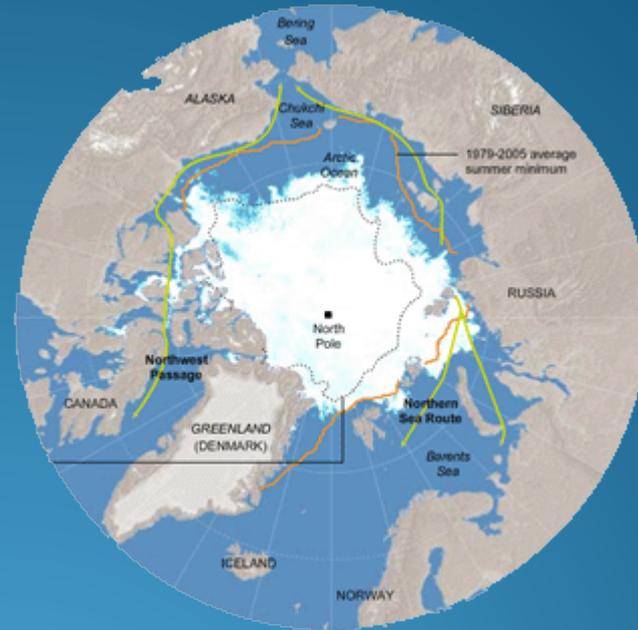


Nature and the Metropolis



• Presented by Qian Wang
Land Economy, Cambridge University



A sustainable urban form, City need to be compact to reduce the footprint, but it should also

- 1.ensure its quality of environment.
- 2.create equity for social groups.
- 3.restore of history and culture.

Harmonizing Nature and the Metropolis

- Requires global understanding: “Think globally”
- Many problems require regional planning: “Act regionally”
- Approach should be interdisciplinary
 - Planning and design professional fields
 - Social science disciplines
 - Other disciplines and fields
- Theory and practice should go together
- Technology—particularly GIS—is very useful
- Harmonizing nature and urban development is important

Outlines

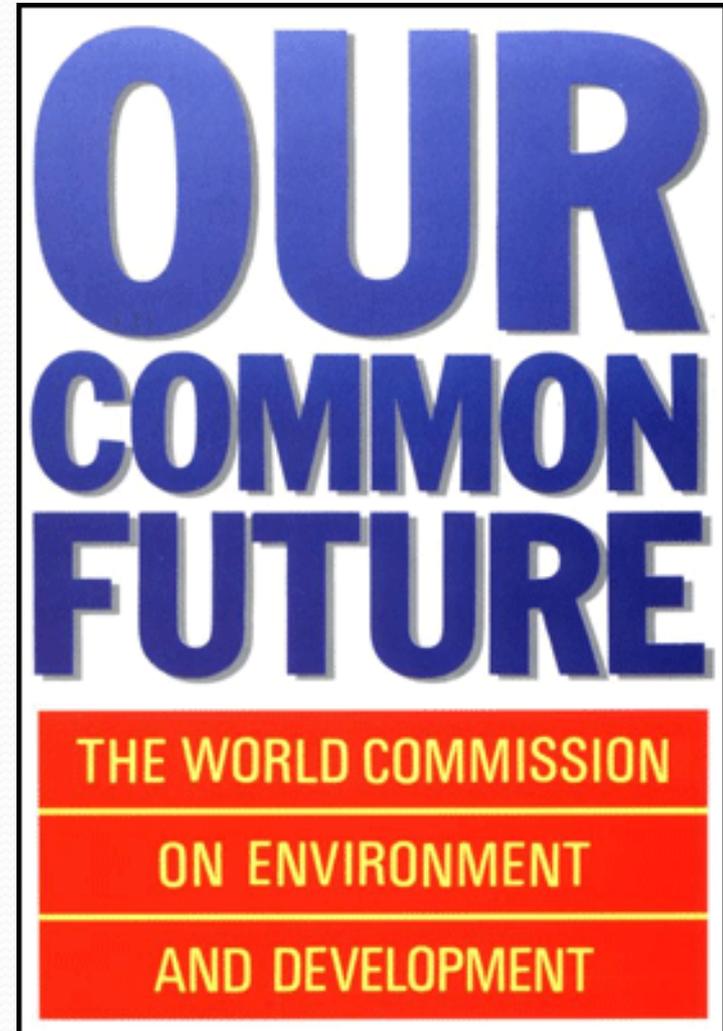
- **1 Sustainable urban development**
- **2 Sustainable urban form**
- **3 Ecological design**
- **4 Green urbanism**
- **5 City ecological foot analysis**
- **6 Deisgn nature**

Outlines

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Brundtland Commission Report

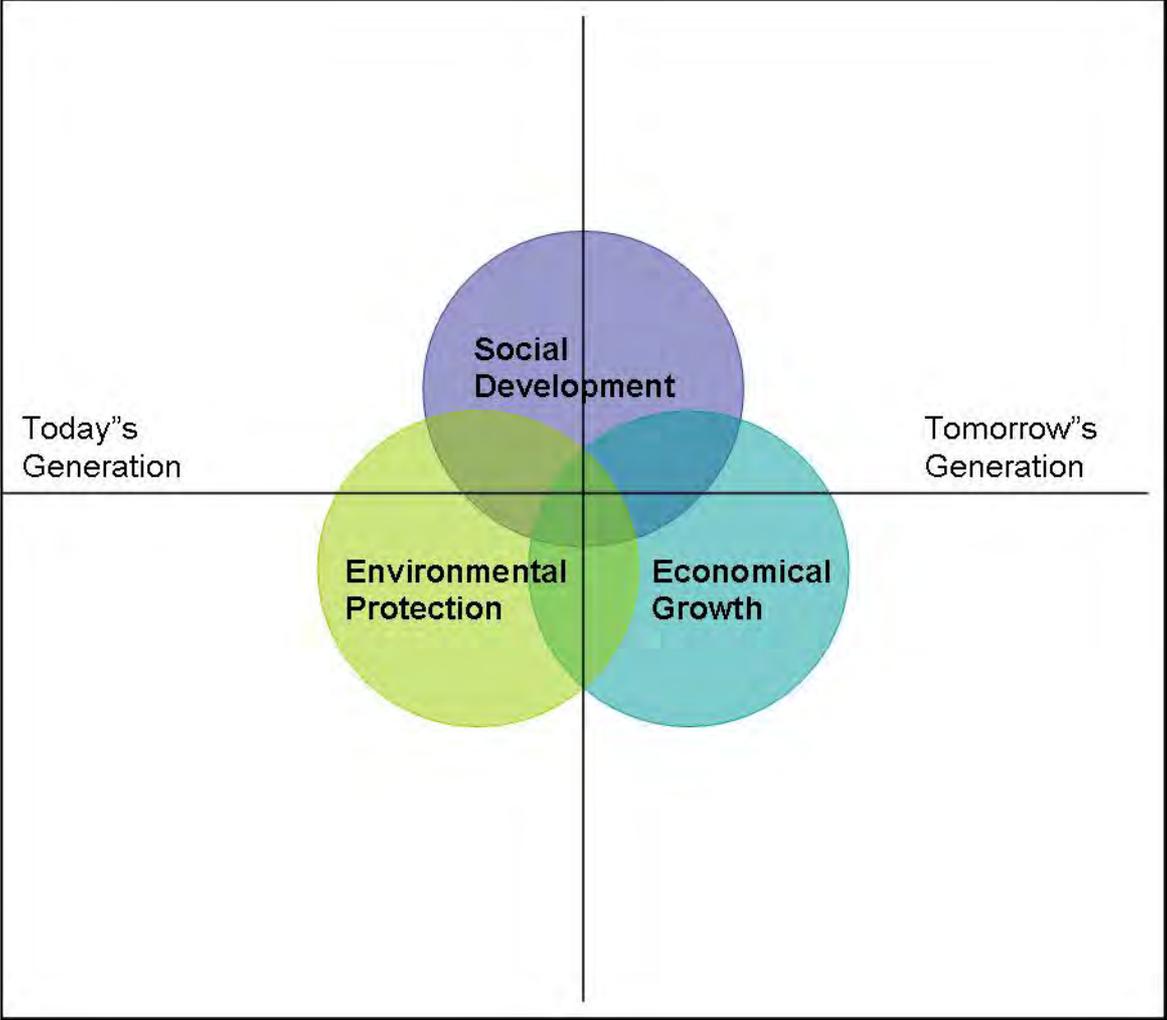
- 1987 United Nations Report
- Named after chairperson Gro Harland Brundtland
- Former Norwegian Prime Minister

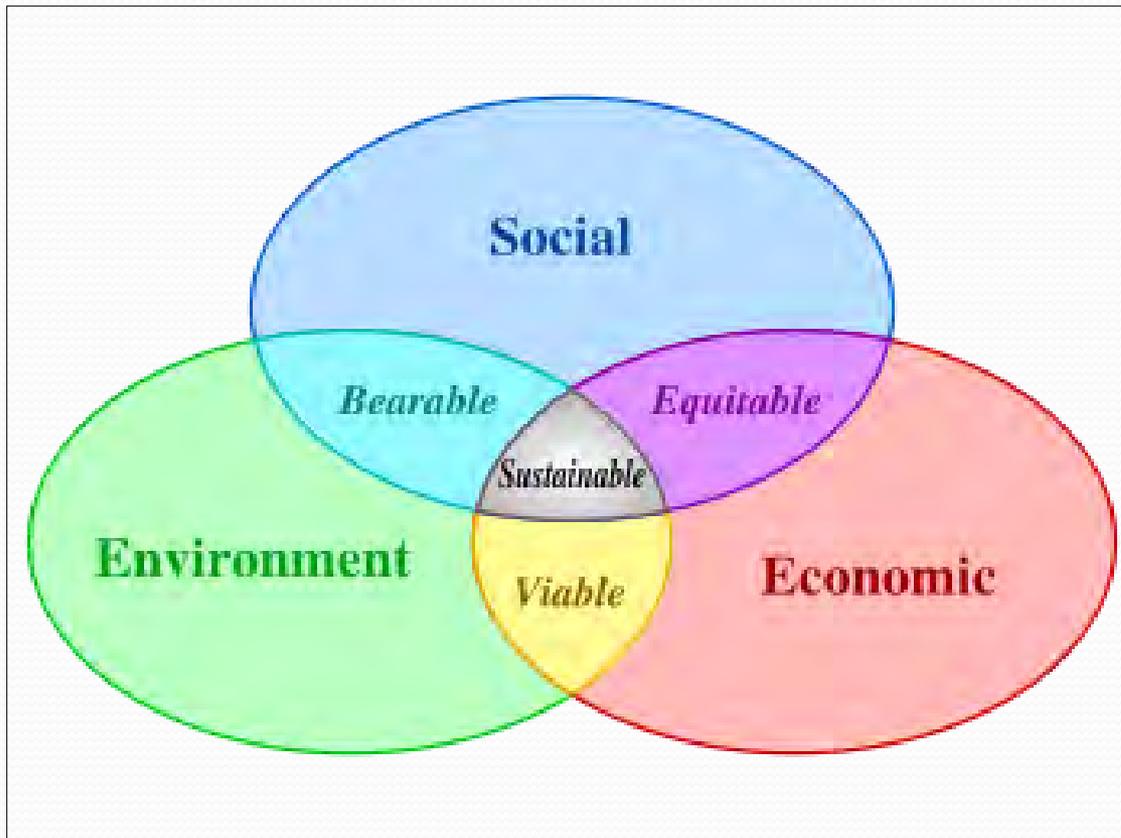


- Defined sustainability as

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

- Argued that world development was “unsustainable”
 - Developed countries consuming disproportionate Share of irreplaceable resources
 - Developing countries often sacrificing future for immediate gain by exploiting resources unwisely
- Focus was on exploitation of natural resources; not specifically “urban” development.
- Now what is a suitable form on urban development in the climate change era.





Sustainable development at global scale

- Collective impact of development is unbalancing the earth
- **Climate change (global warming) most pressing concern**
- Destruction of the world's oceans
- Extinction of plant and animal species
- Depletion on non-renewable resources

...How cities and regions are built—as well as the design of individual buildings—will have a major impact on global sustainability

The Theory and practice of Sustainable Urban Development

- U.S./UK theory developed by
 - Stephen Wheeler
 - Timothy Beatley
 - Many others
- Focuses on how urban development can:

“meet the needs of the present without compromising the ability of future generations to meet their own needs”

Sustainable Urban Development Concepts

- Use renewable instead of non-renewable resources
- Natural capitalism (Paul Hawken)
 - ecological “capital”
 - natural “interest”
- Appropriate technology
- Import replacement | produce locally
- Conserve | restore | recycle
 - Conservation
 - Restoration
 - Recycling

Use renewable energy resources



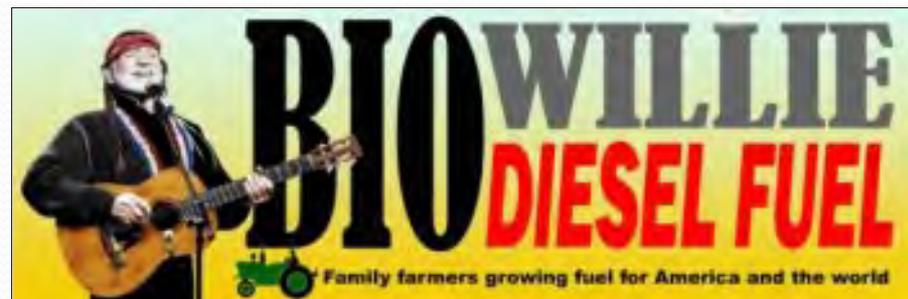
Solar



Wind

Substitute renewable fuels like biodiesel for fossil fuels

- Alternative system pioneered by country/western singer Willie Nelson
- Increasingly mainstream



Reduce vehicle miles drive

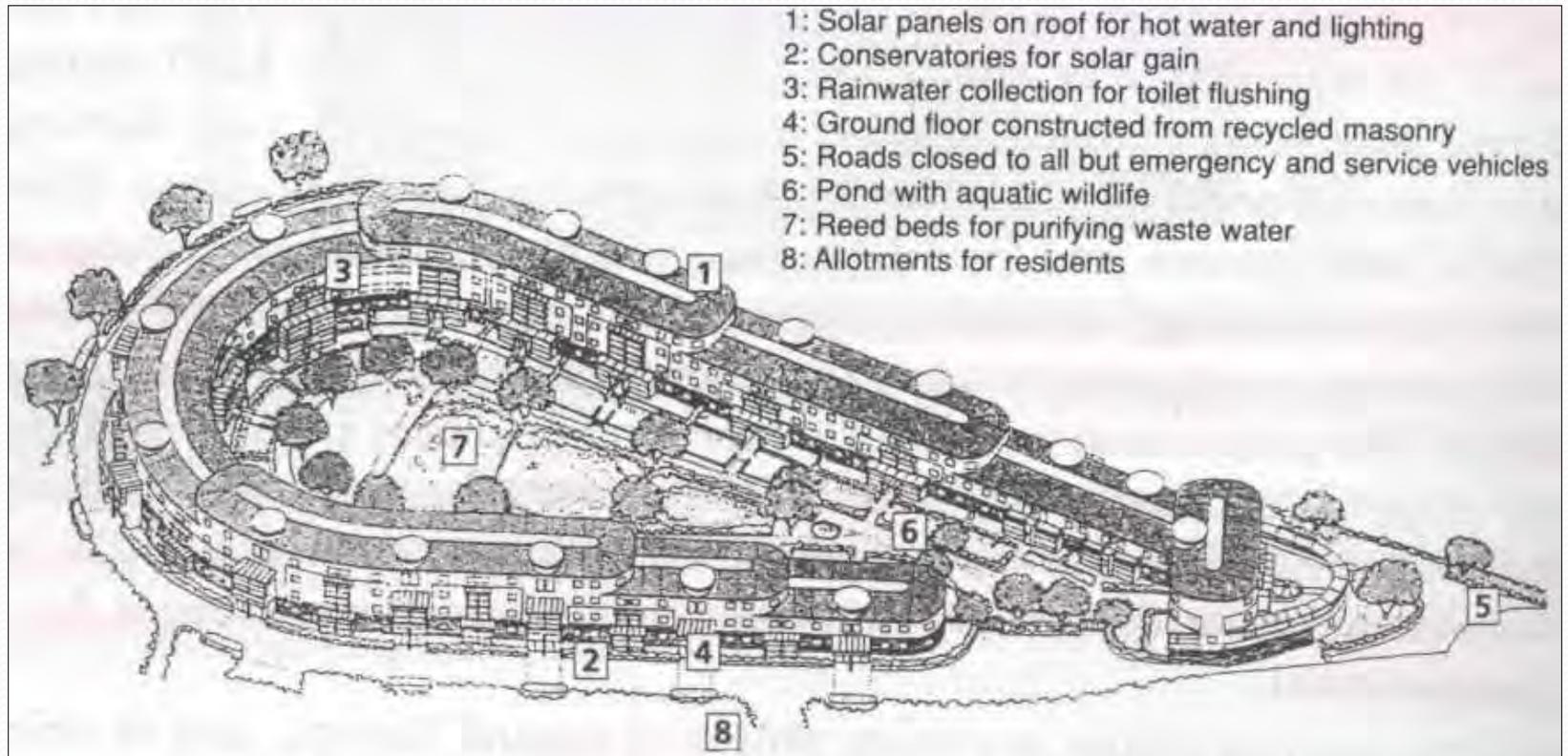
- Compact development
- Multi-modal transportation
- Public transportation
- Bicycling and walking
- Car sharing



The Ohlone Chynoweth TOD San Jose, California



The Slateford Green Car Free Sustainable Housing Development in Edinburgh, Scotland



Provide multi-modal transportation alternatives like Bogota, Columbia's

- TransMilenio high capacity bus system



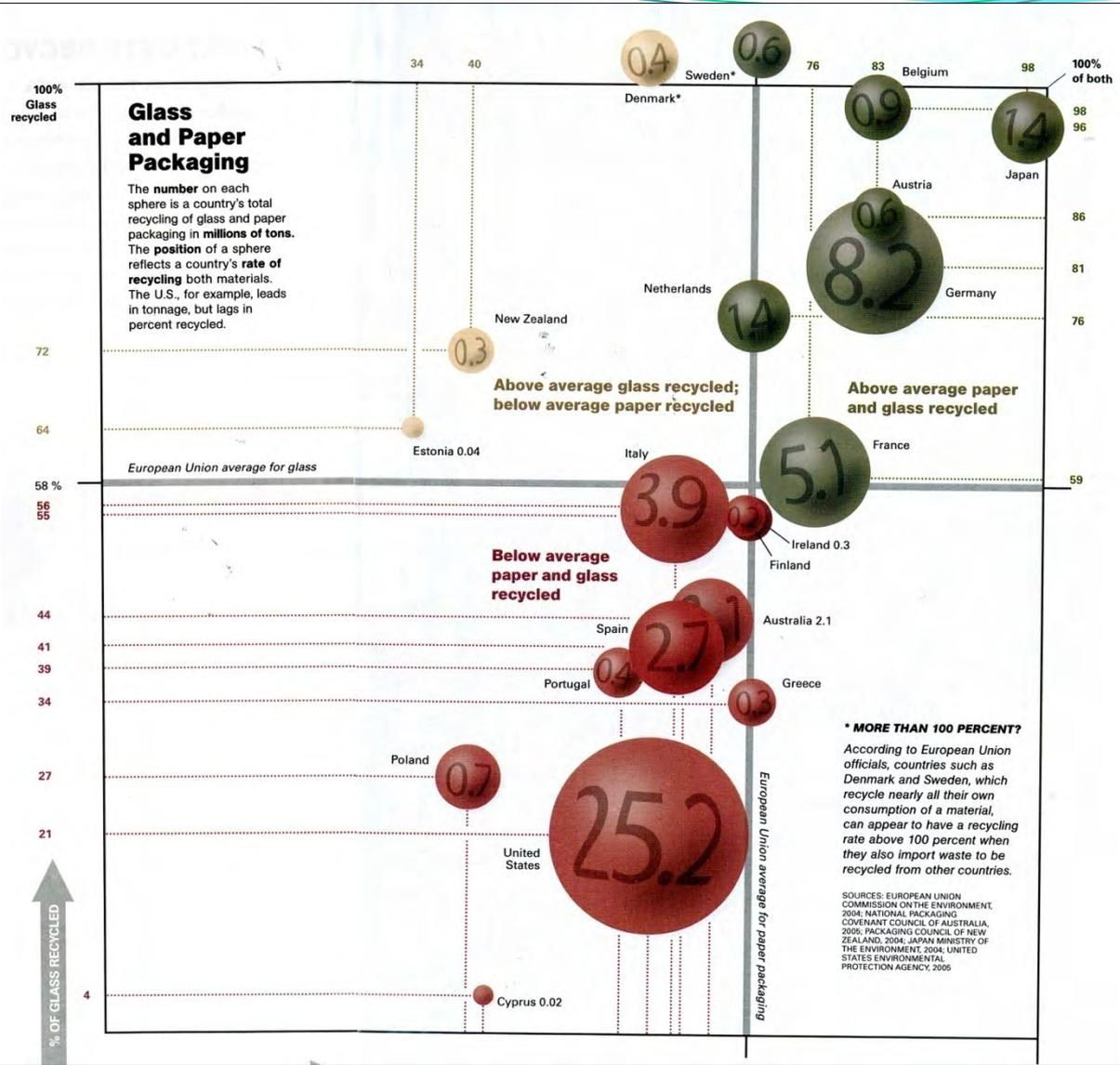
- Ciclovía: Major bicycle-only road system



Recycle

- Where energy used to collect and recycle > energy to produce
- E.g. glass, paper





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Before industrialization: Scottish countryside near Glasgow



Before industrialization: In the 19th century smoke from coal-fired factories and power plants in the England and the United States was a source of pride



The natural environment was similar in American and European slums

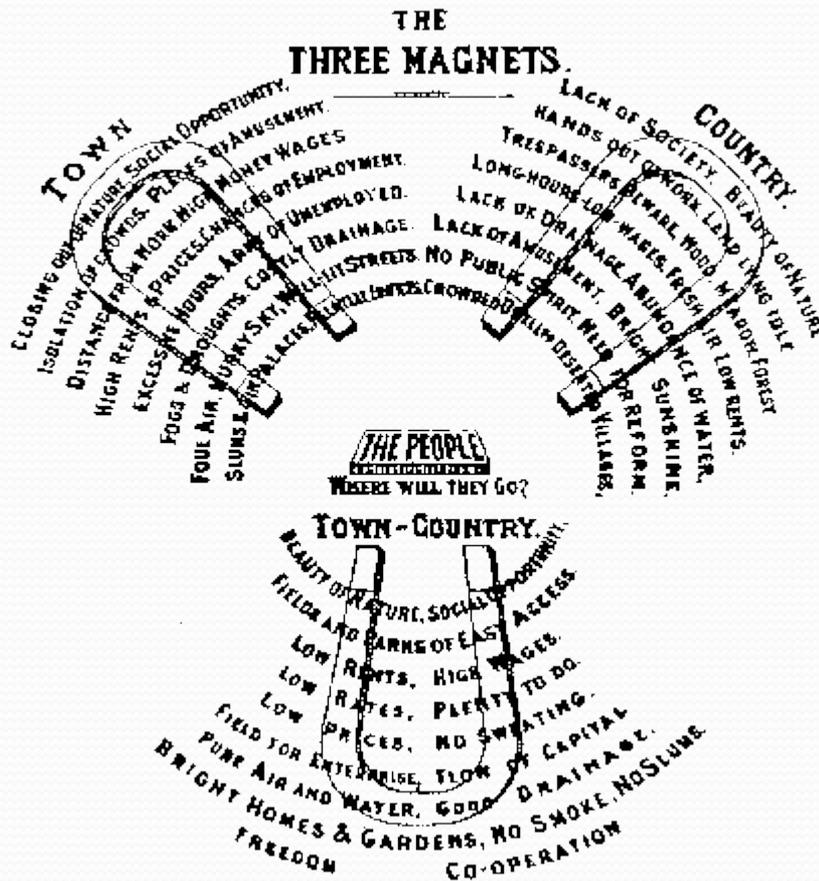
- Air pollution (coal fired factories)
- Water pollution (industrial waste)
- High density and overcrowding
- Poor sanitation (no indoor plumbing)
- Lack of parks and open space
- Destruction of natural resources



Jacob Riis “Bandit’s Roost”
in New York 1888

Social: Ebenezer Howard : Garden city

Ebenezer Howard's famous 3 magnets diagram



1. Town: social opportunities, amusement, high wages... but high rents, isolation of crowds
2. Country: Low rents, beauty of nature, sunshine... low wages, no public facility....
3. Town-Country:...

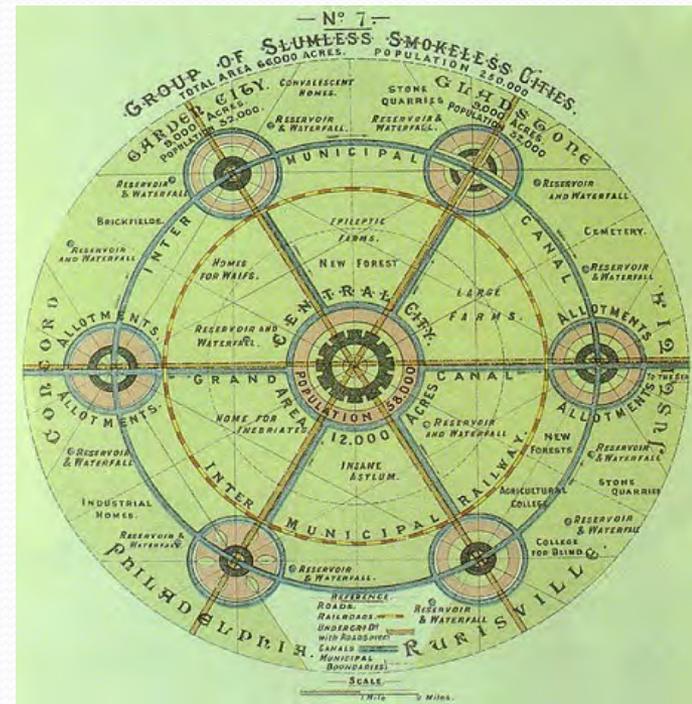
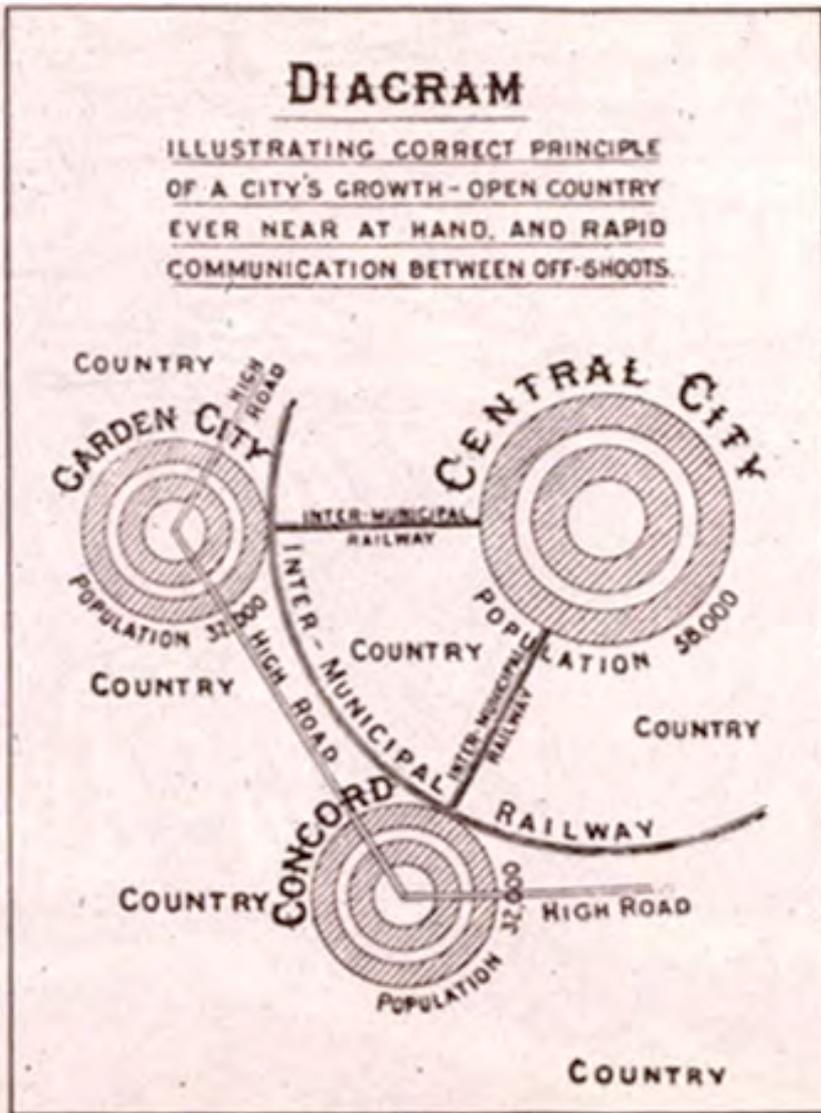
Size:

Central city 58000, land

Garden city 32000, land

Railway connected, and ring
high way system.

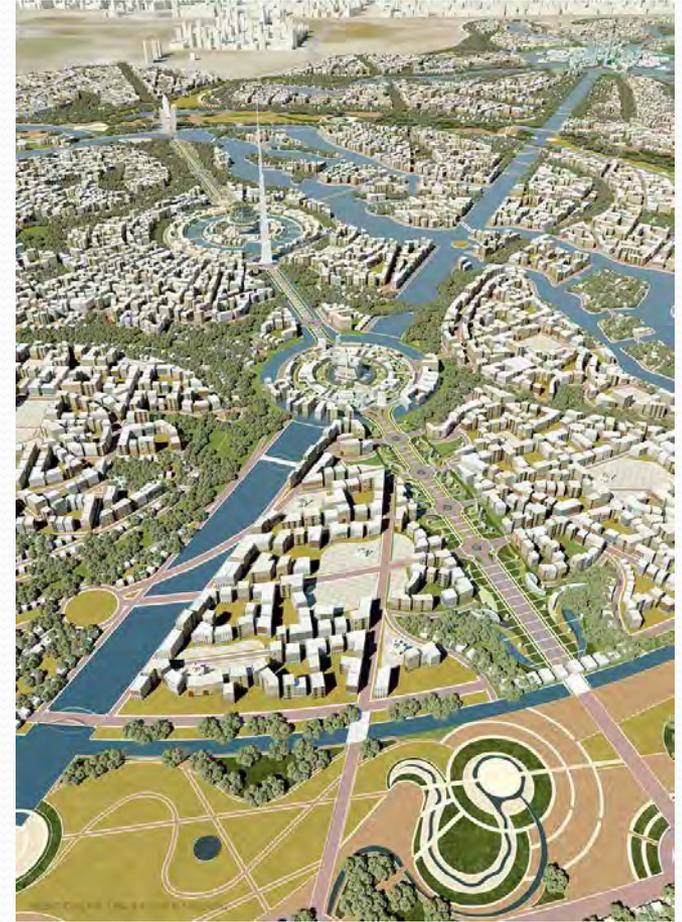
Density for facility.



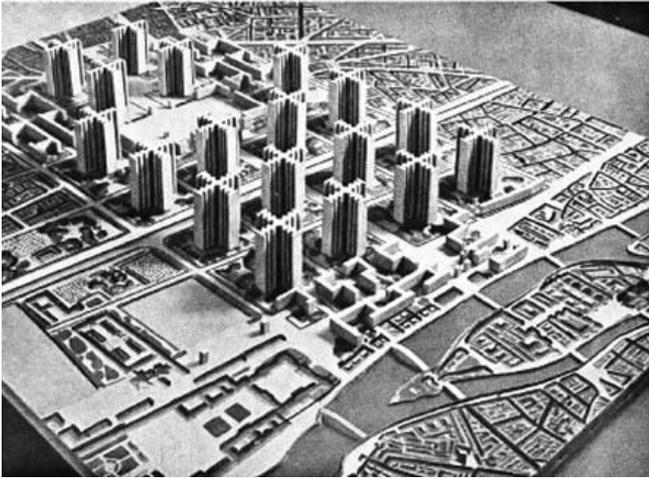
Lin Gang satellite town (Shanghai)



Mohammed Bin Rashid Garden (Dubai)



Ville Radieuse (Radiant City),



18 high density blocks and

- Sixty-story cruciform skyscrapers
- Glass curtain walls on steel frames
- Both offices and upper-income flats
- In large, rectangular parks
- Huge transportation center
 - different levels for buses, trains, airplanes
 - highway intersections
- Segregated pedestrian circulation paths from roadways
- Glorified speed: automobiles and trucks
- Workers housing
 - Surrounding center
 - Zigzag blocks in parks
 - Set far back from the street



Twenty-first century cities' golden ages?



Green Modernism for China?....

- Modernized modernism
 - Build up | decongest center
 - Speed IS essential
 - Efficient | modern materials important
- Can China adapt modernism
 - Designed to avoid flaws
 - Green
 - Humane
 - Fit to Chinese conditions?



Broadacres



American settlements would be organized around a network of highways and (underground) power lines, with each citizen-farmer tending to his own acre.

All important transport is done by automobile and the pedestrian.

In a sense it was the exact opposite of transit-oriented development. There is a train station and a few office and apartment buildings in Broadacre City, but the apartment dwellers are expected to be a small minority



Urban sprawl



The impact of automobiles on the mode of production, urban form and culture



- Rees calculated in 1996 that if everyone lived like North Americans it would take two more planet earths to produce the resources, absorb the wastes, and maintain life.
- The situation is rapidly becoming worse in both the developed and developing world



Figure 5. *Wanted:* two (phantom) planets. If everybody lived like today's North Americans, it would take at least two additional planet Earths to produce the resources, absorb the wastes, and otherwise maintain life-support. Unfortunately, good planets are hard to find. . . .

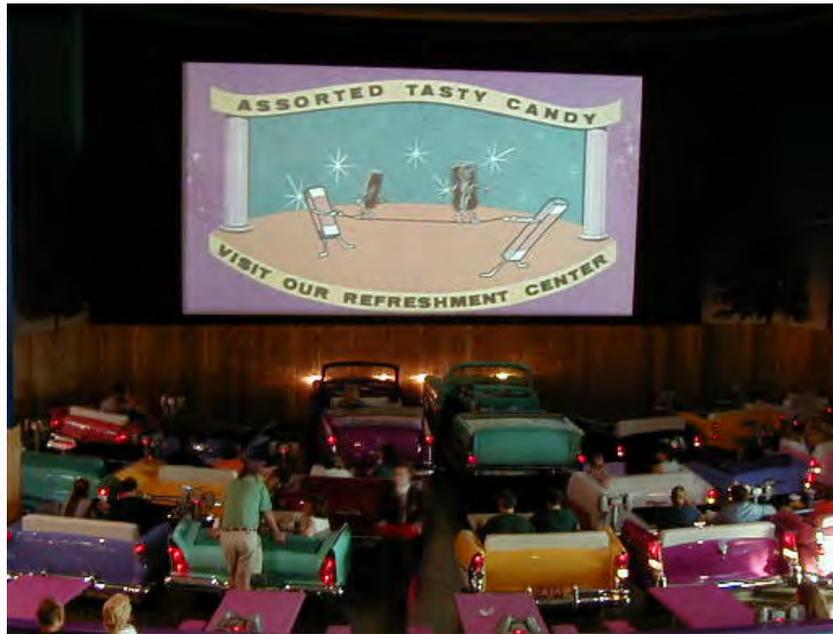
Source: Illustration by Phil Testemale.



INTERCHANGE BETWEEN THE 5 AND 110 FREEWAYS, Los Angeles, United States (N 34°02' - W 118°16')
<http://www.garvanthubertland.org>



Contemporary culture of drive-in America



Mall



Drive in church



Sustainable Urban form: Development of urban compaction policy

In the compact city- a very high density scheme, it assumed that in a climate-controlled interior, travel distance between horizontal and vertical destination would be very low, and energy consumption would be minimized. ----Dantzig and Saaty (1973)

The passenger's transport is a potential part to reduce green house gas emission cause it indicates that perhaps 10%-15% saving in fuel use in passenger transport might be achieved through land-use changes. These would translate as indicated 10%-15% cut in carbon dioxide emissions. (Rickaby et al. 1992).

Evidence shows the pattern of travel shift can reduce green gas emission. In the UK, the passenger transport sector the car is the dominant mode, account for 48% of journeys but over 90% of energy consumption. Conversely, walk and bicycle account for nearly 40% of journeys but under 1% of energy use. (Banister 1992)

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Berkeley Integral Urban House

- Pioneering model by Berkeley visionaries 1969
- Sym Van der Ryn and others
- 1/8 acre lot in Berkeley
- Raised food: vegetables, chickens, rabbits
- Solar heat
- Recycling | reduced waste
- Innovative technologies



Early experiments led to small green developments

- Green fingers collect stormwater (no conventional stormwater collection)
- Narrow rear-access streets
- Solar siting
- Bicycle paths
- Fruit trees and edible landscaping
- Community garden
- 300 Almond trees



Village Homes Davis California

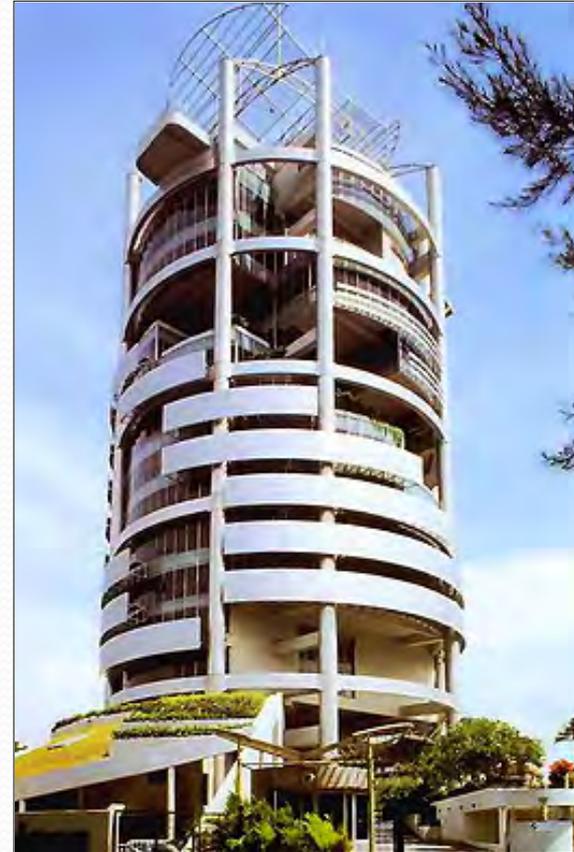
Adelaide EcoVillage (Christie Walk) Australia

- Energy-efficient:
active and passive
solar
- Stairwell ventillation
- Recycled materials
- Rooftop garden
- Access to public
transportation



...The larger buildings

- IBM Headquarters
- Exterior permeable:
allows air and natural
ventillation
- Vertical landscaping:
thermal buffers
- Sun-shaded roof with
gym and pool



**Menara Mesiniaga bio-climatic
skyscraper Kuala Lumpur, Malaysia**

...And ecological neighborhoods

- Transit-oriented development (TOD)
- Bicycle lanes
- Recycles storm water
- Solar and wind power
- Ecological farm
- Huge collective hot water tank warms children's play area



**Kronserg Ecological District
Hannover, Germany**

Beddington Zero Energy Development (BedZed) London

- Mixed live/work space
- Built on reclaimed sewage works
- Almost all local materials
- Photovoltaic cells for electric cars



Green roof – Chicago City Hall

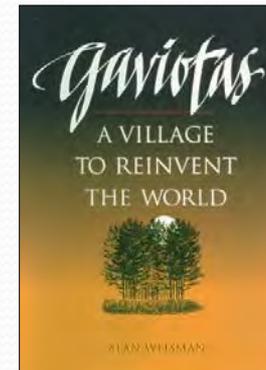
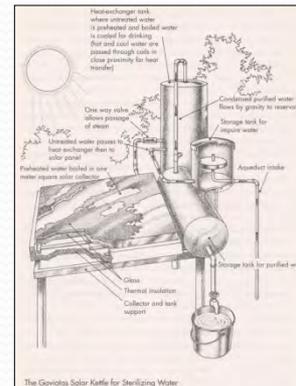




COURTESY STUDIO INVISIBLE

...and ecological development in developing countries

- Model ecological city
- 16 hour jeep ride from Bogota
- 20,000 acres of new forest
- Methane from manure powers hospital
- Small windmills
- Hydroponic farming
- Bicycle-based transportation system
- Innovative engineering (notable water pump)



Gaviotas, Colombia

Tongji and Shanghai will be models for large cities

Google Image Result for <http://www.green-shanghai.com/images/map.jpg> - Microsoft Internet Explorer provided by America Online

File Edit View Favorites Tools Help

Address <http://images.google.com/imgres?imgurl=http://www.green-shanghai.com/images/map.jpg&imgrefurl=http://www.green-shanghai.com/&h=1153&w=1701&sz=253&hl=en&sz> Go Links >>

Search Mail IM Blocked: 51 Yellow Pages Maps Shopping Quotes Weather Movies

Google  [See full-size image.](#) www.green-shanghai.com/images/map.jpg 1701 x 1153 - 253k [Remove Frame](#) [Image Results](#)



ecobuild
shanghai 2006 上海·汉堡生态建筑展

background partners objectives projects ecobuild review technology guide infos press contact

走向生态城市创造美好生活 上海和汉堡的合璧



A joint effort of Hamburg and Shanghai on the way to „better city, better life”

 [chinese version](#)

ecobuild shanghai 2006, a cooperation project between the cities of Hamburg and Shanghai, featured a two year long awareness raising campaign towards ecological building concepts. It resulted in an exhibition of buildings projects, showcasing innovative techniques and technologies in various building types in several districts of Shanghai. Projects still in the conceptual phase will be pursued.

sustainability partners



Bayer MaterialScience



BASF
The Chemical Company

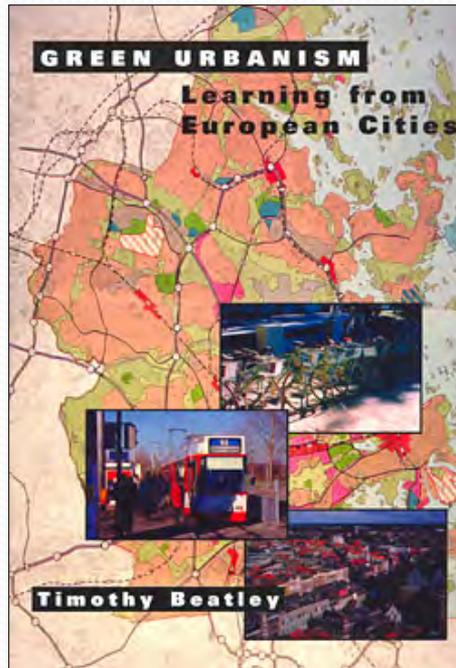
Internet

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Green politics are increasingly important

- Green parties elect officials
- Important in some European countries
- Less important in U.S., except
 - Liberal states
 - Liberal communities



Summer and Fall: Seasons of Protest



Green Politics

Volume 12 - No. 5 A Publication of the Greens/Green Party USA

Fearless Cindy Sheehan Speaks Out!
■ Anti-War Activist Mother Continues to Spread Message of Truth to BushCo On the Fruitless Nature of War and the Quagmire in Iraq

By Cindy Sheehan

October 2005
The potluck in DC found me in many offices of our elected officials: Senators, Congressmen, pro-war, "anti-war," Democrat, Republican. With a few notable exceptions, all of our employees look pretty lame.

Thanks to those who met with me, because, except for Senator Barbara Boxer (D-Calif) I was not their commitment. And I believe the Republicans who met with me, whether they knew it or not, were breaking with their leader on this since he was too cowardly to meet with me.

The "We Have to Fight" made my skin crawl. They're obviously are supporting a war that is not in our nation's best interest nor is it making us richer. I heard from Senator Dole (R-NC) and McCain (R-Ariz) and Representative Khazim, McGovern (R-CA) about 9/11 and

"Fighting them over there, so we don't have to fight them over here."

That made me sick.

George Bush and his lying band of imperialist greed-mongers exploited 9/11 and our national terror of other terrorist attacks to invade a country that had nothing to do with the attacks on our country. Now, in the aftermath of those lies, tens of thousands of innocent Iraqi civilians are dead, and almost 2000 of our brave young men and women

What makes the Iraqi babies and families less precious than ours? The same that these people committed was being born at the wrong place at the wrong time. George took his war of terror to their doorsteps. I even asked Senator Dole when she thought the occupation would be able to end, and she

Continued on Page 3



Also spending most of the summer at Camp Casey outside President Bush's Crawford, TX Ranch, Cindy Sheehan brought her message of peace to others throughout the US. In the above members of the Green Politics Staff present that inspired one of Cindy and the events covered.

Major political influence in the Netherlands

Nieuwland solar
suburb
Amersfoort,
Netherlands



- 85% of buildings face south
- Everything within walking distance
- Photovoltaic and solar hot water panels

...and in Curitiba, Brazil

- Fast-growing city of 1.7 million people
- Architect Jaime Lerner led plans starting in 1968
- High volume bus system
- Pedestrianized streets
- 52 square meters of park and open space per capita
- Sophisticated recycling





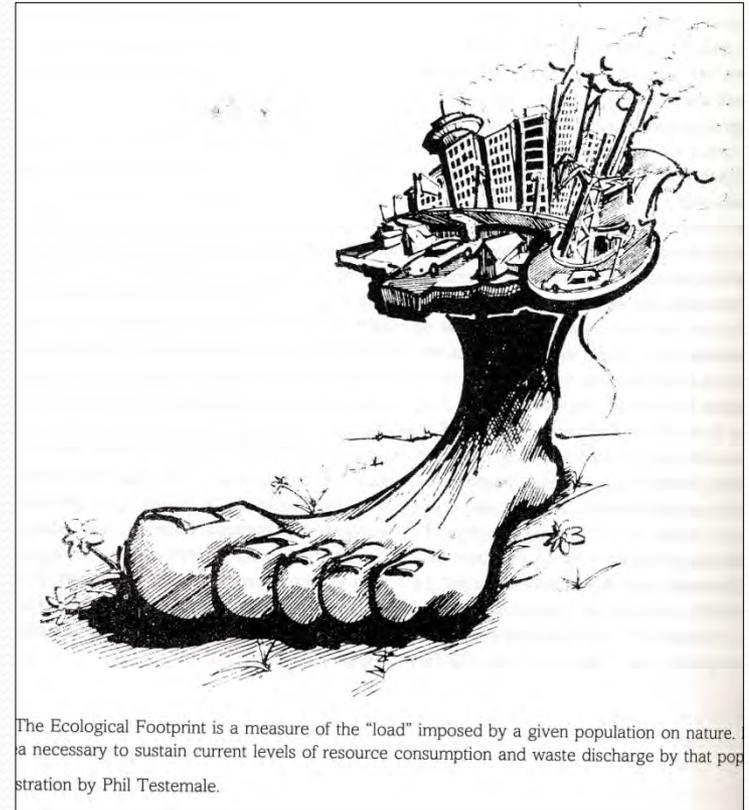


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Ecological footprint analysis

- Developed by Professor William Rees at University of British Columbia
- Idea: development leaves footprint on the earth
- The footprint size depends on resource consumption and pollution patterns
- Goal is to reduce footprint
- Analysis can be done at different scales
- Helps planners and citizens visualize development impact on land and resources



The Ecological Footprint is a measure of the "load" imposed by a given population on nature. It is the area of land necessary to sustain current levels of resource consumption and waste discharge by that population. Illustration by Phil Testemale.

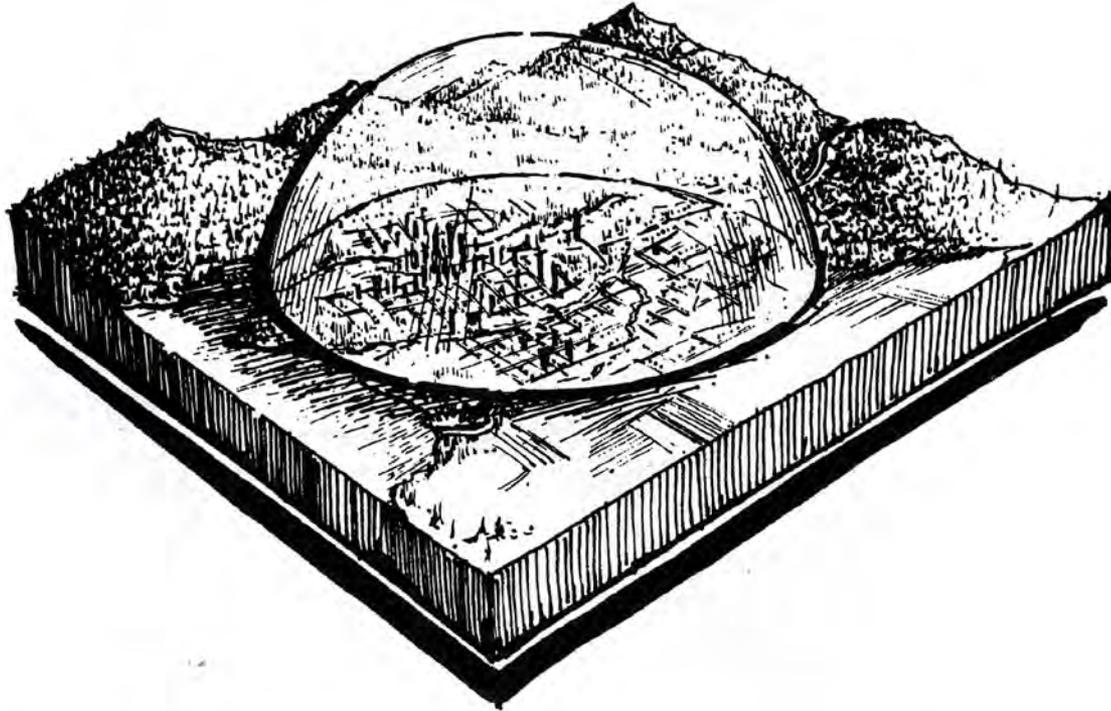
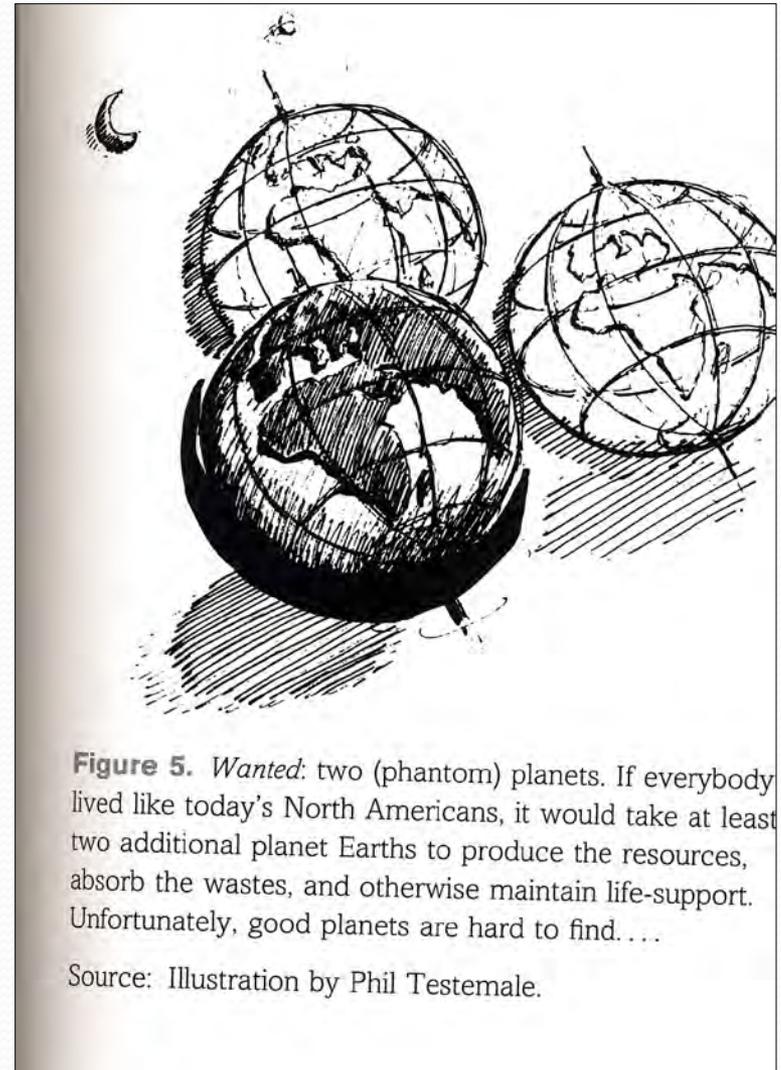


Figure 2. Living in a terrarium. How big would the glass hemisphere need to be so that the city under it could sustain itself exclusively on the ecosystems contained?

Thinking Globally

- Rees calculated in 1996 that if everyone lived like North Americans it would take two more planet earths to produce the resources, absorb the wastes, and maintain life.
- The situation is rapidly becoming worse in both the developed and developing world



Cool California Carbon Footprint Calculator

1. Start with your home economic information



City or Region

San Francisco Bay Area



How many people live in your household?

four



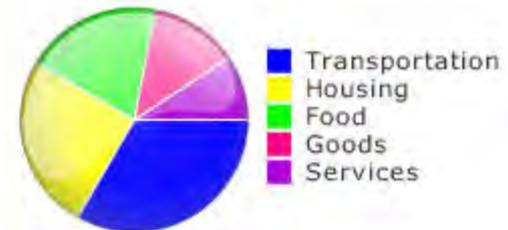
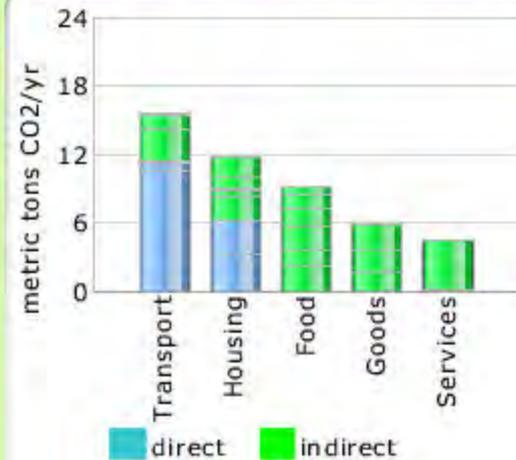
What is your gross annual household income?

\$60,000 to \$79,999

This info can not be viewed by others. [Learn more](#)

- Click "Transportation" or other links at top to continue
- Then, either keep the "default" values or enter your own

Your Footprint: 47 tons CO₂/yr



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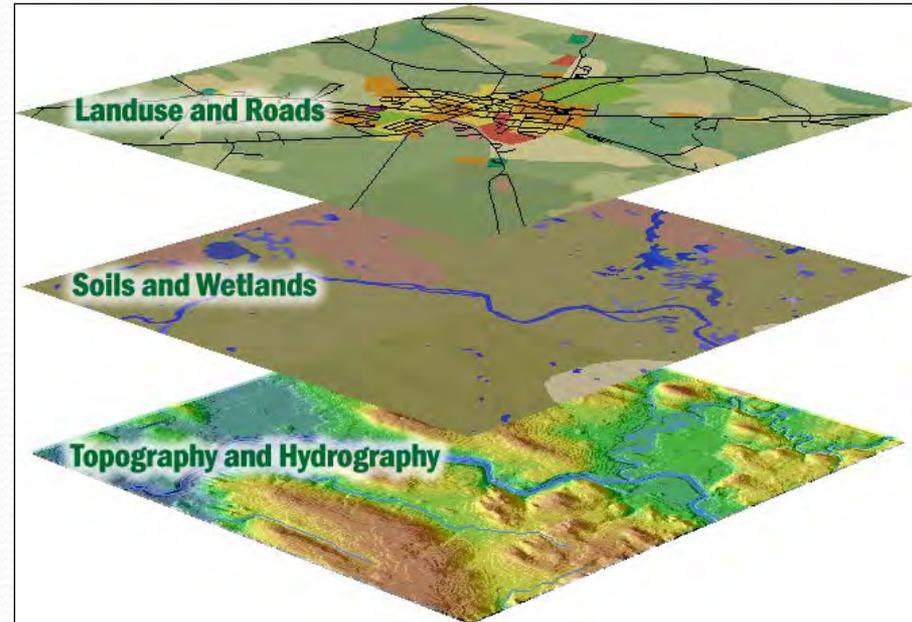
Ian McHarg 1920 - 2001

- From Glasgow, Scotland
- Educated in Landscape Architecture at Harvard
- Professor of Landscape Architecture at University of Pennsylvania
- Author of *Design with Nature* (1970)



McHargian analysis

- Create layer of valuable natural environmental features on transparent sheets of plastic
- Add additional layers
- Conserve darkest areas (most valuable environment)
- Build in clearest areas

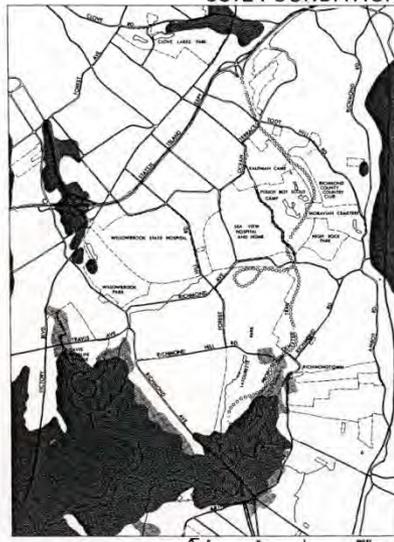




SURFACE DRAINAGE



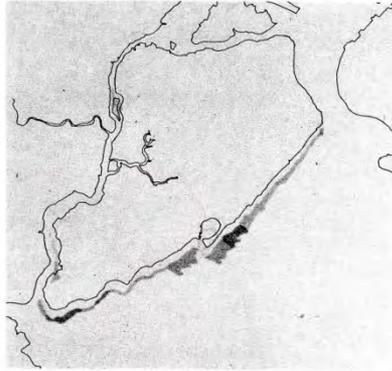
SOIL DRAINAGE



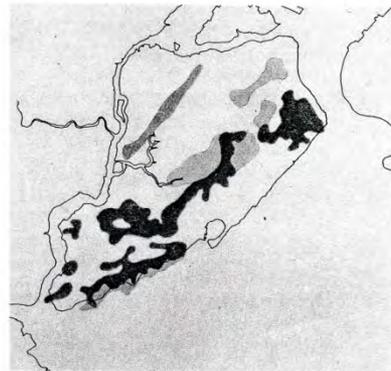
SOIL FOUNDATION



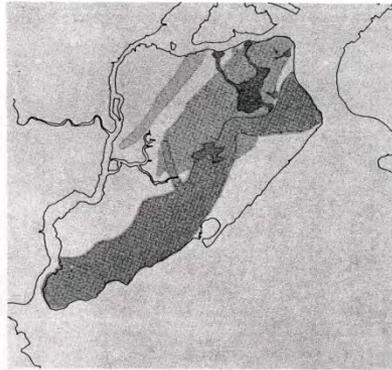
SUSCEPTIBILITY TO EROSION



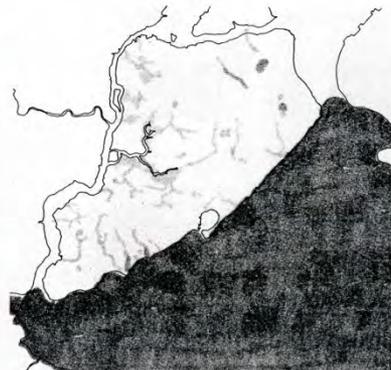
INTERTIDAL HABITAT VALUE



SCENIC VALUE (LAND)



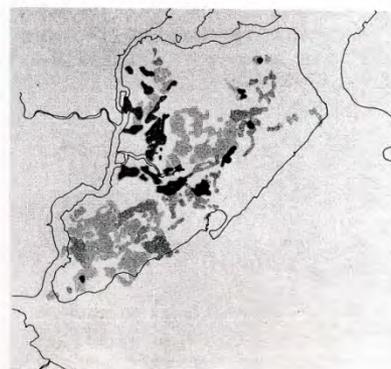
GEOLOGIC FEATURES VALUE



SCENIC VALUE (WATER)



PHYSIOGRAPHIC FEATURES VALUE

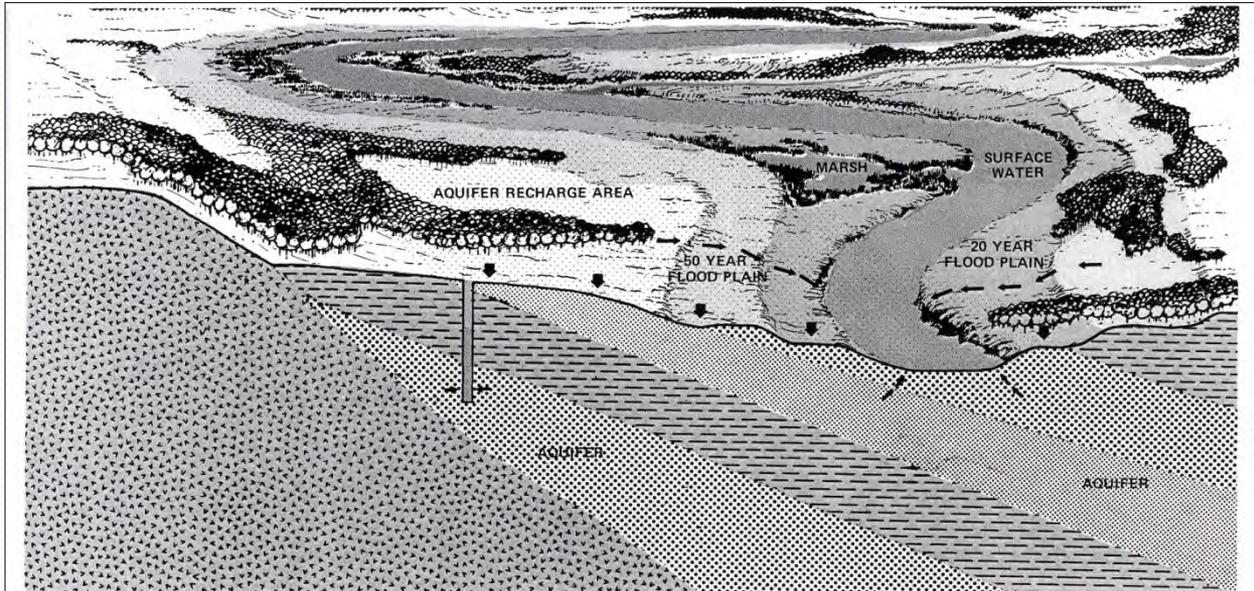


ECOLOGICAL ASSOCIATIONS VALUE



URBANIZATION AREAS

McHarg focused on bioregions (not cities)



WATER FEATURES



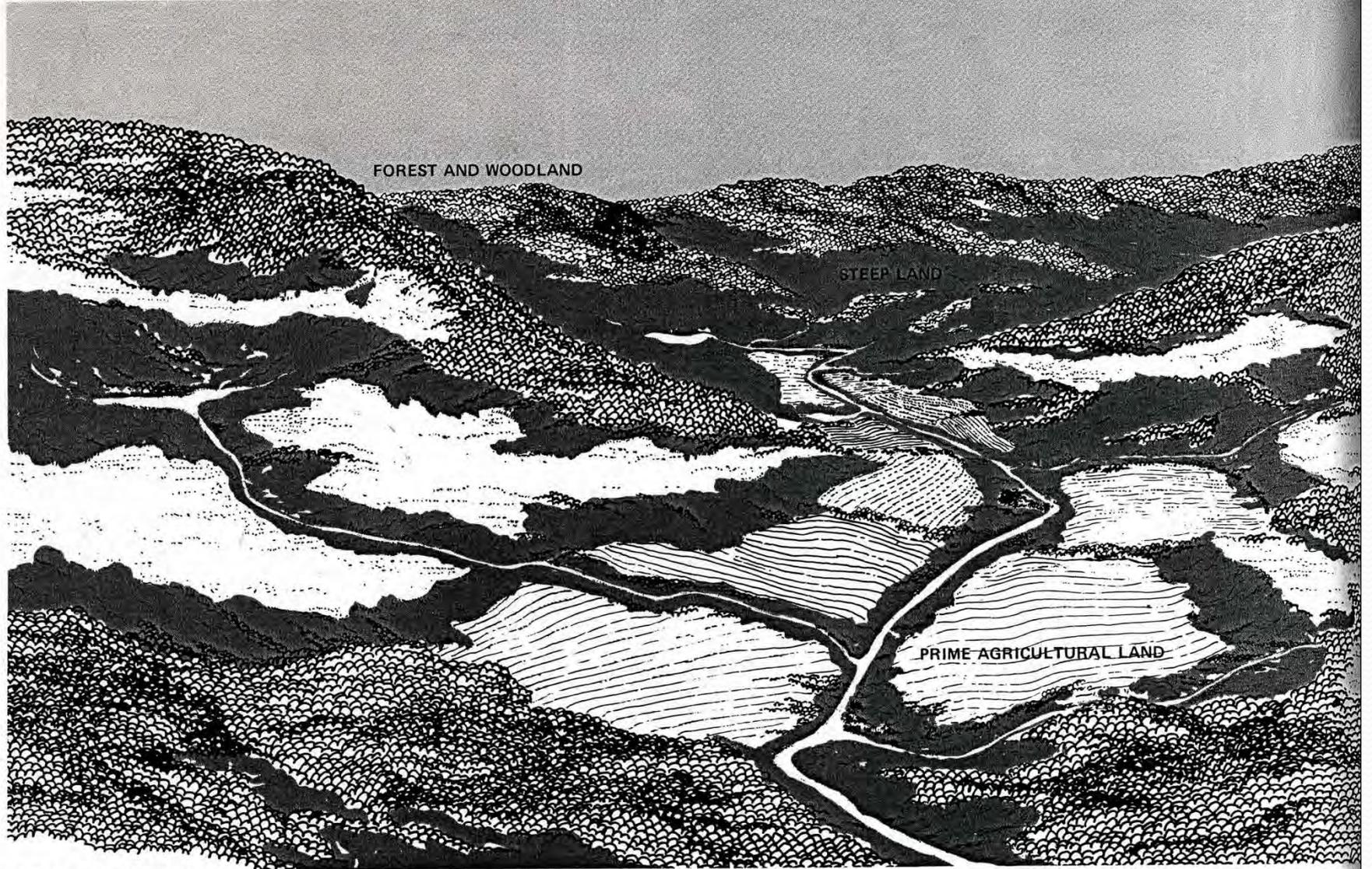
SURFACE WATER



MARSHES



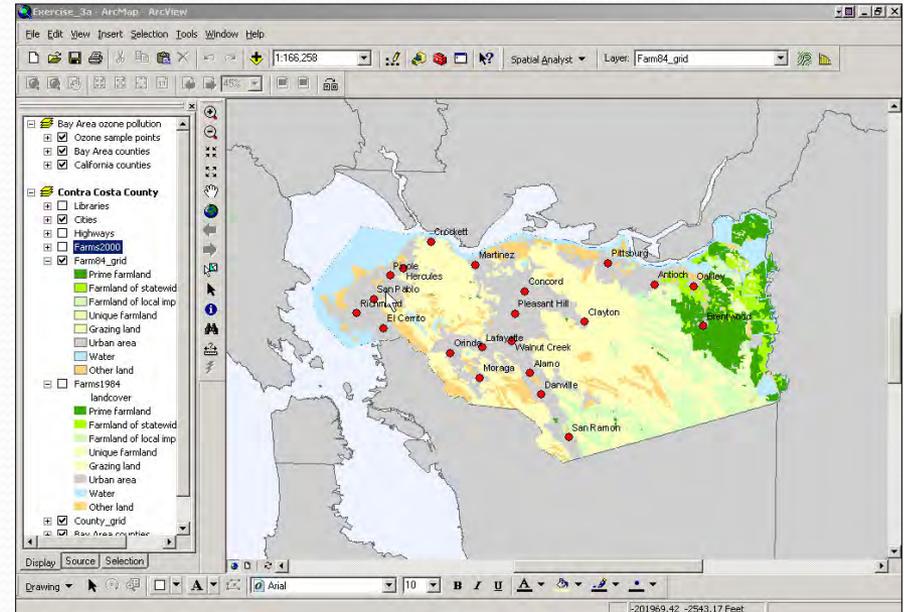
FLOODPLAINS



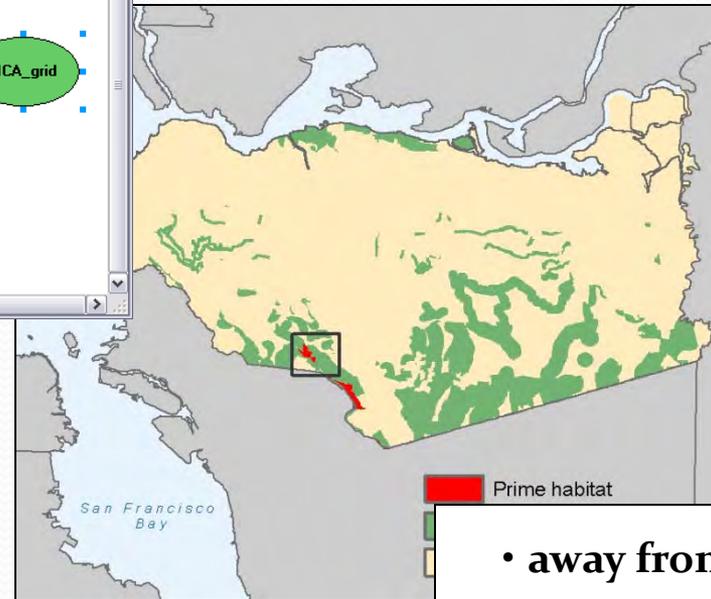
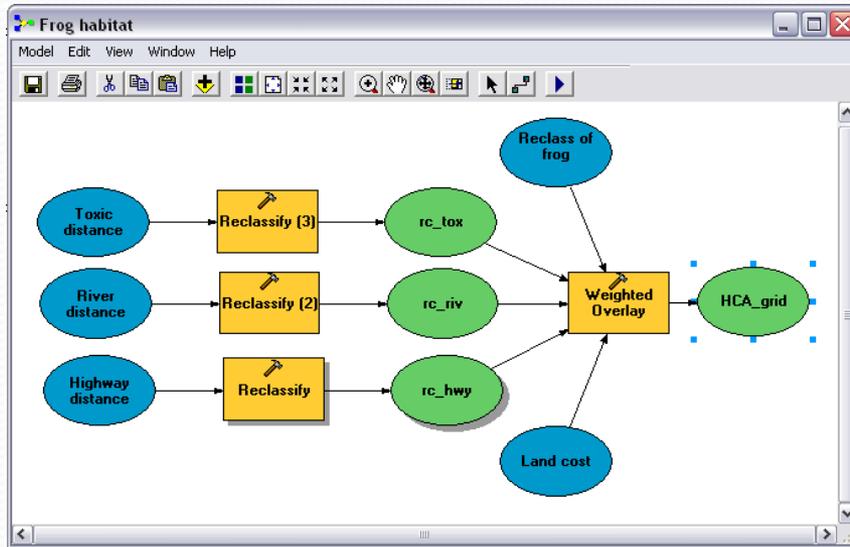
LAND FEATURES

GIS makes McHargian analysis easier

- Digital data is stored in layers
- Digital layers can be overlaid
- Computers can easily analyze relationships among multiple layers



A McHargian *Suitability Model* show the suitability of an area for some purpose



Red areas in this map show areas in Contra Costa County suitable for red-legged frog habitats because they are:

- away from toxic sites
- near rivers
- Away from highways
- Habitats frogs like
- On inexpensive land

Adapting *Design with Nature* theory and practice

- Planners and architects can learn from landscape architects
- *Design with Nature* is an important resource
 - Theory: a method of environmental analysis
 - Practice: specific solutions to common problems
- McHargian analysis should often be regional (natural area or city region; not one city)
- GIS is an important tool for McHargian analysis
- McHargian theory and practice can be adapted to meet developing country conditions



Thank you

