Diversity, Education, and Workforce Development

Fire and Ice: Navigating Variability in Boreal Wildfire Regimes and Subarctic Coastal Ecosystems
DEW core team members

- Laura Conner
  DEW lead

- Beth Leonard
  Diversity

- Megan McGinty
  Learning Sciences postdoc

- Courtney Breest
  UAA/UAS Coordinator

- Joanna Young
  Girls on Water/ Girls in the Forest Director

- Sarah Clement
  Girls on Water/ Girls in the Forest Coordinator
Goals
Diversity, Education and Workforce Development

Goal DEW1
Build key competencies among stakeholders to address ecological change.

Goal DEW2
Build a diverse pool of STEM learners and workers in Alaska.

Goal DEW3
Increase capacity for F&I science and teaching among UA faculty and students.
### GOAL 1: Build key competencies among stakeholders to address ecological change.

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<thead>
<tr>
<th>Objectives</th>
<th>Planned activities</th>
<th>Accomplished to date</th>
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<tbody>
<tr>
<td><strong>Objective 1.1</strong></td>
<td>• Create and implement after-school activities with partners</td>
<td>• Lessons have been co-developed; piloting underway</td>
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<td>Increase K-12 student competencies in systems, values and futures thinking and student knowledge about ecological change related to F&amp;I themes.</td>
<td>• Hold F&amp;I teacher workshops</td>
<td>• Teacher workshop planned for summer 2020; also working with After School Alliance on workshops</td>
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<td><strong>Objective 1.2</strong></td>
<td>• Include F&amp;I content and themes in UA courses</td>
<td>• 6 courses included F&amp;I content in 2019-20 academic year</td>
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<td>Prepare UA students with knowledge and skills related to systems and futures thinking.</td>
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Afterschool activities

• DEW is co-developing systems-based fire ecology afterschool content

• Partners serve diverse school populations
  • 21st Century Learning Programs (Fairbanks and Juneau): low-income, low-achieving students
  • KBNERR (Homer): rural audiences
  • Campbell Creek (Anchorage): ethnic and income diversity
Fire and Ice content in UA courses

Geoscience Applications of Remote Sensing (UAF)
- Incorporated remote sensing of wildfires

Principles and Techniques of Wildlife Management (UAF)
- Addressed wildfire impact on moose, caribou and other ecosystem services
- Completed implicit bias exercise to facilitate discussion of gender issues in the field

Human Dimensions of Wildlife Management (UAF)
- Included presentation on human development in wildlife refuges and facilitation of land management issues

EPSCoR seminar (UAF)
- Students presented project data and discuss related papers

Environmental chemistry (UAA)
- Students analyzed F&I stream data

Earth and Environment (UAS)
- Students visited F&I field site and discussed F&I data

Instructors of F&I courses
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| **Objective 2.1**  
Increase the success of diverse UA undergraduates as they pursue STEM degrees, and support diversity in Fire and Ice research hires. | • Support peer tutoring  
• Hold difference-education events  
• Conduct research into undergraduate STEM identity  
• Share STEM success stories  
• Support diversity in research hires | • 4 EPSCoR-funded tutors reached 50 different students in multiple sessions  
• Difference-education event reached 40 people  
• Educational research underway  
• Success stories: 2 complete, 4 under development  
• Hiring plan in place |
| **Objective 2.2**  
Increase interest in, and identification with, science among pre-college girls. | • Hold Girls on Water program (Years 1-3) and Girls in the Forest program (Years 3-5) | • Held Girls on Water program in summer 2019 with 9 participants |
Partnering with UAF Student Support Services (SSS)

- SSS provides needed support for first-generation students
- We can expand the reach by partnering
- DEW supported four SSS tutors who worked with 50 unique students through 171 appointments
- DEW partnered with SSS to offer difference-education intervention (e.g. Stephens et al. 2014)
- This Fall, extended partnership to UAA
Educational Research

- DEW project examining how students simultaneously negotiate first-generation and science identities
- Project uses qualitative and quantitative methods
- 19 students interviewed
- Conference proposal submitted
- Very preliminary findings indicate that students bring science-based strengths

A student takes part in a drawing exercise as part of the interview process

Megan McGlynn/Alaska NSF EPSCoR
# Alaska NSF EPSCoR Diversity Hiring Plan

## Identify Position
- Develop position description, include DEI statement
- Keep position requirements as broad as possible
- HR Approval to advertise

## Assemble Search Committee
- Ensure diversity on the committee
- Provide implicit bias training to committee
- Hold DEI discussion with committee

## Advertise
- Use DEI priority list
- Listservs, professional networks
- Have search committee share among colleagues

## Interview Questions
- How has the candidate contributed professionally to DEI
- How will they contribute to DEI at UA
- HR Approval of interview questions

## Selection and Post-hire Process
- Review implicit bias training with committee
- Department Approval of hire selection
- Onboarding and mentorship
• Nine 16 to 17-year-old girls from across Alaska participate in a 12-day kayak trip in Kachemak Bay

• Undertake science experiments related to coastal margins

• Such programs impart “tacit knowledge” associated with field science (Carsten-Conner et al. 2018)

• In 2019, high participant satisfaction scores (mean of 3.9 on a 4 point scale)

• Outcome evaluation underway

“The best part of Girls on Water was the positive empowerment of women mixed with the new skills we were learning and the beautiful places we were exploring. I think I can safely say this has been one of the most inspiring adventures of my life so far.”
Expeditions @ Home

• In partnership with Inspiring Girls branches at OSU & Canada

• 73 participants from around the US and Canada; 3 graduate student/educator instructors hired

• Two levels of engagement
  • Month-long seminar series (37)
  • Six-week intensive (36)

• Field guide and activity box mailed

• High participant satisfaction scores

“I learned that science is all around us, even in our backyards and that all we have to do is be willing to be curious and discover new things around us!”
Girls in the Forest – 2021-2023

- Nine 16 to 17-year-old girls from across Alaska
- Will explore boreal wildfire and forest ecosystem
- Similar programs in climate change-impacted landscapes support environmental identity shifts (Young et al., 2020, in review)
**GOAL 3:** Increase capacity for F&I science and teaching among UA faculty and students.

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| **Objective 3.1** Provide mentorship, training and travel opportunities to F&I faculty and postdocs. | • Mentoring workshops and postdoctoral mentoring  
• Travel grants                                                           | • 1 workshop held for 20 people; 1 networking event; UA-wide postdoc mentoring group met four times  
• 23 travel grants awarded, as well as funds for Western Alaska Interdisciplinary Science Conference travel |
| **Objective 3.2** Increase UA faculty capacity to teach diverse students. | • Hold diversity-related workshops  
• Hold teaching and learning-related workshops                             | • Two Indigenous Knowledges workshops held for 52 people  
• Stereotype Threat workshop held for 19 people; Alan Alda Science Communication training held for 32 people |
Mentoring at UA

• Mentoring aids retention and preparation at all levels
• Strong interest in strengthening mentoring culture at UA
• DEW Mentoring Workshop introduced key ideas (networks, managing up and down, and advocacy)
• DEW formed UA-wide postdoctoral mentoring group
• SACNAS chapter also being explored
Indigenous Knowledges Workshops

- Events co-led by Beth Leonard and Ocean Mercier
- Focused on respectful engagement of indigenous communities in teaching and research
  - Co-development
  - Differing worldviews/epistemologies
  - Appropriate practices
- Workshops highly valued by participants
- Roundtable session proposal accepted for International Congress of Qualitative Inquiry conference in Illinois—now developing a full paper
• DEW educational modules and teacher workshops based on F&I themes
• Girls on Water incorporates F&I themes and takes place in F&I project areas
• DEW personnel working directly with researchers:
  • Science pubs
  • Hands-on models and activities
  • Networking with teachers in Juneau
Integration of Research and Education: KBNERR

- Knowledge Exchange through the Marine Ecosystem Workgroup
- Assessment of local educator needs, planned co-development of coastal lessons with our core DEW team
- Thematic integration of EPSCoR research projects with long term monitoring and local engagement

Girls on Water activity at NOAA/UAF Kasitsna Bay Lab, which is also a staging area for Coastal Margins research
Diversity, Education, and Workforce Development

Seed Grant presentations
DEW Seed Grant

Fostering Science

Expanding Access to Science Camp to Youth in Care of the State

Dr. Christa Mulder, Dr. Katie Spellman, Dr. Teresa Hollingsworth, Natalie Schuldt, Kara Kornhauser, Emilia Grzesik, Dr. Steve Decina, Theresa Villano, Jamie Hollingsworth, et. al
Proposal Objectives

1) Provide extended opportunities for returning campers

2) More deeply integrate arts into the camp

3) Support and train graduate students in science education
Fostering Science

Outcomes

1) Virtual Camp 2020 “Be-Leaf in the Future”
Fostering Science

Outcomes

2) Artist in residence, Natalie Schuldt
Outcomes

3) EPSCoR fire fuels research provided extended learning and new science role models
Outcomes

4) Two graduate students mentored in science education
Student-centered leadership for a newly established citizen science beluga monitoring project in Cook Inlet, Alaska

Alison M. Gardell (PI)
UAA/KPC and UW Tacoma (present)

**Who?** Alaska Beluga Monitoring Partnership

**What?** A collaboration between several organizations that facilitate citizen science shore-based beluga monitoring.

**When?** Fall 2019 and Spring 2020

**Where?** Southcentral Alaska’s Cook Inlet

**Why?** Cook Inlet beluga whales are *critically* endangered.
Student-centered leadership for a newly established citizen science beluga monitoring project in Cook Inlet, Alaska

Alaska EPSCoR DEW Project Objectives:

1) To provide students with opportunities to gain paid research and monitoring experience collecting seasonal beluga habitat use data and capturing high resolution images for use in ongoing photo-identification studies.

2) For Kenai Peninsula College to serve as an AKBMP partner facilitating local citizen science opportunities for communities in central Kenai Peninsula.

3) To establish a student-centered Cook Inlet beluga conservation project at Kenai Peninsula College.
DEW Seed Grant Activity Timeline

• KPC named a PARTNER for AKBMP (Jan 2020)
• Three KPC students were recruited and hired as undergraduate research assistants (Feb 2020)
  • Teresa Becher, Kenya Pace, Carrie Woerman
• Teresa Becher selected as first ever Kenai Coordinator for AKBMP
• Student fieldwork commenced in mid-February 2020
• AKBMP in-person orientation for citizen scientists held at KPC (March 4)
• Preparation for participation at “One Health, One Future” conference (March 11-14 at UAF: Postponed)
• First beluga sighting in Kenai River! (March 22)
• All non-essential research activity (lab- and field-based) halted at UAA (March 28)
• AKBMP partners collectively decided to cancel Spring 2020 Monitoring Season due to COVID-19 (April 1)
Spring 2020 Virtual Activities and Future Work

- Coordinated “Wildlife Wednesday” seminar series with AKBMP co-partner Alaska Wildlife Alliance
- Co-presented first ever virtual seminar on beluga monitoring with KPC student, Teresa Becher
- Collaborated with City of Kenai to use existing camera technology for virtual beluga monitoring: https://www.kenai.city/dipnet/page/south-beach-north-end
- KPC student researchers conducted virtual monitoring sessions and analyzed Fall 2019 monitoring data

Looking Ahead…

- KPC will remain a partner of the Alaska Beluga Partnership
- Passed on partner leadership responsibilities to Professor Deborah Boege-Tobin at KPC’s Kachemak Bay Campus
- Facilitated the continuation of a student-filled Kenai Coordinator position and student internships (BIOL A495A)
Diversity, Education, and Workforce Development

Digital Storytelling: Bridging a Gap in Place-Based Science
Partnering with Mount Edgecumbe High School (MEHS) Students

• Students will produce Fire & Ice themed digital stories using cellphones as tools & integrate these on an interactive map to show where the stories are from.
The stories will be from the students’ homes and the hope is that during the Christmas break they will collect materials to use for their stories. Those living in interior villages having “fire” related stories and coastal villages “ice” related stories.
Engaging Pedagogies for STEM Students Studying Ecological Change in Alaska

PI: Shannon Atkinson DeMaster, PhD
Professor, College of Fisheries and Ocean Sciences, UAF

Collaborator: Ms. Kristen Wells, MA
Science Teacher, Thunder Mountain High School, Juneau School District
Goal: Use interesting and exciting STEM classroom activities as workshops targeted at high school students in southeast Alaska, especially Alaska Natives and other under-represented groups.

Aim: Enhance participation in STEM fields by under-represented groups to diversify and increase the future workforce in Alaska.
Workshop 1: Anatomy and Physiology of Alaska’s Culturally Important Marine Mammals

Humpback whale flipper dissection
Attendance 49 students
Workshop 2: Environmental Applications of Drone Technologies

COVID-19 Style       ---       Attendance 37 students
Participants and Demographics

- TMHS has approximately 11.35% Alaska Natives and 20.5% Pacific Islanders or students who come from multiracial households in its student population.

- 43 of the students were enrolled in a dual credit course (BIOL 193) through the University of Alaska Southeast.

- Timing of Workshop 2 was a welcome addition to the online learning that was still becoming the common form of COVID-19 online school.
Equipping Educators to Empower Children as Environmental Stewards
ED 693: Children as Cultural Change Agents
A Collaborative Class Project

Carie Green, Ph.D.
Associate Professor
UAF School of Education
Final Collaborative Project

- Participatory methods to honor children’s voice and perspectives
- Localized Environmental Stewardship
- Three sites
- Building adaptive capacity for future change
Three Sites

Kenai
November 27
15 Kindergarteners from a Science and Art Charter School
Sara Boersma, Kindergarten teacher
Emma Heslop, 2nd Grade Teacher, Fairbanks

Fairbanks
November 11, 12, 14
15 Preschool Children, Bunnell House Early Childhood Lab School, UAF
Maggie Blake, PPP Grad Student, Fairbanks
Kelly Kealy, Grad Student, Fairbanks

Scammon Bay
November 14, 15
5 Seniors (Capstone Project)
15 Kindergarteners
Holly Williams, High School Teacher
Kyle Farris, PPP Grad Student, Fairbanks
How do Alaskan children perceive and enact environmental stewardship in their community?
Themes of Environmental Stewardship

- Picking up trash and recycling - localized concern varied
- Care for animals
  - "feeding them"
  - "cleaning up so no animals get our stuff"
  - "shooting animals that are sick"
  - "Looking for mouse food"
- Care for other humans
- Care for plants
- Clearing snow

Spatial Autonomy (Being outside) influenced children’s environmental stewardship behaviors.
Outcomes:

• Allowing children to take the lead was at times challenging
• Professor stepping back to let graduate students to take the lead
• Children’s perspectives can help inform education and action in a community.
• Accepted book chapter co-authored with graduate students:

  Alaskan Children’s Perspectives of Environmental Stewardship
  in a Changing Arctic Environment

in “Education for Sustainable Development in the Arctic” by the Arctic Frost Network.