

Appendix A. 108 species that have become extinct since 1973, organized by state.					
Common Name	Scientific Name	Taxon	Range	Last Seen	Conservation History
Amak Island song sparrow	<i>Melospiza melodia amaka</i>	Bird	AK	1988	Approximately 25 individual Amak Island song sparrows (<i>Melospiza melodia amaka</i>) were seen in July 1987; only four or five were observed in July 1988.
Eskimo curlew	<i>Numenius borealis</i>	Bird	AK and continental	1987	The Eskimo curlew (<i>Numenius borealis</i>) was formerly across much of the eastern U.S. and Canada. It was driven to extinction by hunting, conversion of winter and migratory stopover grassland habitat to agriculture, and commercial development. One of its key prey species, the Rocky Mountain grasshopper, was also driven extinct by habitat loss. The last reliable sighting was in 1987, though unconfirmed and questionable sightings occur to this day.
Cahaba pebblesnail	<i>Clappia cahabensis</i>	Snail	AL	1976	The Cahaba pebblesnail (<i>Clappia cahabensis</i>) was collected only once in the Cahaba River, Bibb County, Alabama in 1976.
Lined pocketbook	<i>Lampsilis binominata</i>	Mussel	AL, GA	1976	The lined pocketbook (<i>Lampsilis binominata</i>) was last seen alive (four individuals) in 1967 in the Flint River, Pike and Meriwether counties. The last shell, appearing to be three years old, was collected in 1976 in the Flint River at Warm Spring, Georgia [312]
Southern acornshell	<i>Epioblasma othcaloogensis</i>	Mussel	AL, GA, TN	1974	The southern acornshell (<i>Epioblasma othcaloogensis</i>) was last seen in the Cahaba River in the 1930s and the Coosa River in 1974.
Upland combshell	<i>Epioblasma metastrata</i>	Mussel	AL, GA, TN	1988	The upland combshell (<i>Epioblasma metastrata</i>) was last seen in the Cahaba River, AL in the early 1970s, and the Conasauga River, GA in 1988.
Curtus's pearly mussel	<i>Pleurobema curtum</i>	Mussel	AL, MS	1990	Curtus's pearly mussel (<i>Pleurobema curtum</i>) was historically found in the Tombigbee River near Pickensville, Alabama and the East Fork of the Tombigbee River downstream of its confluence with Bull Mountain Creek, Mississippi. A single record from the Big Black River, Mississippi is considered erroneous [310]. Mussel populations in the East Fork have been surveyed regularly since the 1980s. The Mississippi Museum of Natural Science surveyed the most promising pearly mussel habitat in 1990, 1991, 1992, 1993, 1997, 1999, and 2001 [28]. The most recent records are three freshly dead shells killed by a raccoon in 1989 in the East Fork, and two more in 1990 [28].
Marshall's pearly mussel	<i>Pleurobema marshalli</i>	Mussel	AL, MS	1980	Marshall's pearly mussel (<i>Pleurobema marshalli</i>) was historically known from the mainstem of the Tombigbee River in Mississippi and Alabama. It was last seen in 1980 in the Tombigbee River near Columbus, Mississippi [28].
Stirrup shell	<i>Quadrula stapes</i>	Mussel	AL, MS	1984	The stirrup shell (<i>Quadrula stapes</i>) formerly occurred in the Tombigbee River from Columbus, Mississippi to Epes, Alabama, the Black Warrior River, Alabama and in the Alabama River. It was last seen in 1984 [310]
Curtis pearlymussel	<i>Epioblasma florentina curtisi</i>	Mussel	AR, MO	1994	The Curtis pearlymussel (<i>Epioblasma florentina curtisi</i>) historically occurred in the White and St. Francis watersheds of southern Missouri and northeastern Arkansas [1]. In Arkansas, it occurred in the Spring River system, a tributary to the Black River; in Missouri it occurred

					in the White, Black, and Castor river systems [1]. It was last seen in the Little Black River, MO in 1994. Surveys in 1995, 1996, and 1998 did not locate any individuals [50, 103].
Virgin Islands screech owl	<i>Otus nudipes newtoni</i>	Bird	AVI	1980	The Virgin Islands screech owl (<i>Otus nudipes newtoni</i>) historically occurred on several small islands immediately east of Puerto Rico in the Caribbean. It was last seen in 1980 despite a three-week survey of St. John, St. Croix, and St. Thomas in 1995 [211]. These islands contain the largest remaining patches of suitable habitat.
Breckenridge Mountain slender salamander	<i>Batrachoseps "breckenridge"</i>	Amphibian	CA	1983	The Breckenridge Mountain slender salamander (<i>Batrachoseps "breckenridge"</i>) was known only from a single seepage on the southeastern flank of Breckenridge Mountain, Tulare County, California at 6,300 ft [193]. It was discovered in 1979 and seen again in 1983. In the intervening years, black oaks around the seepage had been logged and a logging road had been constructed across the seep [1, 190, 193]. It has not been found since[31]. In 2001, collections of a similar butterfly were made in the Lucas Creek drainage on the northern side of Breckenridge Mountain and deposited in the Museum of Vertebrate Zoology which also houses the original collection [190]. David Wake at UC Berkeley is examining the 2000 and 2001 populations
Fresno kangaroo rat	<i>Dipodomys nitratoides exilis</i>	Mammal	CA	1992	The Fresno kangaroo rat (<i>Dipodomys nitratoides exilis</i>) formerly occurred on about 888,500 acres in an area of grassland and chenopod scrub communities on the San Joaquin Valley floor, from about the Merced River, Merced County on the north, to the northern edge of the marshes surrounding Tulare Lake, Kings County on the south, and extending from the edge of the Valley floor near Livingston, Madera, Fresno, and Selma, westward to the wetlands of Fresno Slough and the San Joaquin River. Fresno kangaroo rats were captured on the Alkali Sink Ecological Reserve in 1981 and 1985, and on adjacent privately owned land in 1981. In spring of 1986 a levee on the south side of the San Joaquin River broke, flooding the Alkali Sink Ecological Reserve and other important habitat. Water nearly a meter deep covered most of the area for several days. The last sighting of the subspecies was the capture of a single male in autumn 1992 on the Reserve. Trapping at the Reserve in 1993, 1994, and 1995 did not yield additional captures. Trapping at other sites in Merced, Madera, and Fresno Counties between 1988 and 1996 were also unsuccessful.
Hoffman jewelflower	<i>Streptanthus glandulosus var. hoffmanii</i>	Plant	CA	1984	The Hoffman jewelflower (<i>Streptanthus glandulosus var. hoffmanii</i>) is endemic to Sonoma County, California. It was last observed in 1984 [1].
Keeled sideband	<i>Monadenia circumcarinata</i>	Snail	CA	1984	The keeled sideband (<i>Monadenia circumcarinata</i>) is a terrestrial snail endemic to the Tuolumne River canyon, where it was found in association with steep limestone outcrops and talus slopes (246). The California Academy of Sciences records eight specimens from Tuolumne and Stanislaus Counties including one on Paper Cabin Ridge about 18.5 miles west of the Yosemite National Park [246]. By 1968 it was nearing extinct [174]. It was last

					seen in 1984.
Lotis blue butterfly	<i>Lycaeides idas lotis</i>	Insect	CA	1983	The Lotis blue butterfly (<i>Lycaeides idas lotis</i>) formerly occurred in wet meadows and sphagnum-willow bogs in Mendocino, northern Sonoma, and possibly northern Marin Counties, California [96]. It was last observed in 1983 in a sphagnum bog in the Pygmy Forest, Mendocino County (a report of a 1994 citing is erroneous). Surveys from the mid 1980s through 2003 have not located the species [15]. Droughts in the late 1970s caused severe declines in populations of Coast Hosackia (<i>Lotus formosissimus</i>), the plant thought to have supported its development. Fire suppression, tree encroachment, development, and possibly climate change also reduced the species' habitat.
Morro Bay kangaroo rat	<i>Dipodomys heermanni morroensis</i>	Mammal	CA	1991	The Morro Bay kangaroo rat (<i>Dipodomys heermanni morroensis</i>) lived in stabilized sand dune areas south of Morro Bay, California. In 1918, approximately 35,000 animals occupied a contiguous block of habitat. By 1957 the population was estimated to be 8,000 animals. By 1977 a maximum of 2,000 animals were estimated. By 1986, only 50 individuals remained with available habitat having been reduced by 98% to 12.6 ha. Wild animals were last seen in 1987 and signs of an introduced population (tracks, tail drags, and scat) were last seen in 1991 on the Bay View Property [79, 91]. Survey efforts since then have not found the species.
Saline Valley phacelia	<i>Phacelia amabilis</i>	Plant	CA	1985	Saline Valley phacelia (<i>Phacelia amabilis</i>) was discovered in 1942, confirmed to exist in the 1980s, and has not since been seen [1].
San Gabriel Mountains blue butterfly	<i>Plebejus saepiolus aureolus</i>	Insect	CA	1985	The San Gabriel Mountains Blue butterfly (<i>Plebejus saepiolus aureolus</i>) was known only from a single wet meadow within the yellow pine forest near the Big Pines Ranger Station, San Gabriel Mountains, Angeles National Forest, California [14]. Its host plant was <i>Trifolium wormskioldii</i> . At a minimum it was seen in 1970, 1980, and 1985. It has not been seen since 1985 [14]. It was not found in a 1995 survey which was a very wet year that would have encouraged reproduction if the taxon still existed [97]. The meadow was still wet, but had been made smaller due to the diversion of some of the water from the natural spring feeding it. The diversion of the spring by the U.S. Forest Service has been suggested as the cause of the species extinction [189]. There is a chance the San Garbriel blue exists in the upper Fish Fork of the San Gabriel River on the north side of Mt. San Antonio though it has never been recorded there [97]. The area has permanent water and may contain suitable wet meadow habitats. Other sites that should be checked are the few remaining wet meadows just ESE of Mountain High Ski Area, WNW of Wrightwood [97]. Some of these are on private land, and willows have overgrown much of the acreage. Water has likely been drained away from the meadows.
High Rock Spring tui chub	<i>Gila bicolor ssp. 11</i>	Fish	CA, NV	1989	The High Rock Spring tui chub (<i>Gila bicolor ssp. 11</i>) was endemic to three connected springs on the border of northern California/Nevada. In California it occurred in High Rock Springs and its outflow in eastern Lassen County. In Nevada it occurred at Fish Springs and

					Flanigan, Washoe County. It was extirpated from the Nevada sites by dessication due to water pumping. In 1982, the California Department of Fish and Game issued an aquaculture permit to the owner of High Rock Springs rear Mozambique tilapia (<i>Oreochromis mossambica</i>) 100 yards downstream of the spring. Tilapia penetrated the protective screening, entered the spring, and competed with/preyed upon the tui chub. The latter was not seen was after 1989 [342, 160]. Introduced channel catfish and freshwater prawns may also have contributed to the species extinction [1].
Lake Tahoe benthic stonefly	<i>Capnia lacustra</i>	Insect	CA, NV	1994	<p><i>Capnia lacustra</i> is a unique, flightless stonefly endemic to deep waters in Lake Tahoe, Nevada and California. It appears to have been abundant (38-80 stoneflies per square meter) in 1962 and 1963 when first discovered. (Some report erroneously state that the species was only located in 1962). <i>Capnia lacustra</i> was not located during surveys in the mid 1980s, and the last collection was of two individual in October 1993 and two more in March 1994 [181, 98]. (Some reports erroneously state that specimens were collected in 1992 or none in 1994). An intensive 1999 survey using a variety of techniques failed to locate the species [181]. The surveyors concluded that the species was either extinct, greatly reduced in number, or reduced in distribution.</p> <p>Algae production has increased in Lake Tahoe due to anthropogenic causes, causing a 33% clarity reduction in the past three decades [181]. The reduction in available light would likely affect <i>Capnia lacustra</i> by reducing the density and distribution of its vegetative habitat. <i>Chara delicatula</i> populations appear to have declined dramatically from historic levels, especially in deeper waters, and may already have been in decline in 1963. Compounding this problem was the introduction of opossum shrimp (<i>Mysis relicta</i>) to the lake (probably by California Game and Fish) to feed introduced fish [430]. It caused a decline in zooplankton which in turn caused an increase in algal growth.</p> <p>Unlike other stoneflies which mate during their flight stage and thus have a high degree of population interaction, <i>Capnia lacustra</i>'s flightlessness limits dispersal ability and may make the species more vulnerable to extinction. The introduction of exotic, predatory kokanee salmon and large mouthbass may also threaten the species.</p>
Dusky seaside sparrow	<i>Ammodramus maritimus nigrescens</i>	Bird	FL	1987	<p>The dusky seaside sparrow (<i>Ammodramus maritimus nigrescens</i>) was endemic to Merritt Island and the upper St. Johns River marshes of Brevard County, Florida. It declined as its salt marsh habitat was drained or converted to freshwater mosquito-control impounds [175]. The use of DDT to control mosquitoes was also suspected as a contributing factor. The last remaining wild birds-- all male --were taken into captivity in 1979 and 1980 and mated with the closely related <i>A. m. peninsulae</i>. It was hoped that backcrossing would produce a subspecies nearly identical to <i>A. m. nigrescens</i>, but the program was terminated by the Reagan administration and the last pure sparrow died on June 16, 1987. The hybrid offspring had died by the summer of 1989.</p>

Emerald seaslug	<i>Phyllaplysia smaragda</i>	Marine Slug	FL	1981	The emerald seaslug (<i>Phyllaplysia smaragda</i>) was discovered in the early 1970s where it was relatively common in the Indian River lagoon system on Florida's Atlantic coast [158, 159]. It may have specialized on the epiphytic algae growing on the basal stems of the seagrass <i>Syringodium</i> . This habitat was extirpated from the species type locality, but remains widespread elsewhere in Florida and the Caribbean. It was last seen in 1981.
Narrow-leaved hoary pea	<i>Tephrosia angustissima</i> var. <i>angustissima</i>	Plant	FL	1985	The narrow-leaved hoary pea (<i>Tephrosia angustissima</i> var. <i>angustissima</i>) was first collected in 1846 in pine rockland habitat near the Miami River. This habitat has been largely destroyed in south Florida, and virtually none exists within the taxa's former range. The last collection was from a natural site was in 1947. A collection was made from a disturbed lot outside of the taxon's natural range in 1985. This plant is thought to have been brought in on roadfill. A survey in 2000 found that the population had been destroyed. [212, 318].
Ochlockonee moccasinshell	<i>Medionidus simpsonianus</i>	Mussel	FL, GA	1993	The Ochlockonee moccasinshell (<i>Medionidus simpsonianus</i>) formerly inhabited the Ochlockonee River system, occurring in the main stem in Georgia and Florida, and the Little River. Only three live specimens have been collected since 1974 despite concerted efforts by numerous investigators. Single live specimens were found in 1974, 1990, and 1993 [99].
Guam bridled white-eye	<i>Zosterops conspicillatus conspicillatus</i>	Bird	GU	1983	The Guam bridled white-eye (<i>Zosterops conspicillatus conspicillatus</i>) was endemic to, and occurred throughout the island of Guam. Its disappearance from the island occurred from the south to the north. By 1945 the southern portion of the island supported just a few birds. The central portion was last known to support a bird in 1961. A 1981 U.S. Fish and Wildlife Service survey documented the extirpation of the species from the southern, central, and 98% of the northern portions of the island. It estimated that 2,220 birds remained, but this was likely a vast overestimation. In 1982 white-eyes were restricted to the Pajon Basin at Ritidian Point in extreme northern Guam. A 1983 survey suggested that fewer than 50 remained there. The last family group was observed with a fledgling in the fall of 1982 at Pajon Basin. The last observation was of an individual was in June 1983 in Pajon Basin.
Guam broadbill	<i>Myiagra freycineti</i>	Bird	Guam	1984	The Guam broadbill (<i>Myiagra freycineti</i>) was once found in mangrove swamps and all forests on Guam. Prior to 1950, it occupied 310 square miles. By 1950, its range had been reduced to 193 square miles. By the early 1970s, it was entirely absent from the southern two-thirds of the island but remained widespread and common in northern Guam into the mid-1970s. By 1979 it was restricted to the mature limestone forest of the relatively undisturbed northern cliffline and was rare in the mixed woodlands and second growth of the extreme northwestern portion of the northern plateau. A 1981 U.S. Fish and Wildlife survey estimated a total population of 460 Guam broadbills, with birds occurring at low densities, and encountered regularly only in extreme northwestern Guam. In 1983 survey estimated 100 birds, primarily restricted to the Pajon Basin, a small area on the north coast. That same year, a male broadbill was collected for captive propagation. This captive breeding attempt failed because no other individuals could be located and the captive male died of unknown causes

					<p>in February 1984. The last sightings of this species took place in 1984, one in March in the Northwest Field on Andersen Air Force Base, and one in August adjacent to the Navy golf course in Barrigada.</p> <p>The extinction of the Guam broadbill was caused by habitat loss, pesticide use, avian diseases, and most importantly, predation by introduced animals, including rats, monitor lizards, and brown tree snakes. The latter was the primarily culprit in the broadbill's extinction.</p>
Guam cardinal honey-eater	<i>Myzomela cardinalis saffordi</i>	Bird	Guam	1984	The cardinal honey-eater (<i>Myzomela cardinalis saffordi</i>) has not been observed since 1984 [1]. It formerly occurred on Guam where it was devastated by the introduction of brown tree snakes from New Guinea during World War II.
Guam rufous fantail	<i>Rhipidura rufifrons uraniae</i>	Bird	Guam	1984	The Guam rufous fantail (<i>Rhipidura rufifrons uraniae</i>) was formerly widely dispersed on Guam, using most habitats except savannah. It was last seen in 1984 [26].
Guam white-throated ground dove	<i>Gallicolumba xanthonura xanthonura</i>	Bird	Guam	1986	The Guam white-throated ground dove (<i>Gallicolumba xanthonura xanthonura</i>) was endemic to Guam [26].
Little Mariana fruit bat	<i>Pteropus tokudae</i>	Mammal	Guam	1979	The Little Mariana fruit bat (<i>Pteropus tokudae</i>) was endemic to Guam. Only three specimens have been collected: two by W.F. Coultas for the Whitney South Sea Expedition in 1931, and one skull by G.S.A. Perez between 1966-1968 [424]. The last confirmed sighting was a female which was shot by hunters in a mature limestone forest at Tarague Point in Northern Guam. There was a possible sighting in June 1979 at Ritidian Point
Marianas euploea butterfly	<i>Euploea eleutho</i>	Insect	Guam	1975	The Marianas euploea butterfly (<i>Euploea eleutho</i>) was endemic to the Mariana Islands and historically recorded from Guam, Rota, Saipan, and the northern islands of Alamagan and Anatahan. It was common on Guam in 1936, but has not been collected from Guam, Rota, or Saipan since 1946. Surveys in 1995 confirmed that it is extinct on these southern islands. In the 1970s, the species was recorded on Alamagan and Anatahan. Members of a recent Japanese entomological expedition initially believed that they had rediscovered it on some of the small, remote northern Mariana Islands, but their collections proved to be a different species [342].
Marianna mallard	<i>Anas oustaleti</i>	Bird	Guam	1981	The Mariana mallard (<i>Anas oustaleti</i>) was endemic to freshwater marshes, lakes, rivers, and mangrove lagoons on the islands of Guam, Tinian, and Saipan. It may have also inhabited Rota and Pagan, but the evidence is not conclusive.

					<p>captivity in 1981. Repeated surveys of all mallard habitat on Guam, Rota, Tinian, and Saipan since 1979 found no birds.</p> <p>The Mariana mallard's extinction was caused by habitat loss and hunting, especially during and immediately after World War II. During the Japanese occupation of Saipan and Tinian (1914-1945), most wetlands were channelized and converted to rice paddies. Sugar mill wastes were discharged into Lake Susupe on Saipan, the last known location of the Mariana mallard in the wild. After the occupation, wetlands continued to be drained or filled for development on Guam, Tinian, and Saipan. Gun ownership was banned during the occupation but hunting pressure was significant after as the mallard was not wary of humans, and thus was easily caught.</p>
[none given]	<i>Cyperus neokunthianus</i>	Plant	HI	1980	<p><i>Cyperus neokunthianus</i> was endemic to the West Maui Mountains, Maui, Hawaii. It is listed as extinct by Wagner et al. 1999 [3] and as missing by NatureServe [1]. The latter states that it was last seen in the early 1900s, but Price et al. 2004 state that was last seen in 1980 [438]. A USFWS database suggests it was last seen in 1997 [43], but there is no supporting documentation. We judge 1980 to be the last reasonably certain observation date.</p>
`Oha, haha, `Ohawai	<i>Cyanea eleeeensis</i>	Plant	HI	1977	<p>The `Oha, haha, or `Ohawai (<i>Cyanea eleeeensis</i>) is known only from the type specimen collected in 1977 on private land in the Wainiha Valley on Kauai, where it had less than ten individuals when discovered. It was considered to be a population of an existing species of <i>Cyanea</i> until 1992, when it was described as a new species [274]. It has not been since originally discovered in 1977 [1].</p>
[none given]	<i>Carex wahuensis</i> ssp. <i>herbstii</i>	Plant	HI	1994	<p><i>Carex wahuensis</i> ssp. <i>herbstii</i> is known only from a small cliff face leeward of the main spine of the Koolau Range, Oahu, Hawaii. It is listed as possibly extinct by Wagner et al. 1999 [3]. It was collected by Perlman and Obata in 1992 and Perlman in 1994 [444]. A 2003 USFWS database suggests that it was last seen in 1995 [43], but provides no further information. We have been unable to verify the sighting thus regard 1994 as the last reliable observation.</p>
Achatinellid land snail	<i>Partulina kaaeana</i>	Snail	HI	1981	<p>The Achatinellid land snail <i>Partulina kaaeana</i> has been observed twice, both times in 1981 at the same location [1].</p>
Achatinellid land snail	<i>Newcombia plicata</i>	Snail	HI	1989	<p>The Achatinellid land snail <i>Newcombia plicata</i> was found in the State of Hawaii's 1,620-acre Olokui Natural Area Reserve on Molokai during a 1989 survey [261], but apparently has not been seen since. The U.S. Fish and Wildlife Service considers all <i>Newcombia</i> species extinct, though it did not expressly mention this species [USFWS 2002].</p>
Achatinellid land snail	<i>Newcombia cinnamomea</i>	Snail	HI	1975	<p>The Achatinellid land snail <i>Newcombia cinnamomea</i> was last recorded in 1975 on the eastern coastal ridge of the Olokui Natural Area Reserve [209].</p>
Bishop's 'O 'o	<i>Moho bishopi</i>	Bird	HI	1986	<p>On the island of Molokai, Bishop's 'O 'o (<i>Moho bishopi</i>) was last collected at Kaluaaha in 1892, last seen in 1904, and last reported in 1915 at Wailau Trail [1, 11]. An unnamed <i>Moho</i> species, perhaps <i>Moho bishopi</i>, is present in the Maui fossil record [141]. Unconfirmed sightings of <i>Moho bishopi</i> occurred on west Maui in the early 1800s and near</p>

					Olinda on East Maui in 1901. The species was not again reported until two auditory detections in 1973 and unconfirmed sightings in 1980, 1981, 1983, and 1986 [70, 115, 134, 136].
Blood tetramolopium	<i>Tetramolopium consanguineum</i> ssp. <i>leptophyllum</i> var. <i>kauense</i>	Plant	HI	1980	Tetramolopium consanguineum ssp. leptophyllum var. kauense is endemic to the Ka'u district on the island of Hawaii. It has not been seen since its discovery in 1980 [1, 444]. The taxon to which it belongs, however, was the subject of Smithsonian Institution Endangered Species Act listing petitions in 1975 and 1978. Taxonomic note: NatureServe identifies this taxon as Tetramolopium consanguineum var. kauense but states that it is a subtaxon of Tetramolopium consanguineum ssp. leptophyllum [1]. It is listed as Tetramolopium consanguineum ssp. kauense by the Bishop Museum [157] and the Hawaiian Ecosystems at Risk Project [442]. The correct name is Tetramolopium consanguineum ssp. leptophyllum var. kauense [444].
Cyanea dolichopoda	<i>Cyanea dolichopoda</i>	Plant	HI	1992	Cyanea dolichopoda is known only from the type specimen collected in 1990 at the headwaters of the Wailua River, Kauai [1]. Surveys following the strike of Hurricane Iniki in 1992 failed to locate the species [150]. The species may survive undetected, and virtually undetectable, on the vertical cliffs surrounding the Blue Hole [150].
Digressa picture-wing	<i>Drosophila digressa</i>	Insect	HI	1986	The digressa picture-wing (<i>Drosophila digressa</i>) was endemic to the island of Hawaii where it was last seen in 1986 [1].
Four-angled pelea	<i>Melicope quadrangularis</i>	Plant	HI	1991	The four-angled pelea (<i>Melicope quadrangularis</i>) was endemic to Kauai. The last published account was of a 1991 collection [441]. It is listed as extinct in the USFWS 2000 Biennial Report to Congress [2] and in the agency's decision to not designate critical habitat in 2003 [13]. The latter states that it was last seen in 1991. A 2003 USFWS database states that it was last seen in 1998 but no further information is provided [43]. We judge 1991 to be the last reliable sighting.
Giffard's 'Ohe hedyleptan moth	<i>Omiodes giffardi</i>	Insect	HI	1982	Giffard's 'Ohe hedyleptan moth (<i>Omiodes giffardi</i>) was last seen in 1982 [207].
Haha	<i>Cyanea truncate</i>	Plant	HI	1994	<i>Cyanea truncate</i> was discovered in 1911 and is known from a few scattered locations along the windward side of the Koolau Mountains on Oahu. It is listed as extinct by Wagner et al. 1999 [3], possibly extinct by the Hawaiian Biological Survey [19], extirpated from the wild by the IUCN [11], and as missing by NatureServe [1]. The latter states that the last remaining population of two plants was destroyed by feral pigs in 1983. However, citing a personal communication with Joel Q.C. Lau, Hawai'i Natural Heritage Program, Price et al. 2004 state that species was last seen in 1994 [438]. The USFWS 2003 database states that no plants remain, but that the species was last seen in 2002 [43]. We have not been able to document the 2002 sighting thus believe 1994 is the most last credible observation.
Haleakala stenogyne	<i>Stenogyne haliakalae</i>	Plant	HI	1984	The Haleakala stenogyne (<i>Stenogyne haliakalae</i>) formerly occurred on the south and west sides of Haleakala on the Island of Maui [1]. It has not been observed since 1984 [1, 207].

Hibiscadelphus crucibracteatus	<i>Hibiscadelphus crucibracteatus</i>	Plant	HI	1985	Hibiscadelphus crucibracteatus is one of seven Hibiscadelphus trees native to Hawaii. All are endangered, extinct in the wild, or extinct. <i>H. crucibracteatus</i> is known only from the type specimen, a single tree discovered in 1981 on a windward, dry slope of Puhielelu Ridge, Lanai. Seeds were harvested on several occasions, but none germinated [1, 3].
Kauai 'O'o	<i>Moho braccatus</i>	Bird	HI	1987	The Kauai 'O'o (<i>Moho braccatus</i>) was formerly common throughout Kauai. By 1920 it was rare. The 1968-1973 population was estimated to be 36 birds +/- 29 [121]. It was last observed nesting in 1973. A single pair was observed in 1975 [123] and 1981 [121]. The female was likely killed during or in the aftermath of Hurricane Iwa in 1982 or 1983. The male was last seen in 1985, and last heard in 1987 [124, 128].
Koa nalo	<i>Drosophila musaphilia</i>	Insect	HI	1988	Koa nalo (<i>Drosophila musaphilia</i>) was endemic to Kaua'i where it was known only from State of Hawai'i-owned land at Alexander Reservoir, Koke'e State Park, and Halemanu [273]. It has only been seen five times in the past 28 years, the last time being in 1988 [435].
Large Kauai thrush	<i>Myadestes myadestinus</i>	Bird	HI	1989	The largest native Hawaiian thrush, Large Kauai thrush (<i>Myadestes myadestinus</i>) was once the most common bird on Kauai [125]. It disappeared from the outer forests by 1928, but the 1968-1973 population was estimated at 337 birds [121], and in 1975 it "was not uncommon" at Alaka'I Swamp in [123]. By 1981 the population was estimated at 24 birds [121] and was likely further depressed in 1982 by Hurricanes Iwa which drove birds down into ravine shelters which by then were infested with exotic disease-carrying mosquitoes. In 1992 Hurricane Iniki again ravaged the island. Confirmed sightings of two birds occurred in 1985 [124,126]. Two "probable" but unconfirmed sightings with no auditory contact occurred in 1989 [126]. "Brief but inadequate" sightings of two birds were reported in 1993 [127]. The last potential record is an unconfirmed sighting of a single bird in 1995 [124]. We judge the 1989 sighting to be last sufficiently certain record.
Lysimachia venosa	<i>Lysimachia venosa</i>	Plant	HI	1990	Lysimachia venosa is known from one current and two historical collections from the area of Waialeale, Kuai. None were found in 1999 (NatureServe 4-26-03).
Maui 'Akepa	<i>Loxops coccineus ochraceus</i>	Bird	HI	1988	The Maui 'Akepa (<i>Loxops coccineus ochraceus</i>) was locally abundant on East Maui in the 1890s. Its known range is a small patch of undisturbed native forest, but in former times it was likely widespread in wet and mesic forests down to sea level. There were either three [137] or eight [124] detections in 1980, two confirmed sightings in 1988 [124, 137], and unconfirmed audio detections in 1994 and 1995 [124].
Meyrick's banana hedyleptan moth	<i>Omiodes meyricki</i>	Insect	HI	1982	Meyrick's banana hedyleptan moth (<i>Omiodes meyricki</i>) was last seen in 1982 [207].
Moloka'i thrush	<i>Myadestes lanaiensis rutha</i>	Bird	HI	1980	The Moloka'i thrush (<i>Myadestes lanaiensis rutha</i>) was endemic to, and very common on, Moloka'i into the early 1900s, but was in serious decline before 1930 [121]. It was known from higher elevation forests including Mt. Olokui, the Kamakou Preserve, and the Ohialele Plateau [121, 70]. The last sightings occurred in 1974 (three birds at Kamakou Preserve and

					adjacent areas) [121], 1975 (2-3 birds) [124], 1979 (three birds on Olokui Plateau) [121], 1980 (three confirmed, three unconfirmed sightings) [124], and one reported, unconfirmed sighting in 1988 [124, 144]. It is likely, however, that last record is actually of a 1980 sighting [135].
Nalo hiihiu	<i>Drosophila substenoptera</i>	Insect	HI	1991	Nalo hiihiu (<i>Drosophila substenoptera</i>) was endemic to O'ahu where it was known from private lands (Wiliwili Nui Ridge, Castle Trail, Halawa Ridge Trail, and Palikea Ridge), state lands (Mt. Ka'ala and the DuPont trail) and those belonging to the City and County of Honolulu (Ka'au Crater) [273]. It was last seen in 1991 on the summit of Mt. Ka'ala [273, 435].
Nalo huluhulu	<i>Drosophila tarphytrichia</i>	Insect	HI	1975	Nalo huluhulu (<i>Drosophila tarphytrichia</i>) was endemic to the Ko'olau and Wai'anae mountain ranges on O'ahu [273]. It disappeared first from the Ko'olau range, was reduced to four sites in the Wai'anae range, and was last seen in 1975 [273, 435].
Nalo kama'a'ole	<i>Drosophila psilotarsalis</i>	Insect	HI	1985	Nalo kama'a'ole (<i>Drosophila psilotarsalis</i>) was last seen in 1972, but according to the U.S. Fish and Wildlife Service it was believed to be extant in the 1980s based on historical collection records, habitat assessments, and surveys by <i>Drosophila</i> researchers [342]. It was not found in more recent surveys, leading the agency to delare the species extinct.
Nalo kikokiko	<i>Drosophila alsophila</i>	Insect	HI	1985	Nalo kikokiko (<i>Drosophila alsophila</i>) was last seen in 1977, but according to the U.S. Fish and Wildlife Service it was believed to be extant in the 1980s based on historical collection records, habitat assessments, and surveys by <i>Drosophila</i> researchers [342]. It was not found in more recent surveys, leading the agency to delare the species extinct.
Nalo makamae	<i>Drosophila ochrobasis</i>	Insect	HI	1986	Nalo makamae (<i>Drosophila ochrobasis</i>) was endemic to the island of Hawai'i where it was regularly collected-- sometimes in large numbers-- between 1967-1975 on State of Hawaii land at Kí puka and Alakahi Stream [273]. It was also seen on private lands at Kí puka Pahipa and Hualalai. It was last seen in 1986 [273, 435].
Nalo malila	<i>Drosophila toxochaeta</i>	Insect	HI	1985	Nalo malila (<i>Drosophila toxochaeta</i>) was last seen in 1973, but according to the U.S. Fish and Wildlife Service it was believed to be extant in the 1980s based on historical collection records, habitat assessments, and surveys by <i>Drosophila</i> researchers [342]. It was not found in more recent surveys, leading the agency to delare the species extinct.
Nalo mea hula	<i>Drosophila neoclavisetae</i>	Insect	HI	1975	Nalo mea hula (<i>Drosophila neoclavisetae</i>) was endemic to Mau'i where it was known only from State of Hawai'i land at Pu'u Kukui [273]. It was last seen in [435].
Nalo miki	<i>Drosophila hemipeza</i>	Insect	HI	1983	Nalo miki (<i>Drosophila hemipeza</i>) was endemic to O'ahu where it is known from only six localities [273]. It was last seen in 1983 [435].
Neal's melicope	<i>Melicope nealiae</i>	Plant	HI	1979	Neal's melicope (<i>Melicope nealiae</i>) is known only from three collections on the west side of Kauai. The first was collected in 1909 at Kaholuamano, the second in 1960 at Kumuwela Ridge, and the third in 1979 on the Honopu Trail [1].
'O'u	<i>Psittirostra psittacea</i>	Bird	HI	1989	The 'O'u (<i>Psittirostra psittacea</i>) formerly occurred on the six largest islands. It was extirpated from Oahu by 1899, from Maui by 1901, from Molokai by 1907, and from Lanai

					<p>by 1931 [129]. By the late 20th century it inhabited only Kauai and Hawaii. The 'O 'u remained one of the most common endemic forest birds on Kauai into the 1960s and had a population estimated in the low hundreds during the late 1970s [123]. It was devastated by Hurricane Iwa in 1982. The last confirmed observations were of one bird in 1987 and two birds in 1989 [124, 126]. There were unconfirmed auditory detections between 1995 and 1997 along Koai'e Stream [124].</p> <p>On Hawaii, the species was most recently found in the wet ohī'a forests of the Hamakua region in Volcanoes National Park. The population estimate was 400 birds +/- 300 in 1976-1978, but a significant portion of its habitat was inundated by the 1984 Mauna Loa lava flow, destroying thousands of acres of forest, creating a treeless corridor over a kilometer [7]. There was an unconfirmed audio detection in 1994 [124]. The last confirmed sighting was in 1987 in the 'Ola'a Forest, Volcanoes National Park [124].</p>
Oahu 'Akepa	<i>Loxops coccinea wolstenholmii</i> (= <i>Loxops coccineus rufa</i>)	Bird	HI	1976	The Oahu 'Akepa (<i>Loxops coccineus wolstenholmii</i>) was endemic to Oahu. It was common in the early 19th century, but apparently rare by the end of the century. Specimens were collected in 1825 and 1893 [125]. There have only been two confirmed sightings in the 20th century: one in about 1900 and one in the late 1930s [139]. A probable sighting of a female in the Koolau range near the headwaters of Kaukonahua Stream occurred in 1976 [138]. Surveys since then have found no birds [121].
Oahu alauahio	<i>Paroreomyza maculate</i>	Bird	HI	1990	The Oahu alauahio (<i>Paroreomyza maculata</i>) was endemic to Oahu. Fossil evidence suggests it once occurred in the lowlands, though historic sightings are all from less degraded higher elevation sites. Sightings since 1977 have been restricted to the Ko'olau and Waianae mountain ranges [70]. There have been no confirmed sightings since February 12, 1985 on the Poamoho Trail [44]. The last probable sighting was in 1990 [69].
O'ahu hesperomannia philodoria moth	<i>Philodoria</i> sp.	Insect	HI	1987	The O'ahu hesperomannia philodoria moth (<i>Philodoria</i> sp.) is only known from Oahu, Hawaii where it was last seen in 1987.
Oahu tree snail bellula	<i>Achatinella bellula</i>	Snail	HI	1981	The Oahu tree snail <i>Achatinella bellula</i> historically ranged from Manoa to Kalihi, a distance of four miles, on the island of Oahu. Some were transplanted to Makaweli on Kauai (none were recovered after 1945). 169 were collected in one location in 1960, but no more than five have been seen at one time since 1979. The species was last seen in 1981 on the trail to Puu Konahuanui.
Oahu tree snail bulimoides	<i>Achatinella bulimoides</i>	Snail	HI	1985	Endemic to the Koolau Mountains, the Oahu tree snail <i>Achatinella bulimoides</i> formerly ranged 12 miles from Waialeale to Kaaawa. There have been four occurrences after 1945: one current (1985) and three historical (1946-1977). [1]. Sightings after 1945 include a 20-square-mile area near Kahana Gulch, on the Poamoho Ridge Trail, and on the ridge between Kaipapau and Maakua Gulches.
Oahu tree snail	<i>Achatinella curta</i>	Snail	HI	1989	The Oahu tree snail <i>Achatinella curta</i> historically occurred in Waialua, Ahonui to Kawailoa,

curta					and across to Laie. There have been 19 post-1945 occurrences: five current (1979-1989) and 14 historical (1946-1976) [1]. Locations since 1979 include Peahinaia Trail, Helemano Trail, and Kawailoa Trail.
Oahu tree snail leucorraphe	<i>Achatinella leucorraphe</i>	Snail	HI	1989	The Oahu tree snail <i>Achatinella leucorraphe</i> was formerly found along the three-mile distance from Wahiawa (Schofield-Waikane Trail) to Kipapa. There have been five post-1945 occurrences, one current (1989) and four historical (1946-1960).
Oahu tree snail lorata	<i>Achatinella lorata</i>	Snail	HI	1974	The Oahu tree snail <i>Achatinella lorata</i> was historically found from Manoa to Waiawa on the leeward side of Oahu, a distance of 12 miles, and also on the windward side in Maunawili. The species has been sighted 16 times since 1945, the last being in 1974.
Oahu tree snail phaeozona	<i>Achatinella phaeozona</i>	Snail	HI	1974	The Oahu tree snail <i>Achatinella phaeozona</i> was endemic to the Koolau Mountains of Oahu and was historically found in Kaalakei, Kailua, Olomana and Waimanalo. It was last seen in 1965 or 1974. Sightings after 1945 occurred in Kuliouou.
Oahu tree snail pupukanioe	<i>Achatinella pupukanioe</i>	Snail	HI	1980	The Oahu tree snail <i>Achatinella pupukanioe</i> was endemic to the Koolau Mountains of Oahu. It has been sighted seven times after 1945, the last being in 1980 on the Aiea Ridge Trail.
Oahu tree snail swiftii	<i>Achatinella swiftii</i>	Snail	HI	1976	The Oahu tree snail <i>Achatinella swiftii</i> ranged historically from the western ridge of Waiawa to the ridges of Kaukonahua and has been sighted twice since 1945, between 1972 and 1978. It was last seen in 1976 or 1978.
Oahu tree snail taeniolata	<i>Achatinella taeniolata</i>	Snail	HI	1978	The Oahu tree snail <i>Achatinella taeniolata</i> was endemic to the Koolau Mountains of Oahu and existed historically from Kaalakei to Palolo, and Maunawili. Other locations include the Koolau Summit Ridge, Puu Lanipo, and the summit of Wiliwilinui Ridge. There were eleven sightings after 1945 and prior to 1979. It was last seen in 1978. Post-1945 records are from Maunalani Ridge, Hawaiiiloa Ridge, Kuliouou 1 and 2 Valleys, and Aniani Nui area.
Oahu tree snail turgida	<i>Achatinella turgida</i>	Snail	HI	1974	The Oahu tree snail <i>Achatinella turgida</i> has had two post-1945 sightings: 1953 and 1974. It was only known from Aiea Ridge Trail and Manana Trail.
Oahu tree snail viridans	<i>Achatinella viridans</i>	Snail	HI	1979	The Oahu tree snail <i>Achatinella viridans</i> was last seen in 1979 on the Summit Trail in the Koolau Mountains.
Opuhe nalo	<i>Drosophila aglaia</i>	Insect	HI	1980	Opuhe nalo (<i>Drosophila aglaia</i>) was endemic to O'ahu where it was known from only six locations in the Wai'anae Mountains [273]. It was last seen in 1980 [435].
Pupillid land snail	<i>Lyropupa perlonga</i>	Snail	HI	1980	The Pupillid land snail (<i>Lyropupa perlonga</i>) was last seen at Barber's Point deep draft harbor on Oahu in 1980 [1].
Scaevola hobdyi	<i>Scaevola hobdyi</i>	Plant	HI	1980	<i>Scaevola hobdyi</i> is known only from the type specimen, a single plant found on West Maui in 1980 [1].
Bland Oregonian	<i>Cryptomastix mullani blandi</i>	Snail	ID	1990	The bland oregonian (<i>Cryptomastix mullani blandi</i>) was once found in a limited areas in the Coeur d'Alene River Valley near Post Falls and Coeur d'Alene, Idaho. It was last collected in 1990 near Coeur d'Alene [182]. Recent surveys found no live specimens [182]. Much of the species' potential habitat has been logged, grazed by domestic livestock, mined, or urbanized

					[182].
White catspaw	<i>Epioblasma obliquata perobliqua</i>	Mussel	IL, IN, KY, MI, OH	1993	<p>The white catspaw (<i>Epioblasma obliquata perobliqua</i>) has been reported from New York to Indiana, but many are misidentifications. The species was likely limited to the Wabash River, White River, Tippecanoe River, Maume River, St. Joseph River, Fish Creek, and possibly the Ohio River [201]. It has only been collected four times since 1970, all in Fish Creek, northwestern Ohio: one living and one freshly dead female in 1975, a living male and a freshly dead female in 1985, one living and one freshly dead female in 1987, and one live animal in October 1993 [10, 200, 201]. The 1987 sighting is apparently mistakenly reported as 1988 by the USFWS Recovery Plan [201].</p> <p>The October 1993 survey was part of an effort to mitigate and monitor the effects of a September 1993 diesel pipeline rupture in a soybean field in DeKalb County, Indiana. The diesel fuel filtered through field tiles into a small drainage ditch and into Fish Creek above the last known and very small catspaw population [202]. By the spring of 1994, a tree had fallen on the last known mussel, scouring out the entire riffle habitat [200]. <i>E. o. perobliqua</i> was not found in 1994 or in 2002 [200].</p>
Longjaw cisco	<i>Coregonus alpenae</i>	Fish	IL, IN, MI, NY, OH, PA, WI	1975	Listed as the longjaw cisco (<i>Coregonus alpenae</i>), this taxa is now considered a population of shortjaw cisco (<i>Coregonus zenithicus</i>). It was known to occur in Lakes Michigan, Huron, and Erie. Extensive over-fishing and increased lake pollution led to a population crash in the first half of the 20th century. The cisco was further decimated by sea lamprey predation and habitat degradation, and has not been seen in Lakes Huron and Erie since the 1950s. It was seriously depleted in Lake Michigan by 1961 and last seen in 1975.
Shortnose cisco	<i>Coregonus reighardi</i>	Fish	IL, IN, MI, NY, WI	1985	The shortnose cisco (<i>Coregonus reighardi</i>) was formerly found in Lakes Huron, Michigan, and Ontario. It has not been seen since 1985 despite intensive survey efforts [191].
Maryland darter	<i>Etheostoma sellare</i>	Fish	MD	1988	The Maryland darter (<i>Etheostoma sellare</i>) was known only from tributaries of the lower Susquehanna River, Harford County, Maryland. It has rarely been seen since it was discovered in 1912. Most recent sightings were in a single riffle in Deer Creek, and it was last seen in 1988.
Sylvan hygrotus diving beetle	<i>Hygrotus sylvanus</i>	Insect	MN, NY, MA?	1979	The sylvan hygrotus diving beetle (<i>Hygrotus sylvanus</i>) was believed extinct until it was rediscovered in 1979 in Cedar Creek, Anoka and Isanti counties, Minnesota [170]. Prior to that it was known only from 1890 collections in Peekskill, New York and Lexington, Massachusetts, though the latter may be erroneous [171].
Sangre de Cristo peaclam	<i>Pisidium sanguinichristi</i>	Mussel	NM	1981	The Sangre de Cristo peaclam (<i>Pisidium sanguinichristi</i>) is one of only two Sphaeriacean clams endemic to North America and is perhaps the most endemic pisidia in the world. It was discovered in 1981 by Dwight Taylor in the muddy shallows and narrow outflow of Middle Fork Lake, a glacial 15 acre cirque at the base of Wheeler Peak (10,485 feet) on the Questa Ranger District, Carson National Forest, Taos County, New Mexico [244]. It has not definitively been located in post-1981 surveys by the New Mexico Game and Fish

					Department, though six specimens were possibly assignable to <i>P. sanguinichrist</i> [183, 243]. The Sangre de Cristo peaclam is considered a valid taxon, but its endemnicity (unusual for pisidia because they are easy transported by birds) and small number of collections, combined with the fact that pisidia are known to display significant morphological variation, has raised taxonomic questions. An mtDNA comparison with sympatric <i>P. milium</i> was inconclusive because there was virtually no remnant soft tissue from the sanguinichristi specimens. Shell mtDNA had to be used even though little DNA exists in the conchiolin of pidisia. Live or freshly dead specimens are needed for a definitive analysis [183, 243]
Blue point pyrg	<i>Pyrgulopsis coloradensis</i>	Snail	NV	1992	The Blue Point pyrg (<i>Pyrgulopsis coloradensis</i>) was collected in the 1970s, 1980s, and early 1990s at Blue Point Spring, Lake Mead Recreation Area, Clark County, Nevada [153]. Similar looking dead shells were found at Rogers Spring (1.25 miles to the southwest), but the species which occurred there has been extirpated and its taxonomy can not be determined [197]. <i>Pyrgulopsis coloradensis</i> was formally described in 1998 by Hershler, who reported that it had "become increasingly scarce in the past decade" [242]. It has not been seen since 1992 despite surveys throughout the 1990s and early 2000s [197]. The cause of the extinction is not definitively known, but coincided with the post-1993 introduction of the red-rimmed thiara (<i>Melanoides tuberculata</i>) a predatory snail native to Africa, Asia, and India commonly distributed through the aquarium trade [197]. Wild burros have caused vegetative damage, but the habitat conditions appear adequate and not to have degraded between 1993 and 2002 [197]. Rogers Spring was impounded for recreational swimming long prior to the 1990s destroying it ability to sustain <i>Pyrgulopsis coloradensis</i> if species ever occurred there. Rogers Spring has also contained various predatory cichlid species over the past 40 years.
Fish Lake pyrg	<i>Pyrgulopsis ruinosa</i>	Snail	NV	1993	The Fish Lake pyrg (<i>Pyrgulopsis ruinosa</i>) is endemic to a single spring on McNett Ranch in Fish Lake Valley and is known only from the type specimen collected on July 16, 1988 [242, 153]. The spring was impounded in the late 1980s or more likely the early 1990s [153]. Sada and Vinyard report an extinction date of 1990 [196], but it is not clear if this is the date last seen or the presumed date of extinction. The species has not been found in subsequent surveys, and the landowner has not allowed recent surveys [153]. The pyrg's species designation is from the latin ruinosa "going to ruin; referring to the current status of the species" [242].
Longstreet springsnail	<i>Pyrgulopsis sp.</i>	Snail	NV	1975	The Longstreet springsnail (<i>Pyrgulopsis sp.</i>) was collected by Dwight Taylor in the 1940s or 50s in Longstreet Spring. Groundwater pumping dried the spring in the 1970s driving the species extinct [196,
Oregon giant earthworm	<i>Driloleirus macelfreshi</i>	Worm	OR	1985	The Oregon giant earthworm (<i>Driloleirus macelfreshi</i>) grew up to three feet in length. It was endemic to the Willamette Valley of northwestern Oregon, where is was collected in 1903, 1929, and 1930 [173]. No sightings have been confirmed since 1985.

Nerite rams-horn	<i>Vorticifex neritoides</i>	Snail	OR, WA	1988	Nerite rams-horn (<i>Vorticifex neritoides</i>) was historically collected from the lower Columbia River below the Dalles (i.e. from Portland to the river's mouth), though it may also have occurred on the lowermost Willamette River between Oregon City and its confluence with the Columbia River [1]. The last certain collections were by Hempill in the 1930s, though several specimens from 1988 may be assignable to the species [260]. Surveys in 1994, 1996, and 2001 did not find the species [260].
Golden coqui	<i>Eleutherodactylus jasperi</i>	Amphibian	Puerto Rico	1981	The Golden coqui (<i>Eleutherodactylus jasperi</i>) is one of 16 <i>Eleutherodactylus</i> (i.e. "free fingered") frogs endemic to Puerto Rico and the only ovoviviparous anuran in the New World. It occurred in bromeliads on Cerra Avispa, Monte El Gato, and Sierra de Cayey summits in Puerto Rico. It was discovered in 1973 and described in 1976 [54]. The population in the early 1970s was estimated to be less than 10 on Cerro Avispa, 500 to 1,000 on Monte el Gata, and 1,000 to 2,000 on Sierra de Cayey [68]. It was last seen in 1981 [68]. There is a great demand for high elevation land within the coqui's range because of the moderate rainfall and temperatures to be found there. The summits have experienced large scale modification for residential development and has been slashed and burned for agricultural and pastoral purposes [177]. With the exception of a highway right-of-way, most of the known habitat of the golden coqui is privately owned. No golden coquis have been found in the extensive bromeliad growth at the summit of Cerro Planada and the adjacent peak to the west which have long been planted in coffee and citrus. Rafael Joglar believes the most probably cause of extinct was chitridiomycosis fungus combined with climate changes (raising of temperature and long periods of draught) [306].
Mottled coqui	<i>Eleutherodactylus eneidae</i>	Amphibian	Puerto Rico	1990	The mottled coqui (<i>Eleutherodactylus eneidae</i>) was endemic to the interior forested uplands of Puerto Rico. It was last seen in 1984 and last heard in 1990. Rafael Joglar believes the most probably cause of extinct was chitridiomycosis fungus combined with climate changes (raising of temperature and long periods of draught) [306].
Web-footed coqui	<i>Eleutherodactylus karlschmidti</i>	Amphibian	Puerto Rico	1974	The web-footed coqui (<i>Eleutherodactylus karlschmidti</i>) was last seen in 1974 [53, 54]. Rafael Joglar believes the most probably cause of extinct was chitridiomycosis fungus combined with climate changes (raising of temperature and long periods of draught) [306].
Green blossom	<i>Epioblasma torulosa gubernaculum</i>	Mussel	TN, VA	1984	The Green blossom (<i>Epioblasma torulosa gubernaculum</i>) was last seen in 1984 in the Clinch River. Repeat surveys after that time have been unsuccessful.
Mexican fawnsfoot	<i>Truncilla cognate</i>	Mussel	TX	1975	The Mexican fawnsfoot (<i>Truncilla cognate</i>) inhabited several hundred miles of the Rio Grande River in Texas and northern Mexico. The last sightings of the species were a number of observations in 1972 and a single weathered shell in 1975 [205].
San Marcos gambusia	<i>Gambusia georgei</i>	Fish	TX	1983	The San Marcos gambusia (<i>Gambusia georgei</i>) was endemic to San Marcos Spring and a 1.25 mile section of the San Marcos River between Rio Vista Dam and 0.3 miles below the I-35 bridge.

					It was discovered 1884 and was described in 1969, by which time less than 1,000 individuals remained. Captive populations were established in Austin, TX (1979) and Dexter, NM (1980), but both were contaminated by the closely related <i>G. affinis</i> in the early 1980s. The last genetically pure individuals were a few fish collected in the wild in 1983 less than three years after it was added to the endangered species list [204].
Texas Henslow's sparrow	<i>Ammodramus henslowii houstonensis</i>	Bird	TX	1983	Texas Henslow's sparrow (<i>Ammodramus henslowii houstonensis</i>) was endemic to a 105 acre brush field near Houston, Texas, where it was last seen in 1983.
Valdina farms salamander	<i>Eurycea troglodytes ssp.</i>	Amphibian	TX	1987	The Valdina Farms salamander (<i>Eurycea troglodytes</i>) was endemic to Valdina Farms Sinkhole, Texas. In 1987 the Edwards Underground Water District redirected a stream into the sinkhole for recharge purposes, driving the species extinct [206].
False spike	<i>Quincuncina mitchelli</i>	Mussel	TX, NM	1975	The false spike (<i>Quincuncina mitchelli</i>) inhabited the Rio Grande basin and the central Texas systems of the Gundelope, Colorado and Leon Rivers. It has not been seen in Texas since the mid 1970s and is known from New Mexico only as a fossil [1].
Phantom shiner	<i>Notropis orca</i>	Fish	TX, NM	1975	The Phantom shiner (<i>Notropis orca</i>) formerly occupied the Rio Grande River from Espanola, New Mexico to Brownsville, Texas, and adjacent Tamaulipas, Mexico. It was last collected in New Mexico in 1939 and in Tamaulipas in 1975 [208].
Paria iris	<i>Iris pariensis</i>	Plant	UT	1976	Paria iris (<i>Iris pariensis</i>) is a narrow endemic known only from the holotype collected in May of 1976 [1]. It has not been found in subsequent searches. It was included in the widespread <i>Iris missouriensis</i> by Kartesz [180], but is considered distinct by others [1].
Georgia Depression Lewis's woodpecker	<i>Melanerpes lewis pop. 1</i>	Bird	WA	1975	The Georgia Depression Lewis's woodpecker (<i>Melanerpes lewis pop</i>) formerly occurred from southeastern Vancouver Island and the lower Fraser Valley of southwestern British Columbia through the Gulf and San Juan Islands to the Puget Trough of western Washington. It was last seen in the mid 1970s.
Giant palouse earthworm	<i>Driloleirus americanus</i>	Worm	WA, ID	1978	The Giant palouse earthworm (<i>Driloleirus americanus</i>) was discovered while "very abundant" near Pullman, Washington in 1897 [210]. Since then its favored habitat -- the rich soils of the Palouse prairies in eastern Washington and northern Idaho -- have been almost completely destroyed by farmers. It was last seen in 1978 in Palouse County, Washington. The introduction of the European earthworm also likely contributed to its extinction.
Rich Mountain cave beetle	<i>Pseudanophthalmus krekeleeri</i>	Insect	WV	1985	The Rich Mountain cave beetle (<i>Pseudanophthalmus krekeleeri</i>) was endemic to Rich Mountain Cave in West Virginia. It was described by Barr in 1965 and the cave was destroyed by a limestone quarry in the 1980s [206].