



Conservation: Research, Education, Citizen Science



Citizen Science at the Lab = Public participation  
in organized research efforts

Needed for questions at large geographic scales  
with most data “where the people are”

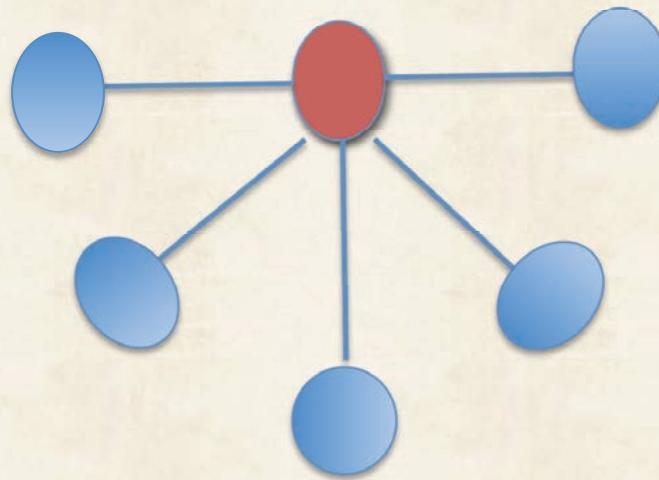


# Citizen Science as crowdsourcing



>300,000 participants annually

# Crowdsourcing as cooperation with soft institutional governance



eBird Real-Time Checklist Submissions — March 25, 2011

CHECKLISTS	OBSERVATIONS	TOTAL BIRDS
0	0	0

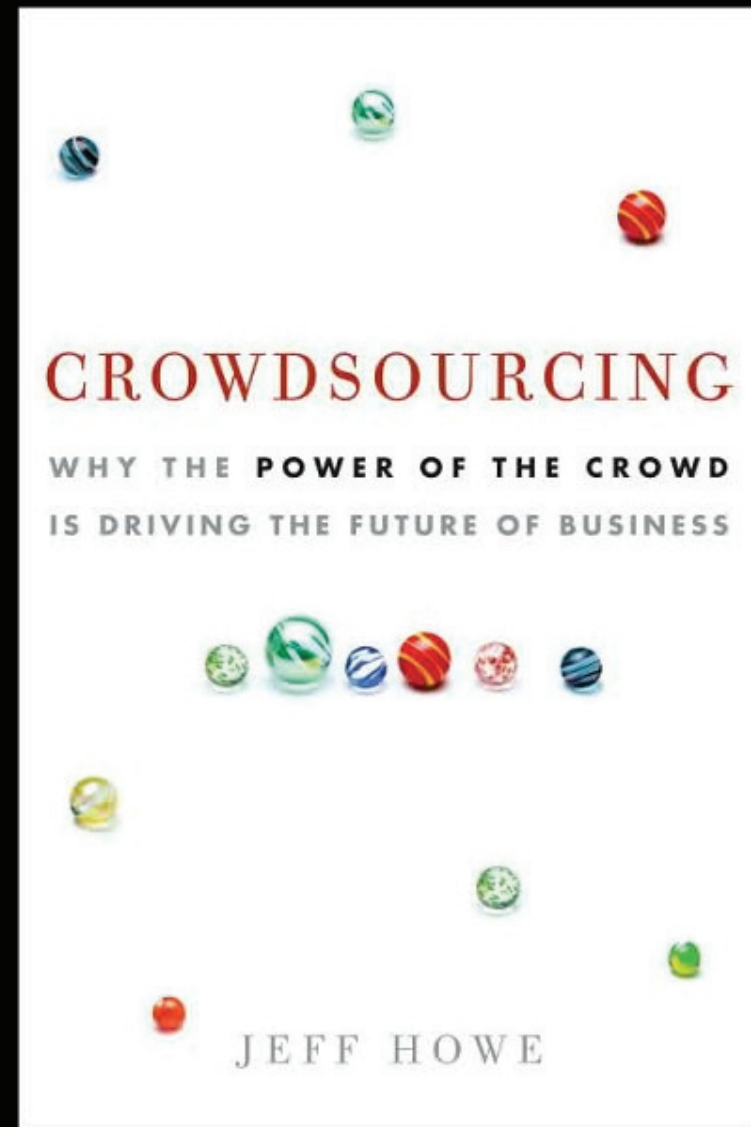
The image shows a web browser window with the following elements:

- Browser title: eBird Real-Time Checklist Submissions
- Address bar: demo.ebird.org/export/indexFast.html
- Page header: eBird Real-Time Checklist Submissions — March 25, 2011
- Summary statistics:
  - CHECKLISTS: 0
  - OBSERVATIONS: 0
  - TOTAL BIRDS: 0
- Main content area: A large black rectangle, likely representing a loading error or a redacted section of the page.

Orchard\_Oriole : January 4

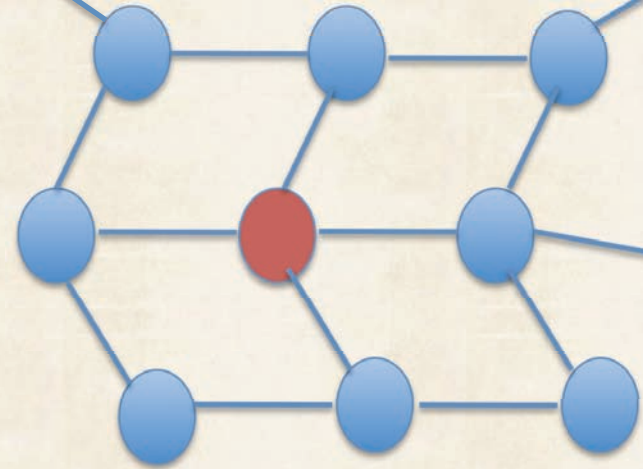
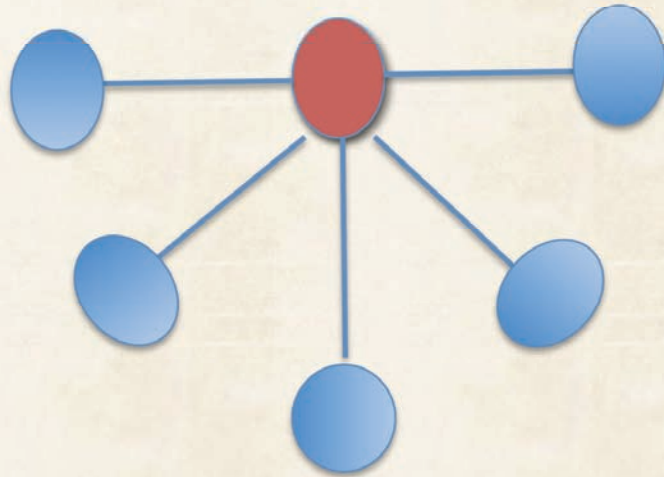


“ If stock photography is the first industry to be transformed by crowdsourcing, then ornithology is the first academic discipline to undergo the same process. ”





# Networked Crowdsourcing



# 46 million birders and 90 million gardeners



# 46 million birders and 90 million gardeners







### Explore your habitat; Map your yard!

YardMap uses new web technology to let you construct beautiful landscape maps using real satellite images of your back yard.

a free, interactive, citizen science mapping project about habitat creation and low-impact land use

Sign Up!

Share 4361 Tweet 539  
Email 2058

### What's a yardmap?



YardMap is a citizen science project designed to cultivate a richer understanding of bird habitat, for both professional scientists and people concerned with their local environments.



The YardMap is funded by the National Science Foundation Informal Science

## Be on the map.

Map for Birds, Science, and Your Yard!



8048  
maps drawn and  
counting

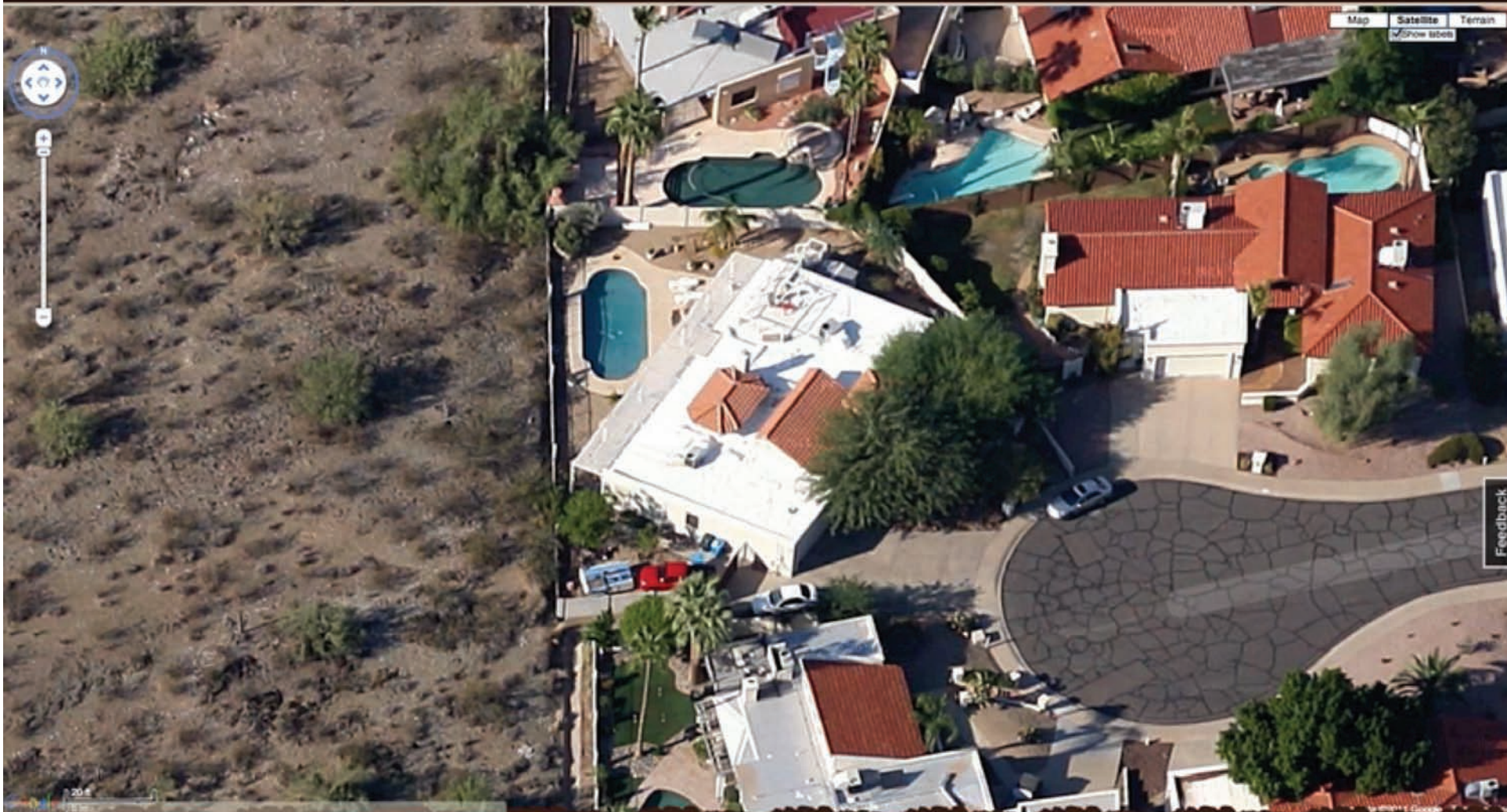


75%  
of threatened and  
endangered species  
occur on private  
lands.



1.2 Million  
Acres  
of non-native lawns  
cover the U.S. That's 8  
times the size of  
New Jersey.





My Sites » Ithaca House » Habitats & Objects

**Ithaca House**  
Tunbridge, NY

Overview

Hide all habitats Hide all objects

**HABITATS & OBJECTS**

Filter Habitats & Objects List  
Selected

Ithaca House  
Tunbridge, NY

visible lock from editing

[show more](#)

**Ithaca House**  
Home

created on: 08/11 last edited: 09/11

Like 0 Share 0

save & close

Why do we collect this data?

**What's Next**

- Overview
- Basic Information
- Characteristics**
- Birds
- Comments
- Photos

**APPLY CHARACTERISTICS**  
click on the one that applies for each category.

1. Cat ✓

2. Synthetic Herbicide ✓

3. Structural Diversity ✓

4. Population Density ✓

5. Synthetic Fertilizer ✓

6. Synthetic Pesticide ✓

**Reset**

Not Known

OUTSIDE Outside Cat

INSIDE Inside Cat

Cat

No Cat

delete

**Have a Question? Ask the Community!**

Your local **RESOURCES**  
plants, birds, and advice based on your zip code

Enter your zip code

**IN THE Neighborhood**  
Join the Conversation Now

CASEY2 commented on Casey's site  
Secondary from casey's site - Mourning Dove nest now has 2 partially feathered young.  
35 minutes ago  
Comment Like Share Save

EVDREX commented on Duffan's site  
Response from evdrex's site - The dominant tree in my area is the velvet mesquite. Many of these trees provide insect nourishment to birds. Those birds include many flycatchers, woodpeckers, and warblers.  
Yesterday at 8:28am  
Comment Like Share Save

JANETGUNTHER commented on forest from janetgunther's site  
lots of wild cherry trees.  
Yesterday at 1:09pm

Recently Completed Sites • Our Home • Overview

**Our Home**  
St. Joseph, IN

Habitats & Objects

Eastern Broadleaf Forest (Continental) Province

SEEDS OF CHANGE BADGES YOU'VE EARNED



How Do I Earn Seeds Of Change?

SITE OWNER

**STEVES**

RECENT BIRD SIGHTINGS

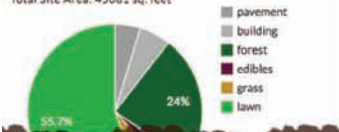
12 species reported in the last 30 days

- Eurasian Collared-Dove**  
last sighting: 2014-04-21 12:08
- Eastern Phoebe**  
last sighting: 2014-04-21 12:08
- American Crow**  
last sighting: 2014-04-21 12:08

[View More](#)

SITE INFO

Habitat Overview  
Total Site Area: 45681 sq. feet



**White Pine**  
Tree eastern white pine - Pinu...  
[open](#)  
Stevex edited: 04/14 created: 04/14

**Have a Question? Ask the Community!**

**Your local RESOURCES**  
plants, birds, and advice based on your zip code

Enter your zip code:

[see now](#)

IN THE Neighborhood  
Join the Conversation Now

- EVOREX** commented on [CarFamFive](#)  
Residence from evorex 's site. The dominant tree in my area is the velvet mesquite. Many of these trees provide insect nourishment to birds. Those birds include many flycatchers, woodpeckers, and warblers.  
10 minutes ago  
[Comment](#) [Like](#) [Share](#) [Save](#)
- JANETGUNTHER** commented on [forest from janetgunt](#) 's site  
lots of wild cherry trees.  
5 hours ago  
[Comment](#) [Like](#) [Share](#) [Save](#)
- DMJOHNSX2** commented on [dmjohnsx2 from dmjohnsx2](#) 's site  
We are an animal loving family, we also have cats who we consider as our kids. Unfortunately one will get a bird on occasion but we try to keep the feeders out of reach.  
Yesterday at 6:11pm  
[Comment](#) [Like](#) [Share](#) [Save](#)
- DrPraetorius**  
Been a gentle spring so far. Getting welcome rain today.  
Yesterday at 3:12pm  
[Comment](#) [Like](#) [Share](#) [Save](#)



My Sites » My House » Habitats & Objects



### My House

Dallas, PA

Overview

hide all habitats on this site  hide all objects on this site

#### HABITATS & OBJECTS

Filter Habitats & Objects List

All Habitats & Objects



#### My Hydrangea

Hydrangea sp.  
flower object



#### RECENT ACTIVITY

[birdluvr234](#)

Does anyone think I should replace this plant? I think it is a non-native.

just now [Comment](#) [Like](#) [Share](#) [Save](#)

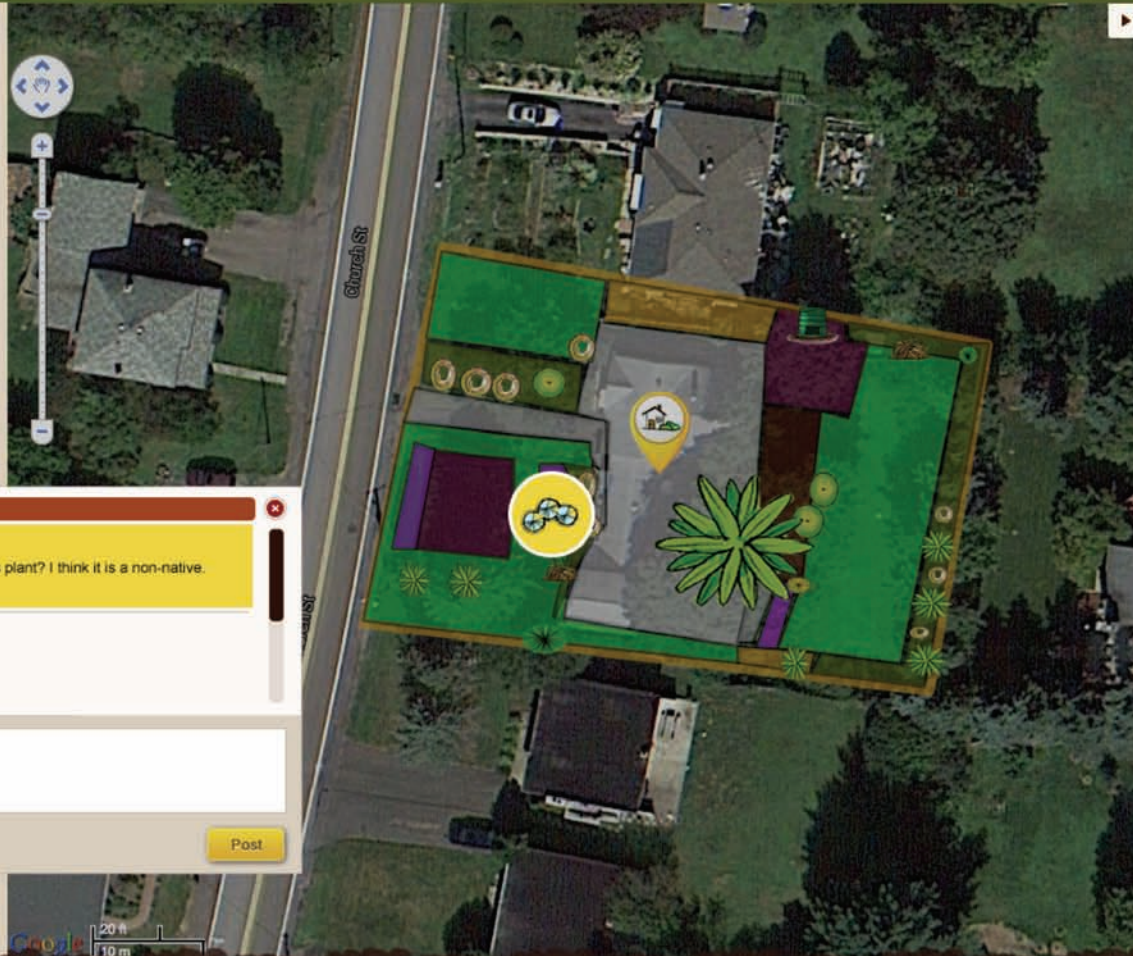
[birdluvr234](#)

[My Hydrangea](#) was created.

Today at 11:14am [Comment](#) [Like](#) [Share](#) [Save](#)



Post



Donate Today!



Your local **RESOURCES**  
plants, birds, and advice  
based on your zip code

Enter your zip code

[see now](#)

IN THE **Neighborhood**

Join the Conversation Now



[birdluvr234](#)

Does anyone think I should replace this plant? I think it is a non-native.  
just now

[Comment](#) [Like](#) [Share](#) [Save](#)



[dberman](#)

[dberman](#) is now following the [Les oiseaux group](#)  
Yesterday at 11:55am

[Comment](#) [Like](#) [Share](#) [Save](#)



[MDBirder3100](#)

Here is the new BOTW! Your clue:  
I like to flick my white-edged tail from side to side because it might help me catch food.



<http://www.flickr.com>

I like to flick my white-edged tail

**BOTW3** |  
Flickr -  
Photo  
Sharing!  
source:



**Have a Question? Ask the Community!**

**Your local RESOURCES**  
plants, birds, and advice based on your zip code

Enter your zip code

[see now](#)

**IN THE Neighborhood**  
Join the Conversation Now

**PLANT4WILDLIFE** commented on American hazelnut - *Corylus americana* from plant4wildlife's site  
Though a favorite of deer to browse on I've had good success with this shrub after caging it for 2-3 years. Good for natural areas and a wildlife favorite. I started 8-10 of these from nuts collected at our previous home.  
38 minutes ago 1  
[Comment](#) [Like](#) [Share](#) [Save](#)

**PLANT4WILDLIFE** commented on bird feeder from plant4wildlife's site  
An added benefit comes from some of the seeds that fall to the ground. Most of those not eaten usually germinate and grow into beautiful sunflowers and are a pollinator favorite.  
After ripening in late summer I hang all of the seed heads in trees...  
Yesterday at 11:37pm 1  
[Comment](#) [Like](#) [Share](#) [Save](#)

**PLANT4WILDLIFE** commented

Feedback

The Cornell Lab of Ornithology **yardmap** BETA

Welcome, ctsacidirect! [Enter Demo Mode](#) [Signout](#)

[Map](#) [Explore](#) [Learn](#) [Community](#) [About](#) [Help](#)

[TOOL SHED](#) [SITE EXPLORER](#)

Type an address or search term  [Search](#)

Recently Completed Sites • Hamden Health Care • Overview

**Hamden Health Care**  
New Haven, CT

Habitats & Objects

5 site views [Like](#) [Share](#)

[Share](#) [Tweet](#) [Pinterest](#) [Direct Link](#)

Eastern Broadleaf Forest (Oceanic) Province

**SEEDS OF CHANGE BADGES YOU'VE EARNED**

How Do I Earn Seeds Of Change?

**SITE OWNER**  
ruddydog

**RECENT BIRD SIGHTINGS**  
18 species reported in the last 30 days

**Red-tailed Hawk**  
last sighting: 2014-04-08 14:00



**Have a Question? Ask the Community!**

Your local **RESOURCES** plants, birds, and advice based on your zip code

Enter your zip code

[see now](#)

**IN THE Neighborhood**  
Join the Conversation Now

**Feedback**

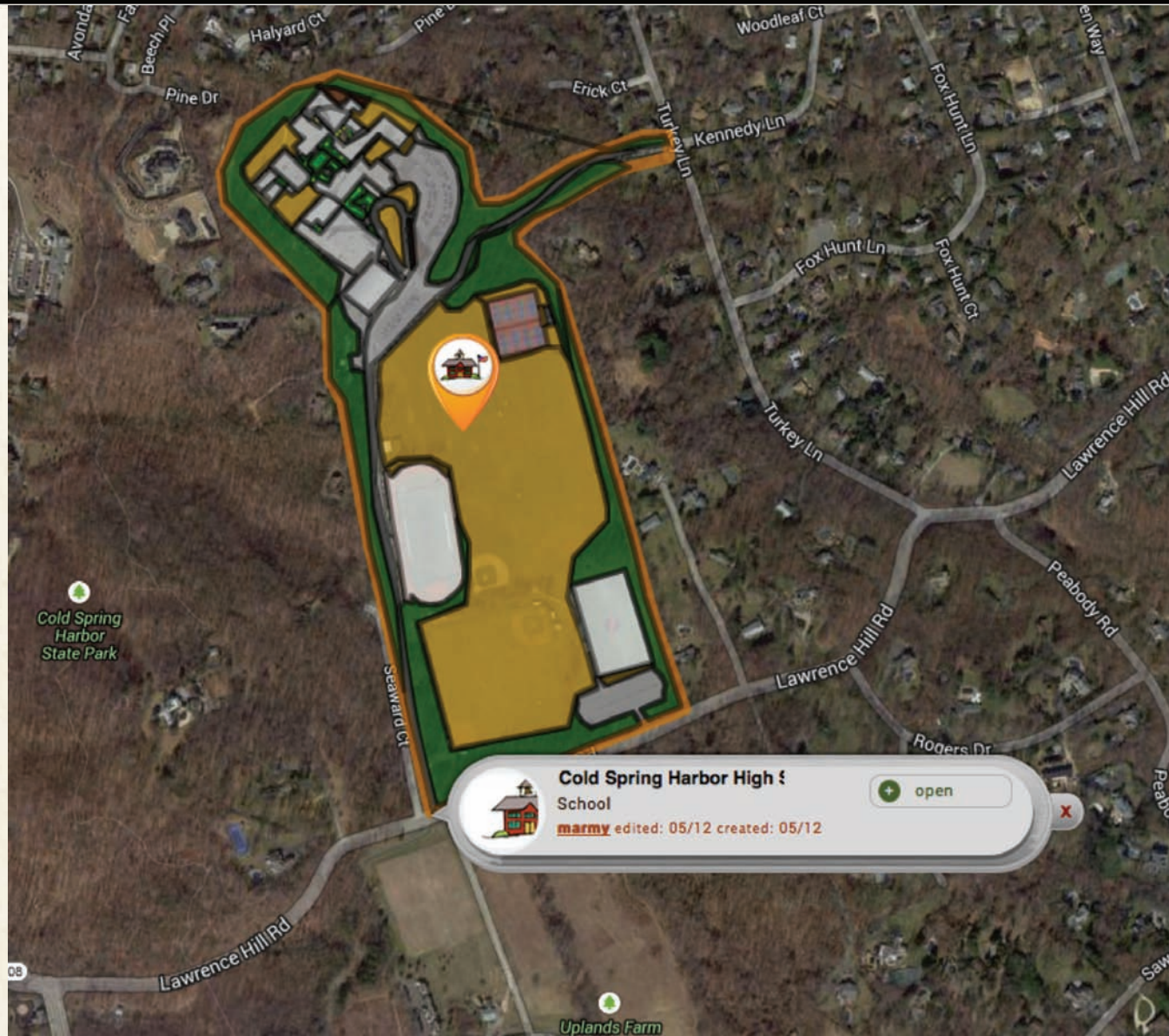
**EVOREX commented on CarFamFive's site**  
Residence from evorex's site  
The dominant tree in my area is the velvet mesquite. Many of these trees provide insect nourishment to birds. Those birds include many flycatchers, woodpeckers, and warblers.  
8 minutes ago  
[Comment](#) [Like](#) [Share](#) [Save](#)

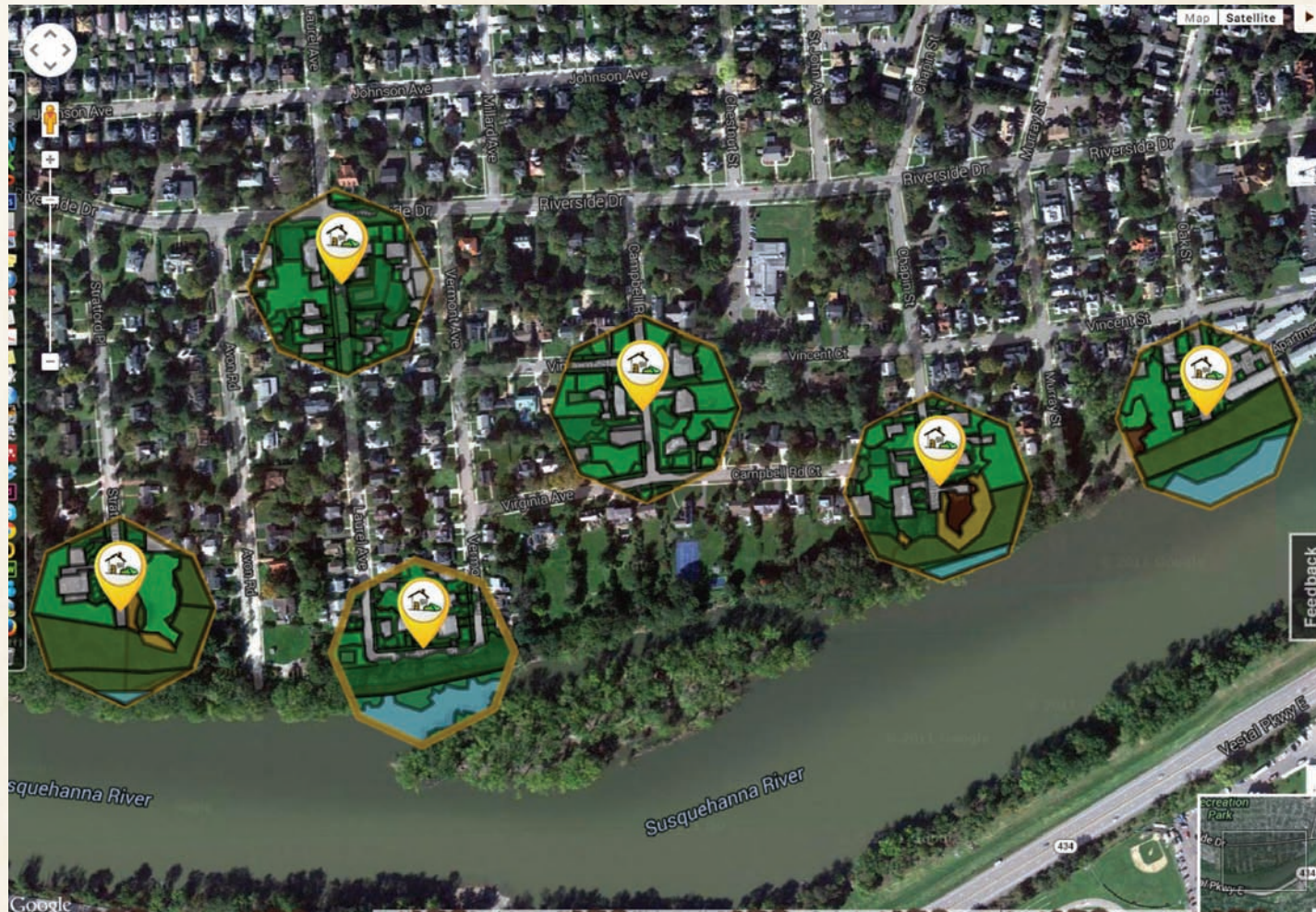
**JANETGUNTHER commented on forest from janetgunther's site**  
lots of wild cherry trees.  
8 hours ago  
[Comment](#) [Like](#) [Share](#) [Save](#)

**DMJOHNSN2 commented on dmjohnsn2 from dmjohnsn2's site**  
We are an animal loving family, we also have cats who we consider as our kids. Unfortunately one will get a bird on occasion but we try to keep the feeders out of reach.  
Yesterday at 6:11pm  
[Comment](#) [Like](#) [Share](#) [Save](#)

**DrPraetorius**  
Been a gentle spring so far. Getting welcome rain today.  
Yesterday at 3:12pm  
[Comment](#) [Like](#) [Share](#) [Save](#)







Scott, John R. 2013. Habitat features that shape the bird communities of a medium-sized city. M.S. Thesis, Binghamton University. [noise, water, shrubs.]



TOOLSHED



SITE EXPLORER

Type an address or search term

Search



6 site views

Unlike 2 Share 0

Share Tweet Pinterest Direct Link



### SITE INFO

Habitat Overview

Total Site Area: 365060 sq. feet

Habitat Type	Percentage
pavement	52.2%
building	11.2%
forest	
edibles	
grass	
shrubbery	
ground	
water	
lawn	
flowershe...	

Site Characteristics

Office Type: Corporate

Synthetic Herbicide: No

Structural Diversity: No

Population Density: No

Synthetic Fertilizer: No

### SEEDS OF CHANGE BADGES YOU'VE EARNED



YARDWORKS

THE CONTEST

THE PRIZE

HOW TO WIN

WHO CAN ENTER

HOW TO SUBMIT

GET OTHERS INVOLVED



Dr. Josh Cerra,  
Landscape  
Architecture

YARDWORKS  
wants you to

**Get To Know Your Neighbors**  
MAY 1 - JUNE 25, 2013

The Cornell Lab of Ornithology  
**yardmap**

Cornell University  
Department of Landscape Architecture

Cornell University  
Cooperative Extension



20 design students  
working with  
communities  
each semester

THE CONTEST

**Gather Your Neighbors To Win!**

Want landscape design advice? Enter to win wildlife-friendly schematic designs customized for you and your neighbors by using YardMap to map as many yards as you can in your neighborhood.



Recently Completed Sites

- East-Central New York Suburban Yard**  
Saratoga, NY

Overview Habitats & Objects
- Hunter's House**  
Lee, NC

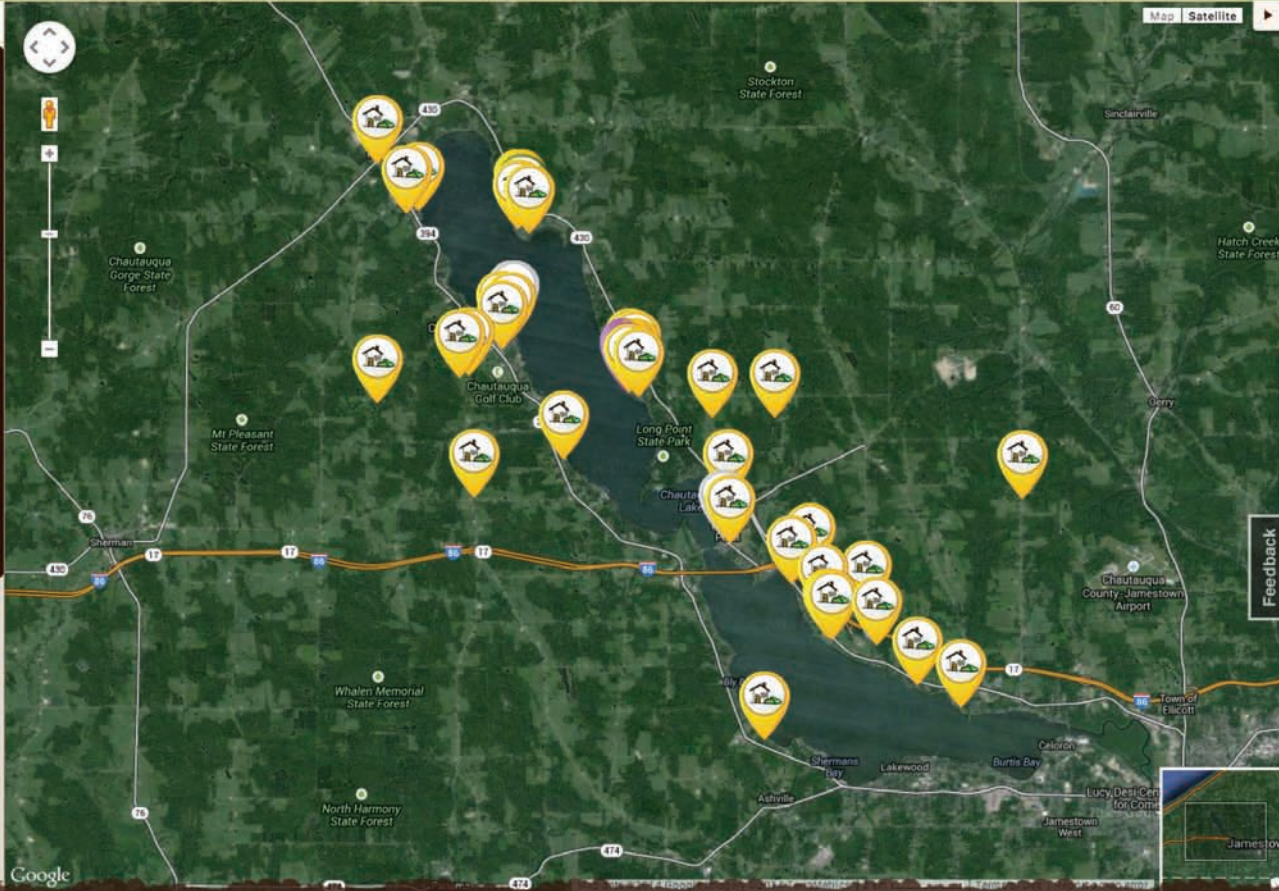
Overview Habitats & Objects
- 607 Gettysburg Home**  
Spotsylvania, VA

Overview Habitats & Objects
- dmjohnsnx2**  
Spokane, WA

Overview Habitats & Objects
- Our Home**  
St. Joseph, IN

Overview Habitats & Objects
- Hamden Health Care**  
New Haven, CT

Overview Habitats & Objects
- Maison**  
Lotbinière, QC



**Have a Question? Ask the Community!**

**Your local RESOURCES**  
plants, birds, and advice based on your zip code

Enter your zip code

[See now](#)

**IN THE Neighborhood**  
Join the Conversation Now

**EVOREX** commented on [CarFamFive](#)  
Residence from [evorex](#)'s site  
The dominant tree in my area is the velvet mesquite. Many of these trees provide insect nourishment to birds. Those birds include many flycatchers, woodpeckers, and warblers.  
22 minutes ago  
[Comment](#) [Like](#) [Share](#) [Save](#)

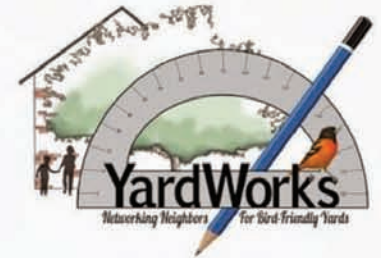
**JANETGUNTHER** commented on [forest](#) from [janetgunther](#)'s site  
lots of wild cherry trees.  
5 hours ago  
[Comment](#) [Like](#) [Share](#) [Save](#)

**DMJOHNSNX2** commented on [dmjohnsnx2](#) from [dmjohnsnx2](#)'s site  
We are an animal loving family, we also have cats who we consider as our kids. Unfortunately one will get a bird on occasion but we try to keep the feeders out of reach.

Feedback

# Neighborhood Planning Strategies

OUR VISION, COMMUNITY GOALS, & PLANNING CONCEPTS



## VISION STATEMENT

We are a community of neighbors that values the beauty of Chautauqua Lake, and its cultural and natural heritage. We envision our common areas and private properties as places that can enhance the water quality of the lake and the biodiversity of our lands, while strengthening our neighborhood character. Together we can operate at the scale of our yards, our neighborhood, and our watershed to be a model for our community and beyond.

## SEVEN GOALS



### ENHANCE LAKE QUALITY

Chautauqua Lake is a part of the community's identity and daily life. As a shoreline community, we have a responsibility to protect this essential resource.



### MAKE SUSTAINABLE DESIGN DECISIONS

Design that is sensitive to site conditions can reduce erosion, chemical inputs, and frequency of garden maintenance. This can help the environment as well as save time and money.



### RETHINK STORM WATER

By managing storm water runoff more effectively, we can make our communities more self-sustaining and provide opportunities for greater plant diversity.



### IMPROVE BIRD HABITATS

Birds contribute to the health of the ecosystem while enhancing our landscape experience. By improving bird habitat quality, we can better enjoy these benefits.



### SUPPORT POLLINATOR SERVICES

Pollinators are critical for plant reproduction, our food supply, and beautiful landscapes. We can support pollinators to help keep plant communities healthy.



### CONNECT AND EXPAND ECOLOGICAL SYSTEMS

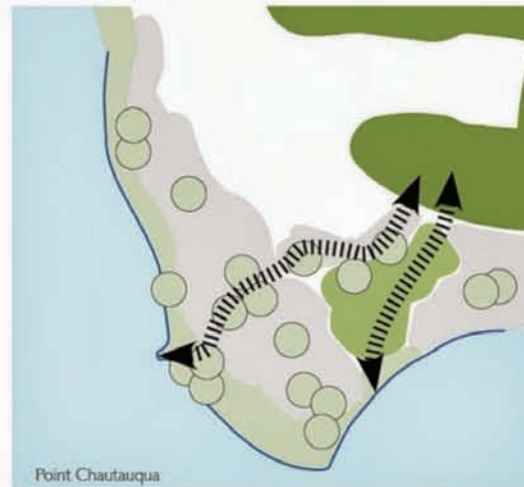
By working at the scales of our neighborhoods and yards, we can enhance ecological networks for improved biodiversity and habitat quality.



### SPREAD THE WORD

Our community and our vision can be a model for others. By sharing our story, we can encourage stewardship that benefits the lake and region.

## LANDSCAPE ECOLOGY



Habitat friendly yards function as stepping stones, allowing wildlife to access to the lake and through the community.



Existing conditions in Point Chautauqua



The stream and other canopy corridors link the forest and the lake. Stepping stones can reinforce this habitat connectivity throughout the community.



Existing conditions in Maple Springs



1

HOW TO MAP A NEW SITE  
create a new yard map

2

SPRUCE UP YOUR SITE  
edit your existing yard maps

3

KEEP GROWING  
what to do next in YardMap

Tool Shed

Saved Sites

Search

Full Screen Mode

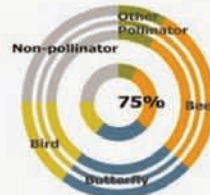
Hide this menu



## WHY ARE POLLINATORS IMPORTANT ?

### VALUE AND ROLE OF BUTTERFLIES AND BEES

A pollinator is a biotic agent that causes plants to make fruit or seeds. They do this by moving pollen from one part of the flower of a plant to another part. This pollen then fertilizes the plant. Only fertilized plants can make fruit and/or seeds, and without them, the plants cannot reproduce.



Animals pollinate 75% of the crop plants.

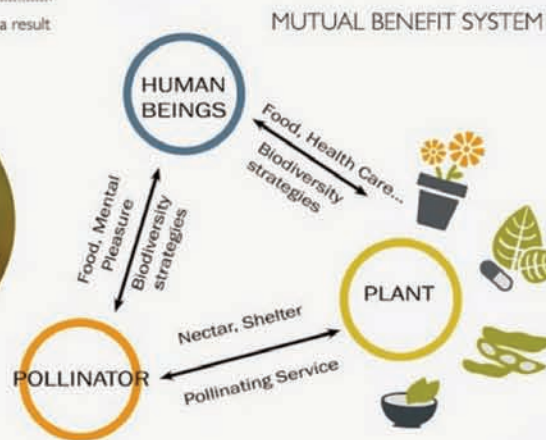
Bees are the primary pollinator, followed by butterflies and then birds.



1 out of every 3 mouthfuls of food or drink is a result of the presence of a pollinator



75 % of all flowering plants rely on pollinators for fertilization and reproduction



Pollinators provide benefits to us through crops, medicinal plants and garden plants.

We can also improve their living conditions with a variety of design strategies.

## WHAT CAN WE DO TO HELP POLLINATORS?

### POLLINATOR NEEDS

- HOST PLANT**  
A species of plant that a butterfly caterpillar will eat. The female must lay her eggs on or close to it.
- NATURAL NEST SITE**  
Bare soil between patchy vegetation can be used for ground nesting bees. Bundles of hollow stems, snags, or areas of long, tangled grass can be used for tunnel nesting bees.
- NECTAR SOURCES**  
Patches of flowers used for gathering food.

- WATER SOURCE**  
A birdbath, fountain, dripping faucet or small pond. A mud puddle mixed with sea salt or wood ash will provide butterflies & bees with their mineral requirements.
- SUNNY OPEN SPACE**  
Pollinating insects need to see the sky to navigate, heat to warm their muscles before flight & a warm habitat.
- OVER-WINTERING SITE**  
Butterflies find shelter in tree cavities, under leaf litter, a pile of rocks, tall grass or in evergreen vegetation. Bees will stay in the subsurface of the ground, leaf litter or their original nest.



### FOUR-STEP APPROACH to help develop a POLLINATOR CONSERVATION STRATEGY

1. **Recognize existing pollinator habitat** that is already present.
2. **Protect that habitat** and avoid causing undue harm to the pollinators already present.
3. **Provide new habitat for pollinators**
4. **Manage land** in a way that maintains the habitat and minimizes disturbance to pollinators.

### SELECTION CRITERIA

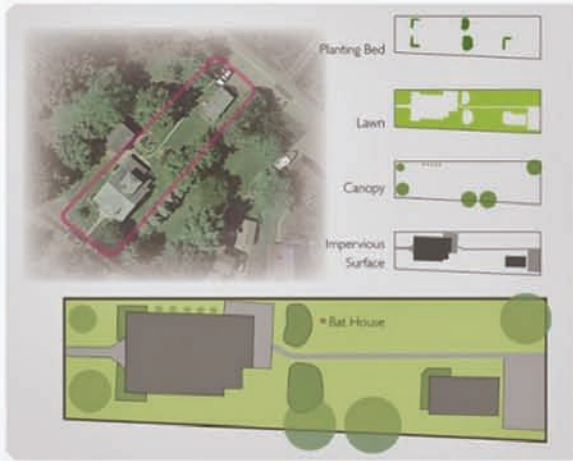
- Plant requirements** (sun exposure - soil type)
- Plant vigor** (hardiness - native - diverse species)
- Growth habit** (overall shape - over-wintering opportunity)
- Flower abundance** (bloom succession - color preference)
- Commercially available** (local nurseries - mail-order seeds)

Resources: <http://www.chatsauquawatershed.org/>  
<http://thecupproject.com>  
 Summers, Carolyn. "Designing Gardens with Flora of the American East." New Jersey: Rutgers University Press, 2010.  
 The Xerxes Society. "Attracting Native Pollinators." Massachusetts: Storey Publishing, 2011.

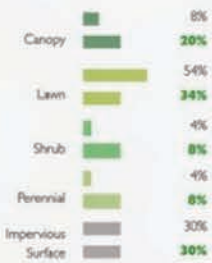
## POLLINATOR



EXISTING CONDITION



EXISTING VS. PROPOSED



DESIGN CONCEPT



DESIGN PROCESS

Front Yard

- Install shade-tolerant planting along the side of pathway.
- Extend planting bed in the front lawn (to be planted with low growing wildflowers that attract pollinators).
- Use rounded stone to highlight entrance pathway.

Central Yard

- Implement bird feeders for additional forage.
- Expansions of recreation area to make more useable for gathering area
- Redesign existing planting bed into rain gardens to help cleaning storm water runoff and pollutants.

Back Yard

- Install low vegetation on the west side of the house.

DESIGN PROGRAMS

DESIGN ELEMENTS



PROGRAM DIAGRAM



MASTERPLAN



SECTION



COLDIRON

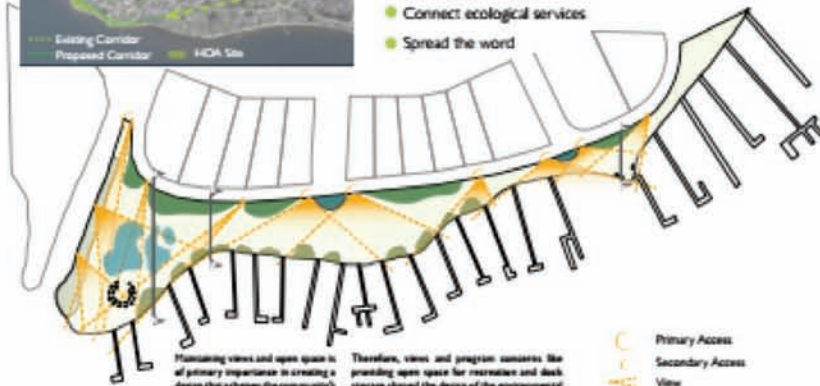


# MAPLE SPRINGS SHORELINE ENHANCEMENT



**GOALS:**

- Restore water quality
- Design sustainably
- Implement stormwater management
- Improve bird habitat
- Support pollinators
- Connect ecological services
- Spread the word



Maintaining views and open space is of primary importance in creating a design that achieves the community's ecological goals.

Therefore, views and program concerns like providing open space for recreation and deck storage shaped the design of the environmental elements such as the Filter Strip, gardens and No-Mow zone.

- C Primary Access
- A Secondary Access
- A View



- A. Filter Strip
- B. No-Mow Zone
- C. Pollinator Garden
- D. Lakeview Point
- E. Flower Garden
- F. Community Garden
- G. Overlook
- H. Primary Access
- I. Secondary Access

**LANDSCAPE PERFORMANCE**

The design of the Maple Springs Shoreline includes the use of about 30 new plants that make up a Filter Strip to capture runoff entering the area, an enhanced No-Mow zone to guard the lake from runoff and pollutants, and several gardens. The design establishes vertical planting layers with year-round interest and ecological benefits.



Existing Land Cover

Proposed Land Cover

- Tree Canopy
- Struts
- Perennial Meadow
- Lawn



Filter Strip Construction & Function



PRIMARY ACCESS



SECONDARY ACCESS

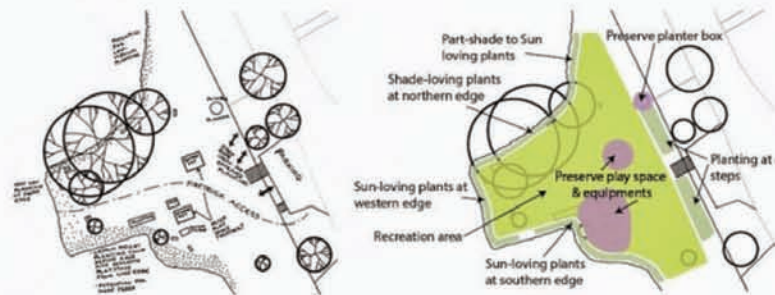


## MAPLE SPRINGS SHORELINE

# THE POINT



Stair plantings reinforce the entryway, beautify the surroundings, and improve polinator and bird habitat.



With over 75,000 sq. ft. of lawn, runoff is a serious problem for this site. But, with the addition of over 800 sq. ft. of planting, the runoff rate will decrease, and the retention rate will increase by nearly 5%. This will result in less runoff into the lake, which is a contributing factor to the algae blooms. The stormwater that isn't retained will be filtered through plant roots, to mitigate both the quality and quantity of stormwater entering the lake.

The additional shrubs and wildflowers will significantly improve and create new habitat and foraging areas for both birds and butterflies. These nesting areas will provide crucial habitat for smaller birds, options for food, and provide protection. Creating space for pollinators will improve the biodiversity of the area.

The main program at the Point, is to create an inviting, functional and aesthetically pleasing area for people to enjoy. The social benefits range from having areas for exercise or other physical activities, and providing access to the lake for water activities, all while providing environmental services for the flora and fauna of the area.

## Design Benefits

- Demonstrate Point Chautauqua's commitment to a healthy lake ecosystem
  - Preserve open space for gatherings and play
  - Maintain lake views
  - Provide benches and picnic tables for sitting and eating
  - Entry plantings at stairs
  - Edge plantings to keep children off the water's edge
- Site Program

## Site Analysis

## Functional Diagram

# POINT CHAUTAUQUA

## Master Plan

CORNELL UNIVERSITY  
DEPARTMENT OF  
LANDSCAPE ARCHITECTURE

Chautauqua Lake Yard Works Project  
LA 6020 Spring 2014  
Ge Yi, Sean Tang, Hayden King, John Crespo

Community is buying signs to advertize what they are doing

**I am a Fall Creek YardWorks Participant!**



**YardWorks**  
*Networking Neighbors For Bird-Friendly Yards*



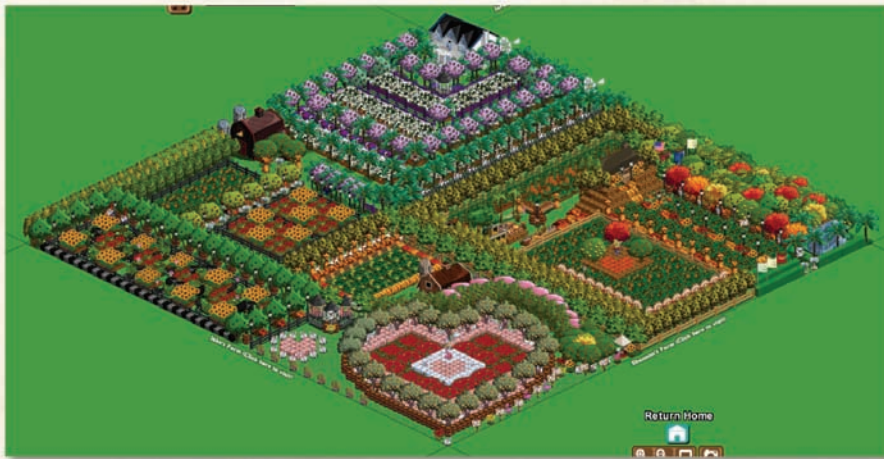
**YardWorks is a collaboration between:**  
Cornell University's Landscape Architecture Department  
YardMap, by The **Cornell** Lab  of Ornithology  
Tompkins County Cornell Cooperative Extension

Visit our website at [yardworksithaca.wordpress.com](http://yardworksithaca.wordpress.com)



How do we move from 3 communities in New York  
to the national or global scale?

# Development of an online planning tool



Farmville

80,000,000 players

Pay for premium content



## Crowdsourced planning



Networked to landscape architecture and urban planning classes at universities

# Partner clone for research and outreach!

**Habitat Network** [already a member? sign in](#)

TheCornellLab The Nature Conservancy powered by yardmap

## Let's Keep Habitat. Together.

Team up with The Nature Conservancy and The Cornell Lab and householders worldwide to study and support conservation right in your backyard.

### What is the Habitat Network?

a *free, social, interactive, citizen science mapping project* about *habitat creation* and *low-impact land use*

[Sign Up Now](#)

[f Share](#) 3616 [t Tweet](#) 529  
[✉ Email](#) 2012

### The Habitat Network in action

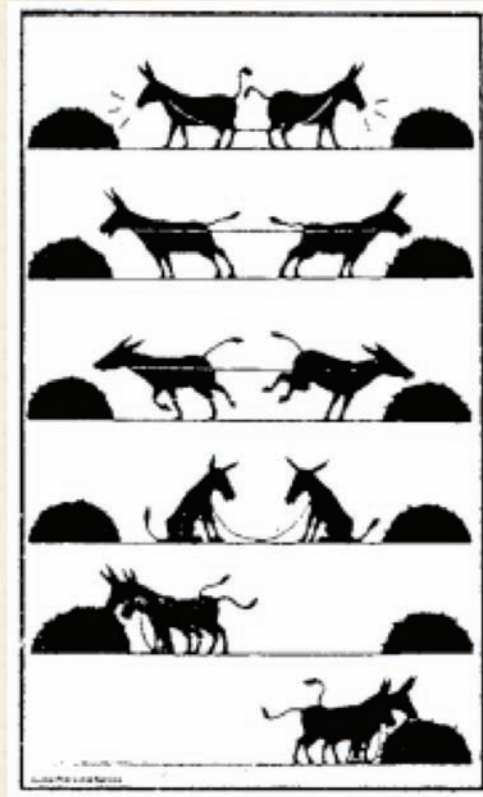
The goals of the Habitat Network are to increase ecological function and resilience in residential landscapes, and to generate personal commitment to, and public support for, conservation through back yard action.

# Be on the map.™

Map for Birds, Science, and Your Yard!

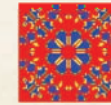
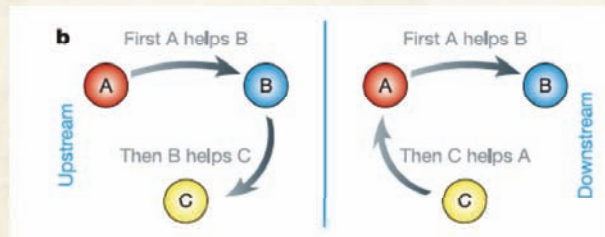


# Theoretical treatments of cooperation and competition



# Resolving social dilemmas

Elinor Ostrom – Nobel prize 2009, died 2012



Public goods games, Models of structured populations with social rewards and punishment

(Sigmund & Nowak 1993)

(Hauert 2005, 2006)

Reputational effects  
 Conditional cooperation  
 Image scoring  
 Partner choice  
 Pay to reward for cooperation  
 Pay to punish for noncooperation  
 Between group competition

Small group sizes

# Can socially networked citizen science make it easier to be green?

What *mechanisms* support increased conservation effort in YardMap?

Deliver two versions of the application

A/B design experiments



## Leaderboards

### MAPS MORE THAN 90% COMPLETE

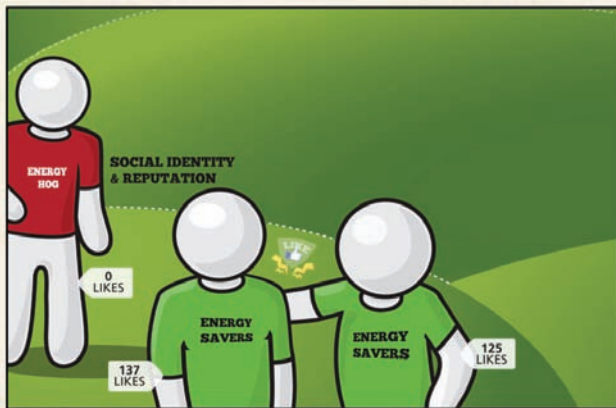
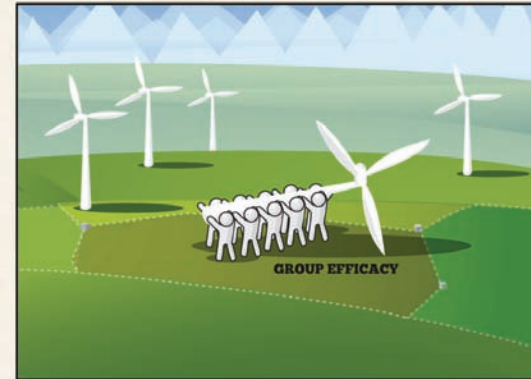
Add categories, tag, and add photos for all your objects and habitats to earn map completeness

YOU	<a href="#">johnnypublic</a>	
	<a href="#">bananabreath</a>	
	<a href="#">spongebob</a>	
	<a href="#">birdluvr14</a>	
	<a href="#">edgar123</a>	
	<a href="#">jenny56</a>	
	<a href="#">tommywarblers</a>	
	<a href="#">cardinal8987</a>	
	<a href="#">wren475897</a>	
	<a href="#">puffinhugger</a>	
	<a href="#">kefirmaker798</a>	
	<a href="#">thunderpangs</a>	
	<a href="#">norsec3254</a>	

### SEEDS OF CHANGE POINTS

Earn points by making changes in your yard and updating object and habiton characteristics

	56	<a href="#">birdluvr14</a>	45
	57	<a href="#">bananabreath</a>	45
	58	<a href="#">spongebob</a>	44
	59	<a href="#">jenny56</a>	44
	60	<a href="#">edgar123</a>	44
YOU	61	<a href="#">johnnypublic</a>	43
	62	<a href="#">tommywarblers</a>	42
	63	<a href="#">cardinal8987</a>	42
	64	<a href="#">wren475897</a>	42
	65	<a href="#">puffinhugger</a>	41
	66	<a href="#">kefirmaker798</a>	41
	67	<a href="#">thunderpangs</a>	40
	68	<a href="#">norsec3254</a>	39



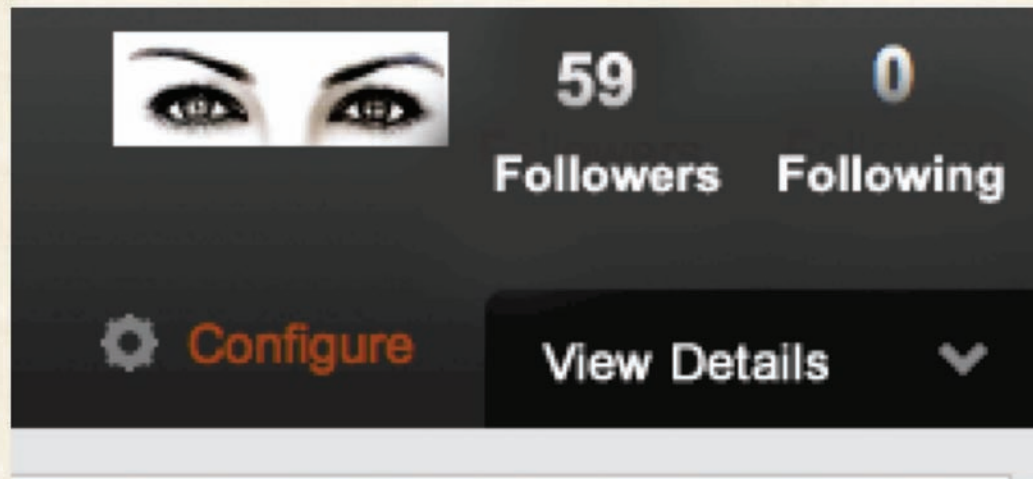
Dickinson et al. 2013. Can deliberate design of online social networks make it easier to be green? *Trends in Ecology and Evolution* **28**: 561-569

# How important is reputation?

H: Pro-environmental behavior (PEB) increases with observer number and sense of being observed

P: Experimentally doubling the number of followers increases PEB.

P: Placing eyespots next to the number of followers increases PEB.



# Shifting social norms



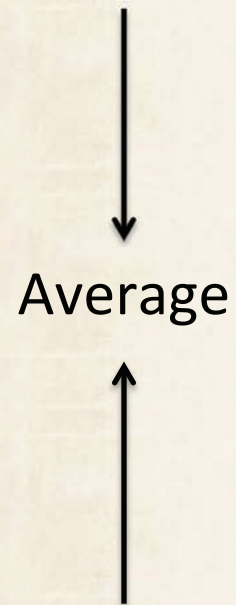
## Descriptive social norms

Describe what is commonly done in a situation (Cialdini et al. 1990)

Making norms salient influences levels of cooperation!

Referent group matters – closer to home, more effective!

# The problem with descriptive social norms



Schultz et al. (2007)

# Adding social approval

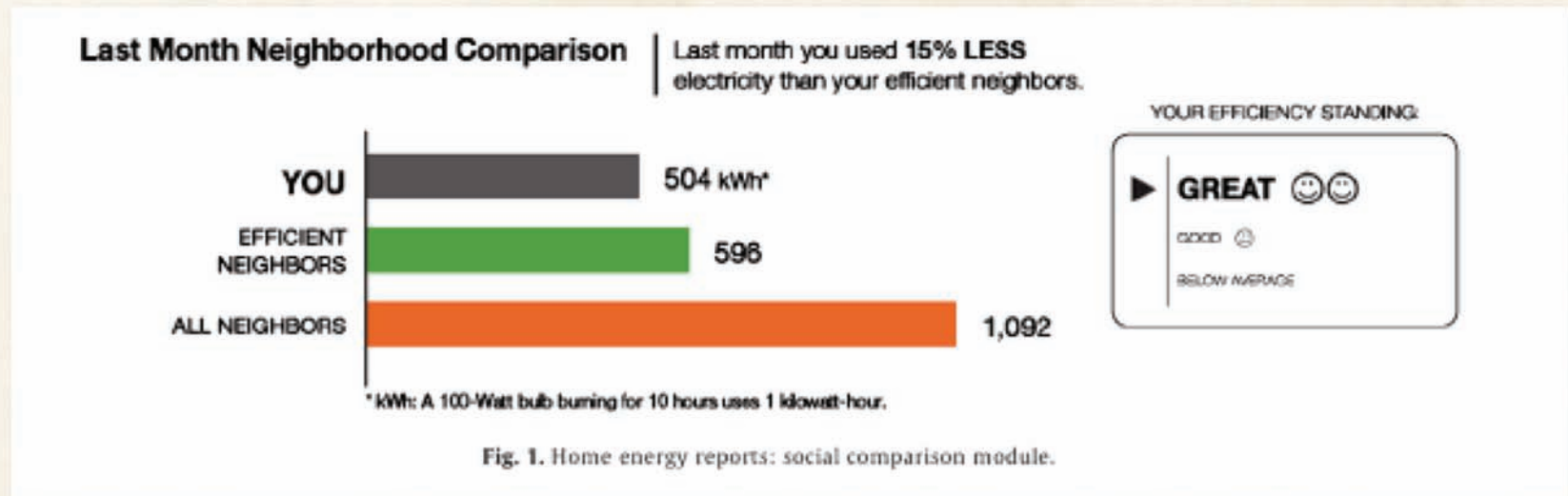
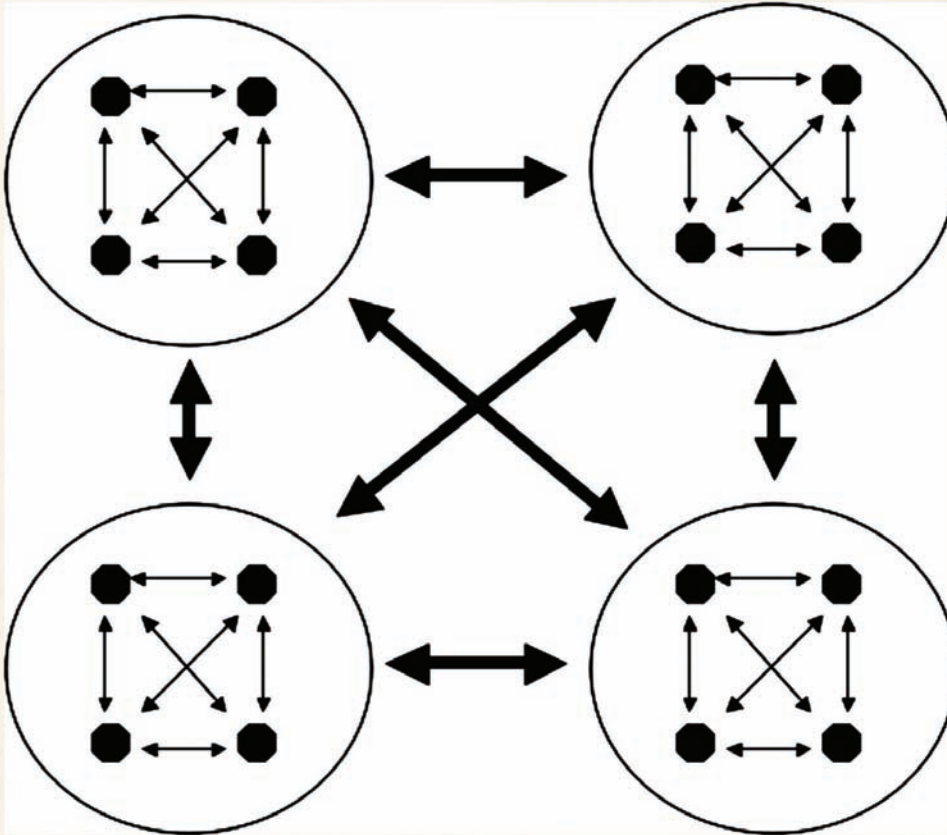


Fig. 1. Home energy reports: social comparison module.

Schultz et al. (2007)

# Can socially networked Web environments enable us to behave like a super-organism?

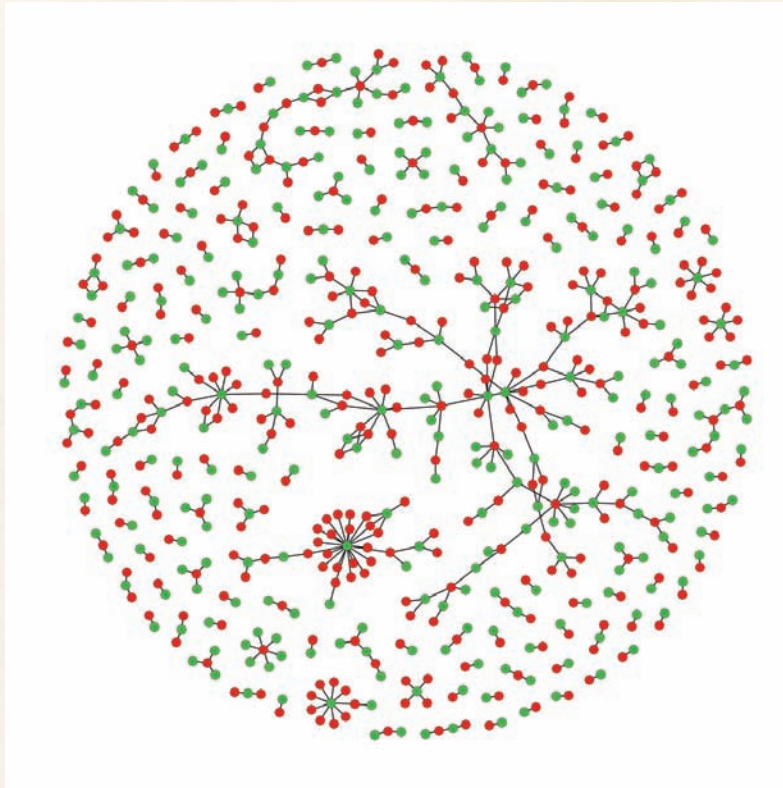


2015: Enable group formation and summaries of data by group; Test effect of competitions.

Reeve, H.K. and B. Holldobler. 2007. The emergence of a superorganism through intergroup competition. *PNAS* 104: 9736-9740.



# Social network effects



A/B testing now

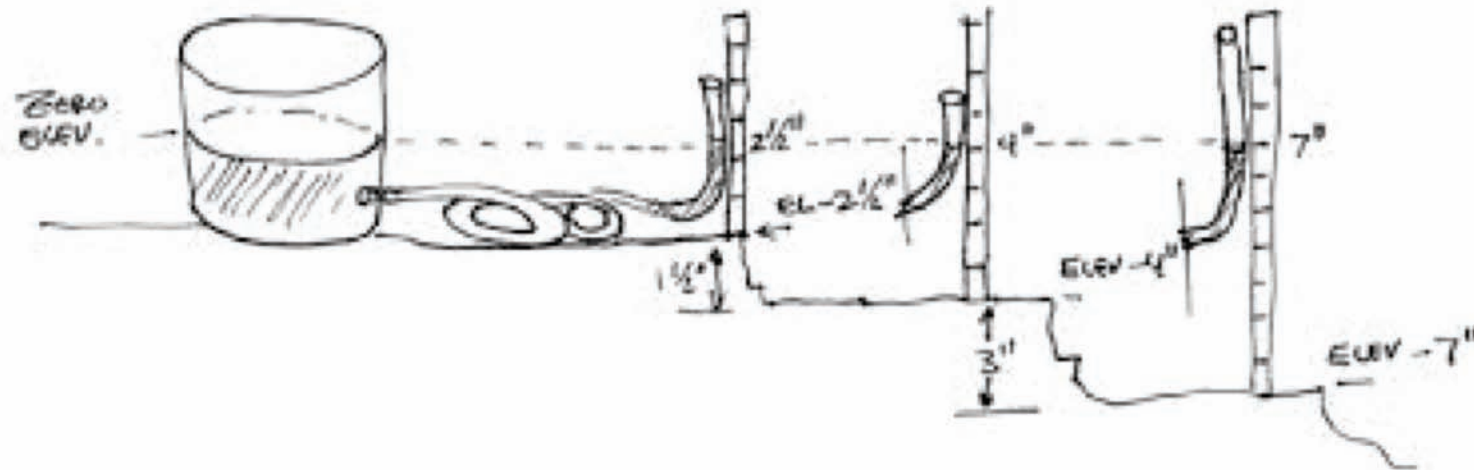
Influence

Diffusion of innovation

## YardMap as a collaboration space:

1. Big data
2. Emergent activities
3. Innovation
4. Collective project solving

Might the level of detail provided in YardMap be useful or Bernard's models?



Citizen scientists + tinkerers + online platform + sensors  
Who is your audience and what do you want to know?  
What do your participants want to know?