

Delivering Field-Intensive Courses in a Remote-Learning Environment: A Case Study and Student-Centered Considerations for Course Planning and Structure

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Abstract

We argue the advantages of field-based learning experiences for undergraduates, the societal imperative for training the next generation of field biologists, and the opportunity to increase the reach of field education dictate that we must meet the challenges of delivering field experiences in the context of a distanced educational environment. We report on our experiences as faculty and students in a spring 2020 Field Ornithology course adapted for remote delivery with an example of a student-centered framework for supporting independent field study. Feedback from students and instructors in this course indicate that remote field instruction is both possible and desirable. We suggest that an instruction model involving guided, independent field study can yield strong learning outcomes and promote self-directed inquiry. Based on reflections of the challenges and successes of our experiences, we provide an prompts for a for assessing the feasibility and desirability of proceeding with field-based education in a distanced environment with an emphasis on supporting student success.

1 | INTRODUCTION

Direct, unmediated study of nature – “the more-than-human-world” (Fleischner, 2002) – has value to science, society, and individuals. The study of life in context is at the heart of ecology and evolution and forms the foundation for medicine, natural resource management, conservation and many other critical fields of science (Barrows et al., 2016). In addition to their role in preparing scientists and citizens to contribute to society, field courses are unique examples of experiential learning and offer important benefits to students and their development as deep learners. Field courses, like lab-based courses, provide students with opportunities for autonomous and collaborative problem-solving, key skills for professional success. This focus on problem-solving raises many STEM courses to the level of ‘deep learning’ where students are applying and testing knowledge, taking risks, and practicing skills, leading to long-term retention and promoting self-directed inquiry (Almeida-Gomes et al., 2016; Burrow, 2018). Field courses are further marked by variable and unpredictable conditions that magnify the demands for problem-solving in pursuit of knowledge.

Through field experiences, students learn to prepare for the unexpected, navigate unfamiliar environments, and cultivate tolerance for often uncomfortable field conditions. Dynamic field conditions lead to spontaneous instruction and discovery that directs student attention to important species, behavior, or phenomena. The resulting unplanned observations and discussions within a learning community enrich student learning and develop the habit of linking first-hand observation with specific areas of scientific inquiry (Durant and Hartmen, 2015; Lewinsohn et al., 2015). Field study can be a source of exploratory, active learning where, by necessity, students test knowledge under novel and changeable conditions, the basis for developing ‘adaptive expertise’ and creativity (Gube and LaJoie, 2020). Beltran and colleagues (2019) provide empirical support for the role of field courses in promoting self-efficacy among STEM students. Their data further demonstrate

that participation in field courses has measurable impact on the academic success of under-represented students in STEM and their persistence in ecology and evolutionary biology (EEB) majors.

Even as contemporary societies dissociate from nature, individuals and communities continue to derive extensive extrinsic and intrinsic benefits from our growing knowledge of the natural world. In the face of climate change, rapid urbanization, increasing demands for natural resources, and other anthropogenic threats to the biophysical systems that support all life, it is essential to train new generations of natural historians and field biologists. Yet, geographical constraints, limited resources, lack of organic familiarity with natural systems among many urbanized and suburbanized youth, and increasing demands on student time and attention are wide-spread challenges to including field-based education in the American undergraduate curriculum.

The recent disruption of in-person education threatens to further diminish our ability to provide field-based training and the positive student outcomes associated with field courses. Our experience transitioning our four credit Field Ornithology course in spring 2020 from an intensive study away model to a mixture of guided independent-study, self-paced learning, and synchronous online meetings suggest that this need not be the case. We present a case study of our adaptations and integrate instructor and student perspectives to identify a set of student-centered considerations and opportunities for others faced with the challenge of teaching field skills in an online environment.

2 | CASE STUDY: ADAPTING UNDERGRADUATE FIELD ORNITHOLOGY FOR REMOTE LEARNING AND INDEPENDENT FIELD STUDY

2.1 | Institutional Profile and Assets

Hiram College is a small, liberal arts college located in Northeast Ohio with under 1,000 residential students and a student-faculty ratio of 13:1. Hiram has a long tradition of curricular innovation and experiential learning across disciplines. Our semesters are arranged on the “Hiram Plan” that has roots in early curricular reform (Whitcomb, 1938). Semesters combine a twelve-week term (12WK) during which students typically take 3 full-credit courses followed by an intensive three-week term (3WK) when students take one full-credit course. Hiram’s unique natural assets include over 100 acres of forested land adjacent to campus and two field stations, the 500-acre J.H. Barrow Biological Field Station located 3 miles from campus and the 6-acre Northwoods Field Station located within the Hiawatha National Forest on the Upper Peninsula of Michigan. Hiram has majors and minors in Biology and Environmental Studies, including tracts in Organismal Biology and EEB, and a minor in Natural History that promotes field-based skills and knowledge. Hiram’s Tech and Trek program, initiated in 2017, triggered sustained faculty-wide discussions and professional development around effective teaching practices and student-centered learning. The program also provides all Hiram students with an iPad Pro®.

2.2 | Course Background and Description

Field Ornithology (BIOL/EVST 30600) was designed as a study away course to be offered during the spring 3WK every 3 years. The class carries a prerequisite of Avian Biology (BIOL/EVST 30500) taught as an intensive, single-credit seminar during the preceding 12WK, a common model for our study away courses. The course is an upper-level elective within the Biology, Environmental Studies, and Natural History curricula, but is open to all students with approval and fulfills the Scientific Methods general education core requirement. Normally, the course involves a 4,000-mile road trip, starting in the third week of April, following a route from Ohio along the Gulf Coast from Mississippi to Texas, north through the Cumberland Plateau and Appalachian Mountains, returning to Hiram around the second week of May (Figure 1). (See Appendix A for full course syllabus.) This course carries a field trip fee of \$1,200 to cover the cost of all travel, lodging, meals, and all

2.2 | Learning Community Profile

The spring 2020 Field Ornithology class originally included 11 students, but two withdrew after the trip was cancelled. The remaining nine students included seven rising seniors and two rising juniors. Eight students

are declared Biology or Environmental Studies majors with declared or intended Natural History minors and had taken at least one prior field-based course; seven had previously participated in summer field-based internships. The remaining student is a double major in Theatre Arts and Business Management with no prior field experience. The cohort's bird identification skills ranged from novice to advanced (three novice, five developing, one advanced). The course instructor is an associate professor in Environmental Studies and coordinator of Hiram's Natural History minor with interdisciplinary training and expertise in avian migration. A Hiram College alumnus with five decades of avocational natural history and birding experience served as a volunteer Teaching Assistant (TA). With few exceptions, all members of our class knew each other well.

2.3 | Spring 2020 Disruption

Hiram College announced the move to remote teaching on March 12, 2020, with four weeks left of our 12WK term. By March 16, the college cancelled all spring academic travel and faculty teaching study away courses were given the option of cancelling courses outright. We had four weeks to modify our 3WK plans (Figure 2). The course instructor (SM) solicited input from students, using a formal survey to reset student expectations and gauge willingness to continue or withdraw. With strong student and TA interest in continuing with Field Ornithology and support from our academic dean and school director, SM moved forward with adaptation. This initial decision was a leap of faith based largely on confidence in students' ability to productively engage in independent field studies. Institutional processes and circumstances imposed two primary constraints on course adaptation: (1) the modified course must align with the learning outcomes previously approved by a faculty curriculum committee; and (2) it would be possible to reallocate a small budget but no additional funds would be available. Supportive circumstances included (1) the unique composition of our learning community and members' positive attitude to adaptation; (2) institutional resources for distributing equipment and supplies (e.g., loaner binoculars, field guides); (3) instructional and technical support for online teaching; and (4) the instructor's advanced familiarity with our online course management system.

2.4 | Adaptation: Vision and Planning

The vision for our adapted Field Ornithology course emphasized four pathways for learning: guided, independent field study; self-paced learning with online materials and scientific literature; synchronous discussions of observations and challenges; and virtual visits with professional field ornithologists. This model took advantage of the fact that birds are everywhere and can be meaningfully studied almost anywhere, key learning assessments (I.e., field notebook and journal, final essay) were transferrable, and technology could bring research professionals and students together.

Course transformation involved four overlapping phases: (1) exploring and selecting tools and resources; (2) conceptualizing and articulating course philosophy and student learning flow; (3) arranging logistics; and (4) structuring the online course site and revising course materials. Under the circumstances, student learning and communication would rely heavily on digital tools and resources. Without the real-time coaching from an instructor, virtual tools would be needed to help students quickly and efficiently progress through initial skill development and overcome the frustrations of not being able to identify and follow birds in the field. Existing courses offered through The Cornell Lab of Ornithology's Bird Academy were available free of charge to post-secondary ornithology courses this spring and served to fill this critical training gap. Identification quizzes offered through eBird were another valuable self-paced learning tool. Finding the right communication platform proved more elusive. Building a sense of community and excitement around field experiences is easy during an extended field trip but challenging in a remote learning environment. SM adopted Flipgrid, an educational Office 365® app designed for teachers to deliver prompts and receive video responses that appeared promising but failed; students in our course expressed preference for communication tools that were more familiar (e.g., Slack, Discord).

The challenge of building a strong course structure was linked to a guiding philosophy that recognized that student learning in the field was rarely linear or uniform. (See Appendix A for Course Philosophy shared with students.) In the context of independent field study, students were even more likely to take their own

routes to knowledge and mastery than they do during curated field excursions. The class structure was designed to support this individualized learning process and self-directed field exploration while providing clear expectations and milestones for achievement (Table 1). Course materials and assignments were revised to emphasize the value of field time, provide prompts and goals for field study, and to facilitate efficient and meaningful self-paced learning. Our online course site was opened a week prior to class start date to provide students time to obtain digital resources, begin planning for independent study, and initiate self-paced study. Key logistical steps included establishing an efficient and secure means of distributing essential field supplies, reviewing CLO Bird Academy courses and arranging student access, and inviting and scheduling guests among other details. Our adapted Field Ornithology course carried no field trip fees.

2.5 | Adaptation: Implementation

Our class met over 22 days with 10 synchronous Zoom sessions scheduled for 90 minutes each on Monday/Wednesday/Friday. Students were asked to review the online course site and set-up all digital resources prior to our first class meeting. The first three synchronous meetings focused on orienting students to course structure and resources, helping students identify safe and accessible locations for field studies, setting initial goals, addressing questions and concerns, trouble-shooting logistical problems, and building enthusiasm for being in the field. Subsequent class sessions began with students reporting on their field experiences (highs, lows, frustrations, and questions), sometimes with the full group, sometimes in smaller breakout groups. Questions in this context refer largely to scientific questions and hypotheses that related new observations to students' existing knowledge and material previously covered in the prerequisite Avian Biology course but were sometimes focused on field practices and identification challenges.

Six class meetings were focused on specific aspects of avian biology and conservation and engagement with research professionals (five guests and course instructor). For these classes, guests were asked to provide an informal overview of their own research, emphasizing the broad relevance of their questions along with field and analytic techniques. Guests selected 1-2 papers for students to read in preparation for their visit. The flexibility of video conferencing allowed students to engage with experts across the country.

The course target for independent field study was at least 20 hrs/week without any specific constraints on when field study occurred. This target was established based on instructor experience and a pre-course student self-assessment of commitment, conflicting time demands, and stamina. At the half-way point, students were surveyed to assess progress and challenges. Students were asked how much time they originally expected to spend in the field and how much time they actually spent in the field. Results indicated that students were spending less time in the field than anticipated. By the end of the course, students reported increased stamina for remaining in the field, increased focus, and greater ease in meeting their field time goals. The course instructor and TA maintained an active schedule of field study as well in order to keep abreast of phenological changes, provide suggestions for what to look for and places to visit, and contribute to the learning community. Field time for the TA averaged 25 hrs/wk and for the course instructor, 18 hrs/wk.

Students recorded real-time field experiences in a field notebook and were required to synthesize and reflect on their experiences with daily entries in a field journal with specific instruction to connect their observations to broader theories, hypotheses and evidence and develop their own questions and hypotheses. Students submitted digital copies of pages from their field notebooks and journals at three progress points during the term and full copies of these documents at the end of term. Progress submissions allowed for assessment of student development and feedback. Feedback focused on providing suggestions for improvement and prompting specific types of field activities and observations to support individual student growth and goals as well as encouraging effort. Early notebook and journal entries emphasized bird identification, particularly difficulties in following and identifying birds. Later entries were more sophisticated and included detailed behavioral observations, information on plants and habitat, and questions tying observations to ideas discussed in class sessions. Self-paced learning activities (e.g., completion of CLO Bird Academy modules; readings; field tests of standard protocols) were assessed through student responses to short, specific prompts. The quality of voluntary and elicited participation during guest visits and discussions allowed for assessment of knowledge integration. Even with a small class, it was difficult to keep up with timely feedback on individual

learning trajectories during the intensive 3WK term. Planning and better real-time communication could address this problem.

In response growing student confidence and enthusiasm for field study, we made one additional change to our learning activities during the course. We modified the final assessment from a research-focused essay to a combine a ‘Big Day’ of birding, broadly interpreted to include maximizing observations of species and habitat diversity, bird behavior, and exploring new locations with a reflective essay focused on the experience of learning about birds through independent field study.

2.6| Lessons Learned

2.6.1 | Student Experience

Students in our Field Ornithology class found remote field instruction not only possible but a learning experience with its own set of distinctive benefits that are often lacking in traditional field, lab, and lecture courses. In part, these benefits are related to overcoming the significant difficulties in taking a field course remotely, accompanied by the stresses of living in a pandemic. At the beginning of the course, it was difficult to set goals and recognizing how much we had to learn was overwhelming. A lack of motivation to spend an allotted amount of time in the field was common, especially when weather was unfavorable. While students benefited from teaching themselves, many felt that they missed some learning opportunities because they were not with an instructor in the field. Occasionally, assignments or learning technologies felt like a burden that prevented more meaningful time in the field and efficient communication was not always possible. Nonetheless, students think the frustrations and course management obstacles related to remote field instruction can be addressed, further improving the benefits of this style of learning.

Despite the challenges of shifting from traditional to remote education, post-course surveys and discussions indicated that students felt that they had significantly increased their knowledge of bird diversity, behavior, and field skills. They reported greater confidence in their identification and field research skills and a deeper connection with birds and the natural world in general. Many have been inspired to pursue their own research questions this summer. As one student said, “The semester is over but the learning continues.”

The primary reason for the course’s success was its self-guided structure. Because students could follow assignments at their own pace, they were able to conduct their work in the most efficient way possible. The open structure allowed students to spend more time on the topics that most interested them, so motivation was derived from curiosity rather than course grades and the students therefore worked harder, thought more deeply, and had a positive learning experience. While the course’s structure was flexible, expectations were straightforward and clearly described. Instructors could not be with students, so the class shifted in focus from learning information (“what to learn”) to learning processes (“how to learn”). This shift resulted in a perceived increase in retention of information and a prolongation of learning after the end of the course. Remote field work was also beneficial because it was local, typically taking place in areas familiar to individual students. This familiarity allowed the observation of birds to be organized in the context of previously observed and familiar natural history. A few students also shared that being in the field during the pandemic disruption helped them de-stress and was an energizing alternative to Zoom classes. The tangible benefits derived from taking Field Ornithology has left the students of this course feeling confident that other remote field courses can meet with similar success.

2.6.2 | Faculty Experience

From the instructor’s perspective the mental and, to some extent, emotional challenges posed by the rapidly evolving early days of the pandemic closures created the greatest challenges to adapting Field Ornithology for remote instruction. The demands of moving on-going classes to a remote teaching environment monopolized most hours of the day, leaving little time or energy to consider what shape an adaption of Field Ornithology might take. Students were disappointed by the trip cancellation and that feeling was compounded for the instructor who felt responsible to students and knew what they were missing. However, it was these same thoughts and feelings that motivated the instructor to find a creative solution that would allow students to

move forward in their ornithological training and spend the spring observing birds in the field.

Two important personal experiences gave the instructor confidence that students would be able to productively engage in independent field study. First, the instructor knew the students well and was familiar with their interests, motivations, and abilities. Second, the instructor herself had experience with both the frustrations and triumphs of independent learning in the field and knew it could be a transformative experience. These factors, in combination with the instructor's comfort with taking pedagogical risks, gave her confidence to adapt this course around a model of supported, independent field study.

Making the decision to adapt the course in the face of uncertainty was difficult, the subsequent planning and revising was time-consuming, but the actual class was almost pure joy. Students began the semester with timidity and significant frustration over their field skills. Each student had a different foundation for learning in this class, but after only three weeks all students demonstrated significant growth in their field abilities, knowledge of avian ecology and behavior, and confidence. Watching this rapid growth while having the rare opportunity to explore local natural areas and observe migration unfolding near home was a source of significant professional and personal satisfaction. Post-semester discussions with students and results of an anonymous survey of students' remote-learning experiences revealed that the pandemic disruption and remote classes caused greater levels of distraction and lowered motivation than the instructor had realized, making student growth and learning attainments that much more impressive. This insight into students' perspectives also underscores the need to have clear expectations and to establish channels for easier, real-time communication. Both actions can address student anxiety, support peer-peer learning, and improve two-way feedback.

3| Reflections on Preparing for Remote Field Courses

There is no one-size fits all solution to adapting field courses to fit within a remote learning modality. However, a model of guided, independent field study has broad applicability shows promise within the context of a remote learning environment. As we rush to prepare for the possibility of remote learning in the fall and expanding the reach of field courses in the future, we do not advocate immediate adoption of this approach. Rather, we recommend a student-centered assessment of the role and values of field-based learning as a key step in the process of adapting field courses for remote delivery. Our experience suggests there are two major decisions to consider during this process: (1) should a field course be adapted for remote delivery and (2) can the course be adapted in a student-centered way. We have identified several key considerations for evaluating these two decision realms and launching efforts to adapt traditional approaches to field study to the new constraints and opportunities afforded by the current disruption in higher education.

3.1| Should a Course be Adapted?

Typically, learning goals drive decisions about appropriate course structures, delivery models, and pedagogies. When online delivery models and remote learning are imposed on courses, they may be starkly dissonant with course objectives and expected student learning outcomes as appears to be the case with field courses. The primary consideration should refocus on learning goals and their alignment with field-based experiences. For example, courses that serve to prepare students for field-based professions and provide practical experience and mastery of professional field skills would fail to meet student learning objectives without field activities. Alternatively, a course that serves to provide students practice in research design and analysis may not require field study even though field research might be a satisfying way to achieve this goal. Close assessment of student learning goals will resolve the first crucial decision: are field experiences integral to student learning and should the possibility of adaptation be pursued further.

3.2| Can a Course be Adapted?

If the learning outcomes for a given course are dependent on field experience, next considerations link back to specific learning goals, examining the extent of modification required and evaluating continued ability to support learning. The focus is on the feasibility of supporting student success and encouraging students to self-guided discovery in the field. A detailed assessment in this phase will help instructors identify the

specific expectations for students and the barriers they may face in meeting those expectations. Examples of questions that can help shape decisions about whether a course can be adapted to support students' independent engagement with field-based learning include:

- *Will students be tasked with developing hypotheses and running experiments or will they be tasked with improving their observational skills, or both? What specifically will that look like from their vantage point?*
- *Will students need access to specialized equipment, and how will they get it?*
- *Do students have access to appropriate field locations? Will they need to find field locations on their own or will the instructor prescribe specific sites?*
- *Will students be permitted or required to manipulate or alter sites or repeatedly visit specific sites?*
- *Can students effectively carry-out field protocols alone or will they need collaborators? How will collaborations be arranged and managed for safety and efficiency?*
- *What are the characteristics of the student population? What level of relevant experience will they have? What are their motivations for taking this course?*
- *What kinds of training will students need to successfully conduct field work? Is there room for trial and error in skill development?*
- *How much time will students need to dedicate to developing skills and completing tasks?*
- *What measures are in place to ensure field safety? Will special safety training be necessary?*
- *How will members of the learning community communicate in real-time?*

Careful review of student learning goals and assessment of the needs and possible barriers to independent field-study will guide instructors in creation of clear expectations and development of resources and structural supports for successful student engagement in the field regardless of delivery modality.

4| Conclusion

The abrupt disruption of the higher education system across the United States in spring 2020 created pedagogical challenges for faculty and significant technical, academic, and personal challenges for students. From the student perspective, the transition from in-person to online learning coincided with change in key aspects of life including living conditions, social support, access to academic and technical resources, and employment. The impact of this shift on mental health and learning is only now emerging in the literature (e.g., Zhai and Du, 2020). The diverse experiences of teachers and students this spring are changing the way we think about education as this special issue of *Ecology and Evolution* demonstrates.

While developing new models of field-based teaching and learning poses significant challenges, it affords us new opportunities as well. We believe this moment of change underscores the need to redouble our commitment to field-based learning and build on four specific areas of opportunity. First, the model of guided, independent field study encourages students to bring their field studies 'home' and investigate natural phenomena that frame and inform their everyday lives (Thomashow, 2001). This can breakdown the misconception that ecology and evolution only happen in exotic places and promote connection with natural systems more heavily influenced by human activity (Tewksbury et al., 2014, Callaghan et al., 2018). Second, this local focus and flexibility reduces key barriers to participating in field courses (e.g., field trip fees) and expand field opportunities to a broader population including non-traditional students and the increasing number of all post-secondary students who are constrained by the need to work. Third, faculty have an opportunity to experiment with new tools and course structures that will enhance student learning regardless of delivery context (e.g., Lee et al., 2014; Soluk and Buddle, 2015; Camfield and Land, 2017; Burrow, 2018; Kenyon et al., 2019). Finally, providing students continued connection with the natural world can help them maintain well-being in times of stress (Capaldi et al., 2015; Martin et al., 2020). Members of our Field Ornithology learning community experienced first-hand each of these benefits of independent field study.

Reimagining how we structure and support field-based learning is daunting but imperative. The 2020 global pandemic has exposed numerous vulnerabilities in human society and represents but one of many possible stresses and disruptions that can occur at the nexus of natural and human systems. It reminds us of the

value of biological knowledge. It spurs us to better prepare to train the next generation of field biologists, natural historians, and informed citizens amidst uncertainty and change.

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TABLES AND TABLE LEGENDS

Table 1. Alignment of student learning outcomes with course structure, key resources, and learning activities for Field Ornithology, spring 2020.

Key Learning Goals	Learning Modules	Resources	Learning Activities
Identify birds by sight and sound	“Getting Started”	CLO Bird Academy “Be a Better Birder” courses eBird, Merlin, and other localized resources	“Be A Better Birder” courses and learning reflection Common birds self-assessment Common birds quizzes
Observe and describe natural phenomena Document field-based experience through daily entries in a field journal using best-practice methods Recall scientific names	“In the Field: Observations and Records”	Field journaling guidelines Field journal examples	Self-guided field time (20 hr/wk) Daily field journaling
Demonstrate and explain field techniques employed in field ornithology Describe habitats and behaviors Recognize and articulate ecological/ evolutionary constraints and opportunities that shape avian life histories	“In the Field: Sharpening Skills”	Guide to essential protocols in field ornithology Guide to describing habitat CLO Bird Academy “Understanding Bird Behavior”	Self-guided field study using chosen field method and critique of methodology Incorporate habitat descriptions in field journal “Understanding Bird Behavior” course and learning reflection

Key Learning Goals	Learning Modules	Resources	Learning Activities
Examine and explain common hypotheses and theoretical frameworks in avian ecology and evolution Describe relationships ecological patterns and relationships and pose testable hypotheses Describe and evaluate threats to birds and conservation efforts to protect them	“Asking Questions, Seeking Answers”	List of major ornithological journals Literature provided by guest researchers	Preparatory reading Discussion with guest researchers Incorporate hypotheses and questions in field journal
Apply field skills Reflect on and articulate new skills and knowledge Reflect on and articulate new areas for future professional growth	“Synthesis and Reflection”	Big Day guidance and challenges Essay guidance	Big Day of birding and field study Final discussion of field experiences Field journal submission Final reflection

FIGURE LEGENDS

Figure 1. Official Hiram College catalog description of BIOL/EVST 30600: Field Ornithology with comparison of details for planned and revised section offered in spring 2020.

Figure 2. Timeline of spring 2020 disruption and key events during adaptation of Field Ornithology.

DATA ACCESSIBILITY STATEMENT

All data, products, and examples associated with this publication are fully presented or linked within the text.

COMPETING INTEREST STATEMENT

None declared.

AUTHOR CONTRIBUTIONS

Sarah E. Mabey: Conceptualization (lead); Writing – original draft (lead); Writing – reviewing & editing (equal), Zachary Z. Fox: Conceptualization (equal); Writing – original draft (equal); Writing – reviewing & editing (equal), Rachel R. Jerkins: Conceptualization (equal); Writing – original draft (equal); Writing – reviewing & editing (lead), Carah A. Katzendorn: Conceptualization (equal); Writing – original draft (equal); Writing – reviewing & editing (equal); Funding acquisition (equal), Miranda Mordue: Conceptualization (supporting); Writing – original draft (equal); Writing – reviewing & editing (equal), Keegan Rankin: Conceptualization (supporting); Writing – original draft (supporting); Writing – reviewing & editing (supporting), Aaron Rivard: Conceptualization (supporting); Writing – original draft (supporting); Writing – reviewing & editing (supporting), J. Henry Schwendler: Conceptualization (equal); Writing – original draft (equal); Writing – reviewing & editing (equal)

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Hiram College Catalog Course Description for Field Ornithology
 Field Ornithology involves the active study of birds in the wild and builds on a foundational knowledge of avian biology and evolution. This class focuses on mastering field identification skills (recognizing birds by sight, sound, and behavior) and observing and describing avian diversity, ecology, behavior and conservation.

Additional 2020 Syllabus Description – Original Study Away
 Over a three-week period, we will travel to the Gulf Coast (Mississippi and Louisiana) and the Southern Appalachians (Georgia and West Virginia). Both regions are regarded as “birding hotspots” where we will encounter rich diversity and great abundance of bird life. We will visit a number of unique habitats including long-leaf pine savanna, bottomland deciduous forest, marshes (fresh, brackish, and salt), barrier island maritime forest and scrub, coastal cheniers, cypress swamps, upland deciduous forest, southern hemlock forest, montane mixed deciduous/evergreen forest, and high elevation spruce forest. Across the region we will encounter and study conservation issues relevant to avian diversity including coastal management, ecological restoration, endangered species management, energy development, habitat fragmentation and degradation, and invasive species.

Additional 2020 Syllabus Description – Remote Learning Revision
 Over the course of three weeks, students will engage in intensive, independent field studies with their instructor’s guidance and support. Students will seek out birds in the ecological communities that surround us -- local natural areas, backyards, farm fields, woodlots, parks, and neighborhoods. Studying nature near-at-hand is part of a long and distinguished tradition. This is an opportunity to discover that the familiar can be a source of wonder and discovery. Regardless of location, the work of the field ornithologist is the same: identifying species; cataloging avian diversity; describing behavior and ecological relationships; and exploring questions that advance our understanding of avian biology, evolution, ecology, and conservation. As our field skills and awareness of the natural world grow, we will begin to formulate research questions and practice standard techniques that allow field ornithologists to observe emergent patterns and unlock the deeper significance of these patterns.

The specifics of each student’s field studies will be influenced by their specific interests in topics that range from communication, courtship, diet, parental investment, territoriality, migration, landscape ecology, population dynamics and species management, habitat associations, inter- and intra-specific competition, and many others.

Spring Semester Timeline: Hiram College 2020

