**\*\*\* Environment DA**

**1NC—Environment DA**

**Transportation infrastructure jacks the environment [DON’T READ—Add-on Impact Scenarios in this card: global warming, ozone depletion, air pollution, ag yields, deforestation, noise pollution, soil erosion, biodiversity, and segregation—highlight down card given the relevant plan]**

**Rodrigue 98** (Note: Copywrite runs from 1998 to 2012—website provides no date of publication) Dr. Jean-Paul Rodrigue, [Dept. of Global Studies & Geography](http://www.hofstra.edu/Academics/Colleges/HCLAS/GEOG/index.html), Hofstra University, New York, USA “Pollutants Emitted by Transport Systems (Air, Water and Noise),” The Geography of Transport Systems, Accessed online at <http://people.hofstra.edu/geotrans/eng/ch8en/appl8en/ch8a2en.html>, Accessed online at 7/9/12)

3. Dimensions

Transportation activities support increasing mobility demands for passengers and freight, notably in urban areas. But **transport activities have resulted in growing levels of motorization and congestion.** As a result, **the transportation sector is becoming increasingly linked to environmental problems). The most important impacts of transport on the environment relate to climate change, air quality, noise, water quality, soil quality, biodiversity and land take:**

**Climate change. The activities of the transport industry release several million tons of gases each year** into the atmosphere. **These include lead (Pb), carbon monoxide (CO), carbon dioxide** (CO2; not a pollutant), **methane (CH4), nitrogen oxides (NOx), nitrous oxide (N2O), chlorofluorocarbons (CFCs), perfluorocarbons (PFCs), silicon tetraflouride (SF6), benzene and volatile components (BTX), heavy metals (zinc, chrome, copper and cadmium) and particulate matters (ash, dust).** There is an ongoing debate to what extent **these emissions may be linked to climate change** and the role of anthropogenic factors. Some of these gases, particularly **nitrous oxide, also participate in depleting the stratospheric ozone** (O3) layer which naturally screens the earth’s surface from ultraviolet radiation.

**Air quality. Highway vehicles, marine engines, locomotives and aircraft are the sources of pollution in the form of gas and particulate matters emissions that affects air quality causing damage to human health. Toxic air pollutants are associated with cancer, cardiovascular, respiratory and neurological diseases. Carbon monoxide** (CO) when inhale affects bloodstream, **reduces the availability of oxygen and can be extremely harmful to** public **health**. An emission of **nitrogen dioxide** (NO2) **from transportation sources reduces lung function**, affects the respiratory immune defense system and increases the risk of respiratory problems. The emissions of **sulphur dioxide** (SO2) **and nitrogen oxides** (NOx) in the atmosphere form various acidic compounds that when mixed in cloud water **creates acid rain. Acid precipitation has detrimental effects on the built environment, reduces agricultural crop yields and causes forest decline.** The reduction of natural visibility by smog has a number of adverse impacts on the quality of life and the attractiveness of tourist sites. **Particulate emissions in the form of dust emanating from vehicle exhaust as well as from non-exhaust sources such as vehicle and road abrasion have an impact on air quality. The physical and chemical properties of particulates are associated with health risks such as respiratory problems, skin irritations, eyes inflammations, blood clotting and various types of allergies.**

**Noise. Noise represents the general effect of irregular and chaotic sounds. It is traumatizing for the hearing organ and that may affect the quality of life** by its unpleasant and disturbing character. **Long term exposure to noise levels above 75dB seriously hampers hearing and affects human physical and psychological wellbeing. Transport noise emanating from the movement of transport vehicles and the operations of ports, airports and railyards affects human health, through an increase in the risk of cardiovascular diseases.** Increasing **noise levels have a negative impact on** the urban environment reflected in falling **land values and** loss of productive land **uses**.

**Water quality. Transport activities have an impact on hydrological conditions. Fuel, chemical and other hazardous particulates discarded from aircraft, cars, trucks and trains or from port and airport terminal operations, such as de-icing, can contaminate rivers, lakes, wetlands and oceans.** Because demand for shipping services is increasing, marine transport emissions represent the most important segment of water quality inventory of the transportation sector. The main effects of marine transport operations on water quality predominantly arise from dredging, waste, ballast waters and oil spills. Dredging is the process of deepening harbor channels by removing sediments from the bed of a body of water. Dredging is essential to create and maintain sufficient water depth for shipping operations and port accessibility. **Dredging activities have a two-fold negative impact on the marine environment. They modify the hydrology by creating turbidity that can affect the marine biological diversity. The contaminated sediments and water raised by dredging require spoil disposal sites and decontamination techniques. Waste generated by the operations of vessels at sea or at ports cause serious environmental problems, since they can contain a very high level of bacteria that can be hazardous for public health as well as marine ecosystems when discharged in waters.** Besides, various types of **garbage containing metals and plastic are not easily biodegradable. They** can persist on the sea surface for long periods of time and **can be a serious impediment for maritime navigation in inland waterways and at sea and affecting as well berthing operations.** Ballast waters are required to control ship’s stability and draught and to modify their center of gravity in relation to cargo carried and the variance in weight distribution. Ballast waters acquired in a region may contain invasive aquatic species that, when discharged in another region may thrive in a new marine environment and disrupt the natural marine ecosystem. There are about 100 non-indigenous species recorded in the Baltic Sea. Invasive species have resulted in major changes in nearshore ecosystems, especially in coastal lagoons and inlets. [Major oil spills](http://people.hofstra.edu/geotrans/eng/ch3en/conc3en/table_majoroilspills.html) from oil cargo vessel accidents are one of the most serious problems of pollution from maritime transport activities.

**Soil quality. The environmental impact of transportation on soil consists of soil erosion and soil contamination. Coastal transport facilities have significant impacts on soil erosion. Shipping activities are modifying the scale and scope of wave actions leading to serious damage in confined channels such as river banks. The removal of earth’s surface for highway construction or lessening surface grades for port and airport developments have led to important lost of fertile and productive soils. Soil contamination can occur through the use of toxic materials by the transport industry. Fuel and oil spills from motor vehicles are washed on road sides and enter the soil. Chemicals used for the preservation of railroad ties may enter into the soil. Hazardous materials and heavy metals have been found in areas contiguous to railroads, ports and airports.**

**Biodiversity. Transportation also influences natural vegetation. The need for construction materials and the development of land-based transportation has led to deforestation. Many transport routes have required draining land, thus reducing wetland areas and driving-out water plant species. The need to maintain road and rail right-of-way or to stabilize slope along transport facilities has resulted in restricting growth of certain plants or has produced changes in plants with the introduction of new species different from those which originally grew in the areas. Many animal species are becoming extinct as a result of changes in their natural habitats and reduction of ranges.**

**Land take.** Transportation facilities have an impact on the urban landscape. **The development of port and airport infrastructure is significant features of the urban and peri-urban built environment. Social and economic cohesion can be severed when new transport facilities such as elevated train and highway structures cut across an existing urban community.** Arteries or **transport terminals can define urban borders and produce segregation. Major transport facilities** can **affect the quality of urban life by creating physical barriers, increasing noise levels, generating odors, reducing urban aesthetic and affecting the built heritage.**

**Environmental destruction results in climatic change, famine, disease, nuclear war and ultimately extinction**

**Takacs,** Instructor in Department of Earth Systems Science and Policy at California State-Monterey Bay **1996** (David, Philosophies of Paradise, Available online at [www.dhushara.com/book/diversit/restor/takacs.htm](http://www.dhushara.com/book/diversit/restor/takacs.htm" \t "_blank), Accesssed 07/13/2012, ZR)

More often, however, humans are said to benefit from such ecosystem services. Half a century ago, Aldo Leopold warned: "Recent discoveries in mineral and vitamin nutrition reveal unsuspected dependencies in the up-circuit: incredibly minute quantities of certain substances determine the value of soils to plants, of plants to animals. **What of the down-circuit? What of the vanishing species, the preservation of which we now regard as an esthetic luxury. They helped build the soil; in what unsuspected ways may they be essential to its maintenance?**" More recently, Jane Lubchenco feels very strongly that **people are in fact much more dependent on ecosystem services that are provided by both managed and unmanaged ecosystems than is generally perceived to be the case**. So I think it's sheer folly for us to act in ways that are undermining the ability of both managed and unmanaged ecosystems to provide these services that we're depen dent on. And that we're doing that more and more as we pollute and destroy habitats, or alter habitats in one fashion or another. And I guess the bottom line is that we're changing the environment faster than our ability to understand the consequences of how we're changing it." Most predictions of eco-doom are predicated on this argument, and many are stated in much more dramatic terms than those Lubchenco employs. As the argument runs, a myriad of organisms, especially "little things," comprise ecosystems that provide countless services that keep the Earth's biotic and abiotic processes up and running.' According to Souls, "Many, if not all, ecological processes have thresholds below and above which they become discontinuous, chaotic, or suspended." **Biodiversity may regulate these processes; among its many talents, biodiversity is said to create soil and maintain its fertility, control global climate, inhibit agricultural pests, maintain atmospheric gas balances, process organic wastes, pollinate crops and flowers, and recycle nutrients.'** Confusion in this line of argumentation ties back into why the concept of biodiversity has risen to prominence. Remember that biologists have scant understanding of the roles that species or populations play in maintaining ecosystems. In interviews, Lovejoy, Falk, and Ray confessed that you can strip away many species from an ecosystem without loss of ecosystem function. Ehrlich points out that by the time a species is endangered, it has probably stopped playing an important role in keeping the system functioning anyway." Furthermore, it is not clear whether we should focus on species as functional cogs in the ecosystem wheel, or whether ecological services are emergent properties of ecosystems themselves. With the biodiversity concept, these dilemmas become nearly moot. Biodiversity embraces lists of species, lists of ecosystems, the interactions of species within ecosystems, and the processes that species may maintain or control. When arguing on behalf of bio-diversity, one need not focus on the specifics-specifically, the specifics of what we don't know. It is enough to explicate some of the functions that keep ecosystems running, or that ecosystems provide for us, and then extrapolate to the dangers associated with declining biodiversity. Peter Raven bases his thinking on Leopold's observation "To keep every cog and wheel is the first precaution of intelligent tinkering": "**In every sense, in the sense of communities that will preserve soil, promote local climate, keep the atmosphere, preserve water, and every thing else, the first rule of being able to put together communities well or have the world go on functioning well, or to keep climates as they are, or to retard disease, to produce products we want sustainably,** be cause, after all, plants, algae, and photosynthetic bacteria are the only device we have to capture energy from the sun effectively-in all those senses, and in the sense that we're losing the parts so rapidly, I con sider **the loss of biological diversity to be the most serious problem that we have-far more serious than global climate change or stratospheric ozone depletion, or anything else**." **"Habitat destruction and conversion are eliminating species at such a frightening pace that extinction of many contemporary species and the systems they live in and support ... may lead to ecological disaster and severe alteration of the evolutionary process**," Terry Erwin writes." And E. 0. Wilson notes: "The question I am asked most frequently about the diversity of life: **if enough species are extinguished, will the ecosystem collapse, and will the extinction of most other species follow soon afterward**? The only answer anyone can give is: possibly. **By the time we find out, however, it might be too late**. One planet, one experiment."" So biodiversity keeps the world running. It has value in and for itself, as well as for us. Raven, Erwin, and Wilson oblige us to think about the value of biodiversity for our own lives. The Ehrlichs' rivet-popper trope makes this same point; by eliminating rivets, we play Russian roulette with global ecology and human futures: "It is likely that **destruction of the rich complex of species in the Amazon basin could trigger rapid changes in global climate patterns. Agriculture remains heavily dependent on stable climate, and human beings remain heavily dependent on food. By the end of the century the extinction of perhaps a million species in the Amazon basin could have entrained famines in which a billion human beings perished. And if our species is very unlucky, the famines could lead to a thermonuclear war, which could extinguish civilization.**"" Elsewhere, Ehrlich uses different particulars with no less drama: What then will happen if the current decimation of organic diversity continues? **Crop yields will be more difficult to maintain in the face of climatic change, soil erosion, loss of dependable water supplies, decline of pollinators, and ever more serious assaults by pests. Conversion of productive land to wasteland will accelerate; deserts will continue their seemingly inexorable expansion. Air pollution will increase, and local climates will become harsher. Humanity will have to forgo many of the direct economic benefits it might have withdrawn from Earth's well stocked genetic library. It might, for example, miss out on a cure for cancer; but that will make little difference. As ecosystem services falter, mortality from respiratory and epidemic disease, natural disasters, and especially famine will lower life expectancies to the point where can cer** (largely a disease of the elderly) **will be unimportant. Humanity will bring upon itself consequences depressingly similar to those expected from a nuclear winter**. Barring a nuclear conflict, it appears that **civili zation will disappear some time before the end of the next century not with a bang but a whimper.**

**Links**

**2NC Link—Generic**

**Transportation infrastructure is increasingly linked with environmental problems- transportation activities are the driving force behind emissions**

**Rodrigue and Comtois, 09** (Jean-Paul Rodrigue received a Ph.D. in Transport Geography from the Université de Montréal (1994) and has been at the Department of Economics & Geography at Hofstra University since 1999. In 2008, he became part of the Department of Global Studies and Geography, Dr. Claude Comtois is a professor at the University in Montreal, specializing in Geography, "The Enivronmental Impacts of Trasportation", written in 2009 from people.hofstra.edu/geotrans/eng/ch8en/conc8en/ch8c1en.html AK)

1. The Issue of Transport and the Environment The issue of transportation and the environment is [paradoxical](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/paradox.html) in nature. From one side, transportation activities support increasing mobility demands for passengers and freight, and this ranging from urban areas to international trade. On the other side, **transport activities have resulted in growing levels of motorization and congestion**. As a result, **the transportation sector is becoming increasingly linked to environmental problems**. **With a technology relying heavily on the combustion of hydrocarbons,** notably with the internal combustion engine, th**e impacts of transportation over** [**environmental systems**](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/envisys.html) **has increased with motorization**. **This has reached a point where transportation activities are a dominant factor behind the emission of most pollutants and thus their** [**impacts on the environment**](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/tenvitbl.html). **These impacts**, like all environmental impacts, can **fall within three categories**: **Direct impacts**. **The** **immediate** **consequence** of transport activities **on the environment** where the cause and effect relationship **is** generally **clear and well understood**. **Indirect impacts**. **The secondary** (or tertiary) **effects of transport activities on environmental systems**. They **are often of higher consequence** than direct impacts, but the involved relationships are often misunderstood and difficult to establish. **Cumulative impacts**. **The additive, multiplicative or synergetic consequences of transport activities**. They **take into account of the varied effects of direct and indirect impacts on an ecosystem**, which are often unpredicted. The **complexities of the problems have led to much controversy in environmental** policy and in the role of transportation. The transportation sector is often subsidized by the public sector, especially through the construction and maintenance of road infrastructure which tend to be free of access. Sometimes, public stakes in transport modes, terminals and infrastructure can be at odd with environmental issues. If the owner and the regulator are the same (different branches of the government), then there is a risk that regulations will not be effectively complied to. It can also lead to another extreme where compliance would lead to inefficient transport systems, but which costs are subsidized. **Total costs incurred by transportation activities, notably environmental damage, are** generally **not fully assumed by the users**. **The lack of consideration of the real costs of transportation could explain several environmental problems**. Yet, a complex [hierarchy of costs](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/table_hierarchy_costs.html) is involved, ranging from internal (mostly operations), compliance (abiding to regulations), contingent (risk of an event such as a spill) to external (assumed by the society). For instance, **external costs account on average for more than 30% of the** [**estimated automobile costs**](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/carcosts.html). **If environmental costs are not included in this appraisal**, **the usage of the car** is consequently subsidized by the society and costs **accumulate as environmental pollution**. **This requires due consideration as the number of vehicles, especially automobiles,** [**is steadily increasing**](http://people.hofstra.edu/geotrans/eng/ch3en/conc3en/carprodfleet.html).2. The Transport - Environment Link **The relationships between transport and the environment are multidimensional**. **Some aspects are unknown and some new findings may lead to drastic changes in environmental policies**, as it did in regards of acid rain and chlorofluorocarbons in the 1970s and 1980s. The 1990s were characterized by a realization of global environmental issues, epitomized by the growing concerns between anthropogenic effect and climate change. Transportation also became an important dimension of the [concept of sustainability](http://people.hofstra.edu/geotrans/eng/ch9en/conc9en/ch9c4en.html), which is expected to become the prime focus of transport activities in the coming decades, ranging from vehicle emissions to green supply chain management practices. These impending **developments** **require a deep understanding of the reciprocal influence between the physical environment and transport infrastructure**s and **yet this understanding is often lacking**. The main factors considered in the physical environment are geographical location, topography, geological structure, climate, hydrology, soil, natural vegetation and animal life. T**he main** [**environmental dimensions of transportation**](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/dimenvtransp.html) **are related to the causes, the** [**activities**](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/activitytrspenv.html)**,** the **outputs and** the **results of transport systems**. **Establishing linkages between these dimensions is a difficult undertaking**. For instance, to what extent carbon monoxide emissions are linked to land use patterns? Furthermore, **transportation is imbedded in environmental cycles, notably over the** [**carbon cycle**](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/carbcycle.html). The relationships between transport and the environment are also complicated by two observations: First, **transport activities contribute among other anthropogenic and natural causes, directly, indirectly and cumulatively to environmental problems.** In some cases, **they may be a dominant factor**, while in others their role is marginal and difficult to establish. Second, transport activities contribute at [different geographical scales](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/spatialdurational.html) to environmental problems, ranging from local (noise and CO emissions) to global (climate change?), not forgetting continental / national / regional problems (smog and acid rain). **Establishing environmental policies for transportation thus have to take account of the level of contribution and the geographical scale**, **otherwise some policies may just move the problems elsewhere and have unintended consequences**. A noted example are local / regional policies that have forced the construction of higher chimneys for coal burning facilities (power plants) and induced the continental diffusion of acid rain. Thus, **even if an administrative division** (municipality, county, state/province) **have adequate environmental enforcement policies, the geographical scale of pollutants diffusion** (notably air pollutants) obviously goes beyond **established jurisdictions.**

**Transportation policies harm the environment- they cause an increase in heat, flooding, health problems and harm ecology**

**Litman, 12** (Todd Litman is founder and executive director of the Victoria Transport Policy Institute, anindependent research organization dedicated to developing innovative solutions to transportproblems. His work helps expand the range of impacts and options considered intransportation decision-making, improve evaluation methods, and make specializedtechnical concepts accessible to a larger audience. His research is used worldwide intransport planning and policy analysis.Mr. Litman has worked on numerous studies that evaluate transportation costs, benefits andinnovations. He authored the Online TDM Encyclopedia, a comprehensive Internet resourcefor identifying and evaluating mobility management strategies; Transportation Cost andBenefit Analysis: Techniques, Estimates and Implications, a comprehensive study whichprovides cost and benefit information in an easy-to-apply format; and Parking ManagementBest Practices, the most comprehensive book available on management solutions toparking problems, "Eva;uating Transportation Land Use Impacts: Considering the Impacts, Benefits and Costs of Different Land Use Development Patterns" on May 27, 2012 from [www.vtpi.org/landuse.pdf](http://www.vtpi.org/landuse.pdf) AK)

**Road and sprawl environmental impacts are widely recognized by land use planners and ecologist**s (Noonan 1996; Flad 1997; Forman, et al. 2003; White 2007). **Ecologically active lands such as wetlands, forests, farms, and parks** (collectively called greenspace or openspace) **provide external benefits**, **including wildlife habitat, air and water quality, and beauty** (Brabec 1992; Quammen 1996; Kauffman 2001; Ewing and Kostyack 2005). These external benefits exist in addition to direct benefits to landowners and are not reflected in land’s market value (Knaap and Nelson 1992, p. 126). Some of these benefits result from the contribution that an ecological system makes toward market goods, such as fishery production or water quality. Other values are reflected in the tendency of greenspace to increase nearby property values and tourism, and in existence, option, and bequest values (Kopp and Smith 1993; Munasinghe and McNeely 1995; Sherer 2006). Banzhaf and Jawahar (2005) identify the following benefits from preserving undeveloped urban fringe lands: 1. Protecting groundwater. 2. Protecting wildlife habitat. 3. Preserving natural places. 4. Providing local food. 5. Keeping farming as a way of life. 6. Preserving rural character. 7. Preserving scenic quality. 8. Slowing development. 9. Providing public access. **Ecological value refers to the contribution land makes toward various environmental functions such as wildlife habitat, and surface and groundwater recharge. Roads and parking facilities have hydrologic impacts** (ch**anges to surface and groundwater flows, which tends to concentrate stormwater, increase flooding, scouring and siltation, and reduce dry season supply, and create barriers to fish** (Litman 2005). **These impose both economic and ecological costs.** **Paved surfaces create heat islands, causing ambient summer temperatures to rise 2-8° F in urban areas, which increases energy demand, smog, human discomfort and health problems** (Stone, Hess, Frumkin 2010; USEPA 2011). **Transportation policies and projects are ecologically harmful** if they tend to divide larger parcels of habitat (for example, **by building roads**), **disturbing habitat** (for example, by harvesting indigenous forests), by **converting habitat to parks, gardens, farms or lawns,** by **stimulating more building construction**, o**r by paving land for roads and parking facilities**. Parks, gardens, farms and lawns generally provide moderate to minimal wildlife habitat, particularly for larger animals, and although they allow surface and groundwater recharge, this often carries significant pollution loads from fertilizers, pesticides and other sources. From an ecological perspective, pavement is generally least beneficial land use since it provides no habitat, prevents groundwater recharge, increases stormwater management costs, and tends to concentrate water pollution.

**Construction causes water pollution, air pollution and loss of biodiversity**

**Litman, 12** (Todd Litman is founder and executive director of the Victoria Transport Policy Institute, anindependent research organization dedicated to developing innovative solutions to transportproblems. His work helps expand the range of impacts and options considered intransportation decision-making, improve evaluation methods, and make specializedtechnical concepts accessible to a larger audience. His research is used worldwide intransport planning and policy analysis.Mr. Litman has worked on numerous studies that evaluate transportation costs, benefits andinnovations. He authored the Online TDM Encyclopedia, a comprehensive Internet resourcefor identifying and evaluating mobility management strategies; Transportation Cost andBenefit Analysis: Techniques, Estimates and Implications, a comprehensive study whichprovides cost and benefit information in an easy-to-apply format; and Parking ManagementBest Practices, the most comprehensive book available on management solutions toparking problems, "Eva;uating Transportation Land Use Impacts: Considering the Impacts, Benefits and Costs of Different Land Use Development Patterns" on May 27, 2012 from [www.vtpi.org/landuse.pdf](http://www.vtpi.org/landuse.pdf) AK)

**Reed Noss (1995), Havlick (2002), and Forman, et al (2003) identify various types of ecological damages caused by roads, listed below. Forman, et al (2003, p. 136) identifies** road density thresholds **(maximum road-miles per square mile) for various habitats. Roadkills: Animals killed directly by motor vehicles. More than 1 million large animals are killed annually on U.S. highways, representing more than 8% of all reported crashes (Hughes and Saremi, 1995). Roadkills increase with traffic speeds and volumes. Road kills are a major cause of death for many large mammals, including several threatened species. Road Aversion and other Behavioral Modifications: Some animals have an aversion to roads, which may affect their behavior and movement patterns. For example, black bears cannot cross highways with guardrails. Other species, on the other hand, become accustomed to roads, and are therefore more vulnerable to harmful interactions with humans. Population Fragmentation and Isolation: By forming a barrier to species movement, roads prevent interaction and cross breeding between population groups of the same species. This reduces population health and genetic viability. Pollution: Road construction and use introduce a variety of noise, air and water pollutants. Habitat Impacts: This includes loss of habitat, invasion of exotic species, and other effects. Impacts on Hydrology and Aquatic Habitats: Road construction alters watersheds through changes in water quality and water quantity, stream channels, and groundwater. Access to Humans: This includes hunters, poachers, and irresponsible visitors.**

**Transportation causes tons of emissions and fossil fuel combustion**

**Office of Environmental Quality, 09** (Office of Environmental Quality Transportation and Environmental Services City of Alexandria. "Alexandria's State of the Air Report: Past, Present and Future" in April 2009 from alexandriava.gov/uploadedFiles/tes/oeq/State%20of%20Air%20Report.pdf AK)

Mobile **Onroad Sources are sources of air pollution from internal combustion engines used to propel cars, trucks, buses, and other vehicles on public roadways. Emissions are typically estimated using USEPA emission factor and transportation planning models**. **Emissions are calculated by road type, vehicle type, and fuel type.** Mobile **Offroad Sources are sources of air pollution from internal combustion engines used to propel trains, airplanes, and marine vessels, or to operate equipment such as forklifts, lawn and garden equipment, portable generators**, etc.

**Specifically, maintenance kills the environment**

**Rodrigue and Comtois, 09** (Jean-Paul Rodrigue received a Ph.D. in Transport Geography from the Université de Montréal (1994) and has been at the Department of Economics & Geography at Hofstra University since 1999. In 2008, he became part of the Department of Global Studies and Geography, Dr. Claude Comtois is a professor at the University in Montreal, specializing in Geography, "The Enivronmental Impacts of Trasportation", written in 2009 from people.hofstra.edu/geotrans/eng/ch8en/conc8en/ch8c1en.html AK)

4. Environmental Externalities Externalities are an economic concept that refers to activities of a group that have unintended consequences, positive or negative, on other groups and most importantly that those consequences, particularly if they are negative, are not assumed by those causing them. They are therefore "externalized". A common example of a positive externality concerns technology since it obviously benefits the innovative firm but also the whole economy through various productivity improvements. **Negative externalities have a lot of relevance over environmental issues**, since **many of the negative consequences of pollution are assumed by the whole society**. For the [**environmental externalities**](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/table_externtbl.html) **of transportation** they **include the consideration of physical measures of environmental damage and the evaluation of involved costs for the society. The main fallacy underlined by externalities is that the costs attributed to a few sources** (e.g. users of cars) **must be burdened by many** (users and nonusers alike). **Knowing the sources of environmental externalities is** a relatively **easy** undertaking, while the evaluation of damage and other costs has not yet reached comparative standards among governmental and non-governmental agencies. The challenge resides over three issues: Relationships. The nature and extent of the relationships between transport and the environment has to be considered. This is particularly complex as most environmental relationships tend to be indirect and cumulative. Quantification. Relationships have to be quantified and also a value to environmental externalities should be appraised. This is almost out of the possibility as only general figures, much subject to debate, can be assessed. The quantification of economic, social and environmental costs is very difficult but possible if some simplifications and generalizations are assumed. Policy making. The level and extent of corrective actions that can be taken to alleviate and mitigate environmental externalities linked to transportation in a way where those contributing bear the consequences of their activities. In view of the two above points attempts at regulation, particularly if they involve a comprehensive framework, can be hazardous.

**The costs of environmental externalities can be considered from economic, social and environmental dimensions**. **The** **basic** **types** **of transportation externalities attributed to the environment fall within air pollution, water pollution, noise, and hazardous materials**. Establishing and quantifying environmental externalities is a complex undertaking. Quantification is only at its preliminary stage and many have used this argument to differ the application of several environmental policies by lobbying governments (e.g. acid rain, CFCs and most importantly, climate change). Additionally, the wider the geographical scale the more complex the environmental problem becomes, mainly due to cross-jurisdictional issues. Recent attempt to reach a consensus about climate change have underlined that multilateral environmental agreements are close to be an impossibility .**The sources / emitters of pollutants rarely bear the consequences of their impacts**. **This has several implications. First, when specific sources are concerned, like road transportation, users only take account of the direct costs of modal ownership like a car** (vehicle, fuel, insurance, etc.). **Ownership is often the only entry and utilization cost for several transportation modes.** **The society generally assumes the role of providing and maintaining infrastructure and any indirect costs like damage to structures and infrastructure, losses in productivity** (agriculture and labor), cleanup, health services and damage to ecosystems. Second, the geographic separation between sources and recipients is often acute. Acid rains and climate change are obvious examples. On a local level, a community may be affected by noise levels well over its own contribution (notably near major highways), while another (suburbs) may be affected in a very marginal way and still significantly contributes to noise elsewhere during commuting.There is a tendency towards a shift from direct to indirect consequences for environmental externalities, as of total costs involved. For instance, the [absolute levels](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/transpolcontrib.html) of air pollutants emissions have considerably dropped in developed countries such as the United States. The problem of source reduction by vehicles was addressed because it was a straightforward cause of air pollutants emissions. This has tended to displace problems elsewhere and developed new types of externalities. Thus, the relative share of air pollution impacts is lessening, but not the number of vehicles, investment in infrastructure or noise levels, which have their own externalities. Reductions in the relative importance of one type of externality redirect the focus on other types that were less addressed, but probably as important in the overall impacts of transport over the environment. Transfers and additions of costs are very common attributes of environmental externalities. Trying to lessen economic costs will either lessen or worsen social and environmental costs, depending on the externality. For instance, keeping salt as the main de-icing agent is a cheaper solution for authorities responsible for road maintenance, but this practice transfers economic benefits into environmental costs (damage to the ecosystem). In the context of limited resources, the distribution of economic, social and environmental costs takes an important role as what type of damage is most acceptable and in what proportions. It is clear from past strategies that several economic costs have been minimized, notably for producers and users, while social and environmental consequences were disregarded. This practice is less applicable since the society is less willing to bear the costs and consequences of externalities for various reasons (public awareness, high health costs, etc

**2NC Link—Roads**

**Road construction is environmentally detrimental- road diversion, animal endangerment, land erosion, pollution**

**Audain, no date** (Keiron Audain specializes in topics related to science, technology and health. He holds a Bachelor of Science in pharmaceutical chemistry from Queen Mary, University of London, as well as a Master of Science in virology from Imperial College London, “The Adverse Impacts of Road Construction on the Environment” from <http://www.ehow.com/info_8567285_adverse-impacts-road-construction-environment.html#ixzz20KJwalpl> AK)

Road construction is essential for boosting development and economic growth within a society. Roads effectively move goods and people across considerable distances and are fundamental to the transport sector. **There are several adverse impacts on** [**the environment**](http://www.ehow.com/info_8567285_adverse-impacts-road-construction-environment.html)**,** however, **which must be considered during the planning, construction and maintenance of roads**. **Environmental impacts of road construction are categorized as direct, indirect or cumulative**. Direct Impacts Direct impacts involve the effects of the physical presence of the road. **Road construction requires direct utilization of land, possibly for environmental practices such as farming**. **Rivers and streams are also diverted during road construction**. **Roads affect wildlife populations, as according to the U.S.** [**Humane Society**](http://www.ehow.com/info_8567285_adverse-impacts-road-construction-environment.html) **and the Urban Wildlife Research Centre, an estimated one million wildlife animals are killed on U.S. highways each day**, **including endangered species** such as the American crocodile and the Key deer. Indirect Impacts Indirect or secondary impacts are more closely related to the construction process and often pose a more serious risk to the environment. They include **issues such as land erosion and pollution from construction raw materials, which has knock-on effects on surface water quality**. **Another** indirect **impact is deforestation when roads are cut into forest areas to support easy logging transport and settler migration**. **Increased human activity in forests as a result of new roads also lead to animal poaching.** Cumulative Impacts Cumulative impacts involve a collective end result of direct and indirect impacts. For example, **road construction impacts, including river diversion, deforestation and water and noise pollution, cause changes to wildlife habitats, which contribute to animal endangerment and even threaten extinction**. **Deforestation also causes increased temperatures due to a lack of vegetative cover, as well as a loss of plant species.** Unpredictable Impacts There are a few unpredictable yet possible **environmental impacts of road construction**. Some of these **include** roadside pollution by **passing commuters**, **fires** **and** **road fatalities due to** [**car accidents**](http://www.ehow.com/info_8567285_adverse-impacts-road-construction-environment.html). **All impacts need to be carefully assessed before a road is constructed in order to minimize their effects on both the environment and human population.**

**Roads trade off with better, cleaner forms of transportation**

**Litman, 12** (Todd Litman is founder and executive director of the Victoria Transport Policy Institute, anindependent research organization dedicated to developing innovative solutions to transportproblems. His work helps expand the range of impacts and options considered intransportation decision-making, improve evaluation methods, and make specializedtechnical concepts accessible to a larger audience. His research is used worldwide intransport planning and policy analysis.Mr. Litman has worked on numerous studies that evaluate transportation costs, benefits andinnovations. He authored the Online TDM Encyclopedia, a comprehensive Internet resourcefor identifying and evaluating mobility management strategies; Transportation Cost andBenefit Analysis: Techniques, Estimates and Implications, a comprehensive study whichprovides cost and benefit information in an easy-to-apply format; and Parking ManagementBest Practices, the most comprehensive book available on management solutions toparking problems, "Eva;uating Transportation Land Use Impacts: Considering the Impacts, Benefits and Costs of Different Land Use Development Patterns" on May 27, 2012 from [www.vtpi.org/landuse.pdf](http://www.vtpi.org/landuse.pdf) AK)**Planning decisions often involve trade-offs between mobility** (physical movement of people and goods) **and accessibility** (the ability to reach desired goods and activities). **Incremental increases in road and parking capacity tend to create more dispersed land use patterns, increasing the amount of mobility required to achieve a given level of accessibility**. **This favors automobile travel and reduces the utility and efficiency of other transport modes**, **since large parking lots and wide streets create landscapes that are difficult for walking, and therefore for transit access.** By increasing the amount of land required for a given amount of development, **generous road and parking requirements favor urban fringe development,** where land prices are lower. As a result, to some degree**, automobile-dependency can be a self-fulfilling prophesy: practices to make driving more convenient make alternatives less convenient and increase automobile-oriented sprawl**.

**Plan decreases property value**

**Litman, 12** (Todd Litman is founder and executive director of the Victoria Transport Policy Institute, anindependent research organization dedicated to developing innovative solutions to transportproblems. His work helps expand the range of impacts and options considered intransportation decision-making, improve evaluation methods, and make specializedtechnical concepts accessible to a larger audience. His research is used worldwide intransport planning and policy analysis.Mr. Litman has worked on numerous studies that evaluate transportation costs, benefits andinnovations. He authored the Online TDM Encyclopedia, a comprehensive Internet resourcefor identifying and evaluating mobility management strategies; Transportation Cost andBenefit Analysis: Techniques, Estimates and Implications, a comprehensive study whichprovides cost and benefit information in an easy-to-apply format; and Parking ManagementBest Practices, the most comprehensive book available on management solutions toparking problems, "Eva;uating Transportation Land Use Impacts: Considering the Impacts, Benefits and Costs of Different Land Use Development Patterns" on May 27, 2012 from [www.vtpi.org/landuse.pdf](http://www.vtpi.org/landuse.pdf) AK)

**A number of studies indicate that proximity to high traffic roads reduces residential property values due to noise and air pollution effects**, while **proximity to green space tends to increase property values.** Kang and Cervero (2008) studied how **the Cheong Gye Cheon** (CGC) project in Seoul, Korea, which **involved converting a freeway into an urban park, affected property** **values**. They found that **freeway proximity reduced residential property values and increased non-residential property values**, and that **both residential non-residential properties within 500 meter were** generally **worth more when the freeway was replaced by an urban stream/linear park**. While proximity to freeway on-ramps was valued by residential properties, **this benefit was offset by nuisance effects of noise, dust, fumes, and visual blight for residences within several kms of the structure.**

Roads kill the environment

**World Bank, no date (World Bank, Roads and Highways: Construction and Maintenance, from www.worldbank.org/transport/roads/con&main.htm AK)**

**Roads have significant impacts on** both nearby communities and **the natural environment**. People and properties may be in the direct path of road works and affected in a major way. **People ma**y also **be** indirectly **affected** **by construction**, **through** the **disruption of livelihood, loss of accustomed travel paths** and community linkages, **increases in noise and pollution, and more** road **accidents**. **Disturbances to the natural environment may include soil erosion, changes to streams and underground water, and interference with animal and plant life.** **New roads may bring development to previously underdeveloped areas, sometimes causing significant effects on sensitive environments and the lifestyles of indigenous people**. The construction process has particular environmental impacts and mitigation options at each level of work: site establishment and setup; construction work activities; and, site restoration after the completion of work. During site establishment it is the location of work facilities and resources that is the key environmental issue. **During construction**, on the other hand, erosion is a major risk and can be prevented by prompt planting and control of runoff water. **Traffic, noise, waster disposal, and work practices are other important factors which need to be managed by road contractors**. Restoration of work areas, especially quarries, borrow pits, work depots, and material storage sites, is an important aspect of contractor responsibility. Provision is also often required for follow up maintenance of restored vegetation. **Environment is seldom taken into account in the design and implementation of road maintenance tasks.** While **impact** might be gradual because of the limited size of maintenance works, it **is noticeable throughout the road network.** **The frequency of** road **maintenance operations can facilitate the implementation of standard good practices**. **Environmental consideration should be included in** road **maintenance** programs and should be looked at from methodological, technical, economical and institutional/contractual points of view.

Transportation infrastructure, specifically roads/highways, increase GHG emissions

**Zimmerman, 99 (Rae Zimmerman is Professor of Planning and Public Administration at New York University's Robert F. Wagner Graduate School of Public Service and since 1998, Director of the Institute for Civil Infrastructure Systems (ICIS), a center, initially funded by the National Science Foundation (NSF) for collaborative and interdisciplinary research, education, and outreach on infrastructure services. For 2011-2013 she is directing Wagner’s Urban Planning Program for the fifth time, "Global Climate Change and Transportation Infrastructure:Lessons from the New York Area" in 1993 fromclimate.dot.gov/documents/workshop1002/zimmermanrch.pdf AK)**

**Implications for Transportation Transportation, and in particular, emissions from vehicular transport, is considered a major contributor to greenhouse gases (GHGs). Indicators commonly used to substantiate this include (1) vehicular usage in terms of the extent of travel (e.g., vehicle miles of travel), (2) type and amount of energy used to provide such travel, and (3) environmental effects associated with both extent of travel and energy use (primarily in terms of emissions of greenhouse gases and other gases and particulates). Vehicle Miles of Travel (VMT). According to the U.S. Department of Transportation (DOT), VMT is increasing on average nationally, having risen from 1.1 trillion miles in the year 1970 to 2.8 trillion miles during the year 2000, averaging a growth of 3.1% annually over that period, slightly slowing to 2.5% annually from 1990 to 2000. This is consistent with data that show increasing numbers of licensed drivers and vehicles between 1969 and 1995 (Hu and Young 1999: 11), and in fact, the number of vehicles has increased during those years by 143% while population only increased 32% and the number of households increased 58% nationwide. New York State data indicate that VMT is also increasing within New York State (often in spite of a leveling off of population), and in the New York-New Jersey region. The increased levels of vehicular travel have potential consequences for global climate change since vehicle travel in total generates more emissions in spite of previous gains in fuel economies and engine and end-of-pipe technologies to reduce emissions. Energy. Energy Information Administration data for the New York area and elsewhere indicate that transportation consumes a large amount of fossil fuel relative to other activities. Nationally, transportation accounted for 27.9% of total energy consumed in 2001, with the average annual percent change increasing from 1.4% in the period between 1973 and 2000 to 1.9% between 1990 and 2000 in spite of fuel economies (Davis and Diegel 2002: 2-3). In New York State, fossil fuel emissions from transportation continue to increase as numbers of motor vehicles are expected to rise. The New York State Energy Research and Development Administration (NYSERDA) 1999 Three Year Plan, citing the 1998 New York State Energy Plan, identified the following statewide energy use trends in transportation and associated energy use and air emissions: Although transportation accounts for 30% of energy use in New York State, it contributes 37% to carbon dioxide emissions; energy use for transportation is forecasted to grow 9% by 2015; and “in 20 years, if current trends continue, daily travel in metropolitan areas will increase by 50%” (NYSERDA 1999). Emissions. Without a change in vehicular emissions, vehicular travel will continue to contribute to the buildup of greenhouse gases because of continued growth in VMT, in spite of fuel economies. By 2000, transportation accounted for about a third of the emissions of carbon dioxide (CO2), a major greenhouse gas, contributed by fossil fuels (Davis and Diegel 2002: 3-1). The percentage share of U.S. carbon dioxide emissions from all transportation sectors has increased in absolute terms** only **by about three percentage points since 1985. However, metric tons of carbon emitted by the transportation sector increased by 33% during that period. Transportation is expected to be the largest growing CO2 emitting sector, with growth projected at 47.5% between 1996 and 2020 (U.S. EPA 2000: 31). National Ambient Air Quality Standard (NAAQS) pollutants are closely associated with global climate change. In 1999, transportation accounted for almost four-fifths of the U.S. emissions of carbon monoxide, over half of the NOx emissions, and over two fifths of the VOC emissions (Davis and Diegel 2002: 4-3). All of these chemicals are NAAQS pollutants. Although highway vehicles initially dominated the carbon monoxide (CO) emission category (accounting for 88% in 1970), their share has gradually diminished to 50% since the share of CO emissions from off-highway vehicles (primarily used in construction and agriculture) has increased, (Davis and Diegel 2002: 4-3).**

**Impacts**

**2NC Impact—Backfile Environment/BioD Impacts**

**Environmental destruction causes extinction**

Paul **Warner**, American University, Dept of International Politics and Foreign Policy, August, Politics and Life Sciences, **1994**, p 177

Massive extinction of species is dangerous, then, because one cannot predict which species are expendable to the system as a whole. As Philip Hoose remarks, "Plants and animals cannot tell us what they mean to each other." **One can never be sure which species holds up fundamental biological relationships in the planetary ecosystem. And, because removing species is an irreversible act, it may be too late to save the system** after the extinction of key plants or animals. According to the U.S. National Research Council, "The ramifications of an ecological change of this magnitude [vast extinction of species] are so far reaching that no one on earth will escape them." **Trifling with the "lives" of species is like playing Russian roulette, with our collective future as the stakes.**

**Loss of biodiversity will lead to extinction – global ecosystems are reliant on each other**

Bruce E. **Tonn**, Urban Planning Prof @ Tennessee, November **2007**, Futures v. 39, no. 9, “Futures Sustainability”, ln

The first principle is the most important because **earth-life is needed to support earth-life.** **Ecosystems are composed of countless species that are mutually dependent upon each other for nutrients directly as food or as by-products of earth-life** (e.g., as carbon dioxide and oxygen). **If** the **biodiversity of an ecosystem is** substantially **compromised**, then **the entire system could collapse** due to destructive negative nutrient cycle feedback effects. **If** enough **ecosystems collapse worldwide**, then **the cascading impact on global nutrient cycles could lead to catastrophic species extinction**. Thus, **to ensure** the **survival** of earth-life into the distant futurethe earth's **biodiversity must be protected**.

**Loss of ecosystems and species risks planetary extinction – each one could be the last**

**DINER 94** Judge Advocate’s General’s Corps of US Army

[David N., *Military Law Review*, Winter, 143 Mil. L. Rev. 161, LN]

No species has ever dominated its fellow species as man has. In most cases, people have assumed the God-like power of life and death -- extinction or survival -- over the plants and animals of the world. For most of history, mankind pursued this domination with a single-minded determination to master the world, tame the wilderness, and exploit nature for the maximum benefit of the human race. n67 **In past mass extinction episodes, as many as ninety percent of the existing species perished, and yet the world moved forward**, and new species replaced the old. **So why should the world be concerned now? The prime reason is the world's survival. Like all animal life, humans live off of other species. At some point, the number of species could decline to the point at which the ecosystem fails, and then humans also would become extinct.** No one knows how many [\*171] species the world needs to support human life, and to find out -- by **allowing certain species to become extinct -- would not be sound policy.** In addition to food, species offer many direct and indirect benefits to mankind. n68 2. Ecological Value. -- Ecological value is the value that species have in maintaining the environment. Pest, n69 erosion, and flood control are prime benefits certain species provide to man. Plants and animals also provide additional ecological services -- pollution control, n70 oxygen production, sewage treatment, and biodegradation. n71 3. Scientific and Utilitarian Value. -- Scientific value is the use of species for research into the physical processes of the world. n72 Without plants and animals, a large portion of basic scientific research would be impossible. Utilitarian value is the direct utility humans draw from plants and animals. n73 Only a fraction of the [\*172] earth's species have been examined, and mankind may someday desperately need the species that it is exterminating today. To accept that the snail darter, harelip sucker, or Dismal Swamp southeastern shrew n74 could save mankind may be difficult for some. Many, if not most, species are useless to man in a direct utilitarian sense. Nonetheless, they may be critical in an indirect role, because their extirpations could affect a directly useful species negatively. In a closely interconnected ecosystem, the loss of a species affects other species dependent on it. n75 Moreover, as the number of species decline, the effect of each new extinction on the remaining species increases dramatically. n76 4. Biological Diversity. -- The main premise of species preservation is that diversity is better than simplicity. n77 As the current mass extinction has progressed, the world's biological diversity generally has decreased. This trend occurs within ecosystems by reducing the number of species, and within species by reducing the number of individuals. Both trends carry serious future implications. **Biologically diverse ecosystems are characterized by a large number of specialist species, filling narrow ecological niches. These ecosystems inherently are more stable than less diverse systems. "The more complex the ecosystem, the more successfully it can resist a stress. . . .** [l]ike a net, in which each knot is connected to others by several strands, such a fabric can resist collapse better than a simple, unbranched circle of threads -- which if cut anywhere breaks down as a whole." n79 By causing **widespread extinctions**, humans **have artificially simplified many ecosystems. As biologic simplicity increases, so does the risk of ecosystem failure.** The spreading Sahara Desert in Africa, and **the dustbowl conditions of the 1930s in the United States are relatively mild examples of what might be expected if this trend continues.** Theoretically, **each new animal or plant extinction, with all its dimly perceived and intertwined affects, could cause total ecosystem collapse and human extinction. Each new extinction increases the risk of disaster. Like a mechanic removing, one by one, the rivets from an aircraft's wings, [hu]mankind may be edging closer to the abyss.**

**Biodiversity loss causes extinction**

**Coyne and Hoekstra, 07 -** \*professor in the Department of Ecology and Evolution at the University of Chicago AND \*\* Associate Professor in the Department of Organismic and Evolutionary Biology at Harvard University (Jerry and Hopi, The New Republic, “The Greatest Dying,” 9/24, http://www.truthout.org/article/jerry-coyne-and-hopi-e-hoekstra-the-greatest-dying)

Aside from the Great Dying, there have been four other mass extinctions, all of which severely pruned life's diversity. Scientists agree that we're now in the midst of a sixth such episode. This new one, however, is different - and, in many ways, much worse. For, unlike earlier extinctions, this one results from the work of a single species, Homo sapiens.We are relentlessly taking over the planet, laying it to waste and eliminating most of our fellow species. Moreover, we're doing it much faster than the mass extinctions that came before. **Every year, up to 30,000 species disappear due to human activity alone.** At this rate, **we could lose half of Earth's species in this century**. **And, unlike with previous extinctions, there's no hope that biodiversity will ever recover, since the cause of the decimation - us - is here to stay**.     To scientists, this is an unparalleled calamity, far more severe than global warming, which is, after all, only one of many threats to biodiversity. Yet global warming gets far more press. Why? One reason is that, while the increase in temperature is easy to document, the decrease of species is not. Biologists don't know, for example, exactly how many species exist on Earth. Estimates range widely, from three million to more than 50 million, and that doesn't count microbes, critical (albeit invisible) components of ecosystems. We're not certain about the rate of extinction, either; how could we be, since the vast majority of species have yet to be described? We're even less sure how the loss of some species will affect the ecosystems in which they're embedded, since the intricate connection between organisms means that the loss of a single species can ramify unpredictably.     But we do know some things. Tropical rainforests are disappearing at a rate of 2 percent per year. Populations of most large fish are down to only 10 percent of what they were in 1950. Many primates and all the great apes - our closest relatives - are nearly gone from the wild.     And we know that extinction and global warming act synergistically. Extinction exacerbates global warming: By burning rainforests, we're not only polluting the atmosphere with carbon dioxide (a major greenhouse gas) but destroying the very plants that can remove this gas from the air. Conversely, global warming increases extinction, both directly (killing corals) and indirectly (destroying the habitats of Arctic and Antarctic animals). As extinction increases, then, so does global warming, which in turn causes more extinction - and so on, into a downward spiral of destruction.     Why, exactly, should we care? Let's start with the most celebrated case: the rainforests. Their loss will worsen global warming - raising temperatures, melting icecaps, and flooding coastal cities. And, as the forest habitat shrinks, so begins the inevitable contact between organisms that have not evolved together, a scenario played out many times, and one that is never good. Dreadful diseases have successfully jumped species boundaries, with humans as prime recipients. We have gotten aids from apes, sars from civets, and Ebola from fruit bats. Additional worldwide plagues from unknown microbes are a very real possibility.     But it isn't just the destruction of the rainforests that should trouble us. **Healthy ecosystems the world over provide hidden services like waste disposal, nutrient cycling, soil formation, water purification, and oxygen production**. Such services are best rendered by ecosystems that are diverse. Yet, through both intention and accident, humans have introduced exotic species that turn biodiversity into monoculture. Fast-growing zebra mussels, for example, have outcompeted more than 15 species of native mussels in North America's Great Lakes and have damaged harbors and water-treatment plants. Native prairies are becoming dominated by single species (often genetically homogenous) of corn or wheat. Thanks to these developments, soils will erode and become unproductive - which, along with temperature change, will diminish agricultural yields. Meanwhile,**with increased pollution and runoff, as well as reduced forest cover, ecosystems will no longer be able to purify water; and a shortage of clean water spells disaster.**     In many ways, oceans are the most vulnerable areas of all. As overfishing eliminates major predators, while polluted and warming waters kill off phytoplankton, the intricate aquatic food web could collapse from both sides. Fish, on which so many humans depend, will be a fond memory. As phytoplankton vanish, so does the ability of the oceans to absorb carbon dioxide and produce oxygen. (Half of the oxygen we breathe is made by phytoplankton, with the rest coming from land plants.) Species extinction is also imperiling coral reefs - a major problem since these reefs have far more than recreational value: They provide tremendous amounts of food for human populations and buffer coastlines against erosion.     In fact, the global value of "hidden" services provided by ecosystems - those services, like waste disposal, that aren't bought and sold in the marketplace - has been estimated to be as much as $50 trillion per year, roughly equal to the gross domestic product of all countries combined. And that doesn't include tangible goods like fish and timber. **Life as we know it would be impossible if ecosystems collapsed.** Yet that is where we're heading if species extinction continues at its current pace.     Extinction also has a huge impact on medicine. Who really cares if, say, a worm in the remote swamps of French Guiana goes extinct? Well, those who suffer from cardiovascular disease. The recent discovery of a rare South American leech has led to the isolation of a powerful enzyme that, unlike other anticoagulants, not only prevents blood from clotting but also dissolves existing clots. And it's not just this one species of worm: Its wriggly relatives have evolved other biomedically valuable proteins, including antistatin (a potential anticancer agent), decorsin and ornatin (platelet aggregation inhibitors), and hirudin (another anticoagulant).     Plants, too, are pharmaceutical gold mines. The bark of trees, for example, has given us quinine (the first cure for malaria), taxol (a drug highly effective against ovarian and breast cancer), and aspirin. More than a quarter of the medicines on our pharmacy shelves were originally derived from plants. The sap of the Madagascar periwinkle contains more than 70 useful alkaloids, including vincristine, a powerful anticancer drug that saved the life of one of our friends.     Of the roughly 250,000 plant species on Earth, fewer than 5 percent have been screened for pharmaceutical properties. Who knows what life-saving drugs remain to be discovered? Given current extinction rates, it's estimated that we're losing one valuable drug every two years.     Our arguments so far have tacitly assumed that species are worth saving only in proportion to their economic value and their effects on our quality of life, an attitude that is strongly ingrained, especially in Americans. That is why conservationists always base their case on an economic calculus. But we biologists know in our hearts that there are deeper and equally compelling reasons to worry about the loss of biodiversity: namely, simple morality and intellectual values that transcend pecuniary interests. What, for example, gives us the right to destroy other creatures? And what could be more thrilling than looking around us, seeing that we are surrounded by our evolutionary cousins, and realizing that we all got here by the same simple process of natural selection? To biologists, and potentially everyone else, apprehending the genetic kinship and common origin of all species is a spiritual experience - not necessarily religious, but spiritual nonetheless, for it stirs the soul.     But, whether or not one is moved by such concerns, it is certain that our future is bleak if we do nothing to stem this sixth extinction. We are creating a world in which exotic diseases flourish but natural medicinal cures are lost; a world in which carbon waste accumulates while food sources dwindle; a world of sweltering heat, failing crops, and impure water. In the end, **we must accept the possibility that we ourselves are not immune to extinction. Or, if we survive, perhaps only a few of us will remain, scratching out a grubby existence on a devastated planet. Global warming will seem like a secondary problem when humanity finally faces the consequences of what we have done to nature: not just another Great Dying, but perhaps the greatest dying of them all.**

**2NC Impact—Turns Case**

**And, Warming kills transportation infrastructure**

**Zimmerman, 99** (Rae Zimmerman is Professor of Planning and Public Administration at New York University's Robert F. Wagner Graduate School of Public Service and since 1998, Director of the Institute for Civil Infrastructure Systems (ICIS), a center, initially funded by the National Science Foundation (NSF) for collaborative and interdisciplinary research, education, and outreach on infrastructure services. For 2011-2013 she is directing Wagner’s Urban Planning Program for the fifth time, "Global Climate Change and Transportation Infrastructure:Lessons from the New York Area" in 1993 fromclimate.dot.gov/documents/workshop1002/zimmermanrch.pdf AK)

Temperature-Related Effects and Transportation Infrastructure. According to the MEC study, temperature increases in the MEC region between 1900 and 2000 are estimated at about 0.2 degrees Fahrenheit per decade, and this rate is expected to increase during the 21st century. Many daily and monthly annual and decade averages as well as temperature extremes and the timing of freezing and thawing cycles have been exceeded in the New York area. For example, a New York Times synopsis of temperature variations in 1999 alone in New York City indicates that 1999 had the seventh warmest February, tenth warmest May, hottest July (with a high of 101 degrees on July 5th and 6th ), and the seventh warmest November. In addition, two days in December tied for the record high (Stevens 2000). That record tends to parallel U.S. trends. According to engineers managing regional infrastructure (Zimmerman 1996: 64), **materials used in roadways have a limited range of tolerance to heat, and the stress is exacerbated by the length of time temperatures are elevated and by stress factors, such as vehicle loadings on roadways and bridges during periods of congestion. Bridges can be particularly sensitive to exposure of the road surface to extreme heat.**  **The extent of the risk is,** in part**, a function of the number of bridges**. New York City alone has 2,200 bridges, potentially subject to extra stresses from elevated temperatures depending on the surface materials used. **If these consequences are realized, they** **can**, in turn, **have economic and social effects**, **exacerbating already serious congestion problems in urban** areas, as indicated by recent studies. According to the Texas Transportation Institute (2001: Appendices), for example, out of a total of sixty eight areas studied, the New York-New Jersey area ranked 21st in its congestion index, 24th in the cost of congestion per person, and 2nd in the total cost of congestion. The Texas Transportation Institute 2002 (2002) study indicates that **increasing congestion trends are widespread: annual transportation-related delay in 75 urban areas between 1982 and 2000 averaged 62 hours, and this increasing pattern of delay occurred in urban areas of all sizes**  (however, the extent of delay increases with urban size).

#### Transportation infrastructure wasn’t built to withstand warming- climate change stressed the system and causes it’s collapse

**Science Daily, 08** (Science Daily, This report is a collaborative effort between the Transportation Research Board and the Division on Earth and Life Studies of the National Research Council. The sponsors of this report are the Transportation Research Board, National Cooperative Highway Research Program, U.S. Department of Transportation, Transit Cooperative Research Program, U.S. Environmental Protection Agency, and the U.S. Army Corps of Engineers, "Climate Change Predicted to Have Major Impact on Transportation Infrastructure and Operations" on March 11, 2008 from www.sciencedaily.com/releases/2008/03/080311120617.htm AK)

ScienceDaily (Mar. 11, 2008) — While every mode of transportation in the U.S. will be affected as the climate changes, potentially **the greatest impact on transportation systems will be flooding of roads, railways, transit systems, and airport runways** in coastal areas because of rising sea levels and surges brought on by more intense storms, **says a new report from the N**ational **R**esearch **C**ouncil. Though **the impacts of climate change** will vary by region, it is certain they **will be widespread and costly in human and economic terms, and will require significant changes in the planning, design, construction, operation, and maintenance of transportation systems. The** U.S**. transportation system was designed and built for local weather and climate conditions,** predicated on historical temperature and precipitation data. The report finds that **c**l**imate predictions used by transportation planners and engineers may no longer be reliable**, however, **in the face of new weather and climate extremes**. **Infrastructure pushed beyond the range for which it was designed can become stressed and fail**, as seen with loss of the U.S. 90 Bridge in New Orleans after Hurricane Katrina. "**The time has come for transportation professionals to acknowledge and confront the challenges posed by climate change**, and to incorporate the most current scientific knowledge into the planning of transportation systems," said Henry Schwartz Jr., past president and chairman of Svedrup/Jacobs Civil Inc., and chair of the committee that wrote the report. "I**t is now possible to project climate changes for large subcontinental regions, such as the Eastern United States, a scale better suited for considering regional and local transportation infrastructure."**

**2NC—Wetlands Module**

**The federal government is terrible at infrastructure—leads to destruction of wetlands**

**The Washington Post 11** October 21, 2011(Accessed online at <http://www.washingtonpost.com/opinions/infrastructure-projects-to-fix-the-economy-dont-bank-on-it/2011/10/18/gIQAgtZi3L_print.html>, Accessed on 7/11/12)

In [a recent television ad](http://www.youtube.com/watch?v=s0gNga6v9EY&feature=related)for her network, MSNBC host Rachel Maddow stands below the Hoover Dam and asks whether we are still a country that can “think this big” — Hoover Dam big. The commercial is built on the assumption that [American](http://www.washingtonpost.com/opinions/infrastructure-projects-to-fix-the-economy-dont-bank-on-it/2011/10/18/gIQAgtZi3L_print.html) greatness is advanced by federal spending on major infrastructure projects.

If I had my own television commercial, I’d stand in front of the wreckage of Idaho’s Teton Dam,which, like the Hoover Dam, was built by the federal Bureau of Reclamation. The Teton Dam was based on shoddy engineering and a flawed economic analysis. It collapsed catastrophically in 1976, just a year after it was built.

Increased infrastructure spending has significant support in Washington these days. President Obama wants a new federal [infrastructure bank](http://www.washingtonpost.com/business/economy/how-obamas-plan-for-infrastructure-bank-would-work/2011/09/19/gIQAfDgUgK_story.html), and some members of both parties want to pass big highway and air-traffic-control funding bills. The politicians think these bills will create desperately needed [jobs](http://www.washingtonpost.com/opinions/infrastructure-projects-to-fix-the-economy-dont-bank-on-it/2011/10/18/gIQAgtZi3L_print.html), but the cost of that perceived benefit is too high: **Federal infrastructure spending has a long and painful history of pork-barrel politics and bureaucratic bungling, with money often going to wasteful and environmentally damaging projects.**

**For plenty of examples of the downside of federal infrastructure, look at the two oldest infrastructure agencies — the Army Corps of Engineers and the Bureau of Reclamation. Their histories show that the federal government shouldn’t be in the infrastructure**[**business**](http://www.washingtonpost.com/opinions/infrastructure-projects-to-fix-the-economy-dont-bank-on-it/2011/10/18/gIQAgtZi3L_print.html)**.** Rather, state governments and the private sector are best equipped to provide it.

**The Corps of Engineers has been building levees, canals and other civilian water infrastructure for more than 200 years — and it has made missteps the entire time.** In the post-Civil War era, for example, there were widespread complaints about the Corps’ wastefulness and mismanagement. A 1971 book by Arthur Morgan, a distinguished engineer and former chairman of the Tennessee Valley Authority, concluded: “There have been over the past 100 years consistent and disastrous failures by the Corps in public works areas . . . resulting in enormous and unnecessary costs to ecology [and] the taxpayer.”

**Some of the highest-profile failures include the Great Mississippi Flood of 1927.** That disaster dramatically proved the shortcomings of the Corps’ approach to flood control, which it had stubbornly defended despite outside criticism. Hurricane Katrina in 2005 was like a dreadful repeat. The flooding was in large part a man-made disaster stemming from poor engineering by the Corps and misdirected funding by Congress.

Meanwhile, **the Bureau of Reclamation has been building economically dubious and environmentally harmful dams since 1902.** Right from the [start](http://www.washingtonpost.com/opinions/infrastructure-projects-to-fix-the-economy-dont-bank-on-it/2011/10/18/gIQAgtZi3L_print.html), “every Senator . . . wanted a project in his state; every Congressman wanted one in his district; they didn’t care whether they made economic sense or not,” concluded Marc Reisner in his classic history of the agency, [“Cadillac Desert.”](http://www.amazon.com/gp/product/0140178244?ie=UTF8&tag=washpost-opinions-20&linkCode=xm2&camp=1789&creativeASIN=0140178244) The dam-building pork barrel went on for decades, until the agency ran out of rivers into which it could pour concrete.

Looking at the Corps and Reclamation, **the first lesson about federal infrastructure projects is that you can’t trust the cost-benefit analyses. Both agencies have a history of fudging their**[**studies**](http://www.washingtonpost.com/opinions/infrastructure-projects-to-fix-the-economy-dont-bank-on-it/2011/10/18/gIQAgtZi3L_print.html)**to make proposed projects look better, understating the costs and overstating the benefits.**

And we’ve known it, too. In the 1950s, Sen. Paul Douglas (D-Ill.), lambasted the distorted analyses of the Corps and Reclamation. According to Reisner, Reclamation’s chief analyst admitted that in the 1960s he had to “jerk around” the numbers to make one major project look sound and that others were “pure trash” from an economics perspective. In the 1970s, Jimmy Carter ripped into the “computational manipulation” of the Corps. **And in 2006,**[**the Government Accountability Office found**](http://www.gao.gov/products/GAO-06-529T)**that the Corps’ analyses were “fraught with errors, mistakes, and miscalculations, and used invalid assumptions and outdated data.”**

Even if federal agencies calculate the numbers properly, members of Congress often push ahead with “trash” projects anyway. Then-senator Christopher Bond of [Missouri](http://www.washingtonpost.com/opinions/infrastructure-projects-to-fix-the-economy-dont-bank-on-it/2011/10/18/gIQAgtZi3L_print.html) vowed to make sure that the Corps’ projects in his state were funded, no matter what the economic studies concluded, according to extensive [Washington Post reporting on the Corps](http://www.washingtonpost.com/wp-dyn/content/article/2006/05/12/AR2006051201550.html) in 2000. And the onetime head of the Senate committee overseeing the Corps, George Voinovich of Ohio, blurted out at a hearing: “We don’t care what the Corps cost-benefit is. We’re going to build it anyhow because Congress says it’s going to be built.”

As Morgan noted in his 1971 book, these **big projects have often damaged both taxpayers and ecology. The Corps, Reisner argues, has “ruined more wetlands than anyone in history” with its infrastructure. Meanwhile, Reclamation killed wetlands and salmon fisheries as it built dams to provide irrigation water to farmers in the West — so they could grow crops that often compete with more efficiently grown crops in the East.**

**Taxpayers are double losers from all this infrastructure. They paid to build it, and now they are paying to clean up the environmental damage. In Florida**, for example, **the Corps’ projects**, along with federal sugar subsidies, **have harmed the Everglades.** So the government is helping to fund a multibillion-dollar restoration plan. In the West, federal irrigation has increased salinity levels in rivers, necessitating desalination efforts such as a $245 million[plant in Yuma, Ariz.](http://www.swhydro.arizona.edu/archive/V2_N3/feature5.pdf" \t "_blank)And **in a large area of California’s San Joaquin Valley, federal irrigation has created such toxic runoff** that the government is considering spending up to [$2 billion to fix the damage,](http://www.lloydgcarter.com/content/110704496_westlands-drainage-delay-no-389) according to some estimates.

When the federal government “thinks big,” it often makes big mistakes. And **when Washington follows bad policies, such as destroying wetlands or overbuilding dams, it replicates the mistakes nationwide**. Today, for instance, **Reclamation’s huge underpricing of irrigation water is contributing to a water crisis across much of the West.**

Similar **distortions occur in other areas of infrastructure, such as transportation. The federal government subsidizes the construction of urban light-rail systems**, for example, which has caused these systems to spring up across the country. But **urban rail systems are generally less efficient and flexible than bus systems, and they saddle cities with higher operating and maintenance costs** down the road. Similar misallocation of investment occurs with Amtrak; lawmakers make demands for their districts, and funding is sprinkled across the country, even to rural areas where passenger rail makes no economic sense because of low population densities.

**When the federal government is paying for infrastructure, state officials and members of Congress fight for their shares of the funding, without worrying too much about efficiency, environmental issues or other longer-term factors.** The solution is to move as much infrastructure funding as we can to the state, local and private levels. That would limit the misallocation of projects by Congress, while encouraging states to experiment with lower-cost solutions. It’s true that the states make infrastructure mistakes as well, as California appears to be doing by subsidizing high-speed rail. But at least state-level mistakes aren’t automatically repeated across the country.

**2NC—Marine BioD Module**

**Transportation infrastructure destroys the marine environment**

**Rodrigue 98** (Note: Copywrite runs from 1998 to 2012—website provides no date of publication) Dr. Jean-Paul Rodrigue, [Dept. of Global Studies & Geography](http://www.hofstra.edu/Academics/Colleges/HCLAS/GEOG/index.html), Hofstra University, New York, USA “Pollutants Emitted by Transport Systems (Air, Water and Noise),” The Geography of Transport Systems, Accessed online at <http://people.hofstra.edu/geotrans/eng/ch8en/appl8en/ch8a2en.html>, Accessed online at 7/9/12)

Several transportation infrastructures have important territorial handholds. **When a transportation infrastructure is built over a hydrological environment like a river, wetland or a coastal area, disruption occurs. The maintenance of transportation infrastructure, particularly harbor and waterways (dredging), have also a significant impact. Each mode needs a specific set of infrastructure that interfere with hydric systems. Road infrastructure accounts for most of the territorial handhold of transportation with structures like bridges and parking facilities. Railways have also an important handhold over continental hydric systems. Maritime transportation**, by its intrinsic link with hydric systems **have several disruptive infrastructure like piers, canals, harbors and terminals. Airports have similar effects when constructed over wetland.** Dredging accounts alone for 80% of the waste released in aquatic environments.

**The most widespread effect of transportation infrastructure on hydric systems is the removal of natural habitats along shorelines. The aquatic / land interface to which several animal and vegetal species depend is considerably reduced.** Further, **a modification of the aquatic environment occurs, particularly during dredging** in port harbors and along waterways. **This notably influences the turbidity of water and destroys habitats. Roads and rails**, when running through wetland, **reduce the water regeneration / purification capacity by splitting available areas and disrupting water flows.** **Large ports occupy extensive areas along the shorelines of waterways and coasts. The construction and maintenance of those infrastructure have thus extensive impacts over aquatic environments.** **The construction of canals changes whole hydrographic systems by altering water flows** (quantity and speed) at regional and often at continental levels.

**2NC—Ports Module**

**Port creation causes air pollution and environmental reefs (DON’T READ—If you win a modeling argument or that a port is built in Hawaii, you can read a coral reefs impact)**

**United Nations 92** (“Assessment of the Environmental Impact of Port Development,” Economic and Social Commission for Asia and the Pacific, United Nations, Accessed online at <http://www.unescap.org/ttdw/Publications/TFS_pubs/Pub_1234/pub_1234_ch2.pdf>, Accessed on 7/11/12)

2.2 IMPACTS OF CONSTRUCTION

2.2.1 Potential impacts on water quality (81 of table 2.1)

**Pile driving, deposition of rubble, dredging, sand compaction and other construction work in water cause resuspension of sediments and turbid water. Resuspension of sediments in water leads to an increase in the level of suspended solids (88) and in the concentration of organic matter, possibly to toxic or harmful levels. It also reduces sunlight penetration. Work vessels are a possible cause of oil spills, garbage discharge, and leakage of other substances into water. Diffusion from concrete work in water and overflows from landfills may be possible sources of water pollution.**

Measures against adverse effects

The adverse effects of construction work could be minimized by appropriate selection of equipment in pile driving or dredging, proper use of silt curtains, careful planning of settling ponds and overflow weirs for landfills, and suitable transport of construction materials and dredged material. Proper disposal of dredged material plays a critical part in preserving theenvironment. Deposition in landfills may offset problems being caused by dumping at sea.

2.2.2 Potential impacts on coastal hydrology (82 of table 2.1)

The potential impacts of construction on coastal hydrology are nearly the same as the potential impacts of the location of a port which are identified in subsection 2.1.2. **Dredging may cause changes in current patterns and flows as well as salt wedge intrusion into a river mouth or littoral drifts in the shore zone. Changes in littoral drifts lead to beach erosion or accretion. Disposal of dredged material on land may possibly cause leakage of harmful substances into ground water or changes in waterfront drainage.**

Measures against adverse effects

The impact of dredging on current flow is usually not serious and can be assessed by current flow simulation. Beach erosion could be avoided by carefully planning the steepness of the dredging slope and the deviation from the shore line.

2.2.3 Potential impacts on bottom contamination (83 of table 2.1)

**Construction work and dredging disturb bottom sediments and induce resuspension, dispersal and settlement of such sediments. Dumping of dredged material directly alters bottom configuration and biota and may disperse toxic or harmful chemicals around the disposal site. Dredging removes bottom habitat and may lead to a loss of fishery resources.**

Measures against adverse effects

A survey of contamination of bottom sediments should be undertaken before dredging. In case substances or materials listed in the annexes of the London Dumping Convention are found during the survey, the dredged material should be treated in accordance with the respective provisions of the convention (See appendix 4). Selection of disposal site, disposal methods and requirements for capping are key issues in undertaking disposal at sea. In shallow water, silt curtains, as well as careful selection of the dredging method, could be effective in minimizing dispersal of resuspended sediments. Specific Guidelines for the Disposal of Dredged Material at Sea have been adopted by the Contracting Parties to the London Dumping Convention.

2.2.4 Potential impacts on marine/coastal ecology (84 of table 2.1)

**Disturbance from construction activities may cause displacement of fishery resources and other mobile bottom biota. Dredging removes bottom biota and dumping of dredged material covers bottom habitat, both of which may reduce fishery resources. Settlement of resuspended sediments on fragile marine fauna and flora damages the ecosystem particularly coral reefs**, which are formed by the extracellular product of symbiotic plants. **The great number of coral polyps attached need dissolved oxygen for respiration and the plants need sunlight for photosynthesis.**

Piles, concrete surfaces, rubble mounds and other similar structures in water could form new habitats, which may introduce undesirable species. If toxic substances and other contaminants are resuspended through dredging or dumping, they may lead to contamination of fishery and shellfishery resources.

Measures against adverse effects

Careful survey of a fragile marine and coastal ecology is essential for appropriate planning of construction work, dredging, and disposal of dredged material. Selection of port site is the key to minimizing adverse effects (subsection 2.1.4). Since adverse effects usually result from bottom contamination and deterioration of water quality, measures against those adverse effects noted in subsections 2.2.1 to 2.2.3 are also effective for mitigating changes in aquatic and terrestrial habitat.

122.2.5 Potential impacts on air quality (85 of table 2.1)

**Emissions from construction equipment, work vessels, trucks and other vehicles used in construction work could be a source of air pollution. Dust from construction activities is alsoa possible source of air pollution.**

Measures against the adverse effects

Methods for controlling dust emission are water scattering in the construction site, use of proper transport methods, such as a conveyor belt, for excavated material and screens around the construction site. A green belt zone or open space between the construction site and the local community could be an effective buffer. Temporary pavement of roads in aconstruction site could considerably reduce dust emission.

2.2.6 Noise and vibration (86 of table 2.1)

**Construction activities may create a problem of noise and vibration generated by construction equipment, truck traffic, work vessels and other similar sources.**

Measures against adverse effects

Transmission of noise and vibration are limited by the distance from their sources. Noise could be considerably reduced by adoption of low noise equipment or installation of sound insulation fences. Green belt of plants can be a good barrier. Limitation of working hours may be a possible means to mitigate the nuisances of construction activities.

2.2.7 Waste management (87 of table 2.1)

**Wastes from construction activities are mainly spoils generated by dredging. Disposal of dredged material on land may cause destruction of plants, loss of vegetation, leakage of contaminated materials and salt, odour, an unsightly view and other nuisances to the localcommunity. Disposal in water may cause problems identified in subsection 2.2.3.**

**United State ivory tree coral is a keystone species**

**Center for Biological Diversity No Date** (“Coral Conservation,” Center for Biological Diversity, Accessed online at <http://www.biologicaldiversity.org/campaigns/coral_conservation/index.html>, Accessed on 7/11/12)

CASE STUDIES: CORALS AT RISK

**The Center seeks protection for all corals in U.S. waters for which population declines have been estimated at more than 30 percent in 30 years. These include eight corals species in Florida and the Caribbean, eight corals in Hawaii, and 67 corals occurring in**[**American**](http://www.biologicaldiversity.org/campaigns/coral_conservation/index.html)**territories of the Pacific.** Here’s an introduction to **a just few of the coral species our petition advocates for:**

**Mountainous star coral** (Montastraea faveolata)  
Once considered the dominant reef building coral of the Atlantic, more than half of these corals have disappeared in just three decades. This Caribbean coral is susceptible to bleaching, ocean acidification, pollution, and disease. Already, the decline and death of this coral is outpacing its ability to grow and build new colonies.

**Ivory tree coral** (Oculina varicosa)  
**This Caribbean coral is a slow growing and delicate branching coral whose thickets provide a home to various reef fish. Ivory tree coral is considered a keystone species, meaning that its own health indicates the health of the ecosystem around it** – thus, it’s telling that these corals have been decimated by destructive fishing practices such as bottom trawling which has killed about 30 percent of the population across its range.

**Blue rice coral** (Montipora flabellata)  
Only found in Hawaii, blue rice coral is uncommon and thrives in shallow reefs pounded by waves. Although this coral is usually flat and sheetlike, on one reef in Molokai it grows branches with an opening at the tip that provides a home to small shrimp. Blue rice coral is vulnerable to bleaching, habitat degradation, and disease.

**Hawaiian reef coral** (Montipora dilatata)  
Hawaiian reef coral remains in fewer than five locations. It has the unfortunate trait of being among the first corals to bleach during increased water temperatures, and the slowest to recover. It has experienced significant climate-related population fluctuations over the last 20 years, and its small distribution makes it extremely vulnerable to extinction. Hawaiian reef coral has been considered a species of concern by the National Marine Fisheries Service since 2004.

**Flowerpot coral** (Alveopora allingi)  
As its common name suggests, flowerpot coral resembles a bouquet of flowers. Overexploited by the aquarium trade and rapidly losing habitat, this coral is found in American Samoa, the Northern Mariana Islands, Palau, and other areas of the Pacific. Flowerpot coral has the highest bleaching response of any coral genus, making it extremely vulnerable to global warming.

**Acropora corals**

Acropora corals are the most abundant corals on the majority of the reefs in the Indo-Pacific. However, these corals are extremely sensitive to bleaching and disease, and they’re slow to recover. Our petition seeks to protect several Acropora corals found in Hawaii and the greater Pacific. Two Acropora species in the Caribbean — elkhorn and staghorn corals — are already protected as threatened under the Endangered Species Act as a result of a petition filed by the Center.

**Keystone species prevent biodiversity loss**

**McKinney 2003** (Michael, Director of Environmental Studies, University of Texas, PHD from Yale, <http://books.google.com/books?id=NJUanyPkh0AC&pg=PA274&lpg=PA274&dq=manatees+%22keystone+species%22&source=bl&ots=rB1vju6y6v&sig=isIAuB81-ZM_Hv4PAMp2EKt4lH8&hl=en&sa=X&ei=kaX7T_GoEYiorQHfrZ2LCQ&ved=0CGgQ6AEwCA#v=onepage&q=manatees%20%22keystone%20species%22&f=false>, Hemanth)

**Are All Species Equally Important**? With so many species at risk, triage decisions cannot be made on the basis of risk alone. Conservation biologists therefore often ask whether one species is more important than another. Ethically, perhaps one could argue that all species are equal; an insect may have as much right to live as a panther. But in other ways, in particular. In ecological and evolutionary importance, all species are not equal. **Ecological importance reflects the role a species plays in its ecological community.** **Keystone species play large roles because they affect so many other species**. **Large** **predators**, for example, **often control the population dynamics of many herbivores**. **When** the **predators**, such as wolves, **are removed, the herbivore population may increase rapidly, overgrazing plants and causing massive ecological disruption**. Similarly, certain plants are crucial food for many animal species in some ecosystems. **Extinction of keystone species will often have cascading effects on many species, even causing secondary extinctions**. Many therefore argue that **saving keystone species should be a priority.**

# \*\*\* Air Pollution DA

## 1NC—Air Pollution DA

#### [Insert Link]

#### Air pollution kills 70,000 people in the U.S. every year—the impact is linear.

Roberts 2 — Bernie Fischlowitz-Roberts, Analyst at the Earth Policy Institute, 2002 (“Air Pollution Fatalities Now Exceed Traffic Fatalities by 3 to 1,” Earth Policy Institute, September 17th, Available Online at http://www.earth-policy.org/plan\_b\_updates/2002/update17, Accessed 06-10-2012)

The World Health Organization reports that **3 million people now die each year** from the effects of air pollution. This is three times the 1 million who die each year in automobile accidents. A study published in The Lancet in 2000 concluded that air pollution in France, Austria, and Switzerland is responsible for more than 40,000 deaths annually in those three countries. About half of these deaths can be traced to air pollution from vehicle emissions.

In the United States, traffic fatalities total just over 40,000 per year, while **air pollution claims 70,000 lives annually**. U.S. air pollution deaths are equal to deaths from breast cancer and prostate cancer combined. This scourge of cities in industrial and developing countries alike threatens the health of billions of people.

Governments go to great lengths to reduce traffic accidents by fining those who drive at dangerous speeds, arresting those who drive under the influence of alcohol, and even sometimes revoking drivers' licenses. But they pay much less attention to the deaths people cause by simply driving the cars. While deaths from heart disease and respiratory illness from breathing polluted air may lack the drama of deaths from an automobile crash, with flashing lights and sirens, they are no less real.

Air pollutants include carbon monoxide, ozone, sulfur dioxide, nitrogen oxides, and particulates. These pollutants come primarily from the **combustion of fossil fuels**, principally coal-fired power plants and gasoline-powered automobiles. Nitrogen oxides can lead to the formation of ground-level ozone. Particulates are emitted from a variety of sources, primarily diesel engines. "Smog"-a hybrid word used to describe the mixture of smoke and fog that blankets some cities-is primarily composed of ozone and particulates.

#### This impact will only get worse—every reduction in air pollution saves thousands of lives.

Plumer 12 — Brad Plumer, Reporter focusing on energy and environmental issues for the Washington Post, previously served as Associate Editor at The New Republic, 2012 (“What’s going to kill us in 2050? Air pollution — and lots of it,” WONKblog—a Washington Post blog, March 15th, Available Online at http://www.washingtonpost.com/blogs/ezra-klein/post/whats-going-to-kill-us-in-2050-air-pollution--and-lots-of-it/2012/03/15/gIQAgiDgES\_blog.html, Accessed 06-10-2012)

Air pollution tends to get wildly underrated as a public health concern. Everyone knows malaria is deadly. Or that access to clean water is a problem. And yet, in the next few decades, air pollution will kill far more people than both of those things combined, according to a new report.

On Wednesday, the OECD released its “Environmental Outlook to 2050,” which contained a few spots of cheery news. Humanity is making steady progress against malaria. Worldwide, the number of deaths from the disease are expected to fall by half by 2050. And fewer people will die from unsafe drinking water and poor sanitation in the future. But the number of deaths caused by air pollution — which includes ground-level ozone, particulate matter, and “indoor pollution” — are expected to **skyrocket**, killing more than **6 million people per year** by mid-century. Here’s the chart: [graphic chart omitted] (OECD Environmental Outlook 2050)

The situation is particularly acute in India. In 2010, about 90 people out of every million died prematurely from ground-level ozone, which is formed when emissions from power plants, vehicles and factories react with sunlight. The resulting pollution can “trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma.” And by 2050, according to the OECD, about 130 Indians out of every million are likely to die prematurely from exposure.

Wealthy countries aren’t immune, either, especially as places like the United States and Europe age, given that the elderly are especially sensitive to ozone pollution. While it’s technically feasible to reduce ground-level ozone, these control measures tend to be pricey and controversial — the Obama White House nixed stricter ozone standards last September for this very reason.

Other pollutants, however, could prove much easier to tackle. Take particulate pollution, which the OECD expects will kill **3.6 million people per year by 2050**. A lot of lung-damaging particulate matter comes from the **burning of fossil fuels**. And actions to curb them can prove quite cost-effective. The EPA’s new regulations on mercury, for instance, will reduce U.S. particulate pollution, as coal plants install new scrubbers. That, the agency estimates, will save an estimated 11,000 lives per year by 2016 and deliver between $36 billion to $89 billion per year in health benefits. And all for a cost of $9.6 billion per year.

### 2NC Impacts

#### Carbon monoxide decreases work capacity and deprives the body of an essential for life

Office of Environmental Quality, 09 (Office of Environmental Quality Transportation and Environmental Services City of Alexandria. "Alexandria's State of the Air Report: Past, Present and Future" in April 2009 from alexandriava.gov/uploadedFiles/tes/oeq/State%20of%20Air%20Report.pdf AK)

\*CO- Carbon Monoxide

High CO levels can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. When CO enters the bloodstream, it reduces the capacity of the body to deliver oxygen to its organs and tissues, thus depriving the body of an essential for life. The health threat from ambient CO is most serious for those who suffer from particular cardiovascular diseases. Elevated CO levels can lead to visual impairment, reduced work capacity, poor learning ability, and difficulty in the performance of complex tasks. At still higher levels, levels that can occur in the indoor environment, CO can lead to headaches and nausea, even in healthy persons. The CO NAAQS include both an 8-hour and 1-hour standard. The 2nd highest 8-hour and 1-hour average concentrations are used because the NAAQS permits one occurrence each year at each monitoring site to exceed the 8-hour NAAQS for CO (9 ppm). The NAAQS requires that the 2nd highest be less than 9 ppm averaged over 8 hours and 35 ppm averaged over 1 hour at all area monitors in order for the region to be in attainment.

#### Exposure to particulate causes bronchitis, premature death, cardiac disease

Office of Environmental Quality, 09 (Office of Environmental Quality Transportation and Environmental Services City of Alexandria. "Alexandria's State of the Air Report: Past, Present and Future" in April 2009 from alexandriava.gov/uploadedFiles/tes/oeq/State%20of%20Air%20Report.pdf AK)

Exposure to particles can lead to a variety of serious health effects. The largest particles do not get very far into the lungs, so they tend to cause fewer harmful health effects. Fine particles pose the greatest problems because they can get deep into the lungs, and some may even get into the bloodstream. Scientific studies show links between these small particles and numerous adverse health effects. Long-term exposures to PM, such as those experienced by people living for many years in areas with high particle levels, are associated with problems such as decreased lung function, development of chronic bronchitis, and premature death. Short-term exposures to particle pollution (hours or days) are associated with a range of effects, including decreased lung function, increased respiratory symptoms, cardiac arrhythmias (heartbeat irregularities), heart attacks, hospital admissions or emergency room visits for heart or lung disease, and premature death. Sensitive groups at greatest risk include people with heart or lung disease, older adults, and children. Fine particles are the major source of haze that reduces visibility in many parts of the United States, including Alexandria. Visibility impairment occurs when fine particles scatter and absorb light, creating a haze that limits the distance we can see and that degrades the color, clarity, and contrast of the view. Fine particles also affect vegetation and ecosystems by settling on soil and water, upsetting delicate nutrient and chemical balances. Finally, particles also cause soiling and erosion damage to structures, including culturally important objects such as monuments and statues.

### 2NC Link—Generic

#### Construction of infrastructure causes air, water, soil, and noise pollution

Environmental Pollution Centers No Date (Environmental Pollution Construction Sites, Environmental Pollution Centers, Accessed online at <http://www.environmentalpollutioncenters.org/construction/>, Accessed on 7/9/12)

Construction sites are found both within urban and rural areas, often in the close proximity of homes. Due to their proximity to homes and the materials used, construction sites may generate home pollution. This involves air, water, soil, and/or noise pollution. Additionally, construction [work](http://www.environmentalpollutioncenters.org/) may reveal existing subsurface pollution. In such situation, construction work is stopped and costly remediation is needed. Thus, construction work may generate construction pollution problems affecting both home owners and construction site owners. Moreover, construction workers (especially in the past) may be exposed to pollution. These aspects will be discussed in more details below, along with tips and measures to prevent and face pollution, as well as to recover the costs. If you live in a home close to a construction site (i.e., within 1 block or less) you may face the following type of pollution: [**Air Pollution**](http://www.environmentalpollutioncenters.org/air/)– the air you breathe may be polluted due to the construction work. Apart from the noise, [**poor**](http://www.environmentalpollutioncenters.org/) air quality is the most immediate pollution effect you may experience from a construction site. This means that airborne contaminants including contaminated particulate matter and volatile compounds are spreading around (mostly carried by wind) in the surrounding neighborhood (the main wind direction will influence the area most affected by air pollution around a construction site). Contaminants spreading around in air can travel large distances in a short time. The main [**construction contaminants**](http://www.environmentalpollutioncenters.org/construction/contaminants/) that spread around by wind include: PM10 (particulate matter with diameter less than 10 microns generating polluted dust), PAHs bound to particulate matter, VOCs (volatile organic compounds), asbestos, gases such as carbon monoxide, carbon dioxide, and nitrogen oxides.[**Water Pollution**](http://www.environmentalpollutioncenters.org/water/)– the surface water runoff and groundwater at and close to a construction site become polluted with various materials used in the construction work. As described for air pollution above, the following construction contaminants can pollute the water: VOCs, paints, clues, diesel, oils, other toxic chemicals, and cement. The immediate effect is creating turbidity in the runoff water and affected surface and groundwater (since some of the runoff water may infiltrate in subsurface reaching groundwater. In fact both groundwater below your home and surface runoff close to your home may constitute a source of pollution emanating from construction sites. Domestic animals and pets may drink contaminated water and soil may become contaminated too. Additionally, once the groundwater below your home become contaminated, it may affect you in the following ways: through direct consumption if you use water from a property well and indirectly by affecting the quality of your indoor air (vapor intrusion of the volatile contaminants from water). Overall, water pollution from construction sites is underestimated and has potential to generate severe environmental problems.[**Soil Pollution**](http://www.environmentalpollutioncenters.org/soil/)– soil at and around a construction site may become contaminated due to air transport followed by deposition of construction contaminants (listed at air pollution) as well as water runoff of construction contaminants (as listed for water pollution). Soil may constitute a sink for pollutants and some of those may accumulate in soil and persists over longer periods of time (e.g., PAHs). Noise Pollution – noise is usually associated with construction work although modern preventive measures may substantially reduce the amount of noise (in the neighboring community). Noise may adversely affect your health including effects such as: stress, sleep disturbance, high blood pressure and even hearing loss.

#### Construction causes air pollution

Sacramento Metropolitan Air Quality Management District 11 May 2011(“Chapter 3 | Construction-Generated Criteria Air Pollutant and Precursor Emissions,” Sacramento Metropolitan Air Quality Management District, Accessed online at <http://www.airquality.org/ceqa/cequguideupdate/Ch3Construction-GeneratedCAPsFINAL.pdf>, Accessed on 7/9/12)

Construction activities have the potential to generate a substantial amount of air pollution. In some cases, the emissions from construction represent the largest air quality impact associated with a project. Even though the generation of construction-related emissions is temporary in nature, the emissions contribute to the inventory for Sacramento County. Under certain conditions, the increased pollution load can exceed California and National Ambient Air Quality Standards (AAQS) and/or expose nearby receptors to substantial pollutant concentrations. The emissions from construction activities should be assessed, and it should be determined if they could result in a significant air quality impact and, when necessary, appropriate mitigation should be developed to reduce the impact. The most common construction activities include site preparation, earthmoving, paving of roadway surfaces, the erection of buildings and structures, and the application of architectural coatings. Earthmoving activities may consist of grading, trenching, soil compaction, and cut and fill operations. Site preparation includes activities such as general land clearing and grubbing. Some projects may also entail the demolition of buildings prior to site preparation. The emissions generated from common construction activities include: Exhaust emissions of particulate matter (PM) and oxides of nitrogen (NOX) from fuel combustion for mobile heavy-duty diesel- and gasoline-powered equipment, portable auxiliary equipment, material delivery trucks, and worker commute trips;  Fugitive PM dust from soil disturbance and demolition activity;  Evaporative emissions of reactive organic compounds (ROG) from paving activity and the application of architectural coatings. The application of architectural coatings is typically the largest source of ROG emissions during construction activity. The District addresses construction-related emissions of ROG through the implementation of District Rule 442, which regulates ROG emissions from architectural coatings; and Exhaust emissions of greenhouse gases (GHG) such as carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O). Construction-related GHG emissions will not be discussed in this chapter. Please see Chapter 6, Greenhouse Gas Emissions for further detail on construction-related GHG emissions. CAPs and precursors of primary concern from construction activity in California include ozone precursors (ROG and NOX), particulate matter with an aerodynamic resistance diameter of 10 microns or less (PM10), and fine particulate matter with an aerodynamic resistance diameter of 2.5 microns or less (PM2.5). Carbon monoxide, sulfur dioxide, and lead are of less concern because construction activities are not likely to generate substantial quantities of these CAPs. Demolition of structures and earth disturbances may also result in airborne entrainment of asbestos. Construction-generated emissions of asbestos are also discussed in Chapter 5, Toxic Air Contaminants. Chapter 5 also outlines the District’s guidance for addressing construction-generated emissions of diesel particulate matter, which is a designated California toxic air contaminant with potentially significant carcinogenic impacts.

**2NC Link—Airports**

#### Construction and operation of airports causes air pollution

Aviation Environment Federation No Date (“What Are An Airport’s Impacts?,” Aviation Environment Federation, Accessed online at <http://www.aef.org.uk/uploads/PlanningGuide2.pdf>, Accessed on 7/11/12)

2.2 Air pollution Airports and aviation generate air pollution through a range of sources: • Combustion of aviation fuel – which is mostly composed of kerosene - produces nitrogen oxides (NOx), carbon monoxide (CO), sulphur oxides (SOx), hydrocarbons and particulates. It also releases the greenhouse gas carbon dioxide (CO2) which is discussed at Section 2.4. • As engines are working inefficiently on approach (as they only use about 30% of the available power) a certain amount of unburnt kerosene is released. These unburnt fuel droplets are a source of volatile organic compounds (VOCs) and give rise to odours. • As aircraft tyres get worn and burnt during take-off and (especially) landing, they release particulate matter (PM). • Fuel dumping by aircraft releases unburned aircraft fuel into the air. This is a rare occurrence and usually only takes place in emergencies. In these circumstances, aircraft are expected to dump fuel over water where possible, and at an altitude where they are likely to evaporate before reaching the surface. • Vehicles travelling to and from the airport, and ground service equipment (tugs for aircraft and baggage, fuel and catering lorries, buses and vans that transport passengers etc.) generate NOx, CO2, particulates and (indirectly) ozone through the burning of petrol and diesel fuel. • Fuel storage tanks and transfer facilities can lead to the release of VOCs. • Aircraft and airfield maintenance (painting, metal cleaning, de-icing etc.), and emergency and fire training use complex chemicals which can release VOCs. • **Construction of airport-related projects can lead to dust, emissions from asphalt laying etc.** (Kenney, 2006). Air pollution can affect the health of people, animals and plants. It can promote eutrophication (essentially over-fertilisation) of water, leading to excessive plant growth and decay. It can also deteriorate buildings and materials and smell bad. Table 2.2 summarises the main impacts of air pollution.

### 2NC Link—High Speed Rail

#### High speed rail causes air pollution—violates clean air act which turns case

The Fresno Bee 5/26/12 (High-speed rail construction will give Valley's bad air a big bump before reductions take hold,” The Fresno Bee, Accessed online at <http://www.fresnobee.com/2012/05/26/2851875/high-speed-rail-secret-construction.html>, Accessed on 7/11/12)

But any reductions in air pollution won't start for at least a decade, when the trains would start carrying passengers between Merced and the Los Angeles Basin. Meanwhile, building the system in the San Joaquin Valley is expected to pump tons of dust, greenhouse gases and other pollutants into the air. International experts warn it could take years for the benefits of train ridership to make up for the harm caused during construction. The California High-Speed Rail Authority expects to pay millions of dollars to make up for construction emissions in the Valley. "Building in an emissions-free manner is not possible, of course," said Lisa Marie Burcar, a spokeswoman for the rail authority. "But offsetting those emissions to result in the same outcome is." In its environmental impact report for the Merced-to-Fresno section -- one of the first portions of the statewide train system planned to be built -- the rail authority allows that "construction ... has the potential to cause temporary and significant localized air quality impacts" on the Valley's air between 2013 and 2022.Work would include demolition, land grading, earthmoving, [**pouring concrete**](http://www.fresnobee.com/2012/05/26/2851875/high-speed-rail-secret-construction.html), building stations and laying tracks.All that work, and the equipment used to do it, are expected to produce reactive organic compounds and nitrogen oxides -- two chemicals that mix in the atmosphere to create ozone -- as well as dust and carbon dioxide and other greenhouse gases. The pollution anticipated from high-speed rail construction would be a small fraction of emissions already generated in the region. But in the Valley, already struggling to meet state and federal air-quality standards, any extra pollution is a major worry, said David Barber, of the San Joaquin Valley Air Pollution Control District. Construction pollution not only has "dire consequences" for healthy air, but it **threatens the San Joaquin Valley's ability to comply with federal mandates under the federal** [**Clean Air**](http://www.fresnobee.com/2012/05/26/2851875/high-speed-rail-secret-construction.html) **Act**, Barber told rail-authority board members this month in Fresno. The Valley faces several deadlines over the next 11 years to meet standards for ozone and fine particles, called PM-2.5. PM-2.5 is made up of dust and other particles that are 2.5 microns in size or smaller. A human hair, by comparison, is between 50 and 70 microns in thickness. Barber said failure to reach those standards will have "dramatic and potentially devastating consequences in the form of federal sanctions on the Valley." Penalties could include severe limits on industrial development and the loss of billions of dollars in federal highway funds.

**2NC Link—Highways**

#### Highway construction results in net more emissions—statistics prove—causes violation of the clean air act

PIRG 4 U.S. PIRG Education Fund, March 2004 (“More Highways, More Pollution: Road-Building and Air Pollution in America's Cities,” US PIRG Education Fund, Accessed online at <http://www.policyarchive.org/handle/10207/bitstreams/5542.pdf>, Accessed on 7/11/12)

The American Highway Users Alliance and other advocates for new roads often claim that increasing highway capacity will reduce vehicular air pollution, arguing that “congestion is a serious barrier to the nation’s otherwise impressive air quality progress.” 28 However, studies of generated traffic outlined in the previous section show that highway expansions are far from a magic-bullet cure for congestion and may well increase overall vehicle travel. To examine the link between highways and air pollution, we analyzed data on highway capacity and vehicle emissions for 314 metropolitan areas in the U.S. Our analysis shows that, per capita, cities with more highway capacity tend to have higher levels of air pollution from vehicles, casting further doubt on the assertion that increasing highway capacity will reduce vehicular pollution. More Highways, More Pollution The 314 metropolitan areas examined in this report vary in population from 60,000 to 9 million and in size from the sprawl of the Los Angeles metropolitan region to single-county urban centers in otherwise rural areas. Drawing valid comparisons among these areas is difficult. To do so, it is necessary first to correct for population by using per-capita figures, then to examine metropolitan areas of differing sizes (under the theory that more populous metropolitan areas will tend to be more dense than less populous areas) to ensure that the conclusions are applicable across all classes of areas. The metropolitan-level data for 1999 show positive correlations between major highway capacity (as measured in lane-miles) and air pollution from all vehicles across metropolitan areas (see Figures 2 and 3). The correlations hold for small (under 250,000 population), medium (250,000 to one million), and large (one million and up) metropolitan areas (see Figures 4-9). In all cases, the relationship between highway capacity and air pollution from vehicles is highly significant. The probability that these two factors are directly correlated is greater than 99.9%. 29As shown in Figures 4 and 5, the relationship between highway capacity and vehicular air pollution, per capita, is strongest in America’s largest cities—those with at least one million people. See Appendices A and B for data on highway capacity, driving, and air pollution for each metropolitan area. The positive correlation between highway capacity and vehicular air pollution suggests that highway expansion will lead to increased air pollution, all other factors held constant. For example, assume that an average large city expands its highway capacity by 14.6 percent – the national rate of growth in urban areas in the 1990s. 30 Based on the relationship between highway capacity and air pollution shown above, an average large city could expect a 10.9 percent increase in NOx emissions and a 10.7 percent increase in VOC emissions, assuming similar levels of per-vehicle pollution. Small and medium-sized cities could expect emissions of each of these pollutants to climb by 2.1 to 5.7 percent (see Tables B and C). While road construction is not the only factor affecting per-capita emissions—population growth, air pollution standards, vehicle choice, and other factors also play a role, as do land-use patterns, which are in part driven by road construction—our analysis of 1999 data on highway capacity and air pollution suggests that metropolitan areas can directly influence their levels of vehicular air pollution by choosing to expand—or not expand—local highway capacity. These decisions will significantly affect regional efforts to meet health standards for smog and soot required under the Clean Air Act and needed to protect public health.

#### Highway construction causes increased air pollution—data proves

PIRG 4 U.S. PIRG Education Fund, March 2004 (“More Highways, More Pollution: Road-Building and Air Pollution in America's Cities,” US PIRG Education Fund, Accessed online at <http://www.policyarchive.org/handle/10207/bitstreams/5542.pdf>, Accessed on 7/11/12)

Building new highways will do little to alleviate traffic congestion in the long run and likely will exacerbate already severe air pollution problems in metropolitan areas across the country. Despite tougher limits on tailpipe emissions and federal rules requiring that air quality play a role in transportation decision-making, cars and trucks remain a leading source of air pollution, particularly in urban areas, because of the dramatic rise in vehicle-miles traveled (VMT). ♦ Today’s vehicles are 80 to 99 percent cleaner per mile than vehicles produced in the late 1960s. However, since 1970, the number of vehicle-miles traveled nationwide has increased by 159 percent, from 1.1 trillion in 1970 to 2.87 trillion in 2002, wiping out many of these potential gains. ♦ VMT has increased most rapidly in urban areas, where exposure to ozone smog and toxic air contaminants can have the greatest impacts on health. Between 1970 and 2002, VMT on urban roads and highways tripled from 570 billion to 1.73 trillion. A growing body of evidence suggests that expansion of the nation’s highway network has helped fuel the increase in driving. The expansion of highways triggers changes in driver behavior and land use that spur additional vehicle travel – a phenomenon called “induced travel.” To examine the link between highways and air pollution, we analyzed data on highway capacity and vehicle emissions for 314 metropolitan areas in the U.S. Key findings include the following: ♦ Per capita, cities with more major highway capacity have higher levels of air pollution from vehicles. The correlation holds for small (under 250,000 population), medium (250,000 to one million), and large (one million and up) metropolitan areas. In all cases, the relationship between highway capacity and air pollution from vehicles is highly significant. The probability that these two factors are directly correlated is greater than 99.9%. ♦ The link between highway capacity and air pollution from cars and trucks is strongest in America’s largest cities – those with at least one million people (see Figures ES-1 and ES-2.) ♦ All other things being equal, this correlation suggests that an average large city that expands its highway capacity by 14.6 percent – the national rate of growth in urban areas during the 1990s – could expect a 10.9 percent increase in emissions of nitrogen oxides (NOx) and a 10.7 percent increase in emissions of volatile organic compounds (VOCs). Both pollutants contribute to the formation of smog, and many VOCs are toxic to humans. Small and medium-sized cities could expect emissions of each of these pollutants to climb by 2.1 to 5.7 percent. To check the growth of vehicular air pollution in metropolitan areas, state and federal officials should allocate a greater share of transportation resources to programs to reduce growth in the number of cars on the road and encourage alternative transportation modes such as transit. In addition, federal and state law must ensure that new transportation projects do not worsen air quality in metropolitan areas.

#### Transportation leads to a massive consumption of space

Rodrigue, no date (Jean-Paul Rodrigue received a Ph.D. in Transport Geography from the Université de Montréal (1994) and has been at the Department of Economics & Geography at Hofstra University since 1999. In 2008, he became part of the Department of Global Studies and Geography, "Transportation, Land Use and the Environment" from people.hofstra.edu/geotrans/eng/ch8en/conc8en/ch8c3en.html AK)

The main impact of urbanization has been the expansion of urban land use, which means that a large city of 5 million inhabitants may stretch over 100 km (including suburbs and satellite cities) and may use an amount of land exceeding 5,000 square km. Such large cities obviously cannot be supported without a vast and complex transport system. Also, modal choice have an important impact on land consumption. The preference for road transportation has led to a [**massive consumption of space**](http://people.hofstra.edu/geotrans/eng/ch6en/conc6en/carlandarea.html) with 1.5 to 2.0% of the world's total land surface devoted to the automobile, mainly for roads and parking lots. The dependence on transportation has reached a point where 30 to 60% of urban areas are taken by road transportation infrastructure alone. In more extreme cases of dependency on road transportation, such as Los Angeles, this figure can reach 70%. Yet, for many developing countries such as China and India, motorization is still in its [early stages](http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/potentialcarfleet.html). For China to have a level of motorization similar to those of Western Europe would imply a fleet of vehicle superior to the current global fleet. From a land requirement perspective, motorization would thus be a technical impossibility. The size of cities takes large quantities of land and their growth lead to the notion of metropolitan areas and, further, urban regions oriented along [corridors](http://people.hofstra.edu/geotrans/eng/ch2en/conc2en/bostwashcorridor.html). With urbanization, the expansion of transportation has allowed the reclamation of vast amounts of land from rural activities towards other usage. Also, the duplication and generalization of infrastructure, public and private alike, have resulted in supplementary land requirements. This is notably the case for large transport terminals such as ports and airports where several were built because they belonged to different administrative jurisdictions. The general aim was to convey a high level of accessibility to answer mobility demand of vast areas. While in several regions road transportation infrastructures are overused, a situation of over-capacity exists in others.

#### That kills the environment

Rodrigue, no date (Jean-Paul Rodrigue received a Ph.D. in Transport Geography from the Université de Montréal (1994) and has been at the Department of Economics & Geography at Hofstra University since 1999. In 2008, he became part of the Department of Global Studies and Geography, "Transportation, Land Use and the Environment" from people.hofstra.edu/geotrans/eng/ch8en/conc8en/ch8c3en.html AK)

The geographical growth of cities has not been proportional to the growth of population, resulting in lower densities and higher space consumption. This also applies to manufacturing and [freight distribution](http://people.hofstra.edu/geotrans/eng/ch8en/appl8en/land_logistics.html) activities that tend to expand horizontally with the expansion of the transportation and storage functions, particularly for [distribution centers](http://people.hofstra.edu/geotrans/eng/ch8en/appl8en/willow_springs_site.html). Such phenomena have not occurred in the same fashion and in the same proportion around the world. An increase in the quantity of energy consumed and waste generated has been the outcome. A typical city of one million inhabitants in an developed country daily consumes 600,000 tons of water, 10,000 tons of fuel and 2,000 tons of food, leading to a daily output of 500,000 tons of sewage, 2,000 tons of refuse and 1,000 tons of air pollutants (mainly CO2 and NO2). Consequently, changes in urban land use and its transport system have aggravated the environmental impacts of cities.

#### Highways increase emissions and cause cancer, respiratory illness, asthma and cardiovascular disease

CHASE, 12 (Creating Healthy and Sustainable Environments, "Traffic Corridors, Air Pollution & Human Health" on January 25, 2012 from chase-canada.org/2012/01/25/traffic-corridors-air-pollution-human-health/ AK)

Over the last two decades, dozens of studies have been directed at air pollution and negative health impacts along high volume traffic corridors in cities around the world. These studies have examined a variety of vehicle-related air pollutants such as fine particulate matter (PM2.5), ultra-fine particles (UFP), nitrogen dioxide (NO2), carbon monoxide (CO), black carbon, and particle-bound polycyclic aromatic hydrocarbons (PPAH). They have been directed at a variety of populations including adults, children, the elderly, pregnant women and newborns. They have addressed a broad range of health impacts including asthma, lung function, strokes, heart attacks, a variety of cancers, and several reproductive effects. They been directed at traffic corridors with varying volumes of traffic (i.e. 10,000 to 100,000 vehicles per day), at traffic corridors with different types of traffic (i.e. different ratios of diesel-fuelled trucks to gasoline fuelled cars), and at different distances between traffic corridors and sensitive land uses such as homes and schools (i.e. 50 to 500 metres).In 2007, when Brugge, Durant and Rioux reviewed the air quality and health studies directed at high volume traffic corridors, they concluded that: **Air levels of** **UFP, BC, CO** **and** nitrogen oxides (**NOx**) are all elevated along high volume traffic corridors with greater than 30,000 vehicles per day; People living beside these highways are likely to receive much higher exposures to traffic-related air pollutants than people living beyond 200 metres from highways;Evidence from a variety of sources suggests that vehicle-related air pollutants have adverse effects on cardiovasular systems; andThere is strong evidence linking traffic corridors to the development of asthma and reduced lung function among children. These researchers declared that: “The most susceptible and overlooked population in the US subject to serious health effects from air pollution may be those who live near major regional transportation routes, especially highways.”In 2008, Boothe and Shendell reviewed 29 traffic corridor studies conducted between 1999 and 2006 and found statistically significant associations between residents who live in close proximity to traffic corridors and at least one of the following:Increased prevalence and severity of symptoms of asthma and other respiratory diseases;Reduced lung function;Adverse birth outcomes;Childhood cancer; andIncreased risk of premature death. While these reviewers acknowledged that a number of uncertainties make it difficult to prove that traffic corridors are causing these health effects, they concluded that: “…public health can be better protected through enhanced precautionary land use; smart growth; and transportation policies…”In 2010, the Health Effects Institute (HEI) released a special report on traffic-related air pollution which reported that:Traffic emissions are the principal source of variation in the levels of air pollutants within many cities; Traffic emissions have an impact on air quality at an urban and regional scale as well as a local scale; and Air pollution associated with traffic corridors can extend up to 300 to 500 metres from a highway depending upon factors such as traffic volume, wind direction and wind speed. The HEI concluded that the health evidence:Indicates that traffic corridor pollution aggravates asthma; Suggests that traffic corridor pollution can lead to the development of childhood asthma, non-asthma respiratory symptoms, impaired lung function, total and cardiovascular mortality, and cardiovascular disease.The HEI Panel declared: “…exposures to traffic-related pollution are likely to be of public health concern and deserve public attention.”Since these reviews were conducted, a number of new studies have been released. For example, a study conducted in Montreal suggests that traffic-related air pollution might be associated with an increased incidence of post-menopausal breast cancer (Crouse et al., 2010), while a Danish study based on 53,000 participants in the Danish Diet Cancer and Health cohort, suggests that traffic-related air pollution might increase the risks of cervical and brain cancer (Raaschou-Nielsen et al. 2011).As the body of evidence linking traffic corridors to negative health impacts grows, there is increasing pressure for a variety of policy responses. While new vehicle emission standards that are being being rolled out over the next decade will ensure that cars and trucks emit fewer air pollutants than those built in previous years, these gains could be off-set by the growing number of vehicles on the roads, the growing number of vehicle kilometres travelled (VKT) by Canadians each year, and by the increasing congestion on some road in Canada.