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## **LESSONS LEARNED: SUSTAINING A COLLABORATIVE, ONLINE GIS FOR GREEN INFRASTRUCTURE**

**Abstract:** Sustaining individual GIS projects can be challenging. But when a project is guided by a partnership of more than 40 wide-ranging organizations, the challenge is magnified – while also offering opportunities for creative solutions and lessons to be learned for participatory GIS. This paper discusses these issues in the context of the Open Accessible Space Information System (OASIS) in New York. The paper builds on a panel discussion from URISA’s first PPGIS conference (in 2002) by describing our experiences since then toward overcoming these challenges and leveraging opportunities for PPGIS sustainability.

### **AN OASIS IN NEW YORK**

The Open Accessible Space Information System (OASIS) is an interactive GIS website for green infrastructure in the New York metropolitan region ([www.oasisnyc.net](http://www.oasisnyc.net)). Supported primarily with public funds, it helps government agencies, nonprofits, community activists, local businesses, academic institutions, and others develop a better understanding of their environment with interactive maps of open spaces, property information, transportation networks, and more. Use of the OASIS website is free to the tens of thousands who have accessed it – a fact that is critical to its success.

But to describe OASIS only as a website scarcely captures what makes it special. More importantly it is a consortium of public and private organizations and individuals that have seen the power of collective effort. The group has pooled resources to create an on-line repository and delivery vehicle for spatial data while coming together as a forum for communication and information sharing.

Though the project emphasizes open space-related information, it encompasses a wider range of data and issues. The mission of OASIS is to “develop an accessible information system that helps enhance the stewardship of open space so these areas are linked, diverse and sustainable for the benefit of all people, organisms, and ecosystems in and around New York City.” From its inception, however, a key goal of the project has also been to emphasize the nexus between a city’s open spaces and its vacant land, housing, zoning, transportation, educational facilities, and a host of other land use planning and community development issues.

Although the project has succeeded in several ways, some of the attributes that make OASIS an effective participatory model also raise issues that need to be addressed to ensure long-term sustainability. The project enjoys wide support, yet it is neither a permanent organization nor does it have a permanent home, and funding is year-to-year. The dilemma faced by OASIS is how to preserve its vitality while developing a sustainable future.

## THE EARLY YEARS

The groups involved in OASIS first came together in late 2000 (see Appendix for partial list of participants). The USDA Forest Service convened the first OASIS meeting in New York to address a two-fold problem for organizations involved in maintaining the city's "green infrastructure" (trees, parkland, natural areas, and other local open spaces).

First, they sought to create a pilot project to harness and coordinate the power of online mapping tools so average citizens, neighborhood groups, and others could better appreciate and care for open spaces such as community gardens, wetlands, or parks. At the time, online maps were an emerging technology. In order to jumpstart the project, ESRI – an OASIS co-founder and leading participant – provided in-kind access to its software and technical support. Their ongoing leadership in OASIS is key.

Second, the Forest Service understood that despite the power of GIS, the data resources needed for a successful GIS effort were located in disparate systems maintained by various public and private entities. Bringing this information together in one place would make it that much easier for the public to use online maps for display and analysis – one of the signature strengths of GIS.

The Forest Service's Urban and Community Forestry Program saw that these issues were most acute in urban centers, and selected New York as the first city in which to launch OASIS. The organizations that met in 2000 coined the project's name, adopted a mission statement, issued an RFP for the website, and selected NYPIRG's Community Mapping Assistance Project (CMAP) to build and maintain the OASIS website.<sup>1</sup> CMAP continues to play a lead role in the steering committee.

## SUCCESSFUL TRACK RECORD

The project has exceeded its original goals. The website is accessed more than 25,000 times per week, and people use OASIS's GIS tools to make more than a million maps a year. The site's users include community gardeners, parks advocates, agency staff, reporters, students, neighborhood organizations, and more. OASIS is used as an educational tool, helping to train



Fig. 1: OASIS maps and data

<sup>1</sup> NYPIRG is the New York Public Interest Research Group Fund, Inc., a 501(c)(3) organization whose mission is to empower, train and educate community members and students through organizing and advocacy efforts. It has incubated and provided an organizational home for CMAP since 1997.

students in basic mapping and community inventory techniques. Lesson guides based on this work now serve as models for other mapping efforts nationwide.

Now that OASIS is almost five years old, online mapping technologies have greatly advanced. Other systems in New York (and certainly in other cities) provide interactive access to a wealth of information about local communities. But in New York, the success of OASIS-the-website combined with the collaborative effort has resulted in creative uses and community benefits beyond what we originally envisioned. For example:

- **Council on the Environment of NYC** provides community garden information for display on OASIS's maps, helping to reveal the vitality that more than 700 gardens bring to neighborhoods throughout the city;
- **Open Road in New York** has coordinated the work of youth groups citywide to use OASIS as a starting point to survey their communities, develop OASIS guides in English and Spanish, and disseminate this information to schools and local groups;
- staff from the **NYS Attorney General's office** have used OASIS to locate areas where bus idling might be a problem. They zoom in on the aerial photos on OASIS where concentrations of yellow are visible, meaning that there is likely a school bus depot in that part of the photo. Then they use OASIS's maps to locate nearby schools, property owners, and transit routes. This creative way of using online maps to target polluters played a key role in the Attorney General's settlement that supported tree plantings and provided anti-asthma funding to communities throughout the five boroughs;
- **Fresh Youth Initiatives (FYI)** prints maps of aerial photos and land use patterns from the OASIS website, and uses these maps to facilitate their local organizing work. Local youth use the maps to identify and plot community assets, and bring these maps to meetings with local service providers, businesses, and policymakers to ensure that the vibrancy of services in the area is protected and strengthened;
- a **neighborhood tree inventory** was taken in 2002 in which volunteer "citizen pruners" used handheld computers to map tree information. The raw data was analyzed to identify pollution removal value and monetary value for each tree, and incorporated into OASIS. As more people add to OASIS's maps, this will present a more accurate and complete picture of a neighborhood, and eventually people will be able to modify this information for "what if" scenarios (local zoning changes, shifting land use patterns, etc.); and
- **the Forest Service's "Living Memorials Initiative"** supports the creation and maintenance of lasting, living memorials that invoke the resonating power of trees to bring people together in the aftermath of 9/11. The Living Memorials project team works closely with the OASIS collaborative, relies on maps provided through OASIS to determine best areas for tree planting, and uses the OASIS website to display the locations and information about memorials in the New York region.

The success of OASIS as a coalition is best measured by the involvement of its partner organizations. The project began with two-dozen participants, and OASIS now counts more than 60 involved organizations and individuals. Steering committee meetings are held three or four times per year with typical attendance of more than 30 representatives of these groups. They commit resources, time, and ideas to guide the project, share strategies and new data sets to integrate into the website, develop outreach and educational efforts, and ensure that OASIS remains a vibrant project.

OASIS has received awards, recognition, and funding from several organizations. It was named “Partnership of the Year” in 2004 by the New York State GIS Clearinghouse. The Forest Service has given two official awards: the “2004 Chief’s Award for Technology Transfer,” and in 2002 designated it as “a model of excellent public outreach and collaborative stewardship with underserved communities.” The Municipal Art Society awarded its 2001 Certificate of Merit to the OASIS partnership, noting that “the public accessibility and vast potential of OASIS NYC as a resource deserves to be applauded.” In a *New York Times* profile in late March 2001, a reporter wrote that OASIS offers “an unparalleled view of the entire city.”

### EXPANDING INTO A “CIVIC INFRASTRUCTURE” PLATFORM

The Forest Service’s original vision for OASIS continues, but the value of the project extends beyond environmental issues. OASIS has begun to play a larger role in the City. It is a platform that others use to provide access to their information and analyze their data not only in relation to open space resources but also in comparison with other spatial data sets. Other elements of the city’s “civic” infrastructure – schools and housing, land use developments, transportation, and demographics – all share geography as a central feature. Visualizing and analyzing these assets through maps enables researchers, public agencies, businesses, and the public to understand and appreciate the value of these infrastructure components in new and powerful ways.

Some efforts already have been undertaken along these lines. For example, the US EPA’s Harbor Estuary Program (HEP) uses OASIS to deliver information on the locations of its



Fig. 2: HEP screen shot from OASIS

priority habitat sites in the New York region. HEP members and others can now view this information in relation to natural areas, wetlands, and other sites of interest to habitat protection.

The NYC Audubon Society has partnered with New Yorkers for Parks to inventory natural areas in the five boroughs. Both groups participate in OASIS so the public can view the inventory on OASIS’s maps, and each group benefits from sharing information with other OASIS partner organizations.

An important goal for OASIS is to enhance the stewardship of local resources, from parks to other open spaces to schools to housing. OASIS has explored ways of mapping this information with Partnerships for Parks. They maintain a list of 40,000 individuals and local groups that care for parks and playgrounds. Creating a map in OASIS now displays contact information for these local stewards for each open space shown on the map. This aids in local networking.

The Brooklyn Economic Development Corporation has also benefited from OASIS, providing online access to real estate information for nonprofit and community developers. The group’s website – [www.DestinationBrooklyn.org](http://www.DestinationBrooklyn.org) – was created by CMAP using

several of the same data sets that are used in the OASIS website, as well as the same hardware and software system. The Brooklyn project is an example of the potential for using OASIS as a platform for other mapping resources in the city.

## **STRATEGIC PLANNING FOR SUSTAINABILITY**

The OASIS steering committee decided at the outset that access to the website was to be free, and participation in the project would not require a fee. This was possible because the Forest Service had committed to funding the project for its first few years, and wanted the project to be as inclusive as possible and for the website to have the broadest usage. The Forest Service's budget for projects like OASIS is being reduced, however, and OASIS cannot rely on any single source of funding.

Similarly, steering committee members have not needed to develop a formal organizational structure due to the Forest Service's overall coordination and leadership for OASIS. For example, issues about the OASIS website functionality, what data sets to include or omit, the diversity and inclusiveness of the steering committee, and how to publicize the project often have been made on an ad hoc basis (sometimes by the committee, sometimes by individual organizations). Data sets have been chosen based primarily on availability and ease of integration. Organizational structure remains an open question. Funding strategies have been reactive, not proactive.

These dual issues prompted the steering committee to begin a formal planning process for OASIS's future. We held a series of internal strategic planning meetings early in 2004, but soon realized that professional expertise was needed. The coalition raised funds in 2004 and 2005 from several sources, and hired a planning consultant (Wolf, Keens, and Co.) in early 2005. Guided by our consultant, the planning process has consisted of:

- compiling and reviewing documents and materials about the project filling four large binders (also helping us to document the history of OASIS);
- holding several focus group meetings and planning sessions with different members of the OASIS steering committee and sub-committees; and
- interviewing more than 25 individuals including representatives of partnering organizations, funders, and users.

Planning will continue through fall 2005, and will include a survey of website users, comparisons with other similar projects nationwide, a final report from our consultant, and specific recommendations regarding outreach to untapped constituencies, enhanced educational efforts using the OASIS model, a decision-making structure, and sustainable funding mechanisms. Several themes and issues have emerged already.

## **WHAT WE'VE LEARNED SO FAR<sup>2</sup>**

### **What is OASIS?**

Research and interviews by Wolf Keens confirmed what many in the OASIS partnership believed, that OASIS is more than just the technology. It serves as:

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<sup>2</sup> Excerpted from unpublished *Situation Paper on the Future of OASIS*, Wolf Keens, March 2005, and supplemented from minutes of strategic planning committee meetings.

- a regular convener of groups from the private and public sectors, creating coalitions and networking opportunities focused on issues around open space in the city that otherwise would not occur;
- a vehicle for stimulating and supporting neighborhood and community planning;
- a consolidator of data, providing a unique opportunity for users to interact with a mix of data about both social and physical geography that is not otherwise available in one location;
- an educational resource, serving as a research tool for students ranging from grade school through graduate school, as well as a tool used to teach adults how to utilize visual data for planning and advocacy; and
- a regional and national model for information sharing, collaboration, and ease of access to data.

### **Decision-making structure**

The OASIS project is guided by a steering committee whose membership was initially determined by groups who came together under the auspices of the Forest Service and who signed an agreement in support of OASIS's mission. Early guiding principles included:

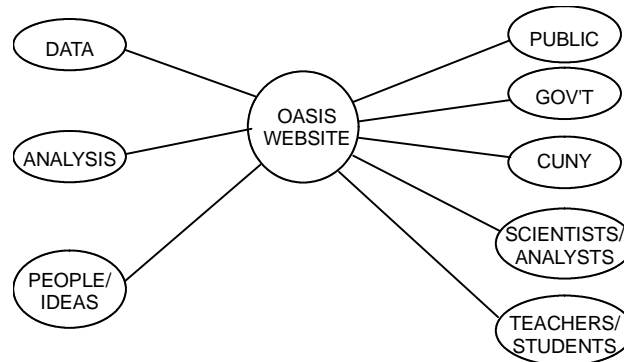
- **introducing a project concept** – developing an interactive GIS website to provide easy access to a wealth of open space data;
- **getting groups to the table** – initial invitations were made by Bette Midler's New York Restoration Project (a group dedicated to restoring NYC parks), which resulted in a broad-based meeting in 2000 of more than 30 groups – the momentum from that meeting carried the project forward;
- **working collectively to outline a vision**, mission, and define a target audience;
- **creating subcommittees to manage tasks** - originally these included Fundraising, Outreach, Web design, and Data. Since then the participating groups have added Stewardship, Natural Areas, and Education;
- **looking for near term successes** – the main objective at first was to create a functioning website, and then use that proof-of-concept to leverage future efforts;
- **selling it and telling it** – the concept of OASIS may be difficult to understand without actually seeing the tangible product, but generally once people see the OASIS maps in action they are sold on how helpful this is and why they should get involved.

Nonetheless, the steering committee has been more ad hoc than formal. A philanthropic program officer sat in on one of the committee's meetings recently and described its function less as "steering" and more as people on a boat together floating happily along. This looseness and lack of bureaucracy gives OASIS vitality, but a more formal structure could facilitate more buy-in, coordinate fundraising, and capitalize on additional partnership opportunities.

The mission of OASIS is neutral from a policy perspective – it is not connected to any advocacy platform or agenda. This provides a comfort level for many government agencies to contribute data to the project, and also invites the involvement of a wide array of organizations. Issues over "turf" that are sometimes associated with environmental (or other) coalitions have been largely avoided with OASIS. Some organizations have taken longer to develop a comfort level with participation and sharing, but the tendency across

all the groups involved in OASIS have been to participate, share, and cooperate.

The OASIS website serves not only as an information resource, but also as an organizing theme. The different components of and participants in OASIS come together through the website. The diagram below (based on a presentation by Dave LaShell, ESRI NYC) highlights the inputs on the left and the beneficiaries/users on the right. But these universes often overlap, and feedback from and to each helps inform the overall process.



(“CUNY” refers to the City University of New York, where OASIS expects to be hosted later this year.)

The steering committee’s broad level of participation also provides a level of checks and balances (though still informal) to ensure that smaller grassroots groups have an equal voice with the larger institutions involved in the project. But a concern that has been voiced through the planning process is the need to involve more grassroots organizations.

Interestingly, our consultant’s interviews confirmed the importance of the partnership of organizations behind OASIS, but noted that this was neither obvious nor seemingly important to OASIS website users. Questions for further analysis are: Does this lack of understanding of the OASIS partnership matter for the website’s users? If it does, how do we best reconcile it?

One important result of the strategic planning process that was identified early on, and confirmed through the consultant’s evaluation, is that OASIS should not establish itself as an independent nonprofit organization. Though some people acknowledged that independence might be helpful in building relationships and attracting funding, most felt that independence was not a viable option for OASIS. It would require substantial time and money to build an organization in an era of shrinking resources. Some also felt that the neutrality of OASIS and its success in building coalitions would be threatened should OASIS establish itself as a separate (competing) organization.

In the midst of OASIS planning, CMAP began a transition from NYPIRG to a new home with greater institutional support and the capacity to take on and further enhance projects such as OASIS. CMAP evaluated several options, including launching a new nonprofit, working under a fiscal sponsor, merging with a for-profit entity, and merging with another nonprofit. For several reasons, none of them provides as good a fit as an academic setting. In particular, the Graduate Center of the City University of New York (CUNY) is

interested in having CMAP become part of one of its research centers, so CMAP is actively pursuing that option. The OASIS steering committee sees the benefit in having an academic institution host the project, and has suggested language to include in an agreement with CUNY that will preserve the OASIS decision-making structure until our strategic plan is finished, and the structure is renegotiated with CUNY.

### **OASIS's benefits**

We continue to be impressed by the breadth of uses of the website and strategic partnerships that have developed through OASIS. Unexpected users include real estate firms and architects, set location teams for TV shows such as “Law and Order” and MTV,<sup>3</sup> and government agencies (an official with the city’s Department of Housing Preservation and Development told us that “not a day goes by that I don’t use OASIS”).<sup>4</sup>

User testimonials are an important way to evaluate the success of the project. Currently they are captured only if a website user happens to contact us. The planning committee is evaluating whether, and how, to implement a website registration system to better track usage and also communicate more effectively with users. Our consultant’s interviews raised the concern that “generally there was resistance to requiring any form of [website] registration at all, because it would compromise the ease of access and would deter some community users. However, it was also recognized that some method of getting more data on users would be helpful, so a quick registration that required only two or three fields of information might be acceptable.” A user survey this summer will seek feedback on this issue.

A number of interviewees felt that OASIS could expand its educational role, offering more training of potential users on how to benefit from the site and how to use data (both on site and beyond). OASIS could serve more actively as a curriculum resource, and could, with targeted trainings, serve more frequently as a research tool.

OASIS is an initiative that is fostered by and potentially limited by technology. It is a venture that would not have been conceivable even a decade ago. But it provides a service in a field that is rapidly changing and evolving. Several interviewees mentioned that information that OASIS provides is now more readily available from other sources – where it is more current than that available on OASIS. However, these same people were quick to note that no other source combines so many layers of data, and also few have such a user-friendly interface – OASIS exemplifies the “one-stop-shop” approach. This type of feedback is especially important, now that other online systems – especially Google Maps and Microsoft Visual Earth – have made it exponentially easier to display and analyze information using online interactive maps.

### **Balancing free access with long-term sustainability**

A cornerstone of OASIS is its freely accessible website. But this belies the real cost in

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<sup>3</sup> Even staff from *Columbia Pictures: Superman 3* have used OASIS to get a better picture of how New York City looks from buildings that Superman will “swing from” in this upcoming movie.

<sup>4</sup> City agencies have access to most of the information available through OASIS’s maps, but since no website provides this information in one place, agency staff often rely on OASIS for initial research.

maintaining the website as a useful tool and resource. Ongoing foundation support is possible, though foundations tend to fund new projects and are less focused on ongoing projects or capacity building.

Evaluating and implementing sustainable funding mechanisms is a key goal of the OASIS planning process. Options that are being considered beyond traditional funding sources include:

- **Contract for service.** Several users suggested variations on the idea of a contract for service – with governmental/quasi-governmental entities in support of projects presenting their data to the general public, or with community-based organizations for the same purpose;
- **Contract for service as technical assistance provider.** OASIS can serve as a model to other groups in cities wanting to establish an OASIS-like resource. Fees could be charged for technical assistance provided;
- **Sponsorship.** When data about users is more fully developed (a need expressed by several), it may be possible to secure corporate sponsorships to support the project. Logos would be featured on website;
- **Sell OASIS “products”** such as printed maps or other products based on the website;
- **Line item funding from public sector entities.** This requires building relationships with key political figures, some of whom use OASIS data already;
- **Service fee for research projects.** Develop relationships with researchers to provide services to display their findings;
- **Fees for commercial users,** or based on access to website content or other system;
- **OASIS partnership/membership fee** for steering committee members that would come with perks such as: access to grants, control of website for member needs, and/or advertising space; and/or
- **Advertising on website,** perhaps geographically targeted ads, or community-focused content (meetings, events).

Our consultant will help the OASIS strategic planning committee design a user survey to be posted on the website and distributed to people who have already given us feedback, to solicit opinions on these options.

### **Next steps**

We will consider this project a success if we have developed a plan for sustaining OASIS at least over the next five years, including a new governance structure, stronger mission statement, a fundraising component to ensure financial sustainability, while also enhancing the website’s tools and data sets and continuing to extend OASIS’s scope to provide an online mapping and data analysis platform for the benefit of a broader array of social justice issues in New York.

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Dr. Thomas Wolf and Jane Culbert from Wolf, Keens & Co. have been instrumental in guiding the strategic planning process.

## **APPENDIX**

### **Partial list of OASIS participants**

#### Federal agencies

National Park Service  
US Army Corps of Engineers  
US Environmental Protection Agency (EPA) Region 2  
US Geological Survey  
USDA Forest Service  
USDA Natural Resources Conservation Service (NRCS)

#### State agencies

New York State Department of Environmental Conservation

#### City agencies

New York City Department of City Planning  
New York City Department of Environmental Protection  
New York City Department of Finance  
New York City Department of Information Technology and Telecommunications (DoITT)  
New York City Department of Parks & Recreation

#### Businesses

Community Cartography  
Environmental Systems Research Institute, Inc.  
istudiodesign (architects, planners, designers)  
Space Track

#### Nonprofit organizations

Cornell Cooperative Extension  
Council on the Environment of New York City  
Green Map System's Green Apple Map Project  
Greenthumb  
Historic House Trust  
Metropolitan Waterfront Alliance  
Neighborhood Open Space Coalition  
New York City Environmental Justice  
New York Restoration Project  
New Yorkers for Parks  
NYPIRG's Community Mapping Assistance Project  
Open Road  
Regional Plan Association  
Sustainable South Bronx  
Trees New York

#### Academic institutions

Center for Remote Sensing and Spatial Analysis at Rutgers University  
CIESIN - Columbia University