

Documentation of Historical Insect Collection
OSMP Studies

4860



McCormack, Bryan

**DOCUMENTATION OF HISTORICAL INSECT COLLECTIONS
FROM BOULDER COUNTY, WITH SPECIAL EMPHASIS ON
LEPIDOPTERA, COLEOPTERA AND HYMENOPTERA**

Bryan McCormack
Museum - Entomology Section
Campus Box 218
University of Colorado
Boulder, Colorado 80309-0218

Background

The importance of insect diversity as an indicator of environmental condition and function is recently recognized. Little information is known on the insects found on City lands. Collecting and identifying insects on some city lands has occurred in past years, but information on insect specimens from Boulder County, including City lands, has never been adequately analyzed. Data on insects may help the City of Boulder Open Space Department and the City of Boulder Parks and Recreation Department identify significant centers of biodiversity requiring special management.

The University of Colorado Museum has recently developed a database in which the insect collections can be uniformly stored and comprehensively analyzed. This existing, and historical, information is important to establish a baseline of information on species occurrence and habitats. Examining this information within a regional context will help land managers understand the wide-ranging impacts from land development and resource uses in the Boulder Valley.

Insect specimen label data traditionally are not accurate enough for specific locational information, resulting in the need initially to evaluate known specimens from Boulder County. Evaluation of current information on insects will provide the basis for preparing a detailed proposal in the future for insect surveys on City Open Space and City Mountain Parks lands.

The University of Colorado Museum - Entomology Section has developed a database to catalog the insect and spider collections in the Museum, using Paradox for Windows software.

The database is currently used by the Entomology Section to input data from the Lepidoptera (butterfly) collection. All specimens from Colorado in the Lepidoptera collection are identified and tagged. The Lepidoptera section is in excellent shape and will be the starting point for entering the material from Boulder County into the database.

Sharon Collinge, a graduate student working on her Ph.D. research on City of Boulder Open Space land, has collected over 4000 specimens of 300 species from her research site. These specimens are mounted and labelled, sorted to morphospecies, and some identified to species. All are sorted to family or subfamily. Dr. Deane Bowers, associate professor in the Department of Environmental, Population and Organismic Biology at the University of Colorado, instructs an insect biology laboratory course and has received permission to collect insects on City Open Space. Insects collected on City of Boulder Open Space lands are curated at the University of Colorado Museum. Insect specimens become part of the Museum collection and will be included in the project to inventory insects from Boulder County.

Proposal

A database for insects from City of Boulder Open Space or City of Boulder Mountain Park lands does not exist. Designing a future detailed survey and study of invertebrate fauna on City lands requires a comprehensive analysis of the insects collected during the past 100 years and deposited

in the collections of the University of Colorado Museum. Since the accuracy and completeness of label information for each insect specimen in the Museum collection varies considerably, descriptions of exact locations where the insect was collected is frequently unavailable. The initial phase of a survey of invertebrates on City lands will be the creation of a database of insects collected from Boulder County and deposited in the Museum.

Three sections of the Museum insect collection are targeted for this project. (1) Lepidoptera (butterflies and moths) is the taxon which is in the best shape at the Museum. Most specimens of Lepidoptera are identified to species and subspecies. Butterflies are well-collected; most of the Museum specimens have excellent locality data. Lepidoptera are an important taxon as indicators of environmental quality and the easiest section of the collection to enter data into a database for Boulder County. Butterflies are well-known to collectors and relatively good information exists on which species are rare or uncommon in particular areas. (2) Coleoptera (beetles) and (3) Hymenoptera (bees) or Odonata (dragonflies, damselflies) are the next orders to be evaluated. These orders are priorities for the database based on their role as sensitive indicators of environmental stress and quality. Recent work by project participants in these orders at the Museum will improve the efficiency of analyzing and entering the data into the database.

Approximately 30,000 specimens of insects collected from Boulder County are estimated to be in the collections at the Museum. Data from 30 specimen labels can be entered per hour into the Boulder County database.

Selected priority areas for additional field collecting will target City Open Space and City Mountain Park lands. Areas chosen for insect collecting will be agreed upon by the Museum staff and City staff. Specimens will be curated by the University of Colorado Museum.

Insect collections at the Colorado State University Museum and the Denver Museum of Natural History will be searched as part of this project. These collection searches will target species collected in Boulder County. Evaluations of the status of insect collections of regional museums and suggestions for further museum and field survey work will be included in the final project report.

Budget

Total: \$4000

Products

1. Computer print-out of Boulder County specimen records from the University of Colorado Museum.
2. Electronic copy of the report with formats compatible with software used by the City of Boulder.
3. Data searches will target Lepidoptera, Coleoptera and Hymenoptera or Odonata.

September 13, 1993

To: City of Boulder Open Space And Boulder Mountain Parks

From: Bryan McCormack, Entomologist

Re: Law and Analysis, the "Twenty Factors".

This letter is intended to clarify my status as an independent contractor to City of Boulder Open Space and Boulder Mountain Parks. In my proposal to perform an entomological survey of City of Boulder Open Space and Mountain Parks it is clear that in no way does the City have the right to control or direct the manner in which I will accomplish this work. Ergo, I have below addressed the "Twenty Factors" that the City has developed in order to separate bona fide independent contractors from employees.

1. Instructions. I will not be required to comply with City instructions concerned with when, where, or how I will perform the entomological survey.

2. Training. I will receive no training from the City. My current qualifications will enable me to fulfil my obligations under the contract.

3. Integration. In no way will my services be integrated with City operations.

4. Services Rendered Personally. I understand that the City is interested in the results of my study, not the methods used in completing my work.

5. Hiring, Supervising and Paying Assistants. I understand that the City will not hire, supervise or pay assistants in conjunction with my work. I will be responsible for any assistants whom I hire for the attainment of the goals stated in the proposal.

6. Continuing Relationship. The proposed work is for a specific project. No future contracts are expected or assumed.

7. Set Hours of Work. The City will not be setting my hours while I work on this study.

8. Full Time Required. I am not under any obligations to devote my full time to this work, but will perform this survey in conjunction with other responsibilities I maintain as a professional entomologist.

9. Doing Work on Employer's Premises. While the survey necessarily will take place on Open Space and Mountain Parks property, all lab work, analysis and writing will take place in my office.

10. Order or Sequence Set. I understand that I am free to follow my own schedule to complete the study. The City does not have the right to direct my work patterns.

11. Oral or Written Reports. I understand that I am not required to report orally or in writing to the City except as specified in the contract.

12. Payment by Hour, Week, Month. Payment will be made by the job as detailed in my bill.

13. Payment of Business and/or Traveling Expenses. Any compensation for these items are addressed in the original proposal.

14. Furnishing of Tools and Materials. I will provide all tools and materials necessary for completion of the contract.

15. Significant Investment. I am not dependant in any way on facilities provided by the City.

16. Realization of Profit or Loss. My original proposal is designed to cover costs and reasonable profits. If I am unable to complete the proposal for the amount that I bid, I will realize a monetary loss that is not the responsibility of the City.

17. Working for More Than One Firm at a Time. My work for other contractors may or may not coincide with my work for the City depending upon my own contractual obligations.

18. Making Services Available to General Public. My services are available to the general public.

19. Right to Discharge. I understand that as long as I fulfill the terms of my contract, the City does not have the right to dismiss or discharge me.

20. Right to Terminate. I understand that neither the City nor myself may end the contract without incurring liability.

MEMORANDUM

To: Ingrid Hutson, Purchasing Department
From: Dave Kuntz, Open Space Planner
Date: September 15, 1993
Re: Sole Source Justification for Bryan McCormack

We have selected Bryan McCormack to provide consulting services to inventory and document the insect specimen collection from Boulder County curated in the University of Colorado Museum. Bryan is the Curatorial Assistant in Entomology at the Museum. He has worked in the insect collections for almost 2 years. Bryan is proficient in the database program used in preparing a database for insects from Boulder County. Bryan has collected insects extensively throughout Colorado. He is well-versed in a variety of insect collecting techniques. Bryan is most familiar with the status of the insect collection in the Museum. The Museum's insect collection has approximately 30,000 specimens and Bryan can provide the most accurate and efficient data analysis and entry from specimen label information. The initial preparation of a database for insects for the City of Boulder will begin with those specimens from Boulder County, since the accuracy of locational information on label data varies considerably.

Enclosed is a copy of the contract, a copy of Bryan's automobile insurance, his response to the "20 Factors," the purchase requisition and a copy of his proposal.

AGREEMENT FOR CONSULTING SERVICES

THIS AGREEMENT is made this ____ day of September, 1993, by and between the City of Boulder, Colorado, a Colorado home-rule municipality (hereafter "the City"), and Bryan McCormack, (hereafter "the Consultant").

RECITALS

A. The City desires to obtain consulting services during 1993 to develop a database of the insects from Boulder County curated in the collections of the Museum of the University of Colorado; to collect, identify and curate additional insect species from specified City of Boulder properties as may be necessary to complete the insect collections for Boulder County contained in the Museum of the University of Colorado; and, to visit other regional museums (including the Colorado State University Museum and the Denver Museum of Natural History) to review insect collections contained at these repositories (hereafter the "Study").

B. The Consultant provides professional consulting services to the public and is fully qualified to perform the consulting services needed by the City for the Study.

COVENANTS AND CONDITIONS

NOW, THEREFORE, in consideration of the promises and obligations set forth below, the City and the Consultant agree as follows:

I. SCOPE OF SERVICES

A. General.

The Consultant shall provide research and advisory services to the City's Open Space Department and Parks and Recreation Department to document the insect fauna,

especially any rare, threatened or endangered insect species, from Boulder County in the collections of the University of Colorado Museum. The Consultant's services shall be in accordance with the "Scope of Work and Budget" consisting of one page, a copy of which is attached hereto, marked as Exhibit A, and incorporated herein. The Consultant shall provide these services at the City's request and to the City's reasonable satisfaction. Any substandard or inaccurate work shall be satisfactorily corrected and replaced by the Consultant without cost to the City of Boulder.

B. Documents.

All work notes, reports, analyses, maps, surveys, or any other materials developed specifically for the Study are and shall remain the sole and exclusive property of the City. The Consultant shall not provide copies of any material prepared hereunder to any other party without the prior written consent of the City.

II. COOPERATION BY THE CITY

The City will thoroughly and promptly consider all reports, sketches, drawings, specifications, proposals, and other documents prepared by the Consultant, and it shall inform him of all decisions it has made which would affect the Consultant's work under the Agreement as soon as reasonably feasible. The City will inform the Consultant of any pending change or revision to the Study as soon as reasonably feasible.

III. SCHEDULE

The Consultant shall begin to perform his services beginning September 15, 1993 and shall continue to provide such services through December 31, 1993 and at such times as the parties mutually agree. The Consultant shall not provide services under this Agreement after

December 31, 1993 unless this Agreement is amended in writing. The City shall use its best efforts to devise a mutually satisfactory schedule with the Consultant and to consult with and advise the Consultant about any revisions to that schedule which it believes are necessary as the Study proceeds, including any renegotiations and renewal of the contract.

IV. COMPENSATION

A. Aggregate Limit.

The amount paid by the City to the Consultant pursuant to this Agreement shall not exceed the sum of \$4,000. These expenses shall include, without limitation, word processing, long-distance telephone charges, reproduction of reports or documents, postage and messenger service.

V. BILLS AND TIME OF PAYMENTS TO CONSULTANT

A. The Consultant shall bill his charges to the City periodically, but not more frequently than once a month. Each bill shall include a description of the Consultant's services, a statement of the fee for such services, and a brief summary of the overall status of the Consultant's efforts. If it agrees with the account of progress on the study, the City shall pay that bill within 30 days of receipt. The itemized invoices from the Consultant shall include the following:

1. The total for each particular service and the total fee for that service since the previous bill.
2. An itemized list of reimbursable expenses, if any and, when possible, copies of invoices therefore.

B. The City will pay each bill which it finds to be in accordance with this

Agreement in full within 30 days of its receipt. If the City fails to pay the Consultant in full within 30 days after receipt of a bill, the amount shall include a charge at the rate of 1-1/2 percent per month from the thirtieth day.

VI. TERMINATION

This Agreement may be terminated by either party for a material breach of this Agreement by the other party not caused by any action or omission of the terminating party by giving the other party written notice at least thirty (30) days in advance of the termination date. The termination notice shall specify in reasonable detail each such material breach. The party receiving the notice shall be given the opportunity to cure each specified breach within the notice period, and if it effects a complete cure within that period, then no termination shall occur. However, if it fails to effect such a complete cure, then the termination shall occur as of the date stated in the notice. In the event of such termination by either party, the Consultant shall promptly deliver to the City all drawings, computer programs, computer input and output, analyses, plans, photographic images, tests, maps, surveys, and written materials of any kind generated in the performance of its services under this Agreement up to and including the date of termination. If this Agreement is so terminated by the Consultant, he will be paid for all services rendered up to the date of termination. If this Agreement is so terminated by the City, the Consultant will be paid for all services rendered to the date of termination, except those services which constituted the grounds, in whole or in part, of the notice of termination. Upon payment by the City in accordance with either of the preceding two sentences, all obligations of the City to the Consultant under this Agreement shall cease.

VII. LAWS TO BE OBSERVED

The Consultant shall be cognizant of all federal and state laws and local ordinances and regulations which in any manner affect those engaged or employed in the work, or which in any manner affect the conduct of the work, and of all applicable orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. The Consultant shall at all times observe and comply with all such existing laws, ordinances, regulations and decrees, and shall defend, protect and indemnify the City against any claim or liability arising from or based on the violations of any such law, ordinance, regulation, order, or decree, whether by itself, its subcontractors, agents, or employees.

VIII. INDEPENDENT CONTRACTOR

The Consultant is not an employee of the City. The relationship between the Consultant and the City is solely that of an independent contractor, and the Consultant shall not be deemed to be a partner, joint venturer, or an employee of the City. Consultant shall supply all materials and equipment necessary to perform the services under this Agreement and also shall operate from his own place of business. The City shall not provide any compensation or benefits to the Consultant other than what is specified in Section IV above.

IX. PERMITS AND LICENSES

The Consultant shall procure all permits and licenses, pay all charges, fees, and taxes and give all notices necessary and incidental to the due and lawful prosecution of his services.

X. PATENTED DEVICES, MATERIALS AND PROCESSES

The Consultant shall hold and save harmless the City from any and all claims for infringement, by reason of the use of any patented design, device, material, process, or trademark or copyright and shall indemnify the City for any costs, expenses, and damages, including court costs and attorney fees, which it might be obligated to pay by reason of infringement at any time during the prosecution or after completion of their services hereunder.

XI. INDEMNIFICATION

The Consultant shall be responsible for all damages to persons or property caused by him, his agents, subcontractors or employees, which may arise from his performance of this Agreement, and shall indemnify, hold harmless, and defend the City from any claim or action brought against the City by reason thereof. As part of this obligation, the Consultant shall compensate the City for time, if any, spent by the Boulder City Attorney's Office in connection with such claims or actions at the rates generally prevailing among private practitioners in Boulder County for similar services. The Consultant's obligation to indemnify the City as set forth in this Agreement shall survive the termination or expiration of this Agreement.

XII. INSURANCE

A. Minimum Amounts.

The Consultant shall carry the following minimum amounts of insurance:

1. Automobile Liability Policy for amounts not less than:
\$250,000 in aggregate.

B. Coverage.

This insurance shall be provided by a reputable insurance company or companies qualified to conduct business in Colorado. The City reserves the right, but shall not have the duty, to reject any insurer which it finds to be unsatisfactory and insist that the Consultant substitute another insurer that is reasonably satisfactory to the City.

C. Certificates.

Certificates showing the Consultant is carrying the above described insurance shall be furnished to the City within fifteen (15) calendar days after the date on which this Agreement is made. Such certificates shall show that the City shall be notified of all cancellations of such insurance policies. The Consultant shall forthwith obtain substitute insurance in the event of cancellation.

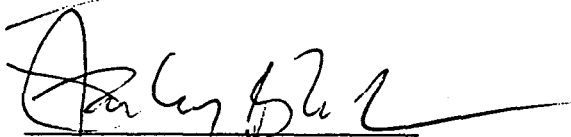
XIII. GENERAL

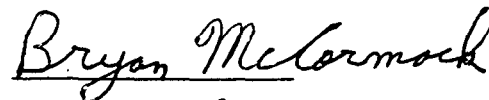
This document constitutes the entire Agreement between the City and the Consultant and incorporates all prior verbal and written communications between the parties concerning the subject matter included herein. Neither party shall assign, sublet, or transfer its interest in this Agreement without the written consent of the other. No amendment or modification shall be made to this Agreement unless it is in writing and signed by both parties. Any suit between the two parties arising under this Agreement shall be brought only in a court of competent jurisdiction for the Twentieth Judicial District of the State of Colorado.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement effective as of the day and year first above written.

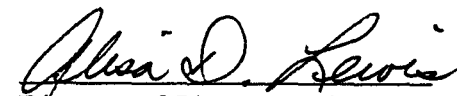
CITY OF BOULDER, COLORADO

BRYAN McCORMACK

By: 
City Manager

By: 
Title: Entomologist

ATTEST:


For Director of Finance and Record
Ex-Officio City Clerk

Approved as to form:

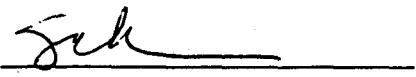

City Attorney

EXHIBIT A

Scope of Work and Budget for Documenting the Insect Fauna of Boulder County.

Contract Period: 15 September 1993 - 31 December 1993

OBJECTIVE

The purposes of the study are to: (1) develop a database of the insects of Boulder County curated in the Museum of the University of Colorado; (2) collect, identify and curate additional insect species from specified City of Boulder properties as agreed by both parties; and, (3) visit other regional museums (including the Colorado State University Museum and the Denver Museum of Natural History) to evaluate insect collections in these repositories. A special attempt will be made to document any species of special concern, including rare, threatened, endangered or sensitive species.

PRODUCTS

The final product of the insect fauna database will consist of the following components:

1. computer print-out of specimen records in formats requested by City of Boulder Open Space Department and Parks and Recreation Department;
2. electronic copy of the report with formats compatible with databases used by the City of Boulder;
3. data searches of the Museum collections will have priorities of species in Lepidoptera, Coleoptera, and Hymenoptera or Odonata.

BUDGET

This work will be completed by 31 December 1993. The Consultant agrees not to exceed \$4,000 including services and expenses. The work may continue under a new contract after 31 December 1993, if both parties agree.



FARMERS INSURANCE GROUP OF COMPANIES

AMERICA CAN DEPEND ON FARMERS

13605-09-45 AUTO CHANGE TRANSACTION SUMMARY 09/23/93 11:49:00 TAC200A-67
 01/ABT: 22/61 HAVE YOU ASKED ABOUT LIFE INSURANCE?
 ITEM CHG EFF. INSURED'S NAME: BRYAN MCCORMACK
 NO CODE DATE DESCRIPTION MASTER #: 13605-09-45 + = GENERATED CHANGE RECORD
 21 09/23 BI/PD: 100/300/50
 25 + 09/23 DA: 100/300

100,000 bodily injury per person
 300,000 bodily injury per occurrence
 50,000 property damage

Effective 09-23-93

Debbie For Joanie Clark

TO CANCEL ABOVE PENDING CHANGE(S):

==> KEY CANCEL HERE:

==> KEY ITEM NO/ALL HERE: NEXT CHANGE CODE:

INSURED ----- TIME ----- DATE -----

A2J9 PF1-NETWORK MENU * PF2-CHG MENU * PF5-TRANS DONE

PREPARATION OF A DATABASE FOR INSECTS FROM BOULDER COUNTY

DOCUMENTATION OF HISTORICAL INSECT COLLECTIONS
FROM BOULDER COUNTY WITH SPECIAL EMPHASIS ON
LEPIDOPTERA, COLEOPTERA

Bryan McCormack
Museum - Entomology Section
Campus Box 218
University of Colorado
Boulder, Colorado 80309-0218

Background

Insect data may help CBOS and CBMP to identify important centers of biodiversity requiring special management.

The importance of insect diversity as an indicator of environmental condition and function is recently recognized. Understanding the status of insect fauna on City of Boulder Open Space and City of Boulder Mountain Parks will help to determine appropriate management actions to maintain the quality of the City's environment. Little information is known on the insects found on City lands. Collecting and identifying insects on some city lands has occurred in past years, but information on insect specimens from Boulder County, including city lands, has never been adequately analyzed.

The University of Colorado Museum ~~now has~~ a database ^{recently developed} ~~where~~ ^{in which} the insect collections ^{data} can be uniformly and comprehensively analyzed. This existing, and historical, information is important to establish a baseline of information on species occurrence and habitats. Examining this information within a regional context will help land managers understand the wide-ranging impacts from land development and resource uses ~~on city lands~~ ^{in the Boulder Valley.}

Evaluation of Insect specimen label data traditionally are not accurate enough for specific locational information, resulting in the need initially to evaluate known specimens from Boulder County. Current information on insects will provide the basis for preparing a detailed proposal in the future for insect surveys on City Open Space and City Mountain Parks lands.

The University of Colorado Museum - Entomology Section has developed a database to catalog the insect and spider collections in the Museum, using ~~the computer program~~ Paradox, ^{software} for Windows.

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Proposal

for?
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B. The Consultant provides professional consulting services to the public and is fully qualified to perform the consulting services needed by the City for the Study.

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XIII. GENERAL

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Boulder County Insect Database
by Bryan McCormack

Summary

This Database contains 26,402 records from the orders Coleoptera, Hymenoptera, Lepidoptera and Odonata. Included with the Database, which is a Paradox table called Insect.db, is the following:

- 1) A print out of the 2114 named species which are included in the Database. (NOTE: There are undoubtedly many more species in the collection, as this number does not take into account those specimens which have not yet been identified to the specific level. In addition, many species have yet to be collected in Boulder County.)
- 2) A pie chart representing the total number of records in the Database for each order.
- 3) A graph of the record distribution by month.
- 4) A list of the localities in the Database for which there are greater than twenty records.

At a later date I will submit a report containing:

- 1) Recommendations from knowledgeable entomologists as to what species and habitats are the most deserving of protection.
- 2) General comments on insect conservation.
- 3) Ideas pertinent to the application of this Database.

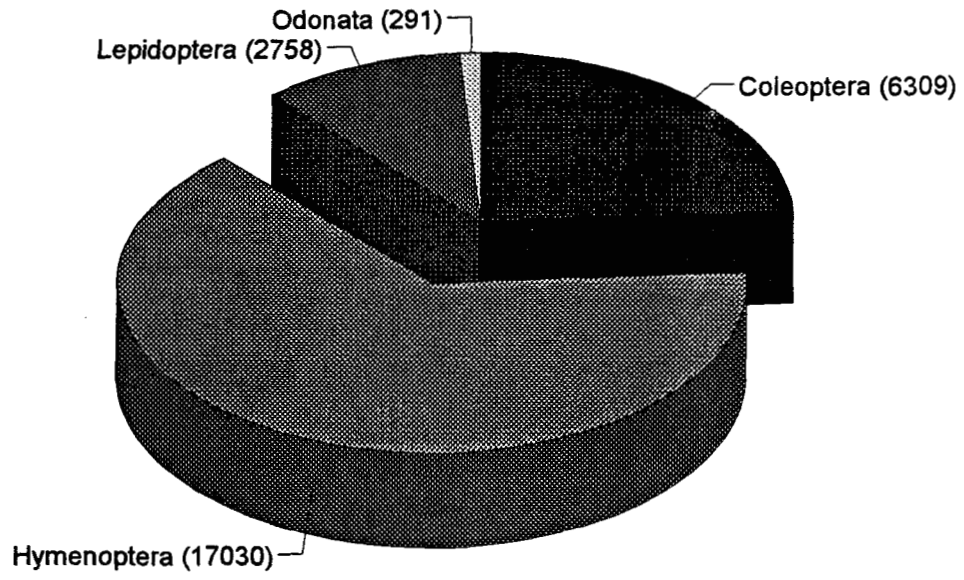
TAM,

4/23

BUG INFO. I RETURNED
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Distribution by Order



Boulder County Insect Survey: Conservation Methods For Insects

The conservation of insects, like most species, is ultimately dependant on the protection of habitat of sufficient quantity and quality. In the case of insects however, substantial complexity can be introduced to a management scenario due to the complex life cycles inherent in the class Insecta. For example, most insects are dependant on particular host plants or microclimates in both the adult and larval stages and/or may be flightless and as such are poor at dispersal. Therefore, the natural history of targeted species is of considerable importance. In addition, it is insufficient to presume the adequacy of existing resources without an understanding of their temporal availability. For instance, the occurrence of a particular host plant in a reserve area is of no importance if it is continually grazed when it is of the most importance to the insect community.

While the protection of small areas of land as natural preserves has proven far less successful for insects than for longer lived plants and vertebrates, these difficulties are in a large part do to the extreme variety of insects and hence, our ignorance of them. Insect conservation can however be effective via a number of avenues:

- 1) Research programs
- 2) Monitoring programs
- 3) Education

Research Programs

Research in the context of a conservation program should focus on inventorying populations, species, guilds, communities and ecosystems. This information can be used (1) to select and design reserves; (2) to assess the potential for sustainable use of natural resources; (3) to strengthen the case for habitat conservation by documenting the distribution of threatened or endangered species and (4) to provide the basis for selecting indicator species or assemblages for ecological monitoring.

Because reserves are designed to protect biotic diversity it seems natural to use insects, the most diverse biotic element, as indicators. Practically, insects also offer a number of advantages; (1) they are inexpensive to preserve and store, (2) there are effective means of passively trapping large numbers of individuals over a short period of time and identifying them, (3) there are not as many cultural taboos associated with killing them, and (4) they closely track environmental changes in their environment.

One component of the inventory process that Boulder County is fortunate enough to have in place is a historical collection of insects. While this information is informative in terms of species richness, one component of biodiversity, it may not accurately represent abundance or association with habitat. This collection does however provide the foundation for developing an effective conservation strategy when it is combined with a database system and a monitoring program.

Monitoring Programs

A monitoring program is designed to assess changes in ecosystem structure, composition, and function in response to natural factors, human disturbance or management activities over time. In contrast to an inventory, a monitoring program makes use of control plots to separate variations in baseline conditions, due to natural fluctuations, from variation due to human disturbance.

By using the results of the inventory a suite of species such as keystone species, dominant and threatened species can be selected for monitoring changes in community composition. The criteria for selecting indicator species might include the following:

- 1) Taxonomically and ecologically diversified
- 2) High ecological fidelity
- 3) Sedentary
- 4) Narrowly endemic
- 4) Taxonomically well known
- 5) Well studied
- 6) Abundant

of carrion may be an unwise choice in terms of biodiversity because of the diverse communities they support, including Hister Beetles, Carrion Beetles, Blow Flies and many other important links in the food chain.

DATE COLLECTED	LOCALITY	COLLECTOR	ORDER	FAMILY	GENUS	SPECIFIC EPITHET	SUBSPECIES	GR	SR
9jul1953	S. St. Vrain Canyon	D. Eff	Lepidoptera	Hesperiidae	Atrytone	arogos	iowa	G4*	S2
4aug1973	Arapahoe Pass Trail	M. Epstein	Lepidoptera	Satyridae	Erebia	theano	ethela	G4*	S3
06aug1953	Arapahoe Pass trail	Don Eff	Lepidoptera	Satyridae	Erebia	theano	demmia	G4*	S3
10aug1951	Arapahoe Pass trail	Don Eff	Lepidoptera	Satyridae	Erebia	theano	demmia	G4*	S3
04aug1949	Arapahoe Valley	Don Eff	Lepidoptera	Satyridae	Erebia	theano	demmia	G4*	S3
28jul1946	Arapahoe Valley	Don Eff	Lepidoptera	Satyridae	Erebia	theano	demmia	G4*	S3
13aug1912	Camp Albion		Lepidoptera	Satyridae	Erebia	theano		G4	S3
30jul1948	Diamond Lake	Don Eff	Lepidoptera	Satyridae	Erebia	theano	demmia	G4*	S3
01aug1954	Lefthand Park	Don Eff	Lepidoptera	Satyridae	Erebia	theano	demmia	G4*	S3
04jul1954	Lefthand Park	Don Eff	Lepidoptera	Satyridae	Erebia	theano	demmia	G4*	S3
15jul1952	Lefthand Park	Don Eff	Lepidoptera	Satyridae	Erebia	theano		G4	S3
22jul1962	Lefthand Park	Don Eff	Lepidoptera	Satyridae	Erebia	theano		G4	S3
04aug1961	Niwot Ridge	SC Johannot	Lepidoptera	Satyridae	Erebia	theano		G4	S3
10aug1941	S Arapaho Peak	HG Rodeck	Lepidoptera	Satyridae	Erebia	theano		G4	S3
01aug1962	Ward Dam	Don Eff	Lepidoptera	Satyridae	Erebia	theano		G4	S3
15jun1953	Flagstaff MT.	D. Eff	Lepidoptera	Hesperiidae	Erynnis	martialis		G4	S2S3
7mar1908	Boulder	S. Rohwer	Lepidoptera	Ethmiidae	Ethmia	monachella		GH	SH
8sep1956	Boulder	D. Eff	Lepidoptera	Lycaenidae	Hemiargus	isola		G5	S?
17jul1961	Marshal	E. Lanham	Lepidoptera	Hesperiidae	Hesperia	ottoe		G3?	S2
2may1959	Coal Creek	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
3may1970	Eldorado		Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
21apr1949	Four Mile Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
6may1946	Gregory Canyon	Det. Aandahl	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
8may1946	Gregory Canyon	Det. Aandahl	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
9may1946	Gregory Canyon	Det. Aandahl	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
19apr1962	N. St. Vrain	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
28apr1961	N. St. Vrain	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
13apr1948	Sunshine Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
15apr1948	Sunshine Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
22apr1953	Sunshine Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
22apr1961	Sunshine Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
5apr1948	Sunshine Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
6apr1948	Sunshine Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
9apr1948	Sunshine Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
14apr1962	Two Mile Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
20apr1958	Two Mile Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
2may1959	Coal Creek	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
3may1970	Eldorado		Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
21apr1949	Four Mile Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
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8may1946	Gregory Canyon	Det. Aandahl	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
9may1946	Gregory Canyon	Det. Aandahl	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
18apr1962	N. St. Vrain	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
28apr1961	N. St. Vrain	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
13apr1948	Sunshine Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
15apr1948	Sunshine Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1
22apr1953	Sunshine Canyon	D. Eff	Lepidoptera	Lycaenidae	Incisalia	fotis	schryveri	G3*	S1