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The Dinosaur in the Living Room: A Proposal to Enable Academic Access to Fossils Discovered on Private Land

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The United States has been a major source of scientifically significant paleontological discoveries over the course of its history. In addition to invaluable primary source material for the study of evolution and climate change, American paleontology has additionally been invoked as symbols of American power since the founding of the country. Even though fossils are prominent national heritage, the United States today only uniformly regulates their excavation and use on federal public lands through the Paleontological Resources Preservation Act. When fossils are discovered on private land, landowners and those with whom they contract often sell them to private collectors, which can lead to research quality specimens becoming inaccessible to museums and universities seeking to research or publicly display them. This Note will use the discovery and litigation over the Dueling Dinosaurs, fossils of two dinosaurs preserved in combat, as a case study to demonstrate the current futility of legal action in providing for scientific access. This Note will argue that the federal government should pass a Model Act that provides universities and museums the opportunity to appeal for a delay in the sale for scientifically significant

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specimens that would allow an institution to have temporary custody over the material. Such a proposal should not be subject to just compensation under eminent domain law because of the financial benefit landowners should receive from affiliation with and analysis from such an institution.

INTRODUCTION

For two years, amateur fossil hunter James Kennedy stored what may be the "oldest, most spectacular and rare work of art in the Americas" under his kitchen sink.[1] While cleaning his fossil collection in 2009, Kennedy spotted a small carving of a mastodon on a piece of mammal bone and subsequently showed it to Dr. Barbara Purdy of the University of Florida.[2] After three years of testing, she published an article in the *Journal of Archaeological Sciences* dating the specimen as at least 13,000 years old.[3] This find offers novel evidence that humans lived in modern-day Florida during the last Ice Age alongside now-extinct mammals such as mastodons.[4] Kennedy also briefly loaned the bone to the Vero Beach Museum of Art, where busses ferried hundreds of local school children for a visit.[5] Though Kennedy stated that he wanted the bone to

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1 Cara Fitzpatrick, *Prehistoric Vero Beach Carving May Be Americas' Oldest Artwork – So What's Its Price?*, THE PALM BEACH POST (Mar. 31, 2012), https://www.palmbeachpost.com/article/20100308/NEWS/812035388 [https://perma.cc/N2J2-XAVN].

2 Greg Allen, *Florida Fossil Hunter Gets Credit for Big Find*, NPR (July 25, 2011), https://www.npr.org/2011/07/25/137549198/florida-fossil-hunter-gets-credit-for-big-find [https://perma.cc/Q5N6-6D22].

3 *See id.*

4 *See* Fitzpatrick, *supra* note 1.

5 *Vero Bone with Ice Age Etching Is Sold to an Out of State Trust*, VERONEWS.COM (Mar. 21, 2013), http://veronews.com/2013/03/21/vero-bone-with-ice-age-etching-is-sold-to-an-out-of-state-trust-3/ [https://perma.cc/3X87-XG9S] [hereinafter *Vero Bone*].

ultimately reside in a museum, he rejected an offer of $80,000 from the University of Florida because it "paled next to the others."[6] He eventually sold it to a private buyer for an undisclosed amount in 2013.[7] Upon learning of the sale, Dr. Purdy stated, "I looked in the dictionary and could find no suitable words to describe my feelings" because "the individual [Kennedy] wins, [and] the rest of us lose."[8]

Compared to finders of other notable discoveries in the United States, however, Kennedy was actually quite generous with the access he provided Dr. Purdy and the public. In 2006, Clayton Phipps unearthed the remains of a twenty-two-foot long carnivorous *tyrannosaur* and its twenty-eight-foot long herbivorous *ceratopsid* prey "[l]ocked in mortal combat…." on the property of Mary Ann and Lige Murray.[9] Commonly called the 'Dueling Dinosaurs,' these fossils are scientifically significant because many believe the *ceratopsid* represents a new species and this find is one of only two known occurrences in paleontology where predator and prey were preserved together.[10] Moreover, the fossils themselves are in remarkable condition: they retain some preserved soft tissue, including skin; they were almost entirely complete; and they were in their natural positions.[11] In 2013, the Murrays consigned them to the auction house Bonhams.[12] The auction estimate was $7–9 million, which, if realized, could have set a record for fossil sales; however, the highest bid was $5.5 million, below the $6 million reserve price.[13] Beginning in 2014, the Murrays have been engaged in litigation with the owners of the mineral estate over the fossils'

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6 *See id.*

7 *Fossil Hunter Says 2nd Etched Ice Age Bone Unearthed*, VERONEWS.COM (Mar. 30, 2014), http://veronews.com/2014/03/30/fossil-hunter-says-2nd-etched-ice-age-bone-unearthed/ [https://perma.cc/W9K4-QCLD].

8 *See Vero Bone*, *supra* note 5.

9 Mike Sager, *Will the Public Ever Get to See the "Dueling Dinosaurs"?*, SMITHSONIAN MAG. (July 2017), https://www.smithsonianmag.com/science-nature/public-ever-see-dueling-dinosaurs-180963676/ [https://perma.cc/S9KR-QJVM].

10 *Id.*

11 *Id.*

12 Raphael Rosen, *Dueling Dinosaurs Hit the Auction Block*, EARTH MAG. (June 9, 2014), https://www.earthmagazine.org/article/dueling-dinosaurs-hit-auction-block [https://perma.cc/9AN3-HGKK].

13 *See id.*; Murray v. Billings Garfield Land Co., 187 F. Supp. 3d 1203, 1205 (D. Mont. 2016).

rightful ownership.[14] As of 2019, the Dueling Dinosaurs were still locked in a "secret storage room" inaccessible to academics or the public. As a result, "[t]he number of people who have seen the fossils remains in the low double digits."[15] The Dueling Dinosaurs may still be purchased by a museum,[16] but, if not, the public and academia will have lost a chance to learn about these specimens, despite them sitting dormant for nearly a decade before litigation even began.[17]

As relevant to this Note, Kennedy and Phipps both unearthed their specimens on private land with the landowner's consent.[18] They consequently had authority over its eventual home because United States law grants landowners all rights over paleontological and archaeological objects traditionally associated with private property, including the rights to sell and destroy, regardless of their scientific significance.[19] Whether the specimen will enhance the scientific record and public knowledge is thus a passive function of the landowners' actions, or those with whom they choose to contract. If landowners only choose to present their highly publicized discoveries to an open market, then there is a high likelihood that the specimen will instead become the centerpiece in a millionaire's living room and remain inaccessible to the rest of the world.[20] The public and scientists only had the opportunity to learn about the Florida mastodon etching because of a stroke of luck—Kennedy,

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14 *See infra* Section II.B.

15 *See* Sager, *supra* note 9; Phillip Pantuso, *Perhaps the Best Dinosaur Fossil Ever Discovered. So Why Has Hardly Anyone Seen It?*, THE GUARDIAN (July 17, 2019), https://www.theguardian.com/science/2019/jul/17/montana-fossilized-dueling-dinosaurs-skeletons-dino-cowboy [https://perma.cc/5D6X-VYL9]; Warren Cornwall, *Court Rules 'Dueling Dinos' Belong to Landowners, in a Win for Science*, SCIENCE MAG. (May 22, 2020), https://www.sciencemag.org/news/2020/05/court-rules-dueling-dinos-belong-landowners-win-science [https://perma.cc/2LZK-TNTT]. As of May 2020, the Murrays had an agreement to sell the fossils to a museum. As of publication, there is no further information on the status of this deal.

16 *See infra* text accompanying note 254.

17 *See* Sager, *supra* note 9.

18 *See* Fitzpatrick, *supra* note 1; Pantuso, *supra* note 15.

19 *See infra* Section II.A.

20 *See infra* text accompanying notes 109–15. *See generally* Richard Conniff, *Inside the Homes (and Minds) of Fossil Collectors*, NAT'L GEOGRAPHIC, https://www.nationalgeographic.com/culture/2019/09/dinosaur-fossils-collector-feature/ [https://perma.cc/E79C-CT79].

unlike Phipps, was willing to cooperate prior to sale.[21] The current reality that academic knowledge of such important discoveries is left to the whims of their finders therefore raises the question of whether or not relevant property laws should be changed.

The proper use and home for paleontological material are highly contentious debates with numerous stakeholders. Whereas paleontologists value the specimens themselves and surrounding contextual rocks for their ability to teach about past ecosystems and biodiversity, commercial fossil hunters, dealers, and landowners prize the specimens for their financial possibilities.[22] From the commercial fossil company's perspective, the objective is to find, collect, and prepare the most attractive specimens for the market to profit from cash and labor heavy expeditions.[23] Meanwhile, landowners typically contract prospecting and digging rights to commercial fossil hunters as a supplemental means of income.[24] Landowners and commercial fossil hunters thus have a property interest in potentially lucrative specimens, which sits in tension with the idea that these subterranean treasures comprise part of our national heritage. Due to these clashing viewpoints, few today are pleased with the current regime wherein collection of paleontological material is only prohibited on federal land. Paleontologists typically argue that the law is insufficient in scope while commercial dealers claim that the law broadly creates "private sandbox[es]" accessible only to those who are "qualified."[25]

This Note will argue that the United States' current legal framework is flawed by not mandating academic or public access to scientifically significant discoveries before sale due to their cultural and scientific value. This Note proposes instituting an appeals process by which museums and universities can request temporary

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21 Kennedy, however, reported afterwards that he became disenchanted with the arrangement as time passed. He claimed to have found a second etched bone but would not permit any testing because "of all the garbage [he] went through with the first one." *See supra* note 7.

22 *See infra* Section I.B.

23 *See* Alexa Chew, *Nothing Besides Remains: Preserving the Scientific and Cultural Value of Paleontological Resources in the United States*, 54 DUKE L.J. 1031, 1033–34 (2004).

24 *See infra* Section I.B.

25 Heather Pringle, *Selling America's Fossil Record*, 343 SCI. 364, 367 (2014).

access to unique specimens that can contribute to the paleontological record for scientific analysis and public display. Part I will provide an overview of paleontology as a discipline and demonstrate that existing laws do not reach material unearthed on private land. Part II will show that the current system is problematic because it impedes the study of evolution, mitigation of climate change, and preservation of a foundational form of American national heritage. Addressing potential constitutional concerns with the Note's proposed solution, Part III will argue that the proposed appeal process for academic and public access does not constitute a taking through eminent domain requiring just compensation because of its temporary nature. Rather than violating landowners' constitutional rights, implementing this proposal would allow academic institutions to obtain limited access to monumental discoveries, which would demonstrate a commitment to public education and shared scientific heritage.

I. STAKEHOLDERS AND LAWS OF PALEONTOLOGY

The United States is the source of some of the most impressive dinosaur discoveries in the world, which has prompted leaders to invoke paleontology as a national symbol of power. Nevertheless, only paleontological specimens unearthed on federal land are currently regulated in the United States by the Paleontological Resources Preservation Act. While state law sometimes regulates paleontological material found on state land, relevant statutes do not protect material originating on private land. As a result, trained scientists must compete first with commercial excavators for private land access and then with private buyers to purchase particularly significant, newsworthy discoveries. These two obstacles often hamper scientific institutions' efforts to gain access to recent finds, stultifying both scientific study and public education.

A. Paleontology in the United States

Paleontology is the history of study of life on Earth based on fossils of plants and animals to better understand the Earth's past

ecologically, evolutionarily, and climatologically.[26] Paleontology is distinct from anthropology and archaeology, which respectively study human remains and artifacts; paleontology is broader because it covers remains of all life forms and involves the study of materials as diverse as shells, tracks, bones, and wood.[27] In particular, paleontologists learn about dinosaur, mammal, and marine reptile diet and development by studying fossils, which are rocks at least 10,000 years old that provide evidence of prehistoric life.[28] Most animal remains, however, never actually fossilize because other organisms consume them or natural elements wear away the body before the process can begin.[29] The fossil record is therefore finite and spotty independent of any human activity.

The United States holds the record for the most dinosaur fossils ever discovered.[30] According to Paleobiology Database, a

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[26] *Paleontology: Examines the Dawn of Life to the Dawn of Civilization*, ENVIRONMENTALSCIENCE.ORG, https://www.environmentalscience.org/paleontology [https://perma.cc/U8ER-TA7K]. *See, e.g.*, Joseph Castro, *Archaeopteryx: The Transitional Fossil*, LIVE SCI. (Mar. 14, 2018), https://www.livescience.com/24745-archaeopteryx.html [https://perma.cc/B9TJ-9A53] (showing how *archaeopteryx* fossils explain the evolution of dinosaurs to birds); Mikael Fortelius et al., *Fossil Mammals Resolve Regional Patterns of Eurasian Climate Change over 20 Million Years*, 4 EVOLUTIONARY ECOLOGY RSCH. 1005 (2002) (studying mammal fossil teeth across Eurasia to model environmental aridity and comparing it to modern patterns).

[27] *See Paleontology vs. Archaeology vs. Anthropology*, PAESTA, https://www.paesta.psu.edu/book/earth-systems-science-introduction/definitions/paleontology-vs-archaeology-vs-anthropology [https://perma.cc/2V6V-S26F].; *Archaeology Program*, NAT'L PARK SERV., https://www.nps.gov/archeology/afori/whisar_eniv1.htm [https://perma.cc/9CSE-FMZF].

[28] *See Dinosaur Bones*, AM. MUSEUM OF NAT. HIST., https://www.amnh.org/dinosaurs/dinosaur-bones [https://perma.cc/4GZ5-HU5W].

[29] *See id.* Fossilization begins when sand or silt buries the animal shortly after death. After nature has decomposed the animal, only the bones, teeth, and horns remain. Over millions of years, water in the nearby rocks surrounds the preserved remains and slowly replaces the bones themselves, which produces a solid rock copy of the original specimen. Paleontologists select excavation sites by looking for these sedimentary rocks. *Id.*

[30] Hugh Morris, *Mapped: Every Dinosaur Fossil Ever Found in Britain*, THE TELEGRAPH (Apr. 3, 2018), https://www.telegraph.co.uk/travel/maps-and-graphics/where-to-find-dinosaur-fossils/ [https://perma.cc/4DUA-YDGL]. Recently, however, many discoveries celebrated by the media were found in China, Mongolia, and Argentina. *See* Sarah Laskow, *Why All the Cool New Dinosaurs Are from Asia and South America*, ATLAS OBSCURA (Oct. 9, 2015), https://www.atlasobscura.com/articles/why-all-the-cool-new-

non-governmental public resource for professional researchers to contribute paleontological discoveries, the United States was the source of 5,077 fossils as of 2018, easily beating Canada in second place with 1,444 finds.[31] The Southwest and Western Mountain States claim the most discoveries because of their arid climates, where erosion naturally peals away layers of rock and exposes lower layers of soil.[32] Similarly, deserts have little vegetation, which allows searchers to more easily spot and excavate fossil fragments.[33] Nevertheless, scientists have unearthed fossils beyond this region, specifically in thirty-six states as of 2015.[34] The United States also has the record for the highest price realized for a fossil worldwide: in 1997, one of the largest and most complete *tyrannosaurus rex* ever found sold for $8.4 million.[35] As this Note was heading to press, the United States further solidified this position after Christie's

dinosaurs-are-from-asia-and-south-america [https://perma.cc/YRV4-XFRV]; Paige Williams, *The Black Market for Dinosaurs*, NEW YORKER (June 7, 2014), https://www.newyorker.com/tech/annals-of-technology/the-black-market-for-dinosaurs [https://perma.cc/GUV2-N9PF].

31 *See* Morris, *supra* note 30; *Frequently Asked Questions*, THE PALEOBIOLOGY DATABASE, https://paleobiodb.org/#/faq [https://perma.cc/LAE2-JHAQ].

32 *See* Laskow, *supra* note 30.

33 Molika Ashford, *Where Are the Best Places to Find Dinosaur Fossils?*, LIVE SCI. (Sept. 24, 2010), https://www.livescience.com/32816-where-are-the-best-places-to-find-dinosaur-fossils.html [https://perma.cc/DZ7Y-DS4G].

34 *See* Craig Smith, *In Which States Are Dinosaur Fossils Found?*, SCIENCING, https://sciencing.com/in-which-states-are-dinosaur-fossils-found-12745564.html [https://perma.cc/2A6K-9UVZ]. The latest state to join is Washington. *See Introducing Washington's First Dinosaur*, BURKE MUSEUM (May 20, 2015), https://www.burkemuseum.org/news/introducing-washingtons-first-dinosaur [https://perma.cc/76XS-RMFH].

35 Black Hills Inst. of Geological Research v. S.D. Sch. of Mines & Tech., 12 F.3d 737, 739 (1993). *See* J. Freedom du Lac, *The T. Rex That Got Away: Smithsonian's Quest for Sue Ends with Different Dinosaur*, WASH. POST (Apr. 5, 2014), https://www.washingtonpost.com/local/the-t-rex-that-got-away-smithsonians-quest-for-sue-ends-with-different-dinosaur/2014/04/05/7da9a73c-b9a6-11e3-9a05-c739f29ccb08_story.html [https://perma.cc/7F92-87PX]; Shaena Montanari, *Sue the Celebrity Dinosaur Just Got a Makeover*, ATLAS OBSCURA (Dec. 21, 2018), https://www.atlasobscura.com/articles/sue-t-rex-dinosaur-field-museum [https://perma.cc/5R4U-Q73M]; *see infra* Section I.B for a greater discussion of the case.

sold a *tyrannosaurus Rex* first discovered in 1987 in South Dakota for $31.8 million dollars.[36]

Like the ruins of Italy, paleontology represents an aspect of American national heritage that has repeatedly been invoked as a symbol of the country.[37] The colonists, for example, used paleontological specimens as political capital in the years leading up to the nation's founding. In 1766, George Louis LeClerc, Comte de Buffon published the fifth volume of his natural history treatise titled "Theory of American Degeneracy" where he sought to understand why American animals were inferior to those elsewhere.[38] For the species the continents shared, he wrote that the New World versions were lesser in size and magnificence.[39] Similarly, the Old World people who travelled to the New World degenerated upon arrival: their blood became "watery" and they shrunk, weakened, or disappeared entirely.[40] Buffon's book was "read by virtually every educated person in Europe," while the colonists needed to rely on those same people for money, political support, and recruits in fighting the Revolutionary War.[41] In an era when many European naturalists were also aristocrats, they quoted Buffon to not only explain American animal behavior, but also to prove that the American experiment was doomed to fail.[42] The natural world of America became a symbol for its political and cultural insignificance.[43]

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[36] *See* Zachary Small, *T. Rex Skeleton Brings $31.8 Million at Christie's Auction,* N.Y. TIMES (Oct. 6, 2020), https://www.nytimes.com/2020/10/06/arts/design/t-rex-skeleton-brings-31-8-million-at-christies-auction.html; *One of the Largest T. Rex Skeletons Up for Auction at Christie's,* NBC NEWS (Sept. 16, 2020), https://www.nbcnews.com/science/science-news/one-largest-known-t-rex-skeletons-auction-christies-rcna121 [https://perma.cc/4QU2-FHJR].

[37] *See infra* text accompanying notes 44–49 and 54–58.

[38] Cara Giaimo, *Thomas Jefferson Built This Country on Mastodons*, ATLAS OBSCURA (July 2, 2015), https://www.atlasobscura.com/articles/thomas-jefferson-built-this-country-on-mastodons [https://perma.cc/ZH29-PKWW].

[39] *See id.*

[40] *Id.*

[41] *See id.*

[42] *See id.*

[43] *See* Andrea Wulf, *Thomas Jefferson's Quest to Prove America's Natural Superiority*, THE ATLANTIC (Mar. 7, 2016), https://www.theatlantic.com/science/archive/2016/03/jefferson-american-dream/471696/ [https://perma.cc/FP5U-3JSD].

Thomas Jefferson issued a rebuke in what would eventually become *Notes on the State of Virginia*.[44] He compiled a chart of animal sizes, in which the first entry was a mastodon (he referred to it as a 'mammoth') whose bones were as large as those found in the Old World; he similarly described the massiveness of the mastodon compared to modern elephants.[45] Jefferson used these data points to argue that the gigantic and diminutive animals in America all derive their stature from the conditions of the land, not heavenly interference.[46] By extension, if the land is capable of supporting great beasts then so too powerful, intelligent, and capable humans can thrive. The mastodons are vital in this argument; otherwise, Jefferson would be "stuck waxing poetic about hedgehogs and comparing the weights of European and American beavers."[47] The mastodons, in other words, grounded the American continent in stature that he masterfully used as a metaphor for the potential of the colonists and their fledgling country.[48] In part due to Jefferson's writings—and undeniably the victory in the Revolutionary War—claims of American degeneracy dwindled by the end of the eighteenth century.[49]

Over the course of the next century, the interest in mastodons waned in favor of a new American beast: dinosaurs. Scientists in England first discovered dinosaur fossils in the 1820s and 1830s, but these earliest beasts did not stand out in size among other large prehistorical creatures.[50] By contrast, in the closing decades of the nineteenth century, scientists unearthed what many observers considered larger and more imposing beasts in the American West, which catapulted the United States into a leadership position in

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44 THOMAS JEFFERSON, NOTES ON THE STATE OF VIRGINIA 49 (1787).

45 *See id.* at 40–41, 43, 49. The first known "mammoth" discovery in the colonies was in 1705 by a tenant farmer in New York. This early piece of paleontology too attracted much interest on both sides of the Atlantic, as Jefferson himself sent bits of mammoth fossils to European scientists to compare them to similar fossils. *See* Giaimo, *supra* note 37.

46 *See* JEFFERSON, *supra* note 43, at 45.

47 Giaimo, *supra* note 38.

48 *See id.*

49 *See id.*

50 LUKAS RIEPPEL, ASSEMBLING THE DINOSAUR: FOSSIL HUNTERS, TYCOONS, AND THE MAKING OF A SPECTACLE 5 (2019).

the field of vertebrate paleontology.[51] The collecting habits of the financial elites and industrialists of the era reflected this shift. Even though they coveted artwork from Europe, they agreed that Wyoming, Colorado, and Utah had the largest and most impressive dinosaur fossils for their natural history collections.[52]

While academic institutions quarried dinosaurs in the American West in the late nineteenth century, the United States was developing into an economic powerhouse and gaining recognition on the global stage.[53] Between the Civil War and the First World War, the United States' economic output grew to exceed that of England, France, and Germany combined.[54] American dinosaurs became outsize, material symbols of the power of the economy because the best specimens originated in the Western frontier as part of the extractive economy that dominated the region and transformed the country into a superpower.[55] The larger, fiercer, and more abundant American dinosaurs, as compared to their European counterparts, only bolstered the narrative of American exceptionalism.[56] Not only were dinosaurs a material symbol of American economic might, but historians have suggested that the beasts were ideologically emblematic of the new, ruthless, and conglomerated modern economy.[57] They accused natural history museums of naturalizing and justifying the competitiveness of modern capitalism—they contended that museum depictions of ferocious dinosaurs

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51 *See id.* at 5–6. In a serendipitous coincidence, scientists unearthed three large and recognizable dinosaur skeletons in the American West in the summer of 1877—*stegosaurus, brontosaurus,* and *allosaurus*. This was a significant turning point. *See id.* at 6.

52 *See id.* at 7.

53 *See id.* at 6.

54 *Id.*

55 *See id.* at 7.

56 *See id.*

57 *See id.* at 144. The literary scholar W.J. Thomas Mitchell was perhaps most forthright, writing that the period "so often portrayed as the era of 'social Darwinism,' 'economic survival of the fittest' [and] ruthless competition…is aptly summarized by the Darwinian icon of giant reptiles in a fight to the death." *Id.*

engaging in bloody struggles for survival promoted the idea that fierce competition is a fact of nature that predates human society.[58]

Today, American paleontology remains an aspect of American heritage that captivates a national and international audience. Paleontologists have identified and exported countless specimens from Wyoming alone to study and display as museum centerpieces since the late nineteenth century.[59] Not only do leading American natural history museums boast these imposing beasts, but Wyoming dinosaurs also represent the United States abroad in institutions in Switzerland, United Kingdom, France, Germany, Denmark, Japan, Singapore, Dubai, and Mexico.[60] Paleontology is not only a quintessential form of American scientific heritage, but also one with deep cultural value due to its repeated invocation as a symbol of American power. As a result, American natural history is today scientifically and financially valuable to many groups.

B. The Modern Paleontology Industry and Market

The modern paleontology market where dinosaur fossils command prices in the millions began in the summer of 1990 with the discovery of "Sue," one of the largest and most complete *tyrannosaurus rex* ever found.[61] In August 1990, Black Hills Institute, a commercial paleontology company, was exploring part of

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[58] *See id.* at 143. On the other hand, industrialist and philanthropist Andrew Carnegie invoked dinosaurs as symbols of peace. In 1899, Carnegie financed the expedition that led to the discovery of the *Diplodocus Carnegii,* one of the longest dinosaurs in existence. In the years leading up to World War I, he made plaster copies of the dinosaur that he provided to at least seven museums across Europe and Latin America as diplomatic gestures in effort to preserve peace. *See* ILJA NIEUWLAND, AMERICAN DINOSAUR ABROAD: A CULTURAL HISTORY OF CARNEGIE'S PLASTER DIPLODOCUS (2019). In the words of Carnegie's great grandson, "He used his gifts in an attempt to open inter state dialogue on preserving world peace – a form of Dinosaur diplomacy." *See* Chris McCall, *Dippy, 'the UK's Most Famous Dinosaur' Arrives at Kelvingrove Museum,* SCOTSMAN (Jan. 22, 2019, 3:39 PM), https://www.scotsman.com/regions/glasgow-and-strathclyde/dippy-uks-most-famous-dinosaur-arrives-kelvingrove-museum-1422466 [https://perma.cc/AFJ6-8UP4].

[59] THE BIG HORN BASIN FOUNDATION, WYOMING'S DINOSAUR DISCOVERIES 8 (2015).

[60] *See id.* at 19–34, 55–74, 78, 80.

[61] *See* du Lac, *supra* note 35. *But see* Steve Johnson, *Scotty vs. Sue: Is the Canadian T. Rex Really Bigger than Chicago's? The Field Museum Disputes New Study*, CHI. TRIB. (Mar. 29, 2019, 5:25 PM), https://www.chicagotribune.com/entertainment/museums/ct-ent-largest-t-rex-scotty-sue-0329-story.html [https://perma.cc/WX9P-83LX].

the Cheyenne River Sioux Reservation when team member Sue Hendrickson discovered the fossils.[62] The company purchased the right to excavate Sue from the Native American resident of the land, Maurice Williams.[63] In May 1992, however, federal officers seized the fossils from Black Hills Institute because the company allegedly violated the Antiquities Act of 1906 by removing the fossils from federal land.[64]

Williams, Black Hills Institute, and the federal government went to trial in 1993, where the district court ruled in favor of the United States; the Eighth Circuit affirmed.[65] The Eighth Circuit explained that the United States holds legal title in trust to Native American land for the individual actually residing there based on the Indian Reorganization Act of 1934.[66] As such, Williams lacked the absolute right to dispose of it as he pleased.[67] The central query of the case was whether fossils were real or personal property before excavation.[68] If they were real property, then the fossils were subject to the Indian Reorganization Act and could not be alienated; if personal property, then the Act is irrelevant and the contract between Black Hills Institute and Williams was valid.[69] The Eighth Circuit looked to state property law, where in South Dakota "land" was the solid material of the earth "whatever may be the ingredients of which it is composed, whether soil, rock, or other substance."[70] The Court ruled that fossils were "component part[s]" of the land because after sixty-five million years the "fossilized remains gradually became incorporated into that land."[71] Thus when the parties transacted prior to excavation, the fossils were real property that belonged to the United States in trust for Williams and they were

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62 Black Hills Inst. of Geological Research v. U.S. Dep't of Just., 967 F.2d 1237, 1238–39 (8th Cir. 1992).

63 *Id.* at 1239.

64 *Id.*

65 Black Hills Inst. of Geological Research v. U.S. Dep't. of Just., 812 F. Supp. 1015 (D.S.D. 1993); Black Hills Inst. of Geological Research v. U.S. Dep't. of Just., 12 F.3d 737 (8th Cir. 1993).

66 *Black Hills Inst. of Geological Research,* 12 F.3d at 741.

67 *Id.*

68 *Id.* at 742.

69 *See id.*

70 *Id.* at 742.

71 *Id.*

an inalienable part of Williams' estate.[72] Accordingly, the Eighth Circuit awarded the United States custody of the fossils in trust for Williams.[73]

Since Williams wanted to sell Sue, the United States consigned her to Sotheby's in 1997 on his behalf.[74] The estimate was around $1 million.[75] But with the support of McDonald's Corporation, Walt Disney World Resort, and private donors, the Chicago Field Museum ultimately purchased Sue for $8.36 million.[76] While many were pleased that Sue remained within public access, this auction monetized paleontology virtually overnight.[77] In the immediate aftermath, landowners demanded the return of fossils they long ago permitted museums to remove, fossil hunters raided institutional dig sites worldwide, and landowners demanded heavy search fees and ownership over valuable fossils that may be uncovered in exchange for digging rights.[78]

Twenty years later, paleontologists still struggle to compete with the private sector in two crucial spaces: land access and auction prices. First, academic access to private land dramatically decreased after Sue.[79] According to paleontologist Gregory Liggett of the Bureau of Land Management, "[m]any ranchers need opportunities to make money off their resources, and dinosaur fossils are just one more resource that they can potentially get money from."[80] For example, in dinosaur-rich Garfield County, Montana, the median household income between 2007 and 2011 was twenty-nine percent less than the United States median.[81]

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72 *Id.* at 741–42.

73 *Id.* at 743.

74 William Mullen, *Curse of Sue Digs Hole for Dinosaur Hunters*, CHI. TRIB. (May 15, 2000), https://www.chicagotribune.com/news/ct-xpm-2000-05-15-0005150127-story.html [https://perma.cc/5TZG-36XT].

75 *See* du Lac, *supra* note 35. At the time, no fossil had sold for more than $600,000. *Id.*

76 *See id.*

77 *See id.*

78 *See* Mullen, *supra* note 74.

79 *See* Pringle, *supra* note 25, at 365.

80 *Id.*

81 *See id.*

Landowners lease digging rights to whoever will pay, paleontologists and commercial fossil hunters alike.[82] On the commercial side, Peter Larson of Black Hills Institute states that the number of commercial companies in the fossil trade in the United States has doubled in the last twenty years, from about seventy-five to 150 today.[83] Matthew Carrano, curator of dinosaurs at the Smithsonian Museum of Natural History, agreed: "Twenty years ago, if you ran into a private or commercial fossil prospector in the field, it was one person or a couple of people," but now "you find quarrying operations with maybe 20 people working, and doing a professional job of excavating fossils."[84] In addition to leasing digging rights, commercial companies also contract with landowners for ownership over or proceeds from discovered specimens. The Association of Applied Paleontological Sciences ("AAPS"), an organization of commercial collectors, dealers, and fossil hunters, published a sample contract for commercial fossil hunters and landowners that recommended the landowner receive a ten percent cut of future proceeds from discovered specimens.[85]

Commercial hunters contracting with landowners is controversial, but far more so are paleontologists who similarly pay for land access. A museum collections specialist for the Tate Geological Museum at Wyoming's Casper College stated that he receives most of his specimens from digs on private lands.[86] The director of paleontology at the Museum of the Rockies in Montana reported that twenty percent of his museum's digs are on private or state land.[87] Not all academic institutions, however, can afford to pay for site access. Prior to Sue, many institutions received free land access but

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82 *See* Douglas Preston, *The Day the Dinosaurs Died*, NEW YORKER (Mar. 29, 2019), https://www.newyorker.com/magazine/2019/04/08/the-day-the-dinosaurs-died [https://perma.cc/DT9G-BJY7]; *see also* Maggie Koerth, *Who Owns the Dinosaurs? It All Depends on Where You Find Them*, FIVETHIRTYEIGHT (Apr. 23, 2019, 2:59 PM), https://fivethirtyeight.com/features/who-owns-the-dinosaurs-it-all-depends-on-where-you-find-them/ [https://perma.cc/8J39-5D2C].

83 *See* Pringle, *supra* note 25, at 365.

84 Donovan Webster, *The Dinosaur Fossil Wars*, SMITHSONIAN MAG. (Apr. 2009), https://www.smithsonianmag.com/science-nature/the-dinosaur-fossil-wars-116496039/ [https://perma.cc/XN63-DBWB].

85 *See* Pringle, *supra* note 25, at 365.

86 *See* Koerth, *supra* note 82.

87 *See id.*

now no longer do because they lack sale proceeds to share with landowners.[88] For instance, in one telling example, paleontologists from one New Mexico museum had spent several seasons excavating scientifically significant semiaquatic reptiles on a private ranch when the landowners suddenly prohibited access because a commercial fossil collector purchased exclusive collecting rights.[89]

The second major effect of Sue on the paleontology market was that she created a high benchmark price for dinosaurs, so academic institutions often struggle to compete. By contrast, early fossil hunters largely sold their finds to museums. Prominent American fossil hunter Charles Sternberg, for instance, unearthed specimens for nearly a dozen museums and universities from the 1870s to 1920s.[90] Today, however, many commercial dealers sell highly publicized discoveries on an open market with auction houses.[91] While finders often state that they hope the specimens will eventually reside in a museum, academic institutions are frequently priced out of the market.[92]

David Polly, a former president of an academic organization called the Society of Vertebrate Paleontology, summarized the landscape well: "Even big museums don't have the budget for purchasing specimens."[93] For instance, as noted *supra*, scientists at the

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88 *See id.*

89 *See id.*

90 *See id.*

91 *See* Webster, *supra* note 84. Bonhams' natural history department conducts three auctions per year and is "the forerunner in the field internationally." *See also Natural History*, BONHAMS, https://www.bonhams.com/departments/NAT/ [https://perma.cc/YF3Z-S2D4]. *See also* I.M. CHAIT, https://www.chait.com [https://perma.cc/664J-BKEV]. *Nature & Science,* HERITAGE AUCTIONS, https://fineart.ha.com/nature-and-science/?ic=Task-art-naturalhistory-121913 [https://perma.cc/J5K8-UTPM]. *Science & Natural History*, CHRISTIE'S, https://www.christies.com/departments/Science-and-Natural-History-47-1.aspx?pagesection=overview#overview [https://perma.cc/68M5-NDC5].

92 *See Vero Bone, supra* note 5; Laura Geggel, *What's the Controversy over the Baby T. Rex Listed on E-bay?*, LIVE SCI. (Apr. 23, 2019), https://www.livescience.com/65296-baby-t-rex-ebay-auction.html [https://perma.cc/PM8S-C9MX] (stating that the professional fossil hunter claimed, "I guarantee you it [partial skeleton of a baby *tyrannosaurus* Rex] will" eventually land in a museum).

93 Cleve Wootson Jr., *Why Scientists are Upset About a Dinosaur Fossil's Sale – and $2.4 Million Price Tag*, WASH. POST (June 7, 2018), https://www.washingtonpost.com/

University of Florida offered $80,000 to purchase the Florida mastodon etching, but Kennedy rejected the offer because it "paled next to the others."[94] Along those lines, commercial dealer Jim Tynsky unearthed a small ancient horse that is in private hands because he "approached several museums about [buying] it, but never came to an agreement about pricing."[95] Tynsky's buyer later consigned the specimen to a New Mexico gallery in 2013, where the asking price was $2.25 million.[96] Similarly, commercial fossil hunter Alan Dietrich offered Son of Samson, the only known baby *tyrannosaurus rex*, to the American Museum of Natural History in New York for $1 million; however, the institution declined due to the price.[97] Dietrich subsequently listed Son of Samson on e-Bay for nearly $3 million.[98] These examples underscore Polly's statement. While museums and universities want to purchase high-priced research quality material, they often cannot afford the climbing prices of the most newsworthy discoveries. As a result, open markets for high-caliber specimens are, in practice, mainly open to private collectors.

The AAPS, however, published an article in 2014 emphasizing that museums previously have and currently do purchase specimens from commercial dealers.[99] Many museums without active paleontology research programs find it more economical to obtain specimens from commercial dealers than sending their staff to the field.[100] Even prominent American natural history museums purchase from commercial fossil hunters: the Carnegie Museum of Natural History in Pittsburgh recently bought an *oviraptorosaur* in

news/speaking-of-science/wp/2018/06/06/dinosaur-fossils-2-4-million-tag-has-experts-worried-museums-are-being-priced-out-of-the-market/ [https://perma.cc/NRW6-Q3DR].

94 *See Vero Bone*, *supra* note 5; *see supra* Introduction.

95 *See* Pringle, *supra* note 25, at 366.

96 *See id.*

97 Wall Street Journal, *Inside the Battle over Dinosaur Fossil Hunting*, YOUTUBE (Apr. 18, 2020), https://www.youtube.com/watch?v=H7WcRTPMcKo [https://perma.cc/TD3S-M2AS].

98 *See id.*

99 *See* Larson et al., *What Commercial Fossil Dealers Contribute to the Science of Paleontology*, THE J. OF PALEONTOLOGICAL SCI. 1, 3 (Nov. 2019), https://www.aaps-journal.org/pdf/Contibutions-to-Paleontology.pdf [https://perma.cc/27K5-MZWV] ("Nearly all natural history museums have acquired specimens for their paleontological exhibits from the professional commercial community.").

100 *See id.* at 6.

large part because the excavators carefully mapped the site and preserved collateral fossils.[101] Commercial paleontologists supply some museums with material first because mounting field expeditions is itself expensive and many struggling institutions have cut research staff and budgets.[102] Time, similarly, is more limited because in the words of director of the Smithsonian National Museum of Natural History Kirk Johnson, "we go for three weeks' vacation. They dig for five months."[103] As a result, the AAPS emphasize that they have strong connections with institutions around the world and published a list of 146 specimens donated or sold to over fifty distinct museums from 1824 to the present.[104]

The AAPS list and news articles reporting on the *oviraptorosaur* sale, however, do not provide information on the specimens' prices. Moreover, only 20 of the 113 dinosaur and reptile specimens purchased or donated had citations to academic articles, raising questions of their relative scientific significance.[105] These observations, combined with statements by academics about museums' inability to pay, suggests that while some museums do purchase from commercial fossil hunters, they are likely not purchasing the particularly high-priced, newsworthy pieces reported on by the media and available at auction. Instead, they are likely more frequently buying less splashy specimens at a lower, undisclosed price point.

Instead, the clientele purchasing the high-end, newsworthy pieces are affluent private collectors. Actors Harrison Ford, Nicolas Cage, Leonardo DiCaprio, Russell Crowe, Charlie Sheen, and

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[101] *See* Lewis Simons, *Fossil Wars*, NAT'L GEOGRAPHIC (Apr. 25, 2020), https://www.nationalgeographic.com/science/prehistoric-world/fossil-wars/ [https://perma.cc/5Y52-5PMU].

[102] Malcolm Browne, *Dinosaurs Still Star in Many Human Dramas and Dreams,* N.Y. TIMES (Oct. 14, 1997), https://www.nytimes.com/1997/10/14/science/essay-dinosaurs-still-star-in-many-human-dramas-and-dreams.html [https://perma.cc/Y6JR-TP7W].

[103] *See* Conniff*, supra* note 20.

[104] *See* Larson, *supra* note 99. *See also Fossil Specimens Placed in Museums and Universities by Commercial Paleontology*, J. OF PALEONTOLOGICAL SCI., https://aaps-journal.org/commercial-contributions-to-paleontology.html [https://perma.cc/L8MH-5RP4].

[105] *See Fossil Specimens*, *supra* note 104.

business magnate Bill Gates supposedly boast impressive collections.[106] David Herskowitz of Heritage Auction Galleries stated after one successful auction, "While I can't disclose who my buyers were, I can say many of them have small to substantive museums on their properties."[107] These collectors have a variety of motivations for purchasing, such as an academic interest in paleontology and a desire to connect with the past.[108] The cover story of the October 2019 issue of *National Geographic* illustrates the results of this unusual hobby.[109] In a Massachusetts beach house, the shield and horns of a *triceratops* skull "greets weekend guests in the foyer," and a 17-foot *mosasaur* hangs from the living room ceiling.[110] In Milan, too, a *mosasaur* skull on a coffee table stares at family members relaxing in the living room.[111] In Southern California, a giant *ichthysaurus* graces the master bathroom.[112] In Santa Barbara, California, a *tyrannosaurus* skull sits in the lobby of a software company with its "fangs bared at the indifferent receptionist seated just opposite."[113] In Dubai, an 80-foot long *diplodocus* is the "star attraction of a shopping mall."[114] Finally in South Dakota, the

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[106] *See* Webster, *supra* note 84; Simons, *supra* note 101. Around 2007, DiCaprio and Cage were in a bidding war for a *tyrannosaurus bataar* skull. Cage won with a $276,000 bid, but the skull became the center of a smuggling investigation in 2013 when authorities learned that the commercial paleontologist who unearthed the skull, Eric Prokopi, previously pled guilty to illegally importing fossils from Mongolia and China. Cage voluntarily relinquished the skull to the Mongolian government after learning of these circumstances. *See* Edward Helmore, *Dinosaur Fossil Collectors 'Price Museums out of the Market'*, THE GUARDIAN (Feb. 24, 2019), https://www.theguardian.com/science/2019/feb/24/dinosaur-fossils-collectors-museums-price-sale [https://perma.cc/UE98-9TC8]; *Nicholas Cage Returns Stolen Dinosaur Skull to Mongolia,* BBC (Dec. 22, 2015), https://www.bbc.com/news/entertainment-arts-35159082. *See also United States v. One Tyrannosaurus Bataar Skeleton*, 2012 U.S. Dist. LEXIS 165153 (S.D.N.Y. 2012).

[107] *See* Webster, *supra* note 84.

[108] *See* Conniff*, supra* note 20.

[109] *See id.*

[110] *See id.* The *mosasaur* was a giant sea lizard. *Id.*

[111] *See id.*

[112] *See id.* The *ichthysaurus* was a large marine reptile. *Id.*

[113] *See id.*

[114] *See id.* The *diplodocus* was one of the longest dinosaurs, where the majority of its length was in its neck and tail. *Id. See also* Joseph Castro, *Diplodocus: Facts About the Longest Dinosaur*, LIVE SCI. (Mar. 17, 2016), https://www.livescience.com/24326-diplodocus.html [https://perma.cc/USQ3-7MXV].

5-foot-long lower jaw of a *tylosaur*—complete with sharp teeth protruding at a curious visitor—sits by a window.[115]

While academia can be seen as the victims of the effects of Sue's auction, paleontologists are not blameless either due to their unwillingness to collaborate with civic-minded collectors and commercial fossil companies. Paleontologists typically do not want to study material in private collections that are lent to institutions or otherwise made available because they want the specimens available in perpetuity.[116] According to Thomas Carr, paleontologist at Carthage College in Wisconsin, "the cornerstone of all the sciences is the reproducibility of observations."[117] Carr explains that if a future scientist wants to double-check the measurements of a particular *tyrannosaurus rex* skull, particularly if the technology improves, he or she only needs to return to the same institution the original scientist visited.[118] Since there is no guarantee that the owner of a specimen on loan to an institution today will permit access in the future, Carr insists that paleontologists should not study a skeleton in private hands even if on public display.[119] Carr is not alone: the Society of Vertebrate Paleontology "strongly recommend[s] that repositories, exhibitions and scientists stay at arm's length from specimens that are not yet permanently in the public trust."[120] Perhaps an even greater obstacle, many leading paleontology journals will not publish papers written about specimens in private hands.[121] For example, paleontologist Robert Boessenecker at the College of Charleston in South Carolina regularly declines collectors' offers to drop off privately owned specimens for him to identify, study, or display.[122]

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115 *See id.* The *tylosaur* was the largest kind of *mosasaur*, or giant sea lizard. *See Tylosaurus Proriger,* NAT'L GEOGRAPHIC, https://www.nationalgeographic.com/animals/prehistoric/tylosaurus/ [https://perma.cc/2W9J-U6E3].

116 *See* Matt Reynolds, *The Dinosaur Trade: How Celebrity Collectors and Glitzy Auctions Could Be Damaging Science*, WIRED (June 21, 2018), https://www.wired.co.uk/article/dinosaur-t-rex-auction-sale-private-fossil-trade [https://perma.cc/4M7S-H7LH].

117 *See id.*

118 *See id.*

119 *See id.*

120 *See* Geggel, *supra* note 92.

121 *See* Reynolds, *supra* note 116.

122 *See* Geggel, *supra* note 92.

Not all paleontologists and journals adopt this perspective. German scholars, in particular, assume a more pragmatic approach. In 2019, the Natural History Museum in Berlin exhibited and studied a privately-owned *tyrannosaurus* skull.[123] Similarly, the journal *Nature* published an article that described the eleventh known specimen of the early bird *archaeopteryx* in 2014, even though the fossil was privately owned by an American and only on loan to a natural history museum.[124] The authors of the original paper, scientists from the Bavarian State Collections in Munich, insisted that the information presented by the important new fossil simply could not be ignored.[125] Ultimately, the fraught relationship between a significant portion of the academic and commercial circles is problematic for ensuring maximum preservation and availability of paleontological specimens, independent of the legal landscape.

C. Legal Background

1. Paleontological Resources Preservation Act ("PRPA")

The United States only passed federal legislation explicitly governing paleontological resources in 2009.[126] The Paleontological Resources Preservation Act ("PRPA") explicitly says that it only applies to federal land.[127] The stated purpose of the PRPA according to its legislative history is to "establish a comprehensive national policy for preserving and managing paleontological resources on

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123 *See id.*

124 Gareth Dyke, *Fossil Collecting Should Be for Everyone – Not Just Academics,* THE CONVERSATION (Jan. 6, 2015), https://theconversation.com/fossil-collecting-should-be-for-everyone-not-just-academics-34830 [https://perma.cc/H65K-GPJF]; *Archaeopteryx: New Specimen Reveals Amazing Details About Feathers of Oldest-Known Bird,* SCI-NEWS.COM (July 4, 2015), http://www.sci-news.com/paleontology/science-archaeopteryx-new-specimen-feathers-bird-02040.html [https://perma.cc/6P4F-L5KM].

125 *See* Dyke, *supra* note 124.

126 Prior to 2009, paleontological resources were managed by the Archaeological Resources Protection Act, the Federal Cave Resources Protection Act, and the Antiquities Act of 1906. For an overview of the failed legislation that preceded the Paleontological Resources Preservation Act, see Keith Cronin, *A Bone to Pick: The Paleontological Resources Preservation Act and Its Effect on Commercial Paleontology*, 7 ALB. GOV'T. L. REV. 267, 277–81 (2014); Chew, *supra* note 23, at 1046–49.

127 16 U.S.C. § 470aaa(2).

Federal lands . . . ."[128] Similarly, the PRPA declares that nothing in the Act should be construed to "affect any land other than Federal land or affect the lawful recovery, collection, or sale of paleontological resources from land other than Federal land."[129]

The PRPA prohibits the removal of paleontological material from federal land as well as the transport, exchange or sale of any material that the recipient knew or should have known originated there.[130] The PRPA defines paleontological resources as "any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust" that are of paleontological interest and informative on the history of life on earth.[131] The Act states that resources can only be collected with a permit, which requires: that the applicant be qualified; that the permitted activity furthers paleontological knowledge or public education; that the collected materials remain the property of the United States; and that the resources and accompanying records will be preserved and made available for scientific research and public education.[132] A person who knowingly violates the Act may be subject to criminal and civil penalties.[133] The Act, however, does permit casual collecting on Bureau of Land Management, Bureau of Reclamation, and Forest Service Land.[134] Casual collecting is gathering a "reasonable amount" of common invertebrate and plant paleontological resources without a permit for non-commercial personal use, either by surface collection or the use of non-powered hand tools resulting in only "negligible" surface disturbance.[135]

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128 S. REP. NO. 110-18, at 1 (2007).

129 16 U.S.C. § 470aaa-10(4).

130 *Id.* § 470aaa-5(a).

131 *Id.* § 470aaa(4).

132 *Id.* § 470aaa-3.

133 *Id.* §§ 470aaa-5(c), -6(a)(2).

134 *Id.* § 470aaa-3(b)(2).

135 *Id.* § 470aaa(1). PRPA additionally requires that the Secretaries of the Departments of Interior and Agriculture pass regulations to enforce the act. As of writing, only the Secretary of Agriculture has issued one that primarily provides greater clarity to causal collecting. 36 C.F.R. § 291.5 provides definitions for some of the vague terms associated with casual collecting, most importantly "reasonable amount," which is defined as a maximum of 100 pounds per calendar year. Similarly, 36 C.F.R. § 291.12 specifies that National Monuments within the National Forests are impermissible for casual collecting.

Despite the PRPA's recent passage and the inherent difficulty in catching offenders in remote locations, federal courts have successfully prosecuted offenders. In *United States v. Ehlers,* Jared Ehlers pled guilty to removing and destroying a three-toed dinosaur track from federal land and received a sentence of one-year probation and $15,000 in restitution.[136] Similarly, two Alaska co-conspirators in *United States v. Elze* stole a fossilized woolly mammoth tusk from an Anchorage Bureau of Land Management museum in the middle of the night and then cut it into pieces to sell.[137] The judge sentenced both men to thirty-three months in prison and ordered them to pay $8,000 in restitution, which was the approximate fair market value of the tusk in its original condition.[138]

2. Antiquities Act of 1906

The Antiquities Act of 1906 was the first law in the United States to protect cultural and natural resources.[139] The Act developed out of concerns at the end of the nineteenth century about the haphazard

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Conversely, the Department of the Interior has not yet passed its regulations that would govern lands controlled by the Bureau of Land Management and the Bureau of Reclamation. The Department of the Interior proposed a regulation in December 2016 but has since withdrawn that regulation. *See* §§ 470aaa-1, -9. *See* John Ruple et al., *Up for Grabs – The State of Fossil Protection in (Recently) Unprotected National Monuments*, GEO. L. (Oct. 5, 2018), https://www.law.georgetown.edu/environmental-law-review/blog/up-for-grabs-the-state-of-fossils-protection-in-recently-unprotected-national-monuments/ [https://perma.cc/L8XP-DZFA].

136 Indictment at 1–2, United States v. Ehlers, No. 2:14-cr-00126 (D. Utah Mar. 12, 2014); Judgment at 1, *Ehlers*, No. 2:14-cr-00126.

137 *"Booster Gary" Sentenced to Federal Prison for Stealing Woolly Mammoth Tusk from Campbell Creek Science Center*, U.S. DEP'T OF JUST. (May 30, 2019), https://www.justice.gov/usao-ak/pr/booster-gary-sentenced-federal-prison-stealing-woolly-mammoth-tusk-campbell-creek-science [https://perma.cc/LH25-58DN].

138 *See id.* Even where PRPA counts have been dismissed, they have still affected the resulting plea bargains. Karen Jettmar, for instance, ran a tour company and allegedly conspired with clients to remove paleontological material. Even though she only pled to conspiracy charges, her sentence addressed her paleontologically-harmful behavior by mandating restitution and cessation of commercial activity on federal and state lands. *See* Plaintiff's Trial Brief, United States v. Jettmar, No.4:11-cr-00030 (D. Alaska May 7, 2012); Indictment at 3, United States v. Jettmar, No.4:11-cr-00030 (D. Alaska Dec. 16, 2011).

139 *American Antiquities Act of 1906,* NAT'L PARK SERV. (June 22, 2017), https://www.nps.gov/subjects/legal/american-antiquities-act-of-1906.htm [https://perma.cc/QG7P-PD3H].

digging and commercial artifact looting that was damaging archaeological sites and artifacts.[140] The majority of archaeological site protection is today covered by the Archaeological Resource Protection Act of 1979.[141] However, the Antiquities Act of 1906 remains influential because it allows the President to designate national monuments[142] on lands owned or "controlled by" the government that contain historic landmarks, historic and prehistoric structures, or other objects of historic or scientific interest.[143] The land at issue may be privately owned, so long as it is "relinquished" to the government.[144]

Courts have not clarified the meaning of the phrase "controlled by," perhaps because thus far presidents have only used the Act to preserve tracts of existing federal land.[145] Similarly, courts and scholars have not elucidated whether "relinquished" requires a voluntary surrender by owners or if the Act permits the President to use eminent domain to obtain landmarks, structures, or objects of scientific interest situated on private land, but simply neglects to incorporate the doctrine and discuss just compensation. While employing eminent domain today in such a capacity is likely already permitted from case law, the Antiquities Act predates those decisions and could alternatively reflect explicit permission to do so. [146]

The sparse legislative history of the Antiquities Act does not illuminate the proper definition and application of either enigmatic

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140 *See id.*

141 *See* United States v. Diaz, 499 F.2d 113 (9th Cir. 1974).

142 National monument designation provides greater protection than typically awarded to federal lands by withdrawing them from entry, location, sale or other disposition under public land laws. The latter can include mining, logging, oil and gas production, and grazing on the land. *See* Matthew Sanders, *Are National Monuments the Right Way to Manage Federal Public Lands?*, 31 NAT. RESOURCES & ENV'T 1 (2016).

143 *See* Brent J. Hartman, *Extending the Scope of the Antiquities Act,* 32 PUB. LAND & RESOURCES L. REV. 153, 184–86 (2011) (arguing that the federal government should use the Antiquities Act to create national monuments on private land). *See infra* Section II.A.

144 16 U.S.C. §§ 431–433.

145 *See* Hartman, *supra* note 143, at 159, 181. The question has only been raised when monuments include submerged lands. *See* Joseph Briggett, *An Ocean of Executive Authority: Courts Should Limit the President's Antiquities Act Power to Designate Monuments in the Outer Continental Shelf*, 22 TUL. ENVTL. L.J. 403, 411–16 (2009).

146 *Compare* 16 U.S.C. §§ 431–433 *with* Kelo v. City of New London, 545 U.S. 469, 478–80 (2005) (interpreting the term "public use" within the Fifth Amendment broadly).

word.[147] A report before the 59th House of Representatives states that its purpose is to preserve prehistoric relics on public and private land in the southwest United States via small land reservations.[148] Moreover, if Congress did not want the Antiquities Act to include private lands, that phrase would have been omitted.[149] The second sentence of the Act specifically mentions land under private ownership, wherein the private party retains discretion to relinquish control to the government.[150]

Past presidents have used the Antiquities Act for paleontology on public land.[151] As of 2018, twenty-three national monuments protect paleontological resources.[152] Though the PRPA already provides academics access to material on federal land, the national monument designation enhances their ability to conduct research.[153] First, it is far easier to obtain research permits from the National Park Service than a patchwork of public lands subdivided among different federal agencies.[154] Second, the near permanency of the national monument designation is highly attractive to paleontologists because then the scientific process can be repeated on the

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147 Steven Platzman, *Objects of Controversy: The Native American Right to Repatriation*, 41 AM. U. L. REV. 517, 537 n.114 (citing H.R. REP. No. 2224, 59th Cong. 1st Sess. 1906).

148 *Id.*

149 *See* Hartman, *supra* note 143, at 182–183.

150 *See id.*

151 Gregory A. Liggett et al., *From Public Lands to Museums: The Foundation of U.S. Paleontology, the Early History of Federal Public Lands and Museums, and the Developing Role of the U.S. Department of the Interior*, MUSEUMS AT THE FOREFRONT OF HISTORY AND PHILOSOPHY OF GEOLOGY: HISTORY MADE, HISTORY IN THE MAKING 324 (Rosenberg and Clary ed. 2018).

152 *See id.*

153 *Comments from the Society for Vertebrate Paleontology About the Scientific Importance of Paleontological Resources at the 21 U.S. National Monuments Established Since 1996*, SOC'Y FOR VERTEBRATE PALEONTOLOGY 2 (July 9, 2017), http://vertpaleo.org/GlobalPDFS/SVP-Repsonse-to-National-Monument-Review-July-2017.aspx [https://perma.cc/CCW8-4V8D] [hereinafter *Comments*]. Nevertheless in 2017, President Trump reduced the size of Bears Ears and Grand Staircase-Escalante National Monument and replaced them with smaller units, claiming that the two million acres, or 63% of the land in the two monuments, were unnecessary for the care of the objects within the monuments. Many fossil resources now fall outside the new designations. *See* Ruple, *supra* note 135.

154 As a result, academics have identified more than 2,000 new vertebrate fossil localities and 20 vertebrate species in Grand Staircase-Escalante National Monument since its inception in 1996. *See Comments, supra* note 153.

geological context, which allows new hypotheses and techniques to be applied to old data.[155]

3. State Law

Most states have legislation that prohibits fossil collecting or excavation on state land without a permit and vests ownership of discovered specimens in the state.[156] Some states' cultural heritage legislation expressly covers paleontology in forbidding extractive activity on state lands,[157] while others more generally refer to "objects of antiquity" or "objects of historic or scientific significance" in statutes that would likely cover paleontology, but seem primarily intended for archaeology.[158] A select few, however, only seem to "discourage" collecting fossil specimens on state lands.[159]

State cultural heritage legislation, however, is typically silent on artifacts or specimens discovered on private land, both for permitting requirements and ownership.[160] The few states that have limited

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[155] *See id.* at 3.

[156] Donald L. Wolberg & Patsy Reinard, COLLECTING THE NATURAL WORLD: LEGAL REQUIREMENTS & PERSONAL LIABILITY FOR COLLECTING PLANTS, ANIMALS, TOCKS, MINERALS, & FOSSILS 77–110 (1997); COMMITTEE ON GUIDELINES FOR PALEONTOLOGICAL COLLECTING 229–33 (1987). One state that does not, for instance, is North Carolina, whose cultural heritage legislation is called the Archaeological Resources Protection Act (modeled after the federal act) and explicitly states that paleontological specimens do not constitute archaeological discoveries unless found in an archaeological context. *See* N.C. GEN. STAT. § 70-48 (1991). Kansas, similarly, did not include paleontology in its Antiquities Act.

[157] *See* A.R.S. § 41-841 (1998) ("A person shall not knowingly excavate in or upon any historic or prehistoric ruin, burial ground, archaeological, or vertebrate paleontological site, or site including fossilized footprints, inscriptions made by human agency or any other archaeological, paleontological or historical feature….").

[158] *See* VA. CODE ANN. § 10.1-2300 (1977) (defining "object[s] of antiquity" as "any relic, artifact, remain, including human skeletal remains, specimen, or other archaeological article that may be found on, in or below the surface of the earth, which has historic, scientific, archaeologic or educational value.").

[159] In Michigan, for instance, "collecting of fossils on state-owned land is discouraged." *See* Randall Milstein, *Middle Silurian Paleoecology; The Raber Fossil Beds, Chippewa County, Michigan*, GEOLOGICAL SOC'Y OF AM. CENTENNIAL FIELD GUIDE, https://www.michigan.gov/documents/deq/GIMDL-GSA87E_302407_7.pdf [https://perma.cc/G5ET-HMYT].

[160] *See* A.R.S. §§ 41-841 to -844 (1998) (no mention of private land); VA. CODE ANN. §§ 10.1-2300 to -2306 (1977) (no mention of private land); Cal. Pub. Resources Code § 5097.5

requirements for activities on private land typically only cover archaeological artifacts and sites.[161] The Alabama Antiquity Act, for instance, covers "antiquities"—which does not include paleontology—and the state has not passed any supplemental legislation for fossils on state or private lands.[162] Yet the Alabama Antiquity Act is far reaching for material within its orbit by vesting ownership of all "aboriginal mounds and other antiquities, earthworks, ancient or historical forts and burial sites" in the state, including those discovered on private land.[163] New Mexico also requires individuals digging on another's land with "earthmoving equipment" on an archaeological site[164] obtain a permit, which includes evidence of qualification to perform the excavation and submitting a report upon completion of specimens removed.[165] While the scope is limited and artifacts discovered still belong to the landowner, the mandatory documentation of excavations on private lands at least generates some information prior to a possible disappearance into private ownership.[166] The Indiana and Washington Appellate Courts similarly determined that private landowners digging on their own land are subject to state permitting requirements.[167] However, these two rulings likely only apply to archaeological sites, since both courts arrived at these decisions through statutory analyses over statutes

(1992) (no mention of private land); FLA. STAT. § 240.5161 (2001) (no site can be designated as a "state vertebrate paleontological site" without consent of private owner).

161 *See, e.g.,* CODE OF ALA. § 41-3-1 (1915).

162 *Id.* The only law governing paleontology on the state level in Alabama is the one that designates the state fossil. *See State Law – Fossils*, BIRMINGHAM PALEONTOLOGICAL SOC'Y (Sept. 9, 2007), http://bps-al.org/whale.html [https://perma.cc/89C5-8RXU].

163 CODE OF ALA. § 41-3-1 (1915); *See* Pamela D'Innocenzo, *Not in My Backyard – Protecting Archaeological Sites on Private Lands*, 21 AM. INDIAN L. REV. 131, 154 (1997).

164 *See* N.M. STAT. ANN. § 18-6-11 (1977) (defining "archaeological site" as "a location where there exists material evidence of the past life and culture of human beings in this state.").

165 *See id.*

166 *See id.*

167 Whiteacre v. State, 619 N.E.2d 605, 607 (Ind. App. 1993); State v. Lightle, 944 P.2d 1114 (Wash. App. 1997).

that pertained solely to archaeological resources.[168] In all these states, paleontology is excluded.[169]

Archaeology likely receives more consideration than paleontology for two reasons. First, many states modeled their cultural heritage legislation on existing federal laws.[170] Since Congress only passed PRPA in 2009, the primary model cultural heritage legislation was the Archaeological Resource Protection Act of 1979 that explicitly excluded paleontological specimens.[171] Additionally, many states may explicitly protect archaeology because of the United States' long and troubled history with Native Americans. This gesture may be an overdue attempt to respect Native American cultural history after centuries of destruction and genocide, which has no corollary with paleontology.

4. Eminent Domain Jurisprudence

The Fifth Amendment states, "Nor shall private property be taken for public use, without just compensation."[172] Commonly referred to as the Takings Clause, this provision originated in the Magna Carta and intended to protect individual liberty by restricting when the government could seize private property by requiring

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168 *See* IND. CODE ANN. § 14-21-1-26 (1995) ("[A] person who disturbs the ground for the purpose of discovering, uncovering, or moving artifacts, burial objects, or human remains must do so in accordance with a plan approved by the department under section 25 of this chapter…."); REV. CODE WASH. § 27.53.060(1) (1975) ("[O]n the private and public lands of this state it shall be unlawful for any person…to knowingly remove, alter, dig into…or destroy any historic or prehistoric archaeological resource or site, or remove any archaeological object from such site…without having obtained a written permit from the director for such activities.").

169 *Cf.* CODE OF ALA. § 41-3-1 (1915); N.M. STAT. ANN. § 18-6-11 (1977); IND. CODE ANN. § 14-21-1-26 (1995); and REV. CODE WASH. § 27.53.060(1) (1975). A few additional states encourage civic duty on private sites, but again only in the archaeological context. *See* FLA. STAT. § 267.14 (2001); R.I. GEN. LAWS § 42-45.1-11 (1956); N.C. GEN. STAT. § 70-2 (1991).

170 North Carolina is one such example. *See State Statutes,* OFF. OF ST. ARCHAEOLOGY, https://archaeology.ncdcr.gov/programs/environmental-review/laws/state#ncarpa [https://perma.cc/58KS-YH4D].

171 "Nonfossilized and fossilized paleontological specimen, or any portion or piece thereof, shall not be considered archaeological resources, under the regulations under this paragraph, unless found in archaeological context." 16 U.S.C. § 470bb.

172 U.S. CONST. amend. V.

it to pay just compensation.[173] Prior to 1922, only a physical taking of property required just compensation under eminent domain.[174] In *Pennsylvania Coal Company v. Mahon*, however, the Supreme Court drastically expanded the scope of eminent domain.[175] The Court decided that a regulation that deprives a property owner the value of his land can constitute a taking sufficient to require just compensation.[176] Justice Oliver Holmes wrote, "the general rule…is that while property may be regulated to a certain extent, if a regulation goes too far it will be recognized as a taking."[177] *Mahon*, however, failed to specify what "too far" meant.

In 1978, the Supreme Court provided an answer in *Penn Central Transportation Co. v. City of New York*.[178] In that case, the New York City Landmark Preservation Law designated Grand Central Terminal as a landmark, which permitted the Landmarks Preservation Committee to block new construction projects, and developers challenged it as a regulatory taking under *Mahon*.[179] Justice Hugo Black explained that the accepted test must bar the government from "forcing some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole."[180] The Court ruled that the regulation did not constitute a taking based on the following three factors: (1) overall economic impact of the regulation on the property owner, (2) the extent the regulation interferes with investment-backed expectations, and (3) the general character of the regulation.[181]

The *Penn Central* test, however, is not used for categorical takings—government actions that are takings regardless of the

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173 Horne v. Dep't of Agriculture, 576 U.S. 351, 358 (2015); *see also* Magna Carta, cl. 28 (1215), *translation reprinted in* G.R.C. Davis, *Magna Carta* (London: British Museum, 1963) ("No constable or other royal official shall take corn or other movable goods from any man without immediate payment….").

174 *See, e.g.,* N. Transp. Co. v. Chicago, 99 U.S. 635, 642 (1878) (concluding a temporary construction a taking because the owner's property rights were impaired, not deprived).

175 Pa. Coal Co. v. Mahon, 260 U.S. 393 (1922).

176 *Id.* at 414–15.

177 *Id.* at 415.

178 Penn Cent. Transp. Co. v. New York City, 438 U.S. 104 (1978).

179 *Id*. at 115–18.

180 *Id.* at 123 (*citing* Armstrong v. U.S., 364 U.S. 40, 49 (1960)).

181 *Id.* at 124.

public interest involved—typically due to their level of intrusiveness.[182] The Supreme Court has recognized three types of categorical takings, two of which will be discussed here.[183] The first was in *Loretto v. Teleprompter Manhattan CATV Corp.*[184] Jean Loretto purchased an apartment building from an owner who previously granted Teleprompter permission to install a cable on the roof of the building for television service to the tenants.[185] New York law required landlords to permit a cable television company to install its facilities on the property.[186] The Court needed to determine whether this "minor but permanent" physical occupation constituted a taking requiring just compensation.[187] The Court analyzed early cases involving the permanent physical occupation of real property and concluded that it has "consistently distinguished between flooding cases involving a permanent physical occupation, on the one hand, and cases involving a more temporary invasion" and only the former situation has consistently yielded a taking.[188] Permanent physical invasions, regardless of the amount of physical space seized, are categorical takings because they destroy each of the telltale rights of property owners: to possess, use, and dispose.[189] Conversely, temporary limitations do not absolutely dispossess the owner of those rights and, as a result, are "subject to a more

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[182] Angela Schmitz, *Taking Shape: Temporary Takings and the Lucas Per Se Rule in Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Authority*, 82 OR. L. REV. 189, 190 (2003).

[183] *See* William Sumner MacDaniel, *No Appropriation Without Compensation: How Per Se Takings of Personal Property Check the Power to Regulate Commerce*, 48 ST. MARY'S L. J. 509, 521 (2017). The categorical taking that will not be discussed here is the Nollan-Dolan test, which pertains to potential takings through land permits and land use exactions. *See* Glen Hansen, *Let's Be Reasonable: Why Neither Nollan/Dolan nor Penn Central Should Govern Generally-Applied Legislative Exactions After Koontz*, 34 PACE ENVTL. L. REV. 237, 239 (2017).

[184] Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419 (1982).

[185] *Id.* at 421–22.

[186] *Id.* at 421.

[187] *Id.*

[188] *Id.* at 428.

[189] *Id.* at 435.

complex balancing process to determine whether they are a taking," referring to the *Penn Central* test.[190]

The second form of categorical taking occurs when the regulation deprives the property owner of all economically viable use of the property.[191] *Lucas v. South Carolina Coastal Council* established this form of categorical taking, in which Lucas purchased two beachfront properties; two years later, however, the state passed a regulation that barred him from erecting permanent structures on them.[192] The Court justified this "rare" form of categorical taking by explaining that from the landowner's perspective the total deprivation is the equivalent of a physical appropriation and the public cannot simply assume the legislature is "adjusting the benefits and burdens of economic life" to secure "an average reciprocity of advantage" to everyone.[193] From a functional perspective, the Court found that the practical necessities for the government to sometimes act without providing compensation does not apply to such rare cases as the one at the bar.[194]

Both *Loretto* and *Lucas* explained their reasoning with the common metaphor of property ownership as a "bundle of rights" with many constituent "sticks."[195] Each "stick" represents a particular right, most commonly to possess, use, destroy, and exclude.[196] The metaphor helps courts and scholars describe the way ownership interests can be divided over time, as with present and future interests, and among people, such as concurrent interests.[197] Property is therefore a collection of rights in relation to others, rather than a

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190 *Id.* at 435 n.12; Dennis H. Long, *The Expanding Importance of Temporary Physical Takings: Some Unresolved Issues and an Opportunity for New Directions in Takings Law*, 72 IND. L.J. 1185, 1201 (1997).

191 *See* MacDaniel, *supra* note 183, at 521.

192 Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1007 (1992).

193 *Id.* at 1017 (*citing* Penn Cent. Transp. Co. v. N.Y.C., 438 U.S. 104, 124 (1978)); *Id.* at 1018 (*citing* Pa. Coal Co. v. Mahon, 260 U.S. 393, 415 (1922)).

194 *Id.* at 1018.

195 *Id.* at 1027. *See also* Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 435 (1982) (*citing* Andrus v. Allard, 444 U.S. 51, 65–66 (1979)); Jane Baron, *Rescuing the Bundle of Rights Metaphor in Property Law,* 82 U. CIN. L. REV. 57, 62 (2013).

196 *See* Denise R. Johnson, *Reflections on the Bundle of Rights,* 32 VT. L. REV. 247, 253 (2007).

197 *See* Baron, *supra* note 195, at 58.

discrete "thing" like a house.[198] *Loretto* explained that a permanent physical occupation is not where the government "simply take[s] a single 'strand' from the 'bundle' of property rights: it chops through the bundle, taking a slice of every strand."[199] *Lucas*, too, employed the metaphor: when a regulation deprives the owner of all economically beneficial use, it has completely denied one stick in the bundle.[200] Therefore, current American property and eminent domain law conceptualizes property as more than binary and allows the nuance necessary to address complex social issues.

5. Trespass to Chattel

Trespass to chattel is an old and rarely used tort that targets unauthorized use or dispossession of another's personal property or physical, tangible goods.[201] The use must be intentional, unauthorized, and substantial.[202] Unlike trespass to land, the "substantial" element requires that actual harm occur.[203] Traditionally, courts applied the tort to cases of intentional interference with another's personal property or cases of dispossession short of conversion, such as beating someone's animal or briefly taking another's watch.[204] Many traditional trespass to chattel actions are today brought as conversion claims and the tort is now used in cyberspace cases to combat spam, noncommercial emails, and spiders.[205]

D. Proposed Model Act

To remedy the absence of laws that ensure academic or public access to subterranean resources discovered on private land, the

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198 *See id*.

199 *Loretto*, 458 U.S. at 435 (*citing Andrus*, 444 U.S. at 65–66).

200 *See* Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1027 (1992). *But see Andrus*, 444 U.S. at 65–66 (holding that denying one stick in the bundle is not dispositive of a taking).

201 RESTATEMENT (SECOND) OF TORTS § 217 (1965).

202 *See* Laura Quilter, *The Continuing Expansion of Cyberspace Trespass to Chattel*, 17 BERKELEY TECH. L.J. 421, 425 (2002).

203 R. Clifton Merrell, *Trespass to Chattels in the Age of the Internet*, 80 WASH. U. L.Q. 675, 677–78 (2002).

204 *See id.* Actual dispossession of chattel would give rise to actions for both conversion and trespass to chattel. The former legal theory is more typically applied. This Note will not cover conversion per se because a taking by the government is classified as eminent domain rather than conversion. *See id.*

205 *See id. See generally* Quilter, *supra* note 202.

United States should pass a codified statute that allows for academic and public access to scientifically significant paleontological discoveries through temporary custody. This Model Act would require commercial fossil hunters, dealers, and auction houses to publicly advertise the impending sale of specimens that are being sold for the first time for a minimum of sixty days. Museums and academic institutions would then be able to petition to stall the sale. A successful application for delay would demonstrate the singular importance of the specimen, the benefits that scientific study can respectively offer that comparable items at institutions nationally and internationally cannot, and corroboration from third party institutions of the scientific importance of the specimen.

If an institution is successful in demonstrating the unique contributions the specimen can provide to the discipline, then it will have temporary custody over it for a period of two years. Before, after, or concurrent with its scientific examination, the specimen would need to be displayed for a minimum of six months. Should the institution require additional time to study or display the specimen beyond the allotted two years, then it could purchase the specimen outright if financially feasible or appeal for the United States government to permanently take the object under eminent domain for fair market value. In the latter, the specimen would be put up for auction and the government would have the right of first refusal where it can purchase the specimen for the winning bid. In the absence of such a taking, the specimen will be returned to the legal owner after the specified two years who may then sell it. Every ten years, the original appealing institution would be able to require renewed access for a maximum of three months to conduct additional research that must be specifically delineated and approved by the same independent body that considered the initial application. Alternatively, an owner could avoid this appeal process entirely by voluntarily providing an academic institution of his or her choice two-year access to the specimen with a guarantee of renewed access every ten years.

The author of this Note believes that the proposed Model Act would address the problem caused by Sue. However, some academics may argue that the proposal is insufficient because vital contextual information is lost once the specimen leaves the ground.

While certainly true, the number of museums that have expressed interest in displaying and studying specimens such as the Dueling Dinosaurs that lack the desired contextual information suggest that scientific value still inheres in testing or at least displaying such items.[206] Moreover, institutions that do not agree would not be required to participate in this appeals process.

Meanwhile, from a practical perspective, enacting legislation that would intervene during the unearthing process to preserve contextual information would be logistically challenging. Once exposed to the elements, the fossil must be unearthed swiftly to prevent erosion so any involvement would need to occur on a short timeframe, which may be difficult to implement when excavations occur in remote locations.[207] Intervening at this point would require elongating the period of time that the fossils are exposed and would endanger the specimens. Moreover, it is likely difficult to determine whether a specimen is of research and museum quality prior to seeing a significant portion of it. Consequently, any legislation at this level would need to be overinclusive and target all vertebrate paleontological material, which would impede landowners' and commercial fossil hunters' rights more so than the proposed statute and, in the vast majority of cases, over material that is not of outsize importance. A proposal at this level would at best further frustrate landowners' and commercial fossil hunters' business ventures and at worst destroy the material. Short of banning all commercial digging in the United States, periodic opportunities to analyze the fossils themselves is likely the best academics could attain.[208]

On the other hand, commercial dealers may argue that this Model Act would remove a client base by disincentivizing museums and universities to purchase by granting temporary access. As already discussed, however, academic institutions are not usually capable of purchasing high-end specimens, which instead often find

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[206] The Denver Museum of Nature and Science as well as the Smithsonian Museum of Natural History, for instance, both still expressed interest in the Montana Dueling Dinosaurs. *See* Sager, *supra* note 9.

[207] *See* Vincent Santucci et al., *Monitoring in Situ Paleontological Resources,* NAT'L PARK SERV. (Sept. 6, 2017), https://www.nps.gov/articles/geomonitoring-paleontology.html [https://perma.cc/EU9E-4VWG].

[208] *See infra* Section III.A.

their homes among anonymous private buyers.[209] Institutions would need to demonstrate the singularity of the specimens publicly available worldwide, not simply within their own institution, which is a high bar that would prevent commercial dealers from losing this client base.

More persuasively, critics may argue that this Model Act would push sellers towards the black market. This may not necessarily be the case first because academic inquiry, display, and prior ownership actually increases the price of the specimen at auction by lending the work legitimacy—this provides dealers with a financial incentive to comply.[210] While many academics would view this commercial incentive as a major limitation of the proposal, academics that would not want to participate would be under no obligation to do so. Second, identifying a buyer for groundbreaking paleontological discoveries at soaring prices is a lengthy process. Phipps, for instance, attempted to find a buyer for the Dueling Dinosaurs for seven years before again failing to sell at auction.[211] As such, it is not a given that such a Model Act would actually delay a sale. But even if such a policy would stimulate a black market, the current difficulty in selling major specimens privately without public auctions suggests that illicit actors would similarly have trouble attaining the right price without sufficient publicity and hype.

II. A GAPING HOLE: LACK OF ACCESS TO SCIENTIFICALLY SIGNIFICANT MATERIAL ON PRIVATE LAND

Just as no legislation regulates paleontological discoveries on private land, so too the judicial system underscores the wholly private nature of fossil ownership. The ongoing Dueling Dinosaurs case exemplifies how courts fail to consider the fossils' cultural and scientific value to the scientific community, but rather exclusively

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209 *See supra* Section I.B.

210 *See infra* Section III.A. For an explanation of why the proposed Model Act would not violate eminent domain, *see infra* Section III.B.

211 *See* Sager, *supra* note 9; Jonathan Keats, *Montana's Dueling Dinosaurs to Fetch up to $9 Million at Bonhams Auction,* FORBES (Oct. 8, 2013, 10:03 AM), https://www.forbes.com/sites/jonathonkeats/2013/10/08/montanas-dueling-dinosaurs-to-fetch-up-to-9-million-at-bonhams-auction/#2b6204732dfe [https://perma.cc/PB92-ZC7B].

focus on the economic value between the two litigating parties. Regardless of the legal analysis and parties named victorious by the courts, scientists' ability to study the material is still based on the whims of owners. This is problematic because fossils serve as important primary source material in the study of climate change and represent a significant form of American national heritage with cultural value.

A. Existing Law Fails to Protect Material Unearthed on Private Land

Currently, the United States does not afford academic or public access to material unearthed on private lands. On the federal level, the PRPA explicitly states that it only affects the recovery, sale, and collection of paleontological material from federal land.[212] While the Antiquities Act of 1906 perhaps could address this issue, no Presidents in the last century have attempted to do so.[213] On the state level, individual states have similarly not filled the void left by the federal statutes.[214] The net result of these laws is that Congress has artificially limited the scope of the problem of the removal of subterranean paleontological material without subsequent public and scientific access to only public land. However, federally owned and controlled land encompasses only one-third of the country's land mass, rendering the majority of the land and fossils unregulated.[215] While some commercial fossil companies dig with attention to the paleontological context and commit to selling the material to museums, such civicmindedness is not required by law. As a result, the difference between the activities of some in the industry who legally dig on private land and others who illegally loot on public land are only differences in name. The fossilization process does not distinguish by property title, rendering Congress' artificial limitation scientifically baseless.

While many academics lament that no legislation—the PRPA in particular—covers material unearthed on private land, legal scho-

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212 16 U.S.C. § 470aaa-10(4).

213 *See supra* Section I.C.2.

214 *See supra* Section I.C.3.

215 Patty Gerstenblith, *Schultz and Barakat: Universal Recognition of National Ownership of Antiquities*, 14 ART ANTIQUITY & L. 21, 24 (2009).

lars have not been similarly vocal in proposing suggestions for change.[216] However, Brent Hartman, Regulatory Project Manager of the Ohio Aerospace Institute, advocated using the Antiquities Act to reach objects on federal land with some degree of private ownership.[217] As discussed *supra,* the Antiquities Act allows the President to designate national monuments on lands "owned or controlled by" the government that contain objects of historic or scientific interest.[218] Hartman first argues that the President can protect more material with a broad reading of "controlled by" through a sliding scale test.[219] Specifically, as the size of the object, landmark, or structure at issue increases, the amount of federal control needed for designation also increases.[220] A declaration could only be made without the owner's cooperation for lands with a "degree of federal control" and he recommends amending the Act to define this ambiguous term.[221] He suggests a few options of varying breadth, such as "control" encompassing situations when rights to the land are unperfected or the government has title to either the surface or mineral rights.[222]

While Hartman creates interesting proposals that could benefit from greater precision, using the Antiquities Act to attain additional protection over scientific and historic objects is problematic first because the Act cannot intercept discoveries on truly private land. The text of the Act is explicit that lands must be "owned or controlled by the Government," so even the most expansive definition of "controlled by" would necessarily still be severely limited and therefore not address the issues discussed in this Note. Second, despite observable erosion and technological advances, archaeologists and paleontologists would have significant difficulty

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216 *See* Pringle, *supra* note 25, at 367.

217 *See* Hartman, *supra* note 143, at 181–82.

218 *See supra* Section I.C.2.

219 *See* Hartman, *supra* note 143, at 184.

220 *See id.* at 184.

221 *See id.* at 187.

222 "Taking a cue from the second sentence of the Act, controlled land could include: 1) land with severed surface and mineral rights which either claim unperfected by a private party or government title to either surface or mineral rights, or 2) the voluntary relinquishment of private property to the government by instrument, such as an easement or any other right less than complete ownership. Of course, Congress could make the definition broader, including a sliding-scale test, or narrower, such as a limitation to public land only." *See* Hartman, *supra* note 143, at 189.

accurately identifying land holding subterranean materials prior to excavation. This would raise the question of whether objects already removed from the ground could be protected under the Antiquities Act if their precise location of discovery is unknown or the subterranean contextual information is lost such that preserving the land itself is of limited scientific value. The Antiquities Act is likely too circumspect and rooted in real property to address the limited scientific and public access to paleontological materials discovered on private land.

B. The Dueling Dinosaurs: Murray v. BEJ Minerals

The litigation surrounding the Dueling Dinosaurs demonstrates the problems of determining accessibility to specimens by property title. As discussed *supra*, commercial fossil hunter Clayton Phipps discovered the Dueling Dinosaurs on the property of Mary Ann and Lige Murray in 2006 and consigned them to Bonhams auction house in 2013, where they failed to sell.[223] In 2005, the Murrays had purchased the surface rights and one-third of the mineral rights to the property from brothers Jerry and Robert Severson, who together retained the remaining two-thirds of the mineral rights.[224] The contract did not mention dinosaur fossils.[225] The Seversons only realized the value of the Dueling Dinosaurs when Bonhams appraised them for the 2013 auction.[226] The Murrays sought a declaratory judgment that the fossils belonged to them as the owners of the surface estate in 2014 and the Seversons subsequently asserted a counterclaim that the fossils belonged to the mineral estate.[227] The Seversons claimed two-thirds of the proceeds not only from a future sale of the Dueling Dinosaurs, but also the past sales of *tyrannosaurus rex* and *triceratops* fossils also discovered there.[228]

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223 *See supra* Introduction.

224 Murray v. Billings Garfield Land Co., 187 F. Supp. 3d 1203, 1205 (D. Mont. 2016).

225 *Millions at Stake in Montana Dinosaur Fight: Are Fossils Minerals?* L.A. TIMES (Nov. 7, 2019, 7:35 PM), https://www.latimes.com/science/story/2019-11-07/dinosaur-fossils-minerals [https://perma.cc/6HA5-HB9H].

226 *See* Pantuso, *supra* note 15.

227 Murray v. BEJ Minerals, LLC, 908 F.3d 437 (9th Cir. 2018).

228 Murray v. Billings Garfield Land Co., 187 F. Supp. 3d 1203, 1205–06 (D. Mont. 2016).

The District Court of Montana heard the case in 2016. The Murrays argued that the ordinary definition of "minerals" does not include fossils.[229] The Seversons not only claimed that fossils are composed of minerals, but also that they are "rare and exceptional in character" and possess "special value" so they should be classified as minerals for the purposes of a mineral deed.[230] The District Court of Montana turned to a test first articulated by the Supreme Court of Texas in *Heinatz v. Allen*.[231] *Heinatz* stated that the scientific or technical definitions of "mineral" are unhelpful because "it is rare, if ever, that 'mineral' is intended in the scientific or geologic sense in the ordinary trading transactions about which deeds and contracts are made."[232] Instead, "mineral" should be interpreted according to its ordinary and natural meaning unless the substance is "rare and exceptional in character or possess[es] a peculiar property giving them special value."[233]

The court used dictionary and statutory definitions to conclude that dinosaur fossils are not included in the natural and ordinary meaning of the term because unlike the common understanding of minerals, the fossils' chemical properties are not the source of their value.[234] While all parties agreed that the fossils were exceptional and rare, the test assumes that status helps inform whether the substance is ordinarily considered a mineral, and in this case it does not. Scores of fossils exist that are not similarly valuable.[235] Fossils, moreover, are distinct from traditional minerals because their value turns not on their ability to be refined as with traditional minerals but on "the completeness of the specimen, the species of dinosaur and how well it is preserved."[236] The court therefore granted the Murrays' motion for summary judgment.[237]

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229 *Id.* at 1207.
230 *Id.*
231 Heinatz v. Allen, 217 S.W.2d 994, 997 (Tex. 1949).
232 *Murray*, 187 F. Supp. 3d at 1208 (citing *Heinatz,* 217 S.W.2d at 997).
233 *Id.* at 1208–09 (citing *Heinatz,* 217 S.W.2d at 997).
234 *Id.* at 1212.
235 *Id.*
236 *Id.*
237 *Id.*

The Ninth Circuit subsequently reversed.[238] The court found that dictionary definitions were inconsistent and many Montana statutes and regulations do encompass fossils in their definitions of minerals.[239] Accordingly, the ordinary definition of "minerals" can include the scientific meaning.[240] Moreover, the *Heinatz* test is non-categorical, meaning that just because some dinosaur fossils have no value and so are not "rare and exceptional" does not mean the specimens at the center of this case that all parties agree are "rare and exceptional" cannot meet the test themselves.[241] However, the Ninth Circuit then granted the Murrays a rehearing *en banc.*[242] In April 2019, while the case was pending in the Ninth Circuit, the Montana Legislature passed a law clarifying that fossils are part of the surface estate unless the parties agree otherwise, though the law did not apply to pending cases.[243]

Rather than resolve the case, the Ninth Circuit *en banc* rehearing certified the central question of whether, under Montana law, dinosaur fossils constitute minerals for the purpose of a mineral reservation to the Montana Supreme Court.[244] The Montana Supreme Court ruled in May 2020 that fossils do not constitute minerals in a mineral reservation, thereby aligning itself with the Montana Legislature and District Court.[245] The Montana Supreme Court identified three relevant factors: how the parties used the term "mineral" in the deed, whether the mineral content of the material renders it "rare and valuable," and the material's relation to the surface of the land from the method and effect of its removal.[246] Applying the test, the Montana Supreme Court found that the parties did not explicitly intend for "minerals" to include fossils and Montana law understands "minerals" and "fossils" as mutually exclusive.[247] Like the District Court, the Montana Supreme Court next ruled that fossils'

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238 Murray v. BEJ Minerals, LLC, 908 F.3d 437 (9th Cir. 2018).
239 *Id.* at 445.
240 *Id.* at 443–44.
241 *Id.* at 447.
242 Murray v. BEJ Minerals, LLC, 920 F.3d 583, 584 (9th Cir. 2019).
243 H.B. 229, 2019 Leg., 66th Reg., Sess. (Mont. 2019).
244 Murray v. BEJ Minerals, LLC, 924 F.3d 1070, 1073–74 (9th Cir. 2019).
245 Murray v. BEJ Minerals, LLC, 464 P.3d 80, 81 (Mont. 2020).
246 *Id.* at 84.
247 *Id.* at 90.

value turns on characteristics other than mineral composition.[248] Finally, the court ruled that fossils are closely related to the surface of the land because their discovery involves analyzing the soil and their excavation interferes with the surface estate.[249] The Ninth Circuit accordingly ruled in June 2020 that the Murrays are the sole owners of the fossils.[250]

However, the Montana District Court and Supreme Court erred by narrowly considering the fossils' "special status." Both courts noted that the parties consider them to be rare and valuable and that they are different in character from traditional minerals unearthed since "the fossils are valuable because of their very existence."[251] Yet by awarding ownership to one party over the other, the courts failed to consider their scientific and cultural value—the true mark of their special status—in addition to their economic worth. As a result, the courts based their rulings on the fossils' unique characteristics distinct from commonplace minerals, which emanate from their scientific and cultural value, but then treated them as ordinary substances by failing to consider any public policy implications of the attributes which make them distinct from ordinary minerals. In other words, it is counter to the internal logic of the case to only consider the nature of the fossils' "special" status in determining ownership but not to consider whether and how ownership itself should be different than for commonplace minerals. Both courts, therefore, failed to explore the full implications of their definitions of "minerals." While the Ninth Circuit ruled in favor of the opposing party, the problem remains. Ruling that the Seversons won because *these* fossils are "rare and exceptional" in character, even if others are not, fails to recognize that their special character is tied to their scientific and public value.[252] The public interest was thus not

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248 *Id.* at 91 (Murguia, J., dissenting (quoting Murray v. BEJ Minerals, LLC, 908 F.3d 437, 450 (9th Cir. 2018)).

249 *Id.* at 91.

250 Murray v. BEJ Minerals, LLC, 962 F.3d 485 (9th Cir. 2020).

251 Murray v. Billings Garfield Land Co., 187 F. Supp. 3d 1203, 1211 (D. Mont. 2016).

252 *Murray*, 908 F.3d at 447.

represented in this litigation, even though the specimens' public value is the direct result of their scientific and cultural status.[253]

The new Montana statute on fossil ownership shows that the Montana Legislature recognized that this litigation sparked a need for change. Nonetheless, by failing to acknowledge the public interest in the fossils, the law solidifies and validates the widespread practice of selling fossils without access for the scientific community by preempting future disputes. As of the Montana Supreme Court ruling in May 2020, the Murrays had an agreement to sell the fossils to a United States-based museum.[254] While a positive outcome if the agreement does come to fruition, this case does not change the reality that the public's ability to learn of future fossils is still dependent on the whims of the owners, resulting in some significant specimens becoming inaccessible to the public.[255] But now Montana, a particularly fossil-rich state, has a body of law solidifying the industry around the fully private nature of fossil ownership. Moreover, if the specimens do not ultimately reside in a museum, this case provides tacit support for future finders and landowners to similarly not provide public or academic access during the potentially lengthy process of identifying a buyer. Here, the fossils sat dormant in a "secret storage room" for nearly a decade prior to litigation, providing little, if any, direct benefit to the stakeholders and none whatsoever to the public as they awaited a buyer.[256] Neither the new Montana statute nor any of the court decisions in this litigation prevent future landowners from doing the same for future discoveries.

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[253] Nevertheless, a past president of the Society of Vertebrate Paleontology stated that the ruling of the Montana Supreme Court is a "win for scientists" because tying fossils to mineral rights could make it harder to obtain permission to excavate and raise doubts about the ownership of fossils already on display. Warren Cornwall, *Court Rules 'Dueling Dinos' Belong to Landowners, in a Win for Science,* SCI. MAG. (May 22, 2020, 7:45 PM) https://www.sciencemag.org/news/2020/05/court-rules-dueling-dinos-belong-landowners-win-science [https://perma.cc/Y8GT-G3F5]. However, one party or another still has total dominion over the fate of the fossils.

[254] *See id.*

[255] *See supra* text accompanying notes 6–7.

[256] *See* Sager, *supra* note 9.

C. *Impact of Absences in the Fossil Record on Evolution and Climate Change Study*

The absence of laws governing paleontology discovered on private land, as exemplified through the Dueling Dinosaurs case, is problematic because it prevents scientists from accessing the full fossil record to deepen human understanding of both evolution and the current climate change crisis. A more nuanced understanding of evolution is itself of value because it allows society to better understand the position of humanity in the history of the world relative to the millions of species that have existed. The desire to understand the past is a human value deserving of protection. The widespread craving to learn about one's past is evident today in the rising popularity of genetic testing: 23andme has tested 30 million people and Ancestry.com has sent kits to 15 million people as of the summer of 2019.[257] The history of the planet is an extension of that same desire, albeit on a macroscopic level: the age of dinosaurs and the Ice Ages can show the changing environment that subsequently allowed mankind to exist and thrive on the planet.

More pressing, paleontologists require these fossils to study the ancient climate to mitigate the current climate change crisis. Using mammal fossils from a site in Colorado, scientists have postulated that the man-made climate change crisis will not benefit from the natural population migrations that offset the ecological effects of species' disappearance in response to specific climactic changes.[258] Rather, the accelerated speed of the current climate change will prevent adjacent species from replacing the dying ones quickly enough because they will likely face their own climate-induced troubles and populations' natural immigration rates to the needed locales may be outpaced by an accelerated rate of population decline.[259] Consequently, species diversity will decrease and

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[257] Christina Farr, *Consumer DNA Testing Has Hit a Lull—Here's How It Could Capture the Next Wave of Users,* CNBC (Aug. 25, 2019, 12:52 PM), https://www.cnbc.com/2019/08/25/dna-tests-from-companies-like-23andme-ancestry-see-sales-slowdown.html [https://perma.cc/5ZE5-XP4V].

[258] *See* ANTHONY D. BARNOSKY, BIODIVERSITY RESPONSE TO CLIMATE CHANGE IN THE MIDDLE PLEISTOCENE 4, 345 (2004).

[259] *See id.* at 345.

ecosystem stability will break down.[260] Considering that air, water, and food ultimately rely on biodiversity, this is a major concern. To rectify the situation, the authors state that scientists must continue to monitor diversity in natural systems and compare them to those in museum collections to take preventive action, such as repopulating an area with a species that serves a similar ecological function.[261]

Despite the potential for these solutions, scientists will not be able to continue preparing for the negative effects of climate change if they do not have necessary and sufficient material to conduct their research. In one particularly stark example, a Polish team recently studied the oxygen isotope profiles in *ichthyosaur* (large marine reptile) and fish teeth as a proxy for the internal body temperature, which allows for paleoenvironmental reconstructions that in turn enables comparisons with the modern climate.[262] Meanwhile, another *ichthyosaur* discussed *supra* was featured in a 2019 issue of *National Geographic* as a centerpiece in a master bathroom in Southern California.[263] While there is no indication that this Polish team wanted additional *ichthyosaurs* for their research, the very different uses of these ancient skeletons suggests that the *ichthyosaur* in Southern California could have similarly aided researchers address the impending global warming crisis. The use of scientifically significant material as personal trinkets similarly occurs in studying evolution. As of 2018, Thomas Carr of Carthage College in Wisconsin estimated that there were at least fifteen *tyrannosaurus rex* skeletons in private hands, several of which are younger dinosaurs that were particularly important to his research on how *tyrannnosauroids* develop as they grow older.[264] He states, "It's a significant number that can really fill in gaps in our knowledge of *T. rex.*"[265]

The pull of material away from scientific reach is problematic because the fossil samples naturally available to mankind are small

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260 *See id.*

261 *See id.*

262 *See* Hubert Wierzbowski et al., *Oxygen Isotope Profiles of Uppermost Jurassic Vertebrate Teeth and Oyster Shells: A Record of Paleoenvironmental Changes and Animal Habitats*, 34 PALAIOS 585 (2019).

263 *See supra* text accompanying note 112.

264 *See* Reynolds, *supra* note 116.

265 *Id.*

compared to all that once existed due to the requirements and randomness of fossil preservation.[266] The commercial fossil market then exacerbates the already spotty nature of the fossil record by preventing material that has been preserved from receiving relevant scientific analyses. By failing to protect this material from disappearing into private collections, society ultimately harms itself and its future. While scientists more typically use microfossils and plant fossils to study the ancient climate, vertebrate fossils can provide important contributions as in the example discussed herein.[267] Since this subset of paleoclimatologically significant material is most enticing to collectors, it is deserving of greater protection to ensure continued access.

D. United States as a Source Country

In art and cultural heritage law, scholars often discuss contested objects through the lens provided by John Merryman of Stanford University. He labeled developing nations where art and cultural heritage originate "source countries."[268] Merryman claimed that source countries typically adopt a nationalist perspective, in which certain nations have a special interest in objects independent of their current legal ownership that legitimizes national export controls and demands for repatriation.[269] By contrast, he aptly named wealthy nations that receive and sell art and cultural heritage "market countries."[270] Market countries usually adopt a universalist perspective, where objects of archaeological or historical interest constitute components of a common human culture, regardless of their place of origin or national jurisdiction.[271]

Merryman's dichotomy, however, is an oversimplification because many prominent market countries are also source countries in their own right. The United States is unquestionably a powerful

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266 *See* Jussi Eronen et al., *Ecometrics: The Traits that Bind the Past and Present Together,* 5 INTEGRATIVE ZOOLOGY 88, 91 (2010).

267 *See, e.g.*, Daniel J. Peppe et al., *Reconstructing Paleoclimate and Paleoecology Using Fossil Leaves*, *in* METHODS IN PALEOECOLOGY 289 (D. A. Croft et al. eds., 2018).

268 *See* John Merryman, *Two Ways of Thinking About Cultural Property*, 80 THE AM. J. OF INT'L LAW 831, 832 (1986).

269 *Id.*

270 *Id.*

271 *Id.* at 831.

market country. In 2019, the United States commanded 44% of the global art and cultural heritage market share, which not only solidifies its position of commanding the largest market internationally but also bests the United Kingdom and China, accounting for 20% and 18% of the market respectively.[272] In addition, fossils are a form of American national heritage with cultural value that originates in the United States and is of interest on an international stage, which have been used as symbols of American power since the founding of the country.[273] Since American dinosaurs are currently housed in international institutions and still auctioned off abroad, the United States is a source country for vertebrate paleontology.[274] By failing to protect, preserve, and regulate the entirety of its paleontological material, the United States arguably does not fully embrace its status as a source country. Whether this is due to its prominence as a market country or longstanding commitment to private property, the result is that the United States provides far less protection to its source material of international interest compared to similarly situated source countries.

Italy serves as a useful comparison. An important aspect of Italian national heritage is undeniably Roman ruins. Italian law vests ownership of all antiquities found on Italian soil in the state, regardless of whether the material was unearthed on private or public property, because the primary proprietor of cultural heritage is the national public.[275] Anyone who discovers items defined as cultural heritage, which includes paleontological finds, must report the discovery within twenty-four hours, provide for their temporary conservation, and leave them in the condition and place in which

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[272] S. Lock, *Share of the Global Art Market, by Country, in 2019,* STATISTA, https://www.statista.com/statistics/885531/global-art-market-share-by-country/ [https://perma.cc/L8BC-5VM3].

[273] *See supra* Section I.A.

[274] *See supra* Section I.A; Agence France-Presse, '*New' Dinosaur Species Fetches €2m at Paris Auction,* THE GUARDIAN (June 4, 2018, 2:30 PM), https://www.theguardian.com/science/2018/jun/04/new-dinosaur-species-carnivorous-allosaurus-paris-auction-france [https://perma.cc/T7PD-LNRZ].

[275] Decreto Legislativo 22 gennaio 2004, n.42 art. 91 (It.); Andrew Slayman, *Recent Cases of Repatriation of Antiquities to Italy from the United States*, 7 INT'L J. OF CULTURAL PROP. 456, 457 (1998); Federico Lenzerini, *Italy*, *in* THE IMPACT OF UNIFORM LAWS ON THE PROTECTION OF CULTURAL HERITAGE AND THE PRESERVATION OF CULTURAL HERITAGE IN THE 21ST CENTURY 444 (Kono ed., 2010).

they were found.[276] The government provides a prize to the landowner for the discovery, which may not be higher than one quarter of the value of the object as determined by the Ministry of Cultural Heritage and Antiquities.[277] While the landowner can request to instead be rewarded with property rights over the find, the discovery would still be considered "goods of public interest" and subject to restrictions even if granted.[278] For instance, if the rightsholder wishes to sell the object, he must notify the Ministry, which has the right of preemption.[279] Similarly, the state can require specific measures of conservation or permission for the public to visit the discovery.[280] Additionally, the state prohibits movable cultural property from exiting the country.[281] In contrast, Egypt is even stricter and simply does not permit private ownership or possession of antiquities, except if the owner acquired the objects prior to 1983 and registered them with the government.[282] Italy and Egypt are not alone: source countries across in the Middle East, Africa, Central America and Latin America have passed similar forms of legislation that restrict or fully prohibit private ownership of cultural heritage.[283]

These laws communicate the value the respective source countries place on preserving their cultural heritage. Like Roman ruins, American paleontology is a significant form of national heritage with cultural value because of the role of this material in establishing the nation's identity among global superpowers at pivotal moments in its history as well as its ability to educate about evolution, climate change, and the early planet.[284] While the dinosaurs

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276 D.Lgs. n. 42/2004 art. 90. Costs incurred will be reimbursed by the government. *Id.*

277 *See* Lenzerini, *supra* note 275, at 449.

278 *Id.* at 445.

279 *Id.* at 449.

280 *Id.* at 448.

281 D.Lgs. n. 42/2004 art. 65.

282 Law No. 03 of 2010 (To Amend the Law on the Protection of Antiquities, Law No. 117 of 1983), al-Jarīdah al-Rasmīyah, 14 Feb. 2010, art. 8 (Egypt).

283 *See* Sibel Ozel, *Under the Turkish Blanket Legislation: The Recovery of Cultural Property Removed from Turkey,* 38 INT'L J. LEGAL INFO. 177 (2010); Constance Callahan, *Warp and Weft: Weaving a Blanket of Protection for Cultural Resources on Private Property,* 23 ENVTL L. 1323, 1325 (1993); Christa Roodt, *Cultural Heritage Jurisprudence and Strategies for Retention and Recovery,* 35 COMP. & INT'L L. J. S. AFR. 157, 164 (2002).

284 *See supra* Section I.A.

that established paleontology's place in American culture and history are not threatened by the current absence of legislation, the pieces that are in danger are scientifically and qualitatively com-parable and so should similarly be preserved. Today, American paleontology remains the centerpiece in many international museums and auctions.[285] To continue and enhance this position, the protection and preservation of paleontology cannot be left to chance.

E. A Different Approach: International Vesting Laws

The United States is not the only country to struggle with striking the appropriate balance between academia and commercial fossil collectors. There is significant variation internationally with the amount of regulation over fossil collecting and ownership.[286] Unlike the United States, some fossil rich regions vest ownership of all paleontology in the state.[287] In Mongolia, the most recent constitution passed in 1992 declares that "historical, cultural, scientific, and intellectual heritages of the Mongolian people shall be under State protection."[288] Permits are required for both digging and exporting fossils.[289]

Mongolia, however, has had limited success in enforcing these stringent rules. According to a Mongolian paleontologist, "hundreds of partial or complete dinosaur skeletons have been poached, as well as thousands of other fragmentary remains and eggs."[290] According to the Association of Applied Paleontological Sciences, skulls, bones, and complete skeletons from Mongolia and China have been available since the early 2000s at trade shows, on E-bay, and

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285 *See supra* Section I.A; *see* France-Presse, *supra* note 274.

286 Vincent Santucci, *Legislation Protecting Dinosaur Fossils*, *in* ENCYCLOPEDIA OF DINOSAURS 403 (Philip Currie and Kevin Padian eds., 1997).

287 United States v. One Tyrannosaurus Bataar Skeleton, 2012 U.S. Dist. LEXIS 165153 at *29 (S.D.N.Y. 2012); *see* Pringle, *supra* note 25, at 367.

288 *One Tyrannosaurus Bataar Skeleton*, 2012 U.S. Dist. LEXIS 165153 at *29.

289 John Pickrell, *The Curious Case of Mongolia's Missing Dinosaur Fossil and How it Made its Way Home,* POST MAG. (Mar. 15, 2020, 5:00 AM), https://www.scmp.com/magazines/post-magazine/long-reads/article/3074950/curious-case-mongolias-missing-dinosaur-fossil [https://perma.cc/R53S-YA26].

290 *See id.*

at prominent auction houses.[291] One particularly notorious sale occurred in 2012, when Heritage Auctions attempted to sell a *tyrannosaurus bataar* skeleton. While the property sold for $1,052,500 to an unnamed buyer, the Mongolian president intervened to ask the United States to repatriate the property because it was illegally unearthed and exported.[292] The Southern District of New York ruled in Mongolia's favor and the United States subsequently repatriated the fossils.[293]

Alberta, Canada similarly vests ownership of all fossils discovered in the province to the government through their Historical Resources Act, but obtains a very different outcome.[294] Excavations require a permit, which is issued only to qualified paleontologists.[295] Surface collecting, however, is allowed on provincial Crown land as well as on private land with the landowner's permission.[296] However, even legally obtained surface specimens cannot be sold, altered, or removed from the province without government permission, which is not given for vertebrate fossils.[297] According to a paleontologist from the Royal Tyrell Museum, the Historical Resources Act has curtailed damaging excavations by untrained individuals.[298]

Unfortunately, vandalism and theft still occur in Alberta. In 2012, vandals at an Alberta dig site snapped the bones of an "invaluable" duck-billed dinosaur and scattered them at a nearby campsite among a mess of beer cans and garbage.[299] As of the date

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[291] George Winters, *International Fossil Laws,* THE J. OF PALEONTOLOGICAL SCI. (May 1, 2013), https://aaps-journal.org/Fossil-Laws.html [https://perma.cc/S47P-7W8H].

[292] *See* David Moscato, *Mongolian Dinosaurs and the Poaching Problem,* THE SCIENTIST (Sept. 8, 2017), https://www.the-scientist.com/news-analysis/mongolian-dinosaurs-and-the-poaching-problem-30946 [https://perma.cc/BY4T-YBQ4].

[293] *See id.*

[294] *See* Pringle, *supra* note 25, at 367.

[295] *Found a Fossil?* THE ROYAL TYRRELL MUSEUM, https://tyrrellmuseum.com/research/found_a_fossil [https://perma.cc/MU8L-3B3G].

[296] *See id.*

[297] *See id.*

[298] *See* Pringle, *supra* note 25, at 367.

[299] Jake Edmiston, *Dinovandals Strike Again: Paleontologists Decry Destruction of Dinosaur Bones at Northern Alberta Site,* NAT'L POST (July 25, 2012), https://nationalpost.com/news/canada/dinovandals-strike-again-paleontologists-decry-latest-destruction-at-northern-alberta-site [https://perma.cc/UYV3-2HVQ].

of the incident, the Royal Tyrell Museum had recorded ten instances of vandalism or theft at dig sites since the 1980s.[300] More common is curious passersby pocketing bones from sites.[301] But instances of illegal commercial fossil hunting appear to be limited.[302] According to Professor Phillip Currie of the University of Alberta, Canadian professional fossil hunters are not as common or as adept as those in Mongolia.[303] One of the few known instances of poaching occurred in the late 1980s, where people chartered helicopters and posed as agricultural inspectors to try to find recently publicized dinosaur eggs.[304] Paleontologists believe that a black market in Albertan specimens is minimal because of the steep fines: $50,000 and/or one year in prison.[305]

Prior to the attempted Bonhams sale of the Dueling Dinosaurs in 2013, paleontologist Thomas Carr posted an article on his blog that advocated for this system.[306] He wrote that the federal government should intervene and seize the Dueling Dinosaurs, as well as a few other specimens in the auction, with eminent domain and compensate the owners' expenses in collecting and preparing the specimens.[307] Afterwards, he argued, the United States should adopt the paleontology laws of Alberta.[308]

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300 *See id.*

301 *See id.*

302 Rob Drinkwater, *Vandals Destroy Prized Dinosaur Skeleton,* THE GLOBE AND MAIL (July 22, 2012), https://www.theglobeandmail.com/news/national/vandals-destroy-prized-dinosaur-skeleton/article4435010/ [https://perma.cc/X4H4-B535].

303 *See id.*

304 *See id.*

305 *See id*; *see also Found a Fossil*, *supra* note 295.

306 Thomas Carr, *How Can We Rescue the Dinosaurs from Tuesday's Auction?* TYRANNOSAUROIDEA CENT. (Nov. 15, 2013), http://tyrannosauroideacentral.blogspot.com/2013/11/how-can-we-rescue-dinosaurs-from.html [https://perma.cc/6U86-MT85].

307 *Id.*

308 *Id.* Carr's proposal would not compensate the owner for the value of the fossil and thus would likely be unconstitutional under the Fifth Amendment. *See infra* text accompanying notes 314–315.

III. SOLUTION: TEMPORARY CUSTODY OF SCIENTIFICALLY SIGNIFICANT MATERIAL

While a national vesting statute would appear to best serve the scientific community, such a solution is shortsighted because it is both overly broad and ignores the significant contributions the commercial sector currently provides to paleontology. Instead, the proposed Model Act would target only the scientifically significant material discovered in the United States and provide a financial incentive for compliance. While the Model Act raises constitutional concerns of an eminent domain taking, the proposal would be neither a categorical nor regulatory taking due its temporary nature and financial benefits.

A. Considering Complete Vesting Statutes for the United States

While implementing the statutory schemes utilized in Alberta and Mongolia would maximize public and academic access, adopting those laws in the United States would not be advisable. Even if a vesting statute could be signed into law, the government would be required to pay just compensation under eminent domain for all material submitted from private land due to the permanence of the taking. This would be a significant, ongoing and usually unjustifiable expense because a substantial amount of material unearthed is not of scientific interest.[309] Such a proposal would thus be expensive and over-inclusive, denying the rights of citizens to own, enjoy, and profit from material that would be of little scientific or display value.

But even if a permanent vesting statute passed and the federal government was willing to overlook these weaknesses, balancing the equities entirely in academia's favor would have negative consequences for the field as well. First, a black market in specimens would be highly likely. While paleontologists in Alberta believe a black market in their specimens is minimal despite heavy regulation, the overall commercial fossil industry in Canada today is relatively small compared to the United States, which justifies greater concern that some of the less scrupulous in the business may continue working despite stringent new laws.[310]

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309 Murray v. Billings Garfield Land Co., 187 F. Supp. 3d 1203, 1207 (D. Mont. 2016).

310 *See* Drinkwater, *supra* note 302.

Second, the commercial fossil industry in the United States is responsible for a sizable portion of modern paleontology discoveries because the private sector typically has more time and money to devote to fieldwork, not to mention oftentimes local expertise.[311] If new legislation were to eliminate the industry entirely, then fewer specimens would be available for anyone. Instead, the fossils poking out of the surface of Midwestern cliffs would likely be damaged or destroyed by the elements.[312] According to Mark Norell, paleontologist at the American Museum of Natural History in New York, "there are a lot more fossils out there that are just being destroyed by neglect and erosion than there are paleontologists that can actually collect them."[313] As a result, instead of increasing the likelihood that scientific institutions would find material that is currently privately owned, it is more likely that fewer specimens would reach them through donation or sale. Thus despite the harm that commercial paleontology imposes on public access to this form of national scientific heritage, eliminating the industry is an unlikely and shortsighted solution.

Not only is Thomas Carr's suggestion of adopting Alberta law flawed, but seizing specimens under eminent domain under his formulation is even more problematic. Carr contemplated a low expense for seizing the Dueling Dinosaurs in the days before the Bonhams auction: the cost of collection and preparation.[314] This, however, would have been unconstitutional because courts define the "just compensation" requirement of eminent domain as fair market value, which is what a willing buyer would pay to a willing seller on an open market.[315] Needless to say, the fair market value for a particularly acclaimed specimen would be well beyond acquisition costs. As a result, a proposal that the federal government seize material and pay fair market value would likely rarely be feasible due to the significant costs.

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311 *See supra* Section I.B.

312 *See* Larson, *supra* note 99, at 9.

313 *See* WALL STREET JOURNAL, *supra* note 97.

314 *See* Carr, *supra* note 306.

315 Almota Farmers Elevator & Warehouse Co. v. United States, 409 U.S. 470, 472–74 (1973).

Instead, both academia and the commercial paleontology industry would be better served by cooperating with one another. The proposed Model Act seeks to facilitate such cooperation by providing an exchange that would benefit both parties: temporary academic and public access to important paleontological discoveries in exchange for the financial benefits that often accompany official affiliation with academic institutions. Anecdotal evidence from the art market suggests that academic affiliation typically increases an object's economic value. Professor J.J. Brody of the University of New Mexico, for instance, published a book in 1977 on Mimbres painted pottery.[316] In the introduction to the 2005 revised edition, Brody wrote that the original book increased demand for Mimbres pottery, particularly those pictured in the book that were already in private collections because Brody implicitly certified them as authentic and so they became "desirable trophies" for collectors.[317] Similarly in 2014, Professor Donna Yates of Maastricht University in the Netherlands wrote that Pre-Columbian artifacts in an upcoming sale were most likely discovered by the noted archaeologist Sylvanus Morley around 1910.[318] The piece ultimately sold for roughly twice the amount of comparable objects, which archaeologists believed was the product of both an academic establishing an ownership history for the object and connecting it to a famous archaeologist.[319] Again in 2019, Christie's sold an Egyptian statue of a god for $50,000 that was previously owned by an Egyptologist.[320] The estimate for the lot, however, was a mere

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316 J.J. Brody, *Mimbres Painted Pottery, Revised Edition,* SAR, https://sarweb.org/mimbres-painted-pottery-revised-edition/ [https://perma.cc/YHK2-ZUU5]. The Mimbres were a Native American tribe who lived in the American Southwest from 1000 C.E. to 1140 C.E. *Id.*

317 *See id*. at xvi.

318 Donna Yates, *Archaeological Institute of America St. Louis Society Selling Mesoamerican Antiques at Auction*, ANONYMOUS SWISS COLLECTOR (Oct. 27, 2014), http://www.anonymousswisscollector.com/2014/10/archaeological-institute-of-america-st-louis-society-selling-meosamerican-antiquities-at-auction.html. [https://perma.cc/UV6Q-86RF].

319 E-mail from Donna Yates, Assoc. Prof., Maastricht U., to author (Feb. 21, 2020) (on file with author).

320 *An Egyptian Bronze Anubis,* CHRISTIE'S, https://www.christies.com/lotfinder/lot_details.aspx?intObjectID=6199539&lid=1&From=salesummery&sid=76d64300-5136-4f9d-b055-5ad0b60c3856 [https://perma.cc/SAE4-7ZHR].

$5,000-7,000.[321] Like the Pre-Columbian artifact, this Egyptian statue likely increased in value because of its affiliation with an academic. Finally, James Kennedy, owner of the Florida mammoth etching described *supra*, most likely could not have sold his specimen for an undisclosed sum significantly above $80,000 without the academic findings from the University of Florida supporting its authenticity and cultural value.[322]

While additional quantitative research is necessary, these episodes demonstrate a correlation between academic affiliation and heightened economic value. In all of the above examples, the primary academic contribution was only implicit or explicit statements of authenticity—not statements about its singularity—and still the prices jumped. Concerns about fakes and forgeries are more prevalent in the art market where scientific analysis is less definitive, so a law-abiding landowner and commercial dealer need not be concerned about such an analysis decreasing specimens' value when both should have firsthand knowledge of the fossils' authenticity based on observing them in the ground.[323] A scientific analysis should only establish any heightened value above that which is readily discernable and the specimens only available to institutions through this program would be those whose uniqueness must be established prior to scientific study.

The recent monumental auction of the *tyrannosaurus rex* Stan for $31.8 million dollars to an anonymous buyer is perhaps the strongest data point supporting this trend.[324] As discussed *supra,* the past record was $8.3 milllion and, in past years, specimens have struggled to approach this benchmark.[325] Originally unearthed in 1987 on private land, Stan has spent the majority of the past decades on display in the museum of commercial paleontology company

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321 *See id.*

322 *See supra* Introduction.

323 Jane Kallir, *Art Authentication Is Not an Exact Science,* THE ART NEWSPAPER (Nov. 23, 2018, 6:58 AM), https://www.theartnewspaper.com/comment/art-authentication-is-not-an-exact-science [https://perma.cc/BN5S-6A3Z].

324 *See supra* text accompanying note 36. The sale occurred as this Note was heading to press, so limited information is currently publicly available.

325 *See supra* text accompanying note 13.

Black Hills Institute of Geological Research.[326] The museum has provided access to researchers, resulting in numerous scientific papers.[327] The ultimate selling price for Stan was unprecedented, perhaps in part due to the significant body of research already in existance on the specimen. The Model Act would ensure that future specimens would have the chance to be publicly viewed and researched like Stan prior to first auction, albeit for a far shorter period of time. But unlike Stan, the Model Act would require recurrent scientific access to allow future insights and publications.

While paleontologists and archaeologists have condemned engaging in activities that increase the value of specimens, the refusal of a large portion of academics to collaborate with the commercial sector only furthers a moral goal. By rejecting opportunities for research or display because of potential financial repercussions for the specimens or lack of permanent access, both academics and the public lose the opportunity to learn about significant individuals in the fossil record. The proposed Model Act[328] addresses the concern that scientists feel they cannot study material without continual access by requiring access every ten years. The additional concern that academic affiliation will increase prices and demand is well founded, but museums are often unable to afford unique discoveries available on the market so the actual loss is limited. Similarly, the Model Act does not preserve contextual information in the dig site because it legislates later in the process; however, legislating earlier would be impractical as discussed *supra*. Ultimately, the Model Act would not require institutions to participate.

The Model Act would address concerns about the current loss of academic information without the drawbacks of a universal vesting statute. First, the Model Act would have a greater chance of garnering support because it would provide benefits to both academia and the commercial sector, rather than favoring one side entirely. For those same reasons, a black market would be less likely

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326 *See* Michael Greshko, *'Stan' the T. Rex Just Sold for $31.8 Million – And Scientists are Furious*, NAT. GEO. (Oct. 12, 2020), https://www.nationalgeographic.com/science/2020/10/stan-tyrannosaurus-rex-sold-at-auction-paleontologists-are-furious/ [https://perma.cc/NJ5G-UQCD].

327 *See id.*

328 *See supra* Section I.D.

to develop or would at least be diminished because dealers would have an incentive to participate in the program independent of punitive measures. Second, the Model Act would not be overinclusive because it would only target material that is of scientific significance. Finally, the commercial sector could continue to operate and provide contributions to the field. Ultimately, any solution to the current concerns about the paleontology market would need to recognize the importance of compromising and the Model Act proposes such a solution.

B. Reconciling the Model Act with Eminent Domain

The major obstacle to the Model Act is whether it would be considered a taking under eminent domain requiring just compensation for the temporary intervals away from the owner. As discussed *supra*, there are two types of takings under eminent domain: categorical and regulatory takings.[329] The Model Act would constitute neither.

1. Model Act Does Not Constitute A Categorical Taking

The Model Act does not constitute a categorical taking under either *Loretto* or *Lucas*. Turning to *Loretto* first, the Supreme Court established that only permanent physical takings are categorical takings, not temporary physical takings.[330] Some scholars have written that the explicit exclusion of temporary physical takings is at least partially dicta because *Loretto* ultimately found a categorical taking.[331] However, *Loretto* spent several pages considering and overcoming the government's argument that the cable was not a permanent intrusion[332] and compared the two forms of takings numerous times.[333] Moreover, later courts have cited this portion of

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329 *See supra* Section I.C.4.

330 Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 435 n.12 (1982); *see supra* Section I.C.4.

331 *See* Long, *supra* note 190, at 1194.

332 *See id.*

333 *See supra* text accompanying notes 189–190.

the case as authoritative, including the Supreme Court,[334] 2nd Circuit,[335] 9th Circuit,[336] and Federal Circuit.[337]

This holding in *Loretto*, however, is in tension with an earlier line of World War II temporary takings cases. In four cases from 1945-1951, the Supreme Court held that temporary physical occupations of businesses or homes constituted takings requiring just compensation.[338] In one such case, *United States v. Pewee Coal Company*, the United States allegedly possessed and operated the respondent's coal mine from May 1943 – October 1943 to avoid a nationwide miners' strike.[339] By disrupting the process for an orderly settlement of labor disputes, the miners were "challeng[ing] the power of the Government to carry on the war" and the spread of the strikes would have the same effect "as a crippling defeat on the field."[340] The Supreme Court found that a taking occurred and devoted the majority of the opinion to determining just compensation.[341] In opposition to *Loretto*, therefore, the Court seemed to treat this temporary physical taking as a categorical taking requiring just compensation without an additional proto-*Penn Central* analysis. While *Loretto* may overrule the World War II cases by

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334 *See* Ark. Game & Fish Comm'n v. United States, 568 U.S. 23, 38 (2012) ("When regulation or temporary physical invasion by government interferes with private property, our decisions recognize, time is indeed a factor in determining the existence *vel non* of a compensable taking.") (citing *Loretto,* 458 U.S. at 435, n.12 ("temporary physical invasions should be assessed by a case-specific factual inquiry.").

335 Southview Assocs. v. Bongartz, 980 F.2d 84, 93 (2d Cir. 1992) ("The Court added that *absolute* exclusivity of the occupation, and *absolute* deprivation of the owner's right to use and exclude others from the property were hallmarks of a physical taking") (quoting *Loretto*, 458 U.S. at 435, n.12).

336 *See* Sierra Med. Servs. All. v. Kent, 883 F.3d 1216, 1225 (9th Cir. 2018) ("California's mandatory care provision constitutes a temporary restriction on plaintiff's use of their property so this [*Penn Central*] balancing test applies.").

337 *See* Boise Cascade Corp. v. United States, 296 F.3d 1339, 1353 (Fed. Cir. 2002) ("The Court carefully distinguished physical occupations (to which the *Loretto* rule applies) from temporary physical invasions of property by the government (to which the *Loretto* rule does not apply).") (citing *Loretto*, 458 U.S. at 435 n.12.).

338 United States v. Pewee Coal, 341 U.S. 114, 117 (1951); Kimball Laundry Co. v. United States, 338 U.S. 1, 16 (1949); United States v. Petty Motor Co., 327 U.S. 372, 378–89 (1946); United States v. General Motors Co., 323 U.S. 373, 383 (1945).

339 *Pewee Coal,* 341 U.S. at 115.

340 Pewee Coal Co. v. United States, 115 Ct. Cl. 626, 634 (1950).

341 *Pewee Coal,* 341 U.S. at 115.

implication, this is unlikely because it cites *Pewee Coal* as instructive earlier in the opinion.[342]

The proposed Model Act is distinct from *Pewee Coal* and the other wartime cases because the federal government there initiated the temporary physical takings for its own purposes. The Model Act, however, provides temporary custody to ascertain its scientific value for research and public viewing. While expanding scientific knowledge is an objective in legislation such as the PRPA,[343] this same goal directly benefits the financial interests of individual landowners by providing a scientific analysis that is both free of charge and does not require research or networking to connect with the right scholars or institutions. This analysis can increase the economic value of the specimen after the two-year period, so the owner can directly and tangibly benefit from this temporary custody. Conversely, when the federal government took the contested property in the World War II cases, the owners lost all sticks in the bundle and in return only received a benefit spread across the entire American public: winning the war. Thus, unlike the World War II cases, here there is a reciprocal advantage which precludes a categorical taking.

In the event that projections of increased scientific and financial value prove incorrect in some instances, the Supreme Court has held that a reduction in value does not constitute a taking.[344] In *Andrus v. Allard*, the Supreme Court needed to determine whether a prohibition on selling Native American artifacts with eagle feathers constituted a taking, as per restrictions in the Eagle Protection Act that rendered it unlawful to possess or transport objects with bird parts that pre-dated the Act.[345] The Court explained that "prevent[ing] the most profitable use of appellee's property" is not dispositive on whether a taking occurred because a "reduction in the value of

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342 *Loretto*, 458 U.S. at 431.

343 16 U.S.C. § 470aaa-1(a) ("The Secretary shall manage and protect paleontological resources on Federal land using scientific principles and expertise. The Secretary shall develop appropriate plans for inventory, monitoring, and scientific, and educational use of paleontological resources….").

344 Andrus v. Allard, 444 U.S. 51, 66 (1979). The Supreme Court has even held that reductions in value of over 90% are not necessarily sufficient to constitute a taking. *See, e.g.*, Hadacheck v. Sebastian, 239 U.S. 394, 405 (1915) (finding no taking despite a 92.5% diminution in value).

345 *Andrus,* 444 U.S. at 53–54.

property is not necessarily equated with a taking."[346] While the law imposed a significant restraint on one way of disposing the artifacts, "the denial of one traditional property right does not always amount to a taking" because "the aggregate must be viewed in its entirety."[347]

Andrus first demonstrates that the constitutionality of the taking is not dependent on the financial value actually increasing.[348] Second, the system *Andrus* establishes for managing scientific specimens is more restrictive than the Model Act. Both *Andrus* and the Model Act simply remove one, albeit different, sticks in the bundle. From an economic perspective, the difference in the sticks the respective acts regulate renders the Model Act a more landowner-friendly system. *Andrus* not only denies the most profitable economic activity, but in all likelihood denies all or nearly all of its financial benefit; the court's suggestion to charge admission to see the artifacts seems highly unprofitable and unrealistic.[349] Conversely, the Model Act conducts a free analysis that can significantly increase the value and publicity surrounding the artifact prior to a sale. The Model Act, therefore, would not constitute a categorical taking under *Loretto* because the temporary custody is distinct from the wartime cases by providing a service to landowners that can provide direct financial benefit.

The Model Act is similarly not a taking under *Lucas* because the owner retains the option of selling the specimen or receiving just compensation should the federal government deem the specimen worthy of an outright taking. The Supreme Court has explicitly declined to extend *Lucas* to create another categorical taking for regulations that prohibit uses of land for a defined period of time.[350] In *Tahoe-Sierra Preservation Council, Inc v. Tahoe Regional Planning Agency,* the Tahoe Regional Planning Agency issued two moratoria on land development for a period of thirty-two months

346 *Id.* at 66.
347 *Id.* at 65–66.
348 *Id.*
349 *Id.* at 66.
350 Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg'l Planning Agency, 535 U.S. 302, 330–31 (2002).

while studying its impact on Lake Tahoe.[351] The petitioners argued that *Lucas* permits the court to sever a thirty-two month segment from the fee simple estate to then ask whether that segment has been taken in its entirety by the moratoria.[352] The Court rejected this "conceptual severance" argument because it ignores *Penn Central*'s requirement that regulatory takings cases focus on the parcel as a whole.[353] Courts therefore cannot disaggregate property into temporal segments and then determine whether the parties were deprived of all economically viable use during the period.[354] The starting point for the analysis is whether there was a total taking of the entire parcel and, if not, the *Penn Central* test applies.[355]

The Model Act is analogous to the moratoria in *Tahoe-Sierra* in requiring a temporary deprivation and so does not affect a categorical taking. The main difference is that the moratoria are regulations, whereas the Model Act institutes a temporary physical taking. *Tahoe-Sierra* describes the necessity of distinguishing between regulatory and physical takings cases and only citing precedent within the respective category because of "this longstanding distinction between acquisitions of property for public use, on the one hand, and regulations prohibiting private uses, on the other …. "[356] As described above, however, the same act that is for the public benefit provides a service to the landowner that can directly enhance his financial prospects—in other words, the average reciprocity of advantage as required in *Mahon*.[357] Here, both public and private interests are enhanced by the Model Act through a means that restricts private use. Since the proposed Model Act dips into both categories, courts should permit flexibility in applying both sets of case law where pertinent. Moreover, the *Tahoe-Sierra* court was almost certainly not considering scientific, historical, and cultural objects in writing the opinion and dicta above, which should encourage the Court to revise this statement at the next opportunity.

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351 *Id.* at 306.
352 *Id.* at 331.
353 *Id.*
354 *Id.*
355 *Id.*
356 *Id.* at 323.
357 *See supra* Section III.B.1.

Since the Model Act would not constitute a taking under either *Loretto* or *Lucas,* the *Penn Central* analysis is warranted.

2. *Penn Central* Analysis

a) Regulation's Economic Impact on the Owner

The most common way courts measure a regulation's economic impact on the landowner is to estimate the difference, as of the date of the taking, between the fair market value of the property with and without the regulation.[358] As discussed *supra*, the Model Act gives landowners the opportunity to increase the value of the specimen through academic affiliation at no personal cost. In the unlikely event that the specimen is not of outsized scientific import as anticipated, the market price should be no lower than if an institution never inspected it. The market value may still even be higher because academic affiliation typically provides an implicit seal of authenticity, even where the inspecting institution makes no claims about its singularity.[359]

A decrease in realized value would similarly be unlikely to occur based on the time value of money, which states that a dollar today is worth more than a dollar in the future because of inflation and interest rates.[360] A recent study by the Geological Society of America comments that museum and research quality specimens' value are so rare that their value is difficult to determine and tracking changes over a twenty year period is impossible when they are rarely sold more than once.[361] However, the authors surmise that the value of museum and university quality specimens appears to be increasing because large dinosaurs were at the time selling for millions of

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358 John D. Echeverria, *Making Sense of Penn Central,* 23 UCLA J. ENVTL L. & POL'Y 171, 180 (2005).

359 *See supra* Section III.A.

360 Nick Lioudis, *Time Value of Money and the Dollar,* INVESTOPEDIA (Mar. 20, 2020), https://www.investopedia.com/ask/answers/032715/why-does-time-value-money-tvm-assume-dollar-today-worth-more-dollar-tomorrow.asp [https://perma.cc/42AN-7WU5].

361 *See* Scott Hippensteel & Simon Condliffe, *Profiting from the Past: Are Fossils a Sound Investment?*, GSA TODAY 27 (Aug. 2013), https://www.geosociety.org/gsatoday/archive/23/8/pdf/i1052-5173-23-8-27.pdf [https://perma.cc/26DF-EV7J].

dollars.[362] This would align with more readily available information about the art market. The *Art Market 2020 Report* states that artworks in the secondary market tend to appreciate in value because they are durable, their creators are deceased, and they do not rely on any degenerative practical function.[363] Collectively, these trends suggests that the kinds of specimens that would be subject to an appeal under the Model Act are precise-ly the fossils that are so rare that, according to specialists, they typically appreciate in value. The first *Penn Central* factor, therefore, does not indicate that just compensation is required.

b) Extent to Which the Regulation Interferes with the Owner's Reasonable Investment-Backed Expectations

Some courts analyze this factor by considering whether the regulation was foreseeable.[364] However, this is a flawed test because of its vagueness, which inherently raises difficult line drawing questions. The pervasiveness of regulation in American society allows one to argue that every industry is on notice that it could be subject to nearly any kind of new regulation in the future.[365] This is especially true of the natural history market because the PRPA explicitly authorizes the Department of the Interior and the Department of Agriculture to promulgate governing regulations, and, as of writing, the Department of the Interior has yet to do so.[366]

Rather, courts typically evaluate this factor by looking at when and for what purpose the landowner initially purchased the property.[367] People do not usually purchase land with the expectation of finding fossils. *Penn Central* showed that the "parcel as a whole"

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[362] In 2013, commercial fossil dealers sold the infamous *tyrannosaurus bataar* for one million dollars and the first large dinosaur in the United Kingdom for $650,000. Two years prior, the National History Museum of Singapore spent millions of dollars on fossil specimens. E-mail from Scott Hippensteel, Assoc. Professor of Earth Scis., Univ. of North Carolina at Charlotte, to Sara Mazurek (Apr. 14, 2020) (on file with author).

[363] CLARE MCANDREW, THE ART MARKET 2020 86 (2020), https://d2u3kfwd92fzu7.cloudfront.net/The_Art_Market_2020-1.pdf [https://perma.cc/WEJ2-ALUF].

[364] *See* Echeverria, *supra* note 358, at 184; *see also, e.g.,* Connolly v. Pension Benefit Guar. Corp., 475 U.S. 211, 227 (1986).

[365] *See* Echeverria, *supra* note 358, at 184.

[366] *See supra* text accompanying note 135.

[367] *See* Echeverria, *supra* note 358, at 185.

must be considered the denominator rather than a particular subsection at the center of a dispute.[368] Like the *Penn Central* air rights, fossils subject to temporary custody represent a small fraction of the landowner's estate. Additionally, an analysis of this factor must consider whether this *Penn Central* factor favors a taking from the commercial fossil company's perspective. These companies only have an investment-backed expectation in the fruits of the expedition, rather than the parcel as a whole. However, those expectations are not being compromised significantly enough to be a taking—they can still recoup their investment at a later point.

c) Character of the Government Action

Until 2005, scholars wrote that as many as nine definitions of this third *Penn Central* factor existed.[369] *Lingle v. Chevron U.S.A.* narrowed and clarified the term to three.[370] The first is whether the taking involves a physical "invasion from which it [government] directly benefits."[371] As already discussed, the Model Act doesn't squarely fall within this category because it provides a direct service to landowners. Academia and the public would be benefitting from the regulation; the government would not necessarily receive a direct advantage because the successful appealing institution could be private.

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368 Penn Cent. Transp. Co. v. New York City, 438 U.S. 104, 130–31 (1978).

369 *See* Echeverria, *supra* note 358, at 186–199.

370 Lingle v. Chevron U.S.A. Inc., 544 U.S. 528, 542 (2005); see Echeverria*, supra* note 358, at 203–08. Echeverria also identifies a fourth definition of whether the regulation is harm preventing or benefit conferring based on *Mugler v. Kansas,* 123 U.S. 623, 655 (1887). However, *Lucas* likely superseded this definition: "the distinction between regulation that 'prevents harmful use' and that which 'confers benefits' is difficult, if not impossible to discern on an objective, value-free basis." The plain meaning of this language likely eliminates the distinction between the two categories, though Echeverria argues that the test still has salience.

371 Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 432 n.9 (1982). This statement in *Loretto* is a reformulation of the *Penn Central* expression of the "character of the regulation," which was a "physical invasion by government, [rather] than when interference arises from some public program adjusting the benefits and burdens of economic life to promote the common good." *See Penn Cent. Transp. Co.*, 438 U.S. at 124. For a discussion of the changes *Loretto* infused into this prong of the three-factor test, *see* Echeverria, *supra* note 358, at 186–89.

The second definition is whether the regulation impairs the right to devise property to one's heirs, based on Supreme Court cases *Hodel v. Irving* and *Babbitt v. Youpee* where the Court stressed it was "one of the most essential sticks in the bundle of rights."[372] The Model Act does not encroach on this right. The third definition is whether the regulation targets a few owners or has a more general application.[373] Justice Rehnquist emphasized in his *Penn Central* dissent that the generality of a regulation softens the economic burden of the regulation.[374] Similarly, Justice Stevens wrote in his *Lucas* dissent that the regulation at issue targeted landowners along the coast throughout the state, rather than a select few.[375] Conversely, the Model Act targets all privately owned land indiscriminately. Thus, the multiple definitions of the character of the regulation prong of the *Penn Central* test similarly does not support a taking.

C. Trespass to Chattel

Courts should find a public policy exception to the trespass to chattel tort, as has already been established for real property. In *State v. Shack*, the New Jersey Supreme Court held that real property rights do not supersede the rights of an individual.[376] Federal and state courts around the country have additionally relied on the case.[377] Attorney Shack entered private property to aid a migrant worker living there, but the owner-employer only permitted them to meet in his presence.[378] When Shack refused, the owner summoned the police to remove him for trespass.[379] The Court asserted that

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372 *See* Echeverria, *supra* note 358, at 203; *Hodel v. Irving,* 481 U.S. 704, 716 (1987); *Babbitt v. Youpee*, 519 U.S. 234, 244 (1997).

373 *See* Echeverria, *supra* note 358, at 204–07; Keystone Bituminous Coal Ass'n v. DeBenedictus, 480 U.S. 470, 488 (1987) (quoting Pa. Coal Co. v. Mahon, 260 U.S. 393, 415 (1922)).

374 *See* Echeverria, *supra* note 358, at 192–93.

375 *See id.* at 193.

376 State v. Shack, 58 N.J. 297, 303 (1971).

377 Newman v. Sathyavaglswaran, 287 F.3d 786, 798 (9th Cir. 2002); Asociacion de Trabajadores Agricolas v. Green Giant Co., 518 F.2d 130, 139 n.26 (3d Cir. 1975); Velez v. Amenta, 370 F. Supp. 1250, 1256 (D. Conn. 1974); State v. DeCoster, 653 A.2d 891, 894 n.3 (Me. 1995).

378 *Shack,* 58 N.J. at 300.

379 *Id.* at 301.

"property rights serve human values. They are recognized to that end and are limited by it" and as a result "title to real property cannot include dominion over the destiny of persons the owner permits to come upon the premises."[380] The Court explained that the migrant workers' needs can be so urgent and their economic and political power so minimal that the law will prohibit them from contracting away essential services.[381] Therefore, "a man's right in his real property is of course not absolute."[382]

The study of the prehistoric planet is vital to the survival of the entirety of mankind, not the more limited minority class in *Shack*, because of the current climate change crisis as discussed *supra*.[383] Enabling scientists to better prepare for the climate change crisis is an urgent need that public policy should promote. Similarly, allowing scientists to enhance our understanding of evolution is of value and should be protected. For both of these reasons, courts should find a public policy carveout for trespass to chattel for these essential human values, much like the *Shack* court found for trespass to real property.[384]

CONCLUSION

Currently, landowners have unfettered control over the fate of museum and research quality paleontological specimens unearthed on their lands and can sell or even destroy them at will. Existing federal and state legislation protects material only on public lands, so a gaping hole remains. The current absence of federal legislation that attempts to address this problem suggests that the United States as a country values capitalistic enterprises and private property rights over natural history and national cultural heritage. While both are foundational values to the country and important individual rights, the destruction and suppression of this finite resource will negatively impact society's ability to learn who we are, where we come from, and how the planet can continue. Sharing this material

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380 *Id.* at 303.
381 *Id.*
382 *Id.* at 305.
383 *See supra* Section II.C.
384 *Cf. Shack*, 58 N.J. at 303.

is essential to answering these fundamental questions for everyone. The United States should not abandon its foundational entrepreneurial spirit and commitment to private property rights, but instead temper them to reach a compromise that will demonstrate a leading market country's commitment to its own heritage.