

## 2022 USGC Nationals Cartographic Examination - Key and Marking Scheme

### Section 1 [30 marks]

#### Expected answers:

1. [1 mark per answer] North Carolina – Gain; Maine – Gain; Hawaii – Lose; Montana – Gain
2. [2 marks per answer / explanation] high level of Covid restrictions, high cost of living, high real estate costs, pandemic hotspots in large cities leading to outmigration, general decline in urban population of large cities [other reasonable answers accepted]
3. [2 marks per answer / explanation] low Covid restrictions, lower cost of living, low real estate costs, remote work enables employees to live away from cities / corporate offices, no state income taxes, large amount of available land, more favorable climate, lower rates of Covid infection [other reasonable answers accepted]
4. [2 marks per answer / explanation] lower birth rates during the pandemic, lower marriage rates, slowdown of immigration into the US due to travel restrictions, higher death rate due to Covid, economic concerns and uncertainty [other reasonable answers accepted]
5. [7 marks] the Great Depression / World War II had a similar effect on population growth due to an immigration slowdown, economic uncertainty and lower birth and marriage rates; in order to earn full marks the student's explanation should be extensive, specific and should connect meaningfully to their answer for question 4 [level marking – partial credit awarded for partial or incomplete answers, or answers that do not meet the above criteria]

### Section 2 [20 marks]

#### Expected answers:

1. [1 mark for correct island, 1 mark for explanation – 4 marks total]  
highest – A; it is both the closest to the mainland and relatively large compared to B  
lowest – G; it is both the farthest away and one of the smallest in size
2. [1 mark per answer] C; E; D; B
3. [1 mark for correlation, 1 mark for explanation] species introduction; while parasite introduction correlates with all three factors it most closely correlates with species introduction because it is a parallel process – parasites either come with or infect already existing species
4. [1 mark for each factor – 4 marks total] distance to nearest neighbor (as opposed to the mainland); time of isolation (how long the island has been separated from the mainland); climate; habitat suitability; ocean currents; prevailing winds; serendipity (chance); human activity
5. [3 marks] these concepts are similar in that both use factors of distance and size to predict the movement of or settlement of populations of organisms, and both adhere to the principle that large and close locations have more interactions with populations than small and distant locations [other reasonable answers accepted; level marking – partial credit awarded for partial or incomplete answers]
6. wildlife corridor [1 mark] - an area of habitat connecting wildlife populations separated by human activities or structures [other reasonable formulations accepted]; explanation [2 marks] - allows an exchange of individuals between populations, help facilitate the re-establishment of populations, gives animals ability to safely move between regions [other reasonable answers accepted]

**Section 3 [30 marks]****Expected answers:**

1. [1 mark per answer] 4.5mm; 3 trillion tons

2. [2marks] ice is gaining mass in several areas including near the Weddell Sea, the coastline of East Antarctica, and in West Antarctica near the Ross Sea (West Antarctic Ice Sheet); ice is losing mass most notably near the Amundsen Sea and on the Antarctic Peninsula [other reasonable answers accepted]

3. albedo effect [3 marks] – changes in albedo (i.e. reflection or absorption of solar radiation) can change temperature and weather patterns in a local areas or even climate on a much larger scale; loss of sea ice explanation [4 marks] – ice has a low albedo compared to seawater (which is much darker in color thereby absorbs much more heat), so the more ice that melts in a given area exposes more seawater, increasing temperature and resulting in more melting; relation to thawing permafrost [4 marks] – both are examples of climate change feedback loops (i.e. processes caused by climate change that exacerbate climate change, sometimes very rapidly), permafrost contains huge amounts of sequestered greenhouse gases and melting permafrost caused by global warming releases those into the atmosphere accelerating global warming [other reasonable explanations accepted; level marking – partial credit awarded for partial or incomplete answers]

4. thermohaline circulation [3 marks] - large-scale ocean circulation that is driven by global density gradients created by surface heat and freshwater fluxes, extensive mixing takes place between the ocean basins, reducing differences between them and making the Earth's oceans a global system, the state of the circulation has a large impact on the climate of the Earth. [other reasonable formulations accepted]

5. [3 marks per part – 12 marks total] climate of Northern Europe – local cooling in this region, particularly in the most coastal areas (UK, northern France, Scandinavia); climate of Antarctica – local warming in this region (exacerbated by albedo effect) and increased precipitation; global food supplies – most estimates point to a sharp drop in global food production due to changes in growing seasons and loss of arable land in food-producing regions; sea life – catastrophic for sea life due to collapse of plankton stocks and to lack of oxygen in parts of the ocean where marine life currently lives [other reasonable explanations accepted; level marking – partial credit awarded for partial or incomplete answers]

**Section 4 - [20 marks]****Expected answers:**

1. [1 mark per answer – 4 marks total] automobile – in general remains unchanged, crossing downtown slightly more difficult but less traffic in the general area; pedestrian – much more open due to fewer cars in the area, more pedestrian / bike friendly, downtown and arts district more walkable; pollution – trees and plants sequester greenhouse gases, more green space cuts down marginally on urban heat island effect; residential – values and rents should rise due to increased amenities and more access to Arts District, makes downtown a more desirable place to live; commercial – should rise due to similar factors of increased desirability and amenities, but less parking and access could have slightly negative affect [other reasonable answers accepted]

2. urban renewal [2 marks] - a program of land redevelopment often used to address urban decay in cities or to make urban areas more livable and create opportunities for higher class housing, businesses, and other developments; goals [1 mark per answer – 4 marks total] - promoting economic growth, increasing employment, making urban areas more attractive to local residents and investors, increasing residents satisfaction in where they live, making better use of urban space, promoting sustainable use of urban spaces [other reasonable answers accepted]

3. more functional [1 mark per answer – 2 marks total] – more walkable, increased access to public transportation, outdoor spaces can be used for events or gatherings; less functional [1 mark per answer – 2 marks total] – less parking, access by car more difficult, park space may attract crowds / people in addition to Arts District (museum / opera) patrons [other reasonable answers accepted]

4. gentrification [1 mark] - the process of changing the character of a neighborhood through the influx of more affluent residents and businesses [other reasonable formulations accepted]; relationship to urban renewal [4 marks] – answers may vary but should include discussion of the displacement of existing populations in favor of more affluent residents and the resulting changes in both the socioeconomic and racial / ethnic makeup of these areas or neighborhoods [other reasonable explanations accepted; level marking – partial credit awarded for partial or incomplete answers]