

### Course Description:

This naturalist certification course aims to develop the natural history skills and knowledge of aspiring naturalist through field, classroom, and lab experiences. The remarkably diverse biotic communities of the Mogollon Highlands, an ecological transition zone of continental importance, provide many opportunities to advance naturalist's knowledge and skills. This exploration of landscape will employ the novel approach of anchoring a conventional naturalist training to an ecological conceptual framework, thereby deepening participants' understanding of nature. Each class is led by experienced professionals who have a passion for sharing their knowledge of this spectacular place. Ten three-hour sessions and four weekend field days employ hikes and field experiences that require moderate physical exertion in places where there are no trails and present uneven travel surfaces. The ten-week course includes the completion of a class project, a volunteer requirement and is capped by a skill and knowledge check.

### Course Objectives:

Participants will develop:

- a more robust ecological literacy
- an understanding of stewardship and stewardship skills
- key naturalist skills and knowledge
- an understanding of and appreciation for the biotic communities of the Mogollon Highlands
- a familiarity and appreciation for scientific collections
- an understanding of citizen science and citizen science skills
- an awareness and appreciation for the importance of the arts, humanities, and well-being dimensions in natural history

Participants will be able to:

- identify the dominant, foundation, and or keystone biota in six regional biotic communities of the Mogollon Highlands
- indicate through writing, presentation, course interactions and/or course activities an emotional attachment or valuing of the Mogollon Highlands
- demonstrate through coursework and/or interactions during the course the ability to gather scientific data
- interweave new found understanding and appreciation through expressions of the humanities, art and science
- indicate a greater sense of wellbeing while engaged in the field elements of the course



- **Required Materials:**
- Clip board
- Pens (waterproof ink) and pencils (colored optional)
- Binoculars
  
- **Coursework:**
- Class attendance and full participation in all field days
- Field journal
- Read course materials and watch course videos
- Species Account

**Course Material:**

Videos from Hank Green's, Crash Course Ecology and Crash Course Biology– (He talks fast!)  
<https://www.youtube.com/user/crashcourse>

Mogollon Highlands Naturalist Certification features an ecological framework to guide the course. The ecological concepts will be delivered through Elements of Ecology, Smith and Smith, 8th or 9th edition. Relevant excerpts will be posted on Google Docs. Readings are available for "in library" use at NHI's and HCNH's library. Prescott Public Library also has copies for checkout.

**Field days:** Most important part of this course!

- Field sites will be reached by carpooling.
- Be prepared to be in the field rain or shine.
- Come well rested. Some days require significant physical effort.

**Field Journal:** Should be an organized and useful resource reflecting your learning in this class.

- Consists of four components:
  1. Field Journal
    - a) Field Accounts: This is what happened during the course of the field day.
    - b) Identification Lists: Daily list **and** a cumulative list.
    - c) Data: Information we collect during exercises.
  2. Notes
  3. Exercises
  4. Field Day Study Question responses

**Requirements for Certification and Maintaining Naturalist Status:**

- Take and pass a skill and knowledge check
- Develop and present a species account
- Volunteer a minimum of 40 hours within a year of enrollment and each consecutive year of Mogollon Highlands Naturalist status

**Completion:** Participants who complete all requirements of the program will receive:

- A Mogollon Highlands Naturalist name badge
- A certificate indicating completion of the program
- 20% off select programming at the Highlands Center for Natural History (HCNH) and Natural History Institute (NHI)
- Access to free continuing education opportunities at NHI and the HCNH

**Volunteering:** Volunteer hours may be fulfilled on approved naturalist opportunities at NHI and the HCNH.

- A minimum of 40 hours of volunteer time within a year of enrollment and each consecutive year of Mogollon Highlands Naturalist status
- All volunteer hours must be submitted on a quarterly basis.
- HCNH volunteer opportunities include working with our education department on program research and development, citizen science efforts, and education.
- NHI welcomes volunteers to work in our scientific collections, the Mogollon Highlands Initiative, our art gallery and at public programs.

### **Continuing Education:**

As an active Mogollon Highlands Naturalist, continuing education is crucial for deepening understanding of the natural world. These continuing education opportunities are offered throughout the year and may take the form of attending natural history classes or any other approved NHI, HCNH or other relevant programs in the community. In addition, we encourage Mogollon Highlands Naturalists to take time each day or several times a week for field journaling and observations.

### **Terms of acceptance:**

- Cost is \$350 for the program due at time of registration.
- The HCNH and NHI reserve the right to change their calendars, withdraw or modify a course or substitute instructors at any time. They also reserve the right to require the withdrawal of any participant whose conduct is antithetical to the program or the mission of said organizations.

### **Attendance Policy:**

- Participants will be permitted one absence from class. It is the responsibility of the participant to collect any material missed from that day.
- If a participant is going to miss more than one day of instruction, please notify the Highlands Center for Natural History Education Director prior to the absence.

### **Cancellation Policy:**

- Participants have up to 5 business days prior to the program start date to cancel, in which case a 75% refund will be issued. After this window has closed, no refunds or vouchers will be issued.
- Participants who cancel 30 or more days in advance will receive a 90% refund.

## Tentative Class Schedule and Assignments:

March 07 – **Week One**- 9-12 @ Highlands Center for Natural History (HCNH)

**Topics:** The practice of natural history, Evolution through natural selection and geologic time

**Instructor:** Tom Fleischner, Walt Anderson

### **Preparation Due at Meeting Time -**

**Watch:** Crash Course Ecology - *The History of Life on Earth*:

[https://www.youtube.com/playlist?list=PL8dPuuaLjXtNdTKZkV\\_GilYXpV9w4WxbX](https://www.youtube.com/playlist?list=PL8dPuuaLjXtNdTKZkV_GilYXpV9w4WxbX)

Crash Course Biology - *Natural Selection*

[https://www.youtube.com/watch?v=aTftyFboC\\_M&frags=pl%2Cwn](https://www.youtube.com/watch?v=aTftyFboC_M&frags=pl%2Cwn)

**Read:** *Natural History and the Spiral of Offering*, Fleischner, Tom and *Evolutionary Thoughts*, Anderson, Walt

Optional - Sections 5.6 and 5.9, in Elements of Ecology, Smith and Smith

March 14 – **Week Two**- 9-12 @ HCNH

**Topics:** Master abiotic factors and Mogollon Highland's biotic communities

**Instructor:** Walt Anderson

### **Preparation Due at Meeting Time -**


**Watch:** Crash Course Biology - *Rules for Living on Earth*

<https://www.youtube.com/watch?v=izRvPaAWgyw&t=12s&frags=pl%2Cwn>


**Read:** Sections 2.3, 2.6, 2.8-2.10, in Elements of Ecology, Smith and Smith *Sequence of the Biotic Communities and Zones*, Lowe


*Mogollon Highlands Description*, Fleischner, T., Hanna D., Floyd-Hanna, L.

And **scan** the following:

 [Interior Chaparral.pdf](#)

 [Interior Riparian Deciduous Forests and Woodlan...](#)

 [Madrean Evergreen Woodland.pdf](#)

 [Montane Riparian Wetlands.pdf](#)

 [Petran & Madrean Montane Conifer Forests and Gr...](#)

 [Plains & Great Basin Grasslands.pdf](#)

 [Semidesert Grassland.pdf](#)

 [Sonoran Desertscrub.pdf](#)

 [Sonoran Riparian Deciduous Forest and Woodlands...](#)

[Great Basin Conifer Woodland -](#)


<https://drive.google.com/open?id=1vsiaE4fUhAV5tVnUm0Cx7jilSrT7ebKH>


March 16 – **Field Day One**- 8-5 @ Black Canyon

**Topics:** Master abiotic factors and the Sonoran Desertscrub community, naturalist skills, biota of the Sonoran Desertscrub and Sonoran Riparian Scrubland communities

**Instructor:** Walt Anderson and Felipe Guerrero

**Preparation Due at Meeting Time -**

**Read:**  [Sonoran Desertscrub.pdf](#) and *Keeping a Natural History Field Journal*, Fleischner, Tom

 [Sonoran Riparian Deciduous Forest and Woodlands...](#)

*Appendix II. Scientific and equivalent common names of plants and animals arranged by biomes*, Brown

March 21 – **Week Three**- 9-12 @ HCNH

**Topics:** Geology, soils, and nutrient cycling

**Instructor:** Walt Anderson and Felipe Guerrero

**Preparation Due at Meeting Time –**

**Watch:** Crash Course Ecology – *The Hydrologic and Carbon Cycles: Always Recycle* -

[https://www.youtube.com/watch?v=F38BmgPcZ\\_I&frags=pl%2Cwn](https://www.youtube.com/watch?v=F38BmgPcZ_I&frags=pl%2Cwn)

Crash Course Ecology – *Nitrogen and Phosphorus Cycles: Always Recycle* -

<https://www.youtube.com/watch?v=leHy->

[Y\\_8nRs&index=9&list=PL8dPuualjXtNdTKZkV\\_GiYXpV9w4WxbX&frags=pl%2Cwn](https://www.youtube.com/watch?v=leHy-Y_8nRs&index=9&list=PL8dPuualjXtNdTKZkV_GiYXpV9w4WxbX&frags=pl%2Cwn)

**Read:** Sections, 21.1 - 21.7, 22.1 – 22.4, 22.8 - 22.9 in Elements of Ecology, Smith and Smith

March 23 – **Field Day Two**- 8-5 @ Mingus Mountain

**Topics:** Geology, soils and nutrient cycling in the Petran Montane Conifer Forest and the biota therein

**Instructor:** Walt Anderson and Felipe Guerrero

**Preparation Due at Meeting Time -**

**Read:** pp. 2-12, *The Mogollon Rim Arizona*, Bezy 4.3-4.7, 4.9 in Elements of Ecology, Smith and Smith

 [Petran & Madrean Montane Conifer Forests and Gr...](#)

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March 28 – **Week Four**- 9-12 @ Natural History Institute (NHI)

**Topics:** Plant and animal adaptations, evolution, taxonomy and scientific collections

**Instructor:** TBA

**Preparation Due at Meeting Time -**

**Watch:** Crash Course Biology - *Taxonomy: Life's Filing System* -

[https://www.youtube.com/watch?v=F38BmgPcZ\\_I&frags=pl%2Cwn](https://www.youtube.com/watch?v=F38BmgPcZ_I&frags=pl%2Cwn)

**Read:** Sections 6.3, 6.7, 6.9, 6.11, 6.12, 7.1-.2, 7.8-7.12 in Elements of Ecology, Smith and Smith

April 04 – **Week Five**- 9-12 @ Granite Basin.

**Topics:** Species interactions, evolution and dichotomous keys


**Instructor:** Walt Anderson and Felipe Guerrero

**Preparation Due at Meeting Time -**

**Watch:** Crash Course Ecology – *Community Ecology II: Predators*

[https://www.youtube.com/watch?v=mFDiISqGB7M&index=5&list=PL8dPuualjXtNdTKZkV\\_GiYXpV9w4WxbX&frags=pl%2Cwn](https://www.youtube.com/watch?v=mFDiISqGB7M&index=5&list=PL8dPuualjXtNdTKZkV_GiYXpV9w4WxbX&frags=pl%2Cwn)

**Read:** 12.1, 12.3, 12.6, 13.4, 13.5, 13.9, 13.11 in Elements of Ecology, Smith and Smith

 [Interior Chaparral.pdf](#)

April 11 – **Week Six** - 9-12 @ NHI

**Topics:** Energetics and insects

**Instructor:** Ty Fitzmorris and Bob Ellis

**Preparation Due at Meeting Time -**

**Watch:** Crash Course Ecology – *Ecosystem Ecology: Links in the Chain*

[https://www.youtube.com/watch?v=v6ubvEJ3KGM&index=7&list=PL8dPuualjXtNdTKZkV\\_GiYXpV9w4WxbX&frags=pl%2Cwn](https://www.youtube.com/watch?v=v6ubvEJ3KGM&index=7&list=PL8dPuualjXtNdTKZkV_GiYXpV9w4WxbX&frags=pl%2Cwn)

**Read:** *Why Big Fierce Animals are Rare*, Colinvaux, Paul and a TBA reading from, *Bugs In The System*, Berenbaum, May


April 13 – **Field Day Three**- 8-5 @ Verde River at Perkinsville

**Topics:** Energetics, detrital food chain, field identification of insects, and Interior Riparian Deciduous Forest

**Instructor:** Bob Ellis

**Preparation Due at Meeting Time -**

**Read:** 20.1 – 20.3, 20.8 – 20.10, 20.13 in Elements of Ecology, Smith and Smith

 Interior Riparian Deciduous Forests and Woodlan...

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April 18 – **Week Seven**- 9-12 @ Indian Creek fire site

**Topics:** Community structure and dynamics, Petran Montane Conifer Forest, fire ecology and naturalist's skills

**Instructor:** Walt Anderson and Felipe Guerrero

**Preparation Due at Meeting Time -**

**Watch:** Crash Course Ecology – *Ecological Succession: Change is Good*

[https://www.youtube.com/watch?v=jZKIHe2LDP8&index=6&list=PL8dPuuaLjXtNdTKZkV\\_GilYXpV9w4WxbX&frags=pl%2Cwn](https://www.youtube.com/watch?v=jZKIHe2LDP8&index=6&list=PL8dPuuaLjXtNdTKZkV_GilYXpV9w4WxbX&frags=pl%2Cwn)

**Read:** 16.1- 16.4, 18.1 – 18.7 in Elements of Ecology, Smith and Smith

 Madrean Evergreen Woodland.pdf

April 25 – **Week Eight** - 9-12 @ NHI

**Topics:** Natural history at landscape level, island biogeography, conservation biology, anthropogenic disturbance - grazing in Southwest biotic communities

**Instructor:** Walt Anderson

**Preparation Due at Meeting Time -**

**Read:** Ch. 19.1 – 19.6 in Elements of Ecology, Smith and Smith

April 27 – **Field Day Four**- 8-5 @ Walnut Creek Center for Education and Research

**Topics:** Landscape Ecology, Great Basin Conifer Woodland, Plains and Great Basin Grasslands, Interior Riparian Deciduous Forest, grass identification, anthropogenic disturbance - grazing in Southwest biotic communities

**Instructor:** Walt Anderson, Felipe Guerrero

**Preparation Due at Meeting Time -**

**Watch:** Crash Course Ecology – *Conservation and Restoration Ecology*

[https://www.youtube.com/watch?v=Kaeyr5-O2eU&list=PL8dPuuaLjXtNdTKZkV\\_GilYXpV9w4WxbX&index=12&frags=pl%2Cwn](https://www.youtube.com/watch?v=Kaeyr5-O2eU&list=PL8dPuuaLjXtNdTKZkV_GilYXpV9w4WxbX&index=12&frags=pl%2Cwn)

**Read:** Great Basin Conifer Woodland -

<https://drive.google.com/open?id=1vsiaE4fUhAV5tVnUm0Cx7jilSrT7ebKH>

 [Plains & Great Basin Grasslands.pdf](#)

 [Semidesert Grassland.pdf](#)

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May 02 – **Week Nine** - 9-12 @ Natural History Institute (NHI)

**Topics:** Communication (literature and art), citizen science and natural history education

**Instructor:** Tom Fleischner, Bob Ellis

**Preparation Due at Meeting Time -**

**Read:** Ch. 13, *The World is a Park* in Science, Conservation, and National Parks edited by Beissinger, S., Ackerly, D., Doremus, H., Machlis G., and other readings TBA

May 09 – **Week Ten** - 9-12 @ HCNH

**Topics:** Poster presentation, practicum, written test and potluck

**Instructor:** Felipe Guerrero and Bob Ellis

