Current Issues

"Adapting to a Changing Climate"

Where to find the Current Issues Information
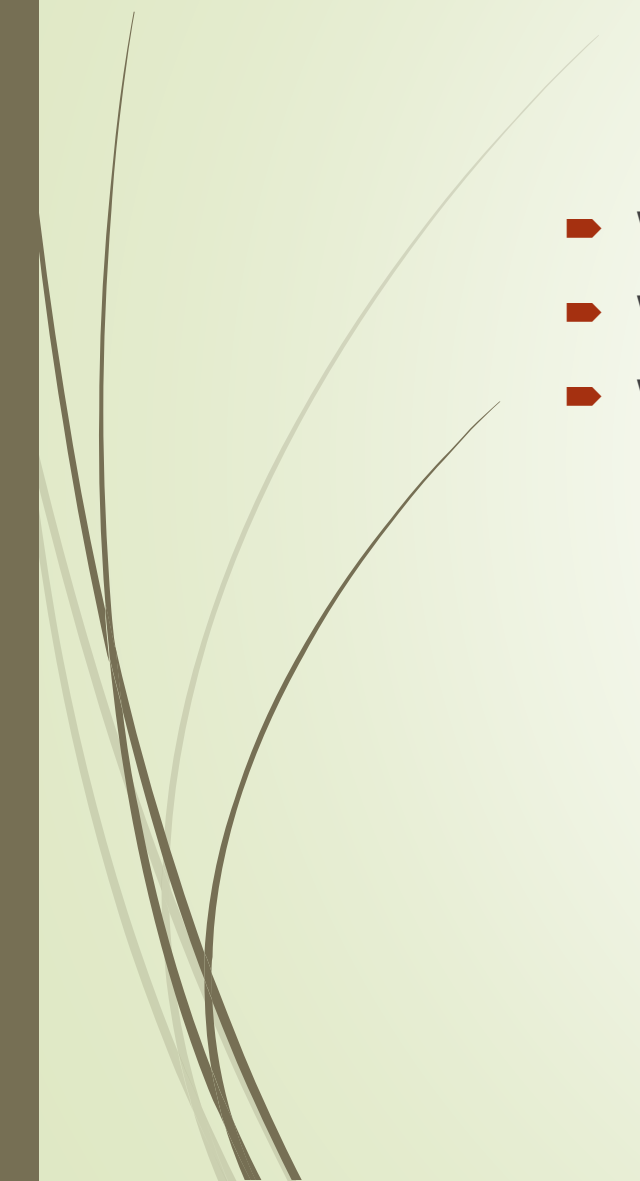
- https://www.njenvirothon.org/current-issue.html

Current Issues Test

- Two parts of the test (15 minutes per part)

- Written Part: 25 questions, 2 points each (50 pts).

- Hands-On Part: 21 questions (50 pts).

Climate Basics

- Weather vs. Climate

- What is Climate Change

- What are Greenhouse Gases

Weather vs. Climate
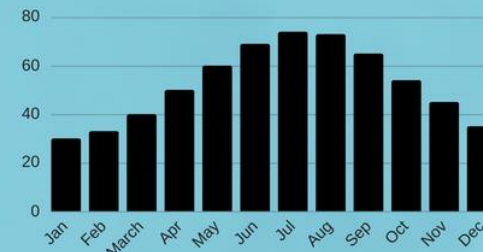
What is Climate Change

Climate Change in New Jersey

October 2022

RUTGERS
New Jersey Climate Change Resource Center

A decade after Sandy, the Garden State continues to grow warmer, wetter, and more prone to flooding.

Temperatures are climbing
The Mid-Atlantic region is one of the most rapidly warming locations in the continental U.S.

3rd — 2021 was the 3rd warmest year on record in NJ[1]

~4°F — Increase in avg annual temps in NJ since 1900, roughly twice the global average[1]

3-9°F — Projected increase in avg annual temps by 2100 (relative to 1901-1960) with moderate emissions[1]

30 — Days with max temp over 95°F by 2100 in Camden and surrounding area (with moderate emissions), up from current average of 5 days[2]

Sea-level rise is accelerating
And the trend is expected to continue well beyond the 21st century.

~1.5 ft — Amount of sea level rise at Atlantic City since 1911[1]

2x — How much faster sea level is rising in NJ compared to global average[1]

240 — Projected days per year of tidal flooding in Atlantic City by 2100 (with moderate emissions), up from 5 days in 2000 and 13 days in 2021[1]

Extreme precipitation is more frequent and intense
Greater warmth and humidity increase heavy rainfall and, with sea-level rise, drive severe flooding.

74% — Increase in 48-hour extreme precipitation events in northeast U.S. 1901–2016[1]

5-15% — Projected increase in extreme 24-hour rainfall in NJ relative to 1950–1999[1]

>9 in — Rain in 6 hours in parts of central Jersey during Tropical Storm Ida, 2x normal September amount[1]

njclimateresourcecenter.rutgers.edu

The New Jersey Climate Change Resource Center was established by statute in 2020 to address climate change issues in the Garden State by providing actionable science, planning tools, and technical guidance to policymakers, practitioners, and communities.

What's at Stake for New Jersey?

Recent events offer a glimpse of what we can expect — and where our vulnerabilities are most acute — as temperature and sea level continue to rise and extreme precipitation becomes more frequent and intense.

⊕ Health
- Increased heat-related illness
- Degraded air quality
- Spread of vector-borne disease
- Storm-related injury and death

30 — Deaths caused by Tropical Storm Ida in NJ, 2nd greatest loss of life in NJ due to a natural disaster since 1900[1]

8.7% — Proportion of NJ health and medical lifelines (hospitals, clinics, EMT, health facilities) in 100-year floodplain[3]

156% — Increase in heat-related hospital admissions in NJ during warm season (May–Sep) from 2004 to 2013[4]

28 — Additional growing season days in Flemington since 1970, lengthening the allergy season[5]

559,715 — NJ residents from "overburdened communities" living in a 100-year floodplain[6]

$ Economy
- Damage to infrastructure
- Damage to homes and businesses
- Economic disruption
- Potential decrease in agricultural yields

$8-10 bil — Estimated damage in NJ caused by Tropical Storm Ida[7]

$5.8 bil — Total NJ flood insurance claims from 1978 to 2019. NJ ranks third in nation in claims paid by FEMA[8]

16% — Proportion of residential NJ parcels with at least half of area in 100-year floodplain[6]

24% — Proportion of NJ commercial and industrial properties with at least half of area in 100-year floodplain[6]

6,100 — Approximate number of NJ buildings engulfed in seawater at high tide by 2050, a taxable property value of more than $6 billion[9]

🌱 Environment
- Greater wildfire risk
- Habitat loss
- More short-term droughts
- Potential freshwater salinization

2 bil — Gallons of untreated sewage discharged into local waters from NJ wastewater facilities due to Hurricane Sandy[10]

35 — Confirmed harmful algal blooms in NJ in 2021, up from 20 in 2017, down from 47 in 2020[11]

29% — NJ bird species vulnerable to climate change, including American Goldfinch, NJ's state bird[12]

20% — Area of existing NJ salt marshes vulnerable to 1 foot of sea level rise by 2050[13]

16,600 — Acres of coastal farmland inundated by 1 foot of sea-level rise, which is within the likely projected range by 2050[13]

1. Shope, J. et al. (2022). State of the Climate: New Jersey 2021. Rutgers University. bit.ly/3SECWWR | 2. njforestadapt.rutgers.edu | 3. Glova, Tracy. (2021). NJ Health and Medical Lifelines Flood Analysis. Rutgers University. bit.ly/3C2TgcM | 4. NJDEP. (2022). Climate Change Impacts on Human Health & Communities. bit.ly/3Ca5yQK | 5. Sol Warren, Michael, & Horn-Muller, Ayurella. (2022). Climate change makes allergy season longer. Climate Central. bit.ly/3SFrfiA | 6. NJAES Office of Research Analytics, Rutgers University | 7. Beven, John L. II et al. (2022). National Hurricane Center Tropical Cyclone Report: Hurricane Ida. National Hurricane Center. bit.ly/3V6LzL8 | 8. NJDEP. (2022). Commissioner LaTourette delivers remarks on climate change adaptation to joint meeting of Senate, Assembly Environment Committees. bit.ly/3CA2xua | 9. Bain, Don. (2022). Sinking Tax Base: Land & Property at Risk from Rising Seas. Climate Central. bit.ly/3RGdlpD | 10. Kenward, Alyson et al. (2013). Sewage Overflows from Hurricane Sandy. Climate Central. bit.ly/3EjTHCS | 11. Poretti, Victor et al. (2021). Cyanobacterial Harmful Algal Bloom Freshwater Recreational Response. NJDEP. bit.ly/3RCaOlB | 12. NJDEP. (2020). NJ Scientific Report on Climate Change. bit.ly/3C8JO7L | 13. Lathrop, R.G. and Hasse, J.E. (2020). Changing landscapes in the Garden State: land use change in New Jersey 1986 through 2015. Rutgers University. bit.ly/3ykzYhZ

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What are Greenhouse Gases

Greenhouse Gas	Global Warming Potential
CO_2	1 (reference)
CH_4	28-36
N_2O	265-298
Fluorinated Gases	High-GWP gases because they can be thousands or tens of thousands

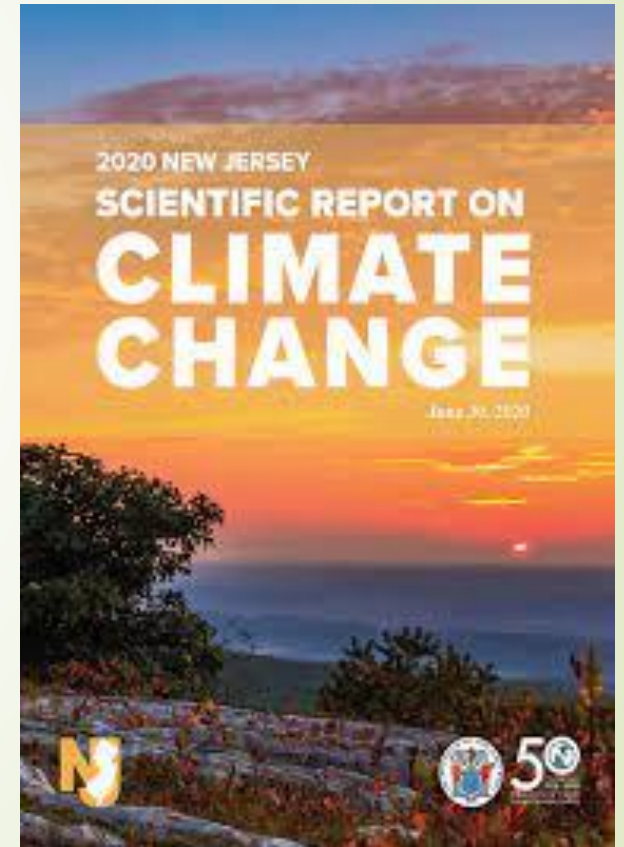# Sample Question

- Which of the following best describes the difference between weather and climate?

- a) Weather is the description of long-term patterns of atmospheric behavior in a particular area, while climate is what conditions of the atmosphere are over a short period of time.

- b) Weather is what conditions of the atmosphere are over a short period of time, while climate is the description of long-term patterns of weather in a particular area.

- c) Weather and climate are the same thing.

- d) Climate is what you expect, while weather is what you get.

- Answer: b) Weather is what conditions of the atmosphere are over a short period of time, while climate is the description of long-term patterns of weather in a particular area.

- Explanation: The text explicitly states that weather is what conditions of the atmosphere are over a short period of time, while climate is the description of long-term patterns of weather in a particular area.

CLIMATE CHANGE SCIENTIFIC REPORT ON 2020 NEW JERSEY June 30, 2020

- TEMPERATURE
- PRECIPITATION
- SEA-LEVEL RISE
- OCEAN ACIDIFICATION
- AIR QUALITY
- WATER RESOURCES: SUPPLY AND QUALITY
- AGRICULTURE
- FORESTS
- WETLANDS
- TERRESTRIAL CARBON SEQUESTRATION
- TERRESTRIAL SYSTEMS
- FRESHWATER SYSTEMS
- FRESHWATER SYSTEMS

Sample Question

- What are the significant changes that New Jersey will experience as atmospheric levels of carbon dioxide and other greenhouse gases increase?

- A) Decrease in temperature, less variability in precipitation, and fewer storms.

- B) Increase in temperature, variability in precipitation, frequency and intensity of storms, sea-level rise, ocean acidification, and associated impacts to ecological systems, natural resources, human health, and the economy.

- C) No changes in the environment.

- D) Increase in temperature and humidity.

- Answer: B) Increase in temperature, variability in precipitation, frequency and intensity of storms, sea-level rise, ocean acidification, and associated impacts to ecological systems, natural resources, human health, and the economy.

- Explanation: As atmospheric levels of carbon dioxide and other greenhouse gases increase, New Jersey will experience significant direct and secondary changes in its environment.

Sample Question

- What is the primary driver of climate change, according to the report?

- A) Decrease in atmospheric levels of greenhouse gases.
- B) Increase in atmospheric levels of greenhouse gases.
- C) Land use changes like afforestation.
- D) Reduction in the use of fossil fuels.

- Answer: B) Increase in atmospheric levels of greenhouse gases.

- Explanation: The primary driver of climate change, according to the Rutgers Climate Report, is the increase in atmospheric levels of greenhouse gases, particularly the emissions of heat trapping greenhouse gases from the burning of fossil fuels and land use changes like deforestation, which have increased atmospheric carbon dioxide concentrations.

Sample Question

- What is the reason for the stronger impact of temperature increases in New Jersey compared to other regions?

- a) Lack of open spaces for cooling effects
- b) Variability in precipitation
- c) Sea-level rise
- d) Increase in snow accumulation

- Answer: a) Lack of open spaces for cooling effects.

- Explanation: The report states that the high urbanization of New Jersey results in large expanses of asphalt and concrete instead of forests, fields, and other open spaces that can provide cooling effects. This condition makes heat waves especially pronounced and leads to increased impacts in densely populated urban areas.

State of the Climate New Jersey 2021

- 2021 Weather Summary

- What Are Emissions Scenarios?

- Agriculture and Sea-Level Rise Vulnerability in the Garden State

- Understanding Return Periods

- Changes between New Jersey's 1981-2010 and 1991-2020 Climate Normal Periods

- Extreme Events: Focus on Post Tropical Cyclone Ida

- Climate Change and Vulnerable Populations

Sample Question

- How do scientists project how the climate may change?

- a) By looking at historical data
- b) By using a crystal ball
- c) By conducting experiments
- d) By using a range of illustrative scenarios

- Answer: D. By using a range of illustrative scenarios

- Explanation: The report explains that scientists use a range of illustrative scenarios to project how the climate may change, which vary based on socioeconomic assumptions, climate change mitigation strategies, and air pollution controls.

Sample Question

- How does sea-level rise affect New Jersey's coastal farmers?

- a) It decreases the probability of saltwater intrusion in near-shore freshwater wells.

- b) It reduces the risk of erosion along tidal waterways.

- c) It raises the baseline for coastal flooding.

- d) It increases crop yields.

- Answer: c) It raises the baseline for coastal flooding.

- Explanation: As mentioned in the report, sea-level rise raises the baseline for coastal flooding, which is a climate change risk to New Jersey's farmers located in coastal regions.

Sample Question

- What does a 100-year event mean in terms of probability?

- a) It means there is a 100% chance of the event occurring each year.
- b) It means there is a 50% chance of the event occurring each year.
- c) It means there is a 1% chance of the event occurring each year.
- d) It means there is a 10% chance of the event occurring each year.

- Answer: c) It means there is a 1% chance of the event occurring each year.

- Explanation: A 100-year event refers to a flood or extreme weather event that has a 1% or 1/100 probability of occurring each year at a specific location.

Current Issue Hands-On Test Sample

Table1: Recommended Sizing for Sacrifice Areas Based on Animal Type and Weight

Animal	Horse	Beef Cow	Dairy Cow	Goat	Pig (Sow/Boar)	Pig (Wean to Finish)	Pig (Nursery)	Sheep	Hen/Broiler	Turkey
Typical Weight (lbs.)	1,000	1,000	1,400	170	350	150	50	170	4	20
						$Ft^2 = .2167 \times BW$				
Area Needed (ft²)	400	75-100	75-100	50	76	33	11	20-25	3-4	6
Typical Area Needed/AU (ft²/AU)	400	75 - 100	105 - 140	9	27	5		3.5 – 4.25		

- Recommended pasture size can vary depending on the type animal the farmer is planning to implement on the property. Smaller properties may be limited on what they can raise due to pasture size.

- Using table 1, answer the following questions:

- 1. What would be the minimum typical pasture area needed for 15 horses?

- 2. Which animal type has a higher typical area needed vs area needed?

- 3. Which animal type would be ideal for a farmer that wanted to raise 30 individuals within a pasture size of 120 sq ft?

- 4. What is the difference in pasture size needed for 20 Sow Pigs vs. 20 Nursery Pigs?

- 5. What is the difference in typical weight between a dairy cow and beef cow?
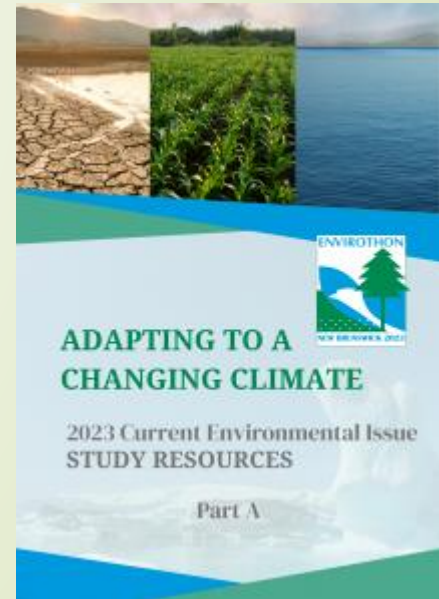
Hands-On Test Sample Answers

Table1: Recommended Sizing for Sacrifice Areas Based on Animal Type and Weight										
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- Recommended pasture size can vary depending on the type animal the farmer is planning to implement on the property. Smaller properties may be limited on what they can raise due to pasture size.

- Using table 1, answer the following questions:

- 1. What would be the minimum typical pasture area needed for 15 horses? **6000 ft/AU**

- 2. Which animal type has a higher typical area needed vs area needed? **Dairy Cow**

- 3. Which animal type would be ideal for a farmer that wanted to raise 30 individuals within a pasture size of 120 sq ft? **Hen/broiler** 120/30 = 4 sq feet per individual required

- 4. What is the difference in pasture size needed for 20 Sow Pigs vs. 20 Nursery Pigs? **1300 square feet** Sows= 1520 Nursery= 220

- 5. What is the difference in typical weight between a dairy cow and beef cow? **400 pounds**

Questions?