I. Introduction:

For centuries Native American cultures have had a unique understanding of the complexities of human–interactions with earth systems. This perspective is important to the geoscience field. However, Native Americans are historically underrepresented in geoscience degree programs and careers. The reasons for this lack of participation are complex and differ on case-by-case bases, yet are important to understand in order to employ strategies that will increase students’ interests in geoscience careers.

School culture and curricula have a strong influence on students’ decisions for the future. Integrating Earth Science into public schools through place-based and culturally inclusive methods has potential for engaging students and increasing underrepresented populations’ participation in geoscience. However, many schools do not teach Earth Science content passed 8th grade and few educators have a firm background in geoscience. In addition, Earth Science is often taught in the absence of other STEM subjects despite its interdisciplinary nature.

II. Study Setting:

- Hannaville Potawatomi Indian Community is located in Michigan’s Upper Peninsula in the Cedar River Watershed
- Nah Tah Wahsh (Soaring Eagle) is a community school established in 1976 & serves both community students and non-Native Americans from the surrounding area.
- The school building includes K–12 grade levels, youth service programs, child care & adult education.
- The scope of this study is focused on middle school & high school geoscience education at Nah Tah Wahsh school and Hannaville Youth Services.

III. Research Questions:

How does integrating interdisciplinary community-based investigations into existing STEM programs affect:

- Earth Science literacy among Nah Tah Wahsh students & teachers?
- Student attitudes towards geoscience-related careers?
- Partnership building between the school and community groups?
- Awareness of ongoing community watershed management efforts?

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<tr>
<th>Outcome Measured</th>
<th>Mixed Method Design</th>
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<tr>
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<td>Pre Post Student Test</td>
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<td>Geoscience Knowledge</td>
<td>X</td>
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<td>Scientific Inquiry Skills</td>
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<td>Geoscience Attitudes</td>
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<td>Watershed Management</td>
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<td>Partnerships</td>
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IV. Lesson Development Strategies: Turning Challenges into Opportunities

Teacher Driven Lesson Development

Teacher Professional Development

Partnership Building

Student Centered, Field-Based Investigations

Community Focused & Culturally Relevant

Interdisciplinary Earth Systems Lessons

V. Pilot Study: Summer Youth Programs 2013

- Experimental Design with 9–12th graders (n=17)
- Experimental Group participated in curriculum that included:
  - Inquiry-based investigations focused on local water resources & hydrologic process
  - Student developed and taught STEM lessons to K–6th grade Kut Zone participants
  - Creation of Water Awareness Videos for community members

VI. Results

- Deeper understanding of water pathways & how human actions can affect water quantity
- Increase awareness of Hannaville careers & infrastructure
- Improved confidence & skills in communication & education
- No measurable changes in Student attitude towards science

-Expressed Interest in
  - Hands-on activities
  - Outdoor explorations
  - Student Centered Learning
  - Working in Groups
  - Students would like
    - Focus & connection to Biology
    - Fun (and less school)

VII. Next Steps in Lesson Development

Redesign lessons for next class

Data Analysis

Implement Lesson

Co-design lesson

Provide needed teacher training

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