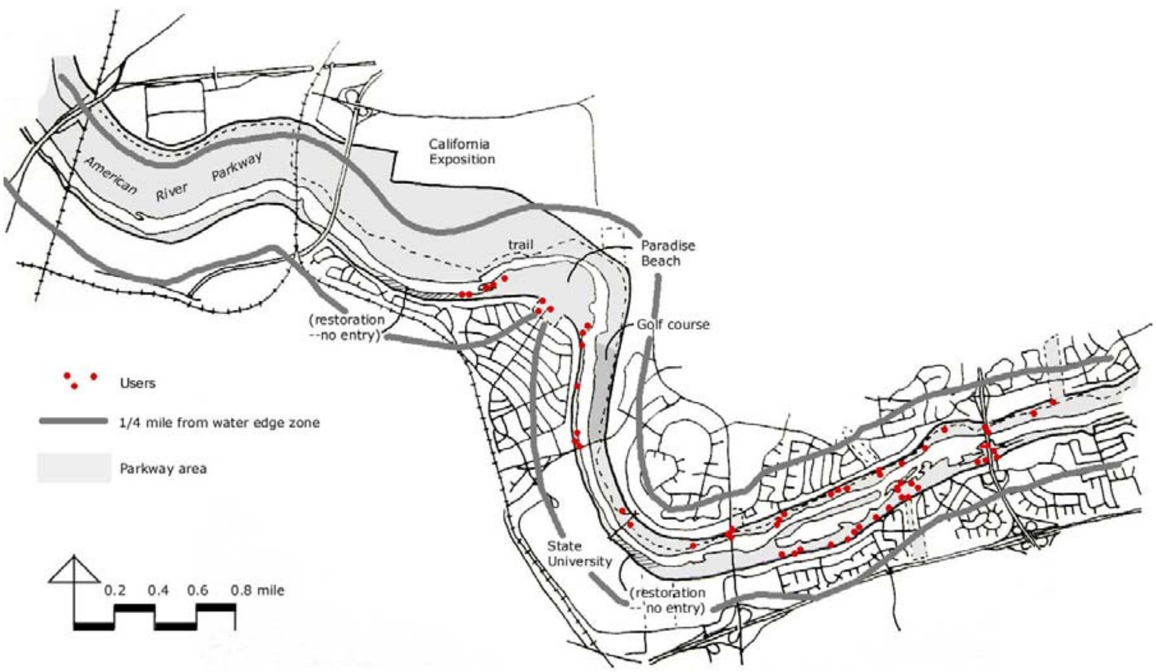


Figure 5.6 User distribution in an informal walking survey on American River Parkway. The contrast of the well-used east section and little-used west section reveals the importance of community interface in wide stream corridor. Although flowing through dense urban areas, 80% of the parkway buffer is too wide and unvaried for spontaneous uses to happen

The American River Parkway in Sacramento provides a continuous trail system through out the city, but I found spontaneous uses from neighboring residences only occur at sections with narrow buffer (Figure 5.6). Among areas surrounded by residences, the well-used areas have a buffer width of less than 0.1 mile. We can therefore assume that at areas intended for community uses, the buffer should be no wider than 500 feet.

3) Quiet and secluded use: A corridor can seem too narrow to provide a quiet spot for solitude. In Creekside Park, the visual intrusion of a house reduced the buffer from 100 feet to 75 feet and caused loss of solitude spot. With design means, however, the situation can be mitigated. Japanese gardens for example demonstrated the art of creating visual buffer in extremely narrow space.

As a result, the concept of a minimum corridor width is not of much use to the planning for the spontaneous use. Rather, a limit at the maximum side of the criteria seems reasonable. In practice, however, by contriving site configuration there is only a minimal chance that the need of spontaneous uses would conflict with current scientific logic in deciding corridor width. Rather, what may be of conflict is the conceptual foundation of riparian corridor: to drive people out or to enrich their experiences.

5.2.2 Density and Proximity

Observation of spontaneous uses revealed the multiplicity of experiences an urban stream should afford. It should have sections that are cozily tucked into the neighborhood where young kids can casually reach, worrisome parents can be at ease, and elderly can socialize and cool off. It should also have free-rein "wilderness" where poets stroll for inspirations, escapers roam around to heal, adventurers randomly explore, and lovers quietly love. Translated to planning, it means an urban stream should provide at least two sets of places: the *community territory* and the *urban wilderness*.

At least three conditions are considered necessary to form effective community territory: public ownership (see **5.2.3**), proximity, and high enough density.

Much research has been accumulated on proximity to open space. The 1/4 mile radius service range of neighborhood parks established in the 1910s is still in use today (Mozingo 2000). In *A Pattern Language* (Alexander et al. 1977), the "Accessible Green" pattern states: "[I]f the greens are more than 3 minutes away, the distance overwhelms the need" (p. 305). The 3-minute rule was proven robust in Brentwood adult survey—when residents lived farther than 900 ft, stream use in daily life dropped sharply.

Density needs more scrutiny. The common "one-acre of park space per 100 residents" standard does not lend itself to linear stream systems. On the other hand, carrying capacity formula at wild and scenic rivers commonly champion low use density. For example, the "Wisconsin Formula" suggests two parties per river mile as an acceptable use density (Flink and Searns 1993, p. 235). At urban streams, since normatively scarce resource should serve many instead of the blessed few, the concept of carrying capacity should be used to create a high-capacity, well-used space instead of forming restriction. Kuska (1977) suggested that sinuosity could be equated with "visual carrying capacity," since the greater the bend, the shorter the view, therefore the more users can be accommodated at the same time. Islands, local inlets or peninsula can provide similar effects. By devising the plan forms, vegetation patterns, various water edges, etc., more visual and activity pockets can be created to increase the capacity of an urban stream.

Although a solitude user can enjoy the stream at extremely low density, many spontaneous uses require a minimum level of density for dynamic interaction among users to occur. Play-mates are particularly indispensable for kids. For many kids I interviewed, good places are no fun without friends; fun places become secret paradises with friends. Moreover, knowledge and skills passed among players form an important share of local stream culture. To find a minimum density level for community-wide spontaneous uses to occur, let's take Kagami river and Marsh Creek as indicators.

In Brentwood, most spontaneous uses was encountered from Creekside Park to Central Avenue. A mother informed me the use density by the Green Valley Footbridge: "probably about 15 kids in our court, they're all always down there, every single one of those." The local density here was about 6000/mi^2. In Kochi, biking along Kagami River from Riffle of Moon Bridge to Sou-An Temple (about 3.5 mile) in a hot summer day, I could normally spot over a hundred users engaging in various activities. The local density there ranged from 8,000 to 15,000/mi^2.

For a moderately attractive waterway, what would be the density necessary to encounter 10 kids during a half-mile walk by the stream in a summer day? Assuming kids spend in average 2 hours at the stream, then in that day, about 30 kids would have used the stream. Suppose one forth of the kids between age 5 and 14 living within 1/4 mile (5-minute walking distance) from the stream use it as frequently as every other day, than we need 240 kids to be within this 1/4 squire mile range. Consider 15% of the population is between 5 and 14 years of age, than we need a density of 6400/mi^2 or 10/acre (Figure 5.7). This value gives an idea of the density required for community territories.

Figure 5.7 A segment of Marsh Creek that has a neighborhood population density of about 6,000/mi^2, close to the minimum density required for community-wise spontaneous uses

Urban wilderness is not characterized by the union with its neighborhood, but by an "other-worldness," where the familiar signs of civilization and care diminish and the chance to have surprises increases. A wide corridor easily allows such experiences, but for streams with narrow corridors, attractive "wilderness" usually occurs at accessible urban fringe, vacant lands or industrial areas within the city. It can be a rock outcrop in the valley, woodland, a weedy freight yard, an old gravel pit, a beach, a reclaimed wetland, etc. These spots usually have a locally low density and non-residential land use that fosters the other-worldness quality. Such areas can be identified along the stream corridor and be preserved or enhanced for spontaneous uses. Ideally, a "wilderness pocket" should occur every mile along the stream. If pedestrian/bike-friendly routes are available, a distance of one mile can be reached within 20 minutes by walking and 3-5 minutes with bikes.

Urban wilderness does not have to be spacious. In Brentwood, both open fields and dense woods were cited as "wild" and facilitate the feeling of getting away. The Creekside Park in Brentwood provides an example of how wilderness quality can be achieved in a narrow corridor. Located at the southern edge of the city, the creek channel keeps much riparian vegetation and a closed atmosphere; more importantly, it is connected with orchards and farmlands and effectively brings a wide range of wildlife into the city. The narrow riparian woods (30-90 ft) accommodates an enormous range of spontaneous uses. The well developed dirt path system and the large number of tree houses, rope swings, crossings and debris dams witness its popularity as a free-reign but readily accessible urban wilderness (Figure 5.8).

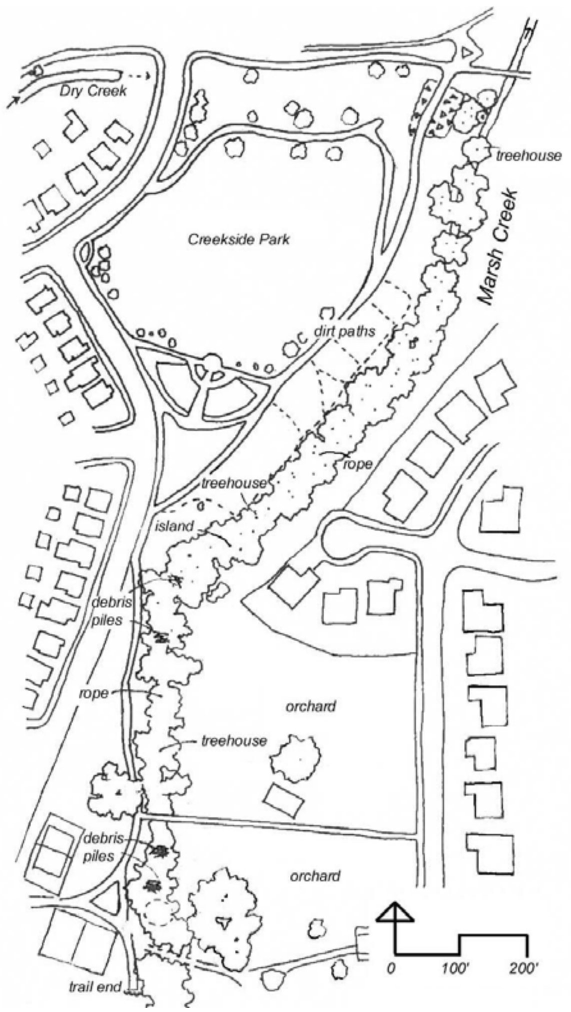


Figure 5.8 Located at urban fringe, the popular Creekside Park combines the features of a community territory and urban wilderness.

For urban wilderness to attract spontaneous users, it requires easy and continuous access. Sonoma Creek in Maxwell Park has ample wooded riparian corridor (50-400 feet wide). The 85-acre park is largely dedicated to a wild character—grass fields, dirt trails, magnificent oak woods and the 0.4 mile stretch of Sonoma Creek. However, it does not seem to perform nearly as well in attracting spontaneous uses as Creekside Park. The main reason is the wasted opportunities for neighborhood access. To get down the creek, users need to access from the park entrance on Verano Ave. The Riverside Drive that forms the west edge of the park and parallels the creek has potentially great community interface; yet it is rampant with undergrowth and provides no entrance (Figure 5.9).

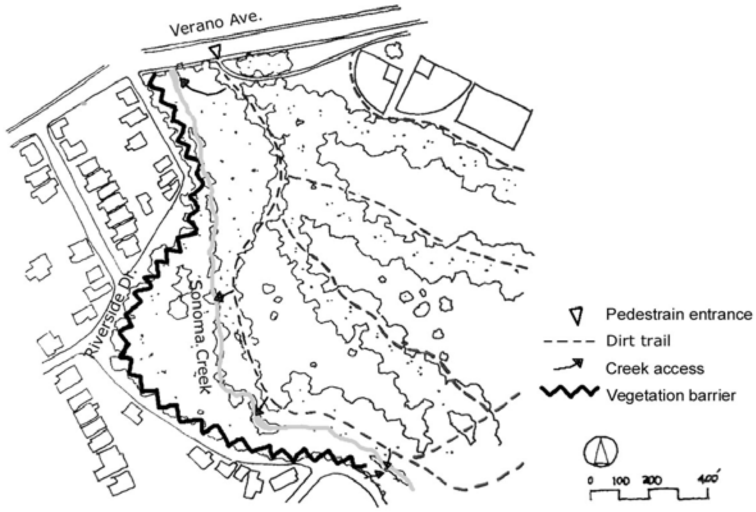


Figure 5.9 Sonoma Creek in Maxwell Park wastes its potential as urban wilderness to be accessed easily by allowing thick vegetation to seal the community interface

5.2.3 Ownership

Stream ownership not only dominates accessibility, since exerting control and claiming territory is a significant part of spontaneous use, it also effects the interaction level manifested by users. In the US, stream ownership may be classified into three types: public, private, and private with public right to access (although there is no clear delineation, as will be seen).

Private ownership of waterways is a persistent nightmare in management and frequently an issue in the courts. Property lines set to the center of a stream can never be stable and the “lost land” is difficult to settle. Further, the charm of a nearby stream is such that it constantly entices “trespassing”.

In Sonoma, although some of my subjects who do not live right by the creek managed to access from a friend or neighbor’s yard, they are forced to be less spontaneous. Dan’s swimming hole was a block away by his friend’s home and whenever he went he had to detour and wade for a hundred yard to get there. Before Kate started the tour, she assured me that she had called the neighbor in advance and got the permission to go. When we were down at the creek, she pointed to me the keep-out plank at the edge of the grove that she also put in her drawing. To access from a base-point to a rope swing there was a bush barrier—Kate and her sister could have got to the rope easily if they chose to trespass but they dared not.

In contrast, the kids who live in low-density area with big backyard by the creek took the creek for granted and did not show much excitement in the creek tour. For example, Ted and her sister's backyard against a tributary of Sonoma Creek is probably many kids' dream yard (Figure 5.10). The property was at least four acres big, and the creek was about 100 yards from the house. In between, the beautiful riparian grove was full of play spots, including an elaborate tree house and several kinds of swings built by Dad.

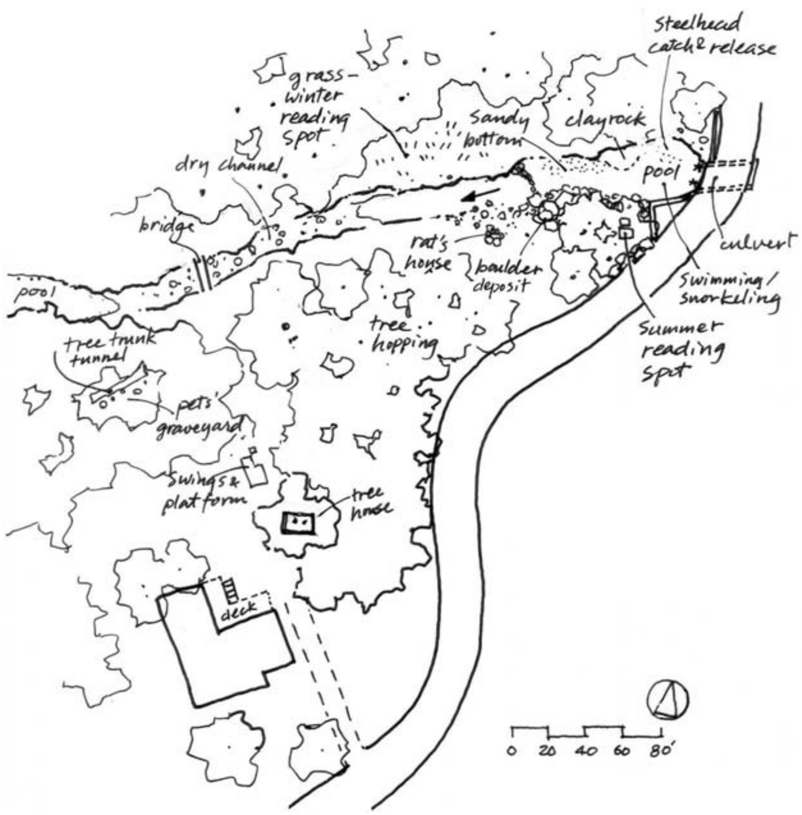


Figure 5.10 Ted's backyard creek in Sonoma Valley

Legally public right to visit a stream flowing through private properties is confusing to the extreme. The current legal right of stream access focuses on navigation. The courts have consistently ruled that on rivers that are physically navigable (called “navigable water”), the riverbed and bank up to the “ordinary high water mark” (the highest level the water gets in an average year) are state land, held in trust for the public for navigation, fishing, and other non-destructive visits (NORS 2004). Yet ironically, nobody except the courts determine which watercourses qualify for navigable waters. The owners and general public usually are not aware of their rights or know how to tell the ordinary high water.

In reality, stream accesses are based on the perception of ownership instead of an understanding of legal rights. If the stream flowing through private properties is wide enough, back yard accesses would dominate, but informal accesses always develop by bridges and behind public structures (schools, libraries, etc.) or semi-public spaces (vacant lots, supermarkets, apartments, etc.). In small urban creeks where the channel is clearly seen from backyards, even home owners avoid using the stream across the invisible property lines. Moreover, owners sometimes exert complete alteration to the backyard creek that is environmentally detrimental (Parker 1998).

Consequently, minced-off ownership by small streams do not facilitate spontaneous uses or any other restoration goals. At the policy level of planning, a few points can be made on private ownerships by urban streams:

1) “Navigability” is not a good index anymore to determine the criteria of waterways for public access. Boating is only a limited form of recreation and most of the “trespassing” controversies occur at the level of spontaneous use. Recognizing the need for spontaneous use happens at almost all size of waters, agencies simply should not allow individual property rights extending to the waterway anymore.

2) For sections of streams flowing through private properties, government agencies could create incentives to have creekside residents deed easement, such as providing grants to modify backyards and hire designers to help residents redesign backyards so the opening of the creek does not cause uneasiness. An advocacy group for Codornices Creek in Berkeley recently proposed to construct a footpath through residential backyards. Unfortunately, without proper incentives and design aids, even the most sensible neighborhood in California could not accomplish this (Jeff Haltiner, pers. comm. 2004).

3) Broad education efforts are necessary on the fact that the public does have rights to access the stream, big or small (NORS 2004). This may help transform the way owners treat their backyards and allow community access to backyard creek on a gradient scale.

On the other hand, even on public lands spontaneous users are often excluded due to litigation concern or mismanagement. In Brentwood, when Jane and Sara first saw me approaching them under the bridge, they quiet down immediately and started to defend: “We are just playing here. We are not doing anything bad…” Once I explained my purpose overtly they seemed very relieved and invited me to play with them. But they thought somebody was going to stop them because there was a keep-out sign by the trail and they did not want to get into trouble (Figure 5.11).

Figure 5.11 Jane and Sara requested that this photo be taken to show their discontent against the keep-out sign by the Marsh Creek channel

Hester (1984) concluded that in neighborhood space, public and ambiguously owned private lands, if furnished with suitable elements, have the potential to encourage the occurrence of “collective-symbolic ownership.” In field observation of spontaneous uses, I found individual adaptation of base-points and territory most developed along places with such quality. The informal accesses occurred by bridges and at the back of public/semi-public buildings are often explorers’ paths, displaying adaptation and stimulating continuous use. However, if the use density is too low and the community does not consider the place as “ours”, informal accesses may be perceived as signs of danger and even factually become abused with drug deals and criminal acts. The “collective-symbolic ownership” is the system of care reflected on the community level without a mandate of formality. Spontaneous users thrive best under the gentle, permissive system of care—the democratic consensus that a neighborhood stream is collectively owned and to be spontaneously used.

Planners and designers can help the community enhance its stream interface by building collective-symbolic ownership through a participatory process. They could identify valued access spots and negotiate access from areas fenced off by public agencies (the Cities, flood control agencies, school districts, etc.) and local businesses (restaurants, supermarkets, cafes, etc.).

The way neighborhood streets meet streams also have great influences on the perceived ownership. Streets with slow traffic along streams promote community adoption most easily. Cul-de-sac entrances or connector trails, on the other hand, can separate the community from the stream and facilitate an other-worldness close by home that is highly valuable (Figure 5.12).

Figure 5.12 Different street patterns create diverse relationships between communities and streams. In this example, larger setbacks are required of developments with cul-de-sac entrances

Bridges are crucial connectors between communities and streams. To residents not living by the stream, it is where the stream is first perceived and often where it is accessed. A vista from the bridge is the minimum reminder of the existence of the stream to infrequent users; yet it can have magical power to enhance the quality of life. Bridges themselves also compose a significant part of the image of the stream when perceived from anywhere else.

5.2.4 Scale

Brooks, creeks, gulches, washes, and rivers are loosely defined terms that represent cultural and regional customs rather than standardized geographic features (Riley 1998). From an environment-behavioral viewpoint, "human scale" is an important index to comprehend how stream space is perceived and used.

There is a tendency that scale difference of the stream will evoke different images and invite different uses. Two indices seem sensitive in determining the social characters of the stream: the width of low-flow channel (B1) and the ratio of flood channel to low-flow channel (B2/B1).

The scale of low-flow channel has most to do with the general perception of the stream and the variety of in-stream uses, such as water contact and wildlife contact (Figure 5.13).

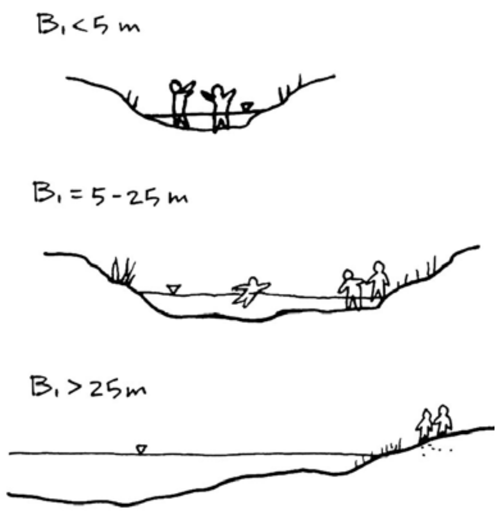


Figure 5.13 The width of low-flow channel (B_1) determines patterns of wildlife contact and water contact and implies different planning/design challenges

- Small streams (B1< 5m): The whole channel is at an intimate scale to spontaneous users and every corner of it can be explored. Wildlife density is usually high and the stream is very easy to adopt. Planning and design for small streams should focus on enlarging the range of experiences that the stream can afford and assuring the survival of local plant and animal communities.

- Intermediate streams: (B1 = 5-25m): Stream at this scale supports diverse in-stream activities, but only active in-stream users can be familiar with the whole channel through swimming or catching. Wildlife and water contacts concentrate at water edge and crossings. Planning and design should address these spots specifically to support stream contact while locating sensitive areas where direct wildlife contact should be avoided.

- Large streams (B1 > 25m): The stream tends to become too broad. As opposed to smaller streams that have a high percentage of usable habitat across the channel, in large streams wildlife concentrate by water edge. Planning and design should emphasize the edges, with additional focus on providing clues to punctuate visual and activity territories. At this scale, local design intervention to diversify uses tends to become wildlife habitat enhancement.

The ratio of flood channel width and low-flow channel width is a function of flow energy, sediment regime as well as structural constraints (valley wall, levee, etc.). When the ratio is small (narrow floodplain), the stream is in general more tamed and conductive to form community territories—the flow is stable and the channel can be easily accessible from the neighborhood (unless the stream balance is badly disturbed to require high levee or form deep gully). When the ratio is large (wide floodplain), the stream assumes an urban wilderness character—the flow fluctuates and there is higher potential to provide space for a broad range of uses (Figure 5.14).

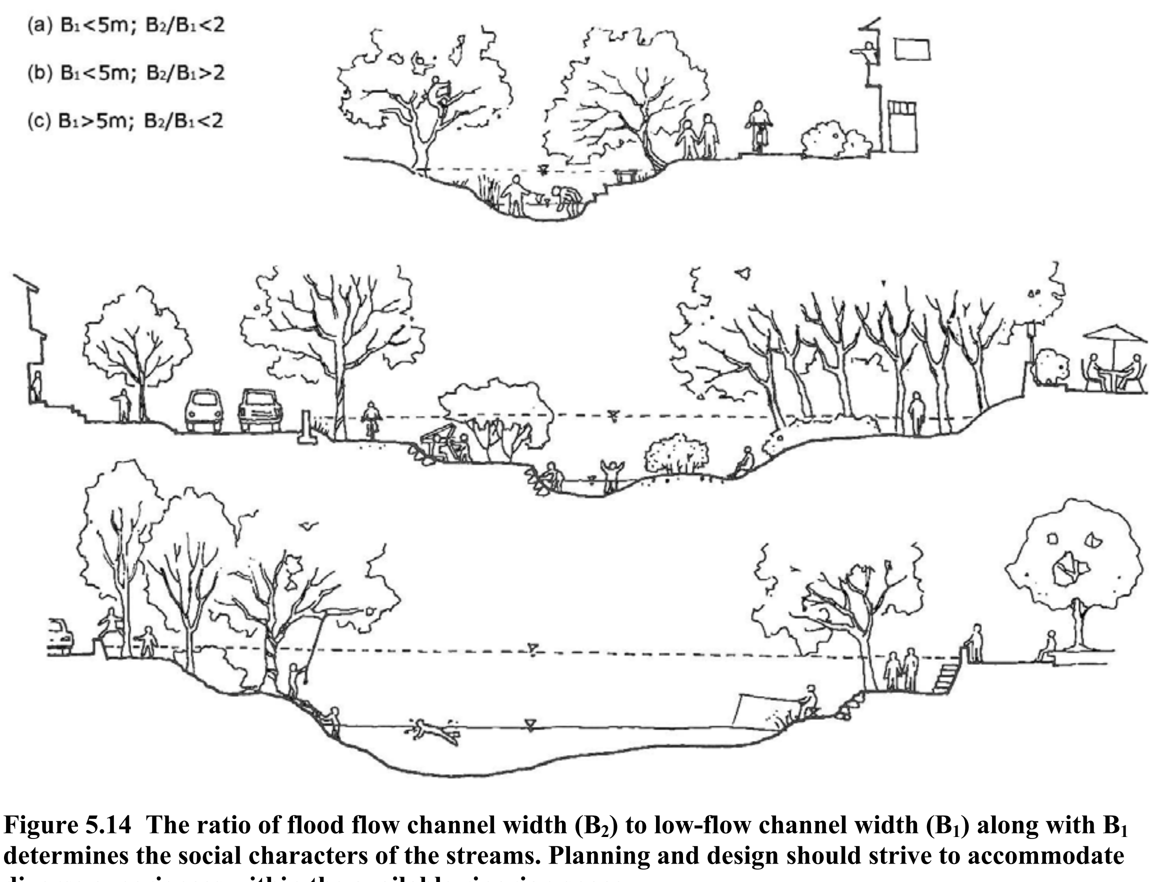


Figure 5.14 The ratio of flood flow channel width (B_2) to low-flow channel width (B_1) along with B_1 determines the social characters of the streams. Planning and design should strive to accommodate diverse experiences within the available riparian space

- B1 < 5m and B2/B1 < 2: The stream functions as a *front yard* that can be closely knit to the neighborhood. Planning and design should promote neighborhood stewardship and meanwhile link the stream to urban wilderness.

- B1<5m and B2/B1>2: The stream remains an amiable neighborhood scale; yet the floodplain starts to accommodate both stationary users and adventurers. According to design, it can provide both *front yard* and *backyard* experiences.

- B1>5m and B2/B1<2: The stream is likely to provide a *main-street* experience and usually has been utilized for navigation and even redeveloped as waterfront. It would be at the public extreme of the social dial. Planning and design should strive to create personal spaces, diversify water-edge and encourage a moderate level of ecosystem to establish in order to assure loose parts and wildlife contact.

- B1>5m and B2/B1 >2: The stream can be planned and designed to provide almost any kind of experiences, including serving as urban wilderness. However, if the water surface, floodplain or point bar becomes too wide, design should focus on punctuation and division to humanize the space.

According to the land availability, a stream can be planned to provide different experiences at different sections or different banks. When the corridor width is considered too narrow to fulfill higher environmental goals, some forms of spontaneous use will be possible when a minimum of wildlife, water and loose parts are available. If access and density can be secured, there exists potential to improve a waterway for spontaneous uses. Regarded this way, spontaneous use is the first achievable function in urban stream restoration.

5.3 Design Strategies

Only when the confining factors at the watershed scale and community interfaces are to a degree addressed can we enter the realm of physical design for spontaneous uses. This section will employ the concept of human intervention and stream response as the design methodology. Stream response includes the fluvial processes of erosion and deposition empowered by floods, and the establishment and evolvement of flora and fauna thereof. Human intervention is the impingement of design behavior on the above mechanisms with an ideal image in mind. My basic stance is that stream processes are to a degree predictable—they follow certain rules in geomorphology, hydrology and ecology, with fluvial geomorphology as the start point. If we bring spontaneous uses into focus, we inevitably embrace flood and its attendant processes since for users these mechanisms are the origin of a stream's charm.

5.3.1 Built Structures and Local Diversity

In designing urban streams, habitat enhancements for wildlife and for spontaneous uses both aim at local diversity. From the fieldwork I confirmed that where no spatial diversity exists, be it a continuous stretch of concrete banks or grassland, use diversity suffers. However, whenever shallow and deep water, coarse and fine sediment, different forms of vegetation and wildlife exist within a rather short distance, the use value is promising. Geomorphologicly this means a close riffle-pool regime that is often observed at step-pools (upstream reach) or big bends (intermediate or downstream reach). The big bend pattern, for example, appeared in Taylor's territory (Figure 4.16), Kate and Mark's territory (Figure 5.15) and many other users' choices.

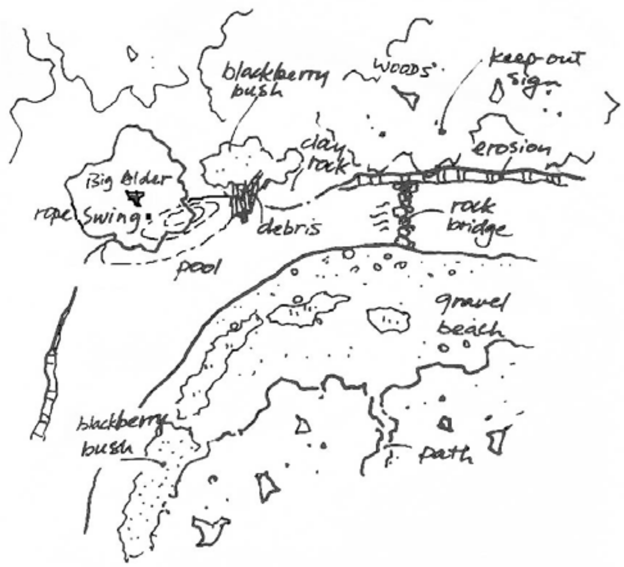


Figure 5.15 Kate and Mark separately adopted a big bend at Sonoma Creek as their own territory. The bend allowed deep and shallow areas, coarse and fine sediment and various life forms to occur within a short distance.

When these patterns do not exist, designers can create local diversity using the concept of human intervention and stream response. Special note needs to be made on built structures at streams. Whatever attitude or opinion people may have for their visual quality, the bottom line is that on average, half of the base-point uses observed occurred around built structures—bridges, weirs, drainage pipes, deflectors, revetments, levees, culverts, drop works, concrete blocks, riprap, etc. The appeal of built structures can be summarized as the following:

- *Access*: They are where the urban infrastructure system intersects the streams. Bridges are particularly important in that they form both physical and visual accesses. At weirs, sluices, or bank protection works, paths for maintenance usually already exist. They draw people to the streams.

- *Foothold*: Within the channel, the comfort of hard surface is difficult to resist—they are dry base-points; they are familiar clues for human users; they are safe. Their presence usually enhances the diversity of routes and paths.

- *Interplay with flow and sediment*: This is the heart of the matter—structures tend to locally intervene with flow and sediment and create local diversity at stream bed and bank, which sometimes further induces vegetation and wildlife.

- *Permanence*: Although built structures induce changes around them, they themselves are usually stable and sturdy. They therefore provide reference points for users while contrasting stream processes by staying recognizable.

If the structure further conforms to human scale, diverse uses will. The Kuma Rock Weir in Kochi provides an excellent example on how hydraulic structures could be designed to support spontaneous uses. The weir is located at the dead-end of Kuma Creek embankment where the narrowing trail filters out car traffic. As most traditional weirs in Japan, the axis of the structure is slightly slanting to one side in order to direct the thalweg to the inlet. A narrow groove at the top of the weir further helps to smooth the intake of water. At the upstream side, the rock mat gently slopes down to the shallow sandy bed to prevent scour. Cobbles are embedded on the surface of the gracefully curving concrete ramp that extends downstream as a scour prevention mat. The left-bank end of the ramp is left with smooth concrete so as not to hinder the water intake.

All the details deliberately designed for a functioning weir happened to be perfect for water players. Kids climbed down from the maintenance iron bar ladder. The smooth ramp became water slide. The cobble ramp and the slippery moss on it made jacuzzi and rock climbing exciting. Kids sat and lied in the groove, caught dace fry at the shallow pool upstream, bathed at the middle pool down the weir and dived into the deep pool from the embankment (Figure 5.16 to Figure 5.18).

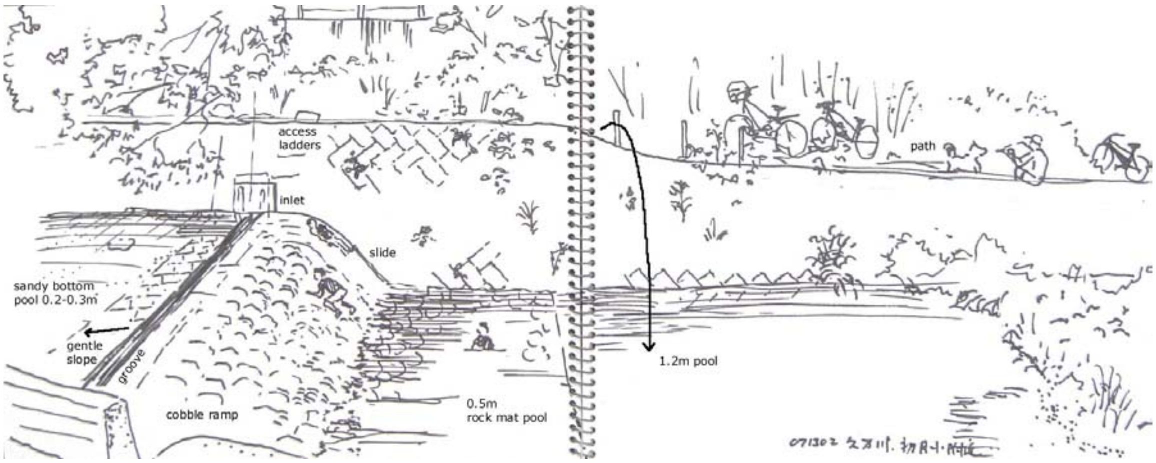


Figure 5.16 The deliberately designed details of the old weir create habitat for diverse water contacts

Figure 5.17 Boys sitting in the groove of the weir—"it is hard to stand up!"

Figure 5.18 The deep pool created by the weir also attracts anglers

In the planning process, an *urban infrastructure map* can be prepared and all structures in the stream environment that can intervene the flow should be highlighted. Designers should investigate the use effects they have caused, and decide if they need to be modified. Similarly, every new construction in the channel and on the floodplain should be regarded as an opportunity to enhance stream interaction.

5.3.2 In-stream Structures

In fish habitat improvement, restoration ecologists deliberately create riffles, pools and refuges using rocks, logs and root wads. The California Fish and Game's Salmonid

Habitat Restoration Manual (CDFG 1998) provided 22 habitat typing protocols, all illustrated with such materials (Figure 5.19).

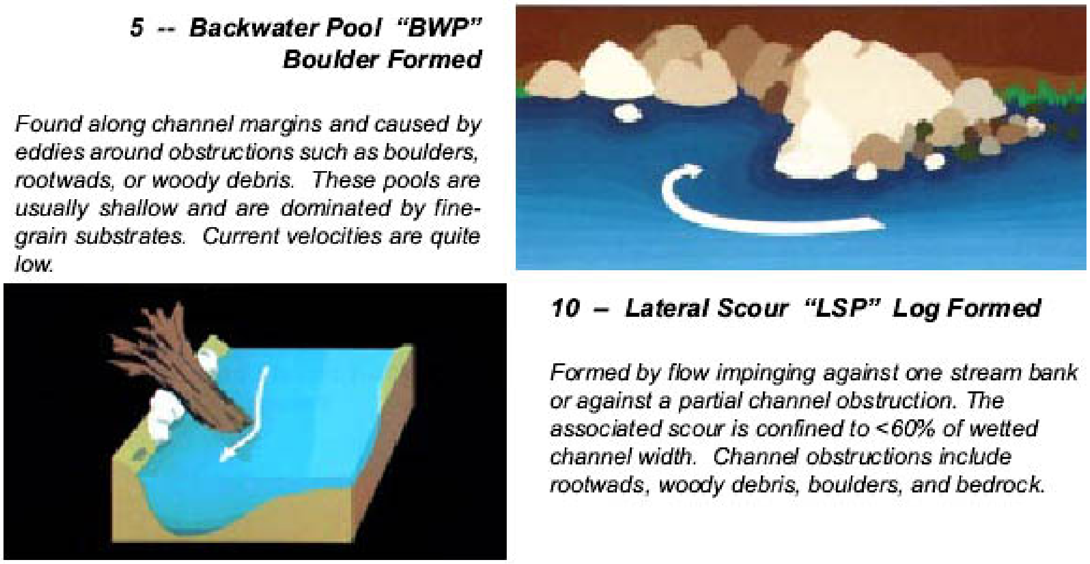


Figure 5.19 Examples of fish habitat protocols used by California Fish and Game (CDFG 1998). Fish habitat enhancement is typically limited to natural materials such as rocks, logs and root wads

It is understandable that restorationists would desire to restore the natural look of a creek along with its functions. However, since an urban stream is already in contact with diverse forms and materials, designers have a broader choice for their interventions. Hydraulic structures such as weirs, deflectors and revetments can be designed to enhance water contact and wildlife contact. Other structures that occur in the stream environment such as gauge stations (a potential look out, diving board, etc.), and bridge piers (potential to create islands, high-speed flow, scours, etc.) are also of design interest.

Following the basic mechanism of geomorphology, the same stream response can be created in numerous ways with diverse materials. The common behaviors of structures in flow can be briefly summarized as the following (Figure 5.20):

1) Hard-point effect: deflection (away from the structure), erosion (around the structure), deposition (downstream of erosion).

2) Soft-point effect: deposition (at and downstream the structure)

3) Drop effect: direction (perpendicular to the structure), erosion (downstream of the drop), deposition (downstream of erosion).

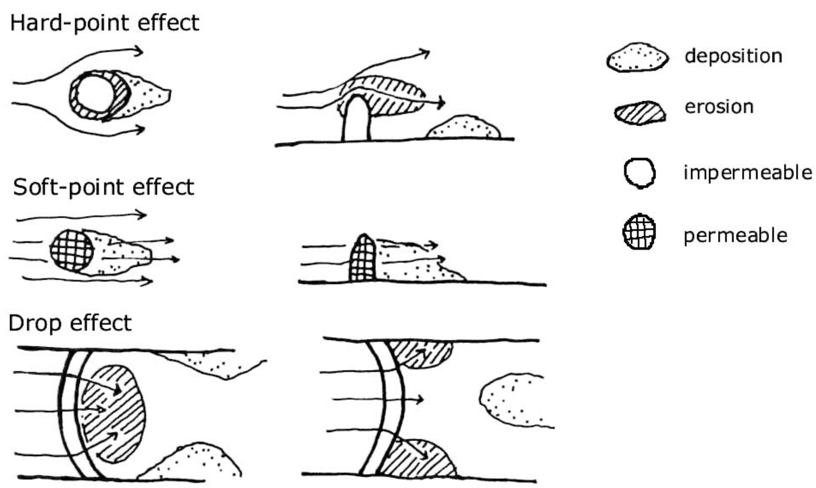


Figure 5.20 Basic patterns of stream responses to in-stream structures

Table 5.1 Common bed forms valuable to spontaneous uses and their locations

Pattern	Uses	Locations
Deep pool	Swimming, diving, fishing, catching, etc.	Meandering corner pools, confluence, pools at drops, lateral scour around deflectors, rocks, etc.
Shallow pool	Observing, paddling, swimming, skipping, etc.	Behind weirs, edge water by bars, edge water behind deflectors, continuous step-pools, etc.
Riffle	Flushing, Jacuzzi, catching, collecting, sound, view, crossing, etc.	Gentle drop structures, downstream of structure-caused pools, continuous step-run, confluence with sediment loaded tributary, etc.
Island	Stop-over base point, visual division, catching, collecting, secluded use, etc.	Deposition behind soft structures, deposition between deflectors, local widening of channel, confluence, etc.
Falling water	Jacuzzi, sound, view, flushing,	Step pools, steep weirs, drop works, etc.
Shallow run	Observing, paddling, crossing, catching, etc.	Sheet flow on hard surface, secondary channel in bar, etc.
Deep run	Flushing, swimming, viewing, etc.	Flow confined by reflector, culvert, bed rock, etc.
Confluence/diversion	View, sound, exploring, etc.	Tributary, distributary, by-pass, etc.

Table 5.2 Common bank forms valuable to spontaneous uses and their locations

Pattern	Uses	Locations
Barren surface on slope	Foot path, bike ramp, dirt slide, etc.	Created by users (barrier- free and convenient routes)
Steep bank/ headland	Diving, outlook, tree swinging, fishing, observing, etc.	Rock outcrop, tall deflector, eroded bank, bank protection work, etc.
Overhang	Observing, catching, etc.	Vegetated bank after erosion, bunker and shelter structure, etc.
Bank toe barren surface	Quiet use, swimming, catching, observing, etc.	Deposition after hard point, clay bedrock, bank grading, bank protection work, etc.
Underwater ledge	Swimming, catching, fishing, etc.	Clay bedrock, bank grading, bank protection work, etc.
Ledge on bank	Quiet use, catching, observing, water contact base point, etc.	Tree root ledge, grassy-edge bank, bank protection work, bedrock, etc.
Peninsula	Water contact base point, quiet use, catching, fishing, crossing, etc.	Plant protected deposition, deflectors, etc.
Alcove	Secluded use, catching, swimming, etc.	Erosion behind or between hard-points, erosion by concentrated flow, etc..

Based on these simple shaping mechanisms, Table 5.1 and

Table 5.2 list a number of bed-form and bank-form patterns valuable for spontaneous uses and where they can be found or created with in-stream interventions.

In general, hard structures can be considered as fixed-points that constitute the skeleton of the stream. Strategically allocated structures compose the defense line for community—the framework that is supposed to be lasting so the stream can co-exist rather peacefully with human settlement. This framework can be determined using the dominant riffle-pool patterns at middle scale (10-year) floods. In other words, the deepest pools and their associated riffles would not move easily, but within this framework the stream is allowed to alter and migrate. When obvious fixed points such as road bridges and outer bend protections are already in place, designers can utilize or modify them to create the in-stream features that are considered of top priority, such as deep pools or long riffles. Once the fixed-points are set, locations of secondary features (smaller pools, riffles and local sediment patterns) can be laid out, anticipating how the stream would respond in shaping the channel at different levels of flood events.

Where the low-flow condition can be grasped, water expression can be deliberately created by the degree it concentrates and disperses flow, the smoothness at flat surface, the splash at the bottom, the roughness over a irregular ramp, etc. (Chanson 1997, Brown and Daniel 1991). Similarly, sounds can be predicted as water gurgles, hisses, and bubbles over natural or human-placed elements in the stream (Suzuki 1981).

Following basic geomorphologic principles, spur dikes, for example, can be designed to create different erosion and deposition patterns to form habitats for spontaneous uses (Figure 5.21 to Figure 5.23; Yang and Ishii 1998). A design proposal was made for a downtown reach of Kagami River (downstream of the field study site) to diversify the water edge at the southern bank using different types of spur dikes (Figure 5.25, Figure 5.26; Yang and Ishii 1999).

As a principle, in-stream structure design uses floods to shape the channel so as to create the desired condition during the low flow, when most spontaneous uses happen. However, variability is a tool of design by itself. The low flow image can change dramatically at a braided channel where thalweg frequently shifts (Figure 5.24). These different phases of images can be anticipated and used to enrich the design. Oddities in urban hydrology also demand special notice. For example, treatment plant discharge and irrigation return water usually have a daily/weekly schedule that fluctuates the low flow level and affects the uses. Designers will need this type of information to correctly estimate, for example, the water contact potential during the day.

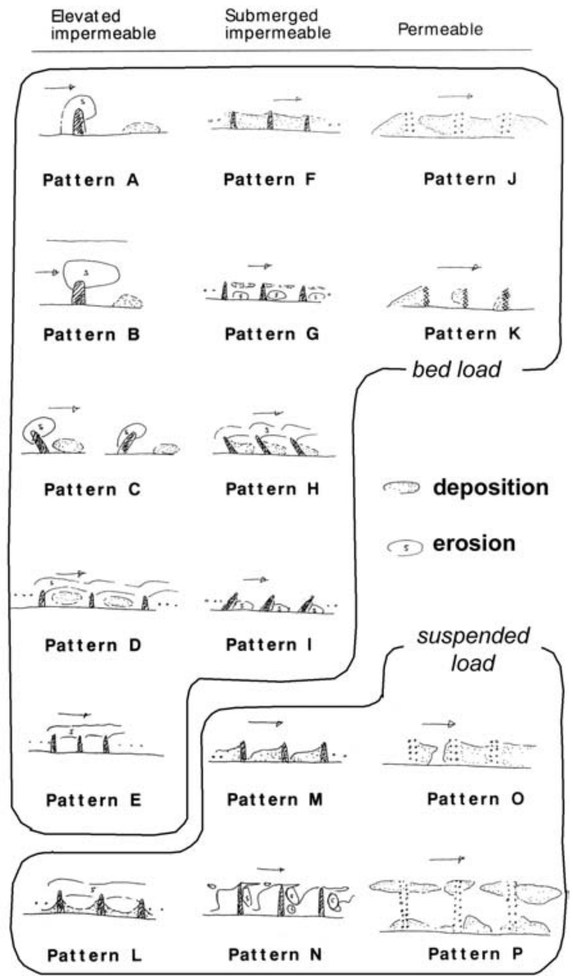


Figure 5.21 Sedimentation patterns around spur dikes [Revised from Yang and Ishii (1998)]

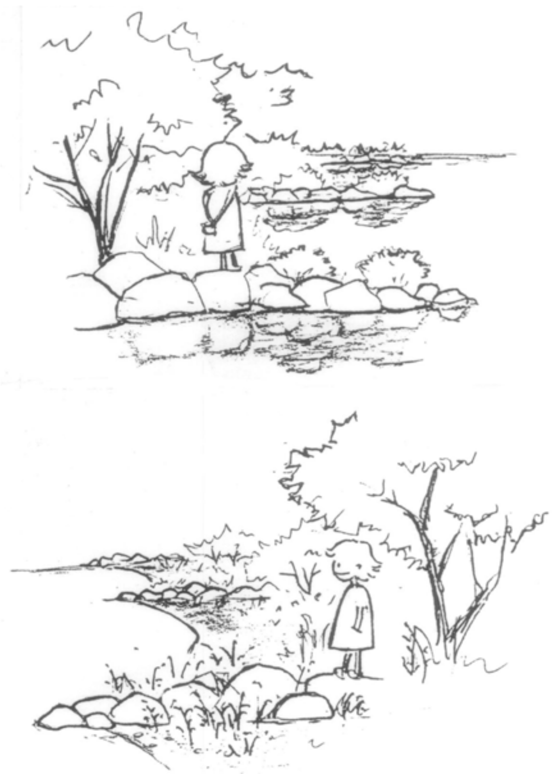


Figure 5.22 The unsymmetrical deposition pattern produced by a series of spur dikes (pattern M in Fig. 5.21) creates two distinct vistas at water edge. The upstream view (above) features water surface and reflections; while looking downstream (below), the water-edge seems to be connected smoothly between the dikes

Figure 5.23 The image of belt deposition at dike toe (pattern G in Fig. 5.21). The belt creates a safe zone for water play and forms visual division that makes the broad water surface more friendly and varied

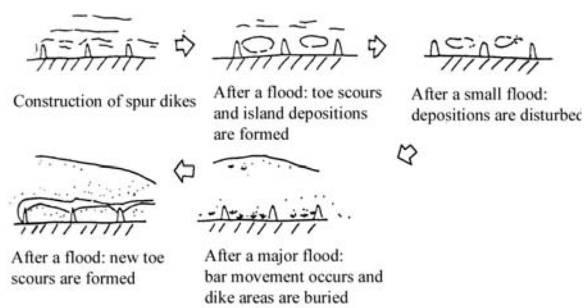


Figure 5.24 A scenario of temporal changes around spur dikes at a braided river

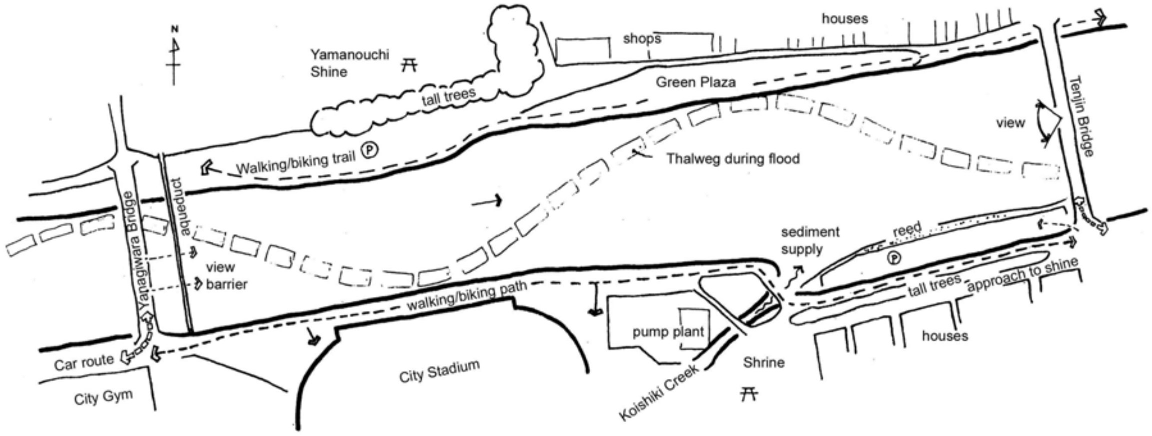


Figure 5.25 Site analysis for Kagami River at downtown Kochi [Revised from Yang and Ishii (1999)]

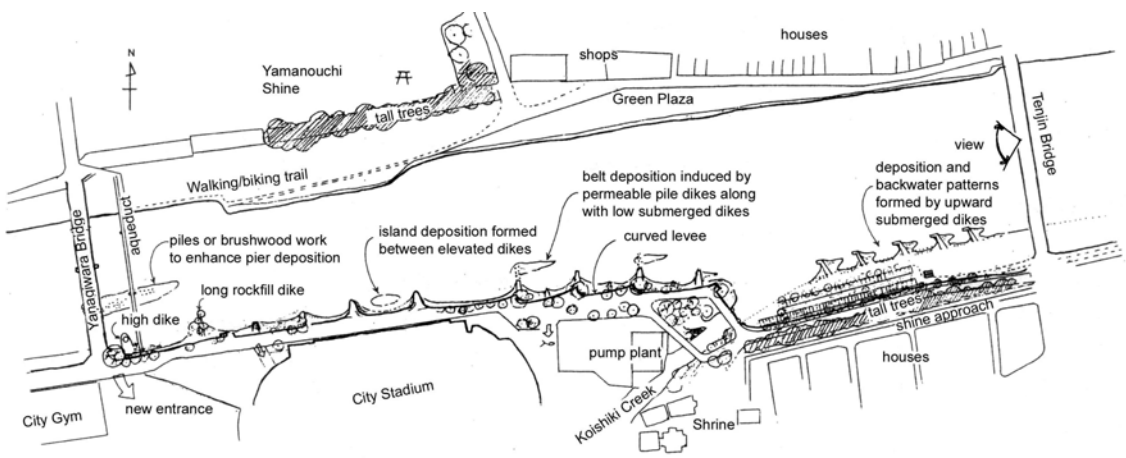


Figure 5.26 Design plan for downtown Kagami River—using spur dikes to diversify the water edge [Revised from Yang and Ishii (1999)]

5.3.3 Bio-engineering Banks

Bio-engineering banks are technologies developed in stream restoration that combine inorganic structures and organic plant materials to achieve erosion control or create in-stream habitats. In the US, bio-engineering banks have a tendency to create an overly thick mass of scrub before they grow up. Young willow and other shrubs are extremely functional for bank reinforcement and gathering fish and macro-invertebrate, but they severely deter spontaneous uses at shore and in-stream. In Berkeley, the Blackberry

Creek daylighting project has experienced continuous struggle with the neighborhood over its willow fascine banks. After fascine sprouting, they were immediately perceived as scruffy and blocking visual access to the channel (Figure 5.27, Askew 1996).

Figure 5.27 Blackberry Creek daylighting project in a residential park in Berkeley. The "scruffy willow" was a constant issue of controversy.

Ecologists also censured indiscriminate plantings for their impacts on small mammals:

> *"Project officers, often after only cursory surveys, invariably recommend tree planting schemes…. Such planting is often quite unnecessary and indeed blanket planting of banks could be detrimental, for some stretches of bare bank clearly have major social significance to otters; they are heavily marked with spraints and other signs of activity, such as rolling places…." (Mason 1995, p. 304).*

In addition, these techniques tend to encourage mass production, covering a long stretch of banks with little variation in structure and plant species. Only a small stock of species have been studied for bank stabilization and for wildlife use (see e.g., Johnson and Stypula 1993, RSPB et al. 1994), and the commonly seen ones have almost always been willow, alder and cottonwood. Landscape architects can contribute greatly in this regard by actively joining the team, experimenting with soil bio-engineers on a variety of riparian species and the means of installation. This will provide an enlarged plant palette not only for bank stabilization, but also for loose part contact, adventures, and aesthetic enjoyment. The "one-section design" has not worked for any attempt to diversify habitat and would not satisfy spontaneous users. However, these techniques can be easily modified to support diverse activities. Below are a few examples.

As in-stream structures, bio-engineering bank protection measures should be conceived as devices to form the stream framework by local reinforcement. Leaving part of the bank free for erosion is crucial for the recruitment of sediment in the channel and the provision of water access and loose parts. To provide water-edge access, live stakes, fascines or brush layers can have alternate openings among layers so paths can be formed by users during the establishment of bank cover (Figure 5.28).

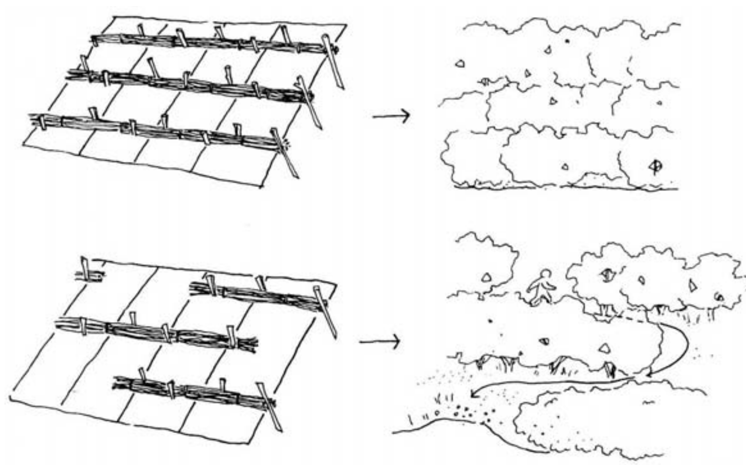


Figure 5.28 The commonly employed live fascine bank creates thick barriers for water edge access (above). Alternate layers provide openings that can be maintained as dirt path access (below)

To expect individual trees valuable for base-points on the bank, post plantings should not be established densely. Saplings or even rooted stock can be protected by hard structures that will form seating under trees in the future. They can be combined with other measures for short-term bank protection. To assure water contact base-points, toe protection work such as coconut fiber also need to have notches that will facilitate local erosion and create inlets (Figure 5.29).

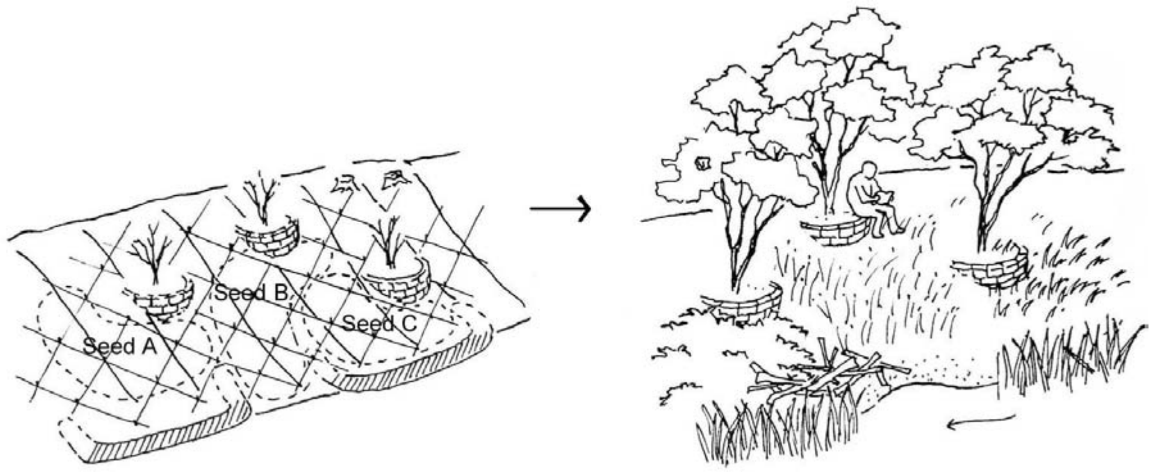


Figure 5.29 Soft and hard structures can be combined to create base points at water edge and on the bank slope

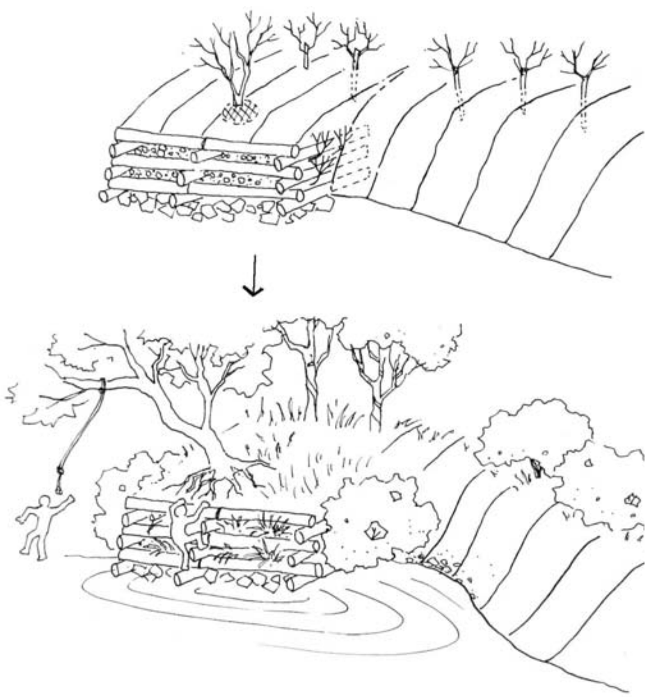


Figure 5.30 (left) Cribwall structure can provide the play loop necessary for diving. Underwater part can be devised to attract wildlife

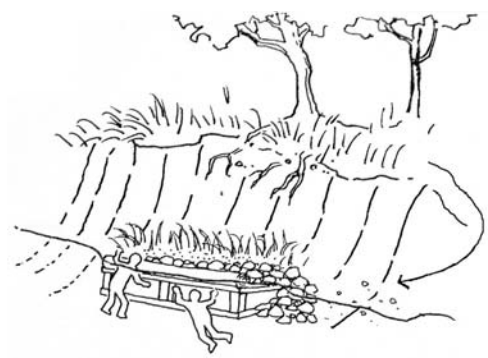


Figure 5.31 (above) Lunker has great potential to attract catchers

Steep bank protection measures such as live cribwall have high potential to become base-points for diving and swimming, particularly in combination with big trees. These structures also have the potential to create holts or shelters for animals (Figure 5.30). Revetments with pores and openings have been used as fish shelters. With some access considerations they provide great catching and water contact base-points (Figure 5.31).

5.3.4 Floodplain

In high-energy streams with sediment available, the fluvial processes form and maintain the floodplain. The diversity of floodplain depends on flood flow to deposit and erode so as to change the terrain, cause undulation, and create backwaters, temporary ponds, or local sandy spots. These features are formed with the same shaping principles as mentioned earlier. At a popular floodplain along Kagami River, a few scattered willow trees (hard-points) growing at the edge of the bar created inlets immediately downstream where gravel gently sloped into water. Since the remaining water edge was colonized by tall grass, these little inlets became the most visited spots (Figure 5.32)

Figure 5.32 At Kagami River Green Park, the trees are eye-catching on the broad and vague bars. The inlets formed after the trees are partly shaded—they become the favorite water access points.

Not only do these floodplain features attract uses, the result of uses also effect the development of these features. Dirt paths on Marsh Creek floodplain for example became a form of human intervention that caused stream responses. At Marsh Creek, the section between Balfour Bridge and Valley Green Footbridge had the most diverse dirt path system. Following the 1991 plan (KVA & RABA 1991), this section was constructed into a standard two-stage channel, including an official dirt trail on the left bank terrace. After flood disturbance and human use, the channel has responded and transformed to a varied and gently sloped terrain (Figure 5.33). The dirt paths were probably initiated when the vegetation was still young; and once formed, they were maintained by frequent trample and wear while vegetation established. From the official dirt trail, narrow paths cut through the slope and floodplain and lead to various points of water edge (Figure 5.34). Very possibly these water-edge foot paths provided in-cuts for high flows and created a thin secondary flow that is less than a foot wide that allowed young kids to jump across easily and attracted tadpoles and fry fish to gather (Figure 5.35).

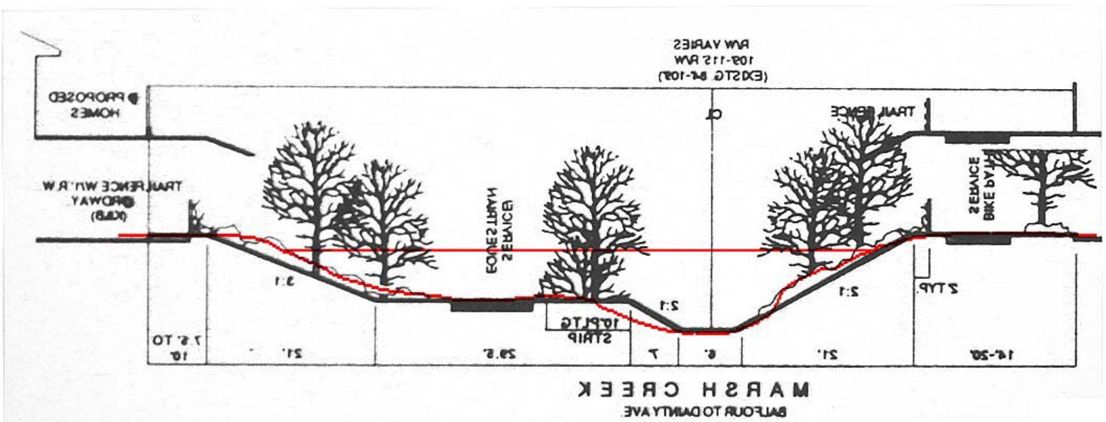


Figure 5.33 The section between Balfour Road and Dainty Avenue as presented in the 1991 plan (image flipped horizontally to face downstream) and the section measured in 2001 (red lines)

Figure 5.34 (above) The dirt path system developed on the floodplain of Marsh Creek between Balfour Bridge and Valley Green Footbridge

Figure 5.35 (right) The secondary flow was possibly created by a dirt path

Designers can direct the location of floodplain formations by introducing hard and soft structures, give initial grading such as inlets to form secondary flows, pits for ponds, shrub to catch sediment, rocks to form puddles, etc. Table 5.3 lists some of the common patterns on floodplains that facilitate spontaneous uses and how they can be created.

As a substitute system of natural floods or simply as a means to maintain high bio-diversity in between floods, restoration scientists have been using measures such as planting, irrigation, coppicing, thinning and mulching to manage the floodplain (RSPB et al. 1994). In the UK, livestock poaching is a legitimate technique deliberately employed to maintain marginal plant communities that are characteristic of floodplains (ibid.). The concept of poaching management is neither new nor limited in one culture. At least by the 18th Century of Edo Era, Japanese engineers would plant lines of cherry trees on newly constructed levee to attract big crowds of cherry-blossom viewers to come and compact the levee structure.

Table 5.3 Common floodplain features valuable to spontaneous uses and their locations

Pattern	Uses	Locations
Barren surface	Dry base-points, footpath, dirt play, dirt bikes, catching, observing, etc.	Created by users (barrier- free and convenient routes), new deposition of silt and sand, etc.
Inlet	Paddling, swimming base-point, observing, catching, etc.	Erosion by concentrated flow, erosion behind or between hard points, etc.
Backwater/secondary flow/ pond	Observing, catching, paddling, crossing, etc.	Erosion of dirt path or inlet, erosion behind hard point on floodplain, levee opening, floodplain grading, etc.
Flat gravel beach	Group gathering, collecting, rock skipping, building, dry base-point, catching, etc.	Point bar at inner curve, deposition behind low deflectors or soft structure, deposition downstream the weirs or drops, etc.
Sloped gravel bar	Swimming, tree swing, building, collecting, dry base-point, etc.	Behind soft structure at eroded bank, point bar at sharp inner curve, etc.

Similarly, spontaneous uses may well be regarded as management schemes. Not only may the creating and sustaining of dirt paths and barren surfaces contribute to floodplain diversity, collecting of nuts, picking of fruits, harvesting of bamboo shoots can also be considerable aid to prevent over-dense stands. In fact, plenty of studies have revealed that the frequent disturbance of coppicewoods through human activities, whether for livelihood or as recreation, have created unique and extremely diverse habitats that would not have existed otherwise (Tadashi 2002, Buckley 1992). To achieve such functions again calls for proper use density, since a floodplain can soon appear derelict if used too little and the lack of sign of use will deter further use.

Symbolic lone tree, woodlands, tall grass, bush, annual grass, and emergent and marginal communities all attract users' interaction in characteristic ways. Strategic planting plans should define base points and possible paths on the floodplain. On this regard we have comparatively more information accumulated. Lists of riparian plants, their environmental requirements and their performance in supporting wildlife have been compiled for many regions. On the other hand, landscape architects have developed plant lists that highlight the play values of common vegetation (e.g. Moore 1993).

Although not in a riparian setting, Rydberg and Falck's (1998) experimental forest demonstrated how woodlands can be managed for neighborhood recreation, bio-diversity and timber harvest all at once. Within a 2.1-hectare land the forest consisted of 12 small patches, each designed with deliberate species composition and coppicing scheme for particular experiences. For example, the Children's Forest (about 0.25 acre) contained a contrast of small, safe glade and the dense, dangerous groves. It was devised with climbing trees, dense undergrowth, large rocks and fallen logs. Children are allowed to cut small trees for building and clever crafts. The Walk-The-Dog Forest was maintained with a sparse growing overstory and a dense understory that is considered unfriendly for humans but inviting to dogs (ibid.).

Management criteria for floodplain vegetation can be formulated so as to maintain qualities important to different users. For instance, a minimum *visible channel percentage* can be determined so that part of the low-channel can be seen from the paralleling street or main trail at all time during the establishment of vegetation (Figure 5.36). Similarly, a minimum *accessible water-edge percentage* should also be guaranteed for in-stream uses.

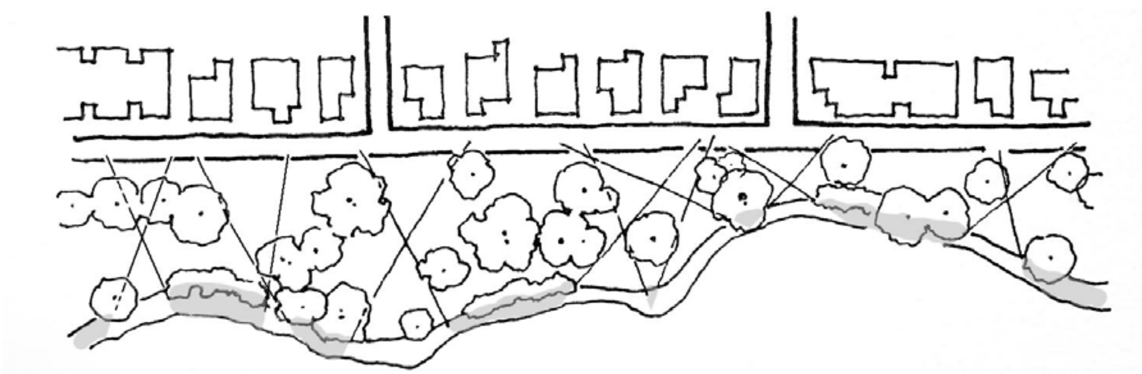


Figure 5.36 Floodplain management for spontaneous uses can be based on a minimum "visible channel percentage" from the paralleling street or trail

Where water is within sight and water sound is within reach, users are more likely to be drawn to water edge for static or dynamic activities. Using visible channel percentage as an index, we can conceptually divide the floodplain into less water-bound and more water-bound zones. Trails for smooth traffic (commute, exercise, etc.) can be located outside the frequent creek-in-view range. Range of water sound is controlled by factors such as drops, in-stream hard points, plant coverage and topography. By walking around the floodplain, simple mapping can be carried out regularly to determine the view, sound and access ranges during high flow and low flow seasons (Figure 5.37).

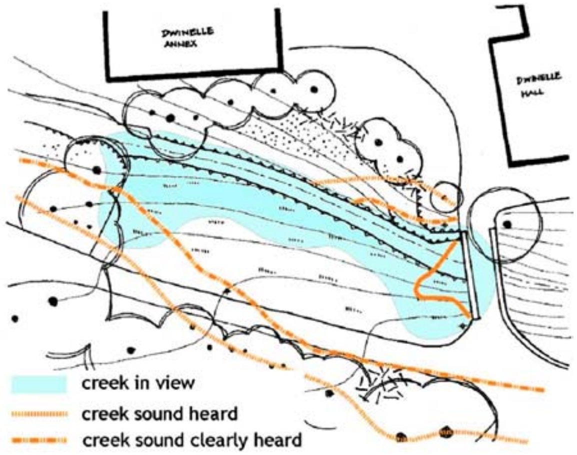


Figure 5.37 A walk along the floodplain can decide the visual and sonic ranges of water for vegetation management

Finally, a few basic principles apply for floodplain design:

- Assure some quiet and secluded base-points. Solitude spaces are highly desired and rather vulnerable. Some separation between these spots and those of adventures can be achieved by setting smaller base-point size and using dead-end accesses.

- Large open space for social gathering is of lower priority, since they are often provided by parks and other facilities already.

- Strive to create multiple layers of paths. A main trail with distinct route for smooth movement is still highly valuable for obvious reasons, but secondary trail, informal paths, narrow ledge by water, etc. are necessary to link to diverse base points. They separate speed and stream interaction levels and in general enhance the capacity of the stream.

5.3.5 Drainage/Irrigation Systems

To maintain watershed function in densely developed areas, the only solution is to bring watershed function into them. For this reason, the stormwater drainage system has recently invited a great deal of discussion. There have been many initiatives to transform drainage pipes to open swales that reduce the amount and speed of runoff and enhance its quality. Meanwhile, devising stormwater drainage system has tremendous opportunity to manifest urban hydrology and connect living spaces to urban streams (BASMAA 1999).

As seen at Julian's "creek", drainage ditches themselves can be rich resource for spontaneous uses during both wet and dry seasons. Since they very much replaced the predevelopment drainage patterns, they can rightly be considered as small creeks. If only the main drainage pipes in a city were remodeled to function as Julian's creek, with a few frogs and mudsuckers in a few puddles and places to climb up and down and hide, the kids' territory would have extended into the watershed and closer to home. After rain, tadpoles are hatched and drainage creeks become favorite spots for wildlife and water contacts. When they dry out and get covered by grass, they serve the path for adventurers and niches for quiet uses. Dirt bikes would cut smooth paths through them; fort or dam building would roughen their surfaces again. When another rain season comes, tadpoles would again show up.

Drainage creeks should be adopted by the neighborhood area they drain (the *hydrologic neighborhood*). The residents can decide with designers whether the drainage creek should be on the street or along backyard alleys; whether they want to vegetate the bank, put a bench or create a gathering place. Using the hydrologic neighborhood as a water quality working unit has particular potential since the NPDES permit for municipal stormwater quality control heavily depends on community education and monitoring as a best management plan. At each drainage outlet by the stream a map can be prepared to show the sub-watershed drained by it. Contests can be held by local citizen groups to compare the runoff quality of each sub-watershed. Water quality data collected this way will also facilitate the municipalities to satisfy the NPDES requirements (Figure 5.38).

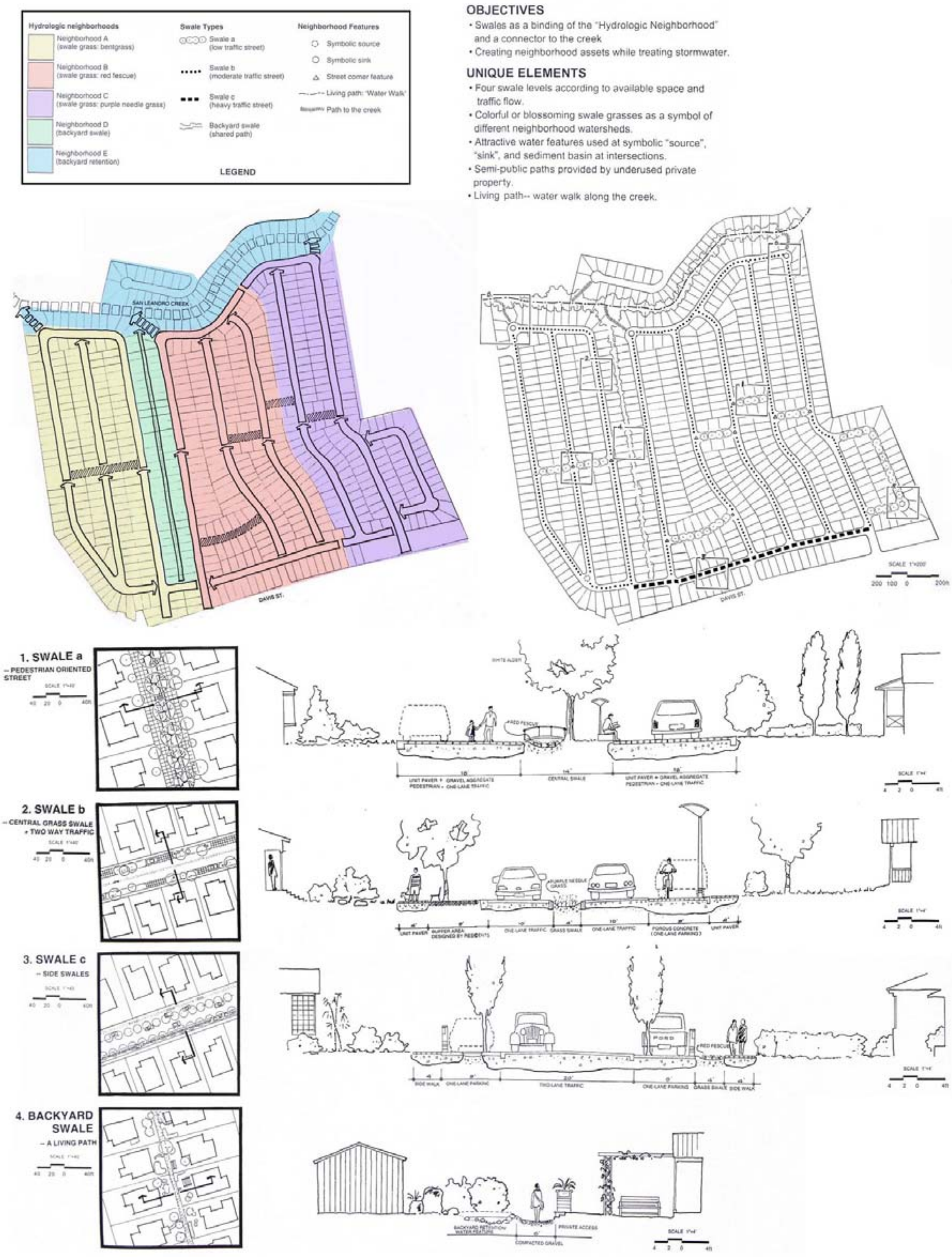


Figure 5.38 A residential stormwater drainage retrofit proposal for San Leandro Creek, California using the concept of the "hydrologic neighborhood"

Although open drainage features are in general more beneficial for spontaneous uses, the mystery and fun of pipes are hard to resist for adventurers. Fortunately, pipes would not disappear—there are plenty of situations that swales do not work, particularly when drainage need to cross dikes, trails, or roads paralleling to the stream. In such cases, pipes can serve as underground passages that connect the stream to other neighborhood open space such as back yard alleys, community farms or groves. These passages will provide safe but exciting road crossings for some kids and small animals such as moles and raccoons (Figure 5.39).

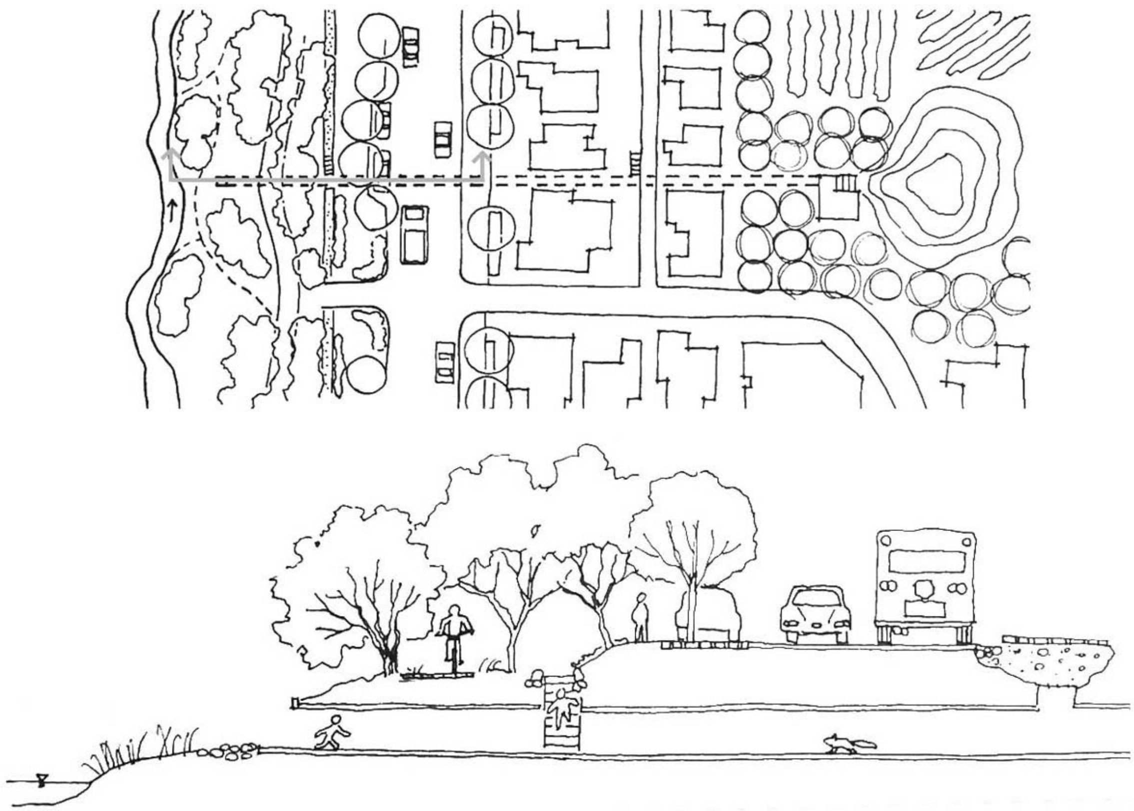


Figure 5.39 The drainage pipe can be designed to form safe road crossing for kids and small animals and connect the stream to other neighborhood open spaces

In fact, not only stormwater drainage, all sorts of distribution and drainage systems are an integral part of our urban watershed, and should be utilized to provide habitats and moving corridors for wildlife and spontaneous users. Irrigation canals are especially an important resource. In most parts of California, privatized, straightened and hardened to maximize volume and speed, we have these open waterways crossing cities or framing city boundaries with no contribution to their neighboring communities. Yet the potential natural resources canals can present is enormous and particularly beneficial to spontaneous users. They are tamed waterways without much flooding and water pollution concern. In cultures and cities where community gardening and farming prosper, canals are closely knit to urban texture, providing spontaneous use literally to people's doorsteps. In addition, drainage and irrigation systems provide diverse settings that complement the mainstream as they flow over different land uses. Agriculture drains will have water more frequently than neighborhood stormwater drains; irrigation canals provide stable flow at least seasonally that caters to water contact in summer. These secondary waterways can function as the vein of a reconnected urban watershed.

5.4 Summary: Filling the Missing Piece

At the level of watershed management, promoting the spontaneous use accentuates and even elevates the importance of healthy hydrologic and sediment regimes, water quality and sound habitat base addressed by environmental scientists in stream restoration. Spontaneous uses therefore add to the momentum to advocate for a "living stream" based on watershed health and integrity. Table 5.4 summarizes the watershed management challenges that currently confront spontaneous uses and possible strategies to address them.

Table 5.4 Challenges confronting the spontaneous use at watershed level and suggested strategies

Challenge	Strategies
Reduced in-stream flow	- Restore healthy hydrologic regime through dam discharge. - Reclaim treated water or gray water. - Establish in-stream water right for spontaneous users.
Reduced sediment	- Restore healthy sediment regime through dam dismantlement or sediment pass-through strategies - Reclaim construction aggregate to stream bed - Reuse dredgings - Reshape channel locally - Establish in-stream sediment right for both spontaneous users and in-stream wildlife
Dubious water quality and lack of adequate standard	- Assign all accessible urban streams as waters for recreational uses for water quality monitoring purpose - Establish reliable but flexible water quality standard that addresses the concern of spontaneous users - Encourage volunteer monitoring
Dwindling wildlife habitat base	- Set local bio-diversity as habitat restoration goal - Regard urban areas as part of the habitat base connected with stream corridors - Conduct biotope mapping in cities - Create urban habitat development plan for each city

When it comes to stream planning, much conceptual conflicts and regulation pit holes become apparent barriers to accommodate spontaneous uses in restoration projects. Planning for spontaneous uses focuses on creating effective stream-community interfaces and forming the social characters necessary to cultivate a “living stream” within the city. The challenges and strategies in creating living stream-community interface is summarized in Table 5.5.

In physical design, there is an enormous range of techniques available in stream restoration that can be utilized to realize spontaneous uses in urban streams. Using the concept of human intervention and stream response, designers can deploy hard as well as soft structures and borrow the forces of flood and other natural processes to shape stream bed, bank and floodplain.

Table 5.5 Challenges confronting spontaneous use at the stream-community interface and suggested strategies

Challenge	Strategies
Corridor as a tool to exclude users	- Search for corridor width criteria from the spontaneous uses viewpoint - Examine compatibility of criteria for spontaneous uses and other environmental goals
Density too low or too high	- Increase visual and use capacity by devising the plan form, vegetation patterns, water edge, etc. - Secure a minimum local density (about 6,400/mi^2) necessary for community territories - Locate urban wilderness pockets with locally low density
Distance	- Utilize and devise community territories within 3-min walking distance (about 900 ft) -Utilize and devise urban wilderness within 15-min biking distance (about 3 miles) - Assure easy and continuous access for urban wilderness
Lack of public access	- Discourage further private ownership next to urban streams - Encourage backyard renovation to allow stream access - Broad education efforts - Nourish "collective-symbolic ownership" at potential stream accesses - Devise visual and activity access from neighborhood streets and bridge crossings
Scale too large or too small	- Small streams: emphasize wildlife contact while assuring the survival of wildlife habitat base - Intermediate streams: emphasize water edge and crossings - Large streams: emphasize water edge and provide punctuation for visual and activity territories - Promote diverse social character and use experiences according to floodplain width and low-flow channel width

For in-stream environment, every built structure occurring in the riparian space is an opportunity to create local diversity and invite spontaneous uses. Existing bio-engineering bank protection techniques can be modified easily to support spontaneous uses; and landscape architects can particularly facilitate the development of new techniques by broadening the palette of plant species and installation methods. Floodplain can be designed with user needs in mind and managed to assure visual, sonic and physical access. Spontaneous uses themselves can be regarded as a management regime that can be directed to enhance floodplain diversity. Finally, all drainage and irrigation systems possess enormous potential to extend spontaneous uses and ecologic infrastructure into the communities. Using hydrologic neighborhood of these small waterways as a working unit, the urban watershed can be reconnected.

With the knowledge we now have of spontaneous uses and a positive planning and design intention, we can provide new solutions that effectively address multiple purposes at once in urban stream restoration. Before habitat conservation was regarded as a paramount goal of floodplain management, engineers considered it a trade-off and a secondary business to flood control. Only after a small number of pioneer engineers started to embrace its ecological value did we see the developments of non-structural flood control and bio-engineering bank protection. Today, from a broader, more informed viewpoint, no engineer will argue for overpowering structures even for flood control's own sake. Similarly, a higher set of restoration concepts and techniques can be born after all professionals engaged in urban stream restoration confront and embrace the value of spontaneous uses.

Chapter 6 Fitting Spontaneous Uses into the Cultural Landscape

The prior two chapters have focused on the physical aspects of spontaneous uses, namely their habitat requirements and how planning and design can support them. To promote spontaneous uses nevertheless needs to combat barriers on the cultural plane, since value, conception and use are inter-related while conception and value are partly driven by culture. From the fieldwork, several cultural issues can be identified. Marsh Creek survey project informed us that children and adults have sharply different modes in interacting with streams. Children use the creek much more spontaneously, but as they grow, their uses tend to change. Adults are concerned with all sorts of danger associated with spontaneous play; agencies have burden of liability; restorationists are wary of human impacts. Moreover, a strong idyllic tendency, which does not view the stream within its urban/urbanizing context, is held among the adults who appreciate streams highly. This tendency is further complicated by the widespread sentiment of loss on nearby nature.

This chapter addresses the above issues through theoretic construction and proposes participatory planning and design as the way to fit spontaneous uses into the cultural landscape.

6.1 Spontaneous Play, Children, Adults

Play as a spirit permeates all parts of human culture (Huizinga 1955). There seems no reason to regard play as an exclusive right for children. Adults who are in good shape enough to engage in some spontaneous interaction with the environment would certainly find a no-loose-parts situation frustrating. We all need sensuous nourishment, sense of ownership, sphere of control, freedom to use our bodies, wonder of nature, communication to other beings and organisms, the feeling of being alive, and the faith that the world is beautiful and life is basically worthwhile. Yet my fieldwork suggests that few adults engage in spontaneous interactions with the stream. Although they sometimes accompany the kids to the stream, they seldom participate in the play. This section reviews the essence of spontaneous use that is common to adults and children and intends to explain the adult estrangement to spontaneous play at streams.

6.1.1 Re-examining Spontaneity

Certain notions are highly consistent among both adult and child users: They want more contact with wildlife, clean water, and first and foremost, they want to remove trash and stop dumping. Children's ideas on just what in the creek is trash or garbage may be different from adults, but when garbage is encountered, their reaction would be comparable, if not more severe than adults. Kids detest signs of neglect. A sight of a teddy bear so filthily covered with mud made a cheerful 8-year old boy instantly silent. Another kid refused to walk through the culvert under a bridge because there was a big dead dog dumped down from the road. Similarly, kids are not particularly fond of dirtiness. An active girl told me how "yucky" it was to fall into a tributary of Marsh Creek when trying to measure the depth of a pool—her shoes smelt so bad afterwards that she had to get a new pair.

In Michael Southworth's study (1970) on Cambridge boys' use of the city, six qualities of the physical environment were found to be most valued: cleanliness and order, physical safety, water and other natural elements, color, newness, and form symbolism, ornateness, and height (p. 159). He further noted that "Even though kids spend time in [wastelands] and have fun, they don't think of them as places to like or to learn more about, in fact… they are critical of all areas that lack neatness." (p. 130)

If kids do not like signs of neglects just as adults, isn't it puzzling to find kids so attracted to rummage in wastelands and junkyards, or see them so busy and alive wrapped around the dumped shopping carts and construction wastes?

My observation is that these spots have a few qualities that make the simple idea of "kids hate signs of neglect" complicated. In addition to signs of neglect, what wastelands and junkyards and dumping usually declare is a lack of ownership. It means freedom of adaptation, absence of supervision, not to mention the drama and imagination these places or objects may entice. This sign "lack of ownership" is so valuable that it is considered worthy enough to combat some amount of discomfort inherent to these places or objects; after all, how much ownership are children allotted in public outdoor space?

Another crucial quality of these estranged places is the promise of experiences. Kids care less about making themselves dirty by interacting with the environment in the pursuit of experiences. The same applies to danger. Getting dirty and getting hurt are both to a degree attendant to play, which kids more or less consider as inevitable. Yet they engage in such activities because they know the reward of them would exceed the troubles occasioned by them.

"Waste lands," "junk yards," and many other offbeat places are so popular in children's place literature because they provide both control and experience. In fact, I found these qualities essential to all forms of spontaneous uses. Spontaneous, as defined at the beginning of this work, means resulting from a natural impulse or tendency. We can now say that this impulse or tendency is *need of experience* and *want of control*.

6.1.2 Forgetful Adults

The result of Brentwood fieldwork indicates that compared to the survey average, the interviewees compose a permissive group concerning kids playing in the creek. The subjects' childhood creek experiences had an important role on their supportive attitude. They may not actively participate in the kids' play themselves, but they generally allow the kids to directly interact with the creek and wildlife.

However, it is not uncommon to meet forgetful adults. In Sonoma, Julian's mother worked a busy schedule and seldom used the creek. She suggested me to talk to the father, who accompanied the girls' play much more. But when we started to talk, the mother suddenly remembered her childhood creek in Berkeley and vividly recalled how she and her friends dug around and found salamanders. Absorbed in listening, Julian commented, "Mom, I can't believe you did those kind of things! Maybe when I grow up, my daughter wouldn't believe me, either."

Even for just a brief moment, when the forgetful adults remembered their childhood play experiences, their faces softened and their eyes sparkled like a ten-years-old. After observing this repeatedly, I wonder why many adults tried so hard to persuade themselves that they are not "kids" anymore; that they are discrete existence from children, while the slightest turmoil can tip over the presence they maintain and throw them back in time.

Some adults are not forgetful, but are instead simply too embarrassed to admit that they, too, desire play. One bright day when a big group of levee divers congregated at the

4th stairway by Kagami River, I saw two adults aiming their cameras toward them. Watching one splash after another, they stayed there for a long time. What temptation was the scene to them? The body, the mind with all associated images must have been evoked. A feeling that part of them went in along with the crisp splash—that must be what was shared among all the adult spectators.

Developmental psychology literature considers play as a phenomenon to be mapped with ontogenetic developmental functions (e.g. Cobb 1977). However, even though the body stops to grow at some point, there is no evidence that at a certain age competence, skill and intelligence would stop to develop. If a main function of spontaneous play is to nurture these qualities, I see no reason why adults would not benefit profusely from it.

In her critique of ontogenetic developmental theories, anthropologist Margaret Mead (1977) reminded us that as a theoretical concept, "The Child" is a fiction. An over-dependence on the notion of "The Child" prevents us from realizing how complex are the things children can learn, and the things that adults can learn later. Since empirically, we find the shifts and enlightenment happen throughout the course of our lives, Mead argued to obscure the notion of 'adults' and 'children' and "fit the two together." (p. 23)

Edith Cobb certainly touched upon something which very many adults recognize when she wrote:

> *"It is significant that adult memories of childhood, even when nostalgic and romantic, seldom suggest the need to be a child but refer to a deep desire to renew the ability to perceive as a child and to participate with the whole bodily self in the forms colors, and motions, the sights and sounds of the external world of nature and artifact."* (Cobb 1977, as cited in Moore 1986a, p. 19)

Reviewing the literature, it is not uncommon to find researchers' pursuit accompanied with a sentimental tone, such as "unless children have a chance to experience novelty in the real world they will slip into the well worn thought ways of the adult status quo." (Moore 1977) However, if 'The Adult' is a result of socialization, the 'adult status quo' is a social construct.

6.1.3 Termination of Use

As discussed in Chapter 3, Brentwood kids typically stop using the creek by the 8th grade. Similarly, empirical studies on children's play literature commonly pointed out the rather abrupt termination of spontaneous use at about the age of 12 (Moore 1986a, Lewis 1995, Hart 1979).

This phenomenon can be partly explained by the developmental quality of spontaneous uses and the physical constraint of the streams. Since many uses involve testing out body functions and skills, when ability outgrows the challenge, their attraction fades quickly. When one can swim and dive, the limited splash pond does not content anymore; when one has speared an ayu, netting the minnows would not be satisfying again. This is evidenced by the fact that in Kochi, uses shift with age and extend to much older children. Since there are adequate challenges for all ages, junior high students form a major user group and plenty of individuals carry a life-long association with the river.

In Brentwood, the activities are less diverse. Although crawdading is wildly popular, it is sufficiently easy that by the age of 12 most kids have mastered it. Fishing seems to sustain the kids' attention to an older age. But since in Brentwood the creek is too small for many target species, Brentwood kids have to go to Oakley for serious fishing.

However, the shift of use can also be occasioned by the *shift of viewpoint*. According to Southworth (1970), the middle-class suburban ideal was strong by the age of 12 even among those who still explored the fun of cities. It was evident in the descriptions of places kids would like to live, and more so among the middle class kids than the working class kids. From Brentwood kids' drawings, we observed that non-users take on idyllic viewpoint by 6th grade; and by 8th grade, appeal of remote streams seems to exceed nearby creeks. This observation was exemplified by the tour with the 8th-grader Eli. The tour was basically a reminiscence of his past uses. Eli spent much time catching crawdads and tadpoles when younger, but now he came to Marsh Creek because it is "peaceful… away from people and buildings." He used the trail mainly for biking to friends' house. In other words, in terms of interaction mode, he is a typical Brentwood "adult" now.

To some degree, termination is inevitable. Growing up does necessitate knowing more and playing "bigger games". With enhanced mobility, adults have more diverse ways to experience nature. However, "knowing" and "withdrawing willingness to interact" are two different matters. Knowing should not bring about withdraw of attention. I met at least three kinds of adults who had intimate childhood experiences with streams. The first kind easily picks up the sensation and skills when getting in contact with a stream. They may not be using streams as frequently but the stream never leaves them. Physical interaction has sublimated to care, with constant attention. A second kind of adults can be reminded easily of past sensations but are rather stuck in adulthood and reluctant to re-experience them. A third kind hold in contempt past experiences and have lost the ability to experience the stream. How do they lose such ability?

6.1.4 About Growing Up

A crucial mechanism that occasions attitude change toward spontaneous play is status seeking or the so called "culturalization," where value is derived not from one's own viewpoint but from the culture in vogue.

Status seeking has caused much paradox in community development. Because of the internal contradiction of symbolic value and use value, we have the paradox that the majority of a community want recreational facilities or large open space but very few use them (Rapoport 1982). Hester (2002) identified eight status-seeking impulses that is most destructive to local cultures and places in the US: 1) The attempt to be something one is not; 2) The shame of poverty; 3) The allure of mobility, moving away and up; 4) Bigness; 5) Distant beauty; 6) Conspicuous consumption; 7) Enclaves of homogeneity; and 8) Sterile cleanliness. Here I would add a number nine—Stifling safety.

One would find that both the spontaneous use and being a child are much against the various status symbols promoted in our culture. Children are certainly small and poor, less mobile, less clean, and more prone to physical danger. (Curiously enough they are also in general much happier than adults.) Spontaneous uses per definition are least bound by matter, energy, space, time—they are less consumptive and susceptible to nearby beauty and diversity. Therefore to children adulthood is a higher status. To adults the culture in vogue or upper-class is a higher status, which involves more vacation-oriented uses than spontaneous uses. This list well displays the symptoms of our middle-class society at large, but in reality they all derive from the first item. In other words, it is not the status objects themselves are destructive to self or place identity. One can certainly enjoy the comfort of being big and wealthy and mobile and safe and clean to one's content, but s/he does not need to get stuck in such a mode. One can still experience smallness and poverty and danger and dirtiness by choice and do not feel contempt for the past joy. Growing up in this sense is expanding territory of control from a core of "I", with ability to experience more and appreciate more in life. Harmful status seeking, on the other hand, is to shift the core again and again, until one is finally lost (Figure 6.1).

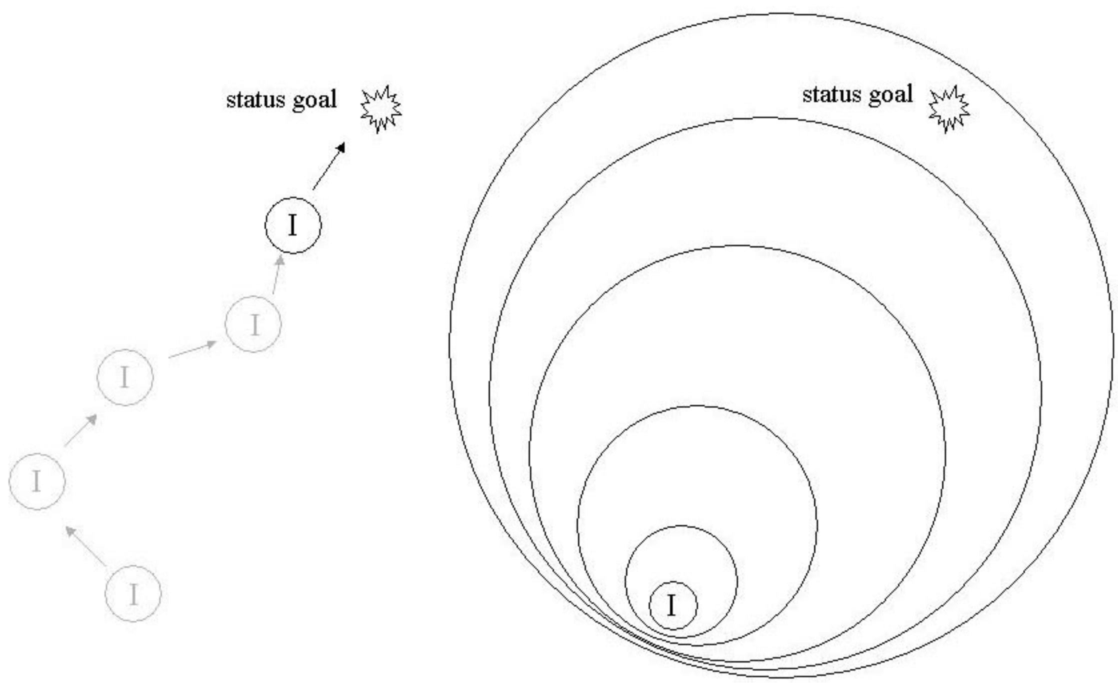


Figure 6.1 Two patterns of "growing up": a constant shift of the core value of "I" without expanding capacity of experience (left); a continuous expansion of "I" as an experiential subject (right)

Therefore, the biggest barrier of adults' spontaneous play is their own assumption that they had to stop communicating with the world in the intuitive and spontaneous way. The same environment is open to all, but adults tend to ignore and reject its invitation. As Hubbard (1966) once noted:

> *"Actually, a little child derives all of his pleasure in life from the grace he puts upon life. He waves a magic hand and brings all manner of interesting things into being out in the society. Here is this big, strong brute of a man riding his iron steed, up and*

down, and boy, he'd like to be a cop. Yes sir! He would sure like to be a cop; and twenty-five years later he looks at that cop riding up and down and checks his speedometer and says, 'Doggone these cops!'

"Well, what is changed here? Has the cop changed? No. Just the attitude toward him. One's attitude toward life makes every possible difference in one's living. You know you don't have to study a thousand ancient books to discover that fact. But sometimes it needs to be pointed out again that life doesn't change so much as you." (p. 17)

Using a streamside landscape, Tuan (1974) argued adults must learn, or relearn, to experience our environment fully by learning to be yielding and careless like a child:

"He needs to slip into old clothes so that he could feel free to stretch out on the hay beside the brook and bathe in a meld of physical sensations: ...the tickling of an ant making its way up the calf of his leg; the play of shifting leaf shadows on his face; the sound of water over the pebbles and boulders, the sound of cicadas and distant traffic. Such an environment might break all the formal rules of euphony and aesthetics, substituting confusion for order, and yet be wholly satisfying. (p. 96)

One loses ability to experience a stream simply by not experiencing it; by not looking at it with the alertness and desire of knowing that they once had. But one also gains ability to experience easily – by finding one's viewpoint back and simply experience again. Hester (2002) illustrated how forgetful adults can be reminded of the true values they once treasured as a child by having them recall wonderful childhood experiences in the participatory design process. It also occurred repeatedly in my fieldwork that when adults overcome the initial embarrassment, they would find spontaneous play enormously rewarding.

6.2 Danger

Safety concern, as revealed in Chapter 3, is overwhelmingly the reason why adults prohibit or impose restraints on children's spontaneous play. Physical, biological, social and pollution-related danger all threaten parents. Among these, social danger (crime) and pollutant that cause actual harm when contacted need to be eliminated without reserve. However, physical and biological danger, as an integral part of a stream, can never be eradicated without losing the whole thing.

In the past, brilliant ideas such as adventure playground have been suppressed largely due to liability burden (Pollowy 1977, Cooper 1970). Liability issue of water in public space has become a remarkable sore spot. Landscape architects constantly struggle with placing water features in parks or playgrounds even just for young kids to stick their toes in. This burden intensifies at urban streams, as witnessed by the omnipresent signs, fences, and safeguards in official play zones. But what is danger to spontaneous users and how does danger become liability?

6.2.1 Danger as Experience

Experience, or unpredicted experience, may be one of the most basic human needs. Suppose all of a sudden everything become thoroughly predictable, I do not know who would be interested in living anymore. Nature has since the beginning of human culture provided challenge, disturbance and randomness. It is this quality and the life force it embodies that compose its ultimate charm to us. Adults who are supportive of spontaneous play know that physical danger is inevitable. In most cases they themselves experienced the same—they know the value of danger to experience in life. Katy's words illustrated how danger is part of their association with Marsh Creek:

"When my kids were in junior high, in summer they would get bored and build a bike jump. They would ride as fast as they could go, flying off one side of the creek, hit the bottom, and swoop up on the other side of the wood… and that's only if you were a good bicycle rider, because some of the kids would crash on the rock or something and get hurt. We always said it could never be a holiday that we didn't have to go to the emergency room, because the kids would always get hurt on their bike at the creek and have to have stitches… It happens all the time, all the time."

Talking about his childhood experience playing in the big Shimanto River in Kochi, Nakajima was beaming with joy. The elementary school teacher used one word to characterize the spirit of his play: *punch*.

"That is to say, risking your life and knowing that you may die as a result, compared to swimming in the designated 'municipal swimming zones' you would still rather spend an hour floating and swimming—and catch fish on your way—down a mile of the river. The river was so big, there were rocks and there were runs; and it was like being jailed in a box to be told 'please play here' and only swim in the safe zone—it's just darn boring…."

The fun of Shimanto River lies in its rocks, its runs, all the life it nurtures, and most of all, the process of finding all the fun parts oneself. For Nakajima, Shimanto River was not just "fun" in a shallow sense. The fun cannot exist out of its enchantment, mystery and danger. To many spontaneous players, even the pain inflicted by accident is to be relished later in life.

Along Kagami River, there were a few spots known for water accidents. But the danger of these spots attracted a particular group—the taboo lovers. Kakuchyu Sluice was one of such spots. When the sluice is closed, at the upstream side it forms a strong sucking flow that can be deadly. Consequently, striking yellow paint was all over the concrete abutments—“Keep Out.”

One day after a typhoon I met a group of youths gathering defiantly on the yellow paint. With a definite trace of delinquency, they were defensive when I approached them. One of them, likely the leader, tried to scare me away, “I’ve never seen someone die in front of me—just wanna see a dead body.” They smoked and dyed hair for each other and then jumped in from the abutment to see what color it turned out to be. But I found them clever enough to always dive downstream of the weir, avoiding the troublesome zone upstream of the gate. They walked skillfully on the top of the thin metal gate to the second abutment. The central sluice opened for discharge, forming a concentrated flow; and there they would dive from the abutment and get flushed down some 20 or 30 meters. As a matter of fact, I wonder if that was not the real reason for the timing of their gathering. They were so familiar with the river that they knew when the central sluice would discharge so they could play the daring-looking but really innocuous “flushing.”

The way the apparent “delinquency” groups had to linger around the taboo spots may seem foolish, but it is their way to protest that the environment has been made too even and benign and safe to them that they find no challenge—they are experience-hungry kids. Experience does not have to be of busting and cracking character—there are many other rewarding modes of stream interaction. Violent physical experience, however, seems to be a good remedy for experience-hunger.

6.2.2 Danger and Competence

My subjects often reported with obvious satisfaction how they first fell when crossing a creek or climbing a tree but then became very skillful. At Marsh Creek, Stella moved around on the dirt path with her bare feet. There was trash and even broken glass in the grass, but she just nimbly avoided all the hazardous spots. Stella told me that at the beginning it hurt a little bit running around like that, but now she had got used to it and the feet were "getting tougher."

Knowledge for the environment conquers the fear of physical or biological danger. The Spook Rock at upstream Kagami River is a spot known for sad stories. The rock sticks out in the flow remarkably and the underwater part of it has been seriously undercut and forms a ledge. By the evenings and particularly after rain, the complicated eddies around it may sweep one under the ledge. In spite of all the danger, the rock remained irresistible to local youths. According to my local guide, experienced kids know how to watch the surface of the pool. When they see ripples and eddies forming, they know it is time to go home.

In Brentwood Jewel picked up a rock, flipped it over, and said briefly, "leeches!" They were all over the rock. She explained calmly: "Once they got into you, you can never get them out. They suck the blood." "You're not afraid?" asked I. Jewel laughed, "No. You see, before they get into you, you can easily wash them away. You don't feel it when they drill into the skin, but you can use the nail and nip it out if you find it early…."

Danger, once known and overcome, composes competence. Both danger and competence are qualities on infinite scale. I have seen many feats displayed by spontaneous players, some may be more astonishing than others, but even the superior balancing on sharp rocks or the swift and facile motion on slippery concrete blocks can all well be considered dangerous if observed by "normal" adults. But they were not, to my subjects. (Honestly I felt myself, comparatively underdeveloped in these skills and estranged in local stream conditions, was much more in danger.) There is a broad sphere of skills to be gained in physical interaction with nearby nature, providing the environment is diverse enough for all of us to seek out a level of danger we consider manageable. Studies pointed out that current children on average have a much smaller territory than earlier generations (Matthews 1992). By eradicating danger in the environment, we risk losing collective competence. Forty years ago, Nakajima's daily play course in Shimanto River was miles long, unparalleled by what I observed from kids today. He recalled his parents and other parents took the risk for granted:

> *"They would not overprotect children like nowadays parents do. Everybody knows that kids may die playing in the river—but it's just everybody was doing that all the time! And because there is danger, we would often picture the situation in our mind: if it [the flow] come this way I have to do this; if it come that way I have to turn over like that.... It takes constant judgment—judging whether one's skill and strength can overcome the power of the river. This, if not practiced in daily life, can't be achieved. The less experience you get the more dangerous it becomes!"*

6.2.3 Danger as Liability

There are certainly accidents associated with playing in streams, some originating from the fact that we have made the streams more dangerous than they need to be. A concrete flood control channel for example is truly hazardous because it provides no gradient of challenge (Figure 6.2). But even so, it does not have to become liability.

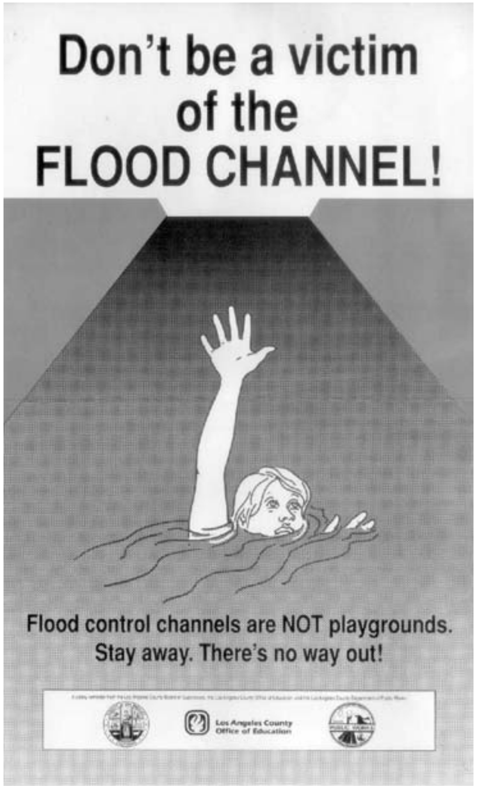


Figure 6.2 A poster that depicts the real danger created by ill-designed flood control channels

Ben's younger brother once stepped on a broken glass bottle in Marsh Creek and got hurt, so getting into water was banned by the parents. The tunnel exploration was soon banned too because Ben banged his head one time there. Ben did not care much about getting hurt; rather, he was frustrated about the punishments. It is questionable how banning can help a child to be safer, especially after an accident. The child has just learnt a source of danger in a hard way, now s/he is forbidden to face the same challenge again. In this logic, no conquering of territory is possible; instead, there is only forced shrinkage and withdrawal. After an accident, do we make sure the child (and ourselves) now understand the source of danger and can better deal with it, or do we punish them because they incidentally made trouble for us?

Ben commented that kids typically go twice as far as the play range acknowledged by parents because they generally move twice as fast than the parents think. This notion of gap between adult conception and the child's actual ability is observed repeatedly by myself and other researchers (Southworth 1970, Hart 1979, Moore 1986a). Adults do not change much themselves, so they tend to overlook the kids' growing capacity.

I was quite amused to find that with such a density of in-stream use, all schools in Kochi had policies that prohibited playing in water except for the two designated swimming zones in Kagami River. For principals and head teachers, it was a peculiar request on my part to go in schools and have kids draw down their spontaneous uses. It would expose them as knowingly admitting the offense of rules. Fortunately, at both Mikazuki and Asahi elementary schools I encountered open-minded educators who were willing to cooperate with my research. But at another school I intended to conduct drawing exercises in Kochi, there was considerable resistance.

It was a small mountain school located by a branch creek of upstream Kagami River. The creek was clean and less modified by levee, but after several visits I found no kid playing there. The school had an unusually stiff atmosphere. Kids were extremely disciplined and did not make much noise. Teachers treated me as an important foreign guest and demanded all kids to treat me as such, yet they were too concerned to leave me talking with the kids one-to-one. Although results from this school had to be discarded, the conversation I had with the principal and head teacher in a dignified office was informative. I soon realized that as much as they were trying not to offend my intention, playing in the creek was in fact strictly regulated. My first thought was that these adults did not have much creek experience. But to my surprise, once I brought up the topic of childhood creek experience, the rigid and dignified teachers suddenly loosed up. The head teacher Ms. M's memory was first aroused:

> *"Summer was always for swimming. …Every summer I would soak in river water from morning to evening and got tanned all dark, and we never got tired. Even now the sight of clear river water thrills me…. My parents—they had to work, and I was perfectly free to play whatever way I wanted. Everyday I played there until my folks came to search me. Oh, yeah, we rode on a log and rocked down the river. I did quite some bad things, too!"*

Then the calm and courteous principal Mr. N opened his mouth:

"Gee, did I play! I used 'chan' or 3-fork spear to spear fish all the time. Even now when I see fish, I think of those moments. The body still remembers the wonderful feeling—swimming in the river…. Just recently I was looking at the flow here by our school; boy, did I want to get in! …"

I was perplexed. I finally asked Mr. N why he would get so concerned and limit the kids from playing in the creek in front of the school. He was a little bit embarrassed when he said, "the kids now don't play as we did. They don't even play in the swimming pool! They are not that built up. If we just let them go to the creek it would be dangerous." "Then you need to allow them play everyday so they can be strong!" the words escaped my mouth.

In the views of forgetful adults, kids are weak and incapable. The element of danger had enriched their lives profoundly, but the fear of liability burden made them deprive children's right to confront and experience danger. In the US, we have a more litigious society than Japan. The culture encourages accusation when things go wrong. The car insurance tip even admonishes, "Don't Admit Fault." Hubbard (1988a) presented the KRC (Knowledge-Responsibility-Control) triangle that provides insight if we want to change this liability syndrome and make things go right:

"It is difficult to be responsible for something or control something unless you have knowledge of it.

"It is folly to try to control something or even know something without responsibility.

"It is hard to fully know something or be responsible for something over which you have no control, otherwise the result can be an overwhelm." (p. 21)

Since "want of control" is an essential quality of spontaneous use, it would be chaotic to promote control without raising knowledge and responsibility of individuals and communities at the same time. Citizens need to recognize that to continually enjoy the resources for spontaneous use, obsessive lawsuits and calling self a victim would not work. Government agencies and professionals also need to realize that suppressing community access and control would not alleviate liability burden more than allowing citizens to take part in the planning, design and management activities. Thus a new definition for liability can be: *danger without knowledge about it and responsibility for it*. Giving up responsibility, we eventually lose knowledge and control of the stream—and all the potential benefits it can bring.

6.2.4 Impact to Ecosystem

A reverse vector of the danger of the stream is the danger of users to the stream. Compared to the system-wise wholesale transformation, one finds the impacts of recreational use being at the slight end (see **2.1.2**). Further, the more serious impacts caused by recreational use have been associated with non-spontaneous activities such as the use of motor vehicles or social gathering with high time and place concentration (Edington & Edington 1986, Catton 1983). Although we often associate human effects of different orders to "human impacts" indiscriminatingly, the actual level of impact and consequence of spontaneous uses have rarely been studied.

Possible impacts of spontaneous uses include: trampling causing vegetation damage, incidental kills of animals, dirt paths that induce erosion, organic pollution by the use of baits, turbidity and disturbance of fish by active in-stream uses, trash such as hooks and fishing line resulting animal deaths or injuries, presence of human disturbing sensitive species, trails fragmenting habitats, etc. However, to make any of these accusations, serious and unbiased research on the actual level of effect is necessary. For example, what is the composite result of “fragmentation” caused by a 5 foot-wide dirt path, with a wide range of species considered?

It is even possible to question the negative connotation in “impact” when it applies to spontaneous uses. Kills happening to crayfish and bullfrogs help to check the population of exotics; dirt paths on floodplain can create runs for fry and amphibians; collecting helps to reduce trash; trampling maintains barren lands that are important for marginal communities and animal passage. Moreover, why is the energy of fencing and excluding not funneled to education so the truly harmful effects of use can be reduced? In England, mute swans were once found to be poisoned by lead deposited in the water from anglers’ discarded or lost weights. Once anglers became aware of this fact, they passed a voluntary code, which soon became legal measures, to ban the use of lead weights. Lead-caused swan deaths therefore decreased remarkably (Maitland 1995).

More fundamentally, what system or species should be promoted at a particular time for a particular stream? The dwindling of native species has made common targets for spontaneous uses in the past exclusive to specialized leisure seekers and sportsmen today. Dawson’s interviews (2003) with senior residents in Sonoma Valley revealed that in the 1920s and 30s, trout was very relevant to spontaneous catching. It could be caught by “just a willow pole, a string and a bent pin.” Now that exotics have become the stars in spontaneous catching, should we eliminate them?

For this value question I have two arguments. On one hand, the goal of restoration has to be realistic. It has to take into consideration the long history of human alteration of the watershed. The altered hydrologic and sediment regimes of urban streams, for instance, cannot be restored with any short-term, local-scale effort. Where a recovery of a higher-quality system is not possible, maintaining a system of “second-hand habitats” still possess great potential for spontaneous uses. On the other hand, the value conflict and the differences in attachment between the public users and restorationists (Ryan 2000) should not suggest us to compromise the possibility of a higher-quality ecosystem that does not exist now. Sharing knowledge and responsibility with users through the participatory process seems the only sound strategy to overcome the conception gaps.

In the participatory restoration process, enfranchisement of children is especially promising. Children are often eager and capable to contribute to community affairs but discouraged to do so. The River Curriculum Project in the lower Illinois rivers exemplified how children’s participation can inspire a great deal of activism and accomplish concrete benefits to the environment (Hart 1997). Activities that employ children’s help to scoop migrating fish over barriers or protect bird nests have had the wildest popularity. The bottom line is that spontaneous users, adults or children, do not interact with the stream because they want to harm; they do so out of innate affinity. Educating them to be stewards, we have their gleeful cooperation; excluding them, we invite objections and doom a future constituency.

Catchers can learn to differentiate the native, exotic, and invasive species that harm biodiversity; they can become the primary predators of invasive exotics. If not polluted, bullfrogs, crayfish and Chinese Mitten Crabs all make family cuisine. Children would be glad to learn that their catching is part of the broad scheme to make the stream “better.” In regular habitat surveys, ecologists can summarize the state of different species and present management measures to schools, which can then encourage catching and caring of certain species. Environmental actions responding to habitat management goals can become an integral part of the school curriculum. Through these actions, daily life can again be connected with the pulse of the biotic world.

Urban ecology reminds us that animals shift behavior patterns in the course of adapting to urban environment. In San Francisco, we have seagulls and sea lions almost domesticated by now. Egrets and herons in Japan are so used to people that they could mind their own feeding when I almost walked into them. If in the next century, we have learnt enough to live with and support a great variety of species in our daily lives that kids in the creeks could pat a heron or an otter, feed trout with caught caddisfly, I would not consider it as a ghastly scene. It is up to us how we conceive ourselves to evolve as a species on earth.

6.3 Beauty

The criticism against the "nature-city dichotomy" concept as a fundamental cause of our environmental crisis is not a new one. From Jackson (1959) to McHarg (1966) to Nash (1982, originally 1967) to Spirn (1984) to Hough (1995), the national intellects have been denouncing it for decades, yet it continues to be the driving force of the mainstream policy and behavior pattern of the majority. As reviewed in Chapter 2, such dichotomy evolves a wilderness imagery as an absolute and fosters pastoral suburban ideal as the only acceptable middle ground. These ideologies embrace distant nature (as amplified by status seeking) and past nature (as entangled with loss). The battle between sprawl and sustainability at cultural plane is very much a battle between distant/past nature and nearby/present-time nature. Since the power of aesthetic experiences on individuals' attachment to nearby nature is notably evident, how urban nature restoration caters to aesthetic experiences becomes the heart of the battle.

6.3.1 Beauty in Spontaneous Uses

Beauty is a matter of communication between the creator and perceiver. David Abram (1997) asked a crucial question regarding such communication between human beings and the biotic world:

> *"How, that is, have we become so deaf and so blind to the vital existence of other species, and to the animate landscape they inhabit, that we now so casually bring about their destruction?"* (p. 27)

Abram observed shamans in Nepal entered into a rapport with the same plants, animals, forests, and winds that "to literate, 'civilized' Europeans are just so much scenery…" (p. 9). The quality that he described of a shaman—being able to readily slip out of the perceptual boundaries that demarcate one's culture in order to make contact with and learn from the other powers in the land, however, is exactly what I observed among my spontaneous players, mostly children and occasionally adults.

According to my fieldwork, children's mode of conception showed a largely different aspect than their adult counterparts. In general, children photographed more close-up scenes on plants and animals while adults focused more on the landscapes. While most adults commented on how the creek should look like, children derived values mainly from the current or potential use. For example, several Brentwood kids did call for more water, not necessarily for the scenery but for swimming or diving. Trees were prized not only because they were "cool", but also because they provided venues and props for all sorts of play. The conceptions toward alga, riprap and woody debris were quite divided. Many kids regarded algae as "scum" and a token of poor water quality, but the highly interactive users seemed to enjoy them: John grasped a whole carpet of algae with no hesitance and smelled it; Kristy named it "noodle grass," dragged it out and offered to give "algae shower" to her father and younger sisters; Stella considered it important because fish and tadpoles would need it. Before the kids are told that algae is "bad," it is simply there to be interacted.

More and more evidences assert the causative quality of perceiving. Sensing is not passive receiving; rather, it is active and searching emanation (Sewall 1999). To many spontaneous players, beauty is not only recording forms, lines, colors and textures and evaluate them with existing values in the mind; it is gained with intentional creation.

The photos taken by Jerry (7 years old) convey how the seemingly chaotic creek environment becomes meaningful and beautiful for spontaneous users (Figure 6.3). Jerry pictured all the former sites of tree houses and swings, the bamboo shrub for making spears or walking sticks and the debris piles that might hide a raccoon den. He also created shots with his own direction and participation—his shadow projected on the dirt bank, the ripples created by throwing rocks in a pond, a sheet of algae he pulled up from the water, etc. These photos express vividly how spontaneous users not only adopt a place by observing and registering its content, they constantly create and invest value into the place. To the degree value is invested, the place becomes beautiful.

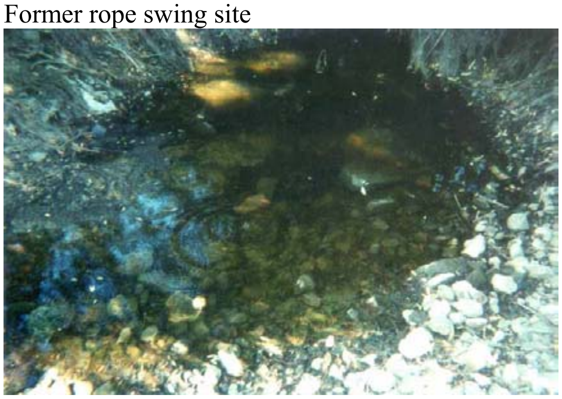
The wide-open willingness to perceive makes spontaneous users susceptive to beauty. To the majority of users who do not actively emanate perception, however, beauty needs a thoughtful designer. If the ability to perceive determines one's sense of beauty, the capacity of inviting participation becomes the test of aesthetic products.


Former tree house site

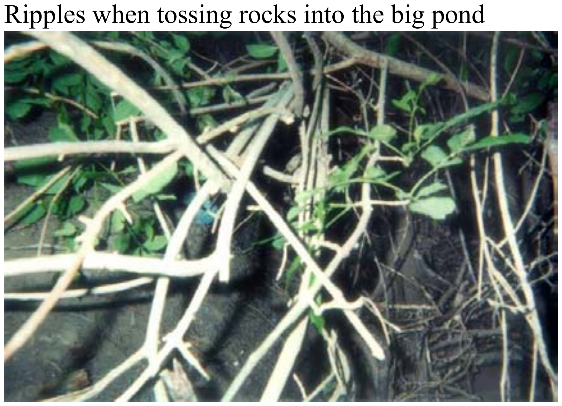

Debris pile that may hide raccoon den


Former rope swing site


Downed tree


Ripples when tossing rocks into the big pond


Bamboo shrub for walking sticks


Hole to check for animal


Shadows against the dirt bank

Figure 6.3 Some of Jerry's photos in Creekside Park convey how messy creek environment can become meaningful and beautiful to a spontaneous user

6.3.2 Restoration Aesthetics

Care, familiarity and visibility are principles championed by designers who advocate to root ecology in culture. Measuring with these principles we easily recognize the aesthetic flaw in current urban stream restoration.

The power of images is well recognized in stream restoration practices. The juxtaposition of what a stream used to be a hundred and fifty years ago and a current scene—a pale, bleak and sterile channel emphatically presents the problems. But this strategy at the same time always reinforces the idea that only the first scene is valid, attainable or not. Often the strategy of dense scrub bio-engineering bank is backed up by the “cover-it-all-up” attitude. Gabions and rock revetments are eyesores to be concealed quick. The comparative scenes of sites under construction and the “green banks” 2 years later become the highest pride of restorationists. To envision any true rooting of ecological restoration in culture, cover-up attitude is the first to be ousted. What restorationists need is to confront and imagine: confront that we just have so many almost intractably messed-up waterways in our immediate environments; and imagine that not between, but aside from the images of the two extremes, there can be something else.

In restoration practice, design guidelines are usually made for practitioners who do not possess a real understanding of the mechanisms of geomorphology or structural behaviors. The outcomes are usually crude, witnessed by the rampant use of riprap in constructing in-stream works. They frequently fail to function properly—structural failure at high flow or failing to create riffles and pools as intended. Rocks thrown in randomly do not perform efficiently, calling for use of over-sized rocks or grouting. But more importantly to our purpose here, such construction conveys the lack of care to anybody who approaches to the stream. There is a reason why objects like oversized boulders, quarry-cut rocks or constructed "rootwads" are not favorably perceived in urban streams (Salisbury 1997)—it creates conflicting information. They have a presence of "natural" materials, yet they are so incompatible with the scale and form of the surrounding stream environment. To a layperson, they look like being simply thrown out or beaten in, evoking the scene created by a gruesome flood disaster. Chapter 5 has emphasized that no matter how crudely made, in-stream structures happen to have inherent values to spontaneous users. Yet they probably would not be aesthetically appreciated or even *consciously* used until they are done in a higher level of craftsmanship.

The developments of in-stream restoration techniques in Germany, Switzerland and Japan commonly combine the concept of habitat enhancement with traditional building technology in stone mason and woodwork. To Shubun Fukudome, a Japanese river engineer and stonemason master, every rock has a life and duty in the structure. His methodology regards the whole batch of rocks as a structure. Size and shape of rocks are carefully selected, positions fine-tuned with hand tools so the entire work can exert ultimate structural strength while creating desired habitat features (Figure 6.4). The structures function exactly as anticipated both ecologically and hydraulically. Once the crew is familiar with this methodology, it is also economic, for it often does not require rocks bigger those that can be found on-site. The products are often considered pretty—they communicate techniques and economy with no guilt or cover-up. More importantly, only at this level of precision can we truly intend to design for habitats of spontaneous users and wildlife.

Figure 6.4 A grade control work constructed with Japanese traditional mason techniques

Restoration as an explicit human effort to create nature has ample intrinsic potential to be beautiful. The encounter of ecological and cultural forces is such a fun event all by itself that it is almost irresistible to people; otherwise a researcher as myself would never casually find so many "fortuitously" born and well-used niches in urban streams. It only takes some intention to not suppress these encounters and some techniques to make things function properly, and beyond which sky is the limit for designer's creativity—for evoking surprises, familiarity, mysteries, imaginations, "Aha," "Wow," …, for inviting spontaneous uses.

6.3.3 Aesthetics and Knowledge

The role of knowledge in aesthetic experience has become a controversial topic when considering ecological aesthetics. The controversy is consisted of two parts. The first is between "extrinsic" and "intrinsic" experiences and the second between knowledge and culture orientation. Eaton (1997) defined two kinds of aesthetic experience: the "intrinsic" experience that can be perceived by the senses, and the "extrinsic" experience which involves cognitive process. On one hand, she admitted that appreciation based on knowledge is the only way to avoid aesthetic omissions and deceptions. On the other hand, she argued the hard-to-defeat power of the "wow" experiences as an extreme form of intrinsic experience. Concerning this, Tuan (1977) has used "appreciation" to interpret extrinsic experience. He points out the initial flaw of the "wow" experiences— usually they can only be experienced once; they depend on the freshness of exploration. However, they almost always transform to other types of experience. Tuan argues that children are finely equipped with sensory experience, and their experiences of nature are often more intense than those of adults. However, in remembered pleasure, which broadens the context to culture and knowledge, the adult is far richer than the child.

The second focus of controversy is whether knowledge from direct contact alone can lead to a new paradigm of ecological aesthetics, particularly when many aspects of ecological value is "invisible". Spirn (1988) argued that with attentive eyes, we can perceive many natural processes encompassing and forming our environments. Nassauer (1997) and Eaton (1997) argued that ecological design needs familiar cultural cues to sustain attention. Their assertion is compatible with Rapoport's (1982) notion of landscape meanings, which can be derived from noticeable cues. Mozingo (1997) further promoted to use "iconic" design to approach to "wow" experience. On the other hand, Eaton (1997), Thayer (1989) and Sewall (1999) all agreed that knowledge redirects attention and help people see what used to be invisible.

Studies have eloquently demonstrated that knowledge can generate a difference in landscape preference. For example, Keyes' study (1984) suggested that even very newly acquired information can change reactions to the landscape. Comparing the preference of two groups on the same scenes before and after explanation signs installed by a trail, Keyes found that a view of tangled underbrush gained a significant increase in preference with the sign explaining the benefits of underbrush for wildlife.

Table 6.1 The typology of aesthetic experiences

Type	Extrinsic (Appreciation)		Intrinsic (New experience)
Source	Culture	Knowledge	Freshness
Content	Iconic beauty (symbolic forms, vernacular landscapes, etc.)	Past experience, “Unseen” beauty (history, function, natural processes, etc.)	Wow-experience (initial contact with wildlife, landscape, artwork, etc.).
Function	Sustain attention	Redirect attention	Attract attention

Table 6.1 summarizes these discussions and my own findings from the field. Aesthetic experience here is defined as *being moved by the force of creativity or life*. Life force is the common origin of aesthetic product, whether created by human or non-human agent. The aesthetic product is something that incites physical or emotional participation, whether it is a big crawdad or a moving melody.

To a young child, the whole world is an aesthetic experience—everything is fresh so everything is beautiful. A stream as a life entity has a way to remain fresh and not be gotten bored of easily. Continuous contact with the stream *does* accumulate knowledge and enable the user to perceive something new with every contact. But as one grows up, it really requires a fresh mind to not rely on past or fixed images and keep discovering; it also has limits. Education provides vital supplement of data. A few diagrams of landscape ecology or fluvial geomorphology immediately connect pieces of images recorded from direct contact so the riparian processes become more comprehensible. Therefore, in order for aesthetic experience to sublimate from initial freshness, it either has to “make sense” through the acquisition of knowledge, or becomes familiarized and entrenched into the mnemonic device of culture. Culture as a form of majority agreement is stable—a rather dangerous but unavoidable condition, so it had better make sense. Through accumulating knowledge from both direct contact and education, eventually we will reach the stable zone of a new culture as a group.

6.3.4 Loss

As introduced in **3.3.1**, the attributes of idyllists include solitude mode under a low density premise, anti-artifactualism, and sentiment of loss on nearby nature. Although planning and design to a degree will handle the need for solitude and the resentment of built structures and developments, addressing the sense of loss remains a hurdle.

The sentiment of loss is a double-edged sword, fueling both idyllic visions and environmental activism. In the first case, loss of beloved place inflicts painful emotion, which in turn captures life energy (Hubbard 1950). When a stream is lost, either by transformation or by one's moving away from it, other waterways encountered become reminders of the loss. The later waterways then are not viewed in present time—they are constantly regarded with an effort by the viewer to approximate the image of the lost stream. Hester's *A Womb With a View* (1979) demonstrated how the prototype landscapes dominate designers' spatial nostalgia. People with a past loss on nature tend not willing to confront elements that apparently violate the old images left in their minds—they become "unnatural" and detested. Thus the unwitting oversight (refusal to confront) of built elements and the desire to recover a low-density environment.

Lost places dictate ideal images and produce nostalgia that always favors the past than the present. The past may be of truly higher value ecologically or otherwise and the losses be real, but what is detrimental of the sentiment of loss is its erosion of the capacity to interact with the present time environment afresh. In this way sentiment of loss becomes the archrival of true spontaneous uses.

On the other hand, it is when facing a loss or threatened loss that one braces up to "do something about it." Evidences indicate that impending loss of open space is a strong factor to occasion local preservation efforts (Press 2002). It is my conjecture that the past loss of nature as well as sense of loss of the larger animated environment propelled many environmental professionals to do what they are doing now. Those of us now doing something about it will remain concerned about the situation, but will not feel the same level of loss as those who have not taken actions. With actions, the encysted energy is channeled out to remedy the past loss. In a survey on environmental stewardship, the satisfaction of knowing that oneself is doing something to "protect natural places from disappearing" was cited as the greatest reward by the volunteers (Grese et al. 2000).

Planners and designers should recognize the sentiment of loss as energy to be released and directed to positive efforts. A process of purposely stirring up the prevailing nostalgia in a community and suggesting to do something at the present-time environment would be a legitimate form of "environmental loss therapy". In a participatory context, such process would include the following steps:

1) *Stir up nostalgia*: This may be a creek memory workshop where residents exchange past associations with the creek, an exhibit of historic images of the creek, a survey that solicits memorable experiences at the stream, etc. In new communities like Brentwood, past images on a common creek are limited, but residents can be encouraged to bring images from elsewhere. The purpose of such activities is not to seek for a

powerful or consistent image among community members, but simply to "start something" by arousing nostalgia.

2) *Orient to present-time*: Nostalgia should only be used to bring about community consolidation and affinity toward the stream at the beginning of the process. It would be risky for planners and designers to use past images in composing restoration goals. In nostalgia, an image from 150 years ago is not more real than one from 35 years ago. To combat the unreal images toward urban nature, orienting people to present-time is vital. A creek re-discovery tour led by children can provide opportunities for adult residents to sense the creek afresh. Adults particularly should be encouraged to participate in spontaneous play with children in order to discover values of the current stream. They may find that albeit limited, the stream in its present condition is supporting local flora, fauna and certain uses. If nothing else, this step will build a consensus among the community that something should be done about the status quo.

3) *Supply data:* Along with step two, planners and designers should supply key data on the watershed processes that tend to be invisible. For instance, the image of a watershed has been displayed on textbooks and other educational materials as a simple vein-like pattern of surface channels in which water follows the terrain and flows one direction. But as shown in Figure 5.1, in reality the urban watershed contains at least three networks: stormwater, drinking water and sewage system; and is usually further complicated by irrigation systems and other water uses. Reality presented in graphic or text forms, while powerful in stripping away romantic ideals, may dilute the value of urban stream as "nature." Thus it should not be done without establishing new values at the same time. In addition to re-experiencing the stream in present-time, idyllists need to

know how the urban stream intertwines with infrastructure and therefore with their everyday life. Most importantly they need to know that all proper restoration tasks are assuming a viewpoint that human has been and is a causative agent in shaping nature (Baldwin et al. 1994). Planners and designers can facilitate this shift of conception by making all drainages and pipes traceable, revealing the control mechanisms of flow and sediment, and demonstrating the beneficial effect of human management/creation of ecosystems.

4) *Engage in actions*: When citizens recognize that the stream does need help and they can be of help, they are then ready to take actions. Community engagement should be on a gradient, starting with visible but simple activities such as trash clean-ups and developing to more technical and long-term efforts such as water quality monitoring or habitat enhancement. Practical goal setting should only begin at this stage, when citizens have reclaimed the value of the stream and acquired certain understanding to it. The vision for the future stream then would no longer be a stereotype, but based on the context and the real wants and needs of the community.

6.4 Summary: Participatory Process in Urban Stream Restoration

This chapter singled out three cultural barriers of spontaneous use that interfere with the conception and value of urban streams.

The first barrier is the fact that most adults forgo the more intuitive mode of stream interaction because it does not comply with the social status criteria. Spontaneity implies the very basic human urge in landscape: need of experience and want of control. It depends on a free mindset more than the physical condition. If one's viewpoint is shifted by culture or fixated in the past, the ability to experience spontaneously can be lost.

The second barrier is the liability concern derived from danger integral to spontaneous uses. The field of stream planning and design pervades timidity, a whole gamut of concerns on the impacts of streams to people as well as people to streams. The fear is understandable, since in the past we both received and inflicted excessive impacts at times. We have throttled and suffocated floods and other elements for the sake of safety before we have a chance to learn how to live with them. The environment has become safer now, the poverty of human experience nevertheless aggravates.

The third barrier, related with the above two, is the deep-rooted nature aesthetics that champions the distant and past instead of the nearby and present-time. Thayer (1994) argues that Americans are struggling between the lust of material technology and the guilt/sentiment toward nature. American affection for nature has remained idealized and distorted so that it lacks functional realism. This attitude is clearly the source of nuisance we are fighting against on the route to sustainability. It also hinders positive design in urban stream restoration.

Because of the mnemonic and law-like quality of culture, it tends to sustain. But culture is also dynamic and dialectic and evolves with all human events. There is a necessity for the professionals to satisfy the needs toward nature and maximize the experience with nature in an urban context, but meanwhile we need to take the lead in shaping a healthier culture of nature. Restoration through participatory process, then, is one of the most promising ways I can envision to get out of these cultural loops.

The essence of participatory process is mutual learning, in which restoration should be neither high science nor high art. In the U.S., citizen participation has been part of the tradition of environmental planning and design fields for over 30 years (Francis, et al. 1981, Hester 1984), but for civil engineers and environmental scientists it hardly exists—their training just has not included much of communication with end-users. Yet when they do communicate, not only would they realize the effect of their jobs to human value, conception and use, they also see how residents can coordinate with them. For example, responding to the popularity of EPA citizen monitoring programs, some biologists have actively developed bio-monitoring techniques appropriate for volunteer and school groups (Resh et al. 1996). To operate effectively in the multi-disciplinary team of urban stream restoration, environmental planners and designers need to play the role to bridge the participation gap and involve engineers and scientists in the process.

In summary, the following grounds call for participatory process in urban stream restoration. First, through participation the professionals gain insights of existing spontaneous uses and prevents further loss of valued places. Second, by empowering the community and involving people in actions the professionals release past nostalgia. Third, it raises community control and responsibility to the stream at the same time and reduces liability burden from the professionals or government agencies. Fourth, the process in which the professionals directly interact with people provides chance for imbuement of ecology. Fifth, the process elicits present-time reality and generates new forms of nature that correspond to specific user needs and site conditions and help to combat the stereotyped nature imagery. Sixth, such “aesthetic products” which are designed in accordance with ecological percepts will be experienced in people's daily life and foster the enculturation of ecology.

Regarding urban nature restoration as a new form of environmental movement, Table 6.2 proposes a paradigm shift from defensive preservation to creative infill of urban nature through providing a different set of ethic, imagery and personal behavior components (corresponding to value, conception and use). In wilderness ethic, the value of wilderness as sacred space is an absolute starting point that shapes the imagery and defines a code of behavior (Graber 1976). For urban nature, its value as living partner is not absolute but based on appreciation toward life force as well as the power of human creation. A powerful imagery of urban nature does not exist and may not be necessary for the new environmental movement. Rather, both the value and conception toward urban nature would derive primarily from actual experiences, which begin with spontaneous uses but can certainly develop into stewardship and uses for livelihood. With participatory processes, planners and designers can cultivate a new relationship with urban nature that is mutually beneficial, where residents harvest honestly the fruit of their own sweat, pursuant to a genuine view.

Table 6.2 A paradigm shift of environmental movement

Component	**Wilderness preservation**		**Urban nature restoration**
Ethic (value)	Wilderness as Wholly Other	→	Urban nature as living partner
Imagery (conception)	Primitive images through propaganda	→	Diverse images through actual experiences
Personal behavior (use)	Minimizing human presence and power	→	Spontaneous use

Chapter 7 Conclusion

Urban stream transformation of the past century illustrated the process of nature drifting away from the city as well as daily experiences. Industrialization and urbanization empowered planners, designers and engineers to little by little eliminate, eradicate, and sanitize nature from the waterways. It was not until the end of the 20th century that cities saw a burgeoning zeal to revive urban streams. As a new form of the environmental movement and with all its hopes and visions, urban stream restoration nevertheless has a missing piece. The spontaneous use, a mode of stream interaction resulting from the innate tendency and least hampered by matter, energy, space and time, although is constantly valued in environmental autobiographies and empirically shared by citizens, has never been continually ignored in the planning and design of urban streams.

This dissertation set out to address the missing piece and establish how spontaneous use can serve as the central philosophy of urban stream restoration. My primary purposes were to delineate the idea and significance of the spontaneous uses in today's cities and to search for positive strategies to invite them to urban streams, both physically through planning and design and culturally through action and education. On the policy level and in actual practices, stream restoration has been treated as a matter of physical science, with its goals and techniques derived from ecology, hydrology and geomorphology. The basic stance of this work has been: in order to respond to its challenging context and compelling implication to our sustainable future, urban stream restoration needs both physical and social sciences.

The following concludes the primary findings of this dissertation:

- Using Marsh Creek at Brentwood, California as an index of current human-stream relationships in urban areas, I discovered that the great majority of adults interact with the stream in very limited way. When adults do engage in more spontaneous uses, they possess more positive creek experiences and have higher affinity to the creek; they also are more supportive of creek advocacy. Yet the effect of spontaneous use in forming conception and value is tampered by culture and limited in extent. Among the most passionate adult creek lovers is the overspreading idyllic viewpoint that tends to negate human existence and distort the reality of urban streams.
- Children in general use the streams much more spontaneously than adults. They demonstrated effectively that the spontaneous use motivates a healthier human-stream relationship through the positive feedback among use, conception and value. The Brentwood children's creek drawings clearly indicated higher understanding of the stream environment and deeper attachment to wildlife and plants of spontaneous users than non-users.
- Through interactions with children at Brentwood and Sonoma Valley in California and Kochi of Japan, the wealth of spontaneous uses in urban streams has been documented into a typology that describes the experiential essence and habitat requirements for quiet and secluded uses, adventures, wildlife contacts, loose part contacts, water contacts, moving along on the trail and social gathering. The fact that spontaneous uses correspond sensitively to physical and biological features of local streams attunes them to the outlook of a viable ecosystem.
- This work substantiated the societal functions of spontaneous uses to provide therapy, support child development, raise environmental awareness, and form place

attachment. By alienating spontaneous uses, we throttle human experiences, deprive the forming of environmental competence and eco-literacy, waste the healing power of urban nature, and as a result, lose constituency in stream restoration.

- Placing spontaneous uses at the center of stream restoration inevitably opens door to new planning and design solutions. Spontaneous users need a living stream, with living ecosystem and living community-stream relationships. At the larger watershed level, this concept not only reinforces but elevates the need of a robust ecological base surrounding and inside the cities. At the physical planning level, I presented principles on corridor width, density, proximity, ownership and scale to devise effective stream-community interfaces. I also proposed using the principle of human intervention and stream response to design in-stream structures, bio-engineering banks, floodplain, and drainage/irrigation systems for spontaneous uses.
- Promoting spontaneous use cannot evade the cultural barriers it confront: the nature-city dichotomy still captures people's imagination and prescribes their aesthetic choices; liability concern forges a planning and design culture hostile to most interaction between streams and users; growing up in a culture with harmful status-seeking impulses make the past spontaneous players forgetful.
- This work advocated fitting spontaneous uses into the cultural landscape with participatory urban stream restoration. Through participatory process, the professionals can raise the knowledge, responsibility and control of community toward its streams. They can establish aesthetics that fulfils spontaneous users' yearn for fresh, reciprocal perception and respond to the less spontaneous' need of cultural cues. They can also help the community to release past nostalgia and engage them in

actions. Starting with spontaneous uses, participatory planners and designers can facilitate a healthier culture of nature while physically infilling nature to cities.

Development of this work can take at least three directions.

The first is to test and substantiate the typology and habitat requirements of the spontaneous use proposed here at streams with a wide range of physical and cultural circumstances. In addition to more empirical research within the academy, site survey on spontaneous uses (which should be a routine step in urban stream projects) would gradually accumulate knowledge on this topic so it become a common sense shared by planning and design practitioners.

The second is to dig into the practicality of various strategies for inviting spontaneous uses to urban streams. This research has barely tapped the possibility to do so on policy, planning, design and management levels. A host of studies can be dedicated to creating a policy environment supportive of spontaneous uses, inventing planning tools to effectively devise community-stream interfaces, refining design principles, vocabulary and estimation on stream response to human intervention, and incorporating spontaneous uses into management schemes.

The third direction is to expand this simple but powerful concept of spontaneous use from waterways to other elements of urban nature, including both urban infrastructure (lands for transportation, power systems, etc.) that is traditionally delegated to engineers and open space system (parks, woodlots, wetlands, etc.) that is customarily assigned to landscape architects and resource planners. After all, the dwindling of experiences of nearby nature is a holistic phenomenon. Only when nature and the actions of caring for it permeate to every part of the city can we achieve true sustainability.

To some the two-folded goal of this research may seem to involve a logic conundrum. We have seen that empirically, spontaneous uses often occupy the places least planned for them. What then is the point to plan and design for them so deliberately? Would it not violate the very spirit of spontaneity? My simple defense is: true, they have so far been found to exist by chance or happenstance, but they do not occur haphazardly. It is for the users to liberally select and enjoy their habitats. Planners and designers as the provider of healthy environment cannot liberally ignore their right.

The need of positive planning and design for spontaneous use can be clarified, again, with the idea of urban ecology. Urban ecologists look at spontaneous plants and animals in the city with indiscriminative and attentive eyes. Instead of saying "they are spontaneous, so just let it be!" they actively preserve, plan and design for them. Undoubtedly finding life at an unlikely place is exciting—it belongs to the category of intrinsic beauty. Yet urban ecologists have a higher goal. What European countries such as Germany and Switzerland are doing is precisely to advance the landscape of chance into a thoughtful web of care, in which the spontaneous urban nature will not be trounced by careless development or deserted by sterile cultural aesthetics. In addition, urban ecologists argued, "Spontaneous urban vegetation… as a type of nature adapted to the specific urban conditions and capable to exist under them—symbolizes the city" (Starfinger and Sukopp 1994, p. 103). The parallel here between spontaneous use and urban nature per se should be more than apparent.

Spontaneity will not disappear in cities when embraced by planning and design professionals. Within the permissive system of care they will thrive—keep developing, keep intriguing planners and designers' attention. Elucidating their needs, planners and designers also continue to invent new ways to interact with nature. This will be how we cultivate vernacular power and genius-loci in the era of urban nature restoration.

It is not rare that we have to make a significant effort to reclaim something almost too basic and familiar to us after its loss through an over-simplified rationalism. As a tool in justifying past flood control projects or today's restoration projects, cost-benefit analysis in fact is nothing more than a reflection of human value in vogue—although we tend to endeavor in making it look objective, persuasive and complicated. History has witnessed that when people do not feel right about something, formula for calculation change. Were it not true, how could we possibly have embarked upon the restoration of putting the curves back to Kissimmee River, with the cost at least 100 times the cost of the initial straightening? Because in projecting future benefits, we lay down the best dream we have, the ideal scene we envision, and we as creative beings always have ways to use numbers to justify for it.

The large societal value of sidewalks and boulevards only became a central concern for urban planning and design after the insights of Jane Jacobs, Jan Ghel, Allen Jacobs and the efforts of their followers pushing for decades. It may also take a while before the spontaneous use becomes the central theme in the theory and practices of urban stream restoration. But let's recognize the immense power it possesses—it is close to home, it is about our innate desire; it is nothing remote, but hidden here is our chance to reverse the spate of losing battles on nearby nature, and even win on remote lands.

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Appendix A Notes on Field Study Methods

From the beginning of the research design, it was clear that for the scope and purpose of this study, an array of methods would be necessary to acquire both the quantitative and descriptive data, since I need to grasp the trends of adult and child population and meanwhile retain personal idiosyncrasies for the width and depth of the work. The way each method only presents a partial picture for a researcher's inquiry can be likened by the old Chinese parable of "blind men feeling an elephant," in which the person touching the trunk conceived it as a pipe and the one touching a leg thout it a pillar. Fortunately, environmental-behavior research in the past decades have accumulated a wealth of information on the merits and limitations of each method so one can knowingly combine a number of them effectively and expect to acquire a picture that would respond to one's level of inquiry.

Both questionnaire survey and in-depth interview were employed to survey the adults in Brentwood, California. The format of in-depth interview was particularly inspired by the study of Hester and McNally (1984), where indoor interviews were combined with outdoor guided tours to investigate valued places.

Southworth (1970), Hart (1979) and Moore (1986a) all explored methods to conduct phenomenological study with children on their outdoor play environments. These researchers left a wealth of notes on research methods, which provided essential guidance for my research on children's spontaneous play in Brentwood and other study sites. From a review of these works, I considered Moore's methods in *Childhood's Domain* (1986a) particularly promising in understanding children's feelings and use contents within the time frame I had. Moore used drawing exercises combined with short personal interviews held in schools as a form of questionnaire survey, which not only allowed quantitative data tabulation but provided a way to identify "play experts" to pursue in-depth interviews. He then used field trips led by children as in-depth interviews to find out personal differences and place-specific details. This procedure was adapted by my fieldwork with kids except for two major differences. First, I heavily depended on informal observation. Second, I did not refrain myself from participating in children's activities. After all, the subject matter of this research has to do with spontaneity—freedom to engage in communications, freedom to experience, freedom to participate, and freedom to adapt the methods on the way so it makes the most sense.

A.1 Household Questionnaire Survey

A.1.1. Questionnaire design

Strictly speaking, the Brentwood questionnaire was not designed exclusively for this research. While my purposes were to gain understanding on the current status of human-creek relationships and to recruit interview subjects, my clients had slightly different interests and focus. For instance, the City Park and Recreation staff would be eager to know people's desire or how the existing trail system and parks were evaluated. The restorationists in NHI would have most concern realizing the ecological awareness of the public they are facing and identifying the actions people are willing to take to improve the creek. The greatest struggle was, therefore, to accommodate the necessary questions for these purposes into a format legible and compact enough so it would not repulse the residents as a tax return form.

The final questionnaire included 18 questions into four 11 x 17 pages as shown in Appendix B. With double-sided printing, binding and folding, it then could be mailed out in a 6" x 9" envelope. In general, the survey presented less complicated questions first and open-ended questions or map sections later. For some questions, such as the creek description (Question 5) and enjoyed activities (Question 11), the design encouraged free communication instead of confining respondents to a long list that takes time to go through and gobbles up space. "Bail-outs" (to allow respondents to skip the question when it does not apply) and "containers" (to accommodate free comments at the end of the list or the survey) were employed so the survey is friendlier to respondents.

Through the help of the City Park and Recreation staff, 20 copies of the survey along with feedback forms were distributed to various departments of the City for a pretest. People spent anywhere from 5 minutes to an hour answering the survey. I estimated that only a small portion would take the time to complete every part of the survey, which in itself gives a picture on their relationships with the creek. My intention in designing the survey was to allow people to be able to select easily the parts they want to answer.

A.1.2. Sampling

The sampling first targeted all residents who lived within 1/4 mile of the creek channels and the old downtown blocks. According to these criteria, the City's GIS database generated a sample of about 3,200 units. An effort to strike off the commercial and incomplete units brought the size down a little bit. Due to logistic constraints, the sample was set to be 2,000. With a predetermined quota for each zone, the final sample units were randomly selected by the computer (Table A.1).

Table A.1 Zones and the size of the sample

Zone	Geographic area	GIS generated sample	Final sample
A	South of Central Blvd.	1225	700
B	North of Central Blvd. and west of railroad	1306	700
C	East of the railroad	485	421
D	Downtown blocks	179	179

A.1.3 Mailing

Each household in the sample was assigned a serial code (1 to 2000) and a zoning code (A, B, C or D). Before mailing, these codes were hand-written on the back of outgoing prints. Although labor-intensive, the coding system was proven invaluable. The serial code not only made it possible to divide the input task among multiple analyzers without losing track, it served as an ID number for each response and made data clearing and manipulation significantly easier. The codes also facilitated the comparison of the results according to geographical areas and distance from the residence to the creek.

The survey went out at the end of February 2002 and postcard reminders followed a week later. A metered return envelope was enclosed with the survey. All of the outgoing materials bore the City of Brentwood icon, an otter figure and an identical catchphrase ("Marsh Creek Needs Your Input!!") to identify them as authorized mails.

A.1.4. Coding and Analysis

Eight undergraduate students of UC Berkeley and myself composed the task force for data input. The amount of open-ended answers made coding a demanding job. I made up category codes and item codes to enable content analysis in open-ended questions. To achieve consistency, I set up a coding file with instructions to be shared by the coders and held workshops to train the students. The responses were first input to Microsoft Excel® and then loaded in SPSS® for data cleaning and analyses. In addition, an ArcView® project was created to accommodate the input of the map section and geographically related responses. Individual marks or descriptions were manually transformed into digital records for later analyses and incorporation to the City's GIS database.

A.2 Adult Interviews

Two UC Berkeley graduate students and myself conducted the in-depth interviews with selected Brentwood adults. To assure useful information be gained from each interviews, I developed a basic procedure to be shared by the three of us. Before we went into the field, we gave dummy interview practices to each other; discussed problems found and further streamlined the procedure.

A.2.1 Basic procedure

Contact the subject

1) Read carefully the subject's survey response to get basic understandings.
2) Contact through phone (priority) or email.
3) Self-introduction
4) Tell the subject you got the contact information from her questionnaire response—the response demonstrated a high level of creek interaction and appreciation about which we would like to learn more.
5) Explain the purpose of the interview: it is for a dissertation study with an aim to inform planners and designers people's wants and needs for urban streams
6) Explain the procedure:
   - You will go to her house or other place she prefers.
   - The interview takes about one to two hours.

- You will ask questions on her use and feelings of the creek. You would also like her to give you a tour of her valued creek places.

7) <u>If there is questions or doubts,</u> explain the human subject protection:
   - The project is approved by Committee for the Protection of Human Subject of UCB.
   - She will sign a consent form before the interview starts.
8) Upon agreement, set a time and place.

Interview preparation

1) Equipment:
   - A digital camera that takes at least 72 shots with middle resolution or a few one-time use cameras (for the subject to take photos).
   - A portable tape recorder and a few 90 min tapes.
   - Plenty of new/recharged batteries.
   - A notebook and a pen (make sure they can fit into your pocket easily.)
   - A camera and films (if non-digital) for your use to take pictures during the tour.
2) Transport: load a bike on your car if the interview requires biking around.

The Interview

<u>Indoor Interview</u>

1) Meet; introduce yourself and casually talk with the subject for a few minutes.
2) Go through the Adult Interview Consent Form (**A.2.2**).
3) Ask if there is anything she needs to end off before you start.
4) Explain briefly the procedure.
5) Ask for permission to start tape recording.
6) Go through the Indoor Question List (**A.2.3**) (The questions need not to be asked in order but need to be covered.)
7) Look at the map page of the survey and ask her which places she would like to show you. Hand her the camera and tell her how to use it if necessary.

<u>On-site Interview</u>

1) When the subject takes picture, ask and note down why.

2) Once arriving at the spot, use the Spot Survey Form (**A.2.4**) as a guide for minimum observation. Have the subject talk freely on how she feels about this place or demonstrate the uses there. Note them down.

3) Take many pictures (including the subject if the consent is gained) during the whole process to: record the route, use, access, view, local geomorphology, etc.

4) Before you leave, make sure the subject does not have more to say. Thank the subject.

After the Interview

1) Take a blank shot in both cameras after finishing each interview.

2) Jot down the main things you learned before the next interview.

3) Type the notes up within 2 days after the interview.

4) Develop (download) the photos as soon as possible. Number them and refer to the numbers in the notes.

A.2.2 Adult Interview Consent Form

College *of* Environmental Design LANDSCAPE ARCHITECTURE AND ENVIRONMENTAL PLANNING
University of California, Berkeley
202 Wurster Hall # 2000
Berkeley, California 94720-2000

phone 510.642.4022
fax 510.643.6166

Walter Hood, Chair

My name is Chia-Ning Yang. I am a PhD Candidate in Env. Planning at the University of California at Berkeley. Thank you very much for responding the questionnaire survey we conducted along with the City of Brentwood in February. From your response, I realized that we could learn further from you on how residents interact with the creeks in Brentwood. Hence, I sincerely invite you to participate in this study.

If you agree to take part in this research, I will conduct an interview with you at the time and location of your choice. The interview will involve questions about your feeling, value and use of the Marsh Creek. I would also like to follow you for a creek tour with the route and content decided by you so as to understand how you perceive, value and use the creeks. The interview and creek tour should last about 1 to 2 hours. With your additional permission, I will audiotape the interview and/or take photographs of your using the creek.

There are no foreseeable risks nor direct benefit to you from participating in this research. However, we hope that the research will inform the City and planners/designers elsewhere on how people interact with creeks in their daily lives, as well as helping to form a creek advocacy group in Brentwood in the near future.

All of the information that I obtain from you during the research will be kept confidential. I will store the tapes, notes, and photographs in a locked cabinet in my home. I will not include your photos or quote from your audio records in any academic publications or presentations without your additional consent on this form. In any use of these information, your name will not be identified.

Your participation in this research is voluntary and you may refuse to answer any questions and may stop taking part in the study at any time.

If you have any questions about the resaerch, you may call me at 510.526.7786. If you agree to receive the interview, please sign below. Please keep the other copy of this form for future reference.

If you have any questions about your rights or treatment as a participant in this research project, please contact the University of California at Berkeley's Committee for Protection of Human Subjects at (510) 642-7461, or e-mail: subjects@uclink.berkeley.edu.

****

I have read this consent form and agree to take part in this research.

_________________________ _____________
Signature Date

I also agree to allow my photographic and audio records to be used in academic publications and presentations resulting from my participation in this research.

_________________________ _____________
Signature Date

A.2.3 Indoor Question List

1. Confirm the use patterns in Q11. Ask questions such as "what do you do when you ____(walk, jog, etc.)?" This is to build up the communication.
2. Read the subject's answer of Q12. Tell the subject you want to know more about that experience following a list of questions. Suggest the subject to close the eyes (she can choose not to) to assist recall.
   a. Can you recall the sight in that experience? (What is that?)
   b. Can you recall the smell in that experience? (What is that?)
   c. Can you recall the sound in that experience? (What is that?)
   d. Can you recall the way you moved around in that experience? (What is that?)
   e. Are there human built structures? How did they influence your experience? (Explain human built structures as pavement, bridge, fence, etc. if necessary)
   f. Are there vegetation in that experience? How did they influence your experience? (Explain vegetation as trees, grass, bush, etc. if necessary)
   g. Are there wildlife in that experience? How did they influence your experience? (Explain wildlife as birds, fish, bugs, etc. if necessary)
   h. What was the creek bed made out of? How did it influence your experience? (Explain bed materials as mud, gravels, etc. if necessary)
   i. What was the water like in that experience? How did it influence your experience? (Explain water features as temperature, depth, flow velocity, etc. if necessary)
   j. What was the creek channel like in that experience? How did it influence your experience? (Explain channel features as bank slope, channel width, curves, islands, etc. if necessary)
3. Do you have another good experience at Marsh Creek? (If so, have the subject describe it briefly, then go over the list in 2.)
4. How has Marsh Creek changed during the period you live here? How does this effect the way you feel about or use it?
5. Did you have a creek or a river you value before Marsh Creek? How was it like?
6. What's your ideal image for a creek close by your residence? What would you like to do if you have such a creek nearby?

A.2.4 Spot Survey Form

DATE:
TIME:
WEATHER:

INITIAL: SERIAL: SPOT:
LOCATION:

ACTIVITIES: __ in-channel __ flood plain __ path

ACCESS:

LOCAL GEOMORPHOLOGY:

BASE POINT:

/ AMENITY:

/ TERRITORY:

/ DIVERSITY

/ VIEW:

/ WATER ACCESS:

A.3 School Drawing Exercise

Through information provided by my personal contacts at each site, I got hold of the first teachers who were interested in this research. These teachers then referred me to other teachers in charge of the grades I needed to contact. Since each class had different schedules and time constraint, the length of the exercises varied between 50 to 100 minutes. For each practice in Brentwood, one or two UC Berkeley graduate students assisted the process of short interviews after the kids completed their drawings. The following basic procedure was used for exercises in all study sites.

A.3.1 Basic Procedure

1. Preparation

1) Meet the teacher 1-2 weeks before the exercise.
2) Arrange the working area with the teacher: make sure the classroom has enough space for the kids to work independently.
3) Since the participation is voluntary and conditioned upon parental agreement, ask the teacher to arrange some other activities for the non-participants.
4) Arrange drawing materials: the researcher prepares fine-tip black markers and 12”x18” drawing paper. Some classes have shared wax crayons, color pencils, watercolors, etc.; others have each kid store their own drawing materials in the classrooms.
5) Show the teacher the Drawing Exercise Consent Form (**A.3.2**) that will need to be signed by both the parent and the kid and returned to the teacher by the exercise for the kid to participate.
6) Ask for a note signed by the teacher that goes along with the consent form to the parents. (This was proven useful because only less than 5% of the parents refused to allow their kids participate in the exercise.)

2. Briefing

After introducing myself to the kids, I would use 5 minutes to do a little practice called “mind’s eye” to give the kids some idea what I was looking for in the drawings. For example, a typical session in Brentwood started with a talk like this:

"Today I want to learn from all of you about a creek in Brentwood. Who knows the name of the creek? (The kids would throw some names, including Marsh Creek and the tributaries.) *Who has been to any of them?* (Keep an eye on who has and who has not)*... Very good. Now, we are going to play a game called 'mind's eye.' Let's see if we can see without using our eyes. Now, I want you to all close your eyes.* (Make sure they did.) *For now you need to keep your eyes closed. Recall your home. Have you got a picture there? Are you there? Are you inside or outside of the house? Can you see the door? What color is the door? Where is the door? Point that door for me.* (After each question, I paused to see the indicators given by the kids. Most may do this easily but some may not. For the kids who can not picture in their minds, the drawing exercise would not be a good way to know their relationships with the creek. In stead, I would talk to them more in the personal interviews to find out.)

"In a few minutes, I want you to do the same with the creeks in Brentwood. Before we do that, I want to let you know that this exercise has nothing to do with your normal classroom work, and no one will grade it. It's only for me to learn from you about the creeks. Also, because it is not school work, it is your own choice whether or not you will help me."

I made sure the kids were spread out as much as possible in the room or the outdoor courtyard and passed around the materials. Then the following direction was given:

"Now let's play mind's eye again. Close your eyes. Do you have a place you like at the creek? Do you remember a time when you had a good time there? What do you see there? What are you doing there? Who is there with you? What is interesting there? Do you smell anything? Do you hear anything? How do you feel there? Now, I want you to draw these down for me. Draw down all your favorite places at the creek and what you do there. You can also write notes to explain your drawing for me. If you have not been to the creek before, you can draw a 'dream creek' in your mind. Just show me how a perfect creek would be for you. Once you finish it, raise your hand and let us know. You can ask for more paper and draw as much as you want, but please just work on yourself."

Sometimes there were further questions, and for most of it I would reassure them that whatever they put down would be just fine.

3. The Exercise

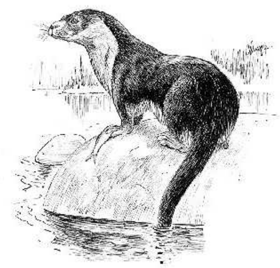
After the kids started, if we noticed anyone who was not progressing, we would go by and made sure the directions were understood. During the exercise, we checked with the kids to make sure we understood what were put down. We encouraged them to make annotations on their drawings or noted down on the drawing ourselves with light pencil. After we confirmed that there were no more places at the creek he or she wanted to put down, the kid is then asked the following questions at a corner of the classroom:

- How often do you use the creek, especially during summers?
- Whom do you go to the creek with?
- What do you do at the creek? (Get specifics as much as possible.)
- What do your parents think about you playing at the creek? Are there rules?

If a student completed when all of us were busy interviewing other kids, the teacher let the student work on a second drawing until one of us was available. At the end of each exercise, we collected the drawings and materials and thanked all the kids and the teacher.

A.3.2 Drawing Exercise Consent Form

College of
Environmental
Design LANDSCAPE ARCHITECTURE
AND ENVIRONMENTAL PLANNING
University of California, Berkeley
202 Wurster Hall # 2000
Berkeley, California 94720-2000
phone 510.642.4022
fax 510.643.6166



My name is Chia-Ning Yang. I am a doctoral candidate in Environmental Planning at the University of California at Berkeley. I'm currently doing a research to understand Brentwood children's uses, values and feelings toward Marsh Creek. Since children are the most easily overlooked user group in public space planning and design, this research hopes to document their wants and needs about the Creek so that valued places will not be wiped out unwittingly and their uses can be taken into consideration in the future design and planning of the Creek. I sincerely invite your child to take part in my research.

With your agreement, I will have your child complete a drawing exercise in school to show her/his familiar places at the creeks. The exercise should last for about an hour. I will collect the drawings after the exercise. Participation of this exercise is voluntary and has nothing to do with schoolwork. If the drawing indicates that I can learn more from your child, I would like to call you to discuss the possibility to interview your child.

There are no foreseeable risks nor direct benefit to your child from participating in this research. However, we hope that your child will enjoy it and the result of this research will enhance the educational quality of Marsh Creek.

All information that I obtain from your child during the research will be kept confidential. I will store the drawings in a locked cabinet. I will not use the name of you r child or his/her drawing work in any report without your additional consent on this form.

If you agree to let your child participate in this study, please sign below and return the

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University of California, Berkeley
202 Wurster Hall # 2000
Berkeley, California 94720-2000
phone 510.642.4022
fax 510.643.6166

form to _________________ by _________. Also have your child sign below if s/he agrees to participate. If you have any questions about the research, you may call me at (510) 526-7786.

If you have any questions about your child's rights or treatment as a participant in this research project, please contact the University of California at Berkeley's Committee for Protection of Human Subjects at (510) 642-7461.

****

Parent or guardian's consent to allow child to participate:

I have read this consent form and agree to let my child take part in this research.

_____________________ _________
Parent/Guardian's Signature Date

I also agree that the photos of my child's drawing to be included in publications of this research.

_____________________ _________
Parent/Guardian's Signature Date

Child's consent to participate:

I realize the nature and purpose of this research and agree to take part in it.

___________________ __________
Child's Signature Date

I also agree that the photo of my drawing to be used in publications of this research.

____________________ __________
Child's Signature Date

A.4 Creek Tours with Children

If the child's drawing and interview obviously presented much information, I would ask if the child be interested in going out and showing me these places. A creek tour then was orally confirmed. After an initial review of the materials collected from the exercise, I would list the prospects within a class and acquire their phone numbers from the teacher. (Some teachers offered to call the parents for me, which was of tremendous help.) Two UC Berkeley graduate students and myself conducted the in-depth interviews with selected. Interviews at the other study sites were conducted by me alone. Below is the basic procedure for a creek tour in all my study sites.

A.4.1 Basic Procedure

Contact

1) Read carefully the child's drawing.
2) Contact the parents through phone. If the kid answers the phone, talk to her first as 9).
3) Self-introduction
4) Tell the parent that the child was selected because her drawing demonstrated knowledge and diverse use of the creek that you feel you can learn more about. You would like the child to lead a tour and inform you her uses of the creek.
5) Explain the purpose of the interview
6) Explain the procedure:

- You will arrive at their house or another place they prefer.
- You will first discuss the drawing with the kid and then have the kid lead you to the creek and demonstrate for you what she does there. (Ask whether the parent allows the kid go to the creek by herself. If not, you can invite the parent to company.)
- The interview takes about one hour, but it will be up to the child whether she would like to continue. You would also observe the time regulation if there is any.
- You will prepare a cell phone so the parent can reach you.

7) If there is questions or doubts, explain human subject protection.

8) Once the parent agrees, set up a time and place.

9) Require talking to the child

- Remind the child who you are and tell her your purpose
- Confirm the time and place with the kid.
- Ask her how she usually gets to the creek (thus prepare yourself biking or not.)

Preparation

As interviews with adults except for the addition of a cell phone.

Interview

1) Meet; introduce yourself and casually talk with kid and parent for a few minutes. (Note: It is very important to give most of your attention to the child so she would not have the idea that you are the parent's friend.)
2) Go through the Creek Tour Consent Form (**A.4.3**) with the kid and the parent. Put your cell phone number on the form.
3) Discuss the drawing with the child. Clarify whatever points you did not understand.
4) Invite her to show you all her creek spots.
5) Hand the child the one-time-use camera with a waist bag and let her know she can take pictures for things she thinks important or interesting.

The basic procedure during and after the tour is similar to the on-site interviews with adults. However, the interviewer is expected to pay special attention on the following:

1) Notes and photos should be taken without interrupting the flow of the tour.
2) If accompanied by an adult in the creek tour, be sure to give most of your attention and interest to the child. Communicate to the parent beforehand that you would like the child to take the lead so you can learn more from her.
3) Avoid inciting or limiting the child on her actions.
4) Be a child yourself and participate in her play.
5) Observe the time limit and follow the child home at the end of the tour.

A.4.2 On-site Observation and Participation

The drawing exercise inevitably gives less credit to the kids who are not oriented to graphical representation. Also, the post-exercise interviews would tend to direct me to kids with higher verbal communication skills. On-site observation remedied these shortcomings. By simply frequenting the sites, every once a while down at the stream I would be recognized by some kids who participated in the drawing exercise but were not selected for the tour. I would then ask them to show me what they have been doing there and get a tour. I would also encounter kids whom I had not met at the schools. By showing interest to know their play, I was usually welcomed to participate them. Tours gained this way were often no less, if not more rewarding than the planned creek tours for the obvious reason that they were more "spontaneous."

Whether it was pre-arranged creek tours or on-site encounters, when kids were down at the creek, it was seldom possible that one be an invisible observer. In addition, I usually would need to know more than what was directly observable. During the fieldwork I learned to first put down the camera and participate. Particularly when encountering the diving groups in Kochi, it was obvious that before I dived myself from the Spook Rock or railroad track, no one would talk to me. When inquired, I would be very frank about my purpose and explain my research in an easily understandable way.

Most of the time I would abstain from suggesting uses to children and only follow their actions. However, when I stayed with them long enough, sharing what I knew or inventing games together with them became the natural flow. They were always happy to learn something new. Hart (1979) stated his philosophy of doing research with children:

"I want to make the process enjoyable for them." The participatory research process was to me a way to adopt his philosophy.

A.4.3 Creek Tour Consent Form

College *of*
Environmental
Design LANDSCAPE ARCHITECTURE
AND ENVIRONMENTAL PLANNING
University of California, Berkeley
202 Wurster Hall # 2000
Berkeley, California 94720-2000

phone 510.642.4022
fax 510.643.6166

I am Chia-Ning Yang, a doctoral candidate in Environmental Planning at the University of California at Berkeley. In the drawing exercise for my research on children's feeling, value, and use of the creeks in Brentwood, your child demonstrated superior knowledge and variety of use that I feel I can learn further from. As a follow-up of the drawing exercise, I would like to invite your child to participate in an outdoor interview—the creek tour.

If you agree to let your child be interviewed, I will set up a time to visit your house and invite your child out for the creek tour. I will discuss with your child the places s/he wants to go. The tour will be led by your child to the places in the creeks where s/he uses in a daily basis. I will ask questions about the feelings toward the places, the elements of value, asking for demonstrations on how s/he use the place, and have the child take pictures of scenes s/he chooses. The tour should last for about an hour. I will conduct the interview in good weather only and return to your house with your child before dark or the time specified by you. With your permission, I may take photographs of your child or audiotape during the interview.

There are probably no risks on participating the interview other than what will be encountered in your child's daily life playing in the creek. I will be prepared with a cell phone in case we need help during the time your child stay with me. There is no direct benefit to your child, either. However, we hope that the research will provide insights for enhancing the educational quality of the creeks in Brentwood.

All information that I obtain from your child during the research will be kept confidential. I will store the notes, tapes and pictures in a locked cabinet. I will not use the photographic records or quote from the audio records of your child in any academic publications and presentations without your additional consent on this form. In any use of these records, your child's name will not be identified.

If you agree to let your child participate in this study, please sign below and return the form to me at 1310 Milvia St., Berkeley CA 94709. Also have your child sign below if s/he agrees to participate. If you have any questions about the research, you may call me at (510) 526-7786.

If you have any questions about your child's rights or treatment as a participant in this research project, please contact the University of California at Berkeley's Committee for Protection of Human Subjects at (510) 642-7461.

****

College *of*
Environmental
Design LANDSCAPE ARCHITECTURE
AND ENVIRONMENTAL PLANNING
University of California, Berkeley
202 Wurster Hall # 2000
Berkeley, California 94720-2000

phone 510.642.4022
fax 510.643.6166

Parent or guardian's consent to allow child to participate:
I have read this consent form and agree to let my child take part in this research.

______________________________ __________________
Parent/Guardian's Signature Date

I also agree to allow my child's photographic and audio records to be used in academic publications and presentations resulting from his/her participation in this research.

______________________________ __________________
Parent/Guardian's Signature Date

Child's consent to participate:
I realize the nature and purpose of this research and agree to take part in it.

______________________________ __________________
Child's Signature Date

I also agree the researchers to use my photographic and audio records in academic publications and presentations resulting from my participation in this research.

______________________________ __________________
Child's Signature Date

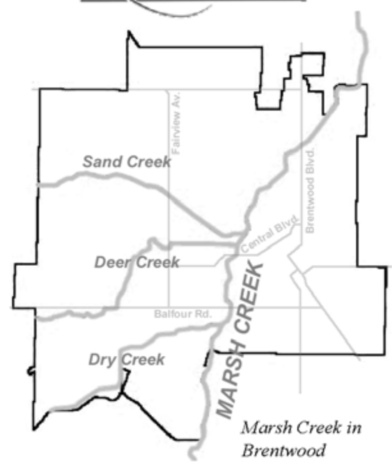
Appendix B   Marsh Creek Household Questionnaire

The original size of all pages is 8.5” x 11”. The survey was double side printed on 2 sheets of 11” x 17” beige color paper. The sheets were staple-bound and folded at the center into an 8-page booklet.

Marsh Creek needs your input!!

The City of Brentwood is collaborating with the Delta Science Center and the University of California to identify opportunities to enhance the ecological value, flood safety, public access and educational function of Marsh Creek. We need YOUR input to help the City do a better job transforming Marsh Creek into a source of community pride and a resource that you can benefit from. In this questionnaire, by Marsh Creek we mean the Marsh Creek mainstream and its tributaries (Sand Creek, Deer Creek and Dry Creek) within the city. Could you please fill out this survey and send it back using the enclosed pre-stamped envelope? Your time on this survey means a lot to the future of the Creek, Brentwood, and the quality of life for you and your family.

CITY OF BRENTWOOD



Marsh Creek in Brentwood

John Stevenson	Steve Barbata	Chia-Ning Yang
City Manager, Brentwood	Delta Science Center	University of California, Berkeley

1) How long have you lived in Brentwood?

☐ less than 1 year ☐ 1- 3 years ☐ 4-6 years ☐ 7-10 years ☐ over 10 years

2) How important were the following factors to you when you decided to live in Brentwood? For each factor, indicate in the five point scale.

	not important	……………….			very important
Convenience (commute to work, school, shopping, etc.)	1	2	3	4	5
Children's education (availability of good schools)	1	2	3	4	5
Cost (housing price, living expenses, etc.)	1	2	3	4	5
Natural environment (scenery, access to nature, etc.)	1	2	3	4	5
Social/cultural environment (safety, connection with family, friends, cultural diversity, etc.)	1	2	3	4	5
Others ______________________	1	2	3	4	5

3a) When you were considering where to live in Brentwood, was the Creek a factor in your decision?

☐ Yes ☐ No

3b) If yes, how did it influence your decision?

☐ a great plus ☐ a mild plus ☐ no influence ☐ a mild minus ☐ a serious minus

1

4) **Living in Brentwood, how much do you value the following features in or around the city? Indicate in the five point scale.**

	not valuable				very valuable		not valuable				very valuable
Farms	1	2	3	4	5	Marsh Creek	1	2	3	4	5
Mount Diablo	1	2	3	4	5	Orchards	1	2	3	4	5
City parks	1	2	3	4	5	The Delta	1	2	3	4	5
Regional parks	1	2	3	4	5	Golf courses	1	2	3	4	5
Downtown shopping area	1	2	3	4	5	Historical buildings	1	2	3	4	5

5) **How would you describe Marsh Creek to someone who has never been to Brentwood? Use up to 5 words:**

1. ______________ 2. ______________ 3. ______________ 4. ______________ 5. ______________

6) **How do you experience Marsh Creek in your daily life? (Choose all that apply)**

- ☐ I can see the creek from my house
- ☐ I can hear the creek from my house
- ☐ When I am in my yard
- ☐ When driving to work
- ☐ When driving to shop
- ☐ When walking around my neighborhood
- ☐ When I go to use the creek or creekside trails
- ☐ I don't experience the creek in my daily life
- ☐ Other: ______________________________

7) **What, if anything, makes Marsh Creek valuable to you? Indicate in the five point scale. ➔ Skip this question if you don't consider the creek as valuable at all.**

	not important				very important
It is close by and accessible	1	2	3	4	5
Simply knowing it is there	1	2	3	4	5
It is a viable piece of nature	1	2	3	4	5
There is a place in or by the creek that I value particularly	1	2	3	4	5
It is where I can enjoy quiet time alone	1	2	3	4	5
It is where I go for exercise or recreational activities	1	2	3	4	5
It provides an alternate commute route to school or work	1	2	3	4	5
It is where I refresh myself from the pressure of life	1	2	3	4	5
It is where I can meet other people	1	2	3	4	5
It is where I can be close to nature	1	2	3	4	5
It is where I spend time with my family/friends	1	2	3	4	5
I feel like it is "my creek"	1	2	3	4	5
It is pretty	1	2	3	4	5
Other: ____	1	2	3	4	5

8) Below and next page are 12 scenes of Marsh Creek. Scan through them and check in the boxes the scenes familiar to you. Then for all 12 scenes, indicate on the scale how you like it. Explain why you like or dislike it.

(a) ☐ ▲ Check if familiar

dislike……………like Why? ____________
1 2 3 4 5 ____________

(b) ☐ ▲ Check if familiar

dislike……………like Why? ____________
1 2 3 4 5 ____________

(c) ☐ ▲ Check if familiar

dislike……………like Why? ____________
1 2 3 4 5 ____________

(d) ☐ ▲ Check if familiar

dislike……………like Why? ____________
1 2 3 4 5 ____________

(e) ☐ ▲ Check if familiar

dislike……………like Why? ____________
1 2 3 4 5 ____________

(f) ☐ ▲ Check if familiar

dislike……………like Why? ____________
1 2 3 4 5 ____________

3

8) (Continue)

(g)

☐ ▲Check if familiar

dislike……..……like 1 2 3 4 5 Why? ____________

____

(h)

☐ ▲Check if familiar

dislike……...……like 1 2 3 4 5 Why? ____________

____

(i)

☐ ▲Check if familiar

dislike……...……like 1 2 3 4 5 Why? ____________

____

(j)

☐ ▲Check if familiar

dislike……...……like 1 2 3 4 5 Why? ____________

____

(k)

☐ ▲Check if familiar

dislike……...……like 1 2 3 4 5 Why? ____________

____

(l)

☐ ▲Check if familiar

dislike……...……like 1 2 3 4 5 Why? ____________

____

4

9) To your knowledge, does Marsh Creek have any of the following problems? Indicate on the five-point scale.

	not serious………… very serious		not serious………… very serious
Water pollution	1 2 3 4 5	Bank too steep	1 2 3 4 5
Flood hazard	1 2 3 4 5	Poor habitat value	1 2 3 4 5
Not enough water	1 2 3 4 5	Monotonous channel form	1 2 3 4 5
Too grassy	1 2 3 4 5	Not accessible	1 2 3 4 5
Mosquitos/pests	1 2 3 4 5	Dumping/garbage	1 2 3 4 5
Not enough shade	1 2 3 4 5	Presence of crime	1 2 3 4 5
Bank erosion	1 2 3 4 5	Others ________________	1 2 3 4 5

10a) Do you allow your kids to play in the creek channel?

☐ Yes, without restriction ☐ Yes, with restriction ☐ No, not at all ☐ Don't have any kids

10b) If no or with restriction, why? ____

11a) ➔ If you don't use Marsh Creek at all, go to question 14).

What activities do you <u>enjoy doing most</u> at the Marsh Creek? Write down up to 3 activities:

Activity ① ______________________ **②** ________________________ **③** ______________________

11b) How often do you engage in the 3 activities?

(Choose only 1 for each)

Activity ①	②	③	
☐	☐	☐	everyday
☐	☐	☐	2-3 times a week
☐	☐	☐	once a week
☐	☐	☐	a few times a month
☐	☐	☐	once a month
☐	☐	☐	a few times a year
☐	☐	☐	other: _______________

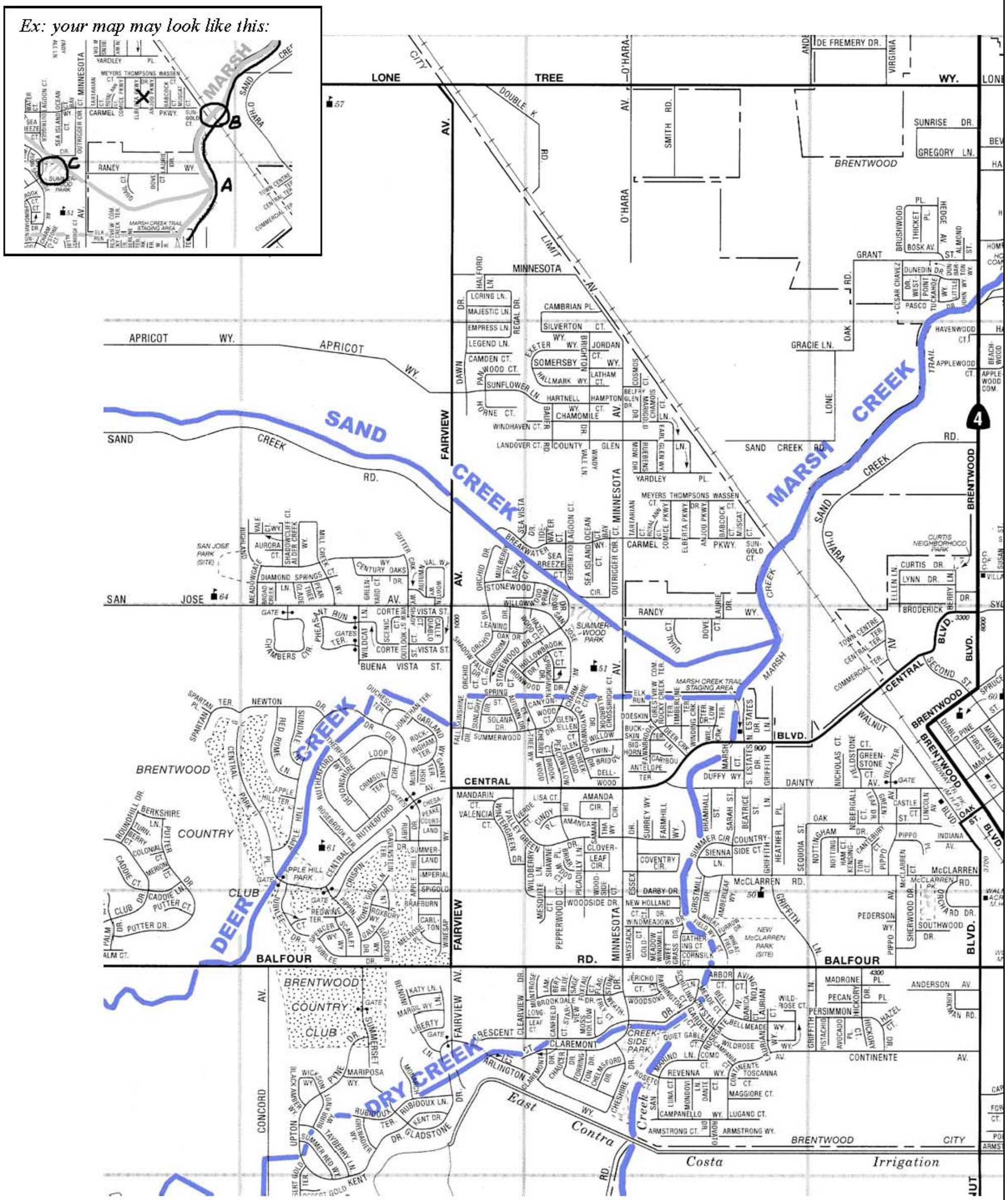
11c) With whom do you enjoy the 3 activities?

(Choose all that apply)

Activity ①	②	③	
☐	☐	☐	Alone
☐	☐	☐	Spouse
☐	☐	☐	Children
☐	☐	☐	Family group of > 5
☐	☐	☐	One or two friends
☐	☐	☐	Peer group of > 3
☐	☐	☐	Pet(s)
☐	☐	☐	other: ______________

12) Take a minute to think about one of your most wonderful experiences associated with Marsh Creek and describe it in the space below. Be sure to include the place, the activities, the participants, the environmental features, and your feelings.

13a) Look at the map. Please first locate your home with an "x", then mark the spots or the routes along the creek (highlighted) you experience or use most. Mark up to 3 spots or routes on the map. Then letter them (A, B, C).



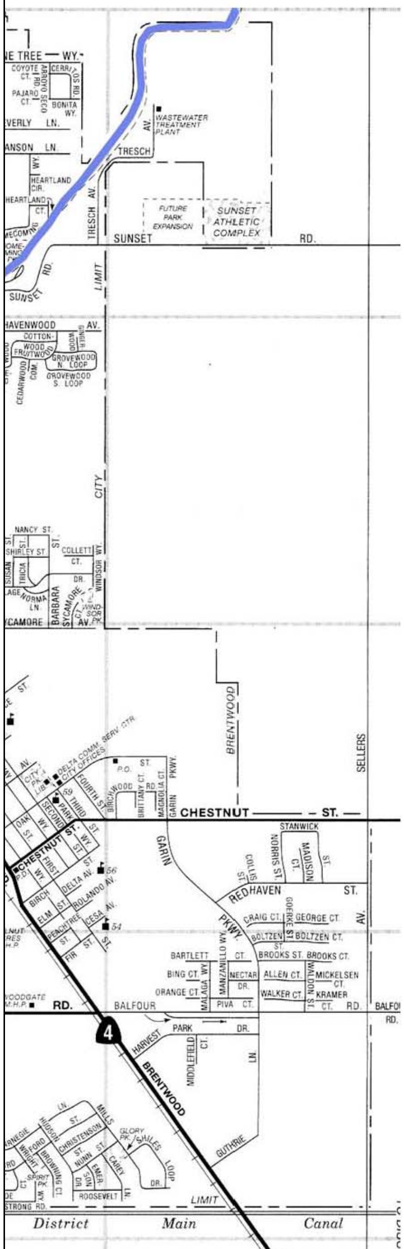
6

If you don't know for sure where they are on the map, describe their whereabouts as specifically as possible:

A:____

B:____

C:____



13b) For each of the routes or spots you marked on your map (A, B, C), indicate how you use them. Check all that apply and add any additional activities in your own words where it says "other".

A	B	C	
☐	☐	☐	a) Walking
☐	☐	☐	b) Jogging
☐	☐	☐	c) Biking
☐	☐	☐	d) Bird watching
☐	☐	☐	e) Insect catching
☐	☐	☐	f) Fishing
☐	☐	☐	g) Watching others
☐	☐	☐	h) Chatting with friends
☐	☐	☐	i) Having lunch/snack
☐	☐	☐	j) Wading in the creek
☐	☐	☐	k) Playing in the water

A	B	C	
☐	☐	☐	l) Thinking
☐	☐	☐	m) Reading
☐	☐	☐	n) Planting
☐	☐	☐	o) Building stuff
☐	☐	☐	p) Climbing trees
☐	☐	☐	q) Playing games
☐	☐	☐	r) Picnicking
☐	☐	☐	s) Other:________ ____________
☐	☐	☐	t) Other:________ ____________

14a) If changes were made to enhance Marsh Creek, what are the AREAS or QUALITIES of the creek that you think MUST be changed or improved?

14b) What AREAS or QUALITIES of the creek do you think MUST be preserved?

7

15) Please use a few sentences to write down your ideal image for the future Marsh Creek.

16) To assure that Marsh Creek is improved in ways that serve the community needs, it is essential that citizens participate in various kinds of actions. What actions would you be interested in taking to improve the conditions of Marsh Creek? (Check all that apply)

- ☐ Receiving information on the future planning/design actions
- ☐ Participating in creek clean up
- ☐ Planting vegetation
- ☐ Joining a volunteer stewardship program
- ☐ Participating in the planning/design activities
- ☐ Learning more about the Creek and the watershed
- ☐ Helping to reduce the quantity and pollution of urban runoff
- ☐ Helping to assess, enhance and monitor creek habitats
- ☐ Water quality monitoring
- ☐ Voting for local funding or an assessment to enhance the creek
- ☐ Other ____

17) Is there anything else you want to tell us about Marsh Creek?

18) Demography (Check one in each category)

Age	☐ 18-25	☐ 26-35	☐ 36-45	☐ 46-60	☐ >60
Sex	☐ female	☐ male			
Ethnicity	☐ White	☐ Black	☐ Asian	☐ Hispanic	☐ Other
Household Annual Income	☐ <50,000	☐ 50-70,000	☐ 71-100,000	☐ 100-150,000	☐ >150,000

Please give the following information if you would like to tell us more about Marsh Creek, know the results of the survey or get involved in the planning and design of Marsh Creek.

Name: Phone:

Address: Email:

Thank you very much for completing this survey!!! Please use the enclosed envelope and return it to Department of Park & Recreation by **M a r 6 t h , 2 0 0 2 .**

Please contact Park Planner Janet Hansen (925-516-5369) for questions concerning this survey.

Outgoing envelope (original size 9.5” x 6.5”)

Brentwood Parks and Recreation
Department, 740 Third Street,
Brentwood, CA 94513-1359

MARSH CREEK NEEDS YOUR INPUT!!

Return envelope (original size 9” x 6”)

Janet Hansen, Park Planner
City of Brentwood Parks and
Recreation Department
740 Third Street
Brentwood, CA 94513-1359

MARSH CREEK NEEDS YOUR INPUT!!

Postcard reminder (original size 6”x 4.25”)

Brentwood Parks and Recreation
Department, 740 Third Street,
Brentwood, CA 94513-1359

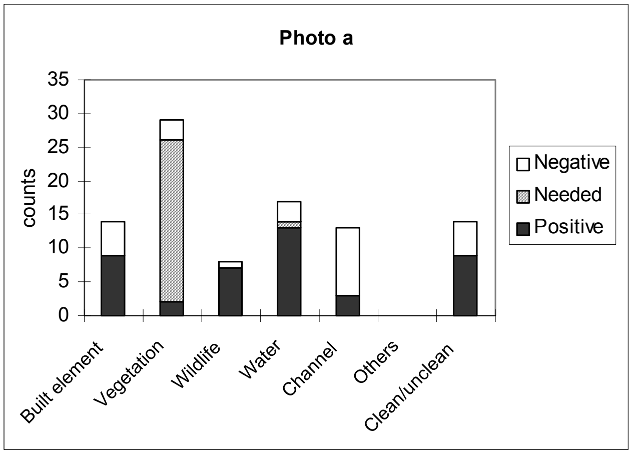
MARSH CREEK
NEEDS YOUR INPUT!!

Greetings!

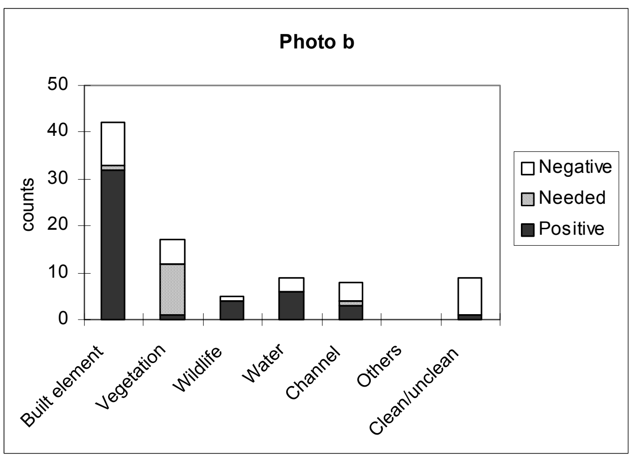
We would like to remind you about the survey of Marsh Creek which you received a week ago. If you have already responded and sent it back, we truly appreciate your cooperation! If you have not got a chance to do so, could you please use the pre-stamped envelope we provided and mail it back to us by **Feb. 28th**? Again your input is crucial to help us do a better job enhancing the Creek and the living quality in Brentwood.

Janet Hansen,
Park Planner, Brentwood

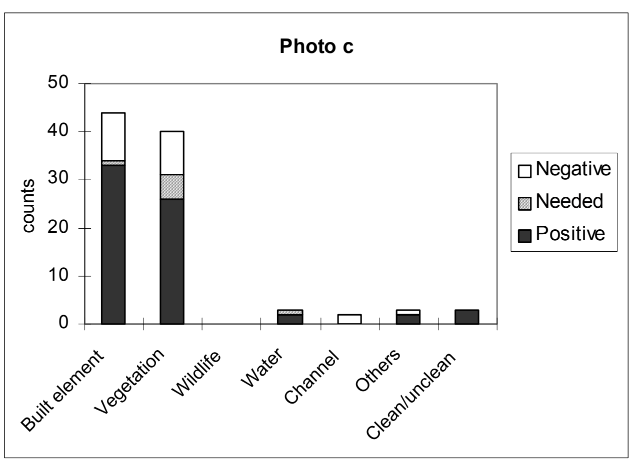
The following charts tabulate the comments given by the respondents on elements in each of the 12 scenes in the Marsh Creek Household Survey (Question 8).



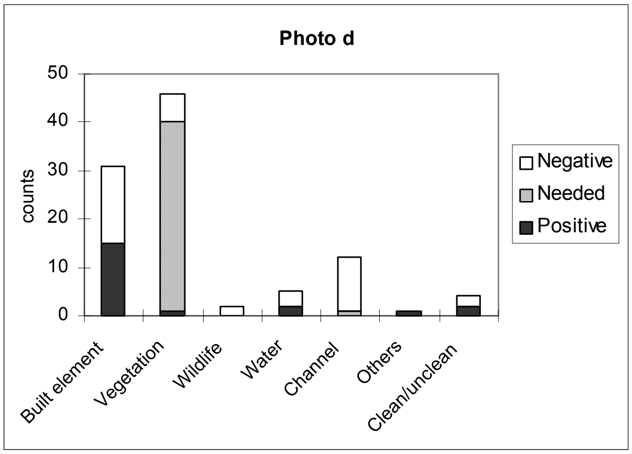
- It is in bad need of vegetation
- The wide water surface evokes positive impression on water quality and quantity.
- The rock weir reminds some people the sound of water.
- The channel is "too engineered" and it "looks like a ditch."
- Positive comments on wildlife are from personal experiences.
- Respondents' homes and the trail are responsible for positive remarks on built elements.



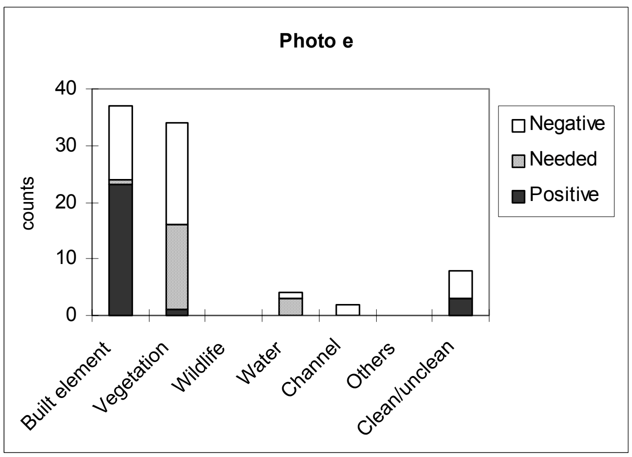
- The bridge receives highly positive remarks.
- Comments on homes nearby are divided: positive when "near my home" and negative when they are referred as "junky" or "unkempt."
- It needs more vegetation by water.
- It is considered as a trashed place from those with use experiences.



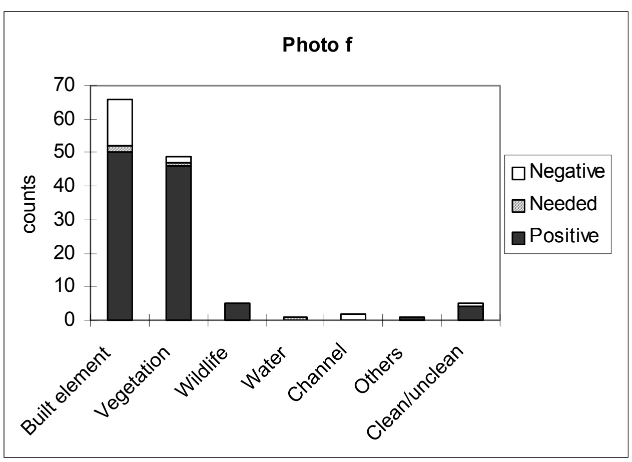
- It receives favorite comments on the nearby park, bridge, trail and homes However several consider the street next to the creek as intruding.
- Vegetation receives divided valuation: most think the trees and grass are pleasant, some object to the spray use to kill weeds and others think overgrown and not maintained.
- The dirt mount has caused erosion problems.



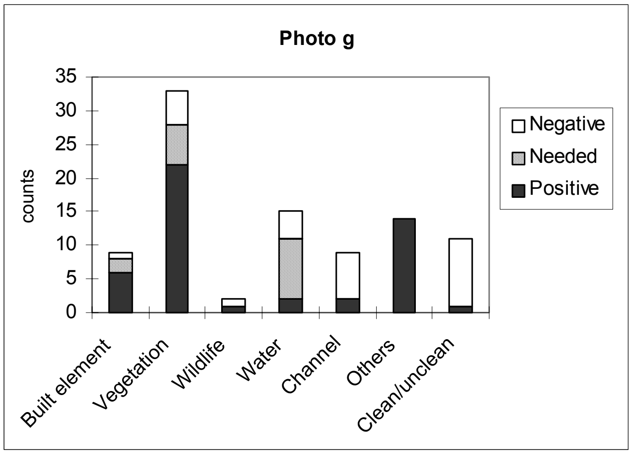
- "It needs more trees instead of weeds."
- The channel is criticized as "an open sewer", "irrigation canal" or "ditch."
- The trail is popular with users, but some consider it be unnatural and suggest using gravel surface; still some consider the pavement lack of maintenance.
- A few complain that there are "too many houses."



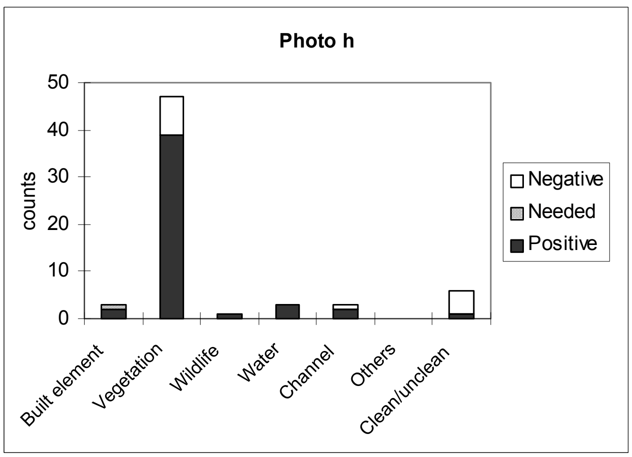
- Negative comments focus on built elements: "too many houses", "looks broken down", "trail/paving unnatural". Positive comments again are associated with own homes and the trail.
- Vegetation is both negative and needed in this scene: "too overgrown," "weeds," "needs cleaning"



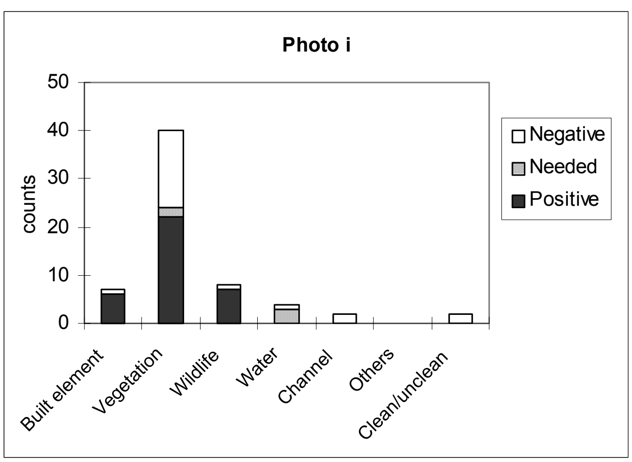
- This "pastoral" scene is the second favorite among all.
- Positive responses are concerning the trail, homes nearby and the fence with its countryside flavor.
- Positive feedback is given to a variety of plant elements: the riparian trees and bush as well as the landscaped lawn and flowers.



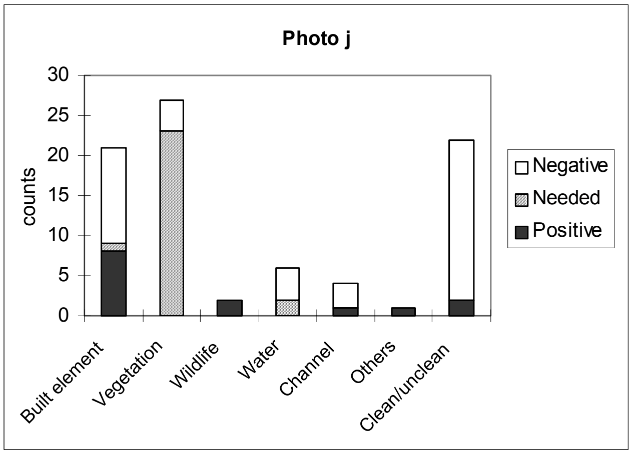
- The tree line at the right bank wins positive comments; some demand the same for the left bank.
- Some consider the channel too overgrown and weedy.
- It needs more water. Some think the water is dirty and "dumpy".
- The view of Mount Diablo is a great plus for this scene.



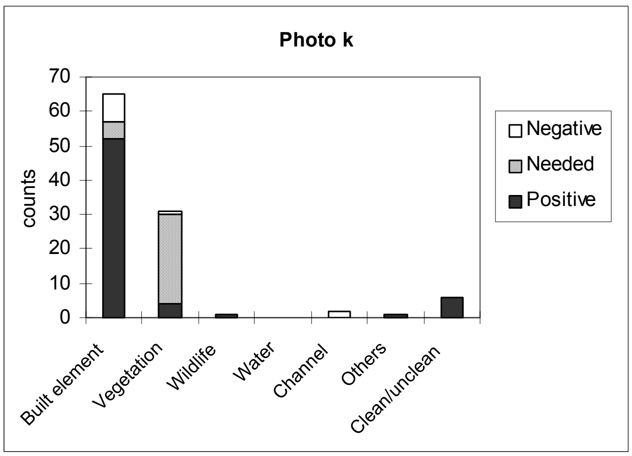
- The scene wins the overall highest preference.
- Vegetation composes almost all the elements mentioned. It is regarded as natural and woodsy, secluded, and good for kids to have adventures.
- Some consider it as too overgrown. A few mentioned it is unsafe for children to play.



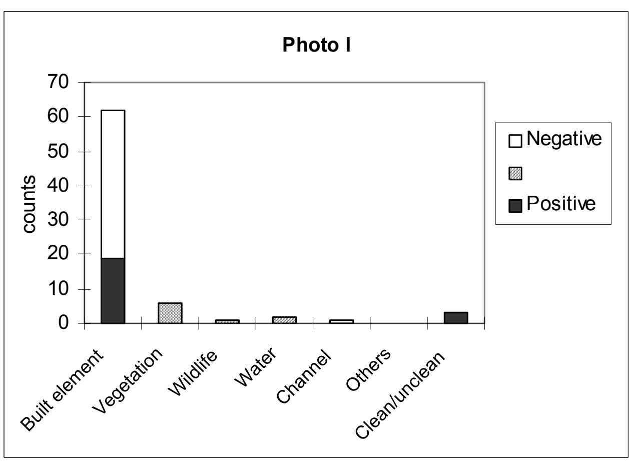
- This scene receives divided perception on vegetation. Some consider it too overgrown to be delightful; while others consider it "natural."
- A comparatively high percentage of the respondents recognize its habitat value.



- The scene is rated lowest among the 12 scenes.
- The main messages include: “needs more trees and landscaping,” “too trashed” and “the bridge is ugly.”
- Some mention the bridge as a functioning devise, including “it is fun to go under the bridge.”



- The facilities of the staging area (bench, water fountain and trashcan) are appreciated by most people. Some call for a port-o-let.
- A few criticize it as too unnatural.
- There is a strong desire to have more vegetation by the creek.
- It is considered as rather clean.



- This scene receives highly negative comments on built elements, particularly the fence. However, a few acknowledge the fence a good item for safety.
- The path is considered too narrow and restricting.