Just A Comfortable Place to Sit: Davis Sittable Space Study



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Executive Summary





"You can measure the health of a city by the vitality and energy of its streets and public open spaces." -- William H. Whyte (1980)

The report summarizes twenty-five years of observation and analysis of pedestrian use of downtown Davis and the UC Davis central campus (Quad District) conducted by the Center for Design Research and Department of Environmental Design at UC Davis. It focuses on how people use public open spaces such as parks, plazas, streets and found spaces. Particular attention in this report is directed at better understanding sittable space and how this adds to the life and experience of public spaces. The overall goal of this study is to inform future planning and design of the downtown Davis and the UC Davis campus as well as to better understand the ecology of public space activity over time.

The study has five parts conducted over a twenty-five year period. It offers a rare longitudinal overview of public space activity over an extended period¹:

- The "Downtown Davis Urban Ecology Study" was conducted from 1981 1983 and mapped pedestrian use of downtown Davis on sidewalks, in open spaces and in shops.
- The "UC Davis Quad District Open Space Study" mapped open space use, perception, and potential in the central part of the UC Davis campus.
- The second downtown Davis mapping was updated as part of the Urban Open Space Studio (LDA 181L) taught by Mark Francis in Winter 2008.
- Mapping of sittable space was conducted of the same downtown and campus area in Spring and Fall 2008. Seating opportunities mapped included fixed seats and benches, movable chairs and tables and walls and steps that are sittable. Areas of lawn seating such as in Central Park and on the Quad were not mapped.

 ¹ / It should be noted that the population of the City of Davis increased from about 35,000 in the 1980s to 65,000 today while the campus has expanded from 18,000 students in the 1980s to 32,000 today.

• An experiment of movable seating was conducted at the entrance plaza and courtyard of Hunt Hall, the new home of the Department of Environmental Design located on the center of the UCD campus, for two months in the Spring of 2009. Ten plastic movable Adirondack chairs were purchased and donated to the Department of Environmental Design. Four were placed at the entrance and six in the courtyard and behavior mapped to determine their use and movement over time.

The findings are briefly summarized as follows:

- Seating is a critical part of the daily social life of the downtown and campus.
- There has been an explosion in the number and quality of seating opportunities in downtown Davis and the central part of the UCD campus² increased from only a few hundred in the 1980s to over 2500 today.
- In 2008, 2276 sittable spaces were observed in downtown Davis and 2640 sittable spaces were counted on the UC Davis central campus in an area of similar size (approximately 85 acres). It is striking and surprising to the research team that the number in both areas is almost identical (a difference of only 7%).
- Central Park and Davis Farmer's Market (20% of all seating downtown), Davis Commons (14%), and the Train Depot (8%) are the most sittable spaces downtown. In the Quad District on campus, the Memorial Union is the most sittable with 22% of all seating in the central campus.
- A major difference exists between the type and quality of seating found in downtown Davis and on the UC Davis campus. For example, 48% of all seating in the downtown is movable while only 3 % on the campus is movable.
- Factors we found that contribute to comfortable places to sit in public space include access, comfort, relationship to views, sun and shade, movability, and ability to be together or alone.
- The Hunt Hall experiment found that movable seating is popular and well used offering a low cost way to expand seating and social space. 70% of people observed were utilizing movable chairs compared to fixed seating opportunities.
- The movable chairs at Hunt Hall contribute significantly to the social life and interaction of the building occupants. In addition, many students, staff, faculty and visitors from other parts of the campus were observed using the chairs.
- Based on the popularity of the experiment, the department bought and placed an additional dozen movable chairs on the Hunt Patio in Spring 2010 with more planned.
- Movable chairs outside Hunt Hall do move but remain largely in place during the study period³.

² / The study area for downtown Davis was bounded by Fifth Street to the North, First Street to the South, B Street to the West and the railroad tracks to the East. The UC Davis campus study area was bounded by Hunt Hall to the North, Mrak Hall and the Arboretum to the South, California Street to the West and A Street to the East. Each is roughly 85 acres.

• We recommend that the City of Davis and the UC Davis administration embark on a major Davis Public Space Initiative to manage existing and develop new open space downtown and on campus. We think this could be done separately but would be better accomplished as a city/campus partnership with assistance from UC Davis faculty and students.

³/ One chair broke and two disappeared some months after but seven remain now over a year later.

Acknowledgements & Project Background

This research began as part of a University of California Agricultural Experiment Station project focused on the use and meaning of urban public space shortly after Mark Francis arrived at UC Davis from the City University of New York in 1980. Mark's research interests were on public space and he had conducted earlier studies of how people use and value public open spaces including parks in Berkeley, California, the Harvard Square area in Cambridge, Massachusetts and various open spaces and community gardens in New York City.

Mark initiated a research project entitled "Downtown Davis Urban Ecology Study" in 1981 – 1983 with research assistants Christophe Girot, Diane Chow, Dale Cook, J. Patrick Sullivan and James Trapani. This project mapped pedestrian use of downtown Davis on sidewalks, in open spaces and in shops. In the late 1980s, he was commissioned by the UCD Office of Planning and Budget and Campus Planner Robert Segar to map open space use in the central part of the UC Davis campus to aid in the revision of the Campus' Long Range Development Plan. The Quad District Open Space Study was conducted by research assistants Lisa Dharmawan, Ellen Harris and Matt Siegel and resulted in a report published by the Center for Design Research in 1990.

Some twenty-five years later, Mark and his undergraduate and graduate students returned to replicate portions of the original study of the downtown and campus. The updated downtown Davis mapping was conducted as part of the Urban Open Space Studio (LDA 181L) taught by Mark Francis in Winter 2008. Mapping and field work was done by landscape architecture students Devin Caprari, Kim Chacon, Helen Chang, Wes Downing, Alex Edwards-Hastings, Kevin Evinger, Laurie Fong, Rachel Jacobson, Andy Le, Beth Lee, Joe Linehan, Henry Luc, Forrest Luna, Nazaneen Pouya, Stephen Ramirez, Anthony Tadina, Maren Walker, Daniel Yadegar. Stephen Ramirez and Mark Francis collected the sittable space data of the downtown and campus in Spring and Fall 2008. The Hunt Hall movable chair experiment was conducted by Jayoung Koo, a PhD student in Geography and Landscape Architecture, then undergraduate student Stephen Ramirez and Mark Francis in Spring 2009. This report summarizes the results of this longitudinal research.

The title for this report was inspired by an article "It all comes down to a comfortable place to sit" by Nancy Lindsay in <u>Landscape Architecture</u> in 1978.

Authors

Mark Francis, FASLA is Professor of Landscape Architecture and Environmental Design at UC Davis. His work is concerned with the theory and design of urban and community landscapes. Jayoung Koo is a PhD candidate in landscape architecture and geography at UC Davis. She has Bachelors in horticultural science and Masters in landscape architecture from Korea and a MEM from the Yale School of Forestry and Environmental Studies. Stephen Ramirez received a BS in landscape architecture in UC Davis in 2009.

All photos by authors unless indicated otherwise.

1. Just a Comfortable Place to Sit: Using Public Space



Figure 2: A diversity of seating options at Union Square, San Francisco

People tend to sit most where there are places to sit. William Whyte, 1980

Over thirty years ago, the sociologist William H. Whyte published *The Social Life of Small Urban Spaces*, a landmark book on urban public space (1980). Based on detailed observations of plazas and parks in New York City, it found comfortable seating to be the primary ingredient to successful public space. Whyte writes:

Ideally, sitting should be physically comfortable--benches with backrests, wellcontoured chairs. It's more important, however, that it be socially comfortable. This means choice: sitting up front, in back, to the side, in the sun, in the shade, in groups, off alone. Choice should be built into the basic design. Even though benches and chairs can be added, the best course is to maximize the sittability of inherent features. This means making ledges so they are sittable, or making other flat surfaces do double duty as tabletops or seats. There are almost always such opportunities. Because the elevation changes somewhat on most building sites, there are bound to be several levels of flat space. It's no more trouble to make them sittable than not to.

Whyte's findings have been confirmed in numerous studies since in a variety of cities and countries (Carr et. al. 1992, Gehl 1997).



Figure 3: Uncomfortable seating at Quincy Market, Boston

Seating and Downtown Planning

Urban designers and city officials now recognize that comfortable seating is an essential ingredient of successful downtowns (Carr et. al. 1992). Comfort may include protection from the sun, rain or wind as well as ability to sit alone or in a group.



Figure 4: Movable seating at the DeYoung Museum in Golden Gate Park, San Francisco

The Project for Public Spaces (2010) in New York City proposes the following guidelines for sittable space:

Good public spaces give people a choice of where and how they would like to sit. They provide different types of seating options such as ledges, steps, benches, moveable chairs as well as different places or locations within the same area, such as in the sun, in the shade, in groups, alone, close to activity, or somewhat removed from activity.

Outdoor Seating and Campus Planning

Open space and outdoor seating is also an important part of good campus planning. It has been found to be an integral part of a campus' image and to directly influence students, faculty, staff and visitors overall assessment of a campus' sense of place (Marcus and Francis 1998, Turner 1987). Open spaces provide places for people to gather, study and relax and contribute to collaboration and even interdisciplinary interaction between researchers and faculty. They can also contribute to a person's restorative experience and reduce stress (Kaplan et. al. 1998). For example, A study at Washington State University found that the inclusion of movable chairs in campus public spaces "positively shift user perceptions of therapeutic landscape qualities overall, perhaps allowing users a more restorative experience in that space" (Martin 2006).

Campus planners have come to rely on providing comfortable seating to provide a sense of place and bring together students, staff, faculty and visitors. Harvard University, for example, has recently made a major commitment to use open spaces to bring people together for interaction, socialization and contemplation:

For the first time in more than a century, members of the Harvard community will be able to come together in Harvard Yard to meet, talk, relax, or study with the benefit of chairs and tables. Harvard Gazette, September 1, 2009



Figure 5: Harvard University is using movable chairs and outdoor performances to turn open spaces into stages and places of social interaction (Source: Harvard Gazette)

Harvard's Committee on Common Spaces writes "Our experiments are aimed at creating outdoor spaces along this corridor that draw people together for socializing, eating and drinking, and enjoying Harvard's talented singers, actors, and other arts performers. Over time we will recommend additional strategies for making Harvard's campus a more interactive and sociable place."

2. The Case of Davis



Figure 6: Davis, California (Source: Google Earth)

Davis is a small university town of about 65,000 located between Sacramento and the Bay Area in Northern California. It is widely regarded as a livable community with a strong sense of place. It has also become internationally recognized as a sustainable community for its innovations in community design, greenway and bicycle planning, model energy ordinances, and overall sustainable practices (Lofland 2004, Corbett and Corbett 1999, Francis 2003b). Many give credit to its extensive network of community places and open spaces as the binder that makes Davis a memorable and meaningful city.

When Mark Francis moved to Davis in 1980 from New York City, there were only a handful of places to sit outside in downtown Davis and seating on campus was limited. There was a lack of open space in the downtown with the only green space located in front of old City Hall on F Street and the original one block square historic Central Park. Pedestrian use was focused only on streets and sidewalks with conflicts common between pedestrians, bicyclists and cars. This led Mark and others including Mike Corbett, Richard Berteaux, John Mott Smith and Donna Lott to form an ad hoc committee to explore developing a town square in the city owned parking lot located in the block bounded by E and F Street and Second and Third Street (refereed to then as the Baskins Robbins parking lot). While unsuccessful due to downtown merchant concerns with loss parking, their effort led to a twenty years of creative work and research focused on creating a system of new public open spaces in the downtown. This includes the expansion of Davis Central Park, the Davis Commons project and E Street Plaza (designed by co-author Mark Francis and his landscape architecture firm CoDesign/MIG) as well as other projects such as the Davis Train Center open spaces. These new or redesigned public spaces have also resulted in many more seating opportunities downtown from just about a hundred to over 2600 today. The number of outdoor cafes downtown has also grown from a

handful in 1980 to over 35 today. The result is an expanding network of small and large public spaces.



Figure 7: Art provides a seating opportunity for children in the Central Park Gardens

New open spaces and pedestrian improvements added downtown since our original Downtown Ecology Study include⁴:

- Expanded Central Park and Davis Farmer's Market (CoDesign/MIG)
- Davis Commons (CoDesign/MIG)
- E Street Plaza (CoDesign/MIG)
- Davis Train Station (Indigo Architects)
- Remodeled G Street Plaza
- Sidewalk and pedestrian improvements including new benches, signage and improved intersections along Third Street initiated by the City of Davis.
- New mixed-use projects with ground floor outdoor cafes (3rd and C, The Lofts)
- Numerous outdoor cafes and Restaurants
- The Davis Greenway (Francis et. al. 1988) and the recently marked Davis Bike Loop links downtown and campus open spaces to the larger community and region (Mark Francis, Kerry Dawson and Stan Jones).

New open spaces built on campus since our Quad Open Space Study:

- Humanities/Social Sciences Building
- North side MU Plaza improvements
- Dutton Hall and entry plaza

^{4/} It should be pointed out that Mark Francis was principal of CoDesign/MIG and designer/landscape architect of several of these spaces. This study provided a useful post occupancy evaluation of downtown open spaces he designed.

- Environmental/Plant Sciences Building with new entry and Salad Bowl Garden built and managed by graduate students
- Remodel of Hunt Hall with new entry plaza and improved courtyard
- Centennial Walk
- Upcoming projects include remodel of the Memorial Union currently under construction and reuse of the original Football Stadium

Research and evaluation has tracked some of these changes. In addition to our longitudinal research at the Center for Design Research at UC Davis, studies have been conducted of various favorite places and pedestrian amenities in the downtown (Fleming 1997). Students in landscape architecture at UC Davis have done several senior projects focused on public open space in Davis. This includes Victoria Ngo's study of public outdoor dinning in the downtown (2007) and Beth Lee's project on outdoor spaces on the UCD campus (2008). The City of Davis has also been involved in improving and managing the pedestrian environment in the downtown and the UCD administration has been actively engaged in studying and improving open spaces on the UC Davis campus.



Figure 8: Observed Central Campus Activity, 1988-90 (Francis 1992)

3. The Study and Methods

The Davis Sittable Space Study is part of a larger twenty-five year longitudinal examination of public space use in downtown Davis and on the UC Davis campus. This includes a 1981-1983 study of pedestrian use in downtown Davis, a 1988-1990 study of open space use on the central part of the UC Davis campus and several related studies of downtown and campus public space use conducted between 2008 and 2010. All relied primarily on observation in general and behavior mapping specifically to assess public space use. The central focus of the study is on sittable space outdoors.

The first project was the "Downtown Davis Urban Ecology Study" conducted in 1981 – 1983 with research assistants. This project mapped pedestrian use of downtown Davis on sidewalks, in open spaces and in shops. The second was done in the late 1980s commissioned by the UCD Office of Planning and Budget and Campus Planner Robert Segar to map open space use in the central part of the UC Davis campus to aid in the revision of the Campus' Long Range Development Plan. A report was published by the Center for Design Research in 1990.

The original studies of the downtown and campus were updated in the Winter of 2008 as part of the Urban Open Space Studio (LDA 181L) taught by Mark Francis. Additional sittable space data of the downtown and campus was collected in Spring and Fall 2008. A more focused experiment with movable seating in the public spaces surrounding Hunt Hall was conducted in Spring 2009.

Behavior Mapping Method

The primary methods utilized in the study are the case study method (Francis 2001) and the behavior mapping method consisting of observing and mapping use of public open spaces. Behavior mapping is a well-established method developed within environmental psychology, landscape architecture and urban design based largely on the post occupancy evaluation method (Marcus and Francis 1998, Marcus 2006).

Behavior mapping involves observation of public space use locating observations on a structured map. It is a systematic method to determine who, is doing what, where in public open space. The method involved dividing the downtown Davis core area and central UC Davis campus into several observable sub-areas with teams of students or researchers conducting five-minute observations during different times of the day and week. Each observed activity is coded and later displayed on maps as dots (for behavior on sidewalks, parking areas and open spaces) and lines (for observed street crossings) on base maps. They also were organized as tabular summaries of data⁵.

There are several limitations of this study to point out. It does not attempt to assess the perception or meaning of public spaces in Davis. No interviews were conducted to determine how satisfied people are using public spaces and seating in the

⁵/ This research repeated a method utilized twenty-six years ago of the same area during May 1982 (see Francis 1984).

downtown although the Quad District Open Space Study did interview users to identify likes and dislikes of open spaces and solicit ideas for improvements. Therefore the results presented here are limited and need to be supplemented with additional user surveys. However, we feel that the behavioral data is compelling and can be used in future open space planning in Davis and elsewhere.

Specific observation times and details are presented as part of each study description.

4. Downtown Davis Public Space Study



Figure 9: Downtown Davis (Source: City of Davis)

This part summarizes mapping of pedestrian and public space activity in downtown Davis by UC Davis landscape architecture students during a one-week period in January 2008. The intent was to update the earlier downtown pedestrian study and get a snapshot of activity in downtown Davis to guide a redesign of the E Street Plaza block bounded by Second, Third, E and F Streets. The downtown Davis core area was divided into several observable sub areas with teams of students conducting fiveminute observations during six hours for the following schedule (and weather conditions): Thursday, January 24, 2008, 3 – 5 PM (rainy, cool), Saturday, January 26, 2008, 12 – 2 PM (sunny), and Tuesday, January 29, 2008, 3- 5 PM (rainy, cool).



Figure 10: Outdoor seating on chairs, walls and lawn at Davis Commons

Mapping Results

For the six hours of observations, 2743 people were observed on streets, sidewalks, parking lots and open spaces downtown (See Figure 12). Even with the poor weather, there was a diverse set of users and activities. It should be noted that these results are considerably lower than typically found during other times of the year. These findings are discussed below.



Figure 11: Typical Fixed Bench in Downtown Davis with Limited Seating Options



Figure 12: Downtown Behavior Mapping Summary, January 24 - 29, 2008



Figure 13: Downtown Behavior Mapping Summary, May 18, 1982 (Francis 1984)

5. Sittable Space in Downtown Davis

Our mapping of downtown pedestrian use in 1983 and again in 2008 found seating to be a critical dimension of the daily social life of the downtown. During this period, we found an explosion in the number and quality of open spaces downtown including expansion of Central Park and the Davis Farmer's Market, major renovation of the Davis Train Center, construction of the Davis Commons development and E Street Plaza. In addition, many outdoor cafes and restaurants with service outside were added to the downtown.



Figure 14: Over 35 cafes have added numerous seating opportunities downtown, but you have to pay for it

Given the importance of seating to the life of downtown Davis, we decided to return in 2008 to map all sittable space counting all chairs, benches, picnic tables, stairs, seat walls and sittable edges in the downtown. We found that seating opportunities in downtown Davis expanded from only a few hundred in the 1980s to over 2500 sittable spaces today. The following figures present this data.



Figure 15: Locations of Observed Sittable Space in Downtown Davis



Figure 16: Observed Sittable Space in Downtown Davis

Available Seating in Downtown Davis



Figure 17: Available Seating in Downtown Davis



Figure 18: Permanent versus Flexible Seating in Downtown Davis

6. Sittable Space on the UC Davis Campus



Figure 19: An area of the central UCD campus was mapped almost identical in area mapped downtown (Source: Google Earth)

We were asked in the late 1990s by campus planner Bob Segar to conduct a study of open space use and potential in the Quad District. The UCD Quad District Study (1990) found that of 9,000 total observed activities, 60% involved walking with 5% sitting activity. Beth Lee in 2008 found that 15% of favorite places on campus were areas of seating.



Figure 20: Almost all of campus seating is fixed

After our downtown mapping was complete in 2008, we decided to map the location of all sittable spaces in the Quad District (from A Street to California Avenue and

from the north edge of the Arboretum to the north area of Hunt Hall/Plant and Environmental Sciences building). The study area was selected to be almost exactly the same as the downtown area mapped (approximately 85 acres). We found 2640 sittable spaces in this central part of the campus. It is striking that this number is almost identical to the number observed downtown (a difference of only 7%).



Figure 21: Locations of Observed Sittable Space in UCD Campus



Figure 22: Observed Sittable Space on UCD Campus



Total Available Seating in UC Davis

Figure 23: Total Seating at UC Davis



Figure 24: Permanent versus Flexible Seating at UC Davis



Figure 25: There is a lack of seating in some areas of campus such at some Unitrans bus stops

7. Movable Seating Experiment at Hunt Hall



Figure 26: Movable Seating Added to Hunt Hall Entrance and Courtyard in 2009

One of the issues that resulted from our studies of the downtown and campus was the phenomenon of movable seating. In conversations with campus planners and administrators, we found a bias against flexible seating on campus. Our observations of open spaces downtown found that movable seating was well used and popular. We decided to explore this in more detail by conducting a study of movable chairs outside our new department home in Hunt Hall located in the central campus just North of the Memorial Union and Quad.

For this experiment, we purchased ten Adirondack chairs at Home Depot (at a cost of \$130) and donated them to the Department of Environmental Design. Four were located on the entry plaza to Hunt Hall and six were placed in the courtyard at fixed locations. Observations were made on the location and use of the chairs for a two month period between April 2 and May 28, 2009. A total of 62 twenty-minute observations were done during this period using the behavior mapping method as in our other studies. They included 7 Mondays, 7 Tuesdays, 7 Wednesdays, 9 Thursdays, 4 Fridays and 14 mornings, 34 lunch hours, 14 mid-afternoons. Chairs were returned to their original position after each observation period. We observed no use during 19 of the 62 mapping periods largely due to rain or poor weather conditions. The results included here are drawn from this data.



Figure 27: All ten chairs typically moved from their original location each day such as these chairs in the Hunt Hall courtyard meadow.



Figure 28: Total Observation of Movable Chairs and Fixed Seating

192 total uses of sittable spaces were observed during the two-month period. Of these users, the majority was in the 20 to 29-age range. The ethnic diversity was similar to the campus population. 69% of users were students and 30% faculty or staff. Three quarters were for individual activities. Eating was most popular (21%) followed by reading

(20%), conversation (19%) and cell phone use (13%). 70% of sitters were observed in movable chairs and 30% in fixed seating (See Figure 29).



Figure 29: Location of Moved Chairs



Figure 30: Movable Chairs and Fixed Seating Use by Activity



Figure 31: Types of Activity Observed in Movable Chairs and Fixed Seating ⁶

⁶/ Includes all types of activities whether done separately or simultaneously.



Figure 32: Individual versus Group Use of Movable Chairs and Fixed Seating



Figure 33: Size of Groups Using Movable Chairs and Fixed Seating



Figure 34: Individual/Group Use of Movable Chairs and Fixed Seating



Figure 35: Use of Movable Chairs and Fixed Seating by Age



Figure 36: Use of Movable Chairs and Fixed Seating by Student, Faculty or Building Visitor

Several observations of movable chairs are noteworthy. Almost all were moved by their users before use to create better positions for viewing, talking or sun orientation. This reflects the distinct advantage of movable versus fixed seating. One of the ten chairs disappeared for a couple hours but mysteriously reappeared a few hours later.

During one of the observations a Hunt Hall occupant commented, "The new chairs are terrific. Can we move them?"

8. Findings and Comparisons

This section summarizes major findings from the various studies. Findings are discussed separately for the downtown and campus followed by a comparison of each.

Overall Downtown Davis Findings

In 2008, we observed 2743 people on streets, sidewalks, parking lots and open spaces downtown. Of these, more men than women were observed although this was a minor difference. 18 - 34 year olds were the largest observed downtown users comprising 54% of all observations. This was followed by 35 - 50 year olds (25%), 7 - 17 year olds (7%) and 51 - 56 year olds (7%). Over 65 was the lowest observed users with only 2% of all observations. This number is strikingly low although probably a function of the time of the year and weather.

Walking, as expected, was the most frequently observed activity downtown with 65% of all activity. Talking was a frequently observed activity (11%), a good indicator that the downtown has a large amount of social activity even during poor winter weather. Sitting accounted for only 4% of all activities. This low percentage of sitting as an overall activity was probably a function of the winter season when the observation was done. But it also points to the fact that seating as a percent of all pedestrian use could be substantially increased downtown.

Downtown users employ a wide variety of props in support of their activities with cell phones comprises 106 or 50% of all observed props, evidence of the increased use of phones and computers in public spaces. This was followed by bikes (27%), coffee drinking (8%) and smoking (6%). The latter is especially surprisingly high for a no smoking city such as Davis.

Even during winter conditions, the downtown is well used by pedestrians for a wide variety of activities. Some open spaces such as Davis Commons are well utilized even during poor weather. The Davis Train Station was also heavily used during the mapping periods with activities including sitting and standing related to waiting for trains. Other spaces such as the E Street Plaza were poorly utilized during this time of the year with people observed moving from parked cars to adjacent shops or restaurants.

All streets downtown show considerable mid-block crossing by pedestrians. E Street (between Second and Third), G Street (between Second and Third), and Second Street (East of G Street) had a high frequency of mid block crossings. The E Street mid-block crossings are consistent with the findings from the 1982 behavior mapping.

A noticeable shift in the center of gravity of pedestrian activity was observed to the south of the core area especially on D, E and F Streets. Much of this is consistent with new development in these areas especially Davis Commons. We think there is a need for a larger public space at or near the E Street Plaza to establish this as the historic center of gravity in the core area with amenities that support social activity such as talking, gathering with friends, etc.



Figure 37: The E Street Plaza is underutilized compared to other downtown public spaces

Downtown Davis Sittable Space Findings

2276 sittable spaces were mapped downtown in 2008 due to its healthy mix and quantity of seating outdoors. This is explained in part by the large number of cafes and restaurants with outdoor eating areas and movable seating along with some major public spaces with substantial number of seating resources such as Davis Commons, Central Park and the Davis Train Station. The importance of this seating is underscored by the pleasant climate in Davis especially during the evenings that lend themselves well to outdoor gathering and dinning.

UC Davis Campus Sittable Space Findings

2640 outdoor sitting spaces were mapped on the central campus in 2008. While the total number of seating options is slightly greater on campus than the downtown, they are less utilized and not as effective as ones in the downtown. The seating on campus is highly controlled and choreographed limiting its flexibility and value. Better design and management could address this. Recommendations from our Quad District Study led campus planners to include substantial movable seating in the outdoor areas of the Silo renovation project in the early 2000s and these have functioned well over time with few problems.

Even with limited options, people are resourceful and will find places to sit on ledges, on stairs and on lawns such as the Quad and in Central Park during good weather. People do sit where there are seats or benches as found in Whyte's studies (1980). There is a healthy mix of seating opportunities downtown but the campus while high in sittable space, was limited in seat diversity and flexibility. Fixed seating restricts use due to orientation, being in or out of the sun and located in areas where people do not typically gather. Like Whyte, we found most popular seating to be adjacent to areas of movement and circulation. We also found people watching to be a popular aspect of seating. We observed a large amount of underutilized open spaces on campus that could offer additional opportunities for seating, informal gathering spaces and social interaction. These include the large lawn areas in front of Walker and the East and North sides of Shields Library and the North side of Sproul Hall. This was also found in our earlier Quad District Open Space Study (1990).

Hunt Hall Findings

People use and do move movable chairs. In fact our Hunt experiment shows that they are constantly in motion. This is due to their inherent comfort and sociability including allowing greater choice than fixed seating for sun or shade, be alone or together in a group, talking with others, capturing the best views and sitting in hardscapes or green spaces. People also sit in the movable chairs when they are provided. In a number of cases individuals occupying chairs were joined by others on their way in or out of the building. Indirectly, the existence of movable chairs increased socialbility in the outdoor areas.

At Hunt Hall, despite the number of available sitting opportunities, considerable number of users were occupying movable chairs (70%) than fixed seating (30%). We found outdoor seating to be primarily used by students but also by a large number of faculty and staff from Hunt Hall and adjacent buildings. The majority were woman users perhaps due to the current mix of landscape architecture majors housed in the ground floor of Hunt Hall. Most of the movable chairs and fixed seating were used by single users (72%) although some were used for group activities including talking, eating and working on group projects. In some cases the chairs were moved to create a circle for faculty meetings and to have lunch with candidates visiting for an open faculty position in landscape architecture (See Figure 29). Most frequently observed activities in the movable chairs were eating, reading, holding conversations and using cell phones.

Comparison between Sittable Space in Downtown and on Campus

There are some striking differences between the provision, type and use of seating between the downtown and campus. For example, almost all seating on campus is fixed (97%) with half of these as steps, seat walls or planters. This is in contrast to the downtown where half (48%) is movable and steps and seat walls account for only 13% of all available outdoor seating. The campus has twice as many fixed benches than found in the downtown but many of these are older or in poor condition (See Table 1). In fact, the function as a kind of bench museum with almost every size, shape and materials possible is evident on the central campus.

TABLE 1:Downtown versus UCD Sittable Space

	DOWNT	OWN	UCD	
Movable Chairs	1087	(48%)	84	(3%)
Benches	42 433	(2%) (19%)	462 818	(17%) (31%)

Steps Seat Walls and Planters **Total**

2276		2640	
459	(20%)	414	(16%)
255	(11%)	862	(33%)

TABLE 2: Downtown/UCD Permanent versus Flexible Seating

	DOWNTOWN	UCD
Permanent/Fixed Seating Flexible/Movable Seating	1189 (52%) 1087 (48%)	2556 (97%) 84 (3%)
Total	2276	2640

Overall Findings



Figure 38: Central Park in Davis was found to be the most sittable space downtown with 464 seating possibilities or 20% of all sittable spaces

As they are summarized well elsewhere (Carr et. al. 1992, Francis 2003a, Gehl 1987, Marcus and Francis 1998, Project for Public Spaces 2000, Shaftoe 2008, Whyte 1980), we do not attempt to present overall principles of public space design in this report. We do want to offer some overall principles on what makes good sittable space in the downtown and on campus.

Overall, we found numerous outdoor seating possibilities available both downtown and on campus. This is due to the large number of movable seats provided at cafes and restaurants downtown and steps, seat walls, and edges on campus. Yet all spaces are not created equal as the majority of seating is found in three open space downtown (42% of all seats in Central Park, Davis Train Station and Davis Commons) and two spaces on campus (35% in Memorial Union and Chem. Lecture Hall). There is also a significant difference between fixed and movable seating on campus versus the downtown with UCD having two and a half times more fixed seating than the downtown.



Figure 39: The Memorial Union was found to be the most sittable space on the UC Davis campus with over 585 seating possibilities or 22% of all sittable spaces in the Quad District

Most Sittable Spaces in Downtown and on Central Campus. The most sittable space downtown is Central Park and the Davis Farmers Market with a total of 464 or 20% of all downtown seating. The majority of these were the seat walls in the central lawn and fixed and movable seating in the Fountain Plaza. Central Park was followed by Davis Commons (14% of all seating), the Train Depot (8%) and the E Street Plaza (3%) as the most sittable spaces downtown. In the Quad District on campus, the Memorial Union was the most sittable with 22% of all seating. At the MU, the South Courtyard followed by the North Courtyard and second floor roof terrace had the majority of seating. Of these, all were fixed seats or picnic tables.

TABLE 3:Most Sittable Spaces in Downtown Davis7

	TOTAL	%
Central Park & Davis Farmers' Market	464	20
Davis Commons	309	14
Train Depot	185	8
E Street Plaza	57	3

TABLE 4:Most Sittable Spaces in the UC Davis Quad District⁸

	TOTAL	%
MU	585	22
Chem Lecture/West/Courtyard	352	13
AOB/Wright Courtyard	128	5
Wickson Hall Entries	120	5
Shields Library Entry and North	77	3

Types of Seating Available

Seats including movable chairs were the most common with 48% of all seating opportunities available downtown. This was followed by seat walls and planters (20% of all observed), benches (19%), steps (11%) and Picnic tables (2%).

Almost the opposite distribution was found on the UC Davis campus where steps accounted for the most common seating opportunity with 33% of all observed seating. Next were benches and picnic tables (17%) with chairs accounting for only 3% of all seating possibilities on campus as compared to half of all seating downtown. This can be explained in part by the large number of cafes downtown.

TABLE 5:

^{7/} Does not include grass seating in Central Park, Davis Commons, etc.

^{8/} Does not include grass seating on Quad, lawn areas, etc.

TABLE 5: Available Seating in Downtown Davis

	TOTAL	%
Chairs	1087	48
Seat Walls and Planters	459	20
Benches	433	19
Steps	255	11
Picnic Tables	42	2

TABLE 6: Available Seating in the UC Davis Quad District

	TOTAL	%
Steps	862	33
Benches	818	31
Picnic Tables	462	17
Seat Walls and Planters	414	16
Seats	79	3

9. Conclusions and Recommendations



Figure 40: Underpass Park Proposed near Toronto Waterfront with a Variety of Seating (Source: *WATERFRONToronto*)

The results of this study suggest some future directions for the planning, design and management of public space in downtown Davis and on the UC Davis campus as well as some implications for public space design in general. Overall, our work demonstrates a remarkable growth in the amount of and enjoyment of public space in Davis. In the 25 years of this study, there has been a marked increase in the number and type of open spaces. Along with this increase has come a strong growth in the amount and diversity of seating opportunities outdoors. City and campus designers and administrators, developers and the community should be applauded for their efforts to expand public space.

It is clear that public space life is still evolving in Davis. People are still figuring out how to use the network of spaces available to them and what activities best suit their needs. Public life in Davis is still evolving as it is elsewhere in the United States, and over time people will feel even more comfortable using and hanging out in public space. We expect to see an increase in the appetite for public open spaces downtown and on campus. Davis is also not unlike other towns and cities that have also problems and conflicts associated with public space such as the homeless, funding for management and maintenance and competition between some user groups.

Downtown Seating and Public Space Recommendations

We recommend that the City of Davis develop a more coordinated planning, design and management process for public open spaces downtown. This could be directed at increasing seating options downtown and making sure they are in the best locations. In addition, new development could be asked to help meet this growing need.

Open Space Improvements on Campus

We also recommend that the campus develop an open space initiative to improve and manage open spaces on campus. This could include developing an outdoor seating strategy to expand the amount and quality of sittable space in the Quad District and other heavily used parts of campus. This is in line with the recommendations included in the UC Davis Physical Design Framework (2009) that calls for the development of new and improved open spaces in the central campus including ones that "accommodate a variety of group sizes with movable seating" (p. 4.3). A program of public space improvements would require coordination with various administrative units including Grounds, Planning and Budget, Architects and Engineers and involvement from individual building occupants and departments. These new initiatives could consider the following guidelines in developing their approach to design and management of open spaces on campus and downtown. They can also be used in developing new projects that include outdoor public space.

Amount of Seating

Seating in any urban environment is a dynamic, constantly changing part of its public life. While fixed seating does not change frequently, movable seating changes by its very nature as new cafes and land uses come and go. It is also an easy and affordable way to dramatically add seating opportunities and to populate and animate an existing downtown or campus.

It is critical to consider and provide for seating in any existing or new public space projects of three types: 1) fixed including benches, 2) movable including chairs and tables, and 3) provision of walls, steps and other landscape features that can serve as seating.

The Sustainable Sites Initiative of the American Society of Landscape Architects (2009) suggests that seating be a core criterion for sustainable design ratings of both existing and new landscapes. Points can be gained by providing "visual and physical connections to the outdoors to optimize the mental health benefits of site users". They suggest designers and developers provide views of vegetation and access to quiet outdoor space(s) on site to optimize mental health benefits of site users. For sites without regularly occupied building(s), provide quiet outdoor spaces that must be accessible to potential users and provide seating for 5 percent of total site users. They further suggest providing a variety of seating microclimate and other site-specific conditions such as sun, shade, and wind. They suggest that outdoor spaces must be within 200 feet of the building entrance(s) (Sustainable Sites Initiative 2009). They recommend based on their review of past research that moveable seating is preferred and comfortable seating should be provided in both the sun and shade. They also

accommodate groups, for the purpose of building community and improving social ties".

Location of Seating

All things being equal, you can calculate that where pedestrian flows bisect a sittable place that is where people will most likely sit. And it is not so perverse of them. It is by choice that they do so. If there is some congestion, it is an amiable one, and a testimonial to the place. Circulation and sitting, in sum, are not antithetical but complementary. (Whyte 1980)



Figure 41: Location in addition to quality and quantity of outdoor seating is important to consider in open space planning

Seating tends to be most frequently used in high use public spaces and in areas of high pedestrian and bicycle use. Movable seating also appears more popular than fixed seating. Fast food establishments such as Taco Bell, Jack in the Box and Subway downtown and the Coffee House on campus are under seated outside. There also does not seem to be a well thought out patterns or locations of seating on campus or in the downtown. In comparison to bicycle parking, which is well provided for, seating seems more of an afterthought than an essential part of downtown or campus life. For example, there is no seating provided at entrances to movie theatres and some shops although they are high volume pedestrian areas.

Design and Quality of Seating



Figure 42: There is a wide range of elegant seating design options that the campus and downtown utilize

Selection of seating is critical to its success as social space (Mann and Hannah 2009). We found design to be an essential ingredient to the quality and use of public spaces studied both downtown and on campus. All outdoor seating is not created equal with some more popular than others. Therefore, we recommend a mix of seating types with an overall guideline of 1/3 fixed, 1/3 movable and 1/3 built into the landscape as steps, walls and edges. For steps to be comfortable they need to have treads of 14 - 16'' and seat walls need to be 16'' high.

Ongoing Management of Seating Resources

Management is critical to successful public spaces (Carmona et. al. 2008, Carr et. al. 1992). One question that emerges from our study is who should control and manage seating downtown and on campus? Currently, unless permanently designed into the space such as Central Park, E Street Plaza, etc., seating happens largely in an ad hoc fashion downtown. This may be something that could be better managed although currently no city department is mandated to do so.

On campus, we recommend a more open minded and experimental approach to seating. This would lead to more variety and types of seating options available. Given the wide range of types and styles of seating, it may not be possible to create a unified seating style or preferred type of furniture. We found no problem with the diversity of seats and seating although many of the benches are outdated or in need of replacement. We recommend more of an open-ended policy toward movable seating as this can add to seating resources at a low cost. We see the possibility of adding as much as an additional 250-500 movable chairs in the Quad District that would bring it more in line with outdoor seating downtown. With the proposed loss of existing open space due to the expansion of the UCD Bookstore at the MU, replacement seating will need to be provided. Much of this could be accommodated through the provision of lower cost

chairs. While this requires some additional management, it could be accommodated through normal maintenance of campus open spaces.



Figure 43: The campus could develop a more flexible approach to providing sittable spaces such as more movable seating and landscape features that can be used for sitting such as at Hart Hall

A Future Public Space Vision for Davis

Given our findings, we see a healthy and positive future for public open spaces in Davis. As the town and campus have grown over the past 25 years, so too have the number and quality of open spaces. Compared to most cities, Davis does an outstanding job of providing usable and memorable public space. As Davis continues to grow, it will need to continue to promote the development and management of good open spaces downtown and on campus.

There are some challenges ahead. We would like to see a better balance between paid and free seating with the largest number of seating possibilities available without having to buy food or drinks to sit outside (Kayden 2000, Moore 2004). This would also contribute to greater mixed-life downtown and on campus (Francis 2010).

Overall, the downtown and campus have developed a network approach with open spaces dispersed rather than centralized. However, as the city grows, there will be a need for larger open spaces and greater seating possibilities and choices. This could be accomplished through the redevelopment of blocks downtown or with major new buildings on campus. For example, the E Street Plaza downtown could be doubled or tripled in size as part of a larger development of that block with two and three story buildings and relocation of parking into planned parking structures on other blocks. Requiring developers to provide it as part of new mixed-use buildings can also expand seating.



Figure 44: Downtown Davis has a dispersed, network approach to public space

Future Research and Planning Issues

This study raises a number of research questions in need of future study. While our study looked primarily at the provision and use of open spaces in Davis, there is a need to examine their perception and meaning. For example, how do people value these spaces? Do they consider them well designed? These questions could be the focus of future theses at UC Davis. We also suggest that the City of Davis and UC Davis create an ongoing partnership to study and plan older and future public open spaces including the quantity and quality of outdoor seating. Similar to its acclaim as an innovative bicycle community, Davis can be known as a premier green, open space and pedestrian-friendly city.

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Appendix: Observation Data of Downtown Davis, January 2008 (by group and street)

Downtown Davis Behavior Mapping - January 24 - 29, 2008												8 (Total Observations = 2743)																		
	S	9X		Age Activities												Pr	Notes													
#NAME?	Male	Female	9-6	17-Jul	18-34	35-50	51-65	over 65	Talking	Eating	Walking	Sitting	Standing	Parking bike	Parking car	Reading	Working	Photographing	Running	Entering store	Bike	Smoking	Cellular Phone	Coffee	Dog	Cane	Laptops	Stroller	Skateboard	
/D	332	342	- 24	48	361	156	67	18	100	34	341	16	-30	9	26					- 36	25	-4	18	16	7	0	0	6	6	
2/E	420	338	49	54	408	171	- 55	21	87		535	12	18		25	3	3	1				6	-46							
3/F	364	316	19	53	355	192	52	9	- 99	19	418	21	35	0	41					22	32	3	15							
4/G	372	259	18	40	356	175	35	15		21	345	57	180						8				27							
Total	1488	1255	110	195	1480	694	209	63	286	74	1639	106	263	- 9	- 92	3	3	1	8	58	57	13	106	16	7	0	0	6	6	
%	54.2	45.8	- 4	7.1	54	25	7.6	2.29	11.3	2.9	64.5	4.2	10	0	3.6	0.1	0.1	0	0.3	2.3	27	6.2	50.2	7.58	3.32	0	0	2.8	2.8	