

Economic Implications of Not Taking Action to Address Climate Change

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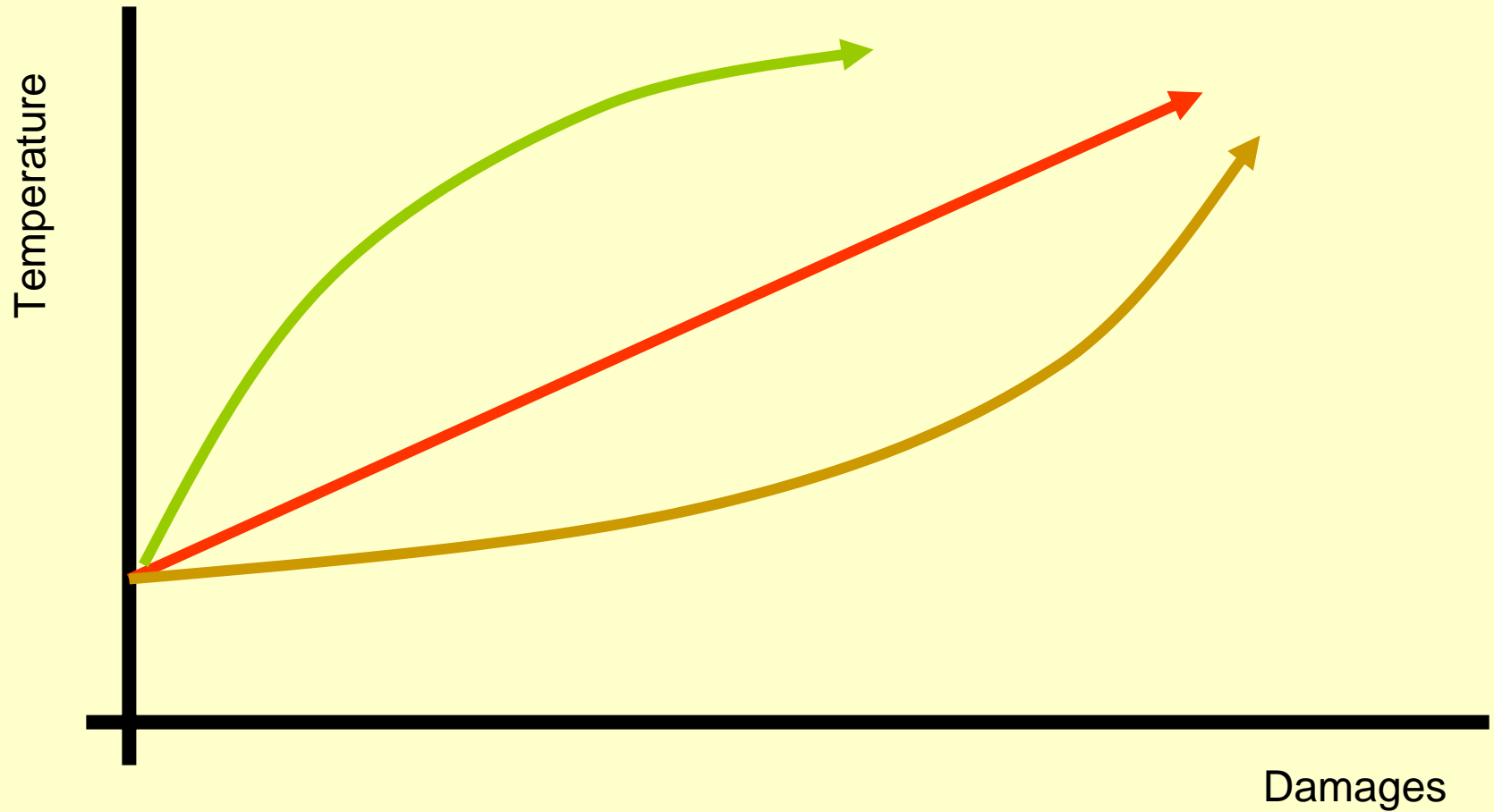
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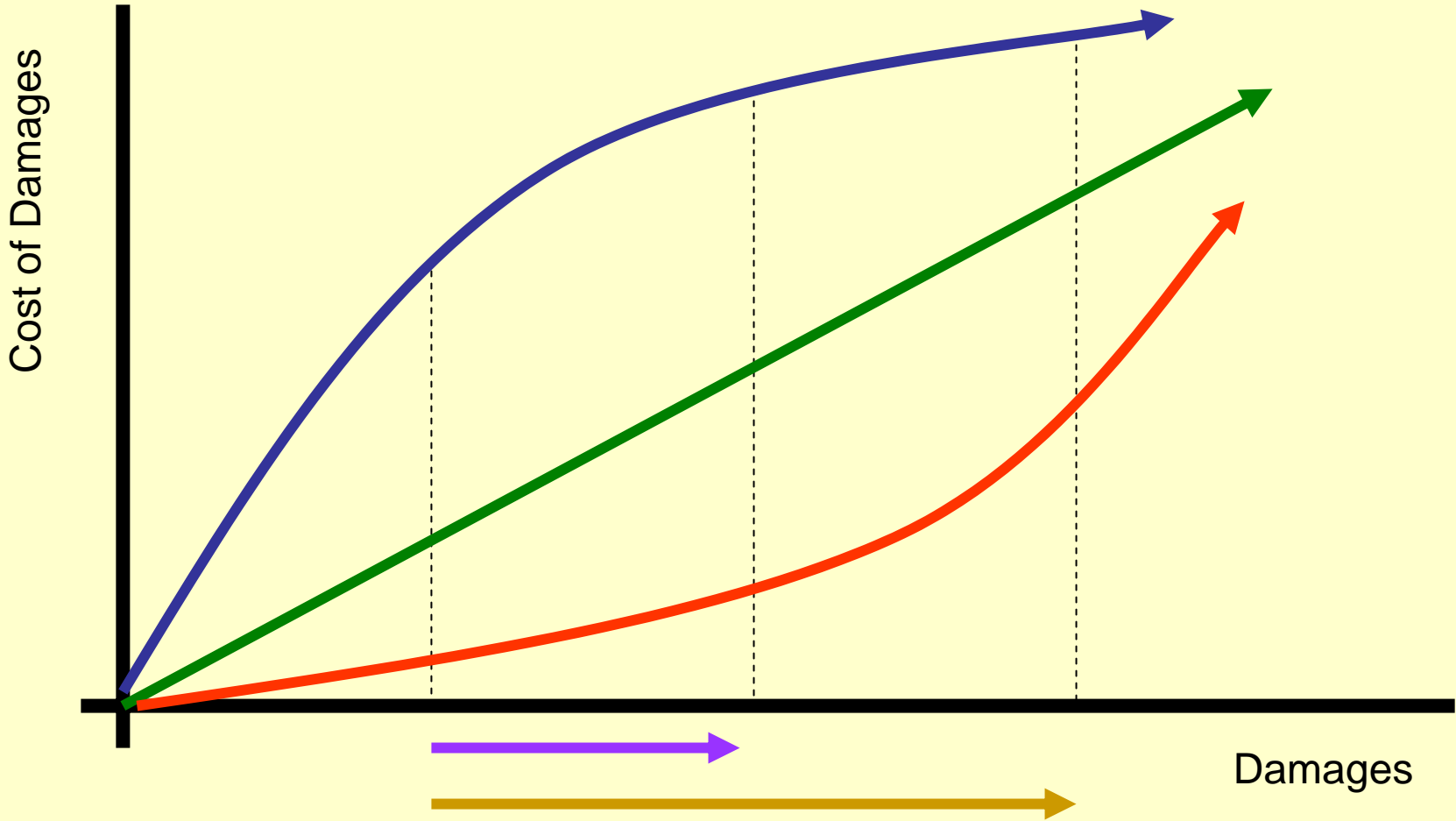
Outline

- Economic uncertainty
- Partial list of potential impacts
- Valuation of potential damages

Damage Function



Valuation Function



Potential Damages

1. Human Health
2. Environment
3. Agriculture
4. Forests

Valuation Methods

- Back of the envelope calculations (i.e., benefit transfer)
- In response to the economic uncertainty, the magnitude of damages are estimated as an annual 1% change
- Damages can be scaled up (or down) by multiplication [assuming linear damage functions] (e.g., 10% = 1% × 10)
- 2005 dollars

Human Health

- Heat-related deaths
- Storm-related deaths
- Non-melanoma skin cancer
- Drinking water
- Others

Heat-related deaths

- Scenario: increase in annual heat-related deaths

Total deaths (1977-2001)	161
Annual deaths	6.71
Each 1% change	.0671
Value of statistical life	\$4.54 million
Damages	\$304,634

Sources: Mirabelli and Richardson, AJPH, 2005; Blomquist, REH, 2003

Storm-related deaths

- Scenario: each 1% change in storm-related deaths
- VSL = \$4.54 million

Hurricane	0.091 (more deaths)
USCG search and rescue	1.74 (fewer lives saved)
Damages	\$8.31 million

Sources: NHC; USCG; Blomquist, REH, 2003; Dumas and Whitehead, ASU, 2005

Non-melanoma skin cancer

- Scenario: annual “defensive expenditures” required to offset increases in UV-b
- 8.5 million NC residents
- 72% white

Year	Damages (millions)
2010	\$25
2020	\$53
2030	\$96
2040	\$155
2050	\$250

Source: Murdoch and Thayer, JEEM, 1990

Drinking Water

- Scenario: NC households experience a drinking water contamination episode for 1 week

Households	3.1 million
Each 1% change	31,000 households
Defensive expenditures	\$6.5
Damages	\$201,140

Source: Whitehead and Van Houtven, ECU, 1997

Environment

- Wetlands
- Tourism
- Commercial fishing
- Hurricanes
- Biodiversity
- Others

Wetlands Loss

- Scenario: coastal wetland loss due to sea level rise

Coastal wetlands	5.42 million acres
Each 1% change	54.2 thousand
Value per acre	\$70
Damages	\$3.79 million

Sources: USGS; Woodward and Wui, EE, 2001

Tourism

- Scenario: beach erosion causes a reduction in beach days

NC Beach Days	28 million
Each 1% change	280,000
Value per day	\$23
Damages	\$6.44 million

Sources: NSRE 2000; Bin, et al., MRE, 2005

Commercial Fishing

- Scenario: loss of commercial fishing dockside value

Annual ex-vessel finfish value	\$44,486,485
Each 1% change	\$444,865
Annual ex-vessel shellfish value	\$71,138,977
Each 1% change	\$711,390
Damages	\$1.16 million

Source: Dumas and Whitehead, ASU, 2005

Hurricanes

- Scenario: increase in economic damages due to hurricanes

Annual average hurricane damages	\$360 million
Each 1% change	\$3.6 million

Source: NHC

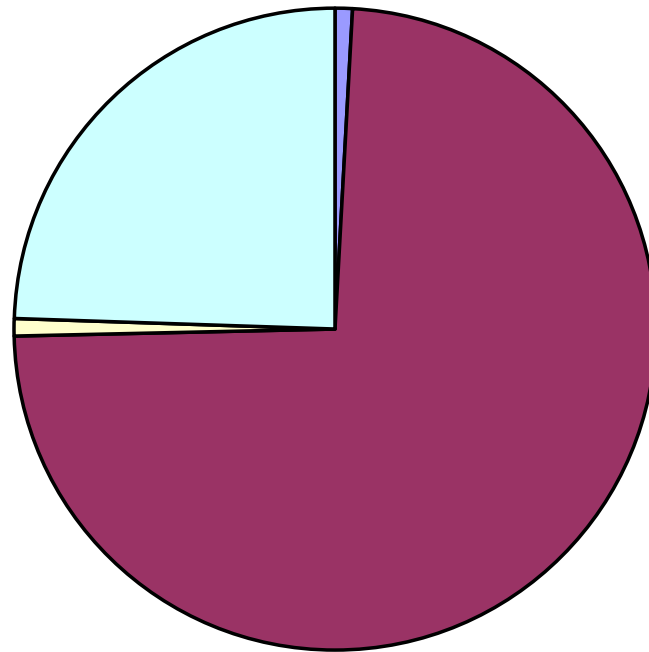
Biodiversity

- Scenario: increase in the probability of extinction for coastal threatened and endangered species

NC population	8.5 million
Cost of each 1% increase in probability	\$0.42
Survey response rate	35%
Damages	\$1.26 million

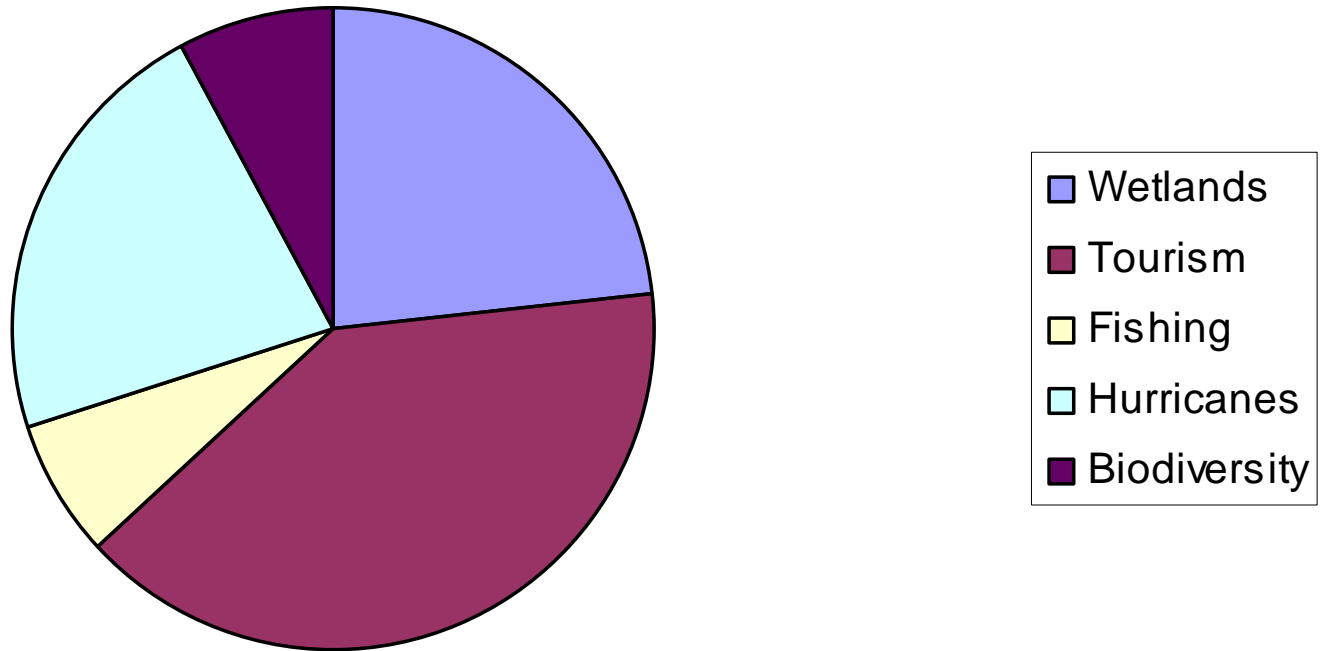
Source: Whitehead, MRE, 1993

Health Impacts: Summary

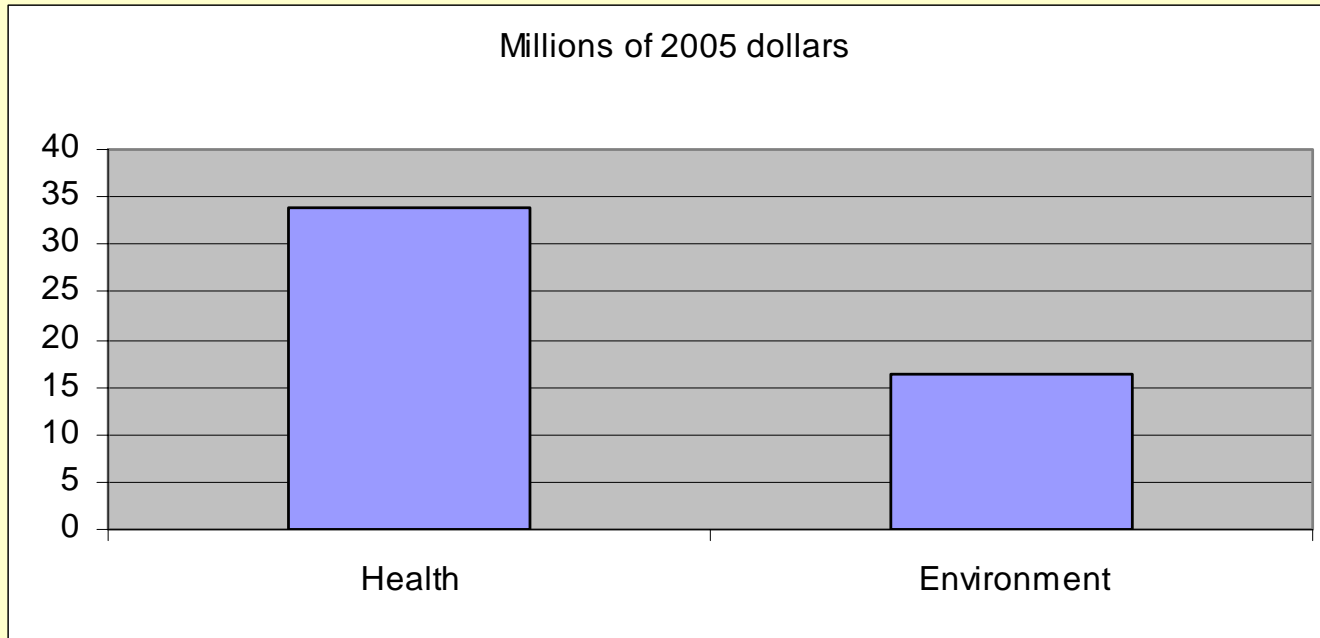


- Heat
- Cancer
- Water
- Storm

Environment Impacts: Summary



Total impacts of each 1% change



- 0.02% of state personal income
- \$16 per household

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