

REMINDE RS

➤ Part III required essays are due no later than May 13.

✓ Late penalty now applies (better than a zero!) for missing Part I and Part II essays.

✓ Must submit any missing essays by May 17, 2021 to avoid a ZERO for missing required work.

EXAM II was April 16-19. If you missed it, please contact me.

❖ Extra Credit: "Think Geographically" Essays from any five of textbook chapters

- O R -

❖ One additional **topic** from the required essay list **plus** TG chapter essays (max. 5 total).

- Last day to submit is May 12 but it is best to do them as you finish reading a chapter.
- **Deadline** to submit a proposal for any other form of extra credit **has passed**.

✓ Don't wait for the night before to write them.

GEOG 101
PART III

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Life on Earth:
Population Geography 2

Chapter 6

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Hunter College Geography

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Lecture Topics for
Part III

- ✓ I Intro. to Human Geography
- II Living on the Earth
 - ✓ A. Habitat
 - ✓ B. Demography
 - C. Medical geography
 - D. Population growth
 - E. Biogeography/Ecology
- III Economic Geography
- IV Urban Geography
- V Political Geography (read chapter)

Covered in this lecture

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Medical Geography

❖ **MEDICAL GEOGRAPHY** studies the **well-being of people as an aspect of habitat**.

- Medical characteristics are studied **spatially** (i.e., where they occur and how they spread).
- They are **correlated to conditions of site and situation** as wind direction, watershed, wells and aquifers, **and to routes of dispersal**.

❖ **EPIDEMIOLOGY**: the study of the cause and control of disease.

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Medical Geog.: Epidemiology Diagram

"The Case for Greater Focus on Mosquitoes, Ticks in Epidemiology"

Reference: "Japanese Encephalitis Virus: Placing Disease Vectors in the Epidemiologic Triad" by Ana R. S. Oliveira, Lee W. Cohnstaed, and Natalia Gemicchiaro, published online, August 2, 2016, in the *Annals of the Entomological Society of America*.

Health and Nutrition

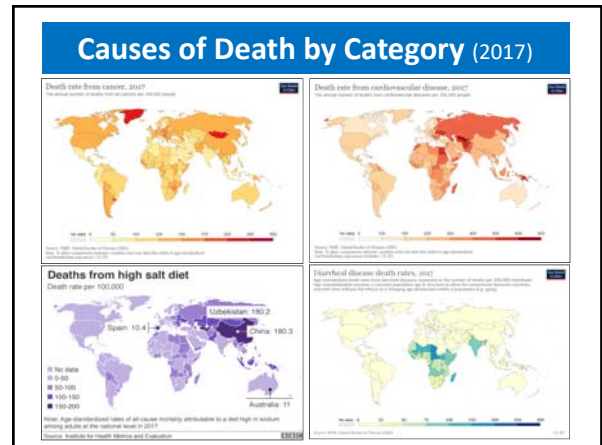
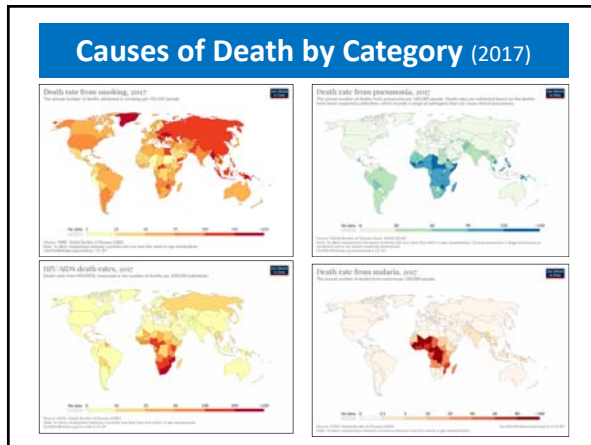
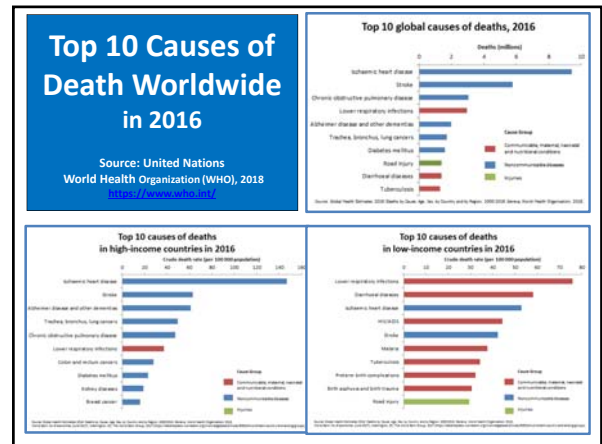
Important part of the population question.

➤ Areas with good health and nutrition can accommodate large numbers of people.

- ✓ They also become **PULL** factors (drawing more people).
- Conversely, areas prone to food and water shortages or disease can experience **PUSH** factors, but in many cases it is just the negative version of **STAY**.

▪ **Analysis includes:**

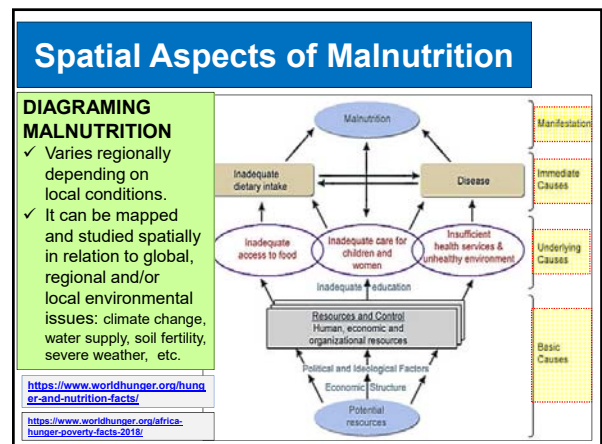
- **Food availability** (type/diet/caloric value)
- **Life expectancy/infant mortality** (BR/DR/wellness)
- **Disease** (susceptibility/transmission/DR/social issues)

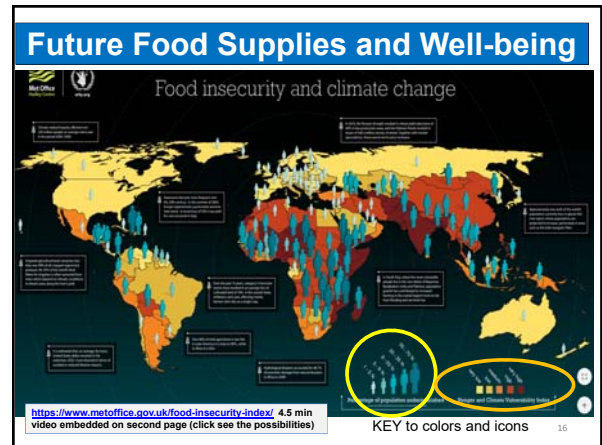
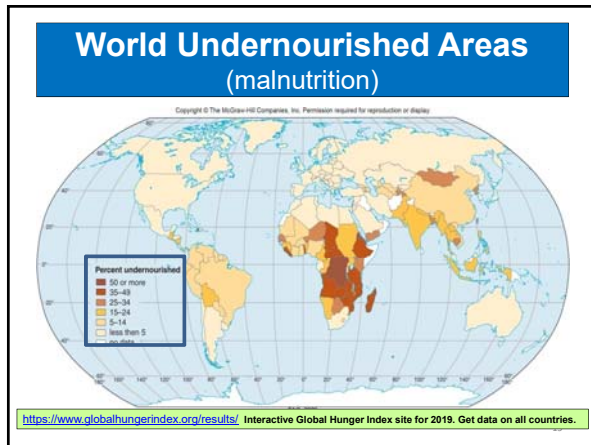
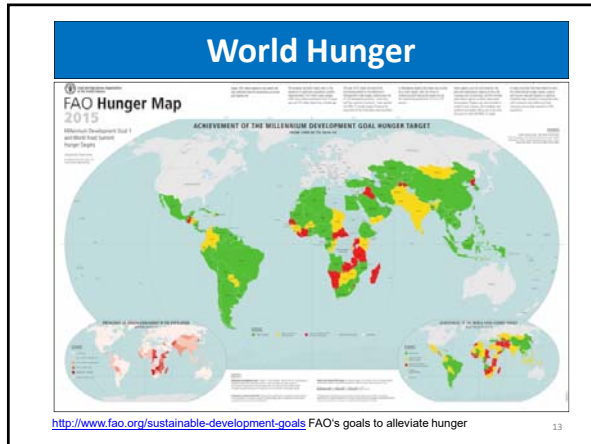


Hunger vs. Poor Nutrition

- ❖ **Hunger:** A feeling when one does not eat enough food to fill current physiological needs. It can be temporary or long-lasting (*when the person does not get enough to eat to maintain physical needs over a sustained period of time*).
- **Hunger can lead to malnutrition.**
- ❖ **Malnutrition:** any disorder of nutrition resulting from an unbalanced, insufficient or excessive diet or from the impaired absorption, assimilation or use of foods.
- **Undernutrition:** caused by an inadequate food supply or an inability of the body to use the nutrients in food.
- **Overnutrition:** excess nutrient and calorie intake over time; may be regarded as a form of malnutrition when it leads to morbid obesity.
- **Chronic malnutrition:** the long-term ingestion/use of less-than-required nutrient amounts; can result in physiological short-comings and vulnerability to disease and other illnesses.

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Geographical Issues Facing Food Supplies and the Well-being of People

PHYSICAL ENVIRONMENT CHANGES	EFFECT ON PEOPLE
1. Worldwide mean temp. is increasing.	▪ Very high percent of world's people live/farm in river deltas/ coastal plains which are the first to be impacted by sea level rise and salt water intrusion.
2. Regional mean precipitation will vary off the norm (some higher/some lower).	▪ About 15% of world's people live and farm in glacier meltwater-fed river valleys.
3. Increase in carbon dioxide levels will effect crop growth.	▪ Over 80% of the world's agricultural land is rain-dependent.
4. Drought, heat waves and severe flooding will reduce crop yield.	▪ About 50% of the world's food supply comes from irrigated land
5. Heavy rainfall and flooding will devastate food storage/distribution.	▪ 220+ mil people are affected by severe weather events each yr.
6. Melting glaciers will first cause valley flooding, then water shortages.	
7. Tropical storms will be more frequent, intense and destructive.	
8. Sea level will rise, flooding farm land.	

Decreased food supplies will result in changes in health and nutrition.

Medical Definition of Disease

❖ **DISEASE:** An impairment of the normal state of the living human, animal or plant body or its parts that interrupts/modifies the performance of vital functions, and is typically manifested by distinguishing signs and symptoms.

- Also called a SICKNESS or ILLNESS

➤ **It is a response to:**

- ✓ environmental factors (as malnutrition, hazards, climate);
- ✓ specific infective agents (as worms, bacteria, or viruses);
- ✓ inherent defects of the organism (as genetic anomalies);
- ✓ or combinations of these factors.

Spatial Labeling of Diseases

DISEASE: disorder of the normal structure or function that has specific signs and symptoms. A disease may have breeding conditions, a transmission route and a spatial range influenced by geographic parameters.

❖ **EPIDEMIC:** a disease that affects many people in a local or regional area.

- It is contagious
- It can spread to other areas

❖ **ENDEMIC:** a disease that is characteristic of a particular area or limited to a host population.


- May affect many people locally.
- Can be confined to a small cohort of people.
- Usually not transferrable to other regions.

❖ **PANDEMIC:** a disease with a large regional or a worldwide scope.


- Requires an international response to control its spread and treat its victims.

Examples of Disease Types


Malaria is an endemic disease to tropical areas.




H1N1 Virus occurred world wide. It was a pandemic.



Swine flu is locally an epidemic.




COVID-19 virus is a pandemic.




REFRESHER: Types of Diffusion

a) EXPANSION
Movement away from point of highest concentration; there's an increase in both area and numbers.




(a) Expansion diffusion

b) RELOCATION
Migration; actual movement away to another location.



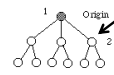
(b) Relocation diffusion

c) CONTAGIOUS
Contact and exchange between adjoining areas; person-to-person contact, blending.



(c) Contagious diffusion

d) HIERARCHICAL
Movement between levels: "up the ladder"; skipping areas in between (as moving from the small town to big city without stopping at the smaller cities).

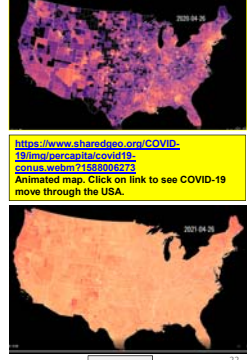


(d) Hierarchical diffusion

COVID-19 virus's original spread has been likened to the sparks of a starburst firework: launching from its point of origin (Wuhan), spreading out over an area (first Wuhan area, then China) and when the sparks return to earth (airline passengers) creating new hot spots from which it now spreads to other areas and from the new hot spots expands in area.

COVID-19 Trackers using GIS

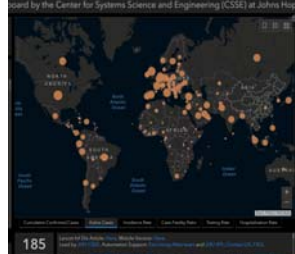
What a difference a year makes!
Top 4-25-2020/Bottom 4-26-2021



<https://www.sharegeo.org/COVID-19/mo/persapla/covid19-comus-webm71583004771>
Animated map. Click on link to see COVID-19 move through the USA.

<https://oisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594741fd40299423467b48e9ecf6>

Johns Hopkins University




Johns Hopkins University

Dr. John Snow's Cholera Map

The cholera pandemic reached London in 1842.

- Dr. John Snow began to map each case and death.
- He was convinced contaminated water was to blame and he associated new cases with people getting water from tainted wells.
- In 1854, when officials refused to shut down wells, he removed the pump handles to prevent the wells' use.

➤ **New cases decreased immediately!**




Distance to well

Climate Change and the Spread of Disease

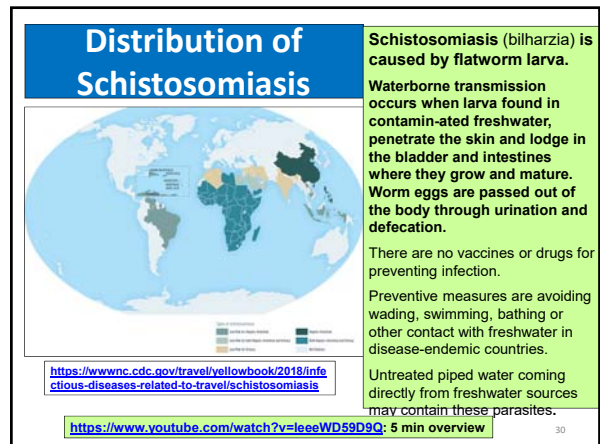
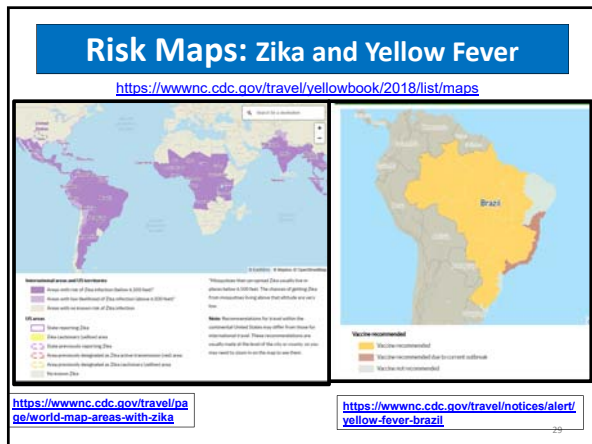
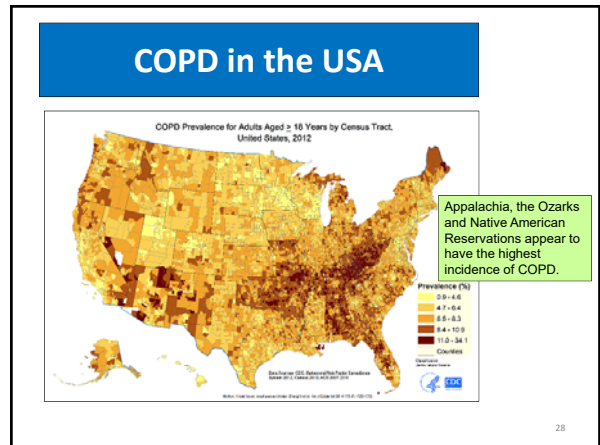
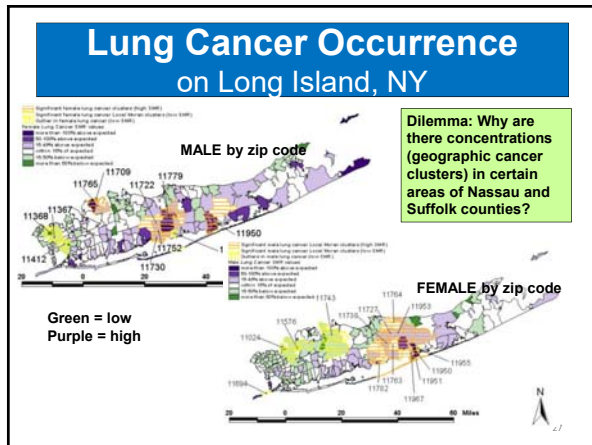
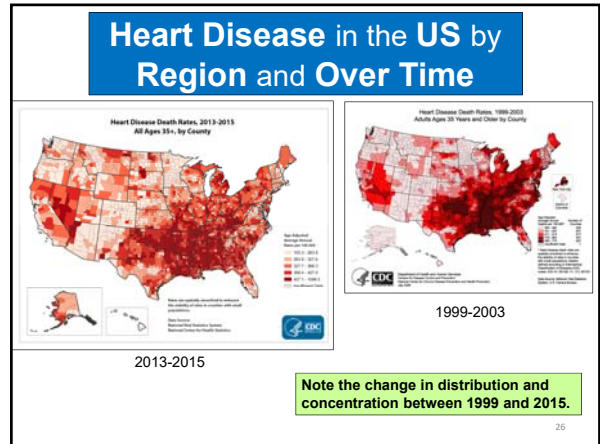
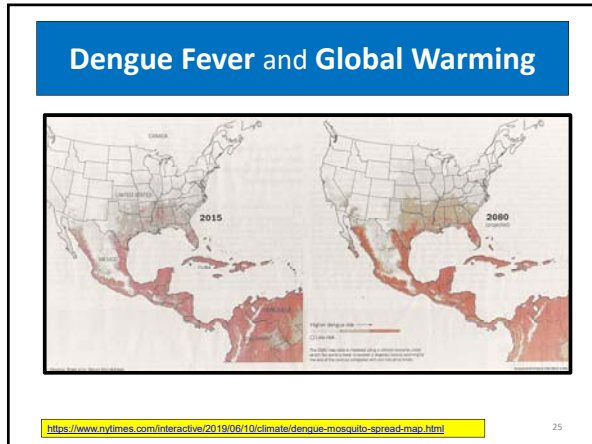
Results of changing climates:

- Drought** (wind-borne dust diseases)
- Increased Rain-fall** (water-borne diseases)
- Warmer Temps** (increase range of mosquitoes and other heat-sensitive insects)

Climate Change and Malaria



Indicates possible distribution by 2060



Health, Nutrition and Numbers of People

❖ If humanity addresses and deals with this important part of the population question by making people healthier and therefore living longer --- **what affect will this have on the earth's ability to support its growing population?**

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Population Growth and Overpopulation

The world needs to deal with the present rate of population growth and overpopulation.

- There is a need to either **increase** the **carrying capacity** of an area (habitat quality) or **reduce** the **stress** of a population on the habitat.
- Can this be done? How can this be done?

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Population Growth

1 AD: 250 mil people on earth
 1650: 500 mil = 1,650 yrs to double
 1830: 1 billion = 180 yrs to double
 1925: 2 billion = 95 yrs to add 1 billion and double in size
 1960: 3 billion = 35 yrs to add 1 billion
 1975: 4 billion = 15 yrs to add 1 billion
 1986: 5 billion = 11 yrs to add 1 billion
 2000: 6 billion = 14 yrs to add 1 billion
 2011: 7 billion = 11 yrs to add 1 billion
 >2023: 8 billion? = 12 yrs to add 1 billion?

2021 = c. 7.8 billion
 8 yrs to add 1/4 billion

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Dealing with Population Growth

How can this be done?
There are 5 general scenarios:

1. Expand the resource base
2. Emigration
3. Economic change
4. Education
5. Natural population controls

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Dealing with Population Growth

How can this be done?

1. Expand the resource base (carrying capacity).
 - A. Use of technology (existing and/or new).
 - B. Creation of artificial environments.
 - C. Make new discoveries.

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Dealing with Population Growth

How can this be done?

2. Emigration.
 - A. Encourage movement away (emigration)
 - B. Discourage in-migration (immigration)
 - C. Relocate people to other areas (transmigration)

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Dealing with Population Growth

How can this be done?

3. Economic change (demographic transition model)

- A. Shift from an agrarian to an industrial economy
- B. Shift from rural to urban settlement (may have a negative impact if cities take over farmland)
- C. Use of technology

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Dealing with Population Growth

How can this be done?

4. Education

- A. Knowledge of the local situation
- B. Ability to read and follow instructions (male and female; understanding package labeling; employment)
- C. Training in the use of modern technology
- D. Changing the attitudes and philosophies of people (i.e., culture) regarding family size through dialogue, reasoning and teaching.

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Dealing with Population Growth

How can this be done?

5. Natural population controls (involves ethical and moral issues)

- A. Famine
- B. Disease
- C. War
- D. Poverty

Should the world community help borderline areas by providing aid for hunger and disease prevention or provide rescue services after a natural disaster?

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Biogeography

Studies the spatial aspects of plant and animal life.

- ✓ The relationship between a life forms and the physical environment.
- ✓ Looks at the composition of biomes, habitats, ranges, etc.
- ✓ Migrations.

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Biogeography

Tundra Swan Range in North America

Migratory pattern

Location of dinosaur fossils

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Ecology

Studies how living things affect each other and what determines their distribution and abundance (habitat).

- ✓ Biosphere, biomes, ecosystems, and communities.
- ✓ Quality of habitat and carrying capacity.
- ✓ Role of all life forms within a habitat (niche).
- ✓ Food chain.
- ✓ Human interaction.

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Biodiversity: Both Temperature and Moisture Sensitive

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"Humans Are Speeding Extinction and Altering the Natural World at an 'Unprecedented' Pace"

- <https://www.nytimes.com/2019/05/06/climate/biodiversity-extinction-united-nations.html>
- https://www.theguardian.com/environment/2019/may/06/human-society-under-urgent-threat-loss-earth-natural-life-un-report?CMP=Share_iOSApp_Other

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Plight of Migratory Shorebirds

Bar-tailed Godwit and Great Knot migratory routes. These shorebirds, tracked by GPS, migrate more than 6,000 mi in each direction. They rely on tidal mudflats to rest and eat.

<https://www.nytimes.com/interactive/2018/04/27/opinion/shorebirds-extinction-climate-change.html>

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Declining Migratory Bird Populations relying on Yellow Sea mud flat stopovers sites

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Climate Change, Hatching and Insect Season

In 2009, Hudsonian godwit nests hatched closer to the start of insect season ... but in warmer years, nests hatched closer to the tail end. Bird populations thrive when nests hatch before peak insect season. When this happens, there is not enough food for hatchlings.

Nests hatched per day, 2009

Nests hatched per day, 2010

Nests hatched per day, 2011

Note: Peak insect period based on the highest average insect abundance. Source: Nathan R. Serner, Maria Deger and Brett K. Sanderson/Duke

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NEXT

GEOGRAPHY of ECONOMICS:
 Economy, development and sustaining a population with food.
 Chapters 9 and 12

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