

NATURAL AND HUMAN LANDSCAPES OF ALASKA
ESF 548 (3 credits)
Spring 2007

Instructors: Jim Jordan, Rachel Thiet, and Michael Gaige (Teaching Assistant)

Trip dates: May 13 – May 31, 2007 (see flight itinerary at end of syllabus)

Pre-trip meetings: Thursdays, February 1, March 1, and April 19, 2007 (all meetings from 7 – 9pm). *Attendance at all pre-trip meetings is mandatory. Failure to attend all pre-trip meetings may result in not being permitted to attend this trip. The deadline to drop this course is 2 February 2007; failure to drop the course by this date will result in forfeiture of your trip fee.

Course summary

This field study trip will focus on the physical, cultural, and ecological landscapes of Alaska in the context of conflicting notions of pristine environment and underutilized resource. The degree to which these ideals define the state and shape its future is aggressively contended in the political, economic, and social arenas. Alaska is an immense and diverse landscape; evidence of past and present environmental change is ubiquitous and profound. This course provides you the opportunity to immerse yourself in the region's rich natural history and contemporary issues. General course topics that will be explored include marine, estuarine, riverine, and boreal forest ecology, forest and treeline history, short and long-term climate and hydrology, ancient and modern patterns of human settlement, subsistence issues, and the management of biotic and abiotic resources.

Course objectives

Your pre-trip and in-field assignments, discussions, and presentations will allow you to:

1. Understand the general geology of Alaska
2. Understand the ecoregions, basic plant and animal communities, and soil types of Alaska
3. Understand the basics of climate and climate change impacts of Alaska
4. Describe the biotic and abiotic factors that influence selected marine and terrestrial communities
5. Become familiar with life zone changes across elevation gradients in nearshore, lowland, and upland landscapes
6. Understand the impact of the military-industrial complex on Alaska's biota and landscape, and its associated threats to the environment
7. Describe human management strategies for Native, Federal, and State lands

Course resources:

Required text: Pielou, E.C. 1994. A Naturalist's Guide to the Arctic. The University of Chicago Press, Chicago.

*This textbook is available in the ANE bookstore, or you can come up with some creative ways to obtain it. You should read this text in its entirety before the trip.

A list of suggested texts and websites is also included at the end of the syllabus; use this list and the suggested web links for your research and exploration of Alaska prior to our trip.

Subscribe to these listservs

- Please subscribe to the Arctic Action listserv, maintained by the Northern Alaska Environmental Center (<http://www.northern.org>). To subscribe, send a message to info@northern.org with your full name, email address, USPS mail address, phone number, and issue concerns in the BODY of the message. Write "Arctic Action" in the SUBJECT of the message. Part of the March 1 meeting will be devoted to discussing current and critical environmental issues facing the state; Arctic Action is a valuable resource in this regard.

- Please subscribe to ARCTIC INFO. ArcticInfo is administered by the Arctic Research Consortium of the United States (ARCUS - <http://www.arcus.org/>). Subscribe or unsubscribe by using the web form located at: <http://www.arcus.org/arcticinfo/subscription.html>. This listserv provides current information of interest to the circum-arctic science and policy community and includes announcements of events, workshops and conferences, job postings, links to current research initiatives and results, etc.

Course evaluation:

Your performance in this course will be evaluated based upon your class participation and the quality, depth, and delivery of the following assignments:

1. A pre-trip group presentation on a background-research topic
2. A co-authored research paper on a selected topic, and an in-field presentation of your research
3. A brief in-field description of a species or landform of your choice
4. A final synthesis exam consisting of several essay questions

Assignments:

1. Pre-trip background-research project and presentation

At our pre-trip meeting of February 1, students will choose a topic to research with two partners prior to our trip. Your group will present your results in a 20-30 minute presentation during pre-trip meetings 2 or 3. These research topics are related to the ecologic, geologic, and cultural / political issues we will be dealing with during the trip. A list of background research topics is suggested below.

2. Co-authored research paper and in-field presentation

At our pre-trip meeting of February 1, students will also select a topic on which a 7-10 page research paper will be developed with a partner. This co-authored paper will be due on May 1 and will be presented at some point during the trip. We will develop the sequence of presentations based when the topical focus best fits the itinerary. This project should take the

form primarily of a literature review on the topic of your choice, although you are welcome to acquire and analyze data if you have a specific research problem in mind. A list of research paper topics is suggested below.

An abstract (250-word limit) of your paper must be posted to the course folder by April 10, and papers are due on May 1.

3. Brief in-field description of a species or landform of your choice

Each of you will also choose one species or landform to research prior to the trip, which you will present independently in a brief, 10-minute presentation in the field. Research about a particular species should consist of natural and cultural history and ecology (including physiological adaptations to AK climate), and research about landforms should focus on geologic and geomorphologic history and impacts on ecological communities. No written assignment is required for this project, but you may consider preparing a brief handout for the group. A list of species and landforms is at the end of this syllabus; please feel free to choose topics not included on the list, but run them by us first.

4. Final post-trip synthesis exam consisting of several essay questions

On the last day of the trip, we will provide you with a series of essay questions that require you to synthesize the geo-ecological, cultural, and political concepts we deal with during this course, with an emphasis on content conveyed during the trip. **Your essays will be written independently, and are due to Jim or Rachel no later than June 22, 2007.**

Class participation:

You will have the opportunity to engage in this course by facilitating discussions on your research topics during pre-trip meetings and in the field. Your engagement in independent learning and preparation for the trip and your personal group dynamics also reflect your class participation.

Pre-trip meeting agendas:

February 1, 2007

Trip logistics: itinerary, drivers, travel forms
Discussion of course expectations and assignments
Introduction to AK geology, physiography, and ecoregions
Research topic selection

March 1, 2007

Presentations of background research

April 19, 2007

Presentations of background research
Finalize travel logistics

Pre-trip background-research topic suggestions:

AK climate dynamics and ecoregions
AK geologic and geomorphologic history
AK human history
Dominant plant and animal communities in the Kenai Peninsula-Kachemak Bay area
Dominant plant and animal communities in the AK Range
Dominant plant and animal communities in interior Alaska
Dominant soil types in AK
Major, current land use and resource issues in AK
Historical and current political climate of AK

Research paper and in-field presentation topic suggestions:

Plant adaptations to the taiga/boreal forest biome: physiological responses to extremes of temperature and daylight

Animal adaptations to the taiga/boreal forest biome: physiological responses to extremes of temperature and daylight

Predator/wolf control management and ecology

Migration and breeding status of avifauna choose a species or group

Soil-carbon and permafrost dynamics in relation to climate change

Short-term ecological disturbance: affects of fire, volcanism, earthquakes on community composition or succession

Kenai Peninsula forest management: harvesting practices, spruce bark beetle impacts, and environmental / cultural issues

Tundra-wetland transition and shifts in the boundaries of shrub communities

Climate change impacts in Alaska, Little Ice Age to the 21st century (e.g., permafrost; sea ice, glacier dynamics; sea level changes; biome and ecoregion boundary shifts)

Mining: environmental impacts and effectiveness of environmental regulation

History and current status of the National Petroleum Reserve in Alaska (NPRA)

ANWR: new drilling in the context of old, cultural and environmental issues

Exxon Valdez: the event, the consequences, the legacy

Energy and environment: assess the infrastructure and impacts of domestic hydroelectric, coal, gas, and the status and prospects for green technologies in Alaska

Shorebird Sister School Program, curriculum and implementation

Trans-Alaska Pipeline: construction, operation and environmental impacts

Commercial fisheries: management and economic/environmental conflicts (focus on a sector, e.g., Cook Inlet, Prince William Sound, etc., and a species e.g., salmon, halibut/groundfish, herring, etc.)

Resident Hunting and Fishing: Subsistence Preference and the management of game resources under Alaska National Interest Lands Conservation Act (ANILCA)

Extinction events in Alaska / Beringia: climate change, landscape evolution, human occupation

Significance of Bering Land Bridge to modern distribution of plant and animal communities

Paleoecology of Beringia and peopling of the New World

Geomorphic history of 1) Kenai Peninsula / Kachemak Bay; 2) southern Alaska Range / upper Copper River Basin; or 3) Yukon – Tanana Upland

Climate change, fire ecology and maintenance of boreal forest

Intertidal zonation and ecology of marine invertebrates and plants

Relationship between substrate and succession on deglaciated terrain or floodplains

Alaska Native Claims Settlement Act (ANCSA) and land tenure

Suggested species and landforms for brief *in-field* research presentation:

Sitka spruce	Moose	Thermokarst
Black spruce	Black/brown bear	Pingo
White spruce	Muskox	Raised beach
Dwarf willow	Dall's sheep	Tundra polygon
Dwarf birch	Caribou	Tundra hummock
Red alder	Arctic fox	Loess sheet/dune
Quaking aspen	Arctic ground squirrel	Paleosol
Crowberry	Sea otter	String bog
Salmonberry	Stellar's sea lion	Esker
Mountain sagewort	Arctic hare	Solifluction lobe

Bearberry	horned/tufted puffin	Hanging valley
Cottongrass	golden plover	Outwash plain
<i>Sphagnum</i> moss	bald eagle	Terminal/end moraine
Devils club	arctic tern	
	guillemot sp.	
limpet	raven	
sea urchin	Stellar's jay	
blue mussel	harlequin duck	
10-pointed sea star	sand hill crane	
brown kelp		
razor clam		
anemone		

Suggested supplemental texts:

E. Hulten, [A Guide to the Vascular Flora of Alaska](#)

O. Mason, et al., [Living With the Coast of Alaska](#)

F. West, [American Beginnings: the Prehistory and Paleoecology of Beringia](#)

J. VanStone, [Athabaskan Adaptations](#)

N. Lethcoe, [Glaciers of Prince William Sound Alaska](#)

W. Irving, [Arctic Life of Birds and Mammals, Including Man](#)

G. Orians, et al., [Wolves, Bears, and Their Prey in Alaska](#)

R. Armstrong, [Guide to the Birds of Alaska](#)

W. Oechel, [Global Change and Arctic Terrestrial Ecosystems](#)

T. Pewe and R. Reger, [Guidebook: Richardson and Glenn Highways](#)

S. Haycox, [Frigid Embrace: Politics, Economics, and Environment in Alaska](#)

T. Pewe, [Quaternary Geology of Alaska](#)

D. Carter et al., [Late Cenozoic History of the Interior Basins of Alaska and the Yukon](#)

R. Thorson and T. Hamilton, [Glaciation in Alaska: The Geologic Record](#)

N. Davis, [Permafrost](#)

J. Matthews, [The Ecology of Recently Deglaciated Terrain](#)

D. Hopkins et al., Paleoecology of Beringia

J. Brigham-Grette et al., Beringian Paleoenvironments

D. Greenland et al., Climate Variability and Ecosystem Response at LTER Sites

D. Kane, et al. Water Resources in Extreme Environments

C. Connor and D. Ohaire, Roadside Geology of Alaska

L. Vierick, Alaska Trees and Shrubs

J. Pojar and A. MacKinnon, Plants of the Pacific Northwest

D. Johnson, et al., Plants of the Western Boreal Forest and Aspen Parkland

R. Nelson, Shadow of the Hunter / Hunters of the Northern Forest / Make Prayers to the Raven / The Island Within

H. Brody, Maps and Dreams / The People's Land

W. Berger, Village Journey: Report of the Berger Commission on ANCSA

D. Mitchell, Sold American: The Story of Alaska Natives and Their Land

R. Arnold, Alaska Native Land Claims

D. Damas / J. Helm, Handbook of North American Indians (V.5 Arctic, V.6 Subarctic)

B. Lopez. Arctic Dreams

T. Kizzia, In the Wake of the Unseen Object

D. O'Neil. The Firecracker Boys

J. McPhee, Coming Into the Country

J. Wheelwright, Degrees of Disaster: Prince William Sound, How Nature Reels and Rebounds

K. Ross, Environmental Conflict in Alaska

R. Hudson, Moments Rightly Placed

P. Moore and A. Seed, The Ecology of Rocky Coasts

K. Mann, Ecology of Coastal Waters: With Implications for Management

USGS Professional Paper 542, The Alaska Earthquake, March 27 1964

Kachemak Bay National Estuarine Reserve, Final Management Plan

Proceedings: 2002 Kachemak Bay Science Conference (Patterns and significance of environmental change in Kachemak Bay and the North Pacific Ocean)

Selected web resources:

Alaska Atlas / US EPA

<http://www.epa.gov/ceisweb1/ceishome/atlas/stateatlas/alaska.html>

Alaska Center for the Environment

<http://www.akcenter.org/>

AK Department of Fish and Game / Kachemak and statewide

<http://www.state.ak.us/adfg/wildlife/geninfo/viewing/kachemak.htm>

ADF&G / Kachemak Bay National Estuarine Research Reserve

<http://www.habitat.adfg.state.ak.us/geninfo/kbrr/index.html>

ADF&G / Wildlife Conservation Curriculum (K-12)

<http://www.state.ak.us/adfg/wildlife/geninfo/educate/awc.htm>

ADF&G / Teacher's Environmental Resources (Links!!!)

http://www.sf.adfg.state.ak.us/Region2/ie/Teacher_Resources/html/teachres.htm

AK Geospatial Data Center / USGS, Ecoregions of Alaska

<http://agdc.usgs.gov/data/usgs/erosafo/ecoreg/ecoreg.html>

Alaska Native Regional Corporations

<http://www.kstrom.net/isk/maps/ak/alaska.html#arcticslope>

Alaska Bird Observatory, Fairbanks

<http://www.alaskabird.org/index.html>

Bonanza Cr., Poker Cr. Long Term Ecological Research, Fairbanks

<http://www.lter.uaf.edu/>

Center for Alaskan Coastal Studies, Homer

<http://www.akcoastalstudies.org/>

Climate Change and AK Vegetation, USGS

<http://pubs.usgs.gov/fs/fs-0071-97/>

Cook Inlet Keeper

<http://www.inletkeeper.org/>

Cornell Lab of Ornithology

<http://birds.cornell.edu/>

Earth Energy Systems, Brian Hirsch, Homer

<http://www.earthsys.org/>

Exxon Valdez Trustee Council – Kachemak Bay protection area
http://www.oilspill.state.ak.us/habitat/large_kachbay.html

Fox Permafrost Tunnel, CRREL, Fairbanks
<http://www.crrel.usace.army.mil/alaska-office/foxtunl.html>

Kenai Borough / Spruce Bark Beetle mitigation
<http://www.borough.kenai.ak.us/sprucebeetle/>

Murie Science and Learning Center / Denali Institute
<http://www.alaskanha.org/murie-science-learning-center.htm>

NOAA / Alaska weather and climate, +archives
<http://www.arh.noaa.gov/>

NOAA / Arctic Theme Page (great resource)
<http://www.arctic.noaa.gov/index.shtml>

Northern Alaska Environmental Center, Fairbanks-based
<http://northern.org/artman/publish/>

Pipeline info / Alyeska Pipeline Co.
<http://www.alyeska-pipe.com/pipelinefacts.html>

Taiga.net / Arctic borderlands sustainable communities and TEK
<http://www.taiga.net/>

University of Alaska Anchorage / Resources for Alaska Biologists (Links!!!)
http://www.uaa.alaska.edu/enri/aknhp_web/links/links.html

University of Alaska Fairbanks / Large Animal Research Station
<http://www.uaf.edu/lars/>

UAF / Inst. Marine Science / Kasitsna Bay Research Station
<http://www.ims.uaf.edu:8000/kbay/>

UAF / Alaska Native Knowledge Network
<http://www.ankn.uaf.edu/>

US Fish and Wildlife Service / AK Maritime Wildlife Refuge, Homer
<http://www.r7.fws.gov/nwr/akmnwr/akmnwr.html>

US FWS / Kenai National Wildlife Refuge
<http://kenai.fws.gov/>

USGS / population status of Alaska shorebirds
http://www.absc.usgs.gov/research/sis_summaries/shorebirds_sis/shorebirds_population_status.htm

USGS / Avian Monitoring and Assessment Program
<http://159.189.217.245/>

US National Park Service / Prehistory of Alaska

<http://www.nps.gov/akso/akarc/>

Equipment list:

This is an 18-day trip, and a few of these days will be spent in vans. We will have opportunity to do laundry on several occasions so please don't over pack, but do bring enough to stay dry (two sets of clothes should do it). Plan to layer clothes that dry out easily. We will travel from coastal to interior continental environments during the trip; weather at this time of year is variable. We can expect some frosty evenings, cool to hot days, rain and sun.

Sleeping bag (rated for your comfort, 20°-30°F is recommended)

Sleeping pad

Good set of raingear (something you can hike in, not rubber/plastic)

Comfortable day pack large enough for raingear, fleece jacket, and personal gear

Fleece jacket and/or wool sweater

Wind parka, if your rain jacket won't suffice

Polypro long johns

Light wool, cotton, or cotton-poly pants (whatever dries well)

Footwear:

Sturdy, broken-in hiking boots / shoes

Camp / casual shoes

Sandals if desired

Lots of socks, sufficient underwear

Towel, shampoo, soap

Sun hat and fleece hat

Light gloves

Water bottle, poly

Bug dope of choice (I never use high-test DEET)

Sunscreen, toiletry kit, small first aid kit

Camera / binoculars, accessories

Flashlight

Travel mug, plate or bowl, fork, spoon, knife (pack in checked bag)

*Please be mindful of new airline regulations. For up-to-date information about carry-on restrictions, visit the Federal Aviation Administration website at <http://www.faa.gov/>

Trip itinerary (subject to modification):

<u>Date</u>	<u>Schedule</u>	<u>Lodging</u>
May 13	Fly Boston to Anchorage	APU
May 14	USGS map store/shopping Anchorage Museum	APU
May 15	Drive Anchorage-Homer/stops/AK Maritime Wildlife Refuge visit/boat to Yukon Island	Yukon Island
May 16	Orientation: Kachemak Bay environmental history/ vulnerability assessment-shore zone characterization	Yukon Island
May 17	Grewingk Glacier hike/glacial-climate history, disturbance-succession	Yukon Island
May 18	Tide flat zonation and natural history (Marilyn Sigman, CACS)/free time	Yukon Island
May 19	Boat Yukon Island to Homer/clean up	Seaside Hostel
May 20	Fox River Valley overlook/Pratt Museum/free time/ shopping for Outdoor Education Center (OEC)	Seaside Hostel
May 21	Drive Homer-OEC/stops	OEC
May 22	Skilak Lake hike: fire, bark beetle, climate history, and human development (Ed Berg, KNWR)	OEC
May 23	Swanson River Oil Field, lowland forest ecology (Claire Caldes, KNWR)	OEC
May 24	Drive OEC-Whittier/AK Ferry to Valdez	Valdez B&B
May 25	Drive Valdez-Tangle Lakes Lodge/stops	TLL
May 26	Alpine-subalpine ecology, landscape, culture history/ Landmark Gap hike	TLL
May 27	McClaren Summit hike/free time solo	TLL
May 28	Drive TLL-Fairbanks/stops Delta River, Broken Mammoth site	UAF
May 29	UAF Museum/Tanana River geoecology	UAF
May 30	Bonanza Creek LTER/free time/ABO/NAEC	UAF

****FLIGHT INFORMATION****

BOSTON TO ANCHORAGE MAY 13, 2007

ANCHORAGE TO BOSTON MAY 31, 2007

<u>FLIGHT#</u>	<u>DATE</u>	<u>FROM</u>	<u>TO</u>	<u>DEPART</u>	<u>ARRIVE</u>
DL1749	13MAY	BOSTON	SALT LAKE CITY	4:40P	8:05P
DL1035	13MAY	SALT LAKE CITY	ANCHORAGE	9:00P	12:04A 14MAY
DL1154	31MAY	ANCHORAGE	CINCINNATI	8:40P	7:10A 01JUN
DL642	01JUN	CINCINNATI	BOSTON	7:45A	9:50A

