

THE LIST

ANNOTATED CHRONOLOGY OF ENVIRONMENTAL ISSUES, LAND MANAGEMENT PRACTICES & NATURAL HISTORY (esp. botany) WITH A MIDWEST (U.S. HEARTLAND) FOCUS

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Inspired by innumerable conversations with Gerould Wilhelm, a presentation by Doug Ladd at an event honoring Wilhelm, as well as simple Old World prophetic folklore, e.g., Humpty Dumpty and Henny Penny (Chicken Little), **and our denial** – the recurring and absurd notion that an ignored problem does not exist or will just go away.

Ignorance, though admittedly blissful, is also often ill-advised – reset is either impossible or very slow,

and status quo in the real world we have created is obviously NOT sustainable.

THE LIST contains a broad array of what we have done and are doing – both foolish and wise.

To provide context, since *everything is related*, other relevant significant happenings have been included.

GOAL: to inform, prompt reflection prospective and to serve as guidance

red (benchmarks and measure of root cause, people) **blue** (government programs/laws)

- – Cassandra, Trojan priestess fated to utter true prophesies never to be believed
- BC – Heraclitus (pre-Socratic Greek philosopher), *Everything flows – change is the only constant*
- 1226 – Saint Francis of Assisi died; enlightened friar who tried to depose man from his monarch over nature thinking by promoting material austerity, humility and the brotherhood of all creatures (God in all of them), calling humans to live in harmony with the Earth, not separate from it; rejecting the axiom that nature has no reason for existence save to serve man
- 1306 – **Edward I (King of England)**, in response to terrible London air quality, and on the urging of important noblemen and clerics, **banned the burning of sea-coal; anyone caught burning or selling the stuff faced torture or execution**; Richard III and Henry IV followed suit in the 14th century (ironically, sea-coal burns cleaner and produces more heat than mined coal)
- 1600 – “*The evil that men do lives after them*” William Shakespeare (*Julius Caesar*); often misattributed to Henry David Thoreau who stated something similar in *Walden* (1854)
- 1611 – **Virginia House of Burgesses mandated that all colonists plant an Old-World native (hemp)**, what a century plus later would be called *Cannabis sativa*
- 1620s – white mulberry (*Morus alba*) introduced from its native China to Virginia; attempts to develop a silk industry started with **King James I “mulberry mandate” requiring landowners to plant the species, imposing a fine for those who did not meet the quota “every male resident to plant at least four plants”** and reached a peak with the 1830s “Mulberry Mania” but the sericulture efforts failed due to climate and disease but also owing to the fact that tobacco was more profitable and less labor-intensive; we have the legacy of this folly as white mulberry naturalized and is a ubiquitous eastern U.S. weed
- 1735 – Swedish botanist Carl Linnaeus published first edition *Systema Naturae* (binomial nomenclature and Linnaean {hierarchical} system of taxonomy)
- 1750s – Tartarian honeysuckle (*Lonicera tartarica*), first of several Asian bush honeysuckles introduced; promoted by wildlife biologists two centuries later; widespread invasive by 2000
- 1760 – start of Industrial Revolution, spurred unprecedented population growth and extensive manmade environmental damage, including widespread deforestation and burning of coal
pre-industrial atm CO₂ level stable (or so we thought) at 280 ppm: 770,000,000 people

- 1779 – George Rodgers Clark and his men, on their 17-day mid-winter march from Kaskaskia (IL) over what he referred to as “drowned country” owing to the spongy land, were able to wade across the Wabash River (*waapaahšiki*) at Vincennes (IN) which was base-fed; now, due to human activity, the land has been dewatered (surface drainage and aquifer depletion) such that the Wabash is primarily fed quickly by warm runoff which has created a high energy down cutting (entrenching flow) ditch and the mean channel depth at Vincennes is 30 feet
- 1780 – chainsaw invented by two Scottish doctors, used in childbirth and to remove diseased bone; first portable gasoline powered version for trees/wood patented by Canadian millwright (James Shand) in 1918; Stihl produced first electric chainsaw (1926)
- 1784 – tree-of-heaven introduced (Philadelphia, PA)
- 1804 – Lewis and Clark Expedition began (Camp Dubois, IL), [Thomas Jefferson’s Corps of Discovery](#) steam-powered dredge invented by Oliver Evans (Philadelphia, PA)
world population reaches 1,000,000,000 (growth rate 5.3M/yr.)
- 1811 – series of four New Madrid earthquakes began (Dec 16 - Feb 7), created temporary waterfalls on the Mississippi River which also flowed backwards, much subsidence (e.g., Reelfoot Lake TN formed) and soil liquefaction caused geyser-like sand blow (boil) cones; John James Audubon was on horseback and reported that his mount splayed in anticipation, other strange animal behavior including cattle crying loudly and creatures leaving burrows
- 1813 – Audubon, while traveling between Henderson (KY) and Louisville, witnessed a flock of passenger pigeons numbering >1B, “*with a noise like thunder ... obscured the light of noonday like an eclipse*” and the multitude took two hours to pass
western Ohio native, Shawnee chief and warrior Tecumseh killed; with his younger brother Tenskwatawa (the Shawnee Prophet) united indigenous people to reject European influence and to resist land grab of their territory during westward U.S. expansion
- 1816 – Year Without Summer (volcanic winter from 1815 Mount Tambora eruption, Indonesia)
- 1818 – after a three-week stay with Audubon, Turkish-born eccentric genius and autodidact naturalist Constantine Rafinesque visited the herbarium of Dr. Johann Christoph Müller, Rappite botanist and polymath (New Harmony, IN)
- 1826 – Boatload of Knowledge (Lesueur, Maclure, Say, et al.) arrived at New Harmony (IN)
Rafinesque considered joining the Owenite (New Harmony) utopian community after being fired from his position at Transylvania Univ (Lexington, KY) but decided against due to his rivalry with Thomas Say, instead returned to Philadelphia; among his works were the description of over 6,000 new plant species
- 1830 – last wild Indiana bison shot near French Lick (Orange Co.)
- 1837 – John Deere developed self-polishing cast steel plow (Grand Detour, IL)
last wild Illinois bison shot near Troy Grove (LaSalle Co.)
- 1838 – Asa Gray (botanist) became first professor at Univ Michigan
William Maclure (father of American geology) established the Working Men's Institute (New Harmony, IN) dedicated to the notion of practical self-instruction

- 1841 – shortly after Rafinesque's death (1840) Asa Gray commented "*[Rafinesque's plant taxonomy] must be regarded as fictitious, and unworthy of the slightest notice [and] his passion for establishing new genera and species appears to have become a complete monomania, a curious mass of nonsense.*" Rafinesque later referred to as "an agent of chaos"
- 1843 – Audubon, upon returning to Kentucky (away two decades), lamented on the devastation of the natural world (habitat, wildlife and aboriginal people) along the Ohio River due to "progress" (i.e., westward expansion and wanton exploitation by Europeans)
- 1845 – start of the Irish Potato Famine, consequence of climate, mold (disease), monophagy, narrow genetic diversity of crop and [poor governance](#)
- 1849 – [U.S. Department of the Interior formed](#)
- 1850s – soybean seeds (native to China) distributed to Midwest farmers, grown primarily as forage or cover crop; first introduced in Georgia (1765)
- 1850 – [federal Swamp Land Act](#), transferred millions of acres of wetlands to states (>1M in Indiana alone, mostly in the NW corner) to be drained for agricultural use and to encourage settlement; 36,000-acre Beaver Lake (largest Indiana lake) was completely drained
- 1854 – [Office of Entomologist created within the U.S. Patent Office](#), the start of federal plant-related pest control efforts
- 1858 – Liberty Hyde Bailey born (South Haven, MI), Michigan State and Cornell botanist, educator, rural reformer, co-founder Amer Society for Horticulture Science
Illinois Natural History Survey (INHS) formed (Normal), moved to Champaign in 1885
- 1859 – Charles Darwin's *On the Origin of Species* ... published
Missouri Botanical Garden founded (St. Louis, Henry Shaw)
U.S. oil boom began, western Pennsylvania (Titusville)
- 1861 – Louis Pasteur's proposed the germ theory of diseases, and his experiments definitively disproved the notion of spontaneous generation (life from non-living matter)
- 1862 – [United States Department of Agriculture \(USDA\)](#) founded by Abraham Lincoln, he called it "the People's Department"
[Morrill Act](#), [land-grant institutions formed](#) "to promote practical education," George Washington had called for public support of agricultural education in a 1796 address to Congress; Michigan State Univ served as the model, Kansas State Agricultural College (now KSU) first newly created
- 1866 – [Rosa multiflora](#) introduced; rootstock for ornamental roses, erosion control, wildlife food and as living fence; renown Indiana botanist Charlie Deam noted (1948), when recommended for old cemeteries, "*When Gabriel blows his horn. I am afraid some will be stranded and not be able to get thru the roses.*" [Heavily promoted by USDA 1930s-60s](#) invasive that has become a major ecological and agricultural problem, [now banned by many states](#)
- 1867 – John Muir's near blinding accident at Indianapolis carriage factory (started his mission), yet for all the great conservation activity he was totally opposed to fire as a management tool
barbed wire patent to Lucien B. Smith (Kent, OH), an alternative to rows of Osage orange (a living fence), but Joseph F. Glidden's (DeKalb, IL) 1874 patent offered improving innovations

- 1869 – DNA “nuclein” discovered (Swiss chemist Friedrich Miescher)
 gypsy moth (now spongy moth) introduced from its native Eurasia (by a French artist/
 astronomer) source for silk to replace the cotton shortage caused by U.S. Civil War
 David Fairchild born (Lansing, MI), [managed Office of Seed and Plant Introduction \(USDA\);
 responsible for the introduction of >200,000 exotic plants and crops to Americans](#); see *The
 Food Explorer* (Daniel Stone, 2019)
- 1871 – [U.S. Commission of Fish and Fisheries formed, precursor of U.S. Fish and Wildlife Service](#)
 Peshtigo (WI) Fire, Oct. 8 catastrophic fire on and N of the Door Peninsula that destroyed the
 town (Peshtigo) and several other communities, killing an est. 2,000 people and burned at
 least 1.2M acres; poor forest management and logging practices, especially slash, contributed
 to the firestorm conflagration; slash and burn fires can kill the soil with a profound long-term
 effect on replacement growth; occurred the same day as the Great Michigan Fire(s) and the
 Great Chicago Fire
- 1874 – Amos Sawyer reported on climate change in Illinois due to loss of aqueous agent (afternoon
 showers attributable to reduction in wetlands) Trans. Acad. Sci. St. Louis
 famous Great Plains Plague of Rocky Mountain locust, one sighting the next year est. at
 almost 200,000 mi² and **>12T individuals**; species last sighted 1902, now extinct
- 1875 – oriental bittersweet imported as an ornamental by Parson's nursery (Flushing, NY)
- 1876 – [kudzu](#) introduced (Philadelphia Exposition), [promoted by the USDA as a “wonder plant”](#)
- 1880 – 1,140 U.S. factories manufacturing drainage tiles (mostly in IL, IN and OH)
 modern record-keeping of surface temperatures begins
 wintercreeper (*Euonymous fortunei*) arrived at the Arnold Arboretum (Boston, MA)
 Mt. Carmel (IL) native Robert Ridgway appointed first full-time curator of birds at the U.S.
 Natl. Museum; he produced prototype of today's field guides and published on the forests
 of the Lower Wabash Valley
- 1881 – *The Formation of Vegetable Mould Through the Action of Worms* published, remarkable
 long-term study and Charles Darwin's last publication
- 1883 – “last great buffalo slaughter” final large-scale hunt (Dakota Territory) by Native Americans;
 American bison population fell from an est. 60M (late 18th century) to just a few hundred
 individuals by 1900; [promoted by U.S. government to force “Indians” to reservations](#)
- 1885 – [Bureau of Biological Survey formed](#), within Dept of Agriculture since initial focus on species
 that harmed agriculture
- 1888 – Jens Jensen created the first American Garden (Union Park, Chicago)
- 1892 – Sierra Club formed (founder John Muir, originally CA focused)
- 1893 – Columbian Museum of Chicago (Field Museum) founded
- 1895 – Eugenius Warming (Danish botanist) authored first ecology textbook
- 1896 – John Coulter (Indiana botanist) arrived at Univ Chicago; developed world-renown program

Svante Arrhenius (Swedish chemist) first to suggest that $\uparrow[\text{CO}_2]$ will increase temp; established the concept of greenhouse effect, elucidating that human-caused increase in atm carbon dioxide from fossil fuel burning will cause *climate change*

- 1898 – Henry Cowles dissertation on vegetation succession at Lake Michigan sand dunes
- 1900 – Gregor Mendel's (1856-63) foundational work on heredity rediscovered
[Lacey Act](#), a conservation law enacted to address illegal possession, trade and transport of wildlife (incl. plants), first federal environmental protection
[8-year project to change flow of the Chicago River away from Lake Michigan completed](#), killed all aquatic life in the bio-rich Illinois River except sewage microbes and sludge worms (became Chicago surface sewer)
nothing left of the 1,500 mi² Great Black Swamp, northwest OH and adjacent IN territory
[\(organized bistate effort to drain "civilize the land" began in 1850s\)](#)
- 1901 – U.S. Steel formed; beginning of the industrial ravage of the special unique environment at the southern end of Lake Michigan; in short order Gary (IN) sprang forth from natural area
- 1902 – last authenticated wild passenger pigeon (Laurel, IN); genetic analysis has shown that their population size was stable for the preceding 20,000 years; last large nesting was in Petosky (MI) in 1878 where 50,000 birds were killed each day for nearly five months; last known specimen died in the Cincinnati Zoo (1914), a female referred to as Martha the endling; first North American endemic bird extincted due to anthropogenic activity
- 1905 – Chestnut Blight introduced (U.S. east coast), killed virtually all native chestnut trees (est. 4B) loss of this magnificent giant caused economic and long-term ecological impact
The National Audubon Society founded, to protect birds and their habitat
- 1909 – Callery pear (Asian native) introduced as an ornamental (Arnold Arboretum, MA)
- 1910 – Haber-Bosch method (N fixation, synthetic fertilizer) scaled up to industrial capacity
- 1912 – Norma Pfeiffer (Univ Chicago student) discovers *Thismia americana* in SE Cook Co. (IL) wet sand prairie; small parasitic mostly subterranean plant species; site subsequently covered with several feet of industrial waste; unique taxon not seen since 1916, presumed extinct
- 1914 – [Smith-Lever Act established Agricultural Cooperative Extension Services](#)
[Forest Preserve District of Cook County formed](#) (Jens Jensen & Dwight Perkins)
- 1915 – Wilhelm Miller first Ag extension educator (Univ Illinois), his Citizens Oath in *The Prairie Spirit in Landscape Gardening* (Ag Extension Circular) promoted use of native plant species
Ecological Society of America (ESA) formed, Victor Shelford (Univ Illinois) at the fore
- 1916 – Callery pear reintroduced (disease resistant rootstock) USDA Beltsville, MD
Frederic Clements' theory of predictable (climax) plant succession; later discredited by Henry Gleason's Individualistic (1926) and Arthur Tansley's Ecosystem concepts (1935)
- 1918 – [Migratory Bird Treaty Act \(MBTA\)](#) made it illegal to possess, sell or transport all parts of most wild birds without a permit
Carolina parakeet – last captive specimen died (Cincinnati Zoo); last confirmed evidence of wild existence, eggs collected in FL (1927); declared extinct 1939; Audubon noted that cats who ate them died, apparently poisonous since bird's diet included cocklebur seeds

- 1920 – took two decades but the largest Indiana dune (Hoosier Slide, all 12M tons of iron-rich sand) was completely removed, mostly by Hemingray and Ball Brothers (both in Muncie, IN) and converted to blue glass insulators and jars; [state had designated the dunes wasteland to facilitate the take](#); Michigan City Generating Station subsequently built on the site
- 1921 – first report of Gulf of Mexico “dead (hypoxic) zone” caused by agricultural and sewage pollution (excessive nutrient runoff) with the Mississippi River and its tributaries by far the primary contributor
- 1922 – The Morton Arboretum founded, Lisle (IL) west of Chicago
Izaak Walton League of America founded in Chicago (IL) to protect the environment
first report of European starling in Illinois; first Indiana report 1923; reported from Detroit (MI) 1924 and Massachusetts as early as 1874; released in New York’s Central Park 1890 & 91 but the Shakespeare literature connection, while popular, is an urban legend
- 1923 – bulldozer invented (Morrowville, KS)
- 1925 – Henry Cowles succeeded John Coulter (his graduate adviser), heading what became known as “Chicago school” of ecology; merged with zoology (1967)
Scopes Monkey Trial, TN substitute teacher tried for violating states’ Butler Act which prohibited the teaching of human evolution in public schools; a national spectacle pitting religious fundamentalism (creationism) against modern scientific views
- 1926 – [Milorganite created](#) (microbes used to convert biosolids produced from Milwaukee wastewater into fertilizer thereby reducing landfill and Lake Michigan pollution)
- 1927 – [world population reaches 2,000,000,000 \(took 123 years to double, 1B more\)](#)
An Annotated Flora of the Chicago Region published (Herman Silas Pepon)
- Indiana Academy of Sciences (IAS) abandoned the idea of a natural history facility and relinquished its collections to the institutions and individuals who had maintained them
- 1930 – [Congress authorized 9-Foot Channel Project, Mississippi River lock and dam system](#)
Dutch Elm Disease confirmed in Cleveland (OH); fungal and from infected logs imported from Europe; reported from New York City in 1933; impact less profound than Chestnut Blight (1905) but, like it, all containment/control efforts failed (foolish misconception)
- 1932 – opening of the [most recent renovation of the Welland Canal](#) connecting Lake Ontario to Lake Erie (bypassing natural barrier, Niagara Falls), permitted the sea lamprey to invade and decimate what was left of Great Lakes fishing (overharvest responsible for decline); “Dracula of the Lake” spread unchecked for decades, TFM chemical control method finally discovered and started (1958) but invasion so extensive control only somewhat effective and necessarily ongoing
- 1933 – [Congress authorized programs that over the next decade distributed \(gave\) @ 85M kudzu plants](#) (mostly to southern farmers) to reduce erosion and “*to revitalize the land,*” est. 3M acres planted by 1946; [listed as a Federal Noxious Weed in 1970](#)
- 1934 – [Migratory Bird Hunting and Conservation Stamp Act \(aka Duck Stamp Act\)](#) established to fund wetland conservation efforts
- 1935 – DuPont introduced slogan “Better Living Through Chemistry” (dropped in 1982)

- 1936 – Curtis Prairie “restoration” started (Univ Wisconsin, Madison)
- 1937 – “urban sprawl” coined (resembles mycelial takeover, visually and outcome)
- 1938 – [Illinois government-sponsored \(DOC\) eradication program](#) used dynamite to kill 328,000 crows in Rockford area roosts: numerous such acts elsewhere in same period
- 1940 – [U.S. Fish and Wildlife Service formed \(Dept Interior\), merged Commission of Fish and Fisheries \(1871\) with Bureau of Biological Survey \(1885\)](#)
genesis of the Green Revolution (Henry Wallace {U.S. Agriculture Secy.} in Mexico)
Flora of Indiana published (Charlie Deam)
- 1943 – *Plowman’s Folly* published (Edward Faulkner) promoting no-till farming; in response to an epic, sustained, manmade environmental catastrophe, the 1930s Dust Bowl (ill-advised, greed driven, agricultural practices by farmers and their reluctance to change) – [the social programs this crisis necessitated represent superb leadership, government at its best](#)
- 1944 – [Federal-Aid Highway Act, Congress authorized the creation of 40,000-mile National System of Interstate Highways](#), did not truly begin until 1956
- 1945+ – post-World War II, prestige of traditional natural history began to decline, indoor sciences (cellular and molecular) started to dominate
- 1946 – The Ecologists Union formed by members of the Ecological Society of America (ESA)
- 1947 – “engineering consent” coined by Edward Bernays (father of public relations), propaganda method used to manipulate opinion and behavior, i.e., to get people/the public to act against their own best interest, and to believe those choices are their own (masking the influence)
Indiana Univ enlisted students to throw its world-class zoological natural history collection into a dump truck, known as The Great Housecleaning, sanctioned by Dept Head (former Indiana Academy of Science president who was a native Hoosier)
[Federal Insecticide, Fungicide, and Rodenticide Act \(FIFRA\)](#), first pesticide regulation
- 1948 – [Federal Water Pollution Control Act](#); first but inadequate (due to effective enforcement)
- 1949 – *Sand County Almanac* published (Aldo Leopold), “*The modern dogma is comfort at any cost*”
- 1950 – 8th ed. *Gray’s Manual of Botany* published (Merritt Fernald), the standard floristic reference for over a century
Deciduous Forests of Eastern North America published by Lucy Braun (Univ Cincinnati botanist/ecologist) who vehemently opposed fire management, first female ESA president
The Nature Conservancy (TNC) formed, morphed from the Ecologists Union (1946), George & Barbara Fell at the fore
- 1953 – DNA double helix structure reported in *Nature* by Crick & Watson
- 1955 – [National Air Pollution Control Act](#)
Life magazine published article *Throwaway Living* in which the phrase “throw-away society” cited the rise of consumerism (mass and over consumption) which began after WWII
- 1956 – James Watson (Indiana Univ PhD 1950) when vying for a faculty position at Harvard said, “*Ecology is not very intellectually challenging. Anyone who would hire an ecologist [or*

taxonomist, stamp collectors as he referred to them] is out of their mind. Waste of a tenured position.”

- 1957 – *Reading the Landscape: An Adventure in Ecology* published (May Theilgaard Watts) Morton Arboretum naturalist and Cowles protégé, argued for the preservation and public use of abandoned railroad rights-of way, which morphed into remnant RR and pioneer cemetery prairie ID, preservation and management later championed by Bob Betz and Chicago region associates; <0.01% of once abundant grassland ecosystem remaining in IL & IN
- 1959 – [St. Lawrence Seaway construction completed; binational project](#) with unintended adverse consequence, facilitated the introduction of several negatively impactful invasive aquatic species, impact both fiscal & ecological
- 1960 – first Indiana land trust, ACRES (Fort Wayne)
- 1961 – Hunt Botanical Institute formed (Carnegie Mellon University, Pittsburgh)
- 1962 – *Silent Spring* published (Rachel Carson), documented the environmental harm caused by indiscriminate use of a pesticide (DDT); “*In nature, nothing exists alone*”
 Schulenberg Prairie started (Morton Arboretum, W Chicago)
 ‘Bradford Pear’ available commercially, it and other flowering pear cultivars subsequently awarded and promoted by many professional gardening associations and developers; widespread invasive species problem within a couple of decades
 journal *The Michigan Botanist* founded; became *The Great Lakes Botanist* (2017)
- 1963 – [Clean Air Act, numerous subsequent amendments](#); the cleansing (the diminishment) was gradual but within 50 years was evident by the recovery of hypersensitive lichen populations
Wildlife Management in National Parks, significant ecosystem management paper which supported the concept of carrying capacity and the need for prescribed fire – christened by U.S. Secretary of the Interior (Stewart Udall) as the Leopold Report (after its principal author, Starker Leopold, Aldo’s eldest son) – attempt to reverse the unintended “all fires are bad” thinking which the [Smokey Bear \(1944\) advertising campaign](#) perpetuated and that contributed to agency and public opposition to wise established management activity
 “*The greatest danger to our future is apathy*” (Jane Goodall)
Flora of Missouri published (Julian Steyermark); George Yatskievych’s 3 vol. update *Steyermark’s Flora of Missouri* published in 1999, 2006 and 2013, Missouri Botanical Garden balked at the notion of accepting his state voucher specimens
[Nature Preserves Commission Act for Illinois](#) (George Fell at the fore)
 Openlands founded (NE IL nonprofit dedicated to regional conservation)
- 1964 – [National Wilderness Act](#), managed by several federal agencies
- 1965 – [Motor Vehicle Air Pollution Control Act](#), amending the 1963 Act; first federal vehicle emission standards, phased-in starting with 1968 models
[Solid Waste Disposal Act](#), designed to improve waste disposal technology
- 1966 – [Indiana Dunes finally received some protection \(National Lakeshore\)](#)
 cladistics introduced by Willi Hennig, he called it phylogenetic systematics; subsequently had both wonderful and very negative impact on natural history education

- 1967 – Lynn White's essay *The Historical Roots of Our Ecologic Crisis* in which he argued that Western Christianity's anthropocentric worldview was the cause, dominion over nature, mastery rather than stewardship; considered the genesis of modern environmental ethic yet Native American cultures have long viewed man as part of nature, not separate from, using traditional ecological knowledge to promote sustainability to ensure survival, which deflates the noble savage concept (an idea as absurd as the notion of meliorism)
- 1968 – *Population Bomb* published (Paul & Anne Ehrlich), **world population 3.5B**
- 1969 – Charles Krebs (Indiana Univ ecologist) discovered the Fence Effect – studying voles (small mammals) he found that the inability to disperse caused profound density related effects (overpopulation, followed by overexploitation of resources {thus habitat destruction}, aggressive behavior and ultimately precipitous population decline), no reset
Cuyahoga River catches fire (Cleveland, OH); galvanized the environmental movement
National Environmental Policy Act (NEPA) became law, Keith Caldwell (Indiana Univ political scientist) primary author
- 1970 – **Environmental Protection Agency (EPA)** formed (Nixon Admin.)
National Resources Defense Council (NRDC) formed, New York
first Earth Day (April 22), conceived by U.S. Senator Gaylord Nelson (WI)
Walt Kelly's Pogo cartoon "WE HAVE MET THE ENEMY AND HE IS US"
Big Yellow Taxi (Joni Mitchell) released
Norman Borlaug, Iowa native and Univ Minnesota agronomist, given Nobel Peace Prize for developing and promoting a form of wheat agriculture that prevented a billion deaths; later regretted his work noting that the Green Revolution was only a temporary solution and did not address the underlying issue, the real problem, what he called **the population monster**; Rockefeller Foundation was key force behind the Revolution that gave rise to corporate ag with its dependence on synthetic fertilizers, pesticides and monoculture, resulting in profound negative environmental and social impact
Southern Corn Leaf Blight disaster (caused by a foliar fungus and monoculture)
- 1971 – **federal lead-based paint restrictions** (leaded gasoline phase-out started 1973)
The Closing Circle published (Barry Commoner, Washington Univ); in it he cites the "four laws of ecology" (1) everything is connected to everything else, (2) everything must go somewhere, (3) Nature knows best, (4) there is no such thing as a free lunch; called the "Paul Revere of ecology" he viewed the current environmental crisis as a symptom of a fundamentally flawed economic and social system with the corporate imperative for wasteful growth as the root cause; his early work led to the 1963 Nuclear Test Ban Treaty
term *corporateocracy* emerged to describe corporate control of government
Robert Metcalf (entomologist / ecotoxicologist, Univ Illinois) designed a miniature model ecosystem "an Illinois farm pond in a box" to test the fate of pesticides, subsequently alerting us of the consequences of pesticide abuse; referred to as the "Thomas Edison of entomology," he was responsible for making environmentally safe pest control achievable; his contribution to ecological health rivals Rachel Carson yet he is largely unknown
Mercy Mercy Me (The Ecology) (Marvin Gaye) and *Paradise* (John Prine) released
The Lorax published (Dr. Seuss)

Crying Indian (PSA), successful effort to shift public focus to individual behavior rather than corporate responsibility; later (1986) termed **greenwashing** (the deceptive practice of making misleading and/or false claims about the environmental benefits of a company's products, services, or overall operations); Iron Eyes Cody was in fact Italian (de Corti), and again the "noble savage" pretext

Peter Raven named Missouri Botanical Garden Director

- 1972 – Stockholm Conference (UN) first international conference on environmental issues
major amendments to the 1948 Federal Water Pollution Control Act (Clean Water Act)
EPA bans most use of DDT (in U.S.); still legal to manufacture for export
Animal and Plant Health Inspection Service (APHIS) created within USDA
last wild sighting of prairie chicken in Indiana (Newton Co.); population est. 100,000 in 1910;
heath hen (once abundant eastern U.S. subspecies) extinct by 1932
- 1973 – U.S. Endangered Species Act (ESA)
- 1974 – Safe Drinking Water Act
Monsanto released glyphosate (Roundup); first company to apply biotech to agriculture
world population reaches 4,000,000,000 (took just 47 years to double, this time 2B more)
Natural Areas Association (NAA) formed (Wisconsin)
- 1975 – Hazardous Materials Transportation Act (HAZMAT commerce regulation)
Wild Things founded (Chicago nature conservation organization), big biennial conference
- 1976 – The Land Institute formed (KS, Wes Jackson) sustainable food production methods
Guide to the Vascular Flora of Illinois published (Robert Mohlenbrock) with later revised eds.
- 1977 – U.S. Consumer Products Safety Commission (CPSC) banned the use of lead-based paint in residences, furniture and toys
Surface Mining Control and Reclamation Act (SMCRA) attempt to restore and repurpose strip-mined land
Floristic Quality Assessment (FQA) methodology introduced (Gerould Wilhelm)
- 1978 – Love Canal (Niagara Falls, NY) disaster, toxic waste dumped by Occidental Chemical Corp led to the 1980 CERCLA
Illinois Natural Areas Inventory (INAI) created (Jack White, Univ Illinois), became template for similar efforts elsewhere
- 1979 – 3rd ed. *Plants of the Chicago Region* published (Swink & Wilhelm), noted nativity for each species which was an uncommon practice, intended to help those involved with restoration work, not as a us/native (good) them/exotic (bad) reference or to grade a garden
- 1980 – Comprehensive Environmental Response, Compensation, and Liability Act (aka Superfund)
entire Illinois Nature Preserves Commission (INPC) staff fired; by standing up for environmental right they had angered politicians
- 1980s – climate change (warming) and Asian bush honeysuckle spread became more noticeable
- 1981 – James Watt (anti-environmentalist) appointed Secretary of the Interior by Ronald Reagan

- 1982 – Times Beach (MO) dioxin environmental disaster
Flora North America Project revived (Missouri Botanical Garden spearheading)
- 1983 – controversial and unfinished Marble Hill Nuclear Power Station on Ohio River (Jefferson Co., IN) abandoned (\$2.5B spent); 11 reactors (at 6 sites) in neighboring IL
Chicago 's Volunteer Stewardship Network (VSN) formed, came to be regarded as the exemplary conservation program in the country (Stephen Packard at the fore)
- 1985 – mapping of the Gulf of Mexico “dead (hypoxic) zone” began; 2017 measurement was >8,100 mi²; *A River (now largely a sewage ditch) Runs Through US*
- 1986 – first edition Peter Raven's superb *Biology of Plants*
INHS botanist conducted a survey of 25 IL botanists asking for their rank-ordered 10 worst invasive plants; 1,000+ years of combined field experience but none listed garlic mustard and only a couple included Asian bush honeysuckle or Callery pear; if asked a few years later these two pernicious interlopers would have been vying for # 1 & 2 by all
- 1987 – **took just 13 years to increase world population by 1B (14.4x the 1804 growth rate)**
Montreal Protocol credited with significantly reducing CFC's and ozone layer depletion, but not enacted until 1989
- 1989 – *Manual of Seed Plants of Indiana* (William Crankshaw, Ball State Univ) published by the Indiana Academy of Science; pulled from distribution due to shoddy construction, poor editing and terrible scholarship; scathing review by Ed Voss in *The Michigan Botanist*; Bill McKnight asked to resolve the matter and revamp the IAS publications program
- 1990s – **Lacey Act case**, Alpena, MI man guilty of harvesting (AWA orchestrating others) and selling wild collected orchids (>60,000 specimens in one year); access to records for details denied
disregard of natural history / whole organism field-oriented biology at university hits full stride, from faculty expertise to courses and shedding collections; decline ongoing
climate warming took hold (irreversibly) with cataclysmic global ramifications (esp. 1998 fwd)
- 1991 – **national ban on lead shot for waterfowl hunting (federal lands exempted)**, stemming from the revealing work of biologist Frank Belrose (Illinois Natural History Survey) esp. his 1959 publication: **subsequently some state and federal fishing tackle lead restrictions**
Biological Pollution: The Control and Impact of Invasive Exotic Species (Indianapolis, IN)
first national symposium dealing with both animal and plant invaders
Holcomb Research Institute at Butler Univ (Indianapolis) closed two decades after start, environmental biology research program abolished and associated personnel discharged (administrators found a loophole in the bequeath and appropriated the funds)
- 1992 – **Residential Lead-based Paint Hazard Reduction Act (Title X)**
UN Rio de Janeiro Earth Summit addressed sustainable development and environmental concerns, lead to agreements on climate change and biodiversity but ...
E.O. Wilson's *The Diversity of Life* published
“It's the ~~economy~~ environment, stupid” (adapted James Carville political slogan)
- 1993 – World Wide Web placed in public domain; U.S. allowed educational and commercial networks to connect

Great Missouri & Mississippi River flooding caused by record rainfall; [exposed Army Corps of Engineers flawed flood control practices and priorities](#) (1) navigation over public health and environmental issues, (2) protection of urban areas at the expense of agricultural communities, and (3) promoting engineering projects with minimal economic benefits whilst causing harm to natural ecosystems; [numerous other USACE Midwest blunders](#) (e.g., Cache River channelization and New Madrid Floodway Project)

same flooding allowed Asian carp spp. to escape from Arkansas fish farms; containment efforts futile but invasion thus far contained to Mississippi watershed; will be coup de grâce to Great Lakes ecosystem once in that watershed but exclusion/control efforts favor shipping

- 1995 – Floyd Swink, Gerould Wilhelm and two associates fired by Morton Arboretum for disobeying the director’s order to not publish a revised *Plants of Chicago* (4th ed.) because “*no need, it would not sell*,” Publications Director for the Indiana Academy of Science supervised the production of two pressruns (initial release 1994), all 5,300 copies sold within a decade even though technical and no photos, only art was illustrated glossary
- 1996 – [National Invasive Species Act \(NISA\); amended the 1990 Nonindigenous Aquatic Nuisance Prevention and Control Act](#)
 34 Illinois & Indiana organizations collaborate to launch The Chicago Region Biodiversity Council (Chicago Wilderness) to build constituency and to promote and fund conservation
[“The Moratorium” imposed by Cook Co. \(IL\) administrators](#) due to negative press about fire, tree killing, herbiciding and deer control – forced halt of all forest preserve management by volunteer stewards and staff, included prohibition on removal of trash and weeds and education programs, activities resumed slowly, took until 2006 to return to previous status
[Congress established Midewin National Tallgrass Prairie \(NE IL\) at the abandoned Joliet Army Ammunition Plant, restoration led by U.S. Forest Service](#) and Openlands (see 1963)
- 1997 – *The Prairie Pioneers - A Fireside Chat* (documented Schaumburg {IL} meeting) to celebrate the founding of the Conservation Research Institute (CRI) later changed to Midwest CRI
novel ecosystems coined (F. Stuart Chapin & Anthony Starfield) to describe habitat altered, often irreversibility, by human activity; hallmark of the Anthropocene Epoch; concept (novel habitats) later championed by Peter del Tredici (Harvard horticulturalist and urban ecologist)
- 1998 – Gabe Brown (N Dakota rancher) saw the light and started promoting nonstandard but profitable farming practices (for a sustainable future)
 even though the number of botany majors was rising, Eastern Illinois Univ administration merges the nationally acclaimed Botany Dept with zoology and does away with botany B.S.
 (Asian) brown marmorated stink bug introduced in Allentown, PA
- 1999 – [National Invasive Species Council \(NISC\) and Invasive Species Advisory Committees \(ISAC\) formed, Dept of the Interior](#)
- 2000 – Kankakee Sands Restoration Project (10K acres); led by TNC, work began on this glacial remnant (the Grand Kankakee Marsh) once the homeland of the Pokagon Potawatomi; described as the “Everglades of the North” this >1K mi² wetland ecosystem, straddling the Kankakee River in Illinois and Indiana, mostly had been destroyed (<5% remained) when in 1927 [Indiana transferred 2,300 acres to its Dept of Conservation \(forerunner of DNR\)](#)

- 2002 – emerald ash borer first reported in U.S. (MI, Detroit area) but likely already here for a decade (pallet wood from China, probably Lombardy poplar); again like with Chestnut Blight (1905) & Dutch Elm Disease (1930) containment/control efforts failed (foolish misconception)
- 2004 – Institute of Botanical Training started (Springfield, MO)
- 2005 – [judge rules against legal challenge to the transfer of the Univ Iowa herbarium](#); university spokesperson said the move was a “*strategic academic decision ... we no longer emphasize plant sciences*”
- 2007 – Tallamy’s miracle biodiversity cure (BS), blind acceptance (denial) and approbation started
Mayday 23, demographic milestone, world population became more urban than rural
- 2008 – [Farm Bill amended 1900 Lacey Act](#), broadening protection for plants and plant products, including illegal logging
natural area conservation education and land management activities involving inner city youth fought by residents of affluent NW Chicago community near preserve where many city officials lived, signage protestors brandished included “*darkies go home*” and such citizen science social network iNaturalist launched (UC Berkeley)
Illinois Natural History Survey(s) became the Prairie Research Institute (PRI), the five scientific surveys were transferred from the state (DNR) to the Univ of Illinois; critics argued the biological research had become less appealing to the state's sportsmen
Erle Ellis identified 21 different kinds of anthropogenic biomes (anthromes) including a new soil group (technosols)
- 2009 – Wendell Berry (KY agrarian writer & activist) and Wes Jackson (The Land Institute, KS) published op-ed article in *The New York Times* titled *A 50-year Farm Bill*
- 2012 – *Field Manual of Michigan Flora* published (Edward Voss & Anton Reznicek); Voss’s preceding three volumes of *Michigan Flora* published in 1972, 1985 and 1997
- 2013 – Indiana farmer sued by Monsanto because he used a cheaper unlabeled soybean seed from a local grain elevator to do a risky second-crop planting and he saved the seed – Monsanto prevailed since some of its patent protected genes were in the unlabeled seed, Monsanto’s goal being to oblige farmers to buy their GMO seed, forcing corporate ag
- 2014 – Illinois Natural History Survey (INHS) publications, which began in 1862, ceases publishing except its Bulletin, now online only
Merlin Bird ID app launched (Cornell Lab of Ornithology)
- 2015 – [Paris Agreement](#); international treaty to limit global warming, but ...
Pope Francis's *Laudato si'* encyclical on environmental activism esp. global warming, English subtitle *On Care for Our Common Home*, related 2022 documentary film *The Letter: A Message for Our Earth*
first land-grant school (Univ Missouri, Columbia) to get rid of its herbarium
- 2017 – *Flora of the Chicago Region: A Floristic and Ecological Synthesis* published (Gerould Wilhelm & Laura Rericha)
Southeastern Grasslands Institute (SGI) formed (Austin Peay Univ, Clarksville, TN)
purge and editing of climate change data by Trump Admin.

Save Yellowwood Forest pitted Indiana Forest Alliance against state DNR who argued the culling of old hardwood trees was necessary to maintain forest health, sound ecological thinking [vs DNR's old school wood farm](#)); campaign failed

- 2018 – Monsanto sold to Bayer, name (Monsanto) had become toxic like many of the products they manufactured (e.g., DDT, PCBs, Dicamba and Agent Orange); Bayer made Zyklon B
- 2020 – seawater pH 8.05 (8.15 in 1950) ongoing decrease largely due to CO₂ absorption from atm
NOVA documentary *Human Nature*, examines gene-editing and profound ethical questions surrounding playing creator (molecular technology); techniques and concerns apply to other life forms with potential profound environmental consequence
Mound Lake Reservoir (Delaware Co. IN) project defeated due to taxation, environmental and other impacts; trend toward decommissioning dams rather than new or repairing
- 2021 – DuPont (and its spin-offs Chemours and Corteva) \$4B settlement on “Forever Chemicals” (like PFAS, used to make nonstick products) following decades-long deception and truth burying by the chemical giant; documented in the film *Dark Waters*; estimated 2,300 PFAS contaminated sites in U.S. [but no federal limits or cleanup requirements](#)
SIU Press (Carbondale) told Robert Mohlenbrock they would publish no more of his books; the once powerful botany program there had been dismantled in the preceding decade; his first book (1967) was *Ferns* (Vol. 1 of 15 in *The Illustrated Flora of Illinois* series)
- 2022 – [world population surpasses 8,000,000,000 \(15.5x the 1804 growth rate which was 5.3M/yr\)](#)
many experts say we are well past the carrying capacity and it (cc) is likely to diminish
Rothrock Sedge Symposium, Bloomington IN (but not at or supported by IU), plight of natural history collections and training front and center; new paradigm proposed; event documented ([themadbotanist.com](#))
[Congressional report describes the U.S. as the leading plastic waste generator](#)
- 2023 – Audubon Society’s national board voted to keep the name amidst cancel culture protest, arguing that the brand had come to represent more than the person, some local chapters voted to disassociate and changed their name
additional woke name changes; American Ornithological Society (AOS) announces plan to rename hundreds of birds (eponymous names like Audubon’s shearwater and Bachman’s sparrow) and International Botanical Congress followed suit
Duke Univ announces the closing of its herbarium; a few institutions that purged have subsequently found it necessary to have “a library of formerly living plants” thus starting over (e.g., Oberlin and Stanford)
Univ Wisconsin (Madison) does away with Botany Dept, merges it with zoology
American Midland Naturalist ceases publication, began in 1909 at Notre Dame Univ (South Bend, IN), botanist-chemist Julius Nieuwland founder
invasive spotted lantern fly confirmed in IL, near Philadelphia PA as early as 2012
PHYTOFASCISM coined to describe “the plant police” delusional native species purists
[updated USDA Plant Hardiness Zone Map released](#) but, because the climate is changing so fast, outdated even before released, and map often not as relevant as most want to believe
- 2024 – [new Illinois law says homeowner associations \(HOAs\) cannot ban native gardens](#)

virtual closing (again) of the Indiana Univ Deam Herbarium

Barbara Thiers (NYBG) reported that nearly 800 (1/4) of the worldwide total of 3,400 herbaria had been unresponsive to Index Herbariorum inquiries for the past 15 years, suggesting they may no longer exist; about 1/4 of the worldwide total are/were in the U.S.

Wilhem FQA (Reading the Land) Symposium, Pokagon State Park (IN); again, plight of natural history at university emphasized; event documented (themadbotanist.com)

2025 – EPA reported that Midwest cities have the worst air quality in the U.S. and per capita production of solid waste is highest in the Midwest, sustainability paradox

[UN Brazil COP30 compromise deal](#), too little too late; U.S. boycotted

global fossil fuel C emissions rise to all-time high; est. four years from 1.5 °C (2.7 °F) threshold

[rapid systematic disregard and dismantling of environmental protection statues as well as science funding by MAGA](#) (denialism and *nova aetas obscura* - New Dark Age)

the 25 warmest years have been since 1998 (see 1880)

at current rate of consumption world oil and gas reserves estimated to be depleted by 2100, coal by 2200; only time can make fossil fuel

Greenland glacial ice melt 2.5ML per sec (3 swimming pools), Antarctica has 8x more ice

atm CO₂ level 431 ppm (up 30% since 1975); 1925-75 rose 9% (305 to 331); see 1760

• **Almost all our environmental problems are anthropogenic (our number and behavior).** Furthermore, the world population **increased** (net gain) during the Spanish Flu and COVID pandemics, during WWII (even on the days atomic bombs were dropped on Hiroshima and Nagasaki), as well as following the devastating 2004 Sumatra tsunami! NET daily gain has been ≈200,000 since 1970s. Despite claims to the contrary, humankind continues to increase due to lag effect (demographic inertia) – the base number got too large. *But the populations of most other life forms have declined, many are near extinction or already have been.*

“Those who cannot remember the past are condemned to repeat it” (George Santayana, 1905)
but extinction is forever, or so we thought (see dire wolf, then consider the merits)

LESSONS TOO LATE FOR THE LEARNING ?

PREVENTION IS BETTER THAN REPAIR

AGAIN, PRESUMING A FIX IS EVEN POSSIBLE