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

www.yardmap.org
Crowdsourcing as cooperation with soft institutional governance
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
CREATING A COMMUNITY

www.yardmap.org
Explore your habitat; Map your yard!

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

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.

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.

www.yardmap.org
Dr. Josh Cerra, Landscape Architecture

20 design students working with communities each semester

www.yardmap.org
Neighborhood Planning Strategies

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

1. 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.

2. 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.

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

4. 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.

5. 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.

6. 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.

7. 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.

www.yardmap.org
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.

Why Pollinators are Important:

- Food, Monterey, butterflies, and shelter
- Benefits to us through crops, medicinal plants, and garden plants
- We can 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. This insect must lay its eggs on or close to it.
- NATURAL NEST SITE:
  Bars of nest paper by solitary bees can be used for ground nesting bees. Bundles of hollow stems, cones, or areas of long, tangled grass can be used for burrowing nesting bees.
- NECTAR SOURCES:
  Patches of flowers used for gathering food.
- WATER SOURCE:
  A pond, stream, or puddle serves as a water source for all pollinators.
- SUNNY OPEN SPACE:
  Pollinators need space to see the sky to navigate, feed to warm their muscles and eyes before flight, and warm their habitat.
- OVER-WINTERING SITE:
  Butterflies find shelter in tree cavities, under leaf litter, a pile of mulch, or in some other vegetation. Bees will stay in the subsumer of the ground, leaf litter or their own nest.

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)
- Commercial availability
  (local nurseries - mail order seeds)

FOUR-STEP APPROACH

1. Recognize existing pollinator habitats that are 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.

Resources:
- https://www.bee Pewligt.org
EXISTING CONDITION

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 clearing storm water runoff and pollutants.

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

COLDIRON

www.yardmap.org
MAPLE SPRINGS SHORELINE ENHANCEMENT

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

LANDSCAPE PERFORMANCE

The design of the Maple Springs Shoreline includes the use of about 30 new plants that enhance a Filter Strip to create natural areas surrounded by native plants to reduce run-off loss and filter pollutants. The design establishes natural planting layers with year-round interest and ecological benefits.

www.yardmap.org
THE POINT

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

Site Analysis

Functional Diagram

POINTER CHAUTAUQUA

www.yardmap.org
Community is buying signs to advertise what they are doing.
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!

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

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

(Sigmund & Nowak 1993) Reputational effects
Conditional cooperation Image scoring Partner choice
Small group sizes Pay to reward for cooperation
Pay to punish for noncooperation
Between group competition

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

www.yardmap.org
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
johnnypublic
bananabreath
spongebob
birdluvr14
edgar123
jenny56
tommywarblers
cardinal8987
wren475897
puffinhusger
kefrmaker798
thunderpangs
norsec3254

SEEDS OF CHANGE POINTS
Earn points by making changes in your yard and updating object and habitat characteristics

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</table>
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

Average

Schultz et al. (2007)
Adding social approval

Last Month Neighborhood Comparison

- **YOU**: 504 kWh*
- **EFFICIENT NEIGHBORS**: 596 kWh
- **ALL NEIGHBORS**: 1,092 kWh

* kwh: A 100-Watt bulb burning for 10 hours uses 1 kilowatt-hour.

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.

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?