III. Environmental Crisis

I. Ecology: the environment is a complex system of mutually interactive ecosystems.

A. Throughout these systems there is a complex interaction between biotic and abiotic elemements.

B. There are no independent parts or isolated parts. Human beings are not outside the ecosystem; it acts upon them; they act upon it in unpredictable, uncontrollable ways

C. Complexity is a value because it enhances stability

D. the effects of human encroachment on these ecosystems by industrialized society has increased 1000x, especially since the 1950s

E. We do not have one single problem; we have a variety

of problems, interrelated

D. World Scientists Warning to Humanity, over 1500

Nobel Prize winners and members of national science

academies, present rate of assault on the environment cannot continue without vast human misery and a planet

so irretrievably mutilated that it will not be able to sustain life as we know it.

F. Worldwatch Institute " not one life-support system upon which the biosphere depends for its existence that is not threatened and getting worse"

G. The Failure of Rio, global environmental conference

1. WSJ congratulated US delegation on keeping the

conference from coming to any substantial

agreement

2. Two treaties

i. biodiversity - US wouldn't sign

ii. greenhouse gases - everyone signed no one

will meet the limits

iii. US kept military out of play, major polluter

in the world, one ton of toxic waste is

produced by the US military every minute

H. US Geophysical Union, 35,000 scientists

I. Kyoto Protocol

I. Land and water

A. Loss of arable land

1. loss of topsoil

a. 24 to 26 billion tons per year lost

2. desertification

a. 5 to 14 million hectares each year (VS '99)

b. Sahara has expanded 81 miles from 1980-90

c. Algeria, Tunisia, Morocco

d. deserts out of rainforests

3. marginalization

a. 50 million acres additional each year that cannot

support farming or grazing

B. Water

1. underground aquifers which provide water for

irrigation are being depleted faster than

a. irrigated land is 17% of land but 40% of

food

b. China, India, souther Great Plains in US

2. Mountain glaciers are melting more rapidly

C. Practices

1. monocrop farming with row plowing

2. overgrazing

3. farming marginal land

4. irrigation

5. oil drillin and mining

6. suburban sprawl

a.Silicone Valley built over the world's largest

continuous orchard, 8,000,000 flowering trees

b. topsoil 40 feet deep

D. Consequences

1. challenges our capacity to feed ourselves

2. one billion people will eventually suffer absolute

water scarcity by 2025 (VS '99)

II. Worlds Forests

A. Destruction of Rainforests and old growth forests

1. lost 1/2 of world's forest since 1960, 2/3rds since

the Industrial Revolution

2. 55,000 square miles a year of rain forest --

3. Global 2000 Report - all forest that is accessible in

Third World will have been cut by 2020

4. Rainforests drying out because of warming and

changing weather patterns

B. Practices

1. burning and bulldozing rainforests

a. timber

b. cattle grazing

c. farming

d. palm plantations and soybean farming

e. roads, damns for mining operations, widening

river channels

f. fuel

2. roundwood for industry temperate and boreal forests

a. 77% used by first world (VS)

b. 2x as much as 1950

c. paper mills - US is leading paper producer and

consumer 330 kilograms per person - 1 kilo African

d. construction

C. Consequences

1. greenhouse

a. forests as carbon sinks

b. don't absorb methane, nitrous oxide, hydro

flourocarbons, perfluorocarbons

2. desertification

3. extinction of animal and plant species

4. smoke cloud from burning forests in Indonesia and

rest of SE Asia, hundreds of thousands of square miles

eight countries

a. air index equal 800 - dangerous - no rating

over 500

b. burned rain forest 1997 8000 square miles

c. 20 million people treated for respiratory

illnesses

d. Orangutangs infections and respiratory ailments

e. burning by agribusiness - 29 large corps

i. clear-cutting for timber

ii. burn brush

iii. huge palm plantations for palm oil,

soaps, salad dressings, desserts

iv. Good Hope co. 15 sq miles a night,

50 mile by 50 mile palm plantations

v. health hazards

vi. Surharto more clear cutting permits

5. 150years to 1000 years depending upons how it was destroyed

6. leaves exposed parts of forest more susceptible to

destruction, i.e., Hurrican Mitch

7. can't burn the forests without destroying broad

ecosystems

8. Paper production is 3rd most toxic industry and creates 38% of municipal solid waste, chlorine, dioxin, arsenic

1.Mitsubishi is largest destroyer of rainforests,

a. operations on most continents, where

it destroys forests, cultures, broken

international law, evaded taxes

b. Penan, Kayan, Kenyan, Kelabit, and Iban

peoples have fought to save their homelands

c.. Alaska Tongass national forest, laws

violated antitrust, environmental, labor

d. Alberta, Canada 40,000 acres of Aspen

clear cut each year to feed their mill

e. Brazil - mill which purchase illegally cut

timber

f. supports a violently repressiv military

regime in Burma with cash for natural gas

and teakwood

g. Malaysia - attempting to uproot the indigenous people

2. Lack of enforcement and collusion

a. Headwater groves - old growth redwood forests

i. $480 million to Pacific Lumber 4x, cited

over 200x for violations

ii. 10,000 acres, not old growth, some already

clear-cut, second growth stands, 40% ogrowth

iii. could have stopped logging with Endangered Spiecies ACt

iv. instead granted him a by on EDAct

for 211, 000 acres

v. allowed to destroy habitat of 36

wildlife species

vi. continue logging on steep slopes

b. Fisher family

i. the Gap, Banana Republic, Old Navy

ii. Mendocino Redwood (formerly Louisiana Pacific) - director on National

iiiResource Defense Council

iv. owns over 1/2 of all

v. liquidation logging

clearcutting

toxic herbacides

vi. 2x sustainable rate

vii. habitat for endangered species

viii. $300,000 political contributions buys ok

from Dept of Forestry

3. Suriname

a. poor country with rain forests

b. pressured by TNCs to sell, use bribery of officials

c. $28 million to corporations only $2 million to

Suriname

a. no reforestation

b. no monitoring

c. displace three indigenous people

III. Species Diversity

A. Great extinction

1. 1.5 million categorized species, perhaps as many

as 30 million, mostly in rain forests

2. background extinction rate 1 species every few years

according to text over 1000 per day due to human

B. monoculture - loss of food diversity

1. India 30,000 strains of rice 10 by 2005

2. US only 7 varities of corn, 9 of wheat

3. Third world 1 acre a 100 different varieties of

crops and strains of potatoes

C. birds of prey, birds and insects, pollination

1. 9600 bird species, 1000 face extinction,

and 70% declining

2. 50 million songbirds on the dinner table in Italy

3. increase in concentration of pests

D. Fish

1. 73% of world's major fishing areas and 70% of major

fish species are at peak production or decline

2. on Ca coast some species have declined 90%

since 1960s

3. White abalone down to 1600 from millions could

be first Marine Invertebrate to be Endangered

Species

C. Practices

1. destruction of habitat

2. pesticide use does more damage to the natural

predators than to the pests, in last 35 years pesiticide use has increased 10x, yet crop loses to pests have doubled

3. monocrop farming

4. over fishing and illegal fishing

D. Consequences

1. Not just extinction

2. loss of species diversity weakens ecosystems

3. stability of biosphere is proportionate to complexity

4. Example

a. overfishing pollock, depletion of pollock and

b. 90% decline in sea lion population which

feeds off pollock, designatied Endangered

c. killer whales eat sea lions, so now they eat

sea otters

d. sea otters have declined by 90% since 1990

e. surge in sea urchins

IV. Indigenous People

A. Cultures did and still inhabit the rain forest

1. destruction of the rainforest is destroying their

way of life

2. these people are resisting, in the courts, protests,

etc.

B. Basically they are ignored in mainstream media

1. Americans don't want to know that their life style

kills people

V. Overpopulation

A. Population growth

1. the worlds population is 6 billion with a growth rate of about 1.5 % or 90million per year. The highest rate of growth is in the poorest countries.

2. there is however a disproportionate impact on the environment relative to wealthy countries and poor countries.

3. The problem of hunger is a third world problem where

1.5 million live in abject poverty and 15 million children

die each year

B. Future

1. world's population will increase by one billion in 10

years

2. increasing hunger will put more pressure on land,

farming marginal land, cutting down forests

C. Causes

1. there is a direct correlation between poverty and

fertility, fertility is social security for poor

2. correlation between poverty and the exploitation

of third world's labor and natural resources

3.no "development" poorest 50 countries poorer than

they have ever been, biggest gap between rich and poor

VI. Air Pollution

A. Air pollution, greenhouse effect, ozone depletion

1.400 counties exceed federal air pollution standards

2. 140 million Americans exposed to harmful air each day

3. Carbon and Co2 have created Greenhous effect

4. CFCs have depleted the Ozone

5. 185 studies conclude that air pollution is getting worse

6. US Industry 1.3 billion pounds of toxins earch year

B. Practices

1. auto

a. carbon monoxide, carbon dioxide, nitrous oxide,

CFCs and ozone smog

b. carbon emissions 6.4 billion tons, since 1950

200 billion tons, 1990- 98 US + 11.8%

c. largest jump in global CO2 in 98 since data

was collected

2. coal, oil, and gas power plants and incinerators

a. nitrous oxide and sulphur dioxide

3. industrial plants and incinerators

a. fine particle pollution soot

4. construction

b. coarse particle pollution

5. burning of tropical forests

C. Consequences

1. 60,000 Americans die prematurely of related

diseases respiratory and cardiac, Harvard Medical

School

2. levels 200-400 x greater than Clean Air Act, LA and Orange county - cancer causing no agency affiliated with monitoring air quality released these numbers, it was a congressional study

3. 250,000 children with asthma the leading casue of children being admitted to hospitals

4. China alone 3,000,000 deaths from air pollution

between 1994 and 1996

5. children in India and China unhealthy levels of lead

VII. Greenhous effect

1. Human induced climate change

A. IPCC (Intergovernmental Panel on Climate Change)

B. NASA new record in 1998

C. acceleration of greenhouse gases

D. last decade is warmest in 600 years according

to Nature magazine

2. consequences

a. melting of polar glaciers, Greenland, and Himalyas about 1 meter rise

i. two billion people at risk and the value

and productivity of the land

ii. souther coast of Med, west coast of Africa,

south Asia (India, Bang, maldives), low lying

coral atolls in Pacific and Indian oceans, and

SE Asia

iii. US study on east and gulf coast 1 meter

rise would flood 3.6 million hectares

iv. IPCC study of five east coast LA countries

13.5 million hectares and 750,000 people

v. study: 40-50% of world's remaining wetlands gone by 2080, drainage from ag,

urban sprawl, 1 meter sea level rise

vi. mangrove forests: largest in India, Sunderbans, home to 315 species of birds,

Rhesus macaque, Irrawaddy dolphin, and

Bengal tiger, plus one half million people

c. more violenct weather, storms, hurricanes, warmer air greater moisture carrying capacity

d. 92 billion in weather related damage in 1998

e. El Nino and la Nina bleaching and destroying

coral reefs, ocean temperature rising .3 degrees

C each decade, .5 in tropics

f. Artic

i. 10% reduction in area covered by ice

ii. 40% decline in thickness

iii. could b ice free in summer

E. Ozone depletion

F. WAIT A SECOND --**Government --**

1. EPA lost 1 billion in funding and 750 employees, is only able to collect 20% of fines,

2. govt forced finally by court order to institute new regualtions, not until 2002, actually 2012, decreased standards.

3. Clinton administration, wanted tocut standards 30 to 50% on soot and softer sanctions, decreased ozone standards by 20%, and changed formula for how smog is measured which help major cities get by the standards

4. Arco and Southern California Edison big supporters

5. not even in effect until 2002 then no fines until

2012, 360,000 lives lost

6. Federal judge overturnned

7. American Petroleum Institute, urban smog is no big deal people actually seem to adjust to it

8. REp Tom DeLay, we need to overhaul Clean Air Act and

strip the EPA of its power

G. Gatt and the air

1.The country of Venezuela challenged some of US regulations regarding the our clean air act.

2. A three-judge WTO panel invalidated the US regulation

"WTO members were free to set their own environmental objectives, but they were bound to implement these objectives only through measures consistent with WTO provisions.

3.Therefore we are to pay (that is you and I) Venezuela 150 million per year or change.

VII. Water

A. Water Pollution

1. various contaminants put into water which contaminate it for human use

B. Practices

1 municipalities and industries, between 100,000 and 200,000 dumpdirectly into the sewage system, rivers, or lakes

a. human and animal waste

b. toxic chemicals: lead, asbestos, detergents, solvents, acid, amonia, chemicals,

2. agricultural runoff,

a. pesticides, herbicides, fertilizers,

b. increasingly high concentrations of **animal waste** because of factory farming.

3. Oil spills

Dependence on importing fossil fuels creates the possibitlity of Exxon Valdez.

4. Domestic lawn runoff has extremely high concentrations of pesticides and herbicieds

5. Biological and pharmaceutical waste

6. landfill seeping into ground water

C. Consequences

1. 14 million Americans drinking herbicide laced water

2.1.7 billion in third world do not have safe drinking water, another 3 billion are at risk, high death from cholera, typhoid, dysentery, diarrhea

"The bigest slum in the world maybe Dharavi, a vast shantytown in Bombay, where hundreds of thousands of people live in hovels connected by tiny meandering alleys. Sewage runs in the paths along with the rats."

3. Worst in US is Mississippi river and 150 miles located in Louisiana where 25% of nations chemical industry is located, and the nation's largest polluter (Dow) "cancer corridor" highest rates of cancer and infant deaths

4. Ocean --

a..dead zones increasing chemical pollution

b. neuston .

5 bays - 75% of commercial fishing CA

6. wetlands and estuaries (9%of CAs left)

Surprise -

I. The Black Sea

A. 1972 Dam on the Danube River between Romania and Serbia,

1. generate electricity

2. control the natural floodplain of the river

B. consequences

1. Danube contributes 70% of fresh water and

80% of silicate to Sea

2. silicate is consumed by diatoms, tiny single

celled algae that fuel the food web

3. new silicate is required, but now back behind

the dam

4. simultaneously, increase in nitrogen and phosphorus

pollution from fertilizer runoff and from the sewage

of the 160 million people who live in Black Sea drainage

5. lack of silicate kept diatoms from 'blooming" but not

"red tide" organisms that produce powerful toxins

C. Oops! welcome to globalization

1. jellyfish native to Atlantic accidentally released from

ballast tank of ship

2. ate all the zooplankton which fed on algae

3. red tide boom consumed oxygen on surface

4. no oxygen below 200 meters, below is reservoir of

dissolved hydrogne sulfide gas

5. dead fish - asphyxiated or poisoned

Also, The mollusks, sponges, sea urchins, een the marine worms are disappearing. The shallows, where vast beds of seagrass once breathed life into the waers, are regularly fouled in a fetid soup laced with a microbe that thrives in such conditions: cholera

II. Surprise II - Coral Reefs

A. Reefs are massed calcareous skeletons of millions of coral -

small sedentry worm-like animals that live on the reef

surface, filtering the water for edible debris - tropical and

subtropical water and host plants and animals

B. Second richest biome next to rain forests, 1/4 of all

ocean species, incl 65% of marine fish species

C. susceptible to heat stress and the high sea surface

temperatures (SSTs)

D. bleaching

1. when the temp is to high corral expels aglae that

lives within

2. needs algae to help feed it through photosynthesis

3. 90s and last year 98 most extensive bleaching to date

a. every area affected

b. 70% of coral killed in Indian Ocean along

African coast

E. Consequences

1. crown-of-thorns starfish are eating their way

threw corals

2. overfishing is also aiding this by depleting the

fish that eat the starfish

3. nitrogen-rich agricultural runoff and sewage runoff

promote algae growth

4. algae growth starvs coral of light and colonizes

the coral

5. Jamaica coral reefs, 90% off northwest coast are

algae covered humps of limstone

6. coral diseases 1996 9 of 44 corl species diseased in

reefs off Florida, 1997 28

F. Consequences II the shared ecosystem

1. coral protects narrow band of water between it

and shore - sea grass

2. this sea grass protects coral and is home to 70%

of commercially important fish at one time or another

3. sea grass beds are silting under sediment from

logging, mining, and shrimp farms

4. loss of mangroves in warmer regions, knit sea

and land, trap sediment and stabilize coast lines, roots

are fish nurseries

i. esp devasting in se asia

ii. Indonesia

III. Other surprise

A. Nitrogen pollution has triple the occurenc of low-oxygen

dead zones in coastal ocean waters over the last 30 years

1. tocix algae species 20 to 85

B. Organochlorine pollutants create immunodeficiencies in

marine mammal, viral epidemics

C. hunting birds and primates in tropical forests (Indonesia)

they pollinate flowers and disperse seeds

D. powerful storms which are on the increase spread exotic

plants over wide areas

E. global decline of amphibians, habitat loss, pollution, disease, exotic predators, higher levels of UV exposure

VIII. SOLID WASTE POLLUTION

A. problem: our society of hyper consumerism, built-in obsolesence, throwaway, packaging has created a junk problem

B. extent of problem --

1. each year -- 13 billion tons of solid waste (50 tons) per person, 10 million computers, 220 million tires, and 16 billion disposable diapers (2 % of solid waste). Not currently biodegradable, 3 million tons of untreated feces and urines end up i landills .

2. losing landfill space, for every one opened, four close down, the one NY receives 44 million pounds every day.

3. Also, companies dump illegally in landfills, toxic and hazardous waste, which seeps into groundwater.

4. all landfills leak, with toxic waste seeping into ground and eventually contaminating drinking water and crops

C. Causes

1. to live is to overconsume, profit

2. overpackage, multiple package, plastic (PVC)

3. throwaway consumerism

4. dynamic and planned obsolescence

5. limited recycle

a. 11% of computers recycled

b. monitor 8lbs of lead

c. Motherboard 700 toxic substances, incl mercury,

cadmium, chromium

IX. CHEMICAL POLLUTION

A. 500 million tons of chemicals into biosphere each year

1. 20 million registered chemical with Chemical Abstract Service and 3 new each day

2. 60,.000 in regular use,

3. 80% no info concerning effects on environment,

animals or humans

4. 20% we know about

a. 4.81 billion pounds are toxic

b. 408.3 are known or suspected carcinogens

c. 1.2 billion lbs birth defects

B. These chemicals are ubiquitous, they are used in the production process, they are in the products, they are by-products of the products

1.PCBs in the Hudson

2. Dioxin the supertoxin, should it be regulated

by eliminating PVC from production

a. Not according to the Vinyl Institute, pay scientists to say ($130,000), scientific study is not very scientific

b. The ease with which the EPA accepts self-serving

industry-sponsored research as the basis of its

regulations

3. Love Canal

4. food - richer, moister, preserve - 1000 miles

5. clothes - Tris - in childrens clothing

6. worker exposure

a. 100,000 deaths from worker exposure

b. IBM

7. chemical accidents - Bhopal, India Dec 3, 1984

Union Carbide, US company

a. release of deadly gas from pesticide storage

plant - methyl isocyanate

b. killed 8,000 people, 300,000 injured many

permanentlys

8. before accident

a. own investigating team "serious potential for

sizeable release of toxic materials"

i. coolers not functioning, scrubber system

down, previous leaks

ii. employess not trained

iii. didn't warn down right away when leak

occurred

b. cost benefit, each life worth $85oo, divested

themselves so they didn't have to pay damages

9. Union Carbide in W. V. 221 violations and site of

smaller leak

10. 75% of Americans live close to chemical plant

C. Toxic Waste, EPA, and Profit

1. 1250 EPA super fund to clean up most toxic sites

2. huge profits few results, 10% cleaned up correctly

3. estm that there are really another 10,000 more, total cleanup cost will be 100 billion

D. Military

1. d o defense generates more than 500,000 tons of toxins, more than top 5 chemical companies combines

2. 17,482 sites on 1855 military bases are in non- compliance with federal environmental laws.,

3.97 bases on the EPA superfund list, top 10 weapons contractors name 133x in Superfund sites

4. "sacrifice zones" Nevada Site 51, the Figi Islands

E. Global chemical pollution

1.US corps sells toxic chemicals to third world,

a. 40% of pesticides sold are sold as exports,

b. 15% unregistered.

c. Frequently, the purchasers are multi-national corporations in Third world, Standard Oil of Ca, Ortho, aldine, chlordane and DDT, Nicaragua under Somozan

2. Pay the poor to take our toxic waste, who the world system has made poor, 2 million tons

a. car batteries

b. pesticide plants to India and Egypt, E. subsidizes

its pest ind more than health care

3. One of the sites of greatest chemical contamination, and the possible site of ecological crisis is the US Mexican border and the maquiladorias

a. over 2000 dumping toxic waste, either in

water or ground

b. one of most dangerous environmental sites

in the world

F. Transporting toxic waste **--**  400 spills per year in US alone

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Nuclear Pollution

A. Problem

1. radiation to a certain degree is natural, but the development of nuclear energy has created problems far beyond those anticipated,

2. high level radiation, death, short or long term, cancer

birth defects, liver disease, infections

3. all stages of nuclear production are dangerous

a.radons gas is released just in drilling holes, thousands left uncovered in Arizona, Wyoming, South Dakota

b.uranium tailings are byproducts of minings, left lying around (10 million tons by Colorado river,

130 acres on a flood plane, over a fault zone, leaking into river, near wildlife preserve and

National Park)

c.occupational exposure to workers who make fule rods

d. deactivating

e. accidents

i.. Chernobyl - core meltdown - 20,000

to 100,000 will die of radiation poisoning

from exposure and fallout

much of Europe highly contaminated

fish, agriculture, water, milk

contaminated wheat sold to Africa

contaminated milk in Germany

powedered and sold to Egypt and

Nigeria

ii. Sverdlovsk - accidental explosion, villages

and forests destroyed, cancer in surrounding

areas

iii. St. George Utah

iv. Novaya Zemlya, 1962, most horrifying

nuclear blast, opposed by Sakharov, fall out

heavy in Scandinavian countries

v. Three mile island- partial meltdown

vi. nuclear submarine

vii. Mayak plutonium plant dumping plutonium into Techa river, 450,000 people

effected

C. Nuclear energy as an alternative source

1. so cheap that we would no longer need to meter it

2. (also safe!!! mr. Plutonium is your friend)

3. incredible cost overrns --

4. so dangerous they cannot be insured, US government guarantees limited liability

5. 4 out of 5 plants are in non-compliance with federal safety standards

6. meltdown near populated area would be catastrophe -- 100,000 to 1million, increase in cancer and genetic defects, just like if a bomb went off

7. they are a national security problem, what if someone decides to sabotage one, ooops

8. by year 2000 2.5x more expensive than coal

9. NRC cutting back on inspections

D. Nuclear Waste

1. 477 power reactors world wide, 105 in US down from

111, plus 301 research reactors, some Chernobly types

2. US 80,000 tons of irradiated fuel and hundreds of

thousands of tons of other waste

a. millions of gallons of high level liquid waste,

34 million gallons in aging tanks

b. dangerously radioactive for thousands of years

c. paid Westinghous 500 million

d. process produces a combustible gas benzene

e. knew this from the beginning, kept funneling

money into program

f. $1 billion more?

3. Yucca mountain

a. 77,000 tons for 10,000 years