Setting the Stage

Engaging and Learning for Conservation
Workshop on Public Participation in Scientific Research
American Museum of Natural History
April 7-8, 2011
This document is intended to be a faithful synthesis of presentations and discussions at the Engaging and Learning for Conservation Workshop on Public Participation in Scientific Research, held at the American Museum of Natural History on April 7 & 8, 2011. It is meant to serve as a resource for those who attended, for funders, and for others in the field. It does not necessarily reflect the views of the American Museum of Natural History, the Cornell Lab of Ornithology, the National Audubon Society, or individual meeting participants.

Participant comments have been paraphrased and the sequence of participant remarks has been reorganized. These are not exact quotes, rather they are an attempt to capture the content and meaning of the ideas presented.

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Document Series

This is one of a series of documents about this workshop available as PDF downloads on the workshop website. The series includes:

I. Setting the Stage
II. Challenges and Opportunities
III. Putting Strategies into Practice
IV. Next Steps

Workshop Web Site
http://citizenscience.org/conference/ppsr2011
Opening Remarks

The Collaborative Context
Felicity Arengo, Project Co-Principal Investigator  
Associate Director, Center for Biodiversity and Conservation, American Museum of Natural History

I would like to begin by thanking our collaborators, with whom we envisioned, designed, and organized this workshop: Rick Bonney and Jennifer Shirk from the Cornell Lab of Ornithology, and Judy Braus and Robert Petty from the National Audubon Society. The workshop was made possible with funding from the National Science Foundation’s Informal Science Education program.

The Center for Biodiversity and Conservation (CBC) was established at the American Museum of Natural History in 1993 to leverage museum expertise to address the biodiversity crisis. Since its beginning, and throughout, we have had explicit in our mission a strong commitment to capacity-development and outreach. Over the years we have used our position, expertise, and venues to convene world-class symposia, such as our 15-year series offering a Spring Symposium on biodiversity and conservation. We have held a range of workshops, and last year for the first time held the Student Conference on Conservation Science at the Museum, the sister conference to those held in Cambridge and Bangalore. We are currently organizing another Student Conference for this coming October.

PPSR: initiatives where the public is involved in one or more stages of the scientific research process (from defining questions to using results), encompassing citizen science, participatory monitoring, community science, and a variety of other endeavors and approaches.

The workshop today on public participation in scientific research (PPSR) certainly promises to be another in our distinguished series, with more than 50 projects represented that are engaging the public in collecting scientific information. We are delighted to partner with two of the foremost organizations working on the ground, in the lab, and on the cutting edge of PPSR, the Cornell Lab of Ornithology and the Audubon Society. It is my pleasure to introduce my colleague and the primary organizer for this event, Meg Domroese, Outreach Program Manager for the Center for Biodiversity and Conservation, who has done an outstanding job of keeping us focused and on track to put together a great program for the next couple of days.

Goal
Identify best practices for engaging the public in participatory scientific research that contributes to conservation action and environmental stewardship

Objectives
1. Share success stories and take stock of progress in linking PPSR and biodiversity conservation
2. Identify key strategies for developing conservation-related PPSR initiatives that contribute to participant learning and to scientific/conservation knowledge for society
3. Generate ideas for promoting communication, networking, and partnerships among individuals and organizations working in PPSR and conservation

From left: Rick Bonney, Felicity Arengo, Meg Domroese
Acknowledgements and Session Overview
Meg Domroese, Content Coordinator
Outreach Program Manager, Center for Biodiversity and Conservation, American Museum of Natural History

I am really glad that the Engaging and Learning for Conservation Workshop on Public Participation in Scientific Research, also affectionately known as the PPSR Workshop, is finally getting under way. Felicity mentioned our partners. I would like to acknowledge some of the folks in the room who have been part of the core planning team: Eleanor Sterling, Director of the Center for Biodiversity and Conservation, who is Project Principal Investigator; Felicity Arengo, Project Co-Principal Investigator; Rick Bonney, the Project Co-Principal Investigator from the Cornell Lab of Ornithology; Judy Braus, Project Co-Principal Investigator from the National Audubon Society; and Robert Petty, also from the National Audubon Society. Jennifer Shirk, from the Cornell Lab of Ornithology, is responsible for the great forum that has been online since early March, in which many of you have participated.

From the CBC, Anne Toomey has been assisting with the project, Fiona Brady has worked on logistics, and Tony Alexander will be helping with technology. I would also like to acknowledge Andrés Goméz. Without his contribution there would not have been a proposal to NSF, and he really helped get that through to the finish line.

We are so appreciative of the financial support the National Science Foundation has given for this workshop. Our team also counts on the invaluable support of some others in the room. I would also like to introduce: Ed Salt, who will be facilitating this session; Catherine McEver, who will be documenting; and Joe Heimlich, who will be evaluating how well we do in meeting our objectives.

You will hear much more from all of these people in a bit. We are very excited to finally meet all of you and look forward to discussing and developing together best practices for achieving conservation through public participation in scientific research. We will begin by hearing from some of you about inspiring experiences and getting some background on the field of public participation in scientific research. We will be linking this with ways to engage people in conservation as well as some of the challenges and opportunities for conservation-related public participation in scientific research. Ed Salt will then walk us through the process we will be engaged in during the course of these two days. Next we will be raising some of the big questions that will then carry into conversations over lunch and into the afternoon session.

Rick Bonney is now going to be our guide into the frontiers of public participation in scientific research. I would say, “Sit back and enjoy the ride,” but though I’m sure you will enjoy it, I’m also sure that you won’t be sitting back, you will be on the edge of your seats.
Human Impact and Involvement

Rick Bonney, Project Co-Principal Investigator
Director, Program Development and Evaluation,
Cornell Lab of Ornithology

I want to thank all of you for showing up. We have been working on this for two years, and it is always amazing how two years of your life can then disappear in two days, which is what is about to happen here. I have been working at the Cornell Lab of Ornithology for about 30 years now and am going to do my best to take you into the frontiers of public participation in scientific research. I will even explain to you why we call it that awful name.

This is an image of my personal power site. It's my favorite place to go and sit and reflect, think, relax, and be happy. Some of you might recognize this as part of the Cape Cod National Seashore. This is in Wellfleet, Massachusetts.

No doubt all of you have a power spot, a personal place that you love and go to. It might look like this, but it might not. It might be a wilderness, it might be a beautiful community garden growing in the city. It could be in suburbia somewhere, some place that someone has saved and preserved for biodiversity, or it could be a playground with happy kids. But there is that personal power place, and I want you to hold that in your mind and think about the fact that these places often tend to not look like that first image, they tend to look more like this because almost everywhere that we go there are people, there are humans who have come into this scene in some way, shape or form. Sometimes that can be a problem in terms of environmental degradation, but it can also be a wonderful thing. It can be a real solution.

The Cape Cod National Seashore is safe for perpetuity because of the actions of humans who have decided to make it a national seashore. So sometimes when I go there I see people, but I also recognize that it was through the largesse of people that we have this area. All of the systems of the world are influenced by humans. In fact, the future of conservation absolutely depends on the way that we understand, appreciate, involve, manage and deal with humans. And there are so many ways that people can be involved in the environment.
For example, we know that a lot of times people get very upset about something that is going to happen and they will go out and picket and say, “Please, no! We don’t want this!” Or maybe they’ll say, “We do want this.” Sometimes when we talk about environmental habitat preservation, we can actually get people to go out and get involved in clean-up efforts or restoration efforts, but there are so many, many other ways that we can get people involved in this whole endeavor of conservation.

For example, people can learn to ask important questions about the environment and conservation, and they can think about how they are going to answer those questions. They can also be involved in data collection projects to go out and gather the information that we need in order to achieve effective conservation. They can be involved in the decision-making process. They can take results of projects, they can take their convictions, their beliefs, and go to elected officials and other decision makers and make their voices heard.

All of us are here in this room because we are in some way, shape, or form involved in this endeavor. We call ourselves and our endeavors lots of different things.

There are all of these different names that have come up over the last few decades for looking at and acknowledging the human impact on science and conservation. We are all here for a common reason. Though we may have different names we all have a common goal or a common desired outcome.

We are going to start with examples of four different types of projects that have emerged for different reasons and from different traditions. These projects have been chosen not because they are the best or the most important, but because they are representative of different approaches that we are all going to be talking about, dissecting, and hopefully putting back together over the course of the next couple of days.
Four Case Studies

MONARCH
LARVA MONITORING PROJECT
Karen Oberhauser
University of Minnesota; Department of Fisheries, Wildlife and Conservation Biology and Extension Service

I think that the Monarch Larva Monitoring Project would classify as a traditional citizen science project. It was started by Michelle Prysby, who is here today, as a master’s project when she was a student at the University of Minnesota 15 years ago. From a scientific perspective, the Monarch Larva Monitoring Project has the overarching goal of collecting long-term data on monarch egg and larva abundance and their milkweed habitat.

Basically, what we are doing is documenting temporal patterns in monarch abundance, both within season and between seasons; spatial patterns and how they vary between and within seasons; and monarch use of their breeding habitat in the United States. We also look at mortality and get stage-specific mortality from the monitoring data our volunteers collect, and we look at qualities of a site that affect monarch breeding and recruitment into the population.

About a thousand sites have been monitored throughout the 15 years of the project. The number shown here on the slide is based on volunteers, and doesn’t reflect the fact that

Overarching Goals

Long-term data on egg and larva abundance and milkweed habitat
- Temporal and spatial patterns
- Stages at which mortality occurs
- Site qualities that affect monarch recruitment

Volunteers
- About 700 sites monitored (many volunteers have multiple sites)
- Started in 1997
Conservation Outcomes: Volunteer Activities

- **Land stewardship**: Long-term engagement in project supports “adaptive management” practices
- **Outreach and education**: volunteers develop expertise that empowers them to share their findings and knowledge
- **Environmental advocacy**: awareness of habitat loss

Many of these volunteers are monitoring multiple sites. The project started with volunteers in 1997, but it actually started in 1996, when our lab group began monitoring several sites near the University of Minnesota campus, so we have data from 1996.

In this talk I am going to focus on the conservation outcomes of this project rather than the scientific outcomes, and I am going to focus first on volunteer activities that have occurred without a lot of support from us. We have divided these activities into three categories. The first is land stewardship—stewardship of the land that the volunteers monitor. We have found that their long-term engagement with their site supports what Caren Cooper called “adaptive management practices.” The volunteers are trying out management practices on their sites that will attract more monarchs, and changing those things in response to their observations of how monarchs are impacted by what they do.

The second category of behavior in which our volunteers engage is outreach and education. They develop expertise that empowers them to share their knowledge. A lot of them work with youth, and you can see some kids monitoring a site [top photo at left]. A lot of volunteers give talks in public venues, and a lot of them speak to the media.

Finally MLMP volunteers engage in environmental advocacy. When they monitor a particular site it becomes their personal place, as Rick said. They notice the impacts that humans have and they often advocate for preserving that site and other sites that they think would be good habitats for monarchs. We receive a lot of letters from them asking us to support their activities in trying to prevent another big box store or parking lot from affecting the site that they have been monitoring.

The other big category of conservation outcomes comes from the data themselves. This is probably what most people think about when they think of conservation outcomes of PPSR projects. Monitoring data have incredible value. Conservation programs require that we understand how human activities affect...
species, species assemblages, and populations, and we can gain these data by involving the public in collecting them. The monitoring data can be used both to assess the need for conservation actions and the impacts of conservation actions. In thinking about the overall value of the data, what is probably most important for the stewards or leaders of PPSR projects is to make sure that these data are managed responsibly, that they are analyzed, and that they are published. If we don’t use their data well, the people serving as volunteers are really wasting their time.

Very quickly, here are some of the things that we would like to do. In the stewardship area we are trying to figure out how we can explicitly incorporate adaptive management and the stewardship actions that people can undertake on their monitoring land into our recruiting, our training, and our communication, to really share the outcomes of what the volunteers do in order to encourage more people to engage in these kinds of activities.

We have been focusing a lot of time on promoting their outreach and education activities. We provide a lot of materials and support for these activities, and we also support media contact with the volunteers. For example, if a reporter in Madison Wisconsin calls us about this project, we connect them with a volunteer in Madison so that they don’t just talk to us but also talk to the volunteers. We encourage volunteers to conduct training, and support their training activities with materials, PowerPoint presentations, and coaching.

We also provide information in the advocacy area that the volunteers can use as ammunition in their activities.

In summary, we learned a lot about what volunteers have done on their own to support monarch conservation, and are working to support these activities, to manage their data responsibly, and to publish our findings so that the broader community is aware of the outcomes of the project. We are convinced that these actions will help to promote conservation outcomes of our project.

More on Monarchs
You are going to have the opportunity to look at this project in greater detail and help Karen pick it apart in the next couple of days. • Rick Bonney

“Wish List”/“Next Steps”

• Stewardship
  - Explicitly incorporate adaptive management into recruiting, training, and communication
  - Share outcomes of volunteer actions

• Advocacy
  - Provide information that volunteers can use as “ammunition” in advocacy activities

• Outreach/education
  - Provide materials or other support
  - Support media contact with volunteers
  - Encourage volunteers to conduct training
I want to give you a quick overview of the Fresno Bird Count, which started from somewhat selfish reasons on my part. I am a faculty member on the California State University campus, which is very teaching-heavy but trying to maintain a research program, so I came up with citizen science as a way to help me maintain an active research program. I also began this because I am interested in questions of urban ecology. I am an ecologist trying to understand cities as ecosystems with complex social and ecological dynamics. That is the broader perspective of where I came from with this project and how the Fresno Bird Count started.

This is a Google Earth image of Fresno. The Fresno-Clovis combined area is the fifth largest urban area in California. Regarding academic motivations, one of my goals was to set up a monitoring program on birds that would give us some basic information on distribution of species across the city, with the goal of eventually continuing in the long-term so that we can see changes as the city grows. Of course, with the real estate crash, the city’s growth has stopped a little bit, but that has brought about some interesting changes in the urban system and I am hoping to unravel some of those.

With that in mind, the design was influenced by the Tucson Bird Count, which is another long-term urban bird monitoring project, using a somewhat more rigorous sampling protocol. What you are looking at on this Google Earth image is a sampling grid, which is basically a one-square-kilometer grid laid across Fresno and Clovis. Within each square kilometer, one point is chosen randomly, so there are 460 points that you are looking at here. The basic sampling protocol is a point count. All of the volunteers pick routes with seven or eight points, and they go to those points and conduct counts in the early morning. It has been mostly a spring count, so our next count starts next week and this is our eleventh year. We have also recently added a winter count, so the project is growing and we are getting some interesting data.

Below is a clearer map showing you both Fresno and Clovis and where we are with respect to the rest of California. We have a total...
Volunteers include local birdwatchers, students, and faculty from CSU Fresno—recruited via Fresno Audubon, county bird listserv, flyers on campus.

Motivation for participation includes interest in birds and the environment, concern for local water policy issues, and academic interest (thesis, class project, etc.).

What do they get out of it? They seem to enjoy the field work, bring friends along, are intrigued by results so far, and hope to become more engaged in urban policy and management efforts.

One of the things that Rick asked me to talk about is involvement of volunteers, and I was thinking about this last night. We have volunteers recruited mainly through Fresno Audubon and the local birding community as well as the campus. For example, there are student volunteers from my classes on ecology. It is a group of volunteers that is slowly growing.

There are a variety of reasons why volunteers participate in this, including general interest in birds and concern for local issues, especially water. Water has become a big issue in the Central Valley in general, with conflicts over agriculture versus conservation and so on.

The urban area fits in as a stakeholder in that as well, and Fresno is interesting because it is one of the two cities that doesn’t have water meters. Under federal mandate, Fresno is installing water meters now. That actually provides us with the opportunity to do an experiment to see what the bird count and other indicators are before metering and after metering because up until now, there has been just a flat rate and no real constraint on how much water people use because it’s not very expensive.

We haven’t really done a systematic evaluation of what the volunteers are getting out of this, but my thinking on this is that in general, we are trying to get people out to appreciate nature and birds in the community, which is surprisingly (or maybe not that surprisingly) not very common in the area. We have an Audubon chapter and are located near some major national parks. A lot of our students don’t even go out to these national parks that are nearby, which attract people from all over the world.

We are also trying to engage some local schools to see if we can get some schoolyard ecology projects happening as well.

The results we have gotten are attracting attention, especially when we tie them to issues...
One Set of Pathways Examined

- Irrigation rate will be positively correlated to the socioeconomic of a neighborhood.
- Vegetative cover will be partially correlated with an increase in irrigation.
- Bird species richness will be partially positively correlated with areas containing increased vegetative cover.
- Foraging guild richness will be partially correlated to areas of higher irrigation.

Poverty, Irrigation, & Bird Diversity

- Residential irrigation decreased significantly with increased % poverty.
- **Species Diversity**: Multivariate results indicate that poverty has strong indirect effects on bird species diversity through intermediate variables including irrigation, % grass, % open canopy, and mean grass height.
- **Guild Diversity**: Poverty and irrigation significantly affects bird guild diversity. Multivariate results show that both poverty and irrigation have strong effects on bird guild diversity through intermediate variables including mean grass height and % grass.

This has led to our expanding projects now. We have an NSF grant to look at the socioeconomic system in greater detail.

Other Pathways Being Studied

- Same sampling scheme as FBC
- Tree Diversity and Cover survey (in progress)
- Social Survey of individual households (first round complete)
- Interviews of institutional actors (key policy makers & implementers in city govt; summer 2011)
- Land Use Land Cover (LULC) analysis (preliminary)
QUEEN CONCH
(STROMBUS GIGAS) AND
RESERVE EFFECTIVENESS PROJECT

John A. Cigliano
Department of Biological Sciences, Cedar Crest College

My project is a little bit different from the
standard citizen science projects. This is an
Earthwatch-funded project, so I get volunteers
from around the world, mainly the US and the
UK, who pay to come out to beautiful Belize
and snorkel and look for queen conch with me.

Here is a one-slide background. The reason
for this project is that conch have been over-
harvested throughout their range and are
threatened in many parts of their range.

The project that I am working on is in Belize
in the Sapodilla Cayes Marine Reserve. The
broad research goal of this project is to test
the effectiveness of this reserve in protecting

and replenishing the queen
conch. We are doing a before-
after control impact study.

We were able to get to the reserve after the
reserve boundaries were somewhat set, but
before the zones were actually enforced, so
this is a nice experimental design that we’ve
been able to take advantage of.

Ultimately, we want to be able to provide
information to the co-managers of the reserve,

Broad Goals

• Determine the effectiveness of the Sapodilla
  Cayes Marine Reserve (SCMR) in protecting
  and replenishing queen conch populations

• Provide information for adaptive manage-
  ment of the marine reserve

• Build capacity in all stakeholders to ensure
  the long-term effectiveness of the reserve

• Educate volunteers about marine conserva-
  tion and the need to build capacity in local
  stakeholders
the Department of Fisheries in Belize and the NGO SEA Belize. We also want to build capacity on the part of local stakeholders and to educate Earthwatch volunteers on the need for marine conservation.

To quickly give you an idea of how we do this project, as I said, the volunteers come mainly from the UK and the US, but we also try to incorporate local participation as much as possible. We have had local university students, Department of Fisheries officers, and SEA Belize scientists. We engage local fishers and we try to engage the local community as much as we can when we are in the field but also when we are in Punta Gorda on the mainland, where we stage our research project.

We start off on dry land, where they learn how to run belt transects and how to measure queen conch. It’s a very straightforward experimental design, just collecting basic demographic parameters of the population.

Then we take them into the ocean where they snorkel. You can see [below left] some volunteer researchers measuring conch and recording data. So the volunteers are part of all aspects of the project and do everything from collecting data to data entry, and we talk about data analysis with them as well.

Here are some of the outcomes so far.

**Conservation Outcomes**
- **Provide information for adaptive management of the marine reserve**
  - All data, raw and analyzed, are shared with Belize Department of Fisheries and SEA Belize (NGO that co-manages reserve with Fisheries).
  - Meet regularly with Fisheries and SEA Belize to present and discuss findings.

The reserve was proposed in 1996 and has just been enforced last year. Right now we have four years of pre-enforcement data and one year of post-enforcement data, so we are still working on the analysis but have been able to share all of our data with the appropriate parties, raw and summarized, in reports and presentations.

We talk informally with the local community every chance we get, and we meet regularly with SEA Belize and the Fisheries Department. We have influenced the zonation of the reserve. We have been able to provide support
for those zoning patterns and the need for preserving queen conch in southern Belize and the management plan. So that has been nice.

Conservation Outcomes
- **Build capacity in all stakeholders to insure the long-term effectiveness of the reserve**
  - Work closely with Fisheries and the SEA Belize, sharing data and expertise. Engage local community.
  - Fisheries officers, SEA Belize scientists, and University of Belize Natural Resource Management students participate in fieldwork.

We have helped to build capacity in the stakeholders. As I said, we work closely with Fisheries and a Fisheries officer always comes out with us now whenever we do a sampling. We engage stakeholders as much as we can. Again, we try to have a big presence in Punta Gorda, where we go to local restaurants and hire local people for staff, so we are always out in the community talking about the research and the findings.

Conservation Outcomes
- **Educate volunteers on marine conservation**
  - Daily informal discussions on the research project and on marine conservation, focusing on marine reserves, fisheries conservation, tropical marine conservation, and the need to build capacity in local stakeholders.

For the educating of the volunteers, whether they are Belizian or Earthwatch volunteers, we live with them 24 hours a day for ten days. The biggest outcome of this is this cross-cultural education that we have, where our volunteers and the Belizians learn from each other.

Conservation Outcomes
- **Cross-cultural education**
  - Outcome that we did not consider when we designed the project but has become one of the more important outcomes of the project.
  - Living and working so closely together is a great way for people from different cultures and backgrounds to get to know each other.

Challenges
- Funding for non-Earthwatch volunteers
- Attracting Earthwatch volunteers
- Accommodating different levels of interests and expertise

Next Steps
- Continue post-enforcement surveys
- Look for funding to support more local involvement

About Project Origins
- I need to give Mark Chandler credit for the conception of this project. The Queen Conch project came out of a community meeting that Mark led down in Punta Gorda. We met with the local stakeholders and we asked the question, what information do you need to manage your resources? The project really started out of those discussions. • John Cigliano
I have tried to set up this first slide [below] to really capture the essence of the program I’m going to be talking about. The first day that this project started back in 2005, we asked all of the participants to go back home and rummage through their shoe boxes to bring back old photos of sites in the community that were important to them.

The photo on the left [below] is one of the photos that one of the participants brought back. It was of her mother and aunt and other family members out at the site I call Tú nchaa halii, also known as Big Springs. It is a prominent site in both ecological and cultural terms. This is one of the major sources of the creek that runs through this community and has a lot of cultural significance, which has actually been documented in a book called *Wisdom Sits in Places*, by an anthropologist named Keith Basso. He did work in this community over 30 years ago, partially funded by NSF. The work that we are doing here is mining some of that legacy by revisiting a lot of the sites that he visited with elders decades ago and seeing how they have changed.

The photo on the right [below] is the same area, same spot. The older woman leaning over talking to her daughter is one of the kids who was in that original photo. The idea was, what if we had all of the kids who were in that photo back in 1957 participating in observing how these sites were changing and talking about how science plays into understanding those changes? Then when they grow up, those folks are leaders and decision makers, such as Judy there, who has been on the tribal council and is president of the school board and a major community leader. That is the set-up for what we are doing.

Our goals are necessarily broad, with a big focus on trying to build community capacity. Then we are trying to weave together cultural knowledge and traditional knowledge and science to guide the restoration of cultural and ecologically important places. The tribe has had tremendous support throughout the communities and within the tribal council to restore their lands and waters. They had set aside millions of dollars from a land settlement
Goal

Build community capacity to restore culturally and ecologically important places using traditional knowledge and science

Jonathan Long

Case from the Federal Government to pay for damages that were done to the lands decades ago. They have set some of that money aside as a permanent fund to support restoration.

Of the outcomes that we’ve had, I think the one that I would highlight first for this group is greater community ownership of ecological information and the science process. Here are a couple of shots from one of the sites where students are collecting data [below left]. They have become really engaged in the process of discovery. The kids on the left are using a metal detector to try to find rebar site markers that we put in several years ago. There was extensive erosion at the site and it had been hit by a fire, so it is very difficult to find things with burned trees fallen on top of rebars. It is a little bit of an Easter egg hunt out there and the kids are enjoying that.

Conservation Outcomes

- Greater community ownership of ecological information and science process

The students on the right are resurveying one of the cross-sections and seeing how sites have changed. The site featured here is not necessarily one of the most important sites from a cultural or an ecological perspective. It has been pretty
Conservation Outcomes

- Better monitoring and more restoration treatments on community lands.

heavily degraded as the result of fire and past use, but the site has value as a place of learning. The woman I mentioned, Judy, came out to one of the classes to do a presentation on the project, and she talked about how it was important to go back here to see how the site had changed because it hadn’t been treated. So it kind of serves as a quasi-control for restoration treatments.

And then a lot of the work involves providing better support for better monitoring and more restoration treatments on community lands, and we are working with tribal programs to try to implement that.

Some of the key next steps include trying to find ways to make the data management easier and more accessible, and to make the program more durable through collaborations with tribal programs and stronger linkages between high school, college, and post-college work.

The final slide offers a taste of some of the impacts. The first year of the program, we had a lot of students back home in the community, who were not working or are single parents with young kids. But in this group from 2009, all but one of the students are in school, which is a big deal. I’ve included some census figures: only 25% of people in the community in 2000 were listed as having a high school degree, and 7% had college degrees, which would mean about 40 people in the community would have college degrees. We are on track to have a lot of the kids who have gone through this program gaining college degrees.
Rick Bonney, Project Co-Principal Investigator
Director, Program Development and Evaluation,
Cornell Lab of Ornithology

I am going to try to put what we have just heard into perspective and also talk a little bit about where we are hoping to go and set the stage here. I want to acknowledge my two colleagues in putting all of these thoughts together. They are actually the ones who do all the work, I just get up and talk about it because I’m a little bit funnier than they are. You probably all know Jennifer Shirk and the work that she has done, and Tina Phillips, who is the head of our DEVISE project, which stands for Developing, Validating and Implementing Situated Evaluation Instruments.

I know many of you in the room, while some of you I am just meeting for the first time. I have been involved in this area of working with the public for about 30 years. Some of you know that I founded what is now known as the Citizen Science Program at the Lab of Ornithology, but a few years ago we started a new program at the Lab called Program Development & Evaluation. We are small but hard-hitting, and you have three-fifths of us here in the room.

One of the first things that we did back in 2007 was the Citizen Science Toolkit Conference because we had so much interest from the field and people asking us to help them, especially with NSF proposals because they knew we had received a number of them. We got NSF to sponsor the first-ever conference bringing together people who are engaged in the practice that we now call public participation in scientific research (PPSR). A lot of survivors...
of that conference are here in the room with us today. I think we had about 130 people who wanted to come to that conference, and we were able to take about 50.

Out of that conference we developed proceedings documented by the magician also known as Cathy McEver. She put everything from that conference into these proceedings, which you may download from our website. Also out of that conference came the website, citizen-science.org, which is the work and love of Jennifer Shirk, and which we are hoping over the next few years to build into a new association for PPSR. We will be discussing that also over the next couple of days.

One of the things that Jennifer has recently introduced into citizen-science.org is a new community forum in which many of you have participated. We were appreciative of how many people signed on to the forum and spoke to each other about some of the issues that we are going to talk about over the next couple of days. In fact, some of the quotes were so good that you will have a chance to hear them later this morning.

A couple of years after that 2007 conference, the NSF funded a center called the Center for Advancement of Informal Science Education, or CAISE. One of the first things that CAISE did was to commission a paper and they asked me to head it up. It was supposed to be called “Citizen Science: Assessing the Field.” We already knew from the people we invited to that 2007 conference, many of whom we deliberately invited to challenge our thinking, that there were issues with the term “citizen science.” Sometimes it is because many of the
participants aren’t citizens of their country of residence. Also, the concept of citizenship is one that you could study for years and years in terms of whether it is really appropriate here. Although it really had a lot of cachet and caught on, we decided quite quickly that because there were so many different traditions and disciplines, we really needed to come up with another term. We decided to start using “public participation in scientific research.” I know it sounds horrible, but it really is an attempt to be inclusive and agnostic and understand all of these different traditions that are all coming together.

In that report for CAISE, instead of trying to redefine “citizen science” or “civic science” or “participatory action research,” we thought, what is going on here is that there are so many different ways the public can be involved in this enterprise called science. There are all of these different steps or stages in the scientific process, from defining a question or issue all the way down to discussing results. And really, what all of these different projects represent are different ways of involving the public in one or more different steps. There is no right or wrong, there are just different approaches here.

Consider the range of what we called “citizen science” projects. To pick on Karen Oberhauser and the Monarch Larva Monitoring Project, when that project started it was really about collecting data: getting the public to go out and collect data that we as scientists and conservationists need in order to move forward. But you can also involve your participants in so much more. They can be helping to develop explanations, they can be helping to analyze samples and analyze data. This isn’t something we invented, this is already happening, and we started to hear about it in some of the project presentations in the last few minutes. The water quality monitoring folks in particular have been doing this for a very long time. We decided we would call those “collaborative” projects.

Finally, we came to the realization that there are projects in which the public is involved from the beginning to the end. They come up with questions that are very important to them or very relevant to their community. They work with scientists to come up with a scientifically valid way of studying the issue, and then at the end they are actually doing something to try to put their results into action. We decided to call those “co-created” projects.

Again, there is no right and there is no wrong, but with all of these projects there are also opportunities to look and see if you are involving your participants to engage in all of these steps and if not, why not? Maybe

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<th>PPSR models:</th>
<th>Contributory</th>
<th>Collaborative</th>
<th>Co-Created</th>
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<td>Define a question/issue</td>
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<td>Gather information</td>
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<td>Interpret data/conclude</td>
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<td>Discuss results/inquire further</td>
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there are good reasons why you don’t want to, but maybe you can think about making your projects more inclusive.

There is a trade-off here between large and small. One of the projects we do at the Lab of Ornithology, the Great Backyard Bird Count, involves 50,000 people who contribute data to us over four days. There is no way that we can get 50,000 people to do a co-created project, but there are things we can do with that project to make it more inclusive. And then there are a lot of co-created projects right now that are small and local and are involving their participants in the whole process, but maybe there is more that they could do to connect to the next watershed or the next state or the next country. One of the things we want to do is encourage projects to look across the wide range of things that they can do to get their participants involved.

Those of you who know me know that I cannot give a talk without talking about the “circles and arrows and a paragraph on the back of each one explaining what each one was to be used as evidence against us.”*

Here is the slide. It was created by Jennifer Shirk and has a lot of circles and arrows and paragraphs on the back. This is what is sometimes called a logic model and could also be called a program model. The point of this is to say that even though we have a lot of approaches, a lot of different ways of looking at PPSR, there is one common logic model that you can look at for all of them.

We can talk about inputs. We can talk about the interests of the scientists who are trying to think about the project and what scientists would like to get out of it in terms of data, but we can also talk about the interests of the public. Maybe in a particular project we just need them to go out and count the birds, but maybe it’s a project that is really coming from the public because there’s a water issue or a clearcutting issue or something like that. So we can talk about the different inputs that go into the project and come up with the central question that is being studied.

After we know what that question is we have a whole series of common activities. There is the project infrastructure: How are we going to manage the project and how are we going to implement it? Here we are talking about training programs, website development, trying to understand how we are going to manage all of these data. There is so much that goes on here in this activities column.

What we hope for in the output from all of these activities are data and experience. We hope that we can gather the data that we need to answer the question and move forward. We

*Alice’s Restaurant by Arlo Guthrie
also hope that we are going to have experiences, things that happen to and inside the thinking of the participants.

And we hope that those outputs, which are fairly easily measured, are going to result in outcomes, which are harder to measure, but these are the things that are really going to begin to change society. We are going to have more outcomes for science, we are going to have more data and more articles in peer-reviewed journals, we are going to improve our socioecological systems so that we are actually managing them in better ways. And individuals are going to be learning that they actually can participate in the process of science and think about themselves as scientists.

Finally there is that thing that we always hope to achieve, the impact: the sustainability, the resilience and the conservation.

So even though these projects are all very different, they do have this set of things that they all need to think about. What we have started talking about is intentional design. One of the things that happens with PPSR projects is that there are a lot of assumptions that if you build it they will come, they will learn, data will result, and good things will happen. It just doesn’t work that way. Every step of this process has to be intentionally thought about, and the projects have to be intentionally designed, and we have to remember that the outcomes always feed back and we always start over again with the inputs.

Later we will be talking about how we are going to take some of these different projects and look at them more closely. We have a number of projects, including the four you already heard from, that are going to expose their soft underbellies and allow us to look at them and think about how they can be improved.

Finally, we do have a lot of outcomes that we can already point to. We already have, from the field of PPSR, a lot of research that has come out in peer reviewed journals. At the Lab of Ornithology a lot of that has been spearheaded by Caren Cooper, who is here in the room.

We do know that we have to engage the participants in critical thinking. A lot of the work that we’ve done at the Lab of Ornithology has involved trying to document that. It was Karen Oberhauser who spoke about the monarchs, and it was one of her colleagues who came up with the concept of “science bonding,” which we love. She wrote about the fact that sometimes the kids would come together on a front porch to have lemonade, but now they were bonding not only over lemonade and sports but also over science.

We know that this is resulting in environmental actions. We saw examples of that just a few minutes ago. We know that social capital is evolving out of these projects and can be measured. Heidi Ballard from UC Davis, who has done work in this area, is here in the room. We even know that sometimes improved policy is coming about. In fact, one of the
slides I showed you earlier of the picketers was actually sort of a faked slide because what those picketers were really doing was taking the results of their community project on hog farms and the deleterious effects of hog farms on their lungs to city hall and getting some changes made.

So we do know that there are a lot of outcomes that are already happening, and what we are about here is trying to see if we can get more. This whole field is still in its infancy in terms of us working together to build infrastructure. There is so much happening and there is so much more that we could do, and it is really just a very exciting time. Much of this is sponsored by the National Science Foundation, and we really appreciate all of the funding that they have provided to move this forward.

There is a whole movement right now in the infrastructure of informal science education. CAISE, the Center for the Advancement of Informal Science Education, is building infrastructure across the field. We are going to have an information commons soon, so that when you sign in to informalscience.org or exhibitfiles.org you are directed to one common way of searching for and finding ways of getting into those types of projects.

I already mentioned the DEVISE project that Tina Phillips is heading up, developing generalized and customizable evaluation instruments for PPSR. That is funded by NSF, and there will be an opportunity tomorrow to learn more about it from Tina and become involved in that project in which we are trying to develop methodologies to allow anybody to not have to reinvent the wheel to begin getting similar baseline information for participants and then measure change with their projects.

There is a gigantic need for data management infrastructure. How can we build common platforms so that people can start these projects without having to reinvent all of these smart data forms and ways of warehousing data? Greg Newman and Alycia Crall, both of whom are here, have been spearheading a lot of that work and we will have an opportunity to learn more about that. DataONE is a huge project sponsored by the National Science Foundation that is working to federate all of the biological databases in the country so that they can all speak to each other. That has a citizen science working group, which I am co-chairing along with Jake Weltzin, who is here in the room. I am sure I have forgotten to mention some of the really important infrastructure work, but we are still at the beginning of a really exciting movement here.

scienceforcitizens.net

In talking about infrastructure projects, there is one more I would like to mention. We have all of this NSF funding to support projects working on building the infrastructure and then we have Darlene Cavalier (co-founder of scienceforcitizens.net), who is at this session, doing this on her own with no funding whatsoever. If you haven’t already, you really need to look at scienceforcitizens.net because it provides a terrific interface for the field. • Rick Bonney
As we wind up and move into the next presentation, we have seen a lot of slides and pretty pictures and we’ve seen a lot of circles and arrows, but I want to leave you with a song.

This is by a dear friend of mine, Walkin’ Jim Stoltz. He and I are the same age, 57, and both started hiking the Appalachian Trail at the same time, which had a huge, profound impact on each of our lives. Unfortunately Jim just died this year of cancer. This is one of my favorite Walkin’ Jim songs.

To stand and to move this forward, we need people to know what to do, and one of the masters at helping people know what to do is the National Audubon Society under the direction of the Vice President for everything important, Judy Braus, who is up next.

There is power, there is power in a band of folks that care
When they stand, hand in hand.
That’s a power, that’s a power
Must be heard throughout this land
For the Earth now we must stand.

Come all you folks, from all over the land,
Sing out for the Earth, come on make a stand.
No more Love Canals, no more dyin’ seas,
Come on do you share and sing with me!

(Chorus)

What gives us the right to soil and destroy
The Earth is a home, it isn’t a toy.
Life has no place in a stripped over land
Come on do your share, lend a hand.

(Chorus)

Lyrics from Power in the Earth by Walkin’ Jim Stoltz

Rick Bonney on guitar
Judy Braus, Project Co-Principal Investigator
Senior Vice President for Education and Centers,
National Audubon Society

I am really happy to see everybody gathered here and want to thank Meg Domroese and Eleanor Sterling and everyone on the planning team for getting us together. I will be talking about a new resource that is coming out that I hope will be useful to everybody in this room, and I will also explain the link to PPSR. It is called Tools of Engagement and is a planning tool for conservation. A number of people in this room have been working on it and you will all get a copy. We would love to have your feedback.

You are the first group to see this document. It is a BETA version and is going to be posted on the Web, and I will be telling you more about that and what we are going to do with this toolkit as a result of this workshop. I would like to give you an overview of the thinking behind the toolkit, a quick overview of what’s in it and what’s coming, and then how it links to the PPSR workshop.

Why a toolkit and how did it all start? People in this room who know me know that I have been talking about this toolkit for years, and we finally have a product. It started when I was working at the World Wildlife Fund (WWF) and a group of us were talking about the role of education in a conservation organization or agency. There were a number of us who got together and really thought about how education fits in a conservation realm and how education helps lead to conservation outcomes when we know what really works.

So a lot of us have been thinking about this for a long time. We were thinking about education and then broadened that to think about what...
are all of the tools we have, including education and other social strategies, that can help us accomplish our conservation goals.

*How do we build a stronger conservation constituency? How do we sustain our work?*

How do we build a stronger conservation constituency? If we are making some progress, how do we sustain that progress?

Then we talked about the idea that when you look at how a lot of organizations are structured, you’ll see the science and policy experts situated in different places, the educators somewhere else, then the communicators somewhere else.

As a field, we have been looking at what integrated conservation really looks like, how it works in organizational structures, and what it means for practice on the ground. We all know that conservation is about people. It is about people doing things that are going to either help or hurt the environment. When we think about how we are going to plan a conservation project, how are we thinking deliberately about what we are doing, as Rick talked about? What is the people part of that?

That is part of the thinking in the development of this toolkit. It starts with thinking about what are you shooting for. What are your conservation targets, what are your biodiversity targets, and what are your human welfare targets? And it involves identifying the threats to those targets and the root causes and behaviors that are causing the threats. Which audiences do you need to reach and why, and what do you know about those audiences? Which messages are going to resonate? What strategies are you going to want to use and what is your theory of change? It involves trying to think about your process instead of just jumping ahead to a tactic, and trying to think about it with a people focus in mind.
That is where the *Tools of Engagement* came from, and we had a lot of trouble with the title, just like “PPSR.” We didn’t really like the acronym “TOE.”

The audience for the toolkit is conservation professionals: educators, communicators, project managers, scientists. The educator side of the realm and the outreach side really need to think about the conservation side if you’re working for a conservation agency or organization, and the scientists or folks who have not come up through the social sciences need to think about the people side. How can we work together and think more deliberately about that?

We built it on the Open Standards for the Practice of Conservation.

They were developed by The Conservation Measures Partnership, formed by a group of conservation organizations that got together about five years ago and started collecting the best practices of what we know works in conservation planning. It’s an adaptive management process, very common sense, and there is a lot of good stuff there, including a software tool called Miradi that some of you might have used. This is really helpful in thinking through your conservation project.
Integrate the People Factor into Conservation Planning

What we wanted to do with the toolkit was take it a step farther and really focus on the people part. In addition to identifying your biodiversity targets, what is the role of engaging people along the way?

Initially we have been funded by the Environmental Education and Training Partnership, which many of you in the room are familiar with, and that ended in December of last year. It was a consortium of organizations funded by EPA and they helped support this, which has been terrific, and it has really been a collaborative project.

Environmental Education and Training Partnership

EETAP: a consortium of organizations

Audubon was a lead partner in this, and then we worked very closely with the U.S. Fish and Wildlife Service and Janet Ady. Janet and Georgia Jeppesen were really helpful, and together we were trying to take the lead on this, but a bunch of other people have contributed, thought about it, and reviewed it. It has really been a collaborative effort.

The U.S. Fish and Wildlife Service
Janet Ady and Georgia Jeppesen

Great Team!
Ohio State University (Joe Heimlich), Stanford (Nicole Ardoin), Disney’s Animal Kingdom, National Aquarium, AZA, Spitfire Strategies, and a number of others... including colleagues at Audubon (Robert Petty, Tess Present, Mary Ford...)
involving scientists, policy folks, educators and communicators and having them talk together.

We did some homework before we put this together, and a number of you were involved in some of those surveys and interviews and literature search. Joe Heimlich and Nicole Ardoin did a lot of that up-front work. We also interviewed CEOs, asking them whether they think about education, and why or why not, and what they think about the social strategies. We collected all of that and have access to that information if anybody is interested.

And of course we pulled from all of the great work that is out there, and this is just a tiny list. We pulled from the work of a lot of you in this room including Martha Monroe, Susan Jacobson, and a lot of other folks.

We were looking at all of the ways we engage people. Education is critical, but we broadened the search from there to look at all of the ways we get people involved in our projects. What do we think about? If you’re coming from a human communication point of view, you are thinking about communication, advocacy, and social marketing. In the toolkit we are emphasizing some of the highlights.

Think about environmental education: Why use education? Why think about education as a tool to help us achieve our conservation goals as well as a way to help us achieve education goals? For something like environmental education in the toolkit, we refer to Martha Monroe’s book because we don’t want to reinvent the wheel.

But we do want to really think about what’s different about communication and education, about the experiential learning cycle, so critical to how we learn and how we form a new world view.

We want to consider critical thinking. Rick Bonney was mentioning that, how important critical thinking is in terms of developing environmentally literate citizens. We want to think
about that in terms of the work and why you are doing something.

Use Critical Thinking When Making Decisions

You also might want to think about social marketing. If you have identified an action, how do you get there, how do you get through the barriers?

Social Marketing

- Awareness
- Knowledge
- Relevance
- Trial
- Assessment
- Sustained Behavior

In the toolkit, we have some case studies that highlight how education, social marketing and other social strategies actually do help us get to our conservation goals.

And of course there is advocacy, and Rick mentioned this as well. There is advocacy on education, on conservation issues, but the tools of advocacy often use education and communication. They all overlap. The words can get us into trouble because we sometimes create silos.

Advocacy

- Focus: Policy
- Persuasion
- Skills
- Goal: Political Action

We also wanted to look at what we know about what it is that makes people take action, all of the different things that influence action. What have we learned from the research that can help influence our project planning and think about it more deliberately?

We looked at audiences, at which audiences and why. We often talk about the general public, which, when you think about it, is not really an audience. It’s really hard to do any targeted messaging and programming when you group everybody in one giant group. So who is causing the problems that you’re working with? Who can influence the people causing the problems? How much do you know about your audience? How much do you know about

Give Swordfish a Break!

What do we know about taking action?

- Which audiences and why?
- Who is directly causing the problems?
- Who can influence the people causing the problems?
- How much do you know about what makes them tick?
- What do they care about? What’s in it for them?
what makes them tick? How much do you know about what they care about and what they want to do? What’s relevant to them? And what’s in it for them if they actually do something different?

Then we looked at some of the barriers to engagement, which is an important part of understanding why people don’t do what they say they will do or what we hope they will do. There are many barriers to engagement. For example, people might not see your issue as their issue because you haven’t made it relevant. Or you haven’t formed a good working relationship with the individuals or groups you hope to influence.

In project planning, thinking about identifying the right audience for your project and identifying your strategy is critical. We found that is a critical part that takes a lot of time, a lot of relationship building, a lot of thinking, and a lot of community assessment. There are many things in the planning process that you think about, and then you make decisions and take a stab at something.

We also tried to look at short- and long-term strategies. When you are doing a conservation project or plan, you are often thinking about the immediate, about emergencies, about tomorrow, about how we are going to get there. But what are the long-term strategies that fit into that thinking? We might want to change societal values. Okay, how do you build that into your project planning? You need to think about that and be able to articulate your theory of change.

When you’re thinking about your theory of change, think about it in these terms: “If I do this, then I expect this to happen, and then if I do this, then this will happen, and eventually I’ll reach my goal.” It’s outlining the logic of your project and how you will get to your goal. It’s not easy, and some of the research is a little fuzzy in terms of how to help you do that.

This toolkit was an attempt to pull a lot of this together in one place. We divided into 20 steps. It’s important to know that those steps aren’t linear and you will need to revise and go back, as needed. You will also want to skip around. But good planning starts with what you
are trying to do and then, building on the Open Standards, determine how you will identify and engage your target audiences.

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<td>Understand the Problems and Context</td>
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<td>The People Factor</td>
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<td>What are you Going to Do?</td>
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<td>Planning Tools and Other Helpful Stuff</td>
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<td>Appendix (Glossary, Resources, etc.)</td>
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I want to note that we worked with Spitfire Strategies, which is a wonderful communications outfit. If you go to spitfirestrategies.com, they’ve got many wonderful resources online about how to think about people taking action and communication strategies. They’ve got something called the Smart Chart, so if you’re developing a project and want to think about your communication strategy, you can download this chart and really think it through. They helped us a lot in terms of thinking through the messaging and some of the communication strategies.

Then we have included some tools, many of which came from a lot of you in this room. For example, there are tools from Ed Salt’s Training Resources Group in terms of how you might facilitate some of these discussions. For example, how to dig into root causes or identify your target audiences. Again, this is a BETA version and we expect to make changes and update as we get more feedback.

We are currently working on a set of appendices to the toolkit. The entire toolkit will be available as a PDF on the website, and these four modules are in the works right now. One is on influencing conservation action and what the research says. We have been working with Joe Heimlich, Nicole Ardoin, and Christy Merrick to gather the research and summarize it into digestible and helpful bits for practitioners. And as you all know, some of the research is conflicting. We are trying to identify what we know from the research that can help inform practice. We have written this section in a question-and-answer format and hope to keep updating as we learn more and get additional feedback.

As I mentioned, we have about 20 case studies that we’ve gathered from around the world that illustrate how people have used social strategies to help achieve conservation goals. We have tried to find case studies in which people have actually done some evaluation.

The third module is on diversity and the conservation movement. Tony DeFalco has been helping us with that, along with Marcelo Bonta and Angela Park. This module looks at the issue of diversity in the conservation realm and what that means, and includes some practical thinking about how you can think about and increase engagement of people with different ethnicities and backgrounds. We think it’s going to be a helpful tool.

Appendices

1. Influencing Conservation Action: What the Research Says
2. The Case Study Collection
3. Diversity and the Conservation Movement
4. Why Storytelling Matters to Conservation
Then there is storytelling and why storytelling matters to the conservation movement. We have been working with Michael Margoulis and Terrence McNally and others on the value of storytelling and getting your message out in compelling ways. So these four appendices are in the works.

Regarding next steps, again, this is a BETA version and we would love your feedback. This will be posted on audubon.org/toolkit soon. The appendices will be coming in the next two to three months. We really hope this is a useful resource for all of us in the field of PPSR. One of the things we are going to be looking at during this workshop is a module specifically on the link between PPSR and conservation. With Rick Bonney, Eleanor Sterling, Meg Domroese, and all of you, we will be looking at what makes sense in terms of helping others who couldn’t be here pull all of this together.

That, in a nutshell, is what the toolkit is all about. We would love to have your feedback, and we look forward to working with all of you on the module focused on citizen science and conservation.

Questions?
jbraus@audubon.org & rpetty@audubon.org

Next Steps

- This is a beta version. We’d love your thoughts. PDF will be posted on audubon.org/toolkit soon.
- Appendices should be completed in the next several months. Lots of people in this room are helping (Martha, Carol, Joe, etc.)
- Hope it’s a useful resource for everyone working in PPSR.
- Will be working with many of you to develop a module that integrates what we talk about here—and the relationship between PPSR and Conservation.

Feedback

Photo by Gerry Ellis
Pre-workshop Feedback on Challenges and Opportunities

Introduction
Anne has done a tremendous job of bringing together the rich input we have gotten through the application and survey process for this workshop and through the online forum. She has boiled this down to some points that can serve as the focus for discussion. • Meg Domroese

Anne Toomey, Project Assistant
Project Assistant, Center for Biodiversity and Conservation, American Museum of Natural History

As Meg said, we spent a lot of time boiling down all of the surveys and applications that everyone filled out prior to this workshop. We received over 200 applications and surveys all together. When I joined this project, the first task was to come up with an agenda, and to do that we started reviewing all of the responses.

To give you some idea of the quantity of information that we had, the responses to one question that asked, “What are the challenges and opportunities that you see for PPSR?” resulted in a 67-page, single-spaced Word document. The points on the next few slides were derived from that document and should give you an idea of how the project team came up with the agenda for this workshop, the main issues we decided to focus on, and the key questions. In addition to the applications and surveys, we have also been mining the online discussion forum to continue to shape the agenda, and it has been an ongoing process up until last week.

Rather than going into detail at this point, I am just going to offer an overview of the challenges and opportunities that we face. This [above] is a word cloud from the 67-page document, showing the main words and phrases that came up. The challenges and opportunities boiled down to three main areas that we identified: the scientific debate, opportunities for learning, and translating into conservation.
Challenges and Opportunities

- The Scientific Debate
- Opportunities for Learning
- Translating into Conservation

There are actually many areas and those areas overlap considerably between science, opportunities for learning, and conservation, but here are four simple points in the scientific debate category.

Then we have opportunities for learning and again, these are just four of the challenges in this area.

And finally, it was mentioned in so many of your applications that the most important part of all of this is translating it into conservation. It’s great to have good science, it’s great to have scientific literacy and learning about conservation, but the most important part is that it all actually makes a difference. Some of the challenges involved in order to do that are listed here.

This final slide illustrates some of the expected outcomes, which are connected to the challenges. In the area of science, desired outcomes include research protocols, interdisciplinary collaborations, and data reliability and credibility. In education, you are looking for scientific literacy, individual and social learning, increased social capital, and direct experiences with nature. For conservation, some hoped-for outcomes are biodiversity management, attitude and behavioral changes, and stewardship and advocacy.

Then there are some cross-cutting issues, such as having good online databases, communication across networks, and what I think is one of the most important issues, diverse knowledges and ways that scientists and communities can work together and share different perspectives and ways of looking at the world.
Workshop Goals and Objectives

Ed Salt, Facilitator
Management Consultant, Training Resources Group

The previous presentations are part of what we call setting the stage, and as I listened to the range of what is happening in the world of PPSR, I think we have achieved that. We have been informed and we have been inspired, and I think that was certainly our objective for this first portion of the workshop.

Anne just shared with us a little on framing the challenges and opportunities that we are going to be talking about over the next two days. When I became involved in planning for this workshop with the organizing committee, there was a different kind of challenge and a different kind of opportunity. There is no shortage of things to talk about, there is no shortage of things to work on. How do we use the time? Our ideas evolved from week to week and I am going to share with you a little about how we met that challenge of figuring out how to structure our time.

First, there is our overall goal, what it is that we are looking to do here. It is to collect and document some best practices from our very rich experience for engaging the public in these challenges and opportunities. The intent is to build on the work that you have all been involved with, and to do that in a way that creates a product that allows others to use and benefit from what we do here.

Objectives

1. Share success stories and take stock of progress in linking PPSR and biodiversity conservation
2. Identify key strategies for developing conservation-related PPSR initiatives that contribute to participant learning and to scientific/conservation knowledge for society
3. Generate ideas for promoting communication, networking, and partnerships among individuals and organizations working in PPSR and conservation

Goal

Identify best practices for engaging the public in participatory scientific research that contribute to conservation action and environmental stewardship

The specific kinds of things we will do to reach that goal are outlined above. You have already begun to hear the sharing of experiences, and we will have the chance to go much more deeply into some projects that your colleagues here have been working on and to draw lessons from that experience.
The second thing we are going to do is not just talk in a general way, but instead focus and identify specific kinds of actions that can be taken. Rick Bonney already previewed this when he talked about intentional design of projects. We are going to engage in activities that will enable us, as we plan, design, and implement projects, to intentionally think about how we can take into account those best practices that we are talking about.

Finally, we are going to be exploring where we go from here. There is clearly already a network in this room, a group of people committed to this work. We are going to be taking some time to talk about how we might extend and enrich the networks that you are a part of in the support of this work.

So that is the overall goal and the three specific objectives that we will be trying to pursue in our work together. Let me just say a little about how we will go about this. We are going to begin by looking at what has been created out of the community forum regarding identification of the key questions about this field and the world of PPSR. As we planned this workshop, we recognized that these are questions that don’t as yet have answers. They are sort of the frontier questions, the questions that we are all working on, whether we realize it or not, and whether we have organized it in our minds in those kinds of ways. These are the questions that we would really like to be able to answer.

Let’s identify those, let’s talk about those, let’s realize the factors involved as we move this field forward. You will have the opportunity to share your experience in working with those questions. You will have the opportunity to spread out, work in small groups, and really talk and engage with each other.

The second activity we will be doing will involve looking more deeply at seven cases, four of which you began to hear about this morning. We will be looking at those cases in terms of how they are addressing those larger questions. As those projects walk through those steps of project development, what are the best practices that are being used and what other best practices might be used? We are going to try and draw out some deep thinking using these projects as focal points.

The third activity is a little different. We will be doing a design studio activity, and this is the most wide open of the things we are going to do. It will be a chance to think about the “what ifs.” What if we had an opportunity to do—fill in the blank? What are the possibilities? What might we imagine? It is an opportunity to take some of the work accomplished up to that point and look toward the future.

Finally we are going to put careful attention on the question, where do we go from here? We want to be able to walk away with a more considered plan for actions we might take as a result of our work here.

Workshop Evaluation

Joe Heimlich, Evaluator
Professor, OSU Extension, School of Environment & Natural Resources, and Environmental Science Graduate Program and Senior Research Associate and Director, Institute for Learning Innovation

Evaluation of the workshop process is an interesting thing because we don’t really care how it affects you or if you like it. What we really want to understand is, how does it work? There are three assignments you are going to be given during the course of this process. First, I will be taking individuals aside at various points for a five-minute interview. Those intercepts are an attempt to track “group think” during the process. Toward the end of the workshop we will be giving you a typical feedback form, but we will be using that as a baseline for follow-up interviews we will be conducting with you in a few months. We are more interested in what happens from this than we are in how much you like it. I look forward to talking to each of you.
That is the plan we came up with. We have tried to combine plenary discussions with some really good smaller group discussions where there will be opportunity to hear from others and to contribute ourselves. That range and variety is part of what we are looking for over the next couple of days.

**PROCESS QUESTIONS/COMMENTS**

**Need to Generate Specific Benchmarks**
- I am really struck by these objectives relative to science, which is where I come from, and conservation resource management. Without throwing a wrench into the works, I would like to suggest that when people are talking in small groups, they consider identifying very specific benchmarks of success and not just key strategies or best practices because if we can’t prove that we are making a difference in science and making a difference in conservation, we are just self-affirming what we are doing on the education platform.
  - Julia Parrish, Professor of Aquatic and Fishery Sciences, University of Washington

- This is a suggestion early on that as we talk about best practices, it is a best practice to talk about benchmarks, so we are to include in our discussions, as we identify those best practices, how we might benchmark our progress or how we are benchmarking our progress in achieving those best practices.
  - Ed Salt

**Distinction Between Conservation and Advocacy**
- To elaborate on what Julia just said, I want to point out that NSF was initially concerned about the fact that we were even holding a workshop on conservation outcomes. To them, every time we said the word “conservation,” they heard “advocacy.”

  I want us to not only remember what Julia said, but to also remember that we are looking at the field of conservation science and conservation biology. If, as a result of becoming involved in conservation science, we have participants who become advocates, well that’s an outcome that we can document. But we are not here talking about advocacy, we are talking about gathering data and helping to come up with conservation plans and outcomes that are based on our best understanding of science.
  - Rick Bonney

**Participation in Action**
On day two of the workshop, participants had the opportunity to go on an early morning bird walk led by Madhu Katti and David Burg, a local naturalist who directs a non-profit conservation organization in New York City. Results of the walk were uploaded to eBird.
Upon registering for the workshop, each participant received a word cloud name tag highlighting the activities, experience, and passions included in their biographical statements. As an introductory activity, during the first break participants were asked to stand, read the word clouds on the name tags of those in their proximity, and get to know others at the workshop.