Dear Earth and Environmental Sciences Faculty,

Thank you for your response to our antiracism action letter. We recognize the process of enacting change in our department and our university will be a continual project, and we wanted to continue this process by responding to your letter. We hope that as we move through this process, we can keep the lines of communication open and facilitate a dialogue between students and faculty. We were encouraged by your thorough response to our original letter; however, we feel that there is more work to be done. We have noticed and appreciate programs that the department has already set in action, such as the planned department presence at SACNAS; the department's participation in the AGU Bridge program; the elimination of the GRE in the graduate application process; and the consideration of community-engaged research and scholarship in the tenure review process. Still, we feel that the faculty response neglected some important issues, either through the omission of specific plans to remedy them or by characterizing them as impossible to act on in the short term.

The purpose of this letter, then, is to highlight these issues and push for concrete plans that can be implemented in the near future. It serves both as a response to the faculty letter and as a further articulation of our experiences in the department. While we as a student body understand that we must be a part of any change enacted in the department, we ask for a response from the faculty that goes beyond statements of support. We ask that all faculty be involved in planning these changes and that they take part in the action alongside students. We emphasize that this work must be taken on by all faculty; it cannot just fall on the shoulders of a few overburdened allies. The remainder of this letter highlights specific problems we feel deserve a more detailed response in an attempt to move our conversation around these issues towards a more organized, action-oriented format.

We ask that the faculty begin to incorporate issues of Indigenous sovereignty and History and Environmental Justice (EJ) into the Earth Science curriculum, highlighting the ways these issues intersect with more traditional geoscience subjects. We ask that the faculty push themselves toward more inclusive teaching, especially during times when students must face the challenges of online learning. We ask that the department continue to overhaul its approach to field courses with the aim of removing the barriers these courses impose on many students. Finally, we ask that the faculty communicate with the students as they move forward with these changes, ensuring that all members remain a cohesive unit. **We hope to discuss this letter with you during an upcoming facilitated conversation between students and faculty and work alongside you as we continue to try and build a more equitable department.**

1. (Indigenous) EJ Issues, Native Histories and Tribal Sovereignty

We are disappointed that the department believes the inclusion of Indigenous sovereignty and environmental justice (EJ) in its curriculum and degree programs is impractical and impossible at this time. We recognize that these changes require considerable dialogue and time, but we believe this issue should be top priority within the department regardless. We recognize that all faculty are significantly stressed and exhausted from the COVID-19 pandemic, particularly those who have taken on additional family care responsibilities. We also recognize that issues of EJ have many specificities resulting from complex (albeit non-mutually exclusive) histories of settler colonialism, anti-Blackness, and other forms of white supremacy that require critical analyses. Still, we ask *faculty* to commit to the following goals now and **take action within their current abilities to learn more about EJ issues and struggles, build relationships with scholars across the UMN system with relevant expertise, and make small changes to their courses and our degree programs each year** just as they regularly update courses with new scientific advances.

Our Responsibilities on Dakota Land

The University of Minnesota Twin Cities occupies the traditional (and contemporary) homelands of the Dakota people as a land-grant university. The establishment and the functions of this institution, including our department and the Minnesota Geological Suvery, were made possible through legacies of settler colonialism, land theft, genocide (and dispossession) of the Dakota, the Očhéthi Šakówiŋ, the Ojibwe and other American Indian tribal nations and communities who have called Mni Sota Makoce (Minnesota) home (Lass 1992; Lee and Ahtone 2020). Furthermore, our department, the institution and the formal geoscience discipline, were made possible through histories of anti-Black state violence: American University and Collegiate systems were and are still today complicit in regulating, maintaining, and defending settler property that was acquired through the enslavement of Black people, the theft of Native land, and the genocide of Indigenous peoples (Wilder 2013; Yusoff 2018). In addition to occupying stolen Dakota homelands, our department is situated in a settler colonial nation-state that enacts systemic and militarized forms of anti-Black violence and disproportionately subjects communities of color (particularly BIPOC communities) to the health hazards of environmental pollutants and toxins.

In the wake of George Floyd's murder, countless historical (and ongoing) struggles for Black life and liberation and the recent coup attempt at the Capitol by nationalist neo-Nazis, **we find it imperative and non-negotiable that our department reconcile its place as a beneficiary of white supremacy, anti-Black violence and the dispossession and genocide of Native peoples**. Furthermore, the legacies and day-to-day activities of the UMN TC, our department, and the MGS still remain predicated on these inseparable histories. As members of this land-grant university and in recognition of the how we are implicated in these histories and legacies of violence (i.e. the ways that we benefit from and/ or participate in the erasure of these histories), we share imperative obligation(s) to the Dakota, whose lands were stolen, obtained through especially violent, fraudulent means and are now currently maintained for the purposes of upholding settler interests and sustaining the UMN TC's functions. For these reasons and in response to faculty concerns over the logistics and (in)feasibility of implementing these changes, we maintain our initial demands and visions for more inclusive and critically informed

teaching strategies, curriculum, pedagogies, research methods and relationship-building practices that account for and (re)center Native histories, issues and epistemologies, and just as importantly (re)prioritize our relations with Minnesota tribal nations. We will continue to seek these changes as long as our department benefits at the expense of the Dakota, the Očhéthi Šakówiŋ and the Anishinaabe peoples.

Taking Action

In this section, we offer some proposals and possibilities to both address faculty concerns over the perceived *impracticality* and/or *inability* of (re)centering or including course material on Native and Black EJ struggles, histories and issues and further advocate for more critical and informed departmental curriculum, functions and teaching practices. **We request that our faculty become even more informed about Native and Black histories, issues and EJ struggles AND in turn hold other department members and students accountable for doing the same.** We further suggest and ask that this be done through **increased faculty collaboration, communication and networking with American Indian, First-Nation and other Indigenous scholars, scientists, experts and activists** who are currently and for decades have been doing cutting edge (interdisciplinary) work on the intersection(s) between Native sovereignty rights, histories of settler colonialism, geography, the epidemic of violence against Native women in the US and Canada, Native traditional ecological knowledge systems (TEK) and climate change, environmental policy, Native EJ struggles, biotechnology (and sustainable energy) development projects and other environmental science-related issues. We call for **increased coordination and communication with the UMN TC's Department of American Indian Studies**, whose members not only specialize in and teach undergraduate and graduate courses on Native history, Indigenous TEK systems, Federal Indian policy, and Indigenous environmental issues but also participate in and organize talks, seminars and workshops that foreground this work.

We anticipate that this will not only solve the issue of logistics and inability to teach about these issues within the department but also provide faculty and other department members opportunities to (re)tend to community and university relations and become even more informed about or familiar with these issues in ways where these complicated (and often fraught) issues can be critically situated and done justice by experts on those topics. These efforts will in turn further improve upon, critically inform, and/ or (re)shape Earth Science methodologies, practices, pedagogies, curriculum and work. At the very least, we envision that our **department members will seek out resources and opportunities to become more informed about the history of Mni Sota Makoce and the land which the UMN TC occupies** AND just as importantly, **hold each other and our students accountable for doing the same through promoting, sharing and circulating relevant events, resources and material.**

We envision that faculty members will be committed to:

1. Sharing and promoting resources that include (but are not limited to) UMN TC Dept. of American Indian Studies classes and readings (particularly on Dakota and Očhéthi Šakówiŋ histories) AND that this material be promoted/ shared in EarthSci curriculum, department newsletter(s), on the new department website and/ or through department-wide or in-class announcements.

2. Building *meaningful* partnerships across the UMN TC campus, the greater UMN system and the wider Twin-Cities community with experts on Indigenous EJ-related issues, Native histories and general EJ-related struggles.

3. Adjusting curriculum in ways that (re)center and engage with *tribally* and/ or *nationally specific* Native epistemologies, histories and EJ-related issues.

4. Attending seminars, workshops and/ or informative events on issues relating to decolonization, Indigenous EJ struggles, Indigenous TEK systems, tribal sovereignty and Native history, particularly but not limited to events hosted by the Dept. of American Indian Studies and the Institute for Advanced Studies.

5. Recognizing and explicitly addressing the values embedded in the science we teach and their material implications for BIPOC communities. This might look like critically assessing the legacy of the Army Corps of Engineers within the contexts of Environmental (In)justice towards impacted tribal nations or the development of more “sustainable” energy biotechnology with regards to Indigenous communities in introductory ESCI course labs and case studies.

6. Issuing/ providing comprehensive land acknowledgements that include Indigenous place names, histories, and current EJ issues in preparation for and/ or during field trips.

7. Further explore, research and acknowledge the intersections between Geoscience and EJ, potentially starting with our suggested reading list (Appendix).

2. Inclusive teaching

As stated in the faculty response letter, the department encourages faculty to proactively use student-centered pedagogy and recognizes participation of faculty members in CEI trainings, consultations and workshops in annual reviews. A growing body of literature demonstrates that **inclusive teaching and other student-centered learning practices improve learning for all students and, critically, can help to reduce the achievement gap for students from underrepresented groups.** In order to fulfill the department's vision statement of being "global and regional leaders in Earth Science research and education" we must commit to inclusive teaching practices in order to enhance diversity, equity, and inclusion in our department. The January Classroom Inclusivity Retreat is a meaningful step that builds momentum for regular inclusive teaching seminars and workshops in this department. However, there is also an individual responsibility on each faculty member, staff member, and instructor to actively practice inclusive teaching. Based on our experiences in ESCI classes, STEM education literature, and CEI teaching workshops, we recommend the practices listed below to help foster more inclusive classrooms, both online and in person, as well as a more inclusive department.

1. Take responsibility for routinely practicing inclusive strategies in the classroom (and department) by having an open and welcoming attitude with students. Acknowledge that you, the instructor, will need to go beyond "doing what worked last time" in a class to add inclusive teaching practices. Be aware of trauma and poverty informed pedagogy and be ready to refer students to the resources available on and off campus to assist students.
2. Interrogate your content for bias, colonialism, and racism. Include the intersection of science and society, particularly environmental justice in class content (see section 1).
3. Use good course design principles by aligning your course (e.g. CEI's aims, assessments, activities, atmosphere):
    a. Academically: create clear, well crafted learning objectives (aims) (both for content mastery and skills mastery) for your course, make sure all classroom activities and assessments (exams, assignment, projects ect.) align with the learning objectives and scaffold big projects over the semester. Utilize the CEI consultations for help designing and implementing these changes.

    b. Pedagogically/Inclusively (atmosphere): incorporate diversity in your learning objectives, make an inclusive classroom environment, and incorporate content that includes diverse perspectives and have options for diverse assessments 4. Have a high quality syllabus that is inclusive, sets clear expectations, set an example of the tone/atmosphere for the class and meets all UMN requirements
    a. Examples of good practices are: Use a personal tone with first person pronouns and address the students (e.g. "you") directly, include the required disability statements and have a personal diversity statement that reflects your personal progress with diversity and inclusivity and how you will value diversity in the class.
5. Accept all students for who they are and their lived experiences and interests at the intersection of science and community (local and global). Provide space for students to exhibit their lived knowledge into their classroom work (DOI: 10.1002/tia2.20071). (also related to section 1)

Since outlining the above practices, the 2020 Higher Learning Commission, Annual Progress Reports (APR) for our department was sent out and Section II of the APR outlines some specific actions that are very similar to or would help implement the above practices we suggest as ESCI students. The actions listed in the APR are from a broader student survey that summarizes what was effective for online learning last semester. We affirm the report statement:"it is worth listening carefully to [the APR] recommendations for short- and long-term remote learning and perhaps adopting them as guidelines for instruction within our department."Additionally, we provide the above practices, listed actions below, and links in this section as resources for all instructors to utilize.

While some of these suggestions from ESCI students and Section IIB of the APR will require a more systematic (and time intensive) interrogation of course content and teaching strategies, many actions can be implemented this semester, and are particularly important to enact while teaching online. Progress can be made if instructors commit to trying at least a few of the following for Spring 2021 (also see the APR section IIA):

- Acknowledge that we are still in an extraordinary, difficult situation and establish a spirit of empathy and collective learning
- Be an approachable, helpful, empathetic instructor
- Prioritize student learning over covering content by focusing on the core ideas of the class
- Ask for student feedback (early and mid semester) and then communicate with students about how you will act on their feedback and why you cannot if you cannot
- Add in flexibility for all students in some deadlines, attendance, assessments (e.g. drop one assignment per semester) ect. without asking for any documentation/verification or reasoning
- Provide resources for students to learn the material and predictive for an exam. (e.g. practice problems with solved answers, study guides, learning aids like e-flash card decks, practice exams, review sessions, working through problems in class)
- Include rubrics for assessments that are clear, concise and that align with the learning objectives
- Be aware of and avoid cognitive overload of students (amplify essential content, communicate consciously, use active learning, allow collaboration among students)
- Increase accessibility by using both visuals (diagrams and charts) and verbal descriptions including "thinking out loud" through a worked problem and descriptions of the images, charts and graphs.
- Address current events with your class and acknowledge how events may be affecting student stress and productivity.
- Plan to be flexible with the class schedule, content and assessments to accommodate and reduce student stress
- Incorporate informal icebreakers and conversational check-ins the first few minutes of class to build a community and familiarity among students and instructors. Consider adding breakout rooms, doing example problems solved as a group with annotations, or quick polls within class time to encourage participation online.

While these actions and responsibilities apply to individual classes and instructors, we, as a department community, can support students by continuing to attend seminars/retreats in order to learn how to implement inclusive teaching practices, incorporate Native perspectives and environmental justice content into classes, and discuss the development of inclusive field courses.

3. Departmental Field Experiences

We would first like to acknowledge the hard work of the Undergraduate Studies Committee and the Field Committee to provide innovative field-based experiential learning to students. Experiential learning is an extremely important part of geoscience curriculum, and field courses have historically been an opportunity for students to experience geologic concepts "in their natural habitat" and bring the equations and theory they have learned in the classroom to life in the field. **While field courses are effective at providing these experiences for many students, the physical requirements, location, and environment of the currently offered field courses create fundamental inequities that directly contribute to the lack of diversity in the geosciences.** We feel strongly that it is essential to address these inequities, and hope that this can be the beginning of many discussions on these topics so we can move towards our mutual goal of providing valuable experiential learning opportunities to all students in the Department. We therefore divide our thoughts on field experiences into two parts. **The first part is "immediate" goals that we would like to work towards meeting within the Spring semester so that they can impact the upcoming Summer 2021 Field courses.**

We propose directly linking to the summer field course page on the website to the major/minor page on the website. We recognize (and appreciate!) the work that is ongoing in the Field Committee to address many of these topics and hope that these suggestions can provide additional ideas and guidance. This page is currently undergoing revision, and **we recommend it include the following information:**

- Learning objectives for each course, including:
  - Summary of skills that will be mastered by the end of each course.
    - Recommended courses to be completed or skills to be mastered *before* each field course.

Explicit description of costs (including "hidden" costs like gear purchases) as well as● financial aid and scholarship information.

- Link to gear list being collated by undergrad Geoclub members.
- Link to scholarship information elsewhere on Department website.
- Link to gear rental and purchase opportunities through the University and Department.

- The physical requirements and training recommendations (e.g. weight of gear carried, distance hiked, altitude) required for a successful experience.
- Provide resources for students to gain outdoor experiences and confidence prior to the start of the course.
  - Trips and clinics offered by UMN Outdoor Center.○
  - Link to REI intro camping resources or other sources.
- Specific information about the housing and dining provided during each course, including:
  - Explicit description of the process of grouping students for housing purposes that is sensitive to the identity and desires of transgender, non-binary, and genderqueer students.
    - Explicit description of accommodations made for dietary restrictions.

    - Explicit description of accommodations made for religious or cultural observances.
- A statement that acknowledges the risk of identity prejudice against certain individuals in the fieldwork setting, and explicit description of the procedures by which these incidents can be reported and will be dealt with.
    - Link to the Department Field Code of Conduct.
- Description of the formalized process for requesting to participate in an alternate program.
    - Deadline for submitting a course for approval.
    - State general requirements of the alternative program with respect to length, rigor, and material covered.
    - List alternative projects or programs for students who were unable to participate in the residential field course(s) currently offered.

We feel that publicizing and sharing this information with undergraduates would improve the preparedness of students entering the Department and help demystify the "field experience." Explicitly stating the learning goals of each field course will streamline approval of alternative courses and provide guidance for students who need to request an alternate project. **We request that the Field Committee familiarize themselves with the strategies for minimizing risk during fieldwork set forth in Demery and Pipkin (2021) and implement these strategies within each field course's design.** (Demery, AJ.C., Pipkin, M.A. Safe fieldwork strategies for at-risk individuals, their supervisors and institutions. Nat Ecol Evol 5, 5–9 (2021). https://doi.org/10.1038/s41559-020-01328-5)

We request the Field and Undergraduate Studies Committees create a procedure for resolving an "incomplete" field course. These alternatives, communicated to students ahead-of-time, help provide reassurance to students who may become injured or have a family emergency (for example), and create less burden on the field course instructors and TAs who would otherwise have to develop these procedures on their own. We request that the Department create a fund to assist students with unforeseen costs when they leave field courses due to the above described or other emergencies.

We are disappointed in the response from the Department with respect to the creation of a "gear closet" that would provide gear for field trips, field courses, or research. We do not feel that general support for this idea with vague provisos for someone coming up with a "stable plan" is an adequate response. We therefore propose that the oversight of the gear closet be made a graduate student job. This job would be structured similarly to how the Outreach Coordinator and Student Symposium jobs are allocated, with overlapping two-year commitments for two to four graduate students that creates continuity within this position. We appreciate and are encouraged by the DEI Committee's work with Columbia to develop a pro-deal for purchasing discounted gear as well as communication to students about the opportunity to purchase or rent gear through the UMN Outdoor Center. **We request that information about these opportunities be prominently posted within the Department and on the website, and regularly advertised to students participating in field experiences.**

As a long-term goal for the Department, we would like the Department to consider the efficacy, accessibility, and equity of exclusively summer-based, residential field courses versus remote or local alternatives, and alternatives that occur over winter or during the semester. **Acknowledging the financial and logistical complexities involved, we request that the Department prioritise the development of field experiences outside of traditional residential field courses, such as class or departmental field trips or additional courses.** We are excited to collaborate within the Department to develop field skills course(s), shorter camping trips offered department-wide, and other opportunities for experiential, field-based learning. The Urban Field Course currently being developed is an excellent example of the kind of innovation that we see as an opportunity to expand the participation of all persons in geosciences. This kind of non-residential, "workday" field course broadens participation by allowing participants to continue part-time work in the evenings and weekends, care for their families, and continue to participate in cultural and religious events in their communities. We request that the department continue to support the development of this course and proactively seek out the resources and partnerships necessary for it to be successful. The virtual field courses developed for Summer 2020 are another example of the kind of innovation we are excited about, and we hope that the Department continues to develop and offer GIS-based, digital "field" experiences, both in individual courses and as part of the summer field courses. Finally, we would like the Field Committee to consider allowing undergraduate students to participate in NSF-funded Research Experiences for Undergraduates (REUs) or other formal research experiences by creating flexibility in field course scheduling and implementation. These REUs can be essential experiences for the undergraduates that are interested in pursuing graduate education in the geosciences, and are frequently designed to provide the structure and mentoring experiences that have been shown to increase the retention and success of geoscience students.

We applaud the efforts to make Hydrogeology Field Course accessible for those with physical mobility disabilities and hope that similar changes can be made to the Introductory and Advanced Field Courses so that people of all outdoor ability levels and confidence can experience these courses and gain the skills and knowledge taught. Further, **we hope that the current curricula for these courses can grow to acknowledge the colonialist mindset that underpins the geosciences and explicitly include Native traditional ecological knowledge systems as part of the coursework, as described in the first section of this letter.** These innovative learning experiences would place the Department at the forefront of experiential geoscience pedagogy and are essential for the development of a more diverse, inclusive, and equitable field of science.

4. Departmental Communication

Widespread communication efforts are key to an inclusive and successful Departmental community. **However, success in our department often depends on access to unwritten knowledge and undocumented resources.** Many of these issues include lack of understanding about funding, fellowships, or details about events that are usually disseminated by word of mouth. This unwritten knowledge can act as a barrier for many, particularly undergraduates and new students, while inconveniencing and slowing knowledge transfer for those involved in these resources. We provide a list of areas where written communication could be improved in the Departmental Communications Appendix.

We acknowledge the ongoing hard work to update the Graduate Student Handbook, but urge the completion of this update as soon as possible. The current system puts unnecessary work on graduate and undergraduate students to find this unwritten information and communicate needs, as well as on administrative staff who spend excessive time resolving confusion and fielding questions. **We identify three specific communication gaps within our department: the prevalence of undocumented resources, a lack of formalized updates particularly with regard to departmental committees, and an inability to fully reach undergraduates.** We propose that these issues may be addressed through implementation of departmental guides, formalized semesterly department update emails, and consistent communications geared specifically to undergraduates and new majors, as outlined below. We are open to further discussion about other ways to disseminate information more frequently and consistently. We acknowledge the ongoing work to centralize information through a departmental intranet and other efforts, and affirm that this is a great start.

As a solution to many of the knowledge gaps created by lack of understanding of departmental procedures, **we propose generating short Departmental Guides with standardized flowcharts and contact information for the wide range of issues that come up in day-to-day and month-to-month departmental business.** These short Guides would be created by each relevant Departmental group or person (e.g., Accounting, Jen, Sharon, etc.) and would serve as a resource for the entire community by providing quick reference information for who to contact (or where to look) for answers to common questions. They would also serve as a centralized place for the departmental community to share important links and resources. Importantly, they would also reduce the workload and streamline tasks for the Office Staff, Department Head, and Committee Leaders. These guides could be available on the departmental website and updated as needed. A non-exhaustive list of suggestions for Guides to be created are listed in the Departmental Communications Appendix, but additional Guide ideas are welcome.

While our department has been remote and unable to connect as we usually do in Tate, we have greatly appreciated Donna's email updates. These emails not only helped us as a community remain informed in this highly variable time but also allowed for more unified and regular updates on the state of the department as a whole. **We advocate for continuing these timely updates going forward. Additionally, we propose adding a more consistent email or internal newsletter (separate from the current alumni newsletter) at both the beginning**

and end of each semester.

At the beginning of each semester, this update could be sent concurrently with the department seminar schedule, and include notes about upcoming events and reminders on when regular departmental events occur, such as Happy Hour and Soft/Hard Rock Seminars. It should also be posted to the department website. We acknowledge that it has been difficult in the past to create an undergraduate listserv, and see this beginning-of-semester newsletter as a way to improve communication with current and potential undergraduate majors. **We propose that this beginning-of-semester newsletter also be distributed to all introductory level ESCI classes to bring them into the community.** By doing this, students who are potentially interested in joining the department or those who are not currently active in Geoclub could remain informed about ongoing departmental efforts and events.

The end-of-semester newsletter would include some larger department updates from the past semester and for the coming semester. Importantly, it would contain specific updates from each of the departmental committees. **We suggest that the committee updates highlight work that has been done during the semester, goals each committee has for the coming months, and any needs they may require from the larger department. We propose either asking the pre-existing Communications Committee or creating a new graduate student job to gather the committee updates.** For this, a Google Form would be distributed to the department committees several weeks before the end of the semester and results would be compiled. **These responses would then be included in the end-of-semester update, which would be sent out by Donna or Office Staff.** This semester-end newsletter and update by committees would greatly improve overall communication of ongoing activities within the department.

Finally, as a next step to this continued conversation, **we propose an externally facilitated meeting between a representative group of approximately five students and five faculty this semester.** The meeting this semester could be in lieu of the OGRES conversation between the Department Head, the DGS, and the graduate students if needed, and could also be held yearly to ensure communications remain open between groups. Combined, these regular updates and meetings would provide an avenue for more open communication between groups within our departmental community.

Conclusion

The response of the geoscience community at large to the murder of George Floyd and the series of protests it inspired has been a burst of energy and interest in efforts towards increasing diversity and promoting equity within the community and outside of it. As time moves on, we must challenge ourselves to maintain that interest and make that push for equity a part of our daily practice. We have tried to highlight in this letter issues to focus on and steps to take that will make knowledge more accessible and teaching more inclusive. While these changes cannot be implemented immediately, we hope that we as a department can move quickly to begin to implement them. We look forward to working with you in their implementation and reflecting with you on how to evolve further. We look forward to addressing these requests as part of a facilitated discussion between faculty and graduate students during the upcoming semester.