2003

A blueprint for environmental sustainability along the James River

Trevor S. MacDougall
University of Richmond

A Blueprint for Environmental Sustainability Along the James River

by
Trevor S. MacDougall

Senior Project
Jepson School of Leadership Studies
University of Richmond, VA

April 25, 2003

Advisor: Dr. Thomas Shields

Table of Contents

Chapter I: Preface

The paper is the result of a research project conducted through the University of Richmond, the desired end of which is to produce a Blueprint for Environmental Sustainability Along the James River, a document that provides guidelines for managing the urban riverfront in a sustainable fashion.

The first chapter is designed to outline the layout of this report. The subsequent literature review is divided into four chapters: The Ecological Model, An Overview of Sustainability, Sustainable Practices in Other Cities, and Richmond Development: Past and Present. The first pair of these chapters provide a general assessment of two important environmental paradigms, and the next couple detail pertinent historical and contemporary physical development locally, as well as both domestically and internationally.

Chapter two offers coverage of the Ecological Model. Beginning with an account of the progress from a competition-based functionalist theory of urban development to contemporary, multi-faceted ecological theory. Chapter two also forms a foundation for the concept of the Ecological-Economic Model. An overview of the prototypical model describes its functions, purpose, scope, and limitations. This is followed by operational and structural definitions of ecological-economics, criticisms on the value of combining the two fields, and an overview of the evolutionary paradigm, a common pattern for creating ecological-economic models. Finally, chapter two describes modern benefits derived from using computer programs to generate ecological-economic models.

Chapter three provides a history of and introduction to the evolution of sustainability. Sustainability is an environmental preservation concept that has gained increasing attention over the past few decades. The basic idea is using our resources in a fashion that does not stifle future generations opportunities to use the same resources. The Eco-City, the archetype of which was developed in Berkeley, California in 1975, provided a foundation for the growth of a sustainable development movement in America. Similarly, Agenda 21, a set of international principles designed to ensure sustainable human development, provides a similar base worldwide. Local Agenda 21, a subsection of Agenda 21, supplies guidelines for tailoring sustainable practices to meet the needs of individual communities. Local Agenda 21 has had the greatest success of any global sustainability program. There are also a number of adjunct concepts that enhance one's understanding of sustainable development. Among those are indicators of sustainable development, which delineate guidelines for measuring an area's sustainable progress; ecological economics, which connects humans to their environment via mutually influential fields; and a differentiation between sustainable development and new urbanism, which are two paradigms for urban renewal that are often confused because of a number of overlapping concepts.

The fourth section presents a variety of ideas instituted by other cities in the United States and worldwide that could potentially benefit a Blueprint for Environmental Sustainability Along the James River. Hamilton-Wentworth, Canada is one of the first regions to successfully implement Local Agenda 21. The area instituted a number of potentially useful programs and gained community support using techniques worthy of duplication. Curitiba, Brazil is a model sustainable community because of its visionary

mayor. The city has had ever increasing environmental standards over the last three and a half decades. Curitiba's transit system and creative sustainable programs are also outstanding. Over the past few decades, Chattanooga, Tennessee completed a remarkable environmental turnaround from having the worst air quality in the nation to an ideal sustainable city. The San Francisco Bay Area has always been on the cutting edge of sustainability. It was here that the eco-city first started, and a number of large environmental agencies are active in the region. Finally, Baltimore offers the city of Richmond examples of implementing educational programs to spur community knowledge of and involvement in sustainable practices.

Chapter five defines and explains the research methodology. It expands upon the overarching research question and delineates research foci, including environmental standards, leadership vision and connectivity, and community involvement.

Chapter six parallels the evolution of Richmond with that of the James River. This chapter notes how humans have shaped local urban development over time and what factors influenced policy decisions. A summary of recent riverfront development projects and policy culminates with a brief history of the James River Park System.

The seventh section details why I selected each participant. It expands upon the categorization of participants as members of environmental interest groups, government, or business to explain what interviewing each participant added to the research.

Chapter eight explains the differences in the three types of questionnaires I used; government, business, and environmental interest group. This section also summarizes the theme around which I framed interview questions. The theme is "What is happening now? vs. What should happen in the future?". This chapter concludes with a synopsis of

the specific questions that sought to answer each portion of the theme and how the questions fit together to form the theme.

Chapter nine is a research findings summary. It illuminates what each occupational category stated or believed about the thematic questions. This section seeks to compare the input of local government, business, and environmental interest groups about Richmond's environmental strengths and weaknesses, environmental initiatives, venues for expression and idea generation, how to pique public interest, roles that must be filled to achieve environmental sustainability, and suggested sustainable benchmarks or indicators related to the James River.

Chapter ten begins by offering a series of environmental benchmarks and indicators of sustainability on the James River. This is followed by a section about goals and recommendations for improving local leadership, particularly the connection between different organizational realms and the mindset of Richmond's leadership class. The paper concludes with a segment on increasing community engagement in the decision-making process.

Chapter II: The Ecological Model

Classic Urban Ecological Theory

Classic ecology originated during the 19th Century as a subdivision of biological science associated with the adaptation of flora and fauna to each other and to their environments (Kleinberg, 1995). During the 1920s, Robert Park and Ernest Burgess, two University of Chicago sociologists, introduced the concept of human ecology. This concept applies human community of the Darwinian concept to an organic network built on interdependence, competition, and finding an ecological niche to ensure survival (Kleinberg, 1995). Thus, according to Kleinberg (1995), "an image of urban evolution based on continual social and spatial competition resembling that found among natural organisms" (p.9). Park and Burgess also documented similarities between the formation of an ecological order and a socioeconomic order, especially concerning the acquisition of strategic location and/or resource control (Kleinberg, 1995).

This concept of the functionality of actions led to the widely known Theory of Concentric Zones, in which the central business district (CBD) is physically and functionally the core of a city (Kleinberg, 1995). Stretching outward from the CBD in concentric circles were zones of increasingly lower functional importance. Geographic factors such as rivers and hills influence the structures and location of various zones. Park views this approach as functional because he assumes that a person's niche will not only cause him/her to meet with the least competition, but also to be able to contribute the most to community life (Kleinberg, 1995). While many of Park and Burgess' ideas

are now outdated, the basis of human ecology, that one must take note of the relationship between humans and their environment, is just as crucial to any modern developmental plan as it was when the concept of human ecology originated.

Criticism of this view included the idea that Park and Burgess assume an unfounded shared set of group values and culture that allows each to accept his/her ecological niche (Kleinberg, 1995). Some believed values to be universally divergent, even within a group with other commonalities. Thus, the acceptance of an ecological niche lacks a critical step in achieving validity. Others believed competition-based theories also completely overlooked "cultural and other motivational factors in explaining land use patterns." (Kleinberg, 1995, p. 14)

Contemporary Ecological Theory

Neoclassical (Contemporary) Ecological Theory moved away from competition as the sole motivating factor in shaping a community. Two new key variables were technological innovation and cultural preferences (Kleinberg, 1995). However, modern urban ecological theory recognized that any number and combination of factors can lead a person to thrive where he/she does. People responded to push factors, such as increasing taxes, and pull factors, such as affordable housing, that either repelled or attracted a person, respectively (Kleinberg, 1995). In 1964, Duncan developed the concept of the ecosystem, "an evolving social spatial system consisting of the three major classic ecological variables: population, environment, and technology." (Kleinberg, 1995, p. 16) These three variables mutually influenced one-another to create social

organization, which in turn influenced the other three factors. Berry and Kasarda added to this the idea of metropolitan expansion as the combination of centrifugal movements, which are out-migrations of people, retail, and industry, and centripetal movements, or growing concentrations of administrative, business, and financial services in central cities (Kleinberg, 1995). Thus, neoclassical ecology added considerations to the formation of a plan for sustainable development, just as it enhanced Park and Burgess' realm of interaction between humans and their environment.

Modeling

In "Modeling Complex Ecological Economic Systems," Costanza, Wainger, Folke, and Mäler (1993) provide an excellent overview of the basic components of systems modeling. They explained that "models are analogous to maps. Like maps, they have many possible purposes and uses, and not one map or model is right for the entire range of uses...Models, like maps, are abstract representations of complex territory." (Costanza, Wainger, Folke, & Mäler, 1993) The purpose of modeling is to formulate a method of predicting the outcome of the interaction between different variables and/or systems. In 1993, Costanza and his associates documented that systems are:

> Groups of interacting, interdependent parts linked together by exchanges of energy, matter, and information. Complex systems are characterized by strong (usually non-linear) interactions between the parts, complex feedback loops that make it difficult to distinguish cause from effect, and significant time and space lags, discontinuities, thresholds, and limits. (p. 545)

However, models are intended to inform policy decisions, not to legitimize them, since they are indeed only predictions with varying degrees of certainty.

Models can be classified by numerous criteria, the most useful of which depends on the goals of the exercise. Some of these criteria include resolutions, scales, generality, realism, and precision (Costanza, Wainger, Folke, & Mäler, 1993). The three minimum criteria for evaluating models are: 1) realism, which is simulating system performance in a qualitatively practical manner, 2) precision, which is simulating behavior in a quantitatively accurate method, and 3) generality, which is portraying a wide-ranging set of systems' performance with the same model (Costanza, Wainger, Folke, & Mäler, 1993). None of these models can maximize every goal because the choice of objectives depends on the reason(s) for the model (Costanza, Wainger, Folke, & Mäler, 1993).

In 1993, Costanza and his colleagues documented four primary model prototypes. First, *high-generality conceptual models* relinquished some realism and/or precision by simplifying associations and/or diminishing resolution. An example of such a model was a simple linear or nonlinear ecological/economic model, such as the evolutionary games approach. Second, *high-precision analytical models* surrendered realism and generality. One strategy was to maintain a high resolution but abridge relationships and manage minimal time frames. Another method following this scheme was to model one or a few properties of a system that characterize the whole. According to Costanza, Wainger, Folke, and Mäler (1993), an examination of relationships between biotic and abiotic communities in a marine ecosystem was one example of such a model. A third type was the *high-realism impact-analysis model.* The goal was to form realistic assessments of the performance of specified complex systems, therefore relaxing precision and generality. Such models had a high resolution and were

"concerned with accurately representing the underlying processes in a specific system, rather than with precisely matching quantitative behavior or being generally applicable.

Dynamic, nonlinear, evolutionary systems models at moderate to high resolution generally [fell] into this category." (Costanza, Wainger, Folke, & Mäler, 1993, p. 547) A micromodel of responses of specific business activities was one such example. The final model was a *moderate-generality and moderate precision indicator model.* With the aim of accurately predicting general magnitude and direction of change, this model relinquished realism for reasonable generality and precision. One common example of this type of model was the standard gross national product (GNP).

Of the model prototypes mentioned above, all can be applied to environmental sustainability along the James River. Selection of the most applicable model is dependent on the desired goal(s). To best understand sustainable development in a complex system such as the James, one must have a firm grasp on the underlying processes in a system. Because of its ability to lay out these processes, the most useful type of model was a *high-realism impact-analysis model.* Other models, however, may be developed to predict secondary information.

Furthermore, in modeling complex systems, scale and hierarchy are paramount. Scale equates to resolution, such as "spatial grain size, time step, or degree of complication," while extent refers to space, time, and component quantity (Costanza, Wainger, Folke, & Mäler, 1993, p. 548). An easily comprehendible hierarchy of scale can be found in the natural world (atoms, molecules, cells, organs, organisms, populations, communities, ecosystems, bioregions, global system, beyond). On this hierarchy, the James River is an ecosystem that contributes to the Chesapeake Bay Watershed, a bioregion. The James River contains a number of communities, which are less complex. Although these can then be divided until the James River is segmented into atoms, the River will be examined as an ecosystem in this research.

Ecological Economics

One of the most significant and controversial connections in the field of sustainable development has been the overlap between ecology and economy (Common & Perrings, 1992). The relation between ecological and economic sustainability was not in question. Instead, disagreements arose over natural capital, the worth of the environment and whether a dollar amount can be assigned to something occurring in nature. For instance, the essence of sustainability was that one generation preserves enough resources to pass a suitable amount on to their successors. When ecology and economics begin to intertwine, is it still sustainable to pass along currency instead of nature (Victor, 1991)? If so, is there a limit to the percentage of nature can be exchanged for currency before the practice is no longer considered sustainable? Although both concepts are valuable separately, any study can benefit from an analysis of the overlapping effects of ecology and economy.

Ecological Economics has been the latest trend in modeling among economic theorists. Braat and van Lierop presented a two-pronged definition of economic-ecological models (1987). *Operationally*, they defined economic-ecological models as those that can assess the pertinent effects of socio-economic behavior on ecosystems, and vice versa (Braat & van Lierop, 1987). *Structurally*, they were models that include in an adequate manner both the socioeconomic and the ecological phenomena germane to the problem at hand (Braat & van Lierop, 1987). The purpose of ecological-economic modeling spans the same spectrum as any other model, general to detailed (Costanza,

Wainger, Folke, & Mäler, 1993). In addition, since ecological and economic systems are commonly complex systems separately, when analyzed together they are almost always highly complex (Costanza, Wainger, Folke, & Mäler, 1993).

As mentioned earlier, most theorists depict ecological-economics as a boon to the modeling world. Costanza and his colleagues, avid proponents of the mixed model, commented, "The interactions between ecological and economic systems are so many and strong. So, splitting the world into separate economic and ecological systems is a poor choice of boundary." (Costanza, Wainger, Folke, & Mäler, 1993, p. 545) They further stated,

> Economic and ecological analysis needs to shift away from implicit assumptions that eliminate links within and between economic and natural systems because, due to the strength of the real-world interactions between these components, failing to link them can cause severe misperceptions and indeed policy failures. (Costanza, Wainger, Folke, & Mäler, 1993, pps. 545-546).

Conversely, Pearce and Barbier offer some of the only criticism of joint modeling. The pair believed that jumping to label the ecological-economic model a panacea for developmental problems was rash (and that others are doing just that). They claimed economics has important contributions to our understanding of the development of effective policy to make on its own and that many theorists are overlooking that aid (Pearce and Barbier, 2000).

One approach to ecological economics posited by Costanza and his associates in 1993 was the evolutionary paradigm. The general evolutionary pattern hypothesized that complex systems of any scale learn and adapt using three fundamental interactive processes: "information storage and transmission, generation of new alternatives, and selection of superior alternatives according to some performance criteria." (Costanza,

Wainger, Folke, & Mäler, 1993, p. 550). The following are a few sample models from this paradigm: 1) genetic evolution, 2) the Holling Model, and 3) evolutionary game theory.

The genetic evolution model parallels biological evolution, in which information storage via new alternatives created by sexual recombination or mutation leads to survival of the fittest (Costanza, Wainger, Folke, & Mäler, 1993). However, in the genetic evolution model of ecological economics, the elements of the process are different (i.e. in a cultural process the mediums of information retention are books, film, oral tradition, etc).

The Holling model is an evolutionary process with the ambition of maximizing generality (Costanza, Wainger, Folke, & Mäler, 1993). This model includes four basic functions through which the process continually cycles as the system evolves – exploitation, conservation, release, and reorganization. Systems evolve through rapid colonization, exploitation of easily accessible resources, a conservation stage of building/storage of increasingly complex structures, breakdown of established structures via aperiodic events (i.e. fire, political upheaval) and/or ongoing creative destruction and improvement, and subsequent reorganization (Costanza, Wainger, Folke, & Mäler, 1993).

Evolutionary game theory is a combination of game theory, in which a number of players act rationally to maximize individual payoff, and evolutionary models, wherein the participants adapt and learn as they gain experience (Costanza, Wainger, Folke, & Mäler, 1993). As applied to ecological economics, the players strive to improve their lots both fiscally and in terms of natural resources as they learn increasingly beneficial strategies.

Although the evolutionary paradigm is merely an overview of one approach to ecological economics models, it is indeed applicable to sustainable development along the James River. The James can only afford a limited amount of learning via hit-or-miss experience, but each experience will indeed benefit Richmonders' understanding of the interconnectedness of our ecosystem and socioeconomic structure, and each developmental attempt or idea can potentially influence Richmond's policy progress.

Computers and the Ecological Model

Computer hardware advances have drastically impacted the complexity of systems that humans are capable of analyzing. For example, CRAY supercomputers and Connection Machines can model complex systems with sophisticated numerical algorithms (Costanza, Wainger, Folke, & Mäler, 1993). In addition, those of us who do not own a supercomputer can gain a greater understanding of how a real system works using Geographic Information Systems (GIS) (Gimblett, 2002). The advantages to developing models via computer rather than experimenting with real systems include great savings in cost and time, easily interpretable data, and completely repeatable and non-destructive simulations. GIS offers logical, qualitative, and quantitative data that can be easily represented at resolutions ranging from local to small-scale satellite pictures (Gimblett, 2002). GIS also provides a valuable means of presenting real-world data three-dimensionally (multi-layered) at different resolutions (spatial scales) across a time frame (Gimblett, 2002). GIS could prove extremely helpful in analyzing complex ecological-economic systems of the James River.

Chapter III: An Overview of Sustainability

The Eco-City: Sustainable Foundations

Another important urban concept that arose because of increasing environmental consciousness was the "eco-city." In 1975, the "eco-city" was crafted by Urban Ecology, a San Francisco-based nonprofit organization that merged ideas from urban planning, health, bioregionalism, civic participation, transportation, social justice, energy, and economic growth (Roseland, n.d.). The ten principles upon which the "eco-city" was based included: 1) revision of land-use doctrines to stimulate communities near transit facilities that espoused dense, diverse, green, mixed-use, and safe characteristics, 2) revamped transportation priorities that discourage automobiles and promote pedestrian, bicycle, and transit travel, 3) restoration of urban environments, 4) creation of reasonably priced, safe, convenient housing, 5) nourishment of social justice, 6) support for local crop growth, increase urban green space, and foster community gardening, 7) promotion of recycling, re-use, resource conservation, and appropriate technology while decreasing pollution and hazardous waste, 8) collaboration among businesses and grassroots organizations to create ecologically friendly economic activity, 9) discouraging excess consumption, and 10) increasing environmental and bioregional awareness through educational programs on sustainability (Roseland, n.d.). Over the last 25 years, these principles have aided a number of paradigms that can be classified as "eco-city" movements, the most pertinent of which was sustainable development. Urban Ecology's "eco-city" provided a sound basis for belief in the viability of attaining sustainable goals.

Sustainability: What does it entail?

A common, broad definition of sustainability is "meeting the needs of the present without compromising the ability of future generations to meet their own needs." (Roseland, n.d., p. 91) The sustainable development paradigm grew out of human concern for rising rates of resource consumption and ecosystem destruction that occurred as a result of the industrial revolution. Initially, sustainable development was solely focused on environmental issues. The idea has expanded to include meeting social and economic needs as well. However, since it is the core concept in sustainable development, this research highlights the environmental aspect of sustainability.

In 1983, Gro Harlem Brundtland of Norway was appointed by the United Nations to chair the newly formed World Commission on Environment and Development. The commission worked toward the creation of universal sustainable development principles. In 1992, the United Nations convened nearly every country in Rio de Janeiro, Brazil for a Conference on Environment and Development (also known as "Earth Summit"). The convention's goal was to map out a path for the future of human development (Lafferty, n.d.). The result was a forty-chapter document called "Agenda 21" that offered guidelines for worldwide social, economic, and environmental development in the twenty-first century.

Local Agenda 21

Arguably the most influential portion of "Agenda 21" was chapter twenty-eight, "Local Agenda 21." This chapter recognizes that the ideas proposed by "Agenda 21" must be implemented on the local level. The conferees at "Earth Summit" realized that, although pursuing sustainability required collective action by a number of organizations, it was crucial that individual behavior align with sustainable principles (Lafferty, n.d.). Thus, "Local Agenda 21" identified the need for regional and community leaders to mold sustainable plans that met their local needs, keeping in mind national and global goals. The four focal objectives of "Local Agenda 21" included: 1) by 1993, the global community should have commenced a process geared toward stimulating collaboration between local authorities, 2) by 1994, city representatives should have developed a system of information exchange between communities and regions, 3) by 1996, most local areas should have completed the consultative process through which they determine community needs under "Local Agenda 21," 4) all local officials should ensure that women and young people are represented in the decision-making and implementation procedures (Lafferty, n.d.). Since 1992, several cities and regions have become models of the successes of "Local Agenda 21," such as Hamilton-Wentworth, Ontario. Many more are working to institute sustainable practices. "Local Agenda 21" even begot the now-clichéd phrase, "Think globally and act locally" (White, n.d.).

Indicators of Sustainability

The increased focus on sustainable development in modern society created a need for a means to measure our progress. Since sustainability was fundamentally linked to decision-making and planning, a system of goals and criteria was useful as a guidance tool (van Wijngaarden, n.d.). Under "Local Agenda 21," each community's plan for achieving sustainability differed, so sustainable indicators of would also differ to match community initiatives. Although development differs from place to place, Elizabeth Kline offers a general set of guidelines for creating a method of success measurement (n.d.). A few of these suggestions included discovering and focusing on core concerns rather than symptomatic problems; gauging interconnectedness; measuring community feedback, rather than just the success or failure of programs; assessing progress at neighborhood, regional, and citywide levels; noting deficits and evaluating whether they turn into assets; and addressing equity issues (Kline, n.d.). Such a system of possible areas of measurement can be crucial to setting a community on track to appropriate sustainable goals.

Chapter IV: Sustainable Practices in Other Cities

A number of cities have instituted sustainable practices over the past few decades. Each city tailors its policies to meet its needs. Thus, all of the following cases highlight different concepts that fall under the umbrella of sustainable development. Although some of the information is not pertinent, each case details the successful implementation of some aspects beneficial to developing Richmond in an environmentally sustainable fashion.

Hamilton-Wentworth, Canada

In 1990, a number of governmental, community, and industrial organizations in the Regional Municipality of Hamilton-Wentworth, Canada convened to devise a vision for their ideal community (UNESCO, n.d.). They created a task force who surveyed over 1,000 citizens to engender a regional proposal titled "Vision 2020: The Sustainable Region." The task force used several different methods of outreach to make participating in the public input process as convenient as possible. Seven town hall meetings and two full-day open community forums were held. Focus group discussions were also conducted among generally overlooked people, including the elderly, homeless, and non-English speaking groups. Citizen vision-working groups directed the final report along sustainable guidelines and implementation teams determined the actions necessary to realize the regions goals.

The actions decided upon by the region fall into four major categories (UNESCO, n.d.). First was aligning policy documents and long-range planning with the primary aim of the revised economic strategy, that of infusing economic development with sustainable practices. Second, the Staff Working Group on Sustainable Development had been striving to integrate sustainable development into the capital budget and annual tasks carried out by various departments. Hamilton-Wentworth had to ensure that there were people to carry out "Vision 2020" without significantly overloading any governmental or construction departments. The third major activity entailed implementing the recommendations proposed under "Vision 2020." By February 1993, when "Vision 2020" was complete, several important sustainable projects had taken effect in Hamilton-Wentworth. A few of these projects included a transportation review, pollution prevention project, greenlands project, bicycle commuter project, free auditing of home energy use, and an educational organization partnered with Hamilton-Wentworth schools (UNESCO, n.d.). Finally, Hamilton-Wentworth organized several progress gauges and publicity aids, including hosting an annual Sustainable Community Day, the design of twenty-eight sustainable community indicators, and the composure of a Sustainable Community Decision Making Guide (UNESCO, n.d.).

Although Hamilton-Wentworth has designed a program ideal to its urban areas, not all of the region's ideas can be applied to a Blueprint for Environmental Sustainability Along the James River. The majority of Hamilton-Wentworth's projects, those pertinent to transportation review, pollution prevention, greenlands maintenance, bicycle commuting, and education have some relevance to development along the James. The most important lesson Richmond can learn from the Canadian region is how to

involve the community. An effective Blueprint for Environmental Sustainability Along the James River will require the cooperation of the city council, local businesses, environmental groups and Richmond residents. Hamilton-Wentworth achieved a level of participation and subsequent success worthy of replication. Educational programs about environmental health and sustainability would also be beneficial to public awareness and involvement.

Curitiba, Brazil

Between the 1950s and 1990s, Curitiba's population increased nearly eleven-fold, from 150,000 to 1.6 million (Globalideasbank, 1995). With such rapid growth, city planning became a major issue on the mayor's plate as early as the 1960s. In 1965, a group of young architects approached the mayor about proposing ideas for a master plan for the city. The mayor then sponsored a master plan contest and the company of architects was commissioned to develop and execute a final plan. The plan's central tenets included integrating transportation, traffic management, and land-use strategies (Dismantle, n.d.). It was also flexibly structured to permit unanticipated scenarios well into the future (Dismantle, n.d.). In 1971, Jaime Lerner, one of the architects, was appointed mayor by the Brazilian military government (Globalideasbank, 1995). Since then he has helped engineer many innovative, sustainable programs for Curitiba.

First, following the Master Plan's guiding principle that land use and mobility are integrally connected, Lerner engineered a very impressive citywide transportation system. He created a network of concentric roads connected by five primary transport

arteries ((Dismantle, n.d.; Sustainable Communities Network Partnership, 1996). Each artery has separate lanes for express buses, local access for cars, and a one-way high-capacity lane for both buses and cars. The bus system also includes five types of buses, for a total of 1,100 buses serving 1.3 million passengers per day (Dismantle, n.d.). Express buses operate solely on main arteries. These buses travel as fast as subway cars, but cost only one-eightieth as much to build (Globalideasbank, 1995). "Rapid" buses change routes based on demand and are available on both arteries and other major streets. "Bi-articulated" buses operate in the high-capacity lanes. With a passenger limit of around 300 people, "bi-articulated" buses are the largest in the world (Dismantle, n.d.). "Inter-district" buses carry passengers through sectors between arteries. Finally, "feeder" buses travel with general traffic and cart passengers to transfer stations. As a result of the bus system, there has been twenty-five percent less congestion in Curitiba than in cities of comparable size (Sustainable Communities Network Partnership, 1996). There is also noticeably cleaner air and thirty percent less gasoline use per capita than eight similar Brazilian cities (Dismantle, n.d.). In addition, many retired buses serve as free transportation to green or open spaces (Sustainable Communities Network Partnership, 1996). Some are also used as mobile training centers on which citizens can take courses in general skills such as auto repair, typing, or hair dressing for only $1.00 (Sustainable Communities Network Partnership, 1996).

Lerner's programs have also significantly benefited parks and open spaces in Curitiba. Since 1970, the amount of green space per resident has increased from 5 to 559 square feet, 1.3 million saplings have been planted, sixteen parks have been fostered, and one thousand plazas have been created throughout the city (Sustainable Communities

Network Partnership, 1996). Lerner also solved the Curitiba's flood problems by rerouting lowland waters into park lakes (Globalideasbank, 1995). He then hired teenagers as grounds' maintenance workers for the parks (Globalideasbank, 1995). Finally, Lerner offers city builders a tax break if their projects add green areas (Globalideasbank, 1995).

After turning the downtown shopping district into a pedestrian-only zone, which resulted in an economic boom, Lerner convinced each shop or industry to "adopt" a few street children. The children tend the gardens and perform trivial shop maintenance in exchange for a daily meal and a small salary (Globalideasbank, 1995).

Curitiba has also gained international recognition for its waste management programs. Two-thirds of the city's daily 100 tons of garbage is recycled (Sustainable Communities Network Partnership, 1996). Citizens separate trash into organic and inorganic material and a truck comes to collect each kind. Poor squatter families in settlements not reachable by truck can bring trash to neighborhood centers and exchange it for produce bought from local farms or bus tickets. The inorganic trash is taken to a plant where recent immigrants, disabled people, and alcoholics are employed to separate plastic, cans, and bottles. Recycled materials are sold to nearby industries and styrofoam is used to fill quilts for the poor.

Richmond can use a number of the concepts behind Curitiba's sustainable programs. For instance, although Curitiba's recycling program is phenomenal, the idea is too broad to include in a plan for environmental sustainability along the James. However, viewing waste management as a cyclical system that rewards citizens for participating and produces visible secondary community benefits (jobs, blankets) is a

helpful, innovative way for Richmond to frame its thinking while instituting sustainable practices. Along these same lines, a tax incentive program for including green space in developmental plans is another positive initiative Richmond could take from Curitiba that would directly relate to building along the James. Also, since Richmond has little pre-existing funding for sustainability, using Curitiba's low budget mindset and creating programs that pay for themselves or "kill two birds with one stone," such as so many of Lerner's ideas that both satiated a need and provided jobs to a generally underemployed group, could significantly improve the city council's opinion of sustainable projects.

Chattanooga, Tennessee

In 1960, Chattanooga had the highest workforce percentage in manufacturing in the Southern U.S. (Parr, 2001). Pollution standards were very low and, in 1969, Walter Chronkite announced that Chattanooga had been declared by the federal government to have the worst air quality in the nation. Subsequently, industrial and civic leaders in Chattanooga united to remedy the problem. To improve local living standards, they set up a control board to educate the public about pollution and health issues. With the help of outside consultants from Carl Lynch and Associates, the board held over sixty-five public meetings and decided to renovate the city's approach to conducting civic business (Parr, 2001).

In 1984, the "Chattanooga Venture" was created to bring diverse groups of citizens together to solve citywide problems. The program's goals included gathering continual input from citizens, a focus on revamping entire bureaucratic systems, and starting new organizations to meet community needs (Parr, 2001). The end result of the

"Chattanooga Venture" was named "Vision 2000," a campaign that incorporated several projects and strove to coordinate city leaders with grassroots groups, to educate the public, and to ensure that sustainable development was experiential for those involved (Parr, 2001). Over the sixteen-year course between 1984 and 2000, Chattanooga invested $793,303,813 ($2,778 per person) in projects associated with "Vision 2000" (Parr, 2001). These projects were aimed at creating affordable housing, bettering public education, developing transportation alternatives, increasing parks and greenways, renovating urban design, and revitalizing neighborhoods.

A change method that has become routine in the city is what's known as the "Chattanooga Process." The basics of this method include using a visual preference survey of possible outcomes to determine citizen's ideal vision of development for a proposed project, incorporating survey results into the city's long-range plan with the help of a regional planning agency, rewriting zoning and other regulations to coincide with citywide preferences, and taking action to complete the project. The first step, gathering public opinion, involves surveying at public meetings, major employment hubs, neighborhood and professional organizations, and public libraries. Television broadcasts and video presentations also aid in measuring public opinion.

By 1990, Chattanooga had evolved into the nation's best sustainable turn-around story. The city continued its trend by devoting its entire 1996 Chamber of Commerce session to limiting urban sprawl and creating Advanced Vehicle Systems (AVS) to manufacture electric buses, which had previously been produced in only one place (Parr, 2001). The city now runs a free downtown electric bus system.

Richmonders can learn several concepts from the "Chattanooga Process." Like Hamilton-Wentworth, Chattanooga's experience asserts that active community involvement is vital to success. Richmond should also consider the ease with which Chattanooga's city council is willing to adapt zoning and other policies to meet citizen's desires. Richmond should also note the regional planning and consulting aid Chattanooga sought to facilitate their public opinion-gathering process. Regarding actual programs under "Vision 2020," a Blueprint for Environmental Sustainability Along the James River could benefit from public education, urban design renovation, and greenspace foci. However, due to the researcher's focus on the environmental aspects of sustainability transportation, neighborhood revitalization, and affordable housing programs will not be included.

The San Francisco Bay Area, California

In December 1996, Urban Ecology, a San Francisco Bay organization with an avid interest in sustainability, published the "Blueprint for a Sustainable Bay Area." Ideas for the document were gleaned through a public survey, and they focused on topics of local and regional importance. These topics included the greenbelt; the Bay, Delta, and Estuary; promoting transportation alternatives within the region; old- and new-economy jobs; resource conservation and reuse; respect for local and historical building traditions; developing a strong sense of place; community building; and sharing revenue (Urban Ecology, 1996). The Blueprint highlighted seven principles the city deemed essential for improving sustainability: choice, nature, justice, access, conservation,

context, and community (Urban Ecology, 1996). The centerpiece of choice was affordable housing, although available jobs and transportation also fell therein. Nature referred to preserving a sense of place by caring for the 4.5 million acres of open space in the region. Justice was primarily cultural and economic, with a focus on providing social equity, adequate education for everyone, and social justice programs and training. Access included mainly transportation availability and options. Conservation highlighted the Bay Area's overconsumption and waste of water, energy, and other resources. Context consisted of maintaining the area's appeal through economic development and design. Finally, community included maintaining a focus on the citizens and ensuring that the community takes responsibility for its own upkeep.

Each city in the region had different, yet interrelated needs. According to Urban Ecology, Berkeley had a high degree of community activism, but rigid development restrictions (n.d.). Its layout was perfect for infill development and its policies support sustainable development and low-cost housing (Urban Ecology, n.d.). In addition, it already had an extensive public transit system. Recommended strategies for improvement include maximizing the efficiency of parking spaces by residential, commercial, and retail space sharing, pricing parking to discourage single-person commuting and auto ownership, redeveloping the Amtrak station into a center of transit, and educating about the benefits of infill projects (Urban Ecology, n.d.).

San Francisco is the heart of the Bay Area. Its transit system, business district, and residential neighborhoods, and informed population were all in line with sustainable practices. However, housing costs were very high and bureaucracy stifled projects (Urban Ecology, n.d.). In spite of these drawbacks, San Francisco did have major

redevelopments and renovations planned. A chief transit terminal was scheduled for major overhaul and a 303-acre waterfront redevelopment plan had been approved (Urban Ecology, n.d.). The new waterfront plan included commercial development, retail space, residential units, a hotel, school, parks and open space, and fire and police facilities (Urban Ecology, n.d.). San Francisco was also in the process of constructing a new light rail corridor.

Fremont formed when five smaller towns merged in 1956. It was an eclectic community with reasonable amounts of developable land. The city was shifting towards infill development and had been consulting with private contractors to consolidate the central business district into a more pedestrian-friendly, mixed-use area (Urban Ecology, n.d.). However, there was still a noticeable need for renovated transit services, more dense transit-oriented development, and a re-emphasis on public open markets and green space (Urban Ecology, n.d.).

Oakland offered remarkable possibilities for sustainable development. The city instituted what is known as the "10K initiative," a high-density development in downtown Oakland (Urban Ecology, n.d.). In fact, Oakland was one of the few Bay Area cities that are wholly committed to high-density development. Oakland's largest problem was that it housed the largest Bay Area poor population, and dwindling federal subsidies were limiting affordable housing programs (Urban Ecology, n.d.). Thus, the city had to find a medium between protecting existing residents and encouraging new development. At the time of this research, Oakland was working on pedestrian, streetscape, and bicycle master plans; studying downtown circulation and inclusionary zoning; working to fund

new open spaces; and attempting to renovate parts of the city and the Bay Area Rapid Transport (BART) transit station (Urban Ecology, n.d.).

Like other regions, the Bay Area's plan, the Blueprint for Sustainability, inspired goals of public education, citizen organization, and implementation of sustainable policies. However, the Bay Area also actively encouraged progressive developers (Urban Ecology, n.d.). Urban Ecology, the organization responsible for the Bay Area Blueprint for Sustainable Development, recognized the fundamental impact real estate developers had on shaping a region's cities. They judged developers on inclusion of mixed-use development, housing choice, pedestrian design, transportation choice, and ecological design (Urban Ecology, n.d.). Urban Ecology hoped to encourage more developers to increase integration of sustainable ideas into their design and to promote customers' selection of the most sustainable builders. In addition, Urban Ecology collaborated with grassroots organizations to provide a Community Design Program that gears builders towards higher standards of environmental health and social justice (n.d.).

The Bay Area provided three central ideas that could prove useful to promoting sustainability in Richmond. First, the region proved the tremendous impact that independent sustainable development interest groups, such as Urban Ecology, can have on driving a city in a sustainable direction. Second, the Bay Area showed the benefits that symbiotic relationships with private developers can have on attaining sustainable goals. Finally, the issues of high parking fares, limited parking areas, and tolls to encourage public transportation could possibly be usefully applied to Richmond. However, contemporary downtown Richmond could hardly be called a "hub." Deterring individual auto travel may simply detract from the number of Richmonders who visit the

downtown area. Because the focus of this document is environmental sustainable along the James River, the Bay Area's ideas about infill development will not be cited in Richmond's Blueprint. In addition, because this study is river-centric, the researcher will not focus on the Bay Area's extensive public transportation system. Thus, of the seven principles detailed in the Bay Area's Blueprint for Sustainable Development, the most applicable to the Blueprint for Environmental Sustainability Along the James River were nature and conservation. Richmond should tailor its own sustainable practices to fit these categories in ways similar to the San Francisco Bay Area, but with it's unique environment in mind.

Baltimore, Maryland

In 1994, Baltimore initiated the "Baltimore Ecosystem Study" (BES). The BES was both an organization and a scientific endeavor in which biological, physical, and social science researchers collected and analyzed data on how the built and natural ecosystems of Baltimore function. Specifically, field crews examined everything about Baltimore's environment, from soil particles to how urban factors affect wildlife (James, 1997). In 1996, the study gained national recognition when the National Science Foundation offered the BES a grant of $4.38 million over six years to conduct the first examination of long-term ecological change in an urban environment (James, 1997). The project then expanded to include several research organizations in Maryland and to involve local schools in the research process.

Another organization, the Maryland Geographic Alliance (MGA), also strives to familiarize students with their physical environment. The MGA conducts teacher training programs in which they identify and explain age-appropriate facets of geographic education that are then passed on to elementary and middle school classes. The pre-kindergarten through third grade program includes the following tenets: 1) Constructing and interpreting maps; 2) Describing and classifying physical and human-made places and regions; 3) Explaining why some locations are better for specific human activities; 4) Identifying a region with one or more common geographic characteristics; 5) Identifying the geographic characteristics that affect where people settle; 6) Describing how transportation and communication networks link communities; 7) Identifying ways people adapt to and modify their natural environment to satisfy their wants; and 8) Identifying environmental concerns of their community (Maryland Geographic Alliance, n.d.). Each tenet has an accompanying, more in-depth counterpart in the lesson for grades 4-5 and 6-8. MGA promotes a Geography Awareness Week in which the organization encourages teachers to share the aforementioned program with their classes.

Although the actual outcome of the BES is not germane to Richmond, the city could benefit from noting if and how the results are used to benefit urban environmental sustainability in Baltimore. Overall though, the important things to consider from Baltimore are the importance of ecological studies and the idea of getting involved in citizens' lives at the elementary school level.

Chapter V: Methodology

Through interviews with several Richmonders who would aid sustainable progress in the city, as well as those who are knowledgeable about sustainability, this paper will provide a better understanding of the city's needs and capabilities. This information will prove helpful in tailoring a Blueprint for Environmental Sustainability Along the James River.

First, the researcher needed to take into account what the city has done in the past to encourage and pursue sustainability. Having an accurate perception of past initiatives and practices helped create a picture of how open the city was to participating in new programs, specifically those geared toward sustainability. To bolster that knowledge, the researcher examined what initiatives were currently in place in the city.

Next, it was important to consider who was invested in sustainability in Richmond and what groups or organizations were the most concerned with the future of the city. What were the concerns of these groups and how would they be willing to help achieve sustainability? Overall, this section sought to answer the question of – Which individuals and groups would fill the roles necessary for a sustainable James River environment?

Overarching Question

Shaping growth to suit the natural environment is paramount to achieving sustainability. In order to attain sustainable standards, Richmond must examine its

strengths and weaknesses, in terms of nature, growth, and people. The city must catalogue the urban growth currently in progress and take note of plans for future development. Then, Richmond's leaders must compare developmental plans with sustainable goals to determine how environmentally sustainable practices can be instituted along the James without stifling progress. Richmonders must also ask the crucial question, "What is the value of our natural environment?" They must note the intrinsic value that the James River and its watershed bring to the city, as well as the economic benefits the James can provide as well. They must consider what the long term affects of pursuing sustainable goals vs. unchecked development entail.

Research Foci

It was essential to define the necessary categories within which the city needed to make progress. Before doing so, the researcher would like to note that there are several aspects of sustainable development on which this study did not focus. Although social justice, choice in employment, fair housing, infill development, spirituality, and mass transit contribute to sustainable development, these topics were not researched. While they are important to sustainable development, they were not germane to the study of environmental sustainability.

Based on literature from other cities actively seeking high levels of environmental sustainability, three key categories were developed. They included community engagement, leadership vision and connectivity, and environmental improvements. These three facets of urban growth offer the city a starting position for a discussion of

sustainability. First, "nothing can grow in a self-sustaining way unless there are reinforcing processes underlying its growth." (Senge, 1999, p. 42). Strong leadership representing all concerned parties in Richmond must have the foresight and stability to set such processes in motion. Second, community involvement is a crucial step in beginning any systemic change in a city. In order for a change to take effect, it must have the backing and investment of the populace. Thus, both committed, focused leaders and community involvement are essential to successfully improving Richmond's environmental standards. Finally, progressive environmental standards can have a profound effect on the sustainability of a community, as displayed by the goals and accompanying programs found in Curitiba, Brazil. As evidenced by literature regarding the successes of other cities, connected leadership, environmental improvements, and community engagement each impacts one another and proves to be a valuable building block for initiating sustainable practices.

Community Engagement

Community engagement is the centerpiece of any successful change initiative. In order for sustainability to take hold in Richmond, the people must embrace the concept. Citizens must take ownership of the idea of sustainability and believe they have an active role in determining the future of the city. To draw from the successes of Chattanooga and Hamilton-Wentworth, the researcher examined if Richmond should take advantage of the resource it has in its people by inviting them to focus groups, town hall meetings, and planning sessions wherein the future of sustainability in the city is to be determined.

In Richmond, the major question regarding community involvement should be, "How do we most effectively interest the public in actively striving for sustainable

goals?" This study sought to determine several important steps that need to be taken to bring the community to the level at which it will see the value in improving Richmond's sustainability. The research explored methods of conveying the importance of sustainability as well as where and when environmental education would be most effective. After a community recognizes the importance of sustainability, how can they take ownership of ensuring that sustainable principles are instituted in their area? This study examined the roles of local businesses, government, and environmental groups in fostering community engagement.

Environmental Improvements

The most important question regarding environmental improvements was, "What crucial environmental policies must be put into place in Richmond to ensure sustainability?" In order for sustainable urban growth to occur, the natural environment should be given status parity with development plans. This study explored environmental policies that go hand-in-hand with urban growth. The researcher wanted to examine if the most important environmental policies should primarily regulate water use and pollution, the development of wetlands, and the consumption of the James River's other natural resources and wildlife.

Leaders' Vision and Connectivity

The last question this research sought to answer was, "How do Richmond's leaders coordinate efforts across demographic divisions to align community efforts with a common vision?" The research examined the ways in which local government, business, and environmental interest groups can work together to achieve goals. It also

investigated systemic problems the city faces and how communication difficulties can damage the city's progress.

Benchmarks and Goals

What should be entailed in the city's leadership, community engagement, and environmental goals for attaining environmental sustainability? The outcome of this research was a series of sustainability-related goals that were tailored to suit Richmond's demographics, openness to change, resource availability, and community investment. In addition to goals, the city needs a means of measuring progress. Therefore, it was important to set benchmarks for improvement and to note who should create and direct the change process. Finally, attempting to incorporate sustainable goals into progress and urban development already set in motion was also crucial to affecting the easiest possible change process.

Chapter VI: Richmond Development: Past and Present

Early Importance of the James River

Because of its importance to travel, the James River became a focal point for Richmonders when the city was still in its early formulation stage. Prior to the railroad, the majority of long-distance travel took place via waterway. Thus, during the mid-1700s, maximizing the James River's potential for transporting cargo and humans was a principal interest of Richmond's citizens (Ellyson, 1970). In 1784, George Washington was elected president of the James River Navigation Company. He proposed a canal to connect the James and Kanawha Rivers. The canal was built in 1790 and by 1795 it extended into the city. Other canals were subsequently established east of the Kanawha to join the basin of the James with the river's fall line (Ellyson, 1970). These canals proved to be transportation hubs until the advent of rail lines, which ultimately eclipsed the importance of the canals along the James for everything save pumping stations for community water use (Morrison, 1893). Thus, for over a century, Richmond's once beneficial canal system had lain largely in disuse.

Two Richmonds?: 1970-1982

Although the idea of urban redevelopment dates back to the mid-1940s, it did not take on a definitive direction in Richmond until around 1970. After annexing 23 square

miles of northeast Chesterfield County in 1970, Richmond encompassed an area of approximately 62.5 square miles (Dabney, 1976).

Two acclaimed Richmond historians, Virginius Dabney and Charles Silver, offered detailed accounts of Richmond's growth during the 1970s. Both noted that Richmond's physical landscape experienced tremendous augmentation during this decade. The majority of development took place under two downtown development strategies. The first, titled *A Concept Plan for Main-to-the-James*, called for hotels, offices, upscale housing, retail facilities, and parks on a 400-acre stretch along the riverfront (Silver, 1984; Dabney, 1976). A key aim of this plan was to bolster Richmond's Central Business District (Silver, 1984). Portions of this proposal were implemented before and after a second development plan stole center stage in Richmond. This approach, titled *A Strategy for Action in Downtown Richmond, 1976-2000*, shifted the city's focus to the district north of Broad Street (Silver, 1984). This plan called for a new city hall, the erection of the Richmond Coliseum, and a complex including hotels, offices, and a convention center near the Coliseum (Dabney, 1976; Silver, 1984). The plan also endorsed development along the river, but in a much less grandiose fashion than *A Concept Plan for Main-to-the-James*. Dabney noted that segments of the antebellum James River and Kanawha Canal were restored by Reynolds Metals and that the Ethyl Corporation restored the Tredegar Iron Works gun foundry to its Civil War condition (1976). Finally, $200 million was invested in the Downtown Expressway, a highway that connected I-95 to I-64 and reduced congestion in the city (Dabney, 1976).

Although the two historians catalogued the same material developments in the city, they professed strikingly different interpretations of the city's leaders' ideology and

presented the decade in contrasting slants. Dabney wrote, "Richmond in the mid-seventies is an intriguing blend of the old and the new" (1976). His focus was on the actual development taking place, its economic effects, and his disappointment over the failed merger between Richmond, Henrico, and Chesterfield during the 1960s. He viewed this merger as Richmond's greatest need because of the fiscal equity it would have brought back to the city (1976). Although Dabney discussed racial issues in detail when depicting Richmond in the 1960s, he did not continue this focus like Charles Silver. Silver, who had the advantage of knowing that the city council changed from a majority of white members to a majority of blacks when he published his work, intertwined race with all of his ideas about why Richmond development unfolded the way it did. He depicted urban development through the 1970s and early 1980s as an ongoing battle between black and white interests for control of decision-making power on the city council. He remarked how differences in racial interests stymied progress (1984). Silver ended optimistically, however, by stating that, in 1982, Richmond Renaissance, a public/private coalition for economic progress, was formed by a partnership between the city council and white elites (1984).

Growth and Development: The 1980s

The 1980s saw the city's focus shift toward establishing itself as a corporate and financial hub (City of Richmond, 2000). After approving a Master Plan in 1983, Richmond took on a number of development projects aimed at increasing the city's status. Almost $500 million was spent on landmarks proving Richmond's growth,

including "The Diamond," an $8 million dollar minor-league baseball stadium for the Richmond Braves, an expansion of the Virginia Museum of Fine Arts that doubled the museum's gallery space, and phase one of the massive, $450 million James Center (City of Richmond, 2000). In addition, 400 new upscale apartments were constructed on Tobacco Row to boost the appeal of the city's downtown area (City of Richmond, 2000).

River Rejuvenation: 1987 to Present

In 1987, Richmond Renaissance initiated a two-phase agenda to revitalize the land along the James River from 17th Street to the Lee Bridge. Phase one aimed to increase riverfront accessibility for recreation from 7th Street west. The city invested $4 million in a footbridge to Belle Isle, repaving Tredegar Street, raising a new 7th Street Brown's Island Bridge and landscaping for the Island, and restroom construction and general cleanup on Belle Isle (Halsey, 2002). Phase one began in 1988 and terminated successfully in 1990. These additions and changes almost immediately improved "the quality of usership" of Belle Isle, which had previously been a broken-glass laden haven for drunks, rowdiness, and fights (White, in Timberline, 1999). Furthermore, in 1991, Richmond allocated 19% of its land area to environmental protection under the Chesapeake Bay Preservation Act (City of Richmond, 2000). Since Richmond lies within the Chesapeake Bay Watershed, the majority of this land was designated as a "Resource Protection Area" (RPA), which places controls on land within 100 feet of tidal wetlands, tidal shores, and/or tributaries (City of Richmond, 2000). Such a designation prohibits the city from developing the allotted land. In 1994, the Richmond Riverfront

Corporation reached an agreement with the city on the proposed construction of 1.5 miles of Canal Walks (Halsey, 2002). Construction of the $28 million Canal Walk began in 1996 and culminated in 1999 (Halsey, 2002; and Wingo, 2001). The Canal Walk is located on the north bank of the river, and it runs from Tredegar Iron Works (5th Street) to 17th Street (Department of Parks, Recreation & Community Facilities, n.d.). The six pedestrian entrances to the scenic path were located at Virginia, 17th, 14th, 12th, 7th Streets and Tredegar Iron Works (Department of Parks, Recreation & Community Facilities, n.d.). Then, in 1996, the Richmond City Council endorsed a strategic action plan called *A New Direction.* This plan eventually led to a revamped Richmond Master Plan designed to guide Richmond to a higher quality of life, to make Richmond a top choice in the region for living, doing business, or visiting, and to improve the city's neighborhoods, economic development, and image (City of Richmond, 2000). Richmond's new mission statement became:

> To be a world class city that offers a safe, supportive, and culturally diverse environment for citizens and businesses; superior education, human resource and community development systems; a high performance government; and a leadership that challenges and empowers its citizens and employees to achieve their highest potential. (City of Richmond, 2000)

The master plan entailed a great deal of care for the environment, specifically the James River. It professed a number of sustainable statutes and urged sustainable practices along the River. In 1997, the city finally erected a floodwall to protect 650 acres of vulnerable land from possible water damage (City of Richmond, 2000). The floodwall not only added a walkway for scenic views south of the James, but it protected industry on the south bank and served as a catalyst for transforming Shockoe Slip and Shockoe Bottom from a historic area into a lively mixed-use zone (City of Richmond, 2000).

At the heart of the city lies the James River Park System, the largest of its kind in the state (Department of Parks, Recreation & Community Facilities, 2000). The Park System encompasses nearly 550 acres of land, and includes a number of natural attractions and smaller parks. The Park lines both banks of the James from Ancarrow's Landing to Huguenot Woods (Department of Parks, Recreation & Community Facilities, 2000). The James River Park System features islands, woods, wetlands, wildlife, and opportunities for numerous outdoor activities. In addition, it is noted for the historically significant facets such as Great Ship Lock Park, which was in use for decades as a connection between the James and the Richmond Dock, and Belle Isle, which housed a Confederate Prison during the Civil War (Department of Parks, Recreation & Community Facilities, 2000). Effective use of such a bountiful resource as the James River Park System could prove to be extremely helpful in developing Riverfront plans that unite the Richmond community while preserving the environment and keep costs to a minimum.

Recent Riverfront Development Policy

On July 31, 2002, a tie vote by the Richmond City Council blocked an incentive proposal that would have offered developer David Cordish $5.9 million in civic aid to begin construction of a "Riverside Village," a mixed-use complex on Brown's Island (Redmon, 2002). The council members who voted "nay" did not do so because they opposed development along the James River. In fact, nearly everyone on the Richmond City Council agreed that development of the Riverfront would benefit the city (Redmon, 2002). Cordish's plan, however, included aspects that, while practical and space-

conscious, are far from sustainable. The project included continuous structures on the riverbank that forged a wall that prohibits any view of the water, save from an upper floor of a nearby building. In addition, the village included only 76,000 square feet of retail space in contrast to 209,000 square feet of office space, 160 elegant apartments, and a 659 car parking deck, all of which would have privatized a large stretch of crucial public space (Slipek, 2002). Also, the presence of a massive parking deck was about as far from encouraging sustainability as materialistic convenience can get.

Five weeks after the first development plan collapsed, City Manager Calvin D. Jamison reconvened Cordish and the City Council with a new $4.6 million proposition that would afford the developer $3 million for bridges from 10th and 11th Streets to Brown's Island and $1.6 million for public infrastructure, while placing fiscal responsibility for any parking structures on Cordish (Redmon, 2002). This deal was sealed when Dominion Power made the drop from $5.9 to 4.6 million more feasible for Cordish by offering to lease their old building, which was crucial to riverfront development, with the option to buy later, rather than forcing a purchasing decision now (Redmon, 2002). Cordish and Daniel, Inc., his partner organization, have been given approval to build an $82 million retail, office, residential complex called the Power Plant (Redmon, 2002). The Power Plant will be fashioned after the highly successful model Cordish established on the Baltimore inner-harbor. Richmond expects revenues to cover its initial $4.6 million investment in about 8-9 years before the city begins to earn a profit of $800,000/year (Redmon, 2002). Richmond also estimates that the development project will create around 1,200 permanent jobs (Redmon, 2002).

Chapter VII: Participant Selection

The research was conducted through a series of questionnaires that were administered to Richmonders who possess significant knowledge of the environmental status and future of the James River and/or a vested interest in the River. Eight interviews were conducted in three distinct occupational fields: environmental interest groups, government, and business. Each field's questionnaire contained around ten questions, some of which were uniform to all fields and others were tailored to a particular type of job. See appendix for the environmental interest group, government, and business questionnaires, respectively. In addition to the surveys, a consent form was available for any participant upon request. See appendix for the consent form.

To add validity to the research, a number of different variables were taken into account when selecting participants. First, the researcher accounted for occupational diversity. There needed to be relatively equal representation of opinions from environmental interest groups, government, and business. The interviews included three representatives from environmental interest groups, two local government officials, and two business spokespeople. In addition, one academic was added, who completed the environmental interest group questionnaire. The researcher sought adequate gender and racial representation. Of eight surveys, one was completed by a racial minority and three were completed by women. Although this did not represent gender and racial parity, it did provide input from parties traditionally overshadowed by Caucasian males. Racial and gender status had no influence on the questions posed to an participant.

Ann Jennings of the **Chesapeake Bay Foundation** (CBF) was selected because of CBF's ties to the James River and its tributaries. Although its focus is the entire Bay, the James falls within CBF's area of concern as part of the Chesapeake Watershed. CBF has been involved in a number of annual initiatives geared toward promoting the well-being and preservation of the James.

Patty Jackson of the **James River Association** was the second participant whose organization qualifies her solely as a member of an environmental interest group. The James River Foundation was the most integrally tied to the River, its namesake, of all of the participants' groups.

Dr. Margot Garcia is a professor in the **VCU Urban Planning Department**. She has an avid and active interest in the preservation of the James River and she frequently works with environmental groups in the area. Therefore, she completed the survey designed for environmental interest groups. Aside from her interests, she was selected because of her ability to offer insight about Richmond's educational system.

Ralph White is in charge of the **James River Park System**. He administers to the needs of the eleven-park system, which encompasses a span of around eight miles. Although the city government technically employs him, his interests are similar to those of the environmental interest groups. He also completed the environmental interest group survey. Mr. White was selected because the park system he supervises lies along, in, and near the River. In addition, two other participants recommended that I speak with Mr. White because of his extensive knowledge of the James.

Mayor Rudolph McCollum and **Joseph Brooks** are both local government officials who sit on the **Richmond City Council**. They were selected to represent the

governmental perspective, and both completed the government questionnaire. In addition, Mayor McCollum was the sole minority interviewed.

Jack F. Berry is the Executive Director of **Richmond Renaissance,** a business partnership whose mission is to revitalize Downtown Richmond through economic development. **Chris Barksdale** is the Property and Operations Manager of the **Richmond Riverfront Corporation**, a business whose objective is to lease and develop property they own along the James, including Brown's Island, the Canal Walk, and the Civil War Visitor Center at Tredegar Iron Works. Mr. Berry and Mr. Barksdale were selected to represent the viewpoint of Richmond business because of their organizations' expansive interest in the economic development of the city and the river area, respectively. Both completed the business questionnaire.

Chapter VIII: Questionnaires

Three different variations of an environmental sustainability questionnaire were devised. These variations were based on anticipated differences in the interests and knowledge of participants from diverse occupations. All participants were categorized as a member of an environmental interest group, government, or the business community. If a person's occupation placed him/her in more than one of these categories, the questionnaire from the profession with which the participant was most likely to identify was administered. Each questionnaire asked approximately nine questions, four of which were common to all questionnaires. These common questions included:

1) What role(s) must be filled in order to achieve environmentally sustainable urban life in Richmond? What should _____ (insert occupational type being interviewed) responsibility in filling those roles be?
2) What are the city's environmental strengths and weaknesses?
3) What venues for expression and idea generation does Richmond offer its citizens?
4) Please suggest some reasonable sustainable benchmarks or indicators for the city.

In addition, several questions appeared on two of the three surveys. For participants' completed surveys, see the appendix.

These questionnaires were designed to measure "What is happening now? vs. What should happen in the future?". The present vs. future theme was employed to gauge the city's level of engagement in environmental issues today (and in the recent past) as well as what ambitions and plans various groups have for Richmond's environmental progress.

What is happening now? vs. What should happen in the future?

Three questions that were included on every questionnaire were designed to answer: **What is happening now?** These questions included:

1) What are the city's environmental strengths and weaknesses?
2) Has you organization taken any steps toward environmental sustainability along the James River? If so, what? Are you aware of other such initiatives taking place in the city?
3) What venues for expression and idea generation does Richmond offer its citizens?

Question one was posed to determine each occupation's perspective about what they noticed that the city was doing well and poorly in regards to the environmental health of the James River. Question two examined the involvement of each field in preserving and bettering the River, as well as how connected they were to other groups promoting environmental sustainability. Question three inquired about the level of ease or difficulty in making concerns public and channeling questions to the appropriate party.

The environmental interest group and government surveys also asked, "What is the value of the James River's natural environment – ecologically, as a source of life, and economically?" The relevance of this question to the aforementioned theme was that it attempted to elicit general information from the city government about the River's current economic uses and to attach a dollar value to the River.

In addition, two questions were asked in both the government and business questionnaires that were related to Richmonders current perception of environmental sustainability along the River. The first asked both government and businesses how the environmental health of the James ranks on a list of priorities. This question was used to

determine how valuable government and business found the River and to conceptualize the order for how funding was distributed to different types of initiatives in the city. The second question asked businesses, "Are businesses aware of any restrictive environmental policies and, if so, are they enforced?" Government was asked, "How visible are Richmond's environmental policies? How are they enforced?" The two questions were designed to either correlate or contradict one another. These queries served a dual purpose. They sought to gather information about environmental policies and their enforcement in the city. They also gauged the level of coordination of lines of communication between Richmond government and business.

Three questions appeared in all questionnaires to assess: **What should happen in the future?** These included:

1) What roles must be filled in order to achieve environmentally sustainable urban life in Richmond?
2) What should Richmond offer to effectively interest the public in actively striving for sustainable goals?
3) Please suggest some reasonable sustainable benchmarks or indicators for the city.

Question one was devised to examine various views of environmental sustainability and what parties should be responsible for attaining it. In addition, question one highlighted what the city lacked and what the participant's ideal image of the future included. Question two requested information about community involvement and how the participant envisioned the ideal incentive and feedback setup for the city. Question three detailed the participant's vision of environmental change; the speed at which it would occur, the components involved, and the standards he/she believed to be most important.

In addition, both the environmental interest group and government questionnaires asked, "What crucial environmental policies must be put into place to ensure sustainability in the city?" This question was eliminated from the business questionnaire in favor of others because the business community would be the most likely to oppose further environmental restrictions due to their potential negative economic impact. The question was posed to the other two groups to bolster the benchmarks and indicators feedback, to learn about any environmental policies currently being discussed at any level of government, and to determine if government and environmental interest groups' visions matched or clashed on the subject.

Chapter IX: Findings

What is happening now?

Findings related to this theme centered around the three questions asked to every occupational type that attempted to determine how aware the city was of current environmental initiatives and which occupational groups were partaking in such initiatives.

Strengths/Weaknesses

The question of strengths and weaknesses was asked to all participants to determine discrepancies between and overlaps in the responses of the different occupational types.

The environmental interest groups noted a variety of Richmond's strengths and weaknesses. Ms. Jennings noted that we have some good laws on the books, particularly the Chesapeake Bay Preservation Act, a land use law that requires that developers implement water quality measures and that localities develop land use plans. She stated that Virginia also had a strong and effective conservation easement program through which a person can legally put a document (easement) on his/her land that prohibits future owners from building anything further on the land.

Environmental advocates tended to note the successes of the counties in the Greater Richmond area. Dr. Garcia touted the advances Henrico has made toward fulfilling the environmental element of its Master Plan. They invested $600,000 in photographing all rivers in the county and developing cutting edge storm water management plans. Henrico has also built a number of BMP's (known both as Best

Management Practices and Big Muddy Ponds) to filter out excess nutrients from running water. In addition, Dr. Garcia believed Chesterfield has developed a good program for managing the drinkable water in the Swift Creek Reservoir.

Environmental interest groups also addressed the value of the opportunity for outdoor recreation on the James, especially the Class IV rapids that flow through the city. This sentiment was echoed by City Councilman Brooks, who added that Richmond is one of the few cities in America with white-water flowing through the center of the city. He added that areas adjacent to the River were often developed as parkland, that easy access to the River has been preserved, and that the Canal system has provided an opportunity for economic development without damaging the scenic view. Mr. Barksdale stated that he felt the River contributed to a strong sense of community in the city.

Mayor McCollum believed that Richmond has both strengths and weaknesses because it is an older city. On the positive side, he stated, it required us to be more creative, reuse, and adapt existing facilities. On the negative side, the city has more Brownfield issues with few greenfields and no opportunity to grow geographically. Councilman Brooks tended to view Richmond's age as a weakness. He noted that age was the main factor in dilapidated housing and out-of-date underground infrastructure (CSO piping, water mains, and gas pipes). Barksdale also blamed the city's weakness on age, but he focused more on old industry and the deleterious effects that it has on pollution levels in the James.

The environmental interest groups discussed different weaknesses. Ms. Jennings claimed that localities did not hire a sufficient number of people to effectively implement and enforce environmental policies, and that the state agency has not forced localities to

do so. Along similar lines, Mr. White claimed the city's greatest weakness was its mindset at the leadership level. He stated that the city council did not understand the concept of spending money to maintain a natural area if it was not being spent on development. Park upkeep involves more than what the local government thinks. A study conducted years ago recommended that Mr. White have a staff of seven to effectively maintain the eleven parks under his supervision. Just last year the city provided him with his first staff member. He stated that so much could be done with the James River Park System that is completely unrelated to development. Mr. White declared that the city is not playing its developmental cards correctly either. They are concerned with the Canal Walk, but they are still trying to "plan for rich, old-fart executives." The people considering moving to the area are young people who want to rollerblade, bike, and run with their dogs. However, the Canal has regulations against bikes, rollerblades, and dogs. Ms. Jackson agreed that the mindset of city leadership was not what it should be. She claimed that most decisions were made based on what will generate tax dollars and jobs, without a sense of people attempting to avoid hurting the environment.

Environmental Initiatives

A question about environmental initiatives was asked to inform the researcher of events in the city that could add to the "Richmond Development" section, as well as to determine which groups in Richmond took an active interest in environmental initiatives.

From the perspective of environmental interest groups, there were a number of valuable current initiatives for environmental sustainability along the James River. First, any significant environmental organization in Richmond is probably a member of the

Virginia Conservation Network, a coalition working towards joint ecological goals. Second, according to environmental interest groups, the largest initiative in the city was the combined sewage overflow (CSO) project. This project aspires to ameliorate a major concern that occurs in many older cities, Richmond included. When the city was built, all of the excess drainage (sewage and rain water) was channeled into the same place. During times of heavy rain and flooding, the city's sewage systems overflowed into the James River, releasing sewage and excess nutrients into our water supply. Although it has not been proven, these nutrients most likely caused deformities in fish even in the mouth of the River. In addition, they killed river grasses and make the James unsafe for swimming and drinking. The problem can be fixed, but it involves a costly process of completely redoing underground sewage pipes and disconnecting the city's rain gutters from the sewage system. In the mid-1980s, the James River Association convinced the city to conduct a study of the costs involved. A plan was developed in 1989, which included an upgraded sewage treatment plant, with an estimated cost for completing the project ranging in the hundreds of millions of dollars. Richmond has been undertaking the process, but at a much slower rate than what would be ideal for the environment. The city was able to combine part of the CSO project with the Canal restoration. According to Ms. Jackson, redoing the pipes under the Canal for the CSO project actually expedited Canal restoration. Environmental advocates continue to push for a faster resolution of the CSO issue.

Mayor McCollum and City Councilman Brooks argued that they are keeping up with EPA mandates. Brooks claimed that Richmond has already invested $240 million in CSOs and that the city is moving toward separating storm water from sewage, which he

estimates will cost another $200 million. Both government officials claimed that this was the dominant environmental issue, and that it was draining the city of most of the money allotted for environmental programs.

While the CSO project was the most discussed environmental initiative in the city, it was by no means the only one. Other James River Association projects include: tree planting, water quality testing, working with companies on the James to develop better pollution control, and convincing the city to hire a river keeper. The CBF has recently pioneered a Bayscapes program, an initiative that involves grooming small areas of natural vegetation to remove impurities and excess nutrients from the River. A small area just beyond Brown's Island has been newly bayscaped. CBF has also created a citizen's guide to planning and zoning (downloadable online). In addition, the James River Advisory Council puts on a six month program series known as the "James River Days." This series is designed to educate the public about the James, to increase public interest in the River, and to create a community of better environmental stewards. Finally, environmental groups in Richmond spend a significant portion of their time lobbying for more environmentally friendly standards. Their most recent legislative success involved helping to pass a state law protecting nontidal wetlands.

Both business representatives were grateful for the benefit their organizations derive from the effort of environmental groups. Chris Barksdale of the Richmond Riverfront Corporation does work with environmental groups on occasion to complete mutually beneficial river projects. For example, he helped create the Bayscaped garden near Brown's Island (which his company owns). On the other hand, Mr. Berry claimed no ties to environmental associations. His organization is currently more concerned with

the Downtown area around Broad Street and he is seldom involved in anything in the "Main-to-James" section of the city.

Venues for Expression & Ideas

A question about the availability of venues for public idea expression was asked to inform the researcher of those available and whether participants found these satisfactory. The researcher also asked which venues were most commonly mentioned, how often these venues were utilized, and the participant's perspective on the awareness level of the general public about places to raise concerns or questions.

Nearly every participant mentioned the call to the audience at the beginning of city council hearings as the main venue for raising concerns and questions to authorities in Richmond. Councilman Brooks added that the Chamber of Commerce, The Richmond Regional Planning District Commission, and the neighborhood teams were all open to suggestions. He stated that those interested in the environment will make themselves aware of how to be heard. Mr. Berry added that the public has had many opportunities to get involved in larger issues, but that they seem to be more interested in local issues that directly affect their lives, like zoning. Dr. Garcia claimed that the basic operating attitude was low and unmotivated. Mr. White commented that the city was too insular about the way it gets input. Several participants said that the methods Richmond used to get input were inadequate.

Priority of the Environment

A question regarding whether the environment was a priority for both government and business was asked to determine how the health of the James River ranked when compared with other issues that require effort and funding in the city.

Neither government official professed a numerical rank of the River against other citywide issues. Neither compared the James' need-based magnitude to that of another issue. However, Mayor McCollum claimed that the James River was an important physical aspect of the city and City Councilman Brooks added that water quality was of great importance.

Neither business representative directly listed the James River among any set of priorities either. However, Mr. Barksdale was well informed about upcoming river initiatives and Mr. Berry noted that the importance of the James to businesses would grow as downtown commerce continues to shift toward the River and into the "Main to James" section of the city.

Awareness and Enforcement of Environmental Policies

Questions about the awareness and enforcement of environmental policies were asked of government and business to determine the policies of which each group was most aware, the effectiveness of Richmond's policy enforcement mechanism, and whether the two groups espoused good coordination on this issue.

The Mayor suggested that, while most environmental policies are not visible to the average person, business owners are well aware of the environmental policies pertaining to their operations. The two government officials also noted a plethora of environmental policy enforcement officials, including the police, fire department, building inspectors, state and federal investigators, and the permit department. It was also worthwhile to note that none of the enforcement groups mentioned by government representatives were mentioned by both participants.

The business representatives corroborated that they are indeed aware of environmental restrictions by citing a few and listing the appropriate enforcement personnel. However, there was some discord between the two participants over policy stringency. Jack Berry stated that he would be uneasy if environmental restrictions were ever relaxed for businesses, whereas Chris Barksdale believed that government enforcement had sometimes been a little overzealous, and that local government officials should be more aware of when certain federal and state laws should not be applicable in Richmond. Mr. Berry also noted a tight and frequent communication between local government and businesses. Local and state officials have sat on Richmond Renaissance' executive committee.

What should happen in the future?

The researcher sought information about Richmond's future environmental plans for several reasons. One aim of this research was to determine whether the environmental health of the James River was improving. This research also sought to investigate who had plans to make environmental improvements to the James River, what those plans were, and when they planned to implement them. Finally, the researcher hoped to glean suggestions about how to measure sustainable progress along the River.

Public Interest

A question was raised concerning methods of building public interest in striving for environmental sustainability. This arose as a follow-up to the question about venues for expression that are currently available. The question was asked to determine whether the city was aware of alternative, possibly better methods of public input. If so, the

researcher sought to determine whether Richmond was incapable or unwilling to implement them.

The only occupational group who offered ideas about how to more effectively interest the public in striving for sustainable goals was the environmental group. Ralph White observed that the city needs a way to bring in the input of concerned groups on a more regular basis. He suggested that members from associations around the city (James River Rowing Club, Sierra Club, James River Outdoor Coalition) sit on a council that advises the city council or economic development department. He suggested that the council be small and area specific, pertaining solely to the area along the James River. Ms. Jackson suggested regular town hall meetings or dialogues, so Richmond could finally start being proactive rather than reactive. She also stated that the Richmond Metropolitan Area needs more regional cooperation. Currently, each locality operates independently of the others. This causes economic problems that ripple through the communities and affect intrametropolitan relations. For example, Goochland is wooing Motorola, but it is not planning to zone for a housing increase. Therefore, the people will all move to Henrico and Hanover. Goochland will get the economic benefit, and Henrico and Hanover will have to school the children, provide water, increase landfill/waste management services, etc. Other regions in the U.S. are now working as units that share costs and benefits over and area including several cities and counties.

Dr. Margot Garcia offered two unique perspectives on how to increase the public's interest in sustainable goals. First, she suggested working though existing organizations (churches, Boys and Girls Club) where people already have a propensity to

get involved. Second, she declared that we need a crisis because people are not aware of a problem when it is mediocre, only when the situation becomes desperate.

Finally, Ralph White advocated getting involved in the Richmond educational system. In terms of commercial education, he recommended creating tours that weave together human and environmental history, as well as self-guiding booklets and trails. He also noted that there were certain things every child should have to experience before he/she graduates from a Richmond city school. First, he thought every child should experience a flood. This shows the connection between humans and nature as well as being a very humbling experience. Second, he believed every child should have to walk the Slave Trail out of Richmond. White claimed that Richmond was much more of a hub for the slave trade than most people knew. In fact, other cities complained about our monopoly on importation of human chattel. He asserted that these were the two main learning experiences every Richmonder should have, and that these events would help shape our sense of place and pride in the city as well.

Roles to Fill

A question about vacant roles in the current governmental and/or environmental structure was included to stimulate thought about jobs that could be added to the current system of river administration to improve its functionality.

This question gave rise to a very diverse set of answers. Mr. Barksdale stated that the role of business in the environmental health of the River was a combination of supporting the initiatives of local environmental groups and thinking of your own initiatives and higher standards. Mr. Berry agreed that business should be conducted in a way that limits environmental impact. He claimed that environmental projects were

generally expensive and tended to impact tax and utility rates, but that Richmond businesses were generally willing to accept the trade-off for cleanliness. Companies located in the "Business Improvement District" paid an extra five cents per hundred dollars of assessed real estate value. This money was used to fund the Ambassadors Program, through which the city hired people attend events in uniform to make Richmonders feel safer. Richmond's Ambassadors Program is a sub-section of the Clean and Safe Program, which hired citizens to accomplish both of the title's objectives.

According to Mayor McCollum, the most important need was that of mass transit to reduce pollution in the region. To accomplish this, he proposed to expand the use of buses in the counties and create more bike paths. Contrastingly, Councilman Brooks asserted that between the Community Development Department, which approves housing and industrial plans, and the Permit Department, which covers compliance with state and federal environmental acts, Richmond has all of the employees necessary to carry out sustainable tasks.

The environmental interest groups presented yet another perspective. They believed the community as a whole lacked a sense of the decision-making process at the local level and that they were even more distant from the state legislative process. Ms. Jackson believed that people needed to get better information earlier in the decision-making process in order to have an impact on local policies. Ms. Jennings believed the key to greater public interest in sustainable goals was getting people elected who will make the environment a priority in funding, law establishment, and enforcement. Dr. Garcia noted that Richmond is too consumed in other issue, such as race politics, to accomplish much on the community scale. She addressed sustainability on an individual

level, stating that many things were involved in environmental sustainability that the average person does not realize, such as how you spend your money, whether you compost, and whether you buy local produce as opposed to that of another community. Mr. White added that the immediate needs he sees include filling the five vacant employee spots he has in his park system, focusing on people friendly activities to attract citizens to the river, such as bicycle routes and marked walking routes, and instilling a sense of city pride in Richmonders. He believed we have to make people want to brag about Richmond. To do this, Mr. White recommended focusing on our non-Civil War historical roots, such as Irish/Jewish roots and Old Industry.

Benchmarks and Indicators

The researcher asked participants to suggest some reasonable benchmarks for progress toward environmental sustainability along the James River. The primary purpose of this question was to gather a number of ideas to inform the "Environmental Improvements" section of the recommendations for the city. In addition, a participant's response was an indicator of how much thought he/she had given to this topic prior to speaking with the researcher.

Business and government offered a few general indicators of progress towards environmental sustainability. Mr. Berry's suggestions included ensuring that environmental regulations were not relaxed and, in the face of tremendous development and change along the downtown portion of the James, that certain areas (i.e. Belle Isle) remain undeveloped forever. Both of his suggestions were reactive in the sense that there would be no awareness or concern unless the status quo deteriorates. Mr. Barksdale, also representing business, did offer some general proactive measures. He believed standards

for improvement could be calculated by improving water quality and providing more funding to the James River Park System. The Mayor echoed Mr. Barksdale's sentiment concerning funding, but added that his standards for environmental improvement would include greater awareness of need and subsequent funding from the federal and state levels. Ideally, Mayor McCollum would like to see a balance between environmental protection and economic development. City Councilman Brooks, on the other hand, emphasized the need for added budget for tree maintenance. He also stated that a strong indicator of the environmental health of the River could be found in the kinds of debris left on the floodplain whenever the inundated ground resurfaces.

The environmental interest groups offered a variety of benchmarks of sustainable progress that related directly to the physical environment of the James. Ms. Jennings stated that the Chesapeake Bay Foundation composed a numerical assessment of the Bay Watershed that rates environmental quality across a number of factors, some of which include forest buffers, oysters, nutrient levels, health of tributaries, toxin intake levels, and number of underwater grasses. She claimed a key to the James was the underwater grass count, including how many we have and the rate at which we lose them. She also suggested that the fish count, particularly migratory fish, was an important variable for which sustainable standards could be set. Jennings said that the Bay's assessment rating was around 27 out of 100, and that CBF's goal was to hit 40 by 2010. The organization's ultimate target is 70. Ms. Jackson added that Richmond does not currently meet air pollution standards, and that getting the city out of non-attainment status should be one of the highest priority benchmarks. She further commented that the city needs to increase its commitment to maintaining the floodplain and the James River Park System.

Dr. Garcia contributed a number of benchmarks that would start the city on the road to sustainability. She believed indicators for air and water quality should be measured, as well as water conservation (per capita use per day). She also advocated increasing the James' riparian areas, or buffer zones. Riparian area benchmarks could be measured by determining the percentage of the River that had an adequate buffer and undisturbed vegetation. In addition, the city could set standards for fish health and monitor them by counting their numbers and assessing the levels of carcinogens in their flesh. Garcia also asserted that richness of bird diversity was a good indicator of the health of a natural environment. Additionally, landscape fragmentation was a powerful standard for qualifying the encroachment of mankind into a natural environment. This could be measured by determining how many areas around the James were intact, without roads traversing them, and the sizes of these areas. Finally, Dr. Garcia recommended that the city monitor the number of old buildings along the River that do not meet the requirements of the Chesapeake Bay Act because they were built prior to the mandate taking effect in 1989. She suggested that the city set standards for restoring these riverside areas by reducing the number of old buildings that do not meet buffer zone requirements.

Lastly, Ralph White advocated preserving land and ensuring that it was *appropriately* accessible. He emphasized that he did not advocate debauchery of undeveloped land. Rather, he would like Richmond to set benchmarks for increasing human-environmental interaction in a natural manner (walking/bike trails, connecting humans to previously inaccessible natural areas). White also encouraged building along the River in human scale. He noted that developers often put huge buildings right on the

water, and that this blocks everyone else's connection to the River. White suggested that citizens would be more engaged if housing along the James were built so smaller buildings lined the River and the larger buildings were further back (designed so the largest buildings were the furthest from the water). This way, more people could have a view of the River. White suggested that this was crucial to engaging citizens living near the water with the River, as if the natural environment was a part of their backyard rather than something on the other side of several large buildings. White urged the city to accept this concept as its riverside building standard.

Policy Need

Both environmental groups and government participants were asked to suggest environmental policies that the city would need to attain environmental sustainability. The question was posed to gain information for the benchmarks and goals section, to learn about environmental policies being considered by government, and to assess whether government and environmental interest groups' ideas for environmental policies corresponded or conflicted.

The two occupational groups' ideas are complementary. Although both governmental participants mainly cited programs they would like to see completed rather than policies they would like to see instituted, they did have several aspirations for environmental improvement. Nearly everyone mentioned completing the CSO project. The governmental participants also mentioned desires to fix problems with erosion, runoff, dilapidated housing, mass transit, and education. Both representatives of local government mentioned cost as the biggest issue impeding environmental progress.

The environmental interest groups added that they would like to see policy improvements or additions in air pollution, water use, water pollution, land use planning, environmental education, recycling, and wildlife management. Patty Jackson remarked that policy makers should every decision should include a "zero pollution" consideration up front; that environmental sustainability will not be reached without this as a policy tenet. Dr. Garcia added that environmental policy should be geared towards low-tech, small-scale solutions. She believed that the change process must take place at the local level, rather than through federal or state initiatives.

Chapter X: Benchmarks and Goals

After assessing the information collected, a number of goals and standards for environmental sustainability have been developed. These benchmarks were placed into three broad categories: Environmental Improvements, Leadership Vision and Connectivity, and Community Involvement.

Environmental Improvements

Environmentally, the research yielded a number of quantifiable objectives for Richmond on the James. Local and regional interest groups already measure a number of environmental health statistics. The city simply needs to improve communication with these groups and adopt the standards they recommend. For instance, as noted earlier, the Chesapeake Bay Foundation conducts an assessment of the quality of the natural environment. If the city were to monitor the results, determine the areas of deficiency, and attempt to fix them, this would help pave the way for environmental sustainability along the James. Some other standards that are or could easily be measured to examine the River's health include:

1) **Water quality** – the state legislature is attempting to pass a comprehensive water quality plan. Enacting the plan's measures and enhancing the River's wetlands will filter more pollutants from the James. This should have a significantly positive effect on water quality that benefits both the Richmond community and the wildlife of the James River Ecosystem.

2) **Air quality** – Richmond does not meet ozone standards, and this has rippling effects throughout the James River's ecosystem (i.e. effect on wildlife).

3) **Water conservation** – measure the water use per capita per day and strive to decrease this amount incrementally over time. A sustainable goal for water conservation would be to provide for the city's basic water needs without impacting the level of the River's flow downstream.

4) **Riparian areas** – attempt to increase the percentage of riparian areas that comply with the standards set by the Chesapeake Bay Act, and keep a count of the number of non-compliant old buildings. Work to eliminate all non-compliance over the course of a few years.

5) **Bird diversity levels** – bird diversity is a sign of a wide variety of habitats within an ecosystem. The richer the bird diversity levels, the better the James River's foliage diversity.

6) **Landscape fragmentation** – strive to eliminate roads that divide natural areas along the river to preserve unified natural sanctities for wildlife. This can be measured by calculating the areas of tracts of undeveloped land.

7) **Appropriate land access** – (in conjunction with landscape fragmentation). Do not cut the people off from natural areas, as eliminating landscape fragmentation may initially suggest. Alternatively, provide them with bike paths and walking trails to access natural areas.

8) **Runoff** – calculate the percentage of pervious vs. impervious surfaces, strive to locate impervious surfaces (mainly roads) as far from the James as possible, to decrease runoff, and provide more ditches along roadsides and farmland to

minimize the spreading of chemical-laden runoff from pavement and cultivated land.

9) **Managing for wildlife** – the city has to realize that changes in air and water quality will affect animal numbers as well, possibly to the point of overpopulation. Richmond must be aware of wildlife increases both as a sign of improving habitat conditions and as a caveat to control animal populations to ensure that they do not overconsume the River's other natural resources.

10) **Underwater grass count** – underwater grasses are a good indicator of the level of nutrients in the water. Too many nutrients kill the grasses. In Richmond, this is often a result of sewage seeping into the James. Thus, recording underwater grass counts, and ensuring that they are rising to a sustainable level would be a strong indicator of improving nutrient conditions, and hopefully of simultaneously improving sewage management in the city.

11) **Fish count** – another indicator of the nutrient level (and health status) of the River is the number of fish, particularly migratory fish, in the James at a given point in time (or in a season, for migratory fish). The fish count should rise proportionately with the underwater grass count as the city's water quality improves.

12) **Fish health** – one more method of taking a biopsy of the River's health is to check the level of carcinogens in fish flesh. This can be used as an alternative or a supplement to measuring fish count and/or underwater grass count.

These suggested environmental improvements are all measurable, so the city could easily establish a plan with chronological benchmarks that determine a course to environmental sustainability. Ideally, Richmond could match these improvements to the goals of local environmental interest groups who are already striving to accomplish some of the things mentioned above. For instance, the Chesapeake Bay Foundation set a goal of reaching an assessment level of 40 out of 100 on their scale by 2010. Richmond could adopt that goal for the James River to forge both more connectivity between and a unified sense of direction for local government and environmental interest groups.

Leadership Vision and Connectivity

Despite the vast effects environmental improvements can have on an ecosystem, these changes will not be possible without significant aid from influential members of Richmond's leadership class. The leadership class, as it is used here, is defined as members of the Richmond community with the potential to impact citywide policy or to affect action. Specifically, systemic environmental improvements require the participation of Richmond government, business, industry, environmental interest groups, and concerned citizens.

1) There must be an extreme increase in the level of collaboration between members of Richmond's leadership class.

Organizations like Richmond Renaissance, a business partnership focused on economic development of downtown Richmond, have very close ties to local government. In fact, some of the members of Richmond Renaissance' board of trustees

are city and state government officials. This allows a very free and frequent flow of communication between business and government. However, there is a blatant chasm between environmental organizations and other members of Richmond's leadership class, particularly between environmental interest groups and local businesses.

This lack of connectivity has several repercussions. First, when there is a perceived clash between development and the environment, it has the potential to slant local governmental decisions in favor of economic development. Second, no one currently believes businesses have much responsibility in contributing to the success of environmental initiatives. Environmental groups strive to better the natural environment for its own sake, and businesses gratefully, yet passively share the benefits. Environmental groups' biggest problem is almost universally lack of adequate funds. Although they lobby local government, environmental agencies can realistically only obtain so much money from the government, which often also works from a relatively stretched budget. The only portion of Richmond's leadership class with consistent excess in their operating budget is the business sect. However, as mentioned above, business and environmental groups are more removed from one another than any other two groups in the leadership class.

Third, lack of connection between business and environmental interest groups stifles collaboration. The majority of the city still holds the tacit mental model, or subconscious mindset, that development and environmental sustainability are polar opposites and therefore, that they cannot both be achieved by the same initiative. Richmond's leadership class needs to develop the capacity to challenge their traditional

methods of thinking and to scrutinize even their most deep-rooted beliefs about how organizations interact in the city.

There are ways that businesses and environmental groups can work together. The organizations simply need to commit the time, energy, and resources to making it happen. To develop a long-term symbiotic relationship, the two groups need to begin by meeting for a dialogue, with the purpose of dispelling untrue mental models about each other. From there, they could realize that the two types of organization do hold some ideas in common. For instance, a lot of the business world does not realize that most environmental groups are not opposed to all development. In fact, renovation of old buildings along the James that do not meet buffer zone standards set by the Chesapeake Bay Act would actually be a boon to the environment because the new structures would have to take the mandated buffer zone into account. In addition, such new development could further collaboration within the city's leadership class if local government were to offer tax benefits to developers and businesses that include green areas in their development projects.

2) The communication pattern of the local government structure must be revamped to allow the necessary groups to interact.

There are also critical gaps in the lines of communication within the local government structure. Although Ralph White's sympathies were those of an environmental interest group, he works for the Parks and Recreation Department of the Richmond governmental structure. However, there was no direct line of communication between Mr. White, who works in the natural environment, and those involved in the

decision-making process for the city. Although he was able to tell his supervisor his concerns, which can then be passed on to a number of other people, there was little chance that they will reach the city council effectively. There was even less chance that Mr. White will receive feedback. Thus, the James River Park System's needs have not been fulfilled and its problems have not been accurately heard, understood, or ameliorated. This is a major problem in Richmond because Mr. White has been working for the city for 23 years, knows exactly what the system needs to flourish, and has hardly received any of it over the course of his tenure in his current position. Mr. White has dedicated almost a quarter of a century to the James River Park System and he spends ten hours almost every day tending to the natural environment provided by the park's 550 acres.

Most importantly, Mr. White discussed the unmet needs of the natural environment. He asserted that city council does not understand the concept of spending money on a natural area that does not further development. Natural parks require a tremendous amount of upkeep and, after years of requesting a seven-member crew, White just received his first assistant last year (keep in mind that this is to administer to the needs of eleven miles of undeveloped land). Mr. White also complained that the city was not gearing its resources toward the right type of people. Both the Canal Walk and Brown's Island are stifled by the way the city elected to develop them. White stated that, in restricting dogs, rollerblades, and bicycling, the Canal Walk is repulsing the young, energetic crowd who are considering moving to residential portions of the city, such as Shockoe Bottom, Church Hill, and others that are being renovated. Additionally, White has observed the flow of crowds during the day around Belle Isle and Brown's Island.

Belle Isle, an undeveloped stretch of land with a walking/running trail, was packed with people, while Brown's Island, which has been developed by the Richmond Riverfront Corporation, was only minimally visited. The researcher observed the two islands one day at lunchtime. Mr. White's observations held true, at least on that particular day. White claimed this occurred because Belle Isle is disconnected from the cars and the city. As a part of the James River Park System, it fulfilled its goal of offering "a little bit of wilderness in the heart of the city" (R. White, personal communication, April 3, 2003). He said to think of the curtain of trees and thin wall of vegetation as a set in a play that temporarily creates an entirely different world. Brown's Island, on the other hand, is now virtually treeless and lacks a truly natural environment. He claimed that the contrast between the two islands was what makes one so alluring and the other so sparsely visited. Granted, Brown's Island also serves as a concert venue, but White believes that a natural scape is what people want on a day-to-day basis. In spite of all of these valuable observations and opinions, Mr. White was essentially unable to communicate them to the appropriate decision makers when they plan the future of land along the River. Thus, in order for environmental sustainability to be useful, local government's communication pattern must be restructured to allow greater interaction between the necessary groups.

3) A shift to systemic thinking is another crucial change that needs to be adopted by Richmond's leadership class.

Systemic thinking involves shifting away from simple cause and effect mental models to holistic views of the way things interact. The James River and the city of

Richmond are both complex systems with a number of dynamic factors playing roles in the way each operates.

The leadership class in Richmond must recognize this and begin to make connections between parts of each system that they may never have explored before. For instance, reference the way Jaime Lerner of Curitiba was often able to find the solution to a problem by solving another problem. Recent immigrants, handicapped persons, and recovering addicts often have a difficult time finding work, and have a propensity for ending up jobless, poor, and homeless in Brazil. Lerner wanted to start a recycling industry in Curitiba, but he needed workers. He solved the two problems by employing the people from problem one at the place of need in problem two. The same was true of the way he linked depraved street children and the need for aesthetic improvements in the city. He had local shop owners pay the children a small salary and provide them with a meal each day in exchange for their services in maintaining beautiful flower gardens throughout the shopping district.

Richmond needs to make similar connections. One such connection is the need for a walking bridge across the James and the dilapidated, unused train track that some consider an eyesore. Mr. White suggested that the city spend a little money to turn the track into a walking bridge that would connect Brown's Island to the south shore of the River near the Manchester climbing wall. From there, a walking/bike path could connect to Belle Isle, thus completing a circle with the existing footbridge from Belle Isle back to Tredegar Steet. To most effectively use the resources it has, Richmond's leadership class needs to examine its current problems and think in a creative, systemic fashion to devise solutions.

4) There need to be policy and enforcement standards that would aid the city in attaining environmental sustainability.

In terms of policy, the city needs to ensure that business and industry meet or exceed federally mandated environmental standards. In addition, the sentiment from local government was that they don't make the rules; the rules are handed down from them by the state and federal administrations. Richmond government needs to change its mindset about this structure. To attain environmental sustainability, federal and state mandates should be the minimum requirements Richmond enacts. They should serve as guidelines for Richmond to build upon, rather than as standards the city has to struggle to attain. Furthermore, the city must enforce its policies. While both local government and business believe environmental regulations are adequately enforced, some of Richmond's environmental interest groups disagree, citing examples such as ozone standards that the city currently fails to meet. Whether this means more officials need to be hired to handle the workload, more funds allotted, and/or more active interest taken by local government in making itself aware of infractions, it must be done. In other policy considerations, ideally, all new development would be build according to Leadership in Energy and Environmental Design Rating System (LEEDS) building standards. Also, the city should adopt Mr. White's developmental ideas for incrementally larger housing along the River (as opposed to the other way around) to foster a greater sense of environmental engagement among Riverside residents.

Community Involvement

1) Richmond needs to improve its citizen input mechanism.

The final factor necessary for the development of environmentally sustainable practices along the James River is an engaged community. According to the research, the primary mechanism for civic input was the open call to the audience at the beginning of city council meetings. Nearly every participant did not believe this is adequate. Richmond needs a frequent, well-publicized, effective engine for input and it needs to be kicked off by a large event. Said venue can be used for public forums on any topic, but the initial series of meetings should focus on an environmental issue. For instance, a well-publicized forum series regarding CSOs (publicity should clarify the problem in detail) could prove invaluable to the resolution of the cause as well as to the city's purse. The CSO issue is a problem that, when presented as raw sewage and feces running into the source of Richmond's drinking water, could raise significant public concern and activism. The forum series should focus on brainstorming a cheaper way to fix the CSO problem and on how citizen's can help the process. A simple solution that could potentially save the city government millions of dollars could be to offer a small tax break to citizens who redo their rain gutters so they no longer drain into the sewer. In addition to the forum series, Richmond could organize a task force of concerned members of Richmond's leadership class to examine the same issues in depth. Besides just improving the citizen input mechanism, it is also important that people of varied demographics are represented. This includes a range of income brackets, occupations, races, genders, and ages. Finally, it is critical that the information gathered from these

meetings not only be documented, but also taken seriously and used to affect local policy and development.

2) In order for civilians to most effectively participate in community decisions, Richmond must improve its environmental education.

Environmental education programs should be offered in local schools at all age levels. Environmental learning should also be woven into city and river tours and displayed in conspicuous places around the city. Moreover, the city should employ a professional to create ecological models of the James River as a process of change over time. These could be used to educate Richmond's leadership class, civilians, and students of all ages about the degenerative effects of being environmentally passive or reactive, rather than proactive. Ecological modeling could also prove useful in playing out different scenarios during decision-making processes in which a range of variables could be altered to affect change. Additionally, computer modeling programs such as GIS should be taught in conjunction with environmental education in schools, as a fun and memorable way to learn about the natural environment.

3) The community input process can also be greatly enhanced by developing a sense of pride and investment in Richmond citizens.

Ideally, environmental education, which should include historical information and strive to develop a sense of place, would develop hometown pride in Richmonders. Furthermore, the city must do all it can to bring the River to the citizens, to make it as accessible as possible without additional roads. Some ideas for doing so include placing

bicycle racks and rentals at various locations downtown and along the River and having a Downtown shuttle bus run by the Greater Richmond Transit Commission (GRTC) that offers free lifts from Downtown Richmond, Shockoe Slip, and Shockoe Bottom to the James and the Canal Walk.

4) Richmond must realize that the River does not belong solely to the city, but to the Greater Richmond Community as a whole.

Richmond lacks any sense of regionalism. In fact, Greater Richmond has a strong sense of city-county and county-county rivalry/competition. This can all be traced back to the concept of separate economic systems. Many metropolitan areas have moved to a joint economic system with a unified tax collection and distribution structure. Richmond should follow this trend to end inter-community fighting. The Greater Richmond Area would be greatly strengthened by joint economic and community efforts, the effects of which would be felt structurally throughout the community.

Chapter XI: Recommendations for Further Research

The aforementioned suggestions should serve as a catalyst for systemic change in Richmond to benefit the pursuit of environmental sustainability along the James River. The James is Richmond's most valuable resource; as we degrade its waters, we are degrading the quality of the city itself. The researcher hopes this document serves to heighten civic awareness of the needs of the James and to suggest a few avenues for satiating those needs.

Further research should include more interviews for greater accuracy and volume of information. Better gender and racial parity would benefit further research in the same ways. In addition, more diversity of occupational types interviewed, to include industry and state government, and to separate commerce from quasi-governmental organizations, would better represent the perspectives of each of these fields. Finally, procuring funding requests and amounts allotted from the city council's budget reports would clarify the natural environment's position in the hierarchy of governmental priorities, and thus, enhance this report.

Chapter XII: Appendix

Questionnaire – Environmental Interest Group

1. Has your organization taken any steps toward environmental sustainability along the James River? If so, what? Are you aware of other such initiatives taking place in the city?

2. What roles must be filled in order to achieve environmentally sustainable urban life in Richmond?

3. What are the city's environmental strengths and weaknesses?

4. What is the value of the James River's natural environment – ecologically, as a source of life, and economically?

5. Does Richmond have the resources to meet respectable sustainable goals?

6. What should Richmond offer to effectively interest the public in actively striving for sustainable goals? What venues for expression and idea generation does Richmond offer its citizens?

7. What crucial environmental policies must be put into place to ensure sustainability in the city?

8. What components, crucial to ensuring sustainable transportation practices, are missing from Richmond's system of mass transit?

9. Please suggest some reasonable sustainable benchmarks or indicators for the city?

Questionnaire – Ann Jennings, Chesapeake Bay Foundation

1. Has your organization taken any steps toward environmental sustainability along the James River? If so, what? Are you aware of other such initiatives taking place in the city?

   - Land planner on staff – Joe Lurch, completed a citizen's guide to planning/zoning (can download from website). It is an educational tool for citizens. Shows how to change development in local communities.
   - Also, the CBF offers outreach through workshops, a map of NOVA that shows how land will change without sustainability.
   - All organizations in Richmond try to work as partners – VA Conservation Network (CBF is a member). Any significant conservation organization is in the network, work with the James River Association.
   - Most recent significant success – state law protecting nontidal wetlands – if you had to pick on thing that did it, it was grassroots efforts: getting citizens to call, write, demand the law. Another factor was the sheer number of destructions (thousands in a number of months/a year).
   - VA is difficult to work in because of property rights advocates (many)

2. What roles must be filled in order to achieve environmentally sustainable urban life in Richmond?

   - Personal opinion: need to get people elected who will make the environment a priority in funding & law establishment. And not just the Senate/House of Delegates, but also people who are supposed to enforce the laws (Governor, etc).
   - We are also in need of citizen activism – CBF has over 100,000 activists – 40,000 of whom are in VA…not sure how many are actually *active*.

3. What are the city's environmental strengths and weaknesses?

   - The James: We have some good laws – Chesapeake Bay Preservation Act: A land use law that requires that development implement water quality measures & that localities develop land use plans (on books since late 1980s). We need more of these laws.
   - Weakness: It's not being effectively implemented. Localities don't hire people to implement or don't have the will to enforce it. State agency hasn't forced localities to implement it either!
   - Very effective conservation easement program: a person can legally put a document (easement) on his/her land that prohibits future owners from building anything further on the land. This is a big deal in Chesterfield because one woman owns a huge amount of land, everything is developed around it, and she has put an easement on it. A weakness is that we don't have anything more substantial to control urban sprawl.

4. What is the value of the James River's natural environment – ecologically, as a source of life, and economically?

   - Does provide incredible economic value for fishermen @ mouth.
   - Eco-tourism (recreational fishermen)
   - Water supply at mouth
   - Mode of transportation
   - Tremendous aesthetic value – think about how people relate to the James River. Thing of beauty.
   - Source of fun
   - Bird watching (number of wonderful cites)
   - Wetlands provide incredible flood protection and filter out pollutants (water quality)
   - Resource includes its farmland (products, aesthetics, etc)

5. Does Richmond have the resources to meet respectable sustainable goals?

   - From a funding perspective – no. Not only Richmond, but local and state are faced with massive current budget shortfalls. – one area that's been cut the most = funds for natural resources.
   - Probably won't see a change in the near future.
   - Combined Sewer Overflow (CSO) – septic connected to sewer – rain can make them overflow into the river. (happens to lots of old cities). Hasn't been changed/separated because of funding.

6. What should Richmond offer to effectively interest the public in actively striving for sustainable goals? What venues for expression and idea generation does Richmond offer its citizens?

   - Ask Jeff Painter
   - CBF has a # of different approaches – educational: newsletter, action network via e-mail (sign-up & get alerts), workshops – "Save the Bay Breakfasts," canvassing – works with a company that hires younger people to go door-to-door, working with other organizations (getting their people involved as well)
   - Richmond offers city council meetings (public forum)

7. What crucial environmental policies must be put into place to ensure sustainability in the city?

   - One important thing large municipalities can do: upgrade sewage treatment plants using advanced technology that removes the nutrients – too many going into River will cause a loss of underwater grasses. We know how to drastically cut the amount of nitrogen (NRT technology – but expensive).
   - Working with federal Senators to give localities money to make this change.

8. What components, crucial to ensuring sustainable transportation practices, are missing from Richmond's system of mass transit?

- Combo of transportation and land use (shouldn't allow sprawl)

9. Please suggest some reasonable sustainable benchmarks or indicators for the city?

   - Use the resource as the benchmark.
   - Bay Foundation put together a numerical assessment of the Bay that hovers around 27 out of 100. Wants to hit 40 by 2010, with an ultimate goal of 70. Oysters, underwater grasses, forest buffers, nutrients, tributaries, inputs of toxins are all assessment categories (there are others as well).
   - Keys in James – underwater grasses: how many do we have? How many have we lost? Sediment, dirt, grass is important to fish numbers.
   - Migratory fish – Richmond has blocked off the River! Recent efforts to unblock, need to see fish numbers increase.

Questionnaire – Patty Jackson, James River Association

1. Has your organization taken any steps toward environmental sustainability along the James River? If so, what? Are you aware of other such initiatives taking place in the city?

- Long-term, get city to reduce/eliminate combined sewer overflows (CSO). In the mid-1980s, JRA got the city to do a study on the issue and a plan was developed in 1989. The estimate for project completion is a couple hundred million dollars (including the upgrade of the sewage treatment plant). The city was able to combine part of the CSO project with the Canal Restoration (revamping sewage pipe in canal); this did expedite canal restoration (this was an environmental improvement that aided economic development.
- Have been involved for years in a clean-up project on the James every June (the project now runs from Lynchburg through Charles City) – it's over 160 miles with over 600 volunteers. (2nd Saturday in June) They recycle what they can. There are about 7 spots for congregating to begin work. Part of "James River Days" – educational/clean-up environmental campaign that takes place yearly.
- Alliance for the Chesapeake Bay: Bayscapes Program – use native vegetation to clean water (a small area just beyond Brown's Island has just been bayscaped) -- *** go there and photograph for project?
- The JRA's mission is Conservation & Responsible Stewardship (more involved, more educated, more careful/steward-like)
- The JRA also takes volunteers to plant trees and to take water quality samples.
- JRA works with companies to prevent pollution.

2. What roles must be filled in order to achieve environmentally sustainable urban life in Richmond?

- Need more participation by citizens in decision making process, @ local level (planning/zoning)
- Even less involvement at the state level. Hard for people to get public notice that policies are coming up for debate (open to public) in VA Legislature (most such notifications are just put in the classified section); people need better info earlier in the decision-making process.

3. What are the city's environmental strengths and weaknesses?

- Strength – location: on the River, central in Commonwealth – a lot of opportunities to maximize tourism, economic development.
- Weakness – Economic development that can be detrimental to the environment is promoted, and wins over natural resources most of the time. Most decisions are made based on what will generate tax dollars & jobs, without a sense of people attempting to avoid hurting the environment.

4. What is the value of the James River's natural environment – ecologically, as a source of life, and economically?

- A lot of diversity of aquatic/animal life. The James River is a microcosm of the entire state (from the mountains to the bay).
- Economic diversity as well (rural to very urban)
- Transportation – river navigable from Richmond to mouth ** Transportation and natural resources sometimes clash.

5. Does Richmond have the resources to meet respectable sustainable goals?

- Patty is afraid it may not. Richmond struggles to meet the basic needs of its citizens (economic development/education, etc rise above the environment). Plus, it seems our city does not have the ability to think long-term. The government spends a lot of time reacting and responding (which is not unique to Richmond).

6. What should Richmond offer to effectively interest the public in actively striving for sustainable goals? What venues for expression and idea generation does Richmond offer its citizens?

- Should offer Town Hall meetings, dialogues – instead of being on the reactive side.
- Strategic planning process a few years ago, but nothing since then. Needs to be some commitment to making things happen, following through.
- Citizens need more sense of ownership (i.e. regularly offering and publicizing Town Hall Meetings).
- A lot of localities are competing. We need more regional and statewide cooperation. (i.e. Goochland wooing Motorola, but didn't have any area zoned for a housing increase. So Henrico, Hanover will get the people living there – will have to school the kids, etc – will get taxed, but will not get any economic benefit. (Also, water supplies, landfills/waste management). A lot of other places have regional units that work together.

7. What crucial environmental policies must be put into place to ensure sustainability in the city?

- Have to consider environmental impacts of every decision up front rather than as an afterthought. (i.e. zero pollution)
- Air pollution is the most important issue right now – ozone non-attainment status. Long term – water supply/resources is another important issue.
- We currently permit discharge into the River that is below water quality standards.
- Just finished VA Legislative Session: 1 bill to develop state water plan w/ local plan as part. – must do it by Dec. 2003 with a final approval no later than July 1, 2004.
- Also working on a state water plan on conserving water resources (impetus for politicians mostly from drought)

8. What components, crucial to ensuring sustainable transportation practices, are missing from Richmond's system of mass transit?

- Just not enough mass transit statewide (would alleviate some air quality issues).
- Getting adequate transit service outside the city limit (don't have a good way for people from suburbs to get to city)
- Train renovation downtown will help.
- Will need easy transit to train station
- People tend to look at environmental issues as a cost, not a benefit, not an improvement or an investment (mindset)

9. Please suggest some reasonable sustainable benchmarks or indicators for the city?

- Basics!
- Revitalize the city, revitalize the environment of the city by assuring safe and adequate water supply at same time as maintaining sustainable River flow
- Reduce air pollution to get out of non-attainment status.
- Make a commitment to maintaining floodplain, James River Park, etc.
- ***Increased quality of life leads to economic development!

** Pat Dezern – Sierra Club (transit) TIGER

Questionnaire – Dr. Margot Garcia, Professor, VCU Urban Studies Department

1. Has your organization taken any steps toward environmental sustainability along the James River? If so, what? Are you aware of other such initiatives taking place in the city?

    a. VCU internship program with local environmental groups, talk in classes about sustainability
    b. Most encouraging thing from any organization is the new River Keeper (Patty Jackson got state to hire him)
    c. Renovation of old buildings is also a good initiative (i.e. Church Hill)

2. What roles must be filled in order to achieve environmentally sustainable urban life in Richmond?

    a. So many!...Community as a whole has low-level of understanding of River, functions, ec. – need basic River education from General Assembly down to Elementary School
    b. We have a River Keeper (for one year)
    c. Richmond is too consumed with other policies (i.e. race politics)
    d. So much is involved from our everyday lives (how do I spend money, whether I compost, do I buy local food, etc)

3. What are the city's environmental strengths and weaknesses?

    a. Class IV Rapids (could go out and kayak on your lunch break)
    b. Policy – Environmental element of Master Plan: Have begun to look at watersheds...Henrico invested $600,000 in having all rivers photographed/cutting edge storm water management program, put in BMPs (best management programs or big muddy ponds) – supposed to filter out excess nutrients from running water. Henrico has excellent Stormwater Management Plan.
    c. The more impervious surfaces (roads, the more chemicals on road, the more degraded surrounding rivers are)
    d. In Chesterfield, Swift Creek Reservoir has good program to maintain drinkable water.
    e. Biggest problem – CSOs: Tough to quantify actual rise in fecal matter in River. Strange things connected though – fish with sores located downstream (from organism in feces). Other fish had other abnormalities (pop eye, etc) being impacted by PCBs and heavy metals – haven't identified source.

4. What is the value of the James River's natural environment – ecologically, as a source of life, and economically?

5. Does Richmond have the resources to meet respectable sustainable goals?

- We have money – it's how they choose to spend it. Environment is not their goal. Issue of leadership – need one or more champions (speak out, write reports, brochures, speeches, letters to editor)

6. What should Richmond offer to effectively interest the public in actively striving for sustainable goals? What venues for expression and idea generation does Richmond offer its citizens?

    a. NGOs doing their best (Sierra Club created movie on sprawl), other groups have lobbyists, other orgs doing similar publicity ideas
    b. VA Environmental Network (many groups involved) – try to coordinate efforts
    c. We need a crisis. People aren't aware when the problem is mediocre/ not desperate.
    d. Basic operating attitude is low and unmotivated.
    e. Psychologists tell us we have to work through existing orgs (churches, Boys & Girls Club, etc) where people already have a propensity to get involved.
    f. Main venue: call to the audience at the beginning of city council meetings, letters to the editor. Are they adequate – no.

7. What crucial environmental policies must be put into place to ensure sustainability in the city?

    a. Need better land use planning, need Henrico's water policies in Chesterfield, Hanover, and Richmond.
    b. Need environmental education in schools
    c. We are improving our recycling. (Tuscon, now allows only one garbage can & one recycling can picked up per house per week)
    d. We still don't have curbside recycling bin pickup for recycling at apartments.
    e. We need to disconnect our old gutter systems from sewers! Shoot the water just about anywhere else (it's just rain water), and it's currently contributing to CSOs.
    f. Look at more low-tech solutions. Think about the small scale and make it happen on the local level.

8. What components, crucial to ensuring sustainable transportation practices, are missing from Richmond's system of mass transit?

    a. We have good operating bus system, but it should come further into counties.
    b. Light rail needed.

9. Please suggest some reasonable sustainable benchmarks or indicators for the city?
    a. Air quality, water quality, water conservation (per capita use, per day), work on bicycle paths, alternatives to car (in metro area), and connectivity of transportation routes. (in Tucson, all buses have bike rack on front).
    b. Not sure how to measure alternative transportation (maybe % of trips taken without car)
    c. Housing adequacy (rent as % of income)
    d. Riparian Areas (buffer zones on River) – percentage of river that has adequate buffer and undisturbed vegetation
    e. Fish health (don't have high levels of carcinogens in flesh)
    f. Bird diversity (richness thereof) – need wide variety of habitats
    g. Landscape fragmentation – how many areas in fact without roads through them, and what are the areas' sizes.
    h. Chesapeake Bay policy that mandates a buffer zone in which no buildings can be built along the edge of the James doesn't apply to anything built before 1989 – are working to restore several thousands of acres along the riverside with pre-policy buildup.

Talk with Ralph White – James River Park Association

Questionnaire – Ralph White, James River Park System

1. Has your organization taken any steps toward environmental sustainability along the James River? If so, what? Are you aware of other such initiatives taking place in the city?

2. What roles must be filled in order to achieve environmentally sustainable urban life in Richmond?

- The city does not need to spend a great deal of money on this park (James River Park – series of 11 parks). Give it its seven employees (the recommended number for completing all of the necessary work there), but that's it.
- Set up a method for greater citizen input.
- Needs focus on people friendly activities! Bicycle routes and marked walking routes – to provide activities not accessible in surrounding counties. To compete with the counties, we must provide something they don't have.
- Also, the city has deep historical roots – and not just dealing with the Civil War – Irish/Jewish roots, Old Industry, etc. – Richmonders talk down about themselves, we don't play up things unique about our area – have no sense of pride in the city. We need to make people want to brag about Richmond.

3. What are the city's environmental strengths and weaknesses?

- Opportunity for adventure recreation
- Weakness – mindset at the leadership level.

4. What is the value of the James River's natural environment – ecologically, as a source of life, and economically?

5. Does Richmond have the resources to meet respectable sustainable goals?

- Yes, in this park and in Richmond in general. Take self-discipline to do it. (i.e. Richmond wants to develop the Canal, but has not dedicated resources necessary to do so). San Antonio – local businessmen agreed to tax themselves more for a dedicated litter patrol (3 cleaning shifts per day) and police force directly supported by their tax $ and guaranteed to be in their area of the city only.
- We need that kind of commitment – requires political spine.

6. What should Richmond offer to effectively interest the public in actively striving for sustainable goals? What venues for expression and idea generation does Richmond offer its citizens?

- City is too insular about the way it gets input.
- Needs a way to bring in input of concerned groups on a more regular basis – possibly members from associations sit on a council (which advises the city council or economic development department) – bring users to the resources (i.e. someone from the rowing club, sierra club, JROC, etc) – make it small and area specific, not universal, but just pertaining to area along the River.

7. What crucial environmental policies must be put into place to ensure sustainability in the city?

- Managing for wildlife – we already make efforts to make the River's air and water clean, or at least the government is aware of those problems. However, we can't just make those attempts and then throw up our hands and say, "We're done!" We have to deal with changes in wildlife (i.e. there will be more animals when the water/air is cleaner – and their habitat or population must be adjusted accordingly)

8. Please suggest some reasonable sustainable benchmarks or indicators for the city?

*** Other info he just started talking about:

- "Mission 66" – JRP land identified as land near the city that would attract people. Purchased based on the clean water act & its concomitant sewer act. (Federal Law mandated that fishable, swimable water be nearby). This is how the James River Park system was created.
- Around this time, a maintenance road through the floodplain granted access to a large amount of previously inaccessible land along the River.
- The James River Park's feature is to offer "a little bit of wilderness in the heart of the city." Think of the park as a set in a play – a curtain of trees/thin wall of vegetation that creates an entirely different world.
- Ralph White's job is to manage the eleven sections of park along the fall line (total of 8 miles, 550 acres). He is also responsible for coming up with programs, and people to support the River and his initiatives. It is the opposite of a top-down hierarchy – the field workers do things and then send the report up, rather than being told what to do and then carrying it out).
- How the Pony Pasture transformed from a low-class area where undesirables hung out and quaffed alcoholic beverages to a place that attracts everyone from old women to children – 1. Cleaning up. 2. Cops on bikes: heavy policing for first couple of weekends of warm season...once they've established themselves as a presence, they aren't really necessary (originally tried cops in watch stands, but the presence was not felt). 3. Good information – directional signage.
- Additional benefit – high school and college kids using the Pony Pasture now want to keep it clean.
- Something to observe: Look at the difference between Belle and Brown's Island: during the day, watch at lunchtime, etc...Belle Isle is packed and there are usually but a few people sitting out on Brown's Island. Why? Belle Isle is disconnected from cars and the city. It is a natural, undeveloped environment. Brown's Island is still right in the face of the city with its open, treeless scape and lack of truly natural environment.
- Something the city needs, that is easy to do and cheap: there needs to be a walking connection across the River. There is a set of old railroad tracks that provides the perfect opportunity to connect Brown's Island to the south side of the

River – in fact, it is almost a complete trail already – there just needs to be about 10 more feet of connection. Then, on the other side, there is the Manchester rock wall for climbing. From this point, there should be a path back to Belle Isle, which connects to the suspended walkway and would thus offer a complete circular route.

- The city is concerned with the Canal Walk, but they have regulations against bikes, rollerblades, and dogs. The city doesn't get it – they're still trying to plan for rich old fart executives, when the people that are considering moving to the area are young people who want a place to rollerblade, bike, and run/walk with their dog!
- Another thing the city council doesn't get: we do need to spend money on the natural area, but not on development! There is more involved in the upkeep of a park than they think. This is why Ralph needs the recommended 7 person staff, rather than a 2 person staff (and he just got the second person last year). The city council thinks that if an area is not going to be developed that no money needs to be invested in order for it to thrive, and this is simply not the case. So much could be done to improve the James River Park system that is completely unrelated to development.
- Education: on the commercial level, it should be leading tours along environmental areas – weave together human and environmental history. Also, self-guiding booklets and trails. Plus, link the local school system to the resource! There should be certain things Richmond City school kids do before graduation that distinguishes them from Chesterfield and Henrico. 1. Every student must experience a flood – shows you the connection between people and nature, and the magnitude puts people in their place, so to speak. 2. Walk on the slave trail — route they walked out of Richmond to boats that took them to Charleston and New Orleans – Richmond was by far the greatest exporter of human chattel for 40 years…so much so that other cities started to complain about our monopoly on the slave trade. This gives you a different understanding of the Civil War – Richmond supported slavery solely because it made money. Our weather really did not mandate having slaves on plantations….(as opposed to places like Mississippi, where swamps often had to be drained to farm the land). These are the two big ones…but also, all school children should learn about 3. Fish migration. 4. Rock types and erosion.
- There is a disconnect between Ralph and the city council. He is a city employee, and for some reason (which I didn't really understand) he can't just go to them and recommend certain actions/inform them about what decision should be made/why the environment needs to be more of a focus in Richmond. Also, the city council cannot directly make him do anything. He has a superior who is a wall between the city council and himself, which is both a good and a bad thing.
- The Mayor has theoretical support for the River. He sees economic development as the future. Mayor is interested in developing south of the falls (show on map).
- Illegal tree cutting incident: A wealthy man – Mark Romer, lived along the River. Had a great view, but wanted an even better one – so he started cutting down the trees. However, part of the James River Park runs between his land and the water. He cut down those trees too. This was a big deal recently because that is illegal.

Councilman Joe Brooks made some waves in Richmond by stating that it was ok for Mr. Romer to cut some of the trees, as long as he didn't cut them all down. Very focused on meeting the needs of a few wealthy people.

- White advocates building along the River in human scale – small directly along the River and bigger as you go further back – otherwise you've created a canyon (look at picture of described development on his original interview form)
- "What we have to sell in Richmond is beauty." – this makes us different from other cities. (Belle Isle, Canal Walk, Floodwall) – all 5-9 minutes from your office.
- Preserving land and making it appropriately accessible is what needs to be done.
- To handle his 11 parks/8 miles of land, White is allotted $20,000 for the entire year. Imagine just the cost of trash pickup for this size of an area for an entire year. White is forced to attempt to make up for the shortfall through donated money.
- White also has the aid of JROC (the James River Outdoor Coalition), a support group that organizes what can't be paid for by White's funding (i.e. this weekend they are building a footbridge that is needed near the Belle Isle suspended walkway – so people coming down the hill won't have to walk across the railroad tracks (which is both dangerous and complained about by the Railroad people).
- One other thing White would like to see: recycling bins on Belle Isle – and ideally, a recycling bin next to every trash can in the park

Questionnaire - Business

1. Are you aware of environmental initiatives taking place in the city? Has your organization taken any steps toward environmental sustainability along the James River? If so, what?

2. What roles must be filled by Richmond businesses, if any, in order to achieve environmentally sustainable urban life in Richmond?

3. What are the city's environmental strengths and weaknesses? Are any of these aided or detracted from by businesses along the riverfront?

4. How invested are businesses along the riverfront in the environmental health of the James? Is it a priority?

5. How coordinated are Richmond businesses and local government? Are businesses aware of any restrictive environmental policies and, if so, are they enforced?

6. What should Richmond offer to effectively interest the public in actively striving for sustainable goals? What venues for expression and idea generation does Richmond offer its citizens?

7. Please suggest some reasonable sustainable benchmarks or indicators for the city?

Questionnaire – Chris Barksdale, Property and Operations Manager: Richmond Riverfront Corporation

1. Are you aware of environmental initiatives taking place in the city? Has your organization taken any steps toward environmental sustainability along the James River? If so, what?

- Across the street, Bayscape Garden (worked with CBF, JRA, etc) – he helped make it.
- One of the things that helped fund the canal was that it was included as part of CSO project.
- Didn't notice any effects from last flood though.

2. What roles must be filled by Richmond businesses, if any, in order to achieve environmentally sustainable urban life in Richmond?
   - Need to work together
   - The River is a lot cleaner than 20 years ago, River provides a source of income.
   - Role of business in environmental health of the River is a combo of supporting the initiatives of local environmental groups and thinking of their own initiatives and higher standards.

3. What are the city's environmental strengths and weaknesses? Are any of these aided or detracted from by businesses along the riverfront?

- Feels that people are very willing to do what's necessary – a strong sense of the River from the community as a whole.
- Weakness – old industry, there isn't much along the River anymore, but that which is there is a weakness, because it pollutes the air and water. Industry along the tributaries is another weakness.

4. How invested are businesses along the riverfront in the environmental health of the James? Is it a priority?

- Next week, James River Sojourn – week-long float, bring environmental awareness to Chesapeake Bay (check Ches. Bay Association's website)

5. How coordinated are Richmond businesses and local government? Are businesses aware of any restrictive environmental policies and, if so, are they enforced?

- #1 is the Chesapeake Bay Act -- % of pervious vs. impervious surfaces, runoff, etc.
- Government can sometimes be overzealous. Sometimes common sense should dictate that a certain law shouldn't be applicable.
- Debbie Byrd – Coordinator for Ches. Bay Act – makes sure act is enforced in new construction.

6. What should Richmond offer to effectively interest the public in actively striving for sustainable goals? What venues for expression and idea generation does Richmond offer its citizens?

- It's an ongoing process, and it's being done.
- Newsprint – Style, Blue Ridge Outdoors; Web
- Richmond City Council – as for how it works, depends on how info/requests are presented.

7. Please suggest some reasonable sustainable benchmarks or indicators for the city?

- Water quality is better, but still needs improvement – everything ties back to this.
- Fairly good job with parks – but need more funding.

Richmond Riverfront Corporation – leases Brown's Island, Canal Walk, Tredegar. Objective is to promote the development of these properties.

River District – group comprised of companies in the Bottom, Slip, and Riverfront. Objective is to promote their economic success.

Richmond Renaissance – Economics, also aesthetics, quality of life.

Questionnaire – Jack Berry, President, Richmond Renaissance

1. Are you aware of environmental initiatives taking place in the city? Has your organization taken any steps toward environmental sustainability along the James River? If so, what?

- Not tied to environmental associations at all. Benefit from the work that they do & grateful for it.

2. What roles must be filled by Richmond businesses, if any, in order to achieve environmentally sustainable urban life in Richmond?

- Any commercial development should be done in a way that limits environmental impact. Business is generally supportive of standards as long as they are not overboard.
- Environmental regulations are generally made at the federal/state level, and enforced locally.
- On the pollution control front, the city plays a very large role in funding and implementing such policies. There are things the city can do to get pollutants out of the streets before they reach the river.
- Projects are very expensive, and they tend to impact tax rates and utility rates. But you get the benefit of cleanliness and businesses in Richmond are generally willing to accept that trade-off.

3. Would businesses be willing to pay a higher tax rate for extensive cleanup and police services in certain areas, like in San Antonio along their canal?

- The city has already agreed to pay higher taxes to promote the development of the canal. Companies that lie within the "Business Improvement District" pay an extra five cents per $100 of assessed value on their real estate. This funds the Ambassadors Program, through which the city hires people to be at events in uniform to make people feel safer (for instance, they will be at the unveiling of the Lincoln statue 4/5. They will walk people to their cars or just be around to create a secure environment. The Ambassadors Program is a subsection of Richmond's Clean and Safe Program – which hires Richmonders to accomplish both of the title's objectives. In addition, this has essentially privatized cleanup downtown.

4. How invested are businesses along the riverfront in the environmental health of the James? Is it a priority?

- The River is the reason the city was founded here. As downtown business moves toward the River and the "Main to James" area becomes the area of greatest development, business has and will become more invested.

5. How coordinated are Richmond businesses and local government? Are businesses aware of any restrictive environmental policies and, if so, are they enforced?

- Richmond Renaissance has a partnership with the city government – the Mayor sits on their committee. Richmond Renaissance is a private sector enterprise that

tries to stay connected with government, not so much state or even city, but with those dealing with Downtown.

- Two of their thirty executive committee members are state legislators.

6. What should Richmond offer to effectively interest the public in actively striving for sustainable goals (said "change" in interview)? What venues for expression and idea generation does Richmond offer its citizens?

- Primarily marketing efforts – forums, tours, website, speeches.
- Richmond Ren. is a leadership group – tends to be CEOs, public officials – not a grassroots organization. There is limited opportunity for public involvement in what they do, which can be both a strength and a weakness.
- Overall the public has many opportunities to get involved in larger issues – they seem to be more involved in local issues like zoning that directly effect their lives though.

7. Please suggest some reasonable sustainable benchmarks or indicators for the city?

- Would worry a great deal if any environmental regulations were relaxed. – I asked, "Are these regulations intensely lobbied against by Richmond businesses?" – Businesses downtown aren't active in lobbying against environmental standards. The development industry is very concerned with wetlands regulations. These limit their ability to build houses and golf courses. They tend to be suburban. Another group that lobbies against more stringent regulations is major manufacturing (i.e. Dominion Resources and their ability to burn coal, Allied, DuPont).
- You must make a distinction between these different structures – business, industry, quasi-governmental organizations.
- The region is actively trying to attract new industry, but it will mostly locate in the counties due to more open space.
- The city, on the other hand, is actively seeking office development, research, and banking.

- Jack Berry believes there are some areas that should never be developed (i.e. Belle Isle), but along the River there are areas that have been developed for hundreds of years – and he is all in favor of redeveloping these.

Questionnaire - Government

1. How does the environment rank on the list of priorities in comparison with other issues?

2. Have local and state government taken any steps toward environmental sustainability along the James River?

3. What role(s) must be filled in order to achieve environmentally sustainable urban life in Richmond? What should local government's responsibility in filling those roles be?

4. What are the city's environmental strengths and weaknesses?

5. What is the value of the James River's natural environment – ecologically, as a source of life, and economically?

6. Does Richmond have the resources to meet respectable sustainable goals?

7. What venues for expression and idea generation does Richmond offer its citizens? If you view these as inadequate, what should Richmond offer to effectively interest the public in actively striving for sustainable goals?

8. What crucial environmental policies must be put into place to ensure sustainability in the city?

9. How visible are Richmond's environmental policies? How are they enforced?

10. Please suggest some reasonable sustainable benchmarks or indicators for the city?

Questionnaire – Rudolph McCollum, Mayor of Richmond

1. How does the environment rank on the list of priorities in comparison with other issues?

- Given that the River is an important physical aspect of the city (literally divides city) and we depend on it (life & livelihood), River is important…more so than any other aspect of the environment.
- Richmond prides itself on its trees and park system.

2. Have local and state government taken any steps toward environmental sustainability along the James River?

- Main thing is River cleanup.
- CSOs – mitigation program takes up the major amount of all $ allotted for envt.
- Adopt a tree program
- Fact that a lot of parks are free is a fiscal provision by local government.

3. What role(s) must be filled in order to achieve environmentally sustainable urban life in Richmond? What should local government's responsibility in filling those roles be?

- From an overall societal standpoint, more needs to be done to encourage mass transit – to reduce pollution in the region.
- Expand use of buses in the counties.
- Bike paths.

4. What are the city's environmental strengths and weaknesses?

- Both a weakness and strength that Richmond is an older city (fully developed). On the positive side, it requires us to be more creative, reuse, and adapt existing facilities. On the negative side, we have more brownfield issues, not a lot of greenfields. We can't grow geographically – this imposes strains on our infrastructure/forces us to strengthen it.

5. What is the value of the James River's natural environment – ecologically, as a source of life, and economically?

- Ecologically – rapids, where else in the world can you find class V rapids in urban environment? Walks along shore/in natural environment, wildlife, park system.
- Economically – fact Richmond was built on the Riverfront allows great development opportunities.

6. Does Richmond have the resources to meet respectable sustainable goals?

- No – we have depended a lot on residents in trying to respond to EPA mandates – more support needed from the federal government. It's tough to get citizens to pay for water/sewer when 20+% of the population lives below the poverty level.
- Old City – many water/sewer systems are made of iron pipes, have come to end of lifetime, going through expensive 40 year replacement program.
- Better drainage systems are needed for floods

7. What venues for expression and idea generation does Richmond offer its citizens? If you view these as inadequate, what should Richmond offer to effectively interest the public in actively striving for sustainable goals?

- In general, we don't do enough of marketing the city @ all. Try to use tv, print media, get assistance from private sector. Ideally, would like to do more public forums – but need the money. Use forums for planning and discussion.

8. What crucial environmental policies must be put into place to ensure sustainability in the city (if you had an unlimited budget)?

- Complete the CSO program, meet water quality standards, complete infrastructure replacement, provide more mass/alternative transit, more education – bottom line, it comes down to a cost issue.

9. How visible are Richmond's environmental policies? How are they enforced?

- Not very visible at all to the average person. Professionals are more aware (business).
- Enforce – spread amongst different people. Police, fire, building inspectors. State and Federal gov't have their own people.

10. Please suggest some reasonable sustainable benchmarks or indicators for the city?

- Like to see more of an environmental protection effort and assistance @ the federal level.
- Work to achieve a balance between protecting the environment and economic development.

Questionnaire –Joseph Brooks, Richmond City Council

1. How does the environment rank on the list of priorities in comparison with other issues?

- Richmond regional planning district commission (serves on that). Drinking water/quality is high on list of priorities. As the major supply (James), he's very concerned.

2. Have local and state government taken any steps toward environmental sustainability along the James River?
    a. City of Richmond under mandate from EPA is required to invest in CSOs —have invested $240 million, going into phase 4&5 – separating storm water from sewage (another $200 million). This is an overriding issue, based on regulations coming out of the federal government about contaminants.
    b. 80% of this comes from local taxes
    c. Richmond is just completing a 96-inch tunnel from the Bridge @ Powhite to Maymont.
    d. Most of what the city does is keeping with EPA mandates – they set the guidelines and we follow them.

3. What role(s) must be filled in order to achieve environmentally sustainable urban life in Richmond? What should local government's responsibility in filling those roles be?
    a. Current employees in public utilities are aware of the environment.
    b. Community Development Department – approves housing & industrial plans.
    c. Permit department – covers compliance with Acts (silt plans, filter plans, water retention)
    d. We already have the employees necessary to carry out these tasks (no new roles needed).

4. What are the city's environmental strengths and weaknesses?
    a. Strengths – we are a city of trees, architecture is great environmental strength (preservation and rehabilitation), historical background.
    b. Also, much of our business community is in service rather than industry – so there is less environmental impact.
    c. Weaknesses – as an older city, has a high percentage of dilapidated housing, need for repair
    d. Our underground infrastructure is aging and needs to be upgraded (water mains, gas pipes).
    e. CSOs are a design weakness.
    f. Demand on funding for ongoing city functions that outweigh/are higher priority in the immediate need than the environment.

5. What is the value of the James River's natural environment – ecologically, as a source of life, and economically?
    a. James is the centerpiece of the city, one of few in America that has whitewater running through the center of the city. Major source of our water supply. Does provide high level of water recreation, areas adjacent to River have been developed often as parkland, access has been preserved, Canal system has provided opportunity for economic development. There is a scenic view.

6. Does Richmond have the resources to meet respectable sustainable goals?
    a. Like all cities, funding always puts limitations on things you'd like to do. Our responsibility, as administration, is to sustain quality of life through distribution of these funds.

7. What venues for expression and idea generation does Richmond offer its citizens? If you view these as inadequate, what should Richmond offer to effectively interest the public in actively striving for sustainable goals?
    a. They have the Chamber of Commerce & city council meetings.
    b. Richmond Regional Planning District Commission – open meetings (9 cities and counties, including Richmond, Chesterfield, Henrico, Hanover, Ashland, New Kent, Charles City, Goochland, Powhatan)
    c. Neighborhood teams
    d. Individual expression to city council
    e. Those interested in environment will make themselves aware of how to be heard.

8. What crucial environmental policies must be put into place to ensure sustainability in the city?
    a. If you had unlimited funds – would like to see older neighborhoods clear of dilapidated housing, old infrastructure redone (pipes, curbs, gutters).
    b. Drainage problems – erosion, runoff
    c. Completion of combined sewage overflow systems
    d. Educate people on impact of runoff or agricultural products used on lawns, nitrogen in water resources.

9. How visible are Richmond's environmental policies? How are they enforced?
    a. Enforcing mechanism is in the permit process – don't want anyone to build anything that would destroy what's been done so far.
    b. If the city became aware of a violation, we would enforce it.

10. Please suggest some reasonable sustainable benchmarks or indicators for the city?
    a. The river floods often – leaves debris on banks, look at debris and determine health.
    b. Contracts with VCU to test water quality.
    c. Do not allow cutting of trees on city property without permission.
    d. Do have a budget item for maintenance of trees, try to maintain them

CONSENT FORM

TITLE: A Blueprint for Environmental Sustainability Along the James River

INVESTIGATORS: Trevor S. MacDougall, Jepson School of Leadership Studies
Thomas Shields, Ph.D., Jepson School of Leadership Studies, University of Richmond

If this consent form contains information that you do not understand, please ask for clarification.

Purpose

The purpose of this research project is to assess the past and present efforts of the city of Richmond to attain environmental sustainability along the James River, and to provide suggested benchmarks for a sustainable future. You are being asked to participate in this study because you have been identified as an expert in Richmond policy and/or environmental studies.

Description and Procedures

The study will ask you questions for a questionnaire. The interview will allow you the opportunity for a leisurely dialogue with the interviewer. You will not be pressed into answering any questions that make you feel uncomfortable. The expected duration of the interview is approximately one half hour to one hour. There are approximately ten to fifteen other participants in the study.

Confidentiality

The information from the interview will be used in a senior research project. Your statements could be attributed to you by name or title in this report. The researchers will not include information from your interview in further publications and presentations without receiving further prior consent.

Voluntary Participation and Withdrawal

Your participation in this study is voluntary. You may refuse to participate at any point in the interview. The interviewer will take notes and possibly quotes during the course of the interview.

Questions

In the future, you may have questions about your participation in the study. If you have any questions, contact: Trevor S. MacDougall @ tmacdoug@richmond.edu ; Thomas Shields, Jepson School of Leadership Studies, (804) 289-8524.

Consent

I have read this consent form. I understand the information and procedures about this study. All my questions about the study and my participation in it have been answered. I freely consent to participate in this study.

I understand that I will receive a signed and dated copy of this consent form for my records.

By signing this consent form I have agreed to participate in the interview.

_____

Participant Name, printed

_____ _____

Participant Signature Date

_____ _____

Trevor S. MacDougall, interviewer Date

_____ _____

Thomas Shields, Ph.D. Date

Chapter XIII: Works Cited List

Bay Area Transportation and Land Use Coalition. (6/21/02). *BART budget crisis: our solution.* Retrieved October 23, 2002, from http://www.transcoalition.org/sustransport/index.htm

Braat L.C., & van Lierop W.F.J. (1987). Integrated economic-ecological modeling. In Costanza, R., Perrings, C., & Cleveland, C.J. (Eds.), *The development of ecological economics* (pp. 209-222). Brookfield, VT: Edward Elgar Publishing Company.

City of Richmond, Virginia. (2000). *City of Richmond's master plan, 2000-2020.* Retrieved September 11, 2002, from http://www.ci.richmond.va.us/ecitizen/documents/masterplan/masterplan2001.asp

Common, M., & Perrings, C. (1992). Towards an ecological economics of sustainability. In Costanza, R., Perrings, C., & Cleveland, C.J. (Eds.), *The development of ecological economics* (pp. 209-222). Brookfield, VT: Edward Elgar Publishing Company.

Costanza, R., Wainger, L., Folke, C., & Mäler, K. (1993). Modeling complex ecological systems: Toward an evolutionary, dynamic understanding of people and nature. In Costanza, R., Perrings, C., & Cleveland, C.J. (Eds.), *The development of ecological economics* (pp. 209-222). Brookfield, VT: Edward Elgar Publishing Company.

Dabney, V. (1976). *Richmond: The story of a city.* Garden City, NY: Doubleday & Company, Inc.

Department of Parks, Recreation & Community Facilities. (n.d.). *Parks.* Retrieved January 10, 2003, from http://www.ci.richmond.va.us/department/parks_rec/james.asp

Department of Parks, Recreation & Community Facilities. (n.d.). *Points of Interest.* Retrieved January 10, 2003, from http://www.ci.richmond.va.us/department/parks_rec/POI.asp

Dismantle. (n.d.). *Curitiba, Brazil.* Retrieved October 24, 2002, from http://www.dismantle.org/curitiba.htm

Ellyson, A. (1970). *Richmond on the James.* Santa Fe: The Press of the Territorian.

Gimblett, H.R. (2002). Integrating geographic information systems and agent-based technologies for modeling and simulating social and ecological phenomena. In Gimblett, H.R., (Ed.), *Integrating geographic information systems and agent-based modeling techniques for simulating social and ecological processes,* (pp.1-20). New York: Oxford University Press, Inc.

Globalideasbank. (n.d.). *Curitiba and its visionary mayor*. Summarized from Donella Meadows' article *The city of first priorities*. In *Whole Earth Review*. (Spring 1995). Retrieved December 5, 2002, from http://www.globalideasbank.org

Halsey, B. (2002). Restoration Encompasses Commercial, Historical Renaissance. *Richmond Times-Dispatch.* Retrieved September 27, 2002, from http://web.lexis-nexis.com

James, M. (November 1997). *Experts Pick Baltimore for ecology study.* In the *Baltimore Sun.* Retrieved September 11, 2002, from http://www.ecostudies.org/bes/frame2-page_3c.html

Kleinberg, B. (1995). Urban America in transformation: perspective on urban policy and development. Thousand Oaks: Sage Publications.

Kline, E. (n.d.). Indicators for sustainable development in urban areas. In D. Devuyst, L. Hens & W. De Lannoy (Eds.), *How green is the city?* (275-298). New York: Columbia University Press.

Lafferty, W. M. (n.d.). Local agenda 21: The pursuit of sustainable development in subnational domains. In D. Devuyst, L. Hens & W. De Lannoy (Eds.), *How green is the city?* (63-84). New York: Columbia University Press.

Maryland Geographic Alliance. (n.d.). *Learning outcomes: grades prek-3rd*. Retrieved September 11, 2002, from http://www.umbc.edu/ges/mga/learning2.html

Morrison, A., (Ed). (1893). *The city along the James*. Richmond: George W. Engelhardt.

Parr, J. (7/21/01). *Chattanooga: the sustainable city.* Retrieved October 24, 2002, from http://www.academy.umd.edu/publications/Boundary/CaseStudies/bschattanooga.htm

Pearce, D. & Barbier, E. B., (2000) *Blueprint for a sustainable economy.* London: Earthscan Publications Ltd.

Redmon, J. (2002). Brown's Island Revisited: City's Share Down to $4.6 Million. *Richmond Times-Dispatch.* Retrieved September 27, 2002, from http://web.lexis-nexis.com

Roseland, M. (n.d.) The Eco-City Approach to Sustainable Development in Urban Areas. In D. Devuyst, L. Hens & W. De Lannoy (Eds.), *How green is the city?* (85-103). New York: Columbia University Press.

Senge, P. (1999). *The dance of change*. New York: Doubleday.

Silver, C. (1984). *Twentieth-century Richmond.* Knoxville: The University of Tennessee Press.

Slipek, Jr. E. (2002). Disappointed by the rejected Brown's Island development plan? Snap out of it, the plan was flawed anyway. *Style magazine*. Retrieved September 11, 2002, from http://www.styleweekly.com/article.asp?idarticle=5058

Sustainable Communities Network Partnership. (10/23/96). *Curitiba's voluntary sustainability*. Retrieved October 24, 2002, from http://www.sustainable.org/casestudies/international/INTL_af_curitiba.html

Timberline, H. (1999). The Great White Way. *Style weekly*. Retrieved September 11, 2002, from http://www.styleweekly.com/article.asp?idarticle=3394

Transportation and Land Use Coalition. (6/21/02). *BART budget crisis: Our solution.* Retrieved October 23, 2002 from http://www.transcoalition.org

Transportation and Land Use Coalition. (6/21/02). *Night BART.* Retrieved October 23, 2002 from http://www.transcoalition.org

UNESCO. (n.d.). *Creating a sustainable community: Hamilton-Wentworth's VISION 2020 Canada.* Retrieved October 24, 2002, from http://www.unesco.org/most/usa4.htm

United Nations Division for Sustainable Development. (6/29/00). *Agenda 21 – contents.* Retrieved December 6, 2002, from http://www.un.org/esa/sustdev/agenda21text.htm

Urban Ecology. (1996). *Blueprint for a sustainable bay area: access*. Retrieved October 23, 2002, from http://www.urbanecology.org/blueprint/blue.access.html

Urban Ecology. (1996). *Blueprint for a sustainable bay area: choice*. Retrieved October 23, 2002, from http://www.urbanecology.org/blueprint/blue.choice.html

Urban Ecology. (1996). *Blueprint for a sustainable bay area: Community*. Retrieved October 23, 2002, from http://www.urbanecology.org/blueprint/blue.commun.html

Urban Ecology. (1996). *Blueprint for a sustainable bay area: conservation.* Retrieved October 23, 2002, from http://www.urbanecology.org/blueprint/blue.conserv.htm

Urban Ecology. (1996). *Blueprint for a sustainable bay area: context.* Retrieved October 23, 2002, from http://www.urbanecology.org/blueprint/blue.context.html

Urban Ecology. (1996). *Blueprint for a sustainable bay area: introduction.* Retrieved October 23, 2002, from http://www.urbanecology.org/blueprint/blue.intro.html

Urban Ecology. (1996). *Blueprint for a sustainable bay area: justice.* Retrieved October 23, 2002, from http://www.urbanecology.org/blueprint/blue.justice.html

Urban Ecology. (1996). *Blueprint for a sustainable bay area: nature.* Retrieved October 23, 2002, from http://www.urbanecology.org/blueprint/blue.nature.html

Urban Ecology. (n.d.). *Introduction.* Retrieved October 23, 2002, from http://www.urbanecology.org/cities/cities.intro.html

Urban Ecology. (n.d.). *Land use profiles: Berkeley.* Retrieved October 23, 2002, from http://www.urbanecology.org/cities/cities.berkeley.html

Urban Ecology. (n.d.). *Land use profiles: Fremont.* Retrieved October 23, 2002, from http://www.urbanecology.org/cities/cities.fremont.html

Urban Ecology. (n.d.). *Land use profiles: Oakland.* Retrieved October 23, 2002, from http://www.urbanecology.org/cities/cities.oakland.html

Urban Ecology. (n.d.). *Land use profiles: San Francisco.* Retrieved October 23, 2002, from http://www.urbanecology.org/cities/cities.sf.html

van Wijngaarden, T. (n.d.). Indicators of sustainable development. In D. Devuyst, L. Hens & W. De Lannoy (Eds.), *How green is the city?* (251-274). New York: Columbia University Press.

Victor, P. A. (1991). Indicators of sustainable development: Some lessons from capital theory. In Costanza, R., Perrings, C., & Cleveland, C.J. (Eds.), *The development of ecological economics* (pp. 209-222). Brookfield, VT: Edward Elgar Publishing Company.

White, R. R. (n.d.). Sustainable development in urban areas: An overview. In D. Devuyst, L. Hens & W. De Lannoy (Eds.), *How green is the city?* (47-62). New York: Columbia University Press.

Wingo, H. C. (2001). Hey, Where is Everybody? *Style weekly.* Retrieved September 11, 2002, from http://www.styleweekly.com/article.asp?idarticle=308