

## Making Connections: Environmental + Social Action Through Design

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The question of stewardship is essential for architectural educators today. Design studio can be a highly effective venue for fostering stewardship, especially through a pedagogy that invites students to take action in places and with populations underserved or even unaware of the potential benefits design can have on their environment. In two recent studios, my students worked with community partners to design, and in one case build, sustainable educational projects that asked them to link *why* one acts with *how* one acts—opening a discussion about the enabling power of architecture. Students employed analytical and design methods that work from complex urban environments to architectural details, while understanding intertwined cultural, economic and ecological processes. Within this broader discussion, each studio produced specific and viable formal proposals communicated through a variety of graphic methods, including digital and manual drawings, models and texts. Both studios sought to prepare students to critically engage social and ethical considerations and to formulate their own clearly articulated theory for responsible environmental and social action through design.

### EDUCATIONAL OBJECTIVES

During the past two years I have linked research, design and community engagement in two studio-based collaborations with the Elizabeth River Project, an environmental non-profit group located in Portsmouth, Virginia, whose mission is to clean the toxic Elizabeth river and its watershed—“one creek at a time.”<sup>1</sup> The Paradise Creek Nature Park Interpretive Center and the Learning Barge initiative provided an opportunity to publicly test ideas I have explored in recent years through design competitions, essays and speculative studio proj-

ects. These are the first grant-funded studios that I have taught in association with local communities and environmental organizations. During the Fall 2007 semester, a third studio designed a green, education and office building for the Chesapeake Bay Foundation in Norfolk. While these complex design processes have been more difficult to orchestrate than a speculative studio, the projects have been more rewarding for the students and myself than I had imagined possible. Based on theories of *research service learning* and *critical pedagogy*,<sup>2</sup> there are several inter-twined educational objectives for these courses: helping students to connection their research, abstract learning, design practice and daily lives as responsible citizens of their local and broader community; working to make a positive difference in the world through design by linking students with real communities and places that would not have access to design services; fostering an awareness of and commitment to environmental ethics and green strategies at the urban and building scales; and linking such an awareness to formal and aesthetic research.

### CONNECTIONS BETWEEN ACADEMIC LEARNING, DESIGN PRACTICE AND CITIZENSHIP

Perhaps because of my teaching in two seemingly divergent areas, design studio and architectural theory, I am keenly aware of the gap between abstract theory and built architecture felt by many students. In both the academy and profession there is an ongoing reaction against “critical,” yet often autonomous theoretical discourse and a more recent “post-critical,” numerically generated form of practice that are both distanced from issues of environmental, economic and so-

cial justice. In both cases, ethical and aesthetic engagements are seen as disparate. George Baird and Reinhold Martin have thoughtfully analyzed the problems inherent in each approach. Though perhaps too late, Baird has argued for a reflective theory of praxis that might stop the post-critical position from spawning an architecture that “could all too easily again find itself conceptually and ethically adrift,” devolving into the merely pragmatic and the merely decorative.<sup>3</sup> Specifically rejecting the prevalent, post-critical position complicit with an unjust and unsustainable status quo, the Paradise Creek and Learning Barge studios emerged as a model of practice meant to infuse the architecture curriculum with an intertwined sense of ethical responsibility, social consequence and material making.

Diverging from the typical studio pedagogy, student teams researched and analyzed a broad range of important issues, then situated their intentions and design proposals within a particular place and a larger set of ethical concerns by writing a series of individual project statements. They developed a mode of inquiry that bridges the gap from both sides—through critical thinking and critical making. This conundrum, experienced in the lab, library and studio, is not new in educational theory. In “Researching for Democracy and Democratizing Research,” two professors in Law and Sociology



Figure 1. Learning Barge team at the 2007 US EPA P3 competition

study problems inherent in research conducted in academic isolation and analyze methods for a more civically engaged form of research, including participatory action research, collaborative inquiry and practitioner research.<sup>4</sup> The “Research Design Build” methodology of the Paradise Creek and Learning Barge projects share a commitment to participate in civic life, “struggle with the messy interconnectedness of real-world problems”<sup>5</sup> and instill a sense of ethical responsibility.

### EDUCATING AGENTS OF CHANGE THROUGH COMMUNITY INVOLVEMENT

Community service should not just be about serving when asked or fulfilling the needs identified by others. A socially engaged architectural practice and pedagogy must be able to see problems and opportunities, and conceive strategies for action. Samuel Mockbee articulated a meaningful way forward for architecture that embraces stewardship. “The practice of architecture not only requires the active individual participation in the profession, but it also requires active civic engagement. The architect’s primary emotional connection should always be with place, and not just the superficial qualities of place, but the ethical responsibility of shaping the environment, or breaking up social complacency and energizing one’s community. It is not prudent for the architect to sit back and rely on the corporate world, science and technology experts to decide what problems to address. It is in our own self-interest to assert our ethical values and our talents as citizen architects.”<sup>6</sup>

In both initiatives with the Elizabeth River Project (ERP), students collaborated with a diverse group of participants in several venues: during informal sessions to share needs, aspirations and concerns; on river explorations that generated experiential knowledge of the place; and through design reviews and public exhibits that brought together community members, ERP staff, teachers, project supporters and technical experts donating their time and knowledge. In the case of the Learning Barge, University involvement will not stop at the conclusion of construction, but will continue during yearly post-occupancy evaluation and design sessions by faculty and summer student fellows. As noted by Mockbee, the academy is an excellent venue to educate and inspire future agents of change. “If architecture is going to ‘nudge, cajole,

and inspire a community or challenge the status quo into making responsible environmental and social structural changes,' he says, 'it will take the subversive leadership of academics and practitioners who keep reminding students of the profession's responsibilities.'"<sup>7</sup>

Unlike the Rural Studio's focus on rural poverty and architecture's ability to be an agent of change in these places, however, the Paradise Creek and Learning Barge projects are primarily concerned with the degraded state of the urban environment and how architecture can be both responsible and educational about this state of affairs. All are committed to the concept of educating future agents of change, which is a concept that was theorized as "critical pedagogy" by the Brazilian educator Paulo Freire.<sup>8</sup> Advocating critical pedagogy as a powerful methodology for architectural education, Thomas Dutton writes: "Recognizing the inherently political nature of teaching and learning, critical pedagogy gravitates toward those theories and practices advocating social transformation. There is a moral imperative here. In a world of needless pain and social suffering, critical pedagogy values social justice, democracy, equality, and emancipation. This is why critical pedagogy is critical."<sup>9</sup>

#### **FOSTERING EDUCATION AND STEWARDSHIP**

Both the Paradise Creek and Learning Barge projects will bring about environmental awareness in their drawn and built forms, which is particularly appropriate to the needs of an environmental education program. Students asked: how can a building or landscape teach about environmental issues and act responsibly in built form? Neither concerned with a primarily visual nor globally focused practice, these two projects sought to achieve a direct and sustained engagement with a local place. These public university students are working in one of the most degraded areas of their state and seeking to foster stewardship and ultimately positive change. Across the United States, many middle and high schools have stopped taking their students on field trips, have removed environmental education from their curricula and even deleted outdoor recess from the daily school schedule. Richard Louv and others have noted the negative impacts of an increasing disconnect between children and nature. While describing

the positive physical, psychological and cognitive benefits of direct human contact with nature, Louv writes: "Factoring out other variables, studies of students in California and nationwide show that schools that use outdoor classrooms and other forms of experiential education produce significant student gains in social studies, language arts, and math. One 2005 study by the California Department of Education found that students in outdoor science programs improved their science testing scores by 27 percent."<sup>10</sup> Hermetically sealed and climate-controlled architecture, along with dispersed urban patterns where time *outside* is largely spent within the confines of the automobile, have contributed to an experiential disconnect from nature and the world outside.

Director of the National Center for Environmental Health, Howard Frumkin, has written several essays about connections between health, equity and the built environment. He notes, "future research about the positive health effects of nature should be conducted in collaboration with architects, urban planners, park designers and landscape architects."<sup>11</sup> Architects are well suited, though not always well prepared, to imagine and advocate for greater connections to nature and more environmentally responsive architecture and settlements. Educators Kim Tanzer and Vincent Canizaro have identified five competing definitions of sustainable, green or ecological architecture that are useful to consider: "Buildings and environments that help to establish an integrated relationship with nature; that preserve and/or improve local ecosystems; that result from civic action in which environmental quality, understood both physically and socially, is essential; that satisfy a series of benchmarks (i.e., LEED) defined by experts, interested parties, and politicians; and that save and/or conserve energy and satisfy our real and perceived needs."<sup>12</sup> One might argue that a truly sustainable building should achieve all these goals, as both projects have sought to do.

#### **THE PARADISE CREEK STUDIO**

Taking on this challenge, a fall 2006 graduate architecture studio created twelve proposals for a planned 40-acre Paradise Creek Nature Park and Interpretive Center in Portsmouth, Virginia. The park is being created and grant-funded by the Elizabeth River Project in collaboration with the



Figure 2. Paradise Creek Park (Beth Kahley)

City of Portsmouth, who will own and operate it after completion. Most of the public park will be a restored wetland on remediated industrial land and is a crucial component of the ongoing restoration of Paradise Creek, a polluted tributary of the Elizabeth River (fig.2). The Interpretive Center will be off the grid, LEED certified, and will contain a mix of educational programs, exhibits, public restrooms, offices, a kayak launch and boardwalk overlooking the wetland (fig.3). Each student was asked to propose one important addition to the

program, such as community daycare or boat rental, that could spatially, socially and educationally transform this place of learning and working. Students questioned the responsibility of architects and students to the environment and communities in which they operate. They advocated for a strong connection between the park and the adjacent economically disadvantaged neighborhood for which the City has shown little concern. Students designed energy self-sufficient buildings that explored didactic possibilities for the archi-

ecture—what and how a building can teach. They worked at the scale of the watershed, neighborhood, park, building and its detailed material assembly. The studio assembled a design research book that has become an invaluable document for our non-profit partner as they seek public support, regulatory approval and funding to realize the park. This type of *unbuilt social action* is an invaluable and engaged service that design studios may easily provide to a community.

The Paradise Creek studio is one in a series of core studios where I worked with graduate students to develop fundamental design skills while engaging specific issues from my own research: sustainable strategies for marginal and toxic sites, thresholds between public and private life within both city and building, and the relationship between materials and tactile experience. The students devised



Figure 3. Paradise Creek Park (Beth Kahley)

interwoven scalar, spatial and programmatic strategies, while exploring the haptic realm through space, time, texture, color and other non-quantitative phenomena. The Paradise Creek studio was my first attempt to reinvent this required second-year studio for Master of Architecture students by offering a “real project” with a non-profit organization. Rather than waiting for the third-year options where design/build and urban design studios offer greater community engagement, I hope to empower the students to become *both* skillful architects and critical, committed environmental stewards sooner in their education.

### THE LEARNING BARGE STUDIOS

The Learning Barge will be a floating field station that travels to wetland and oyster restoration and remediation sites along the Elizabeth River—the most polluted tributary of the Chesapeake Bay (fig.4). In several interdisciplinary studios and seminars starting in January 2006, students in architecture, engineering, science education and landscape architecture collaborated with ecologists, engineers, representatives of federal and state public agencies and middle school teachers. Learning Barge visitors will learn about environmental degradation and the ongoing restoration of this highly industrialized river that links Norfolk, Portsmouth, Virginia Beach and Chesapeake, Virginia. Both the need and the potential for environmental education in such sites is great, and the Barge and its associated curriculum will build ecological literacy in K-12 school children and the adult population of the Hampton Roads region. The

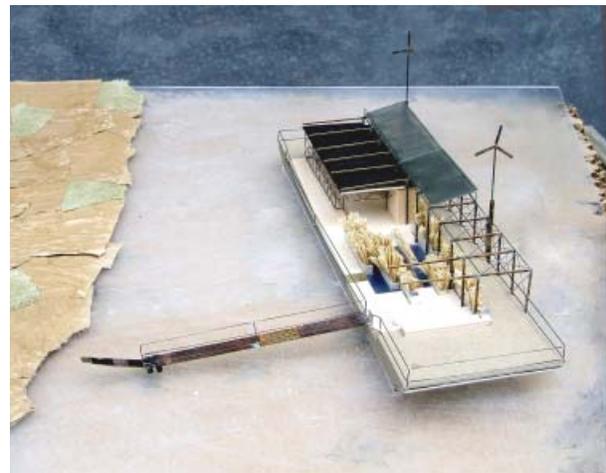


Figure 4. Learning Barge model

Elizabeth River Project, in partnership with several local school districts and non-profit organizations, will own and operate the field station to support environmental research, public outreach, and education for a disproportionately large community of economically and socially disadvantaged children. The idea quickly demonstrated its potential to become an appropriate and innovative *research design build* studio for University of Virginia students, while yielding a public benefit through their learning. By actively engaging both university students and barge visitors in the Elizabeth River's cultural and physical ecologies, the Learning Barge will encourage stewardship and create a significant national model for education about urban habitat restoration and sustainable practices.

Powered entirely by solar and wind energy, the 32' x 120' barge has been carefully designed to teach visitors about renewable power generation, easily replicable rainwater collection systems, grey water filtration utilizing native plants, oyster gardening, and the ongoing restoration of the Elizabeth River (fig.5). As a discrete and detailed test of several ideas, including the didactic ability of architectural space, form and material, the Learning Barge project works across a wide range of scales. Students directly explored tactility, materiality and fabrication at full scale with both analog and digital processes during a Fall 2006 Intention>Fabrication Workshop. They made detailed construction drawings in collaboration with Eric Matherne, a Naval Architect from Portsmouth and other technical consultants. Most workshop students participated in the Spring 2007 Fabrication Studio the next semester, where they built systems armature wall components and quickly developed an understanding of the properties of materials such as dimensional lumber, plywood, concrete, various metals and plastics. Material investigations were always rooted in the specific place of the Elizabeth River and the educational opportunities that each material and assembly could offer. For instance, students worked with concrete as a liquid that can accept meaningful additions before reaching a monolithic state. They experimented with aggregates such as oyster, clam and mussel shells, which serve an educational purpose and connect with the history of "tabby," a mixture of lime, sand and oyster shells once commonly found in southern coastal buildings. After much trial and error, students refined a similar technique to cre-

ate a series of concrete filtration basins onboard the Learning Barge. Another concrete technique was developed using CNC Laser cut chipboard form liners to shape concrete hand sinks, which produced a complex topography within. Students also developed an interactive rainwater filtration system suited specifically to the barge that holds and supplies water for non-potable use. Children will manually pump the water they require into a clear, measured reservoir above the hand sinks and observe the amount of water used as they operate the tap, thus developing an awareness of effort expended and water consumed.

Teaching about how to communicate and disseminate the design research throughout the process has been another important aspect of the pedagogy. By designing competition boards and preparing reports for design award programs in which they happily received several awards, the students learned how to communicate to diverse audiences.<sup>13</sup> The breadth and complexity of the design research endeavor is apparent in the range of disciplines and professional organizations to whom the students presented their work, including the American Institute of Landscape Architects, National Council of Architectural Registration Boards, US Green Building Council, Association of Collegiate Schools of Architecture and the American Institute of Chemical Engineers. The studio competed with forty-one university teams that had developed projects focused on sustainability in the EPA's P3 Sustainability Competition on the National Mall in Washington, D.C. in April 2007 (fig.1). Preparation for and participation in the EPA event was an educational highpoint of the semester and the team came home with \$75,000 to fund ongoing project construction. Students went beyond the design/build scope to understand how to make a complex process happen and hone strategic communication and representational skills, all while raising the project's visibility and bringing in funds to realize the project in the community.

## REFLECTIONS ON THE PROCESS

The Paradise Creek and Learning Barge projects give students the chance to work with real communities and a non-profit group committed to an urgent environmental cause. These two projects differ from many design build studio projects in

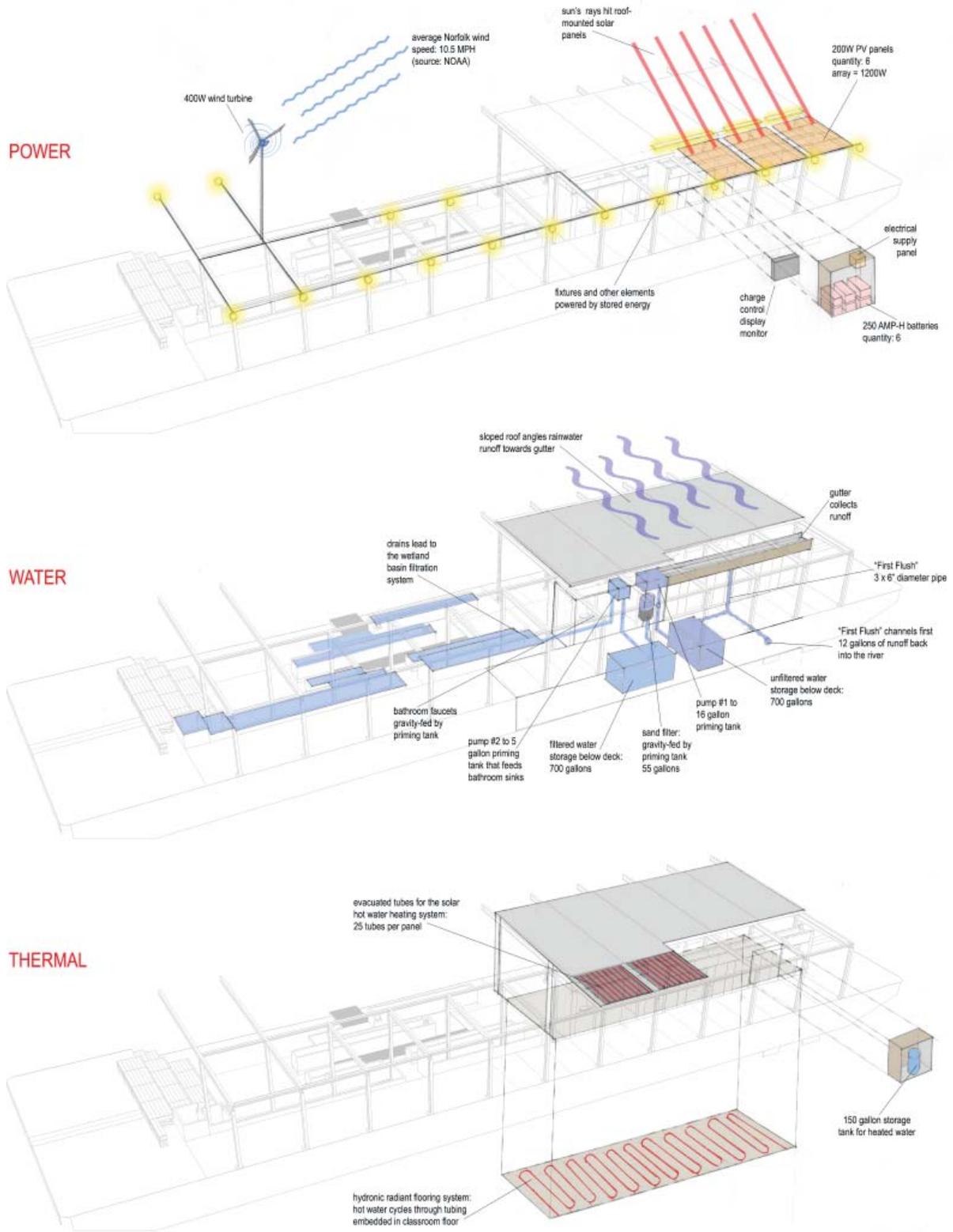


Figure 5. Learning Barge systems diagrams

that they will be public buildings in public landscapes that have been specifically designed by an interdisciplinary student group to teach about environmental issues and practices. The Learning Barge team simultaneously and synthetically developed the physical design and a site-specific curriculum, in collaboration with students from the University of Virginia's Curry School of Education, ERP staff and teachers from several public school districts. The Learning Barge will help an estimated 19,000 student and adult visitors each year to understand the environmental implications of how we live, while demonstrating sustainable practices that can be easily transferable to their own homes, including rainwater collection, solar and wind power generation, solar hot water heating and planted water filtration systems. In addition, both projects will provide schools in the region with needed outdoor experiential learning opportunities that would not have been available otherwise.

Clearly this type of *research service learning* is beneficial for the community, but how did the students fare throughout the process? A review of anonymous course evaluations provides valuable insight into how students experienced these studios and workshops, which they consistently ranked as a unique and meaningful educational experience. For example, a graduate student in the Spring 2006 Learning Barge studio wrote: "This is the best studio I have had at UVA. It is exciting and sometimes frustrating to work on a "real life" project, but always rewarding. Phoebe's dedication to the project and the studio is unwavering and energizing. She has designed a studio that works at all scales, focusing at times on careful construction details and others at the scale of an industrial landscape; it is a studio that exemplifies my understanding of UVA's goals as a school."<sup>14</sup> A fourth-year undergraduate student in the Spring 2007 studio noted: "The opportunity to work on a real-world project has obvious educational benefits; the opportunity to work on this particular project, with all of its incredible potential for architectural, educational, environmental and societal improvements, has been nothing short of amazing... I can say with certainty that involvement in the Learning Barge project has shaped my perception of architecture and what it can be used to achieve."<sup>15</sup>

As an instructor I have learned several important lessons as well. Structuring a multi-year public project within an academic schedule can be complicated, since a project does not stop when the semester is over and teaching assignments can interfere with project scheduling. For instance, Learning Barge construction has gone on hold for a semester while I teach two required courses this semester. Since this type of project often goes above and beyond regular teaching responsibilities, time management and maintaining a high energy level is another challenge that can be easily offset by the students' infectious enthusiasm. Securing funding for research, development and construction may be a significant concern depending on the financial structure of the project. For example, the Learning Barge is completely funded by monetary awards from competitions and grants, which require a great deal of time and effort to write proposals, submit status reports and manage funds. At the same time, this type of experience is invaluable for students and faculty hoping to create projects in non-traditional ways. Cultivating a strong working relationship and clear communication with a community partner or non-profit group is an interesting and essential process as well.

The traditional knowledge and skills of the architect expand to meet these challenges and open new possibilities for ethically engaged ways of learning and practicing. Ultimately, this studio pedagogy seeks to foster an intellectual commitment to making connections between diverse disciplines, ideas, people and places. Teaching students through a "real life" project can inspire a larger ethical commitment to environmental justice, social responsibility and the role of aesthetics in everyday life. These community collaborations help ensure that environmentally sound and beautiful places are available to underserved populations and neglected places.

#### ENDNOTES

1. For a complete description of their mission and activities, see The Elizabeth River Project, *Restoration and Conservation: A Watershed Action Plan* (2000). Also see the ERP website at <http://www.elizabethriver.org>.
2. The practice of Research Service Learning connects a research university's mission to create new knowledge with a civic mission that positions students as agents of change in the community. See Timothy Stan-

ton, Dwight Giles, and Nadinne Cruz, *Service-Learning: A Movement's Pioneers Reflect on its Origins, Practices, and Future* (Jossey-Bass, 1999): 216-224.

3. See George Baird's article for an analysis of the current attack on resistant forms of critical theory by proponents of an instrumentalism unapologetically complicit with business and dominant economic interests. George Baird, "'Criticality' and its Discontents," *Harvard Design Magazine* 21 (Fall 2004/Winter 2005): 16-21. Reinhold Martin builds on Baird's critique of the post-critical and characterizes it as "sharing a commitment to an affect-driven, nonoppositional, nonresistant, non-dissenting, and therefore nonutopian form of architectural production." Reinhold Martin, "Critical of What? Toward a Utopian Realism," *Harvard Design Magazine* 22 (Spring/Summer 2005): 104-9.

4. Fran Ansley and J. Graventa, "Researching for Democracy & Democratizing Research," *Change* 29 (Jan/Feb 1997): 46-53.

5. Ibid. "We are all familiar with the conventional paradigm of research. In this view, research is largely the business of experts trained in specialized domains of knowledge. Experts study the problems of others, striving to maintain a posture of objectivity and distance from their research subjects. Scholars reap rewards not for contributions to community or civic life but for contributions to an expert knowledge base. Their work is judged by professional peers, and publication in refereed disciplinary journals is taken to be the most reliable indicator of quality. Such an approach to research, of course, does little to strengthen participation in civic life. In the social sciences, the job of the people being studied is to be the object of another's inquiry. Those who draw their understanding from experience—from living and engaging in real-world issues—may find their knowledge dismissed as too subjective. Those who struggle with the messy interconnectedness of real-world problems may find their ideas recast into narrow disciplinary terms and esoteric debates in which they cannot participate. Ultimately, a knowledge system that discredits and devalues common, everyday knowledge serves to disempower common people as well. Such a system represents a contradiction for any vision of democracy that values the participation of people themselves in key deliberations and decisions that affect their lives."

6. Samuel Mockbee, "The Role of the Citizen Architect," in *Good Deeds, Good Design: Community Service Through Architecture*, ed. Bryan Bell (New York: Princeton Architectural Press, 2004): 151-156.

7. Samuel Mockbee quoted in Andrea Oppenheimer Dean and Timothy Hursley, *Rural Studio: Samuel Mockbee and an Architecture of Decency* (New York: Princeton Architectural Press, 2002): 13.

8. See Paulo Freire, *The Politics of Education: Culture, Power, and Liberation*, trans. Donaldo Macedo (South Hadley, MA Bergin & Garvey, 1985) and Paulo Freire, *Pedagogy of Freedom: Ethics, Democracy, and Civic Courage*, trans. Patrick Clarke (Rowman & Littlefield, 1998).

9. Thomas Dutton, "Cultural Studies and Critical Pedagogy: Cultural Pedagogy and Architecture," in *Reconstructing Architecture. Critical Discourses and Social Practices*, eds. T. Dutton and L. Mann (Minneapolis: University of Minnesota Press, 1996): 172.

10. Richard Louv, "Leave No Child Inside," *Orion Magazine* (March/April 2007): 57.

11. Ibid. 60.

12. For a full description of their five definitions, see Vincent Canizaro and Kim Tanzer, "Introduction," *Journal of Architectural Education*, v.60, n.4 (May 2007): 4-14.

13. The Learning Barge project has received several awards: 2006 National Student Collaborative Design Award from the American Institute of Landscape Architects; 2007 P3 Sustainability Award from the U.S. Environmental Protection Agency; 2007 NCARB Prize for the Creative Integration of Practice and Education in the Academy from the National Council of Architectural Registration Boards; 2007 Virginia Go Green Honor Award for Unbuilt Architecture from the James River US Green Building Council; 2007 Youth Council for Sustainable Science and Technology Design Award from the American Institute of Chemical Engineers; and 2007-2008 ACSA Collaborative Practice Award.

14. Excerpt from an anonymous, student course evaluation for the Spring 2006 Learning Barge studio.

15. Quote from an anonymous, student course evaluation for the Spring 2007 Learning Barge studio.