

Science in the Park:
Natural Resource Research in
Great Smoky Mountains National Park, 1963-1988

Curated by Amy Lundell

Exhibit Purposes:

- To introduce the general public to the natural resource research that takes place in Great Smoky Mountains National Park, NC/TN
- To provide online access to natural resource research records for eligible GRSM staff

Exhibit Description:

In the Great Smoky Mountains National Park (GRSM) Archives, there is a collection of natural resource research permits from 1963-1988. These permits cover all natural resource research that took place in the park during those years. They contain information about who performed the research, their sponsoring institution, what was studied, when the research took place, and, in many instances, a general description of the project's findings.

This exhibit will provide users with the digitized records from this collection, an interactive timeline of research, and general descriptions of the research subjects. There will also be a private side for eligible GRSM staff to access restricted images and metadata.

Public vs. Private Sides of Omeka Exhibit:

- Though the majority of material will be available on the public side, GRSM staff will have access to additional restricted information on the private side.
- Private side functionality will be created using Omeka's user roles.
 - Eligible GRSM staff will be given a user status of "researcher" to allow access to any record or field marked "private."
- Private side will be accessible via the login page.
- Private side will have full access to all aspects of exhibit, both public and private.

Theme:

- As this would be a National Park Service exhibit, the theme would match official design standards of green, brown, black, ivory, and the NPS arrowhead as seen below on the NPS homepage (www.nps.gov).



Existing Plugins:

- Exhibit Builder 3.0
 - Used to create Omeka exhibit
- Neatline/ NeatlineSimile
 - Used to create integrated timeline
- Search by Metadata
 - Allows users to browse by specific metadata in certain fields
- Hide Elements
 - Designates certain fields to available only on the private side

Major Sections (Public Side):

Homepage:

- This is the primary webpage of the exhibit and will be the main entry point to the collection.
- It will contain a brief description of the exhibit, links to all the other webpages, example records, and a search engine for the entire site.

About the Collection:

- This webpage will contain basic information on the purpose and design of the exhibit, how to navigate the exhibit, the contents of the collection, the park archives, GRSM Resource Management and Science Division (creator of the records), and contact information regarding the collection.
- It will also provide links to the park website and NPSpecies (controlled vocabulary).

Timeline:

- Using Neatline and Neatline Simile, this webpage will contain an interactive timeline of all major research covered in the collection.
 - It will provide a date range for each research project.
 - As most projects are not continuous, repetitive entries are likely (see example below).
 - Each project will be referred to by the common name (not scientific).
 - For example, research on *Plethodon jordani* would be noted as “Red-Cheeked Salamander” with a date range of May 1969-June 1973 and April 1975-September 1978.

Research Topics:

- Using topical information produced by the GRSM Resource Education division, this page will contain links to individual general descriptions of the various natural resources being studied in the park (e.g. Black Bears, water quality, air quality, Balsam Woolly Adelgid).

FAQs:

- FAQ page will provide answers to questions such as the following:
 - “What are these records?”
 - “Where can see the originals?”
 - “Can I have a copy of any of these records?”
 - “Where can I find more information on one of these research projects?”
 - “Who can I contact if I have more questions?”

Browse:

- This standard Omeka webpage will allow users to browse all records in the collection.

Additional Resources:

- This webpage will provide bibliographic entries for additional resources (in print and online).
- It will also include information about related collections in the park archives.

Major Sections (Private Side):*Login:*

- Accessible via a link at the top of each webpage, the login page will allow for GRSM staff to gain access to records, metadata, and maps that are unavailable to the general public due to various restrictions (e.g. archeological site coordinates, threatened/endangered species).
- Park archivist will provide login username to allow for verification of access credentials.

Individual Pages (Public Side):*Digitized Images:*

- Each digitized record will be its own “item” containing the digitized image(s) and the accompanying metadata.
- If there are multiple parts to the image (e.g. multiple pages), all parts will be associated with one item and one set of metadata.

Metadata:

- Dublin Core, Omeka’s standard metadata schema, will be used for the general metadata associated with each item.
- The following are the basic Dublin Core elements, descriptions from Omeka (https://omeka.org/codex/Working_with_Dublin_Core), and notes specific to this exhibit:

Element	Description	Notes
Title	Name of the Resource	Project Title
Subject	Topic of the Resource	Ex. “Bats”
Description	Account of the Resource	Includes a brief description of the research (see project description section of permit)
Creator	Entity primarily responsible for making	Great Smoky Mountains National Park

	the resource	
Source	Resource from which the described resource is derived	GRSM 7000/002.002.001.001
Publisher	Entity responsible for making the resource available	Great Smoky Mountains National Park Archives
Date	Point or Period of Time associated with an event in the lifecycle of the resource	Follow NPS protocol (YYYY-MM-DD)
Contributor	Entity responsible for making contributions to the resource	If applicable
Rights	Information about rights held in and over the resource	For public side, use standard NPS rights statement for publicly accessible records. For private side, use standard NPS rights statement for restricted records.
Relation	Related resources	If applicable, include GRSM archival references
Format	File format, physical medium, or dimensions of a resource	Paper
Language	Language of the resource	English
Type	Nature or Genre of the resource	Document
Identifier	Unambiguous reference to the resource within a given context	Use file numbering system
Coverage	Spatial or temporal topic of the resource, the spatial applicability of the resource, or the jurisdiction under which the resource is relevant	Great Smoky Mountains

- Additional metadata will be discussed below under “New Plugin: Modified Darwin Core Metadata Plugin.”

Links:

- Using the “Search by Metadata” plugin, the user can click on designated metadata fields and instantly search by that term in that specific field across all records.
- Tags using standardized vocabulary will contain the name of the researcher(s), associated institution, and general subject(s).
 - By clicking on one of these tags, users will be able to search all records for the corresponding tags.

Individual Pages (Private Side):*Additional Digitized Records Available:*

- Any digitized records that are restricted in nature will be marked as “private” during upload to exhibit.
- These records will be available to eligible GRSM staff via the private side login.

Additional Metadata Available:

- As some records are public in nature but include restricted types of metadata (e.g. specific locations), some metadata fields will be marked as “private” by “Hide Elements” plugin during upload to exhibit.
- These fields will be available to eligible GRSM staff via the private side login.

New Plugin: Modified Darwin Core Metadata Plugin*Justification:*

- Scientific records include valuable information not covered in Dublin Core (Omeka’s standard metadata schema).
 - For example, “subject” cannot contain an organism’s common name and scientific name (including all levels of taxonomy).
- Based on Dublin Core, Darwin Core is a metadata schema developed specifically for scientific records and specimens.
- Darwin Core, however, is missing a couple of elements necessary for this collection of records, thereby making this a modified version of Darwin Core.

Use:

- As Darwin Core contains numerous metadata fields, this plugin will focus on the record-level terms, specifically those under “Event” and “Taxon.”

- Additional detail beyond these fields is not necessary for this collection.
- Only applicable fields will be used with each exhibit item.
 - For example, taxonRemarks will not be used if there are no additional notes for the taxonomy
- Controlled Vocabulary will be the taxonomy on the NPSpecies website (<https://irma.nps.gov/npspecies>).
- The following is a table of Darwin Core elements to be included, the descriptions of each element from the Darwin Core website (<http://rs.tdwg.org/dwc/terms/>), and an example of element content:

Element Name	Description	Example
event	An action that occurs at some location during some time.	Human Observation
eventID	An identifier for the set of information associated with an Event (something that occurs at a place and time). May be a global unique identifier or an identifier specific to the data set.	GRSM_1988_01_01
fieldNumber	An identifier given to the event in the field. Often serves as a link between field notes and the Event.	GRSM_FN_1988_01_01
startDateOfYear	The earliest ordinal day of the year on which the Event occurred (1 for January 1, 365 for December 31, except in a leap year, in which case it is 366).	25
endDateOfYear	The latest ordinal day of the year on which the Event occurred (1 for January 1, 365 for December 31, except in a leap year, in which case it is 366).	67

year	The four-digit year in which the Event occurred, according to the Common Era Calendar.	1988
habitat	A category or description of the habitat in which the Event occurred.	Bog
samplingProtocol	The name of, reference to, or description of the method or protocol used during an Event.	Mist Netting
fieldNotes	One of a) an indicator of the existence of, b) a reference to (publication, URI), or c) the text of notes taken in the field about the Event.	GRSM LC 7000/001.001.002.003-004
taxonID	An identifier for the set of taxon information (data associated with the Taxon class). May be a global unique identifier or an identifier specific to the data set.	https://irma.nps.gov/NPSpecies/Species/Profile/61152
kingdom	The full scientific name of the kingdom in which the taxon is classified.	Animalia
phylum	The full scientific name of the phylum in which the taxon is classified.	Chordata
class	The full scientific name of the class in which the taxon is classified.	Mammalia
order	The full scientific name of the order in which the taxon is classified.	Carnivora
family	The full scientific name of the family in which the taxon is classified.	Ursidae
genus	The full scientific name of the genus in which	Ursus

	the taxon is classified.	
specificEpithet	The name of the first or species epithet of the scientificName.	U. americanus
infraspecificEpithet	The name of the lowest or terminal infraspecific epithet of the scientificName, excluding any rank designation.	Pallas
vernacularName	A common or vernacular name	American Black Bear
taxonRemarks	Comments or notes about the taxon or name.	Also known as Ursus americanus americanus

- The following is a table of the additional elements being added for this specific exhibit:

Element Name	Description	Example
primaryInvestigator	Name(s) of the primary investigator(s) on the permit. Follow standard NPS protocol for names (Last, First Middle, Suffix). If more than one, separate with a vertical line ().	Jones, John Evans III
additionalInvestigator	Name(s) of any additional investigator(s) on the permit. Follow standard NPS protocol for names (Last, First Middle, Suffix). If more than one, separate with a vertical line ().	Samuels, Sarah E. Richards, Paul D.
sponsoringInstitution	Name of Institution sponsoring research	University of Tennessee at Knoxville

Interaction with Existing Plugins:

- As Darwin Core is based on Dublin Core, all general metadata will be covered by pre-existing Dublin Core metadata set.
- Using “Search by Metadata,” the new metadata fields should become “clickable” thereby allowing users to search specific fields for specific terms.
 - For example, by clicking on “Ursus” in the “genus” field, the user will see a list of all bear research in the park.

Future Use:

- The addition of this extensive metadata schema opens the door for numerous future uses:
 - Development of interactive taxonomy to allow for users to see all the organisms researched during this period
 - Development of two mind maps with links to specific items
 - One mind map containing all the taxonomy classification levels so that users can see how all the organisms are interrelated
 - One mind map containing sponsoring institutions, researcher names, and projects so that users can investigate the interconnectedness of institution, researcher, and subject.
 - Create an interactive map of all the institutions who conducted natural resource research in the park during those years
 - Connections to other NPS site natural resource research exhibits
 - For example, multiple parks researching same organism
 - Engages students in exploring taxonomy classification structures
 - Shows researchers what species are found in which type of habitat
 - Assists users in determining when and what research has taken place on a specific topic
 - Helps users identify what institutions are working on similar projects and what projects a specific institution researches
 - Allows researchers greater access to park information by allowing them to zero in on research pertaining to their area of study
 - For example, permits researcher to see what has been done to aid in formulating a request for research (e.g. Ph.D. dissertation)
 - Can be linked to future digitized field notes and final reports
 - On private side, allows GRSM staff to know what species have been spotted where (using standard Omeka mapping features)

Under Development: Darwin Core Plugin Files*Plugin.ini*

```
[info]
name = "Modified Darwin Core Element Set"
author = "Amy Lundell"
description = "Creates Darwin Core element set based on Biodiversity
Information Standards's Darwin Core Standards. This element set
has been modified to accommodate NPS requirements by use of
specific related Darwin Core elements and by the addition of the
primaryInvestigator, additionalInvestigator, and
sponsoringInstitution elements.
(http://rs.tdwg.org/dwc/index.htm) "
version = "0.1"
license = "GPLv3"
```

```
omeka_minimum_version = "2.0"
optional_plugins = "SearchByMetadata"
```

ModifiedDarwinCoreElementSet.php

```
<?php

$elementSetMetadata = array(
    'name' => 'Modified Darwin Core',
    'description' => 'Darwin Core is a metadata standard for biological
        diversity created by the Darwin Core Task Force of the
        Biodiversity Information Standards (TDWG). This element set has
        been modified to accommodate NPS requirements by use of specific
        related Darwin Core elements and by the addition of the
        primaryInvestigator, additionalInvestigator, and
        sponsoringInstitution elements. More information on Darwin Core
        can be found at http://rs.tdwg.org/dwc/index.htm.'
);

$elements = array(

    array(
        'name' => 'event',
        'description' => 'An action that occurs at some location during
            some time.',
    ),

    array(
        'name' => 'eventID',
        'description' => 'An identifier for the set of information
            associated with an Event (something that occurs at a place and
            time). May be a global unique identifier or an identifier
            specific to the data set.',
    ),

    array(
        'name' => 'fieldNumber',
        'description' => 'An identifier given to the event in the field.
            Often serves as a link between field notes and the Event.',
    ),

    array(
        'name' => 'startDateOfYear',
        'description' => 'The earliest ordinal day of the year on which the
            Event occurred (1 for January 1, 365 for December 31, except in a
            leap year, in which case it is 366).',
    ),

    array(
        'name' => 'endDateOfYear',
        'description' => 'The latest ordinal day of the year on which the
            Event occurred (1 for January 1, 365 for December 31, except in a
            leap year, in which case it is 366).',
    ),
);
```

```

array(
  'name' => 'year',
  'description' => 'The four-digit year in which the Event occurred,
    according to the Common Era Calendar.',
),

array(
  'name' => 'habitat',
  'description' => 'A category or description of the habitat in which
    the Event occurred.',
),

array(
  'name' => 'samplingProtocol',
  'description' => 'The name of, reference to, or description of the
    method or protocol used during an Event.',
),

array(
  'name' => 'fieldNotes',
  'description' => 'One of a) an indicator of the existence of, b) a
    reference to (publication, URI), or c) the text of notes taken in
    the field about the Event.',
),

array(
  'name' => 'taxonID',
  'description' => 'An identifier for the set of taxon information
    (data associated with the Taxon class). May be a global unique
    identifier or an identifier specific to the data set.',
),

array(
  'name' => 'kingdom',
  'description' => 'The full scientific name of the kingdom in which
    the taxon is classified.',
),

array(
  'name' => 'phylum',
  'description' => 'The full scientific name of the phylum in which
    the taxon is classified.',
),

array(
  'name' => 'class',
  'description' => 'The full scientific name of the class in which
    the taxon is classified.',
),

array(
  'name' => 'order',
  'description' => 'The full scientific name of the order in which
    the taxon is classified.',
),

```

```

array(
  'name' => 'family',
  'description' => 'The full scientific name of the family in which
    the taxon is classified.',
),

array(
  'name' => 'genus',
  'description' => 'The full scientific name of the genus in which
    the taxon is classified.',
),

array(
  'name' => 'specificEpithet',
  'description' => 'The name of the first or species epithet of the
    scientificName.',
),

array(
  'name' => 'infraspecificEpithet',
  'description' => 'The name of the lowest or terminal infraspecific
    epithet of the scientificName, excluding any rank designation.',
),

array(
  'name' => 'vernacularName',
  'description' => 'A common or vernacular name.',
),

array(
  'name' => 'taxonRemarks',
  'description' => 'Comments or notes about the taxon or name.',
),

array(
  'name' => 'primaryInvestigator',
  'description' => 'Name(s) of the primary investigator(s) on the
    permit.',
),

array(
  'name' => 'additionalInvestigator',
  'description' => 'Name(s) of any additional investigator(s) on the
    permit (e.g. graduate students).',
),

array(
  'name' => 'sponsoringInstitution',
  'description' => 'Name of the institution sponsoring the research.',
),
);

insert_element_set($elementSetMetadata, $elements);
?>

```

Availability:

As of 18 December 2015, exhibit and plugin is still under development. Look here notification of future updates.

Links to Further Resources:

Omeka: <http://www.omeka.org>

Darwin Core Terms: A Quick Reference Guide: <http://rs.tdwg.org/dwc/terms/>

NPSpecies: <https://irma.nps.gov/npspecies>

Great Smoky Mountains National Park: <http://www.nps.gov/grsm>