Forum

Judicial doom of an ursid genome

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Abstract The Louisiana black bear *Ursus americanus luteolus*, a subspecies of the subtropical south-central USA, was protected by the U.S. Endangered Species Act in 1992 but removed from coverage in 2016 based on the alleged presence of two viable native populations that had begun to interbreed. However, historical and genetic data show that one population is descended from bears captured in the U.S. state of Minnesota, far to the north, and released on the property of a hunting club in Louisiana. A recent judicial decision ignored those data, deferring to deceptive government claims and effectively dooming the native subspecies to genomic extinction through hybridization with the introduced population.

Keywords Bear, endangered species, genomic extinction, hunting, hybridization, invasive species, Louisiana wildlife, Ursidae

Introduction

The date 28 December 2023 marked the 50th anniversary of the U.S. Endangered Species Act (1973), which aimed to conserve biodiversity through law and science. Just a month later, on 29 January 2024, that objective was cast aside when a judge allowed the removal of a bear from coverage by the Act, disregarding scientific evidence of the animal's imminent genomic extinction.

The 1973 Act established a List of Endangered and Threatened Wildlife species and subspecies. The Louisiana black bear *Ursus americanus luteolus* was recognized as a distinct subspecies of the American black bear *Ursus americanus* by the U.S. government when it was added to the List in 1992 and when delisted in 2016 (U.S. Fish & Wildlife Service, 1992, 2016a; see timeline in Fig. 1 for the sequence of events).

Estimates of historical range and numbers

The U.S. Fish & Wildlife Service (2014) issued a map that showed the historical range of *luteolus* to include 292,232 km² in the state of Louisiana and adjacent parts of Texas and Mississippi (Fig. 2). The agency reported a then current population density of 0.66 individuals/km² in the Tensas River National Wildlife Refuge and in nearby protected bottomland hardwood forests in north-eastern Louisiana (U.S. Fish & Wildlife Service, 2016a). This density was estimated after many years of total protection of the bear in an almost completely protected habitat and thus probably approached carrying capacity.

Comparable prime habitat once covered c. 50,000 km² of the historical range of *luteolus* in Louisiana (St. Amant, 1959; Lowery, 1974), which, at 0.66/km², had the potential to support c. 33,000 bears. No density estimates are available for the remaining historical range but the subspecies was common in most areas (Bailey, 1905; Lowery, 1943; Shropshire, 1996). Densities reported for various other populations of *Ursus americanus* averaged c. 0.33/km² (Larivière, 2001). Applying that average to the remaining historical range of *luteolus* would suggest an original population of at least 100,000 individuals for the subspecies.

Intensive hunting and habitat loss led to severe declines in bear numbers (Lowery, 1974). Describing a hunt in the Tensas area, U.S. President Theodore (Teddy) Roosevelt (1908) noted that his guide, Holt Collier, a former slave and Confederate Army cavalryman, had participated in killing over 3,000 bears. Collier had also guided a 1902 hunt in nearby Mississippi during which Roosevelt refused to shoot a captured bear, an incident that led to fabrication of the children's Teddy Bear (Mullins, 2002).

A U.S. Fish & Wildlife Service (1944) survey estimated that by 1941 only 500 individual *luteolus* remained in Louisiana. Most evidently vanished shortly thereafter when a large virgin forest in the Tensas, formerly preserved by the Singer Sewing Machine Company, was clear felled. The logging also led to the loss of the last known population of the ivory-billed woodpecker *Campephilus principalis* and remnant populations of the southern wolf *Canis rufus* and panther *Puma concolor* (Severson, 2007). *Ursus americanus luteolus* did survive in Louisiana but state government surveys of 1946–1951 estimated only about 100 individuals remained, half in the Tensas area and half in the Lower Atchafalaya Basin (St. Amant, 1959; Fig. 2). The two populations were separated by 250 km over which the subspecies had been extirpated, as it soon would be in Mississippi (Shropshire, 1996) and eastern Texas (Schmidly, 1983).

Introduction of a different subspecies

During 1964–1967, a Louisiana government project captured bears of a separate subspecies, *Ursus americanus*

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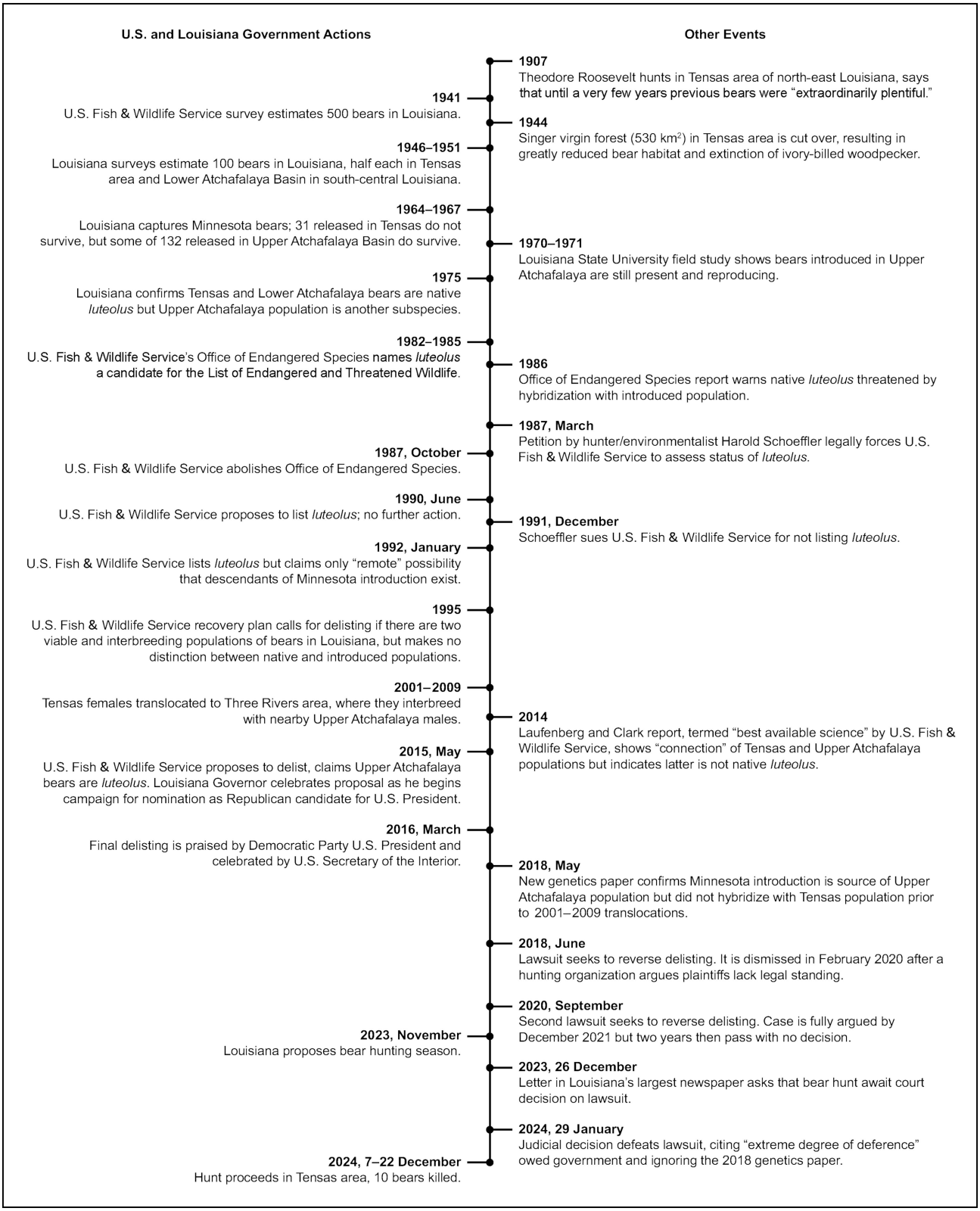


FIG. 1 Timeline of events relevant to the Louisiana black bear *Ursus americanus luteolus*.

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FIG. 2 Map of Louisiana showing the range (in grey shading) of four populations of bears in Louisiana at about the time of the work of Laufenberg & Clark (2014). The Tensas and Lower Atchafalaya areas support populations of native *luteolus*, the Upper Atchafalaya supports descendants of the 1964–1967 introduction of *Ursus americanus americanus* from Minnesota, and the Three Rivers area supports *luteolus* translocated from the Tensas area in 2001–2009 and their hybrids with Upper Atchafalaya *americanus*. The ranges shown in this figure have been drawn as close as possible to those shown by Laufenberg & Clark (2014, p. 5). The inset shows the location of the states of Louisiana (LA), Texas (TX), Mississippi (MS), Arkansas (AR) and Minnesota (MN) within the conterminous United States, and (in green shading) the historical range of *luteolus* as mapped by the U.S. Fish & Wildlife Service (2014). However, the portion of that range in Arkansas was not included in the range of *luteolus* as covered by the Endangered Species Act listing.

americanus, in north-east Minnesota and introduced 31 individuals to the Tensas area, c. 1,800 km to the south in the subtropical climate zone. All of these bears either moved away or perished and a subsequent genetics study confirmed they had not interbred with native *luteolus* (Murphy et al., 2018). A further 132 of the captured *americanus* were released on the property of a hunting club in the Upper Atchafalaya Basin of Louisiana (Fig. 2). Many of those also moved away from the release area but a 1970–1971 Louisiana State University study captured six bears there: four were identified by ear tags as introduced bears and two were evidently cubs of released females (Lowery, 1974).

In 1975, a Louisiana government publication verified that the Upper Atchafalaya population had originated with the introduction of the bears captured in Minnesota, that it represented the subspecies *americanus*, and that the only surviving native populations of *luteolus* were those in the Tensas and Lower Atchafalaya Basin areas. Both populations reportedly were confronted by many adverse factors and were heading towards extinction (Brunett et al., 1975).

Listing

Based in part on the Louisiana government publication (Brunett et al., 1975), in 1982 and 1985 the U.S. Fish & Wildlife Service's Office of Endangered Species named *luteolus* as a candidate for addition to the U.S. List of Endangered and Threatened Wildlife (U.S. Fish & Wildlife Service, 1992). Such listing provides legal protection and other conservation measures and requires that actions authorized, funded or carried out by federal agencies do not adversely affect covered species or their critical habitat. A report by the Office of Endangered Species identified numerous threats to *luteolus*, including potential hybridization with the introduced population of *americanus* (Nowak, 1986). Nonetheless, higher levels of the U.S. Fish & Wildlife Service were reluctant to proceed with listing (O'Byrne, 1992). Then, Harold Schoeffler, a prominent Louisiana environmentalist and hunter, obtained the Office of Endangered Species report and, based in part thereon, submitted a petition to list *luteolus* in March 1987, legally forcing the U.S. Fish & Wildlife Service to initiate a formal assessment. Later that year, the agency abolished the Office of Endangered Species (Shabecoff, 1987).

Although the agency eventually found that listing was warranted (U.S. Fish & Wildlife Service, 1989) and proposed listing *luteolus* (U.S. Fish & Wildlife Service, 1990), alleged uncertainty, together with opposition from the Louisiana government and commercial logging interests, delayed final listing until January 1992, when it was finally actioned after a lawsuit by Harold Schoeffler (O'Byrne, 1992). The listing rule was weak, designating *luteolus* not as endangered but as threatened, which means

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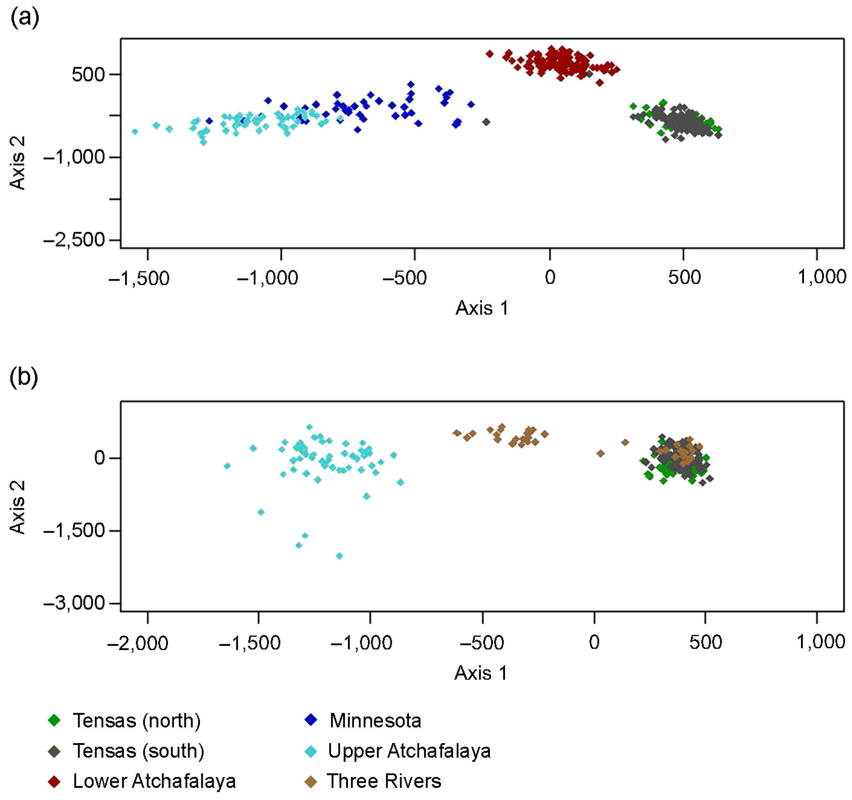


FIG. 3 Factorial correspondence analyses of the genetics of bear populations taken from Laufenberg & Clark (2014). Each dot represents an individual bear. Sample sizes are: Tensas, n ≥ 100; Lower Atchafalaya, n ≥ 100; contemporary population of state of Minnesota, n ≥ 50; Upper Atchafalaya, n ≥ 50. Note (a) the total overlap of two adjacent Tensas samples (one north and one south of Interstate Highway 20) and the separation of other populations but the partial overlap of the Minnesota and Upper Atchafalaya populations, which corresponds to the genetic overlap reported by Laufenberg & Clark (2014). The introduced Upper Atchafalaya population of *americanus* is diverging from its ancestral Minnesota stock and away from the native populations of *luteolus*, not towards the latter as would be expected if there had been hybridization *before* the 2001–2009 translocations. Note (b) that the bears at Three Rivers either closely align with their Tensas parental stock or are genetically intermediate to Tensas and Upper Atchafalaya due to hybridization *after* the 2001–2009 translocations.

only likely to become endangered within the foreseeable future. The rule largely dismissed the hybridization issue and, incredibly, noted only a 'remote' possibility that any descendants of the bears introduced from Minnesota remained (U.S. Fish & Wildlife Service, 1992, p. 594), thus disregarding the 1970–1971 field study (Lowery, 1974) and the 1975 Louisiana government publication (Brunett et al., 1975) showing that only introduced *americanus* were present and reproducing in the Upper Atchafalaya.

Listing did help *luteolus* by setting severe penalties for illegal hunting, enabling habitat protection and providing for other conservation measures and research, which contributed to substantial increases in bear numbers (U.S. Fish & Wildlife Service, 2016a). However, an agency recovery plan called for delisting merely if two viable and interbreeding populations were confirmed, one in the Tensas area and one in the Atchafalaya Basin. This plan made no distinction between the populations in the Upper Atchafalaya (introduced *americanus*) and Lower Atchafalaya (native *luteolus*) and did not mention the introduction of *americanus* from Minnesota in 1964–1967 (U.S. Fish & Wildlife Service, 1995).

Delisting

The opportunities for natural migration and interbreeding between all Louisiana bear populations were minimal (Laufenberg & Clark, 2014). However, a 2001–2009 government project captured 48 *luteolus* females and their cubs from the Tensas area and translocated them to the so-called Three Rivers area (Fig. 2), where no bears had been recorded since the early 20th century. Following this translocation, genetics studies showed that interbreeding was occurring between the Three Rivers and Upper Atchafalaya bears (Laufenberg & Clark, 2014). Consequently, in May 2015 the U.S. Fish & Wildlife Service proposed delisting *luteolus*, treating the Upper Atchafalaya bears as an additional population of that subspecies (U.S. Fish & Wildlife Service, 2015). The proposal relied on a report by Laufenberg & Clark (2014) referred to as 'the best available science' (U.S. Fish & Wildlife Service, 2016a, p. 13143). However, the agency was selective in reviewing the data, emphasizing only the report's finding that the Tensas and Upper Atchafalaya populations were viable and connected through interbreeding in the Three Rivers area.

The delisting proposal ignored the indication in the report that only the Tensas and Lower Atchafalaya populations were native *luteolus* and the finding that the Upper Atchafalaya population was genetically aligned with the existing population of *americanus* in Minnesota (Laufenberg & Clark, 2014). Statistically, the Upper Atchafalaya *americanus* were further removed from the native Louisiana *luteolus* than was the population of *americanus* in Minnesota (Fig. 3a), confirming the absence of a close relationship between *luteolus* and the introduced

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population of *americanus*. Despite this, the proposed delisting asserted that the Upper Atchafalaya population of bears was a native population of *luteolus*.

The claimed connection between bears in the Three Rivers area was actually hybridization between native *luteolus* (translocated from the Tensas area during 2001–2009) and *americanus* from the Upper Atchafalaya (originating from the 1964–1967 introduction from Minnesota; Fig. 3b). It is likely that over time this will result in a fully hybridized population in the Three Rivers area. According to Laufenberg & Clark (2014), some individuals from the Three Rivers area have begun to disperse northwards into the Tensas area, most probably young male hybrids (*luteolus* × *americanus*), placing the Tensas population in danger of genomic extinction. No comparative movement into the Lower Atchafalaya is known, but the smaller resident population of *luteolus* there is not demonstrably viable and faces numerous threats including collisions with vehicles, poaching and habitat fragmentation (U.S. Fish & Wildlife Service, 2016a).

Public comments on the proposed delisting claimed the motivation for the reassessment was political (U.S. Fish & Wildlife Service, 2016a). Paul Davidson, for 24 years executive director of the Black Bear Conservation Coalition, a group formed to work with government agencies on conservation of *luteolus*, commented that delisting was unwarranted and being promoted to allow bear hunting (Davidson, 2015). However, the federal and state bureaucracies, which had tried to avoid Endangered Species Act listing for *luteolus* for many years, proclaimed the alleged recovery of the subspecies a conservation success. This misled both major U.S. political parties at the highest level. Louisiana Governor Bobby Jindal celebrated the proposed delisting just before opening his campaign for nomination as the Republican Party candidate for U.S. President (Cama, 2015). Subsequently, Secretary of the Interior Sally Jewell celebrated the final delisting (U.S. Fish & Wildlife Service, 2016b), augmenting praise by U.S. President Barack Obama of the Democratic Party (Pacelle, 2016).

The final rule of March 2016 cited support from three peer reviewers (U.S. Fish & Wildlife Service, 2016a). However, one reviewer (David Garshelis, co-chair of the IUCN Bear Specialist Group) subsequently co-authored a genetics paper (with a former Louisiana government bear biologist as the lead author, and with Laufenberg and Clark as co-authors) concluding that the Upper Atchafalaya population 'is likely the product of the historical translocated Minnesota bears' (Murphy et al., 2018, p. 1061).

Legal arguments around genetics and other factors

The genetics studies (Laufenberg & Clark, 2014; Murphy et al., 2018) were cited in two successive lawsuits in U.S. federal courts that were instigated in a bid to overturn the delisting. The first was dismissed when Safari Club International, a hunting organization, intervened on behalf of the U.S. Fish & Wildlife Service and argued successfully that the plaintiffs lacked legal standing (Bates, 2020). The second lawsuit achieved standing and emphasized that the Upper Atchafalaya population was not *luteolus* and had not hybridized with the Tensas population prior to the 2001–2009 translocations to Three Rivers (Mitchell, 2021).

In response, the U.S. Fish & Wildlife Service argued that there could have been dispersal and interbreeding between the Upper Atchafalaya population and the two native populations in the Tensas area and Lower Atchafalaya even before establishment of the Three Rivers population. This claim was contrary to Laufenberg & Clark (2014) and was largely based on unsupported opinion in an unpublished, earlier report (Pelton, 1989). The agency's position was contradictory in asserting that *luteolus* had been saved as a subspecies but also that it had already undergone hybridization and therefore further genomic mixing did not matter. The U.S. Fish & Wildlife Service even suggested that an untagged male, sighted during the 1970–1971 study of the introduced population of *americanus* in the Upper Atchafalaya, was *luteolus*, and that by implication the entire population in the Upper Atchafalaya was *luteolus* (Finnegan, 2021). In reality, the animal could have been the offspring of an introduced female, or it could have been an introduced bear that had lost its ear tags, a common occurrence (Diefenbach & Alt, 1998).

The lawsuit pointed to the reduced distribution and numbers of *luteolus* (Mitchell, 2021). The U.S. Fish & Wildlife Service had claimed that c. 700 bears occupied 7,300 km² (U.S. Fish & Wildlife Service, 2016a). That was just 2.5 % of the historical range of *luteolus*, yet still deceptive, as it included areas occupied by: (1) the introduced population of *americanus* in the Upper Atchafalaya, (2) the hybridized (*luteolus* x *americanus*) Three Rivers bears, (3) a group of bears in Mississippi, which the agency identified as *luteolus* but which Murphy et al. (2018) showed were mostly (63%) migrants from or descendants of a population in the White River Basin of the state of Arkansas, usually considered *americanus* (Hall, 1981), and (4) a small group of bears in north-central Louisiana descended from translocations from the White River Basin population (*americanus*). By contrast, Laufenberg & Clark (2014, p. 90) emphasized that the native Tensas population of *luteolus* 'exists almost entirely' in the Tensas River National Wildlife Refuge and in two nearby state wildlife management areas, a total of just 445 km². The U.S. Fish & Wildlife Service reported a range of 528 km² for the Lower Atchafalaya population of *luteolus*. At the time of delisting, the number of *luteolus* in the Tensas was c. 296, with a further c. 164 in the Lower Atchafalaya (U.S. Fish & Wildlife Service, 2016a). The Tensas population has increased in number and distribution more recently but remains mostly in the Tensas River National Wildlife Refuge (Clark, 2023).

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The lawsuit also challenged a U.S. Fish & Wildlife Service (2016a) claim that interbreeding promotes the health of the native populations. There were no data in the delisting rule, peer reviews, or any other document supporting such a claim. Murphy et al. (2018, p. 1064) did suggest that the Upper Atchafalaya population, which has the highest genetic diversity of any group in the region (probably because of its origin in a widespread, far northern population), 'might be useful as a source for genetic restoration' of the native populations of *luteolus* in the Tensas and Lower Atchafalaya. However, their suggestion was based on a genetics study (Puckett et al., 2015) indicating that *luteolus* may not be distinguishable from *americanus*, as found in the Upper Atchafalaya population.

In their review of American black bears *U. americanus*, Puckett et al. (2015) assessed only two specimens designated *luteolus*, both from Mississippi. As noted by Murphy et al. (2018), most of the bears in Mississippi originated from a different subspecies, most probably *americanus*. The U.S. Fish & Wildlife Service had cited Puckett et al. (2015), but stated: 'although we recognize that there are still questions around the taxonomy, we still consider the Louisiana black bear to be a distinct subspecies' (U.S. Fish & Wildlife Service, 2016a, p. 13143).

Judgment and consequences

The lawsuit was fully argued by December 2021 but 2 years passed with no decision. Meanwhile, the Louisiana Department of Wildlife and Fisheries (2023) proposed a hunting season in the Tensas area. A letter to the editor in Louisiana's largest newspaper asked that hunting await the court's decision (Nowak, 2023); perhaps not coincidentally, that decision came just a month later.

Noting an 'extreme degree of deference' owed to a federal agency, and citing the outdated report (Pelton, 1989) used to support the agency's argument, the judge found that the U.S. Fish & Wildlife Service had used a 'reasoned analysis' in concluding that the Upper Atchafalaya bears were *luteolus* and that all Louisiana populations were 'likely the product of hybridization' (Jackson, 2024, pp. 4, 21, 25, 32). The judge ignored the new study by Murphy et al. (2018) showing that the introduction of bears from Minnesota was the source of the Upper Atchafalaya population of *americanus* but that this had not genetically affected the native Tensas population of *luteolus* prior to government manipulation. No attention was given to Laufenberg & Clark's (2014) analysis (Fig. 3a) showing that the introduced Upper Atchafalaya population is genetically diverging from its ancestral Minnesota stock in a direction away from the native populations of *luteolus*, not towards the latter as would be expected if hybridization had produced the Louisiana populations present at the time of listing.



Plate 1 Mr. Deron Santiny with the 316 kg bear he took during the December 2024 hunting season in the Tensas area. The photograph was published by the Louisiana Department of Wildlife and Fisheries (Iles, 2025), which presented Mr. Santiny with the Teddy Roosevelt Award, now given each season to the hunter who takes the largest bear. (Photograph published with permission of the Louisiana Department of Wildlife and Fisheries.)

The bear hunt took place during 7–22 December 2024 in the Tensas area. Regulations allowed the animals to be habituated to baits for 2 weeks prior to opening of the season so that they could be shot as they returned to the food source (Louisiana Department of Wildlife and Fisheries, 2023). Eleven permits were issued and 10 bears were killed, including a 316 kg male, a near record size for the state (Iles, 2025; Plate 1). A recent state proposal would increase the number of permits for the December 2025 hunt to 26, of which eight would be for an area that includes the range of the Lower Atchafalaya population (Louisiana Department of Wildlife and Fisheries, 2025).

The social behaviour of *luteolus* is not well studied, but male *Ursus americanus* are known to form dominance hierarchies regarding access to females (Garshelis, 2009). The largest and most powerful males displace weaker and younger males, mate with numerous females and sire the most young. Loss of dominant males in the Tensas area, killed by hunters seeking the biggest trophies, may facilitate impregnation of native female *luteolus* by young males dispersing from the introduced/hybrid populations farther south. That outcome would exacerbate the careless judicial decision that is compromising the integrity of both the historical Tensas population of *luteolus* and the precepts of the U.S. Endangered Species Act. The Act would allow a petition for emergency relisting of the bear, perhaps based in part on information presented here, but such would be only the beginning of an arduous legal and conservation effort.

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Conflicts of interest The author was a plaintiff in the two lawsuits in U.S. federal courts that attempted to overturn the delisting.

Ethical standards This research abided by the *Oryx* guidelines on ethical standards.

Data availability All source material that is not publicly available online is available from the author upon reasonable request.

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