‘Return’ to sustainability:

Sustainable Communities and Lifestyles.

But were humans ever all that sustainable?

Regardless, we now need to be, if we, as a global society, hope to be able to support the ever-increasing population, up to perhaps ten billion of us, that will inhabit the Earth by the next century. Otherwise, it just won’t work.

And that doesn’t take global warming, along with its associated rising sea levels into consideration at all. Which brings us to the extra credit essay on the last exam.... I wrote...
You all know the story . . . the post-apocalyptic survivalist band that somehow makes it fighting the remaining mutants, zombies, monsters, robots, or whatever the plot demands. Well, humankind is creating their own apocalypse right now. No, it likely won’t be as dramatic as a War Against the Worlds, Omega Man, The Terminator, I am Legend, or, most recently Hunger Games, on ad nauseam, but it could have just as serious of consequences. Of course I’m talking about “Global Climate Change,” as it is so politically correctly phrased. Few people in the world today deny that the global climate is changing, and most of them are willing to concede that the change is making it warmer over the long haul. What many are failing to admit is that we, humankind, are causing this phenomenon. Regardless of how well we handle this situation as a global society, it is happening. The main questions are — how can we slow it up, and are we willing to?
So, if things continue to progress as they are now...

As soon as 2020 there is a 1 in 6 chance that the oceans will have risen as much as ten feet, including storm surge and high tide effects, in the Apalachicola estuary. The Jacksonville area and most of the entire eastern U.S. coastline will likely take 100 years to see these sort of surges, but with 10 foot surges more than 30% of the population and homes, and more than 15% of the acreage of Florida would be flooded (http://sealevel.climatecentral.org/surgingseas/).

What would the consequences of this rising sea level be, both for humans and for the Earth? Try to discuss effects on ALL of the aspects of environmental science that we’ve covered this semester. That is, how would this affect as many of the following issues as you can cover: ecosystems, human populations, water, food, disease, fuels, pollution, etc?
Therefore, let’s take those bullets in turn:

1. Ecosystems — This point if easy. All present estuaries and intertidal zones would be destroyed, as would most salt marshes and many other wetlands. All of these organisms would have to emigrate or go extinct, and many would be unable to emigrate due to physical, evolutionary constraints. That’s just the obvious ones. Others would be tundra and ice cap communities. The Arctic ice cap would largely be gone; Antarctica mostly devoid of ice. Both alpine and arctic tundra communities would be missing much of their seasonal snow and ice as well. Many of their inhabitants would also go extinct. Another effect may be the immigration of organisms to established ecosystems not directly affected by rising seas, and only slowly affected by the global warming itself. That is, if low-lying macro-organisms can leave their flooded lands, ...
Where would they go? Into already established high and dry areas, where they would compete with the organisms already there for limited resources. Something would give. All these effects would tremendously hurt the biodiversity of the Earth. Sure, flooded ecosystems would slowly reestablish themselves further inland, but it would take thousands of years, and much of the biodiversity would never return.

2. Human populations — Many (most?) large metropolitan areas of the world would be flooded, because they are on the coast or on low-lying riverbeds! If people escaped with their lives, which many would, because this would not be a quick flood. There would be years of warning (other than tsunami and hurricane effects). Then they would immigrate to higher and drier cities, resulting in huge increases in needs for all day-to-day services: sanitation, transportation, medical assistance, food availability, housing, etc. This would severely tax the ability of local governments, hospitals, food supplies, etc. and many people would be left behind in squalor.
3. **Water** — in particular access to fresh water and adequate sanitation would be severely impacted. Coastal cities would completely lose their drinking water and wastewater treatment facilities. They would be flooded with salt water. This would exacerbate the spread of water-borne disease for those trying to scrape out a life adjacent to flooded areas. And those leaving, as just discussed, would overtax facilities further inland.

4. **Food** — same story — access would be impaired, plus croplands themselves, many of which are coastal areas, would be flooded. Regardless, distribution networks, warehouses, trucking and railroad lines and companies, would all take major hits, since most of them are in major cites, many of which are on coastlines.

5. **Fuels** — same story — access due to distribution networks would wreak havoc. Furthermore, many refineries worldwide are on coastlines! These would all be flooded curtailing production and producing oil huge spills.
6. Disease — I mentioned this previously. Waterborne disease would be very hard to control near flooded areas. But even inland areas would suffer the epidemiological consequences of overcrowding due to the huge influx of people, and overtaxed medical services. Disease spread directly from person to person would flourish — such as influenza and tuberculosis. The incidence of sexually transmitted disease would also increase. And access and supply of antibiotics and all other drugs would be severely impaired.

7. Pollution — What can I say? Solid waste, hazardous materials, and water pollution would be rampant due to flooded wastewater facilities, factories, and warehouses. The only form of pollution that I can imagine that would actually be lessened is air pollution. This would be due to reduced traffic overall, and destroyed factories and fossil fuel burning electricity generating plants.

These are just some of the points that I came up with while writing today’s lecture last night. There are many more.
On to what is not sustainable... urban sprawl

- Urban sprawl is very hard to define but can easily be described:
  - It has low-density residential areas, and lots of shopping malls, industrial parks, and other facilities, all...
  - Linked by multilane highways.
  - Sprawl: city perimeters are continuously extended into the countryside, with...
  - Very little planning, and...
  - No notion of where it will stop.
  - Farms and natural areas are destroyed, highways are built, and old roads are expanded. Sounds pretty typical, eh?
Origins of urban sprawl

- Until the end of World War II, most people didn’t own automobiles.
- Cities developed in such a way that people could walk to most places they needed to be.
- People used public transportation to go “downtown.”
- The outer areas of the city ended at farms that provided food and natural areas.
- Small towns and villages near cities served the farmers. And then . . .
- The end of World War II brought profound changes:
  - Cities became less pleasant: poor housing, inadequate sewer systems, pollution, noise, etc.
  - People wanted the American dream: that is, their own home!
Suburbs

- Consumer goods were in short supply during WWII.
- When the war ended, people demanded goods.
- People bought mass-produced cars . . .
- Gaining freedom from walking to work or using transit lines.
- They could even move away from the city.
- Returning veterans and the resulting baby boom created a large housing demand.
- Developers bought farms and natural areas.
- And the government provided low-interest mortgages.
- It was cheaper to pay a mortgage than rent.
Cities developed without plans.

- The mushrooming development around cities lacked any plan.
- It happened wherever developers got land.
- No governing bodies existed to devise or enforce plans.
- Cities were surrounded by autonomous entities (towns, villages, etc.).
- Local governments had to try to build enough schools, sewers, water systems, and roads to keep up with the growth.
- Local zoning laws kept commercial and residential areas separate.
Urban sprawl . . .

Here, around Las Vegas, NV. (No longer the fastest growing city in the U.S.A. That’s now Charlotte, NC.)
Highways — a vicious cycle

* The movement of commuters into previously rural areas results in traffic congestion.
* The Highway Trust Fund taxes gasoline to raise money exclusively for building roads, which perpetuates development.
* Workers willingly spend 20–40+ minutes commuting.
* And new highways encourage development at farther and farther locations.
* Traffic conditions became as congested as ever. And . . .
* Average commuting distance has doubled, . . .
* But average commuting time has doesn’t change that much.
* However, more fuel is required, which generates more money for the Highway Trust Fund, which builds more roads.
* Government policy promotes urban sprawl!
* Residential developments are followed by malls, industrial parks, big-box stores, office complexes, etc. And . . .
* The only access is by cars on multilane highways.
The new-highway/traffic-congestion cycle of development spawned by the Highway Trust Fund
Exurbs, too

* Urban sprawl is a process of exurban migration.
  * That is a relocation of residences, stores, and workplaces from traditional spots in the city to outlying areas. Therefore, the . . .
  * Populations of many U.S. cities have declined.
  * Whereas populations of suburbs have sharply risen.

* Exurban migration occurs in a leapfrog fashion: people move from suburbs to exurbs, farther and farther from the city. Also . . .

* As people in developing nations become more affluent, they want cars and to adopt the car-dependent lifestyle.
An index of sprawl — ‘sprawlometrics’

* Sprawl occurs when the spread of development across the landscape exceeds population growth.
* So, in widely dispersed populations in low-density developments they . . .
* Measure residential density.
* If an area of separated homes, stores, workplaces, Then measure neighborhood mix of all three.
* If it’s an area with a network of roads marked by poor connections, then . . .
* Measure accessibility of the street networks.
* If there is a lack of well-defined downtowns and activity centers, then . . .
* Measure strength of activity centers and downtowns.
**OK, so what?**

★ Don’t worry about the details of how the number is generated . . .

★ But, a higher index means less sprawl.

★ Results of the sprawl index exercise ranged from 14 to 178.

★ The most sprawl: Riverside-San Bernardino, CA. Go figure. Atlanta, GA’s up there too.

★ The least sprawl: New York City (no room to sprawl).

★ Even if an area has a high score, it doesn’t mean sprawl is not a problem.
Environmental impacts of urban sprawl

- Energy resources: car use of petroleum has tripled.
- Plus, transportation causes 28% of greenhouse gas emissions (mainly CO$_2$).
- Air pollution: many cities don't meet air quality standards.
- Cars cause 80% of air pollution in the U.S. cities!
- Water: pavement increases runoff, flooding, erosion.
- Suburban home runoff and/or improper disposal of fertilizers, pesticides, oil, etc., all degrade water quality.
- Loss of agricultural land: 1.3 million acres/year in U.S.
- Food now travels 1,000's of miles from commercial farms across the world.
- Loss of landscapes and wildlife: 1.8 million acres/year
- Fragmentation threatens species biodiversity.

Tuesday, April 17, 2012
Impacts of sprawl on quality of life

- Higher vehicle ownership and driving mileage: cars are driven more miles per person in high-sprawl areas, ...  
- For example, chauffeuring kids, shopping. This also means ...  
- More traffic fatalities.

- Less physical activity and greater health risks: more driving leads to weight gain and higher blood pressure.
- Congestion and higher costs: moving to the suburbs does not stop congestion. Taxes are just raised for infrastructure improvement.

- But there are offsetting benefits ...

- Quality-of-life issues are decisive for people.
  - The issues are heavily weighted in favor of sprawl. Such as ...
  - Low-density housing, larger homes and lots, better schools, lower crime, better social services, and ...
  - Lower housing costs, and more homogeneous communities.

- Net benefits? Several perceived benefits actually have serious negative side effects for society. Especially the fact that ...
  - The poor have to stay in high-density, inner-city, or older suburban communities.
Common good?

- Environmental costs of sprawl are real, but...
- Are not perceived as decisive by people. This is because...
- They are a matter of common good.
- People make choices for personal, not the common, good.
- But...
- Overall, the costs of sprawl outweigh the benefits.
- Laws may control exurban development. However, ...
- The U.S. strongly favors the right to use property. So...
- Restrictions are politically impossible.
- Therefore, smart growth: the key to controlling sprawl is to provide quality-of-life benefits without incurring serious environmental and social costs.
- This addresses sprawl and purposely develops areas in environmentally sustainable ways.
- Growth will occur, but it must be sustainable.
- Architects and developers need to focus on creating integrated communities.
Principles of smart growth

- Create a range of housing opportunities and ranges.
- Create walkable neighborhoods.
- Encourage participation by everyone.
- Foster distinctive, attractive neighborhoods.
- Make development decisions predictable, fair, cost-effective.
- Preserve open space, farmland, natural beauty, and critical areas.
- Provide a variety of transportation choices.
- Strengthen and direct development to existing communities.
- Use compact building design.
- Dream on...
Initiatives of smart growth

* Setting boundaries on urban sprawl: future development cannot go beyond set boundaries.
* Saving open space: states are acquiring crucial natural areas.
* Developing existing urban space: channel growth to areas where infrastructure already exists.
* Creating new towns: affordable, attractive housing can be built around industrial parks and malls. This uses...
* Preserved land, less pollution, less congestion
* Money from the Highway Trust Fund could go to other modes of transportation (cycling, walking, mass transit).
* And we need a resurgence of mass transit!
Urban blight (decay)

- In the developing world, urban blight results from people moving to the city far beyond the capacity of cities to absorb them. Yet...
- In the developed world, exurban migration causes urban blight.
- With affluence, people leave the cities (‘white’ flight) . . .
- Excluding the poor, elderly, minorities, and the disabled, . . .
- Resulting in segregation by situation.
- Affluent people moving to the suburbs starts a vicious cycle of exurban migration and urban blight.
- Local governments are responsible for schools, roads, police and fire protection, managing refuse, water, sewer, many welfare services, libraries, local parks, etc. These . . .
- Services are for paid by property taxes, determined by the value of the home, business, etc.
- Most city governments do not overlap with suburban governments.
Therefore, economic dysfunction

- Affluent people increase the tax base in suburbs. This gives . . .
- Improved and expanding services and facilities there.
- Yet lower property values and deteriorating real estate in large cities declines (erodes) the tax base. This . . .
- Lower demand leads to lower tax revenues.
- The city ends up inheriting abandoned properties.
- Poor immigrants settle in cities, requiring public help. But . . .
- Services and facilities are cut due to the eroding tax base.
- This flight of affluent people removes purchasing power that supports stores, professional establishments, etc.
- Merchants and practitioners move or go out of business.
- Residents lose access to goods and job . . .
- But they can’t move to the suburbs — it’s too expensive.
- Drugs, crime, and violence, are widespread.
- Some cities have redeveloped core areas with shops, restaurants, office buildings, hotels, etc. but just blocks away, blight continues.
What makes cities livable?

- A sustainable future depends on reining in urban sprawl and revitalizing cities.
- Half the world’s people now live in cities.
- Cities must become resource efficient, leaving the countryside for farms and natural ecosystems.

Livable cities:
- Have a high population density. And . . .
- Preserve a heterogeneity of homes, businesses, stores . . .
- And let people meet, visit, or conduct business informally.

In livable cities, space is designed for people, not cars!
- Yet two-thirds of land in most cities is devoted to moving, parking, or servicing cars.
- The world’s most livable cities are not perfect for cars —
- They reduce sprawl and traffic and improve movement by foot, bicycle, mass transportation, or even banning cars in the downtown areas.
And another livable idea . . . urban gardens

Many cities are developing vacant or cleared areas into urban garden plots. Rooftop hydroponic gardens are popular.

These gardens do not make cities agriculturally self-sufficient. However, they do add to urban livability. By . . .

- Allowing composting and using nutrients from sewage sludge.
- By providing fresh vegetables. And by . . .
- Providing jobs for unskilled workers. Furthermore, . . .

Curbing sprawl allows close-in farms to provide much of the rest of the people's food needs.
To the point . . .

* The decay of cities is hastening the decay of the environment. Because . . .
* Humans spread into natural lands and prime farmlands. Thereby, . . .
* Increasing air pollution and greenhouse gas emissions!
* People entering cities in developing nations degrade human and social resources vital for environmental issues.
* Without sustainable human communities, there is little hope for sustainability for the rest of the biosphere.
* Making urban areas more appealing spares surrounding areas (parks, farms, etc.) from becoming malls, houses, etc.
* Sustainable communities: revitalizing urban economics and rehabilitating cities requires coordinated efforts.
Portland is a livable, sustainable city.

- Portland, OR has taken giant steps to reduce car use.
- An urban growth boundary circles the city, ensuring compact growth, not sprawl.
- It has an efficient light-rail and bus system that carries 45% of all commuters to downtown jobs.
- It converted a former expressway into Tom McCall Waterfront Park.
- It is one of the world’s most livable cities and . . .
- The most sustainable city in the U.S.
- Other cities have redeveloped waterfronts, e.g. . . .
- San Francisco, Cleveland, Chicago, Boston, Baltimore . . .
- Turning rotting piers and abandoned freight yards into workplaces, residences, and public spaces.
The Chattanooga Venture

Chattanooga, TN: 40 years ago, was a decaying industrial city with high pollution levels.

It won the EPA's 1969 award for the "dirtiest city in the U.S."

Yet a nonprofit initiative in 2000 to bring people together to build a consensus resulted in...

$800 million, universal cooperation, and 223 projects to:

- Control pollution, ...
- Build or renovate low- and moderate-income housing, ...
- New industries to build pollution-control equipment, ...
- A recycling center employing mentally disabled adults, ...
- An urban greenway demonstration farm, ...
- A zero-emissions industrial park, and ...
- Pedestrian-friendly theaters, museums, businesses.
Chattanooga has changed from one of the worst to one of the best places to live in the U.S.

Chattanooga Venture developed a guide to help groups build sustainable communities.

Subsequent plans include revitalizing the city’s park system.

People expect public projects to involve the public.
Lifestyles and the common good

* Are we making progress toward sustainability?
* Environmental problems are human, not scientific or technical.
* We know enough to be able to act decisively.
* Human decisions (personally and societally) bring about change.
* Making stewardly decisions is not easy.
* Our personal values and needs compete with others.
* Business as usual solves very few problems.
* Public policies are vital but fail without public support.
The common good

- The common good in the context of public policy: to improve human welfare and protect the natural world.
- Compassion for those less well off: make compassion a major element of our foreign policy.
- Concern for justice: make just policies in international economic relations.
- Honesty: keeping the laws of the land.
- Sufficiency: simplifying lifestyles.
- Humility: being willing to share with others.
- Neighborliness: concern for others and helping them.
Achieving sustainability

* People have to link values with the knowledge that comes from our understanding of the natural world . . .

* Along with our impacts on it.

* People must be willing to grapple with scientific evidence to respect scientific consensus.

* Sustainability must be economically feasible, socially desirable, and ecologically viable.

* Many groups, organizations, and individuals are working together on environmental problems and solutions.
Lifestyle changes

* Millions of people are trying to find solutions.

* We are all involved, whether we recognize it or not. This is because . . .

* Everything we do has an impact. Therefore, . . .

* We must choose what and how great that impact will be. We can all help.

* Levels of participation to work toward sustainability:

  * Individual lifestyle choices;
  * Political involvement;
  * Membership in organizations;
  * Volunteer work; and . . .
  * Career choices.
A new millennium

* The future promises to be an era of unprecedented change.
* Will we thrive, or just survive?
* We are engaged in an environmental revolution.
* Imagine a future of storms, floods, drought, deserts, environmental refugees, and armed conflicts over natural resources! I.e. . . .
* My post-apocalyptic surging seas scenario.
* Or a future of green technologies, livable cities, energy-efficient homes, transport and industry, with rising standards of living.
Now, the comprehensive final — no taking it early, nor any makeups either, period! If you have a conflict, you are to take it up with the SGCEP Director. It . . .

Is Wednesday, April 25 during our usual class time and here in our usual classroom! Furthermore, . . .

You’ve still not gotten all your old exams! This is ridiculous. As I’ve repeatedly said over the entire semester – the final exam will be built directly off these old exams, and it’s worth 40% of the course lecture grade. That’s the difference between failing and passing, maybe even getting a decent grade (e.g. 20% [full in-class credit] + 20% [only 50% on all section tests] + 40% [100% on final] = 80%, a “B” for the lecture portion of the course, without any extra credit at all!).
And don’t forget . . .

The next class meeting is very important. It will cover all topics that have been troublesome over the entire semester, as a review for the final. And the final in-class assignment is due then. In fact, here it is: For next time, write down three questions from previous exams that you don’t understand or are most confused by. Bring those three questions to the next class meeting, and don’t blow it off. It’s a VERY worthwhile preview for the final exam!