

# THE CENTER FOR GREEN SCHOOLS



**Center for Green Schools Fellowship Program:**  
Change Management from Bottom-up, Top-down and Everywhere in Between

Climate, Buildings and Behavior 2012 Symposium

Garrison Institute, 24 May 2012

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## The Impact of School Buildings on Childhood Health and Learning

Released February 2012

# The Impact of School Buildings on Student Health and Performance

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# HOW STUDENTS... SEE



## Classroom lighting and visual experience

Research on lighting and classrooms has been conducted for over a century, but attention in recent years has focused on the importance of natural light, after a departure from natural lighting for two decades in the 1970s and 1980s. Part of the issue has been understanding more precisely why natural light seems to have good results in schools. Intuitively, it makes sense that daylight would enhance the learning environment, but, because school districts are asked to justify facilities decisions using quantifiable means, researchers have attempted to show more conclusively that daylight is objectively positive for schools. This research includes seeking objective information about specific daylight design strategies (like skylights, clerestories, frosted glass, etc.) to ascertain whether certain strategies are more beneficial than others in terms of student health and learning.

The visual qualities of a learning environment are some of the most crucial building aspects to design properly since children depend heavily on sight in the learning process. In the early days of lighting research in schools, the focus was purely on quantity—in how much light to provide for given tasks. Quantity of light is largely agreed upon today. Less understood are issues of how light quality impacts student health. The question that follows, then, is how to ensure that we achieve a truly high-performing visual environment through design.

## What do we know today?

The impact of daylight on student health and learning has been thoroughly studied. Up until the 1970s, it was widely appreciated that natural daylight was necessary for healthy learning environments. But when the energy crisis hit in the early 1970s, designers began building schools with no windows to save energy. They conducted research at this time to test how the change impacted students and found no discernable impact on test scores. Researchers did find that teachers and students were very dissatisfied, but they did not believe that these attitudes could impact student performance and, thus, did not deem the dissatisfaction critical (Baker, 2011).

School building professionals have learned from experience, and we have begun to understand the biology of this phenomenon. For example, one study found that students without access to natural light showed a delay in seasonal cortisol production, a hormone that is positively associated with concentration abilities (Kuller & Lindsten, 1992). More recently, Figueiro and Rea showed that dim light melatonin onset (DLMO) is delayed significantly (by 30 minutes) after a five-day intervention in which a group of 8th graders wore glasses that kept out all short-wave (solar) light exposure while they were at school. DLMO helps entrain the circadian system, and thus, this study showed that an absence of short-wave light (daylight) can contribute to sleep problems in adolescents.

Regarding academic impacts, one well-known study showed that students in daylight classrooms had greater improvement over the course of one school year in math and reading standardized tests than students in windowless classrooms (Heschong Mahone Group, 1999). The numbers

“...one study found that students without access to natural light showed a delay in seasonal cortisol production, a hormone that is positively associated with concentration abilities.”

# GREEN CLASSROOM PROFESSIONAL

Certificate Program



# OVERVIEW

## TOOLS

### Steps to the Green Classroom Professional Certificate

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2 hour online training course  
+ 1 hour online virtual assessment

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3 hours total



Does anyone have extra rain barrels for my **#greenservice** project? @mygreenschools

I just did a **#greenservice** project on my campus with @ashley123! Great way to spend a Saturday.

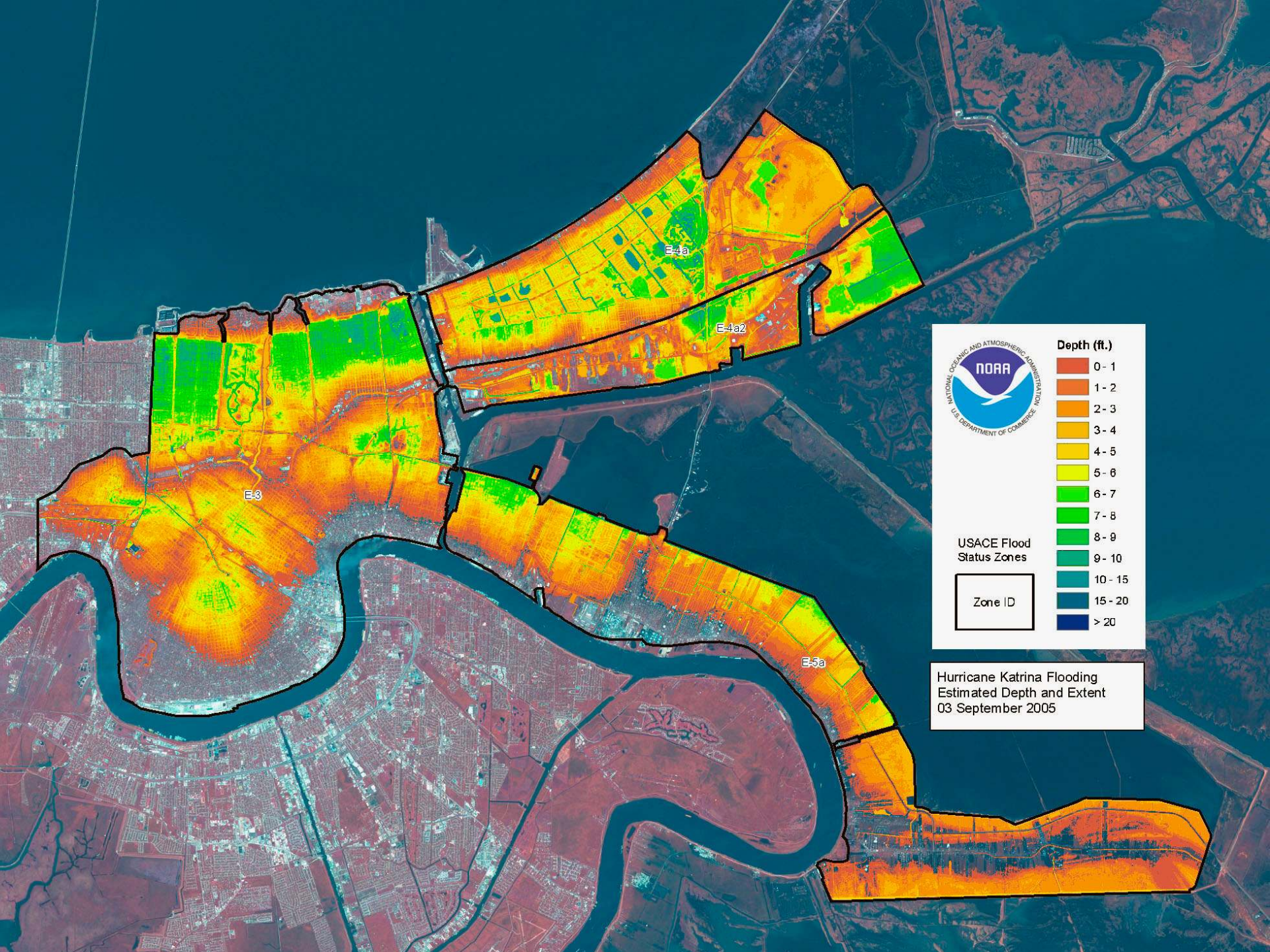
2 much litter! Picking up trash at my bro's elementary school. **#greenservice**

The Center for Green Schools at the U.S. Green Building Council presents

**GREEN**  **APPLE**  
**DAY<sup>OF</sup>SERVICE**

**Sept**  
**29**  
**2012**

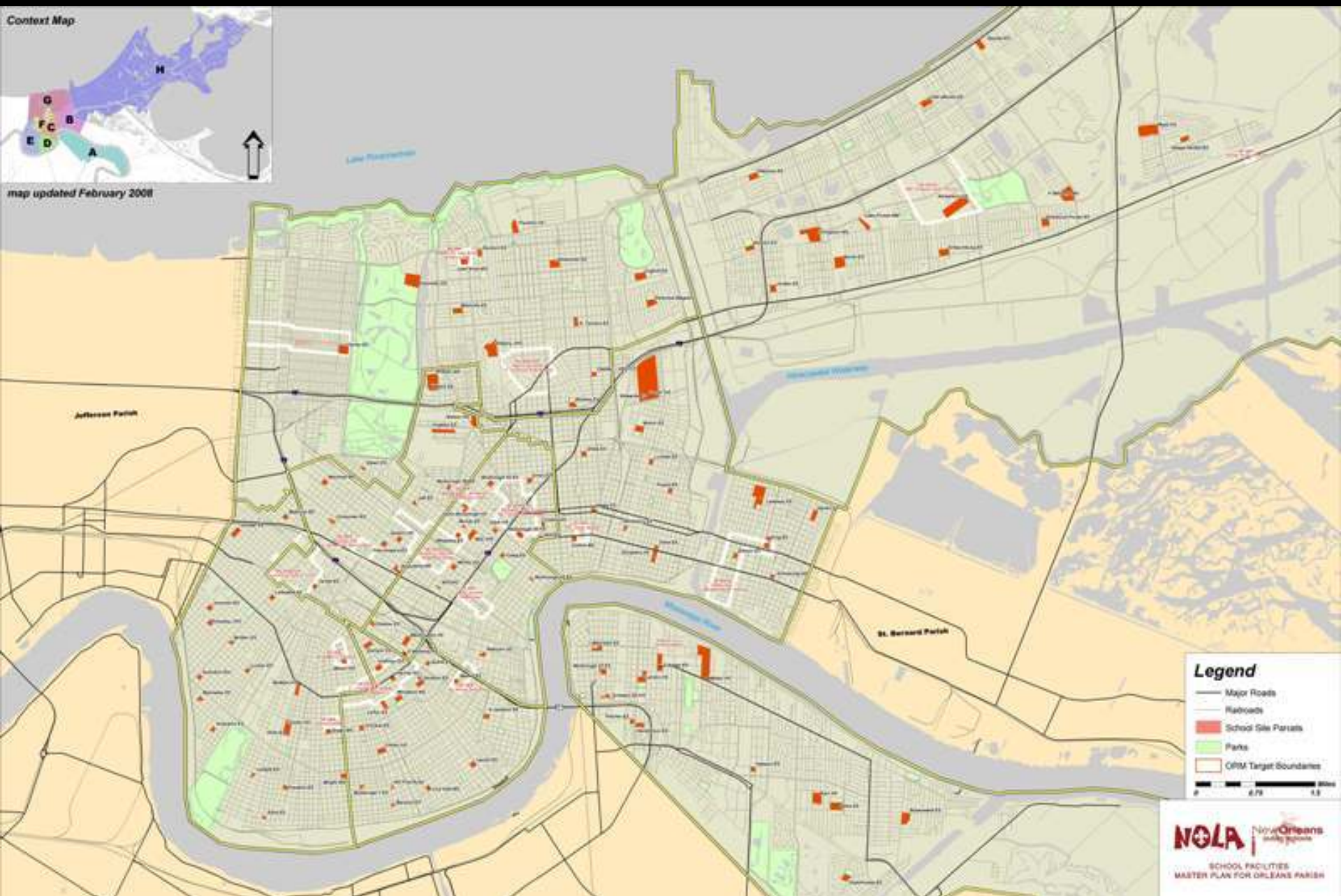












# New Orleans Public Education Pre-Katrina

- Orleans Parish School Board (OPSB) controlled 128 public schools, with an enrollment of approximately 63,000 students
- Private schools in New Orleans had a higher enrollment, 50,000 students in the Archdiocese alone
- In 2005, OPSB schools ranked 67<sup>th</sup> out of Louisiana's 68 parishes in student performance
- In 2007, Louisiana ranked 1<sup>st</sup> nationally in accountability, yet 45<sup>th</sup> in K-12 student achievement and 49<sup>th</sup> in student success indicators
- Approximately \$1 billion in deferred maintenance costs to district facilities



# Katrina's Impact on New Orleans Schools

- All schools closed, most for the entire 2005-2006 school year
- Students dispersed throughout the state and country
- Approx. \$2 billion in storm-related damages to facilities
- More than 50 school campuses were completely destroyed
- Approx. \$89 million in damages incurred by facilities due to vandalism and theft following Katrina
- Approx. \$133 million in termite and mold related damages incurred both before and after Katrina

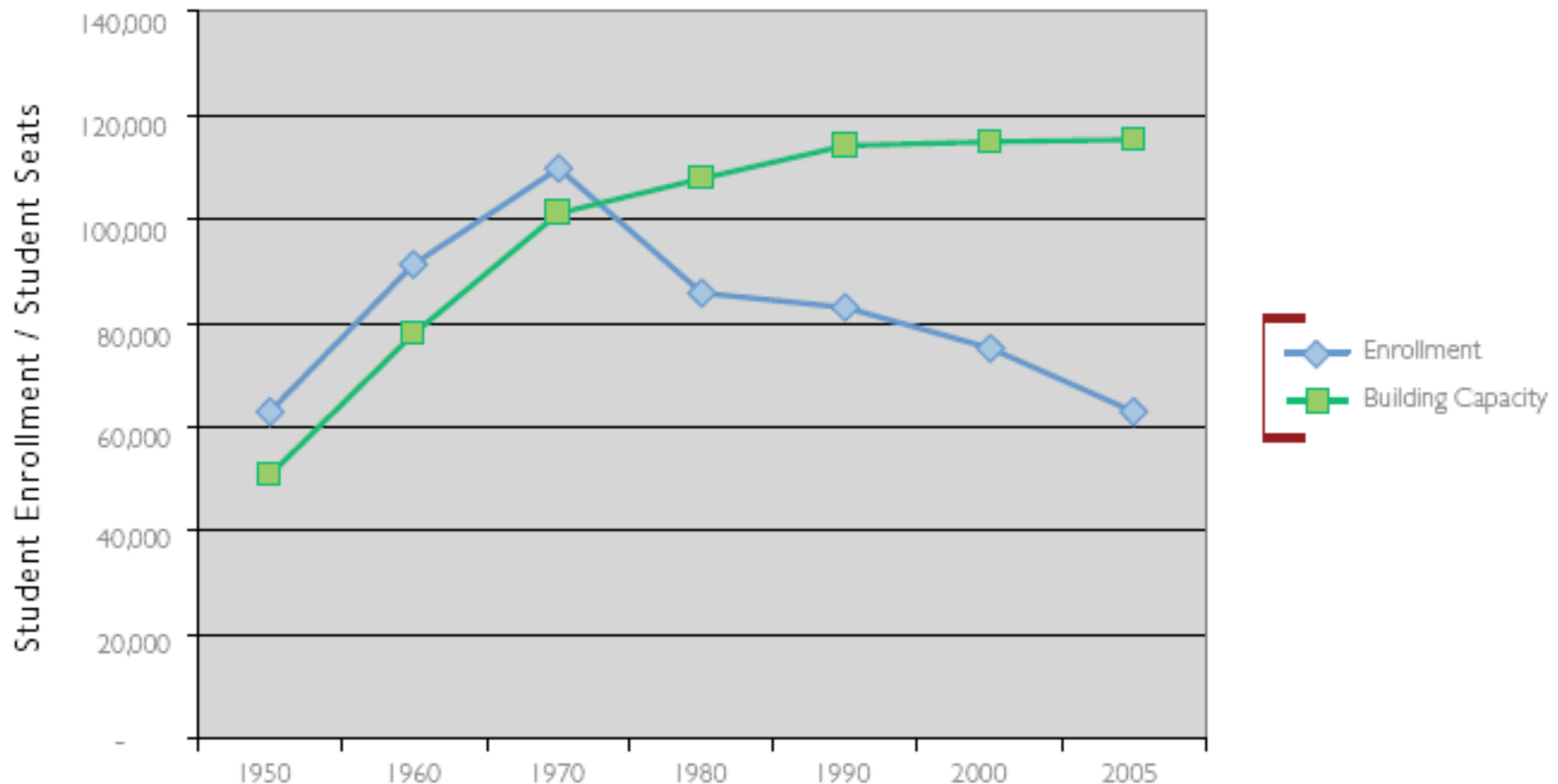






# ORLEANS PARISH PUBLIC SCHOOLS

## Enrollment vs. Historical Student Seat Capacity



### SOURCES

#### Enrollment

"Orleans Parish School Board: District-wide Demographic Projections," Urban Systems, Inc., August 1998.

#### Historic Seat Capacity

Building capacity estimates are based on original building designs.

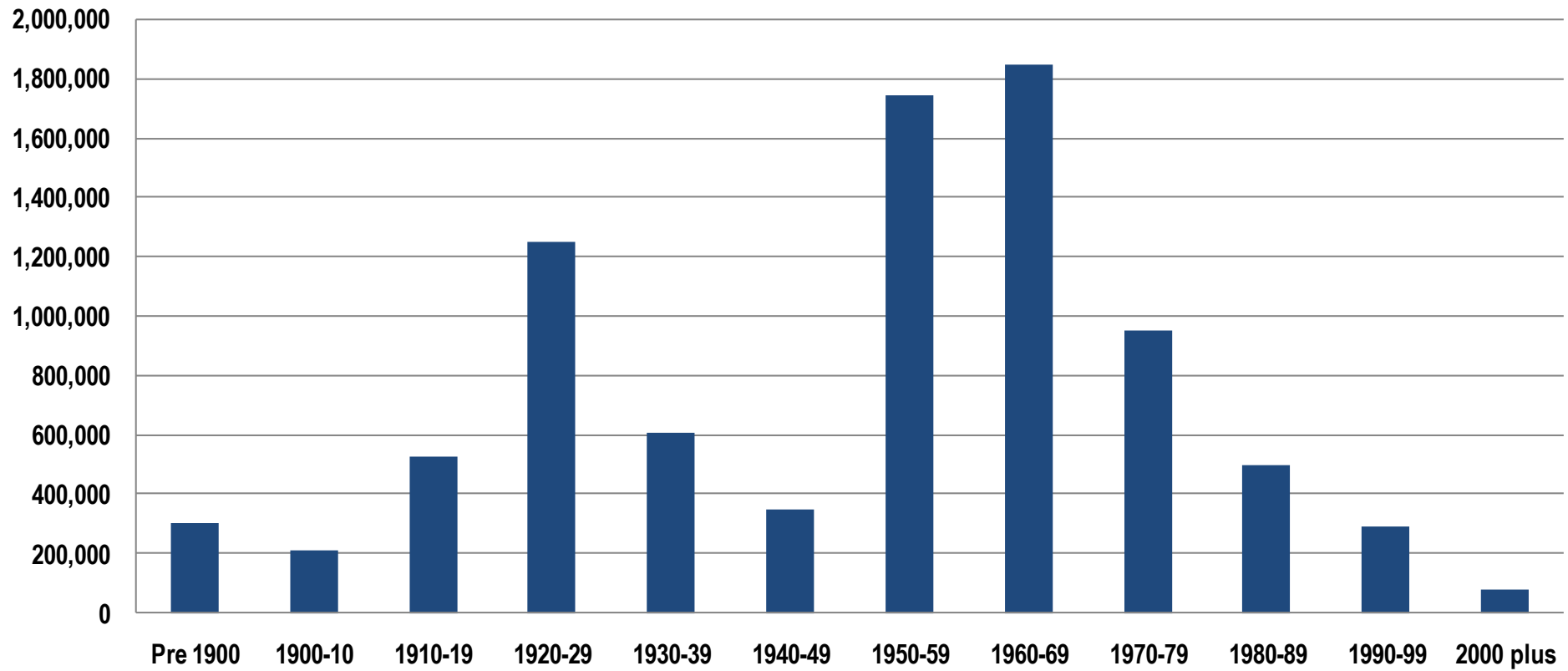
*Proposed Public School Building Plan with A Five-Year Improvement Program*, Harland Bartholomew and Associates, August 1950.

*Planning Sub-District Profiles: Volumes 1 - 13*, New Orleans Public Schools, Department of Planning, various dates in 1983-1984.

*New Orleans Public Schools, Facility Issues Report # 90-01: Overcrowding*, Department of Facility Planning, May 9, 1990.

*New Orleans Public Schools Management Study: Construction, Maintenance and Custodial Operations*, A.T. Kearney & Company, Inc., June 1968.

## Building Square Footage by Decade





“The Center for Green Schools UTC Fellow at Boston Public Schools is critical in our mission to provide innovative, welcoming schools that transform the lives of our students. We are thrilled to welcome the Fellow and work with her to ensure Boston sets the standard for efficient, healthy schools for all our children.”

- Carol R. Johnson,  
BPS Superintendent

“We have set a lofty goal of becoming the greenest region in the country.... This unique opportunity from the U.S. Green Building Council and United Technologies Corp. to be the recipient of an on-the-ground Sustainability Director will better equip Sacramento in its work to achieve green schools throughout our district.”

- Mayor Kevin Johnson



# THE CENTER FOR GREEN SCHOOLS



## FELLOWSHIP PROGRAM

### 2011 Green Schools Fellowships

#### Boston Public Schools

**57,000** students  
**8035** employees  
**134** schools

#### Sacramento City Unified School District

**48,000** students  
**4900** employees  
**88** schools







# School District Sustainability Leaders Summit

June 27-29, 2012

Atlanta Public Schools  
Charlotte Mecklenburg Schools  
Denver Public Schools  
Detroit Public Schools  
Durham Public Schools  
Houston Independent School District  
LA Unified School District  
Madison Metropolitan School District  
Montgomery County Public Schools  
NYC Department of Education  
St. Paul Public Schools





Sacramento, CA









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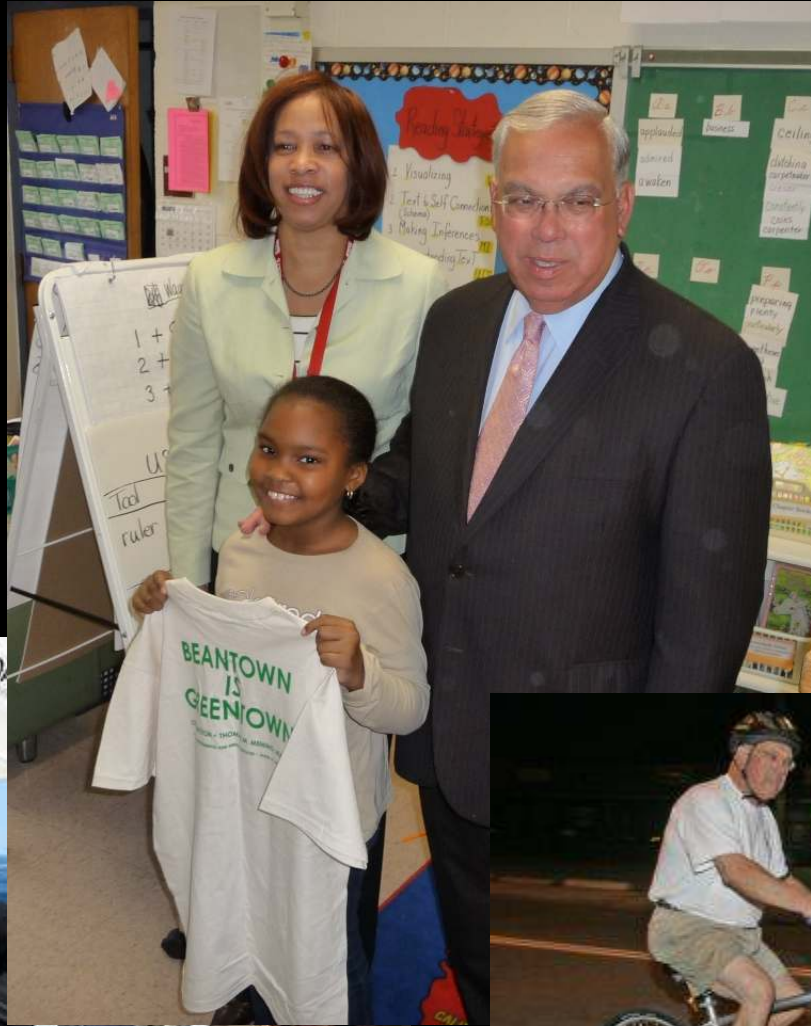




Boston, MA

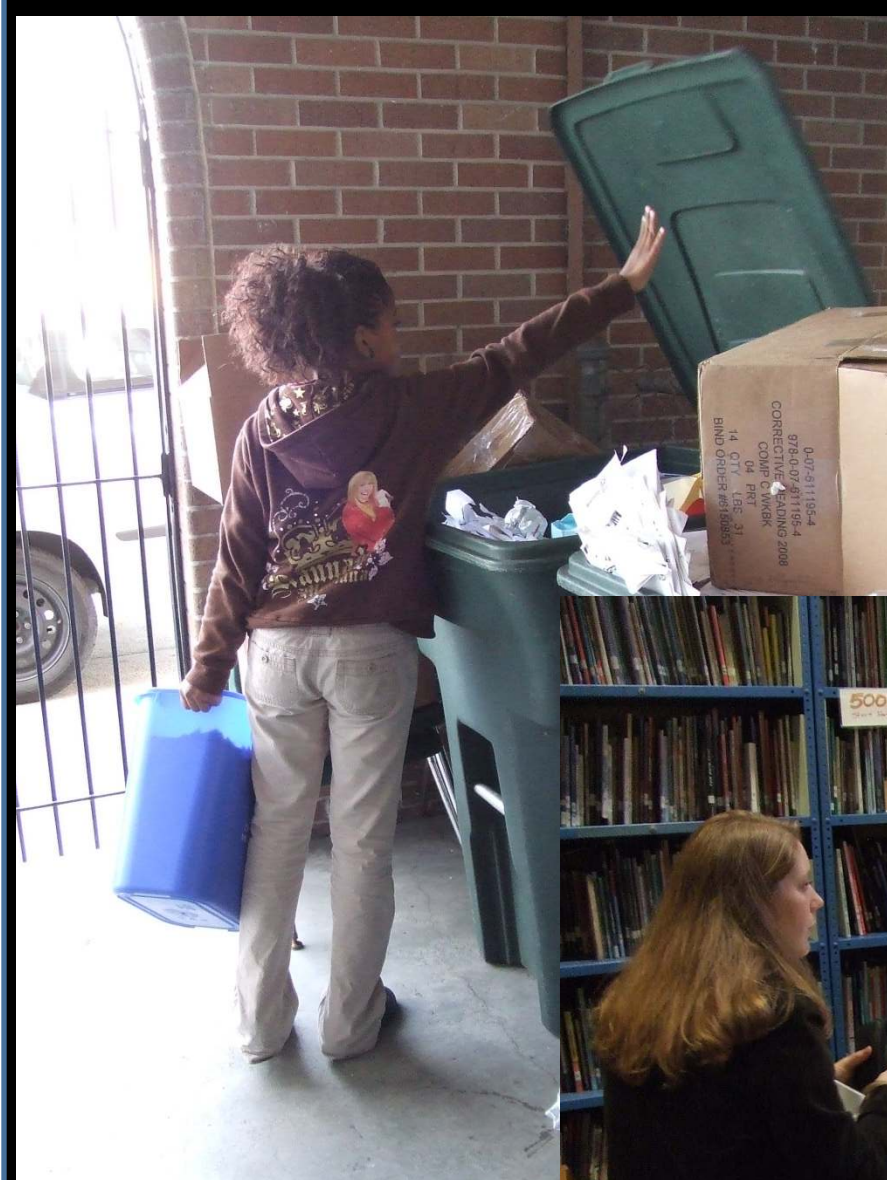














**Problem Statement:**

School leaders have not received substantial training in whole school approaches to greening their schools. Therefore, school leaders wishing to implement green school practices district wide need specific, targeted, professional support to do so.

**Assumptions:**

- Healthy High Performing Schools = high quality learning environments = Green Schools
- One individual (Green School Fellow - GSF) can initiate/accelerate change (knowledge, behavior, culture) throughout a district
- USGBC will provide professional development and support that will enable the work of the Green School Fellow
- Green School Fellows will facilitate school/community partnerships and collaborations that will facilitate district-wide change

**Goal: Green schools for everyone  
in this generation.**

**Strategies:**

- Select Districts with demonstrated commitment
- Select GSF (w/ qualifications) and match to district
- Fund the GSF position for 2.5 years
- Provide ongoing professional development, resources

**Influential Factors:**

- Districts' leader and key players' support and engagement
- Community support
- Political/economic climate
- Degree of "Good Fit" between district and GSF
- Degree of "Good Fit" between USGBC programming/support and GSF needs
- Degree of district turnover

**Outputs:**

- YEAR 1
- GSF will benchmark current policies, contracts, practices
  - GSF will develop positive relationships with key players in district and community
  - GSF will co-create strategic plan with district
- YEAR 2
- GSF will implement strategic plan and document successes and challenges

**Outcomes:**

- District will make GSF permanent position after year 3
- USGBC will document successful strategies and processes for sharing with interested district, state, national leaders
- District will receive recognition for financial savings, student learning outcomes, community partnerships

Figure 1. Green Schools Fellows Program Logic Model





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