Report to Metro Parks and Greenspaces and U.S. Fish and Wildlife Service on Greenspaces Environmental Education Grant Number 924581

The Xerces Society's Butterfly Education and Stewardship Program

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Submitted by: *The Xerces Society* **4828 SE Hawthorne Boulevard, Portland, OR 97215** Tel: 503-232 6639; fax: 503-233 6794

March 2004

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Introduction

The primary objective of this grant was to continue our efforts to teach people in the Portland Metro area about the identification, interesting natural history, ecological value, and usefulness to land management of our local butterflies. We met this objective by (1) holding our third annual Portland Butterfly count and (2) establishing a successful butterfly education and monitoring program in collaboration with Curt Zonick, Metro natural resource scientist, and Mary West, Metro volunteer coordinator.

Project Activities

This project had two principal on-the-ground activities: a mid-summer butterfly count and the training of, and on-going support for, site stewards who monitored butterflies at six Metro greenspaces. Summaries of the grant activities for each of these components will be addressed separately below.

Portland Butterfly Count

Our efforts to organize the 2003 Portland Mid-Summer Butterfly Count can be divided into six project stages:

- Organizing the logistics for each of three venues
- Recruiting butterfly experts to lead and teach participants
- 3. Advertising the event
- 4. Signing up participants for a limited number of spaces
- 5. Day of the event
- 6. Follow up and evaluation

1. Organizing the logistics for each of three venues

Most of the work organizing the logistics of the butterfly counts was conducted by Mary West, volunteer coordinator at Metro. We needed to make sure that shelter, snacks and water were available for up to 45 participants at each site: Clear Creek in Clackamas County, Cooper Mountain in Washington County, and Multnomah Channel in Multnomah County. We also needed to have on-hand Metro staff and/or volunteers (e.g. Americorps volunteers) who were familiar with each site to help register participants, help direct groups through the sites, and provide general support setting up and taking down displays, food, water, shelter, etc.



We also needed to organize both a primary event date and a rain date, in case the weather was not conducive for watching butterflies (i.e., in case it was too cold and overcast for adult butterflies to be in flight).

Our plan was to have three groups of participants at each site (with about 15 participants per group), each group led by either a local butterfly expert, Xerces staff member, or Metro scientist. Depending upon registration, at least one group, if not two, would be focused on families with kids. These groups would have the extra support of butterfly stewards and other knowledgeable volunteers to make sure that the children received enough attention.

2. Recruiting butterfly experts to lead and teach participants

Xerces Society staff took primary responsibility for recruiting local butterfly experts to help guide and teach butterfly count participants. We approached several local experts, including Dave McCorkle, William Neill, Maurita Smythe, Larry Everson, Dana Ross, Neill Bjorkland, and David Myers. We also asked our newly trained group of volunteer butterfly stewards to help lead groups at the count, as well as continue their own education by learning from our local experts. All of these folks were interested and attended based on their availability. Because of weather, the count took place on the rain date (June 28, 2003) and the following local experts were still able to attend: William Neill and Larry Everson. We also were joined by the following butterfly stewards: Karen Halliday, Bev Koch, Clara Elias, Cindy Jones, Traci Echelmeyer, Jenny Apple, Jeff Owens, and Lori Owens.

3. Advertising the event

Metro took primary responsibility for advertising the Butterfly Count, as they have the previous two years. Press releases were sent to local newspapers and the event was highlighted in the Green Scene publication. We at the Xerces Society sent out postcards advertising the event to our more than 300 members in the greater Portland area.

4. Signing up participants for a limited number of spaces

Mary West fielded phone calls and e-mails from folks interested in registering. Each site could only accommodate about 45 participants, so they were signed up on a first come, first served basis. We also needed to have contact information for everyone interested in attending in case the weather did not cooperate – this information proved to be very useful because of the cold, overcast nature of the originally scheduled date (June 21, 2003).

5. Day of the event

During the day of the event, Xerces and Metro staff and volunteers arrived about two hours early to set up sun shelters, food, and water. We also set up information about Metro's greenspace program and the Xerces Society's conservation program, as well as an assortment of regional butterfly field guides (including William Neill's *Butterflies of Oregon and Washington* and Robert Michael Pyle's *Butterflies of Cascadia*).



Unfortunately, the original day scheduled for the event was too rainy and cloudy to count butterflies, so we had to switch to our rain date at the last minute. Because of this, some of the experts who were going to attend could not (i.e. Dave McCorkle, David Myer, and Maurita Smythe). In addition, many of the participants we signed up were unable to attend and we had to eliminate Multnomah Channel from the counts, focusing our efforts on Clear Creek and Cooper Mountain. We had 17 participants attend the Cooper Mountain count and 32 at Clear Creek.

As a group, we collected great data on the diversity present at these sites in June. The weather



was almost too hot, resulting in us seeing most butterflies early in the count. We saw ten species at Clear Creek and six at Cooper Mountain (see data summary in Appendix A). It was tough weather for participants to be out, but most handled it in stride. The participants greatly appreciated the water and shade we provided.

In addition, a reporter from the Oregonian was in attendance and provided wonderful coverage of the event, including some great quotes from a couple of kids who joined in the fun (see copy of newspaper article attached in Appendix B).

6. Follow up and evaluation

Everybody who attended said that they had a great time and learned a lot about butterflies. The experts also enjoyed themselves and the high interest level of the participants.

However, we struggled to get a lot of people signed up, which was a dramatic change from last year when we had to turn people away. We think this lower interest level had three causes. First, we had to postpone the count because of weather. Second, the original announcement made it sound like this event was focused primarily on monitoring, rather than on educating the public and opening up normally closed Metro greenspaces to the public. I think families were given the impression that children were welcome, but not encouraged to attend. Third, we didn't receive the same level of coverage in the Oregonian before the event as we have in years past. Whether this reduced coverage was because of the tone of the press release (i.e., not encouraging to families) or because we were in our third year of hosting this event is hard to say.

We found that this year, as in past years, about a third to half the participants were interested in continuing to spend time in the field with our experts well past the end of the official count. This interest in continuing to both look for and learn about butterflies attests to the high interest level of participants and the quality of our expert volunteers. In fact, at Clear Creek this year, this special group of stragglers saw at least one butterfly not previously recorded at Clear Creek, the Satyr anglewing.

Another challenge we continue to face with this count is the very different site characteristics between Cooper Mountain and Clear Creek. Cooper Mountain has wonderful spring butterfly

diversity (all of our common blues, as well as Sara orange tips are well represented). However, because of the aspect and soil characteristics of Cooper Mountain, it dries out very quickly as soon as the weather turns warm and dry. Therefore, very few butterfly species are seen there at the time of the count. Clear Creek, on the other hand, has high butterfly diversity throughout the summer because of its varied habitats and level fields that hold water for longer periods of time. Therefore, Clear Creek continues to be Metro's premier butterfly site, and the best place for holding a butterfly count at this time of year. Ideally, we would hold a count at Cooper Mountain a month earlier, but the fun of the Portland Butterfly Count is to have people looking for butterflies at both sites simultaneously.

Butterfly Stewards and Monitoring

Our project organizing and supporting the monitoring efforts of more than twenty butterfly stewards can be divided into nine project stages:

- 1. Developing position descriptions for volunteer Butterfly Stewards
- 2. Recruiting and screening volunteer Butterfly Stewards
- 3. Developing transect protocols and training materials
- 4. Training Butterfly Stewards
- 5. Technical support and adaptive management of the project
- 6. Additional training
- 7. Data collection
- 8. Data summary
- 9. Evaluations and comments

1. Developing position descriptions for volunteer Butterfly Stewards

The first step we completed in this project was the development of a position description for the volunteer butterfly stewards. Mary West's expertise was critical for this step. In the description, we clearly established the responsibilities of the stewards, as well as the experience they needed to bring to the position. The position descriptions we developed are attached to this report in Appendix C.

2. Recruiting and screening volunteer Butterfly Stewards

Mary West took primary responsibility for screening these volunteers. Advertisements went out in Metro's Green Scene, to Xerces Society members, and various listservers in the Portland area. We received about forty responses to our request and Mary weeded out those folks who lacked the appropriate experience. Ultimately, she interviewed about thirty people. Of these, twentythree were selected to participate in the program. Mary's years of experience in recruiting volunteers was invaluable for the success of this project and resulted in a solid group of volunteers, many, if not most, of whom want to continue next year.

Participants were required to have some knowledge of science or natural history. They did not have to know anything about butterflies. One of our goals was to take a group of naturalists or outdoor enthusiasts and add butterflies to their repertoire of knowledge. In this way, we were educating the community in the hopes that they would continue to teach others (and learn more, themselves) about butterflies and increase public support for managing some of our green spaces as the rare prairie habitat needed by most of our local butterflies.

3. Developing transect protocols and training materials

Xerces Society staff and Curt Zonick took primary responsibility for developing transect protocols. We went back to the primary scientific literature on Pollock butterfly transects and interviewed scientists who regularly conduct butterfly surveys. We were working to develop a method that was easy to use, allowed us to compare between sites over time, and yielded interesting results for the butterfly stewards (in other words, a method in which they regularly saw butterflies). We ended up producing the method outlined in the training manual attached as Appendix D, as well as the data sheets attached as Appendix E.

In addition to a transect protocol, we also needed to develop training materials to present to the butterfly stewards. These materials included step-by-step documentation of the butterfly monitoring protocol, as well as supporting materials on butterfly identification (specifically, notes on telling apart those butterflies that looked very similar to each other). Besides the training materials themselves, we developed a power point presentation to teach the protocol and butterfly identification. The slides from this presentation are included as Appendix F.

4. Training Butterfly Stewards

The Butterfly Steward Training took place on May 17, 2003. We planned this to be a half-day event in which the morning was spent learning about the sites, protocols, and basic butterfly identification, followed by a couple of hours out in the field looking at butterflies. Unfortunately, it hailed and, needless to say, no butterflies were out and about. However, we made due with many slides (thanks to Larry Everson) and much discussion.



At this training, the stewards also were broken up into teams of two to four. Each of these teams was assigned one of seven Metro sites at which they would monitor butterflies throughout the summer and into the fall. Sites were assigned based on proximity to where people lived, or general interest in the site itself (e.g. if they had done other volunteer work at a site). The seven



monitoring sites included Banks Wetland, Clear Creek Ranch (two sites), Coffee Lake, Cooper Mountain, Multnomah Channel, and River Island. These were spread throughout Metro's three-county region.

Each team also chose a leader who would take primary responsibility for communicating with Xerces and Metro staff. These leaders became important liaisons between us and the volunteers (see leader position description in Appendix G). The final component of the training included a field trip with each group to their site. On these trips, we once again went over the monitoring protocol, practiced it in the field, and also practiced butterfly identification. The field trips were great fun for everyone!

5. Technical support and adaptive management of the project

As the summer progressed, we stayed in regular contact with the stewards. We wanted to learn how to improve the protocol, and their input was critical. For example, as we moved into late June, sites began to dry out and the transects often yielded very few butterfly sightings when butterflies were present elsewhere around the sites. In response to this, we set up loops that meandered through different habitats or along the edges of habitats. These longer, more diverse transects often allowed the stewards to make formal records of butterflies they wouldn't have encountered on their transects. We also initiated a policy in which stewards recorded all butterflies that they saw on site, even if they were not found along a particular transect. This data will not allow us to make comparisons about the size of populations from year-to-year, but will give us good information on what species are present.

We also set up a forum in the middle of the summer for the site leaders to get together and tell us directly how things were going and what we could do to make improvements in the project design. It was a very successful meeting and a time at which we set up loops for two or three sites.

6. Additional training

In the middle of the summer, based on an interest expressed by the site leaders and other participants, we organized an evening event at Metro to spend more time looking at slides of butterflies, discussing identification, and learning about butterfly biology. Larry Everson, one of our most extraordinary and knowledgeable volunteers, pulled together a large collection of his slides, which we used to review identification and talk about the specific biology, host plants, etc. of our local butterflies. He also prepared an excellent summary on the distinguishing characteristics of our



local butterflies (attached as Appendix H). It was a great evening event and another opportunity to communicate directly with the stewards (about fifteen of whom attended) and increase their knowledge of butterflies.

7. Data collection

We collected data from our volunteers regularly throughout the summer. All sites were visited at least once a month and data was sent to Mace at Xerces and Curt at Metro. Raw datasheets are being kept by Curt Zonick at Metro and Mace Vaughan at Xerces.

8. Data summary

Curt Zonick and Metro science and monitoring staff are going to take primary responsibility for analyzing the collected data. However, in Appendix I we present a brief summary of the species seen across the Metro area. In all, twenty-two species of butterfly were recorded among the seven sites by the butterfly stewards. Because monitoring did not start until June, it is likely we

missed species that fly only in the spring, such as Sara orange tips, or others that overwinter as adults, like the Milberts tortoiseshell.

9. Evaluations and Comments

Overall, this project was a huge success. Most of the butterfly stewards are interested in returning next year to continue monitoring and all that I have spoken with say they learned a lot and had a lot of fun working with this project. At the last meeting, we handed out evaluations and received many useful comments back from the stewards. In the following paragraphs, we highlight their suggestions for improving the project in the coming years.

- A few of the butterfly stewards expressed an interest in us setting up a list server or Yahoo Group so that the volunteers can communicate easily with each other. They would like to have an easy way of sharing information about new butterflies that have appeared in their transects, problems they are having, field trips to other sites, etc..
- Some volunteers have been frustrated by trying to get enough folks together to collect data and suggested that there should be four people per group to help ensure that at least two folks can always meet. However, some groups with only two folks have found it much easier to coordinate. I think this may come down to communication among group members and the free time each person has available. How can we improve this? One approach might be for us to establish clearer expectations that the group leader needs to make sure the site is visited at least once a month (ideally more). Another suggestion is for the groups to schedule most of their trips into the field by May and to get that schedule to a coordinator at Metro. The additional advantage of this idea is that Metro or Xerces staff can then join the group if they have time or interest.
- Another issue that some of the butterfly stewards found challenging is that they saw very few butterflies at some of the sites. This lack of butterflies made it more difficult for the project to be rewarding, although all of the stewards persevered. Unfortunately, the nature of this project is that some of these sites are in the early stages of restoration and don't support large populations of butterflies. The other issue is that Portland and the Willamette Valley have relatively low species diversity to begin with and many species are active in the wetter spring and early summer when this project was just getting underway. One response to this problem might be to scale back the monitoring to sites (like Clear Creek, River Island, Multnomah Channel, and Cooper Mountain) that are more pristine and have a higher butterfly diversity.
- One of the most important issues, in Mace's opinion, raised by the butterfly stewards is how we taught them to identify butterflies. In the future, I think that trainings need to involve more time looking at actual butterflies. The volunteers need to identify them on their own so that they can learn for themselves the key characteristics for each species. Slides are useful, but often overwhelming and don't allow for the different amounts of time that each person needs to look and consider each species. I think we need to provide a collection of the Portland area butterflies from which the stewards have to take butterflies, key them out, and have their identifications checked by an expert. In this way, they each have time to carefully observe the specimens and learn the distinguishing

characters. The challenge here will be to find a teaching collection we can use. The stewards also could be taken on an additional field trip to Clear Creek (site of our highest diversity) to study the butterflies there on the wing.

- Some participants are also very interested in continuing to learn about the species they are finding. For example, they want more training in plant identification and host-plant use by the species we see in the field. I think that this interest will nicely play into the plans that Curt and Metro have for expanding the program to include recording more data on host-plant usage by the butterflies observed in the field.
- Some participants also had trouble getting to their sites. While we tried to make sure that
 most sites were close to where people lived, we may need to make extra efforts. For
 example, Cooper Mountain had two folks who had to commute sometimes an hour oneway.
- I also think that some folks still don't understand why we are using these transects, especially when they record so few butterflies on them. I think it will be valuable to reevaluate how the data will be used and the best data to collect for monitoring grassland restoration and management. I also think that as butterfly monitoring becomes a greater part of site management for Metro grasslands, our monitoring will become more refined and the stewards will more clearly see how the data is being used.
- Another great suggestion from our volunteers was for us to pull together a graph showing the flight periods of the species we might see in the field around Portland. I think this product would be very useful and may be something to ask one of the stewards to create. Perhaps Larry Everson would be interested in taking on this project.
- Finally, the stewards also asked for contact information for Metro rangers so that they can call in case they run into trouble or strange happenings at their sites. For example, one group came upon an ATV user and would like to have been able to find out if this person had permission to be on site.

Overall, all of the evaluations came back with positive messages for Xerces and Metro. One of the best quotes was, "This is the most fun I've had volunteering in years!" This is representative of the feeling of usefulness and excitement in learning new things that most of the volunteers expressed.

Conclusions

Our aim was to train twenty Portlanders to be knowledgeable butterfly monitors and stewards at Metro greenspaces and to reach out to 120 additional kids and adults through the Portland Butterfly Count. We were completely successful in achieving our objective to train butterfly stewards. However, because of poor weather we were only able to attract 49 participants to the butterfly count this summer. We still feel that we were successful in our ultimate goal to "expand the public's interest in, and knowledge of, butterfly conservation and local greenspaces." Our focus with all of our educational efforts stayed on the importance of butterflies to ecosystems

and monitoring, capitalizing on their beauty and the public's inherent interest in their identification and biology. Thanks to the support of Metro and the USFWS through the Greenspaces Environmental Education program, we have completed an excellent product that will continue into the future.

In the coming year, this project will be taken over by Metro's Greenspaces program. Curt Zonick is taking the lead on maintaining butterfly monitoring as part of a habitat-focused program whereby several Metro sites will be managed as endangered Willamette Valley prairie. In the coming year, the project will shift away from its major *educational* focus to monitoring. Additional attention is going to be given to monitoring butterfly-plant interactions with the aim of understanding the butterfly species that are present, their plant and habitat requirements, and how best to maintain or augment those requirements in the coming years.

Photo Credits

Photos for this report were provided by Jeff Owens (volunteer) and Curt Zonick (Metro scientist extraordinaire).

Acknowledgements

The Xerces Society would like to extend their gratitude to Mary West and Curt Zonick at Metro. They were wonderful and fun partners with whom to work and, without their help, this project was not possible.

Appendix A – Summary Of Data Collected At Butterfly Count

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Butterfly Species	Clear Creek	Cooper Mountain
western tiger swallowtail (P. rut.)	6	3
cabbage white (P. rap.)	6	4
margined white (P. mar.)	1	
clouded sulphur (C. phi.)	. 1	
Chalcedona checkerspot (E. cha.)	250	
satyr anglewing (P. sat.)	1	
Lorquin's admiral (L. lor.)	6	11
ochre ringlet (C. tul.)	20	8
common wood nymph (C. peg.)		1
spring azure (C. arg.)		3
silvery blue (G. lyg.)	caterpillar	
dun skipper (E. ves.)	5	×
Total number of species	10	6

Summary of data collected at the Portland Butterfly Count on June 28, 2003.

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Appendix B – Oregonian Article About Butterfly Count

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METRO/NORTHWEST

THE SUNDAY OREGONIAN . JUNE 29, 2003

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igzagging hunt nets a measure of nature's health

Volunteers make an expedition into Clear Creek Canyon in Clackamas County to count butterflies

By CAROLINE LYNCH THE OREGONIAN

CARVER - Molly Price, 8, and her sister, Natalie, 4, were on the prowl. Stalking through grass so tall that only their blue hats peeked out, the girls were nearly eye-level with their prey.

Molly struck first. Her fluorescent-orange net swooped. down and smashed the blades with a crunch. She squealed.

The tiny brown butterfly was among the first of the day's plentiful catch.

"I got one. I got one!"

About 35 people joined eight volunteers and a duo of experts Saturday to traipse through prairie lands at Clear Creek Canyon in Clackamas County, catching and releasing butterflies. The event was the third annual butterfly count co-sponsored by the Xerces Society, a nonprofit group dedicated to invertebrate conservation, and Metro Regional Parks and Greenspaces.

Mace Vaughan, staff entomologist with the society, said there are two reasons for the count: Butter-

prairie ecosystems, and they're fun fluttering creatures and inspect and educational.

Counts began at 11 a.m. at Clear Cooper Mountain in Washington County. The counts had been postthe weather was too cool for but- her, too. terflies to be out.

Vaughan taught net technique before two groups took off into the prairie at Clear Creek.

First the crouch. Then the swing. And then a flip of the net.

"The little flip at the end is key," he explained, "so that you can trap it

Participants used nets on 3-foot sticks. A wide mouth and 2 feet of flies are a window to the health of net left plenty of room to trap the said.

them.

Lori and Brad Price of Portland Creek Canyon near Carver and at brought their daughters because they wanted to encourage the girls' love of the outdoors. Lori confided poned from last weekend, when that there was something in it for at Clear Creek and Cooper Moun-

> When she was a little older than her girls, she was president of the local bug club. She once raised moths for a year. Teaching her daughters about insects, she said, is as fun for her as for them.

At the day's beginning, Molly couldn't remember the name of her brown butterfly, an Ochre Ringlet.

"It starts with an 'o.' I think." she

them "ogre ringlets," and by 2 p.m., she'd caught so many that the difficult pronunciation rolled off her tongue.

Vaughan estimated the groups tain saw 13 species. Ringlets, Lorquin's Admirals and Chalcedona Checkerspots were the most common catches. But a few sulfurs. Cabbage Whites and a wood nymph also turned up.

He said the numbers were typical of a healthy ecosystem. Butterflies tell a lot about the land's health, because many lay their eggs on specific plants and require

certain flowers for food.

By midday, Molly was calling Society and Metro are conducting private, monthly counts to get a more accurate picture of the butterfly population. Volunteers, called butterfly stewards, do those counts at six Metro open spaces.

Many of the stewards also helped with Saturday's event. The group at Carver suffered temperatures of 90-plus degrees to make their finds.

But the heat didn't deter the excitement of a discovery.

"Mommy, I'm done drinking water, I want my butterfly net, Natalie said, as she ran into the grass and disappeared.

Caroline Lynch: 503-412-7014; This is the first year the Xerces carolinelynch@news.oregonian.com

Appendix C – Butterfly Steward Position Description

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VOLUNTEER POSITION DESCRIPTION Metro Regional Parks and Greenspaces

600 NE Grand Ave. Portland OR 97232 (503) 797-1850 option 7 parkvol@metro.dst.or.us

Position Title: Division / Program:

Volunteer Butterfly Steward Natural Resource Division

Purpose: To determine the quality of butterfly habitat and the effectiveness of grassland restoration at specific Metro openspaces through monitoring changes in butterfly populations.

Essential Job Duties:

- Conduct butterfly field surveys at assigned Metro property at least once a month, May-September, tracking species seen, how many encountered, and where they were observed.
- Work as a team with at least one additional surveyor on each field day to collect data and complete appropriate forms.
- Ensure one copy of survey results are sent to both the Xerces Society and Metro Regional Parks and Greenspaces within one week of field day outings.
- Help lead butterfly walks with Xerces staff and local experts during the annual Portland Butterfly Count.

Required knowledge, skills, and abilities:

- Understanding of, or interest in, basic biology, ecology, and natural history
- Experience observing nature and an interest in butterflies
- Self-directed, responsible, with great follow-through on commitments
- Methodical, organized, and able to follow data collection procedures
- Able to provide own transportation to adopted Metro site(s)
- Comfortable working outdoors on warm sunny days
- Able to walk on uneven surfaces without defined trails
- High school diploma or equivalent

Time Commitment: Five-month commitment required (May-September), at least 1 day per month, averaging about three hours on site per day. Butterfly stewards will collect data at least once a month during the season and return in future years to continue this important work.

Training Provided:

- Butterfly identification and standardized transect monitoring protocol
- On the ground assistance at adopted site

Received Guidance From / Reports To:

Curt Zonick, Natural Resources Scientist, Metro Regional Parks and Greenspaces

Appendix D – Butterfly Steward Training Manual

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Butterfly Stewardship Program

Sponsored by

The Xerces Society and Metro Regional Parks and Greenspaces



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With financial support from the Metropolitan Greenspaces Program: a partnership between Metro Regional Parks and Greenspaces and the U.S. Fish and Wildlife Service

Contact Information:

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Mace Vaughan Staff Entomologist The Xerces Society 4828 SE Hawthorne Blvd. Portland, OR 97215 503-232-6639 mace@xerces.org

Curt Zonick Natural Resources Scientist Metro Regional Parks and Greenspaces 600 NE Grand Ave. Portland, OR 97232 503-797-1729 zonickc@metro.dst.or.us

Mary West Volunteer Coordinator Metro Regional Parks and Greenspaces 600 NE Grand Ave. Portland, OR 97232 503-797-1814 westm@metro.dst.or.us

Butterfly Monitoring Workshop Outline (May 17, 2003)

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9.30 - 9.45	Introduction and welcome (Mace)
5.50 5.10	
9:45 - 10:15	Introduce the Metro Open Spaces Program (Curt)
10:15 - 10:45	 Overview of monitoring protocol (Mace): purpose and length of transects protocol for walking transect (timing and search area) protocol for recording data (use of partners) data to collect: distance from transect, number of butterflies seen, plus weather, time of day, etc. equipment participants should have in the field
10:45 – 11:15	 Discussion of the seven Metro focal sites (Curt) Announce our recommendations for site assignments and break quickly into site-defined monitoring groups to allow members to get to know each other better. Schedule time to go into the field with each group
11:15 - 11:30	Break (flex-time)
11:30 - 12:30	 Butterfly identification (Mace) species that are difficult to tell apart (not including the skippers – which is quite unfortunate) discussion of a reference collection for the region and potentially each site
12:30 - 12:45	Discuss interest in a mid-summer meeting to present what we're finding and, perhaps, to spread a few butterflies for reference collections.
12:45 - 1:45	Lunch (at THNP or Cooper Mountain) and driving over to Cooper mountain
1:45 – 3:30	 Split group up into two smaller groups and run through sampling protocol along transects established at Cooper Mtn (Curt and Mace). On site, we will practice: walking the transect using the net to help mark distances recording data butterfly identification Wrap-up
3:30	Back to THNP and the Max, or home if folks have their cars

Meeting place: Tualatin Hills Nature Park – Beaver Den Room

Sampling Protocols

The concept of collecting data on butterfly populations along a transect is relatively straight forward. The goal is to collect precise, standardized data that allows for comparison over time. The greatest challenges to meeting this goal are to follow the protocol rigidly every time you monitor, and to learn to correctly identify butterflies on the wing, at distances up to 5 meters from a transect line. The protocol that follows is simple, but requires some practice to follow consistently. And, as you become more and more familiar with the butterflies present at your site, the identification should come easier and easier.

1. Transects:

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a. Curt Zonick, natural resource scientist at Metro, has established transect starting positions at each site. These starting points are marked with pinkflagged fiberglass poles embedded next to rebar stakes capped with aluminum benchmarks labeled "Metro Photopt." The flagging on the fiberglass pole is labeled "BUTTERFLY" and the aluminum cap is marked "BT" (for "butterfly transect") followed by an alphanumeric code for the site and transect number. For example, the first transect at Clear Creek is marked CC1. On your first visit to the site with Mace, you will mark the other end of the transect.

b. Transects are 50 meter, straight lines through areas of a single habitat type. The butterfly data collected from each will allow Metro to monitor the impact of restoration efforts on butterflies – a bioindicator of habitat quality.

2. Collecting butterfly data:

- a. Choosing days and times to go into the field:
 - i. Temperature and precipitation have significant impacts on butterfly activity. Therefore, it is best to collect data on sunny days. Typically, butterflies cannot fly unless their flight muscles are warm, and the sun plays a dramatic role in their thermoregulation. On partly cloudy days when temperatures are around 60 degrees F, butterflies may drop out of sight as soon as the sun goes behind a cloud because it is too cold for them to fly. As soon as the sun returns, the air will fill again with beautiful butterflies. For this reason, if the temperature is less than 60 degrees F, data only should be collected on relatively sunny days (i.e., at least 50% clear blue sky). Furthermore, data only should be collected between 11:00 and 3:00 pm the warmest part of the day. Following this protocol will help ensure that the greatest number of butterflies are seen. On the tail ends of the warmer, summer months, just do your best to get out to sample on the warmest, sunniest days possible.
- **b.** For each trip you make to your site to monitor butterflies, fill out the top part of the data sheet. Also, on your way through the site to the first transect, take some time to acquaint yourself with the butterflies you see; either using binoculars or by catching and releasing those you are having a hard time identifying. Familiarizing yourself with the butterflies that are present before

you conduct your transects will make it easier to identity the butterflies on the wing. Be careful not to disturb the butterflies near your transects.

- c. Just before conducting each transect, record information on the time and weather conditions.
- d. Butterflies will be counted if they occur within 5 meters of the transect line. This includes butterflies above your head, as well as to the side, as if you were counting all of the butterflies in a tunnel 10 meters wide and 5 meters high.
- e. When recording information on each individual butterfly, you will note the distance it occurs from the transect line: either 0 to 2 meters (approximately the distance from the center of your body to the end of your outstretched net) or 2 to 5 meters. This gives us a measure of the quality of each record (those farther away are more likely to be misidentified).
- f. The objective of each transect is not to count all the butterflies that are present at the site, or in the habitat where you are counting, but to count only those individual butterflies that occur in, or move through, the transect's sampling area while you are walking at a steady, reasonable pace. For the sake of consistency, it should take you approximately 10 to 15 minutes to walk the 50 meters for each transect. However, this timing may be worth reconsidering it's pretty slow. After we have all sampled a couple of times, we will revisit the speed at which the transects are walked.

Colorado de la colora

- Two people will walk each transect, the first person about 5 meters ahead of g. the second. The person in front, and only this person, is responsible for counting the butterflies. She/he walks the transect with only the datasheet and pencil in hand, observing and counting as many butterflies, and their distance from the transect, as possible. Any butterflies that can't be identified are noted with a question mark and a number of individuals (e.g. "?2") next to the species that seems the best match. This first person (i.e., the primary observer) continues to walk the transect, but tells the second person about the unknown butterfly. It is the follower's responsibility to try to identify the species. He/she should walk up the transect to the unknown butterfly at the same pace the primary observer is walking. Ideally, this unknown butterfly can be identified on sight, or by using a pair of binoculars to get a closer look (in fact, this will be the best and most successful approach much of the time). If just looking at it from afar isn't going to work, this second person should try to net the butterfly to get a closer look.
 - i. For the sake of consistent data, the members of a site team should always take on the same role. However, for the sake of having a good time, feel free to switch roles as often as you like. The more that everyone practices, the more consistent the data will be overall. So, spend as much time as you can observing and identifying butterflies and practicing counting while walking along a transect.
- **h.** At the end of each transect, note the time as well as the current weather conditions, even if they are the same as before you began the transect.
- i. Data sheets should be organized by the site leader. Two copies should be made of each data sheet. The originals should be sent at the end of the season to Curt Zonick (600 NE Grand Ave., Portland, OR 97232) and a copy to Mace

Vaughan (4828 SE Hawthorne Blvd, Pdx, OR 97215). Please also retain a copy of each datasheet you complete with your own records.

- 3. Other data to collect
 - a. As we mention above, before (e.g., while walking to the transect location) and after sampling the transects, spend some time having fun at the sight. Try to identify as many butterflies as you can find, noting on the day's data sheet any species that were not counted in the transects. Take some notes on abundance of different species and where they are found in the landscape. This information also will be useful, and it will help you to develop your butterfly identification skills.

b. While in the field, you should keep your eyes open for interesting behaviors to

- record. For example, note if you find individual butterflies mating. If you see a female laying eggs, note the plants on which she is laying them. Also, keep your eyes open for caterpillars and the plants on which they are feeding. This information is useful for documenting what resources the butterflies are utilizing, plus it is fun natural history to observe.
- c. Finally, take notice of the condition of the site. If you see any vandalism, or other problems, please let Curt know (503-797-1729). By being on site regularly, we have a unique opportunity to contribute to the stewardship of these greenspaces.
- 4. Reference collection
 - a. For those of you interested in closely observing and learning your butterflies, Metro is permitting you (and you alone) to build a modest reference collection of butterflies that you encounter at your site. This can be an important tool for learning to identify butterflies. Furthermore, it helps to formally document the species that are present on site. Remember though, you are conducting research at a public greenspace that does not otherwise allow public access or collection of biological materials, so please be discrete. Collect a single reference specimen for each species, and do not allow others to collect on the property.
 - **b**. If the group would like, we might be able to arrange a time to hold a workshop on spreading and mounting butterflies. Mace is getting boxes for holding pinned collections.
- 5. Equipment to have in the field
 - a. Data collection equipment:
 - i. Binoculars (close-focusing)
 - ii. 15" butterfly net (we'll supply if need be)
 - iii. Butterfly field guide
 - iv. Clip board (we'll supply if need be)
 - v. Data sheets
 - vi. Pencils and erasers
 - vii. Thermometer (we'll supply these)

- b. Personal equipment:
 - i. Sun protection (consider sunscreen, long sleeve shirt and pants, and/or a hat)

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- ii. Sunglasses (if you've got them, they are especially helpful for reading data sheets in the sun)
- iii. Water and snacks (it never hurts to have some snacks on hand)
- iv. Bag to carry it all in

Outline of protocols – the short version:

- 1. Identify butterflies you observe on site on your way to the transects.
- 2. Fill out top part of data sheet and properly label each transect.
- 3. Record information on time and weather conditions at beginning of transect.
- 4. Two people walk each transect

- a. The first person (primary observer) walks about 5 meters in front of the second.
- b. The first person carries only the datasheet and a pencil (although, initially it might be useful to have a net to help measure distance), noting how many of each butterflies she/he sees and their distance from the transect line. If a species can't be identified by this person, then a question mark and the number of individuals (e.g. "?3") is placed next to the best guess for the species in the space for the appropriate distance.
- c. The first person then tells the second that there is a butterfly that needs to be identified and where it is located. The second person should walk up the transect at the same pace as the first and try to identify the butterfly in question. Ideally, this would be done using binoculars, but if necessary the butterfly is netted and closely examined.
- 5. At the end of each transect, the current weather conditions and time are noted again.
- 6. After all three transects are conducted, feel free to go back through the site, trying to identify as many butterflies as you can see. Have fun! and make notes about any additional species you come across and/or any interesting behaviors you observe.

Beaufort Wind Speed Scale

(Converted for use in monitoring butterflies by Mace Vaughan)

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None	Calm Smoke rises vertically.
Low	Light air to gentle breeze
(Beaufort scale 1-3)	motion.
Moderate .	Moderate to fresh breeze.
(Beaufort scale 4-5)	Small branches to small trees are swaying.
High	Strong breeze and more.
(Beaufort scale 6+)	Large branches to whole trees are swayingor stronger.
It gets much worse, just ask a Floridian.	If the wind is 'High' or stronger, it is unlikely that butterflies will be flying.

Web resources with more information on the Beaufort wind scale:

http://www.islandnet.com/~see/weather/history/beauwscl.htm

http://www.miamisci.org/hurricane/windscale.html

http://www.kites.org/jo/beaufort.html

List of butterflies that may possibly occur at Clear Creek (Clackamas County) or Cooper Mountain (Washington County)

Family Hesperiidae

Epargyreus clarus (silver-spotted skipper) Erynnis propertius (propertius duskywing) Erynnis persius (persius duskywing) Pyrgus ruralis (two-banded checkered skipper) Pyrgus communis (common checkered skipper) Carterocephalus palaemon (arctic skipper) Hesperia juba (juba skipper) ** Atalopedes campestris (sachem) Polites sonora (Sonoran skipper) Ochlodes sylvanoides (woodland skipper) +, * Euphyes vestris (dun skipper) *, + Amblyscirtes vialis (common roadside skipper)

Family Papilionidae

Parnassius clodius (clodius parnassian) Papilio zelicaon (anise swallowtail) Papilio rutulus (western tiger swallowtail) Papilio eurymedon (pale tiger swallowtail)

Family Pieridae

Neophasia menapia (pine white) Pontia occidentalis (western white) + Pieris marginalis (margined white) Pieris rapae (cabbage white) *, +, ** Anthocharis sara (Sara's orangetip) * Colias philodice (clouded sulphur) Colias eurytheme (orange sulphur) **

Family Lycaenidae

Lycaena helloides (purplish copper) +, ** Satyrium sylvinum (sylvan hairstreak) Callophrys perplexa (bramble green hairstreak) Mitoura grynea (cedar hairstreak) Incisalia augustinus (brown elfin) Strymon melinus (gray hairstreak) ** Everes amyntula (western tailed blue) Everes comyntas (eastern tailed blue) Celastrina argiolus (spring azure) Glaucopsyche lygdamus (silvery blue) *, + Icaricia icarioides (lupine blue)

Family Nymphalidae

Speyeria cybele (great spangled fritillary) Boloria epithore (western meadow fritillary) Phyciodes pulchellus (field crescent)

Phyciodes mylitta (mylitta crescent) Euphydryas chalcedona (chalcedona checkerspot) + Polygonia satyrus (satyr anglewing) Polygonia faunus (green comma) Polygonia gracilis (hoary comma) Polygonia oreas (oreas anglewing) Nymphalis californica (California tortoiseshell) Nymphalis antiopa (mourning cloak) Nymphalis milberti (milbert's tortoiseshell) Vanessa virginiensis (American lady) Vanessa annabella (west coast lady) Vanessa cardui (painted lady) * ** Vanessa atalanta (red admirable) Limenitis lorquini (lorquin's admiral) Coenonympha tullia (ochre ringlet) Cercyonis pegala (common wood nymph) + **

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Family Danaidae

Danaus plexippus (monarch)

Species indicated with a '+' have been recorded at Clear Creek.

Species indicated with a '*' have been recorded at Cooper Mountain.

Species indicated with a "**" are those that Bill Neill thinks are likely to be present during mid-July.

Thanks to Paige Shell-Spurling for all of her volunteer help on this! And thanks to Bill Neill for commenting on the original list.

Butterflies that may be difficult to tell apart

Swallowtails

- Anise (*Papilio zelicaon*), pale tiger (*Papilio eurymedon*), and the western tiger (*Papilio rutulus*) swallowtails:
 - The base of the anise swallowtail's forewing is mostly black (a lot more black than the western tiger), the body is predominately black with yellow striping, and the row of submarginal blue spots on the hind wing ends with a "red-orange spot with free, round black pupil" (page 118, Butterflies of Cascadia).
 - As the name suggests, the pale swallowtail has a "chalky white or creamy" background. The black stripes are much broader than the other two swallowtails you will likely encounter. The width of the black bands will distinguish this species from an old, washed-out western tiger.
 - The western tiger swallowtail has tiger stripes on a bright yellow background. The single-tailed hindwings have red crescents at the end of the submarginal row (no red surrounding a black pupil). Little black at base of forewing when compared to anise.

Ladies

- o Painted (Vanessa cardui), west coast (Vanessa virginiensis), and American (Vanessa annabella) ladies:
 - The painted ladies always have an all-white sub-apical bar (p. 332 in Butterflies of Cascadia). The five eyespots near the trailing edge of the dorsal hind wings are usually all black, perhaps with tiny blue centers. The underside of the hind wings has five eyespots, ringed with black and yellow.
 - The west coast ladies are smaller than the other two. The sub-apical bar is always orange. The upper surface of the hind wings has four bright blue eyespots that are ringed in black. The eyespots on the underside of the hind wings do not stand out.
 - The American lady has sub-apical bars that vary depending upon gender (pale orange in females and white in males). There are only two eyespots on the underside of the hind wing and they are relatively large, ringed in black, yellow, and olive. The five submarginal spots on the upper surface of the hind wing (did you get all that) are "smudged [note: well-chosen word] black with dark blue centers," according to Pyle.

Blues:

- Silvery (*Glaucopsyche lygdamus*) vs. spring azure (Celastrina argiolus) vs. Boisduval's blue (*Icaricia icarioides*, formerly known as *Plebejus icarioides*):
 - The silvery blue male is a bright, brilliant blue above, with black border on wings (stunning insect!). To distinguish from Boisduval's, the silvery has no marginal or submarginal markings (i.e. spots along the outer edge) on the underside of the hind wings.
 - The spring azure is distinctive in having light-gray chevrons ('v' shaped markings) running around the outer edges (margins) of both pairs of wings. The spring azure flies high in shrubs and trees.

- According to Pyle, the Boisduval's blue has a row of spots on the underside of its hind wings that are all white to mostly white with tiny, black pupils. They are never mostly black, as in the silvery blue. The underside of the hind wing also has discal cell that is all white – no black bar.
- o Eastern tailed (Everes comyntas) vs. Western tailed (Everes amyntula):
 - When compared to the eastern, the western tailed blue has lighter spots, is more chalky, and has less of an orange lunule (marking) on the underside of the wings. Also, the dorsal side of the western's hind wings typically have more understated spots along the border and the western tailed blues prefer more natural, wetter habitats (e.g. along streams, meadows, trails, etc.). Very tough to tell apart if the individual butterfly is well worn. The eastern does quite well in drier, disturbed and weedy habitat with many introduced species of peas.
 - Sometimes also mistaken for gray hairstreak (*Strymon melinus*), which is more gray overall although sometimes mistaken for a hint of blue and the ventral black spots are lined with white on their outer margin only.
 - According to Bob Pyle, the eastern is thought to have been introduced along the PNW coast, but is native to inland parts of Washington and BC.

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- Checkerspots:
 - Chalcedon (aka snowberry) (Euphydryas chalcedona) vs. Edith's (Euphydryas editha):
 - In the Willamette Valley, the snowberry checkerspot is usually mostly black above, whereas Edith's is a proportionate mix of black, orange, and white. One of the most important characters that distinguishes between these two butterflies is the "Editha line" – a black line on the underside of the hindwing that, in *E. editha*, is surrounded on both sides by orange and, in *E. chalcedona*, separates bands of orange and white.
 - Hostplants: Larvae of the snowberry checkerspot feed on snowberry (Syphoricarpus spp.) and various Scrophulariacea, such as mullein (Verbascum thapsus) and Penstemon spp. The Edith's checkerspot feeds on a variety of paintbrushes (Castilleja spp.), plantains (Plantago spp.), and a few other plants.

Appendix E – Data Sheet

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pale tiger swallowtail (P. eur.)						
western tiger swallowtail (P. rut.)						
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orange sulphur (C. eur.)			1.			
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great spangled fritillary (S. cyb.)						
western meadow fritillary (B. epi.)						
green comma (P. fau.)		1.2				
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oreas anglewing (P. ore.)						
satyr anglewing (P. sat.)						
California tortoiseshell (N. cal.)			1			
Milbert's tortoiseshell (N. mil.)						
mourning cloak (N. ant.)						
American lady (V. vir.)						
painted lady (V. car.)				-		
red admiral (V. ata.)						
west coast lady (V. ann.)						
Lorquin's admiral (L. lor.)						

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ochre ringlet (C. tul.)						
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western tailed blue (E. amy.)						
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silvery blue (G. lyg.)						
lupine blue (I. ica.)						
Skippers (Family Hesperiidae)	1.70					
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com. roadside skipper (A. via.)		•				
Milkweed butterflies (Family Da	naidae)					
monarch (D. ple.)						
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Appendix F – Slides From Training on Butterfly Monitoring

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Welcome to the Butterfly Stewardship Program



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The Xerces Society

An international non-profit that protects the diversity of life and the integrity of ecosystems through the conservation of invertebrates.



The Xerces Society



We don't do just butterflies anymore ...

- Pollinators (mostly bees)
- Aquatic biomonitoring
- Endangered species
- Wings
- And many other small projects related to invertebrate conservation

Endangered Species





Taylor's checkerspot (Euphydryas editha taylori)

Fender's blue (Ivaricia warioides fenderi)

Xerces' Goals for this butterfly stewardship program

- · For you all to learn about the area's butterflies and increase your awareness of conservation issues they face
- · To gather data that is useful for Metro natural resource scientists as they track the impact of their management practices
- To contribute to the future direction of . Metro land management

Where we see this project going...with your help



The Xerces Society

An international non-profit that protects the diversity of life and the integrity of ecosystems through the conservation of invertebrates.



Purpose of following a standardized protocol

- Minimizes differences in data collection among sites and people
- Allows for "quantified" data that can be compared between sites





Overview of protocols 3. Groups will work with a team of at least two people

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Overview of protocols

- Three transects established in areas of one habitat type
- 2. Walked at a consistent pace (about 10 to 15 minutes per transect)





Overview of protocols

- 3. Groups will work with a team of at least two people
- 4. First person is the primary observer and data recorder













Overview of protocols

6. Choosing the right day Butterflies usually are only able to fly on the days you would really like to be outside





Overview of protocols

- 7. Choosing the right time of day:
 - The warmest time of day, usually between 11:00 and 3:00









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Recording Data - butterflies

- · Number of each species seen
- Distance of the individual(s) from the transect line

✓ 0 to 2 meters
 ✓ 2 to 5 meters



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Before and after conducting the transects

 Before approaching your transects, spend some time observing and identifying butterflies on site

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Before and after conducting the transects

• After the transects, continue to track which butterflies are present and note behaviors





Before and after conducting the transects

• Also, get to know the site and keep your eyes open for vandalism or other problems







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Appendix G - Butterfly Steward Leader Position Description

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METRO

VOLUNTEER POSITION DESCRIPTION Metro Regional Parks and Greenspaces

> 600 NE Grand Ave. Portland OR 97232 (503) 797-1850 option 7 parkvol@metro.dst.or.us

Position Title: Volunteer Butterfly Steward Leader Division / Program: Natural Resource Division

Purpose: These leaders coordinate a team of two to four butterfly stewards charged with monitoring changes in butterfly populations at an assigned Metro greenspace. The data collected will determine the quality of butterfly habitat and the effectiveness of grassland restoration at a specific Metro open spaces site.

Essential Job Duties:

- Coordinate and schedule butterfly field surveys at assigned Metro property at least once a month, April-September tracking species seen, how many encountered, and where they were observed.
- Manage Butterfly Stewards assigned to team. Provide the necessary motivation, feedback, and guidance to ensure that the site is properly monitored.
- Ensure one copy of survey results of team's efforts is sent to both the Xerces Society and Metro Regional Parks and Greenspaces within one week of field day outings.
- Provide in-the-field training on data collection techniques, identification, and site details to new butterfly stewards assigned to team.
- Communicate once a month with Coordinator of Butterfly Stewardship program on site conditions, group cohesion, and general support needed.

Required knowledge, skills, and abilities:

- Experience or ability to manage others while creating a supportive and productive environment
- Understanding of, or interest in, basic biology, ecology, and natural history
- Experience observing nature and an interest in butterflies
- Self-directed, responsible, with great follow-through on commitments
- Methodical, organized, and able to follow data collection procedures
- Able to provide own transportation to adopted Metro site(s)
- Comfortable working outdoors on warm sunny days
- Able to walk on uneven surfaces without defined trails
- High school diploma or equivalent

Time Commitment:

Approximately 10 hours/mo

A three hour field survey is required once a month from March-September. Additional field work early in the season may be needed for facilitate on-the-job training of butterfly stewards. Administrative tasks (such as paperwork, survey scheduling, checking-in with stewards) requires an additional three hours per month. Personal study of butterflies is also expected.

Training Provided:

- Leadership training
- Butterfly identification and standardized transect monitoring protocol
- On the ground assistance at adopted site

Received Guidance From / Reports To:

Curt Zonick, Natural Resources Scientist, Metro Regional Parks and Greenspaces

Appendix H – Identifying Characteristics of Portland Butterflies Prepared by Larry Everson

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Portland/Metro Area Butterfly Identification Larry Everson

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Group/Butterfly	Distinguishing characteristics
Ladies:	
Painted Lady - Vanessa cardui	Strong flier. White bar in black near tip of upperside forewing. Four circles on underside hind wing.
West Coast Lady -	Orange bar in black near tip of upperside forewing. Blue spots on upper hindwing bottom more prominent. Underside pattern vague.
American Painted Lady -	Orange bar in black near tip of upperside forewing on female, white bar on male. Two large
Red Admiral - Vanessa	White bar in black near tip of upperside forewing. Orange band across chocolate on
Lorquin's Admiral -	Not really a lady. White band across black upperside with reddish wing tips. White band
Limenitis lorquini Swallowtails:	across reddish brown underside. Flits and soars. Males very territorial.
Western Tiger Swallowtail - Papilio rutulus	Yellow background with tiger stripes from forewing to tails. Flight period mostly June and July.
Pale Swallowtail - Papilio eurymedon	White background with tiger stripes from forewing to tails. Usually at higher elevations, hence "Mountain Swallowtail".
Anise Swallowtail - Papilio	Large areas of black along upper forewing edge. Smaller and tails shorter than P. rutulus. Two adult broods: April-May and August-September.
Whites:	· · · · · · · · · · · · · · · · · · ·
Cabbage White - Pieris	Two spots on upperside female, one on male. Blackish along tip of upper forewing.
Margined White - Pieris	Spring brood underside veins dusted with black. Summer brood nearly immaculate except for cream on underside. Near forest/woodland edges. Flies slower than rappe
Pine White - Neonbasia	Very distinctive black veins and wing tip area on male underside. Female under and uppper
menapia	veins less crisp and trimmed with rouge.
Western White - Pontia	Rare in our area. Upperside small black rectangle with zigzag white line through it. Underside green vein scaling extends throughout wing. Black "V"s extend 1/3 into upper wings
Sara's Orangetip - Anthocharis sara	Crisp forewing orange tip on upperside male, more subdued and creamy on female.
Blues:	
Spring Azure - Celastrina argiolus echo	Chevrons along underside perimeter, and non-descript pattern on spots and dashes. Males usually hold wings closed even when puddling. Female dark border above with blue.
Silvery Blue Glaucopsyche	Males "silvery" blue above, females brown. Both have one row of neat black spots with white edges below. Hold wings open when cold.
Fender's Blue - Icaricia	Chevrons along underside perimeter, but not dashes. Hold wings open when cold. Females
Acmon Blue - Plebejus	Orange on male underside hindwing edge. Female orange edge above and below.
Heiretreekei	
Codar Hairstreak Mitoura	Wings folded when not in flight Underside cedar with white and black strock and bluich near
grynea placateria	tail.
Gray Hairstreak - Strymon melinus	Dark gray above with orange patch near tail shows when warming. Underside light gray with white/black (sometimes orange tinged) streak, with two orange patches near tail
Brown Elfin	Wings folded when not in flight. No tail. No streak. Underside shades of brown.
Crescents:	
Mylitta Crescent - Phyciodes mylitta	Male yellowish-orange above with some black markings. Females bigger with more checkerspot pattern above, but not as dark as Field Crescent.
Filed Crescent - Phyciodes	Male and female much darker than female mylitta and probably rare to far southern end of Metro area.
Sulfurs:	
Orange Sulfur - Colias	Orange flush on upperside. Female lighter than male. Alba form of female has no flush but
eurytheme	black further along upper hind wing than philodice, also deeper with white spaces.
ciouded Sultur - Colias philodice	kare signtings in our area may really have been eurytheme. Black along upper and lower hind wings does not extend as deeply into the wing as eurytheme and does not extend as far.

Appendix I – Summary of Butterflies Recorded During Summer (2003)

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Summary of butterflies recorded by volunteer Butterfly Stewards during the summer of 2003.

Butterfly Species	Clear Creek (upper)	Clear Creek (lower)	River Island	Cooper Mtn	Mult Channel	Coffee Lake	Banks Wetland (Farm)	Presence
anise swallowtail (P. zel.)			х					X
pale tiger swallowtail (P. eur.)				1			x	x
western tiger swallowtail (P. rut.)		х	х		х	?	х	x
cabbage white (P. rap.)	x	x	?	х	X	x	X	X
margined white (P. mar.)		X			х		·	x
western white (P. occ.)					?			?
clouded sulphur (C. phi.)						?		?
orange sulphur (C. eur.)		x	?		x	?		×
Chalcedona checkerspot (E. cha.)	X	X			6			X
mylitta crescent (P. myl.)	x	x	x	?	x		x	x
satyr anglewing (P. sat.)							?	?
painted lady (V. car.)					?	?	x	x
red admiral (V. ata.)		X	x				?	x
Lorquin's admiral (L. lor.)		x	~ X	х	x	•	x	x
ochre ringlet (C. tul.)	х	х	х	х		x		x
common wood nymph (C. peg.)	х	х	х	х		x	x	x
purplish copper (L. hel.)		A					х	x
gray hairstreak (S. mel.)		х						x
eastern tailed blue (E. com.)					X			x
spring azure (C. arg.)		х					x	x
silvery blue (G. lyg.)	x							x
Acmon blue (I. acm)		х						x
dun skipper (E. ves.)			x					x
Persius duskywing (E. per.)		x			*			x
woodland skipper (O. syl.)		x	?			?	X	X
Total number of species	6	15	8 (+3 ?s)	4 (+1 ?)	7 (+2 ?s)	3 (+5 ?s)	10 (+2 ?s)	22 (+3 ?s)

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