

**Greenspaces Environmental Education Grant
Final Report for Contract No. 921701**

Native Pollinators Workshops



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Grantee:

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Executive Summary

There is a growing awareness of the threats facing native pollinator insects and the resulting decline in their populations. Information and support for land managers and educators wanting to take action to reverse this decline is hard to find. The Xerces Society applied for a Greenspaces Environmental Education Grant to present training workshops to help fill this gap. This grant supported the planning, preparation, and presentation of two one-day workshops on native pollinators, particularly native bees.

The workshops were targeted at educators and land managers. Thirty-three people, from a wide range of government agencies, schools, nonprofit organizations, and local groups, as well as private landowners, attended the workshops. Work on the project began in January 2000, building up to the two workshops on May 24 and June 14, 2000. Preparation included research, writing of training materials, creation of a demonstration site, and preparation of a workshop handbook. The workshops were a great success, and well received by the participants.

Since the workshops, contact has been maintained with many of the people who attended. They have taken the information and incorporated it into their own work. Subsequent activities have included school activities, discussion of pollinators in a trail guide, Eagle Scout projects, and guided walks. The materials developed as part of this grant continue to be updated and used as part of the Xerces Society's pollinator conservation program.

Grant Activities

Most of the grant activities were focused on the months leading up to the workshops. Considerable time was put into research to gather information and materials for the workshops. During the first six months of 2000 progress on the project followed the timeline outlined in the grant application, resulting in the workshops happening on schedule.

Workshop planning

Target audience

Two workshops were proposed: one for land managers, and one for educators. The basic content and structure of the days would be the same. Bringing together people with similar interests and facing similar situations would encourage greater sharing between participants. In the end, educators and land managers attended both workshops, though the first was mostly educators and the latter mostly land managers. It was definitely an advantage to have the workshops for people with similar interests.

Choice of dates

Timing of the workshops was planned so there would be active bees and enough diversity of flowers for study. We also wanted to have it early enough in the season to allow people time to do projects the same summer, though for some, fitting in with the school terms may not have made this possible. Since part of this project was for Xerces staff to develop a quality workshop, there was a gap of three weeks between the two days to allow time to revamp the workshop after getting feedback from the first day. The dates of the workshops were May 24 and June 14.

Location

The workshops were held at the Tualatin Hills Nature Park and Interpretive Center in Beaverton. The Nature Park was a lovely place to hold the workshops, providing a combination of a pleasant training room inside and diverse habitats for the outdoor component. The Nature Park also generously allowed us to use the facilities for free, an in-kind donation that helped finance this project. Another attraction of the Park is that although it is on the westside of the Metro area, it is easily accessed by MAX, allowing participants car-free transportation.

The help and cooperation of the staff at the Nature Park and Interpretive Center greatly helped in preparing for these workshops. During the weeks prior to the events, staff took a keen interest in the nesting blocks that were erected, and their care in preparing the room made the actual day smooth and enjoyable for both the participants and organizer.

Workshop structure

We realized from the very beginning that there was far more information about bees than we could ever fit into one day. The workshop was intended as an introduction to the amazing world of bees and their importance in our environment, rather than an opportunity to bewilder people with too much information!

The workshop was structured so participants gained an overview of pollination and bee biology, an introduction to surveying and identification of bees, and guidance on conservation measures. The day included:

- Perceptions of bees: bees in literature, art, and popular culture;
- Plants and pollination: the basics of flower structure, methods of pollination, and the range of pollinating animals;
- Bee biology: diversity of bees, life cycles, nesting habits, foraging behavior;
- Walk in the Nature Park: looking at flowers to see how they achieve pollination, looking for bees, discussion of habitat features, the demonstration site, and pan-traps.
- Bee identification and collection: why collect, pan-trapping and equipment, introduction to bee morphology and ID keys;
- Habitat conservation and educational activities: foraging plants, nesting sites, school and interpretive activities.
- Evaluation session: open forum, evaluation forms.

(Appendix A contains the schedule for the June 14th workshop.)

Evaluation by participants

From the perspective of the organizer, getting feedback from people was one of the most important parts of the workshops. At the end of both days, time was scheduled for each person to complete a brief form before they left. People were asked to grade each session on a scale from 1 (bad) to 5 (great). For the first workshop this was just a simple grade for each session. On the second day this was changed to give two grades per session, for content and presentation. Suggestions from the first day were incorporated into the final planning for the second workshop, which improved both that day's schedule and the

quality of presentation. Summaries of the grades and comments are given in Appendix B, and the evaluation form used for the second workshop is in Appendix C.

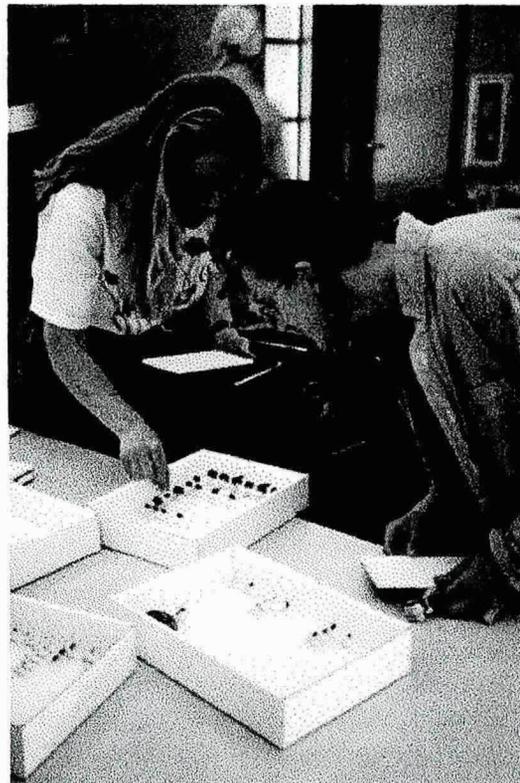
Recruitment

It was decided to limit the number of participants to fifteen per workshop. As these were somewhat experimental workshops, this number was chosen so the group would be manageable and there would be enough bees to go around. A flyer was created and circulated via email networks. People signed up from this advertising, and two weeks before the event more details and location information was mailed.

Workshop preparation

Research

One of the major tasks in preparing for the workshops was research to gather information that was both relevant to the issue of pollinator conservation and appropriate for the level of participants. This is not meant as a slight on the people at the workshops. Most of the literature on pollinators, especially native bees, is in scientific journals and monographs. These assume a significant pre-existing knowledge of the subject, and contain far more information than is needed for the workshops. In preparing for the workshop, this information had to be distilled so that it was in a format that people would want to use. Achieving this involved extensive review of published texts and Internet searches for on-line resources.



Using the pinned collection to identify bees.

Teaching aids

For the first workshop, the number and quality of visual aids, particularly overhead view foils and slides was inadequate, something that was mentioned in several evaluation forms. These were improved for the second workshop.

To help with the bee identification session, a pinned collection of local bees was prepared. This gave an indication of local bee diversity and specimens for use on the two days. Most had been caught in the local area during the couple of months prior to the workshops. The ideal would be have several boxes, each containing the same selection of bees, so that participants would have a box between two people. This would require a more intensive period of collecting and more specimens, but should be achieved for future events.

One thing that we had hoped to do, but were unable to, was to compile a slide library. Images of bees and other pollinators are not readily available, and most are not of Oregon species. Also, quite understandably, many photographers want payment for use of their slides, which was beyond our budget. This would be a hugely valuable resource for future workshops, and we are continuing to pursue this.

Demonstration site

In April, four nesting blocks were put up in a small area of the Nature Park. Two styles of block were used. One was a commercially produced block for orchard mason bees, and the other three were homemade blocks designed to provide for a wider range of bee species. By the dates of the workshops these had been occupied by native bees, so the success of the idea could be shown. Participants could also readily see the different materials used by different bees to fill and seal the nesting holes.

On the days of the workshops, a line of pan-traps was set out in the morning to demonstrate the collecting technique. By the time the group reached the area, bees and other insects had been caught.



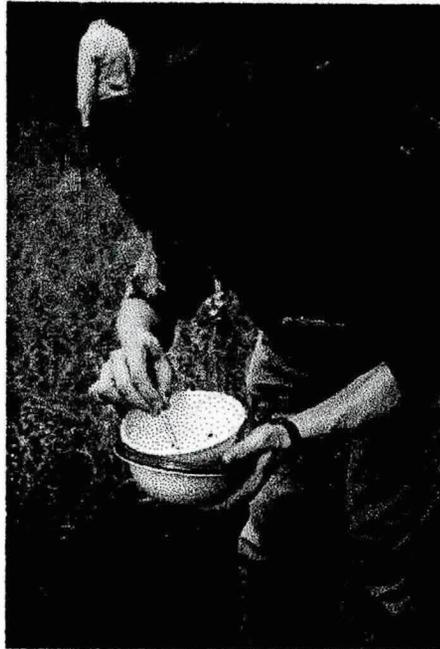
Inspecting a bee nesting block on the demonstration site.

Information pack

A major product of this project is the workshop information pack, which every participant received. This gave people an easily accessible source of information to turn to for help when planning and implementing their own projects. The pack contained eleven documents (over sixty pages) specifically written for the workshops, plus copies of articles and book chapters, and lists of books, organizations, and websites; just over 150 pages in total. A copy accompanies this report.

Participants

A total of thirty-three people attended the two workshops (sixteen on May 24 and seventeen on June 14). In addition, there were two people who had hoped to attend but could not at the last moment. A copy of the information pack was sent to both of them. These people came from a wide range of organizations and backgrounds, including agencies, nonprofits, environmental education, grade school, commercial nurseries, community farms, master gardeners, ecological consultants, park managers, and private landowners.



Checking insects caught in the pan-traps.

After the workshops

Contact has been maintained with many of the workshop participants, and assistance given with their own pollinator-related activities. These have included:

- Ranger walks around nature parks;
- Trapping activities with school children;
- Construction and installation of nesting blocks as an Eagle Scout project;
- Talks in schools;
- A discussion of the importance of pollinators in a trail guide book;
- The training materials have been useful in other Xerces Society work.

Evaluation

Comments from people attending the workshops were very useful in determining whether we were heading in the right direction or not. There were a number of suggestions on how to improve the workshop (inevitable when you have a room full of educators!), but the overwhelming reaction from participants was that the days were a great success. The comments also reflect the wide range of interests and backgrounds of the people at the workshops. Appendix B has a summary of grades and comments from both workshops.

The problem is fitting it all into one day. Pollinators and their conservation is a complex subject. We feel that for people to be able to address the decline in pollinators, they need to have a sufficient understanding and knowledge of both basic entomology and pollinator biology. The risk is that a single day could end up as a series of presentations rather than an interactive workshop. To adequately cover it all, either a multiple-day workshop or an introductory daylong workshop followed by a series of optional, shorter workshops on particular subjects would be needed.

Some aspects of the workshops worked really well, and will form the core of future workshops. These were:

- Overall, the content was good and the information was pitched at the right level, providing participants with a good introduction to pollination, native bees, and conservation measures.
- The introduction challenging perceptions of bees made people aware of the diversity of bees and how they don't all live in hives.
- The pinned collections were a valuable teaching aid, as they illustrated the diversity of species, and range of sizes and colors of different species.
- The demonstration site with nesting blocks already occupied was an effective way to show that they worked.
- Going outside to find bees and look at the ways in which flowers are adapted to pollination (including several "wow, cool" moments, especially the lupine flower) really helped to illustrate what was happening.
- People felt there was a great atmosphere that encouraged questions and discussion throughout the day.
- The pace of the workshops was good ensuring no one felt rushed.
- Providing lunch was valuable, as it created a social time for the groups and an opportunity for informal contact between participants and the presenter.

One of the weaknesses of these two workshops was that we did not put enough time into thinking about how the workshops would be presented. Most of the preparation time was spent gathering information and compiling the information pack. The presentation could be improved; indeed, it was between the two workshops. A few specific things that could be done to improve it further are:

- The morning could be re-structured so that the early sessions lead better into the outside time. To achieve this, less information would need to be presented. In the bee biology session, for example, three or four genera of bees could be used as case studies, each one outlining a different nesting habit or foraging behaviour. This would allow a deeper discussion of bee-flower interaction, from which general bee

behaviors could be understood. This could then be used as the basis for a scavenger hunt-style activity when the group goes outside.

- The pan-traps could be set up by the group as the first activity, and then collected at the end of the outside session. (They were set up before anyone arrived.)
- More time needs to be allocated for the session on conservation efforts.
- A more complete collection of pinned bees would be valuable for the identification session. In the time available, this session can never be more than a brief introduction, but it is an important starting point for people to better understand the diversity of bees on their sites. Knowing what bees you have is also a good starting point for deciding which conservation measures to take.
- A slide collection and improved overhead projector view foils would improve the workshops.
- It would be good to present workshops to people with a common interest, such as the land manager/educator split originally intended. This would allow more focus and more detailed discussion on specific aspects of shared concern.

Conclusion

The object of this grant was to create and present two workshops on native pollinators. This was successfully achieved on schedule. In addition to the increased awareness of pollinator insects engendered by this project, products from this grant included:

- Presentation of two day-long workshops;
- Thirty-three people from a wide range of organizations and backgrounds received training;
- A 150 page workshop information pack was produced;
- Participants have taken their knowledge and used it to generate new pollinator projects.

The legacy of this project continues to grow as the materials produced, and research work done, continue to be valuable in the Xerces Society's on-going work to protect and conserve pollinator insects.

Photo credits

Beverly Koch and Jennifer Thompson, two workshop participants took the photographs used in this report. My thanks go to them for not just taking these and other photos, but for also giving me copies.

Appendix A
Workshop outline

9.30 am	Welcome and introductions
9.40 am	Peoples' perceptions of bees
9.50 am	What is pollination?
10.00 am	All you've ever wanted to know about bees, and a bit more
10.45 am	Break
11.00 am	Outside
12 noon	Lunch
1.00 pm	Bee ID and collection
2.00 pm	Conservation techniques
2.45 pm	Break
3.00 pm	Project planning/forum/Q&A/filling in feedback forms
4.00 pm	Go home

Appendix B

Summaries of workshop participant's feedback forms

The feedback form asked people to grade each session from **1** (bad) to **5** (great). For the first workshop this was an overall grade, for the second workshop it was for both content and presentation. The grades are noted below as the number of 1's, number of 2's, etc. The comments and suggestions have been taken from the forms. When the same comment or suggestion was made on different forms it has not necessarily been repeated.

May 24th workshop

Session 1: Peoples' perceptions of bees

Grades: 1: 0 2: 0 3: 5 4: 6 5: 3

- Split group and get them to think of own perceptions and then compare notes
- Need overheads of poems, etc
- More pictures of happy bees and stinging menaces
- More on confusion between bees and wasps

Session 2: What is pollination?

Grades: 1: 0 2: 0 3: 5 4: 6 5: 4

- More basic discussion of processes
- Illustrations of types/structure of pollen
- Include a detailed description of seed fertilization and development

Session 3: All you've ever wanted to know about bees, and a bit more

Grades: 1: 0 2: 0 3: 0 4: 10 5: 5

- Good introduction into complex subject, summarized it well
- Learned many fun bits of info
- Good basic information and facts
- More please
- More technical stuff
- Compare nests with honey bee stereotype
- More visuals of instars, etc
- Life cycle diagram would be useful
- Photos of bees and their habitats would help

Session 4: Outside

Grades: 1: 0 2: 0 3: 0 4: 3 5: 11 5+++: 1

- Great—fascinating adaptations
- More goal setting to let people know what to expect
- Give assignments to each person (find a bee flower/fly flower, etc.)
- Great discussions of flower morphology and pollinator types
- Good demonstrations of different flowers
- Good to see bee houses and trapping bowls (great prep work)
- Group well handled

Session 5: Bee ID and collection

Grades: 1: 0 2: 0 3: 1 4: 8 5: 6

- Good explanation of why to collect
- Microscopes would make it easier
- Include a more formal look at common bees and wasp
- Go through key as a group, each person with the same bee
- Good demo of pinning
- Could give more info on other activities for kids (observing insect activities, etc)
- More time/expand into a workshop of its own
- Do this in morning rather than after lunch at siesta time
- Nice to have something to take home with us?

Session 6: Conservation techniques

Grades: 1: 0 2: 0 3: 4 4: 5 5: 6

- Slides would be good
- Present case studies
- Outline 5 basic steps to help people move forward
- Fun to make a nesting box
- Could be a separate workshop

Session 7: Forum/filling in feedback forms

Grades: 1: 0 2: 0 3: 3 4: 3 5: 3

- Would be useful to have brainstorming with group

General comments

- Great accomplishment overall
- Great idea, well taught and well executed
- Wonderful work, excellent
- Repeat it
- More slides, etc
- Handouts excellent/phenomenal
- Go through handouts to explain what there is and why
- Have tabs and dividers in information packs (number pages from beginning to end?)
- Too much information in information pack?
- More time to talk about incorporating this with educational activities needed
- Examples of curricula available on bees would be useful
- For teachers, let them build something for their classroom
- Good atmosphere of discussion and sharing between participants
- Easy flow of information, and good feeling that questions could be asked
- Good choice of lunch and snacks
- Good to have “cushion” time

June 14th workshop

Session 1: Peoples' perceptions of bees

Content: 1: 0 2: 1 3: 2 4: 6 5: 5

Presentation: 1: 0 2: 0 3: 3 4: 6 5: 5

- Good idea, poems great.
- Very eye opening & a good icebreaker.
- Great starting place.
- "Turn to your table" is such a great technique to get folks talking, more interactive.
- Icebreakers necessary, but this topic didn't thrill me.
- Kind of fun, not spectacular.

Session 2: What is pollination?

Content: 1: 0 2: 0 3: 4 4: 6 5: 5

Presentation: 1: 0 2: 0 3: 1 4: 11 5: 3

- Very good information, great info about types of pollinators.
- No need to cover more than you did, but worth the mention you gave it.
- It was good to relate this to the outdoor discussion.
- A little vague
- May be useful to know a bit more about how plants reproduce, other than by pollination.

Session 3: All you've ever wanted to know about bees, and a bit more

Content: 1: 0 2: 0 3: 0 4: 7 5: 7

Presentation: 1: 0 2: 0 3: 0 4: 6 5: 8

- Valuable.
- Very good info about bees' senses. I will use this info.
- Interesting. I wanted more, but have the information pack to read.
- Fascinating.
- Could have done more on the basics.

Session 4: Bee ID and collection

Content: 1: 0 2: 0 3: 0 4: 8 5: 6

Presentation: 1: 0 2: 0 3: 1 4: 4 5: 8 5+: 1

- Great hands-on, step-by-step approach.
- Highly useful and faster than shipping to Extension Service for ID.
- Very useful to know how ID is done, though a little hard to follow. Mounting was good, but not sure about practical use.
- Nice class participation, though it could be very advanced for some people (such as kids).
- Complex subject. People should have more than one specimen for comparison.
- Complex subject. It would have been good to have more time.
- Having specimen to look at while going through key is a good idea.
- Very good introduction to the process.
- Very useful, nice to look closely at a bee, I've never had the chance before.

- Interesting, but not quite what I was looking for.

Session 5: Outside looking at flowers, methods of pollination, and conservation.

Content: 1: 0 2: 0 3: 2 4: 4 5: 9

Presentation: 1: 0 2: 0 3: 0 4: 5 5: 9 5+: 1

- Very well presented. Made me realize how much goes on that we don't see.
- Excellent explanations and use of resources as they presented themselves.
- Informative to look at specific flowers and relate them to the type of pollinator, than to revisit "pollination 101."
- A little difficult to see everything due to the size of the group.
- Good size group for interpretive walk—I could see and hear everything.
- I know this is tough with 16 folks. Started well, but could've been tighter.
- Really liked the "tidbits" of learning about bees and flowers.
- More habitat variety if possible.
- Setting out traps before hand was great.
- Might be fun to have the participants put out traps at the start, and then see what is collected at the end of the day.
- Nice to see examples set up in the field.
- It really helped to see how a person would collect in real life; you made it very tangible.

Session 6: Conservation issues and methods

Content: 1: 0 2: 0 3: 4 4: 7 5: 3

Presentation: 1: 0 2: 0 3: 1 4: 10 5: 4

- Would like more on management.
- Excellent ideas for both restoration and education projects.
- Could've spent more time. A bit brief.
- Hoped for more discussion, but feel the information pack will provide an excellent reference.

General comments

- Great job.
- It wasn't too technical, wasn't boring, and had enough "hands on" to be effective.
- Good mix of overheads, "lab," and outdoors walk.
- For a diverse crowd this workshop was very well organized. I didn't get bored, even when I was familiar with the topic—good job.
- The workshop was excellent—a good mix of materials and activities.
- Excellent job; covered many topics in a short time very well—with excellent take home information for us to read on.
- Well organized, well-paced presentation.
- Great day. Very educational. Thanks for putting it on.
- Workshop was great. It was just too short. I don't think you could have fitted more information in, but I wanted more. I think that is the result of a good or excellent workshop.
- Questions were answered very thoroughly, which encouraged people to ask them.

- It exceeded all expectations.
- I learned a lot about bees today. I will continue to learn what I can about such interesting and important creatures.
- These workshops will excite educators to find creative ways to teach about pollinators.
- I would attend more taxonomy and biology.
- More slides of different scaled projects (i.e. home gardens to farms).
- Move “Conservation issues & methods” to the beginning.
- I want to know more.
- Information pack will be a wonderful resource for future use.
- Superb resource book.
- Information pack is an excellent collection and should prove very useful.
- The information pack is great—very thorough and well organized. I can easily use it as a reference.

Appendix C

Workshop evaluation form (June 14)

I hope you enjoyed the workshop and found it useful. Whatever you thought about it, I would really like to know. The comments from the people at previous workshops were very useful, and I would value your observations and suggestions to help make the workshop better. Please fill out the form below and add your thoughts and suggestions. If you can, do it before you leave today. It will be fresh in your mind and you won't have to worry about mailing it back to me.

Please grade the sessions from 1 (bad) to 5 (great) for both content and how it was presented, and write any comments in the space given. If that's not enough space, there's more room on the back and add a second sheet.

Thank you,
Matthew Shepherd

Peoples' perceptions of bees

Content 1 2 3 4 5

Comments

Presentation 1 2 3 4 5

What is pollination?

Content 1 2 3 4 5

Comments

Presentation 1 2 3 4 5

All you've ever wanted to know about bees, and a bit more

Content 1 2 3 4 5

Comments

Presentation 1 2 3 4 5

Bee collecting and ID

Content 1 2 3 4 5

Comments

Presentation 1 2 3 4 5

More over the page....

Outside (flower adaptations, bee habitat, examples of conservation)

Content 1 2 3 4 5

Presentation 1 2 3 4 5

Comments

Conservation issues and methods

Content 1 2 3 4 5

Presentation 1 2 3 4 5

Comments

What were your expectations of this workshop?

Were they fulfilled?

Additional comments (add another sheet if you want!)

Thanks for filling this in. I appreciate the time and thought you put into it.