IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

GRAND STAIRCASE ESCALANTE PARTNERS
on behalf of itself and its members
310 South 100 E., P.O. Box 53
Kanab, UT 84741

SOCIETY OF VERTEBRATE PALEONTOLOGY
on behalf of itself and its members
9650 Rockville Pike
Bethesda, MD 20814

and

CONSERVATION LANDS FOUNDATION
835 E. 2nd Ave. #314
Durango, CO 81301

Plaintiffs,

v.

DONALD J. TRUMP, in his official capacity as
President of the United States
1600 Pennsylvania Ave. NW
Washington, DC 20006

and

RYAN ZINKE, in his official capacity as Secretary
of the Department of the Interior
1849 C St., NW
Washington, DC 20240

Defendants.

Civil Action No. 17-2591

COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF

Plaintiffs Grand Staircase Escalante Partners, Society of Vertebrate Paleontology, and Conservation Lands Foundation (collectively, "Plaintiffs"), by and through their undersigned counsel, for their complaint for declaratory and injunctive relief against Defendants Donald J. Trump and Ryan Zinke (collectively, "Defendants"), state as follows:

NATURE OF THE ACTION

1. This lawsuit seeks to overturn President Donald Trump's unconstitutional, unlawful, and unauthorized action vastly shrinking the boundaries of Grand Staircase-Escalante National Monument ("Grand Staircase," or "the Monument") and eliminating protections for the sensitive resources located there.

2. Defendant Trump's action is an unconstitutional and *ultra vires* exercise of a power committed to Congress and not delegated to the Executive Branch. Under the Antiquities Act of 1906, ch. 3060, §§ 1–4, 34 Stat. 225, 225 (1906) (codified as amended at 54 U.S.C. §§ 320301–320303) (the "Act"), a President may "declare" historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest situated on land owned or controlled by the Federal Government to be national monuments," and "reserve parcels of land as a part of the national monuments." *Id.* In passing this Act, Congress granted the President broad authority to protect lands necessary for preserving sensitive resources. Congress did not delegate any complementary authority to rescind or reduce monument designations or protections. That power resides solely with Congress under Article IV of the Constitution.

3. The President's attempt to eliminate Grand Staircase's protections intrudes on Congressionally reserved powers under the Constitution in violation of bedrock separation of powers principles, ignores explicit post-proclamation Congressional enactments that assert Congress' sole prerogative over the Monument's boundaries and attendant protections, and is an

ultra vires act of unbounded discretion, contrary to the statute and the record. This action puts at risk a key part of our nation's natural legacy.

4. Grand Staircase is one "of the most renowned conservation land units in the United States." *See* Utah Schools and Lands Exchange Act, Pub. L. No. 105-335, § 2(14), 112 Stat. 3139, 3141 (1998). It is comprised of an area in southern Utah that was granted permanent protection as a national monument on September 18, 1996, pursuant to the President's authority under the Antiquities Act.

5. The creation of Grand Staircase was wholly consistent with the long-standing and established interpretation of the Antiquities Act and Presidential practices thereunder. Since 1906, Presidents of both parties have used the Act to preserve over 150 areas, including expansive geographic areas and natural—as well as man-made—objects. President Theodore Roosevelt used the Act to protect, among other areas, the Grand Canyon and, in *Cameron v. United States*, 252 U.S. 450 (1920), the Supreme Court upheld this designation precisely because of the Grand Canyon's vast size as a natural geological feature.

6. At its creation, Grand Staircase totaled approximately 1.7 million acres, and was established to protect the thousands of sensitive scientific, historic, prehistoric, archaeological, paleontological, cultural, and natural resources located across its landscape. *See* Proclamation No. 6920, 110 Stat. 4561, 4564 (1996) ("1996 Proclamation"). The Monument encompasses one of the most fossil-rich areas in the world, and study of the Monument has resulted in groundbreaking discoveries. The ability to find and study hundreds of exquisitely preserved extinct vertebrate, invertebrate, and plant species has, in just the past two decades, added to human understanding of Earth's history. The Monument is a particularly important source for fossils of the Late Cretaceous Era, which represents the end of the Age of Dinosaurs. It is

similarly important for the study of the Triassic period because it contains fossil records documenting the recovery from Earth's largest extinction event at the end of the preceding Permian period, and for the study of the behaviors of ancient animals from the Jurassic period. As a result, the Monument serves as the epicenter for significant research activities by numerous esteemed academic institutions and museums. Likewise, the Monument abounds in archaeological resources left behind by the Fremont and Ancestral Puebloan cultures that occupied the region. Only a small portion of the paleontological and archaeological records have thus far been surveyed. In addition, the Monument is in one of the most remote areas in the contiguous United States and includes unique ecosystems and irreplaceable geological formations.

7. The Monument's original boundaries are the "smallest area compatible with proper care and management" of the protected resources. 54 U.S.C. § 32301(b). Congress later expanded the Monument to approximately 1.9 million acres. *See* Utah Schools and Lands Exchange Act, Pub. L. No. 105-335, § 3, 112 Stat. 3139, 3141 (1998); Act of November 6, 1998, Pub. L. No. 105-355, §§ 201–202, 112 Stat. 3247, 3252–53.

8. The Bureau of Land Management ("BLM"), an agency within the Department of the Interior, has until now managed the public lands within Grand Staircase according to two basic precepts: (i) the Monument must be protected in its primitive frontier state in order to safeguard the sensitive scientific and historic resources; and (ii) the Monument should continue to provide unparalleled opportunities for the scientific study of those resources. *See* Bureau of Land Mgmt., U.S. Dep't of the Interior, Grand Staircase-Escalante National Monument Approved Management Plan – Record of Decision iv, 5 (November 1999), https://ia600202.us.archive.org/11/items/grandstaircasees00unit/grandstaircasees00unit.pdf (the

"Grand Staircase Management Plan") (last visited Dec. 3, 2017). This approach, embodied in the Grand Staircase Management Plan, has been essential for preserving Grand Staircase's critical resources.

9. In 2004, the U.S. District Court for the District of Utah confirmed that the Presidential proclamation creating Grand Staircase satisfied the requirements for the creation of national monuments under the Antiquities Act, including that the objects identified were appropriate for protection under the Act, and that the area delineated was the "smallest area compatible" with protecting these sensitive resources. *See Utah Ass'n of Ctys v. Bush*, 316 F. Supp. 2d 1172 (D. Utah 2004).

10. Neither the Constitution, the Antiquities Act, nor any other provision of law authorize the President to eliminate national monument protections.

11. On December 4, 2017, President Donald J. Trump issued the "Presidential Proclamation Modifying the Grand Staircase-Escalante National Monument" (the "December Proclamation") that purported to rely on the Antiquities Act to eliminate significant portions of Grand Staircase's permanent protections. The December Proclamation asserts that the Monument is "modified and reduced" and replaces it with three substantially diminished units: the Grand Staircase Unit; the Kaiparowits Unit; and the Escalante Canyons Unit. The total area of the new monument is 1,003,863 acres, which excludes approximately half the area of Grand Staircase-Escalante National Monument. This is an unprecedented usurpation of legislative authority. The Antiquities Act does not countenance the President vastly reducing a national monument's boundaries.

12. The December Proclamation also attempts to force management changes over the remaining area of the Monument. On February 2, 2018, the Proclamation would throw open the

excluded areas of the Monument to irreparable extractive activities: "the public lands excluded from the monument reservation shall be open to: (1) entry, location, selection, sale or other disposition under the public land laws; (2) disposition under all laws relating to mineral and geothermal leasing; and; (3) location, entry, and patent under the mining laws." The Antiquities Act does not authorize the President to open protected resources up to such destructive activities.

13. Additionally, the December Proclamation purports to force management changes over the remaining area of the Monument by amending the 1996 Proclamation. The December Proclamation "clarifi[es]" that "the Secretary may allow motorized and non-mechanized vehicle use on roads and trails existing immediately before the issuance of [the 1996 Proclamation and maintain roads and trails for such use." Additionally, the December Proclamation amends the 1996 Proclamation to allow the Secretary of the Interior to "authorize ecological restoration and active vegetation management activities." Neither the Antiquities Act nor any other statute authorizes the President to forcibly remove land protections by fiat and subvert the Congressionally mandated process that the Executive Branch must comply with to alter land management regimes.

14. Defendant Trump's action excludes and fractures key objects specifically identified for protection by President Clinton in the 1996 Proclamation and fundamentally compromises the remote, frontier quality that the original Proclamation identified as necessary for preservation of the scientific and historic objects in Grand Staircase-Escalante National Monument.

15. As a result of these actions, Monument lands and resources both inside and outside of the diminished boundaries are no longer being afforded the protections national monuments are due. Outside of the boundaries, the President's action eliminates prohibitions

against extractive activity (such as coal mining and oil and gas drilling), undermines protections essential to preventing the degradation of sensitive resources (such as through untrammeled access, vandalism and looting), and undercuts the numerous programs, initiatives, business ventures, and projects that rely on the status and protections of the Monument. Inside the boundaries, the December Proclamation will subject the resources and the lands to the destructive effects of "motorized and non-mechanized vehicle use" and intensive vegetation management. More broadly, the President's action will significantly harm the remote and protected qualities of the Monument that preserve these sensitive resources and create the scientific opportunities for which the Monument was created and is best known. This diminishment of protections causes direct and indirect harm to the organizations, businesses, and individuals who value the Monument and depend on its status and the protections such designation affords for advancing scientific research, their livelihoods, and their enjoyment and spiritual fulfillment. This action harms the American people by undermining the protection of key treasured portions of our nation's public lands legacy.

16. Plaintiffs ask this Court to declare the December Proclamation void and to enjoin Defendants from implementing it. The grounds for this request are (a) that the President, in violation of bedrock separation of powers principles, has illegally exercised authority that the Property Clause of the Constitution, U.S. Const. art. IV, § 3, cl. 2, explicitly vests solely in Congress, which authority has not explicitly or implicitly been delegated to the President; (b) that the President's actions are ultra vires by taking an action that is not authorized by the Antiquities Act either explicitly or implicitly; (c) that the President has improperly attempted to override Congressional legislation by eliminating the protections over portions of a monument over which Congress has directly legislated multiple times, thereby asserting its sole prerogative

over the status of this area; and (d) that the President has no authority to circumvent the superstructure created by federal lands management and environmental laws enacted by Congress, and the Secretary of the Interior remains obligated to govern Grand Staircase according to the requirements of the Grand Staircase Management Plan, the Federal Land Management and Policy Act, and the National Environmental Policy Act, *inter alia*. Moreover, even if this Court were for some reason to find that the President has some authority to eliminate monument protections (which he does not), there is no factual or legal basis for undoing a prior President's actions and eliminating Grand Staircase's protections given the clear record supporting the original Proclamation and the current Monument delineation.

PARTIES

Plaintiffs

Grand Staircase Escalante Partners

17. Plaintiff Grand Staircase Escalante Partners ("Partners") is a non-profit corporation exempt from taxation under 26 U.S.C. § 501(c)(3), founded in 2004 and organized under the laws of the state of Utah. Partners's membership is comprised of 420 members as of December 1, 2017, and its governing board is comprised of 11 members. Partners currently employs 12 paid staff members.

18. Partners is dedicated to supporting, protecting, maintaining, and advancing Grand Staircase. As indicated in its bylaws, Partners's primary purpose is to assist Grand Staircase in its mission as established in Presidential Proclamation 6920 of September 18, 1996, and the Monument Management Plan approved November 15, 1999.

19. Partners pursues this overarching goal in numerous ways. In particular, it supports the Monument's activities and programs in upholding the Monument's scientific, recreational, scenic, natural, and cultural objects and values by:

a. carrying out extensive student education programs, including a curriculum-based education program that helps students, teachers, and people of all ages explore Grand Staircase and the public lands and rural communities of southern Utah and northern Arizona;

b. managing lab work for the Monument's world-class paleontology program, cataloging the paleontology collections, training and coordinating volunteers for field work, and educating the public regarding this program;

c. designing and coordinating a Site Steward Program to inspect archaeological sites for signs of damage caused by natural erosion, animal activity, looting, or vandalism;

d. supporting the BLM in restoration of damaged sites; and

e. being a central participant in the largest ecosystem restoration program in the region—and the largest riparian restoration project in BLM history—the Escalante River Watershed Project, which also helps to secure extensive outside financial resources for the operation and management of the Monument.

20. Partners also pursues this goal by actively promoting the vibrant local communities surrounding the Monument. Partners collaborates with local businesses in support of the Monument's activities and programs, contributes to community economic development, and participates in numerous community events.

21. Since its founding, Partners has been inextricably intertwined with the Monument and its programmatic activity has grown as the organization has grown. Incorporation was a

result of a meeting between citizens in Kanab who supported the establishment of Grand Staircase and the Monument Manager who asked these individuals to form a friends group. In the years since, Partners has steadily grown its initiatives—often at BLM's request—to promote and safeguard the Monument. These have grown from assisting BLM with "Walks and Talks"—an educational program for visitors and local residents—into a broad panoply of programs. By 2012, Partners had developed a full suite of educational programs, set up robust paleontological and archaeological programs, and engaged in extensive restoration efforts. All of these programs have expanded since then. For example, in August 2016, Partners established a Master Naturalist Program, which recruited and trained community members to become Utah State University-certified Master Naturalists. As these responsibilities have grown, Partners has hired more full-time staff, including an Executive Director in 2010. Since its inception, Partners has worked tirelessly to advance the Monument's protection and secure the resources necessary to accomplish this work.

22. Partners's membership is composed of: numerous scientists including geologists, paleontologists, archaeologists, ecologists, and biologists; business leaders from gateway towns; community leaders; recreationalists; and other individuals who seek the ongoing preservation of Grand Staircase. These members are drawn from 37 states, Washington D.C., Switzerland, Canada, and the United Kingdom.

23. Partners supports Grand Staircase in all arenas and works to enhance public understanding of, respect for, and enjoyment of the Monument among the general public. Partners submitted comments to the Secretary of the Interior as part of the 2017 monument review process that led to the President's challenged action. *See* Comments of Grand Staircase Escalante Partners, DOI-2017-0002-574082 (filed July 7, 2017),

https://www.regulations.gov/document?D=DOI-2017-0002-574082 (follow Attachment "PDF" hyperlink at bottom of page) (last visited Dec. 2, 2017). Additionally, during the 2017 monument review process, Partners organized a community welcome rally for Defendant Zinke in Kanab, Utah, and sponsored an educational event in Escalante, Utah, to raise awareness and ensure that the community understood the nature of comments being called for by the Department of the Interior.

24. Members of Partners visit or otherwise actively use and enjoy Grand Staircase's lands and resources for recreation, aesthetic and spiritual enjoyment, wildlife viewing, photography, and artistic inspiration. Members rely on Grand Staircase's designation as a national monument in their professional scientific and research work and their businesses, livelihoods, and educational endeavors and have continuing plans to do so. The members' use and enjoyment of these areas are inextricably intertwined with the Monument's sensitive resources, and are affected by the condition of the area and the status of the Monument's resource protections.

25. Partners and its members derive value from the national monument designation and the protections it affords. They rely on Grand Staircase's national monument designation to secure funding for their businesses, increase the value of their investments, attract customers, and increase their revenue. The December Proclamation eliminates significant protections at Grand Staircase. Upon information and belief, this elimination will harm the value of members' investments and adversely impact their revenue streams. Moreover, upon information and belief, visitors will see this elimination of Grand Staircase's protections as damaging the area's scenic and recreational status, and this change will directly reduce the number of visitors and lead to a concomitant reduction in revenue. Additionally, many members rely on the Monument's scale

in their marketing and other materials. As a result of the elimination of Grand Staircase's protections, Partners and its members will be harmed and forced to spend substantial time and resources revising marketing information, business plans, and other material.

26. Further, the extensive elimination of Grand Staircase's protections will immediately and irreparably harm Partners because it undermines the multitude of programs that Partners offers and participates in. These include the Escalante River Watershed Partnership, the Archaeological Site Steward Program, and the Paleontological Science Laboratory. Partners has also led a Master Naturalist Training in collaboration with Utah State University using Grand Staircase as the classroom. Partners participates in numerous community events, including: the Boulder Heritage Festival; the Escalante Canyon Arts Festival; the Bryce Canyon Geology Festival; the Big Water Dino Festival; Earth Day events at the Kanab Elementary School; river restoration presentations at Escalante High School; the restoration of the Historic Rock Springs Corral and Henrieville Creek; Public Lands Day activities; the Amazing EarthFest; the Kanab Balloon Festival; and the newly christened Grand Staircase-Escalante Community Lecture Series—each of which depends to some extent on the area's designation as a national monument for drawing participants and creating programming content. Further, Partners was heavily involved in promoting and running programs related to the 2016 20th anniversary of Grand Staircase, including printing a compendium of research summaries entitled *Science Summary 2006-2016: Learning from the Land*. Partners relies on Grand Staircase's national monument designation—and the attendant protections—to present this programmatic activity to the public, attract public support for it, and generate the public and foundation funding required to undertake these activities. To a large degree, Partners's philanthropic donations are generated to support the "Grand Staircase-Escalante National Monument" as a unique and special place, rich in

scientific and natural resources and opportunities for personal enrichment, and with the understanding that it would be protected for all time. Any action perceived by the public as a demotion of the significance of the Monument will, accordingly, harm this fundraising. On information and belief, the extensive elimination of Grand Staircase's protections is such a demotion and will lead to such harm.

27. Additionally, the Defendants' action seeks to undo the 1996 Proclamation's prohibition for extensive areas on "entry, location, sale, leasing, [and] other disposition under the public land laws" of Grand Staircase's lands, as well as the requirement that land be managed in a way that gives the highest priority to preservation of the protected resources. *See* 1996 Proclamation, 110 Stat. 4561, 4564. This removal threatens current and future uses of the Monument by Partners's members. For example, lands previously protected by the Presidential Proclamation establishing Grand Staircase will be subject to the broader public land management laws, including the General Mining Law of 1872, 30 U.S.C. §§ 21 *et seq*. That law allows prospectors, without prior permit or authorization from any government agency, to enter federal land in search of mineral deposits. Moreover, for resources such as coal, oil, and natural gas, removal of monument protections allows the Department of the Interior to begin the process of leasing parcels of land for extraction.

28. The current Administration has pursued increased extractive activity on federal lands. In particular, the Administration has repeatedly expressed support for greater coal extraction. On information and belief, given this desire and the mineral resources in Grand Staircase, the elimination of Grand Staircase's protections authorizes an upsurge in activity that is inconsistent with preservation of sensitive sites. There is thus an immediate risk of irreparable harm to sensitive resources once this process commences —including to fossils and

archaeological artifacts—that are of significance to Partners and its members professionally and personally.

29. Upon information and belief, the elimination of Grand Staircase's protections will speed degradation of sensitive resources currently protected by the Monument, creating the risk of rock art vandalism, artifact removal, illegal digging, ATV use across sensitive areas, and artifact and fossil theft. The national monument designation is critical for keeping such destructive activities in check. Its removal will substantially and immediately weaken the protections preventing their occurrence.

Society of Vertebrate Paleontology

30. Plaintiff Society of Vertebrate Paleontology (the "Society") is a non-profit organization exempt from taxation under 26 U.S.C. § 501(c)(3), incorporated under the laws of California, and headquartered in Bethesda, Maryland. The Society has approximately 2,200 members as of December 2017. The Society's membership is composed of those interested in vertebrate paleontology and includes both professional and avocational paleontologists.

31. As set out in the Society's constitution, the Society's purpose is to advance the science of vertebrate paleontology and facilitate the cooperation of persons concerned with the history, evolution, ecology, comparative anatomy, and taxonomy of vertebrate animals, as well as the field occurrence, collection, and study of fossil vertebrates and the stratigraphy of the beds in which they are found. The Society also supports the discovery, conservation, and protection of vertebrate fossils and fossil sites. The Society works toward fostering the scientific, educational, and personal understanding of vertebrate fossils and fossil sites by paleontologists and the general public.

32. To advance vertebrate paleontology, the Society: organizes an annual international scientific conference for its members; periodically sponsors symposia at other scientific conferences; distributes merit-based grants, fellowships, and awards for paleontological research, artwork, and educational outreach; establishes professional standards for the collection and curation of fossils, for management of paleontological data, and for the documentation of paleontological research; works with policymakers, lawmakers, and regulators in the United States and around the world to establish regulatory and legal protection of scientifically valuable fossil resources; publishes the Journal of Vertebrate Paleontology; and raises funds to support the aforementioned activities.

33. The Society and its members have a scientific interest in Grand Staircase and actively work to enhance the scientific value and public appreciation of the paleontological resources at the Monument. Approximately 10 percent of the Society's members have done some field research in the Monument. Because of the Monument's exceptional fossil resources, the Society's members have been active in documenting those resources at the Monument since 1996, and recently submitted comments to the Secretary of the Interior as part of the 2017 monuments review process. *See* Comments of the Society of Vertebrate Paleontology, DOI-2017-0002-100908 (filed May 25, 2017), https://www.regulations.gov/document?D=DOI-2017-0002-100908 (follow Attachment "PDF" hyperlink at bottom of page) (last visited Dec. 2, 2017). Fossils from the Monument were showcased at the Society's 2016 annual meeting in Salt Lake City and a three-day field trip to study paleontological sites on the Kaiparowits Plateau was organized for Society members in collaboration with Monument staff.

34. Members of the Society visit and regularly conduct paleontological field research within Grand Staircase and rely on its designation to protect the paleontological and geological

resources upon which their professional scientific and research work, educational endeavors, and careers depend. Furthermore, the Monument is chosen as a place for research because of its scientifically important vertebrate fossils and because national monument status provides for the permanent protection of the field sites, which in turn guarantees future access for purposes of verifying previous data and conclusions. Because the exceptional paleontological resources were objects specifically protected under the 1996 Proclamation, preservation of those resources is prioritized over many other potentially conflicting uses of the land. The special status of paleontological resources also justifies employing professional paleontological staff at the Monument who coordinate activities among research groups and organize protection efforts. Finally, national monument status ensures broad access by the scientific community and the interested public to the fossils and associated data. All of these features enhance the quality of research by Society members, contribute to the success of competitive research grant applications, and ensure that the scientific process of research, conclusions, and verification can be realized. Society members' current and future use and enjoyment of these areas are therefore integrally intertwined with the Monument's sensitive resources, its fossil resources in particular, and are affected by the condition of the areas and the delineation and effectiveness of its resource protections. Furthermore, the Society's broader educational mission to inculcate an appreciation for paleontology among amateur scientists and the general public will be harmed as a result of these losses.

35. Serious vertebrate paleontological research on the lands that now make up the Monument began with the work of Society members Jeff Eaton and Rich Ciffelli, who studied the Late Cretaceous microvertebrate faunas of the Kaiparowits Plateau starting in the early 1980s. The fossils they and their colleagues collected are curated at the University of Colorado,

Oklahoma University, the Museum of Northern Arizona, and the Utah Museum of Natural History (UMNH), where they continued to be studied by Society members and, more broadly, by the international scientific community and interested members of the public. The next phase of research after the Monument was established was surveying the entire property for vertebrate paleontological resources. Member Scott Sampson from the UMNH has conducted field research since around 2001 and member Joe Sertich from the Denver Museum has conducted field research for almost ten years. Other members, such as Jacques Gautier and Marilyn Fox of Yale University, have also conducted research in the Triassic units, which led to the discovery of the most complete *Poposaurus* skeleton known to date (material that sheds light on the origin of dinosaurs). More than 100 members have participated in long-term research at the Monument and at least 100 others have visited for short-term scientific purposes such as field trips or site visits

36. Paleontological research at the Monument is ongoing and there is abundant evidence to indicate that it will continue to yield scientifically important results well into the future. New discoveries are still being made at rates that indicate that the full inventory of the fossil taxa preserved at the Monument has not yet been recovered. In scientific terms, this is referred to as the "steep side of the collection curve." A "collection curve" is a statistical way of looking at the number of taxa sampled relative to the amount of effort expended to recover them in the field. When an area is first studied, the number of new discoveries is large relative to the amount of time expended but, as research continues new discoveries become more rare. At Grand Staircase researchers are still in the first phase of this "curve," which means that important scientific work should continue for decades or centuries to come with the protective regime that the Monument currently affords.

37. Continued status as a national monument is also critical to the Society because new methods and technologies allow new scientific questions to be asked of old, well-studied sites. Monument status affords protections that preserve sensitive sites over long periods of time, and the policy governing scientific work at the Monument has played an essential role in advancing research. For example, Daigo Yamamura of the University of Arkansas recently studied the paleoenvironment and paleoclimate of the Late Cretaceous using new stable isotope analytic techniques. His research was based on earlier collections housed at the UMNH, which he then verified by sampling sediments from the original sites at the Monument. He was able to carry out this research because of the precise locality information available for the previously collected specimens, which is mandated by the Monument's scientific work policy, and because he was able to revisit the same sites, which remained intact. Similarly, member Eric Roberts has been able to develop a refined chronology for the geological units at the Monument by applying new uranium-lead dating techniques at the sites where the original stratigraphic framework was developed. Elimination of extensive areas of Grand Staircase's protections will irreparably harm the ability of Society members to perform paleontological research in the area.

Conservation Lands Foundation

38. Plaintiff Conservation Lands Foundation (the "Foundation") is a non-profit organization exempt from taxation under 26 U.S.C. § 501(c)(3), incorporated under the laws of Delaware, and headquartered in Durango, Colorado. The Foundation maintains regional offices in the District of Columbia and five states.

39. The Foundation's organizational purpose is to promote environmental conservancy through assisting the National Landscape Conservation System ("NLCS," also known as the "National Conservation Lands") and the preservation of open space and

wilderness. The National Conservation Lands are part of a Federal Government land designation system that encompasses 35 million acres and 2,400 river miles of National Monuments, National Conservation Areas, Wilderness and Wilderness Study Areas, Wild and Scenic Rivers, National Scenic and Historic Trails, and other special designations. Grand Staircase is the largest and among the best-known units in the National Conservation Lands. The Foundation is the only non-profit in the country specifically dedicated to establishing and safeguarding the National Conservation Lands. To fulfill its organizational purpose, the Foundation works to protect, restore, and expand the National Conservation Lands through education, advocacy, and partnership.

40. The Foundation created the Friends Grassroots Network, which is comprised of over 60 organizations located in 12 states, including Partners, to support the National Conservation Lands. Member organizations organize and conduct a wide range of conservation-related activities, including clean-up projects, trail maintenance and rebuilding, riverbank and stream restoration, removal of invasive species, closure of illegal roads, water quality monitoring, enhancement of wildlife habitat, and improvement of recreational access. In 2015 alone, members of the Friends Grassroots Network dedicated over 53,000 hours to these types of conservation activities. The Foundation and the Friends Grassroots Network also cooperate in public advocacy and education efforts to promote conservation of public lands.

41. The Foundation was actively involved in Secretary Zinke's national monument review and submitted comments specifically addressing Grand Staircase as part of the 2017 monuments review process. *See* Comments of the Conservation Lands Foundation and the Wilderness Society, DOI-2017-0002-112216 (filed May 26, 2017), https://www.regulations.gov/document?D=DOI-2017-0002-112216 (follow Attachment "PDF"

hyperlink at bottom of page) (last visited Dec. 2, 2017). The comments expressed strong support for Grand Staircase and its boundaries as they existed prior to President Trump's action. The Foundation engaged in these processes in conjunction with other organizations and on its own behalf to further the Foundation's mission and to protect the interests of the organization, its supporters, and its Friends Grassroots Network groups and their members.

42. The Foundation has also undertaken significant independent advocacy and public engagement efforts to protect Grand Staircase, including before, during, and after the 2017 monument review process. Since 2010, the Foundation has met annually with Monument and Assistant Monument Managers in Escalante, Utah, and BLM staff in Washington, D.C., to provide input on management issues related to grazing, maintenance of roads, and collaboration with Partners. For example, in 2012, the Foundation met with BLM staff and sent a formal letter to express opposition to a proposal from Garfield County to pave Hole-in-the-Rock Road, a decision that would have violated the existing land use plan for the Monument. In 2013, the Foundation sent a letter to then-BLM Director Neil Kornze that highlighted the effects the government shutdown had on the National Conservation Lands. In 2013, the Foundation worked closely with the BLM and Partners on the Utah State Plan for the National Conservation Lands, which included an official comment letter that outlined suggestions for how to increase conservation protections for Grand Staircase-Escalante National Monument. On May 21, 2015, the Foundation submitted a letter to the Senate Subcommittee on Public Lands, Forests and Mining, expressing concern over a proposed bill that would have undermined conservation protections in Grand Staircase. On February 9, 2016, Foundation staff traveled to Washington, D.C., to meet with BLM's National Partnerships Program Lead Trevor Needham to request that BLM strengthen a public-private partnership with Partners so that Partners could continue

providing volunteer education and stewardship services at the Monument. In February 2017, Foundation staff and board members met with Acting BLM Director Mike Nedd to express support for continuing the Escalante River restoration work at the Monument.

43. The Foundation plays a large role in preserving the Grand Staircase's values and resources; any elimination of the Monument's protections causes the Foundation direct, immediate, and irreparable injury. Damage to such a prominent unit poses a grave threat to the Foundation's programs aimed at maintaining the National Conservation Lands.

Defendants

44. Defendant Donald J. Trump is the President of the United States, and in his official capacity he signed the December Proclamation eliminating Grand Staircase-Escalante National Monument's protections. President Trump's official residence and his principal offices are in Washington, D.C. Plaintiffs sue President Trump in his official capacity.

45. Defendant Ryan Zinke is the Secretary of the Department of the Interior. In his official capacity, he is responsible for implementing the provisions and requirements of applicable federal laws on federal lands, including the responsibility to protect Grand Staircase, and is responsible for implementing the December Proclamation that eliminated Grand Staircase's protections. Secretary Zinke conducted the review and submitted recommendations to the President upon which the December Proclamation is based. Secretary Zinke's principal office is in Washington, D.C. Plaintiffs sue Secretary Zinke in his official capacity.

JURISDICTION AND VENUE

46. Plaintiffs' claims arise under the Property Clause of the Constitution, U.S. Const. art. IV, § 3, cl. 2., the Administrative Procedure Act, 5 U.S.C. §§ 701–706, and the Antiquities Act, 54 U.S.C. §§ 320301–320303, and concern the lack of Presidential authority to eliminate or

curtail a national monument's protections. This Court has subject matter jurisdiction over this action pursuant to 28 U.S.C. § 1331 (federal question jurisdiction).

47. Venue in this District is proper under 28 U.S.C. § 1391(e)(1) because this is a civil action brought against officers of the United States acting in their official capacities and under color of legal authority, and this is the judicial district in which "a substantial part of the events or omissions giving rise to the claim occurred."

48. Because Plaintiffs allege that Defendants acted in excess of their statutory and constitutional authority, and seek only declaratory and injunctive relief against Defendants in their official capacity, the sovereign immunity of the United States is not implicated. *See, e.g.*, *Larson v. Domestic & Foreign Commerce Corp.*, 337 U.S. 682, 689–90 (1949); *Dugan v. Rank*, 372 U.S. 609, 621–22 (1963); 5 U.S.C. § 706(2).

49. The declaratory, injunctive, and other relief requested is authorized by 28 U.S.C. §§ 1361, 1651, 2201–2202, and this Court's general equitable powers.

LEGAL BACKGROUND

50. The Property Clause of the U.S. Constitution provides that "Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States." U.S. Const. art. IV, § 3, cl. 2. The President has only such authority over federal property as Congress has expressly delegated.

51. Congress delegated to the President certain limited power under the Property Clause when it enacted the Antiquities Act on June 8, 1906. *See* 54 U.S.C. § 320301(a), (b). The Act authorizes the President of the United States to "declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated on land owned or controlled by the Federal Government to be national monuments," and to "reserve parcels of land as a part of the national monuments" that comprise

the "smallest area compatible with the proper care and management of the objects to be protected." *Id*. § 320301(a), (b). Neither the Act nor any other statute contains language authorizing the reduction or removal of national monuments. *See id.*

52. Congress passed the Antiquities Act to empower the President to permanently protect sensitive resources and lands absent later Congressional changes to those areas.

53. The Antiquities Act provides no authority whatsoever for a President to eliminate extensive protections at Grand Staircase. No authority exists for a President to eliminate national monument protections in part or in full. Those authorities rest solely with Congress.

54. Since its passage in 1906, the Antiquities Act has been used over 150 times to create national monuments.

55. In 1976, Congress passed the Federal Land Policy and Management Act, 42 U.S.C. §§ 1701 *et seq.* ("FLPMA"), further specifying the restrictions on, and directives for the Executive Branch's management of Federal lands, including the designation and management of national monuments. In passing FLPMA, Congress preserved the President's unique but limited authorities under the Antiquities Act. Additionally, the management regime specified by FLPMA incorporates procedural protections under other statutes, including the Administrative Procedure Act, 5 U.S.C. §§ 500 *et seq.*, and the National Environmental Policy Act, 42 U.S.C. §§ 4321 *et seq*.), where agency-level management actions are authorized.

56. Under FLPMA, BLM is required to manage federal public lands "under principles of multiple use" and "in accordance with [a] land use plan," "except that where a tract of such public land has been dedicated to specific uses according to any other provisions of law it shall be managed in accordance with such law." 43 U.S.C. § 1732(a). The Presidential proclamation

creating Grand Staircase-Escalante National Monument constitutes such superseding provisions of law dedicating the Monument to specific protective uses. *See generally* 1996 Proclamation.

57. Subsequent to the 1996 Proclamation, Congress passed multiple laws impacting the area, boundaries, and status of Grand Staircase. *See infra*, ¶¶ 64–68.

FACTUAL ALLEGATIONS

The Establishment of Grand Staircase-Escalante National Monument in 1996

58. Prior to Grand Staircase's creation, the area covered by the Monument was well known as a rich source of important archaeological and paleontological resources. For example:

a. Paleontological studies have been pursued in the Monument area since the 1800s. *See* David D. Gillette & Martha C. Hayden, Utah Geological Survey, *A Preliminary Inventory of Paleontological Resources within the Grand Staircase-Escalante National Monument, Utah* 7, Utah Dep't of Nat. Res. (1997), http://www.files.geology.utah.gov/online/c/c-96.pdf (last visited Dec. 3, 2017).

b. Archaeology performed within the Monument boundaries in the early 20th Century was critical in advancing scientific understanding of cultures in the region. *See* David B. Madsen, Utah Geological Survey, *A Preliminary Assessment of Archaeological Resources within the Grand Staircase-Escalante National Monument, Utah* 6, Utah Dep't of Nat. Res. (1997), https://ugspub.nr.utah.gov/publications/circular/C-95.pdf (last visited Dec. 3, 2017).

59. Permanently safeguarding this trove of sensitive resources, Grand Staircase was created by Presidential Proclamation on September 18, 1996. *See* 1996 Proclamation, 110 Stat.

at 4564. The 1996 Proclamation specifically identified numerous sensitive historic, prehistoric, and scientific resources throughout the Monument as the basis for protecting the area. *See generally* 1996 Proclamation.

60. The lands of the Monument were "set apart and reserved . . . for the purpose of protecting the objects identified" in the 1996 Proclamation. *Id.* at 4563–64. In total, the 1996 Proclamation reserved 1.7 million acres for the protection of the plethora of sensitive resources that span the entirety of the Monument *See id.* at 4564. This is the "smallest area compatible with proper care and management," 54 U.S.C. § 32301(b), of the protected resources.

61. As discussed at ¶¶ 64–65, *infra*, Congress later ratified through legislation an agreement between the Secretary of the Interior and the Governor of Utah to exchange federal land outside the Monument for state-owned inholdings within Grand Staircase. This, combined with additional Congressional boundary adjustments, expanded the Monument's acreage to nearly 1.9 million acres. *See* Bureau of Land Mgmt., U.S. Dep't of the Interior, Grand Staircase-Escalante National Monument Manager's Annual Report FY 2014 at 2 (2015).

62. The 1996 Proclamation provides that "[a]ll Federal lands and interests in lands within the boundaries of this monument are hereby appropriated and withdrawn from entry, location, selection, sale, leasing, or other disposition under the public land laws . . . ." 1996 Proclamation, 110 Stat. at 4564. As a result, all new mining claims and oil and gas leasing activities were prohibited within the Monument area as of September 18, 1996.

63. The 1996 Proclamation also allowed for the continuation of grazing in an effort to ensure that traditional land uses remain largely undisturbed. Over 96 percent of the Monument remains open for grazing, and only 17 allotments are partially or entirely unavailable. In 1996, there were 77,400 Animal Unit Months ("AUMs") and today the number of permitted AUMs is

76,957. Some grazing permits were relinquished voluntarily due to drought or, in some areas along the Escalante River, voluntarily sold to a third-party at a premium to protect the fragile riparian zone.

Post-Proclamation Congressional Activity Related to Grand Staircase

64. In 1998, two years after the Monument's establishment, Congress ratified by law an agreement between the State of Utah and the Secretary of the Interior involving the exchange of Utah school trust lands evenly distributed within the borders of Grand Staircase. *See* Utah Schools and Lands Exchange Act, Pub. L. No. 105-335, § 3, 112 Stat. 3139, 3141 (1998). The broad purpose of this act was to eliminate state inholdings on federal lands within the Monument's boundaries and to "resolve many longstanding environmental conflicts." *Id.* § 2(14). As part of this, the state exchanged "approximately 176,698.63 acres of land and the mineral interest in approximately an additional 24,000 acres" that were "within the exterior boundaries of the Monument" for federal land outside the Monument boundaries. Agreement to Exchange Utah School Trust Lands between the State of Utah and the United States of America § 2. The agreement specifically stated that any lands acquired by the United States "within the exterior boundaries of the Monument . . . shall become a part of the Grand Staircase-Escalante National Monument, and shall be subject to all the laws and regulations applicable to the Monument." *Id.* § 5. The same legislation provided Utah with an additional $50 million in compensation. *See* Utah Schools and Lands Exchange Act § 7.

65. As of April 2017, the former federal lands Utah received in exchange for transferring the inholdings to the federal government have, upon information and belief, generated over $340 million in revenue for Utah, including from oil, gas, and coal leases and

royalties. *See* Jennifer Yachnin, *Utah Land Swaps Could Foil a Trump Bid to Strip Protection*, E&E News (May 2, 2017), https://www.eenews.net/greenwire/stories/1060053899/.

66. In 1998, Congress made additional boundary adjustments to Grand Staircase by removing land from the Monument in certain areas and adding it in others. The statute explicitly references "[t]he boundaries of the Grand Staircase-Escalante National Monument." Act of November 6, 1998, Pub. L. No. 105-355, §§ 201–202, 112 Stat. 3247, 3252–53.

67. In 2009, Congress made further boundary adjustments by removing a parcel of land from Grand Staircase and conveying it to a private entity. The legislation states that the "boundaries of the Grand Staircase-Escalante National Monument in the State of Utah are hereby modified to exclude the Federal land" conveyed to that private entity. These changes were signed into law by the President. *See* Omnibus Public Land Management Act, Pub. L. No. 111-11, § 2604, 123 Stat. 991, 1119–18 (2009).

68. In 2009, Congress also permanently established the National Landscape Conservation System. The legislation included Grand Staircase with its then-existing boundaries in the NLCS: "[t]he system shall include each of the following areas administered by the Bureau of Land Management: [] Each area that is designated as [] a national monument[.]" Pub. L. No. 111-11, § 2002, 123 Stat. at 1095–96.

Pre-Monument Management of Grand Staircase-Escalante's Public Lands

69. Prior to 1996, the federal lands within Grand Staircase-Escalante National Monument were managed by BLM in accordance with FLPMA's "multiple use" mandate, which requires managing the land for a range of uses—including oil and gas drilling, mining, and off-road vehicle use—and does not give primacy to the protection of sensitive resources. *See* 43

U.S.C. §§ 1702, 1712 (implementing multiple use in the development and revision of land use plans).

70. Accordingly, BLM managed the Grand Staircase area pursuant to four separate Management Framework Plans, which emphasized intensive resource development activities, such as extraction. This approach to land management, rooted in "multiple use" principles, did not safeguard the unique area of Grand Staircase in a fashion adequate to the scientific and research opportunities that the Monument protects and enables.

71. Prior to the designation of Grand Staircase, location, leasing, and exploration of federal lands for mining and other extractive activities threatened the sensitive resources of the Grand Staircase area. For example:

a. Coal had been mined in the Monument area since the late 1800s. Starting in the 1960s, larger extractive ventures took an interest in coal mining. These ventures acquired leases and drilled test holes. In the 1980s, Andalex Resources began the process of developing an underground mine to ship coal from their lease on the Kaiparowits Plateau. *See* M. Lee Allison, Utah Geological Survey, *A Preliminary Assessment of Energy and Mineral Resources within the Grand Staircase-Escalante National Monument* 8–9, Utah Dep't of Nat. Res. (1997), http://files.geology.utah.gov/online/c/c-93/index.htm (last visited December 2, 2017).

b. Oil and gas drilling had occurred within the Grand Staircase area since 1921. *See id.* at 22–23. Indeed, immediately prior to the Monument creation, oil and gas companies attempted to lease large acreages for

development. *See id.* at 13–14 ("Industry representatives reported attempts to lease an additional 60,000 acres of BLM lands by oil and gas companies in 1996, were denied by BLM.").

c. Prospectors had also pursued other minerals, such as uranium, titanium, manganese, gold, copper, and lead. *See id.* at 27–32.

Management of the Grand Staircase-Escalante National Monument

72. Grand Staircase was the first national monument over which BLM was given management authority. The 1996 Proclamation requires BLM to manage the Monument "to implement the purposes of this proclamation." 1996 Proclamation, 110 Stat. at 4564.

73. In November 1999, pursuant to the 1996 Proclamation and BLM's obligations under 43 U.S.C. § 1712(a) to "develop, maintain, and, when appropriate, revise land use plans," BLM issued the Grand Staircase Management Plan, which provided detailed guidelines for managing the Monument in accordance with the 1996 Proclamation (as opposed to general multiple use principles). *See generally* Grand Staircase Management Plan.

74. The Grand Staircase Management Plan was created after extensive public engagement, including, for example, over two dozen public scoping workshops and open houses in cities and towns across the country, including Kanab, Utah; Escalante, Utah; Denver, Colorado; Washington, DC; San Francisco, California; Flagstaff, Arizona; and Albuquerque, New Mexico, in which the public provided input about the draft management plan. *See* Bureau of Land Mgmt., U.S. Dep't of the Interior, Grand Staircase Escalante National Monument: Proposed Management Plan, Final Environmental Impact Statement 4.1–4.3 (1999); Bureau of Land Mgmt., U.S. Dep't of the Interior, Grand Staircase Escalante National Monument: Draft Management Plan, Draft Environmental Impact Statement 5.1–5.2 (1998).

75. The Grand Staircase Management Plan adopted two basic precepts: (i) the Monument must be protected in its primitive frontier state in order to safeguard the sensitive scientific and historic resources, and (ii) the Monument should continue to provide unparalleled opportunities for the scientific study of those resources. *See* Grand Staircase Management Plan at iv, 5. BLM concluded that significant development will undermine and destroy the very qualities of the Monument that preserve these sensitive resources and create the scientific opportunities for which the Monument was created and is best known.

Scientific Research and Discoveries within Grand Staircase-Escalante National Monument

76. The Monument remains a wellspring of significant scientific research, which would be drastically undermined by the elimination of extensive Monument protections. Scientists flock to Grand Staircase because it is a landscape protected for its scientific values. In 2014, for example, the last year for which public data is available, more than 30 institutions from four countries conducted research in the Monument, including: Brigham Young University, University of Nevada-Las Vegas, Chicago Botanic Garden, Desert Botanical Garden, University of Utah, Northern Arizona University, Nagoya University (Japan), James Cook University (Australia), National de la Recherche Scientifique (France), University of Nebraska, University of Pennsylvania, San Diego State University, California State Polytechnic University, Denver Museum of Nature and Science, Northwestern University, University of Massachusetts-Amherst, Penn State University, Massachusetts Institute of Technology, University of North Florida, Idaho State University, Missouri Southern State University, Museum of Northern Arizona, Norbert College, Weber State University, Midwestern University, Raymond Alf Museum, Colorado Mesa University, Montana State University, Utah State University, Colorado State University, and the Academy of Natural Sciences of Philadelphia. *See* Bureau of Land Mgmt., U.S. Dep't of

the Interior, Grand Staircase-Escalante National Monument Manager's Annual Report FY 2014 at 26–43 (2015).

77. Researchers have unearthed groundbreaking paleontological discoveries within the Monument, discoveries which continue to be made. *See* Bureau of Land Mgmt., U.S. Dep't of the Interior, Grand Staircase-Escalante National Monument Manager's Annual Report FY 2014 at 49–50 (2015). For instance:

a. Since 1996, researchers have discovered over 45 new paleontological species—including 12 new species of dinosaurs—and over 300 taxa total within the Kaiparowits Plateau alone. *See* Jeffrey G. Eaton & Richard L. Cifelli, *Review of Late Cretaceous Mammalian Faunas of the Kaiparowits and Paunsaugunt Plateaus, Southwestern Utah, in At the Top of the Grand Staircase: the Late Cretaceous of Southern Utah* 319–28 (Alan L. Titus & Mark A. Loewen, ed. 2013); Alan L. Titus, Jeffrey G. Eaton & Joseph Sertich, *Late Cretaceous Stratigraphy and Vertebrate Faunas of the Markagunt, Paunsaugunt, and Kaiparowits Plateaus, Southern Utah*, 3 Geology of the Intermountain West 229, 229–91 (2016), https://www.utahgeology.org/openjournal/index.php/GIW/article/view/10/10. According to these experts, only 6 percent of the Kaiparowits Plateau has even been inventoried. *Id.*

b. All of the Monument has paleontological potential according to BLM's own paleosensitivity map. The potential ranking has five categories ranging from "low" to "high". None of the Monument is ranked as "low" and a considerable area of the Kaiparowits Plateau, especially the areas

where the Kaiparowits, Wahweap, and Tropic Shale Formations are exposed at the surface, ranks as "high." The amount of bone exposed in the latter areas exceeds all but the most fossiliferous units anywhere in the world: "high" is thus exceptionally high. The areas ranked as "medium" to "medium-high" include the Moenkopi and Chinle Formations, and can only be characterized as such in relation to the Kaiparowits Plateau. Both of these formations have abundant paleontological sites and are units that are generally recognized to be highly fossiliferous when considered on their own merits rather than in comparison with the truly exceptional Kaiparowits. Similarly, the "low-medium" areas are only characterized as such in relation to the Kaiparowits Plateau. These sites are also recognized on their own merits as fossiliferous. A true and correct copy of this map is attached as Exhibit B.

c. National Landscape Conservation System funding tied to Monument status has allowed researchers to make numerous vertebrate, invertebrate, and paleobotanical discoveries within the Monument. For example, for over 16 years, this funding has allowed the Natural History Museum of Utah, located in Salt Lake City, to inventory 964 paleontological localities and collect over 2000 fossil specimens on the Kaiparowits Plateau alone.

d. The sedimentary rocks also offer a remarkable faunal diversity, including the highest diversity of the iconic frilled herbivorous dinosaurs (known as ceratopsians) worldwide from a single time period. *See* Titus, et al., *supra*, ¶ 77.a. Discoveries include the oldest tyrannosaur, the oldest

named ancestor of *Tyrannosaurus rex* (*Lythronax argestes*), and the oldest named ceratopsian (*Diabloceratops eatoni*), a relative of the iconic *Triceratops*. *See* Mark A. Loewen, et al., *Ceratopsid Dinosaurs from the Grand Staircase of Southern Utah*, *in At the Top of the Grand Staircase: the Late Cretaceous of Southern Utah* 488–503 (Alan L. Titus & Mark A. Loewen, eds. 2013); Mark A. Loewen, et al., *Tyrant Dinosaur Evolution Tracks the Rise and Fall of Late Cretaceous Oceans*, 8 PLoS One 1 (2013), https://www.researchgate.net/publication/258504134_Tyrant_Dinosaur_Evolution_Tracks_the_Rise_and_Fall_of_Late_Cretaceous_Oceans (last visited Dec. 2, 2017).

e. Fossil preservation within the Monument is often exceptional, with dinosaur specimens exhibiting soft tissue preservation of skin, beaks, and claws. *See* Titus, et al., *supra*, ¶ 77.a. For example, as recently as September 2017, a remarkably well-preserved subadult specimen of *Teratophoneus currie* was excavated and airlifted out of the Monument for further study at the Natural History Museum of Utah. Paleontologists believe they recovered at least three-quarters of the whole skeleton, including the skull. According to Dr. Randall Irmis, who led the excavation, "these species that we're finding in Grand Staircase-Escalante National Monument, whether they be dinosaurs or crocodiles or turtles or mammals, they're only found in this one place. . . . They're found nowhere else on Earth." Meghan Bartels, *Teenage Dinosaur Fossil Discovery Reveals What Puberty Was Like for a Tyrannosaur*, Newsweek

(Oct. 20, 2017), http://www.newsweek.com/teenage-dinosaur-fossil-discovery-reveals-puberty-tyrannosaur-689448 (last visited Dec. 2, 2017).

78. The protections that flow from the creation of Grand Staircase safeguard sites for future paleontological research, as well. Without such protections, the paleontological resources would be under threat. For example, coal mining and shale gas production are major threats to such resources. The Straight Cliffs Formation, in particular, is one of the most fossiliferous, scientifically important non-marine units of its age to be protected with national monument status. It is interlayered with the coal beds of the Kaiparowits Plateau and preserves unique fossils from an interval of time that cannot be studied in detail anywhere else in the world. This formation may, under the December Proclamation, be subject to coal extraction. Similarly, the Tropic Shale is a scientifically important marine unit of the Kaiparowits Plateau because it preserves evidence for a Cretaceous extinction event driven by low oxygen levels in the Earth's ancient oceans that was associated with an ecological turnover in marine reptiles from an ecosystem dominated by pliosaurs and ichthyosaurs to one dominated by plesiosaurs and mosasaurs. The Tropic Shale has been identified as having shale gas potential. *See* Steven Schamel, Utah Dep't of Nat. Res., Shale Gas Resources of Utah: Assessment of Previously Undeveloped Gas Discoveries 499 (2006), http://files.geology.utah.gov/online/ofr/ofr-499.pdf. (last visited Dec. 3, 2017). Gas drilling and fracking activities would fragment the fossils in the shale and alter its sediments. On information and belief, these destructive extractive activities are facilitated by the change in monument status.

79. Grand Staircase continues to maintain a remarkable degree of biological diversity. *See* Bureau of Land Mgmt., U.S. Dep't of the Interior, Grand Staircase-Escalante National Monument Manager's Annual Report FY 2014 at 54–63 (2015). For example:

a. The Monument contains a significant percentage of Utah's rare and endemic plant species and a significant percentage of all the plants found in Utah. *See* Leila M. Shultz, *Patterns of Endemism in the Utah Flora, in Proceedings of the Southwestern Rare and Endangered Plant Conference* 249–63 (Robert Sivinski and Karen Lightfoot, eds. 1992), https://www.researchgate.net/publication/264704907_Patterns_of_endemism_in_the_Utah_Flora (last visited Dec. 2, 2017).

b. More than 650 bee species are now described within Grand Staircase. *See* Olivia Messinger Carril, *Bee Haven: The Significance of Grand Staircase-Escalante National Monument for Native Bees, in Learning from the Land: Science Summary, 2006-2016* at 8 (2016).

c. The diversity of aquatic invertebrates in the Monument is consistently higher—with up to three times more species—than in other locations. *See* Mark R. Vinson & Eric C. Dinger, *Aquatic Invertebrates of the Grand Staircase–Escalante National Monument, Utah*, 53 Southwestern Naturalist 301, 374–84 (2008), https://www.researchgate.net/publication/232673708_Aquatic_Invertebrates_Of_the_Grand_Staircase-Escalante_National_Monument_Utah (last visited Dec. 2, 2017).

80. On information and belief, extensive elimination of the Monument's protections will inevitably lead to habitat changes that will permanently harm this diversity.

81. The Monument continues to be a rich source of historic and archaeological discovery, too. *See* Bureau of Land Mgmt., U.S. Dep't of the Interior, Grand Staircase-Escalante National Monument Manager's Annual Report FY 2014 at 51–54 (2015). For instance:

a. A Paleoarchaic site in the Monument has provided researchers with evidence of a wild ancestor of the turkey, which may have been the source of turkeys used during the Ancestral Puebloan era. This discovery has contributed to an enhanced understanding of cultural migration and trade patterns. *See* Bradley A. Newbold, et al., *Early Holocene Turkey* (Meleagris gallopavo) *Remains from Southern Utah: Implications for the Origins of the Puebloan Domestic Turkey, in Learning from the land: Science Summary, 2006-2016* at 4 (2016).

b. Research is being conducted in the Monument on unusual features known as "cup and channel" petroglyphs—geometric carvings that often involve a long, straight channel ending in a small, shallow basin. These unique petroglyphs are exceptionally large (in some cases up to two meters long), and can be found at prominent locations. It has been theorized that they were used to indicate important places, but their definitive function remains undetermined. *See* Michael L. Terlep, *Water, Pitch, and Prehistoric Indexes: An Analysis of Cup and Channel Petroglyphs, in Learning from the land: Science Summary, 2006-2016* at 5 (2016).

c. Archaeologists in the Grand Staircase have also reconstructed climate, fire, and vegetation patterns spanning back 7,300 years for Fiftymile Mountain and nearly 1,650 years for Johnson Canyon. *See* Robert M. D'Andrea, et al., *Paleoecology of Grand Staircase-Escalante National Monument: Human Landscape Impacts and Management Implications on*

the Colorado Plateau, in Learning from the Land: Science Summary, 2006-2016 at 1 (2016).

d. More broadly, the Monument is well-known as the point of contact for the Fremont and Ancestral Puebloan cultures. *See, e.g.*, Florence C. Lister, *Kaiparowits Plateau and Glen Canyon Prehistory: An Interpretation Based on Ceramics*, 71 U. Utah Anthropological Papers iii, iii–92 (1964). Researchers have used ceramics, site plans, and architecture found within the Monument to understand migration and interaction patterns between these cultures. *See* Joel C. Janetski, Lane D. Richens & Richard K. Talbot, *Fremont-Anasazi Boundary Maintenance and Permeability in the Escalante Drainage, in Learning from the Land: Science Summary, 2006-2016* at 2 (2016).

e. Site density analyses of archaeological inventory projects within the Monument indicate that over 100,000 archaeological sites may lie within Grand Staircase's boundaries. *See* David B. Madsen, Utah Geological Survey, *A Preliminary Assessment of Archaeological Resources within the Grand Staircase-Escalante National Monument, Utah* 5, Utah Dep't of Nat. Res. (1997), https://ugspub.nr.utah.gov/publications/circular/C-95.pdf (last visited Dec. 3, 2017).

82. On information and belief, extensive elimination of the Monument's protections endangers both the resources underlying many of these discoveries—by weakening protections against vandalism and looting, for example—and the process of discovery itself by permanently undermining the opportunities for scientific research.

83. The Monument also continues to preserve historical resources from more recent eras. Historic resources associated with the Paiute, Ute, Hopi, Zuni, and Navajo are contained within Grand Staircase's boundaries. Further, resources from an important era of Mormon history are protected, including the famous Hole-in-the-Rock trail. On information and belief, the elimination of the Monument's protections will threaten many of these more recent historical resources.

Grand Staircase-Escalante National Monument and the Surrounding Communities

84. Designation and reservation of Grand Staircase-Escalante National Monument has been a boon to the local communities and economies. BLM purposefully located major visitor centers and other visitor opportunities in nearby towns instead of within the Monument itself, which had the intended effect of ensuring that the economic development generated by the Monument was situated in the surrounding communities. *See* Grand Staircase Management Plan at iv. Surrounding communities such as Kanab, Escalante, and Boulder have seen a proliferation of small businesses, and there are now over 100 outfitters and guides with business operations tied to the Monument. Moreover, total employment in the Monument region has grown since Grand Staircase's creation: the population has grown by 13 percent between 2001 and 2015 and jobs have grown by 24 percent. *See* Headwaters Economics, *The Economic Importance of National Monuments to Local Communities: Grand Staircase-Escalante National Monument Fact Sheet* 1 (2017). The elimination of Grand Staircase's protections threatens these gains.

85. This same pattern of economic dynamism is seen at the county level, too, with surrounding Kane and Garfield Counties experiencing continuous and sizeable economic benefits, including economic diversification, greater employment opportunities, and improved

per capita income. *See id.* at 1–2. Extensive elimination of Grand Staircase's protections threatens these gains.

86. Prior to the Monument's creation, employment had begun to shift away from traditional commodity-based industries and toward more sustainable service-based industries. This trend has continued. Professional services jobs (*e.g.*, doctors and engineers) have grown 42 percent from 2001 to 2015 and comprise much of the employment growth in the Monument region. *See* Headwaters Economics, *The Economic Importance of National Monuments to Local Communities: Grand Staircase-Escalante National Monument Fact Sheet* 1 (2017). This growth has not come at the expense of traditional jobs in areas such as agriculture, mining, and timber: "[l]ong before the monument's creation, commodity industries . . . were becoming a smaller share of the overall economy in the Grand Staircase-Escalante Region. These industries remain part of the region's economy today." *Id*. The elimination of Grand Staircase's protections threatens this more robust economic structure.

87. As expected, this robust job growth and economic development has positively impacted personal income. *See id.* at 1. Garfield County experienced average annual real per capita personal income growth that outperformed Utah's average throughout the 2000s and between 2010 and 2015. *See* Pacific Northwest Regional Economic Analysis Project, *Garfield County vs. Utah Comparative Trend Analysis: Per Capita Personal Income Growth and Change, 1969-2015*, https://utah.reaproject.org/analysis/comparative-trends-analysis/per_capita_personal_income/tools/490017/490000/. The extensive elimination of Grand Staircase's protections threatens these gains.

88. Aside from direct economic benefits, the communities have also benefitted from having a more direct and concrete role in advising BLM on land management decisions within

the Monument. Under the Grand Staircase Management Plan, the Secretary of the Interior established a Monument Advisory Committee. *See* Grand Staircase Management Plan at 66. This committee was comprised of members with expertise in archaeology, paleontology, geology, botany, wildlife biology, history, social science, and systems ecology. Members also included an elected official from Garfield County, an elected official from Kane County, a state or tribal government representative, an educator, a representative of the environmental community, an outfitter and guide that operates within Grand Staircase, and a livestock grazing permittee operating within the Monument. The Committee met quarterly to solicit input on management decisions. Robust community input was thus institutionally woven into the Monument's management. Defendant Zinke suspended the Monument Advisory Committee in May 2017.

89. Grand Staircase has also been woven into the region's cultural experience and opportunities, as evidenced by the numerous festivals celebrating the community connections to the Monument, including the Boulder Heritage Festival, the Escalante Canyons Arts Festival, and the Amazing Earthfest in Kanab. The extensive elimination of Grand Staircase's protections will weaken and undermine these cultural community offerings.

90. Additionally, Grand Staircase provides important educational opportunities. Indeed, one of Grand Staircase Escalante Partners's key roles is connecting the community with groundbreaking science and discoveries coming out of the Monument. K-12 students across the gateway communities of Grand Staircase have the opportunity to experience directly the science and cultural significance of the region as an integrated component of their education. *See* Bureau of Land Mgmt., U.S. Dep't of the Interior, Grand Staircase-Escalante National Monument

Manager's Annual Report FY 2014 at 15–21 (2015). The extensive elimination of Grand Staircase's protections will substantially undermine these educational opportunities.

The 2017 Monument Review

91. On February 22, 2017, Senator Orrin Hatch (R-UT) announced that he discussed rescinding or reducing Grand Staircase with Defendant Trump in order to facilitate industrial development of the coal reserves underlying the Kaiparowits Plateau in the Grand Staircase. He stated that "[President Trump] would be able legally to create the access to this great treasure that may save Utah and the country someday" by eliminating Grand Staircase's protections. Lisa Riley Roche, *Hatch Tells State Lawmakers Trump Looking at Bears Ears, Grand Staircase*, Deseret News (Feb. 22, 2017, 2:46 PM), http://www.deseretnews.com/article/865673984/Hatch-tells-state-lawmakers-Trump-looking-at-Bears-Ears-Grand-Staircase.html (last visited Dec. 2, 2017).

92. On April 26, 2017, Defendant Trump signed Executive Order 13792, mandating that Defendant Zinke review "all Presidential designations or expansions of designations under the Antiquities Act made since January 1, 1996, where the designation covers more than 100,000 acres, where the designation after expansion covers more than 100,000 acres, or where the Secretary determines that the designation or expansion was made without adequate public outreach and coordination with relevant stakeholders." 82 Fed. Reg. 20,429, 20,429 (May 1, 2017). After a 120-day review timeframe, Secretary Zinke was to recommend "Presidential actions, legislative proposals, or other actions consistent with law as the Secretary may consider appropriate to carry out the policy" in the order. *Id.* at 20,430.

93. The date range for the Monument Review indicates that the review was specifically structured to include Grand Staircase, which was created in 1996. *See* Amy Joi

O'Donoghue, *Interior Secretary Zinke: Bears Ears at Center of National Monument Review*, Deseret News (Apr. 25, 2017, 7:10 PM), http://www.deseretnews.com/article/865678594/Interior-Secretary-Zinke-Bears-Ears-at-center-of-national-monument-review.html (describing Grand Staircase as one "bookend" of the review). The review also focused on Bears Ears National Monument in Utah, which was created in 2016, and several other national monuments. For the avoidance of any doubt, Bears Ears National Monument is entirely separate from Grand Staircase and this complaint is focused only on actions affecting Grand Staircase.

94. On May 10, 2017, Defendant Zinke arrived at Grand Staircase as part of the Monument review process. During the day, he toured a small portion of the Monument on foot with Michael Noel, a Utah state representative who had introduced a resolution in the Utah House of Representatives calling for Congress to drastically reduce Grand Staircase. *See* H.C.R. 12, 2017 Leg., Gen. Sess. (Utah 2017). Defendant Zinke also took a two-hour helicopter tour of the Monument area prior to departing. *See* Tracie Sullivan, *On the Ground with Zinke: Grand Staircase Trip Brings 'Optimism'*, St. George News (May 11, 2017), https://www.stgeorgeutah.com/news/archive/2017/05/11/tds-on-the-ground-with-zinke-grand-staircase-trip-brings-optimism (last visited Dec. 2, 2017). Defendant Zinke refused to meet with representatives of Plaintiffs Grand Staircase Escalante Partners or Conservation Lands Foundation during his visit to Utah, and Defendant Zinke also refused to meet with representatives of numerous local businesses, including the Escalante-Boulder Chamber of Commerce. During the same visit, Defendant Zinke stated that Defendant Trump wishes to develop "all energy sources" and that "energy has to be abundant, reliable and affordable and coal has taken huge hits and the [P]resident and I believe inappropriately so." *Id.*

95. On May 25, 2017, Plaintiff Society of Vertebrate Paleontology submitted comments to the Department of the Interior as part of the review process expressing support for Grand Staircase and strongly opposing any changes to the Monument's boundaries or management. The comments detailed the critical role that Grand Staircase plays in paleontological research and the importance of maintaining Grand Staircase's boundaries for that research. *See* Comments of the Society of Vertebrate Paleontology, DOI-2017-0002-100908 (filed May 25, 2017), https://www.regulations.gov/document?D=DOI-2017-0002-100908 (follow Attachment "PDF" hyperlink at bottom of page) (last visited Dec. 2, 2017).

96. On May 27, 2017, Plaintiff Conservation Lands Foundation submitted comments to the Department of the Interior as part of the review process supporting Grand Staircase and strongly opposing any changes to the Monument's boundaries or management. *See* Comments of the Conservation Lands Foundation and the Wilderness Society, DOI-2017-0002-112216 (filed May 26, 2017), https://www.regulations.gov/document?D=DOI-2017-0002-112216 (follow Attachment "PDF" hyperlink at bottom of page) (last visited Dec. 2, 2017).

97. On July 07, 2017, Plaintiff Grand Staircase Escalante Partners submitted extensive comments to the Department of the Interior as part of the review process: supporting Grand Staircase; demonstrating the continuing need for protection of its paleontological, archaeological, historic, and geologic resources; enumerating its ongoing benefits for the surrounding communities; and strongly opposing any changes to the Monument's status, boundaries, or management. *See* Comments of Grand Staircase Escalante Partners, DOI-2017-0002-574082 (filed Jul. 7, 2017), https://www.regulations.gov/document?D=DOI-2017-0002-574082 (follow Attachment "PDF" hyperlink at bottom of page) (last visited Dec. 2, 2017).

98. On July 10, 2017, the review comment period closed. Regulations.gov reflects 2,836,268 individual comments in this proceeding. Studies of these comments reveal overwhelming support for maintaining monument protections. *See* Aaron Weiss, *America to Trump and Zinke: Don't Touch National Monuments*, Westwise: Center For Western Priorities Blog (Jul. 10, 2017), https://medium.com/westwise/america-to-trump-and-zinke-dont-touch-national-monuments-8f4b40c43599 (finding that 98 percent of submissions "express support for keeping or expanding national monument designations" with 1 percent neutral and 88 percent support for monuments from Utah submissions) (last visited Dec. 2, 2017).

99. On August 24, 2017, Defendant Zinke sent a report with his national monument recommendations to Defendant Trump. The report was not made public. Instead, the Department of the Interior released a one-and-a-half page summary that contained no details. The Washington Post later reported that Defendant Zinke had recommended the elimination of protections for Grand Staircase. *See* Juliet Eilperin & Darryl Fears, *Interior Secretary Recommends Trump Alter at Least Three National Monuments, Including Bears Ears*, The Washington Post (Aug. 24, 2017), https://www.washingtonpost.com/news/energy-environment/wp/2017/08/24/interior-secretary-recommends-trump-alter-a-handful-of-national-monuments-but-declines-to-reveal-which-ones/?utm_term=.50aa41ac9bfb (last visited Dec. 2, 2017).

100. On September 17, 2017, the Washington Post obtained and made public Defendant Zinke's national monuments recommendations. *See* Juliet Eilperin, *Shrink At Least 4 National Monuments and Modify a Half-Dozen Others, Zinke Tells Trump*, The Washington Post (Sept. 17, 2017), https://www.washingtonpost.com/national/health-science/shrink-at-least-4-national-monuments-and-modify-a-half-dozen-others-zinke-tells-trump/2017/09/17/a0df45cc-

9b48-11e7-82e4-f1076f6d6152_story.html?utm_term=.db9a4c243bd8 (last visited Sept. 17, 2017). The recommendations noted the large deposits of coal and oil resources underlying Grand Staircase and recommended that "[t]he Proclamation should be amended, through the use of appropriate authority, including lawful exercise of the President's discretion granted by the [Antiquities] Act, to protect objects and prioritize public access; infrastructure upgrades, repair, and maintenance; traditional use; tribal cultural use; and hunting and fishing rights." Defendant Zinke also recommended that "[t]he boundary should be revised through the use of appropriate authority, including lawful exercise of the President's discretion granted by the [Antiquities] Act." Finally, Defendant Zinke recommended that "[t]he management plan should be revised to continue to protect and prioritize public access; infrastructure upgrades, repair, and maintenance; traditional use; tribal cultural use; and hunting and fishing rights" and that "[t]he DOI should work with Congress to secure funding for adequate infrastructure and management needs to protect object efficiently." The report contained no rationale for these recommendations, made no detailed recommendations, and wholly lacked substantive discussion of the sensitive resources that the Monument was created to protect.

101. On October 27, 2017, Defendant Trump announced to Senator Orrin Hatch that he was "**approving the Bears Ears and Grand Staircase recommendation for you, Orrin.**" Jennifer Yachnin, *Trump to Slash Bears Ears, Grand Staircase—Hatch*, E&E News (Oct. 27, 2017), https://www.eenews.net/eenewspm/stories/1060064939/ (emphasis added) (last visited Dec. 2, 2017). For his part, Senator Hatch announced that Defendant Trump "would modify the Grand Staircase to allow coal mining in the Kaiparowits Plateau." Thomas Burr & Brian Maffly, *Trump Headed to Utah in December with Plans to Shrink Bears Ears and Grand Staircase*, The

Salt Lake Tribune (Oct. 27, 2017), http://www.sltrib.com/news/politics/2017/10/27/trump-tells-sen-orrin-hatch-hell-shrink-the-bears-ears-national-monument/ (last visited Dec. 2, 2017).

Lands and Sensitive Resources Removed from the Monument by the December Proclamation

102. On information and belief, Defendant Trump's December Proclamation, *see supra*, ¶¶ 11–13, excludes more than 65,000 acres that were specifically added to the Monument by Congress when it ratified the land exchange agreement between Utah and the Federal Government. *See* Utah Schools and Lands Exchange Act, Pub. L. No. 105-335, § 3, 112 Stat. 3139, 3141 (1998).

103. The areas eliminated from the Monument by the December Proclamation contain numerous sensitive resources, including objects specifically identified in the 1996 Proclamation. Geological formations such as the Waterpocket Fold, portions of the Kaiparowits Plateau, and the Grand Staircase cliff sequence have been removed or fractured. Historical locations such as archaeological sites in the Circle Cliffs and the Hole-in-the-Rock trail have been excluded and carved up. Biological resources, such as bear habitat, desert bighorn sheep habitat, and the Paria River wildlife corridor and been split or removed from the Monument. These objects and lands depend upon Grand Staircase as a cohesive, undeveloped unit for their continued protection. The December Proclamation upends that cohesion and immediately threatens the continued integrity of these resources and others.

104. The December Proclamation will have a particularly destructive impact on the Monument's paleontological resources. On information and belief:

a. At least 400 scientifically important fossil sites have been excluded by the new monument boundaries.

b. All of the Monument's oldest fossils that document the largest mass extinction in Earth's history and its subsequent recovery have been excluded.

c. Much of the petrified forest referred to in the 1996 Proclamation has been excluded. This is the largest example of petrified forest outside of Arizona. Trunks of ancient *Araucarioxylon* trees are preserved in a large section of the Circle Cliffs area. These fossils also contain some of the earliest evidence for insect metamorphosis in which larvae (like grubs and caterpillars) have completely different forms and lifestyles from adults (like bugs and butterflies).

d. The excluded area south of Escalante (near Camp Flats) includes some of the most important sites in the Wahweap Formation, which was named in the 1996 Proclamation, including the site where the unique horned dinosaur *Machairoceratops* was discovered. It also includes the place where only known specimen of a new species of nodosaur (a relative of ankylosaurus, the armored dinosaur) was discovered and where there is a major hadrosaur (duck-billed dinosaur) bonebed.

e. All of the Naturita (Dakota) Formation mammal localities from Bulldog Bench outside of Cannonville have been removed from the Monument. This is the only Cenomanian nonmarine vertebrate fauna in the world and has produced many "type" species of mammals, which are the scientific reference standard for future evaluations of those findings.

f. Outside of Henrieville, the best microvertebrate locality (site with tiny fossils that represent small and often rare species) from the Turonian age in North America (Smoky Hollow Member of the Straight Cliffs) has been eliminated from the Monument.

g. The Kaibab Limestone geological unit is a widespread and important layer in western North America, extending into the Grand Canyon, for example. Its "type" area—where the defining characteristics of the bed (its color, texture, composition, chemistry, fossil contents, and age) are studied in a particular location and then used to trace the bed over sometimes large distances—is excluded by the new monument boundaries.

h. Virtually all of the Tropic Shale—which was specifically named in the 1996 Proclamation—has been excluded. The Tropic Shale is one of the only fully marine geological units in the Monument—from when this region was covered by water eons ago—and is part of the Late Cretaceous aged sequence of ecosystems referred to in the 1996 Proclamation. The Tropic Shale captures a critical moment in the transition from pliosaur/ichthyosaur dominated oceans from the Early Cretaceous and Jurassic to the polycotylid and mosasaur dominated seas of the Late Cretaceous. Loss of the Tropic Shale resource would destroy our ability to understand this transition. Important paleontological resources preserved in the Tropic Shale include: evidence for extinction that preceded the asteroid impact at end of the Cretaceous that killed the dinosaurs; the Earth's earliest mosasaurs, which were giant marine lizards

from the time of the dinosaurs; the very last pliosaur, a giant apex predator of these ancient seas, named *Brachauchenius*; and missing links in the origin of polycotylid plesiosaurs, which were long-necked marine reptiles that became extinct at the end of the Cretaceous period.

105. On information and belief, the December Proclamation undermines the protections necessary for preserving both the sensitive resources described above and others.

106. The December Proclamation disregards overwhelming public and scientific comments delineating the extensive public benefits that accrue from the protection and preservation of these resources and public lands.

CLAIMS FOR RELIEF

COUNT ONE

(The President Lacks Constitutional Authority to Eliminate National Monument Protections)

107. Plaintiffs restate and incorporate all the foregoing paragraphs of this Complaint as though fully set forth herein.

108. Judicial review is available to ensure that actions of the President are consistent with the Constitution and to ensure that the President has not usurped Congress' powers.

109. The U.S. Constitution explicitly grants to Congress plenary and exclusive authority over federal lands. *See* U.S. Const. art. IV, § 3, cl. 2.

110. The U.S. Constitution grants no authority over federal lands to the President.

111. Through the Antiquities Act, Congress has delegated to the President only the authority to create national monuments. The Antiquities Act delegated to the President no authority to eliminate or otherwise compromise national monument protections in part or in full.

112. Accordingly, Defendants' attempt to eliminate Grand Staircase-Escalante National Monument's protections is an unconstitutional exercise of legislative authority by the Executive Branch in violation of the Constitution's separation of powers.

113. Plaintiffs and their members have no adequate remedy at law and absent relief from this Court will suffer irreparable injury flowing from President Trump's unlawful action.

COUNT TWO

(The President's Action Is Ultra Vires as the Antiquities Act Does Not Authorize the Elimination of National Monument Protections)

114. Plaintiffs restate and incorporate all the foregoing paragraphs of this Complaint as though fully set forth herein.

115. The Antiquities Act delegates limited authority to the President to declare national monuments and reserve land as part of such monuments.

116. The Antiquities Act does not explicitly or implicitly grant authority to eliminate national monument protections in part or in full.

117. The Antiquities Act does not explicitly or implicitly grant authority to the President to subsequently decide that duly protected objects are no longer worthy of protection.

118. Congress has never amended the Antiquities Act to grant the President such additional authority over national monuments, despite attempts to do so.

119. Congress has amended the Antiquities Act only to further *restrict* Presidential authority regarding the creation of national monuments.

120. Congress has repeatedly demonstrated that it retains the sole power to eliminate national monument protections.

121. Accordingly, Defendants' attempt to eliminate Grand Staircase-Escalante National Monument's protections is not authorized by the Antiquities Act and is *ultra vires*.

122. Plaintiffs and their members have no adequate remedy at law and absent relief from this Court will suffer irreparable injury flowing from Defendant Trump's unlawful action.

COUNT THREE

(The President's Action Is Unconstitutional and Ultra Vires as Congress Has Asserted Its Sole Prerogative over Grand Staircase-Escalante National Monument)

123. Plaintiffs restate and incorporate all the foregoing paragraphs of this Complaint as though fully set forth herein.

124. The President has no authority to alter reservations or withdrawals of federal lands specifically enacted by Congress.

125. Congress has asserted its sole prerogative over the Monument by legislatively recognizing the protections and full boundaries of Grand Staircase-Escalante National Monument after its creation, ratifying its existence and dimensions.

126. Congress has asserted its sole prerogative over the Monument by repeatedly adjusting the boundaries of Grand Staircase-Escalante National Monument through legislative enactments.

127. Congress has asserted its sole prerogative over the Monument by adding land to and removing land from Grand Staircase-Escalante National Monument, legislatively establishing its boundaries.

128. Congress has asserted its sole prerogative over the Monument by permanently establishing the National Landscape Conservation System and the units that System is composed of, which includes Grand Staircase-Escalante National Monument.

129. Defendants' attempt to eliminate Grand Staircase-Escalante National Monument's protections encroaches on this Congressional prerogative and is unconstitutional, *ultra vires*, and without legal effect.

130. Plaintiffs and their members have no adequate remedy at law and absent relief from this Court will suffer irreparable injury flowing from President Trump's unlawful action.

COUNT FOUR

(Alternatively, the Elimination of Grand Staircase-Escalante National Monument's Protections Has No Factual or Legal Basis and is Ultra Vires on These Grounds)

131. Plaintiffs restate and incorporate all the foregoing paragraphs of this Complaint as though fully set forth herein.

132. Even if the Court were to find that the President has some authority to eliminate national monument protections, the Antiquities Act does not grant the President *carte blanche* authority to overturn properly promulgated Monument proclamations.

133. While the President has significant discretion in how designations occur under the Antiquities Act, that discretion is not boundless. In order to overturn a properly promulgated and judicially sanctioned prior proclamation and for such action to remain within the bounds of the Antiquities Act's delegation, the President needs a clear basis for overcoming the prior Presidential determination. Moreover, the President is not authorized to import non-statutory standards into the Antiquities Act to determine when "objects" are no longer worthy of protection.

134. When Grand Staircase-Escalante National Monument was established in 1996, the Monument protected numerous sensitive resources, including a plethora of geological, archaeological, paleontological, historical, prehistorical, and biological objects. The Monument has been widely regarded as the "Science Monument."

135. Because the resources protected by the establishment of the Monument are not concentrated in a single area of the Monument, but rather distributed throughout the entire area

of the Monument, they are dependent upon its undeveloped state as a key element for their continued protection.

136. Since the 1996 establishment, new sensitive resources have been discovered throughout the Monument and surveys indicate that many more sensitive resources await discovery, further demonstrating the world-class nature of the resources at the Monument.

137. The December Proclamation eliminates monument protections for myriad sensitive resources identified as worthy of protection by the 1996 Proclamation. The Proclamation fails to articulate the clear, legal basis for undoing the 1996 Proclamation and eliminating these protections.

138. Accordingly, Defendants' grounds for eliminating protections from Grand Staircase-Escalante National Monument and its sensitive resources are without basis in law or fact and thus *ultra vires*.

139. Plaintiffs and their members have no adequate remedy at law and absent relief from this Court will suffer irreparable injury from Defendants' actions.

COUNT FIVE

(*Defendant Zinke Is Obligated to Manage Grand Staircase-Escalante National Monument Consistent with the Superstructure Created by Federal Lands Management Laws, Including the Grand Staircase Management Plan*)

140. Plaintiffs restate and incorporate all the foregoing paragraphs of this Complaint as though fully set forth herein.

141. The Administrative Procedure Act creates a right of action for any person adversely affected by final agency action or failure to act, and waives the federal government's sovereign immunity. 5 U.S.C. § 706(2).

142. The Grand Staircase Management Plan, Federal Land Management and Policy Act, and National Environmental Policy Act, *inter alia*, constitute a superstructure of federal law that impose bounds on the Secretary of the Interior, through the Bureau of Land Management, in actions affecting Grand Staircase-Escalante National Monument.

143. The laws referred to at ¶ 158, *supra*, also specify procedures that a federal official must follow in order to modify any of Grand Staircase's protections through changes to its management plan or structure.

144. Eliminating national monument protections from land and resources will result in immediate changes to the management of those lands and resources.

145. By shrinking Grand Staircase's boundaries, Defendant Trump and Defendant Zinke attempt to change by fiat the management regime applicable to hundreds of thousands of acres of land and the innumerable resources contained thereon.

146. Additionally, Defendant Trump and Defendant Zinke attempt to change the management regime applicable to the diminished monument by allowing for increased access by vehicles and more intensive vegetation management practices.

147. Accordingly, Defendant Trump and Defendant Zinke are not authorized to circumvent the laws Congress has passed governing the management of federal lands. Defendants remain obligated to manage the lands comprising Grand Staircase according to the terms of the approved Grand Staircase Management Plan and to follow the procedures specified in FLPMA and NEPA if they wish to undertake modifications to the management regime governing the lands and resources comprising Grand Staircase-Escalante National Monument.

148. Plaintiffs and their members have no adequate remedy at law and absent relief from this Court will suffer irreparable injury from Defendants actions.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs Grand Staircase Escalante Partners, Society of Vertebrate Paleontology, and Conservation Lands Foundation respectfully request that the Court enter judgment in favor of Plaintiffs and against Defendants, as follows:

A. A declaration that:

i. the December Proclamation is not authorized by Article II of the U.S. Constitution and is an impermissible violation of the separation of powers;

ii. the December Proclamation exceeds his delegated power under the Antiquities Act and is *ultra vires*;

iii. the December Proclamation exceeds his delegated power under the post-proclamation assertions of Congress' sole prerogative over the Monument and is *ultra vires*;

iv. The 1996 Proclamation remains operative with regard to the objects identified in that Proclamation and lands within the original boundaries of Grand Staircase-Escalante National Monument, as modified by Congress; and

v. Secretary Zinke is obligated to manage Grand Staircase-Escalante National Monument pursuant to terms of the 1996 Proclamation.

B. An injunction:

i. barring President Trump and Secretary Zinke from recognizing, enforcing or otherwise carrying out the December Proclamation;

ii. requiring President Trump to recognize that the 1996 Proclamation remains operative;

iii. barring Secretary Zinke from issuing any regulations or other administrative orders pursuant to the December Proclamation; and

iv. requiring Secretary Zinke to comply with the provisions of the 1996 Proclamation.

C. An award of attorney's fees, expenses, and costs; and

D. Granting such other and further relief as the Court may deem just and proper.

Respectfully submitted,

December 04, 2017

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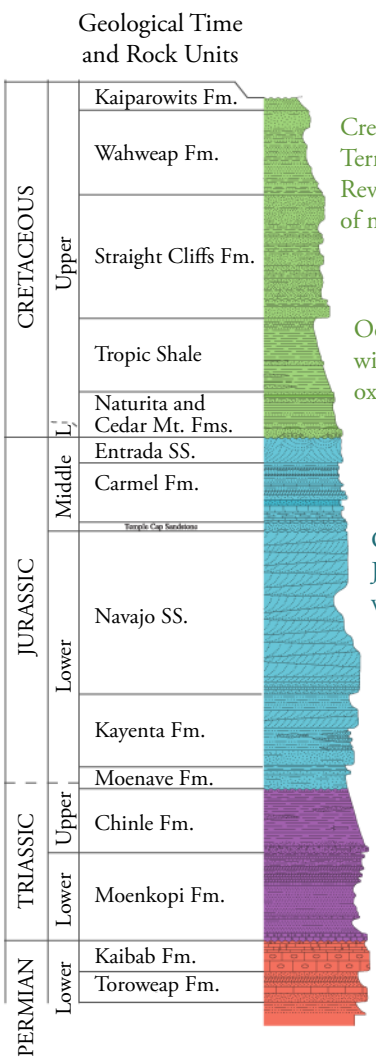
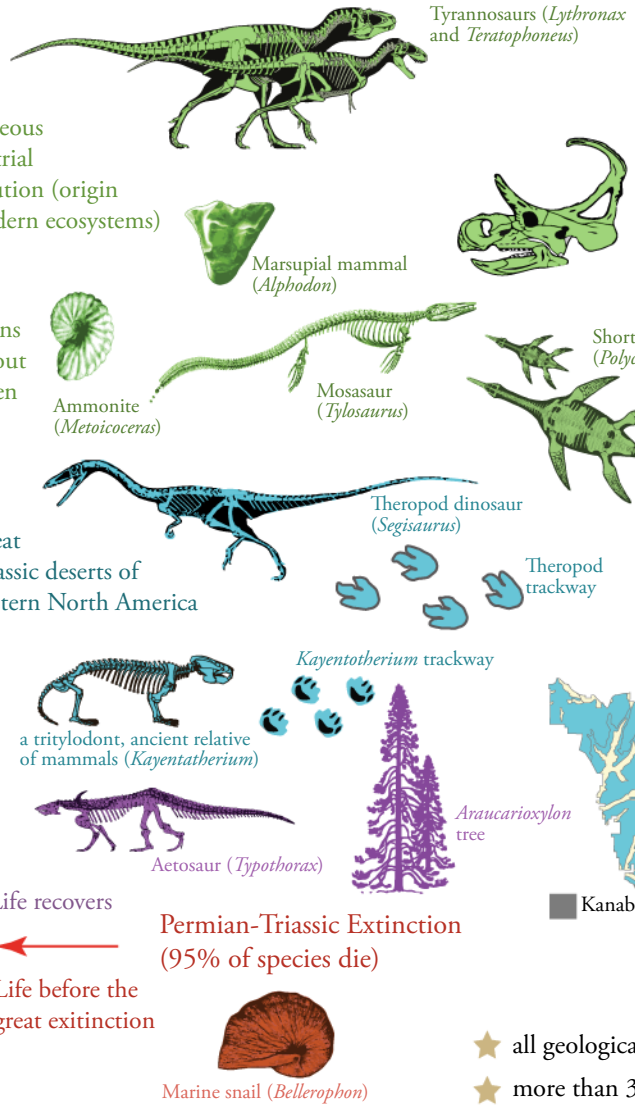
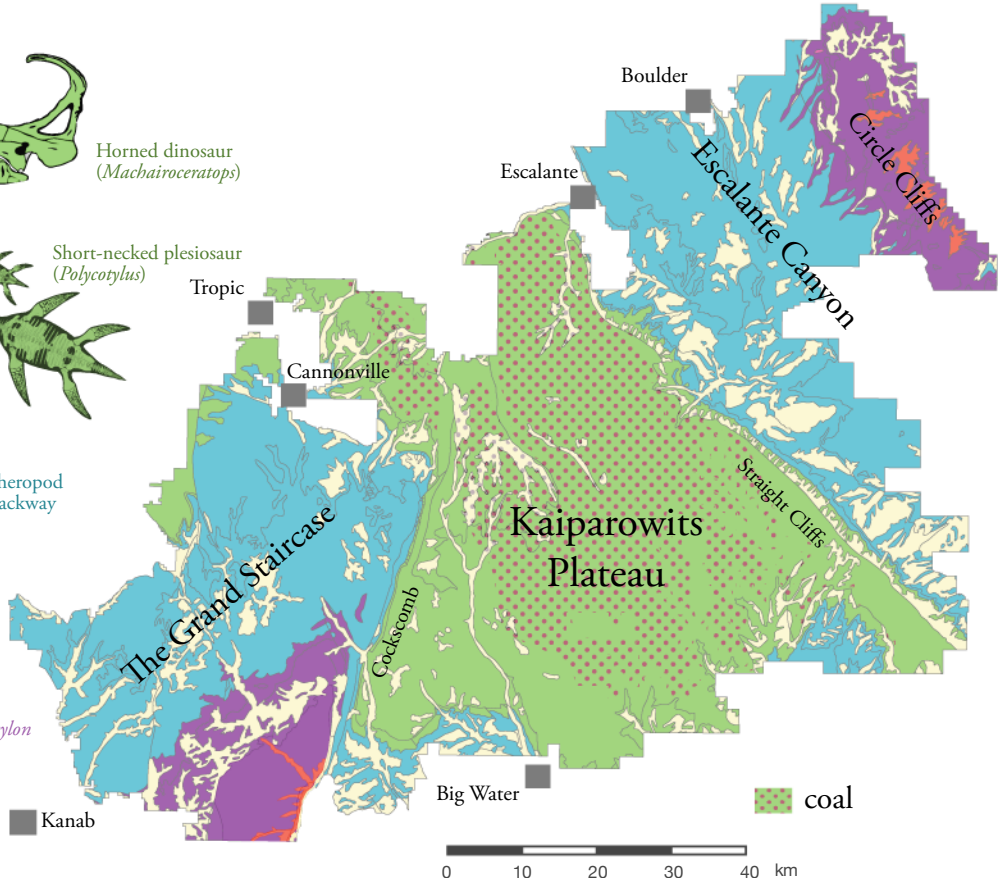
Exhibit A

Grand Staircase-Escalante National Monument

Paleontology and Geology

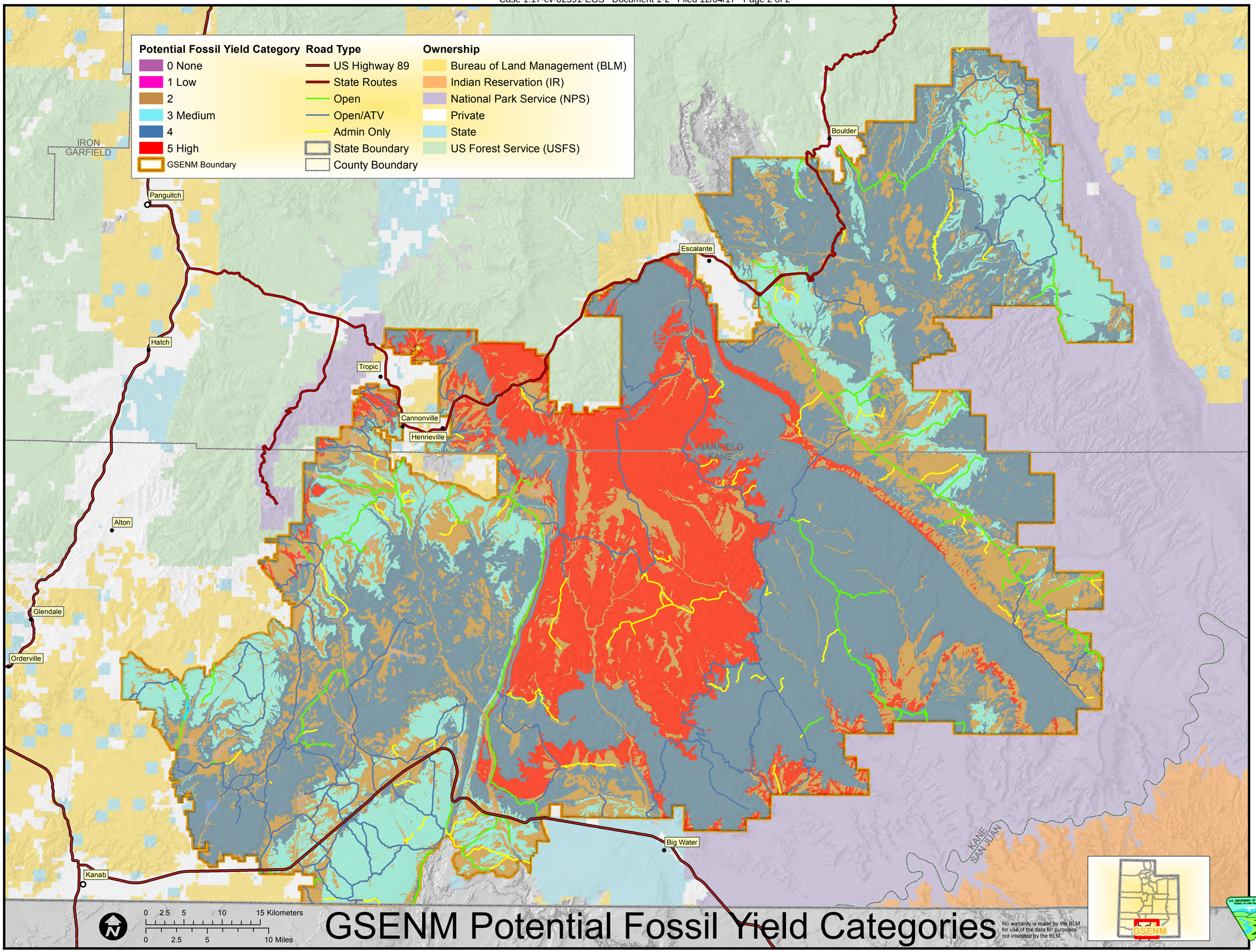






- all geological units in the Monument contain scientifically important paleontological resources
- more than 3,000 scientifically important fossil localities have been identified in the Monument
- the Kaiparowits Plateau has one of the world's most completely preserved Cretaceous ecosystems
- coal extraction (dotted area) would severely compromise Kaiparowits paleontology

Exhibit B



GSENM Potential Fossil Yield Categories

BLM

Grand Staircase Escalante National Monument

Exhibit C

Grand Staircase Escalante Partners

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

GRAND STAIRCASE ESCALANTE PARTNERS, *et al.*,	)	
Plaintiffs,	)	
	)	**CASE NO.** 17-2591
DONALD J. TRUMP, *et al.*,	)	
Defendants.	)	

DECLARATION OF RAYMOND SCOTT BERRY

I, Raymond Scott Berry, declare as follows:

1. I am sixty-five years of age, and competent to testify. This Declaration is based on my personal knowledge and belief.

2. I am a lifelong resident of the State of Utah. I was raised in Salt Lake City, attended public schools, and was awarded a B.A. in History from the University of Utah in 1974 and a Juris Doctorate degree from the S.J. Quinney School of Law at the University of Utah in 1978. My father Raymond M. Berry, also a lawyer, was born in Utah County. My great-great grandfather, Albert King Thurber, founded the town of Bicknell in Wayne County, Utah, in 1878.

3. I am currently a resident of Teasdale, Utah, an unincorporated area of Wayne County. I have owned a residence in Teasdale and been a taxpayer in Wayne County since 1981. Teasdale was my primary residence between 1990-1993, and once again became my primary residence in 2010.

4. My home in Teasdale is located approximately six miles from Torrey, Utah, which in turn is located approximately four miles from the boundary of Capitol Reef National Park. My home in Teasdale is about thirty-four miles from Boulder, Garfield County, Utah, on the northeastern corner of Grand Staircase Escalante National Monument.

5. I have been aware of the organization now named Grand Staircase Escalante Partners since it was first established in approximately 2004. I believe that I intermittently contributed funds to the organization before 2016. I joined the organization in 2016 and became a member of the board of the organization in July 2017. In April 2017, I also

began participating in the Archeological Site Steward program sponsored by Grand Staircase-Escalante National Monument, described in greater detail below.

6. Grand Staircase Escalante Partners is a non-profit 501(c)(3) corporation organized under the laws of the state of Utah. The organization is dedicated to supporting, protecting, maintaining, and advancing Grand Staircase Escalante National Monument. The organization's primary purpose is to assist Grand Staircase in its mission by raising community support and economic development through public awareness, funding, and support for conservation, science, education, and restoration projects involving Grand Staircase.

7. Grand Staircase Escalante Partners conducts three unique and important projects on Grand Staircase: the Site Steward program; the Paleontology program; and the Escalante River Partnership Program.

8. The Site Steward program was established in 2010 and employs 35 volunteer stewards to monitor approximately 100 sensitive and scientifically or historically important sites in Grand Staircase. The program supplements BLM and local law enforcement protections against looting and vandalism of the monitored sites.

   A. Volunteer stewards are each assigned between one and three sites to monitor and are responsible for visiting those sites at least quarterly to record any damage or changes to the site. Grand Staircase Escalante Partners conducts a two-day training program for all site stewards to provide information on how to identify and make notes of damage to the site. The organization provides each steward with information on and pictures of the appearance of the undisturbed site. If any damage is identified, stewards are asked to write a report of the damage, attach pictures of the damage, and provide the information to Grand Staircase Escalante Partners. The organization shares this information with BLM staff and assists BLM staff with remediation efforts.

   B. The Site Steward program has been extremely successful in protecting natural and scientific resources in Grand Staircase. I know of at least two instances where site stewards have identified vandalism at protected sites: the first by the Escalante river; and the second by Willis Creek. Grand Staircase Escalante Partners reported this information to BLM staff and worked with BLM to remediate the damage.

   C. The Grand Staircase Site Steward program is successful *because* the program is conducted on monument-designated lands and takes advantage of BLM's focus towards preserving scientific resources in the Monument. It has been my experience that BLM is not as serious about conducting remediation efforts for vandalism conducted on BLM managed lands outside of the Monument. For example, BLM has long failed to take action to prevent or remediate vandalism at the Fish Creek Cove Pictograph Panel, located on BLM lands just 30 miles outside the Monument area. The Fish Creek Cove Pictograph Panel is one of the first set of artifacts identified for the Native American Fremont culture and has

been used as a marker to identify other Fremont artifacts around Southern Utah. It is considered one of the most valuable archeological finds in the area. Over the past decade, however, I have witnessed significant damage to the site, including significant vandalism and graffiti. Several people, including me, have personally brought the issue to BLM's attention numerous times over the years. Most recently, a visiting archeologist reviewed the value of the Fish Creek Cove site and provided a report to BLM detailing the continued value of the site, and recommendations for remediation. Nonetheless, BLM has not conducted a single remediation effort of the Fish Creek Cove site. I believe that the difference in BLM enforcement is a result of the difference in BLM funding for scientific preservation outside of Monument lands and BLM's mandate to consider the effect that remediation efforts would have on the property rights of adjoining landowners. These are issues that BLM does not face when administering and managing lands that are designated as a monument.

9. The Escalante River Watershed program began in 2009 in order to remove the invasive Russian Olive tree growing rapidly along the Escalante River. Due to the aggressive, invasive nature of the species, the Russian Olive had drastically changed the biology of the river and the riparian zone, forcing out several native species of foliage. Grand Staircase Escalante Partners has worked with several other organizations and agencies, including BLM, to remove the invasive Russian Olive and remediate the land and return it to its natural state. The project is scheduled to complete in December 2018, after which the organization intends to undertake a 5-year monitoring and retreatment project to ensure that the restoration efforts have long-term success.

10. The Paleontology program was first established by Grand Staircase Escalante Partners in 2011. It works with BLM to manage lab work for the Monument's world-class paleontology program, cataloging the paleontology collections, training and coordinating volunteers for field work, and educating the public regarding this program. In the last year alone, the Grand Staircase Escalante Partners paleontology lab manager recorded over 4,000 volunteer hours in the lab. Currently, funding for the Paleontology program comes from BLM. However, the fate of the program is currently at risk, particularly if the Kaiparowits Plateau is removed from Grand Staircase Monument's lands.

11. In addition to these programs, Grand Staircase Escalante Partners routinely collaborates with BLM on various other scientific and educational programs, including: the Master Naturalist Training in collaboration with Utah State University using Grand Staircase as the classroom; the Boulder Heritage Festival; the Escalante Canyon Arts Festival; the Bryce Canyon Geology Festival; the Big Water Dino Festival; Earth Day events at the Kanab Elementary School; river restoration presentations at Escalante High School; the restoration of the Historic Rock Springs Corral and Henrieville Creek; Public Lands Day activities; the Amazing EarthFest; the Kanab Balloon Festival; and the newly christened Grand Staircase-Escalante Community Lecture Series.

12. The President's action will directly harm Grand Staircase Escalante Partners's mission and projects.

A. Funding for the Grand Staircase Escalante Watershed program, the Paleontology program, and the Site Steward Program is now in jeopardy. Both of these programs rely on private funding to continue operations. The President's action has now significantly threatened such private funding. Private funding is extremely competitive and is more likely to be granted to organizations that are affiliated with protected land. In fact, funding applications often ask organizations to describe the size and management mission of the land on which the proposed project is to be conducted on. Grand Staircase Escalante Partners has been able to secure funding for its work thus far by trading on the fact that the work it does occurs on large and famous monument lands that are protected by a scientific and preservation mandate. The size and profile of the land upon which the project is done helps Grand Staircase Escalante Partners's projects stand out among the crowd of applicants in the funding pool. Moreover, because of the Monument's scientific focus and management mandate, grant applications are able to tout the fact that Grand Staircase attracts high-profile scientific research projects, requiring Grand Staircase Escalante Partners's collaboration for site stewardship or restoration. If funding is reduced for any of these programs, as we believe is likely to occur with this change, Grand Staircase Escalante Partners will have to use its scarce resources to counteract the loss, including by diverting resources from other monument projects that form part of its core mission.

B. The continued existence of the Paleontology program is in direct jeopardy because the President's action opens up Grand Staircase lands to large-scale resource extraction on the Kaiparowits Plateau, where a significant majority of paleontological resources is currently located. This directly jeopardizes the core function and sustainability of the program, which depends on continued site integrity. The removal of monument protections means that Grand Staircase Escalante Partners will have to expend additional resources on its Paleontology program to ensure that the fossil resources contained within are protected. Finally, the President's action threatens continued funding for the program, as BLM shifts its focus away from preservation of natural resources and towards "energy independence."

13. In addition to my involvement with Grand Staircase Escalante Partners, I also have personal and professional interests in the Monument. I am one of the founders and part owner of the Boulder Mountain Lodge, located in Boulder, Utah. Exclusive highway access to Boulder is via Utah State Highway 12. Highway 12, recognized as one of the most scenic drives in the United States, travels from Torrey, Utah, through Boulder and Escalante, to near Panguitch, Utah, repeatedly traversing the northern boundary of Grand Staircase Escalante National Monument.

14. The Boulder Mountain Lodge was established in 1994. The Lodge is a twenty-two room guest lodge and incorporates the grounds of the Hell's Backbone Grill, a nationally recognized restaurant. The Lodge employees approximately a dozen residents of Boulder, Utah, with some seasonal variation. The Hell's Backbone Grill employs approximately fifty local residents. The Lodge and the Grill are, to the best of my knowledge, the largest private employers in eastern Garfield County. The owners of the

Boulder Mountain Lodge, myself included, have invested approximately three million dollars in Lodge facilities.

15. The Lodge serves visitors from all over the world visiting Grand Staircase-Escalante National Monument. It has been my experience as one of the owners of the Boulder Mountain Lodge that the designation of Grand Staircase as a recognized national monument under the Antiquities Act has been a critical element in the success of our business.

    A. All visitors to Boulder, and all the guests of the Boulder Mountain Lodge, experience and enjoy the magnificent landscapes bordering Highway 12. Some guests simply enjoy viewing and photographing the fantastic vistas of Monument lands prominent on each side of Highway 12. Most guests and visitors choose to further explore Monument lands on foot or by vehicle, discovering ancient rock art and archaeological ruins, fishing and hunting, and/or visiting nearby landmarks such as Calf Creek Falls, the Hogback, Long Canyon, and the Escalante River.

    B. In my conversations with guests at the Lodge and visitors to the restaurant, I have discovered that the single most common reason that visitors come to Boulder, Utah, is to visit and explore the Grand Staircase-Escalante National Monument. Many guests also add that the Monument was added to their itinerary due to its Monument status and its proximity to extremely popular National Parks, such as Bryce Canyon and Zion, Capitol Reef, and Arches. Based on these conversations, it is my understanding that the monument status of Grand Staircase has elevated public interest in visiting the land. This is further borne out by the upward swing in visitors to the Lodge pre- and post- Monument designation. It is my experience that other state parks in the area do not receive the same interest or foot traffic.

    C. The President's action will directly affect the Lodge's business by reducing the number of visitors to the area. The Lodge relies on the Grand Staircase National Monument for marketing and tourism, and the President's action jeopardizes the businesses' ability to continue to attract and retain the high levels of tourist activity it currently enjoys. I also believe that refocusing BLM's mandate to resource extraction and "energy independence" will drive tourists away from Grand Staircase, as tourists visit the area in order to visit primitive and pristine natural conditions. Tourists have expressed to me that they do not want their experience to be affected by resource extraction. Thus, individuals who would have been likely to visit the Monument are not likely to visit due to the extractive activities that will occur on Grand Staircase. Given my experience with our clientele, I believe that guests would likely view even a partial removal of the Monument's protections as a devaluation or downgrade, and be less likely to visit the area as a result.

16. Finally, I have had a life-long personal interest in the educational and recreational experience available within the Monument. Indeed, protecting these interests is part of the reason why I joined and became active in Grand Staircase Escalante Partners.

A. I have lived in Utah my entire life and began exploring the lands included in the Grand Staircase Monument in the early 1970s, beginning with a ninety mile walk through the canyon of the Escalante from the Highway 12 bridge to Lake Powell. In the intervening decades, I have spent a minimum of several hundred days exploring the canyons and plateaus located within the Monument.

B. I currently visit the lands of Grand Staircase Escalante National Monument approximately fifty times a year. Most of my visits are to the Monument areas in the vicinity of Boulder and Escalante, with occasional visits to other areas. A recent example would be a trip I took last fall, driving the length of the Cottonwood Wash Road from Cannonville to Kanab, then returning to Cannonville via the Skutumpah Terrace Road. I plan to continue this pattern of visits for the rest of my life.

C. As an individual who has explored Grand Staircase both pre- and post- Monument designation, my experience and appreciation of the land has significantly increased as a result of the Monument's designation. It was only after Monument designation that scientific paleontological discoveries enhanced my educational experience on the land, and that restorative ecological projects enhanced my understanding of the diverse nature of the native species. For example, the Escalante River Watershed Partnership's work removing the Russian Olive from the banks of the Escalante River has enhanced the native wildlife along the canyon. The increase in various bird populations has been particularly spectacular.

D. My personal recreational and aesthetic interests will be harmed by the President's action. The President's action will immediately affect the natural beauty of the landscape that I have long explored, particularly due the President and BLM's new focus on resource extraction. The President's action will also result in significant harm to geologic and archeological points of interest, which contribute substantial value to my life and the lives of my family members.

I DECLARE UNDER PENALTY OF PERJURY THAT, TO THE BEST OF MY KNOWLEDGE, THE FOREGOING IS TRUE AND CORRECT.

Executed on this 4 day of December, 2017.

Raymond Scott Berry

Exhibit D

Society of Vertebrate Paleontology

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

GRAND STAIRCASE ESCALANTE PARTNERS, *et al.*,	)	
Plaintiffs,	)	
	)	**CASE NO.** 17-2591
DONALD J. TRUMP, *et al.*,	)	
Defendants.	)	

DECLARATION OF P. DAVID POLLY

I, P. David Polly, declare as follows:

1. I am over the age of eighteen and am competent to testify. This Declaration is based on my personal knowledge and belief. This Declaration represents only my views and does not represent the views of my employer, Indiana University.

2. I am a resident of Bloomington, Indiana, and have lived there for approximately 11 years.

3. I am currently employed at Indiana University as a Professor in the Department of Earth and Atmospheric Sciences and have worked in this capacity since 2006. My job duties include research in paleontology and related fields, teaching, and service to the university.

4. Prior to working at Indiana University, I worked at Queen Mary, University of London, from 1997 to 2006; at the Natural History Museum in London from 1996 to 1997; at the University of Michigan-Ann Arbor from 1994 to 1996; at Genentech, Inc. in 1994; and at the University of California-Berkeley from 1988 to 1994.

5. I received my high school diploma from Boonville R-1 High School in Boonville, Missouri in 1984, my Bachelor of Arts (Plan II Honors Program) from the University of Texas-Austin in 1987, and my PhD (Paleontology/Integrative Biology) from the University of California-Berkeley in 1993.

6. I am a member and Board Member of the Society of Vertebrate Paleontology. I became a member in 1987 and a Board Member in 2014 (and I served a separate term on the Board from 2005 through 2008). I am currently serving as President of the Society and began my term in 2016.

7. I use paleontological and geological data from the Monument regularly in my research and teaching, especially from the Kaiparowits Plateau and Circle Cliffs areas, and I recently visited Grand Staircase-Escalante National Monument to study its paleontological resources firsthand.

8. The Constitution for the Society of Vertebrate Paleontology (SVP) states that the organization's mission is to "advance the science of vertebrate paleontology throughout the world," including to "support and encourage the discovery, conservation, and protection of vertebrate fossils and fossil sites." SVP encourages the discovery, conservation and protection of vertebrate fossils by advocating for the legal protection of fossils and sites.

9. SVP also aims to "serve the common interests and facilitate the cooperation of all persons concerned with the history, evolution, ecology, comparative anatomy, and taxonomy of vertebrate animals, as well as the field occurrence, collection, and study of fossil vertebrates and the stratigraphy of the beds in which they are found." This includes "foster[ing] the scientific, educational, and personal appreciation and understanding of vertebrate fossils and fossil sites by avocational, student and professional paleontologists and the general public." SVP thus interacts with members from all walks of life -- regulators and legislators, administrators of museums and universities, students, and the general public.

10. There are significant paleontological and geological resources found throughout the Grand Staircase Escalante National Monument, including a Permian through Triassic sequence in the Grand Staircase area, a Late Cretaceous sequence on the Kaiparowits Plateau, and another Triassic and Jurassic sequence in the Circle Cliffs and Escalante Canyons areas. As a result, SVP and its members are active in research, field teaching, and educational outreach at the Monument. Approximately 10% of SVP members, including me, have either actively engaged in long-term research at the Monument or have made short-term research visits for field trips or site visits. Of the 56 authors of papers in a 2013 book about the paleontology of the Monument, 28 are SVP members or were members through large parts of their careers. A cataloging of these papers is attached as Attachment A to this Affidavit. Similarly, 27 out of the 35 scientific papers about the paleontology of the Monument that were published in the last 12 months were authored by SVP members. The bibliography of these papers is attached as Attachment B to this affidavit.

11. SVP members conduct field research, train students in paleontological field techniques, conduct educational field trips, and contribute to public educational exhibits at the Monument. SVP featured paleontology from Grand Staircase-Escalante National Monument at its 2016 Annual Meeting, where it also organized field trips for 40 members on the stratigraphy and paleontology of the Kaiparowits Plateau. An excerpt of a field trip guide published from the 2016 Annual Meeting is attached as Attachment C to this affidavit.

12. SVP members who teach at the University of Utah offer a science requirement course titled "World of Dinosaurs," that has between 100 and 125 students each time it is taught.

The course studies fossils collected from Grand Staircase that are included in the collection at the Utah Museum of Natural History.

13. A change to the boundaries or management of Grand Staircase-Escalante National Monument would impair the ability of SVP members to conduct scientific research on the Monument and to obtain grant funding to support their research:

    a. Changes to the boundaries or management of the Monument risk harm to irreplaceable paleontological resources and loss of crucial support to research activities, both of which would harm SVP members in their scientific endeavors.

        i. Monument status prioritizes preservation of paleontological resources over many other multiple-use activities, such as mining, fracking, livestock grazing, off-road vehicular recreation, and commercial fossil collection, any of which can damage or destroy paleontological sites. Furthermore, the Monument's management plan provides for systematic inventories of paleontological resources and coordination of research activities by the Monument paleontologist. These services are critical in assisting SVP members in cataloging paleontological discoveries made on the Monument. Fossils collected at the Monument remain in the public trust for all Americans and for the international scientific community as property of the U.S. federal government.

        ii. The proposed changes systematically remove paleontological resources belonging to the Permian, Triassic, and early Late Cretaceous periods of Earth history, which respectively represent Earth's largest mass extinction event, the recovery of terrestrial life after that extinction, and the extinction event that occurred in the Earth's oceans during the early Late Cretaceous period. Terrestrial sites at the Monument from the Santonian and Coniacian ages of the Late Cretaceous period are the only ones in the world to have yielded mammal fossils. Sites of these ages that are excluded from the Monument will face increased risk of damage from multiple-use activities and will be denied the benefits of coordination and support from BLM and its Monument paleontologist. Any change to the Monument's management plan that prioritizes multiple-use activities over preservation would have a similar effect. Long-term protection of sites and the specimens collected from them is a pre-requisite for publishing scientific articles on paleontological resources, one that is mandated by SVP's own bylaws and best-practice recommendations.

    b. Changes in the boundaries or management of the Monument risk loss of funding to the research projects of SVP members.

        i. Funding is currently available to SVP members and their collaborators through the Bureau of Land Management's National Conservation Lands Scientific Studies support program and other BLM funding sources. These funds support inventory surveys and other scientific research at the

Monument. Funds from the NLCS program are therefore available to support the costs of preparation, curation, and storage at approved research repositories. The proposed boundary changes will make sites from the Permian, Triassic, and early Late Cretaceous periods ineligible for these special NLCS funds, which will in turn impact the ability of SVP's members to carry out research.

ii. SVP members also risk loss of funding from other sources besides BLM. The priority currently placed by the Bureau of Land Management on the conservation and protection of paleontological resources, particularly on the Kaiparowits Plateau, allows SVP members to apply for grants for long-term projects that require assurances that paleontological sites will continue to be preserved and monitored. Any change to the Monument that risks harm to its paleontological resources will diminish Grand Staircase's status as land dedicated to important scientific discovery and will impede SVP members from obtaining grant funding.

c. The combined effect of these changes will make it more difficult for a large number of SVP members to design new research that reveals new findings about the history of life on Earth, to obtain grant funding for that research, and to complete their research by archiving fossil specimens and publishing papers. The proposed reduction to monument boundaries will remove protection of important intervals of Earth's history that are currently represented at the Monument.

14. The proposed changes to the Monument boundaries will also impair SVP's ability to educate the public about paleontological history. SVP and its members collaborate with the Monument paleontologist and with the visitor centers to produce educational exhibits and to conduct educational programs in local communities and to visitors. Currently, activities organized through the Monument encompass the entire Mesozoic "Age of Dinosaurs" and the preceding Permian period. Change to the boundaries will remove large chunks of this long phase of Earth history from the Monument's mission, meaning that educational materials and programs will no longer focus on these periods. Furthermore, the division of the remaining portions into three different monuments will further fragment the educational narrative and thus impair the opportunity to communicate research to the broader public.

I DECLARE UNDER PENALTY OF PERJURY THAT, TO THE BEST OF MY KNOWLEDGE, THE FOREGOING IS TRUE AND CORRECT.

Executed on this 4th day of December, 2017.

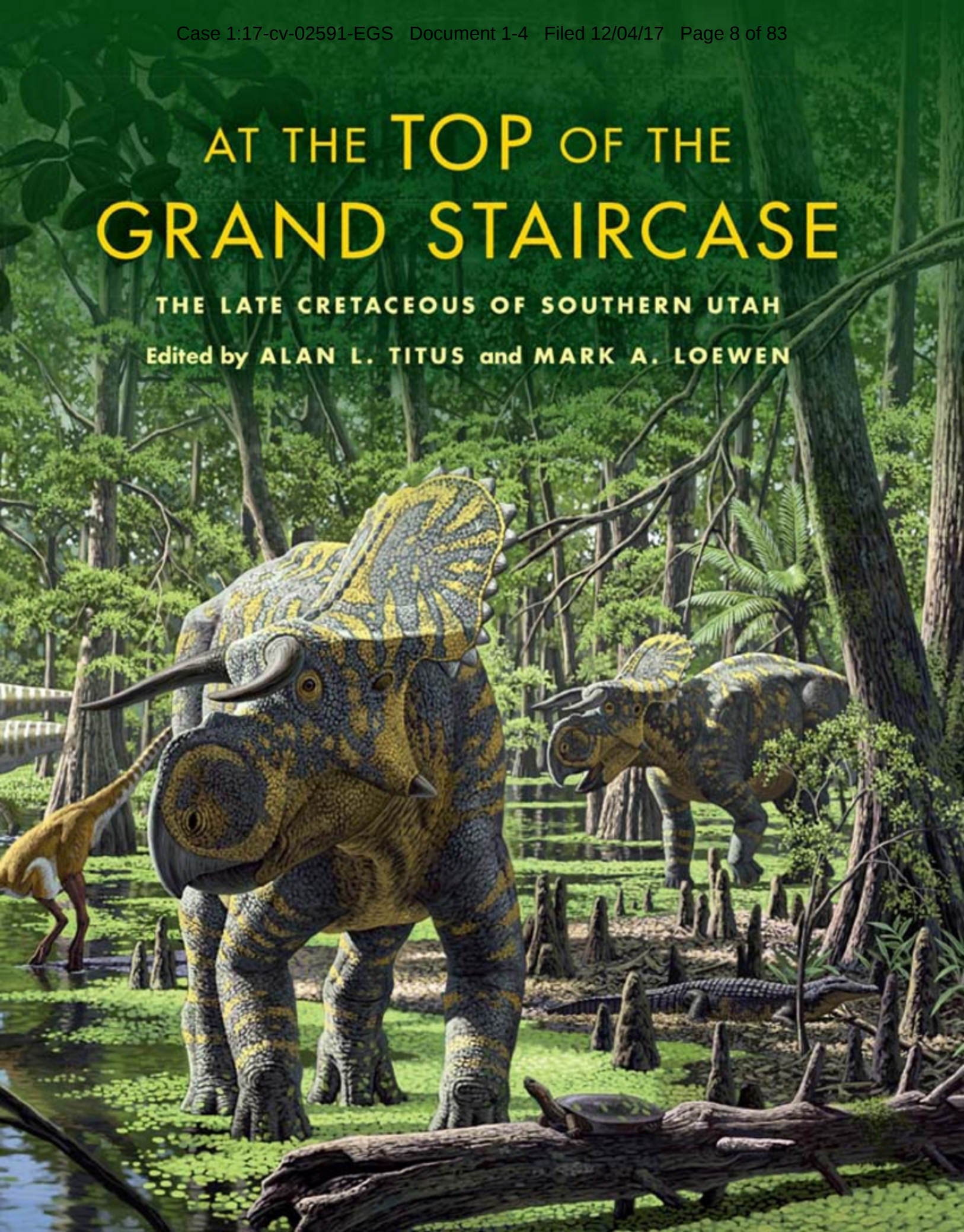
Paul David Polly

ATTACHMENT A

AT THE TOP OF THE GRAND STAIRCASE

THE LATE CRETACEOUS OF SOUTHERN UTAH

Edited by ALAN L. TITUS and MARK A. LOEWEN



This book is a publication of

Indiana University Press
Office of Scholarly Publishing
Herman B Wells Library 350
1320 East 10th Street
Bloomington, Indiana 47405 USA

iupress.indiana.edu

Telephone orders 800-842-6796
Fax orders 812-855-7931

∞ The paper used in this publication meets the minimum requirements of the American National Standard for Information Sciences–Permanence of Paper for Printed Library Materials, ANSI Z39.48-1992.

Manufactured in the United States of America

Library of Congress Cataloging-in-Publication Data

At the top of the grand staircase : the late Cretaceous of Southern Utah / edited by Alan L. Titus and Mark A. Loewen.
pages cm.–(Life of the past)
Includes bibliographical references and index.
ISBN 978-0-253-00883-1 (cloth : alk. paper)–ISBN 978-0-253-00896-1 (e-book)
1. Geology, Stratigraphic–Cretaceous.
2. Paleontology–Cretaceous. 3. Geology–Utah.
4. Animals, Fossil–Utah. 5. Grand Staircase-Escalante National Monument (Utah) I. Titus, Alan L. (Alan Lee), [date] editor of compilation.
II. Loewen, Mark A., editor of compilation.
QE688.A85 2013
551.7'7097925–dc23
2013005859

1 2 3 4 5 18 17 16 15 14 13

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ATTACHMENT B

Scientific publications based on fossils from Grand Staircase-Escalante National Monument (2016-2017)

[x] = one or more authors are SVP members

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ATTACHMENT C

GEOLOGY OF THE INTERMOUNTAIN WEST
an open-access journal of the Utah Geological Association
Volume 3 *2016*

LATE CRETACEOUS STRATIGRAPHY AND VERTEBRATE FAUNAS OF THE MARKAGUNT, PAUNSAUGUNT, AND KAIPAROWITS PLATEAUS, SOUTHERN UTAH

Alan L. Titus, Jeffrey G. Eaton, and Joseph Sertich

A Field Guide Prepared For
SOCIETY OF VERTEBRATE PALEONTOLOGY
Annual Meeting, October 26 – 29, 2016
Grand America Hotel
Salt Lake City, Utah, USA

Post-Meeting Field Trip October 30–November 1, 2016

GEOLOGY OF THE INTERMOUNTAIN WEST

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Volume 3 ***2016***

Cover

View looking west over the Blues from the upper view point along Utah SR 12. The lower 400 m of the Upper Cretaceous Kaiparowits Formation is seen from this view as well as the pink and and white cliffs of the Paleocene–Eocene Claron Formation.

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Late Cretaceous Stratigraphy and Vertebrate Faunas of the Markagunt, Paunsaugunt, and Kaiparowits Plateaus, Southern Utah

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ABSTRACT

The Late Cretaceous succession of southern Utah was deposited in an active foreland basin circa 100 to 70 million years ago. Thick siliciclastic units represent a variety of marine, coastal, and alluvial plain environments, but are dominantly terrestrial, and also highly fossiliferous. Conditions for vertebrate fossil preservation appear to have optimized in alluvial plain settings more distant from the coast, and so in general the locus of good preservation of diverse assemblages shifts eastward through the Late Cretaceous. The Middle and Late Campanian record of the Paunsaugunt and Kaiparowits Plateau regions is especially good, exhibiting common soft tissue preservation, and comparable with that of the contemporaneous Judith River and Belly River Groups to the north. Collectively the Cenomanian through Campanian strata of southern Utah hold one of the most complete single region terrestrial vertebrate fossil records in the world.

INTRODUCTION

The primary purpose of this field trip is to highlight the Late Cretaceous vertebrate paleontology and stratigraphy of southern Utah. This is a daunting task in three days and at best this can only be an overview of what is easily accessible along the road from Cedar City to Escalante (figure 1). The emphasis of this trip is on the terrestrial faunas and facies (figure 2), although the marine Tropic Shale and its fauna will also be examined. There are many other road logs available that highlight broader aspects of the geology of the region and these include Eaton and others (2001), Biek (2014), Knudsen and Biek (2014), and we have borrowed richly from these. This region has also been recently mapped by Biek and others (2015) and we make constant reference to that exhaustive study. Vertebrate faunal lists for Cretaceous formations and members, organized by plateau, are presented in the appendix.

Overview of Cretaceous Stratigraphy and Vertebrate Paleontology, Southwestern Utah

Upper Cretaceous strata crop out (figure 2) across an almost continuous 210-km-wide band between the Hurricane fault system (west) and the southeast edge of the Kaiparowits Plateau. Scattered outcrops of Late Cretaceous strata also occur west of the Hurricane fault system around the Pine Valley Mountains, Gunlock Reservoir, and Parowan Gap. All of the rock units in these exposures were deposited within the Western Interior

Citation for this article.
Titus, A.L., Eaton, J.G., and Sertich, J., 2016, Late Cretaceous stratigraphy and vertebrate faunas of the Markagunt, Paunsaugunt, and Kaiparowits Plateaus, southern Utah: Geology of the Intermountain West, v. 3, p. 229–291.

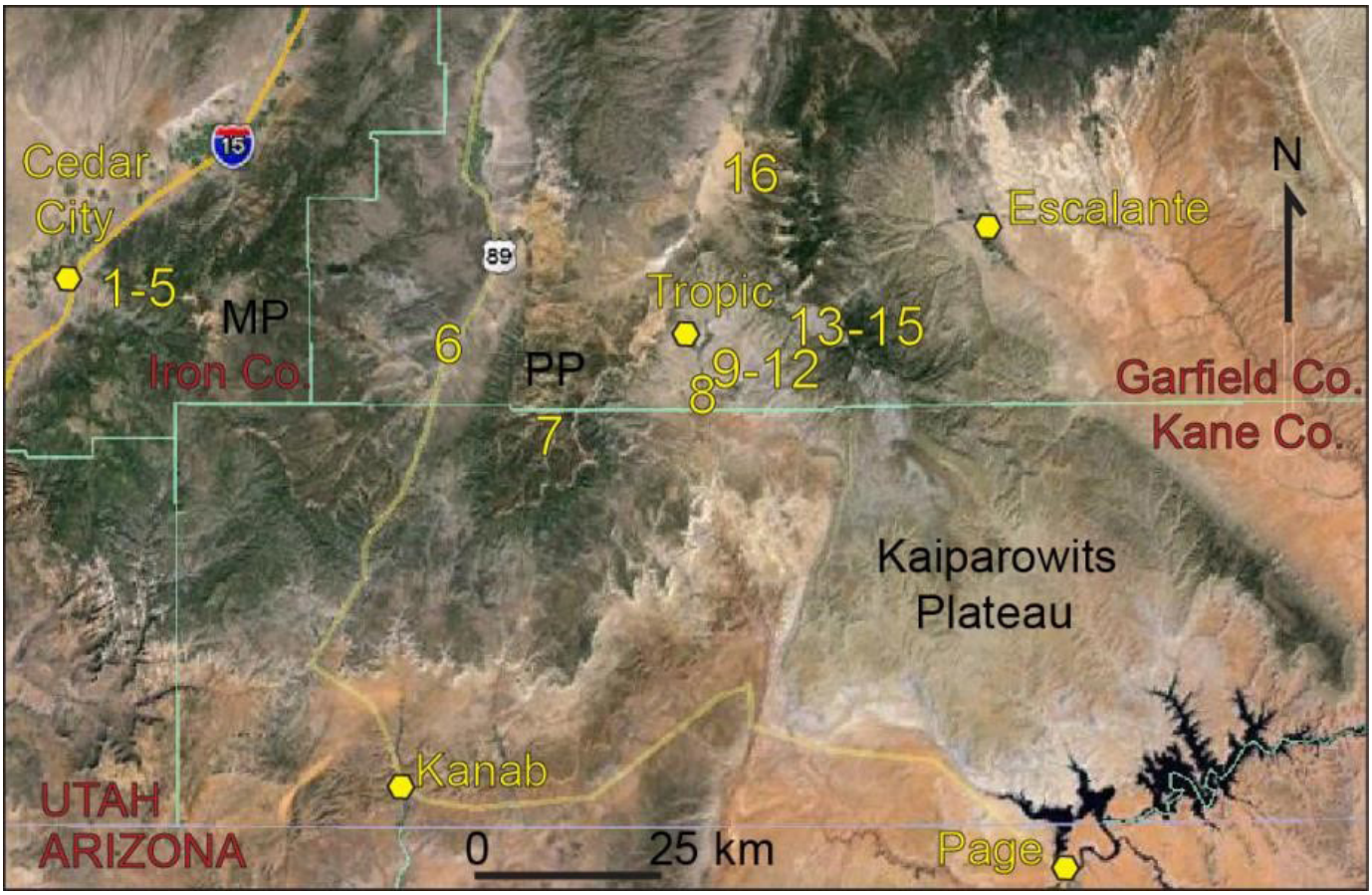

Figure 1. Google Earth image of area covered by this road log. Numbers refer to stops in the road log. MP=Markagunt Plateau, PP=Paunsaugunt Plateau.

basin (figure 3) between late Albian and Maastrichtian time, during the Sevier and early Laramide phases of the North American Cordilleran orogeny (figure 3). As a generalization, the southern Utah Cretaceous section is mostly terrestrial in the western half, and to the east, mixed marine-terrestrial in the lower half and dominantly terrestrial in the upper half (figure 4).

The Cretaceous stratigraphy of the Kaiparowits Plateau, which has become the framework for most of the region, was established by Gregory and Moore (1931), Lawrence (1965), Peterson (1969), and Eaton (1991). The general stratigraphic section is similar throughout the region, but there are some marked facies changes in formations, mostly trending east-west (figure 4).

Paleontological investigations of these outcrops were initiated by the Powell Survey starting in the 1870s. However, during the subsequent 100 years, the region lay largely unnoticed by vertebrate paleontologists, who were content to work in other, more immediately gratifying, and easily accessed regions. This started to change in the 1970s when crews from the University of Utah and Brigham Young University began prospecting the fossil-rich badlands of the Late Campanian Kaiparowits Formation for vertebrates with good results (Weishampel and Jensen, 1979; DeCourten and Russell, 1985). Soon after, J. Eaton and R. Cifelli began long term collaborative investigations on the microvertebrate faunas of the Kaiparowits Basin (e.g., Cifelli and Eaton, 1987; Cifelli, 1990a, 1990b, 1990c, 1990d; Eaton, 1993a, 1993b, 1995), emphasizing mammalian evolution and biostratigraphy. Eaton and Cifelli were the first researchers to intensively sample the entire Late Cretaceous terrestrial record for vertebrates, and it was their work that led to recognition of the exceptional continuity and quality of the Kaiparowits' vertebrate fossil record. Among other things, the region can claim to yield

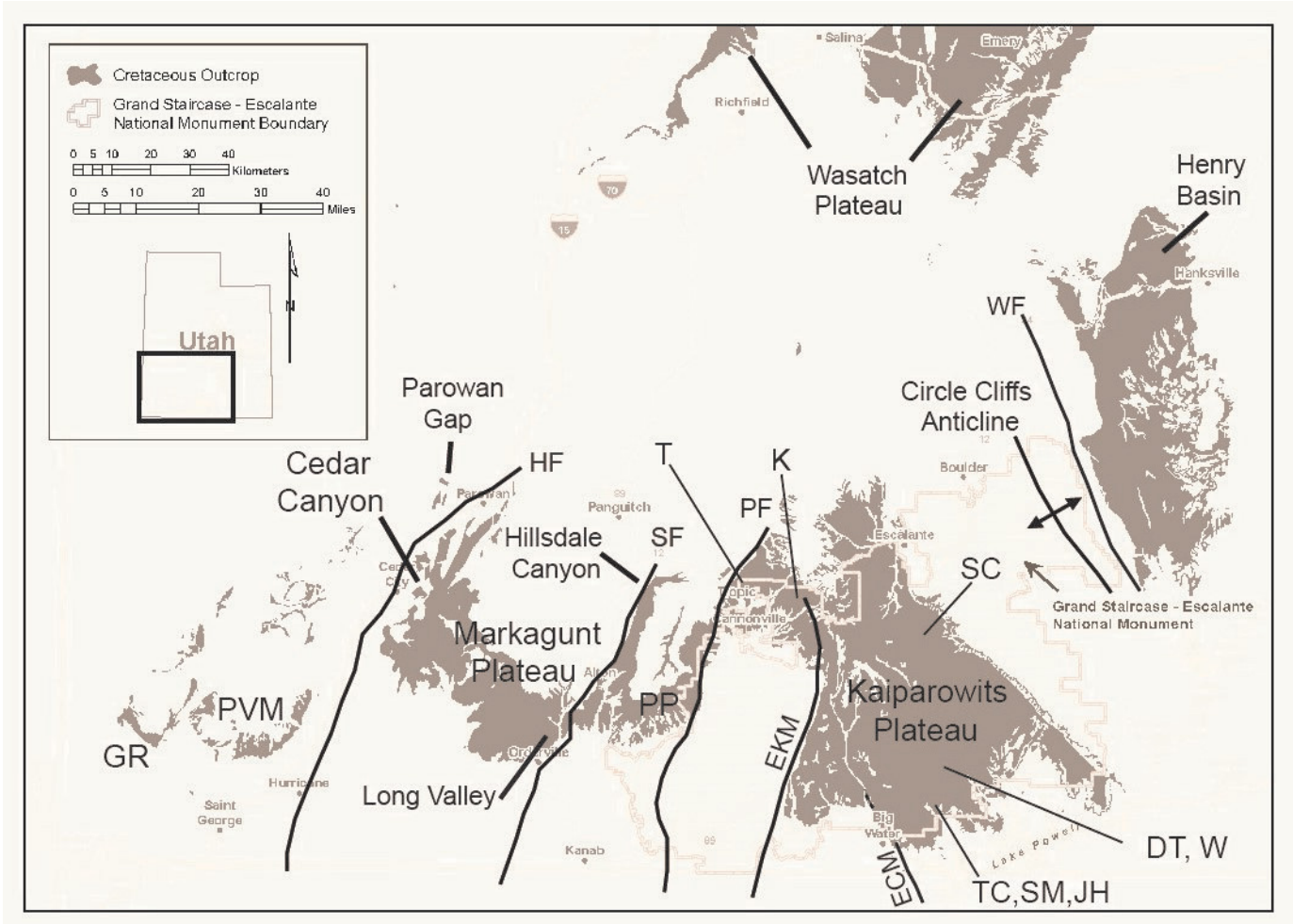

Figure 2. Map showing Cretaceous outcrops in southern Utah. Also shown are major structural features, landforms, location of measured sections, and type sections for the Tropic (T), Straight Cliffs (SC), Wahweap (W), and Kaiparowits (K) Formations and the type sections for the Tibbet Canyon (TC), Smoky Hollow (SH), John Henry (JH), and Drip Tank (DT) Members of the Straight Cliffs Formation. Abbreviations as follows: GR – Gunlock Reservoir; PVM – Pine Valley Mountains; HF – Hurricane fault; SF – Sevier fault; PP – Paunsaugunt Plateau; PF – Paunsaugunt fault; EKM – East Kaibab monocline; ECM – Echo Cliffs monocline; WF – Waterpocket fold. Modified from Titus and others (2013).

diverse terrestrial vertebrate faunas from every stage of the Late Cretaceous except the Maastrichtian. When supplemented by the emerging understanding of the adjacent Paunsaugunt and Markagunt Plateaus, this record becomes truly exceptional, with nearly continuous sampling possible for a 26-million-year time span (ca 100–74 Ma) in facies ranging from shallow marine and coastal plain to alluvial fan (figure 4).

The establishment of Grand Staircase-Escalante National Monument (GSENM) by presidential proclamation on September 18, 1996, led to the need for assessment of condition and significance of all known fossil sites so that a management framework could be built with the latest and most accurate data. Toward this end, the Monument formed a partnership with the Utah Geological Survey, who initiated field studies in early 1998. One of the results of this work (Foster and others, 2001) was the realization that many areas within GSENM with high potential for fossils had never been adequately surveyed. As a direct result, a key management plan decision was formed that required ongoing annual inventory of geological formations with potential to produce significant fossils (GSENM Management Plan, 2000: PAL-1).

After the Monument Management Plan was put into practice, the Monument-Utah Geological Survey

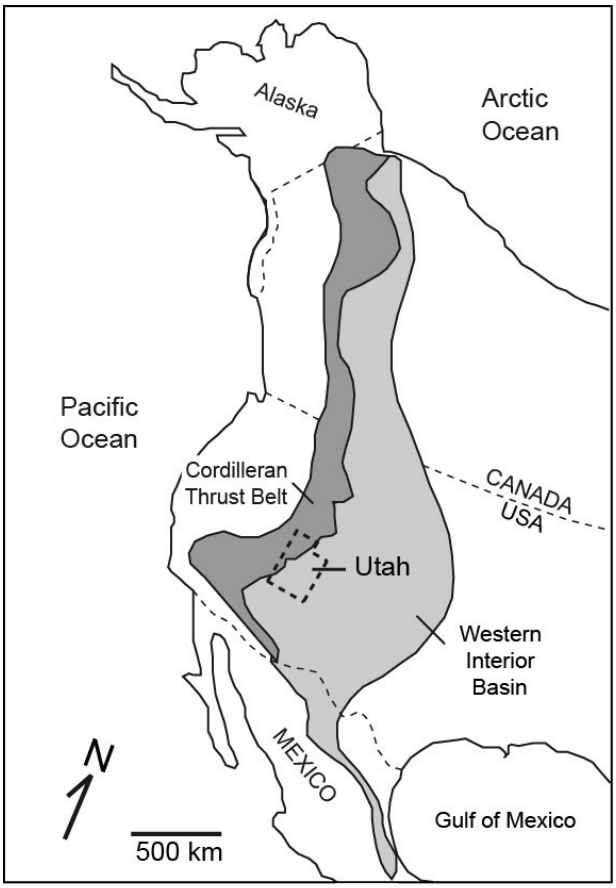

Figure 3. Map showing relationship of the Cordilleran thrust belt (i.e., Sevier fold and thrust belt) with the adjacent Sevier foreland basin or Cretaceous Western Interior basin. From Titus and others (2013).

partnership was expanded to include the Natural History Museum of Utah (NHMU; formerly named the Utah Museum of Natural History [UMNH]) and the Museum of Northern Arizona (MNA) with the intention to intensively survey the Late Cretaceous section of the Kaiparowits Basin region, emphasizing macrovertebrates. A number of articulated or associated specimens of dinosaurs or other macrovertebrates were documented the first year of this effort in 2000. The first new dinosaur taxon named from the Kaiparowits Basin, *Hagryphus giganteus* (Zanno and Sampson, 2005), was based on a partial articulated skeleton of a large oviraptorid collected by the NHMU. Subsequently, 11 other new dinosaur taxa have been named from the Kaiparowits Basin. Intensive recent efforts by the Denver Museum of Nature & Science begun in 2011 have focused largely on the Wahweap and Kaiparowits Formations underscoring a rare modern model of collaboration between major U.S. institutions (e.g., NHMU, MNA, and others) and GSENM land managers. The marine macrovertebrate record continues to expand as well, with at least five taxa of plesiosaur and a mosasaur (the region's first) discovered and/or published since 1996. Perhaps most importantly, synthesis of the area's outstanding macrofloral record is also underway, which will provide an extremely robust ecological framework within which to place the various vertebrate species. Also occurring in the last 20 years was the expansion of Eaton's original Kaiparowits Plateau work into the Markagunt and Paunsaugunt Plateaus, and the western peripheral outcrops of the Iron Springs Formation (e.g., Eaton, 1999b). The most recent summary of available faunal data for the region's Late Cretaceous succession is found in the 2013 dated Indiana University Press volume "At the Top of the Grand Staircase—The Late Cretaceous of Southern Utah," edited by Titus and Loewen (2013) and much of the appendix is derived from that work.

DAY 1: CRETACEOUS STRATIGRAPHY AND PALEONTOLOGY OF CEDAR CANYON, WESTERN MARKAGUNT PLATEAU

0.0 miles – Set trip odometer to 0 at intersection of State Road (SR) 130 (Main Street) and SR 14 (Center Street), Cedar City.

0.4 miles – Cross the Hurricane fault system. This marks the boundary between the Colorado Plateau to the east and Basin and Range Province to the west. The Lower Triassic Moenkopi Formation is evident here.

0.9 miles – Prominent hogback of the resistant Shinarump Member of the Triassic Chinle Formation.

1.0 miles – Normal fault and lower Chinle strata (purple and gray mudstones) exposed.

1.2 miles – The sequence visible to the north includes the Petrified Forest Member of the Chinle (Upper Triassic), the Dinosaur Canyon Member of the Moenave Formation (Upper Triassic and Lower Jurassic), the Springdale Sandstone Member and main body

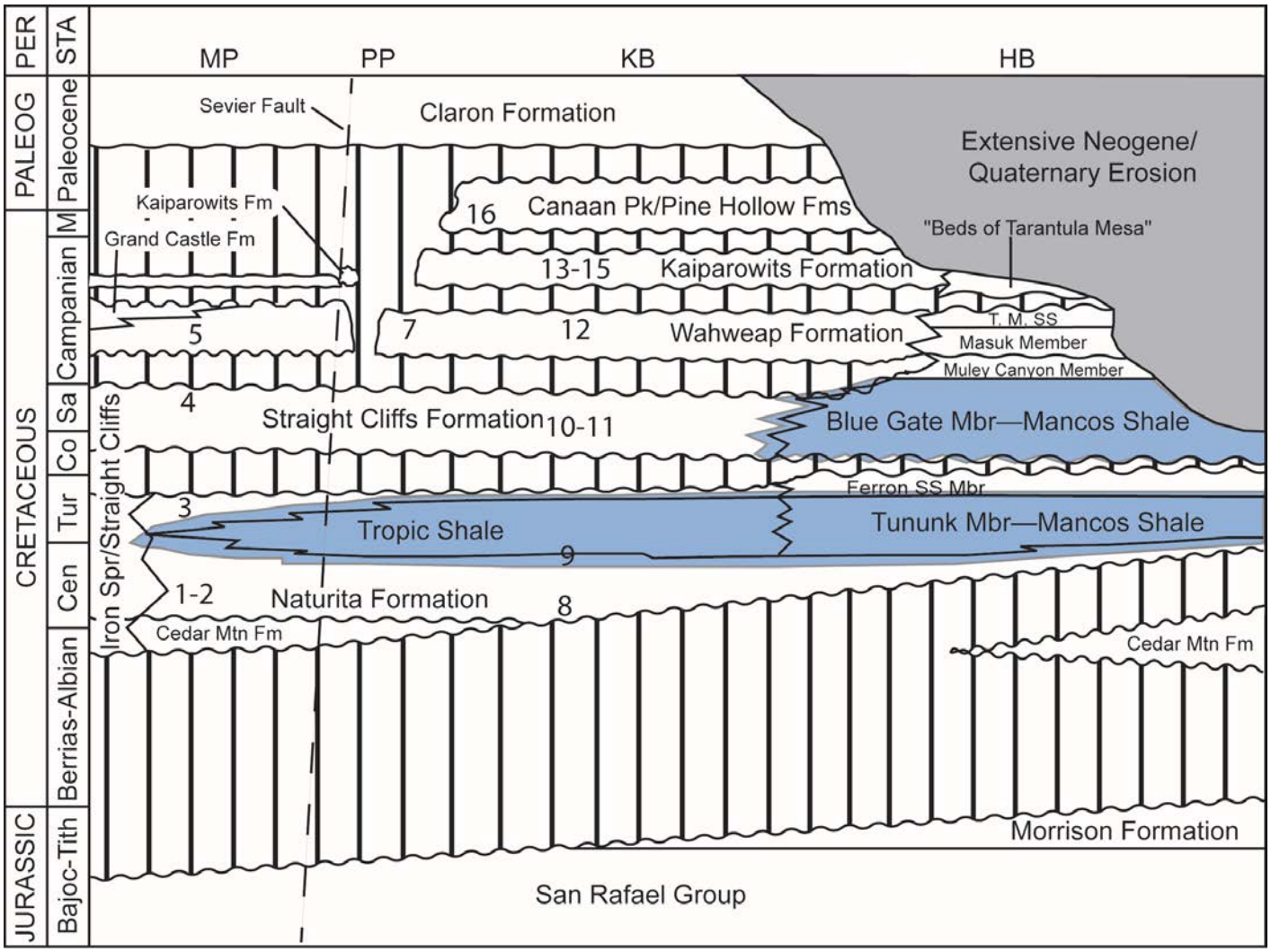

Figure 4. Generalized cross section of Cretaceous rocks covered in this road log showing relative chronostratigraphic relationships and stratigraphic position of field trip stops (numbered). No vertical thickness implied. Blue color indicates marine facies. Abbreviations as follows: PER – Period; PALEOG – Paleogene; STA – Stage; M – Maastrichtian; Sa – Santonian; Co – Coniacian; Tur – Turonian; Cen – Cenomanian; Berrias – Berriasian; Bajoc-Tith – Bajocian to Tithonian; T.M. SS – Tarantula Mesa Sandstone; Upp – Upper; Mid-Middle; MP – Markagunt Plateau; PP – Paunsaugunt Plateau; KP – Kaiparowits Plateau; HB – Henry Mountains basin.

of the Kayenta Formation (Lower Jurassic), and the base of the Navajo Sandstone (Lower Jurassic).

1.8 miles – Contact of the Navajo Sandstone and the overlying Co-op Creek Limestone Member of the Carmel Formation (Middle Jurassic).

2.0 miles – Folded and deformed gypsiferous part of Carmel Formation.

3.4 miles – **STOP 1.** CEDAR MOUNTAIN, NATURITA (DAKOTA), AND TROPIC FORMATIONS: In Cedar Canyon, basal Cretaceous beds rest unconformably (figure 5) on the Middle Jurassic Winsor Member of the Carmel Formation (Biek and others, 2015). Previously, the entire Cretaceous section below the Tropic Shale in Cedar Canyon was referred to the Dakota Formation (e.g., Eaton and others, 1999a). However, recent mapping has referred the basal conglomerate and lower 15 to 20 m of variegated, pastel colored smectitic

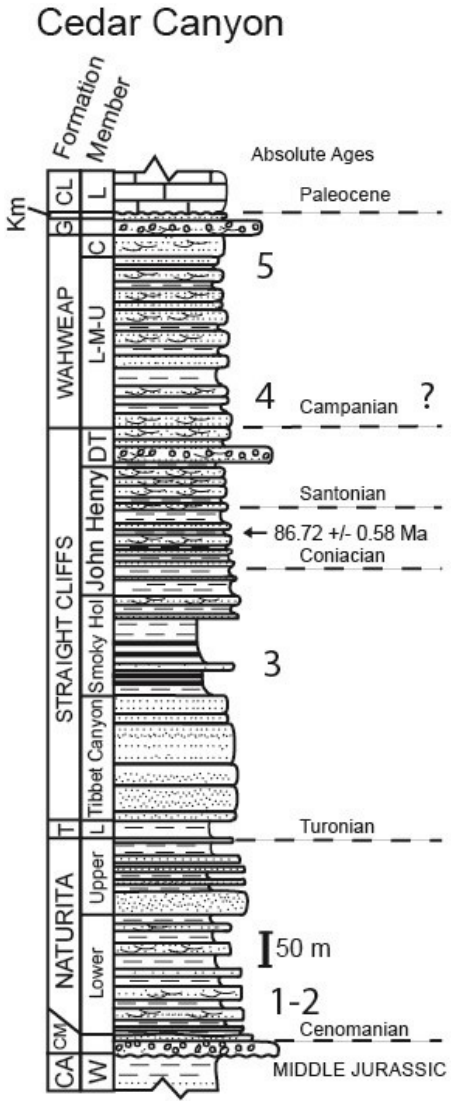

Figure 5. Stratigraphic column for Cretaceous rocks in Cedar Canyon. Numbers correspond with field trip stops in the road log. Abbreviations as follows in ascending order: CA – Carmel; W – Winsor Member; CM – Cedar Mountain; T – Tropic; Smoky Hol – Smoky Hollow; DT – Drip Tank; C – capping sandstone; G – Grand Castle; Km – Cretaceous beds on Markagunt (= lowermost Kaiparowits Formation); CL – Claron; L – Lower; M – Middle; U – Upper.

mudstone (these units are not clearly evident in figure 6), which rests unconformably on the bleached sandstones of the Middle Jurassic Winsor Member of the Carmel Formation, to the Cedar Mountain Formation. The overlying more tan, brown, and gray colored succession is now referred (Kirkland and others, 2016) to the Naturita Formation (figure 6). Dating of the Cedar Mountain beds in the Markagunt Plateau region has been somewhat problematic; no radiometric ages older than early Cenomanian have been obtained, yet palynomorph data suggests a late Albian age (Biek, 2015). Regardless, this interval largely correlates with the Mussentuchit Member of the Cedar Mountain Formation in its type area (Kirkland and others, 2016). The Cedar Mountain is overlain by the middle and upper Cenomanian Naturita Formation (formerly Dakota, [Young, 1960; Carpenter, 2014; Kirkland and others, 2016]) (figures 5 and 6), the lower portion of which is non-marine. The upper portion of the Naturita is paralic and age equivalent to the lower portion of the Tropic Shale in the Kaiparowits Basin. Overall, the Naturita is much thicker in the Markagunt region probably because of higher subsidence rates nearer to the fold and thrust belt. The non-marine part of the Naturita has produced an extensive microvertebrate fauna simply by washing a single road cut (Eaton, 2009, see appendix). Extensive research on the paleontology of the Naturita in this area remains to be done. The marine part of the Naturita Formation in Cedar Canyon has been critical to studies of Milankovitch cycles in the Western Interior Seaway (Laurin and Sageman, 2001, 2007; Tibert and others, 2003) and the Cretaceous anoxic event, OAE 2 (Barclay and others, 2010).

In Cedar Canyon, the Tropic Shale ranges from 0 to 10 m thick. The ammonites *Fagesia catinus* and *Watinoceras* sp. have been found in the formation indicating it is entirely Turonian in age, with the Cenomanian–Turonian boundary occurring essentially just below its base (Eaton and others, 1999a; Tibert and others, 2003). The Tropic fauna by volume consists mostly of inoceramid bivalves and other mollusks. Shark teeth or other vertebrate remains are rather rare and no reptilian fauna has been reported, although turtle remains are found in the underlying paralic portion of the upper Naturita Formation associated with oysters and other brackish water mollusks (Joyce and others, 2016).

5.4 miles – Maple Canyon to the north. Detailed studies of the brackish to marine history of the upper Naturita Formation, the very thin Tropic Shale, and the Tibbet Canyon Member of the Straight Cliffs Formation

Figure 6. Looking north at Naturita (Dakota) – Tibbet Canyon Member section. Annotated by Jiri Laurin (Institute for Geophysics at the Czech Academy of Sciences).

has been undertaken here by Eaton and others (2001), Laurin and Sagemen (2001, 2007), and Tibert and others (2003).

5.8 miles – **STOP 2.** UMNH VP LOCALITY 162: Outcrops in this road cut have yielded microvertebrates, including mammals (faunal list in appendix; figure 7), through blind washing methods (Eaton, 2009). The mammalian fauna here includes a multituberculate (*Dakotamys malcolmi*) that is identical to the taxon recovered from late Cenomanian UMNH VP locality 27 on Bulldog Bench along the eastern margin of the Paunsaugunt Plateau. However, *Eoalphadon woodburnei* (figure 8) appears distinctly more primitive than species of *Eoalphadon* recovered from UMNH VP locality 27 and may suggest that the Naturita Formation here could be slightly older than the fauna from Bulldog Bench, possibly middle Cenomanian.

6.3 miles – Normal fault brings the Tibbet Canyon Member to the road level.

6.9 miles – After crossing bridge to the right, outcrop exposes Tibbet Canyon Member against coal and mudstone beds of the Naturita Formation.

8.1 miles – Contact between Tropic Shale and vertical outcrops of the Tibbet Canyon Member of the Straight Cliffs Formation (figure 9) in road cut. The Tropic Shale is overlain by a very thick (190 m) section of late early to middle Turonian Tibbet Canyon. This marine to marginal marine section and contains abundant brackish and marine mollusks (Eaton and others, 2001).

10.2 miles – Contact between the Tibbet Canyon Member and the basal coal beds of what we have identified as Smoky Hollow Member. See discussion in Stop 3 about identification, correlation, and nomenclature of the members of the Straight Cliffs Formation.

10.6 miles (just past milepost 11) – **STOP 3.** STRAIGHT CLIFFS FORMATION: In general, recognizing the standard four members of the Straight Cliffs Formation in the Markagunt region is difficult, as compared to the type sections in the Kaiparowits Plateau (figure 2). As Biek and others (2015) have done the most recent and extensive fieldwork in the region,

Figure 7. Looking across SR 14 at lower Naturita (Dakota) Formation (UMNH VP locality 162).

we are following their terminology. In general, here the Tibbet Canyon Member, the lower portion of which is age equivalent to the upper portion of the Tropic Shale in the Kaiparowits region, is much thicker, and the John Henry Member in the Markagunt has almost none of the paralic character seen at its type section; more closely resembling the Iron Springs Formation.

At this stop, the base of the Smoky Hollow Member contains common brackish water gastropods described by Hoffman (2005; locality "Jeff's Snail Slope"). Many of these gastropods are identical to those found in the lower Smoky Hollow Member along SR 12 at the east side of the Paunsaugunt Plateau in Bryce Canyon National Park (the Glory Cove fauna). The brackish water invertebrate fauna here is mostly mollusks, but foraminifera and ostracods have been recovered from just above the Tibbet Canyon Member (UMNH VP locality 66) just west of the Southern Utah University (SUU) center. Hoffman (2005) considered the gastropod fauna to be late middle Turonian. At UMNH VP locality 66, very low in the Smoky Hollow Member, abundant rhinobatoid teeth and other fish teeth have been recovered (Eaton and others, 1999). The Smoky Hollow brackish section here is 54 m thick, much thicker than on the Kaiparowits Plateau indicating that subsidence rates are still higher in the Markagunt Plateau area (Eaton and others, 1999). The remaining upper part of the Smoky Hollow Member (53 m) consists of fluvial channel and floodplain deposits. No fossils have yet been recovered from the upper fluvial sequence.

The John Henry Member here consists of variegated floodplain deposits and meandering river sandstones. In its type area, the Smoky Hollow Member is usually capped by a distinctive thick and laterally continuous conglomerate referred to as the Calico bed. Overlying the Calico is the base of the John Henry. In the Markagunt Plateau, locally there is a sandy discontinuous conglomeratic unit 107 m above the base of the Smoky Hollow that may be an equivalent to the Calico bed. Unfortunately, since it is discontinuous in the Cedar

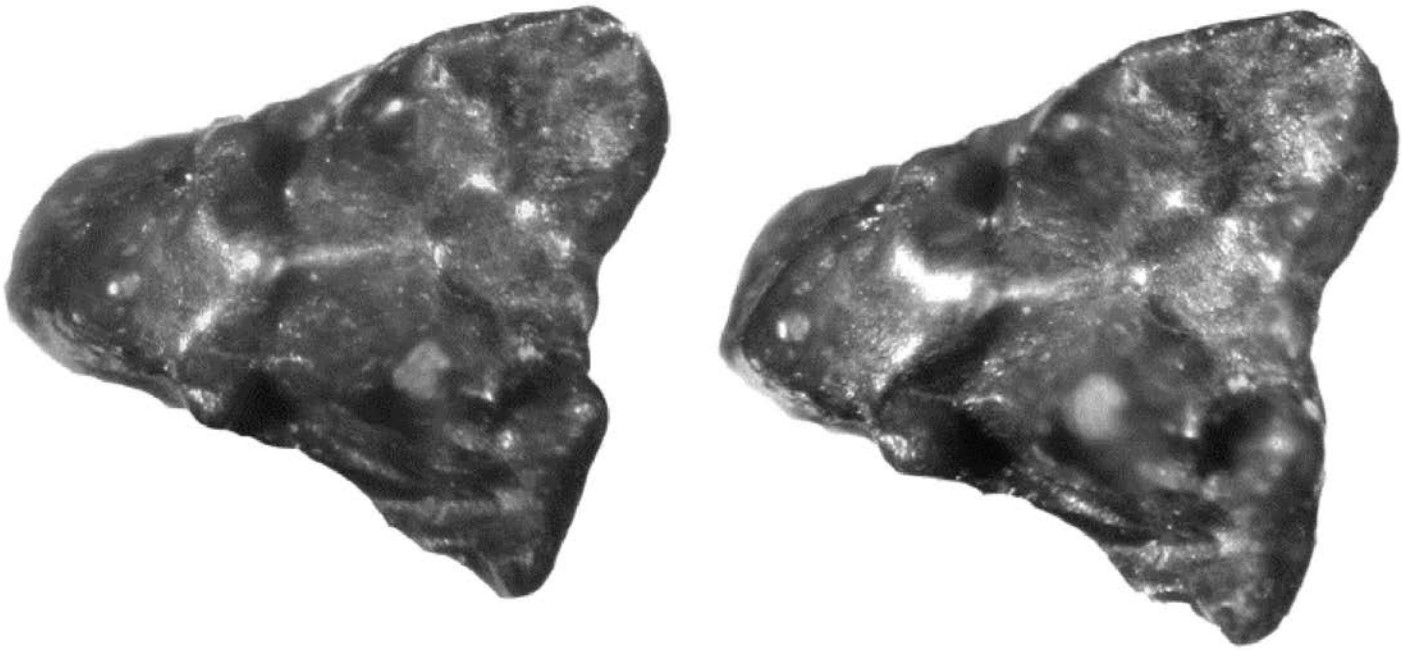

Figure 8. Stereo pair photo of a specimen of the metatherian *Eoalphadon woodburnei* recovered from UMNH VP locality 162. Specimen is approximately 3 mm in horizontal length.

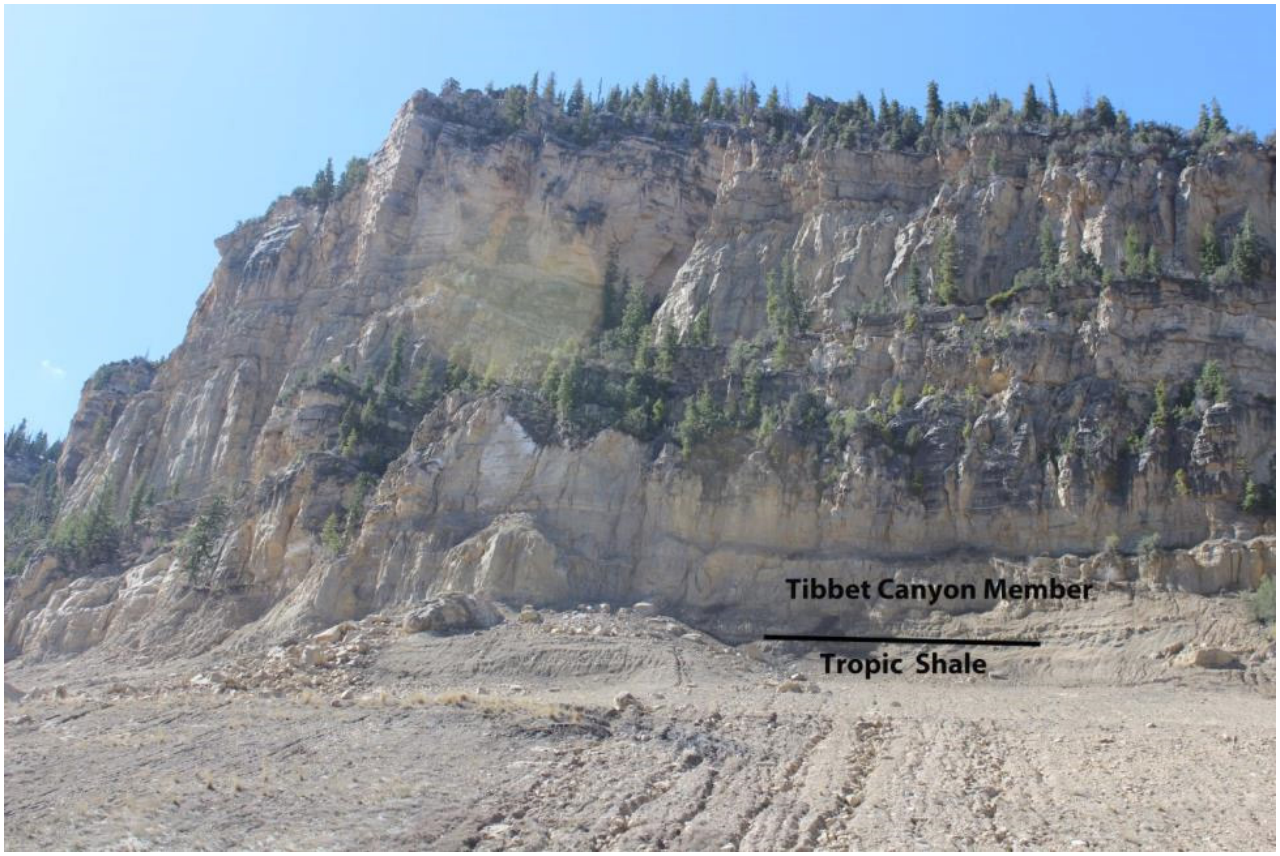

Figure 9. Contact of Tropic Shale and the Tibbet Canyon Member on south side of road in landslide area along SR 14.

Canyon area, the boundary between the two members can be difficult to recognize.

The road on SUU property across from the center leads to ridges that have much better exposures of the Straight Cliffs Formation than is seen in Cedar Canyon. There, localities provide important age controls on the section, including UMNH VP localities 8 and 9 (vertebrate faunal list in appendix). Well above the base (115 m and 150 m, respectively) of the John Henry Member are two localities, UMNH VP 9 and UMNH VP 8 (Eaton and others, 1999, 2001; Eaton, 2006a). Both of these lie well below a horizon with an $^{40}Ar/^{39}Ar$ date, taken on euhedral biotite, of 86.72 ± 0.58 Ma (Eaton and others, 1999) corrected to 87.28 Ma in Albright and Titus (2016), suggesting a Coniacian (or older) age for these localities (see faunal lists in appendix). UMNH VP locality 8 contains abundant freshwater sharks which may represent the Coniacian transgression. These are the only freshwater sharks or rays found in the entire section in Cedar Canyon. No age-diagnostic fossils have yet been recovered above the horizon with the radiometric date and below the Drip Tank Member in which the age of the John Henry Member would presumably be Santonian. UMNH VP locality 9, the stratigraphically lowest vertebrate locality has produced a small fauna that includes marsupial and multituberculate teeth, but the producing horizon has never been located (Eaton, 2006a). UMNH VP locality 8 contains abundant freshwater shark teeth and rare mammalian specimens including the multituberculate *Cedaromys* and fragments of eutherian molars (Eaton, 2006a). Much more work needs to be done on these localities as well as prospecting for additional localities.

The uppermost member of the Straight Cliffs Formation is the Drip Tank Member (Santonian, see Albright and Titus, 2016) on the Kaiparowits Plateau (Peterson, 1969). Moore and Straub (2001) suggested that a conglomerate found 457 m above the top of the Tibbet Canyon Member is the Drip Tank Member. Along SR 14 in Cedar Canyon, this conglomerate is only a few meters thick and Eaton (in Eaton and others, 2001, figure 5) placed a question mark next to the Drip Tank in the stratigraphic column. Biek and others (2015) indicate the same conglomerate is 30 m thick just to the south. Edward Sable (U.S. Geological Survey, written communication, 1994), Moore and Straub (2001), and Biek (2015) claimed to have traced the unit around the southern margin of the plateau to Long Valley where they correlate it with what was previously referred to as the lower member of the Grand Castle Formation.

10.9 miles – A conglomerate that crops out on the north side of the road (as much as 12 m thick) is thought to possibly represent the Calico bed, but identification/correlation is uncertain because it is not laterally continuous.

12.6 miles – Typical outcrops of John Henry Member equivalent rocks are in the road cuts. Notes these include variegated mudstone and thin sandstone; however, in this area, the section is dominated by mudstone. Macrovertebrate remains are known from the John Henry on the Markagunt Plateau, and a partial, small articulated coelurosaur-grade theropod was recovered from north of Cedar Canyon many years ago. This specimen remains undescribed. If the outcrops were more extensive, it is likely that macrovertebrate remains would be found much more frequently.

12.8 miles – Outcrop of a thin pebbly conglomerate considered to represent the Drip Tank Member (see discussion under STOP 3 above). This conglomerate does appear to be laterally continuous and is thicker elsewhere. Biek and others (2015) consider this sandstone to be equivalent to the lower conglomeratic member of the Grand Castle Formation in Parowan Canyon.

13.0 miles – **STOP 4.** LOWER WAHWEAP FORMATION-UMNH VP LOCALITY 10: Drive a short distance and walk down to UMNH VP locality 10 (figure 10). UMNH VP locality 10 (see faunal list in appendix) is located 21 m above the Drip Tank conglomerate. The site contains some taxa (see appendix) similar to those previously recovered from the Santonian part of the John Henry Member (*Cimolomys* sp.) or the Santonian Milk River Formation of Canada (*Picopsis* sp.) (Eaton, 2006a). One taxon (*Cimolodon similis*) has been recovered both from the Milk River and the Wahweap Formations and two taxa (*Symmetrodontoides* sp. cf. *S. foxi* and *Cimolodon* sp. cf. *C. nitidus*) are almost iden-

Figure 10. Josep San Juan Girbau (American University, Beirut) at UMNH VP locality 10.

tical to those recovered from the Wahweap Formation (Eaton, 2006a). This suggests a fauna transitional between that of the John Henry Member and the Wahweap Formation. However, based on stratigraphic correlation this locality is most likely late early Campanian. The Wahweap in the type area has thick laterally accreted sandstone bodies and drab organic-rich floodplain mudstone beds (Eaton, 1991). The sequence above the Drip Tank Member in Cedar Canyon is 290 m thick and is dominated by variegated light-colored mudstone and isolated sandstone bodies representing meandering rivers (Eaton and others, 2001); as is much of the section beneath the Drip Tank Member in Cedar Canyon. For this reason (and others discussed below) Eaton and others (2001, figure 5) placed a question mark next to Wahweap in the stratigraphic column. To emphasize the uncertain identification, Eaton has sometimes applied the term "Formation of Cedar Canyon" (e.g., Roček and others, 2013, figure 12.3) for this part of the stratigraphic section. Titus and others (2013, figure 2.7) considered this part of the section to represent the John Henry Member of the Straight Cliffs Formation. The interpretation of Biek and others (2015) for the upper portion of the Cretaceous sections is followed here. $^{40}Ar/^{39}Ar$ dates of 80.6 and 79.9 Ma (Jinnah and others, 2009; Jinnah, 2013) from low in the Wahweap Formation on the Kaiparowits Plateau and paleomagnetic sections from the formation (Albright and Titus, 2016) indicate that in the Kaiparowits Plateau region there is a significant unconformity between the Drip Tank Member and the overlying Wahweap Formation such that strata of the lower Campanian are missing. If the unit in Cedar Canyon is actually a western equivalent of the Wahweap, perhaps the lower Campanian strata are present in this area. Future research involving radiometric dating and paleomagnetic studies would be most helpful in resolving this issue.

0.0 miles (restart mileage).

1.0 miles – Note fine-grained variegated mudstone beds of the Wahweap Formation, which are essentially indistinguishable from those of the John Henry Member in Cedar Canyon.

1.3 miles – Turnoff to Webster Flats. Here the white sandstone (figure 11) is considered to represent the capping sandstone member (as defined by Eaton, 1991) of the Wahweap Formation used by Pollock (1999) and Lawton and others (2003), but this interpretation is not universal (see discussion below under STOP 5). The sandstone consists largely of reworked Navajo Sandstone. It has not yielded any identifiable vertebrate fossils but does contain the molds of plant material in iron concretions and on bedding planes.

1.4 miles – **STOP 5.** UMNH VP LOCALITY 11: This locality lies at the very top of the Wahweap Formation in Cedar Canyon (267 m above UMNH VP locality 10, Eaton, 2006a). It has a very enigmatic fauna with "pediomyids" similar to those of the Santonian Milk River Formation but also with a taxon (*Meniscoessus* sp. cf. *M. intermedius*) closer to known taxa of the Wahweap Formation or even Judithian faunas. The locality also contains an anuran (*Nezpercius dodsoni*) that has only been recovered in southwestern Utah from the Wahweap (Gardner and Demar, 2013). High in the Cretaceous section above the Wahweap, Nichols (1977) reported the recovery of no palynomorphs younger than Santonian, which supports the interpretation of Titus and others (2013); however, Lawton and others (2003) reported a distinctly middle Campanian paly-

Figure 11. Capping sandstone member of the Wahweap Formation, Websters Flat turnoff.

nomorph (*Dyadonapites reticulatus*) from the capping sandstone member at the Webster Flat exposures (see below) and this is the probable age for these beds.

The about 60-m-thick quartz arenite sandstone, exposed at the Webster Flat turnoff from SR 14 (mile 1.3), lies immediately above the variegated floodplain deposits of the Wahweap Formation containing UMNH VP locality 11. This unit has been variously referred to the Kaiparowits(?) Formation (Moore and Straub, 2001), the middle member of the Grand Castle Formation (Goldstrand, 1991, 1992) and the capping sandstone member of the Wahweap Formation (Pollock, 1999; Lawton and others, 2003). Eaton and others (2001) used the noncommittal term "white sandstone" for this sandstone body. We are in agreement with Biek and others (2015) that this unit is indeed the capping sandstone member of the Wahweap Formation.

The complexity of this area of been recently examined during mapping of the region by Biek and others (2015). This mapping necessarily involved trying to resolve the complex relationship between outcrops in Cedar Canyon and those in Parowan Canyon, which is the next major canyon 20 to 30 km to the north. Parowan Canyon is floored by a Cretaceous sequence of tabular sandstone beds separated by thin mudstone beds previously mapped as Iron Springs Formation (mapping that Eaton still thinks was correct) that has now been mapped as John Henry Member of the Straight Cliffs Formation in Biek and others (2015). Two localities, UMNH VP 6 and VP 64 (Eaton and others, 2001, figure 5) are known from the Iron Springs/John Henry Member of Parowan Canyon, and although UMNH VP 64 was relatively rich in non-mammalian vertebrates none of those specimens have yet been described.

Overlying the Iron Springs/John Henry Member in Parowan Canyon is the Grand Castle Formation of

Figure 12. UMNH VP locality 11, upper Wahweap Formation below the capping sandstone member.

Goldstrand (1991, 1992) and Goldstrand and Mullett (1997). It rest on a deeply weathered surface on top of the Iron Springs/John Henry Member, enough of an unconformity that Goldstrand (1991, 1992) and Goldstrand and Mullett (1997) suggested a Paleogene age for the Grand Castle. The Grand Castle Formation was originally divided into three members. The middle sandstone member of the Grand Castle was shown to be Cretaceous by the discovery of dinosaur tracks by Hunt and others (2011) and palynomorphs reported by Biek and others (2015). The underlying lower conglomeratic member of the Grand Castle has been correlated in Biek and others (2015) to the Drip Tank Member in Cedar Canyon and assigned to that member. Biek and others (2015) correlated the few tens of meters of the lower middle sandstone member of the Grand Castle Formation in Parowan Canyon 20 km away to the 290 m of the Wahweap Formation underlying the capping sandstone member (figure 12) and the rest of the middle member directly to the capping sandstone member. This represents a remarkable thickening of capping sandstone member (formerly, the middle member of the Grand Castle Formation) from Parowan Canyon to Cedar Canyon, whereas the lower unit thins from 30 to 41 m or less. This geometric problem has not been resolved and much more work needs to be done on the relationships of the Cretaceous sequence in Parowan and Cedar Canyons.

0.0 miles – restart mileage.

0.7 to 0.8 miles – Still traveling in the capping sandstone. Upper portion of this mapped unit here contains poorly exposed pebble and cobble conglomerates that are similar to those observed at the top of the capping sandstone member of the Wahweap Formation in the western Paunsaugunt Plateau (Hillsdale Canyon) and represent distal equivalents of the Grand Castle Formation. The Grand Castle as now defined is about 55 m thick in Parowan Canyon and thins into Cedar Canyon where it is variable in thickness from 0 to 8 m.

1.1 to 1.3 miles – Road cuts are in a unit (as much as 60 m thick) that Biek and others (2015) mapped as "Km" (Cretaceous strata on the Markagunt Plateau). This series of sandstone, mudstone, and siltstone beds overlie the coarse conglomeratic facies at the top of the capping sandstone member of the Wahweap Formation and underlies the base of the Claron Formation (Paleogene). Importantly, this interval contains abundant black chert lithics and minor feldspar, which are virtually absent in the underlying capping sandstone member. Biek and others (2015) state (p. 151) that "the stratigraphic position of the Km unit precludes it being Santonian in age." We agree even though Nichols (1977) reported Santonian palynomorphs from this same interval. Biek and others (2015) reassessed the palynomorphs from the Km beds and reported late Campanian to Maastrichtian taxa, which agrees better with the current lithostratigraphic correlations. A very similar interval was mapped by Biek and others (2015) above the capping sandstone member of the Wahweap Formation in Hillsdale Canyon on the west side of the Paunsaugunt Plateau as Kwcg (pebbly sandstone unit of the Wahweap above the capping sandstone) and Kkl (lower unit of the Kaiparowits Formation—see Biek and others, 2015; figure 28, in which Kwu = Kkl). These are mostly likely facies variations within the lower Kaiparowits depositional system that arise where approaching the thrust belt and expanding the section.

1.4 miles – Basal Claron Formation (Eocene) in road cut.

3.5 miles – Intersection with SR 148 to Cedar Breaks.

5.7 miles – Cinder cone and basalts of the Markagunt Plateau volcanic field which erupted from latest Pliocene through the Pleistocene and possibly into the Holocene (Johnson and others, 2010).

9.0 miles – Claron Formation to left and Navajo Lake to the right which formed as a result of basalts damming the drainage.

19.2 miles – Claron Formation outcrops which contain abundant trace fossils described in Bown and others (1997).

21.7 miles – Short Canyon turnoff.

22.3 miles – Mile 38 sign post.

22.7 miles – Outcrop to right is the basal Brian Head Formation (late Eocene). This blind wash locality (UMNH VP locality 1085, IP locality 186) has produced rodent teeth, ostracods, ray teeth, and miscellaneous fragments of fish. Initially, this locality was thought to be part of the Claron Formation by Eaton and others (2011) and they reported the mammals and ostracods from this locality to be from the Claron Formation. Subsequent location of a thin pebble conglomerate (the Boat Mesa Conglomerate) below this white unit demonstrates that it is instead part of the Brian Head Formation and not the Claron.

23.0 miles – Claron outcrop in road cut.

23.3 miles – Outcrops of Brian Head Formation (figure 13).

23.4 miles – Claron Formation. The lithology of the Claron in this area is unusual with abundant fine-grained, soft, pastel-colored beds of brown quartzose sandstone, and white carbonate beds. These lithologies are exposed for the next 16 km northward on U.S. Highway 89. The only bone fragments recovered from the Claron Formation anywhere are from these outcrops of brown sandstone.

25.1 miles – Junction SR 14 and US 89, Long Valley Junction. Driving north from the junction, the upper part of the Claron Formation is exposed in the road cuts.

34.5 miles – Driving on top of the Claron Formation, hills above the white carbonate are made of the lower Brian Head Formation.

35.5 miles – **STOP 6.** OVERVIEW OF THE PAUNSAUGUNT PLATEAU: To the east is the western margin of the Paunsaugunt Plateau. The Sevier normal fault exposes the Cretaceous section consisting of the upper Straight Cliffs and Wahweap Formations. Here, the John Henry Member consists dominantly of fluvial sandstone with almost no mudstone. This Cretaceous block is separated from the Claron Formation to the east by another fault, the Sand Pass fault. These faults merge just south of Hillsdale Canyon (major canyon to the north) where overlying the capping sandstone member (figure 14) of the Wahweap Formation, Biek and others (2015) delineated the following succession: Kwcg (pebbly sandstone unit in the Wahweap Formation), Kkl (lower unit of the Kaiparowits Formation), and Kk (typical Kaiparowits Formation). The Hillsdale section is critical for understanding correlations of the upper portion of the Cretaceous section between

Figure 13. Outcrop of the late Eocene Brian Head Formation showing the quarry horizon in 2011.

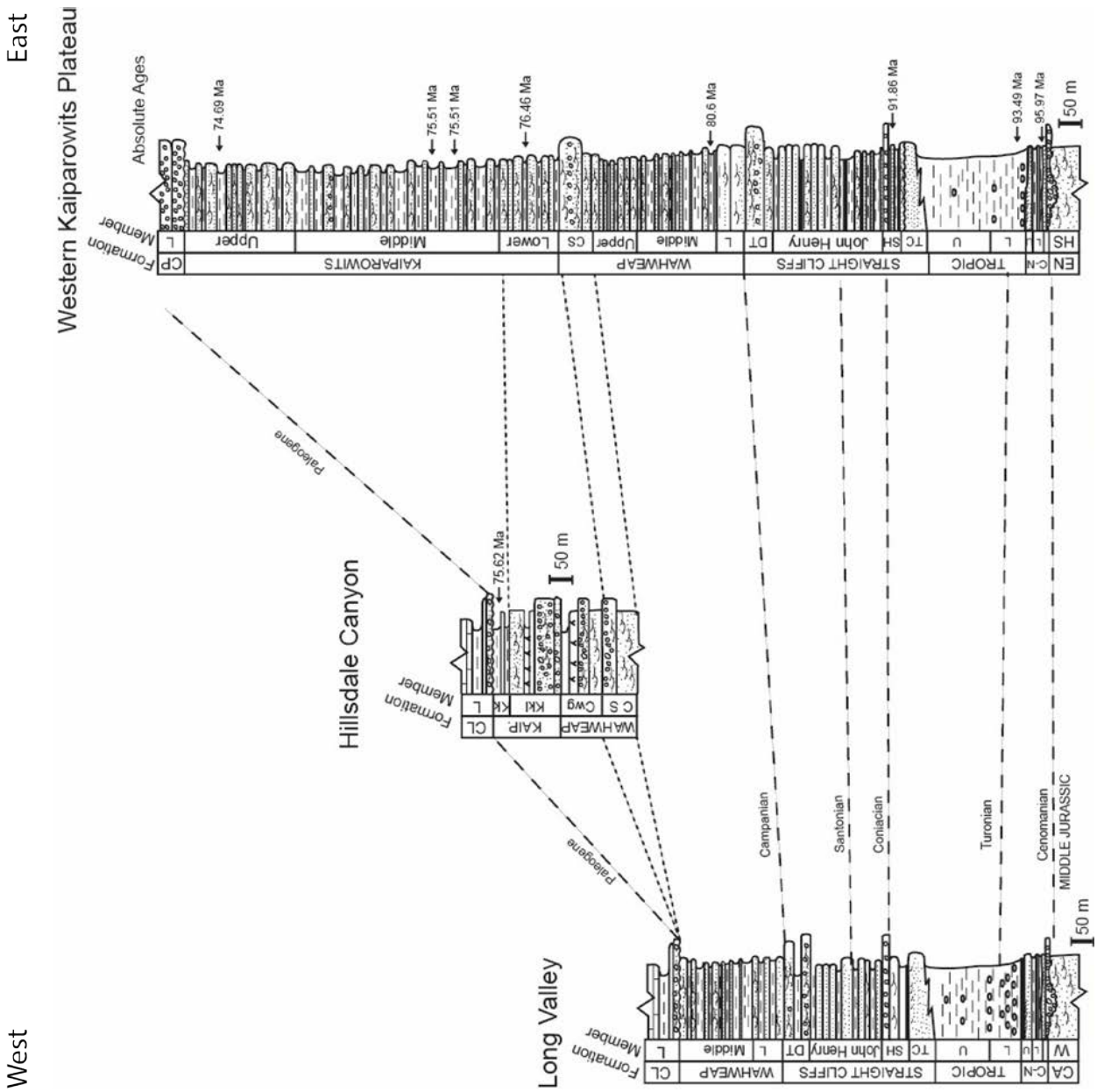

Figure 14. Upper Cretaceous stratigraphic columns for the Paunsaugunt and Kaiparowits plateaus. Abbreviations as follows: CL – Claron; GC – Grand Castle; CA – Carmel; C-N – Cedar Mountain and Naturita; L – Lower; M – Middle; Cwg – pebbly sandstone unit of the Wahweap; Kkl – lower unit of the Kaiparowits; Kk – typical Kaiparowits; DT – Drip Tank; SH – Smoky Hollow; TC – Tibbet Canyon; U – Upper; W – Winsor; CP – Canaan Peak; EN – Entrada; CS – capping sandstone; HS – Henrieville Sandstone. See figure 2 for general location of sections.

the Markagunt and Kaiparowits Plateaus. The capping sandstone member is overlain there by a conglomerate identical in character to that of the upper Grand Castle Formation, which is in turn overlain by sandstones that increase upsection in black chert lithic content, more typical of the Kaiparowits Formation. The overall coarser grain content of what are mapped as Kaiparowits Formation equivalents is largely due to its proximity to the fold and thrust belt.

The lower portion of the section, including the Cedar Mountain, Naturita, Tropic Shale, and lower Straight Cliffs Formations, are well exposed around Glendale and Orderville, farther south. In general, because of the higher altitude and associated plant cover, the outcrops on the Paunsaugunt are not as extensive as they are on the Kaiparowits, but are generally more fossiliferous with vertebrates than their eastern counterparts. Unfortunately, the Kaiparowits Formation was largely removed from the Paunsaugunt (and Markagunt) areas by pre-Claron aged Laramide uplift (figure 14).

The Cedar Mountain and Naturita Formations are exposed only around the southern and eastern margins of the Paunsaugunt Plateau. Exposures of Naturita Formation along the southwest side of the plateau have produced significant microvertebrate material near the town of Alton (MNA 939/UMNH VP 123).

The Tibbet Canyon Member of the Straight Cliff Formation is quite thin (20 m) along the southern margin of the plateau (Mill Creek section of Eaton, 1993b). The overlying John Henry Member is 190 m thick (figure 5). Along the south side of the plateau a few vertebrate localities have been found (MNA 1201, 1204); but abundant private land has restricted access to the John Henry Member there. Along the eastern margin of the Paunsaugunt Plateau within Bryce Canyon National Park (BCNP), and just east of the park, the John Henry Member is relatively rich in vertebrate fossils. This includes localities in the basal Coniacian part of the member, which range from fish-rich microvertebrate localities (UMNH VP 823-826, 860-866, 1084, 1276) and macrovertebrate localities containing turtles to dinosaurs. Unfortunately, little work has yet been done on this area, the richest known for Coniacian macrovertebrate and microvertebrate fossils in the entire region. Santonian localities are also abundant (UMNH VP 419, 420, 424, 781, 799, 826, 1144) and particular UMNH VP locality 424 (a "blind wash locality") in the uppermost part of the John Henry Member in BCNP produced a remarkably rich microvertebrate assemblage described in Eaton (2009), Roček and others (2010), Brinkman and others (2013), and Gardner and Demar (2013). The overlying Drip Tank Member is 50 m thick in the Mill Creek section, but is highly variable in thickness around the plateau and is very thin in Tropic Canyon at the northeast corner of the plateau.

The Wahweap Formation on the Paunsaugunt Plateau has been problematic. Gregory (1951) and Doelling and Davis (1989) thought the youngest Cretaceous strata on the plateau belonged to the Kaiparowits Formation. Bowers (1990) and Tilton (1991) considered the uppermost Cretaceous rocks to represent the Wahweap Formation. Eaton (1993) and Eaton and others (1993) favored the Kaiparowits Formation interpretation based on petrology and comparative faunas. Unquestionable Wahweap is found in the Campbell Creek area along the eastern margin of the plateau south of the town of Tropic. Here, the Wahweap Formation mudstones are drab colored and UMNH VP localities 77 and 82 contain abundant shark and ray teeth; both characteristics are common to the Wahweap Formation on the Kaiparowits Plateau. However, in an erosional window through the Claron Formation on top of the plateau (south of Tropic Reservoir), are exposures of colorful variegated mudstone, which contained no shark or ray teeth, but contains the turtles *Compsemys*, *Neurankylus*, as well as kinosternids, taxa that are more common in the Kaiparowits Formation than in the Wahweap (Eaton, 1993b, 1999a). Although initially favored a Kaiparowits Formation equivalency based on the vertebrate faunas, Eaton ultimately accepted the more parsimonious interpretation of Wahweap Formation (Eaton, 1999a) but suggested marked paleoecologic controls on the vertebrate fauna that reflect the shift from relatively poorly drained coastal floodplains (preserving organics, having abundant sharks and rays) to the east to better drained more upland settings (variegated mudstone, no sharks and rays) to the west.

Biek and others (2015) described a "lower unit" of the Kaiparowits Formation (Kkl) present on the western side of the Paunsaugunt Plateau that thins eastward

and completely disappears by the East Fork of the Sevier River. They considered this unit to represent the Kaiparowits Formation, even though it is unlike the typical lithologies of that formation. It is also lithologically unlike the underlying capping sandstone of the Wahweap Formation but is somewhat like the basal Kaiparowits Formation found along Henrieville Creek. The only Kaiparowits Formation with lithologies typical of the strata in its type area is a remnant along the west margin of the Paunsaugunt Plateau in Hillsdale Canyon (Biek and others, 2015; see figure 28). Along the eastern margin of the Paunsaugunt Plateau, the Wahweap Formation has been eroded from the tops of Laramide folds such that in places the Claron Formation rests directly on the Straight Cliffs Formation and the entire Wahweap has been removed (Bowers, 1990; Biek and others, 2015).

The type section of the Limerock Canyon Formation is east of this stop (Kurlich and Anderson, 1997). Work by Kevin Rafferty (2015; a student formerly at Weber State University and now at Univeristy of Nevada, Las Vegas) has shown that much of the Limerock Canyon (Miocene) is actually Brian Head Formation. Brian Head localities in this area have produced rodent teeth, ostracods, and charophytes.

39.0 miles – Road cut is in the upper Tertiary fan alluvium (Taf) and includes an exposure of the 5.0 Ma Rock Canyon lava flow (Biek and others, 2015).

45.2 miles – Intersection of US 89 and SR 12, turn right onto SR 12. White outcrops at this intersection have been blind washed and produced latest Miocene rodents (William Korth, Rochester Institute of Paleontology, written communication to Eaton, 2016), as well as unaltered gastropods and bivalves (UMNH VP locality VP 1999, IP locality 89).

47.8 miles – Sevier fault.

48.0 miles – Red Canyon; note conglomerate on the left side of the road in the Claron Formation. Conglomerate becomes more common to the northwest.

53.5 miles – Town of Tropic, Utah, and the type section for the Cretaceous marine Tropic Shale.

End of Day 1.

DAY 2: CRETACEOUS STRATIGRAPHY AND PALEONTOLOGY OF THE PAUNSAUGUNT AND KAIPAROWITS PLATEAUS

0.0 miles – Tropic, Utah, at the intersection of 200 North and SR 12. Proceed west on SR 12.

3.5 miles – Paunsaugunt fault. Gray beds of the John Henry Member of the Straight Cliffs Formation faulted against the lower red member of the Claron Formation. This normal fault has the same general orientation as the Sevier fault on the west side of the Paunsaugunt Plateau.

7.4 miles – Intersection with SR 63 to Bryce Canyon Nation Park. On the eastern flank of the park there are extensive exposures of the John Henry Member of the Straight Cliffs Formation and the Wahweap Formation. Eaton conducted a five year (2006-2010) inventory of fossil resources within the park. Both the John Henry Member and the Wahweap Formation are more fossiliferous there than on the Kaiparowits Plateau and hundreds of localities were identified. Only a few localities were intensively worked because of the lack of access. Bulk mudstone samples taken to process for microvertebrates had to be back-packed out of the park, often requiring 3 hours of hiking per sack of matrix in the middle of summer. One of the most significant localities is UMNH VP locality 424 (figure 15) which is almost at the top of the John Henry Member and is the richest microvertebrate site yet known from that member (see appendix for a complete listing of taxa).

10.3 miles – Turnoff to Tropic Reservoir. Make a left turn and proceed south.

17.3 miles – Tropic Reservoir. Continue south. From about this point south, outcrops in the lower portions of the valley are of the middle Campanian Wahweap Formation overlain unconformably by the Claron Formation.

Figure 15. UMNH VP Locality 424 (Santonian), near the top of the John Henry Member of the Straight Cliffs Formation. Note the Drip Tank Member just above the locality. Here the Claron Formation rests unconformably on the Drip Tank Member due to erosion across the Laramide aged Bryce Canyon anticline.

21.6 miles – **STOP 7.** WAHWEAP FORMATION ON THE PAUNSAUGUNT PLATEAU – MILL CREEK AREA (UMNH VP locality 83/MNA locality 1073): The Wahweap Formation on the Paunsaugunt Plateau is exposed in a window eroded through the Claron Formation by the East Fork of the Sevier River and its tributaries. This stop, UMNH VP locality 83/MNA locality 1073, in the Mill Creek area, is one of the most easily accessed of all the highly fossiliferous localities (figure 16). The obvious interpretation of these strata, based on their stratigraphic position, would be the Wahweap Formation, but aspects of the lithology and fossil content were questioned (Eaton, 1993b; Eaton and others, 1993). The Wahweap Formation on the Kaiparowits Plateau (type area) consists of rather drab organic-rich floodplain mudstones and siltstones and laterally aggrading channel sandstone. Eaton and others (1993) noted that the sandstone high in the Wahweap section on the Paunsaugunt Plateau were petrologically more similar to the Kaiparowits Formation than to sandstone of the Wahweap Formation. Biek and others (2015) have now mapped these sandstone beds as the lower Kaiparowits Formation (Kkl). The Wahweap mudstone exposed here also differ markedly from those of the type area as they are variegated and very fossiliferous.

Sampling the Wahweap Formation on the Kaiparowits Plateau for microvertebrate fossils commonly

Figure 16. Typical variegated fossiliferous mudstone of the Wahweap Formation along Mill Creek at UMNH VP locality 83/MNA locality 1073.

produces shark and ray teeth as well as crab claws, with other taxa much less common. On the Paunsaugunt Plateau recovered fossils (see appendix) include taxa that are common in the Kaiparowits Formation but rare or unknown from the Wahweap Formation of the Kaiparowits Plateau. The Paunsaugunt Wahweap strata also lack ray and shark teeth or crab claws indicating a fundamental environmental shift between the two regions, most likely a more upland, better drained environment with less coastal influence. The mammalian fauna (Eaton, 1993b) also initially did not compare well to that of the Wahweap Formation on the Kaiparowits Plateau. For these reasons Eaton (1993b) and Eaton and others (1993) kept open the possibility that these strata might represent the Kaiparowits Formation or possibly another unit. However, subsequent study of the fauna (Eaton, 2013), aided by systematic revisions by other workers, showed a reasonably good correlation with the fauna of the Wahweap Formation to the east. The difference in the overall vertebrate fauna seems to reflect a shift from relatively poorly drained coastal floodplains to better drained more upland floodplains.

Return to Tropic and reset trip meter.

0.0 miles – Intersection of 200 N with SR 12. Proceed east.

1.6 miles – Road cut exposes upper marine portion of the Naturita Formation and lowermost beds of the Tropic Shale.

4.7 miles – Entering Cannonville.

4.8 miles – Turn right (south) onto the Cottonwood Canyon Road to Kodachrome Basin State Park.

4.9 miles – **STOP 8**. OVERVIEW OF NATURITA FORMATION, PAUNSAUGUNT-KAIPAROWITS TRANSITION: To the west of the Cannonville town park and Grand Staircase-Escalante National Monument visitor center parking lots, the red- and white-banded Cannonville Member of the Entrada is in view and overlain by the Naturita Formation cutting out much of

the intervening bleached looking Henrieville Sandstone (figure 17). The Henrieville Sandstone as described by Thompson and Stokes (1970) is somewhat controversial as a map unit and has been synonymized with the upper portion of the Entrada Sandstone by some workers (Bowers, 1983; Biek and others, 2015). Resolution of this issue awaits more detailed lithologic study of all the potentially correlative units. For this guide, we retain these beds in the Henrieville Sandstone. The Cedar Mountain Formation is locally absent, being discontinuous over much of the Kaiparowits Plateau. Thin, gravelly facies at the bottom of the Naturita in this region are probably reworked Cedar Mountain sediments. Here, on Bulldog Bench, the nonmarine lower unit of the Naturita Formation is unusually fossiliferous with vertebrates, including mesovertebrate remains such as turtles and crocodylians. Although many localities have been discovered, only one has been extensively screen washed (figure 18) – MNA 1067/UMNH VP locality 27. This remarkable locality has produced mammalian jaws, including early marsupials, but also large lungfish plates, and material of frogs and lizards (see appendix). The mesovertebrate fossil content of the Naturita appears to be highest trending between Bulldog Bench and the southwestern margin of the Kaiparowits Plateau, where turtle and crocodylian remains are similarly abundant. The Naturita in the Kaiparowits region contains abundant coal and carbonaceous beds. Macrovertebrate skeletal remains are virtually unknown although dinosaur trackways and teeth recovered from microsites indicate the region was inhabited by larger animals.

Return to SR 12.

5.0 miles – Turn right (east) onto SR 12.

9.7 miles – Outcrops of the Middle Jurassic Henrieville Sandstone (overlying Entrada Sandstone) overlain by the lower and upper members of the Naturita Formation visible to the west of SR 12 (figure 19).

11.2 miles – **STOP 9.** OVERVIEW OF KAIPAROWITS PLATEAU STRATIGRAPHY, THE NATURITA FORMATION, AND THE TROPIC SHALE: From SR 12, hike approximately 0.16 km) due south to the Naturita-Tropic contact. The basic Cretaceous stratigraphy of the Kaiparowits Plateau (figure 20) was established by Gregory and Moore (1931), Lawrence (1965), Peter-

Figure 17. Henrieville Sandstone (Jurassic)–Naturita (Cretaceous) Formation contact on Bulldog Bench. The lower nonmarine Naturita Formation is much thicker here than anywhere else in the Kaiparowits-Paunsaugunt Plateaus region.

Figure 18. MNA 1067/UMNH VP locality 27 quarry in the Naturita (Dakota) Formation on Bulldog Bench. This appears to be an overbank deposit immediately adjacent to a meandering river levee. Large material is found along the levee and fines rapidly away from the levee. There are clearly several flood events separated by organic mats.

son (1969), and Eaton (1991). The Upper Cretaceous section is approximately 2600 m thick and fairly similar throughout the region, but there are some marked facies changes in formations, mostly trending east-west. As a rule, exposures are much better for all of the units in this region than they are in either the Paunsaugunt or Markagunt Plateaus. The oldest unit mapped is the Cedar Mountain Formation, which in the Kaiparowits region is mostly limited to the pebbly conglomerate facies. The smectitic gray mudstone facies is absent. In the Kaiparowits Basin, the overlying Naturita Formation is relatively thin, averaging only 30 to 35 m in thickness. As it overlies the basal Cretaceous unconformity and in turn is overlain by the marine Tropic Shale, it represents a variety of terrestrial and nearshore marine environments, in a generally retrogradational sequence. With the exception of shark and fish remains, vertebrate fossils are largely confined to the lower member, occurring in floodplain, channel, and crevasse splay facies. Large mesovertebrate and macrovertebrate remains are generally uncommon and usually occur as isolated elements, but 0.3-m-diameter turtle shells can be locally abundant in lacustrine and channel facies, particularly in the southwestern portion of the Kaiparowits Basin. The Bulldog Bench area near Tropic (Stop 8) is one of the only places where larger vertebrates besides turtles have been found in any quantity. Dinosaur trackways also occur sparingly in the middle unit (Titus and others, 2013).

The overlying Tropic Shale is as much as 300 m thick (Doelling and Davis, 1989), entirely marine in origin, and spans late Cenomanian to middle Turonian time. The formation is dominantly gray-weathering mudstone, but calcisiltites and calcarenites also occur throughout the formation. The lower half of the Tropic is more carbonate rich, whereas the upper half is more siliciclastic. Fossils, mostly invertebrates are common throughout, but vertebrate remains are only locally common. Non-fish vertebrates are uncommon to rare, but long-term collecting has revealed a highly diverse assemblage that will be discussed in more detail below.

The overlying Straight Cliffs Formation is a highly heterogeneous unit that probably exhibits the most lateral variation of any formation in the Kaiparowits Basin. Spanning much of the later Turonian, as well as the entire Coniacian and Santonian, it also represents the longest time span (~ 10 Ma) of any Cretaceous formation in the region except for the related Iron Springs Formation. In general, marine and marginal-marine facies dominate the eastern outcrops, with shoreface, beach complex, estuarine, and deltaic beds interleaved with coastal mire and distributary fluvial units (Allen and Johnson, 2010), whereas western outcrops are composed mostly of meandering fluvial and floodplain deposits. The unit was deposited during the end of the Greenhorn and throughout the entire Niobrara cyclothems (middle Turonian to late Santonian age). In the Kaiparowits Basin the Straight Cliffs locally produces abundant microvertebrate remains. However, macro and mesovertebrate sites are actually somewhat rare. The highest densities of such sites occur in the southwest portion of the Kaiparowits Plateau where alluvial-plain facies dominate. There multiple sites yielding dinosaur material, including a multi-individual ornithopod bonebed have been found, but not in the same quantities as observed on the Paunsaugunt Plateau. Dinosaur trackways are locally known, particularly in coal seems, but bone is quite rare in the eastern half of the

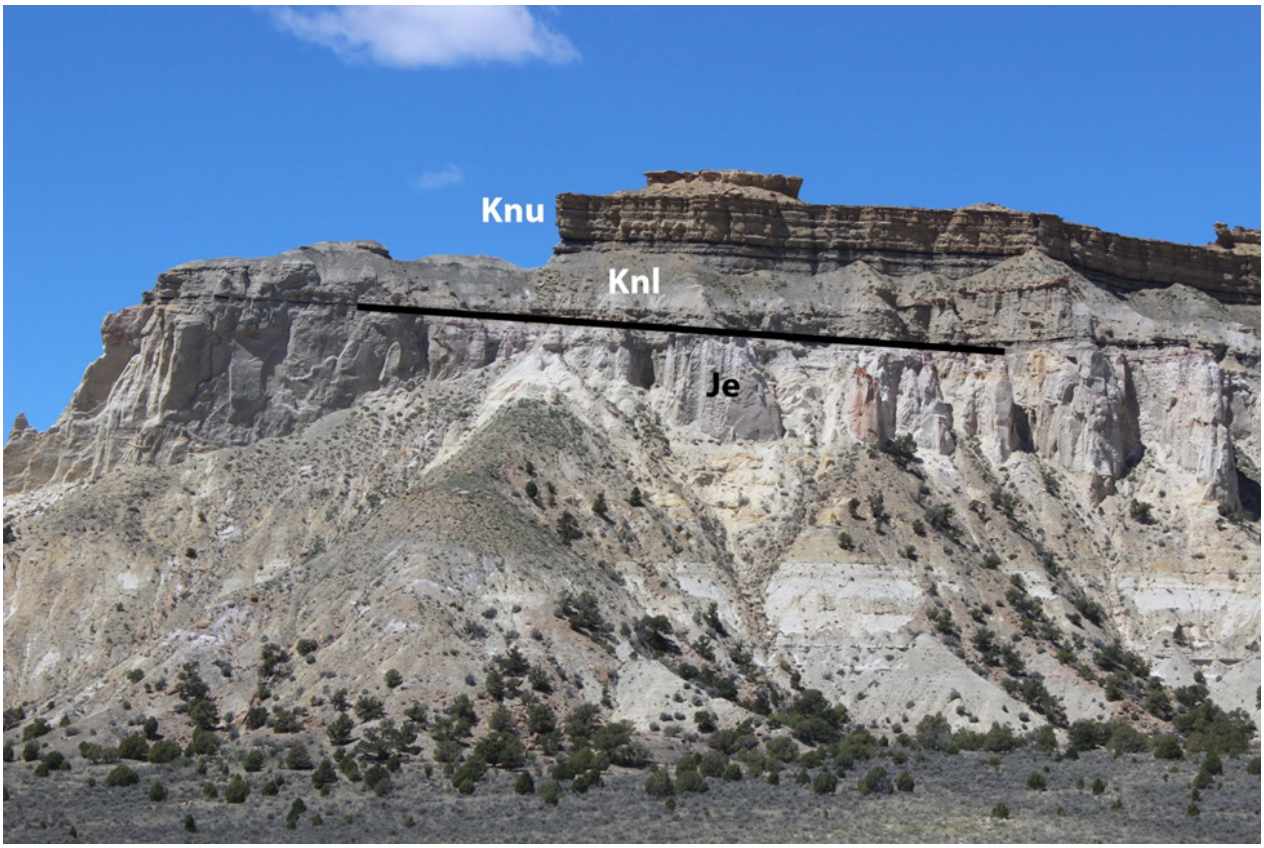

Figure 19. Henrieville Sandstone (Je) in contact with the Naturita (Knl, Knu) Formation. There is very little lower nonmarine Naturita even though this outcrop is only about 16 km from Bulldog Bench.

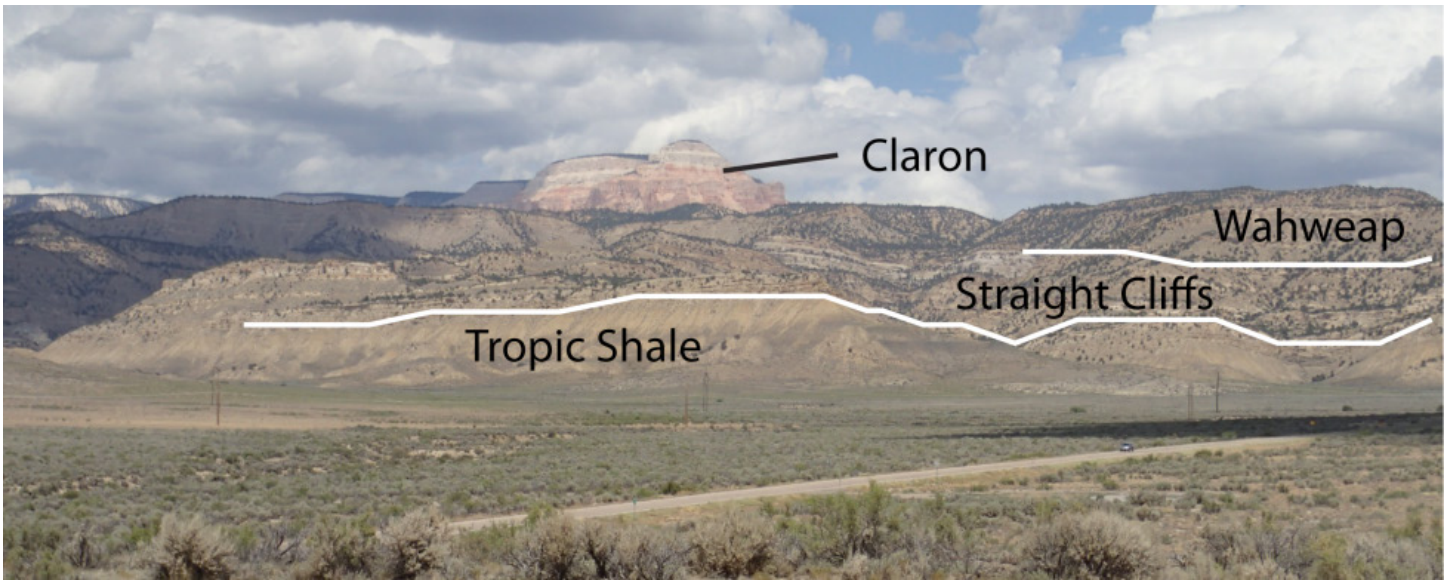

Figure 20. Kaiparowits Plateau stratigraphy visible from Stop 9. The Kaiparowits Formation is not visible, but widely exposed behind the ridge formed in the Wahweap Formation. The highest outcrops of white-colored Eocene age Claron Formation are at Powell Point, at the very south end of the Table Cliffs Plateau. See figure 23 for wide view.

plateau, leading to the conclusion that either the depositional rates or soil conditions were unfavorable to preservation of large bone.

The seaway withdrew at the end of the Niobrara cycle never to inundate southern Utah again. As a result, the overlying Wahweap and Kaiparowits Formations are entirely terrestrial in origin and fairly homogeneous, although not without marine influence on their deposition and occasional brackish water incursions (e.g., Roberts and others, 2008).

The marine portion of the upper Naturita at this stop consists of alternating (cyclic) mudstone and sandstone deposited in a shallow, near-shore muddy shelf setting during the early Greenhorn cyclothem event. Mollusk assemblages alternate between oyster epiboles and more diverse assemblages reflecting fluctuating sea levels. A thin coal bed just below the top of the formation marks a lowstand associated with the top of the *Metoicoceras mosbyense* biozone. The biostratigraphically useful inocermid bivalve *Inoceramus fragilis* occurs near the base of the member, whereas ammonites of the *Dunveganoceras problematicum* and *Metoicoceras mosbyense* biozones occur in the middle and top of the unit, respectively. Collectively, the marine invertebrate record indicates the upper member is entirely late Cenomanian, spanning much of that substage. Vertebrates are not common, and consist mostly of isolated elements of brackish and marine chondrichthyans and osteoichthyans.

The overlying Tropic Shale (figure 21) was deposited in an open water, offshore muddy shelf setting. At peak transgression, the shoreline was over 115 km to the west. The Tropic Shale is mostly gray mudstone and contains abundant invertebrate and vertebrate fossil fauna. Ammonites in the formation indicate it spans the *Vascoceras diartianum* through *Prionocyclus hyatti* ammonite biozones (middle late Cenomanian to middle middle Turonian). The nearshore position of the Tropic Shale depocenter in a regime of relatively high accommodation space make the Cenomanian-Turonian stratigraphic record in the region especially thick and complete (Elder and others, 1994). In particular, the events surrounding ocean anoxic event II (OAE II) and the associated extinction are recorded in great detail (Elder, 1991). Most of the large vertebrate fossils are found in the early Turonian, although rare specimens are known from the underlying Cenomanian (Gillette and others, 1999). An overview of the vertebrate fauna was given by Albright and others (2013) and the described fauna is summarized in the appendix. Chondrichthyan and osteichthyan remains including fully articulated specimens occur commonly in the Tropic, but no detailed studies have ever been published. Over the last 16 years a diverse and significant marine reptile fauna has been recovered from the unit. Plesiosaur remains are most common, but turtles, early mosasaurs, and rare dinosaur remains have also been found. Five taxa of plesiosaurs (one pliosaurid and four polycotylids) are now documented from the formation (figure 22), making the assemblage one of the most diverse known from any Greenhorn age deposits. Three significant trends/events in vertebrate evolution appear to be recorded in the Tropic: (1) the extinction of the archaic pliosaurid plesiosaurs, (2) the diversification of the polycotylid plesiosaurs, and (3) the rise of true mosasaurs in North America.

11.6 miles – View north towards Jimmy Canyon is of the open marine Tropic Shale and the shoreface facies of the Tibbet Canyon Member forming the cliff, which holds up the benches. Resting on the benches is the paludal Smoky Hollow Member (Turonian). On the bench directly to the north (figure 23) is the richest Smoky Hollow Member micro-site known, MNA 995/UMNH VP locality 129. This very productive site is difficult to recover large quantities of matrix from (figure 24). In 1991, a small helicopter made several trips to move 86 moderately sized sacks of matrix from the bench to the valley floor. This locality has provided much of the basis for the faunal list presented in the appendix.

13.0 miles – Turnoff to Henderson Canyon (figure 25). The lower John Henry Member contains coals (figure 26), is very organic rich, and produces a brackish-water fauna of both vertebrates and invertebrates (e.g., MNA 706-2/UMNH VP locality 98). The upper part of the John Henry Member in Henderson Canyon is less organic rich (figure 27) and includes UMNH VP locality 99 (Santonian), a very productive microvertebrate locality from which much of the vertebrate faunal

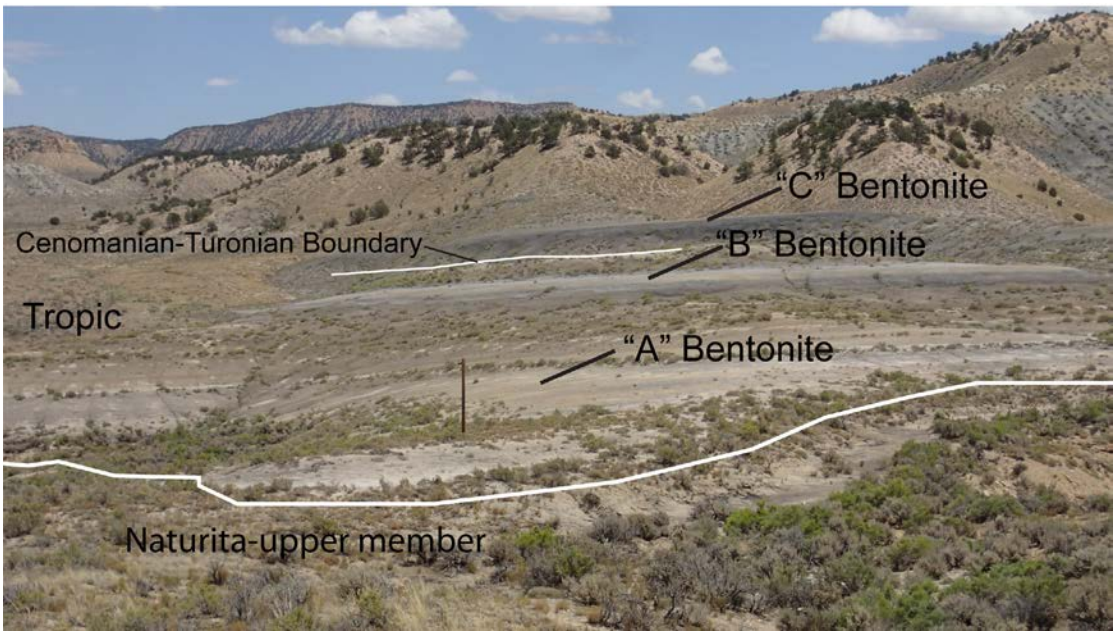

Figure 21. Overview of the Tropic Shale at Stop 9. Lettered bentonites are key marker beds (of Elder, 1991) that can be traced throughout the southern Western Interior, including the Cenomanian-Turonian Boundary Global Stratotype Section and Point near Pueblo, Colorado.

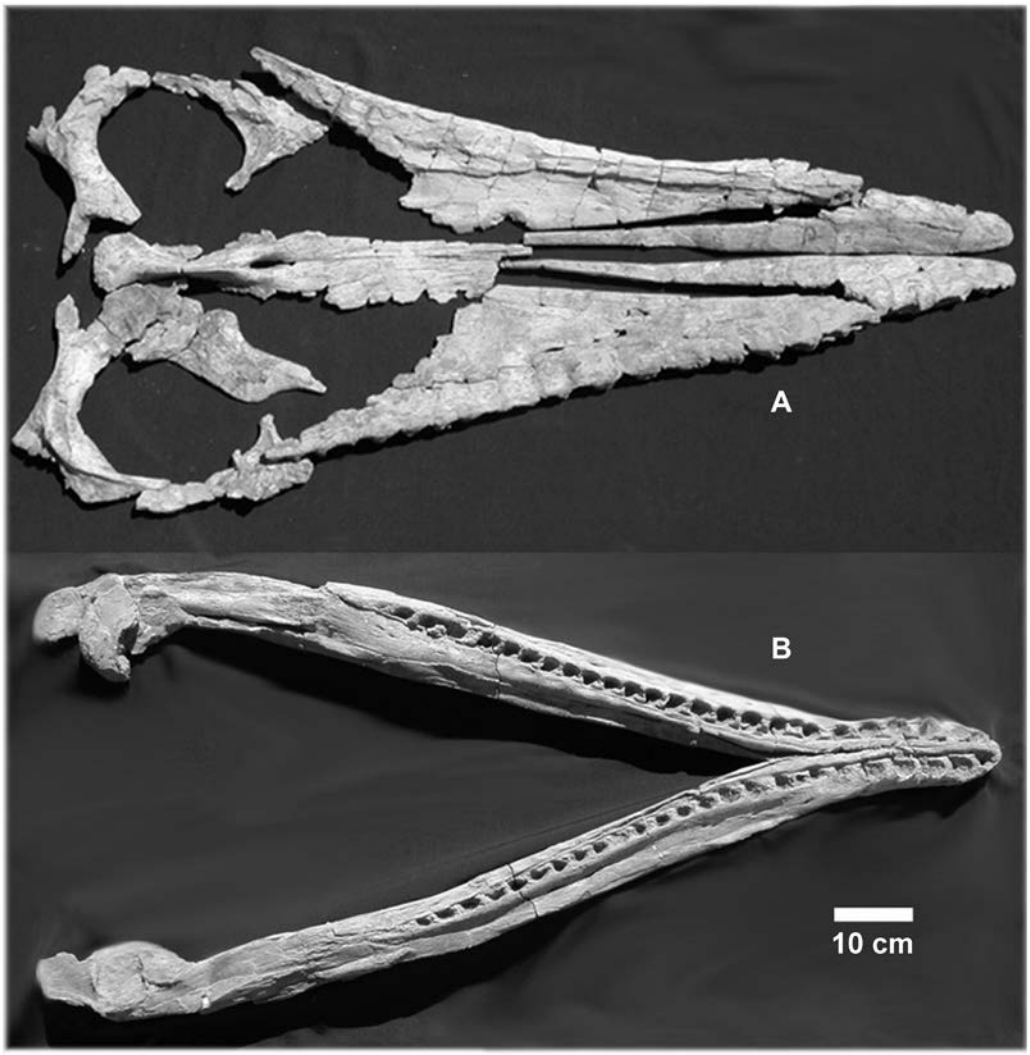

Figure 22. MNA V9433, (A) Dorsal view of nearly complete cranium, and (B) dorsal view of complete mandible of the pliosaurid plesiosaur *Brachauchenius lucasi*. From Albright and others (2013).

Figure 23. Looking northeast at bench with MNA 995/UMNH VP locality 129 in the Smoky Hollow Member of the Straight Cliffs Formation.

Figure 24. The late Jared Morrow at MNA 995/UMNH VP locality 129 quarry, Smoky Hollow Member of the Straight Cliffs Formation, Turonian.

list in the appendix is derived.

14.2 miles – **STOP 10.** SMOKY HOLLOW AND JOHN HENRY MEMBERS OF THE STRAIGHT CLIFFS FORMATION: The Tibbet Canyon Member is overlain by the early late Turonian Smoky Hollow Member, which has coal and lignite low in the member (figure 28). It also contains brackish-water faunas. The upper part of the member consists of beds of fluvial deposition. The Smoky Hollow Member is capped by fluvial sandstone and conglomerate termed the Calico bed by Peterson (1969). The John Henry Member is upper Coniacian-Santonian and rests disconformably upon the Calico bed (figure 29). As with the underlying Smoky Hollow Member, the lower part of the John Henry Member is very carbonaceous and contains brackish-water faunas (listed in appendix). The upper part of the formation here is largely nonmarine; how-

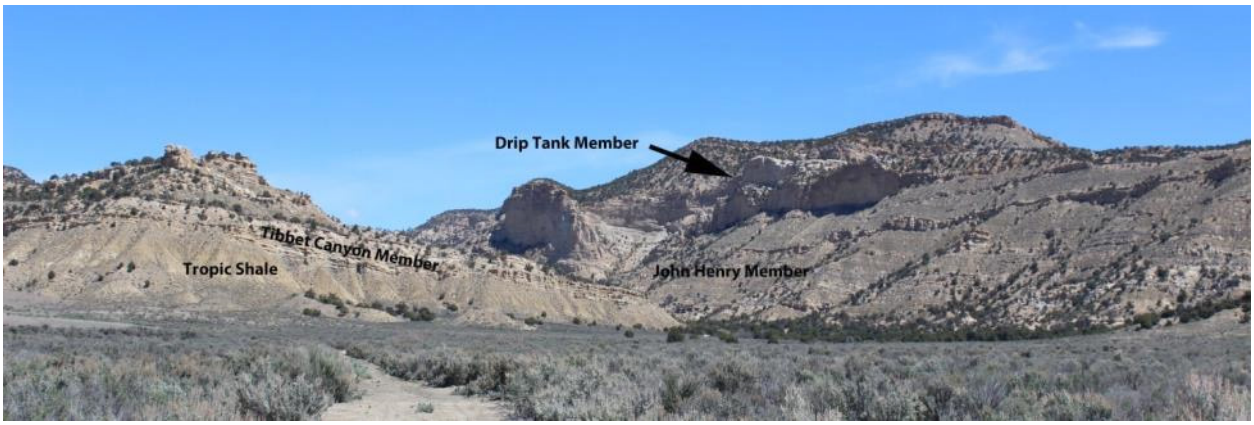

Figure 25. View of the looking north up Henderson Canyon from the SR 12 turnoff of the Tropic Shale and overlying members of the Straight Cliffs Fomration.

Figure 26. Typical coal and sandstone interbeds in the lower John Henry Member in Henderson Canyon.

ever, thin sandstone tongues containing marine taxa are present in the unit. Along the eastern margin of the plateau (type section for the Straight Cliffs Formation) the John Henry Member is mostly nearshore to marine.

14.8 miles –**STOP 11**. UPPER JOHN HENRY AND DRIP TANK MEMBERS, STRAIGHT CLIFFS–WAHWEAP FORMATIONS: On the north side of the canyon, the prominent cliff-forming Drip Tank Member of the Straight Cliffs Formation (Santonian) is unconformably overlain by the less resistant ledge-forming sandstone and mudstone of the lower member of the Wahweap Formation (figure 30). The Drip Tank Member in the Kaiparowits Basin is locally fossiliferous with vertebrate material, including dinosaur bone, but owing to the high-energy nature of its depositional system, most of the material is fragmentary and non-diagnostic.

The overlying alternating sandstones and mudstones of the Wahweap Formation are well exposed in this area (figure 30), but the formation generally forms steep slopes making it difficult to prospect for fossils. In the Kaiparowits region, most of the identifiable macrovertebrate remains have been collected from along the Smoky Mountain road and the southern margin of the plateau. The unit is also more paralic in character here than in the Paunsaugunt region, commonly containing carbonaceous beds indicative of paludal environments.

The majority of the macrofauna of the Wahweap Formation is now well constrained as older than the oldest described assemblages of the Judith River and Foremost Formations (Albright and Titus, 2016), and it includes the oldest named North American representatives of the Tyrannosauridae (*Lythronax*), Lambeosaurinae (*Adelolophus*), Centrosaurinae (*Diabloceratops*), and Pachycephalosauridae dinosaur clades. At least two different species of large alligato-

Figure 27. Upper part of the John Henry Member in Henderson Canyon. Note channel complex at the top of the member. UMNH VP locality 99 is in the underlying fine-grained part of the section.

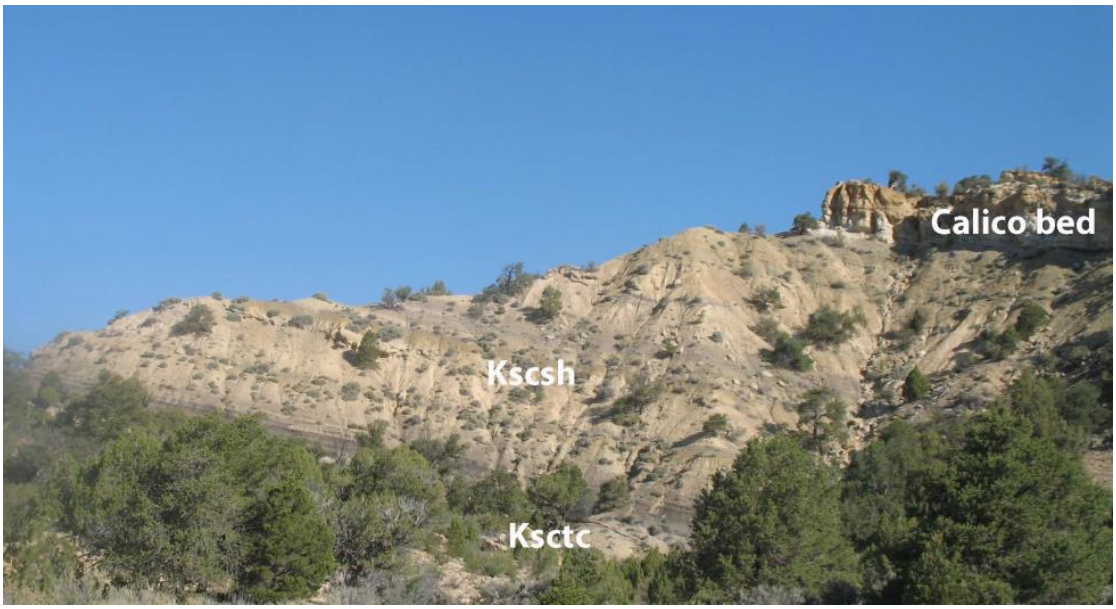

Figure 28. The Smoky Hollow Member (Kscsh) overlies the nearshore deposits of the Tibbet Canyon Member (Ksctc); note the carbonaceous horizons low in the Smoky Hollow Member. The Smoky Hollow is capped by the sandstones and conglomerates of the Calico bed.

roids and a pholidosaur-like crocodylian have also been recovered, but await description. Cranial material of a nodosaurid ankylosaur was also recovered recently but is also awaiting description. Based on the hadrosaurs (Gates and others, 2014) and ceratopsids, the early middle Campanian Wahweap dinosaur assemblage has some similarity to the slightly younger Foremost and Oldman assemblages found in Alberta, Canada.

16.4 miles – **STOP 12.** CAPPING SANDSTONE MEMBER AND LOWER KAIPAROWITS FORMATION: In this vertical cliff face exposed along Henriev-

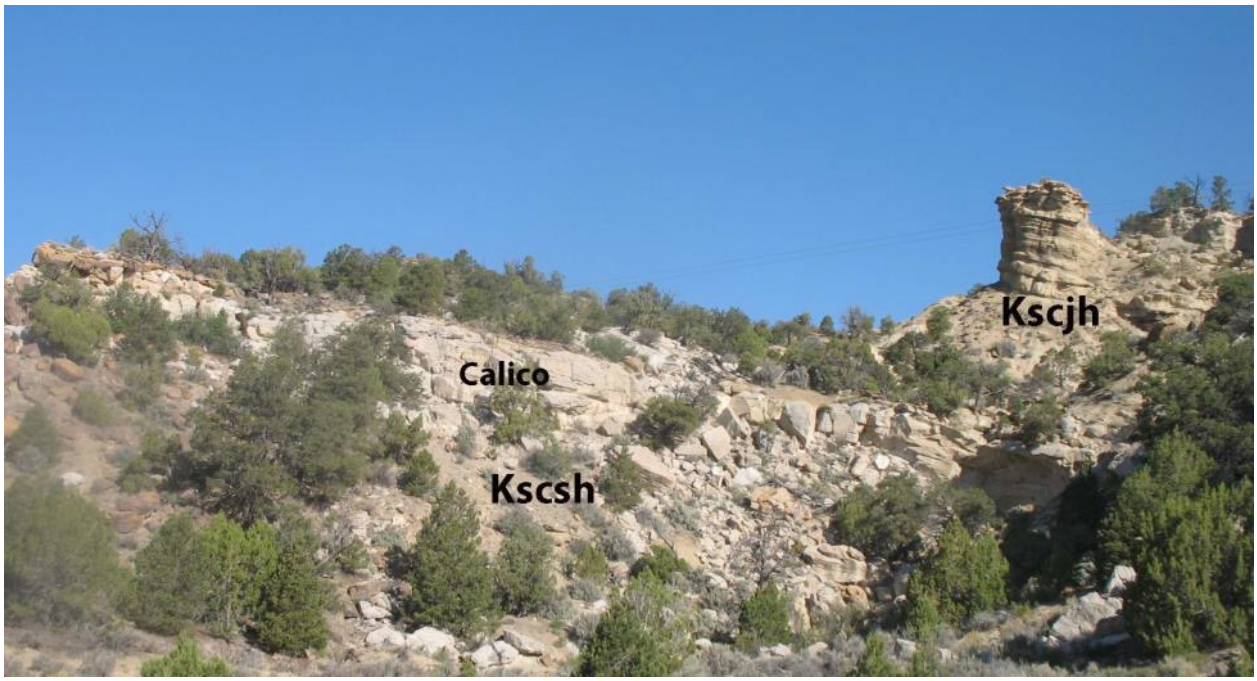

Figure 29. The Calico bed of the Smoky Hollow Member (Kscsh) is overlain disconformably by the John Henry Member (Kscjh). The lower John Henry is locally very carbonaceous and produces a brackish-water fauna.

Figure 30. Contact between the upper part of the John Henry Member and the Drip Tank Member along Henrieville Creek. The Drip Tank Member is a quartz arenite to pebbly conglomerate as opposed to the non-conglomeratic feldspathic sandstones of the upper John Henry Member. Kw = Wahweap Formation.

ille Creek (figure 31) is the contact between the capping sandstone member of the Wahweap (Kwcs) and the base of the Kaiparowits Formation (Kk). Lawton and others (2014) noted a 26-m interval at the base of the Kaiparowits Formation, which they considered transitional between the sandstone lithology of the Wahweap Formation and the more feldspar-rich lithology of Kaiparowits Formation. Several fossil localities were found in the lowest part of the Kaiparowits, which produced ostracods and miscellaneous vertebrate materials including ray teeth (Lawton and others, 2014).

18.2 miles – Turn on small dirt road and proceed about 100 m to the north and park. **STOP 13**. KAIPAROWITS FORMATION OVERVIEW: From this view you can see most of the gray-colored middle and upper members of the Kaiparowits Formation below the prominent cliff-forming outcrops of the Claron Formation. The intervening slope between the Kaiparowits and Claron Formations is formed in the Canaan Peak and Pine Hollow Formations and other coarse clastic units referred to the Grand Castle Formation, but which cannot belong to that formation because they post-dates the Kaiparowits Formation. These formations are not visible from this vantage point because they are covered with slumps and vegetation. Outcrops to the east (figure 32) form the type section of the Kaiparowits Formation, which here is approximately 860 m thick. The immediate foreground is in the middle member, about 200 m above the base of the formation (Eaton, 1991, figure 15). Although the section appears dominantly composed of mudstone, it is close to an even mix of sandstone and mudstone. However, the sandstone beds are generally friable and weather into rounded shapes that resemble more mud-rich outcrops. Dated ash-fall tuffs in the Kaiparowits Formation have yielded an age range of 76.6 to 74.5 Ma, which spans most of the lower half of the late Campanian (Roberts and others, 2013); however, given its thickness the Kaiparowits was deposited at a remarkably fast rate (Roberts and others, 2013). What is possibly even more remarkable is that the entire formation was removed from portions of the Paunsaugunt and Markagunt Plateaus area in the early to middle Paleocene during the Laramide uplift. The Kaiparowits is by far the richest macrovertebrate-producing unit in the entire region.

18.7 miles – **STOP 14.** MIDDLE KAIPAROWITS SEDIMENTOLOGY AND TAPHONOMY: Park on south side of highway, east of culvert. Hike down into creek and north into the culvert. Emerge on other side in small canyon carved into middle member of the Kaiparowits Formation. Many features of Kaiparowits depositional systems can be observed in the canyon walls in good detail. Exposed are overbank, fine-grained sequences that have carbonate pedogenic features, which are incised, scoured, and overlain by fluvial channel sandstones bearing large carbonized logs and fossil-rich lags. Whereas the overall vertebrate diversity of the Kaiparowits has mostly been assessed from mudstone-rich pond and floodplain lake facies, many of the articulated macrovertebrate specimens, some displaying soft tissue impressions, are found at the bases of these channel systems, above the scours. Many associated macrovertebrate specimens actually bear mudstone or pedogenic carbonate in their interstices, indicating that they were reworked into the channels from finer grained facies.

The preservation of individual Kaiparowits vertebrate specimens is sometimes spectacular (figure 33). Complete or partial articulation and preservation of softer elements such as epidermis and the keratinous portions of beaks and claws is not rare, particularly in fluvial channel facies. The turtles *Adocus* (Knell and others, 2011) and *Basilemys* have both been found preserved with clutches of eggs (figure 34). Unusual paleobiological information has also been gained from rare specimens showing predatory or behavioral traits (e.g., Boyd and others, 2013). The distribution of fossils is irregular throughout the formation although the lower and middle portions of the middle member are by far the most fossiliferous. Fossil content largely is inversely proportional to the maturation of calcic paleosol features that are pervasive in overbank sequences. Reworking of vertebrate materials of all size classes, including associated dinosaurs, out of finer grained overbank facies into fluvial channel bottom lags is a very common perservational mode. Soft tissue preservation is most often observed as primary burials in fluvial channels, although rarely hadrosaurs have been observed with soft

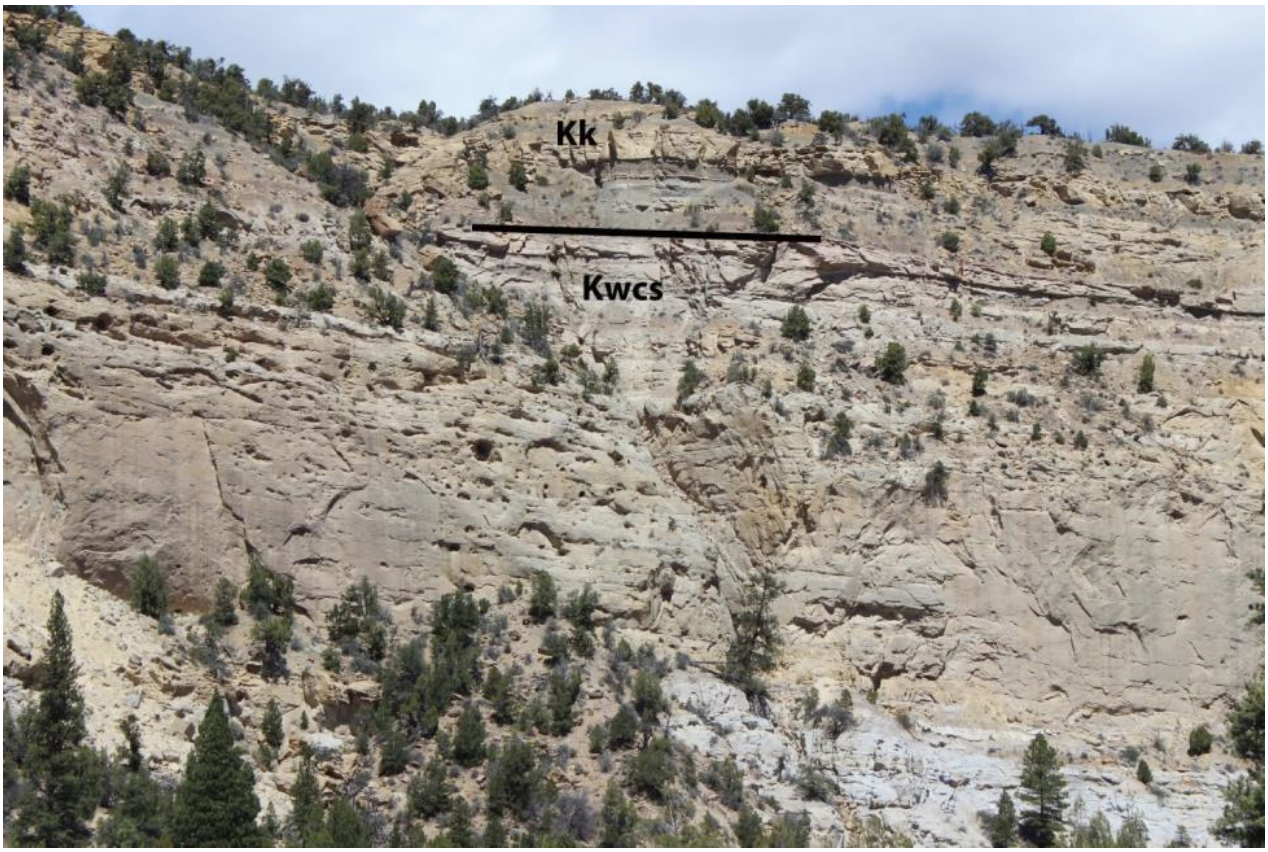

Figure 31. Contact between the capping sandstone member of the Wahweap Formation (Kwcs) and the Kaiparowits Formation (Kk) along Henrieville Creek.

Figure 32. Outcrops of the lower Kaiparowits Formation (above 200 m) in the Blues, the type section of the Kaiparowits.

Figure 33. RAM 14000, an exceptionally well preserved juvenile specimen of the dinosaur *Parasaurolophus* sp. Individual is fully articulated and exhibits soft tissue preservation. The black scale bar is 10 cm. Photograph by Raymond Alf (Museum of Paleontology).

tissue preserved in calcite concretionary overgrowths in floodplain lake facies. Strong correlation between suites of invertebrate fossils and depositional facies (Tapanila and Roberts, 2013) shows promise for vertebrate assemblages. Indeed, anecdotal observations seem to support gross separation of fluvial and overbank assemblages of both microvertebrates and macrovertebrates. A 0.8-km-long hike to the northeast towards the very first *Utahceratops* quarry will afford a look at a typical associated hadrosaur site that includes skin impressions.

20.7 miles – **STOP 15.** KAIPAROWITS FORMATION DIVERSITY- THE BLUES OVERLOOK: The Kaiparowits Formation flora (Miller and others, 2013), invertebrate fauna (Tapanila and Roberts, 2013), and vertebrate fauna are exceptionally diverse (see appendix). Although these are the most accessible outcrops of the formation, most of the type localities for new dinosaurs and other macro and mesovertebrate taxa are actually out of view and to the south of Canaan Peak. Two exceptions to this are the type specimens for the oviraptor *Hagryphus giganteus* and the troodontid *Talos sampsoni*, both of which were collected in the lower elevation hills due west of the overlook (figure 35).

The most common large dinosaur remains are lambeosaurine and saurolophine dinosaurs. Ceratopsids are found in lesser numbers, but are still clearly a significant part of the ecosystem, displaying exceptionally high diversity. Most other dinosaur taxa are uncommon to rare, some being represented by a single specimen (e.g., *Hagryphus*). The only larger elements of the fauna besides dinosaurs are two taxa of crocodylians, a pholidosaur very similar to *Denazinasuchus* and *Deinosuchus*. Ongoing reconnaissance efforts in the Kaiparowits Formation continue to add to its diverse vertebrate fauna and have rapidly enhanced the

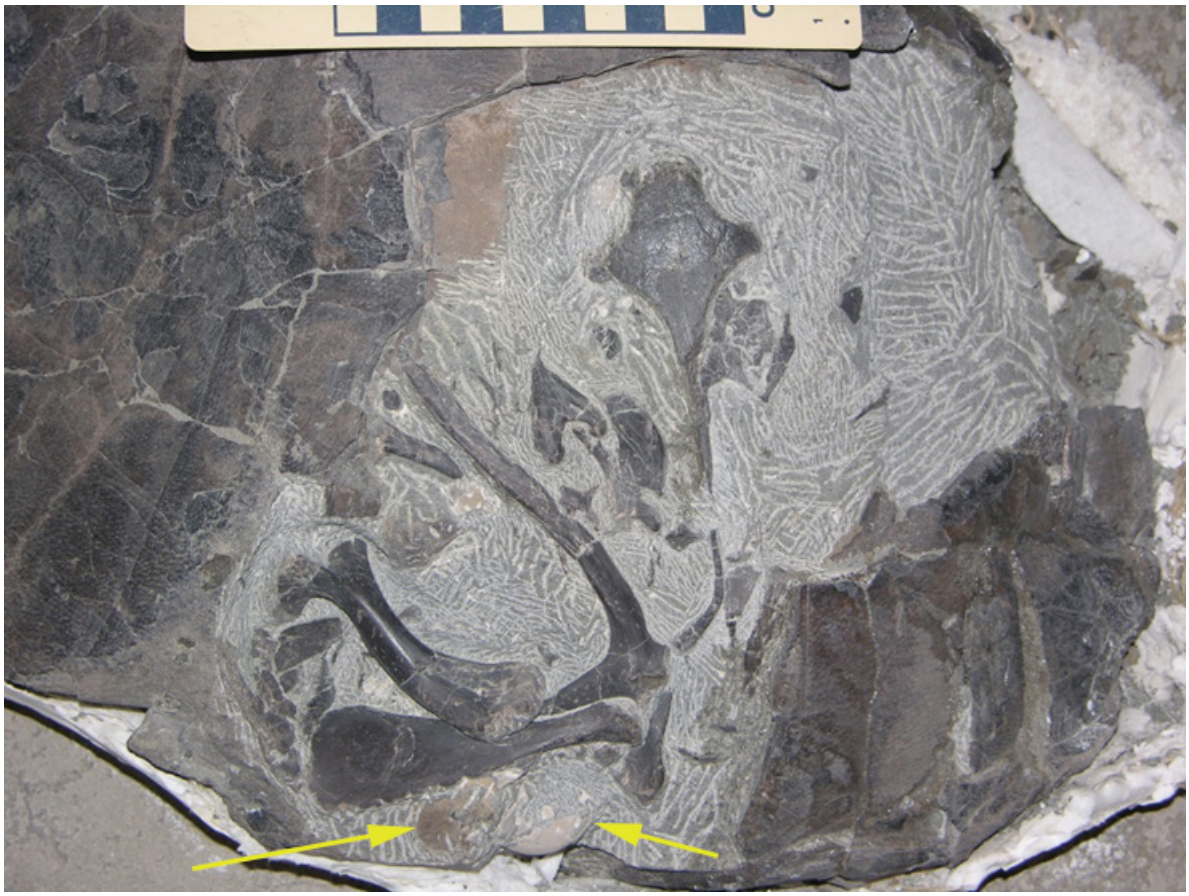

Figure 34. UMNH VP 16868, *Adocus* with skeleton and eggs, the latter are visible in the bottom center of the photo (yellow arrows). Scale = 10 cm.

macrovertebrate assemblages documented in previous published summaries (see appendix). As of now, the Kaiparowits holds the record for most diverse late Campanian assemblages of turtles, mammals, squamates, and crocodylians in North America and is rapidly closing the gap with the diverse dinosaur assemblages known from the Dinosaur Park Formation (Dinosaur Provincial Park, Alberta, Canada). New discoveries continue to add fossil materials to previously documented macrovertebrate taxa, permitting more thorough comparison and phylogenetic evaluation, and add new forms to the overall assemblage. This includes many new, exquisitely preserved crocodyliform specimens that expand the documented diversity and completeness of the group: (1) several associated pterosaur specimens that radically enhance the non-marine record of pterosaurs; and (2) new dinosaur materials that include several specimens of a new chasmosaurine ceratopsian, two new genera of ankylosaur (Wiersma, 2016), and a possible small lambeosaurine hadrosaurid. These new finds, coupled with ongoing efforts to document the microverterate record, the plant macrofossil record, the invertebrate fossil record, and the geological record of the Kaiparowits Formation, promise to make it among the best-documented and understood terrestrial ecosystems in the Mesozoic. Comparison of the Kaiparowits vertebrate assemblage to contemporaneous faunas from Dinosaur Park Formation have documented significant differences in vertebrate taxa. Differences are attributed to possible physiographic barriers (e.g., Sampson and others, 2010; Gates and others, 2012) or climatic/floral differences (e.g., Miller and others, 2013; Nydam and others, 2013).

End of Day 2, return to Tropic, Utah.

Figure 35. View looking west over the Blues from the upper view point along SR 12. Mostly the lower 400 m of the Kaiparowits Formation is seen from this view.

DAY 3: CRETACEOUS-PALEOGENE BOUNDARY IN SOUTHERN UTAH

0.0 miles – Start in Tropic at 200 North and SR 12. Proceed west on SR 12.

7.2 miles – Junction of SR 12 and SR 22 (Johns Valley Road). Turn right (north) on SR 22 and proceed north.

20.6 miles – Junction with SR 17 (Old Escalante Road). Turn right (east) and proceed east.

23.3 miles – **STOP 16.** K-PG BOUNDARY AND THE CANAAN PEAK FORMATION: The more resistant beds of the Canaan Peak Formation (figure 36) are well exposed on this general stretch of SR17. The observable lithosomes are completely typical for the formation, and consist of trough cross-bedded pebble and cobble conglomerate with distinctive black chert clasts and other rocks derived from the lower Paleozoic siliceous strata of the Sevier fold and thrust belt as well as the earlier Antler foreland detritus. Jurassic and Early Cretaceous age volcanic clasts ranging in composition from rhyolite to andesite can locally make up as much as 30% of the total rock (Schmitt and others, 1991). The type section is located 30 km to the south (Bowers, 1972), on the south side of Canaan Peak, where it rests with slight angular unconformity on the Kaiparowits Formation and contains an identical clast composition (Schmitt and others, 1991). Goldstrand (1992) subse-

Figure 36. Conglomerate and cross-stratified sandstone of the Canaan Peak Formation exposed in Horse Canyon, north of SR 17.

quently recognized an upper unit in the Canaan Peak which completely lacks volcanic clasts and is instead dominated by more proximally derived Paleozoic and Mesozoic sedimentary clasts from the Wah Wah thrust system. Given the similar composition of this upper Canaan Peak unit with the Grand Castle Formation in its type section (western Markagunt Plateau), these units were correlated and the term Grand Castle was extended into the Table Cliffs area by Goldstrand (1992). All of this pre-supposed that the Grand Castle in its type section was actually Paleogene (post-Kaiparowits Formation) in age. Now that the entire type Grand Castle Formation as originally conceived by Goldstrand can be demonstrated to be both Cretaceous and pre-Kaiparowits Formation in age (lower and middle Campanian [Biek and others, 2015]), use of the term Grand Castle in the Table Cliffs area should be abandoned. Based on gross clast composition, this locally occurring volcanic clast-free lithosome in the Table Cliffs area may be genetically related to the overlying Pine Hollow Formation, but this needs further work.

Surprisingly, the areal extent of the Canaan Peak Formation is fairly limited, given its resistant nature and substantial thickness. Over most of the region the Cretaceous-Paleogene boundary represents a much more substantial hiatus (figure 14). Unequivocal Canaan Peak is known with certainty only east of the Paunsaugunt fault, around the Table Cliffs and Canaan Peak. However, it was obviously once much more widespread as current directions indicate a source area to the west and southwest (Schmitt and others, 1991).

The precise age of the Canaan Peak Formation proper is unknown as it has not yielded any age diagnostic faunal data or datable ash beds. Paleocene palynological assemblages (Goldstrand, 1990) have been reported from the upper volcanic-clast-free unit (Grand Castle of

Goldstrand, 1992). If these palynology data are correct, then the Canaan Peak, as we define it here (excluding the non-volcanic clast-bearing part), can only be constrained as post middle upper Campanian to Paleocene. Eric Roberts (James Cook University, oral communication, 2013) has observed dinosaur bone in the lower portion of the Canaan Peak near the type section. However, it is unknown at this time whether this represents contemporaneous bone or elements reworked from the underlying Kaiparowits Formation.

The volcanic clast content of the Canaan Peak Formation ties it genetically to the underlying Kaiparowits Formation and strongly differentiates it from all overlying units (Larsen and others, 2010). From a strictly event-oriented view, since Laramide uplift completely removed the Canaan Peak and Kaiparowits Formations from the Paunsaugunt Plateau region, mostly likely in the late Paleocene or early Eocene (i.e., pre-Claron), it seems reasonable to assume that the volcanic lithic-rich Kaiparowits and Canaan Peak Formations occupy a space in time closer to each other than the Canaan Peak would with the Pine Hollow Formation because the Pine Hollow is compositionally very close to the Claron Formation (Larsen, 2007). As such, the Canaan Peak Formation, which could be Campanian-Maastrichtian in age, could also locally span the Cretaceous-Paleogene boundary.

End of Field Trip

ACKNOWLEDGEMENTS

We would like to thank the reviewers for making substantial improvements to the manuscript and the Geology of Intermountain West editors for assistance with the editing. We would also like to thank the Bureau of Land Management—Grand Staircase-Escalante National Monument for support during the writing of this paper, and also supporting much of the paleontological research in the Kaiparowits Basin that has been undertaken since 1996.

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APPENDIX

LATE CRETACEOUS VERTEBRATE FAUNAL LISTS FOR SOUTHERN UTAH

Background

Although the total number of taxa is known to be higher in every single Cretaceous formation of southern Utah, these faunal lists were generated only from published papers that documented specific specimens from specific localities with certain taxonomic assignments. Taxa listed in undocumented faunal lists (e.g., Eaton, 1999; Eaton and others, 1999a, 1999b) or overly broad taxonomic assignments are not included. As such, we only list the published turtle fauna from Hutchison and others (2013, Kaiparowits Formation) and Holroyd and Hutchison (2016, Wahweap Formation) even though turtle remains are common in nearly every formation. Similarly, a large number of additional dinosaur taxa are known from the Wahweap and Kaiparowits Formations, but either the specimens have never been described or the material is not specifically diagnostic. Irmis and others (2013) described the crocodyliform fauna at the order-suborder level and generally did not provide locality information for specimens; however, two taxa at lower levels were described from the Kaiparowits Formation, and since fossils are only known from that formation on the Kaiparowits Plateau, those are included below. The fish described by Brinkman and others (2013) are from a limited number of localities and are only recorded in the faunal lists from the specific plateau from which the specimens are documented. As such, there is a large list of fish represented from the Wahweap Formation of the Paunsaugunt Plateau, but these were not extended to the Wahweap Formation of the Kaiparowits Plateau as there is no documentation for that presented in Brinkman and others (2013). In the faunal lists, names, and years in parentheses cite the original publication naming that taxon, whereas those citations preceded by "in" merely refer to a source that documents the taxon in southern Utah. For nearly all macrovertebrates, the reference is the same as the original paper naming the taxon.

Cretaceous Vertebrate Faunas of Cedar Canyon – Markagunt Plateau

Naturita Formation, Cenomanian (Localities: UMNH VP 161, 162)
Allocaudata
  Albanerpetontidae
    Gen. and sp. indet. (in Gardner and Demar, 2013)
Anura
  Family incertae sedis
    Gen. and sp. indet. (in Roček and others, 2010)
Squamata
  Boreoteiioidea
    Bicuspidon smikros (in Nydam, 2013)
Scincomorpha
  Contogenidae
    Utahgenys antongai (in Nydam, 2013)
  Paramacellodid/Cordylid grade
    Morphotype A (in Nydam, 2013)
    Morphotype B (in Nydam, 2013)
Anguimorpha
  Family incertae sedis
    Gen. and sp. indet. (in Nydam, 2013)
Multituberculata
  Family incertae sedis – *Paracimexomys* group
    Gen. and sp. indet. (in Eaton, 2009)
    cf. *Paracimexomys* sp. (in Eaton, 2009)
    Cedaromys minimus (in Eaton, 2009)
    Dakotamys malcolmi (in Eaton, 2009)
  Cimolodontidae
    Gen. and sp. indet. (in Eaton, 2009)
  ?Cimolodontidae
    Gen. and sp. indet. (in Eaton, 2009)
Symmetrodonta
  Spalacotheriidae
    Gen. and sp. indet. (in Eaton, 2009)
Boreosphenida
  Family incertae sedis
    Gen. and sp. indet. (in Eaton, 2009)
Marsupialia
  "Alphadontidae"
    Eoalphadon woodburnei (in Eaton, 2009)
    ?*Eoalphadon* sp. (in Eaton, 2009)

John Henry Member (Coniacian?), Straight Cliffs Formation (Localities: MNA 1260/UMNH VP 8, 9)
Elasmobranchii
  Lonchidiidae
    Lonchidion sp. (in Kirkland and others, 2013)
Neoselachii
  Ginglymostomatidae
    Cantioscyllium markaguntensis (Kirkland and others, 2013)
Neopterygii
  Semionotidae
    Lepidotes sp. indet. (in Brinkman and others, 2013)
  Pycnodontidae
    Coelodus sp. (in Brinkman and others, 2013)
Teleostii
  Otophysi Order and family indet.
    Gen. and sp. indet. (in Brinkman and others, 2013)
  Acanthomorpha Order and family indet.
    Gen. and sp. indet. (in Brinkman and others, 2013)
Urodela
  Scapherpetontidae
    Gen. and sp. indet. (in Gardner and Demar, 2013)
  Family incertae sedis
    Gen. and sp. indet. (in Gardner and Demar, 2013)
Anura
  Family incertae sedis
    Gen. and sp. indet. (in Roček and others, 2010)
Multituberculata
  Family incertae sedis – *Paracimexomys* group
    Cedaromys sp. (in Eaton, 2006a)
Marsupialia
  Family "Alphadontidae"
    ?*Varalphadon* sp. (in Eaton, 2006a)
Eutheria
  Order and family incertae sedis
    Gen. and sp. indet. (in Eaton, 2006a)

"Wahweap" Formation (basal, lower? Campanian) (Locality: UMNH VP 10/MNA 1417)
Allocaudata
  Albanerpetontidae
    Gen. and sp. indet. (in Gardner and Demar, 2013)
Anura
  Family incertae sedis
    Gen. and sp. indet. (in Roček and others, 2010)
Multituberculata
  Family incertae sedis – *Paracimexomys* group
    cf. *Paracimexomys* sp. (in Eaton, 2006a)

Bryceomys sp. (in Eaton, 2006a)
Cedaromys sp. cf. *C. hutchisoni* (in Eaton, 2006a)
Cedaromys sp. (in Eaton, 2006a)
?*Cimoxomys* sp. (in Eaton, 2006a)
Cimolomyidae
Cimolomys sp. (in Eaton, 2006a)
?*Cimolomys* sp. (in Eaton, 2006a)
Cimolodontidae
Cimolodon wardi (in Eaton, 2006a)
Cimolodon similis (in Eaton, 2006a)
Cimolodon sp. cf. *C. nitidus* (in Eaton, 2006a)
Neoplagiaulacidae
Mesodma sp. cf. *M. minor* (in Eaton, 2006a)
Trechnotheria
Spalacotheriidae
Symmetrodontoides sp. cf. *S. foxi* (Eaton, 2006a)
Marsupialia
Order and family incertae sedis
cf. *Anchistodelphys* sp. (in Eaton, 2006a)
"Alphadontidae"
cf. *Varalphadon* sp. (in Eaton, 2006a)
cf. *Protalphadon* sp. (in Eaton, 2006a)
Eoalphadon sp. cf. *E. clemensi* (in Eaton, 2006a, see Eaton, 2009)
Eoalphadon sp. (in Eaton, 2006a, see Eaton, 2009)
cf. *Turgidodon* sp. (in Eaton, 2006a)
?Pediomyidae
?"*Pediomys*" sp. (in Eaton, 2006a)
Boreosphenida
Picopsidae
Picopsis sp. (in Eaton, 2006a)
cf. *Picopsis* sp. A (in Eaton, 2006a)
cf. *Picopsis* sp. B (in Eaton, 2006a)

"Wahweap" Formation (high, Campanian?) (Locality: UMNH VP 11)
Urodela
Family incertae sedis
Nezpercius dodsoni (in Gardner and Demar, 2013)
Anura
Family incertae sedis
Scotiophryne pustulosa (in Roček and others, 2010; Gardner and Demar, 2013)
Gen. and sp. indet. (in Roček and others, 2010)
Multituberculata
Family incertae sedis – *Paracimexomys* group
Cedaromys sp. (in Eaton, 2006a)
Cimolomyidae

Meniscoessus sp. cf. *M. intermedius* (in Eaton, 2006a)
Cimolomys sp. (in Eaton, 2006a)
?*Cimolomys* sp. (in Eaton, 2006a)
Cimolodontidae
Cimolodon sp. cf. *C. similis* (in Eaton, 2006a)
Marsupialia
"Alphadontidae"
Gen. and sp. indet. (in Eaton, 2006a)
Protalphadon sp. (in Eaton, 2006a)
?*Protalphadon* sp. (in Eaton, 2006a)
Eoalphadon sp. cf. *E. clemensi* (in Eaton, 2006a, see Eaton, 2009)
"Pediomyidae"
Gen. and sp. indet. (in Eaton, 2006a)
"*Pediomys*" sp. near "*P.*" *exiguous* (in Eaton, 2006a)
?*Aquiladelphis laurae* (in Eaton, 2006a)

Cretaceous Vertebrate Faunas of the Paunsaugunt Plateau

Naturita Formation, Cenomanian (Locality: UMNH VP 123/MNA 939)
Anura
Family, Gen. and sp. indet. (in Roček and others, 2010)
Multituberculata
Cimolodontidae
Gen. and sp. indet. (in Eaton, 1995)
Family incertae sedis – *Paracimexomys* group
Paracimexomys sp. cf. *P. robisoni* (in Eaton, 1995)
Paracimexomys sp. (in Eaton, 1995)
cf. *Paracimexomys* sp. (in Eaton, 1995)
Dakotamys malcolmi (in Eaton, 1995)
Theria
Family, Gen. and sp. indet. (in Eaton, 1993b)
Marsupialia
"Alphadontidae"
Eoalphadon lillegraveni (in Eaton, 1993b as "*Alphadon*" *lillegraveni*)
Eoalphadon sp. (in Eaton, 1993b as "*Alpahdon*" sp.)
Family incertae sedis
Pariadens kirklandi (in Eaton, 1993b)

John Henry Member (basal, Coniacian), Straight Cliffs Formation (Localities: UMNH VP 417, 823, 856, 1064)
Elasmobranchii
Hybodontidae
Hybodus sp. (in Kirkland and others, 2013)
Lonchidiidae
Lonchidion sp. (in Kirkland and others, 2013)

Anura
  Family incertae sedis
    Gen. and sp. indet. (in Roček and others, 2010)
Dinosauria
  Ornithopoda
    Iguanodontia gen. and sp. indet. (in Gates and others, 2013)
Multituberculata
  Cimolodontidae
    Mesodma sp. cf. *M. minor* (in Eaton, 2013)

John Henry Member (Santonian), Straight Cliffs Formation (Localities: UMNH VP 419, 420, 424, 426, 427, 569, 781, 799, 821, 843, 1144, 1156)
Elasmobranchii
  Hybodontidae
    Hybodus sp. (in Kirkland and others, 2013)
Neopterygii
  Lepisostidae
  Lepisosteus sp. indet. (in Brinkman and others, 2013)
Neopterygii
  Semionotidae
    Lepidotes sp. indet. (in Brinkman and others, 2013)
  Pycnodontidae
    Micropycnodon sp. (in Brinkman and others, 2013)
  Amiidae
    Gen. and sp. indet. (in Brinkman and others, 2013)
Teleostii
  Hiodontidae
    Gen. and sp. indet. (in Brinkman and others, 2013)
  Elopiformes Family indet.
    Gen. and sp. indet. (in Brinkman and others, 2013)
  Sorbinichthyidae
    Diplomystus sp. (in Brinkman and others, 2013)
  Otophysi Order and family indet.
    Gen. and sp. indet. (in Brinkman and others, 2013)
  Euteleostei Order and family indet.
    Gen. and sp. indet. U-4 (in Brinkman and others, 2013)
  Acanthomorpha Order and family indet.
    Gen. and sp. indet. (in Brinkman and others, 2013)
Allocaudata
  Albanerpetontidae
  Gen. and sp. indet. (in Gardner and Demar, 2013)
  cf. *Albanerpeton nexuosum* (Gardner and Demar, 2013)
Urodela
  Scapherpetontidae
    Scapherpeton sp. (in Gardner and Demar, 2013)

- Batracosauroididae
  - *Opistotriton* sp. (in Gardner and Demar, 2013)
  - Gen. and sp. indet. (in Gardner and Demar, 2013)
- Sirenidae
  - *Habrosaurus* sp. (in Gardner and Demar, 2013)
- Family incertae sedis
  - Gen. and sp. nov. (in Gardner and Demar, 2013)

Anura
- Family incertae sedis
  - *Scotiophryne pustulosa* (in Roček and others, 2010, Gardner and Demar, 2013)
  - Gen. and sp. indet. (in Roček and others, 2010)

Scincomorpha
- Paramacellodid/Cordylid grade
  - *Monocnemodon syphakos* (in Nydam, 2013)

Anguimorpha
- Family incertae sedis
  - cf. *Colpodontosaurus* sp. (in Nydam, 2013)

Platynota
- Family incertae sedis
  - Morphotype B (in Nydam, 2013)
  - Morphotype C (in Nydam, 2013)

Autarchoglossa
- Family incertae sedis
  - Morphotype D (in Nydam, 2013)

Scincomorpha
- Family incertae sedis
  - Gen. and sp. indet. (in Nydam, 2013)

Serpentes
- Family incertae sedis
  - *Coniophis* sp. (in Nydam, 2013)

Dinosauria
- Nodosauridae
  - Gen and sp. indet. (in Loewen and others, 2013a)

Triconodonta
- Triconodontidae
  - Gen. and sp. indet. (in Eaton, 2013)
  - cf. *Alticonodon* sp. (in Eaton, 2013)

Multituberculata
- Family incertae sedis – *Paracimexomys* group
  - *Dakotamys shakespeari* (in Eaton, 2013)
  - *Cedaromys* sp. cf. *C. hutchisoni* (in Eaton, 2013)
- Neoplagiaulacidae
  - *Mesodma* sp. cf. *M. minor* (in Eaton, 2013)
  - *Mesodma* sp. (in Eaton, 2013)
  - ?*Mesodma* sp. (in Eaton, 2013)

Cimolodontidae
Cimolodon sp. cf. *C. foxi* (in Eaton, 2013)
Cimolodon similis (in Eaton, 2013)
Cimolodon sp. cf. *C. similis* (in Eaton, 2013)
?*Cimolodon* sp. (in Eaton, 2013)
Cimolomyidae
Cimolomys sp. A (in Eaton, 2013)
Cimolomys sp. B (in Eaton, 2013)
?*Cimolomys* sp. A (in Eaton, 2013)
?*Cimolomys* sp. B (in Eaton, 2013)
Trechnotheria
Spalacotheriidae
?*Spalacotheridium* sp. (in Eaton, 2013)
Symmetrodontoides sp. (in Eaton, 2013)
Marsupialia
"Didelphomorpha" - Family incertae sedis
Gen. and sp. indet. (in Eaton, 2013)
Apistodon sp. cf. *A. exiguous* (in Eaton, 2013)
cf. "*Anchistodelphys*" sp. (in Eaton, 2013)
"Alphadontidae"
?*Varalphadon* sp. (in Eaton, 2013)
Stagodontidae
Eodelphis sp. (in Eaton, 2013)
Pediomyidae
Gen. and sp. indet. (in Eaton, 2013)
?*Leptalestes* sp. (in Eaton, 2013)

Wahweap Formation, Campanian (Localities: UMNH VP 61, 77, 78, 80, 83, 807, 792, 1073, 1074; MNA 1073, 1074)
Neoselachii
Hemiscyllidae
Chiloscyllium missouriense (in Kirkland and others, 2013)
Batomorphii
Rhinobatoidea - Family incertae sedis
Cristomylus cifellii (Kirkland and others, 2013)
Sclerorhynchiformes
Sclerorhynchiidae
Columbusia deblieuxi (Kirkland and others, 2013)
Neopterygii
Lepisostidae
Lepisosteus sp. indet. (in Brinkman and others, 2013)
Semionotidae
Lepidotes sp. indet. (in Brinkman and others, 2013)
Pycnodontidae
Micropycnodon sp. (in Brinkman and others, 2013)

Actinopterygii
- Albulidae
  - *Parabula* sp. (in Brinkman and others, 2013)
- Otophysi Order and family indet.
  - Gen. and sp. indet. (in Brinkman and others, 2013)
- Acanthomorpha Order and family indet.
  - Gen. and sp. indet. (in Brinkman and others, 2013)

Allocaudata
- Albanerpetontidae
  - Gen. and sp. indet. (in Gardner and Demar, 2013)

Urodela
- Scapherpetontidae
  - *Scapherpeton tectum* in Gardner and Demar, 2013)
- Batracosauroididae
  - *Opistotriton kayi* (in Gardner and Demar, 2013)
- Family incertae sedis
  - *Nezpercius dodsoni* (in Gardner and Demar, 2013)
  - Gen. and sp. nov. (in Gardner and Demar, 2013)

Anura
- Family incertae sedis
  - *Scotiophryne pustolosa* (in Roček and others, 2010)
  - Gen. and sp. indet. (in Roček and others, 2010)

Multituberculata
- Family incertae sedis – *Paracimexomys* group
  - *Paracimexomys* sp. (in Eaton, 1993b)
  - ?*Paracimexomys* sp. (in Eaton, 2013)
  - *Cedaromys* sp. cf. *C. hutchisoni* (in Eaton, 2013)
  - ?*Cimexomys gregoryi* (in Eaton, 1993b)
  - Gen. and sp. indet. (in Eaton, 2002)
- Neoplagiaulacidae
  - *Mesodma* sp. cf. *M. minor* (in Eaton, 2013)
  - *Mesodma* sp. cf. *M. archibaldi* (in Eaton, 2002, 2013)
  - *Mesodma* sp. cf. *M. formosa* (in Eaton, 1993b, 2013)
  - *Mesodma* sp. cf. *M. hensleighi* (in Eaton, 1993b)
  - *Mesodma* sp. (in Eaton, 1993b)
- Cimolodontidae
  - *Cimolodon similis* (in Eaton, 2002)
  - *Cimolodon* sp. cf. C. *nitidus* (in Eaton, 1993b)
  - *Cimolodon* sp. cf. *C. foxi* (in Eaton, 2013)
  - ?*Cimolodon* sp. (Eaton, 1993b)
- Cimolomyidae
  - *Cimolomys milliensis* (in Eaton, 1993b)
  - *Cimolomys* sp. (in Eaton, 2013)
  - ?*Cimolomys* sp. (in Eaton, 2013)
  - ?*Cimolomys* sp. B (in Eaton, 2002)

Meniscoessus sp. (in Eaton, 2013)
Trechnotheria
Spalacotheriidae
Symmetrodontoides foxi (in Eaton, 1993b)
Marsupialia
Order and Family incertae sedis
cf. *Iugomortiferum* sp. (in Eaton, 2013)
Gen. and sp. indet. A (in Eaton, 2013)
Gen. and sp. indet. B (in Eaton, 2013)
cf. *Apistodon* sp. (in Eaton, 2013)
"Alphadontidae"
Alphadon sp. cf. *A. wilsoni* (in Eaton, 1993b)
Alphadon sp. cf. *A. attaragos* (in Eaton, 1993b)
Turgidodon sp. cf. *T. russelli* (*Alphadon* sp. cf. *A. russelli* in Eaton, 1993b)
Turgidodon sp. (in Eaton, 1993b)
Varalphadon sp. cf. *V. creber* (in Eaton, 2013)
cf. *Varalphadon* sp. (in Eaton, 2013)
Pediomyidae
Gen. and sp. indet. (in Eaton, 2013)

Cretaceous Vertebrate Faunas of the Kaiparowits Plateau

Naturita Formation, Cenomanian (Localities: UMNH VP 27/MNA 1067/OMNH V808; UMNH VP 804)
Batomorphii
Rhinobatoidea Family incertae sedis
Cristomylus bulldogensis (Kirkland and others, 2013)
Pseudomyledaphus sp. (in Kirkland and others, 2013)
Elasmobranchii
Hybonontidae
Hybodus sp. (in Kirkland and others, 2013)
Lonchidiidae
Lonchidion sp. (in Kirkland and others, 2013)
Neopterygii
Semionotidae
Lepidotes sp. (in Brinkman and others, 2013)
Pycnodontidae
Coelodus sp. (in Brinkman and others, 2013)
Amiidae
Gen. and sp. indet. (in Brinkman and others, 2013)
Teleostei
Osteoglossomorpha family indet.
Coriops sp. (in Brinkman and others, 2013)
Hiodontidae
Gen. and sp. indet. (in Brinkman and others, 2013)
Elopiformes Family indet.

Gen. and sp. indet. (in Brinkman and others, 2013)
Ellimmichthyiformes Family indet.
Gen. and sp. indet. type LvD (in Brinkman and others, 2013)
Gen. and sp. indet. type U-7 (in Brinkman and others, 2013)
Sorbinichthyidae
Diplomystus sp. (in Brinkman and others, 2013)
Euteleostei Order and family indet.
Gen. and sp. indet. U-4 (in Brinkman and others, 2013)
Sarcopterygii
Ceratodontiformes
Ceratodus gustasoni (Kirkland, 1987)
Allocaudata
Albanerpetontidae
cf. *Albanerpeton nexuosa* (in Gardner and Demar, 2013)
Urodela
Scapherpetontidae
Gen and sp. indet. (in Gardner and Demar, 2013)
Batracosauroididae
Gen. and sp. nov. (in Gardner and Demar, 2013)
Anura
Family incertae sedis
Gen. and sp. indet. (in Roček and others, 2010)
Squamata
Boreoteiioidea
Bicuspidon smikros (in Nydam, 2013)
Scincomorpha
Paramacellodid/Cordylid grade
Dakotasaurus gillettorum (in Nydam, 2013)
Morphotype C (in Nydam, 2013)
Webbsaurus lofgreni (in Nydam, 2013)
Family indet.
Morphotype D (in Nydam, 2013)
?Scincomorpha
Family incertae sedis
Gen. and sp. indet. (in Nydam, 2013)
Anguimorpha
aff. Xenosauridae
Cnodontosaurus suchockii (in Nydam, 2013)
Platynota
Family indet.
Morphotype E (in Nydam, 2013)
Anguimorpha
Family incertae sedis
Gen. and sp. indet. (in Nydam, 2013)
Serpentes

Family incertae sedis
Coniophis sp. (in Nydam, 2013)
Multituberculata
Family incertae sedis – *Paracimexomys* group
Paracimexomys sp. cf. *P. robisoni* (in Eaton, 1995)
Paracimexomys sp. (in Eaton, 1995)
cf. *Paracimexomys* sp. (in Eaton, 1995)
Dakotamys malcolmi (in Eaton, 1995)
?*Dakotamys* sp. (in Eaton, 1995)
Gen. and sp. indet. A (in Eaton, 1995)
Gen. and sp. indet. B (in Eaton, 1995)
Cimolodontidae
Cimolodon sp. cf. *C. similis* (in Eaton, 1995)
Gen. and sp. indet. (in Eaton, 1995)
?Boreosphenida
Order and family incertae sedis
Gen. and sp. indet. (in Eaton, 1993a)
Dakotadens morrowi (in Eaton, 1993a)
Dakotadens sp. (in Eaton, 1993a)
Marsupialia
Family "Alphadontidae"
Eoalphadon clemensi (in Eaton, 1993a as *"Alphadon" clemensi*)
Eoalphadon lillegraveni (in Eaton, 1993a as "*Alphadon*" *lillegraveni*)
Eoalphadon sp. (in Eaton, 1993a as "*Alphadon*" sp.)
Protalphadon sp. (in Eaton, 1993a)
Gen. and sp. indet. (in Eaton, 1993a)
Family indet.
Pariadens kirklandi (Cifelli and Eaton, 1987)

Tropic Shale (Late Cenomanian-Middle Turonian)
Elasmobranchii
Mitsukurinidae
Scapanorhyncus raphiodon (in Albright and others, 2013)
Anacoracidae
Squalicorax curvatus (in Albright and others, 2013)
Cretoxyrhinidae
Cretoxyrhina mantelli (in Albright and others, 2013)
Cretolamna appendiculata (in Albright and others, 2013)
Sclerorhynocoidei
cf. *Ptychotrygon* sp. (in Albright and others, 2013)
Ptychodontidae
Ptychodus decurrens (in Albright and others, 2013)
Ptychodus cf. *P. mammillaris* (in Albright and others, 2013)
Ptychodus whipplei (in Albright and others, 2013)
Ptychodus occidentalis (in Albright and others, 2013)

Ptychodus anonymus (in Albright and others, 2013)
Ptychodus sp. indet. (in Albright and others, 2013)
Neopterygii
Pycnodontidae
Gen. and sp. indet. (in Albright and others, 2013)
Actinopterygii
Ichthyodectidae
Gillicus arcuatus (in Albright and others, 2013)
Ichthyodectes ctenodon (in Albright and others, 2013)
Ichthyodectes cf. *I. ctenodon* (in Albright and others, 2013)
Xiphactinus cf. *X. audax* (in Albright and others, 2013)
Testudinata
Protostegidae
Desmatochelys lowi (in Albright and others, 2013)
Gen. and sp. indet. (in Albright and others, 2013)
Family incertae sedis
Naomichelys sp. (in Albright and others, 2013)
Sauropterygia
Pliosauridae
Brachauchenius lucasi (Albright and others, 2007a)
Polycotylidae
Eopolycotylus rankini (Albright and others, 2007b)
Dolichorhyncops tropicensis Schmeisser McKean, 2012)
Palmulasaurus quadratus (Albright and others, 2007b)
Trinacromerum cf. *T. bentonianum* (in Albright and others, 2013)
Dinosauria
Therizinosauridae
Nothronychus graffami (Zanno and others, 2009)

Smoky Hollow Member (Turonian), Straight Cliffs Formation (Localities: UMNH VP 129/MNA 995/OMNH V843; OMNH V4, 60, 1404)
Batomorphii
Rhinobatoidea (family incertae sedis)
Cristomylus sp. cf. *C. bulldogensis* (in Kirkland and others, 2013)
Osteichthyes-Neopterygii
Lepisostidae
Lepisosteus sp. (in Brinkman and others, 2013)
Semionotidae
Lepidotes sp. (in Brinkman and others, 2013)
Pycnodontidae
Coelodus sp. (in Brinkman and others, 2013)
Amiidae
Gen. and sp. indet. (in Brinkman and others, 2013)
?*Melvius* sp. (in Brinkman and others, 2013)
Teleostii

- Hiodontidae
  - Gen. and sp. indet. (in Brinkman and others, 2013)
- Elopiformes Family incertae sedis
  - Gen. and sp. indet. (in Brinkman and others, 2013)
- Ellimmichthyiformes Family incertae sedis.
  - Gen. and sp. indet. type U-7 (in Brinkman and others, 2013)
- Otophysi Order and family incertae sedis
  - Gen. and sp. indet. (in Brinkman and others, 2013)
- Euteleostei Order and family incertae sedis
  - Gen. and sp. indet. U-4 (in Brinkman and others, 2013)
- Order and family incertae sedis
  - Gen. and sp. indet. type HvB (in Brinkman and others, 2013)

Allocaudata
- Albanerpetontidae
  - *Albanerpeton cifellii* (in Gardner, 1999)
  - cf. *Albanerpeton nexuosum* (in Gardner and Demar, 2013)
  - Gen. and sp. indet. (in Gardner and Demar, 2013)

Urodela
- Batracosauroididae
  - Gen. and sp. nov. (in Gardner and Demar, 2013)
- Family incertae sedis
  - Gen. and sp. nov. (in Gardner and Demar, 2013)
  - Gen. and sp. indet. (in Gardner and Demar, 2013)

Anura
- Family incertae sedis
  - Gen. and sp. indet. (in Roček and others, 2010)

Scinocomorpha
- Polyglyphanodontini
  - *Dicothodon cifellii* (in Nydam and others, 2007)
  - *Chamops* sp. cf. *C. signus* (in Nydam, 2013)
- Contogeniidae
  - *Utahgenys evansi* (in Nydam, 2013)
- Paramacellodid/Cordylid grade
  - Morphotype A-H (in Nydam, 2013)

Anguimorpha
- Anguidae
  - aff. *Odaxosaurus* sp. (in Nydam, 2013)
  - aff. Xenosaurida
  - *Cnodontosaurus* sp. (in Nydam, 2013)

Platynota
- Family incertae sedis
  - Morphotype I-J (in Nydam, 2013)

Anguimorpha
- Family incertae sedis
  - Gen. and sp. indet. (in Nydam, 2013)

Serpentes
- Family incertae sedis
  - *Coniophis* sp. (in Nydam, 2013)

Dinosauria
- Ornithopoda
  - Iguanodontia gen. and sp. indet. (in Gates and others, 2013)

Multituberculata
- ?Taeniolabidoidea Family incertae sedis
  - Gen. and sp. indet. (in Eaton, 1995)
- Suborder and family incertae sedis - *Paracimexomys* group
  - *Paracimexomys* sp. cf. *P. robisoni* (in Eaton, 1995)
  - *Bryceomys fumosus* (in Eaton, 1995)
  - ` *Bryceomys* sp. cf. *B. fumosus* (in Eaton, 1995)
  - *Bryceomys hadrosus* (in Eaton, 1995)
  - *Bryceomys* sp. (in Eaton, 1995)

Symmetrodonta
- Family incertae sedis
  - Gen. and sp. indet. (in Cifelli and Gordon, 1999)
- Spalacotheriidae
  - *Symmetrodontoides oligodontos* (in Cifelli and Gordon, 1999)
  - *Spalacotheridium mckennai* (in Cifelli and Gordon, 1999)

Aegialodontia
- Deltatheridiidae
  - Gen. and sp. indet. (in Cifelli, 1990a)
- Family incertae sedis
  - Gen. and sp. indet. (in Cifelli, 1990a)

Marsupialia
- Family incertae sedis
  - ?*Varalphadon delicates* (in Cifelli, 1990a)
- ?Stagodontidae
  - Gen. and sp. indet. (in Cifelli, 1990a)

John Henry Member (basal - Coniacian), Straight Cliffs Formation (Localities: OMNH V856; UMNH VP 663)

Batomorphii
- Rhinobatoidea Family incertae sedis
  - *Pseudomyledaphus madseni* (Kirkland and others, 2013)

Allocaudata
- Albanerpetontidae
  - Gen. and sp. indet. (in Gardner and Demar, 2013)

Urodela
- Scapherpetontidae
  - *Scapherpeton tectum* (in Gardner and Demar, 2013)
  - Gen. and sp. indet. (in Gardner and Demar, 2013)

John Henry Member (Santonian), Straight Cliffs Formation (Localities: UMNH VP 98, 99, 567; OMNH V27; MNA 706)

Neoselachii
- Ginglymostomatidae
  - *Cantioscyllium markaguntensis* (Kirkland and others, 2013)

Batomorphii
- Rhinobatoidea Family incertae sedis
  - *Pseudomyledaphus madseni* (Kirkland and others, 2013)

Allocaudata
- Albanerpetontidae
  - Gen. and sp. indet. (in Gardner and Demar, 2013)

Urodela
- Batracosauroididae
  - *Opistotriton kayi* (in Gardner and Demar, 2013)
  - Gen. and sp. indet. (in Gardner and Demar, 2013)

Anura
- Family incertae sedis
  - Gen. and sp. indet. (in Roček and others, 2010)

Scincomorpha
- Paramacellodid/Cordylid grade
  - *Monocnemodon syphakos* (in Nydam, 2013)
  - Morphotype A (in Nydam, 2013)

Multituberculata
- Family incertae sedis – *Paracimexomys* group
  - *Cedaromys* sp. cf. *C. hutchisoni* (in Eaton, 2006b)
  - *Cedaromys* sp. (in Eaton, 2006b)
- Family incertae sedis
  - Gen. and sp. indet. (in Eaton, 2006b)
- Neoplagiaulacidae
  - *Mesodma* sp. cf. *M. minor* (in Eaton, 2006b)
- Cimolodontidae
  - *Cimolodon foxi* (in Eaton, 2006b)
  - *Cimolodon* sp. (in Eaton, 2006b)
  - ?*Cimolodon* sp. (in Eaton, 2006b)
- Cimolomyidae
  - ?*Cimolomys* sp. (in Eaton, 2006b)

Theria
- Spalacotheriidae
  - *Spalacotherium* sp. (in Eaton, 2006b)
  - *Symmetrodontoides* sp. cf. *S. oligodontos* (in Cifelli and Gordon, 1999)
- Family incertae sedis
  - *Potamotelses* sp. (in Eaton, 2006b)
  - *Picopsis* sp. (in Eaton, 2006b)

Marsupialia
- "Alphadontidae"
  - *Alphadon* sp. cf. *A. halleyi* (in Eaton, 2006b)
  - *Varalphadon* sp. (in Eaton, 2006b)

?Stagodontidae
Gen. and sp. indet. (in Eaton, 2006b)
Family incertae sedis
?*Anchistodelphys* sp. (in Eaton, 2006b)
Gen. and sp. indet. (in Eaton, 2006b)

Wahweap Formation, Middle Campanian (Localities: OMNH V2, 8, 11, 16; UMNH VP 82, 130; MNA 455, 456, 702, 705, 707, 1015, 1294)
Elasmobranchii
Hybodontidae
Hybodus sp. (in Kirkland and others, 2013)
Lonchidiidae
Lonchidion sp. (in Kirkland and others, 2013)
Neoselachii
Ginglymostomatidae
Cantioscyllium estesi (in Kirkland and others, 2013)
Hemiscyllidae
Chiloscyllium missouriense (in Kirkland and others, 2013)
Batomorphii
Rhinobatoidea Family incertae sedis
Cristomylus cifellii (Kirkland and others, 2013)
Sclerorhynchiformes
Sclerorhynchiidae
Columbusia deblieuxi (Kirkland and others, 2013)
Texatrygon brycensis (Kirkland and others, 2013)
Osteichthyes-Neopterygii
Amiidae
Melvius cf. *M. chauliodous* (in Holroyd and Hutchison, 2016)
Lepisostidae
Gen. and sp. indet. (in Holroyd and Hutchison, 2016)
Actinopterygii
Polydontidae
Gen. and sp. indet. (in Brinkman and others, 2013)
Urodela
Batracosauroididae
Opistotriton kayi (in Gardner and Demar, 2013)
Family incertae sedis
Nezpercius dodsoni (in Gardner and Demar, 2013)
Anura
Family incertae sedis
Scotiophryne pustulosa (in Roček and others, 2010)
Gen. and sp. indet. (in Roček and others, 2010)
Testudines
Baenidae
Arvinochelys sp. (in Holroyd and Hutchison, 2016)

Denazinamys nodosa (in Holroyd and Hutchison, 2016)
Neurankylus sp. (in Holroyd and Hutchison, 2016)
Nanhsiungchelyidae
Basilemys sp. (in Holroyd and Hutchison, 2016)
Trionychidae
Gen. and sp. indet. (in Holroyd and Hutchison, 2016)
Squamata
cf. Anguimorpha indet. (in Nydam, 2013)
Serpentes
Family incertae sedis
Coniophis sp. (in Nydam, 2013)
cf. Scincomorpha – Family incertae sedis
Morphotype A (in Nydam, 2013)
Gen, and sp. indet. (in Nydam, 2013)
Dinosauria-Saurischia
Theropoda-Tyrannosauridae
Lythronax argestes (Lowen and others, 2013c).
Dinosauria-Ornithischia
Ornithopoda-Hadrosauridae
Saurolophinae
Acristavus sp. (in Gates and others, 2013)
c.f. *Brachylophosaurus* sp. (in Gates and others, 2013)
Lambeosaurinae (crested hadrosaurs)
Adelolophus hutchisoni (Gates and others, 2014)
Ceratopsidae
Centrosaurinae
Diabloceratops eatoni (Kirkland and DeBlieux, 2010)
Machairoceratops cronusi (Lund and others, 2016)
"Wahweap centrosaurine C" (in Loewen and others, 2013b)
Pachcephalosauridae
Gen. and sp. indet. (in Evans and others, 2013)
Multituberculata
Family incertae sedis – *Paracimexomys* group
Gen. and sp. indet. (in Eaton, 2002)
?*Paracimexomys* sp. (in Eaton, 2002)
cf. *Paracimexomys* sp. A (in Eaton, 2002)
cf. *Paracimexomys* sp. B (in Eaton, 2002)
Bryceomys sp. cf. *B. fumosus* (in Eaton, 2002)
Cedaromys sp. (in Eaton, 2002)
cf. *Cedaromys* sp. (in Eaton, 2002)
?*Cimexomys* sp. cf. *C. antiguus* (in Eaton, 2002)
Neoplagiaulacidae
Mesodma sp. cf. *M. formosa* (in Eaton, 2002)
Mesodma sp. cf. *M. minor* (in Eaton, 2002)
Mesodma sp. cf. *M. archibaldi* (in Eaton, 2002)

Cimolodontidae
Cimolodon electus (in Eaton, 2002)
Cimolodon similis (in Eaton, 2002)
Cimolodon sp. cf. *C. nitidus* (in Eaton, 2002)
Cimolodon sp. cf. *C. foxi* (in Eaton, 2002)
Cimolodon sp. (small) (in Eaton, 2002)
Cimolomyidae
Cimolomys sp. cf. *C. trochuus* (in Eaton, 2002)
?*Cimolomys* sp. A (in Eaton, 2002)
?*Cimolomys* sp. B (in Eaton, 2002)
?*Cimolomys* sp. C (large) (in Eaton, 2002)
Meniscoessus sp. cf. *M. intermedius* (in Eaton, 2002)
Symmetrodonta
Family incertae sedis
Gen. and sp. indet. (in Cifelli and Gordon, 1999)
Spalacotheriidae
Symmetrodontoides foxi (in Cifelli and Madsen, 1986; Cifelli and Gordon, 1999)
Order and Family incertae sedis
Zygiocuspis goldingi (in Cifelli, 1990c)
Marsupialia
"Alphadontidae"
Varalphadon crebreforme (in Cifelli, 1990b)
Varalphadon wahweapensis (in Cifelli, 1990b)
Gen. and sp. indet. (in Cifelli, 1990b)
?Marsupialia
Family incertae sedis
Iugomortiferum thoringtoni (in Cifelli, 1990b)
cf. *Iugomortiferum* sp. (in Cifelli, 1990b)
Insectivora
?Nyctitheriidae
Paranyctoides sp. (in Cifelli, 1990e)

Kaiparowits Formation, Upper Campanian (Localities: OMNH V5, 6, 9, 61; UMNH VP 24, 25, 51, 54, 56, 108, 1078, 1268; MNA 453, 454, 458, 697, 704, 1004, 1310; UCM 83240; 83258; for turtle bearing localities see Hutchison and others, 2013)
Neoselachii
Hemiscyllidae
Chiloscyllium missouriense (in Kirkland and others, 2013)
Batomorphii
Rhinobatoidea Family incertae sedis
Myledaphus bipartitus (Kirkland and others, 2013)
Sclerorhynchiformes
Sclerorhynchiidae
Columbusia deblieuxi (Kirkland and others, 2013)
Osteichthyes-Neopterygii

Semionotidae
Lepidotes sp. indet. (in Brinkman and others, 2013)
Amiidae
Gen. and sp. indet. (in Brinkman and others, 2013)
Lepisostidae
Lepisosteus sp. indet. (in Brinkman and others, 2013)
Teleostei
Osteoglossomorpha Family incertae sedis
Coriops sp. (in Brinkman and others, 2013)
Hiodontidae
Gen. and sp. indet. (in Brinkman, 2013)
Albulidae
Parabula sp. (in Brinkman and others, 2013)
Clupeiformes Family incertae sedis
Gen. and sp. indet. type G (in Brinkman and others, 2013)
Otophysi Order and family incertae sedis
Gen. and sp. indet. (in Brinkman and others, 2013)
Characiformes Family incertae sedis
Gen. and sp. indet. (in Brinkman and others, 2013)
Euteleostei Order and family incertae sedis
Gen. and sp. indet. U-4 (in Brinkman and others, 2013)
Esocoidea Family incertae sedis
Estesesox foxi (in Brinkman and others, 2013)
Estesesox sp. (in Brinkman and others, 2013)
Order and family incertae sedis
Gen. and sp. indet. type BvE (in Brinkman and others, 2013)
Acanthomorpha Order and family incertae sedis
Gen. and sp. indet. (in Brinkman and others, 2013)
Allocaudata
Albanerpetontidae
Albanerpeton galaktion (in Gardner and Demar, 2013)
Albanerpeton gracile (in Gardner and Demar, 2013)
Albanerpeton nexuosum (in Gardner and Demar, 2013)
Urodela
Scapherpetontidae
Scapherpeton tectum (in Gardner and Demar, 2013)
Lisserpeton bairdi (in Gardner and Demar, 2013)
Batracosauroididae
Opistotriton kayi (in Gardner and Demar, 2013)
Prodesmondon copei (in Gardner and Demar, 2013)
Sirenidae
Habrosaurus sp. (in Gardner and Demar, 2013)
Anura
Family incertae sedis
Scotiophryne pustulosa (in Gardner and Demar, 2013)

- *Theatonius* sp. (in Gardner and Demar, 2013)
- cf. *Eopelobates* sp. (in Gardner and Demar, 2013)
- Gen. and sp. indet. (in Roček and others, 2010; Roček and others, 2013)

Scincomorpha
- Borioteiioidea
  - *Peneteius saueri* (in Nydam, 2013)
  - *Meniscognathus molybrochorus* (Nydam and Voci, 2007)
  - *Chamops* sp. cf. *C. segnis* (in Nydam, 2013)
  - cf. *Leptochamops* sp. (in Nydam and Voci, 2007)
  - *Tripennaculus eatoni* (in Nydam and Voci, 2007)
- Contogeniidae
  - *Palaeoscincosaurus pharkidodon* (Nydam and Fitzpatrick, 2009)
- Paramacellodid/Cordylid Grade
  - Morphotype A-G (in Nydam, 2013)

Anguimorpha
- Anguidae
  - *Odaxosaurus roosevelti* (in Nydam, 2013)
- Xenosauridae
  - ?*Exostinus* sp. (in Nydam, 2013)

Platynota
- Family incertae sedis
  - *Parasaniwa cynochoros* (Nydam, 2013)
  - Morphotypes H-J (in Nydam, 2013)

Serpentes
- Family incertae sedis
  - *Coniophis* sp. (in Nydam, 2013)

Testudines
- Pleurosternidae
  - *Compsemys victa* (in Hutchison and others, 2013)
- Baenidae
  - *Neurankylus hutchisoni* (Lively, 2015b; new sp. A in Hutchison and others, 2013)
  - *Neurankylus utahensis* (Lively, 2015b; new sp. B in Hutchison and others, 2013)
  - *Arvinachelys goldeni* (Lively, 2015a)
  - *Denazinemys nodosa* (in Hutchison and others, 2013; Lively, 2015b)
  - *Boremys grandis* (in Hutchison and others, 2013; Lively, 2015b)
  - *Plesiobaena* sp. (in Hutchison and others, 2013)
  - *Thescelus* sp. (Lively, 2015b)
- Chelydridae
  - Gen. and sp. indet. (in Hutchison and others, 2013)
- Kinosternidae
  - Gen. and sp. indet. (in Hutchison and others, 2013)
- Adocidae
  - *Adocus* sp. (in Hutchison and others, 2013)
- Nanhsiungchelyidae
  - *Basilemys nobilis* (in Hutchison and others, 2013)

- Trionychidae
  - *Helopanoplia* sp. (in Hutchison and others, 2013)
  - *Aspideretoides* sp. (in Hutchison and others, 2013)
  - *Derrisemys* sp. (in Hutchison and others, 2013)
  - *Plastomenoides* sp. (in Hutchison and others, 2013)
  - Gen. and sp. indet. (in Hutchison and others, 2013)
- Crocodylia
  - Neosuchia
    - cf. *Denazinasuchus* sp.
  - Alligatoroidea Family incertae sedis
    - cf. *Leidyosuchus* sp. (in Farke and others, 2014)
    - *Deinosuchus hatcheri* (in Irmis and others, 2013)
    - *Brachychampsa* sp. (in Irmis and others, 2013)
  - ?Pterosauria
    - Gen. and sp. indet (in Farke and others, 2013)
- Dinosauria-Saurischia
  - Theropoda-Ornithomimidae
    - *Ornithomimus* sp. indet. (in Claessens and Loewen, 2015)
  - Oviraptoridae
    - *Hagryphus giganteus* (Zanno and Sampson, 2005)
  - Dromaeosauridae
    - Morphotype A (cf. *Dromaeosaurus*) (in Zanno and others, 2013)
    - Morphotype B (cf. *Saurornitholestes*) (in Zanno and others, 2013)
  - Troodontidae
    - *Talos sampsoni* (Zanno and others, 2011)
  - Aviales
    - *Avisaurus* sp. (in Zanno and others, 2013)
  - Tyrannosauridae
    - *Teratophoneus curriei* (Carr and others, 2011)
- Dinosauria-Ornithischia
  - Hypsilophodontidae
    - Gen and sp. nov. (in Boyd, 2015, "hypsilophodontid" in Gates and others, 2013)
  - Hadrosauridae-Saurolophinae
    - *Gryposaurus* cf. *G. notabilis* (in Gates and others, 2013)
    - *Gryposaurus monumentensis* (Gates and Sampson, 2007)
  - Hadrosauridae-Lambeosaurinae
    - *Parasaurolophus* sp. (in Gates and others, 2013)
  - Ceratopsidae-Chasmosaurinae
    - *Utahceratops gettyi* (Sampson and others, 2010)
    - *Kosmoceratops richardsoni* (Sampson and others, 2010)
  - Ceratopsidae-Centrosaurinae
    - *Nasutoceratops titusi* (Sampson and others, 2013)
    - "Centrosaurine B" (in Loewen and others, 2013b)
  - Pachycephalosauridae (dome-headed dinosaurs)
    - Gen. and sp. indet. (in Evans and others, 2013)

Nodosauridae (spike-tailed armored dinosaurs)
Gen. and sp. indet. (in Loewen and others, 2013a)
Ankylosauridae
New genus and species A (in Viersma, 2015)
New genus and species B (in Viersma, 2015)
Mammalia-Multituberculata
Family incertae sedis
Cimexomys sp. cf. *C. judithae* (in Eaton, 2002)
Cimexomys or *Mesodma* sp. (in Eaton, 2002)
Family incertae sedis – *Paracimexomys* group
Cedaromys hutchisoni (in Eaton, 2002)
Cedaromys sp. (in Eaton, 2002)
Dakotamys magnus (in Eaton, 2002)
Neoplagiaulacidae
Mesodma archibaldi (in Eaton, 2002)
Mesodma sp. cf. *M. archibaldi* (in Eaton, 2002)
Mesodma minor (in Eaton, 2002)
Mesodma sp. (large) (in Eaton, 2002)
Cimolodontidae
Cimolodon foxi (in Eaton 2002)
Cimolodon sp. cf. *C. nitidus* (in Eaton, 2002)
Cimolodon sp. cf. *C. similis* (in Eaton, 2002)
?Cimolodontidae
Kaiparomys cifellii (in Eaton, 2002)
Cimolomyidae
Meniscoessus sp. cf. *M. intermedius* (in Eaton, 2002)
Meniscoessus sp. cf. *M. major* (in Eaton, 2002)
Cimolomys sp. A cf. *C. clarki* (in Eaton, 2002)
Cimolomys sp. B cf. *C. clarki* (in Eaton, 2002)
?Cimolomyidae
?*Cimolomys butleria* (in Eaton, 2002)
Marsupialia
Family incertae sedis
Aenigmadelphys archeri (in Cifelli, 1990d; Cifelli and Johanson, 1994)
"Alphadontidae"
Varalphadon wahweapensis (in Cifelli, 1990d)
Turgidodon lillegraveni (in Cifelli, 1990d)
Turgidodon sp. cf. *T. lillegraveni* (in Cifelli, 1990d)
Turgidodon madseni (in Cifelli, 1990d)
Turgidodon sp. (in Cifelli, 1990d)
Alphadon halleyi (in Cifelli, 1990d)
"Alphadon attaragos" (in Cifelli, 1990d)
Insectivora
Leptictidae
Gypsonictops sp. (in Cifelli, 1990e)
?Nyctitheriidae
Paranyctoides sp. (in Cifelli, 1990e)
Order and family incertae sedis
Avitotherium utahensis (in Cifelli, 1990e)

Exhibit E

Conservation Lands Foundation

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

GRAND STAIRCASE ESCALANTE PARTNERS, *et al.*,	)	
Plaintiffs,	)	
	)	**CASE NO.** 17-2591
DONALD J. TRUMP, *et al.*,	)	
Defendants.	)	

DECLARATION OF CHARLOTTE OVERBY

I, Charlotte Overby, declare as follows:

1. I am over the age of eighteen and am competent to testify. This Declaration is based on my personal knowledge and belief.

2. I am a resident of Durango, CO, and have lived there for approximately 6 years.

3. I have a Bachelor of Arts in English from Mount Holyoke College, South Hadley, MA (1987) and a Masters in Journalism from the University of Missouri (1993).

4. I am currently employed at Conservation Lands Foundation (CLF) as the Colorado Plateau Program Director and have worked in this capacity, or a related one, since 2011. Prior to joining CLF, I was Acting Executive Director and Communications Director for the Nevada Wilderness Project (Reno, NV) helping to advance legislative campaigns to designate Wilderness in Nevada and promoting renewable energy development on public lands. I also co-founded the Missouri River Relief – a non-profit dedicated to cleaning up the lower Missouri River and advocating for its recreational, educational and natural resources. Prior to this, I was employed by the Missouri Department of Conservation as a staff writer and magazine editor for 6 years.

5. CLF's mission is to protect, restore and expand the National Conservation Lands through education, advocacy and partnerships. Its organizational purpose is to promote environmental conservancy through assisting the National Landscape Conservations System (or the National Conservation Lands). The National Conservation Lands encompass 35 million acres and 2,400 river miles of National Monuments, National Conservation Areas, Wilderness and Wilderness Study Areas, Wild and Scenic Rivers, National Scenic and Historic Trails, and other special designations. Grand Staircase-Escalante National Monument is the largest and among the best-known units in the

National Conservation Lands. CLF is the only non-profit in the country specifically dedicated to expanding and safeguarding the National Conservation Lands.

6. For over 20 years, the Grand Staircase-Escalante National Monument has been a flagship unit managed by the Bureau of Land Management (BLM) and a "crown jewel" of its National Conservation Lands system. The protection of this special place is one of the main catalysts for originally establishing our organization. Our founders, former Secretary of the Interior Bruce Babbitt, former Counselor to the Secretary Molly McUsic, and former Chief of Staff to the Secretary Anne Shields, were instrumental in the creation and designation of this national monument. Their commitment to the protection of this area led them to help establish CLF as a not-for-profit organization that would be dedicated to ensuring the long-term conservation of Grand Staircase and other monuments within the National Conservation Lands.

7. CLF has awarded grants to numerous local organizations, including Grand Staircase Escalante Partners (Partners). Indeed, CLF has provided Partners more organizational support than any other group in the Friends Grassroots Network, including a multi-year organizational capacity building training as well as tailored trainings to increase its ability to raise money, recruit and manage volunteers, and communicate with its members. Partners was the first group to receive a grant after CLF's founding in 2008 and has received 13 grants totaling $370,441.02 since then. Grand Staircase Escalante Partners has also been awarded "Friends Group of the Year" recognition, for the staff, board, and volunteers' deep commitment to protecting and stewarding the Monument.

8. As Colorado Plateau Program Director at CLF, I: 1) oversee CLF's Restoration Program; 2) oversee campaigns for specific areas in the National Conservation Lands; and 3) make grants to non-profit "Friends" groups in various states that provide volunteer and community support to units of the National Conservation Lands. Currently, a majority of our grant budget goes to friends groups that are advocating volunteer stewardship and community education on existing national monuments or national conservation areas. Although we also engage in advocacy to help lands gain National Conservation Lands status, CLF's mission and funding is primarily focused on protection and conservation efforts.

9. One of the Restoration Projects that I represent CLF in is the Escalante River Watershed Partnership (ERWP) in the Grand Staircase-Escalante National Monument.

    a. The Escalante River Watershed Partnership began in 2009 in order to remove the invasive Russian olive tree rapidly growing along the Escalante River. Due to the aggressive invasive nature of the species, the Russian olive had drastically changed the biology of the river and the riparian zone, harming several native wildlife and plant species. CLF and Grand Staircase Escalante Partners have worked with several other organizations and agencies, including BLM, to remove the invasive Russian olive and remediate the land and return it to its natural state. The project is scheduled to complete in December 2018, after which Partners's intends to undertake a 5-year monitoring and retreatment project to ensure that the

restoration efforts have long-term success. Provided that the Monument and BLM staffing still exists, CLF will support that effort with professional training, mentoring and funding.

b. CLF has assisted with this project in three important ways:

   i. First, it created a collaborative partnership and communications campaign among the various agencies and organizations interested in and affected by the health of the Escalante River. Because the Escalante River is 90 miles long, it is not located completely within the Grand Staircase-Escalante National Monument; parts of it also cross National Park Service land, non-Monument BLM land, and other state lands. CLF is a critical liaison between these organizations, ensuring that the enormous undertaking of the restoration project has the necessary support and coordination to be successful.

   ii. Second, CLF has provided funding to organizations directly engaged in the restoration effort. Most notably, CLF provided a $125,000 grant to Grand Staircase Escalante Partners to engage youth conservation corps from around the southwest (such as Southwest Conservation Corps, Utah Conservation Corps, Arizona Conservation Corps, and others) in physically removing the Russian olive species.

   iii. Finally, CLF has been engaged in communicating the success of the Escalante River Watershed Partnership with BLM staff in Washington, D.C., with congressional representatives, and with the public at large. Our purpose in this undertaking is to raise awareness of the important restoration and conservation efforts being conducted in Grand Staircase, and the opportunities for continued ecological, geologic, archeological, and paleontological work in the Monument.

c. CLF has relied heavily on BLM cooperation and support in ensuring the success of the river restoration project. BLM has provided support by:
   i. providing over $650,000 in funding for the restoration project in the past decade;
   ii. authorizing the rental of Government vehicles to Partners and conservation corps to assist in hauling and moving Russian olive removed from the area;
   iii. providing office space to Grand Staircase Escalante Partners staff on the ground;
   iv. providing botanist expertise for any questions relating to the removal of the Russian olive;
   v. coordinating activities relating to the restoration project that have occurred on Monument lands;
   vi. conducting educational training for youth corp. members engaged in the removal effort; and

vii. Contributing to scientific analysis and evaluation required prior, during, and after such activities on public lands.

10. CLF's funding and focus have been directly affected by the President's action, which has required that CLF divert funding away from preservation and restoration projects and towards advocacy.

a. Since the establishment of CLF in 2007, our organization has worked to increase the size of the National Conservation Lands from approximately 24 to 35 million acres. In addition, since January of 2010, CLF launched a program to develop a set of core management principles for the National Conservation Lands based on the vision of Interior Secretary Bruce Babbitt. Through its efforts, CLF has helped procure the addition of administrative policy and guidance for managing the National Conservation Lands and all of its disparate units. Eliminating Monument status and thus protective standards for any part of Grand Staircase would be precedent-setting as it pertains to the National Conservation Lands; it would be the first time since the establishment of the system we have seen a decrease in protected lands.

b. As a result of the President's Executive Order initiating the national monument review process, CLF has released $500,000 from our Board Designated Reserve Fund to support CLF's monuments defense work. In addition, since that Executive Order was issued, CLF diverted $460,000 in funding from our Constituency Development Grant Program (our traditional grant-making that supports, education, restoration, conservation, and organizational development projects) in order to communicate and advocate on behalf of retaining Monument status for Grand Staircase and other monuments targeted by the Interior Department's review. We have also re-allocated funds for trips to Washington, D.C. to elicit support from members of Congress for preservation of the lands and for outside firms to assist with public outreach and communications. Staff have also had to redirect their time and job duties in order to channel their energy into advocacy for the continued preservation of the lands rather than on conservation and restoration efforts, and we have had to hire new staff that are focused on Government Affairs in D.C. CLF will have to continue to make tradeoffs and diversions such as these away from substantive programs until monument protections are restored.

c. As a result of our need to respond to the President's initiation of his monument review, CLF will no longer be able to fund or coordinate the Escalante River Watershed Partnership. I have already had to reduce by 75% my work assisting and coordinating with BLM on restoration activities. I no longer have the capacity to represent CLF and contribute my expertise as a member of the Escalante River Watershed Partnership.

d. More generally, CLF has long worked to ensure that Grand Staircase-Escalante National Monument is managed according to established conservation standards

consistent with the rest of the National Conservation Lands. For example, in 2013, CLF worked closely with the BLM and Partners on the Utah State Plan for the National Conservation Lands, which included an official comment letter that outlined suggestions for how to increase conservation protections, such as best management practices for grazing and other uses, for Grand Staircase-Escalante National Monument. If parts of the Monument lose protective status, we will be compelled to exert extensive resources to fight back efforts to open them up to extraction, development, sale, or other destructive uses, which will detract from our current support for conservation programs. CLF believes these lands are truly worthy of Monument status and will continue to advocate for their protection.

I DECLARE UNDER PENALTY OF PERJURY THAT, TO THE BEST OF MY KNOWLEDGE, THE FOREGOING IS TRUE AND CORRECT.

Executed on this 4th day of December, 2017.

Charlotte Overby

Charlotte Overby

CIVIL COVER SHEET

JS-44 (Rev. 6/17 DC)

I. (a) PLAINTIFFS

1) Grand Staircase Escalante Partners, on behalf of itself and its members;
2) Society of Vertebrate Paleontology, on behalf of itself and its members

(b) COUNTY OF RESIDENCE OF FIRST LISTED PLAINTIFF Kane Cty, UT
(EXCEPT IN U.S. PLAINTIFF CASES)

DEFENDANTS

Donald J. Trump, in his official capacity as President of the United States;
Ryan Zinke, in his official capacity as Secretary of the Department of the Interior

COUNTY OF RESIDENCE OF FIRST LISTED DEFENDANT Washington D.C
(IN U.S. PLAINTIFF CASES ONLY)
NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE TRACT OF LAND INVOLVED

(c) ATTORNEYS (FIRM NAME, ADDRESS, AND TELEPHONE NUMBER)

Covington & Burling, LLP
850 10th Street, N.W.
Washington, D.C. 20001
T: 202-662-5381

ATTORNEYS (IF KNOWN)

II. BASIS OF JURISDICTION
(PLACE AN x IN ONE BOX ONLY)

- ○ 1 U.S. Government Plaintiff
- ○ 3 Federal Question (U.S. Government Not a Party)
- ● 2 U.S. Government Defendant
- ○ 4 Diversity (Indicate Citizenship of Parties in item III)

III. CITIZENSHIP OF PRINCIPAL PARTIES (PLACE AN x IN ONE BOX FOR PLAINTIFF AND ONE BOX FOR DEFENDANT) **FOR DIVERSITY CASES ONLY!**

	PTF	DFT		PTF	DFT
Citizen of this State	○ 1	○ 1	Incorporated or Principal Place of Business in This State	○ 4	○ 4
Citizen of Another State	○ 2	○ 2	Incorporated and Principal Place of Business in Another State	○ 5	● 5
Citizen or Subject of a Foreign Country	○ 3	○ 3	Foreign Nation	○ 6	○ 6

IV. CASE ASSIGNMENT AND NATURE OF SUIT

(Place an X in one category, A-N, that best represents your Cause of Action and one in a corresponding Nature of Suit)

○ **A. *Antitrust***

- ☐ 410 Antitrust

○ **B. *Personal Injury/ Malpractice***

- ☐ 310 Airplane
- ☐ 315 Airplane Product Liability
- ☐ 320 Assault, Libel & Slander
- ☐ 330 Federal Employers Liability
- ☐ 340 Marine
- ☐ 345 Marine Product Liability
- ☐ 350 Motor Vehicle
- ☐ 355 Motor Vehicle Product Liability
- ☐ 360 Other Personal Injury
- ☐ 362 Medical Malpractice
- ☐ 365 Product Liability
- ☐ 367 Health Care/Pharmaceutical Personal Injury Product Liability
- ☐ 368 Asbestos Product Liability

○ **C. *Administrative Agency Review***

- ☐ 151 Medicare Act

Social Security
- ☐ 861 HIA (1395ff)
- ☐ 862 Black Lung (923)
- ☐ 863 DIWC/DIWW (405(g))
- ☐ 864 SSID Title XVI
- ☐ 865 RSI (405(g))

Other Statutes
- ☐ 891 Agricultural Acts
- ☐ 893 Environmental Matters
- ☐ 890 Other Statutory Actions (If Administrative Agency is Involved)

○ **D. *Temporary Restraining Order/Preliminary Injunction***

Any nature of suit from any category may be selected for this category of case assignment.

(If Antitrust, then A governs)

● **E. *General Civil (Other)*** **OR** ○ **F. *Pro Se General Civil***

Real Property
- ☐ 210 Land Condemnation
- ☐ 220 Foreclosure
- ☐ 230 Rent, Lease & Ejectment
- ☐ 240 Torts to Land
- ☐ 245 Tort Product Liability
- ☐ 290 All Other Real Property

Personal Property
- ☐ 370 Other Fraud
- ☐ 371 Truth in Lending
- ☐ 380 Other Personal Property Damage
- ☐ 385 Property Damage Product Liability

Bankruptcy
- ☐ 422 Appeal 27 USC 158
- ☐ 423 Withdrawal 28 USC 157

Prisoner Petitions
- ☐ 535 Death Penalty
- ☐ 540 Mandamus & Other
- ☐ 550 Civil Rights
- ☐ 555 Prison Conditions
- ☐ 560 Civil Detainee – Conditions of Confinement

Property Rights
- ☐ 820 Copyrights
- ☐ 830 Patent
- ☐ 835 Patent – Abbreviated New Drug Application
- ☐ 840 Trademark

Federal Tax Suits
- ☐ 870 Taxes (US plaintiff or defendant)
- ☐ 871 IRS-Third Party 26 USC 7609

Forfeiture/Penalty
- ☐ 625 Drug Related Seizure of Property 21 USC 881
- ☐ 690 Other

Other Statutes
- ☐ 375 False Claims Act
- ☐ 376 Qui Tam (31 USC 3729(a))
- ☐ 400 State Reapportionment
- ☐ 430 Banks & Banking
- ☐ 450 Commerce/ICC Rates/etc.
- ☐ 460 Deportation
- ☐ 462 Naturalization Application
- ☐ 465 Other Immigration Actions
- ☐ 470 Racketeer Influenced & Corrupt Organization
- ☐ 480 Consumer Credit
- ☐ 490 Cable/Satellite TV
- ☐ 850 Securities/Commodities/ Exchange
- ☐ 896 Arbitration
- ☐ 899 Administrative Procedure Act/Review or Appeal of Agency Decision
- ☐ 950 Constitutionality of State Statutes
- ☒ 890 Other Statutory Actions (if not administrative agency review or Privacy Act)

G. *Habeas Corpus/ 2255*	H. *Employment Discrimination*	I. *FOIA/Privacy Act*	J. *Student Loan*
☐ 530 Habeas Corpus – General ☐ 510 Motion/Vacate Sentence ☐ 463 Habeas Corpus – Alien Detainee	☐ 442 Civil Rights – Employment (criteria: race, gender/sex, national origin, discrimination, disability, age, religion, retaliation) *(If pro se, select this deck)*	☐ 895 Freedom of Information Act ☐ 890 Other Statutory Actions (if Privacy Act) *(If pro se, select this deck)*	☐ 152 Recovery of Defaulted Student Loan (excluding veterans)
K. *Labor/ERISA (non-employment)*	**L. *Other Civil Rights (non-employment)***	**M. *Contract***	**N. *Three-Judge Court***
☐ 710 Fair Labor Standards Act ☐ 720 Labor/Mgmt. Relations ☐ 740 Labor Railway Act ☐ 751 Family and Medical Leave Act ☐ 790 Other Labor Litigation ☐ 791 Empl. Ret. Inc. Security Act	☐ 441 Voting (if not Voting Rights Act) ☐ 443 Housing/Accommodations ☐ 440 Other Civil Rights ☐ 445 Americans w/Disabilities – Employment ☐ 446 Americans w/Disabilities – Other ☐ 448 Education	☐ 110 Insurance ☐ 120 Marine ☐ 130 Miller Act ☐ 140 Negotiable Instrument ☐ 150 Recovery of Overpayment & Enforcement of Judgment ☐ 153 Recovery of Overpayment of Veteran's Benefits ☐ 160 Stockholder's Suits ☐ 190 Other Contracts ☐ 195 Contract Product Liability ☐ 196 Franchise	☐ 441 Civil Rights – Voting (if Voting Rights Act)

V. ORIGIN

☒ 1 Original Proceeding ☐ 2 Removed from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Reopened ☐ 5 Transferred from another district (specify) ☐ 6 Multi-district Litigation ☐ 7 Appeal to District Judge from Mag. Judge ☐ 8 Multi-district Litigation – Direct File

VI. CAUSE OF ACTION (CITE THE U.S. CIVIL STATUTE UNDER WHICH YOU ARE FILING AND WRITE A BRIEF STATEMENT OF CAUSE.)

Gen. Fed. Question 28 USC 1331 - President's Action Eliminating Monument Protections is Unconstitutional and Ultra Vires

VII. REQUESTED IN COMPLAINT CHECK IF THIS IS A **CLASS ACTION** UNDER F.R.C.P. 23 **DEMAND $** **JURY DEMAND:** Check YES only if demanded in complaint **YES** ☐ **NO** ☒

VIII. RELATED CASE(S) IF ANY (See instruction) **YES** ☐ **NO** ☒ If yes, please complete related case form

DATE: 12/4/2017 **SIGNATURE OF ATTORNEY OF RECORD** /s/ Gary S. Guzy

INSTRUCTIONS FOR COMPLETING CIVIL COVER SHEET JS-44
Authority for Civil Cover Sheet

The JS-44 civil cover sheet and the information contained herein neither replaces nor supplements the filings and services of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. Consequently, a civil cover sheet is submitted to the Clerk of Court for each civil complaint filed. Listed below are tips for completing the civil cover sheet. These tips coincide with the Roman Numerals on the cover sheet.

I. COUNTY OF RESIDENCE OF FIRST LISTED PLAINTIFF/DEFENDANT (b) County of residence: Use 11001 to indicate plaintiff if resident of Washington, DC, 88888 if plaintiff is resident of United States but not Washington, DC, and 99999 if plaintiff is outside the United States.

III. CITIZENSHIP OF PRINCIPAL PARTIES: This section is completed only if diversity of citizenship was selected as the Basis of Jurisdiction under Section II.

IV. CASE ASSIGNMENT AND NATURE OF SUIT: The assignment of a judge to your case will depend on the category you select that best represents the primary cause of action found in your complaint. You may select only one category. You must also select one corresponding nature of suit found under the category of the case.

VI. CAUSE OF ACTION: Cite the U.S. Civil Statute under which you are filing and write a brief statement of the primary cause.

VIII. RELATED CASE(S), IF ANY: If you indicated that there is a related case, you must complete a related case form, which may be obtained from the Clerk's Office.

Because of the need for accurate and complete information, you should ensure the accuracy of the information provided prior to signing the form.

AO 440 (Rev. 06/12) Summons in a Civil Action

UNITED STATES DISTRICT COURT

for the

District of Columbia

Grand Staircase Escalante Partners; Society of Vertebrate Paleontology; and Conservation Lands Foundation *Plaintiff(s)*	)	
v.	)	Civil Action No. 17-2591
DONALD J. TRUMP, in his official capacity as President of the United States; RYAN ZINKE, in his official capacity as Secretary of the Department of the Interior *Defendant(s)*	)	

SUMMONS IN A CIVIL ACTION

To: *(Defendant's name and address)* Civil Process Clerk
United States Attorney's Office
555 4th Street, N.W.
Washington, D.C. 20530

A lawsuit has been filed against you.

Within 21 days after service of this summons on you (not counting the day you received it) — or 60 days if you are the United States or a United States agency, or an officer or employee of the United States described in Fed. R. Civ. P. 12 (a)(2) or (3) — you must serve on the plaintiff an answer to the attached complaint or a motion under Rule 12 of the Federal Rules of Civil Procedure. The answer or motion must be served on the plaintiff or plaintiff's attorney, whose name and address are: Gary S. Guzy
Covington & Burling, LLP
850 10th Street N.W.
Washington, D.C. 20001

If you fail to respond, judgment by default will be entered against you for the relief demanded in the complaint. You also must file your answer or motion with the court.

CLERK OF COURT

Date: _____

_____
Signature of Clerk or Deputy Clerk

Civil Action No. 17-2591

PROOF OF SERVICE

(This section should not be filed with the court unless required by Fed. R. Civ. P. 4 (l))

This summons for *(name of individual and title, if any)* _____ was received by me on *(date)* _____ .

❒ I personally served the summons on the individual at *(place)* _____ on *(date)* _____ ; or

❒ I left the summons at the individual's residence or usual place of abode with *(name)* _____ , a person of suitable age and discretion who resides there, on *(date)* _____ , and mailed a copy to the individual's last known address; or

❒ I served the summons on *(name of individual)* _____ , who is designated by law to accept service of process on behalf of *(name of organization)* _____ on *(date)* _____ ; or

❒ I returned the summons unexecuted because _____ ; or

❒ Other *(specify):*

My fees are $ _____ for travel and $ _____ for services, for a total of $ 0.00 .

I declare under penalty of perjury that this information is true.

Date: _____

_____
Server's signature

_____
Printed name and title

_____
Server's address

Additional information regarding attempted service, etc:

Print Save As... Reset

AO 440 (Rev. 06/12) Summons in a Civil Action

UNITED STATES DISTRICT COURT

for the

District of Columbia

Grand Staircase Escalante Partners; Society of Vertebrate Paleontology; and Conservation Lands Foundation	)	
Plaintiff(s)	)	
v.	)	Civil Action No. 17-2591
DONALD J. TRUMP, in his official capacity as President of the United States; RYAN ZINKE, in his official capacity as Secretary of the Department of the Interior	)	
Defendant(s)	)	

SUMMONS IN A CIVIL ACTION

To: *(Defendant's name and address)* Jefferson B. Sessions III
Attorney General of the United States
U.S. Department of Justice
950 Pennsylvania Avenue, N.W.
Washington D.C. 20530

A lawsuit has been filed against you.

Within 21 days after service of this summons on you (not counting the day you received it) — or 60 days if you are the United States or a United States agency, or an officer or employee of the United States described in Fed. R. Civ. P. 12 (a)(2) or (3) — you must serve on the plaintiff an answer to the attached complaint or a motion under Rule 12 of the Federal Rules of Civil Procedure. The answer or motion must be served on the plaintiff or plaintiff's attorney, whose name and address are: Gary S. Guzy
Covington & Burling, LLP
850 10th Street N.W.
Washington, D.C. 20001

If you fail to respond, judgment by default will be entered against you for the relief demanded in the complaint. You also must file your answer or motion with the court.

CLERK OF COURT

Date: _____

_____
Signature of Clerk or Deputy Clerk

Civil Action No. 17-2591

PROOF OF SERVICE

(This section should not be filed with the court unless required by Fed. R. Civ. P. 4 (l))

This summons for *(name of individual and title, if any)* _____ was received by me on *(date)* _____ .

❒ I personally served the summons on the individual at *(place)* _____ on *(date)* _____ ; or

❒ I left the summons at the individual's residence or usual place of abode with *(name)* _____ , a person of suitable age and discretion who resides there, on *(date)* _____ , and mailed a copy to the individual's last known address; or

❒ I served the summons on *(name of individual)* _____ , who is designated by law to accept service of process on behalf of *(name of organization)* _____ on *(date)* _____ ; or

❒ I returned the summons unexecuted because _____ ; or

❒ Other *(specify):*

My fees are $ _____ for travel and $ _____ for services, for a total of $ 0.00 .

I declare under penalty of perjury that this information is true.

Date: _____

_____
Server's signature

_____
Printed name and title

_____
Server's address

Additional information regarding attempted service, etc:

Print Save As... Reset

AO 440 (Rev. 06/12) Summons in a Civil Action

UNITED STATES DISTRICT COURT

for the

District of Columbia

Grand Staircase Escalante Partners; Society of Vertebrate Paleontology; and Conservation Lands Foundation *Plaintiff(s)* v. DONALD J. TRUMP, in his official capacity as President of the United States; RYAN ZINKE, in his official capacity as Secretary of the Department of the Interior *Defendant(s)*	)	Civil Action No. 17-2591

SUMMONS IN A CIVIL ACTION

To: *(Defendant's name and address)* Donald J. Trump, in his official capacity as President of the United States
The White House
1600 Pennsylvania Ave. NW
Washington, DC 20500

A lawsuit has been filed against you.

Within 21 days after service of this summons on you (not counting the day you received it) — or 60 days if you are the United States or a United States agency, or an officer or employee of the United States described in Fed. R. Civ. P. 12 (a)(2) or (3) — you must serve on the plaintiff an answer to the attached complaint or a motion under Rule 12 of the Federal Rules of Civil Procedure. The answer or motion must be served on the plaintiff or plaintiff's attorney, whose name and address are: Gary S. Guzy
Covington & Burling, LLP
850 10th Street N.W.
Washington, D.C. 20001

If you fail to respond, judgment by default will be entered against you for the relief demanded in the complaint. You also must file your answer or motion with the court.

CLERK OF COURT

Date: _____

_____
Signature of Clerk or Deputy Clerk

Civil Action No. 17-2591

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❒ I returned the summons unexecuted because _____ ; or

❒ Other *(specify):*

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Date: _____

_____
Server's signature

_____
Printed name and title

_____
Server's address

Additional information regarding attempted service, etc:

Print Save As... Reset

AO 440 (Rev. 06/12) Summons in a Civil Action

UNITED STATES DISTRICT COURT

for the

District of Columbia

Grand Staircase Escalante Partners; Society of Vertebrate Paleontology; and Conservation Lands Foundation	)	
Plaintiff(s)	)	
v.	)	Civil Action No. 17-2591
DONALD J. TRUMP, in his official capacity as President of the United States; RYAN ZINKE, in his official capacity as Secretary of the Department of the Interior	)	
Defendant(s)	)	

SUMMONS IN A CIVIL ACTION

To: *(Defendant's name and address)* Ryan Zinke, in his official capacity as Secretary of the Department of the Interior
1849 C Street, NW
Washington, DC 20240

A lawsuit has been filed against you.

Within 21 days after service of this summons on you (not counting the day you received it) — or 60 days if you are the United States or a United States agency, or an officer or employee of the United States described in Fed. R. Civ. P. 12 (a)(2) or (3) — you must serve on the plaintiff an answer to the attached complaint or a motion under Rule 12 of the Federal Rules of Civil Procedure. The answer or motion must be served on the plaintiff or plaintiff's attorney, whose name and address are: Gary S. Guzy
Covington & Burling, LLP
850 10th Street N.W.
Washington, D.C. 20001

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Signature of Clerk or Deputy Clerk

Civil Action No. 17-2591

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