

## ECOLOGICAL MONITORING (NR457/657 - 3 credits)

**Instructor:** Dr. Demchik (CNR 246; mdemchik@uwsp.edu): Monday 1400-1500, Tuesday 1500-1600, Wednesday 1400-1500; 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 in-person class (Tuesday 200-300) that will be used for discussion, planning and other activities
- A three-hour block that is composed of the Friday lecture time and then the Friday lab time. This will be in the field often (i.e. outside in the cold). Please make sure to have appropriate clothing for this. We will be in the field on Friday much of the day, dress for it, this is a cold state.

**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, habitat and restoration activities. I am going to try to get you all addicted to this kind of work, so, you get to help fix a property for this class. See specifics below.

### **The Overall Story for the NRES 457/NRES 459**

I thought that I would put this note in for both classes. These classes are being designed to work together and to interface with both SER and Fire Crew. This is field work, so, expect things to be subject to change due to the nature of doing field work.

For this year, we are going to be doing restoration work on the Minister Lake Property which is associated with the Central Wisconsin Environmental Station. This is owned by the UWSP Foundation and I am the property manager for all CNR properties.

This property contains parts of both Minister Lake and Sunset Lake.

This property contains the remnants of the minister's house for the church down the road as well as foundations for other structures. We are going to maintain and document these as cultural relics for the site. There may also be other cultural elements such as burial mounds etc. (these are very commonly associated with lakes in the area) and we will be certain to manage influences on these sites as well.

Maintaining the remnants of this history is an important element of this restoration plan.

This site is also part of a township level project that I have been working on for 17 years. That township level project was subject of a webinar that I did for the Society for Ecological Restoration and can be viewed here if

you are an SER member (if you are not, sign in with someone that is, if you would like to watch it) [Scaling Up Forest Restoration in a Parcelized Landscape: A Case Study in Working With Neighbors - Society for Ecological Restoration \(ser.org\)](#).

This site is also part of a Landscape Scale Restoration project that I have with the US Forest Service. All time that you put into the project will be used as “match” for the project and will be part of a much larger project that will help get over a thousand acres restored in Wisconsin.

- The NRES 457 class will be doing the overall monitoring plan for this property.
- The NRES 459 class will be doing the restoration plan for this property.

### **Some Constraints for This Property**

I have done both a Natural Heritage Inventory and Historic/Archeological Review for this site. Overall, I do not have specific constraints that would create issues with the restoration but, there is one species occurrence that I do need to watch for, so, I may need to mildly alter some decisions.

### **Targets Made from Reference Conditions**

- Retain/promote large diameter (over 20 inches), long-lived trees species (target of three per acre in areas of older growing stock)
- Target of at least three live cavity trees per acre in areas of older growing stock (ideally with a range of cavity types)
- Target of at least three hard mast trees per acre in areas of older growing stock
- Target of 200 to 800 cubic feet of dead (snags) or down (coarse woody debris) per acre
- Promote age class diversity (target 20% in 5-15 year old range, 20% in 80+ year old range, remainder can be distributed however is possible)

### **Overall Goals**

- Maintain the remnants of cultural history for this site
- Favor early successional, mid-successional and later successional neotropical migrant birds (focus on guilds)
- Favor upland amphibian habitat
- Minimize negative impacts on the lakes
- Increase structural diversity (see specific targets above)
- Reduce both invasive woody plants and poison ivy
- Develop a trail to the standards of USFS Class 2 <https://www.fs.usda.gov/managing-land/trails/trail-management-tools/trail-fundamentals>

### **Birds**

The following birds are of special interest on this site:

- Savanna bird species
  - Indigo bunting
  - Song sparrow
- Early successional
  - Mourning Warbler
  - Chestnut-sided Warbler
  - Yellow Warbler
- Early stem exclusion stage
  - Eastern Towhee
  - Rose breasted grosbeak
- Mid-successional
  - American Redstart
  - Wood thrush

- Late-successional
  - Eastern wood-peewee
  - Great crested flycatcher

## Frogs

The following are the main frogs that can be heard in spring that are likely to be present in the area:

- Boreal Chorus Frog
- Spring Peeper
- Wood frog

**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 this property.** 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.

Regarding the overall plan, I recommend keeping this as a portfolio item, because, you ARE on the team for this plan. You will track all of your time assigned to any feature of this project because it will be used as match for the LSR project that this site is a part of. 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. You are allowed to have assistance from people outside of the class; 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
  - Need to be in BOTH NRES 459 and 457
  - This team needs to pull everything together and set timelines. You will meet with me at least every 2 weeks during the first part of the semester.
  - 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.
- Implementation Liaison
  - This team is responsible for helping plan field activities with each of the teams
  - They will make sure that supplies are ready from the stockroom
  - They will schedule field activities
  - They will be the group that helps this all get done in the field
  - Ideally, these students are S212 certified and Fire Crew members
- Wildlife team- 5 people
  - 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. 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 at least the below elements; however, you can do more. This team will provide wildlife monitoring protocols that will be used for ALL of the stand level teams in NRES 459. You have to do the following animals:

- Neotropical migrant birds (this has to be observational ONLY) See specific list above
- Frogs (this has to be observational ONLY) See specific list above
- Plant Communities team- 4 people
  - You are responsible for developing a protocol that will inventory the following items:
    - Site condition (result in an overall map)...effort to document forest structure, regeneration, health and other factors
    - Spring ephemerals
    - Overall list of known plant species
  - This team will provide plant monitoring protocols that will be used for ALL of the stand level teams in NRES 459.
  - 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.
- Historic/Cultural Team- 3 people
  - This team has to be in both the NRES 457 and 459 class, because you are preparing a document that will span both classes. You will need to explore sources of data that you have never considered before (archives, historical societies, etc.). This team falls at the intersection of the restoration and monitoring, and needs to be able to behave as such.
  - This team will map all relics of former infrastructure (foundations etc.)
  - This team will document as much as possible of the site history
  - This team will develop plans in concert with the savanna team that reduce the impact of the savanna team's management actions on the site
  - The Minister Lake property does not have any known Archeological sites, however, it is conceivable that they are present, you will need to explore the property to determine if any areas need to be addressed.
- Geospatial team- 2 people
  - This team is responsible for developing all maps and archiving all data
  - This team needs to be in both NRES 457 and 459 because the data storage and archiving needs will be similar between classes

**Field Labs:** On week 6, 9, 11, 12, the wildlife, plant and historic team will be coordinating field activities to collect data needed for the monitoring plan. These labs will need to be planned to use all available assets to collect the field data. These will only be 3-hour blocks of time (about 2 hours in the field). Plan efficiently and accordingly.

**Grades:**

- 50% of grade class-wide restoration and habitat plan
- 20% consistent attendance/participation
- 10% online quizzes for videos
- 10% coordination of field measurement labs (week 6, 11, 12 and others)
- 10% final career reflection (for those in both classes, this is the same across both of the classes)

First of all, please note that there are no exams in this class. Also, please note, 50% 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.

**You will be expected to do an evaluation of each of your group members and I reserve the option to reduce your grade in the class by up to 10% based on lack of performance in the class. By that, I mean, you do not get "bonus points" for doing a good job, you get subtractions of points for not filling your roles.**

## **The Restoration and Habitat Management Plan and **Monitoring Plan****

### ***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. **The last paragraph will be the monitoring plan.**

### ***Project Background (responsible party is the Project Coordination Team)***

The Scope- What are the main thematic elements of this project

**Involved parties/stakeholders**

**Process (i.e. planning, public presentation, implementation, outreach)**

### ***Restoration and **Monitoring Plan Team** (responsible party is the Project Coordination Team)***

This will be all of you. This will be written like this:

Savanna Team

Bob Bobson- Ecosystem Restoration and Management student at University of Wisconsin-Stevens Point.

Responsible for developing the woodcock and wood duck monitoring protocols.

### ***Restoration and Habitat Goals, Objectives and Indicators (responsible party is the Project Coordination Team)***

For each team, there will be one or more of these, written appropriately, for each group. Reference section for each

### ***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 Match Time (responsible party is the Project Coordination Team)***

Presented in a table organized by team and person in team

This needs to be legally defensible, in the past people many people have been fired or jailed for billing in excess of hours expended...track these well).

### ***Project coordination (responsible party is the Project Coordination Team)***

- Timelines
- Monitoring team meetings (dates, times, minutes in the appendix)
- Field data collection dates (raw data in the appendix)
- Monitoring protocol development
- Review
- Response to feedback

### ***Maps***

This section will include overall maps and will be doing in collaboration with the Geospatial Team in the NRES 457 class.

### ***Team Related Sections***

*Each Restoration team will have a section like the following below:*

- The Vision- What do you hope to accomplish on this site in the short and long term
- Current Condition- Describe the current condition relative to the restoration/habitat targets
- Desired Future Condition- Describe how the site is hoped to be in the future relative the restoration/habitat targets
- The Targets- What elements are you focusing on (examples could include areas of young aspen/alder, soft mast, reduced invasives etc.)
- Actions needed to reach those targets
- Timeline

### ***Monitoring***

#### ***Wildlife (responsible party is the Wildlife Team)***

- Introduction (this will be a two or more pages that include peer-review articles/management guides 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

### **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 both the uplands and lowlands).
- Timeline for monitoring
- Monitoring protocols (complete with photo guides, etc.)
- Table of first year's data (if collected)
- Reference to appendix for RAW data

### **Historic Team (responsible party is the Historic Team)**

- Introduction (this will be a two or more pages that include as much information about the site history as you can collect)
- Timeline for monitoring
- Monitoring protocols (complete with photo guides and in your case, specific elements mapped)
- Maps and tables
- 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 Lecture	Lab
1	Intro and indicators, read Moses Creek Restoration Plan, take the online quiz	Discuss the course and overall planning	<b>Inside the classroom</b>  Assign teams, Discuss Moses Creek Restoration, Discuss the overall project
2	Planning and monitoring and Mandatory monitoring	This will be focused on each group deciding on their plan for the project. Most important component is determining geospatial needs.	<b>Minister Lake Site Visit</b>  Initial scoping of site  Walk all boundaries of each of your site and take photos  This visit is entirely for you to see the site before you start work on the plan  For those that are not in both classes, they will take a van, the rest will be on a bus
3	Focus on a technique: Birds, Mammals, Reptiles and Insects	Each group presents their monitoring ideas (10 minutes per group), we discuss them	<b>Inside the classroom</b>  Focus on Planning Document  Next week you have draft one of your plan due to me
4	Focus on a technique: Plants and Plant Growth	By today, you will have a first draft of your portion of the monitoring plan together, today will be spent discussing this and coming up with paths forward.	<b>Minister Lake Site Visit</b> <b>Savanna Site</b> Brushsaw and chainsaw work on the savanna restoration site Mark stand boundary and reserve trees inside unit Load firewood in dump truck  Make brush piles OUTSIDE of burn unit
5	Data archiving, sampling statistics and internet resources	All reviews will be done, today will focus on how to move plan to the next stage.	<b>Minister Lake Site Visit</b> <b>Hardwood Forest Site</b> Mark (green), georeference and release (chainsaw) high quality crop trees on north slope Make brush piles for habitat  Cut undesirable brush
6	DNA	All teams will present a 5-7 minute slideshow for their monitoring plan.  These presentation will be included in the full	<b>Minister Lake Site Visit</b>  Field data collection coordinated by all teams



		<p>community breakfast presentation.</p> <p>This will be treated as the first round of presentations for this topic.</p> <p>Discussion of plan for field inventory on Friday.</p>	
7		<p>Final edits are in for the planning part of the document. Class time spent reviewing each section and moving the document to final condition.</p>	<p><b>Minister Lake Site Visit</b>  <b>Early Successional Site</b>  Mark cut boundaries on the early successional habitat sites</p> <p>Mark reserve trees inside units</p>
8		<p>Buffer</p>	<p>Community Breakfast Presentation at CWES (this is the general public version of the plan)</p>
9		<p>Project Coordination Team</p> <p>Preparation for site visit to collect field data (this will be especially focused on collecting information for historical team, but, other teams may collect data as well)</p>	<p><b>Minister Lake Site Visit</b>  Allow runover for prescribed burn site prep. Any last mapping will get done</p> <p>Historic team will gather monitoring data</p>
10		<p>Final draft of plan is due</p>	<p>Campus presentation of the plan (this is the formal version for the foundation board and others)</p>
11		<p>Project Coordination Team</p> <p>Preparation for site visit to collect field data (this will be especially focused on collecting information for plant team, but, other teams may collect data as well)</p>	<p><b>Minister Lake Site Visit</b></p> <p>Field data collection coordinated by all teams</p>
12		<p>Project Coordination Team</p> <p>Preparation for site visit to collect field data (this will be especially focused on collecting information for wildlife team, but, other teams may collect data as well)</p>	<p><b>Minister Lake Site Visit</b></p> <p>Field data collection coordinated by all teams</p>
13		<p>Special Topic: Sian Kaan and Cockscomb Basin</p>	<p><b>Minister Lake Site Visit</b>  Shrub, vine and tree planting</p> <p>May coordinate with the charter school</p>

14		Special Topic:	<b>Minister Lake Site Visit</b> Trail improvement (chainsaw, brushsaw, etc.) for site visit  Plug planting in savanna after burn (hoping that it actually got burned)
15		Special Topic:	Final Site Visit with Site Tour: Tomorrow River Charter School  Community Members and Foundation

## 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.