

ECOLOGICAL MONITORING (NR457/657 - 3 credits)

Instructor: Dr. Demchik (CNR 246; mdemchik@uwsp.edu): Monday 1000-1100 and 1400-1500, Tuesday 1500-1600; 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.

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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 Village of Plover Conservancy Property which is associated with the Little Plover Watershed Enhancement Project, more information can be found at [Little Plover River Watershed Enhancement Project | Plover, WI \(ploverwi.gov\)](http://LittlePloverRiverWatershedEnhancementProject|Plover,WI(ploverwi.gov)). This project has many facets and involves an unbelievable collection of stakeholders.

The property that you will be working on has already had round 1 of restoration work, you are set to begin round 2.

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. We have to be completed with work in the first 75 meters of the river by March 15th (or after that, while still under snow cover) due to a rare/threatened/endangered species concern. Due to oak wilt concerns, all tree cutting must be completed by April 1st (this does not impact brushcutting, just, tree cutting and pruning).

Available Tree Seedlings

I have already ordered 100 each of swamp white oak, river birch and tamarack, so those will be available. Other chosen materials will need to be collected. I have a good amount of sedge and wetland grass seed available.

Management Units

- Riparian Forest Buffer Unit (19.3 acres)
 - Significant woody invasive pressure
 - Emerald ash borer
 - History of wind damage (2019)
 - Host for channel restoration work
 - Host of a wetland scrape
- Forest Unit (8.8 acres)
 - Significant wood invasive pressure (multiple species)
 - Oak wilt
 - Emerald ash borer
- Sedge Meadow and Shrub Carr Unit (5.9 acres)
 - Significant wood invasive pressure
 - Long-term lack of prescribed fire

Targets Made from Reference Conditions

- Retain large diameter (over 20 inches; 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 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

- Favor neotropical migrant birds (focus on guilds)
- Reduce both invasive woody plants
- Promote structural diversity (see specific targets above)
- Favor upland amphibian habitat
- Document cultural history for this site
- 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:

Responsible Group	Nesting	Foraging	Species
Forest Unit	Cavity	Bark foraging	Downy Woodpecker
		Bark foraging	Hairy Woodpecker
		Bark foraging	Red-bellied Woodpecker
		Flycatcher	Great Crested Flycatcher
Tree	Tree	Flycatcher	Eastern Wood-Pewee
		Foliage gleaner	Red-eyed Vireo
		Foliage gleaner	Baltimore Oriole
Shrub/Small Tree	Shrub/Small Tree	Ground foraging	Wood Thrush
		Foliage gleaner	Rose-breasted Grosbeak
Ground	Ground	Ground foraging	Eastern Towhee
		Ground foraging	Ovenbird
Riparian Forest Buffer Unit	Tree	Foliage gleaner	Warbling Vireo
	Shrub/Small Tree	Foliage gleaner	American Redstart
		Foliage gleaner	Chestnut-sided Warbler
Ground	Ground	Foliage gleaner	Mourning Warbler
		Ground foraging	Veery
Sedge Meadow and Shrub Carr	Shrub/Small Tree	Foliage gleaner	Common Yellowthroat
	Shrub/Small Tree	Foliage gleaner	Yellow Warbler
	Sedges or interface of sedge and shrub	Ground foraging	Sedge Wren
Ground foraging		Swamp Sparrow	

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

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 (1 or more)
 - 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. **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. At this point, all monitoring protocols are approved for this project, so, you will need to follow the existing protocols for birds and frogs. 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.
 - I know nothing about the history of this site, we want to document everything from surveyor notes forward.

- 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: Most of these labs are in the field. The weather is standard spring Wisconsin weather. Plan 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	Inside the classroom 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.	Village of Plover Site Visit Initial scoping of site For those in both classes, you will be brushsawing when the NRES 457 group shows up. Plant and wildlife team will walk the property to assist in planning while the rest of the students continue work on the site.
3	Focus on a technique: Birds, Mammals, Reptiles and Insects	Each group presents their monitoring ideas (10 minutes per group), we discuss them	Inside the classroom 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	Individual group meetings with Demchik: Plant team-15 minutes Wildlife team- 15 minutes Historic team: 10 minutes Project implementation, coordination and geospatial team need to be present for all of these meetings	Village of Plover Site Visit- Riparian Forest Buffer Unit Riparian team will mark pockets of dead ash to cut (and keep) for planting to tree seedlings or other covers. For the rest of the class, this Friday is focused on brushsaw, pole saw and chainsaw work in the riparian forest buffer unit. Make brush piles OUTSIDE of burn unit with residue. Due to restricted time to carry out work close to the stream (and it being one of largest units on the property), three lab periods will be allocated to completing that work.
5	Data archiving, sampling statistics and internet resources	By today, you will have a first draft of your portion of the plan together, today will be spent discussing this and coming up with paths forward.	Village of Plover Site Visit- Riparian Forest Buffer Unit This Friday is focused on brushsaw, pole saw and chainsaw work in the riparian forest buffer unit. Due to restricted time to carry out work close to the stream (and it being one of largest units on the property), three lab periods will be allocated to completing that work.
6	DNA	Feb 27 (no lecture, Demchik will be at Wisconsin Chapter of The Wildlife Society running a Forestry for the Birds Symposium	Village of Plover Site Visit- Riparian Forest Buffer Unit This Friday is focused on brushsaw, pole saw and chainsaw work in the riparian forest buffer unit. Due to restricted time to carry out work close to the stream (and it being one of largest units

			on the property), three lab periods will be allocated to completing that work.
7		<p>All teams will present a 5-7 minute slideshow for their monitoring plan.</p> <p>This will be treated as the first round of presentations for this topic.</p>	<p>Village of Plover Site Visit- Riparian Forest Buffer Unit</p> <p>This week is different between the two classes. All students from NRES 457 will ride the bus to the site. Today will be focused on collecting data for the Riparian Forest Buffer Unit. Due to the size of the unit, the entire class will focus on collecting the needed data. This will include legacy trees, cut pockets and any other data that needs collected. The plant team will coordinate this data collection.</p>
8		<p>Final draft of plan is due</p> <p>Debrief last week's data collection. Plan for this week's data collection and any changes needed.</p>	<p>Village of Plover Site Visit- Forest Unit</p> <p>The Forest Unit team will mark and record all legacy trees in the entire unit. Any units to be seeded will be flagged out and georeferenced. Depending on weather, we may be able to seed this day also.</p> <p>The remaining students run brushsaw, pole saw and chainsaw work to clear woody invasives on as much of the unit as possible.</p>
9		<p>Debrief last week's data collection. Plan for this week's data collection and any changes needed.</p>	<p>Village of Plover Site Visit- Sedge Meadow and Shrub Carr Unit</p> <p>The Sedge Meadow and Shrub Carr team will mark and record all legacy trees in the entire unit.</p> <p>All required site prep in this unit to get it ready for the prescribed burn. Depending on weather, we may have to pivot this to the Forest Unit Team. This will involve fire line prep as one of the main activities. The southern fire line is also the future hiking trail.</p>
10		<p>Second round of presentation for practice</p>	<p>Campus presentation of the plan</p>
11		<p>Final plan for all data collection, anything remaining, any issues, etc.</p>	<p>Village of Plover Site Visit-</p> <p>The main focus will be on collecting any remaining data which needs to be collected.</p>
12		<p>Plant team and historic team present collected data.</p>	<p>Village of Plover Site Visit-</p> <p>The main focus will be on collecting any remaining data which needs to be collected.</p>
13		<p>Special Topic: Sian Kaan and Cockscomb Basin</p>	<p>Village of Plover Site Visit-</p> <p>Shrub, vine and tree planting. Remaining habitat work.</p>
14		<p>Buffer</p>	<p>Village of Plover Site Visit-</p> <p>Final trail improvement and all remaining activities</p> <p>Early morning bird walk with wildlife team (this is optional, but, several members of the team need to be available)</p>

15		Wildlife team present collected data Reflection activity	Final Site Visit with Site Tour: Morning bird tour for local birders Field tour for stakeholders
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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.