Incorporating wetland delineation skills into an undergraduate Wetland Ecology course

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Rationale

Context

Wetlands cover ~40% of Alaska, most of which is public land. The federal "no net loss" policy mandates wetland protection, yet development is accelerating as new energy resources are exploited. Further, climate change is already altering hydrologic regimes in northern wetlands. Biologists, conservationists and regulators in Alaska must all understand the basic functions and services provided by wetlands in order to prepare for the future.

Needs

- Basic wetland ecology course for biology students at UAF
- Skills training for entry-level wetland technicians in Alaska
- Emphasis on the functions of, services provided by, and potential changes to, Alaskan wetlands

Course structure (3 credits)

6 weeks; Class: 3/week @ 1.5 hrs, Field trips ~8 hrs every Sat.

Course Objectives

By the end of the course, students will be able to

- Determine whether a site is a wetland, applying field data on soils, vegetation, and hydrology
- Judge the extent of a particular wetland type in the field, and draw boundaries between wetland types and wetlands/uplands based on aerial photos and GIS data such as soil maps.
- Interpret regenerating vegetation communities or disagreements between wetland indicators as the product of a particular ecological disturbance.
- Classify wetlands according to several of the most common classification systems.
- Assess the importance of ecosystem services provided by wetlands, explain how various disturbances can reduce a wetland's ability to provide these services, and suggest ways that function might be restored.

Topics discussed

Wk.	Mon.	Wed.	Fri.	Sat. Field Trip
1	Data & definitions	Hydric veg. indicators	Hydric soil indicators	Black & white spruce Datasheets
2	Hydrology indicators	Intro to Plant ID	Willows & sedges	Rivers & floodplains Invertebrate collection
3	Invertebrates	Viereck class.	Maps & boundaries	Ponds, meadows
4	Redox & CEC	C & N cycling	Permafrost & peat accum.	Peatlands C cycle data collection
5	HGM & Cowardin class.	Ecosystem svcs	Wetland assess.	Assessment More plant ID
6	Disturbance	Wetland mitig. & restoration	Wetland/ upland mosaics	Restoration project

Texts

- Corps of Engineers Wetland Delineation Manual, Alaska Regional Supp.
- National Wetland Plant List, Alaska region
- Local plant field guide & various ad hoc resources
- Wetland Ecology Workbook, a manual created for this class

Field Skills practiced

- Fill out wetland delineation datasheets
- Use a compass and inclinometer
- Use a GPS unit to locate a site and to record a site's location
- Document a site photographically
- Identify common Alaskan wetland and upland plants on sight
- Identify completely unfamiliar plants using a dichotomous key
- Distinguish between grasses, sedges, and rushes
- Estimate % cover of species in the field
- Use the National Wetland Plant List to find plant indicator status
- Dig a proper soil pit
- Texture out soil horizons
- Color out soil horizons using a Munsell color book
- Recognize colors that relate to hydric soil indicators
- Recognize a restrictive layer and interpret its relevance to the site
- Allocate sampling effort in a wetland/upland mosaic
- Choose appropriate hydric soil and hydrology indicators
- Interpret evidence of natural and anthropogenic disturbances
- Interpret evidence of wetland functions and d ecosystem services
- Predict how the site's vegetation and hydrology would change at different times of the year
- Predict how hypothetical disturbances may change site function

Assessment

- In-class activities (in groups), homework & mid-week quizzes (individually graded)
- Field Exams – demonstrate wetland delineation field skills (listed above) and provide oral explanations on-site
- Projects
  - Soil Key – a flow chart, checklist, table, or dichotomous key, based on Alaska Soil indicators. Graded as draft and final product.
  - Photo Collection or Video based on a gradient or contrast of hydrologic conditions, visually demonstrating how hydrology influences soil indicators. Lots of choice here, and a chance to be creative! Partners encouraged.
  - Plant Collection consisting of multiple plant species from each wetland indicator status, correctly identified, annotated and pressed.