

Redistricting in USA

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July 2019



ARKANSAS SCHOOL
FOR MATH, SCIENCES, + THE ARTS

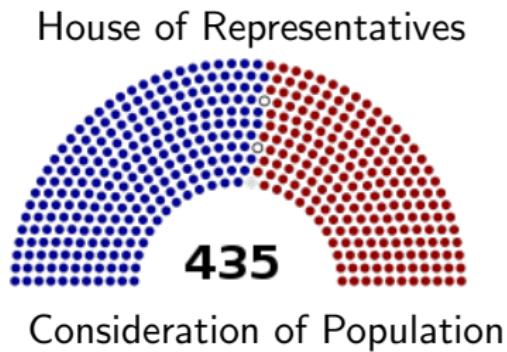
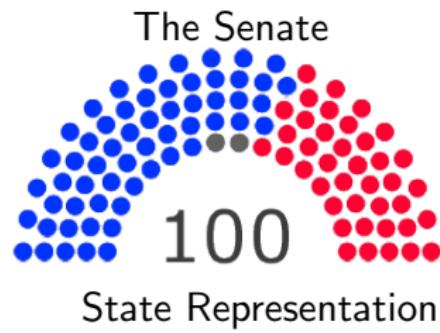
Outline

- 1 Introduction and History
- 2 Controversial Districts
- 3 Methods of Analysis
- 4 Discussion
- 5 Sources and Interesting Websites

Introduction and History

United States of America

The Great Compromise in 1787 led to the two houses of Congress:



The Gerry Mander

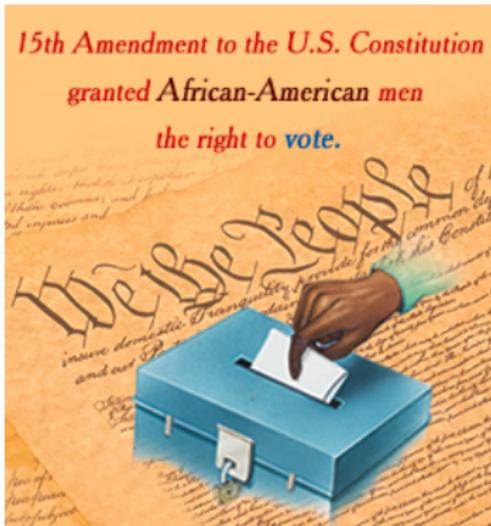
In 1812, Governor Elbridge Gerry of Massachusetts approved a redistricting plan which gave partisan advantage. A cartoon in the newspaper criticized the district as appearing similar to a salamander in shape.



Reconstruction and Amendments to Constitution

The 15th Amendment in 1870s:

"The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color, or previous condition of servitude."



Voting Rights Act of 1965

"The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of race, color, or previous condition of servitude."

Despite the 15th Amendment, the states had little oversight. The Voting Rights Act of 1965 acknowledged the disenfranchisement of black voters in the Southern States and held states accountable.



The Rules of Redistricting

"The Times, Places and Manner of holding Elections for Senators and Representatives shall be prescribed **in each State by the Legislature** thereof; but the Congress may at any time by Law make or alter such Regulations." Elections Clause of the U.S. Constitution

Apportionment Clause of Article I, Section 2, of the U.S. Constitution requires that **all districts be as nearly equal in population as practicable**. For state legislative districts, the Equal Protection Clause of the 14th Amendment to the U.S. Constitution requires that districts be substantially equal.

Section 2 of the **Voting Rights Act of 1965** prohibits plans that intentionally or inadvertently discriminate on the basis of race, which could dilute the minority vote.

The Rules of Redistricting

Now I want to offer you a chance to better understand Gerrymandering techniques. Try the redistricting game we have provided, but keep in mind these three rules.

We will discuss strategies and extreme results.

The Rules of Redistricting

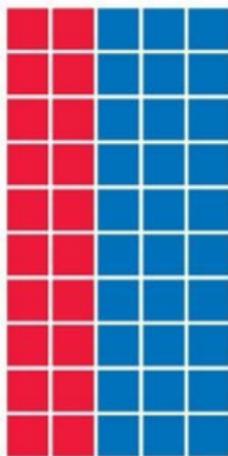
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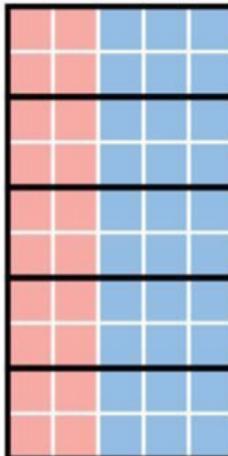
- Population Balance (*Act of Feb. 2, 1872*)
- Contiguous (*Act of June 25, 1842*)
- Compact (*Act of Jan. 16, 1901*)

The Art of Gerrymandering

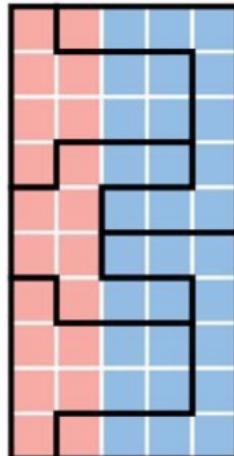
HOW TO STEAL AN ELECTION



50 PRECINCTS
60% BLUE
40% RED



5 DISTRICTS
5 BLUE
0 RED
BLUE WINS



5 DISTRICTS
3 RED
2 BLUE
RED WINS

Techniques of Gerrymandering

A **cracked** district is one in which a party's supporters are divided among multiple districts, so that they fall short of a majority in each.

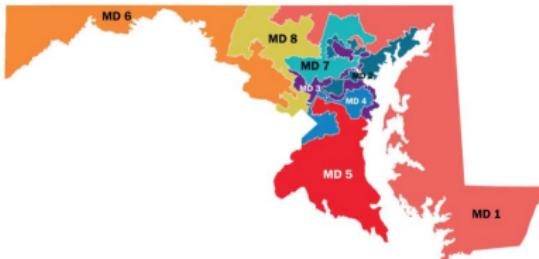
A **packed** district is one in which a party's supporters are highly concentrated, so they win that district by a large margin, “wasting” many votes that would improve their chances in others.

Controversial Districts

Current Controversial States

Maryland Republicans won 37% of the statewide votes for US Representatives, however the Democrats received 7 of the 8 seats due to district boundaries.

Maryland's congressional districts



Source: US Census Bureau

WAPOST/WONKBLOG

In Wisconsin's 2016 election, "Only five of 99 Assembly races were decided by less than 5 points."



Chicago

Heavy evidence suggests hyper-segregation in the current 100 wards of Chicago. Some communities seem to have been unfairly separated and, consequently, the votes in those communities have been devalued. The number of years between redistricting may also be leading to malapportionment.

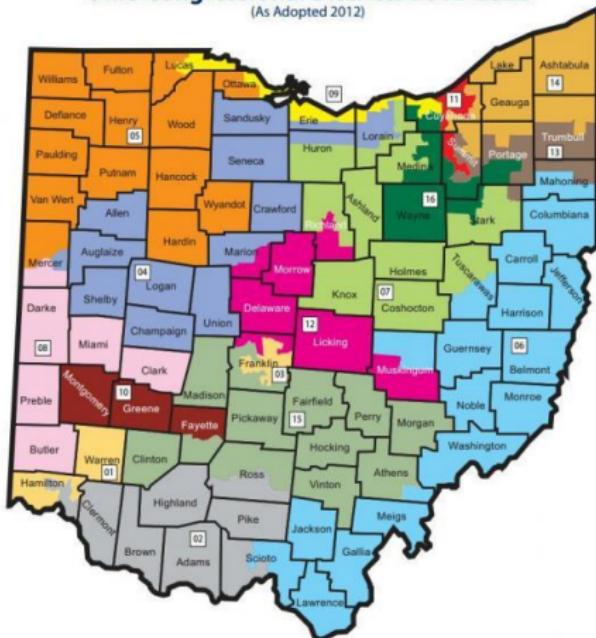


Current Enacted Plan

- 46** wards with a majority race
- 38** segregated wards
- 19** hypersegregated wards
- 19** wards with concentrated poverty
- 13** wards with concentrated wealth

Ohio

Ohio Congressional Districts 2012-2022
(As Adopted 2012)



In the "bunker", districts such as "Snake on the Lake" appear to have cracked Democratic votes. (ACLU)

Changes in the Ohio Congressional Districts

1982–1992



1992–2002



2002–2012



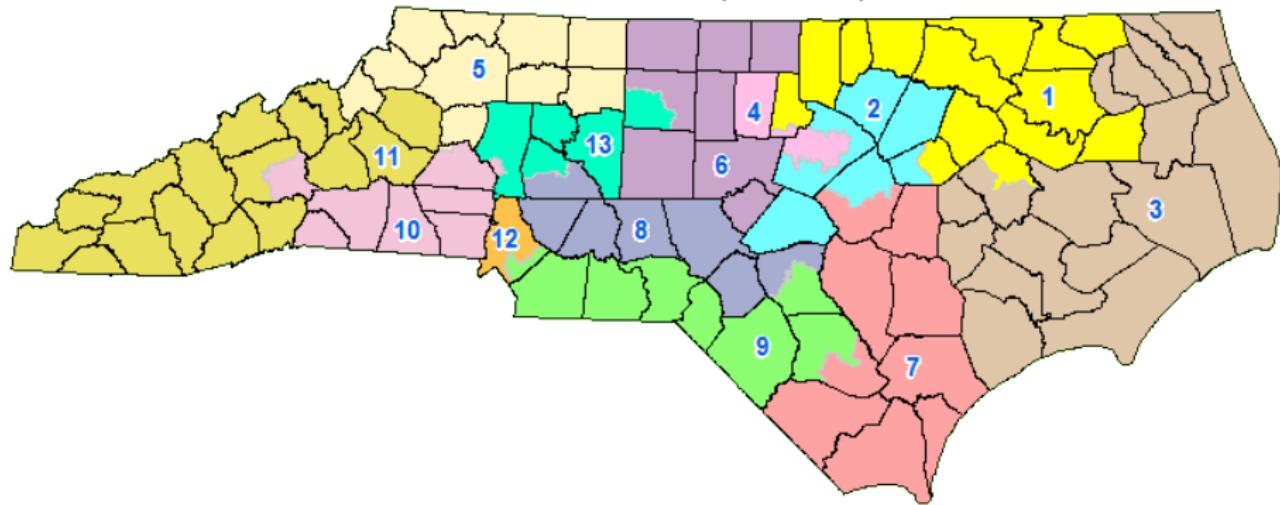
2012–present



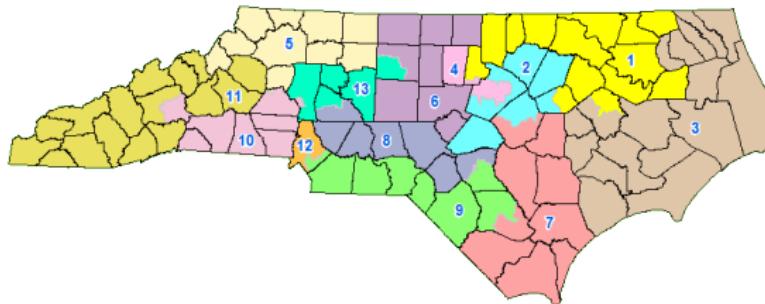
These maps showing Ohio congressional districts as drawn over the past four decades show how they've changed. Athens County has been tugged every which way, as well as being split in half.

North Carolina

"Under current North Carolina congressional boundaries, Republicans won 10 of the 13 House districts in 2016, despite getting just 53 percent of the statewide vote." (Reuters)



North Carolina



North Carolina Case: *Rucho v. Common Cause*, 2019

The first case involves a challenge to the congressional redistricting plan enacted by the Republican-controlled North Carolina General Assembly in 2016. *Rucho v. Common Cause*, No. 18-422. The Republican legislators leading the redistricting effort instructed their mapmaker to use political data to draw a map that would produce a congressional delegation of ten Republicans and three Democrats. 318 F. Supp. 3d 777, 807–808 (MDNC 2018). As one of the two Republicans chairing the redistricting committee stated, “I think electing Republicans is better than electing Democrats. So I drew this map to help foster what I think is better for the country.” *Id.*, at 809. He further explained that the map was drawn with the aim of electing ten Republicans and three Democrats because he did “not believe it [would be] possible to draw a map with 11 Republicans and 2 Democrats.” *Id.*, at 808. One Democratic state senator objected that entrenching the 10–3 advantage for Republicans was not “fair, reasonable, [or] balanced” because, as recently as 2012, “Democratic con-

Maryland Case: Lamone v. Benisek, 2019

The second case before us is *Lamone v. Benisek*, No. 18–726. In 2011, the Maryland Legislature—dominated by Democrats—undertook to redraw the lines of that State’s eight congressional districts. The Governor at the time, Democrat Martin O’Malley, led the process. He appointed a redistricting committee to help redraw the map, and asked Congressman Steny Hoyer, who has described himself as a “serial gerrymanderer,” to advise the committee. 348 F. Supp. 3d 493, 502 (Md. 2018). The Governor later testified that his aim was to “use the redistricting process to change the overall composition of Maryland’s congressional delegation to 7 Democrats and 1 Republican by flipping” one district. *Ibid.* “[A] decision was made to go for the Sixth,” *ibid.*, which had been held by a Republican for nearly two decades. To achieve the required equal population among districts, only about 10,000 residents needed to be removed from that district. *Id.*, at 498. The 2011 Plan accomplished that by moving roughly 360,000

Supreme Court in 2019

Opinion of the Court by Chief Roberts: "We conclude that partisan gerrymandering claims present political questions beyond the reach of the federal courts."



Dissent by Justice Kagan: "For the first time ever, this Court refuses to remedy a constitutional violation because it thinks the task beyond judicial capabilities. And not just any constitutional violation. The partisan gerrymanders in these cases deprived citizens of the most fundamental of their constitutional rights: the rights to participate equally in the political process, to join with others to advance political beliefs, and to choose their political representatives...If left unchecked, gerrymanders like the ones here may irreparably damage our system of government."

Accountability for Gerrymandering

Despite overwhelming agreement that partisan redistricting results in unfair advantages, the accountability and rules remain loose.

The Supreme Court has chosen to not interfere if cases do not directly relate to population apportionment or racial discrimination.

Questions still arise:

- How could courts recognize or quantify gerrymandering?
- Should there be accountability for partisan gerrymandering?
- What are possible legislative solutions?

Methods of Analysis

In a 2004 case sent to the Supreme Court on appeal, Justice Kennedy wrote: "Technology is both a threat and a promise. On the one hand, if courts refuse to entertain any claims of partisan gerrymandering, the temptation to use partisan favoritism in districting in an unconstitutional manner will grow. On the other hand, these new technologies may produce new methods of analysis that make more evident the precise nature of the burdens gerrymanders impose on the representational rights of voters and parties. **That would facilitate court efforts to identify and remedy the burdens, with judicial intervention limited by the derived standards.**"

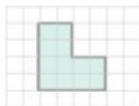
Compactness Tests

Polsby-Popper Test

Polsby-Popper Ratio

$$\frac{4\pi \text{ (area of the district)}}{(\text{perimeter of the district})^2}$$

Area = 12 units²
Perimeter = 16



$$\frac{4\pi (12\text{units}^2)}{(16)^2} = \frac{48\pi}{256} = 0.59$$

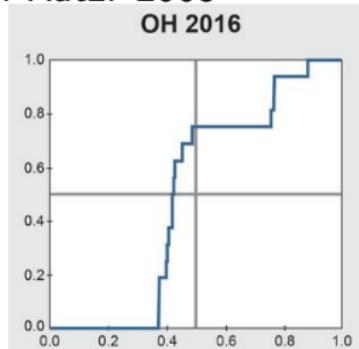
Reock Test

The ratio of the area of a region to the area of its smallest encompassing circle.



Quantifying Partisan Gerrymandering

Partisan Symmetry: Gary King, Bernard Grofman, Andrew Gelman, and Jonathan Katz. 2005



Efficiency Gap: Stephanopoulos and McGhee (2015)

Given an election $\mathcal{E} = (P, Q, p)$, party P 's waste in district i , $w_P(i)$, is $p_i - 1/2$ in those districts it wins and p_i in those districts it loses. Party Q 's waste is $w_Q(i) = 1/2 - w_P(i)$.

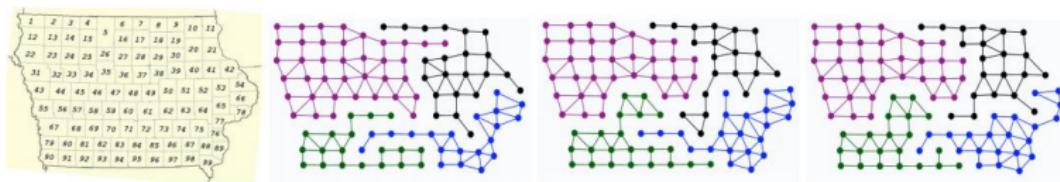
McGhee [McG14, Eq. (2)] (using different notation and terminology) made the following definition: The *efficiency gap* of \mathcal{E} is

$$\frac{\sum_{i=1}^N (w_P(i) - w_Q(i))}{N}. \quad (3)$$



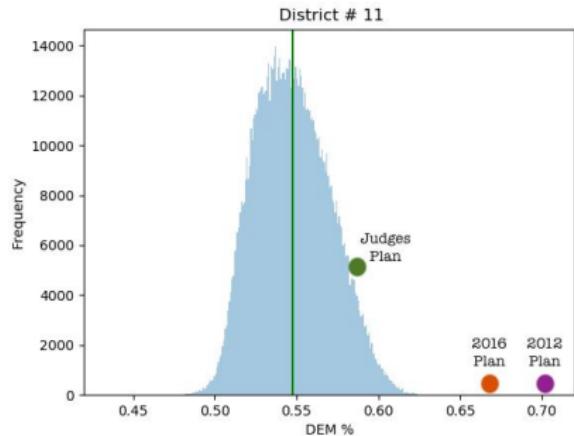
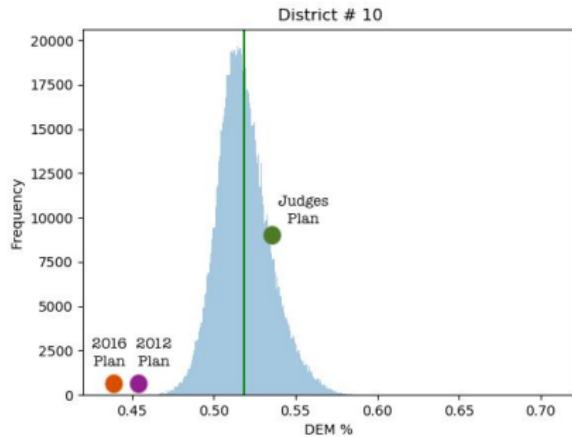
Monte Carlo Markov Chains

Moon Duchin and her team, the Metric Geometry and Gerrymandering Group is currently applying random walks to determine the possible redistricting plans for a state.



Improving Outlier Analysis

The Metric Geometry and Gerrymandering Group, led by Moon Duchin, is using mathematics and technology to determine outliers in redistricting outcomes. After randomly generating one million redistricting plans, the following image indicates the plausibility of the North Carolina plans.



(2012 Plan and 2016 Plan were proposed and enacted by the NC Legislature. The **Judges' Plan**, by contrast, was made by a bipartisan panel of retired judges.) In the 2012 and 2016 Plans, Democrats are “packed” or overstuffed into the right-hand district and “cracked” or dispersed out of the left-hand district.

Discussion

Concluding Remarks

1. Redistricting issues are still OPEN problems! There are many mathematical questions that do not yet have solutions.

There is no single "recipe" to fix all of the issues of gerrymandering.

2. Loose redistricting guidelines disenfranchise voters.

The Voting Rights of the People should be protected. "One Person, One Vote." In 2019, there remain examples of racial discrimination, separating communities of interest, partisan advantages, prisoner adjustment, etc.

Voting methods may compound these issues even more. "You give me a candidate you want to win and I will show you a voting method which will elect that candidate." K. Devlin

3. Attempts at gerrymandering could be masked.

Recently the Supreme Court rejected the Census Citizenship Question. This case has impassioned many citizens. Some of the evidence presented in court was from Thomas B. Hofeller's private documents. Hofeller, the "Michelangelo of Gerrymandering", requested that administration add this question to the US Census. Recently his private work was submitted for the trial. According to his work, his intent was to alter the redistricting in Texas and create a partisan advantage.

"Usually the voters get to pick the politicians. In redistricting, the politicians get to pick the voters!" Hofeller 2000

Sources and Interesting Websites

Sources and Interesting Websites

- Districtr.org allows you to redistrict US States.
- MGGG: a research team currently investigating redistricting issues.
- The Voting Rights Data Institute
- Redistricting Criteria from NCSL.org
- Supreme Court Decisions
- Gridlandia
- GerryChain
- US States Redistricting Rules at NCSL.org