Resource issues impacting national security

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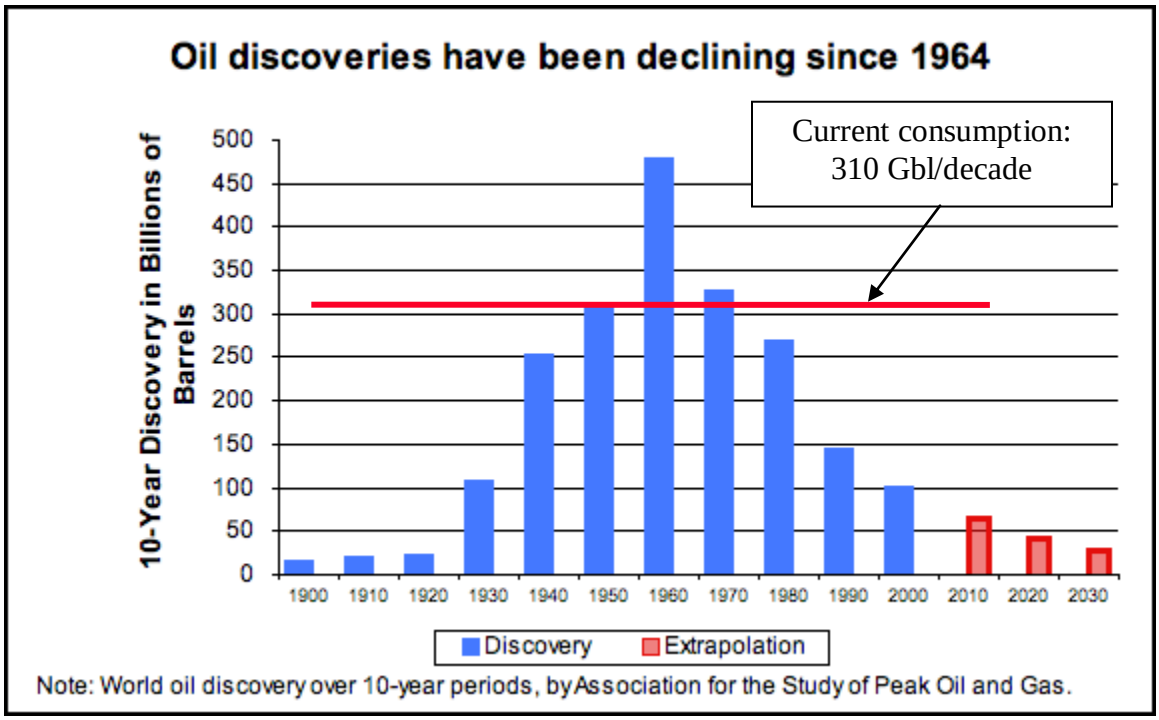
Resource depletion can influence the policy decisions of nations and is especially true now that many natural resources are simultaneously being severely depleted. Fossil fuels at or near peak production affect nearly every aspect of the world economy including transportation, industrial output and agriculture. Oil discoveries peaked in 1964 and have been declining since, despite vastly improved satellite and seismic surveys, and extraction techniques. Current consumption of 310 billion barrels per decade was exceeded by discoveries only during the decades of the 1950's – 1970's. [1,2]

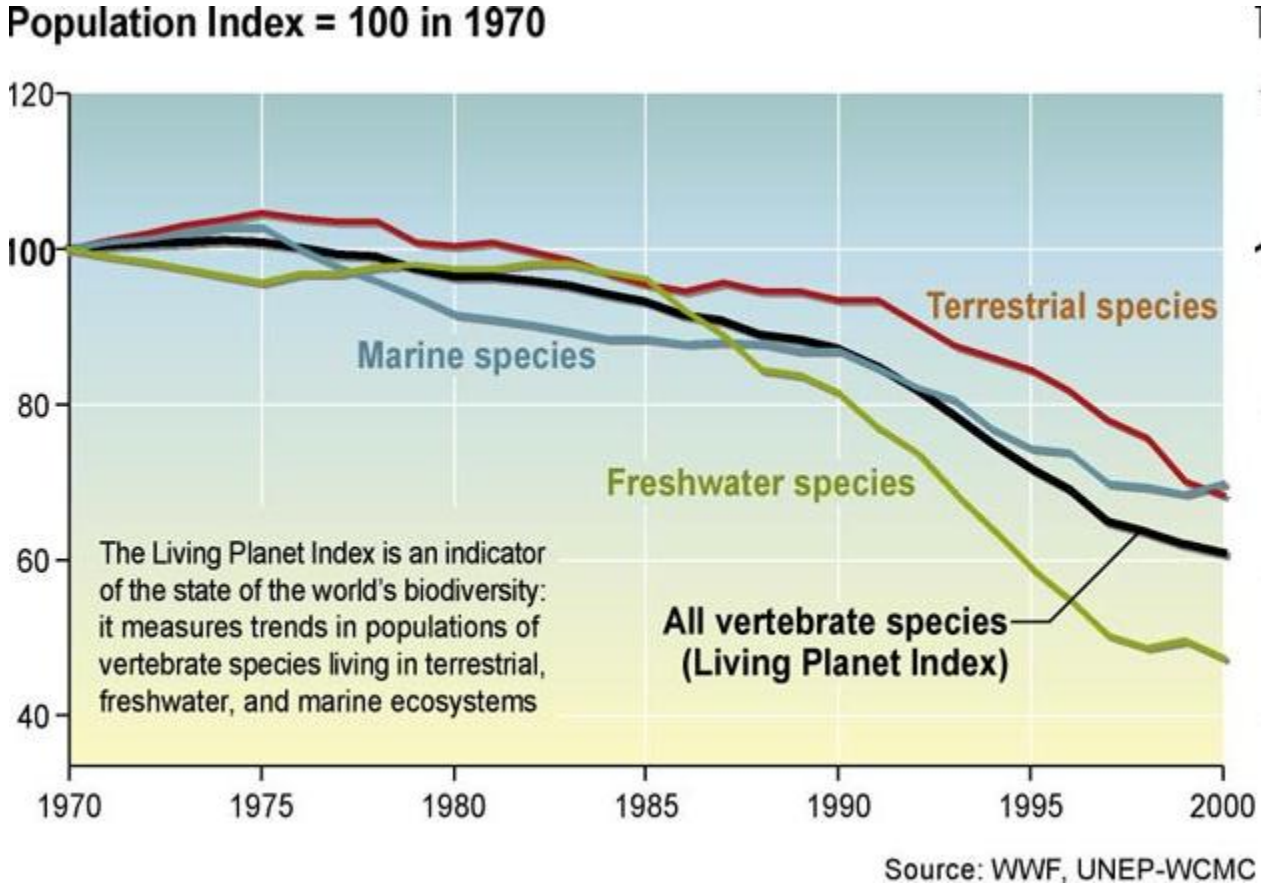


The International Energy Agency (IEA) predicted that production in 2009 would fall by 6.7% below 2008 production excluding the effects of the current recession [3,4]. The energy content of fossil fuels consumed each year (oil: 170 exajoules, coal: 120 EJ, natural gas: 110 EJ) preclude any reasonable alternatives [5], and the Energy Return on Energy Investment (EROEI) ratio for most other energy sources is too low to make them economically viable[6].

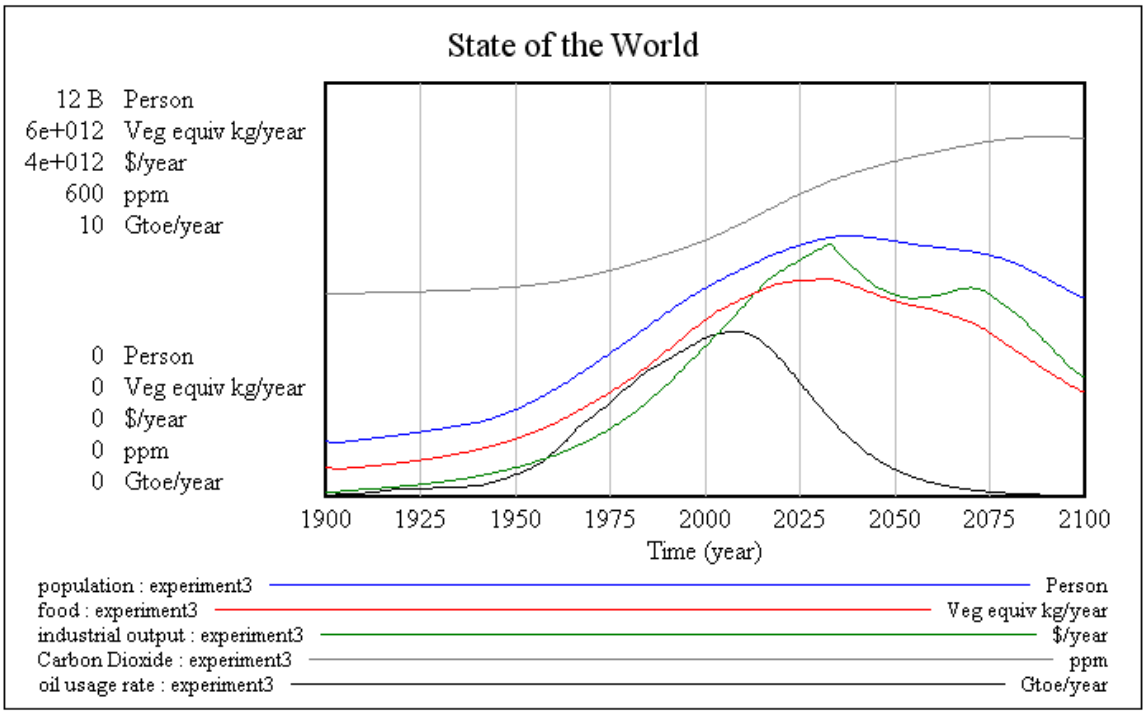
Lester Brown of the Earth Policy Institute argues that food (and water) crises in poor countries may lead to failed nations and thus threaten global security. Key factors include increasing population, global warming (leading to lower crop yields), loss of topsoil, and ancient aquifer depletion. Failed states result in refugees moving into neighboring lands,

and can encourage the rise of extremist movements. For OECD nations, threats to agriculture arise due to depletion of phosphates and natural gas used to produce fertilizers [7].

Biodiversity loss may also lead to stresses in many areas. The U.N. Millennium Ecosystem Assessment estimated that the current rate of species extinction is 100 to 1000 times the natural background rate, and may increase by an order of magnitude by the end of the century. At the present rate, half of all species may be extinct by that time [8]. The effects of biodiversity depletion are felt in agriculture and ocean fisheries, clean water supply and protection from natural disasters. Loss of biodiversity has also been implicated in the rise of new diseases.



A 1970 study of the global impacts of these issues, "*The Limits to Growth, A report to the Club of Rome*", showed that as resources were depleted food and energy shortages might be expected by 2030 [9]. An update of the model was done in 2004 and concluded that the original study results were largely valid [10]. More recently, a model by Garcia [11] included the effects of climate change and energy depletion. In one scenario, oil production peaks by 2010, while food and industrial output peak around 2030.



Further enhancements to this model would be to include the effects of biodiversity loss, the impacts of reduced phosphates and ammonia used in fertilizers in food production, and the results of a "Black Swan" type event arising from an influenza pandemic, or coup in one of the major oil exporting nations, for example [14,15]. Ultimately, the results should help guide policy decisions in regards to the potential for failed states and the rise of extremism arising from resource depletion, as well as energy and food demands of all nations.

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