YardMap Citizen Science Project
Front-End Evaluation

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Understanding, fostering, and promoting lifelong learning

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Executive Summary

Introduction

The YardMap Network is an NSF-funded citizen science project at The Cornell Lab of Ornithology, which will allow participants to map their habitat management and carbon neutral practices in backyards and parks, interact socially within the network, and display their activities and carbon footprints in an online platform such as Google maps.

In 2010, the Institute for Learning Innovation (ILI), in collaboration with the Cornell Lab of Ornithology, conducted a front-end evaluation to assess the following evaluation questions:

1. What are gardeners', and birders', citizen scientists', and novices' needs, motivations, desires and interests in relation to YardMap?
2. How do participants react to the proposed YardMap and social networking sites? What do they find interesting, and how can this information help with the planning process?
3. Which components of YardMap are people most interested in and why?
4. To what extent do participants think they'd participate in the social networking aspect of the site?
5. What are the perceived benefits and barriers to participation?
    a. Regarding the social networking features
    b. Regarding the basic YardMap "mapping" application
6. Are certain types of people more or less likely to participate in YardMap in general, and more specifically in social networking?

Methods

In order to answer the main evaluation questions, ILI conducted a mixed methods approach and employed focus groups, an online survey, and phone interviews. Each method was intended to inform and build upon the previous method and all methods were utilized consecutively. The following table outlines the timeline and sample size for each method:

Table 1: Summary of study methods and samples

Method	TOTAL Sample Size	Data Collection Period
Focus Groups	36	March 2010
Online Survey		
Total Sample	3,469	April 2010
Qualitative Analysis Sample	150	April 2010
Stand-Alone Telephone Interviews	22	August 2010
Follow-up Telephone Interview	20	September 2010

Main Findings

This section includes the main findings of the front-end evaluation, in four general areas: 1) General Reactions, 2) Design and Functions of YardMap, 3) Individual Use and Participation, and 4) YardMap and the Environment. The first two areas are to help inform the team for the design and development of the application, the third area is to understand users' preferences for how they see themselves using YardMap, and the fourth area is to see the potential for YardMap to influence users' environmental attitudes and behaviors.

GENERAL REACTIONS

- Participants showed a strong interest in YardMap, which is not surprising given that the large majority of them were birders and gardeners. One-third had a very strong interest in the application. Reasons given for why they were interested in YardMap included having an interest in birding, being able to improve their yard for birds, enjoying participating in citizen science project, and connecting with others.
- The components users were most interested in were: getting feedback about how to make their yard more bird-friendly, the idea of mapping their own yard, and the ability to ask experts for advice. They were also interested in the idea of being able to help others.

DESIGN AND FUNCTIONS OF YARDMAP

Design – key features of the YardMap design were tested, including the overall look-and-feel of the site, specific features such as the level of detail, format for mapping the yard, appearance of the home page, among others.

- Many participants liked landscape layout designs with what they described to be "visual clarity" and a "3D feel." Other participants liked landscape designs with good visual detail and realistic features. Participants felt that designs such as logos, banners, and word art needed to fully embrace both the birding and gardening aspects of YardMap.
- In early versions of YardMap the functionality was limited to mapping on the actual satellite image itself; this limited the scale at which people could map their yards. Due to feedback in focus groups, the YardMap team learned that participants wanted the ability to map on a small-scale basis. As a result, changes were made to the application and later versions allowed users zoom past the satellite image into the grid layer beneath and map at a finer grain. Continued testing showed that this level of detail was important to users.
- Users wanted designs that were both complex enough to accurately represent their yard yet still simple enough to be visually appealing and easy to understand. Gardeners, especially, wanted to be able to map at a much more detailed level, which may be reminiscent of the landscaping software available to them.

Mapping preferences – YardMap will allow people to map their own yards or spaces, public spaces and other peoples' yards or spaces. It was important to understand potential participants' level of comfort and interest in mapping these spaces, as well as having other people map their yards or spaces.

- When participants were asked which spaces they would like to map, they were most interested in mapping spaces that had some personal importance or relevance. To most participants, it was not readily apparent or obvious that with YardMap they could map areas other than their own yard or space.

- Participants did not see many barriers associated with collaborating with others to map public spaces, although they admitted that they might not have thought of this on their own. Many felt that that collaborating on maps would be a good community resource, and even reported being okay with other people adding to their maps

Bird-friendliness scores–to help participants improve the bird-friendliness of their yard, the idea of a bird-friendliness score was tested. This would give users specific feedback about how their current practices are helping, or not helping, birds.

- Participants were mixed about the idea of a bird-friendliness score, which would measure each user's bird-friendliness by taking in to account their current yard practices. Many felt that a "score" would bring unnecessary competition, and may discourage users who had lower scores in making their yard more bird-friendly. At the same time, participants liked the idea of helping users find and implement bird-friendly practices in an enjoyable way. Some participants also felt that a score like this would be a great tool to promote community awareness about birds.
- As of this report, The YardMap team has already developed a new iteration of a "bird-friendliness score" which addresses the concerns found during the front-end evaluation. The new plan includes opportunities to earn badges for bird-friendly practices rather than be given a score; this approach will be tested further in the formative stages of evaluation.

Plant naming and labeling – to map a yard or space, participants will not only map areas of their yard but may also include individual plants and trees in their map. The level of detail for plants was tested.

- Many participants in this study were sophisticated birders and gardeners who were comfortable with naming major plant and bird species, but indicated that they would need to reach out for help to name more obscure plants, and also to help decipher between what is native and what is invasive. Most participants indicated that they would need some level of help doing a thorough job labeling plants and trees in their yard. They assumed other users would also need the same level of help.

INDIVIDUAL USE AND PARTICIPATION

Privacy – as a social networking site, especially one that includes information about where they live, it was important to gauge participants' preferences for level of privacy. Since the target population included many older participants, this was especially important to test.

Personal and Community Use

- Participants first commented on and were drawn to the personal uses of YardMap such as learning how to make their yard more bird-friendly, mapping their own yard, or receiving a bird-friendliness score. Participants were also interested in the community uses of YardMap but these did not come to mind as readily or seem as important to them. It is possible that not being able to use these community functions

during front-end testing influenced this; once they are able to participate in the functions, they may see them as more interesting or relevant.

- Participants were interested in having the ability to control which pieces of information were displayed for other users, whether they were scores, comments, their maps, etc. Some participants more familiar with the Lab expressed trust that any information they shared would be used appropriately.

Social Networking

- Overall, the participants were familiar with social networking, with a little over half participating in some sort of social networking site already. Social networking opportunities seem to fit naturally with birders and gardeners given their tendency already to share insights, information, day-to-day yard practices, and bird sightings with others who have similar interests. Although small, there was some resistance to the use of social networking, mostly due to general disinterest, privacy concerns, and discomfort with technology.

Citizen Science

- Most of the participants were citizen scientists and had previously participated with one or more citizen science project. Some who participated in projects with the Cornell Lab of Ornithology discussed how YardMap could be integrated with projects such as ebird, FeederWatch, NestWatch, and Great Backyard Bird Count by syncing data from their other projects and providing more context for their bird sightings.

YARDMAP AND THE ENVIRONMENT

Climate Awareness

- Participants were familiar with the term “carbon neutral” and most were able to talk comfortably about what it means. Overall, participants were already concerned about the environment, and were conscious of their behaviors and energy use. A handful were wary of the stigma associated with “climate change,” but nonetheless were still concerned about the environment.

Carbon Neutral Scores

- Feelings about the carbon neutral score paralleled those of the bird-friendliness score, with many concerned about unnecessary competition and potential embarrassment due to their carbon neutral scores. Many felt this score should be based primarily on yard practices, and not general lifestyle practices.

YardMap’s Impact

- Most participants clearly saw the relationship of their yard practices on birds, and thought YardMap had the potential to positively impact peoples’ yard practices. They also thought that if there were enough people doing it then it could potentially have a significant impact on birds. The main areas of impact were perceived to be in awareness of the issues, improvement of the landscapes and also that it could positively impact birds’ ability to reproduce and find food.

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Introduction

Project Background

The YardMap Network merges the lab's existing bird citizen science projects with online social networking and gardening activities, providing new opportunities for a growing audience of middle-aged and older learners to collaborate with professional researchers to investigate the impacts of bird-friendly and carbon-neutral practices in backyards, community gardens, and parks. YardMap learning resources are designed to produce basic, intermediate, and advanced learning outcomes, while engaging people in learning about habitat-bird relationships and carbon neutral practices. In the process, the YardMap will test the hypothesis that coupling citizen science with social networking creates online learning communities with improved STEM learning outcomes.

The YardMap Network is a brand new concept for recruiting citizen scientists, other birding participants, gardeners, and novices into an ecological social network that spans the continent. We will begin by asking people to map bird-gardening and carbon-neutral practices in their backyards and parks. If they choose, YardMappers can monitor birds, display their YardMaps, chat, and/or enter the YardMap's forums and integrated social networks, where novices (non-birders/non-gardeners) will be drawn into the YardMap through social contagion or "the copycat effect."

Evaluation Focus

The Institute for Learning Innovation (ILI), a non-profit educational research and evaluation organization based in Edgewater, MD, was contracted by the Cornell Lab of Ornithology to conduct a front-end evaluation to:1)determine whether the conceptual approach and the information of the planned YardMap site resonates with and makes sense to potential users; and 2) collect information about the target audiences' attitudes, understanding, perceptions and preferences in regards to YardMap content.

This study incorporates a variety of methods and is designed to answer the following evaluation questions:

1. What are gardeners', and birders', citizen scientists', and novices' needs, motivations, desires and interests in relation to YardMap?
2. How do participants react to the proposed YardMap and social networking sites? What do they find interesting, and how can this information help with the planning process?
3. Which components of YardMap are people most interested in and why?
4. To what extent do participants think they'd participate in the social networking aspects of the site?
5. What are the perceived benefits and barriers to participation?
    - Regarding the social networking features
    - Regarding the basic YardMap "mapping" application
6. Are certain types of people more or less likely to participate in YardMap in general, and more specifically in social networking?

Methods

All data for this study were collected between March and August, 2010.Instruments and procedures utilized for these evaluation studies were developed by ILI in consultation with staff from the Cornell Lab of Ornithology. Data for each study were collected by ILI staff, coded, and entered into statistical analysis software (SPSS, Version 18) or analyzed using qualitative approaches.

The following table summarizes the methods and samples from each component of the front-end evaluation.

Table 2:Summary of study methods and samples

Method	TOTAL Sample Size (# of Groups)	Data Collection Period
Focus Groups	29	March 2010
Online Survey		
Total Sample	3,469	April 2010
Qualitative Analysis Sample[1]	150	April 2010
Stand-Alone Telephone Interviews	22	August 2010
Follow-up Telephone Interview	20	September 2010

Each method is described in more detail below.

[1] To analyze open-ended responses, a smaller group was randomly selected from the online survey sample.

Focus Group

Background

Focus groups were held in conference rooms at the Cornell Lab of Ornithology on March 11-13, 2010. Each conference room was equipped with a digital recorder, computers and a projection screen for demonstrating YardMap. The focus groups began with participants filling out a paper survey (Appendix A). Each focus group was audio recorded and later transcribed.

Two ILI staff were present for the focus groups: Steve Yalowitz moderated the groups while Tammy Messick took notes. Rhiannon Crain and Chris Marx from the Cornell Lab of Ornithology assisted in the focus groups by demonstrating YardMap as well as answering questions that came up about the content, details and future plans for YardMap.

A total of 29 participants attended three different focus group sessions. The first focus group was held from 4:00-6:00p.m.on Thursday March 11, 2010 with 8 people in attendance; the second focus group was held from 1:00-3:00p.m.on Friday March 12, 2010 with 13 people in attendance; the final focus group was held from 4:30-6:30p.m.on Friday March 12, 2010 with 8 people in attendance. All focus groups were held at the Cornell Lab of Ornithology in Ithaca, New York, and many of the participants either had or were participating in the Lab's various citizen science programs. Focus group participants were recruited using birding and gardening listservs, Facebook groups, and the Lab of Ornithology newsletter. The primary purposes of the focus groups were to understand the initial reactions to and perceptions of the YardMap application, as well as inform subsequent phases of the front-end evaluation.

It should be noted that the three focus groups included people who were familiar with the Lab's citizen science work, many had previously participated in them, and do not likely represent the views and attitudes were the focus groups held in other locations. However, the main purpose of these focus groups was to test the YardMap prototype with groups with a favorable attitude; if there were issues with these groups, they likely need to be addressed for the broader audience. That being said, there is no reason to believe that the focus group audiences were drastically different from birders and gardeners in other areas; this will be tested in other parts of the front-end study.

Methods

The focus groups were conducted using a focus group guide, which allowed the conversations to cover a list of topics identified beforehand as they occurred. However, there were main categories that needed to and were covered during the process (see Appendix B for focus group guide categories and specific questions). The audio recordings from all three groups were transcribed and analyzed to identify key themes.

Demographics of Participants

The 29 focus group participants included 20 women and 9 men. Ages ranged from 45-71 years of age, skewed towards the upper end of this range, and participants were all from the central New York region. Future phases of the front-end study will include a more nationally representative sample of the United States.

Participants of the focus group were very familiar with the Lab and the large majority of participants had visited Sapsucker Woods (the location of the Lab) in the past. Many of the participants volunteer at the Lab or attend seminars and Spring Ornithology Courses. Additionally, this group was very familiar with citizen science projects. A little over half had participated in a citizen science project previously. The participants considered themselves to be primarily intermediate birders and gardeners, and the majority of the participants reported watching birds every day. As such, the group fell very much within the target audience of YardMap, although they were much more familiar with the Lab and citizen science compared to the general public.

Nearly all participants had experience using basic internet functions such as email and visiting websites. In terms of online activities, participants reported feeling most comfortable using Google as well as online maps to get directions. They were least comfortable pushing an RSS feed to an aggregator (many did not know what it was) and adding a Google gadget. Of the social networking activities listed, two-thirds of the participants used Facebook. While this group was comfortable with the internet and email, there were varying levels of experience with social networking.

Results and Discussion

Data analysis included reading through the transcribed focus group notes, noting themes and general patterns that emerged. Through the analysis a number of themes emerged covering areas such as interest in and reactions to YardMap, feedback about the design and social networking aspects of YardMap, among others.

Interest in YardMap

Overall, focus group participants were interested in the initial concept of YardMap presented to them. About half of the participants were very interested and about half of the participants were moderately interested when provided with a verbal description of YardMap. Not surprisingly, their levels of interest in particular YardMap functions were driven, at least in part, by their experience with and participation in birding, gardening and citizen science. For example, of the groups included in the focus groups gardeners were most interested in providing as much detail and accuracy as possible about mapping the plants in the yard.

Those who were very interested in YardMap from the start of the focus group had a wide range of reasons for their interest including the following: mapping things in their yards, tracking what works to attract birds in their yard, and having a map of their backyard. A few also felt that the activities of YardMap would line up with things that they liked or were already doing.

> *I'm interested in being able to have an electronic version of a map of my property.*

We're trying to rebuild [a portion of our yard] so the birds will come back because the birds are kind of not coming anymore… and I'm trying to know what to put where and how, and it's a very big challenge also.

I'm naturally excited with maps, and I'm also a birder and a gardener. So the whole thing comes together pretty well.

Those who were moderately interested in YardMap at the beginning of the focus group felt that they were too busy, unsure of what the application had to offer, would rather be outside than on their computer, and felt that their interest depended on how easy it was to use.

I already have a fulltime job and a very, almost a fulltime interest outside of my work, and I don't want another job.

I wouldn't want to be sitting behind a computer when I'm supposed to be out weeding. So that's why I was thinking instead of very interested, I'd only be moderately interested.

Reactions to YardMap

At each focus group, a portion of time was set aside to display the current version of YardMap on a screen. During this time, the Lab staff demonstrated how YardMap participants would potentially use the program using both Google and Bing online map platforms, and then discussed the current design with focus group participants. Participants showed a large amount of curiosity by asking the Lab staff many questions about functionality, design, and potential uses. There was a large amount of back-and-forth between staff and participants, typically with participants asking questions of the Lab staff demonstrating YardMap. As an example, the following is a discussion about habitat types available in YardMap.

Participant: *I'm looking at the field on the left, and there's – looks like there's trees on the right side. So are you looking for that level of detail? Do you want each one of those trees identified as a tree?*

YardMap Team: *Maybe. We've thought about having an icon for a tree that would allow you to give us more information about each individual tree. It's really flexible. Is that something you're interested in?*

Participant: *You know, it really depends on if it's useful.*

YardMap Team: *To the lab.*

Participant: *I mean, I assume that kind of habitat is for now either attract birds or not. And so if it does, then I think you've got to put it in there.*

Participant: *Alright.*

After seeing the design, the majority of the participants were just as interested as they were at the beginning of the focus group. While none said they were more interested, it's important to note that many were already interested after hearing a description; there may not have been much room for improvement. Only a handful of people were less interested, due largely to an inability to zoom in to a greater degree of detail. It is important to realize that gardeners in particular may desire a greater degree of detail than can currently be provided by the available technology with online maps widely available to the public. One participant noted:

> *I think I'm a little less interested – I'm actually surprised at my own reaction, but in thinking about my property and how it's used by local birds and realizing the size of that property compared to the ranges of the resident birds, even, I'm disappointed in the scale [of YardMap]. It seems too big.*

Scale/Level of Detail in Images

Overall, participants were somewhat concerned about the scale of the application. Most felt the need to be able to zoom in closer and map their yard in a more detailed way. Participant quotes include the following:

> *It doesn't seem like it's going to be on enough of a micro level for me. Simply because just I don't have that much property, so it would just look so insignificant.*

> *I would want an even more micro level of management. I mean I look at the first [yard] you showed, it's like oh well, my yard would just disappear.*

> *That plot is much, much bigger than all my land. So for me to have something that was more micro would be more interesting, and something that I could play around with.*

When prompted, the idea of pushing past the map into a grid where the user could provide detail on a micro level was well received by the participants.

Design

Web Design

All three focus groups were shown four different designs for the front page of the website. Participants tended to gravitate to the house design and rain design. One person who liked the house design said that they liked it because, "It's obviously someone's home." Another person who liked the rain design said:

> *I really like the rain. I like the fact that as magazine layouts call it, it's a telephoto. You are up there with the plants. It's not something where you pull back. It's not a line drawing map. It's not a satellite view. It is the plants. That's what I notice in this, and it makes me happy.*

Overall, participants were adamant about including a bird in the design and gave suggestions for possible designs including, "A bird in some kind of habitat, a bird in a tree, and a bird in your yard."

A couple people felt that the images would not be relatable to most people, by saying, "I have a problem with the first one [house design]. That is not your average American house….I mean, that could be an urban garden. That

could be in Georgetown, but that would be – that's worth $1 million!" Another person felt that the images of people should be of women.

Logo Design

The first focus group was shown a set of possible logos—none of which included any birds. After receiving feedback from the participants during the first round, the designer, Sarah Seroussi, adapted the logos and added a few birds (Appendix C).

Overall, the discussion about logos focused on the symbols or drawings on the logos including wheelbarrows, birds, leaves, flowers. A handful of participants discussed the font type and the "feel" of the logo. Participants felt that the logo needed to be representative of both gardening and birding, and all of the groups felt strongly about having a bird in the logo. As a response to the first set of logos, one participant said:

> *None of them have birds. I would put a little bird in each one of those.*

The first focus group was unanimous in voting for 1B (Appendix C) but only with the understanding that there would be the addition of a bird. The second and third groups gravitated towards 2D, but wanted to add a bird as part of the logo. It is important to remember that the strong preference to have a bird in the logo may partially be skewed to the audience and context, since the focus groups took place at the Lab of Ornithology and included many birders.

Social Networking

The groups varied somewhat in their interest for including social networking opportunities in YardMap. The majority of participants were interested in the ability to join maps created by others, post questions, make comments, and share their own maps. Generally, they were interested in the various social networking options presented to them. While most participants were interested in collaborating and connecting online in various forms, some focused on tapping into specific individuals and experts; an "ask an expert" sort of approach. One participant who was primarily a gardener expressed interest in having access to an expert by saying:

> *Yeah, I would love to have, you know, sort of the omniscient online ornithologist available to me twenty-four hours a day. Because I don't know anything about birds.*

Participants also noted the limitations in asking questions to a wide network, in that some of the members might lack the specific knowledge to make their responses useful to the group. However, it should be noted that level of knowledge of these groups is high and might not represent the overall audience for YardMap.

Privacy

Most of the participants felt that it was important to have the ability to monitor or change privacy settings in order to feel comfortable contributing to YardMap. While most participants were open to social networking features in

general, there was a handful with resistance to social networking due to comfort level with technology and concerns of internet safety.

> *Well, I just keep hearing how once it's out there you can't pull it back. So it's better to err on the conservative side [and not share].*

The privacy issue is one that requires more investigation. Participants valued sharing their own material with others and looking at material that others shared. They definitely understood that YardMap was about sharing, but also had a strong desire to control the extent to which other people they didn't know could access their information.

Data Use

Focus group participants had a variety of responses when asked about the potential for YardMap to be useful to them as individuals. There were those who felt that YardMap would be useful to them as a way to map their yards, those who felt that the YardMap program would not adequately map their yards, and those who were simply not interested in mapping their yards regardless of what YardMap could offer. There seemed to be a natural tension between the use of YardMap for individuals and use of YardMap for research and community purposes, which some saw as potentially competing purposes. One participant explained this by stating:

> *I'm seeing this in two different ways. One, the usefulness to me as a gardener who wants birds in my yard, and the other the usefulness to the lab. And I'm thinking this is two different things. I'm thinking for me and from what you said, I would want more three dimensionality that you don't really get…but the lab might not need that. They might need me to be putting in data that says native plant that birds like, native plant that birds don't like. You know, they would want that – those kind of data inputs which I could imagine could be time-consuming in a different kind of way."*

A few participants were willing to forego personal usefulness if the program produced meaningful and useful data.

> *I don't think this would be helpful to me to plan my garden but I would do it if it were helpful in just supplying information for the public good, just like eBird does.*

Some participants were not interested in using YardMap, either for themselves or for the greater good.

> *I would use it if I thought the information was useful to anybody, but for me to sit inside and draw my garden on the computer, would not be in the least bit interesting to me. I wouldn't do it.*

Initially focus group participants were confused about how data would be both collected and used for researchers, asking, "Where is the data?" Even after the demonstration and some detailed discussion, participants did not necessarily understand how birds would fit into the project. One visitor stated:

> *I'm a little unclear still of how the bird data fits in. If we provide the habitat data, does that give you some things to work with because you knew certain types of habitat are favorable by certain types of birds, or do you also need feedback on what types of birds are showing up in those mapped areas to be able to do anything useful?*

Once focus group participants understood YardMap and how data would be collected, they readily identified several ways that YardMap could benefit the community including to use as a community zoning tool, to increase awareness about birds, and to track climate issues. This may need to be clearly stated on the YardMap home page, so participants understand why they should participate. One participant noted the power YardMap could have as a tool for activism:

> *This could almost be a tool for activists. People who are getting involved maybe you know, advocating for change on a small or large scale.*

Bird-friendliness

Most participants were very interested in and open to including the bird-friendliness score. They saw the excitement and inspiration that a score could create for YardMap users. One visitor commented, "Wouldn't that be cool? I like that idea. It's like an energy audit." One group discussed the possibility of a bird-friendliness score extending beyond the online platform, and into the real world with actual certificates that participants could display in their yards or home windows. Others felt that a score would be best utilized if it offered advice and help on how to become more bird-friendly. While some liked the idea of a score, they were hesitant about the inherent competition that would result. One participant talked about the pros and cons of having a competitive bird-friendliness score by saying:

Participant 1: *I think – you asked about the bird-friendliness score, and I really think that cuts both ways. I think there's going to be some people who love getting scored. You know, they keep the first year lists and they want to be the first one to see the red-winged blackbird, and they'll probably love that, because they can say, aah, I'll do this and I'll score that much higher*

I think there are other people who say birding is like the noncompetitive part of my life. I don't want to be scored on this, so I wouldn't click on that box.

Participant 2: *I don't see it as a competitive thing. I saw it as sort of an inspirational. I mean, if I do this, will it be better for the birds? So anything that would contribute to the competitive I would hate. I might want the score, but for a different reason.*

Nearly all felt that the score should be an option that participants choose to receive, and not something that is automatically created and shared with others. Participants wanted to have control over who saw this score. In speaking about the accessibility to the score, one participant stated:

> *I vote for choose-to-get, and also you can hide it from other people that are looking at it.*

In describing their concerns, participants noted the possible embarrassment of those who have low bird-friendliness scores, and that a low score may potentially discourage some YardMap users. Some also felt that the score may be competitive. Focus group participants had several specific comments about their concerns:

Maybe it could just give you suggestions if you don't get a high score.

One thing you should give them is the criteria on which they're being judged.

Scores never quite fit. I mean they're always missing something different about what you're doing. But I think maybe comments like, "This yard is bird-friendly because this, this, and this," might be better than a score. 'Cause then it's at least saying something positive about it.

Carbon Neutral Score

The possibility of including a carbon neutral score was discussed withtwo of the three focus groups. Overall, the participants felt that a carbon score would be interesting, and had an overall positive reaction to the idea. After hearing the initial description of the carbon neutral score, participant reactions included:

Wouldn't that be cool? I like that idea. It's like an energy audit.

I think anything that's going to give people a way of evaluating their current lifestyle and maybe help them change that slightly is an excellent way to go. I mean, do any of us really know what our carbon footprint is? I don't have a clue what mine is. You know, it'd be really interesting to know how that really worked.

Although the overall reception was positive, some participants were not sure how the carbon score would fit within the scope of YardMap. They felt that too much focus on habits and life style practices beyond the yard would distract from the purpose of YardMap. As such, while they acknowledged that including types of appliances, automobile and air travel would be useful, they suggested focusing on yard practices only for calculating the carbon neutral score. One participant said:

I would sort of think maybe this would be what you're doing in your yard as opposed to what you're doing in your house. Not that what you're doing in your house isn't important, but I'm just saying –

Similar to the bird-friendliness score, participants advocated for full control over carbon neutral scores, including being able to hide the carbon score for those who were not interested in seeing it.

More information needs to be gathered about peoples' attitudes towards these types of tools, providing specific examples of the tool for people to try out and react to.

Main Findings and Recommendations[2]

Overall, the YardMap version tested was well received and participants showed an interest and enthusiasm for both the concept described to them and for the screen-tested version of YardMap. They also had many specific suggestions related to YardMap, including the types of information to include, features for communicating with

[2] These recommendations were based only on the focus groups, and thus many of the recommendations had already been addressed and tested in later round of front-end testing by the time this report was written.

others about YardMap, and feedback about the design. It is important to remember that the three focus groups were made up of people who already had ties to the Lab and would likely be more receptive to projects like YardMap than the general public.

There were a number of main findings that have implications for the design and development of YardMap:

Finding	Recommendation
1. The basic idea of YardMap was well received and resonated with participants.	1. Test this with a more national audience.
2. Some people had concerns about what others would be able to see if they did a YardMap; there was a strong preference for privacy controls and opt-in functionality.	2. Determine whether an opt-in or opt-out policy would be the best approach, and find a compromise that satisfies peoples' privacy concerns while provided the broadest access possible. Look to similar platforms for their privacy and opt-in/opt-out policies.
3. There was a somewhat natural tension between making the information useful for the individual and contributing to the broader citizen science project.	3. Be clear in messages, especially on the front page, about how the project is meant for both individuals, the birder/gardener community and for citizen science. An explanation might be necessary about how detailed satellite images can be, and that it isn't meant primarily for an individual to map their own yard for their own purposes.
4. Participants, except for those who didn't regularly use computers, were interested in the social network functions and saw value for both themselves and others. There was some concern about how qualified people were related to what they would be posting.	4. Test a wide range of social networking functions, both for sharing information and asking others. Peoples' qualifications will likely work itself out within the community, although testing some functions for regulating could be considered for further testing.
5. The bird-friendliness score made sense to them, although some worried about how people would react to a low score.	5. Frame the score in a more positive manner, providing specific suggestions for how to improve the score and recognition/rewards if they do. Could also provide public recognition/rewards for those with initial high scores.
6. The carbon neutral score, and addressing environmental issues in general, was something the groups were comfortable with, and they also saw the connection to YardMap.	6. Confirm this attitude with a more national sample, including the most effective and acceptable ways to provide and share carbon neutral scores with others within YardMap. Provide specific information about how the score was calculated and why it was included in YardMap. Also test different versions of the carbon neutral score to determine the most effective design and delivery of the score.

Online Survey

The purpose of the online survey was to gather a more nationally representative sample of birders and gardeners for feedback on YardMap ideas and design. The survey covered topics including interest in YardMap, as well as reactions to design and content. Additionally, the survey asked questions regarding computer use, and environmental awareness.

The Lab of Ornithology arranged for an invitation to participate in the survey to be sent out through various mailing listsof their own (eBird, NestCam, FeederWatch), posted on listservs (FeederWatch, American Community Garden Association) and announced on websites (WeLoveBirds.org). It was also posted onthe following Facebook sites: eBird, Citizen Science, CamClikr, Celebrate Urban Birds, Empire, Great Backyard Bird Count, NestWatch, and Audubon. Individual email invitations were sent to a portion of GBBC and NestWatch participants.

A total of 3,469 people completed the online survey between April 13 and June 9, 2010. Since there were so many different ways it was sent out, and because of the multiple ways these various sites track, or do not track, visitation a response rate could not be calculated. However, it is the best guess of the researchers, based on feedback from the team and list managers, that roughly 10,000 to 20,000 individuals had the possibility of seeing the invitation during the survey period.

Analysis Approach

The survey included both forced-choice and open-ended items. Due to the large response rate, it was not feasible to code open-ended response rates with the full data set. As such, a random sample of 150 participants was selected from the 3,469 individuals who filled out the survey, and this group was used for the coding of open-ended responses. Tables 3 through 5 show the demographic summaries of both the total and random samples.In the remainder of this section the Total sample refers to the whole data set, and the Random sample refers to this selection of 150 individuals for coding of open-ended responses.

Sample Demographics

About two-thirds of the sample was female (67.7%) (see Table 3).The sample skewed older, as only 6.8% were younger than 35 years old; conversely, 56.6% were age 55 and older, although only 3.8% were 75 or older. As almost 80% had no children in their household the majority of survey participants could best be described as mature empty-nesters.This sample was highly educated with 76.4% having a college degree or higher and 40.8% having a graduate degree, much higher than the general population (less than 10%).Approximately one-third of respondents had a household income of $100,000 or more; 42.4% earned between $50,000 and $100,000. In general the sample was older, more highly educated and earned a higher income than the general population.

Table 3:Summary of Demographic Characteristics

Demographic Characteristic	TOTAL SAMPLE	RANDOM SAMPLE
Gender	***n=3,423***	***n=148***
Female	67.7%	64.9%
Male	29.9%	33.8%
Prefer not to answer	2.4%	0.0%
Age Category	***n=3,387***	***n=147***
18 to 21	0.5%	0.0%
22 to 24	0.8%	1.4%
25 to 34	5.5%	5.4%
35 to 44	12.5%	17.0%
45 to 54	24.2%	28.6%
55 to 64	34.0%	32.0%
65 to 74	18.8%	12.9%
75 to 84	3.6%	2.7%
85 and older	0.2%	0.0%
Number of Children <18 years old	***n=3,374***	***n=148***
0	79.7%	80.7%
1	10.1%	8.3%
2	7.5%	9.7%
3	2.0%	1.4%
4	0.4%	0.0%
5	0.2%	0.0%
6	0.1%	0.0%
More than 10	0.1%	0.0%
Highest Level of Education	***n=3,414***	***n=148***
Some high school	0.3%	0.0%
High school degree	4.1%	4.7%
Some college	19.1%	20.3%
College degree	35.6%	33.8%
Graduate degree or higher	40.8%	41.2%

Household Income	***n=2,945***	***n=129***
Less than $35,000	10.5%	14.0%
$35,000 – $49,999	13.4%	10.1%
$50,000 – $74,999	22.9%	22.5%
$75,000 – $99,999	19.5%	14.0%
$100,000 – $149,999	19.6%	22.5%
$150,000 – $199,999	7.9%	10.1%
$200,000 or more than	6.1%	7.0%

As Table 4 shows, about half of the sample resided in suburban areas (51.6%) while only 17.2% lived in urban areas.About 44% of respondents lived more than 250 miles from a U.S. coast and almost 90% of them owned their own home.All but 2.1% of respondents were responsible for caring for a yard or green space.

Table 4:Summary of Residential Characteristics

Residential Characteristics	TOTAL SAMPLE	RANDOM SAMPLE
Primary Area of Residence	***n=3,432***	***n=149***
Suburban – near a city	51.6%	51.0%
Rural – not near a city	31.2%	27.5%
Urban	17.2%	21.5%
Proximity to Coast	***n=3,223***	***n=143***
Within one mile	5.5%	2.8%
1 to 50 miles	21.5%	17.5%
51 to 100 miles	11.3%	7.7%
101 to 250 miles	18.2%	21.1%
More than 250 miles	43.6%	51.0%
Current Living Situation	***n=3,398***	***n=148***
I own my own home	89.6%	86.5%
I am renting	7.0%	9.5%
Other	3.4%	4.1%
Care for a Yard or Green Space	***n=3,440***	***n=150***
Yes	97.9%	98.7%
No	2.1%	1.3%

When asked specifically about their participation in gardening and birding, the large majority (77.6%)described themselves as both gardeners and birders.

Table 5:Summary of Hobbies

Are you a…	TOTAL SAMPLE	RANDOM SAMPLE
	n=3,396	***n=148***
Gardener & Birder	77.6%	77.0%
Birder Only	19.2%	20.3%
Gardener Only	2.4%	2.0%
Neither Gardener nor Birder	0.8%	0.7%

Environmental Awareness

Since YardMap will include functions that allow participants to get feedback about how their yard practices may affect bird populations and other environmental issues, survey participants were asked a series of questions to gauge their attitudes towards environmental issues. These questions were adapted from the February 2007 Yale Environment Survey. See the link below for the report and items used in that study.

http://envirocenter.research.yale.edu/uploads/epoll/YaleUniversityEnvironmentPoll07Topline%20Report.pdf

When asked how they would rate the overall quality of the environment in the United States today, 64.5% said Fair or worse. While 33.6% said Good, only 1.9% said Excellent, so it is fair to say that the participants saw the environment as facing many challenges. The results from the Yale Environment Survey in 2007, which included a more nationally representative audience, were: 4% Excellent, 28% Good, 44% Only Fair, and 21% Poor. The respondents to the online survey were slightly more positive, with fewer "poor" ratings.

Table 6: Attitudes Towards the Environment

How would you rate the overall quality of the environment in the United States today?	
	n=3,393
Poor	9.0%
Only Fair	55.5%
Good	33.6%
Excellent	1.9%

Participants were also asked to what degree they agreed or disagreed with four statements about energy consumption and environmental impact, to gauge how environmentally-friendly their attitudes were. The data suggest that a majority of respondents were energy-conscious, aware of the impact their behavior had on the environment, and concerned about global warming.In comparing responses from this study to the original nationally representative study by Yale (2007), this study's responses can be categorized as more concerned and more knowledgeable about the environment.

Table 7: Environmental Awareness

Negatively Phrased Statement	*Sample size*	*Mostly disagree*	*Somewhat disagree*	*Somewhat agree*	*Mostly agree*
I pay little attention to how much energy I use in my home.	3,455	61.0%	24.5%	7.3%	7.2%
Too much fuss is made about global warming.	3,444	66.6%	13.4%	11.9%	8.0%
Positively Phrased Statement	*Sample size*	*Mostly agree*	*Somewhat agree*	*Somewhat disagree*	*Mostly disagree*
I am familiar with the phrase "carbon neutral."	3,422	63.6%	24.2%	5.0%	7.3%
My behavior can help reduce the impact of global warming.	3,435	55.2%	30.4%	7.2%	7.2%

Computer Use and Social Networking

Given that YardMap will be an online tool, it was important to understand birders' and gardeners' computer abilities and preferences, especially in the area of social networking. Almost all respondents said they had experience using a computer and the internet as well as sending and receiving email. The majority owned their own desktop or laptop, while only about one-third (34.4%) used a mobile device to access the internet.

Table 8: Technology Experience

Do you?	***Sample (n=)***	***Yes***	***No***
Use the internet, at least occasionally?	3,423	99.9%	0.1%
Send or receive email, at least occasionally?	3,422	99.9%	0.1%
Use a computer at your workplace, at school, at home, or anywhere else on at least an occasional basis?	3,441	99.7%	0.3%
Own your own desktop computer?	3,412	83.1%	16.9%
Own your own laptop computer?	3,408	68.8%	31.2%
Use a mobile device or phone to access the internet?	3,415	34.4%	65.6%

Since YardMap is a map-based application, participants were asked about their experience with maps, both print and online. They were only slightly more comfortable with printed maps than online maps, and 82.1% were very comfortable with online maps, giving their comfort a 6 or 7 on a 7-point scale.

Table 9: Experience with Maps *(percentage)*

	Very comfortable						*Not at all comfortable*
	7	6	5	4	3	2	1
Printed maps (n=3,193)	73.7	15.4	6.7	2.8	0.8	0.4	0.2
Online maps (n=3,356)	61.2	20.9	11.3	4.5	1.3	0.5	0.3

Participants had most online experience doing basic internet searches (i.e., Google) with 69.8% performing this activity daily. Over one-third of participants (34.3%) used an online forum at least once a week while 26.4% used instant messaging or online chat and 32.9% posted an update to their social networking site at least weekly. About 46% of participants used an online mapping site to find their home or another location and 21.8% shared something online at least once a week. The most unpopular online activities were using a game application on Facebook, creating an online journal or blog, adding content to online maps and subscribing to an RSS feed.

Table 10: Use of Online Activities *(percentage)*

	Every day	*Once a week*	*Monthly*	*A few times a year*	*Once a year*	*Less than once a year*	*Never*
Google something	69.8	21.4	4.9	2.3	0.3	0.4	1
Use an online forum	19.2	15.1	10.3	20.4	2.8	7.5	24.8
Post an update on a social networking site (like Facebook, MySpace, etc.)	14.9	18	10.7	11.8	1.7	2.8	40.1
Use Google Maps, Google Earth, or Bing Maps to find your own home or other location	14.9	31.4	24.2	21.3	3.2	2.7	2
Use instant messaging or chat with others online	14.5	11.9	10.4	14.5	1.9	6.5	40.2
Subscribe to an RSS feed	9.7	4.9	4.9	7.1	2.7	4.6	66
Use a game application in Facebook	7.4	3.5	1.9	3.4	1.2	2.5	80.1
Share something online that you created yourself, like your artwork, photos, stories or videos	6.7	15.1	18.3	22	3.9	5.6	28.5
Post a comment on a blog	4.2	9.9	10.8	18.2	3.4	10.9	42.6
Create an online journal or blog	2.3	4.7	4.4	5.3	2.6	5.7	75.1
Add content to an online map (e.g. Google, Bing)	1.5	2.2	4.2	7.2	3.6	6.4	74.9

Eco-Regions

An understanding of participants' eco-regions provided additional context to their answers, and was important to determine whether there were differences in demographics or preferences for YardMap by eco-region. The majority of participants resided in the Eastern Forest eco-region within the United States (70.4%). This is likely due to the fact that the lab is located in a forested region, has many programs that are conducive to these types of areas, and that they attract birders in that area. Also, forests are important for birds and play an integral role in bird conservation. Table 11 shows a compressed analysis of eight main eco-regions for survey respondents. For a full analysis of respondents across all 40 eco-regions, see Appendix F.

Table 11: Eco-Regions (n=3,065)

	Percent	Frequency
Eastern Forest	70.4	2157
Western Forest	9.8	300
Plains	9.1	280
Shrub	6.3	192
Desert	2.8	86
High Desert	.9	28
Tropical	.4	13
Tundra	.3	9

Citizen Science Demographics

Given that YardMap will be a citizen science project, where participants will be contributing to data that scientists use to study various bird-related issues, items were included gauging whether someone had participated in a citizen science project. The majority of the web survey participants reported participating in a citizen science project. Of the 3,460 people who responded to the question: *"Have you ever participated in a citizen science project where as a member of the general public you collected data and contributed to a scientific effort that was not your own?"* about 71% answered Yes (n=2,476).Characteristics of this sub-sample are summarized in the tables below.Note that not all people answered all questions.

Table 12: Citizen Science Demographic Characteristics (n=2,476 of the total sample)

Demographic Characteristic	Citizen Science Sample	Total Sample
Sex	***n=2,449***	***n=3,423***
Female	68.5%	67.7%
Male	29.4%	29.9%
Prefer not to answer	2.2%	2.4%

Age Category	***n=2,417***	***n=3,387***
18 to 21	0.5%	0.5%
22 to 24	0.8%	0.8%
25 to 34	5.3%	5.5%
35 to 44	12.3%	12.5%
45 to 54	24.6%	24.2%
55 to 64	34.8%	34.0%
65 to 74	17.8%	18.8%
75 to 84	3.8%	3.6%
85 and older	0.1%	0.2%
Number of Children > 18 years old	***n=2,414***	***n=3,374***
0	80.1%	79.7%
1	9.9%	10.1%
2	7.5%	7.5%
3	1.8%	2.0%
4	0.4%	0.4%
5	0.1%	0.2%
6	0.1%	0.1%
More than 10	0.1%	0.1%
Highest Level of Education	***n=2,445***	***n=3,414***
Some high school	0.2%	0.3%
High school degree	3.1%	4.1%
Some college	16.4%	19.1%
College degree	35.8%	35.6%
Graduate degree or higher	44.5%	40.8%
Household Income	***n=2,091***	***n=2,945***
Less than $35,000	10.2%	10.5%
$35,000 – $49,999	12.7%	13.4%
$50,000 – $74,999	22.0%	22.9%
$75,000 – $99,999	19.8%	19.5%
$100,000 – $149,999	20.7%	19.6%
$150,000 – $199,999	8.4%	7.9%
$200,000 or more than	6.2%	6.1%

As

Table 13shows, about half of the citizen scientist sampleresided in suburban areas (52.7%) while almost one-third lived in rural areas. About 44% of respondents lived more than 250 miles from a US coast and 90% of them own their own home. All but 1.8% of respondents were responsible for caring for a yard or green space.

Table 13: Citizen Science Residential Characteristics

Residential Characteristics	Citizen Science Sample	Total Sample
Primary Area of Residence	***n=2,458***	***n=3,432***
Suburban – near a city	52.7%	51.6%
Urban	15.3%	31.2%
Rural – not near a city	32.0%	17.2%
Proximity to Coast	***n=2,324***	***n=3,223***
Within one mile	5.2%	5.5%
1 to 50 miles	21.7%	21.5%
51 to 100 miles	11.0%	11.3%
101 to 250 miles	18.0%	18.2%
More than 250 miles	44.1%	43.6%
Current Living Situation	***n=2,432***	***n=3,398***
I own my own home	90.7%	89.6%
I am renting	6.0%	7.0%
Other	3.3%	3.4%
Yard or Green Space	***n=2,457***	***n=3,440***
Yes	98.2%	97.9%
No	1.8%	2.1%

When asked about their birding and gardening participation, 78.7% of thecitizen scientists described themselves as both gardeners and birders. Most of the remaining participants described them as birders only (19.7%) while only a handful (1.0%) said they were gardeners only.

Table 14: Citizen Science Summary of Hobbies

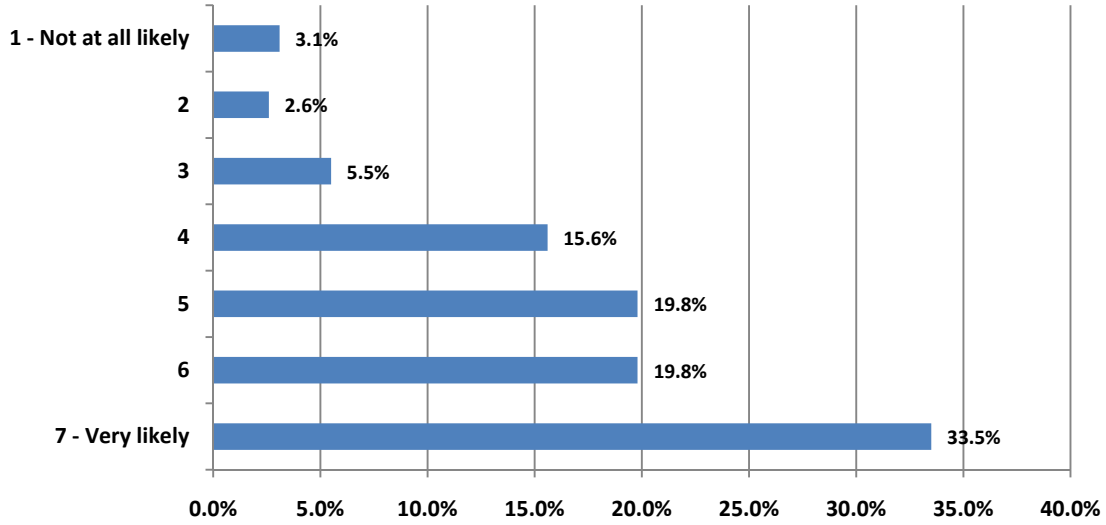
	Citizen Science Sample	Total Sample
Combination of Hobbies	***n=2,426***	***n=3,396***
Gardener & Birder	78.7%	77.6%
Birder Only	19.7%	19.2%
Gardener Only	1.0%	2.4%
Neither Gardener nor Birder	0.5%	0.8%

Main Findings

Interest & Usage of YardMap

Participants were given a brief description of the *YardMap Citizen Science Project* (see Appendix D) and a link to a short video to learn more about the program.Approximately 85% of participants reported watching this video. Participants gave an average of 5.40 out of 7 (*SD*=1.575) when asked to rate the likelihood of whether they would use YardMap based on this initial impression. Figure 1 shows the breakdown of these responses. The majority (53.3%) were very likely (6 or 7) to use YardMap, while many more (39.6%) were moderately likely (4 or 5) to use YardMap. Only 5.7% were very unlikely (1 to 2).

Figure 1:What is the likelihood that you would use YardMap? (n=3,344)



A random sample of 150 responses to why they gave the rating they did were analyzed to examine the reasons why survey participants ranked their likelihood to use YardMap.While a variety of positive and negative reasons were provided, most responses came from participants who were interested in using YardMap.A total of 83% gave positive ratings, 28% gave negative ratings, and 14% gave neutral ratings. The most common positive reason was an interest, hobby or passion for birds and/or birding (16.4%), followed by the opportunity to learn more/improve my yard or habitat for birds (14.8%) and a general interest in the program (13.1%).Among voiced negative concerns were the investment of time and effort in doing YardMap (9.8%) and issues of privacy (9.8%).

Table 15:Likelihood to Use YardMap(n=122)

Reasons		
Positive Reason	**[82.9%]**	
I have an interest/hobby/passion for birds/birding		16.4%
Opportunity to learn more/improve my yard or habitat (for birds)		14.8%
General interest (no specific reason given)		13.1%
I enjoy participating in citizen science projects		10.7%
I'm interested in connecting with others		9.8%
Seems easy-to-use, user friendly		6.6%
Seems fun and enjoyable		6.6%
I'm interested in mapping and sharing my yard		4.9%
Negative Reason	**[27.9%]**	
Too much time/effort required		9.8%
Concerned about privacy issues		9.0%
Concerned about site performance and map quality		3.3%
Not interested in computer/technology		3.3%
Not interested (general)		2.5%
Neutral Reason	**[14%]**	
Don't know enough about program (neutral)		10.7%
Other comments		3.3%

NOTE: Participants sometimes commented on more than one issue, so percentages total more than 100%.

About one-quarter of respondents said that the feature they were most interested in was getting ideas/advice for how to create a more bird-friendly yard/habitat/environment (25.5%).This was followed by the ability to map out their yard (23.5%) and knowing their bird-friendly rating or score (15.7%).

Table 16:Most Interesting Feature(n=127)

Feature	
Ideas/advice for creating a more bird-friendly yard	25.5%
Mapping out my yard or habitat	23.5%
Bird-friendly rating (score)	15.7%
Not sure/don't know	12.7%
Reporting and sharing bird information with others	8.8%
All or most of the features	7.8%
Seeing other people's info/yards/maps	6.9%
Seeing the "bigger picture" – neighborhood, area, region	5.9%
Other comment	4.9%
Information about relationship of birds and garden	2.9%
Connecting to CLO and other bird enthusiasts	2.9%
Viewing maps and bird data (general)	2.9%
Information on plants/vegetation	2.0%
Other resources	2.0%

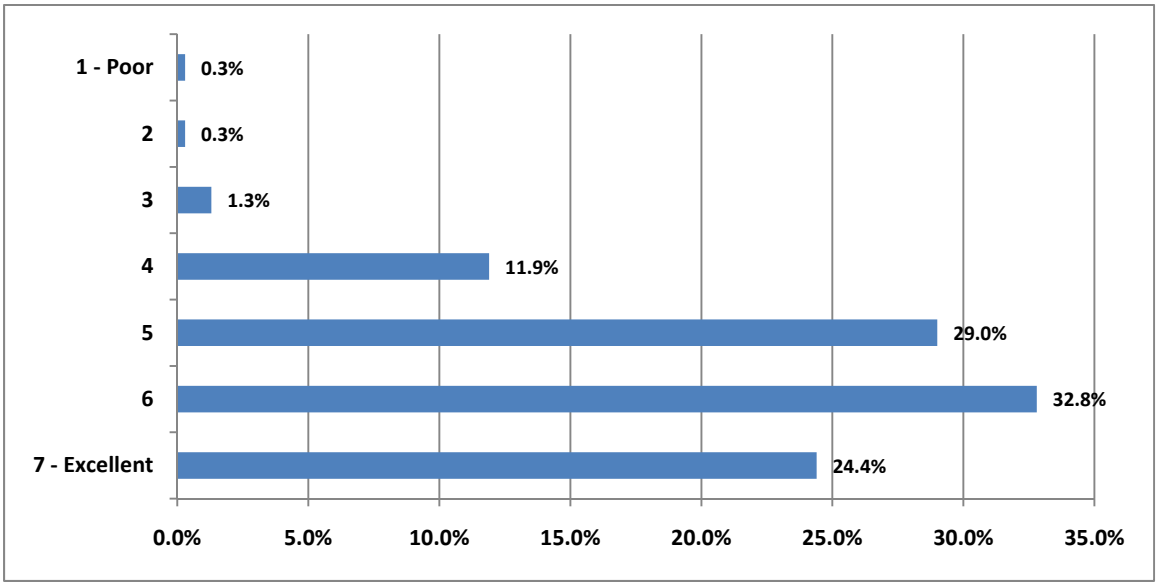
*__NOTE:__ Participants sometimes commented on more than one issue, so percentages total more than 100%.

Design Preferences

Look and Feel of YardMap

When participants were asked to rate the look and feel of YardMap based on the video they watched, they gave an average rating of 5.65 out of 7 (*SD*=1.059).The majority (57.2%) rated it a 6 or 7 on the 7-point scale. A breakdown of their responses can be found in Figure 2below.

Figure 2:How would you rate the look and feel of YardMap? **(n=2,940)**



When asked how the look and feel of YardMap could be improved (see

Table 17), 22% of participants said “Not sure/don’t know”because they hadn’t had the opportunity to use the program more extensively; about 17% said they thought the program looked good as it was presented in the video.Of those who provided suggestions, 12.2% indicated they wanted more types of icons showing different types of vegetation, water features, etc.Other suggestions included the ability to show different levels of vegetation (from undergrowth to canopy) and changes in vegetation over time as it matures, and links to more information such as definitions, resources, and topics.Map resolution quality and the ability to zoom in/out of the map were also important to some respondents.Issues of privacy and security of personal information was also mentioned.

Table 17: YardMap Design Improvement Suggestions (n=41)

Suggestion	
Not sure/don't know	22.0%
Nothing-looks good	17.1%
Provide lots of icon options	12.2%
Good quality graphics and map resolution	7.3%
Show/link to more information	7.3%
Address privacy/security issues	7.3%
Show different layers of vegetation	4.9%
Zoom in/out of map	4.9%
Account for change in vegetation over time	2.4%
Other	14.6%

Design Style

A fundamental feature of YardMap is the ability to create landscaped maps of green spaces to show different habitats, plants, features, etc.Survey participants were asked to review three layout styles and select the one that was most appealing to them.While more than one-quarter (27.6%) did not have a strong preference, those who had a preference were much more likely to choose Option A (33.7%) and Option B (31.5%), rather than Option C (7.3%). Their responses are shown in Table 18:Appeal of YardMap Styles

Table 18:Appeal of YardMap Styles

A: 

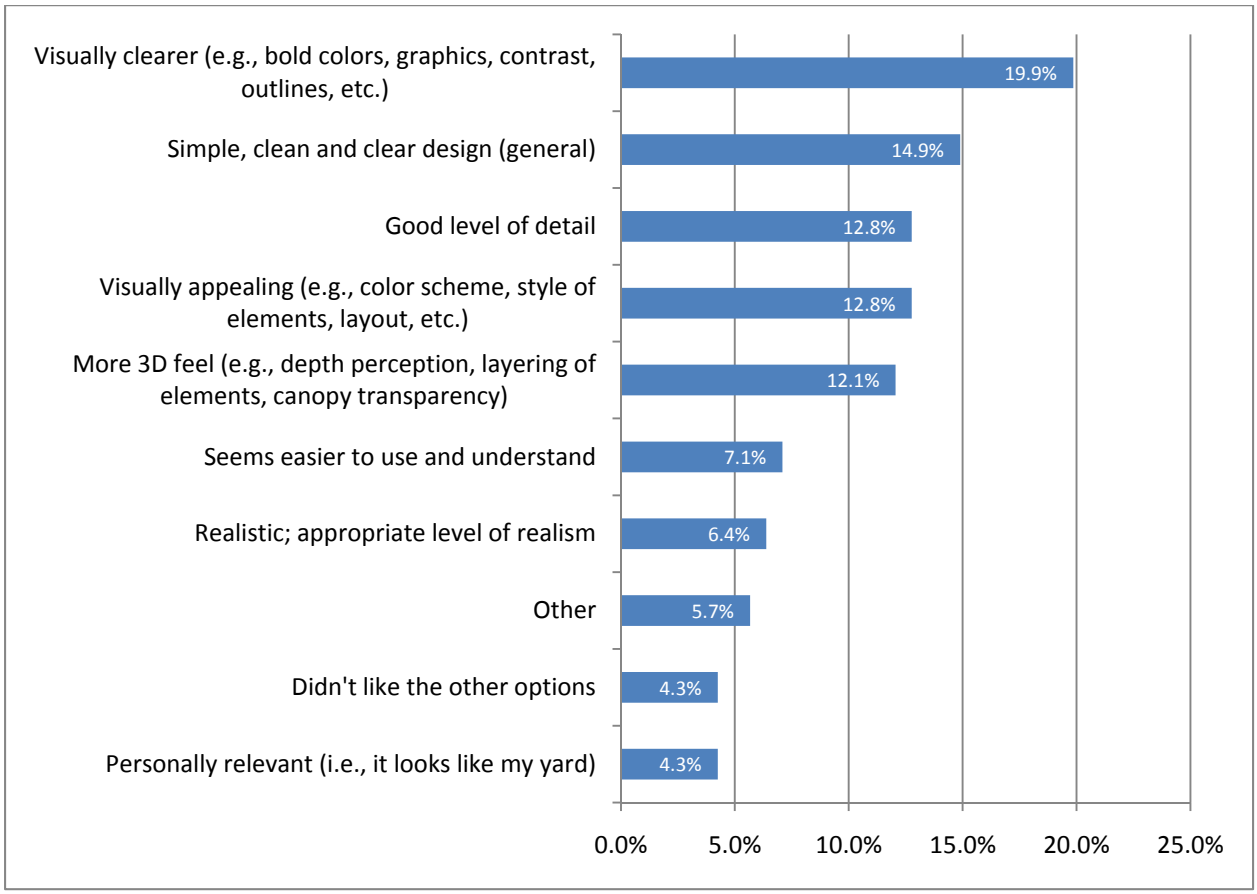
B: 

C: 

Which style most appeals to you?		
Sample=3,442	***Frequency***	***Percentage***
Prefer A	1,159	33.7%
Prefer B	1,083	31.5%
Prefer C	250	7.3%
No strong preference – each would work	950	27.6%

Figure 3summarizes the various reasons respondents gave for selecting their preferred layout styles, across all of the different styles.

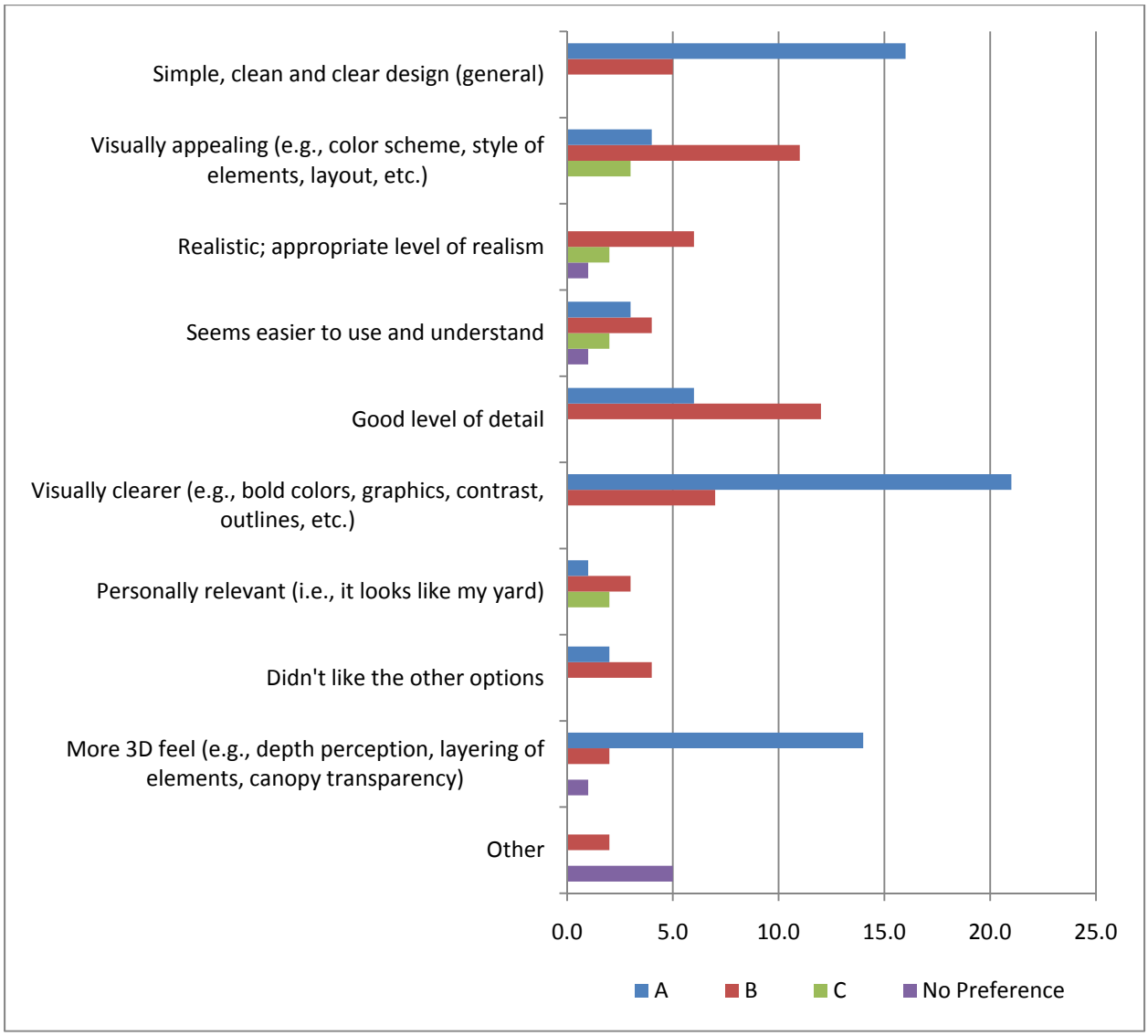
Figure 3: Reasons for Style Choice [Aggregate of all styles, multiple reasons allowed]



Note: These data compiled from open-ended responses taken from a random sample of 150 participants.

Figure 4provides further insight into reasons why participants chose a particular style with each colored bar representing a style choice (i.e., A, B, C, or No Preference). Respondents who preferred A indicated they liked this layout because it was simple, clean, visually clear, and provided more of a three-dimensional feel. In particular, respondents favored the transparency of the tree canopy. Respondents who preferred B liked this layout because it was visually appealing, had a good level of detail, and was realistic. Fewer respondents preferred C, but those that did said they liked this option because it was visually appealing, realistic and resembled their own green spaces.

Figure 4: Reasons for Preferred Style Choice (%) **[multiple reasons allowed]**



While there were numerous respondents who said they did not have a preference, few provided a written reason as to why they felt this way. Some indicated that none of the layouts resembled their personal green spaces while others had difficulty comparing the options and picking one.

In terms of identifying which types of people (i.e., by demographics) preferred each style, those who chose style A and B tended to be slightly younger than those who chose style C. There are no data to adequately explain this difference, but it can be further examined during formative testing, if necessary.

Table 19: Style Choice by Age

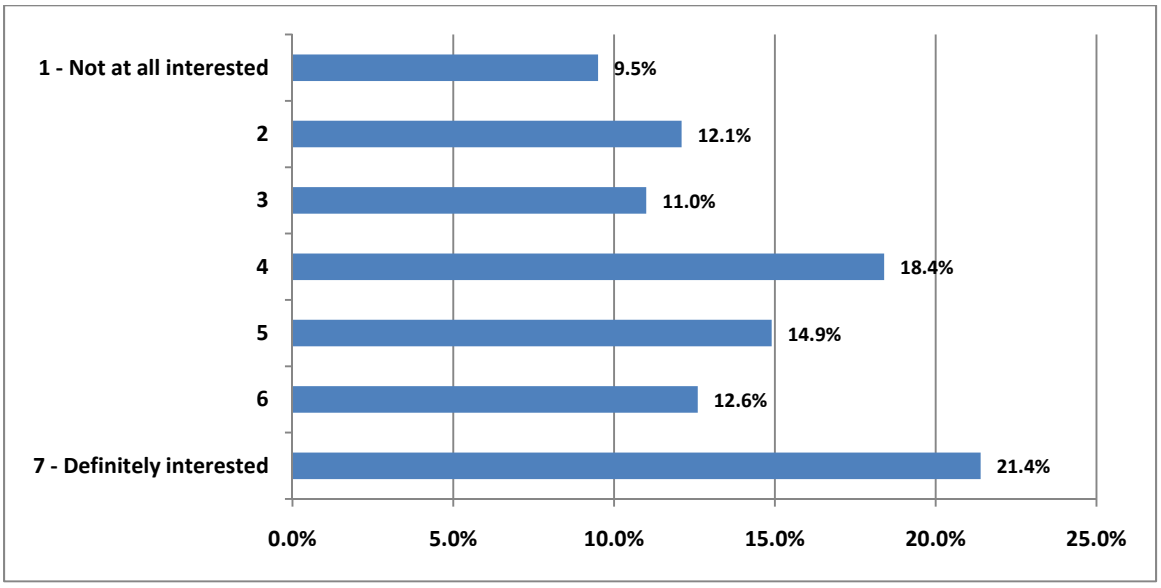
	Frequency	*18-34*	*35-54*	*55-64*	*65+*
A	1,130	8.7%	42.7%	33.7%	14.9%
B	1,064	9.0%	41.3%	31.4%	18.3%
C	241	2.9%	21.2%	36.5%	39.4%

NOTE: There is a significant difference between style choice and age. χ^2 (6, n=2435) = 99.115,p<.05.

Profile Design

Participants were asked about their interest in using a profile space to create maps of various outdoor locations, organize their maps and data, and track their achievements on their YardMap web page. A mock-up web page was provided in the survey as a visual reference. Participants were asked to rate their interest in having a personal profile space as a part of YardMap. On average, respondents rated their interest 4.4 out of 7 (median of 4).

Figure 5: How interested would you be in having a profile space? **[n=3,332]**



Participants were asked about particular types of functionality they would like to have on a profile page (see Table 20). About a third of the visitors (30.6%) were interested in linking to other social networking sites, and a third reported not using other social networking sites (35.9%).Almost half of the visitors (45.4%) were disinterested in adding a profile picture of themselves, and a little over half (53.2%) were interested in looking at other people's YardMap profiles.

Table 20: Interest in Profile Page Functionality

Are you interested in the ability to…	
Link to other social networking sites	***n=3,449***
Don't use those other sites	35.9%
No	33.5%
Yes	30.6%
Add a profile picture of yourself	***n=3,442***
No	45.4%
Yes	19.3%
Not sure	35.3%
Look at other peoples' YardMap profiles	***n=3,443***
Yes	53.2%
No	13.1%
Not sure	33.7%

Upon conducting a bivariate correlation analysis[3], there does not seems to be a significant relationship between participant interest in YardMap and their current online activities (e.g.,using an online forum, instant messaging or online chat, Googling something, sharing something online, etc.)

Habitat Design

Survey participants were asked to review specific habitat options in YardMap (e.g., forest, lawn, water, shrubs, wetland, etc.) and consider whether they would be applicable to the green spaces they were either in charge of or would consider mapping.Almost 89% of survey respondents thoughtthat these proposed habitats would work for their yards.

Table 21: Usability of YardMap Habitats (Q12)

Do you think these habitats would work in the green spaces you would be mapping (i.e., your yard)?		
Sample=3,428	***Frequency***	***Percentage***
Yes	3,047	88.9%
No	95	2.8%
Not sure	286	8.3%

[3] A bivariate correlation analysis looks at the relationship between two numerical variables, and can be positive or negative. When you have a significant relationship between the two, it means that whether a score increases or decreases can be tied to the other score. See http://en.wikipedia.org/wiki/Bivariate_correlation for further explanation.

These data were further analyzed to determine whether the participant's response was impacted by their current residence/living situation. As Table 22 shows, home ownership does not seem to influence whether respondents felt YardMap habitats were useful—renters, home owners, and "others" believed the YardMap habitats would be useful for mapping, regardless of their current living situation.

Table 22: Usability of YardMap Habitats by Living Situation

	Respondent's Living Situation			
Q12 Responses	***I am renting***	***I own my own home***	***Other****	***Total Sample***
Yes	89.4%	88.7%	94.0%	89.0%
No	2.5%	2.9%	0.9%	2.8%
Not Sure	8.1%	8.4%	5.2%	8.3%
Total Sample (n)	236	3,011	116	3,363

NOTE: Not a statistically significant difference

* Even a large majority who responded to having living situations other than renting or owning, believed the YardMap habitats would be useful.Examples of "Other" living situations can be described as follows:

- *Caretaker on a farm*
- *Vacation home*
- *Living in multi-generational family home*
- *Live with parents momentarily. My family's home.*
- *Domestic partner owns property*
- *Housing as part of employment*
- *We live in a condo community.Own our condo.*
- *Resident in continuing Care Retirement Community*

Suggestions given for additional habitats (see Table 37 in Appendix F) consisted of a variety of answers. The following are a few examples from participant's suggestions:

- *Could you include a rural/suburban/urban option? Also, I don't exactly live in a forest, but I do have many, many trees. Could there be an option that isn't forest but...something like...heavily forested? Or shady? I'm not sure what to call it. :-)*
- *I'm sure these would be more defined. I have planted a lot of native Texas plants. They started as shrubs but a lot of backyard is more wild than Wilscape. That's where I feed the birds.*

- *You may want to add 1) patio with furniture 2) Decks 3) fencing 4) rock walls 5) Feeders 6) bird houses as actual items. I'm in New England and we've many wildlife including birds using our patio/deck and furniture for sunning!*
- *Better clarification of the type of forest: deciduous v. pine; underbrush or no underbrush.*

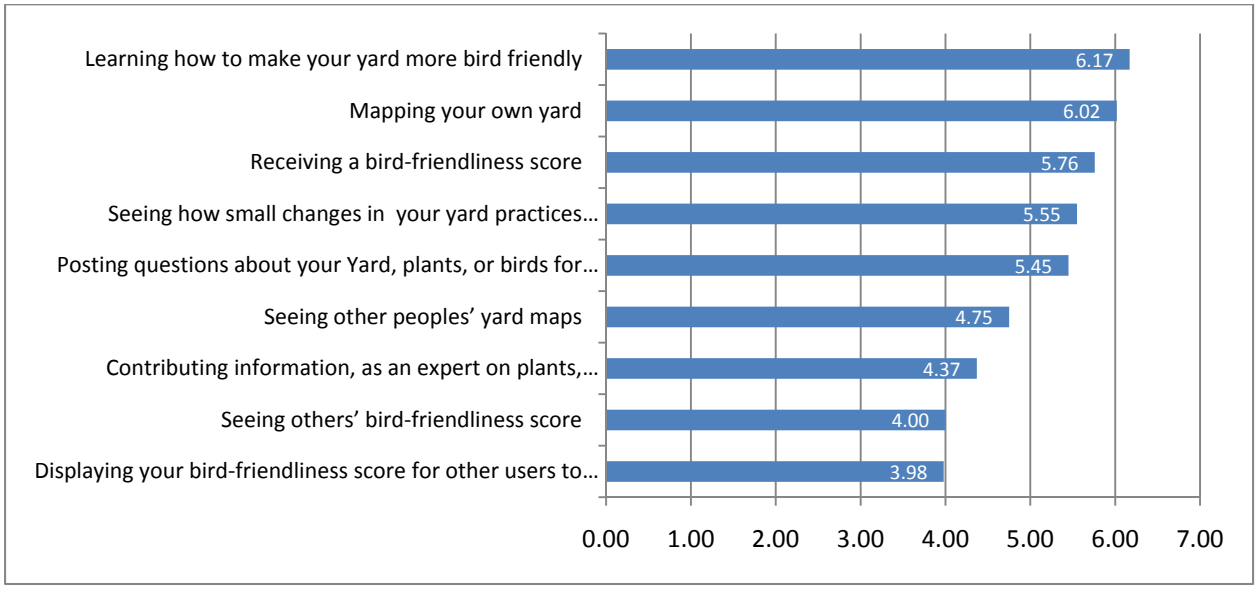
Content

A critical part of developing a robust YardMap website will be establishing a way for bird and garden enthusiasts across the country to contribute and gain information: contributing as an 'expert' on plants, gardens, birds, etc., as well as gaining information they can use by posting questions and discussing issues with other YardMap participants or experts.

Table 23: Rating – Possible YardMap Activities

	Very Interested ---------- ***Not at all Interested***						
RATINGS	***7***	***6***	***5***	***4***	***3***	***2***	***1***
Learning how to make your yard more bird friendly	59.40%	18.70%	10.90%	5.80%	2.20%	1.70%	1.30%
Mapping your own yard	52.90%	20.30%	13.70%	7.20%	2.20%	1.80%	1.90%
Receiving a bird-friendliness score	46.60%	21.10%	13.30%	9.30%	3.30%	2.90%	3.40%
Seeing how small changes in your yard practices (mowing lawns, drying clothes, composting, etc.) can help you save energy	41.40%	21.50%	14.00%	9.40%	5.10%	4.10%	4.40%
Posting questions about your Yard, plants, or birds for expert YardMap users to answer	37.20%	23.20%	14.90%	10.80%	4.90%	1.30%	4.80%
Seeing other peoples' yard maps	21.90%	17.50%	19.80%	16.70%	9.40%	8.20%	6.60%
Contributing information, as an expert on plants, gardens, birds, science, sustainability, that other YardMap users can rely on	19.20%	15.70%	15.20%	17.90%	9.30%	9.90%	12.80%
Displaying your bird-friendliness score for other users to see	16.80%	12.50%	13.50%	16.80%	9.40%	10.80%	20.10%
Seeing others' bird-friendliness score	15.70%	13.30%	14.00%	17.50%	9.70%	10.80%	19.00%

Figure 6: Ratings for Possible YardMap Activities [Mean rating on a scale of 1-7]



Participants were asked about their interest in: 1) *"posting questions about your yard, plants or birds for expert YardMap users to answer,"* and 2) *"contributing information, as an expert on plants, gardens, birds, science and sustainability, that other YardMap users could rely on."*

Responses to these two questions were first analyzed by how participants described their participation in birding and gardening—as Birder and Gardener, Gardener only, Birder only, or Neither Birder nor Gardener. Analysis showed that between these four groups there was a statistically significant difference in responses to both of the questions. For both, the paired groupings that resulted in the most significant response differences were between "Birder & Gardener," and "Neither Birder nor Gardener" and "Birder only."

Table 24: Hobby—Interest in posting questions about yard, plants or birds for expert YardMap user to answer

	Total	Birder & Gardener	Gardener Only	Birder Only	Neither Birder nor Gardener	Statistically Significant Difference?
N	3,370	2,615	81	648	26	YES (ANOVA, F=9.245, df=3, p<.05; Post Hoc LSD B&G>Birder and Neither; B&G=Gardener>Birder)
Mean	5.46	5.53	5.58	5.17	4.85	
Std. Deviation	1.720	1.681	1.524	1.848	2.034	
Minimum	1	1	1	1	1	
Maximum	7	7	7	7	7	

Table 25: Hobby—Interest in contributing information, as an expert, that other YardMap users could rely on

	Total	Birder & Gardener	Gardener Only	Birder Only	Neither Birder nor Gardener	Statistically Significant Difference?
N	3,356	2,600	81	648	27	YES (ANOVA, F=26.993, df=3, p<.05; Post Hoc LSD B&G and Gardener> Birder and Neither; B&G=Gardener)
Mean	4.37	4.52	4.38	3.82	2.89	
Std. Deviation	2.005	1.957	1.953	2.080	2.025	
Minimum	1	1	1	1	1	
Maximum	7	7	7	7	7	

A second analysis was conducted to compare responses from participants who said they tookpart in citizen science projects and those who didnot. This analysis found that there was no significant difference in responses to these two questions in comparing these two groups (see Table 26 and Table 27).

Table 26: Cit.Sci.—Interest in posting questions about yard, plants or birds for expert YardMap user to answer

	Citizen Scientist	Non Citizen Scientist	Statistically Significant Difference?
n	2,456	971	YES (t=-4.504, df=3425, p<.05; Sig.(2-tailed)=.000)
Mean	5.37	5.66	
Std. Deviation	1.754	1.622	

Table 27: Cit.Sci.—Interest in contributing information, as an expert, that other YardMap users could rely on

	Citizen Scientist	Non Citizen Scientist	Statistically Significant Difference?
n	2,446	968	NO (t=-1.063, df=3412, p<.05; Sig.(2-tailed)=.288)
Mean	4.35	4.43	
Std. Deviation	2.003	2.001	

Thus it can be suggested that a participant's involvement in birding and gardening has some relevance to how likely they would be contribute to the YardMap online community, their participation in citizen science projects is only an influencing factor for their interest in posting questions for other YardMap users to answer.

Citizen Science

About 70% of total online survey respondents describe themselves as citizen scientists.Of these, 78.7% said they were both gardeners and birders while 19.7% indicated they were solely bird enthusiasts.

Table 28:Citizen Scientist Hobbies

Are you a…	Citizen Scientists	Total Sample
Combination of Hobbies	***n=2,426***	***n=3,396***
Gardener & Birder	78.7%	77.6%
Birder Only	19.7%	19.2%
Gardener Only	1.0%	2.4%
Neither Gardener nor Birder	0.5%	0.8%

When asked whether there are other resources or activities they would like to see included in YardMap, over one-quarter of participants (26.2%) said "Not sure/don't know;" this may be because they had not actually used the program extensively enough to make suggestions.Of those who did provide suggestions, 14.3% said they wanted more bird information such as breeding and migration maps and food preferences, while 11.9% were interested in having resources that would make them better and more successful birders (i.e., tips from pros, info on local clubs and habitats, product information, etc.).

Integrating YardMap with Citizen Science Projects

Participants were asked whether they would be interested in integrating YardMap into othercitizen science projects in which they already participate. Overall, participants were fairly interested in the idea of integrating these various projects.

Table 29:Citizen Scientist's Rating – Possible YardMap Activities

Interest in data integration between YardMap and other citizen science programs					
	Very interested	***Interested***	***Neutral***	***Uninterested***	***Not at all interested***
Displayinginformation about your participation in other Cornell Lab or Ornithology programs	22.4%	36.9%	15.9%	14.9%	10.0%
Displaying special information from your participation in other citizen science programs	27.5%	38.5%	13.5%	12.0%	8.5%
Having your YardMap information show up automatically as locations in other projects	22.6%	34.1%	17.1%	15.5%	10.7%

Although the comparison was not statistically significant, visitors who participated in two or three citizen science projects were most interested in integrating their projects, and those with four or more were largely neutral, while those participating in one were split between interested and not interested (see Table 30).

Table 30:Citizen Scientist's Rating – By # of Citizen Science Projects

Interest in data integration between YardMap and other programs						
# of Citizen Science Projects		***Very interested***	***Interested***	***Neutral***	***Uninterested***	***Not at all interested***
1 *(n=53)*	Displaying … other Cornell Lab of Ornithology programs	18.9	37.7	9.4	26.4	7.5
	Displaying … other citizen science programs	18.9	35.8	11.3	24.5	9.4
	Having your YardMap information show … in other projects	23.1	36.5	9.6	25.0	5.8
2 *(n=23)*	Displaying … other Cornell Lab of Ornithology programs	21.7	47.8	17.4	13.0	0.0
	Displaying … other citizen science programs	34.8	52.2	8.7	4.3	0.0
	Having your YardMap information show … in other projects	17.4	39.1	13.0	21.7	8.7
3 *(n=13)*	Displaying … other Cornell Lab of Ornithology programs	50.0	14.3	21.4	0.0	14.3
	Displaying … other citizen science programs	50.0	28.6	7.1	7.1	7.1
	Having your YardMap information show … in other projects	46.2	23.1	15.4	15.4	0.0
4 or more *(n=13)*	Displaying … other Cornell Lab of Ornithology programs	15.4	23.1	46.1	15.4	0.0
	Displaying … other citizen science programs	15.4	61.5	15.4	7.7	0.0
	Having your YardMap information show … in other projects	15.4	30.8	15.4	30.8	7.7

NOTE: Not a statistically significant difference

Table 31:Citizen Scientist's Rating – By % of Citizen Science Projects

Interest in data integration between YardMap and other programs						
		Not at all interested	***Uninterested***	***Neutral***	***Interested***	***Very interested***
Cornell *(n=95)*	Displaying … other Cornell Lab of Ornithology programs	5.2%	18.6%	16.5%	35.1%	24.7%
	Displaying … other citizen science programs	5.2%	15.5%	10.3%	41.2%	27.8%
	Having your YardMap information show … in other projects	6.3%	24.2%	10.5%	34.7%	24.2%
Non-Cornell *(n=7)*	Displaying … other Cornell Lab of Ornithology programs	14.3%	14.3%	28.6%	42.8%	0.0%
	Displaying … other citizen science programs	14.3%	14.3%	14.3%	57.1%	0.0%
	Having your YardMap information show … in other projects	0.0%	14.3%	28.6%	42.9%	14.3%

NOTE: Not a statistically significant difference

For a breakdown of interest for integration for each Cornell project, see Appendix F.

Main Findings and Recommendations

Finding	Recommendation
1. **Design Style:** Participants preferred design styles which were simple, had good visual clarity, and were detailed and realistic.	1. Combine preferred design elements from the web survey in the final version; further testing may be needed to refine the design.
2. **Bird friendliness:** The idea of making the yard more bird-friendly was a major draw for respondents. The most common reason they gave for being interested in YardMap was because of an interest in birds, and the features reported as most interesting were those that helped them create a more bird-friendly yard.	2. Conduct more research to decide the best way to deliver this message in the application itself, whether through creating a bird friendliness score, or some other means.
3. **Personal Profile:** Respondents were generally interested in having a personal profile within YardMap. While the large majority was not interested in sharing profile pictures of themselves, half were interested in looking at other peoples' YardMap profiles. Of those who used other social networking sites (around 60% of respondents), they were evenly split between wanting and not wanting to link to those sites.	3. Encourage people to not only view other' profiles but motivate them to create their own profile to share. A reward system or other mechanism to promote the social purpose of YardMap could be effective. More specifically, information should be gathered about how to increase interest in using YardMap's social networking options, as well as linking to other social networking projects people participate in.
4. **Interest in Specific Activities:** Of the 9 possible activities to choose from, the top five (out of nine) responses had to do with individual outcomes, such as learning how to make their yard more bird-friendly, mapping their own yard, or receiving a bird friendliness score. The more community-oriented activities had fewer than 20% of people rating their interest a 7 out of 7.	4. Figure out how to balance an initial individual focus with the purpose of building a community of birders and gardeners. YardMap. Additionally, test further ways to get people involved in the social networking and community aspects of YardMap.
5. **Linking to Other Citizen Scientist Programs:** Of those participating in other Citizen Science and programs at the Lab, there was a lot of interest in linking the programs to YardMap and displaying information about other programs they're participating in.	5. Find ways to link to other citizen science project, especially those at the Lab.

Phone Interviews

Follow-up Phone Interviews

Purpose

While the online surveys provided a large sample size and a broader, more nationally representative sample, the large sample size precluded researchers from going too in-depth into certain topics. The follow-up phone interviews served two main purposes: 1) provide a means to follow-up with participants about topics identified through the online survey, 2) ask participants for more clarification and detail on certain items deemed by the team as necessary for moving forward with the design and development of YardMap.

Methods

Potential participants were randomly selected from web survey respondents who indicated they would be interested in receiving a follow-up phone call and also met specific criteria regarding interest in YardMap; only those who rated their interest a 4 or higher on a 7-point scale were interviewed. These individuals were organized into group types based on level of interest in using YardMap:

Level of interest:

- High interest = 6 or 7 on “interest in YardMap” item
- Moderate interest = 4 or 5 on “interest in YardMap” item
- Low interest = 1 to 3 on “interest in YardMap” item (not included in follow-up interviews)

A second criteria included in recruiting people for the interviews was which ecological region they lived in:
Eco-Region where they lived:

- Forested region= Eastern Forest, Western Forest
- Non-forested region = Plains, Shrub, Desert, High Desert, Tropical, Tundra

These categories then comprised four groups: high interest/forested, high interest/non-forested, moderate interest/forested, and moderate interest/non-forested (see table 31). 16 individuals were selected for each of these groups, and contacted via email. In total, ILI researchers conducted 20 interviews during September 2010. The following table shows the breakdown for total interviews by group type.

Table 32: Group Type for Recruiting Phone Interviews

Group Type	n
High Interest/Non-Forested region	7
Moderate Interest/Forested region	5
Moderate Interest/Non-Forested region	4
High Interest/Forested region	4
Total	20

Demographics

Demographic Characteristic	Percent	Frequency
Sex	***n=18***	
Female	72%	13
Male	27%	5
Age Category	***n=19***	
22 to 24	5%	1
35 to 44	11%	2
45 to 54	26%	5
55 to 64	37%	7
65 to 74	16%	3
75 to 84	5%	1
Number of Children > 18 years old	***n=19***	
0	95%	18
1	5%	1
Highest Level of Education	***n=19***	
Some college	11%	2
College degree	42%	8
Graduate degree or higher	47%	9
Household Income	***n=17***	
Less than $35,000	6%	1
$35,000 – $49,999	12%	2
$50,000 – $74,999	12%	2
$75,000 – $99,999	35%	6
$100,000 – $149,999	24%	4
$150,000 – $199,999	0%	0
$200,000 or more than	12%	2

Key for terms used this section

The table below represents the terms used in this section of the report to indicate the frequency with which responses occurred among the 20 respondents. The key to these terms is as follows:

0=None
1-4=Few/handful
5=Quarter
6-9=Several
10=Half
11-14=Many
15=Three-quarters
16-19=Large majority/Most
20=All

Interest in Sharing Yard Information

Participants in the interview were asked about interest in sharing information about one's yard with other YardMap users. First, they were asked if they felt like other people would be interested in YardMap. Several people indicated that they thought other people would be "very interested," a quarter responded "pretty interested," and a handful said "somewhat interested." Some of those who chose "very interested" felt that avid birders and gardeners would enjoy sharing information about their yards. A few who said "very interested" explained that they themselves would be interested, but could not speak for the wider community. Finally, a few who said"pretty interested" felt that the social networking aspect of YardMap would be too time consuming, or simply not of interest to them.

The large majority said that they would share information such as plans for renovating their yards, their successes and failures in attracting birds, local tips on what grows well, which birds are found in yards, landscape designs, their contributions to citizen science, their achievements in YardMap, etc. The few who said they were not sure they would share this information were either not interested in social networking, were concerned about lack of time or privacy.

Several people were interested in sharing this information with other YardMap users, or contributing to conservation and citizen science. One individual said:

> *"[I'd be interested in] sharing information with other people who want to accomplish the same things -- growing plants, attracting critters and birds."*

Another person who felt strongly about conservation efforts said the following:

> *"My goals are in trying to preserve and help the natural world in many different ways. If this in one small part helps that then I'm all for it."*

Overall, participants were interested in sharing information about their yard, and felt that others would be interested in sharing as well.

Follow-up with Questions from the Web Survey

As part of preparing for the interviews, researchers reviewed interviewees' web survey responses regarding their interest in the following social networking features:

- Mapping your own yard;
- Seeing other people's yard maps;
- Learning how to make your yard more bird friendly;
- Receiving a bird-friendliness score;
- Displaying your bird-friendliness score for other users to see;
- Seeing other's bird-friendliness scores;
- Seeing how small changes in your yard practices (mowing lawns, drying clothes, composting, etc.) can help you save energy;
- Posting questions about your Yard, plants, or birds for expert YardMap users to answer;
- Contributing information as an expert on plants, gardens, birds, science, sustainability, that other YardMap users could rely on.

Researchers looked at these scores overall, and noted whether the participant was "kind of interested" or "pretty interested" in these options based on their ratings. Fourteen of the participants were considered "pretty interested," six were "kind of interested." Participants were asked why they had that level of interest, and several said that they were pretty interested in these options because they would like to make improvements to their yard to make it more bird friendly and would be interested in getting ideas from others. One individual said,

> *"I think [I'd be interested due to] the learning factor for myself and other people in my area. It would be a lot of help. If someone nearby has a high bird friendliness score then I can see what works for them—why it's so high. If they're close by I'd go over and talk to them."*

A few were also pretty interested simply due to their interest in birding and gardening. Others who were kind of interested said that they were not sure how long the project would hold their interest, were not really interested in social networking, or were more interested in other aspects of the project, such as creating a map for their own use.

Prior to speaking with each participant, researchers from ILI identified one or two aspects from participant responses to the web survey that "stuck out" or required follow-up to understand their response. Researchers then asked participants to explain their responsesto those items. Many of these respondents rated their interest inthe bird friendliness items lower than the other items. When asked why, a few reported disinterest in the competition of a score and a few felt that they did not have the time or resources to make their yard more bird friendly.

> *"The whole score thing makes it sound like a competition. I'd like to know if there are things I can do to make my yard more bird friendly, but I have no interest in competing with others on how bird friendly everything is."*

"I don't have a lot of money. So, suggestions about planting ornamentals or buying this plant or that plant, [I] can't do it."

Other responses that "stuck out" included the following: a low rating on the statement about acting as an expert, a high rating for bird friendliness, and a low rating on saving energy.

Those who said in the web survey that they would be interested in posting questions for other YardMap users to answer, were asked what types of questions they might post. Out of the eleven people, most were interested in either learning more about the characteristics of a specific plant or bird, or interested in knowing how to make their yard more bird friendly. One participant remarked,

"Where do I begin? I would have questions about the types of trees or things that I can grow on my property that will survive in my environment and that would be helpful to the birds. If I notice problems/issues with birds in my area, I'd want to ask for advice to see if there is something I can do to help alleviate it."

Participants interested in contributing information as an expert were asked what types of things they would be interested in contributing. Of the ten people this applied to, they said that they would be interested in sharing what has worked in their yard, answering questions, and sharing their own observations. One individual who was interested in answering other's questions said:

"If I can help anyone that has an issue or problem that I know something about then I would. It's something I would be willing to do. If I do know something that can assist others I'd be happy to help."

Species Identification, Plants

Overall, participants were interested in being able to label the location of specific species of plants in their yard. Thirteen of the participants indicated that they were "very interested," six were "pretty interested," and one was only "somewhat interested." A few participants wanted to label species as a means to understand the connections between plant life and wildlife, and better understand how to take care of the plants in their yard. A handful of others had a strong background in plant biology, and felt that labeling species would be second nature to them. A few thought it would be a good challenge, and YardMap could provide the means to help them figure out which species they had in their yard.

Three-quarters of the participants wanted the ability to label either every species in their yard or most of the species in their yard. A quarter of the participants were only interested in mapping a few of the major species in their yard.

Some of those who wanted to label every species in their yard already knew which species were in their yard and felt that it would be a manageable activity for them. Others were simply interested in providing more detailed information, with one respondent saying, *"I would be willing to give it as detailed a survey as I can provide. I have a*

lot of land but I would be interested in being as thorough as possible." Those who wanted to only label most or a few of the species had larger lawns, were less knowledgeable about plants or felt that it might take too much time. One individual remarked, *"Every species? That's a 5-year plan! I think it would be useful to have most of the species identified. You never know what smaller plant could impact your yard."*

Half of the participants were familiar enough with their plants in their yards that they felt that they could name all of the species within their yards on their own. The other half felt that they would need help, and would turn to books, trusted websites, and friends to complete the task.

The majority felt that it would be important and meaningful to understand which plants in their yard are native and which are invasive, but several felt that the average user's identification could not be trusted.

> *"I think that's important information but I'm not sure people would know or not. Just need to make sure that the information is correct. If you have the species name you can look up whether it's native or not. I think it is good information but I don't think a lot of data contributors will know for sure. That's my only concern."*

Conclusions and Recommendations

Participants were generally interested in the social networking features of YardMap, although some were uncertain about how much they would use a few aspects such as a bird friendliness score. Many thought they would share various updates about their yard, and felt that sharing was a natural part of birding and gardening and thus would work for YardMap as well. Overall, these participants were detail-oriented, capable of labeling most of the species in their yard, and would like to do so within the YardMap platform. The majority saw the value in knowing the species of the plants in their yard, specifically whether a plant was native or not, as this would show the connections between plant life and wildlife.

Stand Alone Phone Interviews

Purpose

The main purpose of the stand alone phone interviews was to provide an opportunity to address specific topics and issues identified by the project team in more depth that was possible with the online surveys. Different from the Follow-up Interviews, the questions were not tied specifically to participants' prior responses. Based on the previous methods, there were a number of topics that the team felt they needed to understand in more depth, including level of interest in mapping other spaces besides their own yard, potential for collaborating on maps, sharing of YardMap information with others, integration with other citizen science projects, and perceived potential impacts of YardMap, and the potential for YardMap to engage participants about climate change.

Methods

Sixty web survey respondents out of the 2,378who indicated they would be interested in being contacted and who also had a high interest in YardMap (5, 6 or 7 rating out of 7 for likelihood to use YardMap) were randomly selected from the total online survey sample to recruit for a standalone phone interview. Out of this sample of 60—a number chosen as a means to recruit 20 or more participants—a total of22 interviews were completed. Questions in the interview included mapping preferences, integration with other citizen science projects, impacts of YardMap, and climate change.

Demographics

Participants in the stand alone phone interviews were primarily female, ages 55 to 64. Most had graduate degrees, and no children at home.

Table 33: Stand alone phone interview demographics

Demographic Characteristic	Sample Percent	Sample Frequency	Percent, Total Web Survey Sample
Sex	***n=22***		***n=3,423***
Female	72.7%	16	67.7%
Male	27.3%	6	29.9%
Prefer not to answer	0.0%	0	2.4%
Age Category	***n=22***		***n=3,387***
18 to 34	0.0%	0	6.8%
35 to 44	4.5%	1	12.5%
45 to 54	27.3%	6	24.2%
55 to 64	45.5%	10	34.0%
65 to 74	22.7%	5	18.8%
75 and older	0.0%	0	3.8%
Number of Children > 18 years old	***n=22***		***n=3,374***
0	81.8%	18	79.7%
1	13.6%	3	10.1%
2	4.5%	2	7.5%
3 or more	0.0%	0	2.8%
Highest Level of Education	***n=22***		***n=3,414***
Some high school	0.0%	0	0.3%
High school degree	0.0%	0	4.1%
Some college	22.7%	5	19.1%
College degree	9.1%	2	35.6%
Graduate degree or higher	68.2%	15	40.8%

Household Income	***n=20***		***n=2,945***
Less than $35,000	10%	2	10.5%
$35,000 – $49,999	15%	3	13.4%
$50,000 – $74,999	15%	3	22.9%
$75,000 – $99,999	20%	4	19.5%
$100,000 – $149,999	35%	7	19.6%
$150,000 – $199,999	0%	0	7.9%
$200,000 or more than	5%	1	6.1%

Participants in the stand alone interviews were primarily birders and gardeners, owned their own home, and lived in the Eastern Foresteco-region.

Table 34: Additionalstand alone interview demographic characteristics

Demographic Characteristic	Percent	Frequency
Hobby	***n=21***	
Birder and Gardener	86.4%	19
Birder only	13.6%	3
Living Situation	***n=22***	
Own home	90.9%	20
Renting	4.5%	1
Other	4.5%	1
Eco-Region	***n=21***	
Eastern Forest	71.4%	15
Western Forest	14.3%	3
High Desert	4.8%	1
Plains	4.8%	1
Shrub	4.8%	1

Key

The analysis below uses specific terms to indicate the frequency. The key to these terms is as follows:

0=None
1-5=Few/handful
6-10=Some
11=Half
12-15=Many
16-21=Large majority/Most
22=All

Mapping

Participants were asked whether they had an interest mapping spaces other than their own backyard. Out of the 22 respondents, all but 5 were interested in mapping other spaces. Themes which emerged included interest in

mapping a specific space that is in close proximity or has personal significance, interest due to hobby, or interest in the aggregate of data. About half of those who said that they were interested indicated that they would like to map a space that was close by or important to them, with one participant saying:

> *"I live on the edge of an abandoned pasture land that's not being used for anything. There's a dirt road to a water reservoir. Lots of people use it as a nature path. I go up there to watch birds and feed squirrels. I would be interested in mapping out a placelikethat."*

Those who were not interested indicated that they were "yard only" birders or gardeners, lived in a rural space without proximity to parks etc., or felt that they did not have enough time.

Many of the participants reported feeling comfortable mapping spaces other than their backyard as long as they were familiar with the area. One participant noted:

> *"I would want to be somewhat familiar with these spaces. I wouldn't be comfortable mapping a place I knew nothing about or had never been to before, for example."*

A few reported that their comfort level in mapping other spaces would depend on the detail they needed to provide. Participants were asked about the benefits of collaborating with others to create a map. Many felt that it was beneficial to have different perspectives and a few felt that it would be advantageous to split up the responsibility. One participant noted, "Everybody sees things differently, the more people that participate the better chance you have of getting it right." Of those who perceived issues with this type of collaboration, the majority felt that disagreements could arise between mappers such as identifying boundaries on a green space.

When participants were asked how they would feel if they logged into YardMap to find someone had already mapped their yard, the majority showed some surprise but were open to the idea. Their responses were varied and the following themes emerged: completely fine, surprised, as long as it's correct, I'd like to know who did it, and as long as I have the final say for my own yard.

Most participants indicated that they would share their YardMap and other information with those who held similar interests, including other YardMappers, people from their current hobbyist groups, or friends. A few mentioned that they would share their YardMap information with friends, neighbors, or family. Participants indicated being interested in sharing their map, populations of birds, species, types of vegetation, bird lists, size of yard, tips and tricks to attract birds, what grows well, and bird sightings.

Integration with other Citizen Science projects

Most of the participants interviewed participated in other Citizen Science projects including Great Backyard Bird Count, FeederWatch, eBird, and NestWatch (listed in order of participation). Those who participated in Citizen Science projects were asked to think of ways that YardMap could be integrated with these projects. Half of those who participate in Citizen Science projects (n=8) came up with specific ways that YardMap could be integrated with their project with the majority mentioning connections with FeederWatch. Those who participated in FeederWatch were interested in providing additional context to the feeders themselves. One participant remarked:

"I would think that most people that do FeederWatch do it with their own backyard, so mapping the backyard would help Cornell more—give them a better idea of what it is that we "watchers" are contributing to their program. [It could] provide some context, background to the data."

One user of NestWatch thought that YardMap could be used to help her identify ideal locations for bird boxes. She said,

"Finding an ideal location for bird boxes has been a challenge for me, so if I can use other people's YardMap to see what's been done successfully, that would be great. So to have information integrated."

In addition to these project-specific ideas, a few participants felt that simply integrating the data sets from other citizen science projects would benefit themselves and others, including both citizen scientists as well as scientists.

Impacts of YardMap

Participants were asked to consider YardMap on a more personal level and consider the impact that their use of YardMap could make. Overall, most participants felt that their use of YardMap could in fact make an impact on birds. Half felt that as they made specific changes that they could bring more birds to their yard, a few felt that their use of YardMap would provide important data either to scientists or other citizen scientists, and a handful were unsure that their small actions could directly impact birds. One person who felt that he could make specific changes to attract more birds said, "If I were to map out what's available, and then study what would make it more inviting to certain species, I could improve my yard or just be careful to not make changes to disturb my yard."

Participants were also asked questions about their own yard activities and whether they felt the activities they do in their yards could impact birds. Most already felt that their yard activities make an impact on birds and they shared their current efforts of providing food, shelter, and water for birds. Specifically, participants also discussed having birdfeeders, bird houses, bird baths, native plants, vegetation piles, and not using pesticides.

Participants were then asked to consider YardMap on a more global level and consider the impact that a lot of people who use YardMap could make. Most participants felt that if many people were using YardMap to make changes in their yard, that it would make an impact on birds. Half of the participants felt that the main impact it would have would be greater awareness, a few felt that people's use of YardMap would ultimately change the landscape, and a few were either skeptical, or unsure of what type of impact would be possible.

They were also asked if enough people were to participate in these activities if they felt it would make a difference. Generally, participants agreed that the collective efforts of people practicing sustaining behaviors would impact birds. Some felt that the increased awareness would have the largest impact on the birds while a few felt that this would increase bird populations or an overall improvement of the landscape.

Participants generally felt that YardMap could help impact bird's ability to reproduce. Examples included providing safer areas for nesting, actively planting trees which birds prefer, providing materials and resources needed for nesting. Participants also felt overall that YardMap could help impact bird's ability to find food. In general, participants mentioned how increased awareness would help people create friendlier habitats for birds.

Relationship to climate change

All but four of the participants felt that birds had a relationship to climate change. Of those who felt that there was a relationship, the majority gave examples of how migration patterns are changing as a result of climate change. A few participants discussed other specifics such as changes in population, or the food supply. One individual who discussed changes in migration remarked:

> *"If there's a change in the amount of precipitation in a given year then the birds are going to suffer, if there's too much water, then the grassland habitat will be flooded. Then there's change in temperature that will affect migration patterns. When it's really cold up north then they come down here to coldwater—sometimes they come sometimes they don't."*

Those who felt that there was not a relationship between birds and climate change were skeptical of climate change, with one participant responding, "I'm not really hyped up on this Global Warming thing, I think we are in a cyclical thing, it's happened since the creation of the world."

Participants were asked what they felt the term "carbon footprint" meant, and the majority was able to describe what they felt it meant. Primarily, participants described a connection between their own actions and the impact it has on the environment. A few examples include:

> *"I think it's probably our impact on the environment--what we do and how it affects the long-term environment."*

> *"Amount of carbon dioxide your lifestyle and what you do puts into the environment."*

A handful talked about carbon footprint as a measurement, using phrases such as "per capita output," and "carbon usage metric."

Only a few individuals(3 out of 22) had ever calculated their carbon footprint before. None of these individuals could recall exactly where they had done this, except that it was online.

Conclusions and Recommendations

While those interviewed were generally comfortable mapping spaces outside their backyard, participants will likely need encouragement to branch out of their own backyard to map other green spaces.

Participants are open to collaborating on maps and tend to feel that while different perspectives would be helpful, there may be some disagreements which arise while working together. As such, it may be helpful to create tools to moderate disagreements while mapping.

Participants are more likely to share their YardMaps and use the YardMap space to connect with others with similar interests, than their friends or family. This indicates that users will be interested in connecting with each other based on interest, not necessarily based on prior relationship.

While most participants were open to the idea of others mapping their yard, owners should have some authority to mark their property as such and if necessary make any corrections.

Overall, participants were comfortable with the idea that what they do impacts birds. They naturally felt that what a lot of people do can also impact birds. Most were familiar with the term carbon footprint, although many do not have a concrete idea of what it truly means in the context of their life.

Appendix A

The YardMap Network: Background Survey

Thank you for coming to our focus group today to give your feedback about the YardMap Network project. We'd love to know a little more about you in order to better understand your perspective.

Cornell Lab Experience

Have you participated in a citizen science project at the Lab where you are providing data for them to use?

☐ Yes ☐ No ☐ Don't know

If yes, which one(s): *(check which apply)*

☐ebird
☐ MyBackYard Counts
☐ NestWatch
☐ FeederWatch
☐ Celebrate Urban Birds
☐ PigeonWatch
☐ CamClikr
☐ Great Backyard Bird Count
☐ Birds in Forested Landscapes
☐ Other (please list):

What other contacts do you have with the lab?

☐ Visiting their website
☐ Visiting Sapsucker Sanctuary
☐Volunteering
☐ Lab member
☐ Seminars
☐ Spring Ornithology Course
☐ Migration Celebration
☐ Nest Cams
☐ Other (please list):

_____

Computers and Technology

Please share your experience with computers and technology:

Computer Use:	Yes	No	Don't know what this is
Do you use a computer at your workplace, at school, at home, or anywhere else on at least an occasional basis?	☐	☐	☐
Do you use the internet, at least occasionally?	☐	☐	☐
Do you send or receive email, at least occasionally?	☐	☐	☐
Have you ever created your own profile online that others can see, like on a social networking site like MySpace, Facebook, or LinkedIn.com?	☐	☐	☐
Social Networking Experience. Do you…	Yes	No	
Create or work on your own online journal or blog	☐	☐	☐
Create or work on your own webpage	☐	☐	☐
Create or work on web pages or blogs for others, including friends, groups you belong to, or for work	☐	☐	☐
Share something online that you created yourself, such as your own artwork, photos, stories or videos	☐	☐	☐
Post comments to an online news group, website, blog or photo site	☐	☐	☐

Use applications in Facebook	☐	☐	☐
Use instant messaging or text others	☐	☐	☐

Which social networking sites do you currently participate in?

☐ Twitter ☐ Facebook ☐ LinkedIn ☐ Other: _____

☐ I don't participate in any social networking *(skip question 5)*

Rate your current comfort level from 1-10

	Not comfortable at all									Very comfortable
Using an online forum	1	2	3	4	5	6	7	8	9	10
Posting a comment on a blog	1	2	3	4	5	6	7	8	9	10
Chatting with others online	1	2	3	4	5	6	7	8	9	10
Posting an update on a social networking site (like Facebook, MySpace, etc.)	1	2	3	4	5	6	7	8	9	10
Sharing a news story, photo, or blog entry with your social network	1	2	3	4	5	6	7	8	9	10
Creating a blog	1	2	3	4	5	6	7	8	9	10
Drawing on the computer	1	2	3	4	5	6	7	8	9	10
Googling	1	2	3	4	5	6	7	8	9	10
Pushing an RSS feed to an aggregator	1	2	3	4	5	6	7	8	9	10
Adding a Google Gadget	1	2	3	4	5	6	7	8	9	10
Using online maps to get directions	1	2	3	4	5	6	7	8	9	10
Adding content to an online map (e.g., Google, Bing)	1	2	3	4	5	6	7	8	9	10

Please share some information about your hobbies:

How often do you…

	Daily	Weekly	Monthly	A few times per year	Never
…watch birds?	☐	☐	☐	☐	☐
…garden?	☐	☐	☐	☐	☐

How would you describe your skill level…

	Beginner	Intermediate	Advanced	Expert
…at identifying birds, both by sight and by sound?	☐	☐	☐	☐
…in terms of gardening?	☐	☐	☐	☐

Have you ever participated in a Citizen Science project where as a member of the general public you collected data and contributed to a scientific effort—not your own. ☐ Yes ☐ No

If yes, which projects? _____

_____

Please share some information about yourself:

Are you:
☐ Male
☐ Female
☐ Prefer not to answer
What **year** were you born? (i.e., 1955) __ __
__ __

What is your zip code? _____

Appendix B

Focus Group Guide

YardMap Focus Group Guide FINAL

March 11, 2010

Focus Group Discussion

1) Warm up
    - Introductions, sign-in sheet
    - Fill out surveys
    - State purpose(s) of the focus group
        - The Lab is working on a new project, NSF funded, about social networking for birders and gardeners
        - Discuss your reaction to the idea of YardMap
        - Preview the YardMap design and give feedback.
        - Provide insight into the potential use(s) for the project.
    - Regular internet users?
    - How about social networking like Facebook?

2) Just to start out, how many of you have used software or other applications, something computer-based, to plan or plot your gardens or your yard?

3) YardMap is kind of like that, and is a web-based application. It's a citizen science project that collects information about habitat and domestic practices like lawn-mowing and composting, and how they impact birds. It's a way to not only plot what you've done but you will also be able to share your map with others and see what other people are doing. And there will be lots of ways to communicate with and share with your network. In a little while we'll actually show you what YardMap looks like, but first we're interested in seeing what you think about the idea of YardMap.

4) Needs, motivations, desires, and interests of gardeners/birders in relation to YardMap
    - Now that you've heard a little bit about YardMap, how interested do you think you would be in doing something like this? VERY INTERESTED, MODERATELY INTERESTED, A LITTLE INTERESTED, NOT AT ALL INTERESTED [show of hands]
        - Why did you choose _____. (couple of responses from each group)
    - For those of you who are interested, why are you interested? What would motivate you to participate?

- For those of you who aren't interested, why not?

5) YardMap demonstration – Rhiannon demonstrates YardMap on the screen, showing specific features, touring the site, etc. for about 10 minutes.

   INITIAL REACTION:

   - Now that you've seen it in action, what is your initial reaction?
   - Now that you've seen YardMap in action, how interested do you think you'd be in using it yourself? VERY INTERESTED, MODERATELY INTERESTED, A LITTLE INTERESTED, NOT AT ALL INTERESTED [show of hands]
     - Are you more interested now that you've seen it?
     - Did anything in particular make you much more interested?
   - What aspects of YardMapdo you find most interesting?
   - Is there anything that surprised you? If yes, what?
   - What, if anything, did you find confusing?

   DESIGN:

   - What do you think about how things are laid out, what things look like, how you navigate through the site, etc? What are your initial reactions to thedesign?
   - Do you think this web site will be intuitive and easy to use?
   - Do you foresee any potential problems or issues arising based on how experienced someone is in gardening or birding. Do you see specific issues for…
     - Novice birders/gardeners
     - How about experienced birders/gardeners
   - Show four welcome page screens – show of hands
   - Show eight logos – show of hands

   BENEFITS TO SPECIFIC COMMUNITIES:

   - What benefits do you think YardMap could provide to the birding/gardening communities?
   - Do you think people in these communities would be interested in using YardMap? Why or why not?
   - What barriers do you see within the birding/gardening communities for using YardMap? What would keep people from participating?
     - What could the YardMap people do to remove these barriers?
     - Are there any barriers that just can't be removed?
   - Can you think of any benefits it might have outside of birding and gardening communities?

6) Preferences for certain kinds of experiences planned for the YardMap network.

- Social Networking
    - Instant messaging – where you would be able to chat real-time with other YardMap users
    - Status posting – where you would be able to update your YardMap friends, Facebook friends with updates about what's happening in your yard
    - Smart Questions – where you would be able to post questions from within your YardMap to be answered by the community at large
    - Joining specific maps – where you would be able to "join" or "watch" public YardMaps like of Sapsucker woods so that you would be informed of changes when they happen there
    - Sharing your map – inviting other users to look at your YardMap
        1. What about your bird lists?
        2. Browse other Yards?
        3. See other's Bird-friendliness Scores?

7) Habitat designations and sustainability-oriented activities should be part of the initial YardMap design.
    - Here is a list of some different features that could be added that focus on sustainability or protecting habitat, and take into account some of the things you are doing. Which of these options is most interesting to you?
        - Use of fertilizers
        - Use of pesticides
        - Use of Native Plants
        - Use of Compost
        - Cats indoors/ outdoors
        - Energy-saving domestic habits (walk to work, clotheslines, windmill, etc)
        - Water usage
    - Which of these options do you think you would use most frequently?
    - Are there any that you think you just wouldn't use?
    - Are there any options *not* listed here that you feel should be included in this list? If so, please describe them.

8) Specific Issue: Bird-friendliness

Explanation of bird-friendliness score:To flourish birds need access to FOOD, WATER, SHELTER and they need to not be exposed to PESTICIDES and HERBICIDES. A Yard can provide birds with what they need, and, if managed correctly, can avoid exposing birds to dangerous chemicals. To help users understand that their yard can help birds flourish we want to provide users with a dynamic bird-friendliness score.

- Thoughts?

- Do you think that having a bird-friendless score would add to your experience using YardMap?
- Which of you feel that this is a must-have? Could do without it?

9) (Specific issue: Privacy) One of the functions of the YardMap will be that users, and anyone on the internet really, will be able to see others' YardMaps.
    - Do you think being able to look at someone else's yard would be useful to you? If Yes, why?
    - How important do you think it will be for people using YardMap to be able to look at others' yards?
    - Would you be okay with having others look at your YardMap, or is this something you'd be concerned about? Why or why not?
    - Do you see there being any issues with people being able to look at others' yards?

10) Specific issue: Carbon-neutrality

Most of the Labs Citizen Science Projects focus on Birds. The YardMap extends that focus by collecting data on the two biggest factors that impact the ability of birds to live: Habitat-availability and Climate Change.

- One of the functions being considered has to do with carbon-neutrality, meaning that the YardMap would be able to generate a score for the relative carbon neutrality of your yard based on household habits and habitat composition of your yard. What do you think about one function of YardMap being able to calculate a carbon-neutral score of your "space" or yard?
- Do you think having environmental or green features is important for YardMap? Why or why not?
- Can you think of any reasons why it might not be such a good idea to include these types of features?

11) Final comments / Closing remarks

12) Sign-up sheet for gift cards

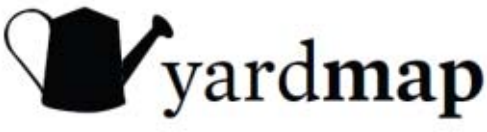
Appendix C

Line Art 1

1A

1B

1C



1D

1E

1F

1G

1H

Line Art 2

2A

2B

2C

2D

2E

2F

2G

2H

Appendix D

Web Survey

Thank you very much for taking time to answer our questions. The feedback you give will help us design the best possible experience for those who use YardMap.

If at any time you need to stop filling out the survey for any reason, you can exit and when you return to finish it the survey will pick up where you left off.

Please click here to start the survey.

1. For the purposes of this study we are only able to gather info from those who are above the age of 18. Are you 18 or older?
    a. Yes [All other groups] Go to Q2
    b. No [If Under 18] We really appreciate you being willing to help us out, but cannot include your responses at this time. Click on "Next Page" to exit the survey. Thank you.

Viewing YardMap

2. Brief YardMap description
   The Cornell Lab of Ornithology has several successful Citizen Science projects where participants contribute information about the birds they see in their yards, in their communities, and in wild places. We are getting ready to develop a new online citizen science project and need your help to make it easy to use, interesting for you, and useful for scientific research. We'd like to extend the ways that people can contribute information to scientists at the Cornell Lab of Ornithology with a new tool, The YardMap. The YardMap will let you trace and describe the habitat in your yard and parks on a Google map with satellite images using your web browser (Internet Explorer, Firefox, Safari, Chrome). In the process, you will learn how to make outdoor spaces friendlier to birds, making small changes in domestic habits to contribute to both the study and practice of conservation."

3. Now we'd like you to see YardMap in action. We've prepared a short two-and-a-half-minute video showing you how YardMap works and what it would look like to use it. Please click here to watch this short video: [link here]
    a. Were you able to watch the video? Yes/No
    b. Given what you now know about YardMap, what is the likelihood that you would use YardMap? [1 to 7 scale, not at all to very likely]
        i. Why do you say that?
    c. Which part of YardMap would you be most interested in using, and why? [open-ended]

4. Design Preferences
    a. Based on what you've seen so far, how would you rate the look and feel of YardMap? [1 to 7, from Poor to Excellent]
        i. How could the look and feel of YardMap be improved upon? [open-ended]
    b. Those using YardMap will be able to create a personal profile, that shows some information about who they are, their interests and the maps they have contributed to YardMap. People will get to choose which information to include in their profile. [Show screen shots of mocked-up profile page]
        i. Given that YardMap would allow you to create maps of multiple outdoor locations important to you, how interested would you be in having a space, like the one pictured here, to organize your maps, data, and personal YardMap achievements? [1 to 7, from 1 Not at all interested to 7 Definitely interested]
        ii. Would it be important for you to link to your other social networking sites like Facebook, Twitter, and Flickr? [Yes/No/Don't use other sites]
        iii. Would you want to add a profile picture of yourself? [Yes/No/Not sure]
        iv. Would you want to be able to look at others' YardMap profiles? [Yes/No/Not sure]
    c. One important part of YardMap is allowing people to add specific habitats (a habitat is a particular type of environment regarded as a home for plants and animals) they have in their yard. Here are the kinds of habitats we are thinking about including in the YardMap. [PHOTO]
        i. Do you think these habitats would work in the green spaces you would be mapping (i.e., your yard)? [Yes/no/Not sure]
        ii. Which other habitats would need to be added for you to feel as if this were an accurate representation of your yard space? [open-ended]
    d. YardMap allows you to make straightforward landscape maps of green spaces showing habitats, plants, and other yard features (like compost bins, brush piles, or boulders). There are many creative ways of visually showing the maps you draw. We have included three different possible ways for your maps to look below.In terms of how you would like your YardMap drawings to look, which style type most appeals to you? [show 3 different kinds of landscape (photorealistic, modern, landscape architect sketch)] [pick one only]
        i. Why did you pick this one? [open-ended]
5. Content
    a. There are different activities we are considering including as part of YardMap. How interested would you be in each of the following: [1 to 7 scale, not at all to very interested]
        i. Mapping your own yard
        ii. Seeing other peoples' yard maps

iii. Learning how to make your yard more bird friendly
iv. Receiving a bird-friendliness score
v. Displaying your bird-friendliness score for other users to see
vi. Seeing others' bird-friendliness scores
vii. Seeing how small changes in your yard practices (mowing lawns, drying clothes, composting, etc.) can help you save energy
viii. Posting questions about your Yard, plants, or birds for expert YardMap users to answer?
ix. Contributing information, as an expert on plants, gardens, birds, science, sustainability, that other YardMap users could rely on?

6. Citizen Science
    a. Have you ever participated in a citizen science project where as a member of the general public you collected data and contributed to a scientific effort that was not your own? [Yes/No]
        i. [Conditional Logic] Please name and describe the project(s).
    b. How interested would you be in each of the following: [1 to 7 scale, not at all to very interested]
        i. Displaying special information from your participation in other citizen science projects, like bird counts, bird species lists, or nesting information on your YardMap?
        ii. Displaying your participation in other Cornell Lab of Ornithology Citizen Science Projects as a part of your YardMap?
        iii. Having your YardMap information (like Yard Site) show-up automatically as locations in other projects (like eBird, NestWatch, FeederWatch, GBBC, or Celebrate Urban Birds)?
    c. What other resources or activities would you like to see included in YardMap?

Environmental Awareness: We would like to ask you a few questions about extending the YardMap to include activities about the connection between habitat and climate.

7. [Items from Yale Environmental poll]
    a. How would you rate the overall quality of the environment in the United States today? [Excellent, Good, Only fair, Poor]
    b. I pay little attention to how much energy I use in my home. [Mostly agree, Somewhat agree, Somewhat disagree, Mostly disagree]
    c. My behavior can help reduce the impact of global warming. [Mostly agree, Somewhat agree, Somewhat disagree, Mostly disagree]
    d. I am familiar with the phrase "carbon neutral." [Mostly agree, Somewhat agree, Somewhat disagree, Mostly disagree]

e. Too much fuss is made about global warming. [Mostly agree, Somewhat agree, Somewhat disagree, Mostly disagree]

8. [Climate Prime Questions here a, b, c, d, e would be randomly assigned to people taking the survey using the survey software, so that each person is only viewing one of the following five options – wording varies for each.]
    a. **[Prime 1: Human mortality**] Climate change is dangerous for people, especially those living in low-lying coastal areas; how interested would you be in working to reduce your carbon footprint and being able to choose to use the YardMap to display your results? [1 to 7 scale, not at all to very interested]
        i. Why did you choose that level of interest?
        ii. How strongly do you believe in the following statements: [1 to 7, Strongly disagree to Strongly agree]
            1. Climate change is real.
            2. Climate change is caused by human activity.
    b. **[Prime 2: Bird population]** Climate change is dangerous for birds, especially those already suffering from loss of habitat; how interested would you be in working to reduce your carbon footprint and being able to choose to use the YardMap to display your results? [1 to 7 scale, not at all to very interested]
        i. Why did you choose that level of interest?
        ii. How strongly do you believe in the following statements: [1 to 7, Strongly disagree to Strongly agree]
            1. Climate change is real.
            2. Climate change is caused by human activity.
    c. **[Prime 3: Collective action]** Studies have shown that if a large number of people in North America would reduce their energy consumption a small amount, this would have a large impact on the U.S. carbon footprint; how interested would you be in working to reduce your carbon footprint and being able to choose to use the YardMap to display your results? [1 to 7 scale, not at all to very interested]
        i. Why did you choose that level of interest?
        ii. How strongly do you believe in the following statements: [1 to 7, Strongly disagree to Strongly agree]
            1. Climate change is real.
            2. Climate change is caused by human activity.
    d. **[Prime 4: Future generations]** Studies have shown that if a large number of people in North America would reduce their energy consumption a small amount, this would have a large impact on the U.S. carbon footprint and its effects on future generations; how interested would you be

in working to reduce your carbon footprint and being able to choose to use the YardMap to display your results? [1 to 7 scale, not at all to very interested]

i. Why did you choose that level of interest?
ii. How strongly do you believe in the following statements: [1 to 7, Strongly disagree to Strongly agree]
    1. Climate change is real.
    2. Climate change is caused by human activity.

e. **[Prime 5: Control]** We are considering giving YardMap Network members the option of calculating their domestic carbon footprint and, if they wish, displaying their score to others on their YardMap; how interested would you be in working to reduce your carbon footprint and being able to choose to use the YardMap to display your results? [1 to 7 scale, not at all to very interested]

i. Why did you choose that level of interest?
ii. How strongly do you believe in the following statements: [1 to 7, Strongly disagree to Strongly agree]
    1. Climate change is real.
    2. Climate change is caused by human activity.

9. Computer Use

   Do you:

   a. Use a computer at your workplace, at school, at home, or anywhere else on at least an occasional basis? [Yes/No]
   b. Use the internet, at least occasionally? [Yes/No]
   c. Send or receive email, at least occasionally? [Yes/No]
   d. Own your own desktop computer? [Yes/No]
   e. Own your own laptop computer? [Yes/No]
   f. Use a mobile device or phone to access the internet? [Yes/No]

10. How comfortable would you say you are using: [1 to 7, not at all to very comfortable]
    a. Printed maps
    b. Online maps

11. Social Networking

    How often do you do each of the following? [Never, Every day, Once a week, Monthly, A few times a year, Once a year, Less Frequently]

    a. Use an online forum
    b. Post a comment on a blog
    c. Use instant messaging or chat with others online
    d. Post an update on a social networking site (like Facebook, MySpace, etc.)

e. Share something online that you created yourself, like your artwork, photos, stories or videos
f. Create an online journal or blog
g. Use a game application in Facebook
h. Google something
i. Used Google Maps, Google Earth, or Bing Maps to find your own home or other location
j. Subscribed to an RSS feed
k. Added content to an online map (e.g., Google, Bing)

12. Demographics
    a. Now we have a few questions about you. This will help us know which groups are best served by the YardMap.
    b. What year were you born?
    c. Are you…
        i. Male
        ii. Female
        iii. Prefer not to answer
    d. Do you consider yourself to be a:
        i. Birder – someone who is interested in or actively watches birds [Yes/No]
        ii. Gardener – someone who gardens on a regular basis [Yes/No]
    e. How many children under the age of 18 are currently living in your household? [drop-down, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, more than 10]
    f. What is the highest level of education you have completed?
        i. Some high school
        ii. High school
        iii. Some college
        iv. College/bachelor's degree
        v. Graduate or professional degree
    g. In which of the following categories is your household's approximate annual income?
        i. Less than $35,000
        ii. $35,000-49,999
        iii. $50,000-74,999
        iv. $75,000-99,999
        v. $100,000 to $149,999
        vi. $150,000 to $199,999
        vii. $200,000 or more
    h. What is your zip code (or if outside the U.S., which country)?
    i. Would you consider where you live to be primarily:

i. Urban – in a city
ii. Suburban – just outside of a city
iii. Rural – not near a city

j. Approximately how far away from any coast (Pacific, Atlantic, Gulf) do you live?
i. Within one mile
ii. 2 to 50 miles
iii. 51 to 100 miles
iv. 101 to 250 miles
v. More than 250 miles

k. Please describe your current living situation:
i. I am renting
ii. I own my own home
iii. Other: _____

l. Do you have a yard or green space you take care of? [Yes/No]

Drawing and Follow up Interviews
(For GBBC List members only)

1. If you would like to be entered into a drawing to receive one of ten copies of *The Bird Watching Answer Book: Everything You Need to Know to Enjoy Birds in Your Backyard and Beyond* by Lab of Ornithology author Laura Erickson, please fill in the information below. (The drawing for the books will take place in (date here).) Please note, we will not share this information with any third parties, but we may use it to share information and opportunities about projects and memberships in the National Audubon Society, Bird Studies Canada, and/or the Cornell Lab of Ornithology."
    a. first name [box] and email address [box]

[next page]

2. Please know that if you enter your email address below, it will only be used for the purpose expressly stated, and not shared, distributed or used for any other purpose besides what is asked in the question.
3. As a thank you for completing the survey, would you like to be entered into a drawing for one of two $200 amazon.com gift certificates?
    a. If Yes, please enter your first name [box] and email address [box]
4. Would you be interested in receiving an invitation for a follow-up conversation a few months from now so that we can continue to improve YardMap? Yes/No

a. If Yes, please enter your first name [box] and email address [box]

Thank you very much for answering these questions, they will be really helpful as we continue to design and work on YardMap.

Appendix E

Stand Alone Phone Interview Guide

There's more to conserving bird populations than the birds themselves. YardMap isan innovative web tool that lets you tell us about the habitat available to birds inyour backyards, local parks, and favorite birding spots. You simply find your Yard ona satellite map and use our fun drawing tools to map your landscape. Connect-up tothe other Citizen Science Projects you participate in. Scientists get a wealth of dataabout bird habitat, and you get a fun, visual map of your Yard that you can sharewith friends and family.

1. How interested would you be in using something like YardMap? (Very interested, Pretty interested, Somewhat interested, Not very interested)
2. Besides mapping your own yard, you'd be able to map other spaces or kinds of properties, like schoolyards, offices, parks, etc. Would mapping these kinds of areas be something you'd be interested in doing? Why or why not?
    - Would you be comfortable mapping areas outside of your residence? Why or why not?
3. **[for Citizen Scientists only]** There's the potential for YardMap to connect to other citizen scientist projects people are working on at the Lab of Ornithology. Are you currently contributing to or a member of a citizen science project?
    - If Yes, which ones?
    - How do you think YardMap could be connected, if at all, to these projects?

4. Do you think that there is a relationship between birds and climate change?
    - If Yes, what can you tell us about that relationship?

Potential impact of YardMap:

5. Do you think <u>your</u> use of YardMap could impact the birds in your area? Why or why not?
6. How about if a lot of people in your area are using YardMap. What kind of impact do you think that would have?
7. Some people have said that YardMap can have an impact on birds in very specific ways. Do you think YardMap, and the changes people make as a result of mapping their own yards, could impact…
    - Birds' ability to reproduce?
    - Their ability to find food?
    - Any other specific things you think it could impact?

Carbon footprint:

8. Have you ever thought about the connection between what you do in your yard and how it impacts birds? That is, do you think any of your specific yard activities have an impact on birds in your area? Please explain.

9. Do you think that if enough people in your community do these types of activities that it could help birds? Why or why not?
10. Have you ever heard of the term "carbon footprint?"
    - Can you tell me what that term means?
11. Have you ever calculated your own carbon footprint?
    - If yes, where did you do this? Why did you calculate it?

Social networking:

12. One of the ideas of YardMap is that you can share your YardMap with other people. Do you think you'd do that?
    a. If yes,
        i. Who would you share it with and why?
        ii. What types of information would you feel comfortable sharing?
    b. If no,
        i. Would any of the following be a reason you would<u>not</u> share your information…
            1. Privacy issues – who would see my information
            2. Time commitment – it would take time that I don't have
            3. Technology – don't use social networking sites
            4. Any other issues you can think of?
13. We're considering allowing multiple users to work on the same YardMap, which would mean that sometimes more than one person would end up mapping one yard or area.What do you see as the benefits to doing it this way?
    a. Would you be interested in working on maps with other people, or do you think you'd rather map green spaces on your own? Why do you say that?
14. How would you feel if you joined YardMap and discovered that part of your yard had already been mapped by someone else? How do you think you'd react?
15. Anything else you'd like to share with us about YardMap?

Thank you very much for taking the time to answer our questions. Your responses will be extremely helpful as we continue to develop YardMap.

Appendix F

Additional analyses

EcoRegion

Table 35: EcoRegions Breakdown (n=3065)

	Percent	Frequency
Eastern Broadleaf Forest Oceanic Province	21.0	645
Eastern Broadleaf Forest Continental Province	19.4	596
Southeastern Mixed Forest Province	9.8	299
Outer Coastal Plain Mixed Forest Province	7.1	217
Laurentian Mixed Forest Province	5.6	173
Pacific Lowland Mixed Forest Province	5.3	161
Central Appalachian Broadleaf Forest Coniferous Forest Meadow Province	4.3	133
California Coastal Chapparral Forest and Shrub Province	3.9	119
Prairie Parkland Temperate Province	3.5	106
Prairie Parkland Subtropical Province	3.2	98
Adirondack New England Mixed Forest Coniferous Forest Alpine Meadow Province	2.2	67
Great Plains Palouse Dry Steppe Province	1.8	56
Sierran Steppe Mixed Forest Coniferous Forest Alpine Meadow Province	1.0	31
California Dry Steppe Province	1.0	31
Southern Rocky Mountain Steppe Open Woodland Coniferous Forest Alpine Meadow Province	1.0	30
American Semi Desert and Desert Province	.9	29
Cascade Mixed Forest Coniferous Forest Alpine Meadow Province	.9	27
Southwest Plateau and Plains Dry Steppe and Shrub Province	.8	26
Intermountain Semi Desert Province	.8	24
Intermountain Semi Desert and Desert Province	.7	22
California Coastal Range Open Woodland Shrub Coniferous Forest Meadow Province	.7	22
Lower Mississippi Riverine Forest Province	.7	21
Great Plains Steppe Province	.5	16
California Coastal Steppe Mixed Forest Redwood Forest Province	.5	16
Colorado Plateau Semi Desert Province	.5	15
Arizona New Mexico Mountains Semi Desert Open	.4	13

Woodland Coniferous Forest Alpine Meadow Province		
Northern Rocky Mountain Forest Steppe Coniferous Forest Alpine Meadow Province	.4	13
Everglades Province	.4	12
Chihuahuan Semi Desert Province	.4	11
Middle Rocky Mountain Steppe Coniferous Forest Alpine Meadow Province	.3	10
Ouachita Mixed Forest Meadow Province	.2	6
Upper Yukon Tayga Meadow Province	.2	5
Great Plains Steppe and Shrub Province	.1	4
Black Hills Coniferous Forest Province	.1	3
Pacific Coastal Mountains Forest Meadow Province	.1	2
Coastal Trough Humid Tayga Province	.1	2
Hawaiian Islands Province	.0	1
Nevada Utah Mountains Semi Desert Coniferous Forest Alpine Meadow Province	.0	1
Alaska Range Humid Tayga Tundra Meadow Province	.0	1
Yukon Intermontane Plateaus Tayga Province	.0	1

Design

Table 36: Style Choice by Likelihood to use YardMap

	1=Unlikely to use	*2*	*3*	*4*	*5=Very likely to use*
A (n=1121)	2.1%	7.1%	14.6%	39.7%	36.4%
B (n=1062)	2.4%	7.4%	16.3%	40.5%	33.4%
C (n=238)	2.9%	13.0%	16.8%	36.1%	31.1%

***NOTE:** There is not a significant difference.

Habitat

Survey participants were then asked to suggest other types of habitats to include in YardMap to make it a more accurate representation of their yard space. Respondent answers ranged widely and included suggestions for additional habitats, vegetation, structures, as well as water sources. Table 37 shows the list of suggestions pulled from a response of 150 randomly selected responses (n=67):

Table 37: Suggestions for Additional Habitats

Which other habitats would need to be added for you to feel as if this were an accurate representation of your yard space?
Habitat

Light woods/forest	5
Farm	4
Swamps	2
Rural/suburban/urban	2
Lawn with scattered trees	1
Flood plain	1
Marshes	1
Plowed/crop fields	1
Cultivated field	1
Bog	1
Dry Creek bed	1
Vegetation	
Evergreen vs. deciduous	3
Vegetable garden	3
Ivy	2
Edibles for people	2
Weeds	2
Native vs. Non native plants	2
Low ground cover	2
Fruit bearing shrubs/trees	2
Specific trees	2
Perennial garden	1
Fallow area	1
Herbs	1
Difference between shrubs and thickets	1
Brush pile	1
Edibles for critters	1
Mulch	1
Structures	
Walls (rock wall, retaining wall)	3
Chairs, areas to sit and observe outdoors, patio furniture	3
Fences	2
Driveway	1
Patio	1
Shed	1
Deck	1
Water Sources	
Birdbath	4
Pool (chlorinated)	3
Stream	2
Running water vs. standing water	1

Salt water vs. fresh water	1
Miscellaneous	
Bird feeders	3
Intensity of road use	2
Railroad ties	1
Wood piles	1
Slopes	1
Boulders	1
Predators	1
Nests	1
Nothing, fine as is	6

Examples of visitor comments include:

- *Could you include a rural/suburban/urban option? Also, I don't exactly live in a forest, but I do have many, many trees. Could there be an option that isn't forest but...something like...heavily forested? Or shady? I'm not sure what to call it. :-)*
- *I'm sure these would be more defined. I have planted a lot of native Texas plants. They started as shrubs but a lot of backyard is more wild than Wilscape. That where I feed the birds.*
- *you may want to add 1) patio with furniture 2) Decks 3) fencing 4) rock walls 5) Feeders 6) bird houses as actual items. I'm in New England and we've many wildlife including birds using our patio/deck and furniture for sunning!*
- *Better clarification of the type of forest: deciduous v. pine; underbrush or no underbrush.*

Integrating YardMap with Citizen Science Projects

The following tables show the breakdown of interest for integration for individualCitizen Science projects. Note that none of the participants in this sample participated in Celebrate Urban Birds, Bird Sleuth, or Species Atlas Project, so there is no data for these projects.

Table 38: Rating – GBBC Participants

Interest in data integration between YardMap and other programs					Sample n=45/45/44
	Not at all interested	***Uninterested***	***Neutral***	***Interested***	***Very interested***
Displayinginformation about your participation in other Cornell Lab of Ornithology programs	4.4%	17.8%	20.0%	35.6%	22.2%
Displaying special information from your participation in other citizen science programs	4.4%	13.3%	6.7%	44.4%	31.1%
Having your YardMap information show up automatically as locations in other projects	4.5%	22.7%	13.6%	34.1%	25.0%

Table 39: Rating – FeederWatch/Feeder Count/House Finch Disease Survey Participants

Interest in data integration between YardMap and other programs					Sample n=48/48/46
	Not at all interested	***Uninterested***	***Neutral***	***Interested***	***Very interested***
Displayinginformation about your participation in other Cornell Lab of Ornithology programs	6.3%	20.8%	12.5%	35.4%	25.0%
Displaying special information from your participation in other citizen science programs	6.3%	14.6%	8.3%	41.7%	29.2%
Having your YardMap information show up automatically as locations in other projects	6.5%	32.6%	4.3%	34.8%	21.7%

Table 40:Rating – NestWatch Participants

Interest in data integration between YardMap and other programs					Sample n=12/12/12
	Not at all interested	***Uninterested***	***Neutral***	***Interested***	***Very interested***
Displayinginformation about your participation in other Cornell Lab of Ornithology programs	--	8.3%	33.3%	25.0%	33.3%
Displaying special information from your participation in other citizen science programs	--	8.3%	8.3%	58.3%	25.0%
Having your YardMap information show up automatically as locations in other projects	8.3%	25.0%	8.3%	33.3%	25.0%

Table 41: Rating – Birds in Forested Landscapes Participants

Interest in data integration between YardMap and other programs					Sample n=2/2/2
	Not at all interested	***Uninterested***	***Neutral***	***Interested***	***Very interested***
Displayinginformation about your participation in other Cornell Lab of Ornithology programs	--	--	50.0%	50.0%	--
Displaying special information from your participation in other citizen science programs	--	--	--	100.0%	--
Having your YardMap information show up automatically as locations in other projects	--	--	50.0%	50.0%	--

Table 42: Rating – eBird Participants

Interest in data integration between YardMap and other programs					Sample n=21/21/21
	Not at all interested	***Uninterested***	***Neutral***	***Interested***	***Very interested***
Displayinginformation about your participation in other Cornell Lab of Ornithology programs	--	19.0%	33.3%	19.0%	28.6%
Displaying special information from your participation in other citizen science programs	--	14.3%	14.3%	42.9%	28.6%
Having your YardMap information show up automatically as locations in other projects	4.8%	23.8%	19.0%	28.6%	23.8%

Table 43: Rating – Other Bird Project Participants

Interest in data integration between YardMap and other programs					Sample n=30/30/30
	Not at all interested	***Uninterested***	***Neutral***	***Interested***	***Very interested***
Displayinginformation about your participation in other Cornell Lab of Ornithology programs	--	10.0%	33.3%	36.7%	20.0%
Displaying special information from your participation in other citizen science programs	--	6.7%	13.3%	56.7%	23.3%
Having your YardMap information show up	6.7%	20.0%	13.3%	46.7%	13.3%

automatically as locations in other projects					

Table 44: Rating – Weather/Climate Project Participants

Interest in data integration between YardMap and other programs					Sample n=2/2/2
	Not at all interested	***Uninterested***	***Neutral***	***Interested***	***Very interested***
Displayinginformation about your participation in other Cornell Lab of Ornithology programs	--	--	50.0%	50.0%	--
Displaying special information from your participation in other citizen science programs	--	--	50.0%	50.0%	--
Having your YardMap information show up automatically as locations in other projects	--	100.0%	--	--	--

Table 45: Rating – Wildlife Related Project Participants

Interest in data integration between YardMap and other programs					Sample n=12/12/11
	Not at all interested	***Uninterested***	***Neutral***	***Interested***	***Very interested***
Displayinginformation about your participation in other Cornell Lab of Ornithology programs	25.0%	--	8.3%	25.0%	41.7%
Displaying special information from your participation in other citizen science programs	16.7%	8.3%	8.3%	25.0%	41.7%
Having your YardMap information show up automatically as locations in other projects	--	9.1%	18.2%	18.2%	54.5%

Table 46: Rating – Other Project Participants

Interest in data integration between YardMap and other programs					Sample n=6/6/6
	Not at all interested	***Uninterested***	***Neutral***	***Interested***	***Very interested***
Displayinginformation about your participation in other Cornell Lab of Ornithology programs	16.7%	16.7%	16.7%	16.7%	33.3%
Displaying special information from your participation in other citizen science programs	--	33.3%	16.7%	16.7%	33.3%
Having your YardMap information show up automatically as locations in other projects	--	33.3%	33.3%	33.3%	--