ECOLOGICAL MONITORING (NR457/657 - 3 credits)

Times: Tuesday 10:00-1050 and Friday 10:00-1:00

Instructor: Dr. Demchik (CNR 246; mdemchik@uwsp.edu): TBA; open door policy

Course description: Theory and practice of ecological monitoring emphasizing ecosystem structure, functions, and populations

Rationale: Ecosystem restoration and adaptive management require monitoring to assess the condition and/or trends in ecological structure, processes and/or populations. Much of this monitoring has been legally mandatory in recent years. This course provides an interdisciplinary introduction to monitoring theory and techniques that are applicable to conservation biology and ecosystem management.

Learning Outcomes: The student will:
1. Write monitoring goals
2. Select indicator species
3. Develop monitoring plans
4. Collect monitoring data
5. Analyze monitoring data (both existing and collected)
6. Report results
7. Critique other monitoring plans

Course Design: Welcome to a completely redesigned NRES 457 class. This class has three components:
- Asynchronous online lectures (these are watched on your own time)…They will be weekly, if you do not watch them BEFORE the Tuesday activity, it will create issues. Please keep up.
- A synchronous zoom activity section (Tuesday 10:00-10:50) that will be used for discussion, planning and other activities
- A three-hour lab that is composed of the Friday lecture time and then the Friday lab time. This will be 100% in the field (i.e. outside in the cold at Schmeeckle). Please make sure to have appropriate clothing for this. We will not be inside a building on campus at any time for this class, so, ignore anything listed online about a room number, you will NOT be there.

Our Laboratory: I am in the middle of a number of restoration projects on both public and private lands. Most of you in this class already know me, so, you know that this is one of my favorite activities to do, both for the university and in my free time. Said another way, the majority of my waking hours focus on forestry and restoration activities. Schmeeckle Reserve is in the middle of a pretty aggressive restoration activity right now. During the semester, the For 434 (one credit weekend class) and the Society for Ecological Restoration students will be completing activities, as will the US Fish and Wildlife and the Schmeeckle Crew, will be continuing to do activities that support the restoration at the reserve. You will be developing a long-term monitoring plan for this property. You are developing protocols that can be completed by other classes, student groups and undergraduate research projects. Also, please realize, I rebuilt this class this semester to take advantage of hybrid delivery (consider the constraints put in place by Covid). I am trying to make this one of the most useful classes you get here, and sometimes, that means that things don't quite work perfect.

Full Blown Monitoring Plan: The main deliverable for this class is a full-blown monitoring plan. ==This is not one of those "pretend" plans, this is the plan that will become the monitoring plan for the Schmeeckle Reserve.== This is assuming a 10-year monitoring window. After 10 years, the plan will be rewritten. This plan will be presented towards the end of the semester in a public meeting that will include:
- The Friends of Schmeeckle (this is a friends group that acts as an advisor board)

- Several administrators for the campus (likely, the Dean, Associate Dean and maybe main campus administration)
- Local politicians
- Any interested university member (last year, the plan for the YMCA camp had greater than 50 attendees)

Regarding the overall plan, I recommend keeping this as a portfolio item, because, you ARE on the team for this plan. In Wisconsin, Schmeeckle Reserve is fairly well known among the natural resource employers because many of them went through this program. <u>You will track all of your time assigned to any feature of this project (time budgeting and managing billable versus non-billable hours is one of the most important skills a person can learn in restoration work).</u> Most of these monitoring plans are done in teams, because very few people (read that NO ONE) has all of the skills needed to do a good job on these for everything that needs to be assessed. We will divide up into teams during the first lab period. These are CONTENT SPECIALIST teams, so, you are going with your skillset, in part. <u>You are allowed to have assistance from people outside of the class;</u> however, this needs to be documented in the plan. Remember, NOTHING in this is done seat-of-the-pants, everything is DOCUMENTED in the plan.

Teams will include:
- Project coordination team- 2 people
    o The goal of this group is to set initial timelines for each group and to assure they have met their timelines. This group will develop a spreadsheet of specific deliverables that will be included in the plan and will coordinate the development of the plan. This is an incredibly important job and the people who choose this team need to be some of the most self-motivated and aggressive people in the class. This team will draw all final sections together into a plan. Suggestion: come up with a template for what people should turn in to you. It should include everything from fonts to margins to headings. This makes life a lot easier (i.e. I have done this repeatedly, and hate dealing with problems created by poor formatting or people that "cannot" live within the rules of the format. They make life hard. <u>Your group will meet with me every 3 weeks to do a progress report on the other groups' work and yes, each of these meetings will be documented in the plan, as well. We will be having regular zoom meetings with the Schmeeckle Reserve Director.</u>
- Wildlife team- 3 people
    o This team will have to complete the online IACUC (Institutional Animal Care and Use Committee) online training and all protocols will need to be submitted to the IACUC committee for review. This will need to be completed in the first three weeks of semester. If you procrastinate, you cannot be on this team. I am serious about that, this one is fun, but, it is very intense. The goal of this team is to develop monitoring protocols that can be carried out by future classes/groups/volunteers. Remember that the Wildlife Society has done a great deal of work on this site. You will meet with Shelli Dubay and I early in the semester to discuss existing projects that you will be documenting in this plan. Some of your work can be collaborative with these student projects. Remember that these plans usually document pre-existing research and you will be certain to include as much of this in the final document as you can. Any protocols that you use should be as standard as is possible. Remember that the internet and the library website exist. Use them. You are required to set up protocol sheets that can be followed by college students and volunteers. Any initial data can be collected by you but some is not possible. That is fine. You need to develop protocols for a 4 animals/elements; however, you can do more. You have to do the following animals:
        ▪ Woodcock (this has to be observational ONLY)
        ▪ Neotropical migrant birds (this has to be observational ONLY)
        ▪ Frogs and toads
        ▪ Den trees/snags/course woody debris

- Lake/Lakeshore team- 3 people
    - The goal of this team is to monitor the condition of the lakeshore and lake in general. Feel free to use existing resources. Basic water chemistry is one option as is shoreline vegetation etc. Remember, as with the wildlife team, you will need to develop protocols for monitoring this that can be followed by VOLUNTEERS. Remember that Lake Joanis is a very heavily used part of the reserve.
- Plant Communities team- 3 people
    - You are responsible for developing a protocol that will inventory the following items:
        - Forest condition (result in an overall map)…effort to document forest structure, regeneration, health and other factors
        - Invasives (adequate to target needed treatment)
        - Spring ephemerals
        - Overall list of known plant species
    - Remember, you will need to develop protocols for monitoring this that can be followed by students or volunteers. Don't consider everything, focus on plants that are structural and food sources.
    - You will meet with Brian Barringer and I early in the semester to get access to currently available plant information.
- Wetland team- 3 people
    - You have two main focus areas:
        - Moses Creek Restoration
        - Natural wetlands in the rest of the reserve
    - You will meet with Dr. Cook and I early in the semester to discuss what current information is available for the Moses Creek Restoration.
    - What you do in Moses Creek will be partly controlled by what data already exists.
    - What you do on the other wetlands must include efforts at the following:
    - Vernal pools in Chilla Woodlot
    - Wetlands in the center of Schmeeckle (both sides of Michigan Avenue)…These will be quite actively managed for habitat during the next 5 years, read the restoration plan to understand what is happening in them
    - You will need to work strongly with the plant communities team. Remember, you will need to develop protocols for monitoring this that can be followed by students and volunteers.
- Geospatial team- 2 people
    - The goal of your team is to create a geodatabase that collects all of the information from the previous teams. Everything for this needs to be stored in a format that will be usable for 10 years. This needs to be stored CLEANLY AND EFFICIENTLY. No creation of morphed, scary things. This is a database that can be used by others in the future. You will need to make things like:
        - Cover maps
        - Maps of monitoring plots
        - PDF's or Collector App projects for each group

Group Field Lab: Each of your groups will develop and deliver one of the field labs for this class. The students in the class will collect your data using your protocol sheets. You will process their data.

Grades: Grades will be based on quizzes associated with the asynchronous lectures (10%), associated assignments (10%), a final exam 20%, the field lab that you build (20%) and my overall grade for the monitoring plan (40%). Yes, that is right, 40% of your grade in this class is based on the composite of everyone's work. When the rest of them screw up, it is a problem. That previous sentence just described the rest of your life in natural resource management. You need to figure out how to make this happen in spite of

personalities. If you hate "group work", that means that you generally hate the majority of natural resources field work. The entire field is basically a giant group project. Learn to work within that.

One last thing, my exam for this class generally scare the heck out of people. It is completely essay. You are given access to any resource you want…the internet, your notes, discussion with other people in class (via zoom)…pretty much anything short of calling professionals to ask questions. You will; however, do your own work in the writing (no plagiarism) and will submit it to the dropbox.

Format for the Monitoring Plan (Note: this is modeling NPS and others)

Executive Summary (responsible party is the Project Coordination Team)
This is a single page that summarizes the whole things. This is kind of like an abstract.

Project Background (responsible party is the Project Coordination Team)
This will be about three paragraphs defining things like funding sources, involved partners.

Monitoring Plan Development Team (responsible party is the Project Coordination Team)
This will be all of you. This will be written like this:
Wildlife Team
Bob Bobson- Ecosystem Restoration and Management student at University of Wisconsin-Stevens Point.
Responsible for developing the woodcock and wood duck monitoring protocols.

Project Goals (responsible party is the Project Coordination Team)
This will be directly from the funding document. I will provide this.

Monitoring objectives (responsible party is the Project Coordination Team)
There will be one or more of these, written appropriately, for each group. Reference section for each

Documented Time (responsible party is the Project Coordination Team)
Presented in a table organized by team and person in team
This needs to be legally defendable, in the past people many people have been fired or jailed for billing in excess of hours expended…track these well).

Sections
- Project coordination (responsible party is the Project Coordination Team)
  - Timelines
  - Team meetings (dates, times, minutes in the appendix)
  - Field data collection dates (raw data in the appendix)
  - Protocol development (first draft in the appendix)
  - Protocol review teams (all names…both internal to the class and any externals that you want)
  - Public review (in case, full class review…all comments, in the appendix with response)
  - Response to feedback
- Wildlife (responsible party is the Wildlife Team)
  - Introduction (this will be a two or more pages that include peer-review articles on each focal organism. The articles should focus on habitat requirements and monitoring techniques.
  - Timeline for monitoring
  - Monitoring protocols (complete with photo guides, etc.)
  - Table of first year's data (if collected)
  - Reference to appendix for RAW data
- Lake/Lakeshore area (responsible party is the Lake/Lakeshore Team)
  - Introduction (this will be a two or more pages that include peer-review articles lake/lakeshore management that is APPROPRIATE to this project. Also, be sure to include specifics on how to monitor this stuff)
  - Timeline for monitoring
  - Monitoring protocols (complete with photo guides and in your case, specific points that were monitored)
  - Table of first year's data (if collected)
  - Reference to appendix for RAW data
- Plant communities (responsible party is the Plant Communities Team)
  - Introduction (this will be a two or more pages that include peer-review articles on monitoring of barrens and savanna habitats).
  - Timeline for monitoring
  - Monitoring protocols (complete with photo guides, etc.)
  - Table of first year's data (if collected)
  - Reference to appendix for RAW data

- Wetlands (responsible party is the Wetlands Team)
  - Introduction (this will be a two or more pages that include peer-review articles on each of your main focus on wetlands of this region).
  - Timeline for monitoring
  - Monitoring protocols (complete with photo guides, etc.)
  - Table of first year's data (if collected)
  - Reference to appendix for RAW data
- Geospatial (responsible party is the Geospatial Team)
  - Introduction (this will focus on how other similar projects have chosen to store data, why you chose what you did and how to access the data)
  - Discussion of the metadata for each feature
  - Collection of appropriate figures (many may actually be in the other chapters; however, you will describe how they were made…what data was used, where it was collected, where it is available, etc. and reference each figure)
  - Geodatabase may be included in some format in this document or referenced to an online location. Issues will arise about what data can legally be stored there (i.e. invasive plants is fine) and what is privileged information (i.e. endangered species data is not publicly available)

Appendix (responsible party is the Project Coordination Team)

Schedule

Week	Asynchronous Lecture	Tuesday	Friday
1	Introduction and Indicators Read the Moses Creek Restoration Plan, take the online quiz	Zoom meeting I will discuss the syllabus and course	Zoom meeting Assign teams Discuss Moses Creek Restoration (Mandatory Monitoring) Discuss what is expected for the class project.
2	Planning and designing monitoring Mandatory Monitoring	Zoom meetings Each group will start their planning…this is individual, but, I will expect a report out at the end via canvas submission	First site visit to Schmeeckle, everyone meets at the lake restoration south of Lake Joanis, by the end of the lab, you will report out to the rest of the people in lab regarding your plans forward. All groups will specifically discuss their needs with the geospatial team…IMPORTANT step
3	Focus on a technique: Birds, Mammals, Reptiles and Insects	Zoom meeting with teams…by this time, the first protocols will be in draft form	Zoom…15 minute meetings with Dr. Demchik discussing where are at in the project…the rest of the lab is devoted to getting drafts together
4	Focus on a technique: Plants and Plant Growth	No class today…by lecture time, your group will have submitted the full draft of the protocol sheets into Canvas	Zoom…By today, your teams will have reviewed ALL protocols. The project coordination team will run this meeting. The goals are simple, this is the first review of all protocols, and, within a week, the full protocols for the class will be approved by the full class..
5	Data Archiving and Sampling Statistics Internet Resources	No class today…final drafts of protocols due into Canvas by start of class time…the Project coordination team has a required zoom meeting with me during class time	Zoom…This is the full discussion of next steps…by this class time, you will have everything except collected field data to the project coordination team. This seems early in the semester,
6	DNA	No class today…I will meet via zoom with the project coordination team to discuss final steps in putting together the document	Zoom…Completed document will be available…this is the last review…the only gaps in the document at this point will be parts of the appendix section (which is were the collected field data goes)
7	Case study: Sian Kaan Case Study: Cockscomb Basin	Lake/Lakeshore Team presents on their plan for monitoring the site	We will complete all monitoring of the Lake/Lakeshore area (this is coordinated by the Lake/Lakeshore Team). Note: we are doing this before spring break because this may require going out on the ice to take samples…better to do when the ice is good
8	Soil monitoring	Wetlands Team Presents on their plan for monitoring the site	We will all monitoring for the Wetland Area (this is coordinated by the Wetland Team)…this time was chosen to allow access over frozen wetland
9		Spring Break	Spring Break
10		Wildlife Team presents on their plan	We will complete some monitoring of wildlife (this is coordinated by the Wildlife Team)…

		for monitoring the site	
11		Plant Team Presents on their plan for monitoring the site	We will complete some monitoring for plants (this is coordinated by the Plants Team)
12		Geospatial Team presents on protocols for data storage, database formats, other stuff	Zoom…the team will walk us through the full database and storage information (at this point, they should have everything stored, as all field collections has been done; this is coordinated by the geospatial team). The project coordination team will use the last hour to complete any final edits to the document. By the end of the day, the final document will be turned in to me.
13		Buffer	Buffer
14		Zoom- Planning for the public presentation of this plan (Project Coordination team runs this)	Zoom…First run at the presentation of this plan (this is the pretend one)…critique and work on fixing error…This is functionally a design lab
4/28 to 5/1		A "stage rehearsal" with audience…I will get several professionals that I know to act as an "audience", they will provide feedback	This is the real deal presentation. This will be PUBLIC, so, treat this as such. PDF copies of the full plan will be distributed to all of the audience BEFORE this public meeting. We will have a half hour break and then we will do a critique of the presentation
15		Buffer	Reflection session and steps forward

Forestry Anti-harassment Statement

Introduction

In adopting this statement, the forestry discipline within the College of Natural Resources (CNR), at the University of Wisconsin-Stevens Point (UWSP) has expectations for professional behavior of its students, staff, faculty, and other associated parties. Anyone who has a reasonable belief that they, or another student, staff, faculty or guest, have been the victim of harassment, bullying, or discrimination, or any other violation in the statement herein, are encouraged and expected to report the conduct. See reporting options and guidelines at the end of this document.

The forestry discipline within the College of Natural Resources is committed to creating a safe, inclusive, and professional environment. The forestry discipline operates under the UWSP harassment, discrimination, and retaliation prevention guidelines, copied here:

> *"The University of Wisconsin-Stevens Point (UWSP) is committed to fostering an environment that is safe, respectful, and inclusive to all and to educate all employees on these important issues. In addition, we are obligated, under Regent policy and federal regulations, to ensure our employees are informed on the issues of unlawful discrimination, harassment, and sexual violence."*

Statement

The forestry discipline, following the lead of the Society of American Foresters which accredits the B.S. forestry degree, believes we all have a responsibility in creating a safe, inclusive, professional environment in all forestry-related activities and events. All forms of discrimination, harassment, and bullying are prohibited. This applies to all participants in all settings (online and in-person) and locations (on- and off-campus) where forestry classes and associated activities are conducted, including student organization events and activities, committee meetings, workshops, conferences, and other work and social functions where employees, volunteers, sponsors, vendors, or guests are present.

Discrimination is prejudicial treatment of individuals or groups of people based on their race, color, creed, religion, age, sex, sexual orientation, gender identity or expression, national origin, ethnicity, ancestry, disability, pregnancy, marital or parental status, veteran status, or any other category protected by law.

Sexual harassment is unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature that creates an intimidating, hostile, or offensive environment. Sexual harassment constitutes discrimination and is illegal under federal, state, and local laws.

Bullying is unwelcome, aggressive behavior involving the use of influence, threat, intimidation, ridicule, hazing or coercion to dominate others in the professional environment. Bullying behavior may go beyond characteristics protected by applicable laws, including but not limited to, political views, dress, or other outward physical appearances.

Other types of harassment include any verbal or physical conduct directed at individuals or groups of people because of their race, ethnicity, color, national origin, sex, sexual orientation, gender identity, age, religion, disability, veteran status, or any other characteristic protected by applicable laws, that creates an intimidating, hostile, or offensive environment.

The following list, while not exhaustive, includes examples of unacceptable behavior: slurs, jokes, threats, or derogatory comments relating to the characteristics noted above. Examples of inappropriate physical harassment that violate this statement include, but are not limited to: assault, unwanted touching, or impeding or blocking movement. In addition, no individual may be denied admission to, or participation in or the benefits of, any UWSP-associated events. Similarly, the display or circulation of derogatory or demeaning posters, cards, cartoons, emails, texts, videos, and graffiti which relate to characteristics noted above violate this statement.

Reporting
Students, staff, faculty, or guests associated with Forestry-related programming who experience or witness incidents of harassment are strongly encouraged to report the incident. The Forestry discipline strongly urges the prompt reporting of complaints or concerns so that rapid and constructive action can be taken. Reporting can be done online or in person, to a faculty or staff member, and/or the UWSP Dean of Students. Anonymous reporting is available.

The UWSP Title IX Website is the home for all information related to harassment and discrimination, including reporting options, student and employee resources, and information about what happens after a report is submitted:
https://www.uwsp.edu/titleix/Pages/default.aspx

University of Wisconsin Stevens Point College of Natural Resources-Principles of Professionalism

The College of Natural Resources at the University of Wisconsin – Stevens Point prepares students for success as professionals in many fields. As a professional, there are expectations of attainment of several personal characteristics. These include:

Integrity

Integrity refers to adherence to consistent moral and ethical principles. A person with integrity is honest and treats others fairly.

Collegiality

Collegiality is a cooperative relationship. By being collegial you are respecting our shared commitment to student education through cooperative interaction. This applies to all involved in the process: students, staff, faculty, administration and involved community members. You take collective responsibility for the work performed together, helping the group attain its goals.

Civility

Civility refers to politeness and courtesy in your interactions with others. Being civil requires that you consider the thoughts and conclusions of others and engage in thoughtful, constructive discussion to express your own thoughts and opinions.

Inclusivity

Inclusivity requires you to be aware that perspective and culture will control how communication is understood by others. While many values are shared, some are quite different. These differences in values should be both considered and respected.

Timeliness

Timeliness is the habit of performance of tasks and activities, planned in a way that allows you to meet deadlines. This increases workplace efficiency and demonstrates respect for others' time.

Respect for Property

Respect for property is the appreciation of the economic or personal value an item maintains. Maintaining this respect can both reduce costs (increase the operable life of supplies and equipment) as well as demonstrate respect for others rights.

Communication

Professional norms in communication require that you demonstrate the value of your colleagues, students, professors or others. The use of appropriate tone and vocabulary is expected across all forms of communication, whether that communication takes place face to face, in writing or electronically.

Commitment to Quality

Quality is the ability to meet or exceed expectations. By having a commitment to quality, we intend to provide a learning environment that is conducive to learning. Intrinsic to this commitment to quality is defining expectation (committed to in a syllabus through learning outcomes), implementation (with quality control in place) and assessment (where meeting of learning outcomes is determined).

Commitment to Learning

Learning is a lifelong process. By being committed to learning you are providing a model for all to follow. This model is not only professor to student but involves all combinations of people within our university and broader community

Adherence to this compact is required of the faculty and staff of the College of Natural Resources and of all students enrolled in College of Natural Resources courses.

Regarding Face Coverings in the Classroom

Face Coverings:
- At all UW-Stevens Point campus locations, the wearing of face coverings is mandatory in all buildings, including classrooms, laboratories, studios, and other instructional spaces. Any student with a condition that impacts their use of a face covering should contact the [Disability and Assistive Technology Center](#) to discuss accommodations in classes. Please note that unless everyone is wearing a face covering, in-person classes cannot take place. This is university policy and not up to the discretion of individual instructors. Failure to adhere to this requirement could result in formal withdrawal from the course.

Other Guidance:
- Please monitor your own health each day using [this screening tool](#). If you are not feeling well or believe you have been exposed to COVID-19, do not come to class; email your instructor and contact Student Health Service (715-346-4646).
    - As with any type of absence, students are expected to communicate their need to be absent and complete the course requirements as outlined in the syllabus.
- Maintain a minimum of 6 feet of physical distance from others whenever possible.
- Do not congregate in groups before or after class; stagger your arrival and departure from the classroom, lab, or meeting room.
- Wash your hands or use appropriate hand sanitizer regularly and avoid touching your face.
- Please maintain these same healthy practices outside the classroom.