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# Up for Grabs: The State of Fossils Protection in (Recently) Unprotected National Monuments

John C. Ruple

*S.J. Quinney College of Law, University of Utah, [john.ruple@law.utah.edu](mailto:john.ruple@law.utah.edu)*

Michael Henderson

Caitlin Ceci

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**UP FOR GRABS—THE STATE OF FOSSILS PROTECTION IN (RECENTLY)  
UNPROTECTED NATIONAL MONUMENTS**

John C. Ruple, Michael Henderson, and Caitlin Ceci\*

**Introduction**

On December 4, 2017, President Donald J. Trump signed presidential proclamations reducing the Bears Ears and Grand Staircase-Escalante national monuments and replacing them with much smaller monument units. President Trump justified the reductions in part by claiming that many of the objects contained in the original monuments were already protected by other federal laws, and that the protections previously afforded to over two million acres—or sixty-three percent of the land in the two original monuments—were therefore “unnecessary for the care and management of the objects to be protected within the monument[s].”

Both Bears Ears and the Grand Staircase-Escalante national monuments were originally designated in part to protect paleontological resources, including plant and invertebrate fossils. Many of these fossil resources fall outside the boundaries of President Trump’s shrunken monuments. This article explains why, contrary to the President’s assertions, plant and invertebrate fossils on the more than two million acres of land that were excluded from the monuments now receive less protection than when they were included in the monuments.

Part I of the article provides an overview of the national monument designation and reduction process. Part II discusses the importance of paleontological resources and their influence on monument designations. Part III reviews the Paleontological Resources Protection Act (PRPA) and the protections it affords, the casual collection exception under PRPA, and additional protections afforded to fossils located on lands designated as a national monument.

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Part IV identifies the negative implications for fossils located on lands which are no longer part of a national monument, and Part V concludes.

## **I. Establishment and Reductions of the Bears Ears and Grand Staircase-Escalante National Monuments**

More than a century ago, Congress passed the Antiquities Act, authorizing the President to designate national monuments in order to protect objects of historic or scientific import that are located on federally owned or controlled land.<sup>1</sup> Since that time, Presidents from both parties have used the Act to designate over 150 national monuments.<sup>2</sup> While sometimes controversial, monument designations and the protections that they provide have proved to be remarkably stable over time. Congress has elevated many national monuments to national park status, but reductions have been comparatively rare, and fifty-five years have passed since a President last

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\* John C. Ruple is a Professor of Law and Wallace Stegner Center Fellow at the University of Utah's S.J. Quinney College of Law. He also volunteers as a member of the board of directors for Friends of Cedar Mesa, which is challenging President Trump's reductions to the Bears Ears National monument. Professor Ruple's views do not necessarily represent those of the state of Utah, the University of Utah, or Friends of Cedar Mesa. Michael Henderson and Caitlin Ceci are Research Assistants at the S.J. Quinney College of Law. This paper was made possible by the generous support provided by the ESRR Endowment Fund, and the Wilburforce Foundation. The authors would like to thank M. Allison Stegner, University of Wisconsin-Madison Dept. of Integrative Biology, and David P. Polly, University of Indiana Dept. of Earth and Atmospheric Sciences and President of the Society of Vertebrate Paleontologists for their assistance and insight into paleontology of the Bears Ears area.

<sup>1</sup> 54 U.S.C. § 320301 (2012).

<sup>2</sup> National Parks Conservation Ass'n, Antiquities Act Designations and Related Actions, <https://npca.s3.amazonaws.com/documents/3387/84cfbad0-3087-4df5-9f58-8d763f7b9ef4.pdf?1492615236> (last visited Jan. 30, 2018).

acted to reduce a national monument.<sup>3</sup>

President Donald J. Trump upended that pattern of stability on April 26, 2017, when he issued Executive Order 13792,<sup>4</sup> directing Secretary of the Interior Ryan Zinke to review the last twenty-one years of presidential national monument designations for conformity with both the Antiquities Act, and with administration policy.<sup>5</sup> Specifically, the Secretary was directed to review designations which “cover[] more than 100,000 acres,” that were expanded to “cover[] more than 100,000 acres,” or designations which the Secretary determined were “made without adequate public outreach and coordination with relevant stakeholders.”<sup>6</sup>

The Secretary’s review focused in part on whether monuments contained “objects of historic or scientific interest,” and whether the monuments were confined to the “smallest area compatible with the proper care and management of the objects to be protected.”<sup>7</sup> Both of these criteria stem from the Antiquities Act of 1906, the federal statute in which Congress delegated to the President the authority to designate national monuments.<sup>8</sup>

President Trump’s executive order also required the Secretary to address five policy considerations not reflected in the authority delegated to the President in the Antiquities Act: (1)

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<sup>3</sup> *Id.* See Proclamation No. 3935, 28 Fed. Reg. 5407 (1963). President Kennedy redrew the boundaries of Bandelier National Monument to include lands formerly administered by the Atomic Energy Commission as part of Los Alamos National Laboratory while removing 3,925 acres of land “containing limited archeological values which have been fully researched and are not needed to complete the interpretive story of the Bandelier National Monument.” *Id.*

<sup>4</sup> Exec. Order No. 13,792, 82 Fed. Reg. 20,429 (April 26, 2017).

<sup>5</sup> *Id.*

<sup>6</sup> *Id.*

<sup>7</sup> *Id.*, quoting 54 U.S.C. §§ 320301(a) and (b).

<sup>8</sup> 54 U.S.C. §§ 320301—303 (2012).

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the effects of a designation on the available uses of federal lands both within and outside of the designation, (2) the effects of a designation on use and enjoyment of non-federal land within and outside of the designation, (3) concerns of state, tribal, and local governments affected by a designation, (4) availability of federal resources to properly manage designated areas, and (5) “such other factors as the Secretary deems appropriate.”<sup>9</sup>

The Secretary evaluated two dozen monuments during the review.<sup>10</sup> In the Secretary’s Final Report Summarizing Findings of the Review of Designations Under the Antiquities Act,<sup>11</sup> he recommended six monuments for boundary reductions and management revisions.<sup>12</sup> Of these

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<sup>9</sup> Exec. Order No. 13,792, *supra* note 4 at 20,429-30. Whether the President has the authority to revise a national monument absent expressed delegation of congressional to do so is in doubt and beyond the scope of this paper. For a thorough discussion of the issue see John C. Ruple, *President Trump’s Leave No Trace Ethic: National Monuments and Lessons Not Learned from Prior Presidential National Monument Reductions*, 43 HARVARD ENVTL. L. REV. \_\_\_\_ (forthcoming 2019), Pamela Baldwin, *Presidential Authority to Modify or Revoke National Monuments*, <http://dx.doi.org/10.2139/ssrn.3095744>, and Mark Squillace et al., *Presidents Lack the Authority to Abolish or Diminish National Monuments*, 103 VA. L. REV. ONLINE 77 (2017); but see Todd Gaziano & John Yoo, *Presidential Authority to Revoke or Reduce National Monument Designations*, \_\_ YALE J. ON REG. \_\_ (forthcoming 2018).

<sup>10</sup> For a list of monuments initially considered for review, see *Interior Department Releases List of Monuments Under Review, Announces First-Ever Formal Public Comment Period for Antiquities Act Monuments*, U.S. DOI (May 5, 2017), [www.doi.gov/pressreleases/interior-department-releases-list-monuments-under-review-announces-first-ever-formal](http://www.doi.gov/pressreleases/interior-department-releases-list-monuments-under-review-announces-first-ever-formal).

<sup>11</sup> Memorandum from the Secretary of the Interior, Ryan Zinke, to the President (2017) [hereinafter Memorandum from Zinke]; *Secretary Zinke Sends Monument Report to the White House*, U.S. DOI (Aug. 24, 2017), [www.doi.gov/pressreleases/secretary-zinke-sends-monument-report-white-house](http://www.doi.gov/pressreleases/secretary-zinke-sends-monument-report-white-house).

<sup>12</sup> In the Secretary’s Final Report, he recommended that the Bears Ears, Cascade-Siskiyou, Gold Butte, Grand Staircase-Escalante, Pacific Remote Islands, and Rose Atoll National Monuments be considered for boundary changes. Memorandum from Zinke, *supra* note 11, at 9–18; Memorandum from Ryan Zinke, Secretary of the Interior, to the President, [www.documentcloud.org/documents/4052225-Interior-Secretary-Ryan-Zinke-s-Report-to-the.html](http://www.documentcloud.org/documents/4052225-Interior-Secretary-Ryan-Zinke-s-Report-to-the.html) (last accessed Nov. 27, 2017).

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six monuments, three—Bears Ears National Monument, Gold Butte National Monument, and Grand Staircase-Escalante National Monument—were originally designated in part to protect the scientifically important paleontological resources found within their borders.<sup>13</sup>

These three monuments, which are all managed by the Bureau of Land Management (BLM), were automatically included in the National Landscape Conservation System (NLCS) by virtue of their monument designations.<sup>14</sup> Congress directs that the NLCS must be managed to protect the outstanding cultural and scientific values giving rise to the designation.<sup>15</sup>

On December 4, 2017, President Trump issued presidential proclamations reducing the Bears Ears National Monument by approximately eighty-five percent,<sup>16</sup> and the Grand Staircase-Escalante National Monuments to just over half its pre-reduction size.<sup>17</sup> By removing lands from the two monuments, President Trump also removed much of the excluded land from the NLCS, eliminating the protections associated with NLCS lands. The President justified reducing the

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<sup>13</sup> The Grand Staircase-Escalante National Monument “includes world class paleontological sites.” Proclamation No. 6920, 61 Fed. Reg. 50,223, 50,223, 50,225 (Sep. 24, 1996); Proclamation No. 9558, 82 Fed. Reg. 1139, 1139–40 (Dec. 28, 2016) (describing fossils in the “Bears Ears area” as items of scientific and historic importance); Proclamation No. 9559, 82 Fed. Reg. 1149, 1150 (Dec. 28, 2016) (stating that “The Gold Butte area contains an extraordinary variety of diverse and irreplaceable scientific, historic, and prehistoric resources, including . . . rare fossils”). Of the monuments recommended to have their boundaries reduced, the Secretary only noted that the paleontological resources were identified by proclamation in Grand Staircase-Escalante. Memorandum from Zinke, *supra* note 11, at 13.

<sup>14</sup> 16 U.S.C. § 7202(b) (2012).

<sup>15</sup> 16 U.S.C. § 7202(c) (2012).

<sup>16</sup> Proclamation No. 9681, 82 Fed. Reg. 58,081, 58,085 (Dec. 4, 2017) (excluding 1,150,860 acres from Bears Ears National Monument).

<sup>17</sup> Proclamation No. 9682, 82 Fed. Reg. 58,089, 58,093 (Dec. 4, 2017) (excluding 861,974 acres from Grand Staircase-Escalante National Monument). As of the date of this Article, no actions have been taken by President Trump towards decreasing the boundaries of Gold Butte national monument or any other national monuments.

Bears Ears National Monument by concluding that:

[M]any of the objects identified by Proclamation 9558 are otherwise protected by Federal law; and . . . it is in the public interest to modify the boundaries of the monument to exclude from its designation and reservation [from disposal or availability for future mineral development] approximately 1,150,860 acres of land that I find are unnecessary for the care and management of the objects to be protected within the monument.<sup>18</sup>

Substantively equivalent language is contained in the proclamation reducing the Grand Staircase-Escalante National Monument.<sup>19</sup> In further justifying his decision to reduce the Grand Staircase-Escalante National Monument, President Trump stated that:

A host of laws enacted after the Antiquities Act provide specific protection for . . . paleontological . . . resources . . . . Of particular note, the Paleontological Resources Preservation Act, enacted in 2009, imposes criminal penalties for unauthorized excavation, removal, damage, alteration, or defacement of paleontological resources. Federal land management agencies can grant permits authorizing excavation or removal, but only when undertaken for the purpose of furthering paleontological knowledge.<sup>20</sup>

These were the largest reductions to a national monument made by any President and unprecedented in scale or justification.<sup>21</sup> President Trump's proclamations misstate federal law. Though President Trump's proclamations state that paleontological resources on the excluded lands will be protected by PRPA,<sup>22</sup> those protections do not extend to invertebrate or plant

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<sup>18</sup> Proclamation No. 9681, *supra* note 16 at 58,085.

<sup>19</sup> Proclamation No. 9682, *supra* note 17 at 58,093.

<sup>20</sup> *Id.* at 58090 (2017). A similar statement was made with respect to the Bears Ears National Monument reduction. Proclamation No. 9681, *supra* note 16 at 58,082).

<sup>21</sup> *See* Ruple, *supra* note 9.

<sup>22</sup> 16 U.S.C. §§ 470aaa—47aaa-11 (2012).

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fossils,<sup>23</sup> which are open to “casual collection” under an exception contained in the Act.<sup>24</sup>

Federal regulations clarify that casual collection is not allowed on national monuments that are managed by the U.S. Forest Service (USFS),<sup>25</sup> and the NLCS indicates that fossils should not be removed from BLM managed lands.<sup>26</sup> These protections disappeared when millions of acres of public land were removed from the Bears Ears and Grand Staircase-Escalante national monuments.

Without the protections afforded to plant and invertebrate fossils by virtue of Forest Service regulations or being located on monument lands included in the NLCS, plant and invertebrate fossil resources are subject to removal or destruction, which threatens the scientific interests monument designation are intended to protect. The risk to irreplaceable plant and invertebrate fossils deserves recognition and careful consideration. “Fossils are a window to our past—a record of the Earth’s history” which allow scientists to “attempt to unfold the mysteries of the evolution of life on this planet.”<sup>27</sup> As the President of the Society of Vertebrate Paleontologists explains in describing fossil-bearing geologic formations: “The rock layers of the monument are like pages in an ancient book . . . If half of them are ripped out, the plot is lost.”<sup>28</sup>

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<sup>23</sup> The terms “fossils” and “paleontological resources” are used interchangeably throughout this article.

<sup>24</sup> 16 U.S.C. § 470aaa-3(a)(2) (2012).

<sup>25</sup> 36 C.F.R. § 291.12(a) (2017).

<sup>26</sup> 16 U.S.C. § 7202(c)(2) (2012).

<sup>27</sup> Gretchen Lundgren, *Protecting Federal Fossils from Extinction*, 26 B.C. ENVTL. AFF. L. REV. 225, 228 (1998) (citations omitted).

<sup>28</sup> Tay Wiles, *Monument Reductions Threaten Future Dinosaur Discoveries*, HIGH COUNTRY NEWS, Jan. 30, 2018. [www.hcn.org/articles/public-lands-monument-reductions-threaten-future-dinosaur-discoveries](http://www.hcn.org/articles/public-lands-monument-reductions-threaten-future-dinosaur-discoveries).



## **II. Paleontological Resources and National Monuments**

Paleontological resources are “any fossilized remains, traces, or imprints of organisms,” not including archeological resources or cultural items, “preserved in or on the earth’s crust, that are of paleontological interest and that provide information about the history of life on earth.”<sup>29</sup> These resources are rare and limited because they require specific conditions to allow for their preservation.<sup>30</sup>

The value of fossils lies in the insights they offer scientists about how extinct organisms behaved and evolved.<sup>31</sup> Fossils also have scientific value based on their context and information that can be derived from the surrounding rock and other depositional materials in which fossils are found.<sup>32</sup> This context provides scientists with important information regarding the climatic and habitats in which these organisms lived, possible food sources, and even individual animal behavior.<sup>33</sup> Complex fossil sites can also indicate climatic conditions at the time those organisms lived and died, allowing scientists to “chronicle the history of climatic patterns of the earth.”<sup>34</sup> This information allows scientists to understand evolution and the effects of climate change, and has been used to develop important scientific theories such as natural selection and continental

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<sup>29</sup> 16 U.S.C. § 470aaa (2012).

<sup>30</sup> Dorna Sachiko Sakurai, *Animal, Mineral, or Cultural Antiquity?: The Management and Protection of Paleontological Resources*, 17 LOY LA INTL COMP L J 197, 204 (1994).

<sup>31</sup> Lundgren, *supra* note 27 at 228.

<sup>32</sup> *Id.* at 228.

<sup>33</sup> *Id.* (citation omitted).

<sup>34</sup> Sakurai, *supra* note 30, at 204–05.

drift.<sup>35</sup>

Outside of their scientific significance, fossils inspire awe and interest in significant portions of the population.<sup>36</sup> This is evidenced by the popularity of books and movies about prehistoric creatures such as dinosaurs. Films such as those included in the Jurassic Park series sparked renewed interest in fossils over the last several decades,<sup>37</sup> and have continued to be widely popular.<sup>38</sup> Similarly, fossil exhibits attract the attention of significant audiences at museums and universities world-wide.<sup>39</sup> Because of their inherent cultural and scientific value,<sup>40</sup> fossils have been recognized as objects worthy of protection in national monument designations.

In the proclamations establishing the Grand Staircase-Escalante and Bears Ears national monuments, for example, Presidents Clinton and Obama identified invertebrate and plant fossils as objects of scientific and cultural significance requiring protection.<sup>41</sup> Petrified wood, as well as

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<sup>35</sup> *Id.*

<sup>36</sup> Alexa Z. Chew, *Nothing Besides Remains: Preserving the Scientific and Cultural Value of Paleontological Resources in the United States*, 54 DUKE L. J. 1031, 1031–32 (2004).

<sup>37</sup> Sakurai, *supra* note 30, at 198 n.2

<sup>38</sup> Following its 2015 release, *Jurassic World* grossed sales of \$1.52 billion worldwide and becoming “the third highest grossing movie of all time.” Kristin Acuna, *'Jurassic World' is Now the Third Highest-Grossing Movie of All Time*, BUSINESS INSIDER (July 22, 2015 3:10 PM), [www.businessinsider.com/jurassic-world-is-third-highest-grossing-movie-ever-2015-7](http://www.businessinsider.com/jurassic-world-is-third-highest-grossing-movie-ever-2015-7).

<sup>39</sup> See Bryan Pirolli, *10 of the World's Best Dinosaur Museums*, CNN (June 16, 2015), <https://www.cnn.com/travel/article/world-best-dino-museums/index.html>; see also *Dinosaurs & Paleontology*, VISIT UTAH, [www.visitutah.com/things-to-do/history-culture/natural-history/dinosaurs-paleontology/](http://www.visitutah.com/things-to-do/history-culture/natural-history/dinosaurs-paleontology/) (last accessed Mar. 1, 2018) (detailing the paleontological discoveries made in Utah and advertising fossils and museums for tourism).

<sup>40</sup> The line between cultural and paleontological resources can be thin. San Felipe Pueblo in New Mexico argued recently that “fossils themselves are in fact cultural items and cultural patrimony.” Pueblo of San Felipe, 191 IBLA 53, 59 (2017).

<sup>41</sup> Proclamation No. 6920, *supra* note 13 at 50,225; Proclamation No. 9558, *supra* note 13 at 1139–40.

marine and brackish water mollusks, were specifically identified in the Grand Staircase proclamation.<sup>42</sup> As the Bears Ears National Monument proclamation explains, “fossilized trackways of early tetrapods can be seen in the Valley of the Gods and in Indian Creek, where paleontologists have also discovered exceptional examples of fossilized ferns, horsetails, and cycads.”<sup>43</sup> Relatively few continuous stratigraphic records Pennsylvanian formations exist in other parts of the North America, so the “Bears Ears National Monument deposits provide a rare and relatively complete look at the ecosystems that developed prior to the devastating Permo-Triassic extinction.”<sup>44</sup> President Trump’s reduction removed all of the Pennsylvanian formation from the Monument.<sup>45</sup>

Both monuments, as originally proclaimed, contained an abundance of other invertebrate and plant taxa, not specifically identified in the proclamations, such as “corals, crinoids, sponges, bryozoans, brachiopods, bivalves, gastropods, ammonoids, nautiloids, conodonts, and . . . trilobites.”<sup>46</sup> Many of these fossils now reside outside of current monument boundaries.

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<sup>42</sup> Proclamation No. 6920, *supra* note 13 at 50223.

<sup>43</sup> Proclamation No. 9558, *supra* note 13 at 1139—41.

<sup>44</sup> Jessica Uglesich et al., *Paleontology of the Bears Ears National Monument: History of Exploration and Designation of the Monument*, PEER. J. PREPRINTS 4 (Dec. 1, 2017) <https://doi.org/10.7287/peerj.preprints.3442v1>.

<sup>45</sup> Society of Vertebrate Paleontologists, *Why SVP is Suing Over Monument Reductions* (Dec. 4, 2017) <http://vertpaleo.org/Society-News/SVP-Paleo-News/Society-News,-Press-Releases/Grand-Staircase-Escalante-and-Bears-Ears-National.aspx>.

<sup>46</sup> JOHN FOSTER ET AL., PALEONTOLOGICAL SURVEY OF THE GRAND STAIRCASE-ESCALANTE NATIONAL MONUMENT, GARFIELD AND KANE COUNTIES, UTAH 7 (2001); *see also* Roland W. Brown, *Cretaceous Plants from Southwestern Colorado*, in SHORTER CONTRIBUTIONS TO GENERAL GEOLOGY, 45, 45 (1949)

### **III. The Protections Afforded to Fossils**

Prior to the passage of PRPA in 2009, few laws expressly protected paleontological resources on federal land, and those that did were significantly limited in scope.<sup>47</sup> Land managers instead relied on an assortment of federal laws that, in application, left significant gaps in the protections afforded to fossils. PRPA filled those gaps and placed a general prohibition on fossil collection without a permit, mandating that federal agencies protect these resources, and calling for a more uniform system of paleontological resource management across the different federal land management agencies.

#### **A. PRPA, its Purpose and Protections**

The road to comprehensive paleontological resource protection began in 2000, when Congress commissioned an “Assessment of Fossil Management on Federal and Indian Lands.”<sup>48</sup> This report was prepared by multiple federal agencies, along with the Smithsonian Institution, and provided recommendations to Congress on how to manage paleontological resources located on federal lands.<sup>49</sup> Following release of the congressionally commissioned report, Rep. James McGovern of Massachusetts introduced PRPA on October 1, 2001,<sup>50</sup> but the bill failed to gain support. Senators and Representatives reintroduced versions of PRPA in each successive

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<sup>47</sup> See, e.g., Federal Cave Resources Protection, 16 U.S.C. §§4301–10 (2012) (providing protections to paleontological deposits, but only where those deposits were located in caves on federal lands).

<sup>48</sup> U.S. DEPT. OF THE INTERIOR ET AL., ASSESSMENT OF FOSSIL MANAGEMENT ON FEDERAL & INDIAN LANDS 20 tbl.2 (May 2000) (cited in Chew, *supra* note 36, at 1050).

<sup>49</sup> Chew, *supra* note 36, at 1050.

<sup>50</sup> H.R. 2974, 107th Cong. (2001).

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Congress,<sup>51</sup> until PRPA was incorporated into the Omnibus Public Land Management Act of 2009 and finally enacted into law.<sup>52</sup>

Codified into law in 2009, PRPA “establish[es] a comprehensive national policy for preserving and managing paleontological resources on Federal lands administered by the Secretary of the Interior and the Secretary of Agriculture.”<sup>53</sup> PRPA also requires that the Secretary of Interior and the Secretary of Agriculture draft plans to manage these resources which “emphasize interagency coordination,”<sup>54</sup> and to “coordinate in the implementation” of the provisions of PRPA.<sup>55</sup>

PRPA forbids the collection of vertebrate fossils without a permit issued by the applicable Secretary.<sup>56</sup> To obtain a permit, applicants must: (1) be qualified to carry out the collection, (2) the collection must “further paleontological knowledge or [ ] public education,” (3) the collection must be “consistent with any management plan applicable to the Federal land concerned,” and (4) the “methods of collecting [must] not threaten significant natural or cultural resources.”<sup>57</sup> Additionally, permits under PRPA require that vertebrate paleontological resources collected from federal lands remain the property of the United States, be reserved for scientific and educational use, and that the location of sensitive paleontological resources must remain

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<sup>51</sup> H.R. 2416, 108th Cong. (2003); S. 263, 109th Cong. (2005); S. 320, 110th Cong. (2007); and H.R. 554, 110th Cong. (2007).

<sup>52</sup> Omnibus Public Land Management Act of 2009, Pub. L. No.111-11, 123 Stat. 99 (2009).

<sup>53</sup> S. Rep. No. 110-18, at 1 (2007).

<sup>54</sup> 16 U.S.C. § 470aaa-1(a) (2012).

<sup>55</sup> 16 U.S.C. § 470aaa-1(b).

<sup>56</sup> 16 U.S.C. § 470aaa- (a)(1).

<sup>57</sup> 16 U.S.C. § 470aaa-3(b).

confidential.<sup>58</sup>

PRPA contains an important exemption from these permitting requirements. The secretaries of Agriculture and the Interior are directed to “allow casual collecting without a permit on Federal land controlled or administered by the Bureau of Land Management . . . and the Forest Service, where such collection is consistent with the laws governing the management of those Federal land and this subtitle.”<sup>59</sup> Casual collecting means “the collecting of a reasonable amount of common invertebrate and plant paleontological resources for non-commercial personal use.”<sup>60</sup> The reach of the terms “common invertebrate and plant paleontological resources” and “reasonable amount” are left to the Secretaries to define by regulation.<sup>61</sup>

## **B. PRPA’s Implementing Regulations**

Under PRPA, the USFS and the BLM are directed to “issue such regulations as are appropriate to carry out this chapter.”<sup>62</sup> The USFS has promulgated regulations prohibiting casual collection of fossils within national monuments. The BLM has proposed regulations which would do the same, but those regulations were not finalized and have been withdrawn.

### *1. Forest Service Regulations*

The USFS allows casual collecting of a reasonable amount of common invertebrate and plant paleontological resources without a permit where collection is consistent with other laws governing management of those lands, and where National Forest System lands are not otherwise

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<sup>58</sup> 16 U.S.C. §§ 470aaa-3(c)(1)–(3).

<sup>59</sup> 16 U.S.C. § 470aaa-3(a)(2).

<sup>60</sup> 16 U.S.C. § 470aaa(1).

<sup>61</sup> *Id.*

<sup>62</sup> 16 U.S.C. § 470aaa–9.

closed to collection.<sup>63</sup> Casual collecting means the “collecting of a reasonable amount of common invertebrate and plant paleontological resources for non-commercial personal use, either by surface collection or the use of non-powered hand tools, resulting in only negligible disturbance to the Earth’s surface and other resources.”<sup>64</sup> “Common invertebrate and plant paleontological resources are invertebrate or plant fossils that are of ordinary occurrence and wide-spread distribution. Not all invertebrate and plant paleontological resources are common.”<sup>65</sup> “Casual collecting is not allowed in: (1) National Monuments within the National Forest System; and (2) Other National Forest System lands closed to casual collecting in accordance with this Part, other statutes, executive orders, regulations, or land use plans.”<sup>66</sup> Areas previously closed to casual collection under “other authorities, remain closed under these regulations” as well.<sup>67</sup>

The Bears Ears National Monument, as originally proclaimed by President Obama, contained approximately 293,000 acres of National Forest System land.<sup>68</sup> This acreage was closed to casual collection of plant and invertebrate fossils by virtue of its inclusion in the monument. President Trump’s reduced Bears Ears National Monument contains just 32,587 acres of National Forest System land.<sup>69</sup> Approximately 260,000 acres (over 400 square-miles) of

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<sup>63</sup> 36 C.F.R. §§ 291.11(a) and (b) (2017).

<sup>64</sup> 36 C.F.R. § 291.5 (2017).

<sup>65</sup> *Id.*

<sup>66</sup> 43 C.F.R. § 291.12(a) (2017).

<sup>67</sup> 43 C.F.R. § 291.12(b).

<sup>68</sup> Fast Facts and Q&A, [www.blm.gov/programs/national-conservation-lands/national-monuments/utah/bears-ears/fast-facts](http://www.blm.gov/programs/national-conservation-lands/national-monuments/utah/bears-ears/fast-facts) (last visited April 12, 2018).

<sup>69</sup> Notice of Intent to Prepare Monument Management Plans for the Bears Ears National Monument Indian Creek and Shash Jáa Units and Associated Environmental Impact Statement, Utah, 83 Fed. Reg. 2181, 2181 (2018).

National Forest System land were therefore excluded from the monument.

Plant and invertebrate fossils on USFS-managed areas that remain within the monument are protected by virtue of USFS regulations and their inclusion in the monument. Plant and invertebrate fossils on over 400 square-miles of National Forest System lands that were excised from the monument, however, are no longer protected, unless those lands were otherwise independently closed to casual collection. A review of the Land and Resource Management Plan for the Manti-LaSal National Forest did not identify any independent protections applicable to plant and invertebrate fossils.<sup>70</sup>

## 2. *BLM Regulations*

The BLM issued draft regulations to implement PRPA on December 7, 2016,<sup>71</sup> but final regulations have not been issued and the draft regulations have been withdrawn for further assessment.<sup>72</sup> The BLM's existing regulations remain in effect until new regulations are finalized and state that outside of "developed recreation sites and areas, or where otherwise prohibited and posted, it is permissible to collect from the public lands reasonable amounts of . . . common invertebrate and plant fossils" for noncommercial purposes.<sup>73</sup>

BLM-issued guidance also indicates that pending issuance of new rules, BLM-managed public lands will remain open to casual collection of paleontological resources unless specifically

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<sup>70</sup> FOREST SERVICE, U.S. DEPT. OF AGRICULTURE, MANTI-LA SAL NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN (1986).

<sup>71</sup> Paleontological Resources Preservation, 81 Fed. Reg. 88173 (Dec. 7, 2016) (to be codified at 43 C.F.R. part 49).

<sup>72</sup> Docket ID No. NPS-2016-003 (April 14, 2017). Accessed: [regulations.gov/document?D=BLM\\_FRDOC\\_0001-0100](https://www.regulations.gov/document?D=BLM_FRDOC_0001-0100).

<sup>73</sup> 43 C.F.R. § 8365.1-5(b)(2) (2017).



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closed by a site-specific designation.<sup>74</sup> Additional direction is contained in BLM Manual 8270, which indicates that permits are not normally required for casual collection of invertebrate and plant fossils, but that “in some situations, locations containing noteworthy occurrences of such fossils may be closed to collection except under permit.”<sup>75</sup>

Existing regulations and guidance do not address paleontological resources within national monuments, and the BLM management plan covering the area excluded from the Bears Ears National Monument does not impose additional restrictions on casual collection of fossils. Indeed, the Record of Decision for that management plan states that “[r]ecreational collectors may collect and retain reasonable amounts of common invertebrate and plant fossils for personal, noncommercial use.”<sup>76</sup>

The BLM’s proposed regulations would have more clearly aligned with USFS regulations. The proposed BLM regulations would have restricted casual collection of plant and invertebrate fossils on “BLM-administered national monuments, national conservation areas, outstanding natural areas, forest reserves, or cooperative management and protection areas, except where allowed by other statutes, executive orders, regulations, or land use plans.”<sup>77</sup>

Similarities between the BLM’s draft regulations and the USFS’s regulations were intentional, as

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<sup>74</sup> Memorandum from the Bureau of Land Management on Collecting of Paleontological Res. Under the Paleontological Res. Pres. Act of 2009 to All State Directors. (June 11, 2012).

<sup>75</sup> BUREAU OF LAND MGMT., DEPT. OF THE INTERIOR, MANUAL 8270—PALEONTOLOGICAL RESOURCES MANAGEMENT, 8270.09(B)(1) (1998).

<sup>76</sup> BUREAU OF LAND MGMT., DEPT. OF THE INTERIOR, RECORD OF DECISION FOR THE MONTICELLO FIELD OFFICE LAND AND RESOURCES MANAGEMENT PLAN 86 (2008).

<sup>77</sup> Paleontological Resources Preservation, 81 Fed. Reg. 88,173, 88,195 (proposed Dec. 07, 2016).

the Department of the Interior and the Department of Agriculture formed an “interagency coordination team” in 2009 in order to collaboratively draft PRPA regulations.<sup>78</sup> A press release issued by the Department of the Interior announced that the BLM’s proposed regulations “provided for a coordinated approach” of paleontological resources, that “calls not only for collaboration between agencies, but also partnership with the scientific community and the public.”<sup>79</sup>

While the BLM may have intended to create regulations that mirrored those promulgated by the USFS, it has thus far failed to do so, and most BLM managed public lands are therefore presumptively open to casual collection of plant and invertebrate fossils unless closed to casual collection by other laws. BLM-managed public lands included in the National Landscape Conservation System provide an important exception to this general rule.

**C. National Monuments and the National Landscape Conservation System**

In 2000, Secretary of the Interior Bruce Babbitt administratively created the NLCS as a way of uniting BLM managed conservation lands under a single management system.<sup>80</sup> The NLCS encompassed national monuments, wilderness study areas, and components of the National Wilderness Preservation System.<sup>81</sup> In 2009, Congress ratified the administratively created NLCS into law, directing that “[i]n order to conserve, protect, and restore nationally significant landscapes that have outstanding cultural, ecological, and scientific values for the

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<sup>78</sup> *Id.*

<sup>79</sup> “Proposed Joint Fossil Regulation for Interior Department’s Managed Lands” United States Department of the Interior, Press Release (December 7, 2016).

<sup>80</sup> 153 Cong. Rec. 4678 (2007).

<sup>81</sup> 16 U.S.C. § 7202(b)(1) (2012).

benefit of current and future generations, there is established in the Bureau of Land Management the National Landscape Conservation System.”<sup>82</sup> In codifying the NLCS into law, Congress directed that the Secretary of the Interior must manage lands within the system “in a manner that protects the values for which the components of the system were designated.”<sup>83</sup>

Paleontological resources have repeatedly been identified as objects to be protected in national monument proclamations due to the “important opportunities for further archaeological and paleontological study”<sup>84</sup> and the “scientific values” that they provide.<sup>85</sup> Both Grand Staircase-Escalante and Bears Ears national monuments were created in large part due to the significance of paleontological resources located on within their boundaries: “The paleontological resources in the Bears Ears area are among the richest and most significant in the United States, and protection of this area will provide important opportunities for further archaeological and paleontological study.”<sup>86</sup> The Grand Staircase-Escalante National Monument similarly includes “world class paleontological sites, . . . [including e]xtremely significant fossils, including marine and brackish water mollusks, turtles, crocodilians, lizards, dinosaurs, fishes, and mammals”<sup>87</sup> Permitting the destruction, defacement, or removal of these objects from a national monument would be inconsistent with the “values for which [those monuments] were

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<sup>82</sup> 16 U.S.C. § 7202 (a).

<sup>83</sup> 16 U.S.C. § 7202(c)(2).

<sup>84</sup> See e.g., Proclamation No. 9558, *supra* note 13, at 1140-41 (Bears Ears); and Proclamation No. 6920, *supra* note 13 at 50223-24 (Grand Staircase-Escalante).

<sup>85</sup> Proclamation No. 9558, *supra* note 13, at 1143.

<sup>86</sup> *Id.* at 1141.

<sup>87</sup> Proclamation No. 6920, *supra* note 13 at 50223.

designated” and therefore inconsistent with the BLM’s statutory mandate.<sup>88</sup> But when lands are removed from the NLCS these objects lose the protections afforded by NLCS status.

At both Bears Ears and the Grand Staircase-Escalante national monuments, this means that vast stretches of the BLM managed landscape lost protection when President Trump shrank the monuments. Only plant and invertebrate fossils on lands that are part of a wilderness study area, national scenic or historic trail, or wild and scenic river remain part of the NLCS and subject to the protections those designations provide—and that is a small fraction of this one protected and irreplaceable landscape.

#### **D. Petrified Wood**

A similar situation arises with respect to petrified wood. Under PRPA, “paleontological resource” include “any fossilized remains, traces, or imprints of organisms, preserved in or on the earth’s crust, that are of paleontological interest and that provide information about the history of life on earth.”<sup>89</sup> Under USFS regulations, fossils are the “fossilized remains, traces, or imprints of organisms, preserved in or on the Earth’s crust.”<sup>90</sup> Petrified wood is defined under federal law as “agatized, opalized, petrified, or silicified wood, or any material formed by the replacement of wood by silica or other matter.”<sup>91</sup>

Despite PRPA’s broad statutory language and similarly broad language in USFS regulations, the USFS states that for purposes of its PRPA regulations, petrified wood is not a

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<sup>88</sup> 16 U.S.C. § 7202(c)(2) (2012).

<sup>89</sup> 16 U.S.C. § 470aaa(4) (2012).

<sup>90</sup> 36 C.F.R. § 291.5 (2017).

<sup>91</sup> 30 U.S.C. § 611 (2017).

paleontological resource unless defined as such by the Authorized Officer using “scientific principles and expertise.”<sup>92</sup> The Department of the Interior takes a similarly dim view of petrified wood. In its draft PRPA regulations, the Department indicated that:

[P]etrified wood may be managed as a paleontological resource, but the savings provisions in PRPA (16 U.S.C. § 470aaa-10) prevent the imposition of additional restrictions on the sale or free use of petrified wood. When it is not subject to sale or free use, petrified wood on BLM-administered lands may be managed as a paleontological resource and/or under the authority of FLPMA.<sup>93</sup>

These regulations, however, were never finalized. Under existing Department of the Interior regulations, “[a]ll public lands administered by the Bureau of Land Management . . . are open to or available for free use removal of petrified wood unless otherwise provided for by notice in the Federal Register.”<sup>94</sup> Up to 250 pounds of free petrified wood may be removed from BLM managed lands annually, provided that removal is for personal use only, not accomplished using heavy equipment, and that collection “prevents hazards to public health and safety, and minimizes and mitigates environmental damage.”<sup>95</sup> Removals for commercial or research purposes may also be authorized by the designated official.<sup>96</sup>

The 1996 proclamation establishing the Grand Staircase-Escalante National Monument indicates that the Circle Cliffs area of the monument contains “remarkable specimens of petrified wood, such as large unbroken logs exceeding 30 feet in length.”<sup>97</sup> Other sources describe the

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<sup>92</sup> 36 C.F.R. §§ 291.9(b) and (d)(2) (2017).

<sup>93</sup> 81 Fed. Reg. 88173, 88175 (2016).

<sup>94</sup> 43 C.F.R. § 3622.3(a) (2017).

<sup>95</sup> 43 C.F.R. § 3622.4(a).

<sup>96</sup> 43 C.F.R. § 3602.10 *et seq.* (2017).

<sup>97</sup> Presidential Proc. No. 6920, 61 Fed. Reg. 50223, 50223 (1996)

Circle Cliffs portion of the monument as containing the “second largest fossil forest of its age [225-million years old] in North America,” with logs up to 100 feet long and 1.5-3 feet in diameter.<sup>98</sup> Very large unbroken logs, some in excess of 20 feet, are also found in the Bears Ears National Monument.<sup>99</sup> Unbroken pieces are difficult to find now, in part due to years of casual collection.

President Clinton identified petrified wood as a resource justifying designation of the Grand Staircase-Escalante National Monument,<sup>100</sup> but petrified wood is not mentioned in the Bears Ears proclamation. USFS regulations create a presumption that petrified wood is not protected on USFS lands, and the only USFS managed lands within the original Bears Ears or Grand Staircase-Escalante areas were within Bears Ears, where petrified wood was not specifically called out for protection.

The question of protection for petrified wood becomes more complicated on BLM managed lands. Congress, as discussed above, included national monuments in the NLCS,<sup>101</sup> and expressly directed that lands within the NLCS be managed “in a manner that protects the values for which the components of the system were designated.”<sup>102</sup> Removal of petrified wood from a monument would conflict with protection of those values, so casual collection was arguably not permitted within the monument. But removal of public lands from a national monument also

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<sup>98</sup> Sidney Ash, *The Wolverine Petrified Forest*, 35-3 UTAH GEOLOGICAL SURVEY, SURVEY NOTES 3 (Aug. 2003).

<sup>99</sup> Personal communication, M. Allison Stegner, University of Wisconsin-Madison, Dept. of Integrative Biology (May 20, 2018).

<sup>100</sup> Proclamation No. 6920, *supra* note 13 at 50223.

<sup>101</sup> 16 U.S.C. § 7202(b) (2012).

<sup>102</sup> 16 U.S.C. § 7202(c).

eliminates them from the NLCS. It appears that the petrified wood located in the Circle Cliffs area of the Grand Staircase-Escalante National Monument and identified in President Clinton's proclamation is outside of the revised monument boundaries and therefore no longer part of the NLCS. Because petrified wood on BLM managed lands is not afforded independent protections, the petrified trees identified in President Clinton's proclamation therefore now appear to be available for free non-commercial use and removal.

### **E. Tracks and Impressions**

Tracks and impressions left by prehistoric organisms pose yet another set of unique challenges. "[P]aleontological resources" under PRPA include "any fossilized remains, traces, or imprints of organisms,"<sup>103</sup> and under PRPA, casual collection is limited to "common invertebrate and plant paleontological resources."<sup>104</sup> This language appears to necessarily exclude tracks or imprints left by dinosaurs or other vertebrate animals from casual collection, as they are neither invertebrate or plant resources. The United States has, moreover, twice brought criminal charges against individuals who attempted to misappropriate dinosaur tracks.<sup>105</sup>

Despite what appears to be a clear prohibition against the removal of dinosaur tracks and criminal prosecution of individuals who engage in such behavior, the BLM has posted to its web page what it calls "Rules for Casual Collection."<sup>106</sup> These "rules" state that "[c]ommon

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<sup>103</sup> 16 U.S.C. § 470aaa(4) (2012).

<sup>104</sup> 16 U.S.C. §§ 470aaa(1) and 470aaa-3(2).

<sup>105</sup> *See* Indictment at 2, *United States v. Ehlers*, No. 2:14-cr-00126 (D. Utah, March 12, 2014); Felony Information at 1, *United States v. Cowan*, 2:11-cr-00576 (D. Utah, July 8, 2011).

<sup>106</sup> Bureau of Land Mgmt., Dept. of the Interior, Rules for Casual Collection [www.blm.gov/programs/cultural-heritage-and-paleontology/paleontology/rules-for-casual-collection](http://www.blm.gov/programs/cultural-heritage-and-paleontology/paleontology/rules-for-casual-collection) (last visited March 30, 2018).

invertebrate fossils include the fossilized remains of animals without a backbone, including snails, oysters, ammonites, corals, shellfish, and others. This also includes different types of preservation of animals in rock, *including tracks, traces, burrows, impressions*, and original hardparts.”<sup>107</sup> Notably, these “rules for casual collection” contain no legal citation or source information, and appear to have been issued without notice and comment rulemaking. They do, however, reflect the information that is most readily accessible to the public.

It may be that whether a track, trace, burrow, or impression would be subject to casual collection depends on whether it was made by a vertebrate animal. But while such an interpretation may make sense, it is far from guaranteed in light of the language contained in the “rules for casual collection.” Members of the public who rely on a good-faith interpretation of the “rules for casual collection” could find themselves subject to felony criminal charges, or the Justice Department may dismiss charges because casual collectors reasonably relied on inaccurate information provided by the BLM. Either outcome would be regrettable, and this information could result in loss of irreplaceable resources.

#### **IV. Negative Impacts Resulting from National Monument Reductions**

Without the protections afforded by national monument designations, plant and invertebrate fossils located on lands that are excluded from a national monument will be vulnerable to casual collection. Private collectors that remove fossils for their personal use deprive the public of the scientific and cultural value of these objects. Collectors without professional training may also inadvertently damage surrounding geology which contributes to

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<sup>107</sup> *Id.* (emphasis added).



our contextual understanding of long extinct resources. Commercial exploitation of mineral resources contained on the more than two million acres of land that were excluded from the Bears Ears and Grand Staircase-Escalante national monuments may also place paleontological resources at risk.

**A. Risks Posed by Private Collectors**

Unauthorized and inadequately trained collectors may pose the most immediate threat to paleontological resources. “The Morrison Formation of BENM has been hard-hit by illegal fossil collection over the last several decades, with numerous looted sites discovered by the most cursory BLM surveys in 2016.”<sup>108</sup> Invertebrate and plant fossils are subject to unique risks because casual collection of those resources is expressly permitted under PRPA. Plant and invertebrate fossils removed from federal land under PRPA’s casual collection provision are, moreover, not removed by “permit,”<sup>109</sup> and not required to be “deposited in an approved repository.”<sup>110</sup> Plant and invertebrate fossils that are removed from public lands are therefore lost to scientific inquiry.

Collection of fossils in the United States harkens back to the early 19th century, as exemplified by Othniel Charles Marsh and Edward Drinker Cope.<sup>111</sup> These early collectors illustrate the risks associated with excavations, as the two often destroyed valuable fossils in

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<sup>108</sup> Uglesich et al., *supra* note 44 at 11.

<sup>109</sup> 16 U.S.C. § 470aaa-3(a) (2012).

<sup>110</sup> 16 U.S.C. § 470aaa-4.

<sup>111</sup> Chew, *supra* note 36, at 1031 (citing Brent H. Breithaupt, *Railroads, Blizzards, and Dinosaurs: A History of Collecting in the Morrison Formation of Wyoming During the Nineteenth Century*, 23 MOD. GEOLOGY 441, 455 (1998)).

their haste to collect them.<sup>112</sup> Collectors without proper training or experience may similarly damage the fossils they are attempting to collect or the surrounding geology, which could provide important contextual information.<sup>113</sup> This occurred in the 1990's when untrained collectors damaged invaluable *Albertosaurus* bones during an excavation.<sup>114</sup>

A more recent example strikes even closer to the recently reduced Utah monument. In early 2018, the WASHINGTON POST reported the discovery of “[o]ne of the world’s richest troves of Triassic-period fossils” in an area that had recently been eliminated from the Bears Ears National Monument.<sup>115</sup> The site, which represents the “largest and most complete bone bed in the state of Utah, and one of, if not the largest, anywhere in the United States” had been looted before the scientists ever arrived.<sup>116</sup> The paleontologists who were permitted to excavate the site, which contains fossils of a long-extinct crocodile-like creature called a phytosaur, found plaster that had been made to encase a portion of a skull. “They broke off the skull,” the paleontologists

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<sup>112</sup> *Id.* For example, an employee under the control of Marsh was alleged to have blown up a quarry containing valuable fossils, or at least buried it and thus preventing excavation for over 100 years. Genevieve Rajewski, *Where Dinosaurs Roamed*, SMITHSONIAN (May 2008), [www.smithsonianmag.com/history/where-dinosaurs-roamed-36987235/](http://www.smithsonianmag.com/history/where-dinosaurs-roamed-36987235/).

<sup>113</sup> Chew, *supra* note 36, at 1031.; *see also* Hanneke Meijer, *To Collect or Not to Collect: Are Fossil-Hunting Laws Hurting Science?*, THE GUARDIAN, July 27, 2016, [www.theguardian.com/science/2016/jul/27/to-collect-or-not-to-collect-are-fossil-hunting-laws-hurting-science](http://www.theguardian.com/science/2016/jul/27/to-collect-or-not-to-collect-are-fossil-hunting-laws-hurting-science).

<sup>114</sup> Carol Potera, *Amateur Fossil Hunters Dig Up Trouble in Montana*, 268 SCIENCE 198, 198 (1995).

<sup>115</sup> Darryl Fears & Juliet Eilperin, *Spectacular FOSSILS FOUND at Bears Ears — Right Where Trump Removed Protections*, WASHINGTON POST Feb. 22, 2018, [www.washingtonpost.com/news/speaking-of-science/wp/2018/02/22/spectacular-fossils-found-at-bears-ears-right-where-trump-removed-protections/?noredirect=on&utm\\_term=.63b4397525f8](http://www.washingtonpost.com/news/speaking-of-science/wp/2018/02/22/spectacular-fossils-found-at-bears-ears-right-where-trump-removed-protections/?noredirect=on&utm_term=.63b4397525f8).

<sup>116</sup> *Id.*

said of the amateurs who robbed the site. “They didn’t even take the whole skull. Also, they missed the entire rest of the animal and several other animals laying on top of it and hundreds and hundreds of bones laying across the slope.”<sup>117</sup> But unlike most cases of looting, the BLM had recovered the fossils a decade earlier when the collector surrendered the skull to a BLM office in Arizona. The team matched the fossil to the recent Bears Ears findings, proving that it came from the same site.<sup>118</sup>

Recovery of the phytosaur skull, which was excavated from Utah and turned over to the BLM in Arizona, highlights another important issue. Valuable contextual information can be lost whenever fossils are removed from the area where they are found.<sup>119</sup> Without being able to identify where a fossil was located, it is more difficult for scientists to accurately discern what time period the organism would have lived in and what its environment may have looked like.<sup>120</sup> Fossils collected by individual collectors are also less likely to end up in public museums or universities where the resources are available for scientific investigation.<sup>121</sup> Because PRPA penalizes the sale of fossils collected on public lands,<sup>122</sup> individual collectors are also more likely to retain the objects they collect, thus limiting access by paleontologists and other members of the public.<sup>123</sup>

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<sup>117</sup> *Id.*

<sup>118</sup> *Id.*

<sup>119</sup> *See* Chew, *supra* note 36, at 1033 (citing congressional records regarding the significance of a fossil’s contextual information).

<sup>120</sup> *Id.* at 1034.

<sup>121</sup> Sakurai, *supra* note 30, at 206.

<sup>122</sup> 16 U.S.C. § 470aaa-5 (a)(3).

<sup>123</sup> *See* Meijer, *supra* note 113.

Plant and invertebrate fossils, though generally more common than vertebrate fossils,<sup>124</sup> remain rare and irreplaceable items with inherent scientific and cultural value.<sup>125</sup> Invertebrates were a dominant feature of life on earth for much of the history of life. Vertebrate animals did not leave the water until approximately 400 million years ago, while the oldest fossils are about 3.5 billion years old. Plant and invertebrate fossils therefore tell a much longer story than vertebrate fossils do.<sup>126</sup> Invertebrate fossils are also used to identify the sources of terrestrial lifeforms and the environments they adapted to over millions of years of evolutionary change.<sup>127</sup> Invert and plant fossils have also been critical to understanding the Big Five mass extinctions. Plants fossils are one of the important lines of evidence for understanding the causes of the Cretaceous extinction, which wiped out the dinosaurs, and how life recovered after the bolide impact. The Ordovician, Devonian, and Permian extinctions are recognized largely through the marine invertebrate fossil record.<sup>128</sup>

Paleontologists studying plant fossils have also developed methods of discerning the climate within which those organisms lived in and how they have changed over time.<sup>129</sup> Plant

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<sup>124</sup> “[A]lmost all animals found as fossils . . . anywhere . . . are invertebrates.” *Invertebrate Fossils*, Sam Noble Museum, <http://samnoblemuseum.ou.edu/common-fossils-of-oklahoma/invertebrate-fossils/> (last visited Feb. 28, 2018).

<sup>125</sup> Chew, *supra* note 36, at 1034 n.25.

<sup>126</sup> M. Allison Stegner, *supra* note 99.

<sup>127</sup> David Jablonski, *Evolutionary Innovations in the Fossil Record: The Intersection of Ecology, Development, and Macroevolution*, 304 J. EXPERIMENTAL ZOOLOGY 504, 505 (2005).

<sup>128</sup> M. Allison Stegner, *supra* note 99.

<sup>129</sup> See, e.g., Volker Mosbrugger & Torsten Utescher, *The Coexistence Approach – A Method for Quantitative Reconstructions of Tertiary Terrestrial Palaeoclimate Data Using Plant Fossils*, 134 PALEO 61, 62 (1997); Robert Spicer & Alexei Herman, *The Late Cretaceous Environment of the Arctic: A Quantitative Reassessment Based on Plant Fossils*, 295 PALEO 423, 423 (2010).

fossils similarly help scientists identify how different biomes—specific types of habitats—came into existence and developed over time.<sup>130</sup> Of significant relevance to scientists studying contemporary climate change, plant fossils provide valuable information on how temperatures fluctuated over time with levels of carbon dioxide in the atmosphere.<sup>131</sup> Thus, invertebrate and plant fossils are instrumental to scientists studying evolution and climate change, and their loss will have a lasting impact.

### **B. Risk Posed by Mineral Development**

The second threat to invertebrate and plant fossils no longer located on national monument lands comes from mineral development. The proclamations originally designating both the Bears Ears and Grand Staircase-Escalante national monuments withdrew the lands contained within both monuments from availability for future mineral leasing or development.<sup>132</sup> In reducing Bears Ears and the Grand Staircase-Escalante national monuments, President Trump reversed these withdrawals and made the more than two million acres of excluded lands “open to . . . disposition under all laws relating to mineral and geothermal leasing; and location, entry, and patent under the mining laws.”<sup>133</sup> Indeed, prior to the reductions, private mining companies

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<sup>130</sup> R. Toby Pennington, Quentin C. B. Cronk and James A. Richardson, *Introduction and Synthesis: Plant Phylogeny and the Origin of Major Biomes*, 359 ROYAL SOCIETY 1450, 1455–56 (2004).

<sup>131</sup> See Generally ChuanBiao Wan et al., *Trend of Santonian (Late Cretaceous) Atmospheric CO<sub>2</sub> and Global Mean Land Surface Temperature: Evidence from Plant Fossils*, 54 SCI. CHINA EARTH SCI. 1338 (2011).

<sup>132</sup> Proclamation No. 1143, *supra* note 13 at 1143, and Proclamation No. 6920, *supra* note 13 at 50225.

<sup>133</sup> Proclamation No. 9681, *supra* note 16 at 58085, and Proclamation No. 58093, *supra* note 13.

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lobbied the Department of the Interior to reduce the boundaries of both monuments,<sup>134</sup> seeking to obtain access to natural resources that are located within the monuments.<sup>135</sup>

Currently, any U.S. citizen interested in mining for most non-hydrocarbon minerals can stake a claim under the 1872 Mining Act.<sup>136</sup> Other common minerals, like sand and gravel, are available from the BLM via a sales contract or a free-use permit entered into pursuant to the Common Varieties Act of 1947.<sup>137</sup> Oil, natural gas, and coal that are found on or beneath federal land are also available for lease in accordance with the Mineral Leasing Act of 1920.<sup>138</sup> The process for acquiring mineral rights under these three laws is beyond the scope of this paper. For this analysis it is enough to recognize that lands excluded from the two national monuments are now open to development unless mineral development is precluded by other laws such as the Wilderness Act.

In the event that resource extractors obtain permits to mine lands excluded from the monuments, fossil resources may be damaged or destroyed. For example, much of the Tropic Shale, “a roughly 94-million-year-old swath of rock” which is part of the Kaiparowits Plateau

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<sup>134</sup> Darryl Fears and Juliet Eilperin, *Spectacular FOSSILS FOUND at Bears Ears — Right Where Trump Removed Protections*, WASH. POST (Feb. 22, 2018), [www.washingtonpost.com/news/speaking-of-science/wp/2018/02/22/spectacular-fossils-found-at-bears-ears-right-where-trump-removed-protections/?utm\\_term=.4d1e546c52b7](http://www.washingtonpost.com/news/speaking-of-science/wp/2018/02/22/spectacular-fossils-found-at-bears-ears-right-where-trump-removed-protections/?utm_term=.4d1e546c52b7).

<sup>135</sup> *Id.*; see also Juliet Eilperin, *Uranium Firm Urged Trump Officials to Shrink Bears Ears National Monument*, WASH. POST (Dec. 8, 2017), [www.washingtonpost.com/national/health-science/uranium-firm-urged-trump-officials-to-shrink-bears-ears-national-monument/2017/12/08/2eea39b6-dc31-11e7-b1a8-62589434a581\\_story.html?utm\\_term=.c012fbcdab1b](http://www.washingtonpost.com/national/health-science/uranium-firm-urged-trump-officials-to-shrink-bears-ears-national-monument/2017/12/08/2eea39b6-dc31-11e7-b1a8-62589434a581_story.html?utm_term=.c012fbcdab1b).

<sup>136</sup> 30 U.S.C. §§ 21—42 (2017).

<sup>137</sup> 30 U.S.C. §§ 601—02 (2012) and 43 C.F.R. Part 3600 (2017).

<sup>138</sup> 30 U.S.C. §§ 181-241 (2012).

and the site of a prospective natural gas development, now lies outside of the Grand Staircase-Escalante National Monument.<sup>139</sup> If shale gas development is allowed to take place in this area, it could “splinter[] all the fossils in it and eras[e] all the geochemical signals that tell us about the extinction, the chemistry of the time.”<sup>140</sup> Similarly, gas drilling and fracking in other areas has the potential of fragmenting fossils and altering the sediment they exist in.<sup>141</sup> This, in turn, could rob scientists of the information they need to draw a coherent and accurate picture of the past from the scraps that remain. More common mineral development, such as sand and gravel mining, could also impact plant and invertebrate fossils.

## **V. Conclusion**

Fossils, like prominent landscapes, rare plant and animal fauna, and the ruins of indigenous civilizations, are a part of America’s, and the world’s, heritage. Because of their inherent scientific and cultural value, fossils have been rightly considered objects worthy of protection in national monument designations. However, the scientific and cultural value of plant and invertebrate fossils are at risk due to recent reductions to the boundaries of national monuments that were established in part to protect those very same resources. Unlike vertebrate fossils, plant and invertebrate fossils are not subject to the categorical protections afforded by statutes such as PRPA and remain vulnerable to casual collection by the general public. It is simply false to say, as President Trump and others have claimed, that these resources are

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<sup>139</sup> Fears and Eilperin, *supra* note 134.

<sup>140</sup> *Id.*

<sup>141</sup> Complaint for Declaratory and Injunctive Relief at 34, Grand Staircase Escalante Partners v. Trump, No. 17-2591 (D D.C. Dec. 4, 2017).

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adequately protected by other laws and therefore unworthy of national monument status.