

Geoheritage: Progress toward Preservation

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Geoheritage sites exemplify the connections between geology and our history and culture. These connections may be illustrated through landscapes, dramatic natural features, natural resources, or geohazards. These sites range in scale from individual local outcrops through state parks and national monuments to international geoparks, and the sites are managed by a wide array of agencies and entities. The common theme coursing through these sites is *geoconservation*; Geoheritage seeks to protect sites for future scientific research, promote sustainable development through geotourism, and foster public geoliteracy via educational outreach in both formal K–16 and informal education (Andrews and Clary, 2021).

At GSA Connects 2021, an enthusiastic group convened both virtually and on site in Portland, Oregon, USA, to celebrate Geoheritage and empower one another to recognize, conserve, and sustain the landscapes that impact our lives. In our 2021 Pardee Keynote Symposium, we explored Geoheritage life cycles, resources, tools, and networks; thoughtfully considered how Geoheritage efforts must include multiple voices and develop community and respect through compromise; and investigated how best to incorporate Geoheritage in science education and outreach. We highlighted volunteered videos and vignettes that featured participants' favorite Geoheritage sites. Our discussion will continue at GSA Connects 2022 in Denver, Colorado, USA, with a new Pardee Keynote Symposium: P1 Geoheritage: Connecting Our Stories to Earth's History.

GEOHERITAGE RESOURCES FOR CLASSROOM, ADVOCACY, AND ENJOYMENT

The assembled resources from our 2021 Pardee Geoheritage session endure: The Geological Society of America reposted volunteered videos, a composite StoryMap®, and other Geoheritage links and files on our Pardee website (www.geosociety.org/geoheritage), ensuring that Geoheritage source materials are consolidated and freely available for K–16 education, outreach, and personal enrichment (Fig. 1). We aligned the eight volunteered videos and featured StoryMap® to the Next Generation Science Standards (NGSS, NGSS Lead States 2013), specifically the Earth and Space Science (ESS) Disciplinary Core Ideas (DCIs), from which K–12 educators can identify Performance Expectations, Science and Engineering Practices, and Crosscutting Concepts



Figure 1. Geoheritage resources assembled from the 2021 Pardee session include StoryMaps®, Geoheritage videos, and links to relevant proceedings, webpages, and position statements. The QR code provides easy access to the website.



appropriate to their grade level and curriculum. Table S1¹ provides selected examples of how educators may use these Geoheritage resources in K–16 classrooms; many videos and StoryMaps® also align with other science content, including physical science and life science. Video and StoryMap® resources additionally address Common Core State Standards in English Language Arts (ELA)/Literacy and Mathematics. In Table S1 (see footnote 1), we suggest lesson plans that are freely available on the Teach the Earth website (<https://serc.carleton.edu/teachearth>), housed within the Science Education Resource Center at Carleton College. Teachers can locate additional teaching resources, available for free or minimal charge, on the National Science Teaching Association (NSTA) website (www.nsta.org/), such as “Using Big Data to Understand the History of Planet Earth” (www.nsta.org/science-scope/science-scope-julyaugust-2021-0/using-big-data-understand-history-planet-earth).

CONTRIBUTE YOUR GEOHERITAGE!

With California, Texas, Illinois, and Maine represented in the collections, the 2021 Pardee Geoheritage videos and composite StoryMap® represent the United States “from sea to shining sea” (Fig. 2). Our video and StoryMap® collection is only beginning, though, and we seek additional volunteered videos of local, state, regional, and international sites. Do you want your favorite Geoheritage site featured at GSA Connects 2022 and available on the Geoheritage website for educators, geoscientists, and the interested public? Please register your interest by **16 September 2022** by accessing the form with the QR code (Fig. 2, <https://forms.gle/1gj3WlUAKA7nqxkKA>). We will provide guidelines on how to record and submit a 3–5-minute mp4 video in landscape format that can be included on our website. The second Geoscientists' Choice Geoheritage Video Award winner will be named in Denver. If you have any questions, please contact us.

GSA Today, v. 32, no. 8, <https://doi.org/10.1130/GSATGeoH-v32.1>.

¹Supplemental Material. Table S1. Geoheritage videos and StoryMaps®, aligned to the Next Generation Science Standards (NGSS) Earth and Space Science (ESS) Disciplinary Core Ideas, with suggested free resources from SERC Carleton Teach the Earth Collection. Go to <https://doi.org/10.1130/GSAT.S.20010227> to access the supplemental material; contact editing@geosociety.org with any questions.

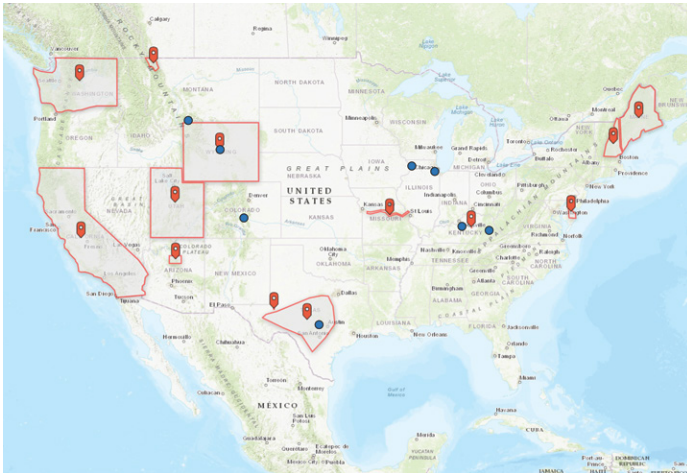


Figure 3. GSA Connects 2022 provides an opportunity to experience Geoheritage in the Denver area, including Red Rocks—either before or after the meeting—with Tim Connors, National Park Service. Photo credit: Big-macthealmanac, CC-BY-SA 4.0 <<https://creativecommons.org/licenses/by-sa/4.0/>>, via Wikimedia Commons.

Figure 2. Use the QR code to express your interest in contributing to videos or StoryMap® for GSA Connects 2022.



EXTENDING GEOHERITAGE IN 2022 AS NATURE'S NARRATIVE

At GSA Connects 2022, our Geoheritage Pardee will further the discussion and seek input for processes and procedures to acknowledge and conserve the geodiversity of our planet. Join us as we discuss criteria for identifying Geoheritage sites at different scales—international, national, state, and local—and how these criteria fit within current initiatives of the International Union of Geological Sciences, the National Park Service, the U.S. Geological Survey, and the state geological surveys. We will investigate national priorities for labeling a site as a U.S. Geoheritage site and if these methods differ from international methodologies. Our Geoheritage Pardee will fundamentally address *whose* heritage we seek to showcase, and how we should honor and preserve sacred spaces while increasing inclusivity and accessibility through Geoheritage. Join the conversation to discuss the academic considerations in research and education for Geoheritage and what metadata and tools are required to communicate Geoheritage to a broad audience and increase accessibility in K–12, undergraduate, and informal community education. Our interactive town hall requests your feedback on Geoheritage initiatives as we encourage audience participation to share best practices and brainstorm ideas for increasing the visibility of Geoheritage sites and initiating Geoheritage efforts in our professions and community.

GSA attendees have an option to experience the Geoheritage in the Denver area, either before or after the conference (Fig. 3). Tim Connors of the National Park Service will lead two identical field excursions (406, 411) for GSA attendees to experience world-class sites, including Morrison-Golden Fossil Areas National Natural Landmarks (e.g., Dinosaur Ridge and Fossil Trace), Red Rocks Park, the type section of the Jurassic Morrison Formation, Table Mountain lava flows, and the Uranium roll front. Join one of our excursions to investigate the Precambrian through the Cenozoic in a globally recognized Geoheritage landscape.

SUMMARY

The concept of Geoheritage encompasses a growing and enthusiastic geoscience community of practice dedicated to identifying, understanding, and communicating the critical geosites with connections to our diverse cultures and heritages. Please join us, either in person, online, or through volunteered contributions to our resource page, as we continue to make progress toward preserving and interpreting these incredible and critical places.

REFERENCES CITED

- Andrews, W., and Clary, R.M., 2021, Geoheritage: *Geology of the community, for the community, by the community*: GSA Today, v. 31, no. 8, p. 16–17.
- Carleton College Science Education Resource Center (SERC), n.d., Teach the Earth: <https://serc.carleton.edu/teachearth/index.html> (accessed 6 June 2022).
- NGSS Lead States, 2013, Next Generation Science Standards: For States, By States: Washington, D.C., The National Academies Press, 533 p.