NestWatch & Virtual NestWatch: an InterSECTION of

Science
Education
Conservation
Technology

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Note that this document did not originate as a formal paper. Rather, it combines an oral presentation with accompanying PowerPoint slides and reflects the more informal, idiosyncratic nature of a delivery prepared specifically for this live event.

Documentation of the conference is meant to serve as a resource for those who attended and for others in the field. It does not necessarily reflect the views of the Cornell Lab of Ornithology or individual symposium participants.

The following is one of three focus point presentations delivered on day one of the Citizen Science Toolkit Conference as part of the opening session titled “Citizen Science Challenges and Opportunities.”

For complete documentation of conference proceedings and to learn more about citizen science and the Citizen Science Toolkit, or to join the ongoing citizen science community, go to:

http://www.citizenscience.org
NestWatch & Virtual NestWatch: An InterSECTion of Science, Education, Conservation, Technology

Introduction

I am presenting NestWatch and Virtual NestWatch, two projects born from the same NSF grant. Someone asked me as I was developing this talk, “What is it that you want people to know?” Basically, it is that this project is really trying to push the envelope, creating intersections between these four very important pathways: science, education, conservation, and technology. I would like to acknowledge that this project could not have been developed without the incredible support at the Lab of Ornithology and the collaboration of the Smithsonian Migratory Bird Center, and most important, the funding from NSF.

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This is a view from one of our NestWatch cams, and these are the things that have really captivated people. During the individual introductions, so many of you said that you are now scientists or science educators. For many of you, your love of science began when you were children, going out with your mother or father and watching birds in real life. Or, as was the case for me, growing up in Long Island, watching Wild Kingdom with my dad on the couch. Either way, these animals and their behaviors are fascinating and they’re a hook; they can get people interested in animals and from that you can build their interest in science. That is what we are trying to do here with Virtual NestWatch and NestWatch—enabling people to look at these images and getting people to wonder and develop that interest in science.

Tina Phillips, Project Leader, NestWatch, Cornell Lab of Ornithology

Tina Phillips has been at the Lab of Ornithology for about ten years. She started out as a Birdhouse Network project assistant and has now helped to write the proposal that funded NestWatch, which we’re doing in cooperation with the Smithsonian. She is in charge of that and is also one of the inventors, along with Paul Allen, of the NestWatch cams. Tina is going to talk about a project that is both research and audience driven.

- Rick Bonney, Director of Program Development and Evaluation, Cornell Lab of Ornithology

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www.nestwatch.org
Lab of Ornithology Citizen Science Model

I’d like to bring you back to the beginning for this project, which is the Cornell Lab of Ornithology’s model of citizen science. Essentially, we define it as a partnership between the public and professional scientists that relies on large-scale observations collected across time and space. It comes very much from a researcher-driven perspective. You’re going to hear about other perspectives during this conference, but ours is what we call researcher-driven. It is large-scale and there are a lot of volunteer networks that we’ve built.

With that definition in mind, all of the citizen science projects at the Lab have three major goals. One is science and research, gathering meaningful data to answer large-scale and relevant questions. These manifest themselves in our publications. We’ve had over forty publications that are based on citizen science-collected data in peer reviewed journals. Our educational mission is to promote environmental awareness and scientific literacy. We can see this in all of the online resources that we have, in our printed materials, and in our outreach efforts. Our conservation goal is to apply these results to real science-based conservation efforts and things like management guidelines.

NestWatch & Virtual NestWatch

Project Overview

These are two projects and I’m going to define them separately so that you can understand how they differ and complement each other. NestWatch is a nest-monitoring scheme that relies on observations of all North American breeding birds across time and space. There are two ways to participate in NestWatch. You can do it on your own, as is the case for most of our citizen science projects, or you can have mentored participation. I just want to underscore that it is all North American breeding birds. This is really important because NestWatch...
comes out of the Birdhouse Network, which is a project that collects data on cavity-nesting birds, which means you’re limited because all of these birds are not distributed widely across all habitats. What NestWatch does is to remove that barrier, so we get reach, we get information on all birds, which means we can track all habitats, which means we can get to all landscapes, which means we can get to all audiences. This is a really interesting and exciting approach for this kind of program. If you’re in the city and you’re a metropolitanite and you have birds nesting on your apartment building, you can enter that information into NestWatch. So it’s a means of branching out our audience.

Virtual NestWatch is a nest-monitoring project that relies on observations of online breeding behavior. The only way to participate is virtually, and it is through those Web cam images that I just showed you. That also allows for wide distribution because as long as you can get to the Internet you can participate in Virtual NestWatch.

Project Goals
Here are some of the goals we have for NestWatch and Virtual NestWatch. With the scientific goals we’ve been a little more specific. We’re interested in knowing how breeding factors vary across time and space, the factors that limit breeding success, and how climate change influences breeding. Our goals in terms of educational impacts are to teach people about bird reproductive biology and things like how to monitor nests properly; to increase their scientific literacy and environmental awareness; and to have them understand how their actions can impact the environment and, as a result, impact breeding birds.

Our conservation goals are to promote better land stewardship practices that would benefit breeding birds. We also have a technological goal, and this is new for us. We all do technology, but it is never one of the inherent goals. Because these projects are so technologically based, we have included the goal of creating online learning communities and online collaborations.

Conceptual Model
I’ve tried to come up with this conceptual model, just for visual learners to understand how these two projects are situated. There are two different ways to participate: self directed or mentored.
Either way, the data that comes in from those two types of participation is the nest record type of data, when you’re out there collecting information in the real world. Then there is this virtual participation, and this is a data source that is image-based. It is a visual set of data. In combination, these two data sets both help to increase our understanding of breeding biology and reach the scientific goals that I just mentioned.

On the educational side, when we look at the formative and the summative evaluation data from these three different types of participation in combination and in comparison, it will help us to analyze different learning outcomes from these different models of citizen science. Essentially, this analysis of learning outcomes of different models of citizen science is what is new and innovative and exciting about this project. It is a new focus for our research, and it is going to contribute to our overall understanding of how to deliver informal science education to different audiences.

When all of this is said and done across the projects and across the treatments, what we want to learn is who participated, how, what was it like for them, how they were affected, what worked, and what didn’t, using several different kinds of evaluative approaches.

**NestWatch Mentored Participation**

I want to start with the NestWatch mentored experience because that is the most intensive, and after I give you a full picture of that, we will get to the other two types of participation. These mentored experiences are site-based at our partner sites. We call them “Nest Quest” workshops.

The partners sites are responsible for holding two Nest Quests per year, with a minimum of fifty participants per year. The first workshop at each site has Cornell staff there so that we can train the trainers how to run these workshops. The second time around they do it on their own. Sometimes they host a Nest Cam site as well. This year, two of the four have successfully gotten a cam online. Another possibility is to incorporate banding days, which two of the four sites have been able to do. That is what is going on in the picture here, a master bander is showing participants up close some of the birds he just caught.

Our partner sites include very different types of organizations, and we can compare across those different types. One is the Smithsonian Migratory Bird...
Does a mentored experience enhance learning & behavioral outcomes?
• Goal setting
• Pledges
• Pre- and post-workshop evaluations
• Interviews, focus groups, observations

Another thing that we want to understand is whether this is an effective way to help people overcome barriers to participation. These are some of the major barriers that we are aware of when it comes to participating: I can’t identify birds; I don’t know anything about birds, forget about nests. So it involves teaching them these deductive approaches. What do you do when you find a nest, and how do you figure out what bird it belongs to? We also offer an introduction to breeding biology and binocular demonstrations and an understanding of how they work. Data entry is a huge barrier for people to overcome, so we walk them through that process of entering their data. Finally, we train them on finding and monitoring nests. It is sometimes just getting them aware that their observations, what they see, can really tell them something about breeding birds in the area.

So we go on these Nest Quests. Sometimes it even involves putting up a ladder in a donkey stable to peek inside of a Barn Swallow nest.

We also go through the complex task of collecting the data. We talk about the code of conduct when we’re out there monitoring, as well as following

NestWatch Partner Sites
• North Carolina Museum of Natural Sciences at Prairie Ridge
• Lee & Rose Warner Nature Center, MN
• Smithsonian Migratory Bird Center
• Urban Ecology Center, WI
• Woodland Park Zoo, WA

This little girl is listening to the heartbeat of a robin right after it was caught in a net. I’m sure it was pretty fast at that point.

Is this an effective way to help people overcome barriers to participation?
• Bird & nest ID activity
• Breeding biology introduction
• Binocular demos
• Data entry demo
• Finding & monitoring nests
Mentored Guidance for:
- Data Collection
- Code of Conduct
- Protocol

They use Google maps, they describe their sites for us, they give us visit information every time they visit a nest, and they can also summarize a nesting attempt. We have people with up to five hundred nest boxes or nest sites, so we also have a lot of tools for them to manage all of this data.

We have completed seven of eight of these workshops and have had about 150 participants. The preliminary evaluation so far indicates that people find these very informative. I’ve read a lot of the evaluations and surprisingly, the four hours might not be long enough. People want a little more, especially in terms of going out and finding nests. That was the part that was really engaging for them. The majority of them indicated in their pledges and in the evaluation information that they were likely to monitor nests and record and submit the data. We’re going to track that and see if, in fact, they do and more importantly if they don’t, to determine why they can’t keep up with it. We also want to evaluate our recruitment plans.

NestWatch Self-directed Participation

Now let’s move on to self-directed participation. Basically, somebody joining us would go to the Web site www.nestwatch.org and they attempt to do everything I just explained in the mentored experience, but essentially they are on their own. They have got to figure it all out and understand broad concepts like avian ecology, breeding biology and natural variation.
This is actually a prototype Web site. It is just being developed and designed and we hope to have this up in a couple of months. I should say that from this point forward, everything I am going to show you is a prototype. The launch for all of this is 2008.

They also need to understand the complexity of collecting data and submitting and retrieving data. And again, this is on their own.

I’m going to quickly show you one of the great features that I think is going to key in on the social networking factor around data. This is something Chris Marx developed. You’ve all seen Google Maps. Basically, you can click on here and say, “I want to see what’s at my location.”
You get a listing of all of your nest sites and there is a summary for everyone. They can download and export this and that is really cool—people love seeing their own data. Then they can say, "I want to see the people around me within fifty kilometers."

You can see other people’s nest sites and exchange information with them: "Hey, you have that kind of bird? How did you get them to nest there?"

So there are these ways for the social network to happen. There is one other way that I think is really cool that we’re all very excited about. You can go to YouTube and upload your video. We have people who are crazy about the cams and who have their own nest cams. Now we can tell people, "We know you want to share this information with everybody, we know you want to show everybody what your birds are doing." We send them to YouTube. We’re not liable for what’s up there, we’re not storing that stuff, but we can link to it because it’s public and we can bring it into these Google maps. People can describe their habitats this way, and they can tell us what is going on with their birds. This is really exciting stuff. If you want to know more about this, contact Chris Marx (Programmer/Analyst, Citizen Science, Cornell Lab of Ornithology, chrismarx@gmail.com). He has even figured out how to overlay temperature data onto this stuff and is just starting to really get into it, so if you’re interested make sure you talk to him. He is a whiz.

One of the other things that we are really excited about is the data infrastructure for entering historic data. We have in one of the rooms in this building 300,000 cards like this that date back to 1965 from the Cornell North American Nest Record Card Program. We’ve never been able to use these data very well because there wasn’t a place to put them. Now there is, and in the next year we’re going to be entering all of these data and I think there is going to be a lot of interest by scientists and by the public, regarding how birds are affected by local climate change and how things have changed over the last forty or fifty years.

Virtual NestWatch

Basically, the crowd we are trying to engage with Virtual NestWatch is the “bowling alone” crowd, people who just love to spend time online. We also want to answer questions that are of behavioral interest; we want to develop software for image
coding, sorting and searching; and we want to determine whether you can get the people from inside their homes and on their computers to go outside in nature. What does this virtual participation look like? This is the prototype for the new Web site. There are discussions, photo archives, and stats. There is a built-in game format, and there is lots of multimedia.

CamClickrs is the application for collecting the visual data. A user might go in and say, "I want to look at Barn Owls, I want to look at them during the nesting period, and I want to look at 500 images." What they would get is much like you see here, with all of these images.

On the right hand side we have predefined a whole bunch of behaviors. We have divided them up, though not explicitly, between observed and inferred behaviors. They tell us what the observed behavior is and can then give us sub-behaviors. For example, they...
could choose “a female sitting,” and then if they go down a level they can choose “incubating” or “alert” or “at rest.” Those are the inferred kinds of behaviors that we want them to drag and drop onto the screen.

On the back end, what they’ve tagged are coded for us so that we can use those and search those out. There’s going to be a consensus tool for coding, so if you’re a user it might say, “This image was flagged and 95% of all of the other people also said the same thing for this image.” So we’re trying to build up consensus but also trying to make it a little bit competitive for them. There are also incentives. For example, if you get through X number of images, you may get a free pass to the Urban Ecology Center. We’re trying to do that kind of thing with our partners.

Innovations and Broad Impacts

The innovations and broad impacts are listed at left, including large-scale research on breeding biology of birds and new tools for searching visual data. What I would like to see, once we get all of these archived and get these seven million images tagged, is that other people like yourselves who have thousands of hours of video and footage might want your own data analyzed. Maybe we can get volunteers in networks to get some of this footage analyzed in a faster way than it is being analyzed right now.

In terms of education and ISE research, in addition to increased environmental awareness we also want to advance the field by increasing our understanding of how these different models of citizen science delivery influence what people learn and how they learn.

Acknowledgments

I would like to thank all of the people listed here. This was a huge team effort. It has been an ambitious project, it’s innovative, and it is starting to launch in 2008, so please look for it.