Course Instructors:
Jack M. Broughton
Isaac A. Hart
Roxanne Lebenzon

University of Utah

ZOOARCHAEOLOGY AND FIELD ECOLOGY
June 17-July 9, 2017

Course Description and Goals

Zooarchaeology is the study of animal remains from archaeological contexts to enhance our understanding of the long-standing and complex relationship between past people and animals. Analyses of archaeological vertebrate remains can address problems that range from past human subsistence strategies and paleoecology to paleoclimatic reconstruction. Addressing such issues involves first, the identification of the animal remains, and second, the interpretation of those remains. These two components of zooarchaeology are inextricably linked, and serve as the main goals of this hands-on, laboratory- and field-based course. The first goal of the course is to achieve competence in the recognition of different classes and orders of vertebrates; this includes the fragmentary remains of fishes, amphibians, reptiles, mammals, and birds. Laboratory activity is centered around the identification of archaeofaunal remains from selected localities—this summer we will be examining faunal material from selected sites in Northern and Baja California. Additional experience in vertebrate identification will be achieved through experience in the preparation and curation of vertebrate skeletal specimens for an osteological comparative collection. The analytical and interpretive aspects of zooarchaeology will receive equal emphasis through assigned readings, lectures and case studies. Topics that will be covered include the nature of the archaeofaunal record, units of quantification, taphonomy, the selective utilization of animals, and foraging theory. To enhance the frame of reference in zooarchaeological analysis, extended background information on vertebrate ecology and natural history will be provided in lectures and reinforced through extensive field study and observations. Additional experience in both vertebrate identification and interpretation will be gained through the completion of a problem-oriented research project where students will develop and address a research problem through the analysis of a specific set of archaeological vertebrate materials. Further appreciation of the analytical and interpretive potential of archaeofaunal remains will be gained through attendance, participation and presentations at the Stanley J. Olsen Eagle Lake Zooarchaeology Conference.

Readings

Required:

Broughton, Jack. M., and Shawn D. Miller. 2016. *Zooarchaeology and Field Ecology: A Photographic Atlas*. University of Utah Press, Salt Lake City.

Dunn, J. L. and J. Alderfer. 2011. *National Geographic Field Guide to the Birds of North America*, *6th. Ed.* National Geographic Society, Washington D.C.

Kays, R. W. and D. E. Wilson. 2009. *Mammals of North America, 2nd Ed.* Princeton University Press.

These books should be purchased in advance and brought to the field school (they are available from a number of vendors online, e.g., Amazon, Barnes and Noble).

We will also use selected readings that will be announced in class, posted on the course online (Canvas) page, and distributed on a flash drive.

Optional:

For those wanting an optional textbook style reference, we recommend the following:

Reitz, Elizabeth J. and Elizabeth S. Wing. 2008. *Zooarchaeology, 2nd Edition.* Cambridge Manuals in Archaeology. Cambridge Univ. Press, New York.

Requirements and Grades

Time investment in the activity of bone identification is essential to learning, and students are expected to attend and actively participate in all lecture, lab and field activities. Comprehension of course content and objectives and the course grade will be assessed through two lab practicals/exams, laboratory activity and bone identifications, a take-home essay exam, and the preparation and presentation of a research project. This latter effort should be linked directly to a body of faunal data that you have examined. This study should be empirically grounded applying the analytical skills of zooarchaeology. There is considerable latitude in the specific project/topic chosen for study, and it should be approved by us by the second week of class. Each student will prepare a research proposal, and a written version of the completed project. Students will also deliver an oral presentation of their project at the Zooarchaeology Conference held at the end of the class.

Graduate students will be evaluated independently from undergraduates in this class. We also fully recognize the diversity of backgrounds and exposure to osteology and take this into account in our grading. A letter grade will be assigned weighting the exams, project, and lab and field effort and participation as follows:

Lab Practicals/Exams	100 pts.
Course Project (proposal, written paper, presentation)	100 pts
Lab & Field Effort/Participation	100 pts.
Take Home Essay exam (due August 1)	50 pts.
Total	**350 pts**.

Tentative Schedule

Week I	**Topics** (Readings)	**Laboratory**
June 17	Course Introduction—Requirements, Organization & Readings; Personal Introductions. (Broughton 2015)	
June 18	The History of Zooarchaeology; Fishes: Taxonomy, Natural History, and Osteology; An Introduction to Local Communities. (Steele 2015)	Fishes B&M: Ch. 1-2
June 19	Modern Goals of Zooarchaeology; Amphibians and Reptiles: Taxonomy, Natural History, and Osteology. (Driver 2011; Wolverton 2012)	Amphibians/Reptiles B&M: Ch. 3-4
June 20	Mammals: Taxonomy, Natural History, and Osteology; Great Basin Environmental and Human Prehistory. (Grayson 2006)	Mammals B&M: Ch. 5
June 21	Birds: Taxonomy, Natural History, and Osteology; Taphonomy (Schmitt 1995)	Birds; Taphonomy B&M: Ch 6-7
June 22	**Lab Practical #1; Depart for Field Trip!!!** ***** WEEKEND FIELD TRIP (June 22-26): ***** **Archaeology and Natural History of the northwestern Great Basin**	

Week II	Topics (Readings)	Laboratory
June 27	Criteria for Identifications; Feather River Faunas; Foraging Theory and Archaeofaunal Applications (Bayham 1979; Broughton et al. 2010)	Faunal data recording Feather River Analysis
June 28	Quantification of Taxonomic and Skeletal Part Abundances; On the Ascendance of Hunting in CA/GB: The Academic Debate; Large Game and Intertribal Boundaries in the Eagle Lake Area; (Bayham et al. 2011; Broughton et al. 2008; Grayson 1979)	Archaeofaunal Quantification Procedures (NISP, MNI, MNE, MAU) Feather River Analysis
June 29	Structure and Organization of Scientific Papers; Elite Feasting and the Hohokam: Fauna from the Marana Platform Mound (Grimstead and Bayham 2010)	Proposals Feather River Analysis
June 30	**Proposals Due**	Stats. Lab, Projects
July 1	**Lab Practical #2**	Projects
July 2	**Open**	Projects
Week III		
July 3	Applied Zooarchaeology (Lyman 1996, 2012)	Projects
July 4	Collection, Preparation, and Curation of Vertebrate Skeletons Paleoenvironmental Reconstruction: Case Studies (Hart et al. 2015)	Vertebrate Skel. Prep. Projects
July 5	Pollen Analysis (Bennett and Willis 2001; Minckley et al. 2007)	Projects
July 6	**Written papers due: July 6**	Projects
July 7	Bone Isotopes and Zooarchaeology; Presentations (group practice) (Bartelink 2009)	Projects
July 8-9	Stanley J. Olsen, Eagle Lake ZOOARCHAEOLOGY CONFERENCE: **Student Presentations of Projects**	
July 10	Departure):	

JUNE 17 – JULY 9: FIELD ACTIVITIES

These field activities include hikes and vehicle-based trips in the area of the Eagle Lake Field Station. Activities will be integrated into the lecture and lab schedule while accommodating guest lecturers.

Great Basin Sage/Western Juniper Community hike

Lakeshore, Sage/Juniper, Coniferous Forest hikes for birds

Field trip to Murrer's Upper Meadow and Willow Creek for fish seining / Night Drive

Hike to the Bat Cave – Evening

June 22-26: Field trip to Southeastern Oregon/Northeastern California. Archaeological and Ecological Sites: Destinations include Paisley Caves, Fort Rock Cave, Connley Caves; Surprise Valley, Stevens Camp, and Cowhead Slough Hunting Blinds.

Middle Eagle Lake Basin lakeshore hike

Field trip to Antelope Mountain, Pine Creek, and the North Basin of Eagle Lake

Field trip to Horse Lake, Karlo Site, and Tommy Tucker Cave

Field trip to the Dry Lakes

Field trip to Dean's Meadow and the High Lakes

Field trip to Goose Island

Broader Course Goals and Learning Objectives

This course provides students with an opportunity to acquire both technical and analytical skills linked to the interpretation of faunal remains from archaeological sites. The goals of this course, therefore, are twofold: first, to develop a level of competence in vertebrate identification; and second, to develop an appreciation for the potential interpretations and inferences (archaeological and biological) which may be derived from archaeofaunal data. These goals are directly linked to several broader learning objectives in anthropology, specifically:

1. **Know substantive data and theoretical perspectives in the subdisciplines of anthropology. Know the history of anthropological theory and be conversant in major issues in each area.**

2. **Be familiar with the forms of anthropological literature and basic data sources. Know how to access, interpret, evaluate, and apply such information, using a range of sources and information technologies.**

3. **Grasp the methodologies of the subdisciplines of anthropology. Be able to apply appropriate methods when conducting anthropological research.**

4. **Be able to present and communicate the results of anthropological research.**

Through this study of an important class of artifactual remains from archaeological sites, students will attain a greater appreciation of the issues and methodologies associated with the archaeological reconstruction of past human behavior (#1, #3). Research and laboratory activities, readings from current periodicals, class projects and discussion will provide students with exposure to the literature of archaeology (#2) and the opportunity to communicate their findings and knowledge (#4).

Research Proposal: Guidelines

The research proposal (due **June 30**) describes in detail the research that will be conducted for the independent Research Report (see Research Report guidelines in syllabus). Students must consult with us on the nature of the research to be conducted. The proposals should be about 2-3 pages and should include a well-defined research question, a detailed description of the appropriate evidence to answer the research question, and a feasible plan for gathering and analyzing this evidence.

The proposal should begin with a few paragraphs developing the research question or problem. This should include a discussion of other previously conducted research that is relevant to your study. Situating your proposed work in the context of what already is known is key to a successful project! Be sure to include the question you are trying to answer with the research and why it is important. Next, provide details on the materials and methods. Describe the site or sites and the nature of the kinds of data you will gather (e.g., taxonomic identifications, damage patterns, skeletal part representation, age structure, etc.) and how they articulate with the research question. Be sure to include what specific indices or measures will be used. Include a references cited section using the format described in the Research Report Guidelines.

Research Report: Guidelines

The problem-oriented research report will be the culmination of your analysis of an archaeological or paleontological vertebrate assemblage. Each student will consult with the instructors in detail on the nature of the research project to be undertaken. You will write the paper in scientific format, using the style of the *Journal of Taphonomy*. Further details and examples are included in the *Journal of Taphonomy* "Guide to Authors" in the laboratory reference file. Note that there are many differences between scientific papers and the typical "term paper" for, say, an English class. Everything is to be double-spaced and word-processed, and the pages numbered. The paper must have the following components in this order:

1. Title page. This page gives the title and your name and affiliation.

2. Abstract. This is a self-contained paragraph that encapsulates the entire study: goals, methods, results, and conclusions. It is normally no more than one double-spaced page and is separated from the Introduction. While the abstract appears first, it is invariably best to write it last.

3. Introduction. This section provides a brief background to the problem and takes the reader by the hand to what will be done in the paper and why it is important. Therefore, it is not the place for an exhaustive literature review but should indicate why the study was conducted and cite pertinent work by others. Introductions typically end with a paragraph more or less as follows: "To test the hypothesis that..., I analyzed x assemblages from x location." (Note: The introduction may be followed by a separate more detailed theoretical exposition.)

4. Materials and Methods: In the zooarchaeological context, this section is often called something like "The Site X Vertebrate Fauna". Here, the site or sites that provided the vertebrate materials are described, including pertinent background information such as the environmental setting, recovery methods, dating issues, etc. Specific taxonomic identification issues are also included in this section. Maps indicating the location of the site or sites are standard in this section.

5. Results: What happened? In this section the data are presented, summarized and synthesized. A table including the numbers of identified specimens per taxon is standard and usually is presented first. What are the patterns in the faunal data relevant to the research problem? Graphs or other figures illustrating key trends in the data are presented here. You may not have had a course in statistics, but if you have this is the place to use what you learned. (Note: There may actually be several subheadings within the general Results section.)

6. Discussion/Conclusion. This section begins with a concise wrap-up of the salient results and whether or not they support the hypothesis outlined in the introduction. Start with the simplest, most sound conclusions from the

analysis. Do not whine about the small sample sizes or make other excuses for shortcomings in the analysis. Be positive and sell the major impact this work has for our knowledge of the topic that was studied. A good closing paragraph states that your test is strong but also identifies additional lines of evidence that would provide stronger tests of the hypothesis.

7. Acknowledgments. This includes a set of "Thanks You's" for people who helped you in the course of your analysis.

8. References. All papers cited in the text, figures or tables must be referenced and no paper should be referenced that is not cited in the paper. Failure to adhere to this indicates careless preparation. Note the way papers in the *Journal of Taphonomy* are referenced and follow their examples ***precisely.*** References in the text should be by name and date (Bayham 1979). A References Cited section should be included directly after the main text. References should be listed alphabetically as follows:

Books, monographs and doctoral theses:

Haynes, G. (1991). *Mammoths, Mastodonts and Elephants. Biology, Behavior and the Fossil Record*. Cambridge University Press, Cambridge.

Articles:
Lupo, K. D. (1994). Butchery marks and carcass acquisition strategies: distinguishing hunting from scavenging in archaeological contexts. *Journal of Archaeological Science*, 21: 827-837.

Book chapters:
Behrensmeyer, A. K. (1990). Transport-hydrodynamics: bones. In (Briggs, D. E. G. & Crowther, P.R., eds.) *Paleobiology: A Synthesis*. Oxford: Blackwell Scientific Publications, pp.232-235.

9. Figures. Tables and figures are not interspersed throughout the paper but are included at the end. The "Figure Captions" page comes after the references and are all typed on the same page. For example:

Figure Captions

Figure 1. Map of the San Francisco Bay indicating location of the Patterson Shellmound.

Figure 2. The distribution of the lagomorph index by stratum at Sudden Shelter.

Figure 3. The relationship between the artiodactyl index and the numbers of identified specimens at the Evans Mound.

10. Each figure (graphs, maps, photographs, etc) should then (following the figure captions page) be placed on its own page in the order in which it appears in the text. Do not use color, only black and white. A computer should generate graphs. No captions are required here. (I usually indicate the figure number in pencil at the bottom so I [they] don't get them mixed up.)

10. Tables. Each table is on its own page and has a self-explanatory caption. This means that one should be able to decipher the table without reading the text. Do not include gridlines on tables.

Again, see examples of previous student papers on the course flash drive or in the lab file.