



Center for Environmental Research at Hornsby Bend



MISSION

Urban Ecology and Sustainability

- Community
- Education
- Research

PARTNERS

- Austin Water Utility
- University of Texas
- Texas A&M University

RESEARCH AREAS

- Soil Ecology, Sewage Recycling and Reuse
- Hydrogeology of the Alluvial Aquifer
- Riparian Ecology and Restoration
- Avian Ecology



50 YEARS OF BIRDING



AUSTIN, TEXAS
Hornsby Bend
1959-2009

The Natural History of the Americas: Discovery and Transformation

Kevin M. Anderson

Austin Water Center for Environmental Research



Natural History

Understanding whole organisms in context

Ecological understanding shaped by cultural contexts

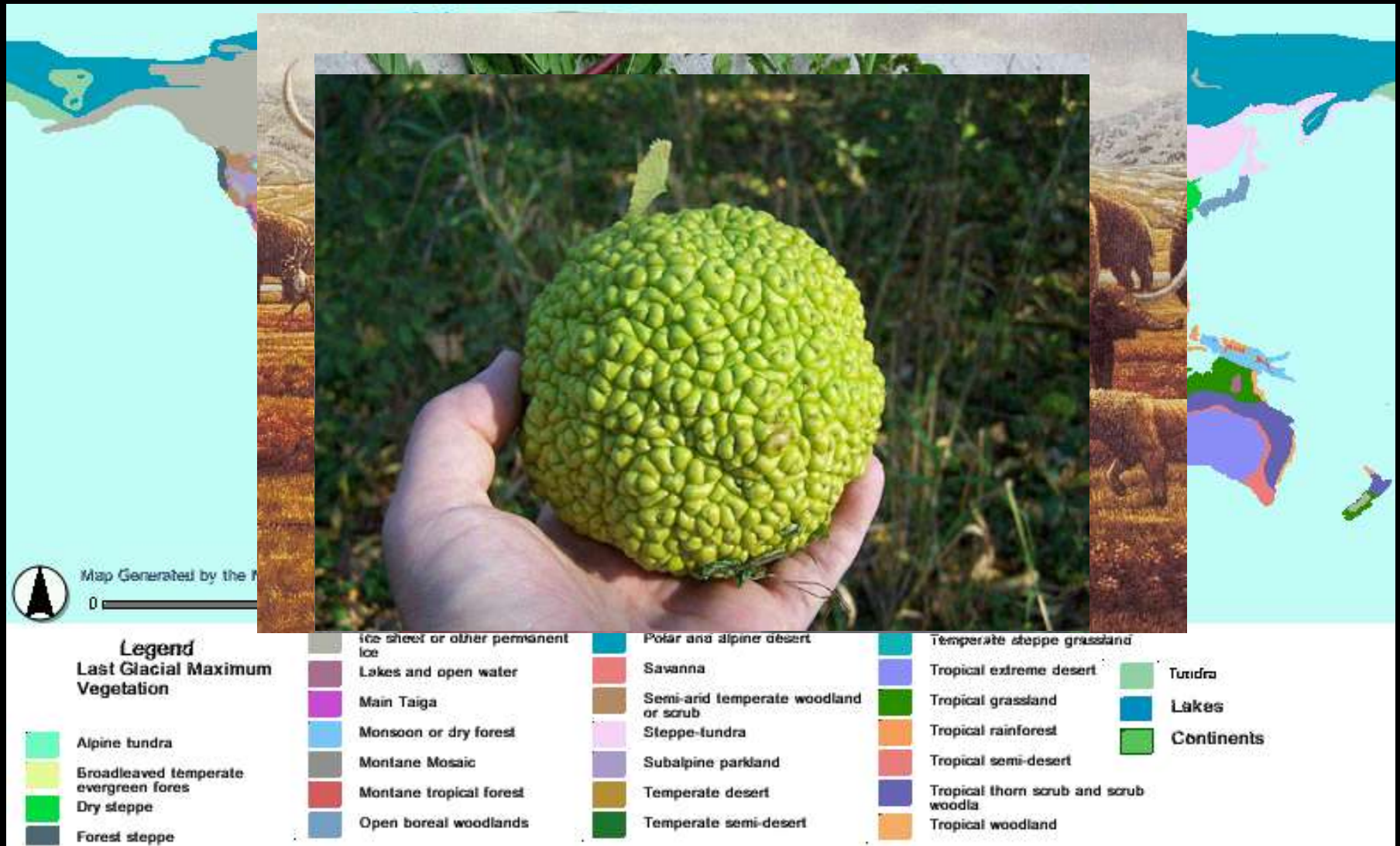
Cultural understanding shaped by ecological contexts



"The idea of nature contains, though often unnoticed, an extraordinary amount of human history."
Raymond Williams, "Ideas of Nature"

Which Natural History?

The Last Glacial Maximum (LGM) refers to a period in the Earth's climate history when ice sheets were at their maximum extension, between 26,500 and 19,000–20,000 years ago



Which Natural History?

Pristine Nature and the Rain Forest

“Zip lining in Costa Rica takes daring adventure travelers over the rainforest canopy: It’s a thrilling ride that can’t truly be replicated on miniaturized, inside zip lining courses. It takes a leap of faith to let go and send yourself across the treetops, despite the safety features in place.



Costa Rica’s rainforests, like all places allowed to remain wild and self-sustaining, are teeming with the perfect balance of flora and fauna, of predators and prey.

Left to itself, the Costa Rica rainforest is more than a natural resource; it’s an ever-changing yet unchanging part of the world’s geography.

Zip lining in Costa Rica is a wonderful way to see the forest while supporting a small local economy in an ethical way — this is an important factor for many travelers to Costa Rica.”



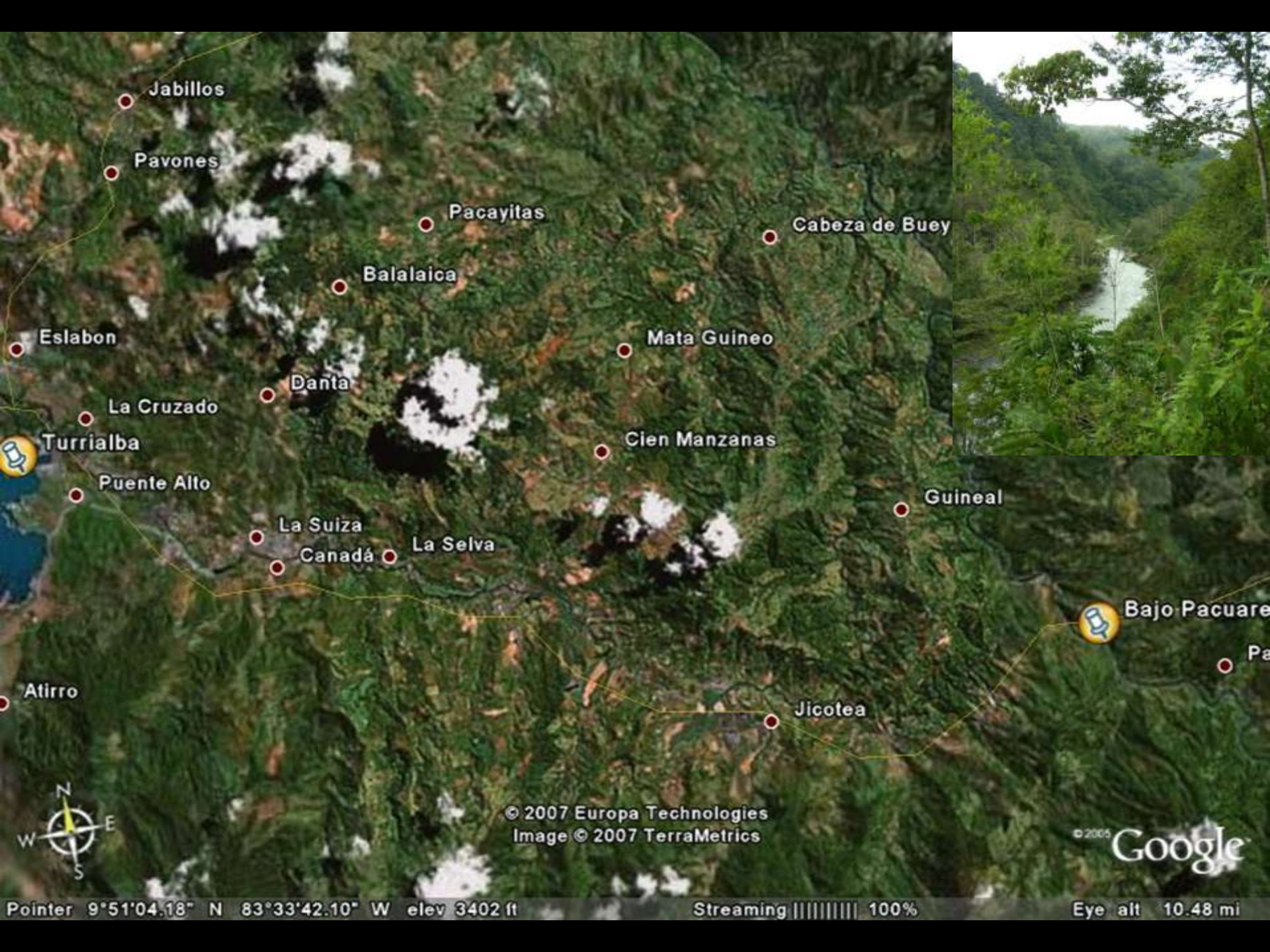


San José

Turrialba

Costa Rica





Jabillos

Pavones

Pacayitas

Cabeza de Buey

Balalaica

Mata Guineo

Eslabon

Danta

Cien Manzanas

La Cruzado

Turrialba

Guineal

Puente Alto

La Suiza

Canadá

La Selva

Bajo Pacuare

Atirro

Jicotea



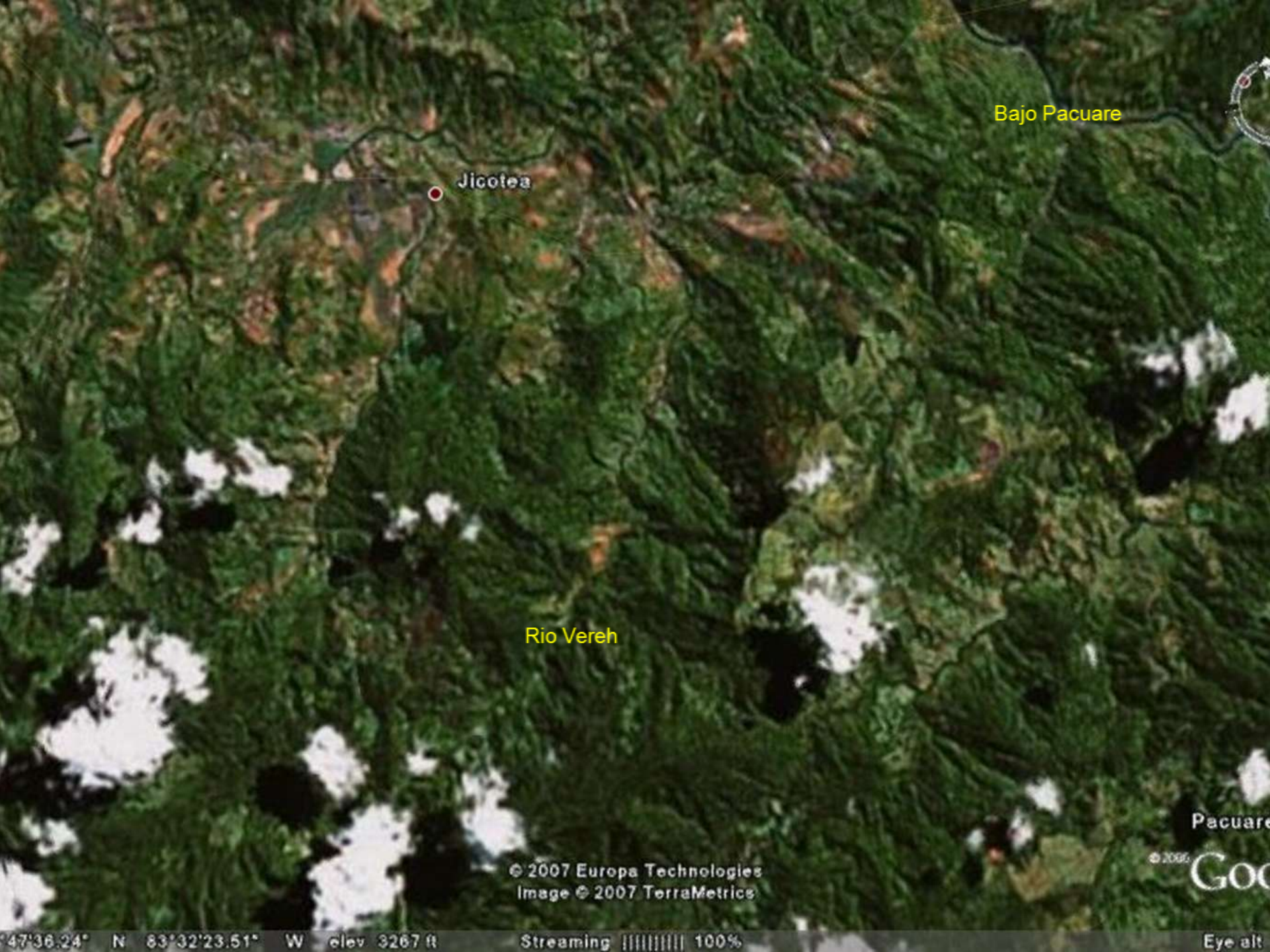
© 2007 Europa Technologies
Image © 2007 TerraMetrics

© 2005 Google

Pointer 9°51'04.18" N 83°33'42.10" W elev 3402 ft

Streaming ||||| 100%

Eye alt 10.48 mi



Jicotea

Bajo Pacuare

Rio Vereh

Pacuare

© 2007 Europa Technologies
Image © 2007 TerraMetrics

© 2006
Goo

47°36.24' N 83°32'23.51' W elev 3267 ft

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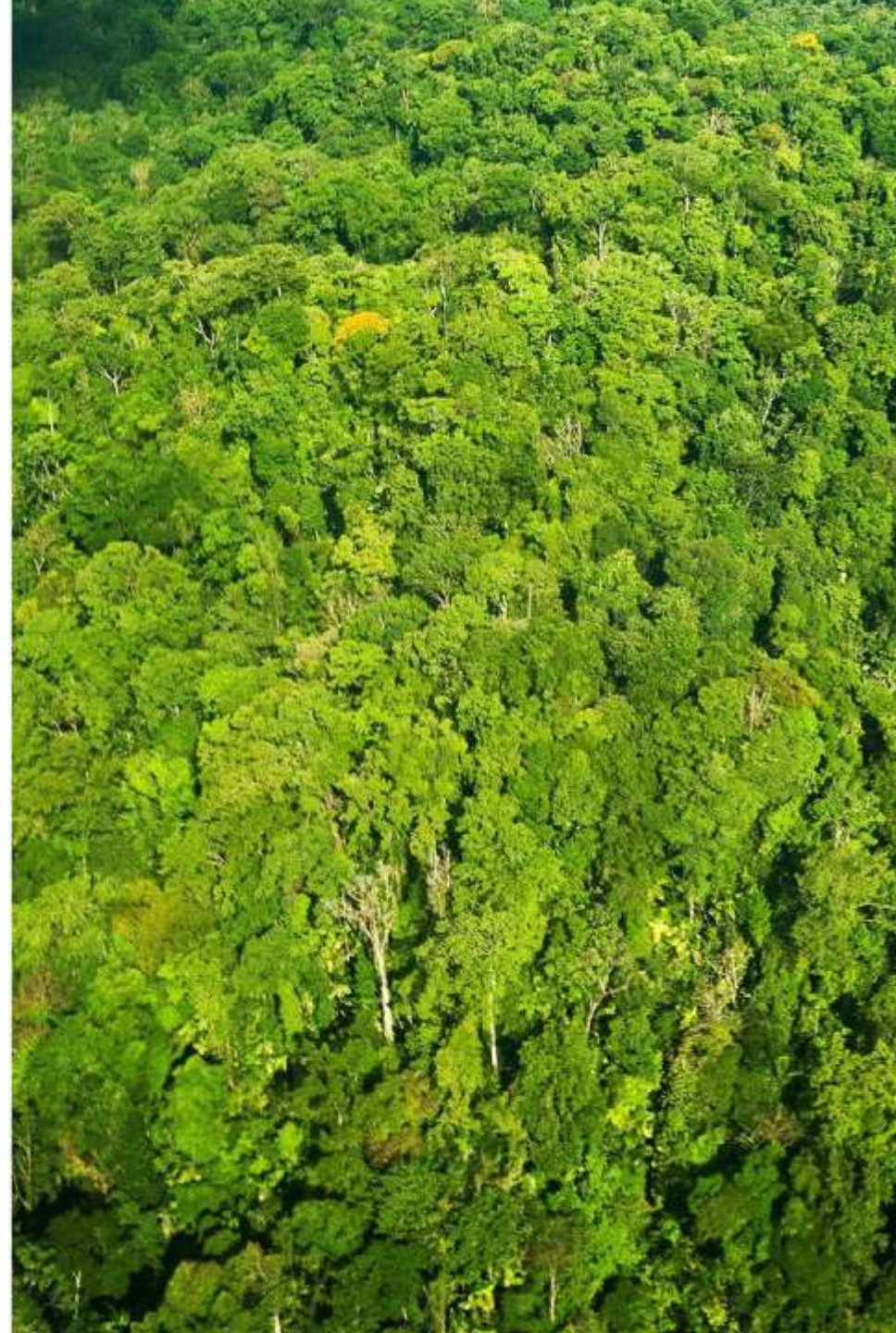
"the virgin forest was not encountered in the sixteenth and seventeenth centuries,
it was invented in the late eighteenth and early nineteenth centuries."

Stephen Pyne (Fire in America, 1982)



Pre-Columbian Central America

- Home to over 19 million people
- Sedentary agricultural societies
- Major population crash after European conquest
- Landscape probably looked less like this →



And more like this. . .

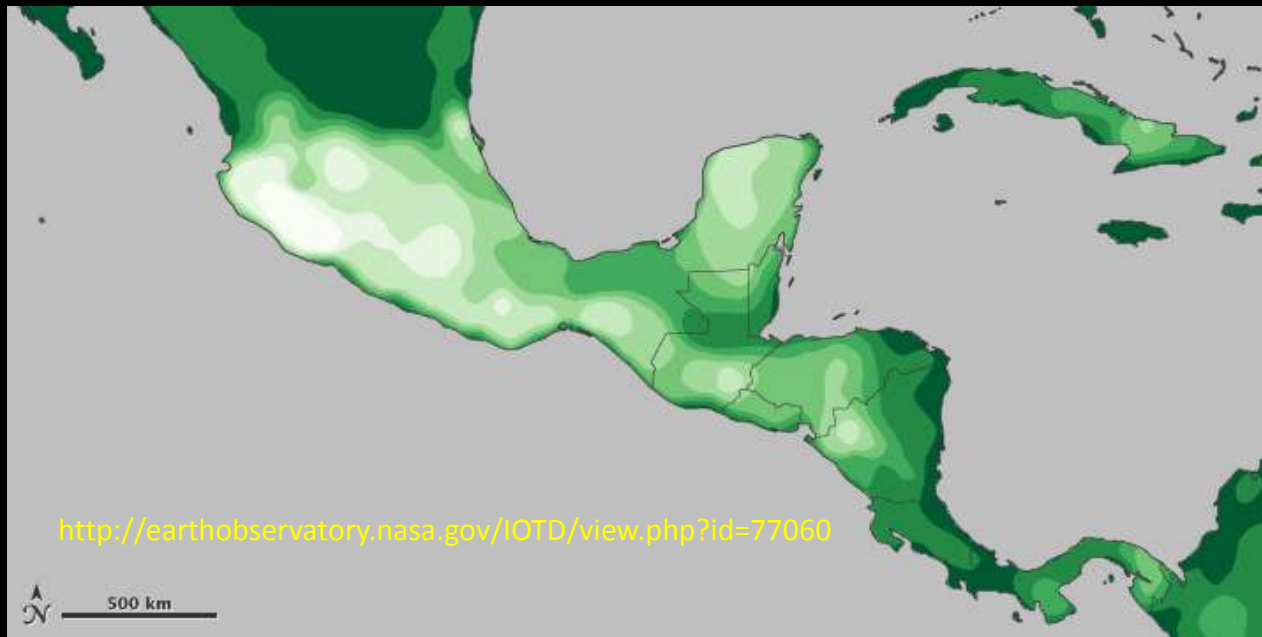




Transformation



How little native forest (dark green) remained at the end of the Mayan period around 950 AD.
By cutting down the forest, the Mayans changed their local climate.

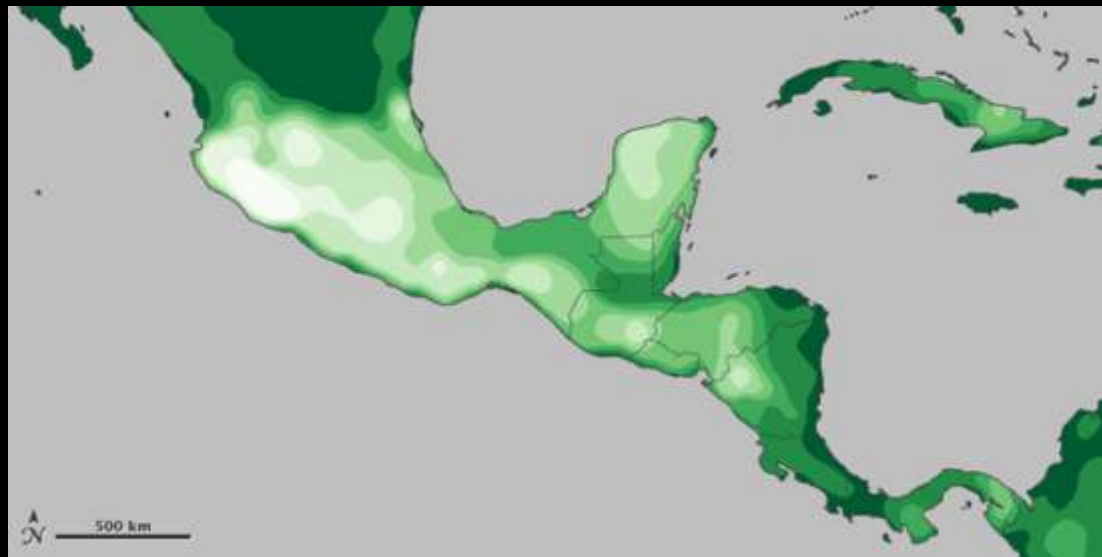


Early humans produced four major changes:

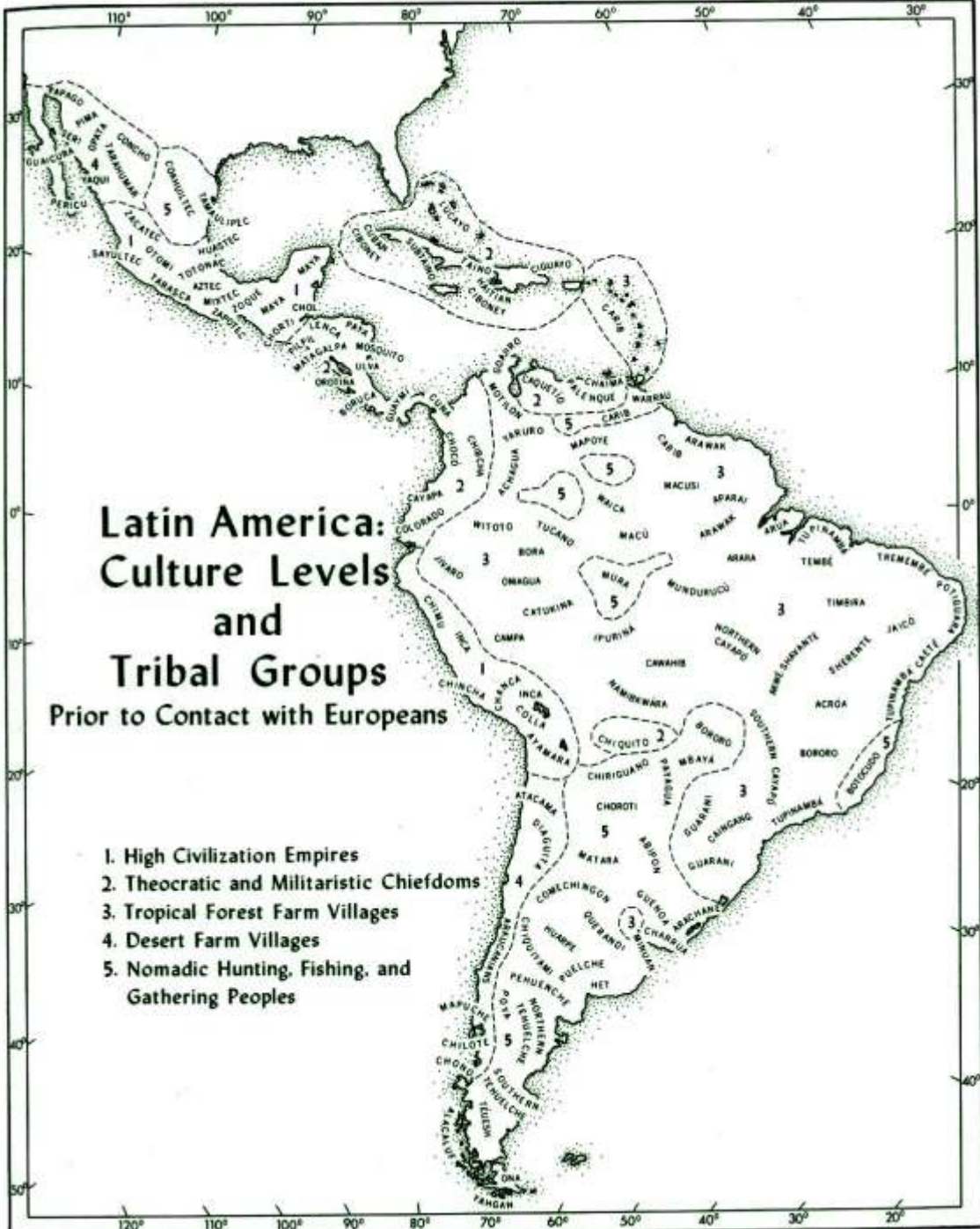
1. The increased frequency and magnitude of disturbance resulted in the expansion of non-forested patches or clearing.
2. The increasingly sedentary life style, the development of territorial control, and the high energy investment in the cultivation of crops resulted in a new sort of disturbance in which large areas were kept in the early stages of succession, which allowed the invasion of subsequent weed populations.
3. The selective utilization of plants by humans and animals resulted in long-term changes in the dominant tree structures within forest communities.
4. There were substantial changes in the distributional limits of certain species.

As the evidence is reinterpreted it seems that the impact of early humans on the forests was greater than suspected, and greater than many would care to admit.

P. A. Delcourt and H. R. Delcourt, Long-Term Forest Dynamics of the Temperate Zone (Ecological Monographs 63) (New York 1987)





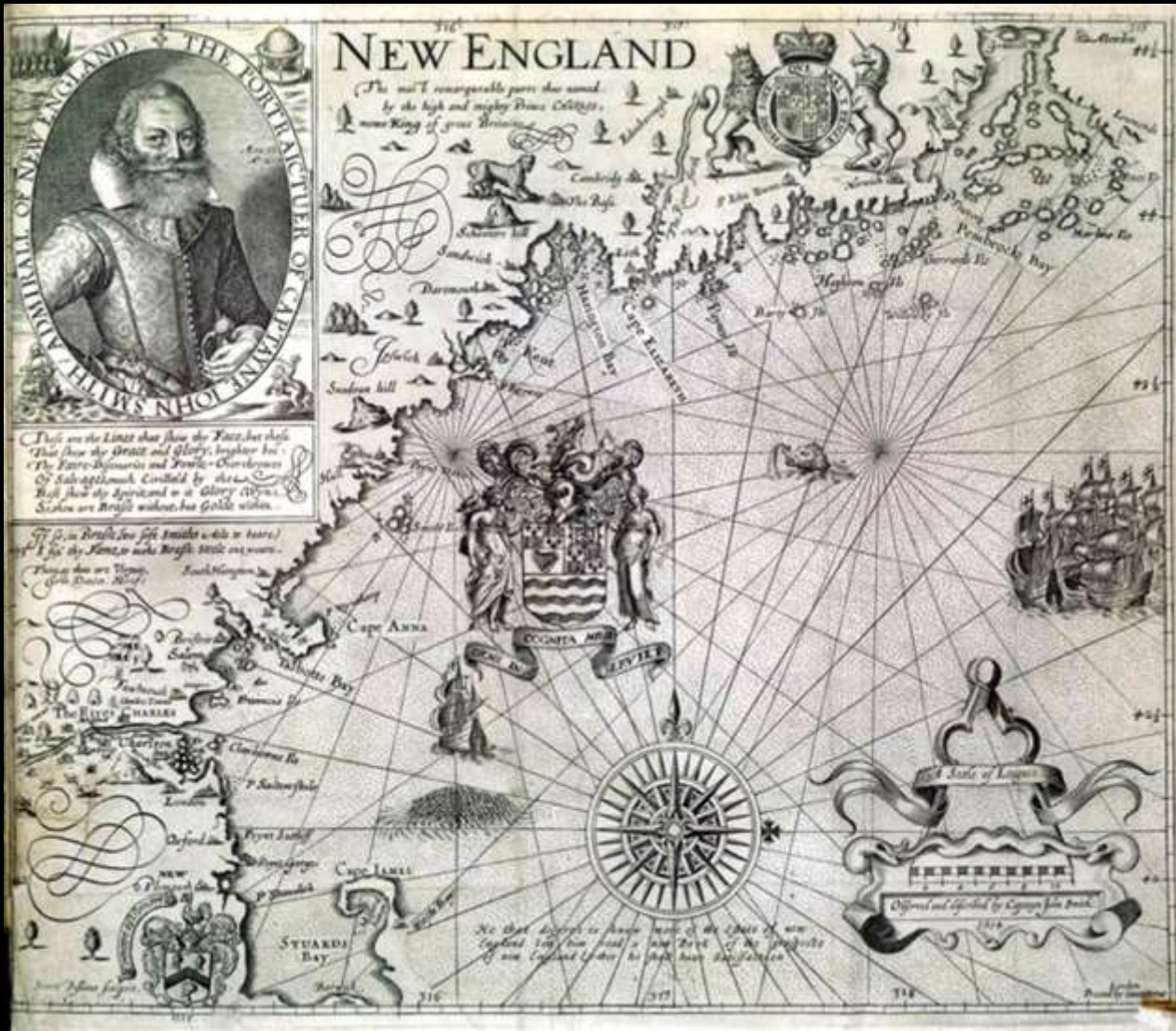


**Latin America:
Culture Levels
and
Tribal Groups
Prior to Contact with Europeans**

1. High Civilization Empires
2. Theocratic and Militaristic Chiefdoms
3. Tropical Forest Farm Villages
4. Desert Farm Villages
5. Nomadic Hunting, Fishing, and Gathering Peoples



Discovery

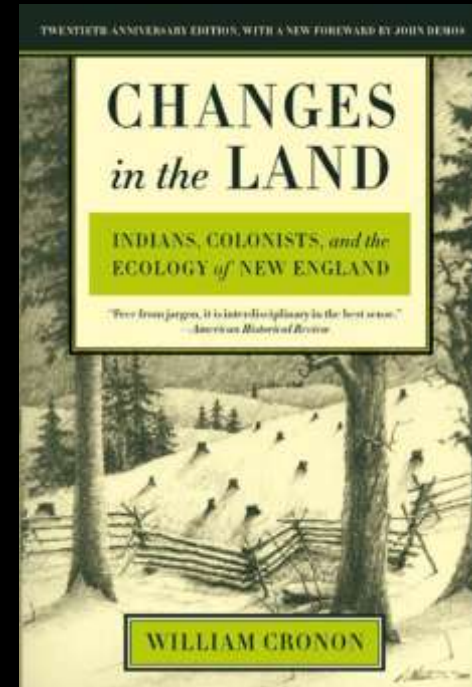


John Smith's New England 1615

In southern New England they would burn large areas of the surrounding forest once or twice a year, creating forests that Europeans saw as “open and parklike.”

The fires would consume all the undergrowth so that the result was “a forest of large, widely spaced trees, few shrubs, and much grass and herbage.”

” Wherever Native Americans in southern New England lived, the English traveler (1633) William Wood noted, “there is scarce a bush or bramble or any cumbersome underwood to be seen in the more champion ground.”





From *American Anthropologist* "Indian Corn-Hills in Massachusetts," Delabarre and Wilder, July 1920.

"Although the cultivation of corn (maize) by the aborigines of the West Indies was observed and reported by the earliest of the discoverers, probably Samuel de Champlain was the first to give any account of this form of agriculture in New England. His first recorded observation was made during his voyage of the summer of 1605, at or near what is now Saco, Maine, his "Choũacoet." He writes:

"The next day [July 9, 1605] Sieur de Monts and I landed to observe their tillage on the bank of the river [Saco river]. We saw their Indian corn, which they raise in gardens. Planting three or four kernels in one place, they then heap about it a quantity of earth with shells of the signoc before mentioned [the horseshoe crab, *Limulus polyphemus*]. Then three feet distant they plant as much more, and thus in succession. With this corn they put in each hill three or four Brazilian beans [the kidney bean, *Phaseolus vulgaris*], which are of different colors. When they grow up, they interlace with the corn, which reaches to the height of from five to six feet; and they keep the ground very free from weeds. We saw there many squashes, and pumpkins, and tobacco, which they likewise cultivate.

The Indian corn which we saw was at that time about two feet high, some of it as high as three. The beans were beginning to flower, as also the pumpkins and squashes. They plant their corn in May, and gather it in September." "

By encouraging the growth of extensive regions which resembled the areas between forests and grasslands, Indians created ideal habitats for a host of wildlife species ... especially those species whose abundance so impressed English colonists: elk, deer, beaver, hare, porcupine, turkey, quail, ruffed grouse, and so on.

When these populations increased, so did the carnivorous eagles, hawks, lynxes, foxes, and wolves. In short, Indians who hunted game animals were not just taking the 'unplanted bounties of nature'; in an important sense, they were harvesting a foodstuff which they had consciously been instrumental in creating.

"In the first millennium A.D., the Indians who had burned undergrowth to facilitate grazing began systematically replanting large belts of woodland, transforming them into orchards for fruit and mast (the general name for hickory nuts, beechnuts, acorns, butternuts, hazelnuts, pecans, walnuts, and chestnuts)...In Colonial times, one out of every four trees in between southeastern Canada and Georgia was a chestnut...

Within a few centuries, the Indians of the eastern forest reconfigured much of their landscape from a patchwork game park to a mix of farmland and orchards. Enough forest was left to allow for hunting, but agriculture was an increasing presence. The result was a new balance of nature."



But the forest not only diminishes with clearing, but regrows and expands with startling rapidity once human pressures are relaxed.

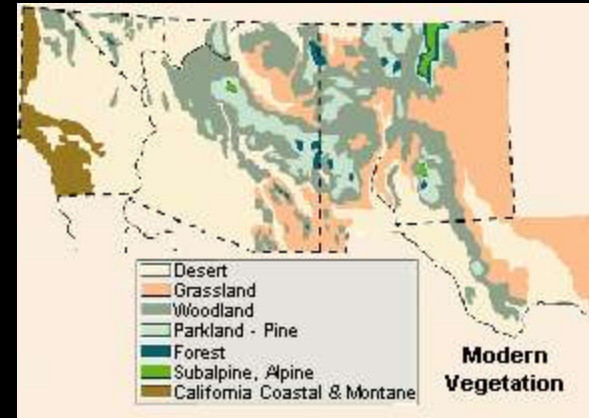
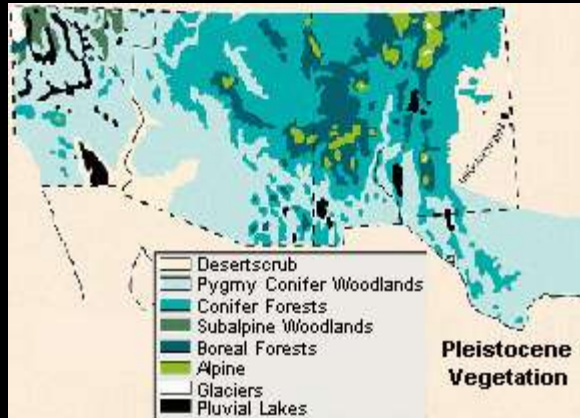
Bearing in mind that different forests in different parts of the world respond differently, it is generally true to say that the power of the forest to regenerate is enormous, as has been demonstrated during the last century and a half in the developed world where the intensification of agriculture on the most productive land has led to the abandonment of marginal land and its recolonization by trees.

In the USA, for example, abandonment began in the difficult to farm New England highlands from 1840 onwards, and then spread south throughout the eastern seaboard states, and was particularly noticeable in the South after the 1920s.

Between 1910 and 1979 a net 60.7 million acres (24.5 million ha) were added to the forest, some of the gains being offset by new clearing in the South and the Mississippi Bottomlands. In other words, the forest grew by about 880 000 acres every year between 1910 and 1979.



Landscape Dynamics in the Southwest



1950

1989

An isolated stand of Colorado pinyon (*Pinus edulis*) at Owl Canyon, north of Fort Collins, Colorado, represents the endpoint of its northward migration since the end of the last ice age.

This 5 km² stand was colonized by pinyon pine less than 500 years ago, possibly from accidental plantings by Cheyenne and Arapaho, who carried pinyon nuts in their "trail mix" on treks along the Front Range. The nearest potential source populations are 250 km to the south near Colorado Springs.

USGS Land Use History of North America
<http://biology.usgs.gov/luhna/index.html>

Landscape Dynamics in the Southwest



1940



1982

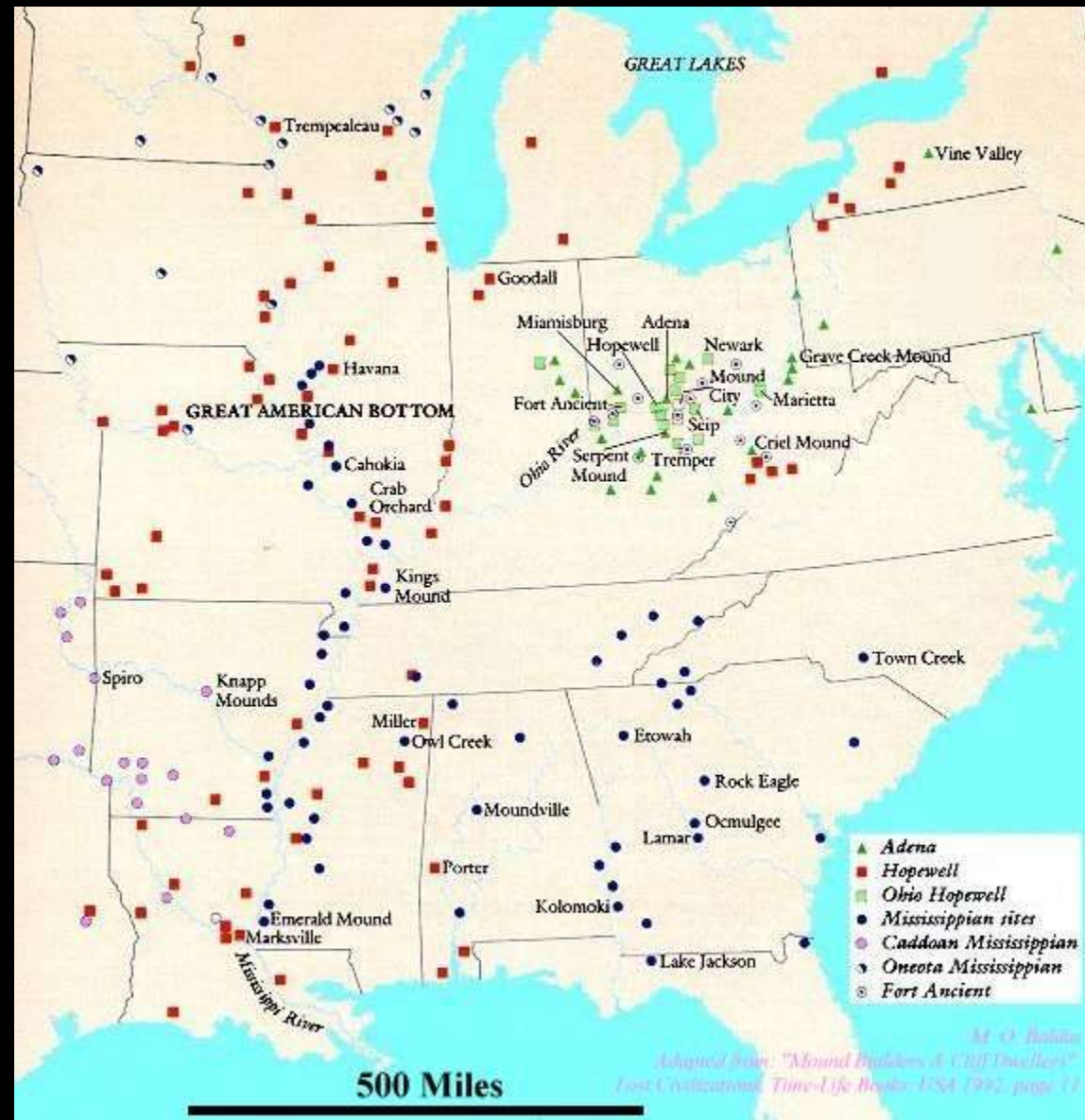
Since World War II, ground-water withdrawals have reduced wetlands and riparian vegetation in southwestern valleys. Mining of ground water in the Tucson Basin, for example, destroyed mesquite forests in the bottomlands of the San Xavier Indian Reservation between 1940 and 1982. Such wholesale conversions of floodplains makes recovery from arroyo-cutting impossible on century time scales.

The American Cultural Landscape 5000 years

They had a strong suggestion of influence from Mesoamerica.

Beginning with the construction of Watson Brake about 3400 B.C. in present-day Louisiana, nomadic indigenous peoples started building earthwork mounds in North America nearly 1000 years before the pyramids were constructed in Egypt.

Serpent Mound in southern Ohio is a 1,348-foot mound built about 1070 A.D.



M. O. Rabin

Adapted from: "Mound Builders & Cliff Dwellers"
Lost Civilizations, Time-Life Books, USA (1992), page 11

The Mississippian Culture reached its climax about 1500 A.D.





One of the most notable temple sites was Cahokia, at St. Louis, where groupings of pyramids and burial mounds cover five square miles. The largest earthen pyramid is 104 feet high and covers 16 acres.

“Anyone who traveled up the Mississippi in 1100 A.D. would have seen it looming in the distance: a four-level earthen mound bigger than the Great Pyramid of Giza...Cahokia was a busy port...Covering five square miles and housing at least fifteen thousand people. Cahokia was the biggest concentration of people north of the Rio Grande until the eighteenth century.”

“To obtain fuel and construction material and to grow food, they cleared trees and vegetation from the bluffs to the east and planted every inch of arable land. Because the city’s numbers kept increasing, the forest could not return. Instead people kept moving further out to get timber, which then had to be carried considerable distances...Meanwhile...the city began to outstrip its water supply...”

Mann, 1491

Cahokia

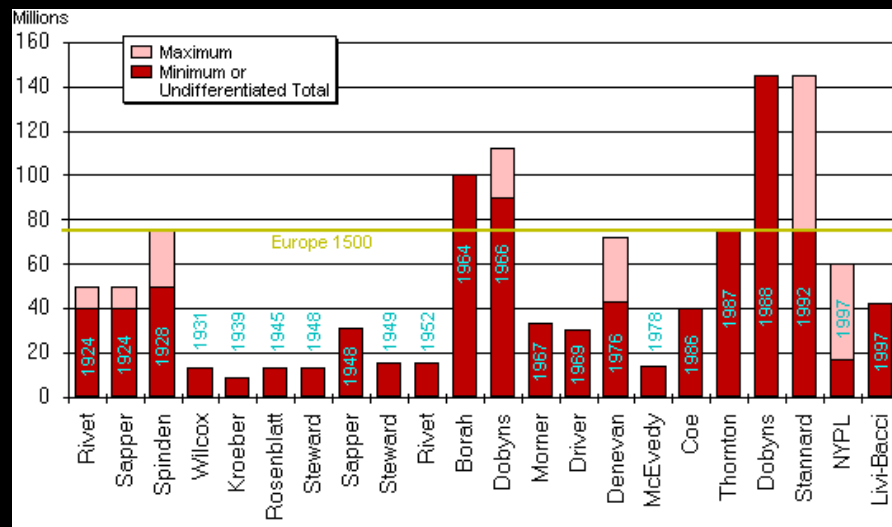


Population of the Americas before 1492

Throughout the nineteenth century, Native Americans spoke often of the great days before Columbus when there were many more people in their tribes. The painter and ethnographer George Catlin, who spent much time among the tribes in the 1830s, listened to these oral legends and estimated that there had been 16 million Indians in North America before the Europeans came. Other white Americans dismissed such claims as preposterous, insisting that Indian civilization was far too primitive ever to have sustained a population even as large as a million.

In 1928, James Mooney, an ethnologist at the Smithsonian Institution, drawing from early accounts of soldiers and missionaries in the sixteenth century, came up with the implausibly precise figure of 1.15 million natives who lived north of Mexico in the early sixteenth century. That was a larger figure than nineteenth-century writers had suggested, but still much smaller than the Indians themselves claimed.

A few years later, the anthropologist Alfred Kroeber used some of Mooney's methods to come up with an estimate considerably larger than Mooney's, but much lower than Catlin's. He concluded in 1934 that there were 8.4 million people in the Americas in 1492, half in North America and half in the Caribbean and South America.



Depopulation of the Americas after 1492

These low early estimates reflected an assumption that the arrival of the Europeans did not much reduce the native population. But in the 1960s and 1970s, scholars discovered that the early tribes had been catastrophically decimated by European plagues not long after the arrival of Columbus--that the numbers Europeans observed even in the late 1500s were already dramatically smaller than the numbers in 1492.

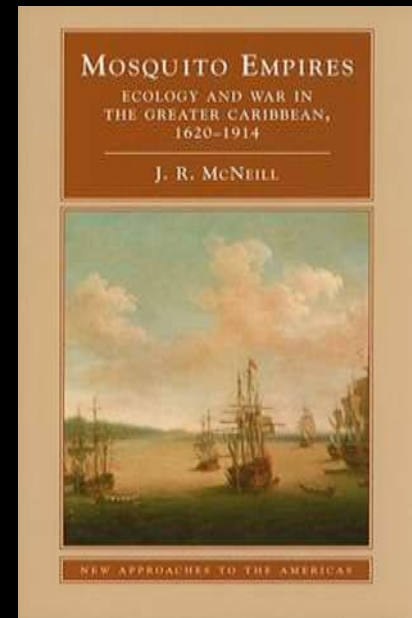
Henry Dobyns, an anthropologist, claimed in 1966 that there were between 10 and 12 million people north of Mexico in 1492, and between 90 and 112 million in all of the Americas.

The Indians in Peru, Dobyns concluded, had faced plagues from the day the conquistadors showed up—in fact, before then: smallpox arrived around 1525, seven years ahead of the Spanish.

Brought to Mexico apparently by a single sick Spaniard, it swept south and eliminated more than half the population of the Incan empire. Smallpox claimed the Incan dictator Huayna Capac and much of his family, setting off a calamitous war of succession. So complete was the chaos that Francisco Pizarro was able to seize an empire the size of Spain and Italy combined with a force of 168 men.

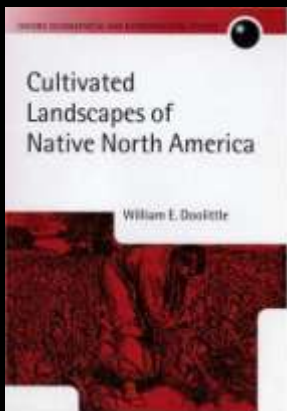
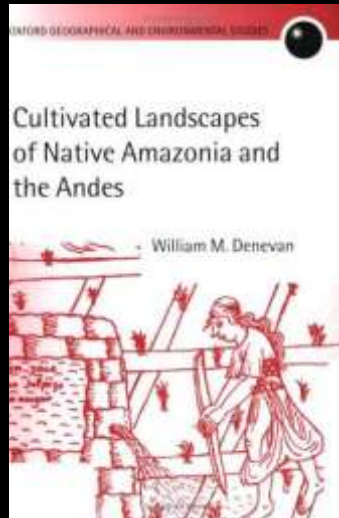
Smallpox was only the first epidemic. Typhus (probably) in 1546, influenza and smallpox together in 1558, smallpox again in 1589, diphtheria in 1614, measles in 1618—all ravaged the remains of Incan culture.

No subsequent scholar has made so high a claim, but most subsequent estimates have been much closer to Dobyn's than to Kroeber's.

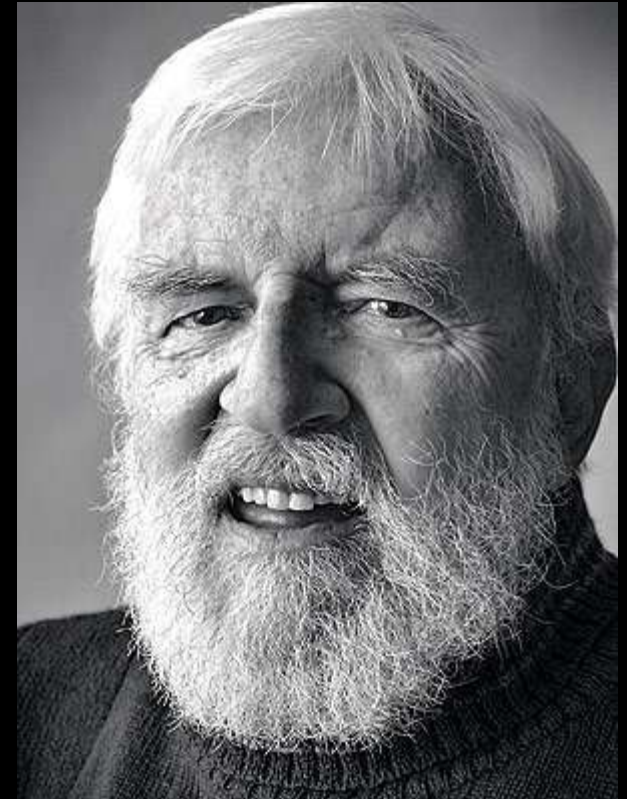
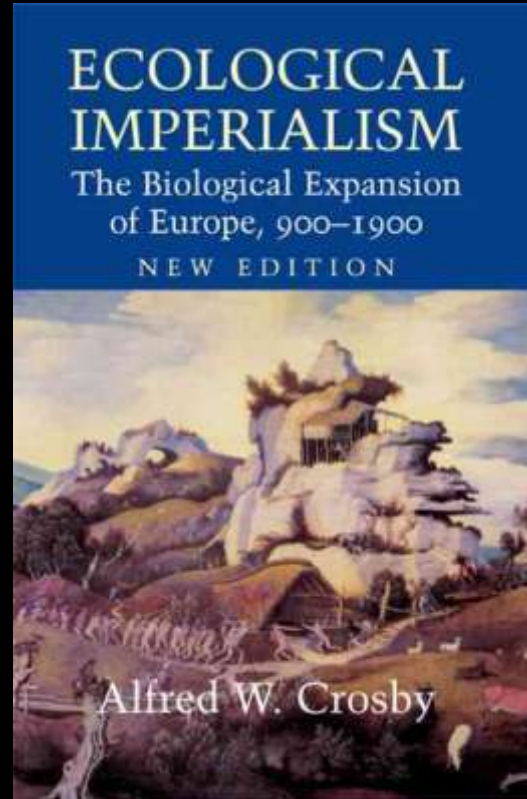
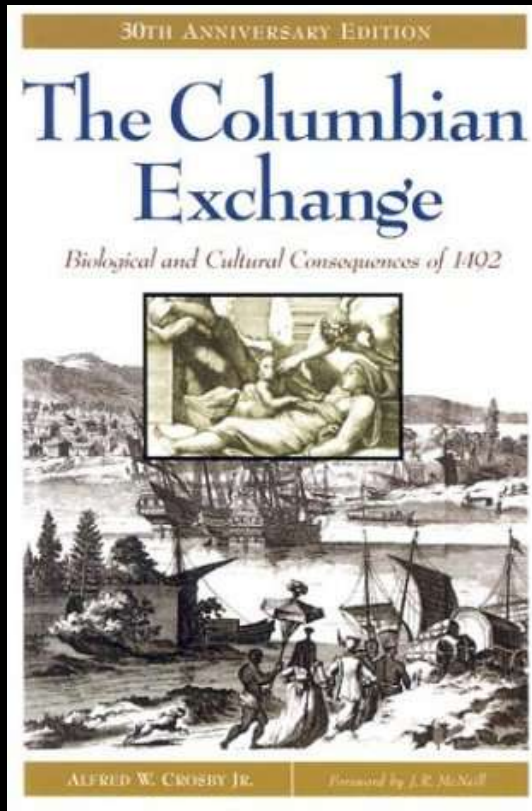


Cultivated Landscapes of the Americas

The geographer William M. Denevan argued in 1976 that the American population in 1492 was around 55 million and that the population north of Mexico was under 4 million. These are among the lowest of modern estimates, but still dramatically higher than the nineteenth-century numbers.



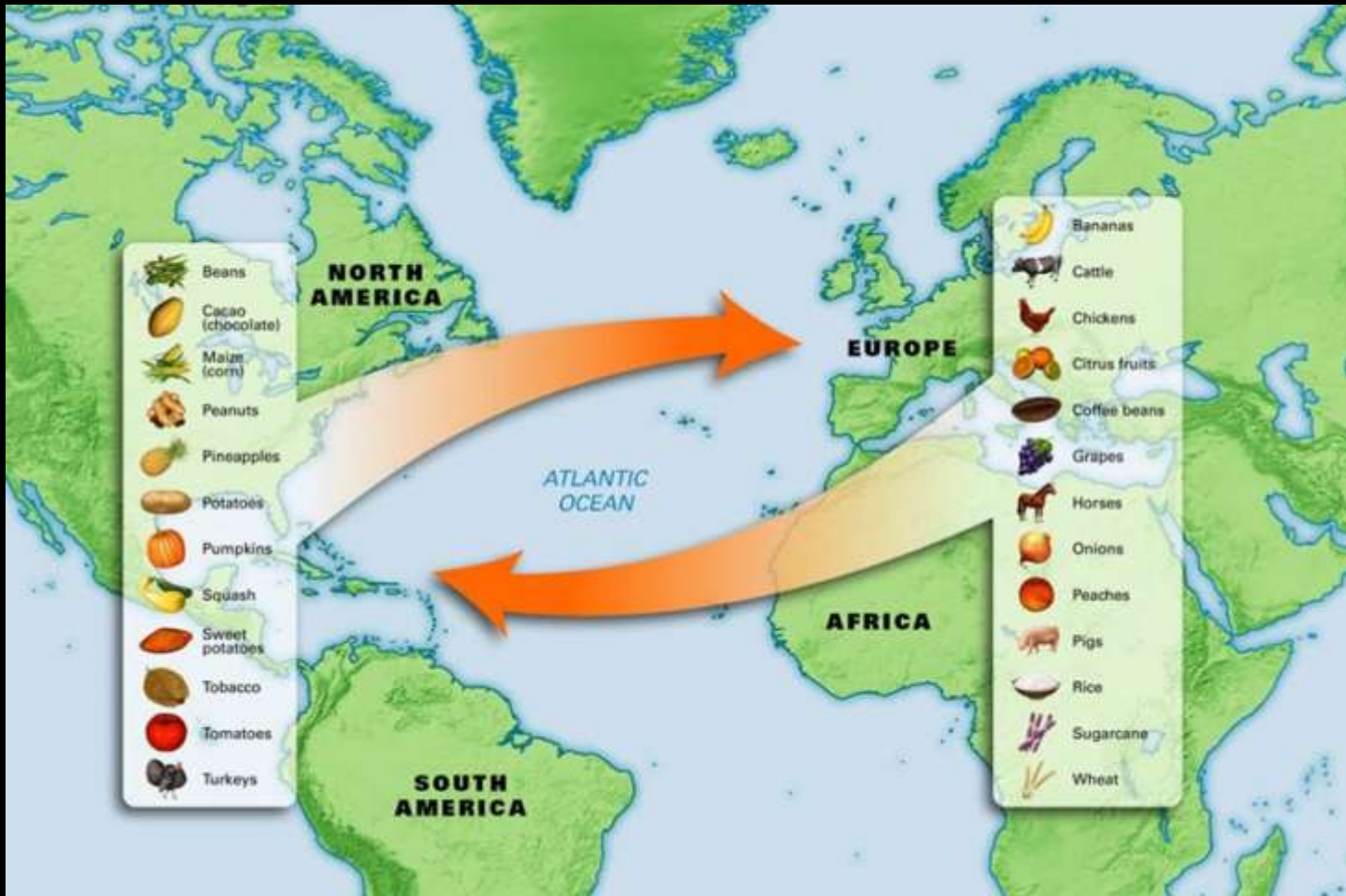
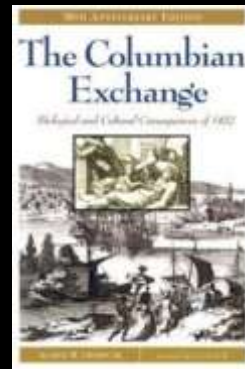
In 1972, Alfred Crosby described the near extinction of some tribes and the dramatic depopulation of others in *The Columbian Exchange* and the biological expansion of Europe in *Ecological Imperialism* published in 1986.



The Columbian Exchange

Until about 200 million years ago Eurasia and the Americas were a single landmass called Pangaea. It broke apart and for millions of years the parts had little communication. As Crosby put it, Columbus initiated the process of knitting back together the seams of Pangaea.

Ever since 1492, the hemispheres have become more and more alike, as people mix the world's organisms into a global stew through the Columbian Exchange.



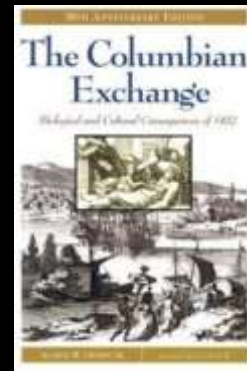
The Columbian Exchange

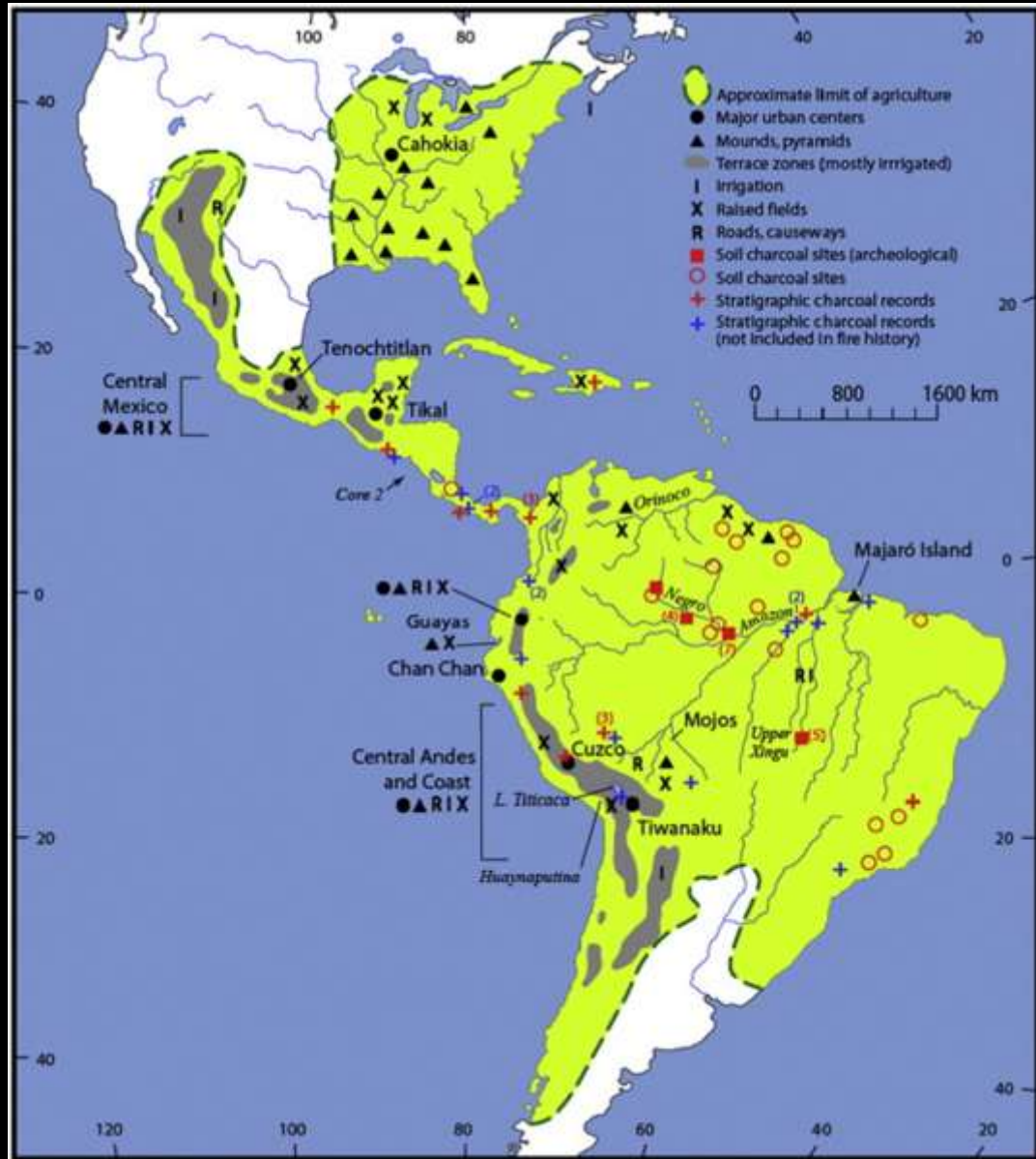
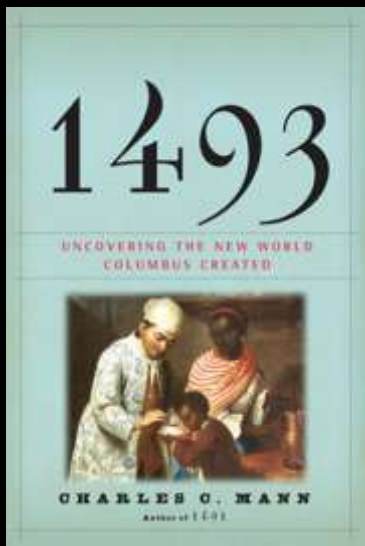
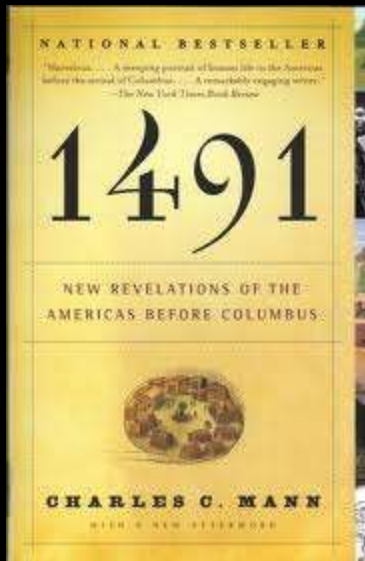
“Columbus set off an ecological explosion of a magnitude unseen since the Ice Ages.

Some species were shocked into decline (most prominent among them *Homo sapiens*, which in the century and a half after Columbus lost a fifth of its number, mainly to disease).

Others stumbled into new ecosystems and were transformed into environmental overlords: picture-book illustrations of what scientists call “ecological release.” Mann, 1491

Not all released species will become invasive. Most released species that don't immediately die out tend to find a small niche in the local ecosystem. Ecological release occurs when a species expands its niche within its own habitat or into a new habitat where there is little competition for resources.





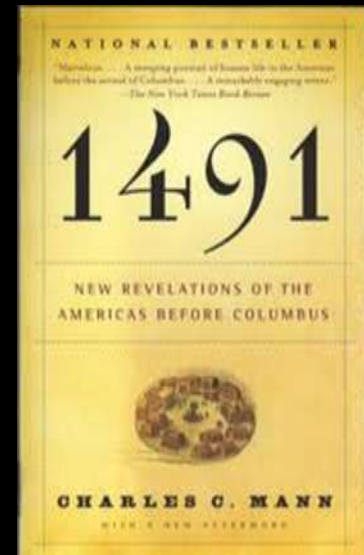
Americas 1491 “humanized landscapes”

“Until Columbus, Indians were a keystone species in most of the hemisphere. Annually burning undergrowth, clearing and replanting forests, building canals and raising fields, hunting bison and netting salmon, growing maize, manioc, and the Eastern Agricultural Complex.

Native Americans had been managing their environment for thousands of years. As Cahokia shows, they made mistakes. But by and large they modified their landscapes in stable, supple, resilient ways. Some...areas have been farmed for thousands of years – time in which farmers in Mesopotamia and North Africa and parts of India ruined their land. Even the wholesale transformation seen in places like Peru, where irrigated terraces cover huge areas, were exceptionally well done.

But all of these efforts required close, continual oversight. In the sixteenth century, epidemics removed the boss...Not only did invading endive and rats beset them, but native species, too, burst and blasted, freed from constraints by the disappearance of Native Americans.”

Mann, 1491



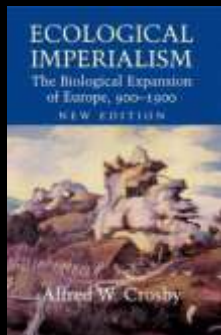
Ecological Imperialism Invasions

Jamestown – rats, clover, bluegrass

Endive and spinach escaped from colonial gardens and grew into impassable six foot thickets on the Peruvian coast

Mint overwhelmed Andean valleys

In the Pampas of Argentina Charles Darwin found hundreds of square miles strangled by feral artichoke in the 1830s.



Darwin found that peach wood from invasive peach trees was the main supply of firewood for Buenos Aires.

Peaches invade the Southeast – 1700s farmers worried that the Carolinas and Georgia would be a “wilderness of peach trees”

The Great Nations of Europe – Randy Newman

The Great Nations of Europe had gathered on the shore
they'd conquered what was behind them and now they wanted more
so they looked to the mighty ocean and took to the western sea
The great nations of Europe in the 16th century

Hide your wives and daughters, hide the groceries too
The great nations of Europe coming through

The Grand Canary Islands first land to which they came
they slaughtered all the canaries there which gave the land its name
there were natives there called Guanches, Guanches by the score
bullet's, disease the Portuguese, they weren't there any more

now they're gone, they're gone, they're really gone
you never seen anyone so gone
there's pictures in a museum, some lines written in a book
but you won't find a live one, no matter where you look

Hide your wives and daughters, hide the groceries too
The great nations of Europe coming through

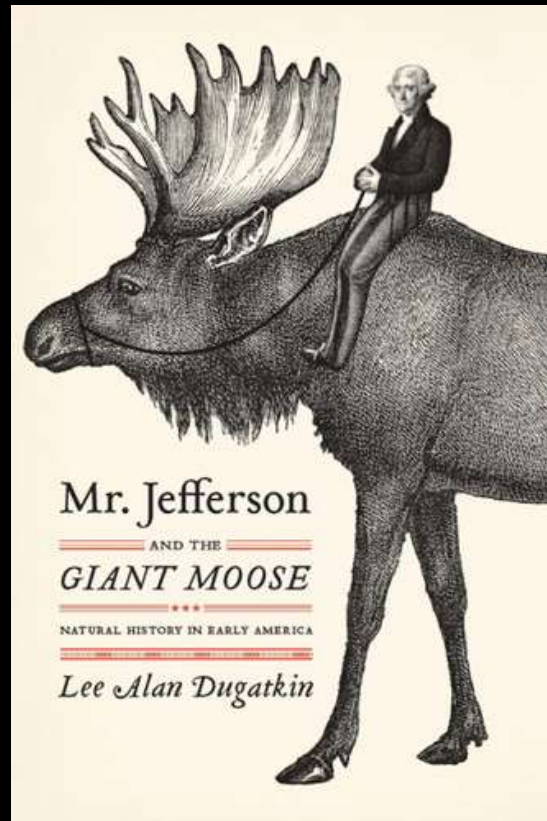
Columbus sailed for India found Salvador instead
he shook hands with some Indians and soon they all were dead
they got tb and typhoid and athletes foot, diphtheria and the flu
'scuse me great nations coming through

On *Bad Love* (1999) and *Songbook Vol. 1* (2003)



The Theory of Degeneracy and Jefferson's Moose

"The idea of nature contains, though often unnoticed, an extraordinary amount of human history."
Raymond Williams, "Ideas of Nature"



Comte de Buffon 1707–1788

French naturalist, mathematician, cosmologist, and encyclopedic author.

Buffon published thirty-six quarto volumes of his *Histoire naturelle* during his lifetime; with additional volumes based on his notes and further research being published in the two decades following his death.

In the course of his examination of the animal world, Buffon noted that despite similar environments, different regions have distinct plants and animals, a concept later known as Buffon's Law. [Biogeography and Evolution]

He was not an evolutionist, yet he was the father of evolutionism. He was the first person to discuss a large number of evolutionary problems.

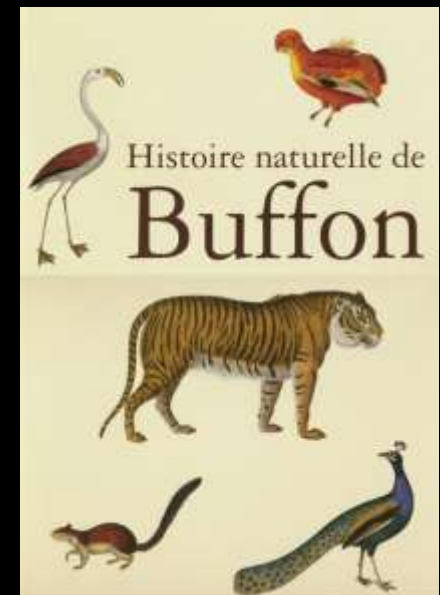
Theory of Degeneracy

“In his massive encyclopedia of natural history, Buffon laid out what came to be called the theory of degeneracy.

He argues that, as a result of living in a cold and wet climate, all species found in America were weak and feeble. What's more, any species imported into America for economic reasons would soon succumb to its new environment and produce lines of puny, feeble offspring.

America, Buffon told his readers, is a land of swamps, where life putrefies and rots. “

Dugatkin, 2009



The Theory of American Degeneracy (Environmental Determinism)

“There was no escaping the pernicious effects of the American environment - not even for Native Americans. They too were degenerate. For Buffon, Indians were stupid, lazy savages.

In a particularly emasculating swipe, he suggested that the genitalia of Indian males were small and withered - degenerate - for the very same reason that the people were stupid and lazy.

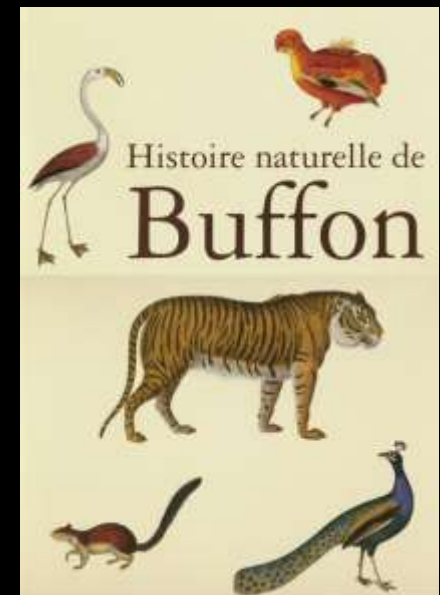
The environment and natural history had never before been used to make such sweeping claims, essentially damning an entire continent in the name of science.

Buffon's American degeneracy hypothesis was quickly adopted and expanded by men such as the Abbé Raynal and the Abbé de Pauw, who believed that Buffon's theory did not go far enough.

They went on to claim that the theory of degeneracy applied equally well to transplanted Europeans and their descendants in America.

These ideas became mainstream enough that Raynal felt comfortable sponsoring a contest in France on whether the discovery of America had been beneficial or harmful to the human race.”

Dugatkin, 2009



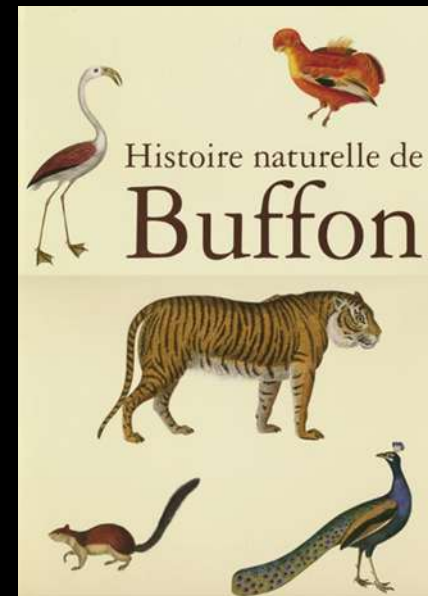
The Theory of American Degeneracy

Kant – the climate in America produced a race “too weak for hard work, too indifferent to pursue anything, incapable of culture” (1788)

Hegel – “America has always been and still shows itself physically and spiritually impotent.” and animals in the New World are “in every way smaller, weaker and more cowardly” This inferiority applied to domesticated animals as well as wild ones, “a piece of European beef is a delicacy” compared to American beef. American birds were mostly mute and would only sing when they lived in a land that no longer “resounds with almost inarticulate tones of degenerate men.” (1816)

Keats – *Lines to Fanny* (1819)

Where shall I learn to get my peace again?
To banish thoughts of that most hateful land,
Dungeoner of my friends, that wicked strand
Where they were wreck'd and live a wrecked life;
That monstrous region, whose dull rivers pour
Ever from their sordid urns unto the shore,
Unown'd of any weedy-haired gods;
Whose winds, all zephyrless, hold scourging rods,
Iced in the great lakes, to afflict mankind;
Whose rank-grown forests, frosted, black, and blind,
Would fright a Dryad; whose harsh herbag'd meads
Make lean and lank the starv'd ox while he feeds;
There flowers have no scent, birds no sweet song,
And great unerring Nature once seems wrong.



Buffon influence on Charles Darwin

The Voyage of the Beagle 1831-36

“If Buffon had known of the gigantic sloth and armadillo-like animals, and of the lost Pachydermata, he might have said with greater semblance of truth that the creative force in America had lost its power, rather than that it never possessed great vigor”



Jefferson's Moose

In his *Notes on the State of Virginia* (1785) Thomas Jefferson responded to Buffon's claims. His evidence included comparative tables of weights of animal species from America and Europe, lists of species endemic to each part of the world (the American list was four times as long) and even an explanation of why cattle were smaller in the New World than in the Old (farming practices, not climate conditions). He also included a passionate defense of Native Americans.

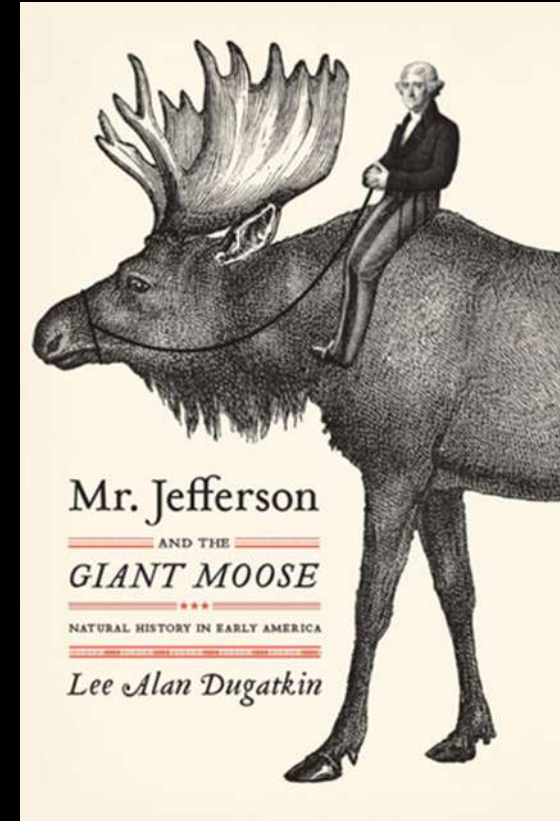
In addition, "Jefferson also wanted to present Buffon with tangible evidence...He tried with the skin of a panther, and then the bones of a hulking mastodon...but Buffon didn't budge.

Jefferson's most concerted effort in terms of hands-on evidence was to procure a very large, dead, stuffed American moose – antlers and all – to hand Buffon personally, in effect saying, "see."

This moose became a symbol for Jefferson – a symbol of the quashing of European arrogance in the form of degeneracy."

Dugatkin, 2009

If the theory of American degeneracy took hold in Europe the long-term consequences could impact trade with and immigration too the United States.

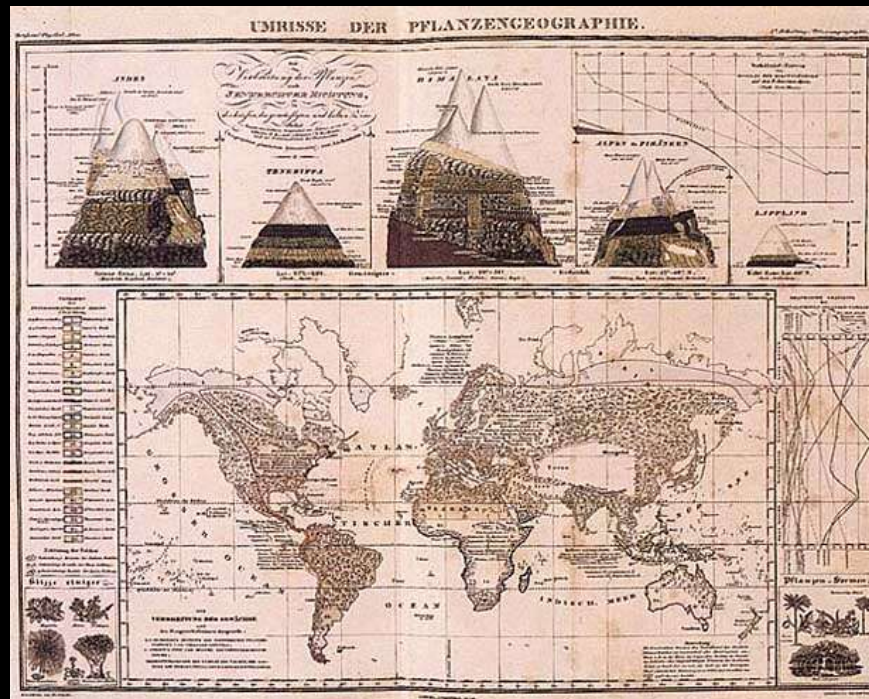


Alexander von Humboldt 1769 - 1859

Charles Darwin described him as "the greatest scientific traveler who ever lived." He is widely respected as one of the founders of modern geography and ecology.

Alexander von Humboldt's travels, experiments, and knowledge transformed western science in the nineteenth century.

Between 1799 and 1804, Humboldt travelled extensively in Latin America, exploring and describing it. His description of the journey was written up and published in an enormous set of volumes over 21 years. Later, his five-volume work, *Kosmos* (1845), attempted to unify the various branches of scientific knowledge.





Alexander von Humboldt and Thomas Jefferson

“It would be superfluous for me to refute here the rash assertions of M. de Buffon...These ideas were easily propagated, because they flattered the vanity of Europeans...When the facts are carefully examined, naturalists perceive nothing but harmony where this eloquent writer announced discordancy.”
(1811)

He had read *Notes on Virginia*, where Jefferson used the mammoth as evidence against Buffon.

Towards the end of his exploratory trip through the Americas, he writes to then President Jefferson to ask to meet, “I would love to talk to you about a subject that you have treated so ingeniously in your work on Virginia.”

And von Humboldt collected mammoth teeth in the Andes which he brings to Jefferson, beginning a lifelong friendship between the two.



Cultural Impact of the Theory of Degeneracy on the Idea of American Nature

Henry David Thoreau, "Walking" (1862)

"This statement will do at least to set against Buffon's account of this part of the world and its productions."

'We go eastward to realize history, and study the works of art and literature, retracing the steps of the race, — we go westward as into the future, with a spirit of enterprise and adventure. The Atlantic is a Lethean stream, in our passage over which we have had an opportunity to forget the old world and its institutions.'

"If the moon looks larger here than in Europe, probably the sun looks larger also.

If the heavens of America appear infinitely higher, the stars brighter, I trust that these facts are symbolical of the height to which the philosophy and poetry and religion of her inhabitants may one day soar.

At length perchance the immaterial heaven will appear as much higher to the American mind, and the intimations that star it as much brighter.

For I believe that climate does thus react on man — as there is something in the mountain air that feeds the spirit and inspires. Will not man grow to greater perfection intellectually as well as physically under these influences?"



The West of which I speak is but another name for the Wild; and what I have been preparing to say is, that in Wildness is the preservation of the world. Every tree sends its fibres forth in search of the Wild. The cities import it at any price. Men plow and sail for it. From the forest and wilderness come the tonics and barks which brace mankind.

Our ancestors were savages. The story of Romulus and Remus being suckled by a wolf is not a meaningless fable. The founders of every state which has risen to eminence, have drawn their nourishment and vigor from a similar wild source.

Ben Jonson exclaims, —

"How near to good is what is fair!"

So I would say —

How near to good is what is wild!



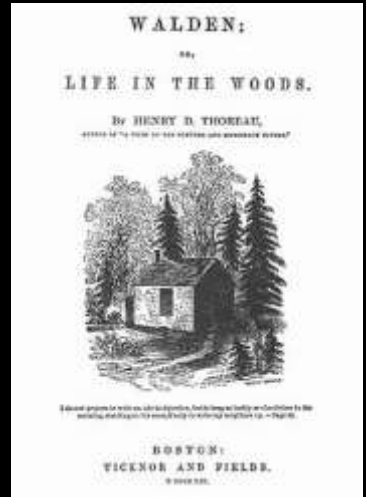
Life consists with Wildness. The most alive is the wildest. Not yet subdued to man, its presence refreshes him. One who pressed forward incessantly and never rested from his labors, who grew fast and made infinite demands on life, would always find himself in a new country or wilderness, and surrounded by the raw material of life. He would be climbing over the prostrate stems of primitive forest trees.

Hope and the future for me are not in lawns and cultivated fields, not in towns and cities, but in the impervious and quaking swamps. When, formerly, I have analyzed my partiality for some farm which I had contemplated purchasing,

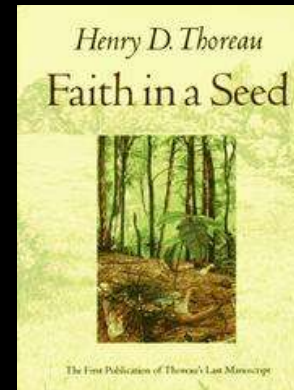
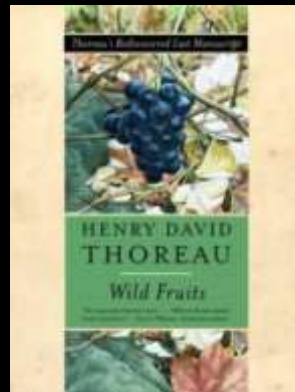
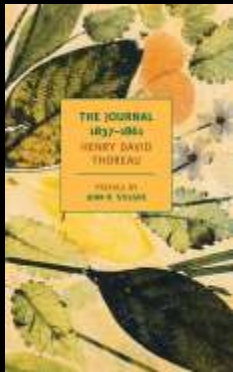
Yes; though you may think me perverse, if it were proposed to me to dwell in the neighborhood of the most beautiful garden that ever human art contrived, or else of a dismal swamp, I should certainly decide for the swamp.

When I would recreate myself, I seek the darkest wood, the thickest and most interminable, and, to the citizen, most dismal swamp.

I enter a swamp as a sacred place — a *sanctum sanctorum*. There is the strength — the marrow of Nature. The wild wood covers the virgin mould, — and the same soil is good for men and for trees.



Published 1854



Natural History

Understanding whole organisms in context

Ecological understanding shaped by cultural contexts

Cultural understanding shaped by ecological contexts



"The idea of nature contains, though often unnoticed, an extraordinary amount of human history."
Raymond Williams, "Ideas of Nature"

Applause



Questions?

