

- Food, Fuel or Wild Species: The
- Eco-Dangers of Growing More Biofuels
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Warning:

- This the most dangerous time in history to mandate large amounts of biofuels.
- World food/feed demand will 2X in next 40 years. Pet food demand will radically expand.
- World is farming all its prime land already.
- Cropland for biofuels would take millions of acres, and displace lots of wild species—without easing global warming.



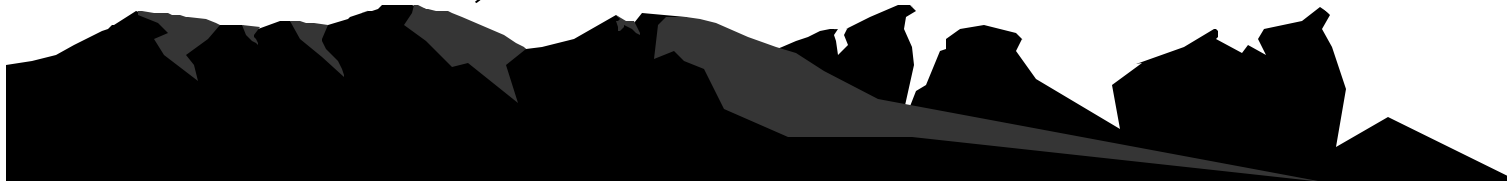
Agriculture is Humanity's Biggest Intrusion on Nature

- Cleared millions of acres of forests.
- Drained massive amounts of wetlands.
- Opens soil to erosion.
- Uses 70% of human water consumption.
- Has displaced virtually all wild species from 41% of earth's land area.



Farming's Saving Grace—to Date

- Farming the best-quality lands, which never had many species. *Had large numbers of a few species.*
- The Great Plains: 60 mil bison, 100 mil antelope, wolves, grasses.
- Australia: 30 mil kangaroos, grasses.
- Ukraine and Russian steppes: at least 10 mil saiga (antelope); grasses.
- Brazil's Cerrados plateau: brushy plants, termites, maned wolf.



“60-80% of wild species in warm climates, on the poor-quality land.” Huston, *Biological Diversity*, ‘94

- The Amazon: an estimated 1 million animal species; half are insects and spiders, 2500 fish, 243 tree species just near Manaus, Brazil.
- The Pantanal marsh, Brazil/Argentine border-- 3500 plant species, 650 birds, 400 fish 100 mammals and 80 reptiles.
- India: an estimated 1200 butterfly species.
- Indonesia: more than 600 mammals, 1400 birds, 675 reptiles and 1300 fish.



World Food and Feed Must 2X by 2050

- Humans up from 6.3 to 8-10 billion (25-55%)
- High-quality diets for 7 bil, up from 1.5 bil.
- Never a voluntarily-vegetarian society in history. Aztec, Maya cannibalism.
- High-protein calories take 3X farming resources, but ardently sought. Key micronutrients like iron, zinc, calcium, Vitamin A, hard to get otherwise.



Biofuels Violate Farm Policy Rule #1: To Save the Poorer Land for Nature

- World uses 1,200 billion gallons gasoline per year: vast amount. EU demanding 10% of transport fuels be biofuel by 2020.
- Corn ethanol nets 50 gals gas equivalent per acre. If corn yields double, still takes too much land.
- Sugar cane yields 3.6 times more energy per acre than corn, but on tropic land with big biodiversity questions.
- Palm oil plantations attract thousands of great apes (orangutans) which are captured (killed) so EU can have biodiesel. Elephants, Sumatran tiger threatened.



Losing the Gains of the Green Revolution?

- Green Revolution saved 16 million square miles of forest, vast tracts of wetlands, from being plowed for low-yield crops.
- Every wild species left on earth owes debt to Norman Borlaug, 1970 Nobel Peace Prize winner.
- Many millions of low-yield acres would be needed to produce significant amounts of biofuels—which are today the biggest threat to global biodiversity.



The Pet Challenge

- Pet ownership rises with affluence. Australia, 53% of households own cat and/or dog.
- If China matches current U.S. pet ownership, 500,000 companion animals, none vegetarian.
- But higher pet ownership substitutes for more children: births per woman down in 3rd wrld from 6.3 (1960) to 2.7 (now), headed for 1.7.
- Human numbers decline after 2100.



Biofuels Radically Raise Crop Prices, Bidding for New Cropland

- As more corn goes to ethanol, corn prices have jumped from \$1.86 in late 2005 to \$5 on Chicago futures market in Feb., 08.
- 2007 acres were bid out of wheat, soybeans, cotton, into corn. With bad wheat crops overseas, prices soared from \$3.40 in late 2005 to \$18 at Chicago in Feb. 08. Other crops need land back.
- Federal mandate, 36 billion gals renewable fuels by 2022. Corn ethanol 2X, to 15 billion gals. Another 21 billion to come from non-corn sources.
- Where does the land come from?



What About Higher Crop Yields?

- GM crop breeder suggests Iowa corn yields can soon rise from 200 bu on good land to 270 bu. More insect resistance and drought tolerance. Current nat'l corn avg: 160 bu.
- Fine. But that increase won't even support the increased 2050 demand for food and feed.
- For crop-based biofuels, need 600 bu corn, 300 bu wheat. Such yields never achieved.



What About Cellulosic Ethanol?

- Everyone wants cellulosic ethanol, but can't yet produce it. Working on biotech enzymes.
- Breaking down cellulose currently requires high-acid baths or expensive steam.
- Better now to burn biomass in boilers, avoid liquid fuel's processing costs, losses.
- Can gasify biomass, but did that in WWII Germany; no real solution.



No Species Lost to Global Warming Yet

- Chris Thomas, U. of E. Anglia, predicted earth would lose more than 1 million wild species if temps rose another 0.8 C in 50 yrs.
- Species lost so far to 150 years of “unprecedented warming”: none.
- Golden Toad of Costa Rica was claimed. But slopes below toad’s mountain forest were cleared for beef production. Changed “cloud forest” moisture regime.
- Net warming since 1850: 0.7 C.
- Net warming since 1940: 0.2 C.



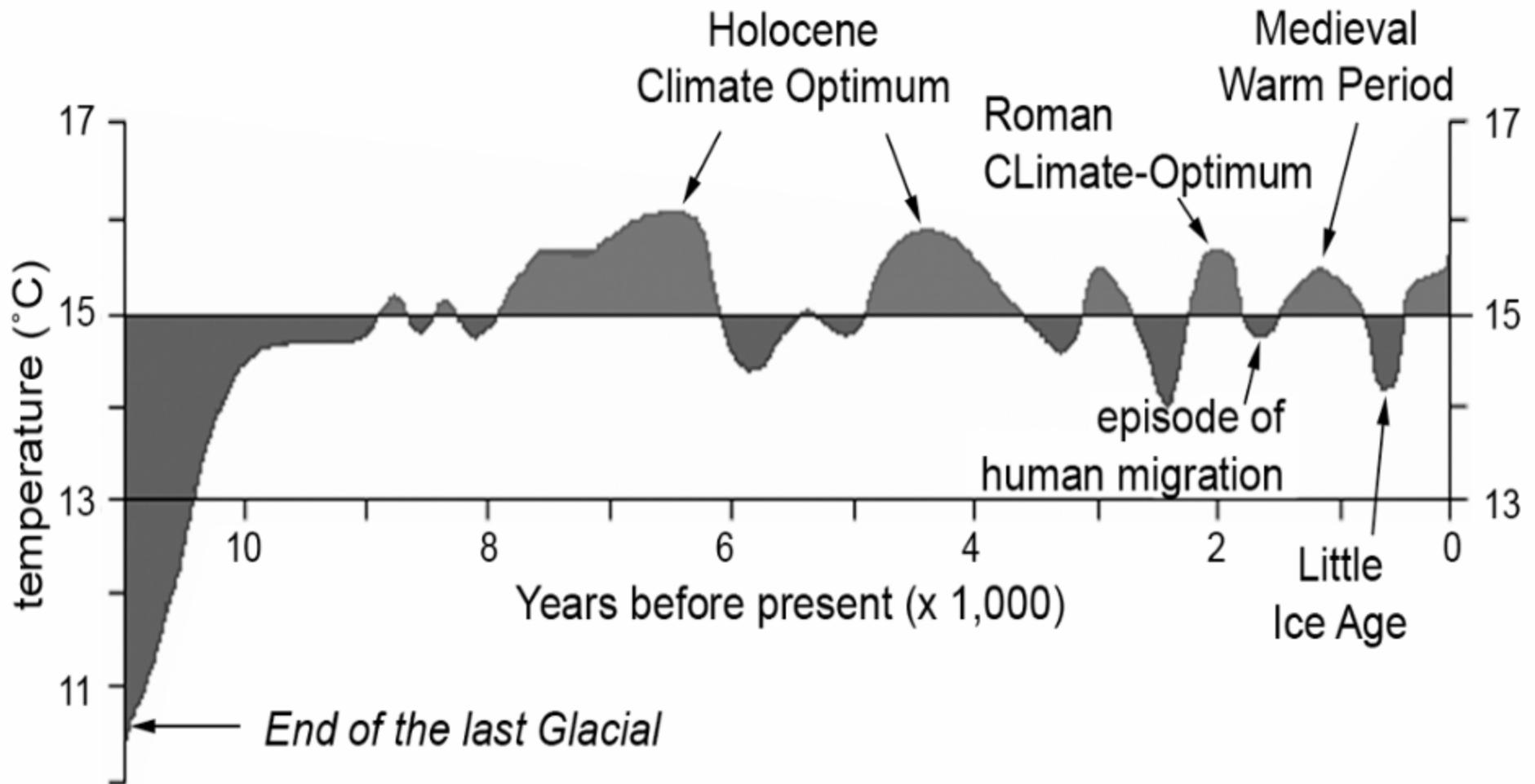
Global Warming: Every 1,500 Years

- Dansgaard-Oeschger cycles discovered in Greenland ice cores in 1984. 1-3 degrees up for roughly 750 years, 1-3 degrees down--at latitude of Paris.
- Found since in Antarctic ice, seabed sediments, ancient tree rings, fossil pollen, cave stalagmites worldwide. Go back at least 1 million years.
- Apparently linked to solar variations. Similar cycles in “solar isotopes”: carbon 14 and beryllium 10.
- Cycles too long and moderate to be perceived by primitive peoples w/o written records, thermometers.

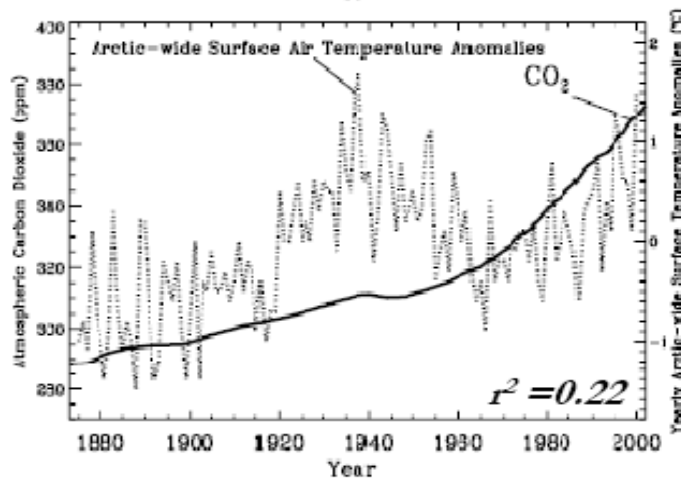
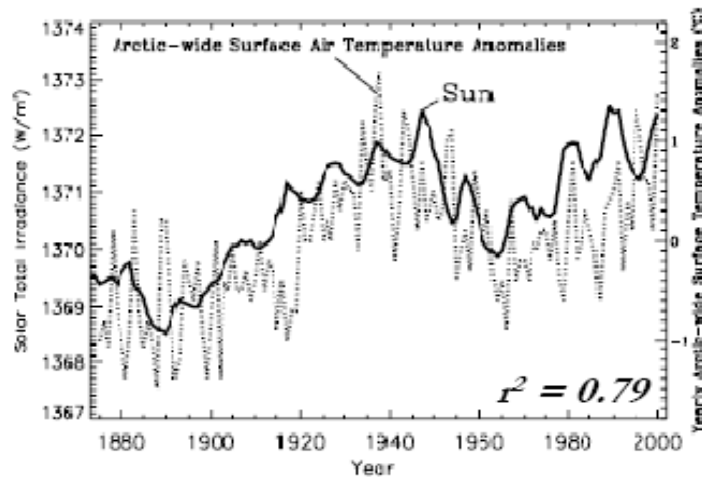


Climate swings since last Ice Age

Northern Hemispheric temperature reconstruction for the past 10,000+ years



Earth temperatures correlate 79% with sunspots—not CO2



Arctic Annual Mean Temperatures vs Solar Irradiance
(Soon GRL 2005)

Fit is much better of solar irradiance with arctic temperatures (Polyakov) than with CO₂

Why Global Warming Won't Destroy Species

- The 1,500-year cycles typically shift abruptly. At least 1200 such shifts in last million years. Species have been through it before.
- Vegetation cold-limited, but not heat-limited. Southern tree species must await stand replacement; delays impact on dependent species.
- In Ontario, pollen shows beech trees dominate warmings, oaks in cooler times, pines in Little Ice Age depths. Today oaks, with beeches waiting.



What About the Polar Bears?

- Arctic ice back to “normal” this winter. Wind shifted ice last summer, helping create open water.
- Polar bears relatively young species, but jawbone on Svalbard dated 110-130,000 yrs. Thus survived big warmings 9,000 and 4,000 yrs ago, plus hot Eemian Interglacial before last Ice Age.
- We haven’t studied how any of our species survived past warmings, but they’ve survived.
- Would they survive deforestation of big biofuels mandates?



Enriched Biodiversity of Today's Wildlands

- Southern-adapted species are expanding north, without yielding southern territory. Thus, more species per acre, worldwide.
- Chris Thomas himself said British birds moved avg 19 km north 1970-90 w no change in southern limits.
- Mountain top species in Alps increased rapidly
- Lichen species in Netherlands doubled after 1972.
- Nearly all common British butterflies more abundant.
- Why no applause?



Real Dangers of Global Warming?

- Floods: Sea levels have been rising 6 in. per century. No recent acceleration, none likely.
- Famine: Crop yields have been rising strongly: science aided by increased CO₂ in atmosphere.
- Storms: fewer and milder during Medieval and Roman Warmings.
- Deaths: Cold far more deadly to humans than warming, especially strokes, high blood pressure.
- “Tropical” diseases not a threat to affluent countries with medications, window screens, etc.



Biggest reason not to displace species for biofuels:

- Unstoppable 1,500-year Dansgaard-Oeschger climate cycle means eliminating fossil fuels won't help.
- Footnoted presentation of historic and physical cycle evidence at Singer and Avery, www.ncpa.org.
- Moderate warming since 1850 consistent w cycle.
- Warming since 1940: 0.2 degree C, no threat to species. (Half for Al Gore?)
- If first projections of computerized climate models valid, world would already have warmed 6 degrees C.



Second-biggest Reason Not to Mandate U.S. Biofuels:

- *Science, Feb. 7, 2008, T. Searchinger et al., “Use of U.S. croplands for biofuels increases greenhouse gases through emissions from land use change.”*
- Any major expansion of biofuels means converting huge tracts of forest and grass to crops. Soil carbon gasifies. Corn ethanol doubles greenhouse gases vs. fossil fuels—for 30 years.
- Switchgrass 50% worse than fossil fuels.
- Should we import sugar cane ethanol from Brazilian tropic lands?



- Don't Burn Food

