

Butterfly Conservation Initiative Survey



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Introduction

This report is a collaborative effort between Mitch Magdich, Curator of Education for The Toledo Zoo, and Educational Research and Measurement faculty (Christine Fox) and students (Toni Sondergeld and Kristin Kelly) at The University of Toledo. The project was aimed at assessing the public's opinions and knowledge about butterflies and butterfly conservations. Information obtained from these data will assist in the creation of educational materials for the American Zoo and Aquarium Association's Butterfly Conservation Initiative.

This report includes descriptive statistics summarizing respondents' responses to the survey. In addition, we examine research questions that might help to further inform the creation of educational materials for spring 2007 butterfly exhibit.

Methods

In 2004, Christine Fox and Mitch Magdich developed a fifteen-item questionnaire. Ten questions asked about butterflies and five questions asked about respondents' demographics. Zoo volunteers distributed the survey at six zoos nation-wide. Toni Sondergeld and Kristin Kelly then analyzed the responses to the survey.

Results

Demographics

Frequencies and percentages (rounded to the nearest whole number) for the visitors who completed the survey are provided in Table 1. More females (71%) completed the survey as compared to males (29%); less than one percent of people chose not to report their gender. A majority of the sample reported living in a suburban (42%) or city/town (39%) setting. With respect to education, approximately 76% of the respondents reported having a degree beyond high school; less than one percent did not answer the question. Most respondents (62%) felt they were moderately informed about environmental issues. Few respondents reported feeling either not informed (2%) or very informed (22%). Table 1 includes the descriptive statistics for the demographic breakdown of the respondents.

Table 1. *Visitors' Self-Reports on Demographics*

Demographic	Frequency	%
<i>Gender</i>		
Female	717	71
Male	293	29
<i>Setting of Residence</i>		
City/Town	396	39
Suburb	421	42
Rural	192	19
<i>Highest Level of Education Completed</i>		

High school	240	24
Vocational	27	3
College	501	51
Advanced Degree	214	22
<i>Informed about Environmental Issues</i>		
Not informed	20	2
Slightly informed	255	26
Moderately informed	611	62
Very informed	96	10

Note: Percentages do not sum to 100% due to incomplete responses.

Survey Descriptives

Frequency and percentages of responses to each knowledge question are provided in Table 2. When asked whether butterflies are insects, nearly all (86%) respondents agreed that this was true. Over a majority (75%) agreed that butterflies are animals. Further descriptive statistics were conducted to examine respondents' beliefs being insects and/or animals. Of the nine-hundred and eighty respondents who responded to both of the questions, a majority (64%) of the sample agreed that butterflies are insects **but not** animals, followed by 22% agreeing that butterflies are both an insect and animal. A small percentage agreed that butterflies are neither an insect or animal (~12%) or, that butterflies are insects but not animals (~3%). **Thus, it appears that some respondents have a misconception about the classification of butterflies**

With respect to the life cycle of butterflies, over a majority (68%) of the respondents agreed that butterflies have a four-part life cycle. Nearly all respondents also agreed that butterflies can be killed or injured by insecticides in the environment. Most respondents (78%) did not agree that butterflies are present year round. When asked about the role of butterflies in the environment, over a majority of the respondents indicated they agree that butterflies provide food for other animals (60%) and are plant pollinators (74%). Nearly all (86%) respondents agreed that butterflies are as important to the environment as other animals. **Overall, respondents seem to have a positive perception of butterflies but vary in their knowledge of the role of butterflies in the environment.**

Table 2. Knowledge About Butterflies

Butterflies:	True	False
	Frequency (%)	Frequency (%)
Are insects	838 (86)	142 (15)
Are animals	243 (25)	737 (75)
Have a four part life cycle	667 (68)	313 (32)
Can be killed or injured by insecticides	790 (81)	190 (19)
Are as important to the environment as other animals	849 (86)	135 (14)
Provide food for other animals	591 (60)	393 (40)
Are plant pollinators	725 (74)	259 (26)
Are present year round even in the colder climates	220 (22)	764 (78)

Note: Percentages are rounded to the nearest whole.

At least 74% of respondents indicated that they agreed or strongly agreed that the existence of strip malls, shopping centers, restaurants, manufacturing/mining, transportation, housing, or agriculture can affect butterflies (see Table 3). Respondents were most likely to agree or strongly agree that manufacturing/mining and commercial buildings (i.e., strip malls, shopping centers, and/or restaurants) can affect butterflies. Only a small percentage (less than 15%) of respondents disagreed or strongly disagreed that the environmental factors listed do not affect butterflies.

Table 3. *Environmental Effects on Butterflies*

...affect butterflies.	Strongly Disagree	Disagree	Agree	Strongly Agree	Unsure
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Strip malls, shopping centers, restaurants	20(2)	47(5)	458(47)	385(40)	58(6)
Manufacturing/mining	11(1)	37(4)	424(44)	429(44)	69(7)
Transportation	11(1)	65(7)	443(46)	362(37)	86(9)
Housing	12(1)	43(4)	481(47)	375(39)	58(6)
Agriculture	23(2)	122(13)	403(42)	303(32)	111(12)

Note: Percentages are rounded to the nearest whole.

Respondents were asked to indicate how they believed the extinction of a butterfly species and a large mammal would affect the environment. Frequency of responses along with percentages are found in Table 4. *A majority of people agreed that the extinction of both a butterfly species (76%) and a large mammal (86%) would have a moderate or large impact on the environment.* However, it was easier for respondents to agree with large mammals (51%) having a large impact on the environment than a butterfly species (38%).

Table 4. *Affect of Extinction on the Environment*

Animal Impact	Frequency	%
Butterfly Species		
<i>No Impact</i>	11	1
<i>Slight Impact</i>	131	13
<i>Moderate Impact</i>	369	38
<i>Large Impact</i>	377	38
<i>Unsure</i>	93	10
Large Mammal		
<i>No Impact</i>	5	.5
<i>Slight Impact</i>	72	7
<i>Moderate Impact</i>	341	35
<i>Large Impact</i>	502	51

<i>Unsure</i>	65	7
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Note: Percentages are rounded to the nearest whole.

Personal value toward butterflies was high among the respondents who took this survey. Eighty-seven percent either agreed or strongly agreed that butterflies add quality to their lives. Complete response frequencies and percentages are in Table 5.

Table 5. *Personal Value of Butterflies*

Item Response	Frequency	%
Butterflies add to the quality of my life.		
<i>Strongly Disagree</i>	14	2
<i>Disagree</i>	50	5
<i>Agree</i>	489	52
<i>Strongly Agree</i>	331	35
<i>Unsure</i>	51	6

Note: Percentages are rounded to the nearest whole.

Overall, respondents disagreed (53%) or strongly disagreed (15%) with the statement there are more butterflies today than in the past. **Although a majority of respondents felt there were fewer butterflies today, a relatively large proportion of respondents (22%) reported being unsure.** Table 6 has frequencies and percentages of responses to this question.

Table 6. *Butterflies Today vs. Past*

Item Response	Frequency	%
There are more butterflies today than in the past.		
<i>Strongly Disagree</i>	151	15
<i>Disagree</i>	524	53
<i>Agree</i>	82	8
<i>Strongly Agree</i>	17	2
<i>Unsure</i>	218	22

An overwhelming majority of respondents agreed (57%) or strongly agreed (33%) that zoos should make butterfly conservation a priority. **Of those who agreed with making butterfly conservation a priority, they believed top missions for butterfly conservation were increasing existing habitat (42%) and improving existing habitat (27%).** See Table 7 for conservation responses in frequencies and percentages.

Table 7. *Conservation Issues*

Item Response	Frequency	%
Zoos should make butterfly conservation a priority.		
<i>Strongly Disagree</i>	5	.5
<i>Disagree</i>	19	2
<i>Agree</i>	559	57
<i>Strongly Agree</i>	328	33

<i>Unsure</i>	72	7
The most important mission for butterfly conservation is:		
<i>Increasing existing habitat</i>	342	42
<i>Improving existing habitat</i>	222	27
<i>Limit pesticide use</i>	132	15
<i>Unsure</i>	100	11
<i>Creating laws</i>	28	3

Note: Percentages are rounded to the nearest whole.

Additional Research Questions

The descriptive information above directed further research questions about respondents' beliefs, knowledge, and value of butterflies. More specifically, research questions were formulated to gain insight on the relationship between how well informed a respondent reported feeling about environmental issues and knowledge of butterflies.

Given that most respondents agreed that butterflies added quality to their life, a further analysis was conducted to see if these individuals also believe action should be taken to conserve the butterfly population and habitat. Thus, our research questions included:

1. Is there a relationship between those who responded true or false on the butterfly knowledge questions and how well informed they feel about environmental issues?
2. Is there a relationship between how well-informed respondents consider themselves about environmental issues and their beliefs about the affects of commercial buildings, manufacturing/mining, transportation, new housing, and agriculture on butterflies?
3. Is there a relationship between respondents' belief that butterflies add to the quality of their life and whether they believe zoos should make butterfly conservation a priority?

Findings

To examine research question one, a series of Chi-squares were conducted to determine whether there was a relationship between those who responded true or false on the butterfly knowledge question and how well informed they felt of environmental issues. Respondents reported how well they were informed on environmental issues by selecting from the following options: not informed, slightly informed, moderately informed, or very informed. The results revealed that there was a statistically significance ($p < .05$) relationship between those who responded true or false on the following knowledge items:

- *Butterflies are plant pollinators.*
- *Butterflies have a four-part life cycle.*

More specifically, respondents who reported they felt more informed about environmental issues were also more likely to respond *true* that butterflies are plant pollinators and have a four-part life cycle.

There was not a statistically significant ($p > .05$) difference between respondents' report of how well informed they felt about environmental issues and those who responded true or false on the following knowledge items:

- *Butterflies provide food for other animals.*
- *Butterflies are insects.*
- *Butterflies are animals.*
- *Insecticides can kill or injure butterflies.*
- *Butterflies have a four-part life cycle.*
- *Butterflies are present year round, even in the colder climates.*

However, some interesting findings were revealed related to the latter knowledge questions. For example, regardless of how well informed a respondent felt about environmental issues, most were inclined to report that butterflies are not animals and are not present year round, even in the colder climates. This latter finding reveals the need to inform visitors that most species are present year round in a life stage other than the adult either as an egg, larva, or pupa. An additional Chi-square was conducted to examine if there is a relationship between whether respondents respond *true* or *false* that butterflies are present year round even in the colder climates and that butterflies have a four part life cycle. Interestingly, the Chi-square revealed a statistically significant ($p < .001$) relationship in that respondents who answered either *true* or *false* that butterflies have a four part life cycle were more likely to respond *false* that butterflies are present year round.

With respect to the second research question, a Chi-square revealed that there was a statistically significant ($p < .05$) relationship between how well-informed respondents considered themselves about environmental issues and their beliefs on the affect that commercial buildings, manufacturing/mining, transportation, and new housing have on butterflies and their habitat. Specifically, respondents who reported being moderately or very informed were also likely to agree that these environmental factors affect butterflies. There was no statistically significant ($p > .05$) relationship between a respondents' report of being well-informed and the belief that agriculture can affect butterflies. Despite this lack of significance, regardless of respondents' report of how well-informed they are on environmental issues, the descriptive statistics indicate that over a majority of respondents agree that the agriculture has an affect on butterflies.

For the third research question, a Chi-square revealed a statistically significant ($p < .001$) relationship between agreement that butterflies add quality to their life and agreement that zoos should make butterfly conservation a priority. This relationship indicates that if zoo visitors value butterflies, they are more likely to support butterfly conservation.

Educational Implications

The information in this report provides descriptive and statistical feedback on zoo visitors' knowledge, value, and support of butterflies and their habitat. Based on this feedback, the following educational implications are the major themes might be addressed through the new butterfly exhibit:

- Visitors need to be informed that butterflies are in fact animals as well as insects.
- Visitors need to be informed that butterflies provide food for other animals.
- Visitors need to be informed that butterflies are present throughout the entire year but in various life stages; either as an egg, larva, pupa or an adult.
- Communicating how butterflies are an important part of the quality of life is important for gaining support for butterfly conservation.
- Inform the public of potential laws that might be created to conserve butterflies.
- Inform the public of the role *they* can play in conserving butterflies and their habitat (e.g., limiting pesticide use; planting native plants).

APPENDIX A

Butterfly Survey

What are your opinions concerning butterflies? We would like to know. Please take a few minutes to fill out the questionnaire. Your responses are important to us! The findings will be used by the American Zoo & Aquarium Association's Butterfly Conservation Initiative to help create educational materials.

1	<p style="text-align: center;">Are You...</p> <p><input type="checkbox"/> Male</p> <p><input type="checkbox"/> Female</p>
2	<p style="text-align: center;">What is your Age:</p>
3	<p style="text-align: center;">What kind of setting do you live in?</p> <p><input type="checkbox"/> City/Town</p> <p><input type="checkbox"/> Suburb</p> <p><input type="checkbox"/> Rural</p>
4	<p style="text-align: center;">How well-informed do you consider yourself about environmental issues?</p> <p><input type="checkbox"/> Very informed</p> <p><input type="checkbox"/> Moderately informed</p> <p><input type="checkbox"/> Slightly informed</p> <p><input type="checkbox"/> Not informed</p>
5	<p style="text-align: center;">Your Education:</p> <p><input type="checkbox"/> High School</p> <p><input type="checkbox"/> College</p> <p><input type="checkbox"/> Vocational</p> <p><input type="checkbox"/> Advanced Degree</p>
6	<p style="text-align: center;">Your home zip code:</p>
7	<p style="text-align: center;">Which of the following statements are true (check all that apply)?</p> <p><input type="checkbox"/> Butterflies are insects</p> <p><input type="checkbox"/> Butterflies are animals</p> <p><input type="checkbox"/> Butterflies have a four part life cycle</p> <p><input type="checkbox"/> Insecticides can kill or injure butterflies</p>

8

In my opinion, butterflies and butterfly habitat are affected by the following land uses:

A. Strip malls, shopping centers and restaurants

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Unsure

B. Manufacturing/mining

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Unsure

C. Transportation

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Unsure

D. New Housing

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Unsure

E. Agriculture

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Unsure

9

Butterflies add to the quality of my life

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Unsure

10

In my opinion, there are more butterflies today than in the past

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Unsure

11

In my opinion, the most important mission for butterfly conservation is (choose one):

- Improving existing habitat
- Increasing existing habitat
- Creating laws
- Limiting pesticide use
- Unsure

12

What affect would the extinction of a butterfly species have on the environment?

- Large impact
- Moderate impact
- Slight impact
- No impact
- Unsure

13

What affect would the extinction of a large mammal have on the environment?

- Large impact
- Moderate impact
- Slight impact
- No impact
- Unsure

14

Butterflies (check all that apply):

- Are as important to the environment as other animals
- Provide food for other animals
- Are plant pollinators
- Are present year round even in colder climates

15

Zoos should make butterfly conservation a priority

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Unsure