Program Outline (Please provide a summary of program requirements including total number of credits for the degree, special admission requirements, capstone or special project requirements, etc. Indicate any requirements and arrangements for clinical affiliations, internships, and practical or work experience.)

The new Master’s degree in Integrative Biological Diversity will be a 30 credit MS, created by leveraging graduate courses and faculty expertise across the Connecticut State Colleges and University System (CSCU). Faculty from WCSU, SCSU, will contribute courses and research mentorship to this program, and faculty with appropriate expertise across the BOR will be invited to join the program. This degree will have two options: Option 1: Students will complete 27 credits of coursework and a required 3 credit stewardship component; Option 2: Students will complete 21 credits of coursework, 6 thesis credits and 3 stewardship credits.

Masters in Integrative Biological Diversity: Program Overview.
The CSCU Integrative Biological Diversity Program will prepare graduates to identify, manage, conserve, and reclaim Connecticut’s, and adjoining regions’, biological resources. Collaborating faculty experts in specific biological taxa and analytical approaches will build capacity across the BOR to include significantly greater expertise and course diversity available to students than any single graduate program is currently able to provide. To this end, students will have the opportunity to select from a diverse suite of courses representing both the diversity of current and past life forms as well as on the inter-relationships among these organisms and mechanisms that support the maintenance of various ecosystems. This advanced program is unique in CT because it requires that all students gain an applied depth of understanding by engaging in biodiversity monitoring stewardship, and breadth of understanding through a diverse curriculum in organismal biology that trains students to identify organisms and prioritize their conservation status. Today we are experiencing the greatest extinction event due to human impact on the environment. Fragmented and artificially altered environmental landscapes, climate change, and emerging diseases threaten all living organisms. Training students to identify key organisms of an environmental system will help prevent the collapse of the biological resource as well as maintain a system’s diversity. Maintaining diversity is key to the discovery of new species and the novel clandestine structures and functions that such diversity can support and improve human health. Learning about biological diversity is not required in high school, and there is no undergraduate program in Connecticut that focuses exclusively on the organismal diversity of the region, resulting in a Connecticut population that is blind to the countless species of plants, animals, fungi, and microscopic organisms that are required to sustain the environment. CSCU faculty expertise exists across the four college campuses, thus leveraging faculty talent, and their professional contacts, to support a quality graduate training program. Students will be required to participate in courses in at least 2 CSCU campuses. The stewardship will provide depth because it will require that the student adopt a specified plot (i.e., body) of land or water and practice responsible planning and management of the associated biological resources. This program is unique because it leverages faculty collaborations with local companies and state agencies. The program can prepare students for careers in ecosystem management and reclamation, policy and environmental consulting, sustainable business, education and non-government organizations. Furthermore it prepares students for further scholarship if they are interested in attending a doctoral program in the future.

The program is designed to provide current and future graduate students access to academic excellence and diverse taxonomic and environmental specialists and practitioners beyond what one CSU campus can provide. The program provides an industry needed pipeline of trained adults who can immediately support land use management, sustainable business, environmental policy, scientists, environmental education and public stakeholders.

The flowchart on the following page aligns the current BOR Graduate Courses to the technology, disciplinary strengths, and crosscutting concepts of the MS in Integrative Biological Diversity Program. Faculty strengths not represented in currently available graduate courses but TBD in the future:
• Paleontology
• GIS and geospatial modeling
• Vector biology
• Bioinformatics
• Molecular genetics and phylogenetics
• Mycology
• Land use
Admission requirements: The program is open to all students enrolled in current Biology or Environmental related graduate programs. New applicants are required to have a Bachelor’s degree from an accredited school. The student should have an undergraduate cumulative average of at least 3.0 on a GPA scale of 1-4 in the appropriate academic areas, or recommendation by the graduate program coordinator. Social science majors with biology or natural sciences backgrounds are also encouraged to apply.

Work and Internship Affiliations: The program anticipates stewardship opportunities provided by areas of faculty interests and internships currently available with state and federal, and private agencies. Examples include but are not limited to State Parks and Fish and Wildlife, Department of Transportation, Department of Energy and Environmental Protection, positions in regional museums and zoos, informal environmental learning centers, and environmentally related businesses and law practices. Monitoring data collected through stewardship will be entered into a common geospatial database where it can be shared with stakeholders.

Alignment of Program with Institutional Mission, Role and Scope

(Please provide objective and concise statements)

This program aligns with the CSCU mission, which seeks to provide an exemplary education that is affordable, innovative and supports economic growth. The projections for employment of individuals with Masters Degrees are predicted to grow by 18.4 percent by 2022 (Achieve, 2012; McKinsey Global Institute, 2012). Economic development and growth cannot afford to neglect environmental sustainability given the finite biological resources available. The global 2011 – 2020 Strategic Plan for Biodiversity is currently on its fourth edition of the Global Biodiversity Outlook (GBO-4). This document reports on the progress of meeting the 20 Aichi Biodiversity Targets (https://www.cbd.int/sp/targets/), and actions for achieving the 2050 Vision for “Living in Harmony with Nature” established by the Convention on Biological Diversity so that sustainable human development can be achieved during this century (https://www.cbd.int/doc/press/2015/pr-2015-06-25-).
biodiversity-barometer-en.pdf). The reports also highlight gaps in the United States’ actions to address global environmental concerns compared to other countries (https://www.cbd.int/reports/). In summary, the US lags behind other countries in prioritizing biological diversity and associated resources, and developing plan for sustainable living. The de-emphasis of biological diversity in k-12 education across America will only cause the gap in knowledge to widen.

Gaps in organismal biology training in Connecticut K-16 education will become greater as districts adopt new science standards that focus on STEM education but lack a foundation in biodiversity (http://www.nextgenscience.org/next-generation-science-standards, http://www.nextgenscience.org/search-standards-dci). This failure to address biodiversity and conservation of resources in U.S. public education is an area of concern as the rest of the world builds cooperation on sustaining biodiversity so that all living species can be discovered, documented, and their unique, possibly life-saving properties studied. This CSCU program in Integrative Biological Diversity will proactively build a professional pipeline that will be prepared to serve US/Connecticut Stakeholders on global conservation issues.

Global climate change is impacting Connecticut’s natural resources, and this proposed MS program in Integrated Biological Diversity will fill the state’s need to hire individuals that are trained to identify, manage, reclaim, and teach about significant environmental changes, and develop appropriate and creative solutions that will contribute to sustaining environmental diversity and its health. This program will apply lessons shared by the United Nations on sustaining biological diversity (https://www.cbd.int/doc/nbsap/unep-sourcebook-web.pdf) so that we can participate in the global effort to register all species and evaluate their biological value. This program in Integrative biological diversity is developed to leverage faculty strength in diverse organismal biological systems across the BOR in an effort to attract students with an applied interest in conserving and protecting the organisms that live in the environment in alignment with regional and international priorities.

**Addressing Identified Needs**

**How does the program address CT workforce needs and/or the wellbeing of CT society/communities?**

(Succinctly present as much factual evidence and evaluation of stated needs as possible) Connecticut’s major habitat types can be grouped into five broad categories that differ in biota and that each require protection and conservation to sustain the biodiversity they support: saltwater and associated wetlands, lakes, inland wetlands, and upland or terrestrial habitats. Important to prioritizing species conservation to sustain an environment are learning to predict climate change and model outcomes of biodiversity loss. As many as two thirds of all species are in danger of extinction, suggesting that we are exceeding the limits of our resources. Drastic transformations of important economic and employment sectors, such as farming, fishing, water supply and management, recreation and tourism will need to occur if we expect the crisis to be mitigated. Connecticut’s Department of Energy and Environmental Protection (DEEP) outlines in their “Green Plan” a proactive guide on the status of the acquisition and preservation of the state’s natural and recreational resources. The vision and purpose statement clearly emphasizes a need for Connecticut citizens to protect water quality and water supplies, preserve natural ecosystems and wildlife habitats, assure green spaces for urban residents, protect agricultural lands and forests for food and resources, and prepare communities for climate change (http://www.ct.gov/deep/lib/deep/open_space/Green_Plan_Info_Summary.pdf). Implementing these efforts require that the state provide access and opportunity to train citizens in recognizing and conserving green and blue spaces (http://conservationmagazine.org/2011/07/into-blue-space/) as well as biodiversity. The proposed MS in Interdisciplinary Biodiversity will support the training of integrated organismal biologists that can support industries in reclamation biology, land-use, and development, policy and environmental consulting, train teachers to inspire students by emphasizing biodiversity education in their classrooms, as well as train and empower people to transform into environmentally responsible citizens. Losses in biodiversity will have a significant impact on farming, fishing, forestry, and the availability of clean water. Biodiversity and ecosystems are the basis of a significant part of the economy and a large part of existing jobs that depend on the health and
balance of the environment as demographics change and human population grows. Examples include jobs in the wildlife areas such as fisheries and sustainable agricultural practices, epidemiology and vector sciences that monitor the stability of the spread of disease through vector pathogens, and management of raw materials. People will need to build buffers from sea level rise, especially in coastal wetlands. Furthermore it prepares students for further scholarship if interested in attending a doctoral program in the future. In summary the program provides a visionary industry needed pipeline of trained adults who will immediately support land use management, sustainable business, environmental policy, scientists, environmental education and public stakeholders.

How does the program make use of the strengths of the institution (e.g. curriculum, faculty, resources) and of its distinctive character and/or location?

This program allows the CSKU to call upon its faculty expertise to collaborate and take a leadership role in providing Master’s level graduate training in Integrative Biological Diversity to produce environmentally responsible citizens that are prepared to manage and reclaim the state’s biological resources, discover new species, and discover novel biological resources. Most graduate courses currently available across departments at WCSU and SCSU support such training. CCSU biology faculty have agreed to permit our students to enroll in their graduate courses, and ECSU faculty will be invited to develop graduate courses in the future. The novel approach of cross-listing the courses across campuses permits access to diverse faculty expertise and diversity of courses for students to choose. It provides opportunity for faculty collaboration and development of new courses to support research concentrations, and leverages university resources to provide access across campuses and reduce duplication. For example, WCSU’s proximity and collaborative relationship with Candlewood Lake, Great Hollow Nature Preserve, and Westside Nature Preserve make WCSU a resource for upland, wetlands, and lake stewardship and scholarship. Furthermore WCSU has a significant herpetological research library and significant herbarium to support scholarship in the areas of reptiles and aquatic plants. Similarly, SCSU’s Werth’s Center for Coastal and Marine Studies and Outer Island Field Station (part of the Stewart B. McKinney National Wildlife Refuge) is a resource for coastal and marine studies. Lastly, the BOR university campuses are spread throughout the state providing opportunity for building research and biodiversity monitoring programs in both urban and rural areas of the state, which although small, is ecologically diverse.

Please describe any transfer agreements with other institutions under the BOR that will become instituted as a result of the approval of this program (Please highlight details in the Quality Assessment portion of this application, as appropriate)

Graduate courses satisfying the Integrative Biological Diversity Program would be cross-listed across participating schools and qualify towards the 30 credits required for the degree. Course offerings would rotate across the system, and graduate students in the program would enroll in courses in at least 2 of the 4 campuses to guarantee exposure to diverse state habitats. The eventual goal would be to offer at least 2 courses per semester at each participating campus, with a total of at least 8 courses every semester. These course offerings include those currently offered to support existing graduate programs in the biological and environmental sciences, and environmental education. The rotation of courses would include 1 Central Learning Goal course and 1 Design and Analytical Approaches course every semester, and diverse offerings of Core Concept courses. The summer would permit a full time residential experience so that students could engage in their applied stewardship, thesis research, or at least 2 biodiversity courses. The goal will be to apply technological pedagogical advances, and experiential opportunities across the BOR to build a graduate student community. The program will require every campus to designate a departmental campus faculty coordinator who will work with a faculty program director on program development, course scheduling and the monitoring of student progress. The faculty program director will rotate across the BOR campuses every 3 years, and the director is responsible for programmatic evaluation and annual reporting. The departmental campus faculty coordinator will update participating departments who will share in the governance of the program. The collective
bargaining agreement will need to be consulted whereby permitting full time faculty to teach courses across the system as part of their contractual obligation.

Please indicate what similar programs exist in other institutions within your constituent unit⁴, and how unnecessary duplication is being avoided.

There is no similar program in the region. Although there are tracks within biology programs that focus on ecology and evolution, this is the first program that leverages faculty strength across the BOR, and the first program that permits flexibility in course selection across the BOR campuses so that students with common interests can be connected across the state. Furthermore, it supports faculty capacity and strength in organismal biology, and focuses on training students on the spatial and temporal dimensions of biodiversity monitoring through required stewardship of biological resources.

Please provide a description/analysis of employment prospects for graduates of this proposed program.

A document explaining the need to create jobs to achieve the Aichi Biodiversity Targets can be found at https://www.cbd.int/ngo/square-brackets/square-brackets-2012-10-en.pdf⁵. The Connecticut Department of Labor market information suggests that Connecticut employment is projected to increase 20% for life scientists into 2022, with projected annual salaries average $76,283.00. Occupational Groups and associated career categories include only those currently recognized, and do not consider interdisciplinary careers the state will need to protect and manage natural resources in the future. Such careers will include the broad integrative training of ecologists and wildlife biologists, marine and coastal scientists, conservation biologists, land use managers, as well as environmental engineers, and biologists that understand how to reclaim degraded lands and water-systems, and rebuild and protect remaining wildlife populations and habitat patches. Connecticut Jobs in these categories can be searched at http://www.simplyhired.com/k-ecology-l-connecticut-jobs.html and represents current stakeholders across academia, policy, management, business, and the private and public sector. Details of currently available jobs can be found in The Center for Biological Diversity (http://www.biologicaldiversity.org/about/) and https://www.cbd.int/. Although some of these job descriptions are not necessarily specific to Connecticut’s workforce, they demonstrate a need to create jobs that support a sustainable environment. Furthermore, they demonstrate that students trained through this program have the opportunity for global employment, supporting the invaluable knowledge and practices our culturally diverse student population will be prepared to contribute.

Cost Effectiveness and Availability of Adequate Resources

(Please provide a short narrative that generally considers projections of program enrollment and graduation, revenues and expenses, existing and needed resources, including faculty and administrative cost, and any major cost implications)

The proposed program provides a highly needed educational opportunity in two areas. First, it benefits adults who hold a Bachelor’s Degree in biology or associated fields and are interested in a career managing and reclaiming biological resources (http://www.nytimes.com/2016/01/26/science/in-napa-valley-future-landscapes-are-viewed-in-the-past.html?_r=0). Secondly, this proposed program benefits teachers who, through traditional training based on national K-12 science standards and traditional biology bachelor degrees, will be limited in their knowledge of biodiversity. This proposed program will address the “Plant Blindness” crisis (https://www.nabt.org/websites/institution/File/pdfs/american_biology_teacher/2000/062-02-0082.pdf), and highlight interesting organismal curiosities with future economic impact often nested in such disciplinary content that engage and inspire young minds (http://www.uwec.edu/Career/students/majors/wcldwamis/upload/Organismalbiology.pdf; http://cabinetoffreshwatercuriosities.com/).

⁴ Constituent units are: the Connecticut Community College System, the Connecticut State University System, Charter Oak State College, and the University of Connecticut.
Training in biological diversity empowers individuals with the skills needed to make responsible environmental choices and proactively prepares the workforce to conserve state resources. Working collaboratively across the system provides graduate students access to the wealth of disciplinary expertise. Integrating BOR resources encourages creative and strategic programmatic growth in areas of biodiversity that are of great economic importance to the state. These include mycology, microbiology, invertebrate biology, vector biology, protozoology and others, and looks to improve the health of forests, fisheries, and watersheds by improving our understanding of invasive species and emerging pathogens. Working collaboratively can lead to creative solutions and disciplinary excellence.

The program is cost effective because it operates in parallel with existing graduate programs in the BOR, leverages existing graduate courses, and provides a mechanism for filling these courses to capacity across the system. It permits faculty with a passion for participating in graduate education to do so without significantly stressing the quality of undergraduate education offered by these schools because no single school is independently responsible for staffing the entire program. The program proposed here is modeled after the CUNY Graduate Center of New York, whose adult training programs are collaborative across the CUNY colleges, and independently funded from the four-year undergraduate programs. As such the collaborative enterprise provides students with greater faculty mentor choice, and leverages resources across the system in an effort to build collaboration, creativity, and scholarly excellence.

**Resources**

Two of the 4-year colleges with existing graduate programs (WCSU and SCSU) have agreed to contribute at least one course per semester, with course offerings increasing as programmatic enrollment increases at the rate of 1 additional course per 10 students. CCSU has agreed to open their courses to Integrative Biology Masters students, if they are interested. However, students will not be able to enroll in the MS in Integrative Biological Diversity Program at CCSU in the initial phase. ECSU is interested in providing faculty expertise in the form of mentorship and eventual graduate courses. The program will permit a student to enroll in as many as 9 - 12 credits per semester, the minimum for full time status and access to financial aid, without burdening any existing program. There will be a need for 1 credit reassigned time per semester for a faculty program coordinator per campus, and 3 credits reassigned time per semester for the faculty program director. These credits will be on a campus-wide rotational basis every three years, beginning with WCSU, followed by SCSU. There will be a need for developing creative instructional practices to permit synchronous and asynchronous distance learning instruction, and development of professional learning communities, across campuses by expanding intersession and summer learning opportunities, and residencies. Initial funding for at least two full time graduate assistants per school to support their thesis and research, will be needed.

Participating departments at WCSU, SCSU would participate in shared governance and assessment of the program, and participating faculty would be expected to work to support graduate student training, and develop opportunities for internships through their professional contacts.

There will be a need for strategic marketing plans to create a presence for the program on all CSCU university websites, and through outreach activities such as direct marketing, promotion to employers, professional conferences. It will also be necessary to establish agreements with Connecticut’s agencies that directly serve to conserve and manage the state’s biodiversity resources. Such a graduate program would permit our graduates to continue their studies and develop careers that directly serve the state. We expect to accept 45 students annually across the 3 campuses. Yearly assessment will take place for a 5-year period at which point the program will be reassessed for sustainability. We can initiate the program with the present faculty and equipment we currently have across campuses.
The program will also develop 2-year rotating Teaching Postdoctoral Fellowship opportunities for visiting disciplinary experts (Ph.D) to provide instructional expertise through special course offerings, and in return gain pedagogical training through the BOR’s outstanding faculty mentors, instructional training initiatives, and Center resources.

**Overall Learning Goals/Principal Learning Outcomes for the Program:** The MS in Integrative Biological Diversity will produce professionals who

1. define the six Kingdoms, and Domains of Life and that their interconnections are the result of millions of years of coexistence and adaptation,
2. are able to measure and monitor biodiversity using spatial and temporal dimensions,
3. understand the adaptive relationship between form and function and mechanisms that control this relationship, and
4. strive to maintain biodiversity through policy, sustainable development, and science.

**Learning Outcomes - L.O.** *(Please list up to seven of the most important student learning outcomes for the program and concisely describe assessment methodologies to be used in measuring the outcomes. If the program will seek external accreditation or qualifies graduates to opt for a professional/occupational license, please frame outcomes in attention to such requirements. With as much detail as possible, please map these learning outcomes to courses listed under the "Curriculum" section of this application)*

1. There are six Kingdoms of Life and their interconnections are the result of millions of years of coexistence and adaptation.
   a. Given knowledge of particular taxonomic group, students will describe shared derived characters across a lineage.
   b. Given knowledge of biodiversity, students will identify local representatives across the Kingdoms of Life.
   c. Given knowledge of biodiversity, students will characterize and quantify phenotypic variation.
   d. Given knowledge of Biodiversity, students will evaluate regionally specific critically endangered and emerging invasive organisms.

Assessment methodologies include examinations, performance assessments, oral presentations, written projects, stewardship and team-building projects, as tied to the course and program objectives.

2. Biodiversity can be measured and monitored using spatial and temporal dimensions to infer stability.
   a. Given the knowledge of biodiversity, students will identify and document the presence of this diversity for a given location.
   b. Given an area or habitat, students will devise a strategy for monitoring and reporting its biodiversity.
   c. Given environmental changes, students will predict the impact to the biodiversity.
   d. Given experimental data and literature, students will assess how energy transfers through an ecosystem.
   e. Given that organisms are non-randomly distributed students will be able to delineate the distribution of this diversity, and communicate its temporal and spatial stability to stakeholders.

Assessment methodologies include examinations, performance assessments, oral presentations, written projects, stewardship and team-building projects, as tied to the course and program objectives.

3. There is a relationship between form and function and mechanisms that control form and function.
   a. Given an understanding of shape and phenotype, the student will be able to discriminate between phylogenetically informative and species delimiting characters.
   b. Given an understanding of form the student will be able to predict and test function, and apply form and function to novel situations.
c. Given an understanding of genetic information transfer, students will explain this genetic transfer from organisms across Kingdoms and Domains.

d. Given an understanding of evolution and natural selection, students will make predictions on how environmental factors will affect gene flow over generations.

e. Given that evolutionary forces such as gene duplication, genomic mutations, and natural selection can provide changes in genetic and protein structures(s) and function(s) students will explain how protein structures might change while retaining an evolutionary conserved phenotypic function.

Assessment methodologies include examinations, performance assessments, oral presentations, written projects, team-building projects, portfolio assessments as tied to the course and program objectives.

4. Relationship between conservation policy, sustainable development, and science.

a. Given the fundamental understanding that science requires objective reasoning, the student will be able to propose risk assessment and impact models for sustainable development.

b. Given a fundamental understanding that science requires objective reasoning, the student will be able to align policy with the conservation needs of organisms and habitats.

c. Given a temporal and spatial data set, students will assess the conservation priority of an organism and system.

d. Given a set of data, students will appropriately interpret and communicate the data.

Assessment methodologies include examinations, performance assessments, oral presentations, written projects, stewardship and team-building projects as tied to the course and program objectives.

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**Program Administration** *(Describe qualifications and assigned FTE load of administrator/faculty member responsible for the day-to-day operations of the proposed academic program. Identify individual for this role by name or provide time frame for prospective hiring)*

Dr. Theodora Pinou at WCSU will serve as the Graduate Program coordinator at WCSU, and serve as the initial Graduate Program Director for a 3-year term, followed by SCSU, and then CCSU. For the purpose of program assessment, she will keep track of the total number of students applying across the BOR, and the number completing in 18-24 months. She will work with the office of alumni relations to track job placement of graduates, external internships and partners, and keep track of all creative work by graduate students and mentoring faculty. She will engage in external grant writing activities that secure funding for graduate student and Postdoctoral training. She will work with Yale University to develop a mechanism to add biodiversity monitoring data to a common database overseen by the Yale University global Geospatial Program. She will work with the BOR to facilitate the establishment and implementation of BOR Postdoctoral Training Fellowships.

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**Faculty** *(Please complete the faculty template provided below to include current full-time members of the faculty who will be teaching in this program and, as applicable, any anticipated new positions/hires during the first three years of the program and their qualifications)*

**How many new full-time faculty members, if any, will need to be hired for this program?**

Zero (0). We have several faculty that will participate and have the proper educational and research experience. We are prepared to offer this program now, but we anticipate healthy programmatic growth and are planning appropriate reallocation/addition of faculty resources to meet these needs.

**What percentage of the credits in the program will they teach?** 100

**What percent of credits in the program will be taught by adjunct faculty?** 0

Describe the minimal qualifications of adjunct faculty, if any, who will teach in the program: If an adjunct is
needed to support a missing organismal thread, a Ph.D. in ecology and evolution with taxonomic expertise will be required. For example, currently both EVE 540 Environmental Design and EVE 532 Ecosystems and Environmental Concerns are taught by adjuncts at SCSU. Kenneth Metzler teaches EVE 532. He is a recently retired plant ecologist from the Connecticut Department of Energy and Environmental protection (DEEP). Teaching Postdoc Fellows can also be used to staff such courses.

**Special Resources** *(Provide a brief description of resources that would be needed specifically for this program and how they will be used, e.g. laboratory equipment, specialized library collections, etc. Please include these resources in the Resources and Cost Analysis Projection sheet for BOR review)*

It is anticipated that additional library collections will be needed in addition to funds for marketing efforts aimed at promoting the program throughout New England. Additional faculty may be needed as the program grows.
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**Program Outline** (Please provide a summary of program requirements including total number of credits for the degree, special admission requirements, capstone or special project requirements, etc. Indicate any requirements and arrangements for clinical affiliations, internships, and practical or work experience.)

MS in Integrative Biological Diversity includes a total of 30 credits in two options. Option 1: 27 credits of coursework, and 3 credits of stewardship. Option 2: 21 credits of coursework, 3 credits of stewardship, 6 credits of thesis.

Hybrid Stewardship Seminar:
Stewardship and Climate Change are points of synthesis for students participating in this program. A new 1 credit hybrid Stewardship Seminar offered in the Fall will introduce graduate students to the theory and practice of stewardship, and expose them to participating BOR faculty, the habitats they protect, and their collaborators. It will be required for all new students, and the hybrid course may rotate campuses every fall.

Applied Stewardship Experience:
Students will select a stewardship site based on their interest, and they will engage in applied stewardship (2 credits) with a faculty of appropriate disciplinary expertise. Students will commit to 6 hours per week of biodiversity monitoring of their site, and work with faculty experts to document and catalogue the temporal and spatial distribution of the organisms they encounter.
Open-Source geo-spatial analysis:
Students will be introduced to open-source software for geo-spatial analysis of environmental and biodiversity data. This will lay the foundation for students to choose a programmatic track that either permits the completion of a research thesis or the completion of an applied management plan in the form of a stewardship synthesis paper.

Annual Graduate Student Stewardship Conference:
An annual graduate student stewardship conference will provide opportunity to share data, inform the community on the status of Connecticut’s Biodiversity, and build community across the program.

Where Degrees is Granted:
Masters of Science (MS) degrees will be confirmed by applicant’s school at point of admission. Students are required to experience a minimum of 6 credits in at least one other campus in addition to where they are enrolled.

Course Alignment To Learning Objectives
The 15 - 21 course credits students will be expected to enroll in will focus specifically on the first and third programmatic learning objectives. The Climate Change (SCSU EVE559) requirement will focus on the second learning objective. The seminar and stewardship will focus specifically on the 4th programmatic learning objective. The programs cumulative experience offers either an empirical or applied management option that expects student mastery of all 4 learning objectives. To that end every student is required to engage in a technology specific 3 or 4 credit course that trains them to quantify or manage biodiversity.

Academic Year and Summer courses
The programmatic design permits students to enroll in 9-12 credits per semester, and will offer graduate courses in the summer to permit intensive research and management experiences. Residence housing in the summer will permit students from out of the region to engage in residence and work with their supervising faculty mentor. Such structure can permit someone to complete this program in 12 – 15 months or in two consecutive summers. The course intensive summer offerings with residence options, combined with flexible, remote, and hybrid instructional options may be inviting for out of state students and educators interested in a degree granting professional development experience in Stewardship.
Full-Time Faculty Teaching in this Program *(Note: If you anticipate hiring new faculty members for this program you may list “to be hired” under name and title. Provide required credentials, experience, and other responsibilities for each new position anticipated over the first three years of implementation of the program)*

<table>
<thead>
<tr>
<th>Faculty Name and Title</th>
<th>Institution of Highest Degree</th>
<th>Area of Specialization/Pertinent Experience</th>
<th>Other Administrative or Teaching Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>WCSU - Biology</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Theodora Pinou</td>
<td>New York University, PhD</td>
<td>Herpetology, Vertebrate Morphology, Ecology</td>
<td>WCSU Coordinator and Thesis Advisor, MS in Integrative Biological Diversity</td>
</tr>
<tr>
<td>Thomas Philbrick</td>
<td>University of Connecticut, PhD</td>
<td>Systematic Biology, Aquatic Plant Biology</td>
<td>Advisor: Stewardship and Thesis</td>
</tr>
<tr>
<td>Neeta Connally</td>
<td>University of Rhode Island, PhD</td>
<td>Vector Ecology, Medical Entomology</td>
<td>Advisor: Stewardship and Thesis</td>
</tr>
<tr>
<td>Rachel Prunier</td>
<td>University of Connecticut, PhD</td>
<td>Plant evolutionary genetics</td>
<td>Advisor: Stewardship and Thesis</td>
</tr>
<tr>
<td>Michelle Monette</td>
<td>UMass, Amherst, Ph.D.</td>
<td>Animal Physiology</td>
<td>Advisor: Stewardship and Thesis</td>
</tr>
<tr>
<td>Ruth Gyure</td>
<td>Purdue University, PhD</td>
<td>Soil Microbiology, Ecology, and Environmental Health</td>
<td>Advisor: Stewardship and Thesis</td>
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<tr>
<td>SCSU-Biology</td>
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<tr>
<td>Meghan Barboza</td>
<td>University of Florida, PhD</td>
<td>Histology, Physiology, Marine Mammalogy</td>
<td>Advisor: Stewardship and Thesis</td>
</tr>
<tr>
<td>Steven Burian</td>
<td>University of Maine, PhD</td>
<td>Biodiversity, Systematics, Aquatic Biology</td>
<td>Advisor: Stewardship and Thesis</td>
</tr>
<tr>
<td>Miranda Dunbar</td>
<td>University of Regina, PhD</td>
<td>Environmental physiology and Thermal energetics of animals</td>
<td>Advisor: Stewardship and Thesis</td>
</tr>
<tr>
<td>Rebecca Silady</td>
<td>Stanford University, PhD</td>
<td>Plant Genetics, Cell Biology, &amp; Development</td>
<td>Advisor: Stewardship and Thesis</td>
</tr>
<tr>
<td>Sean Grace</td>
<td>University of Rhode Island, PhD</td>
<td>Invertebrate, Macroalgae, Marine Ecology</td>
<td>Advisor: Stewardship and Thesis</td>
</tr>
<tr>
<td>Jonathan Weinbaum</td>
<td>Texas Tech University, PhD</td>
<td>Vertebrate Morphology, Systematics, Paleobiology</td>
<td>Advisor: Stewardship and Thesis</td>
</tr>
<tr>
<td>Elizabeth Lewis-Roberts</td>
<td>Rutgers University, PhD</td>
<td>Microbial Ecology, Plant microbe interactions, Mycology</td>
<td>Advisor: Stewardship and Thesis</td>
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<tr>
<td>SCSU Environment, Geography and Marine Sciences</td>
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</tr>
<tr>
<td>Vincent Breslin, Professor</td>
<td>Florida Institute of Technology</td>
<td>Marine Environmental Chemistry/Marine Biology</td>
<td>Advisor: Stewardship and Thesis, Co-coordinator WCCMS</td>
</tr>
<tr>
<td>Susan Cusato Associate Professor</td>
<td>University of Connecticut</td>
<td>Biochemistry/Pollinators/Education</td>
<td>Advisor: Stewardship and Thesis</td>
</tr>
<tr>
<td>James Tait Professor</td>
<td>U. C. Santa Cruz</td>
<td>Coastal Oceanography/Environmental Earth Science</td>
<td>Advisor: Stewardship and Thesis Co-coordinator WCCMS</td>
</tr>
</tbody>
</table>