

# Regulating Elections: Districts

17.251/252

Fall 2008

# Major ways that congressional elections are regulated

- The Constitution
  - Basic stuff (age, apportionment, states given lots of autonomy)
  - Federalism key
- Districting
- Campaign finance

# An aside about the states: Run-off vs. plurality rule

- The South
- Interest in “instant runoff”

# An Aside about Direct Elections

- 17th Amendment: 1914
- Indirect election didn't make senators tools of the state legislatures... quite the opposite
- Direct election effects? Who knows

# Districting

- Apportionment
  - Method of equal proportions
- Required in House races since 1820s
- Effects
  - Possible “malapportionment”
  - Responsiveness

# Apportionment methods

- 1790 to 1830--The "Jefferson method" of greatest divisors
  - Fixed “ratio of representation” with rejected fractional remainders
  - Size of House can vary
- 1840--The "Webster method" of major fractions
  - Fixed “ratio of representation” with retained major fractional remainders
  - Size of House can vary
- 1850-1900--The "Vinton" or "Hamilton" method
  - Predetermined # of reps
  - $\text{Seats for state} = \text{Population of State} / (\text{Population of US} / N \text{ of Seats})$
  - Remaining seats assigned one at a time according to “largest remainder”
  - “Alabama paradox”
- 1940-2000--The method of equal proportions

# Diversion to the Alabama Paradox

- Called the “Alabama paradox” because of the 1880 census (increasing the House from 299 to 300 reduces Alabama’s seats)
- Rule: Compute “fair share” of seats, then allocate an additional seat according to largest remainder
- Example, 3 states w/ 10 & 11 seats

|         |               | 10 Seats     |       | 11 Seats       |       |
|---------|---------------|--------------|-------|----------------|-------|
| State   | Pop.          | Fair share   | Seats | Fair share     | Seats |
| A       | 6             | 4.286        | 4     | <b>4.714</b>   | 5     |
| B       | 6             | 4.286        | 4     | <b>4.714</b>   | 5     |
| C       | 2             | <b>1.429</b> | 2     | 1.571          | 1     |
| Total   | 14            |              |       |                |       |
| Divisor | 1.4=<br>14/10 |              |       | 1.3 =<br>14/11 |       |

# Balinsky and Young (1982)

## *Fair Representation*

- Any method of apportionment will yield paradoxes
- No apportionment method...
  - Follows the quota rule
  - Avoids the Alabama paradox
  - Avoids the population paradox
    - Pop paradox: when you have two states, and the one that grows faster loses seats to the one that grows slower

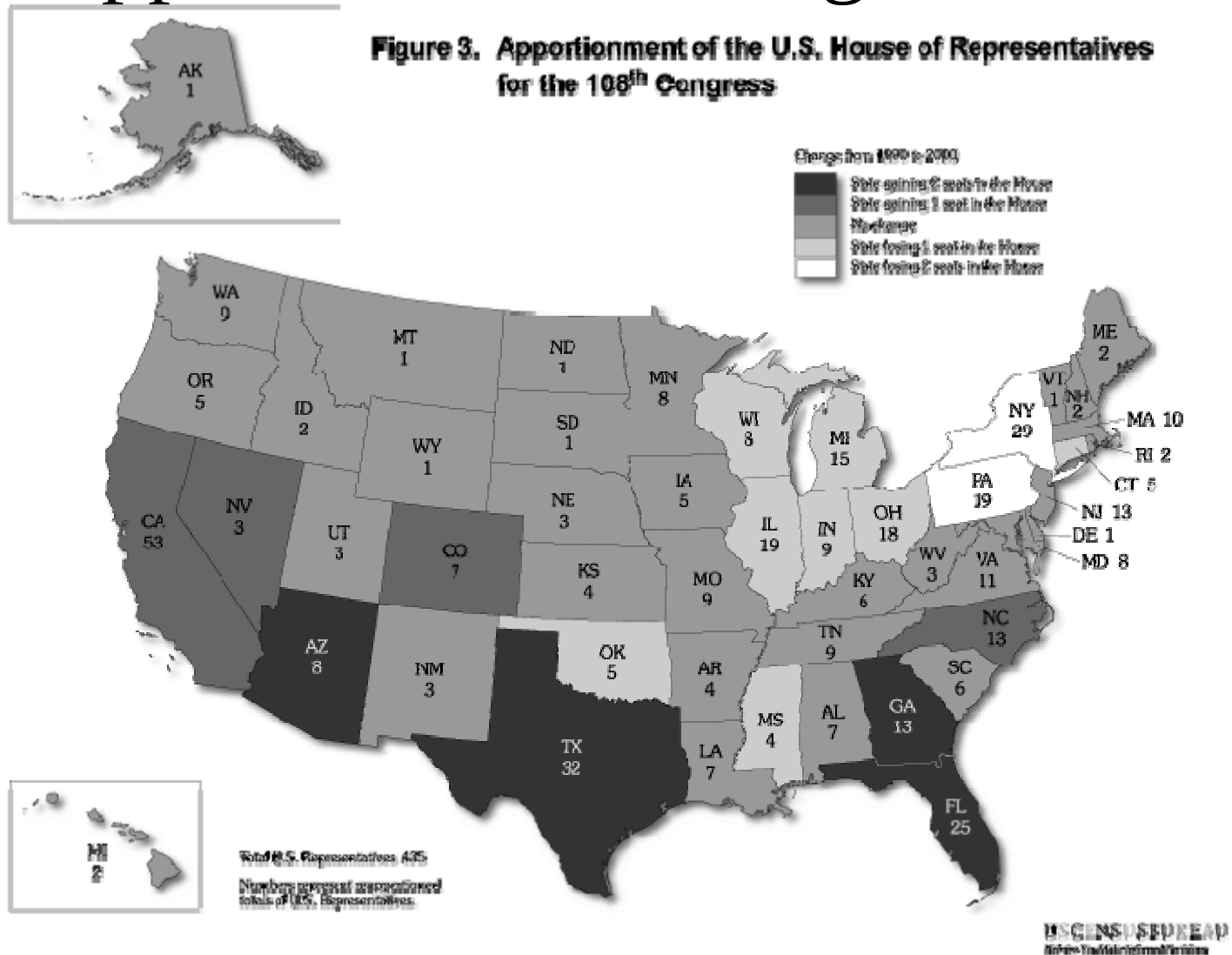
# Method of equal proportions

- “Results in a listing of the states according to a priority value--calculated by dividing the population of each state by the geometric mean of its current and next seats—that assigns seats 51 through 435.”
- Practically: This method assigns seats in the House of Representatives according to a ‘priority’ value. The priority value is determined by multiplying the population of a state by a ‘multiplier.’ For example, following the 1990 census, each of the 50 states was given one seat out of the current total of 435. The next, or 51st seat, went to the state with the highest priority value and thus became that state's second seat.

# Priority values after 2000

| Seat # | State | State seat | Priority # |
|--------|-------|------------|------------|
| 51     | CA    | 2          | 23992697   |
| 52     | TX    | 2          | 14781356   |
| 53     | CA    | 3          | 13852190   |
| 54     | NY    | 2          | 13438545   |
| 55     | FL    | 2          | 11334137   |
| ...    |       |            |            |
| 431    | IA    | 5          | 655598     |
| 432    | FL    | 25         | 654377     |
| 433    | OH    | 18         | 650239     |
| 434    | CA    | 53         | 646330     |
| 435    | NC    | 13         | 645931     |
| 436    | UT    | 4          | 645684     |
| 437    | NY    | 30         | 644329     |
| 438    | TX    | 33         | 643276     |
| 439    | MI    | 16         | 642646     |
| 440    | IN    | 10         | 642025     |

# Reapportionment Change in 2000



# Reapportionment 2010

| -2 | -1 | +1 | +2 | +3 |
|----|----|----|----|----|
| NY | AL | AZ | FL | TX |
| OH | IL | CA |    |    |
|    | IA | GA |    |    |
|    | MA | NV |    |    |
|    | MO | UT |    |    |
|    | PA |    |    |    |

Note: Based on 2008 Census Bureau projections of 2010 pop.

# 2010 Priority Numbers

| State         | # State<br>Seats | Priority<br>number | Overall seat<br># |
|---------------|------------------|--------------------|-------------------|
| Michigan      | 15               | 719647.5           | 430               |
| Pennsylvania  | 18               | 719407.3           | 431               |
| Texas         | 35               | 714535.6           | 432               |
| Louisiana     | 7                | 711751.8           | 433               |
| California    | 54               | 711566.3           | 434               |
| Georgia       | 14               | 710789.9           | 435               |
| <hr/>         |                  |                    |                   |
| Alabama       | 7                | 709229.1           | 436               |
| New York      | 28               | 707159.5           | 437               |
| Ohio          | 17               | 701909.1           | 438               |
| Massachusetts | 10               | 700912.6           | 439               |
| Florida       | 28               | 700177.3           | 440               |

# Reapportionment Court Challenges

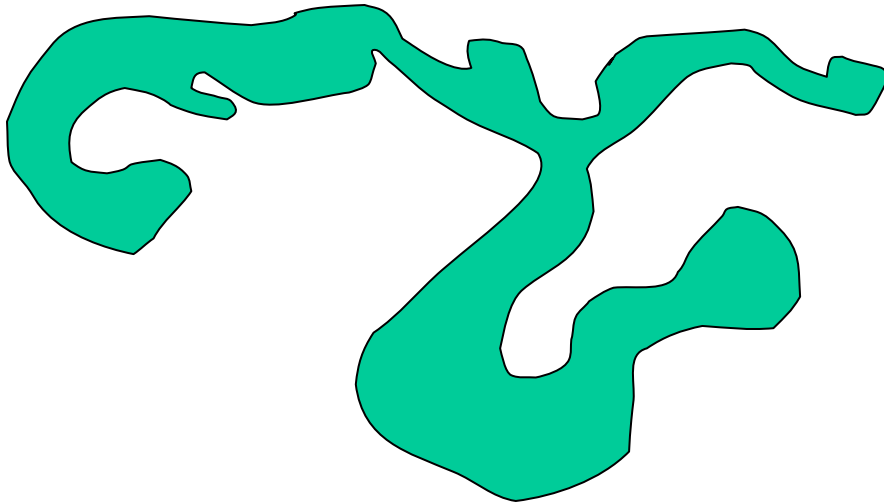
- *Department of Commerce v. United States House of Representatives*, 525 U.S. 316 (1999)
  - The Census Bureau can't sample
- *Utah v. Evans*
  - “Hot deck” imputation challenged
  - Mormon missionaries miscounted

# Districting principles

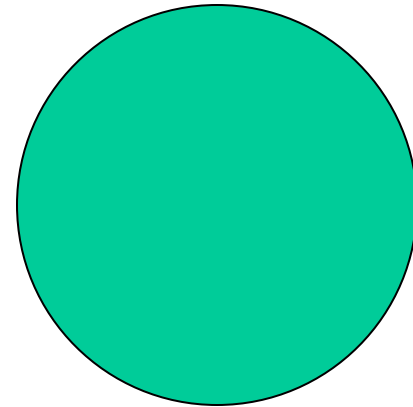
- Compactness and contiguity
- Equal population
- Respect existing political communities
- Partisan (or other) fairness

# Compactness

- General idea:  $\min(\text{border}/\text{area})$

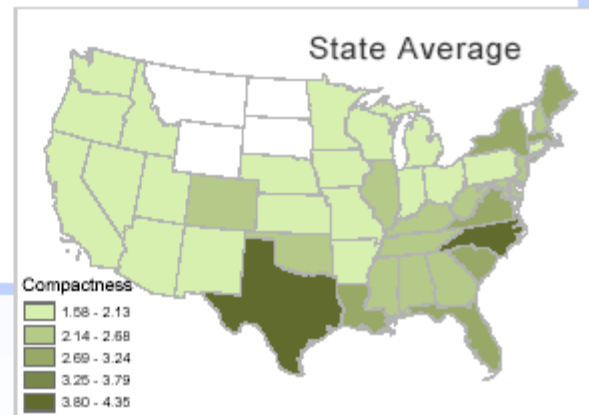
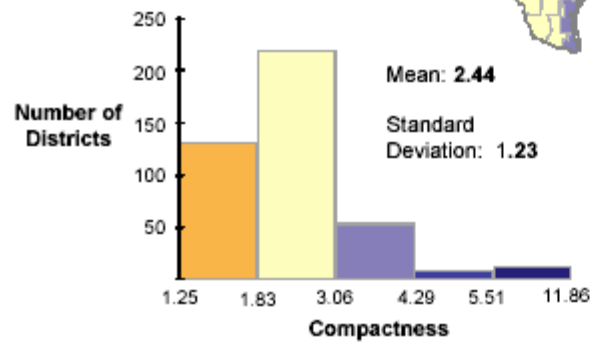
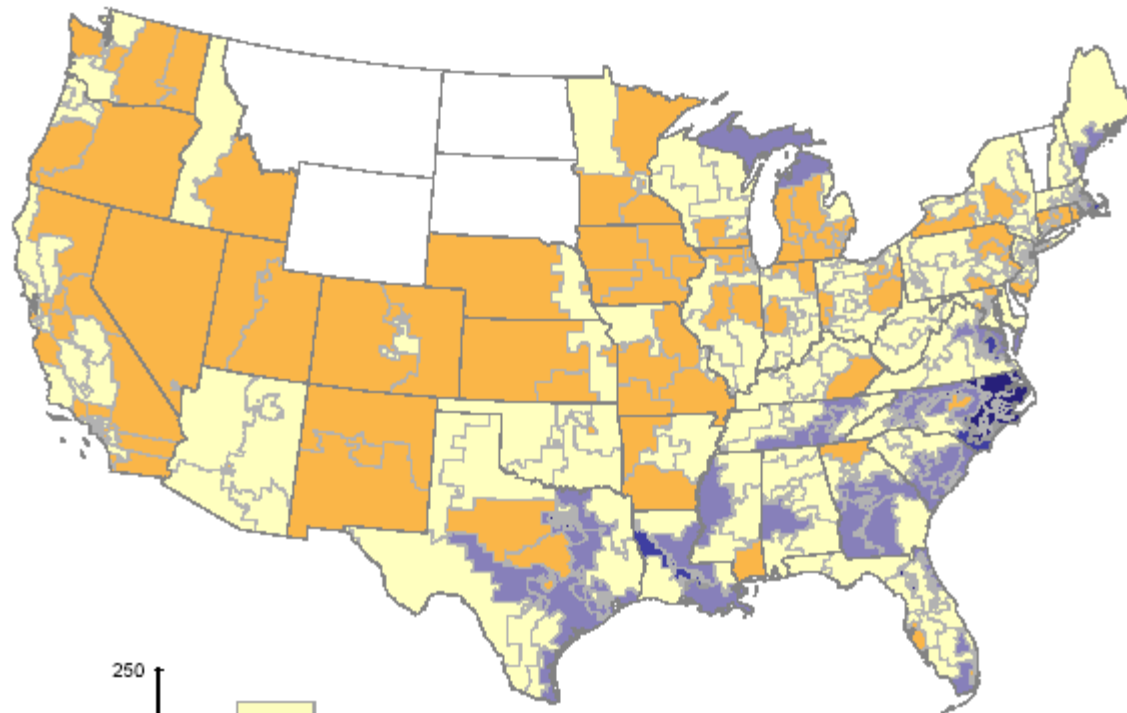


Bad



Good

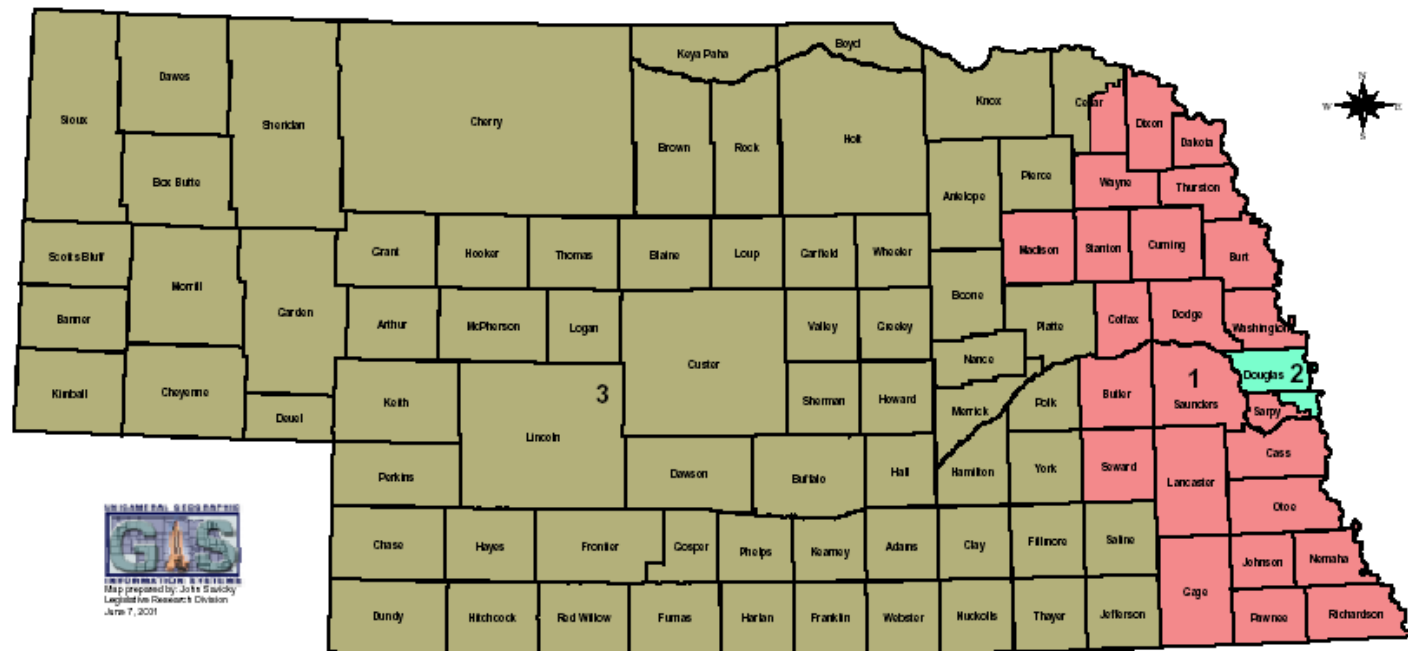
# 104th Congressional Districts January 1995 to January 1997



# Compactness in the real world: Nebraska 2000

U.S. House of Representatives - LB 851 (2001)

(Districts take effect September 1, 2001)

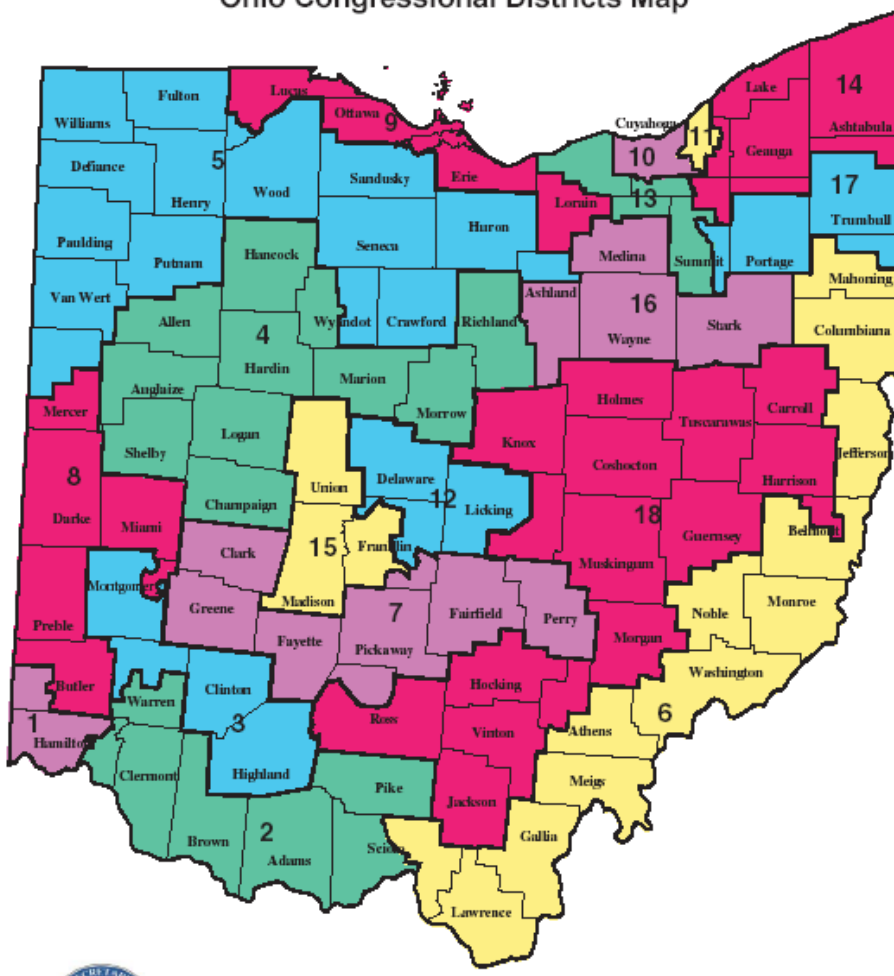


LEGISLATIVE GEOGRAPHIC  
GAS  
LEGISLATIVE GEOGRAPHIC  
Map prepared by: John S. Gaskin  
Legislative Research Division  
June 7, 2001

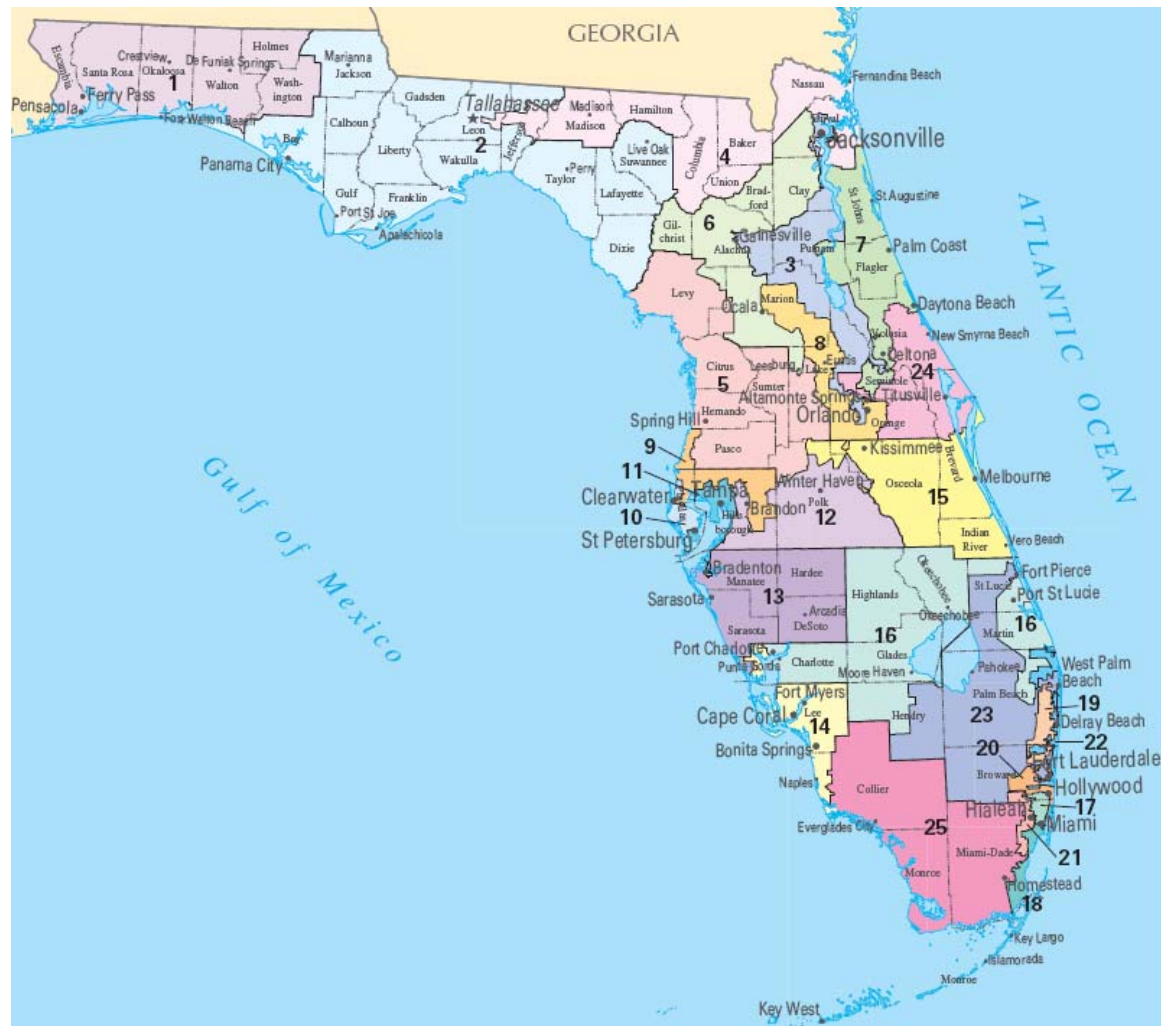
# Ohio 2000

2002 - 2012

## Ohio Congressional Districts Map

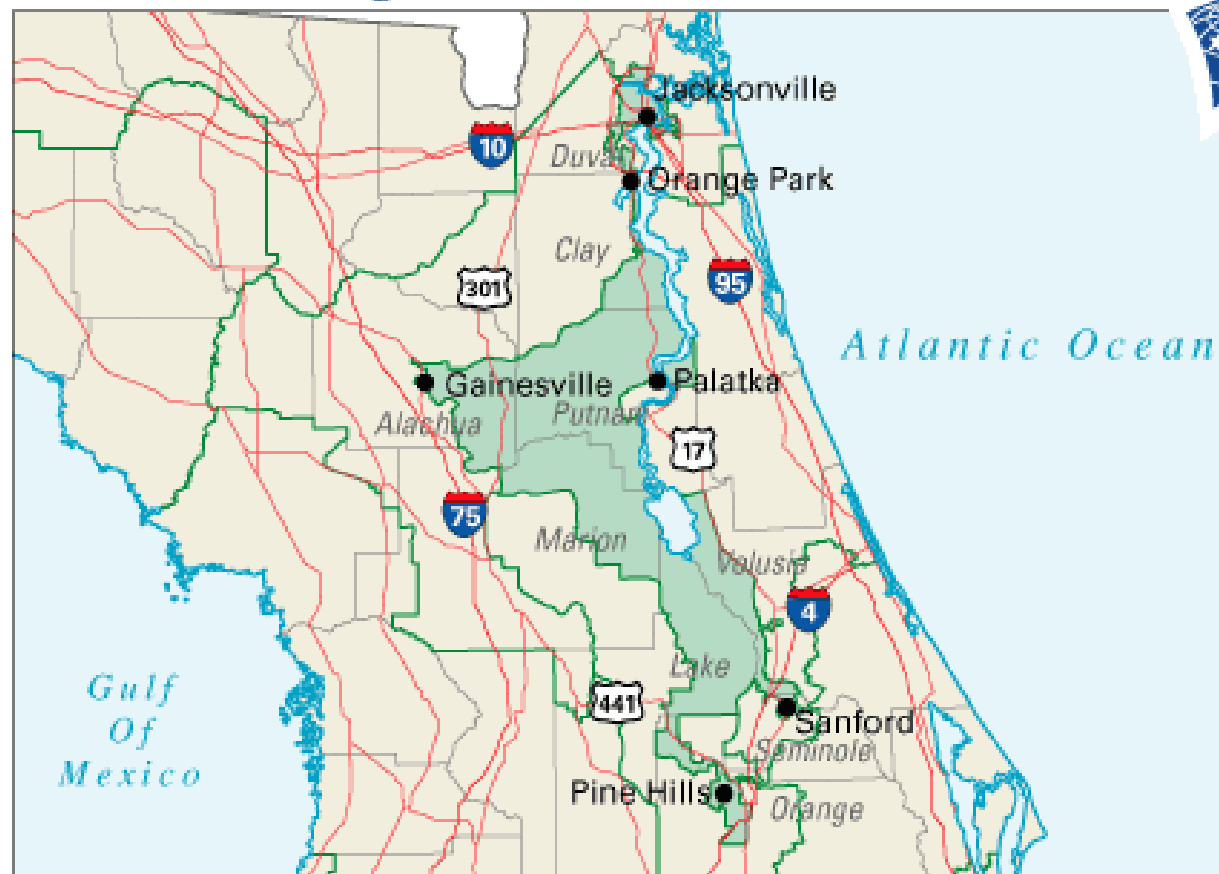


# Compactness in the real world: Florida



# Florida 3<sup>rd</sup> district

## *Congressional District 3*

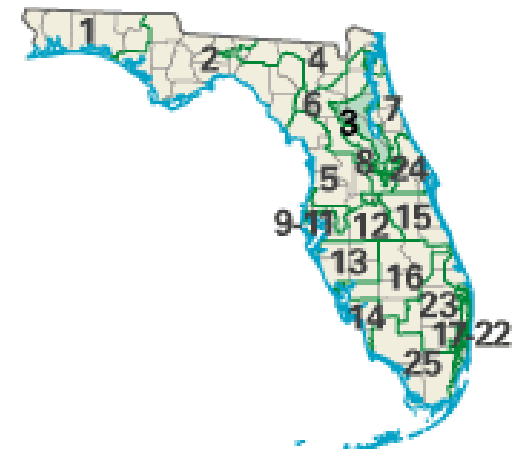


0 50 100 Miles



nationalatlas.gov™

**3** Congressional District  
Marion County



*Florida (25 Districts)*

# Florida 22<sup>nd</sup> District

## *Congressional District 22*



[nationalatlas.gov](http://nationalatlas.gov)<sup>TM</sup>

**22** Congressional District

*Palm Beach* County

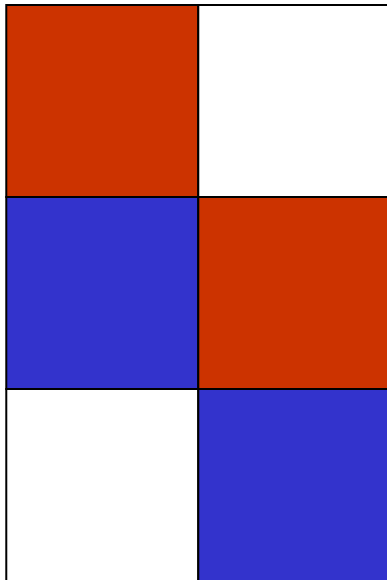


*Florida (25 Districts)*

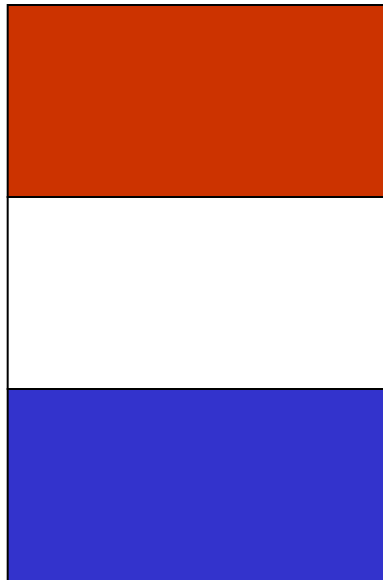
# Contiguity

- General idea: keep the district together

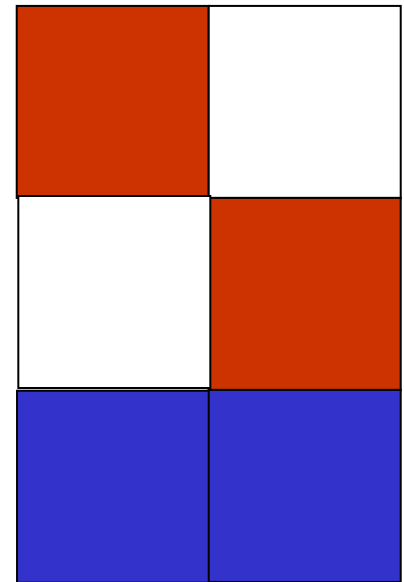
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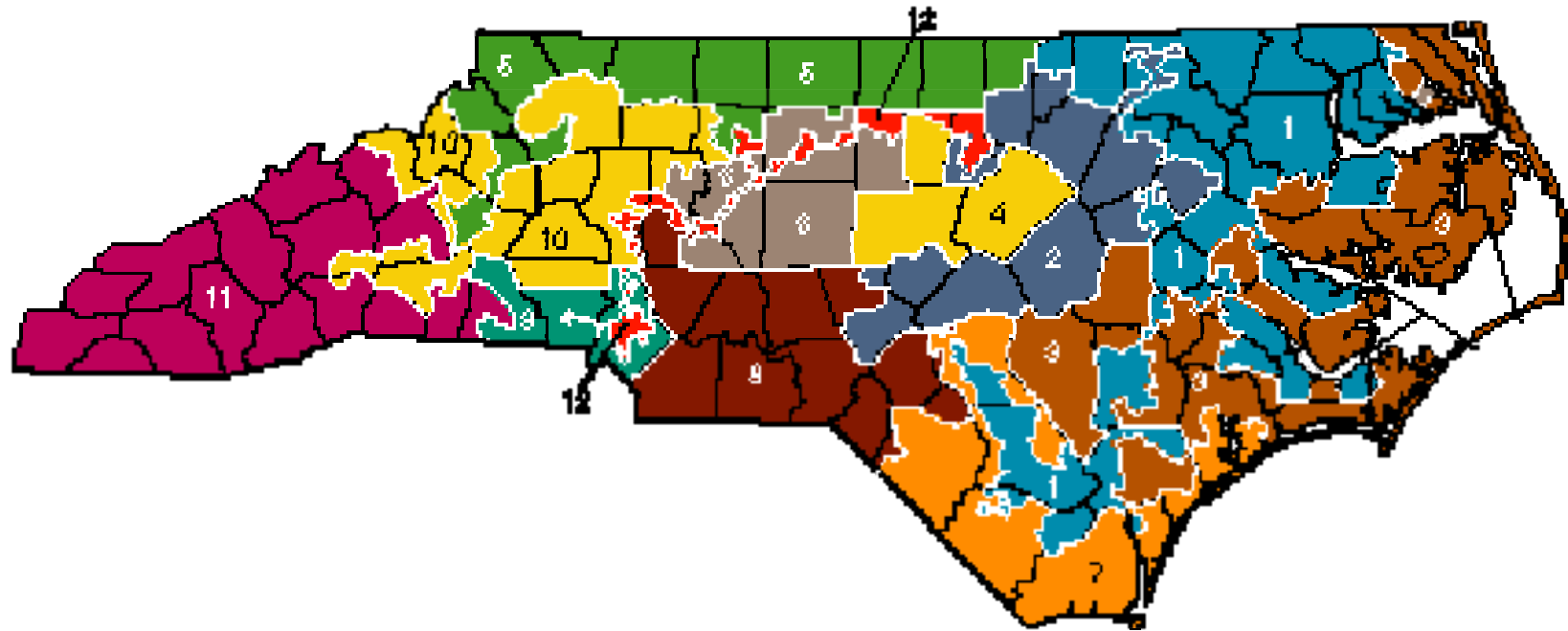
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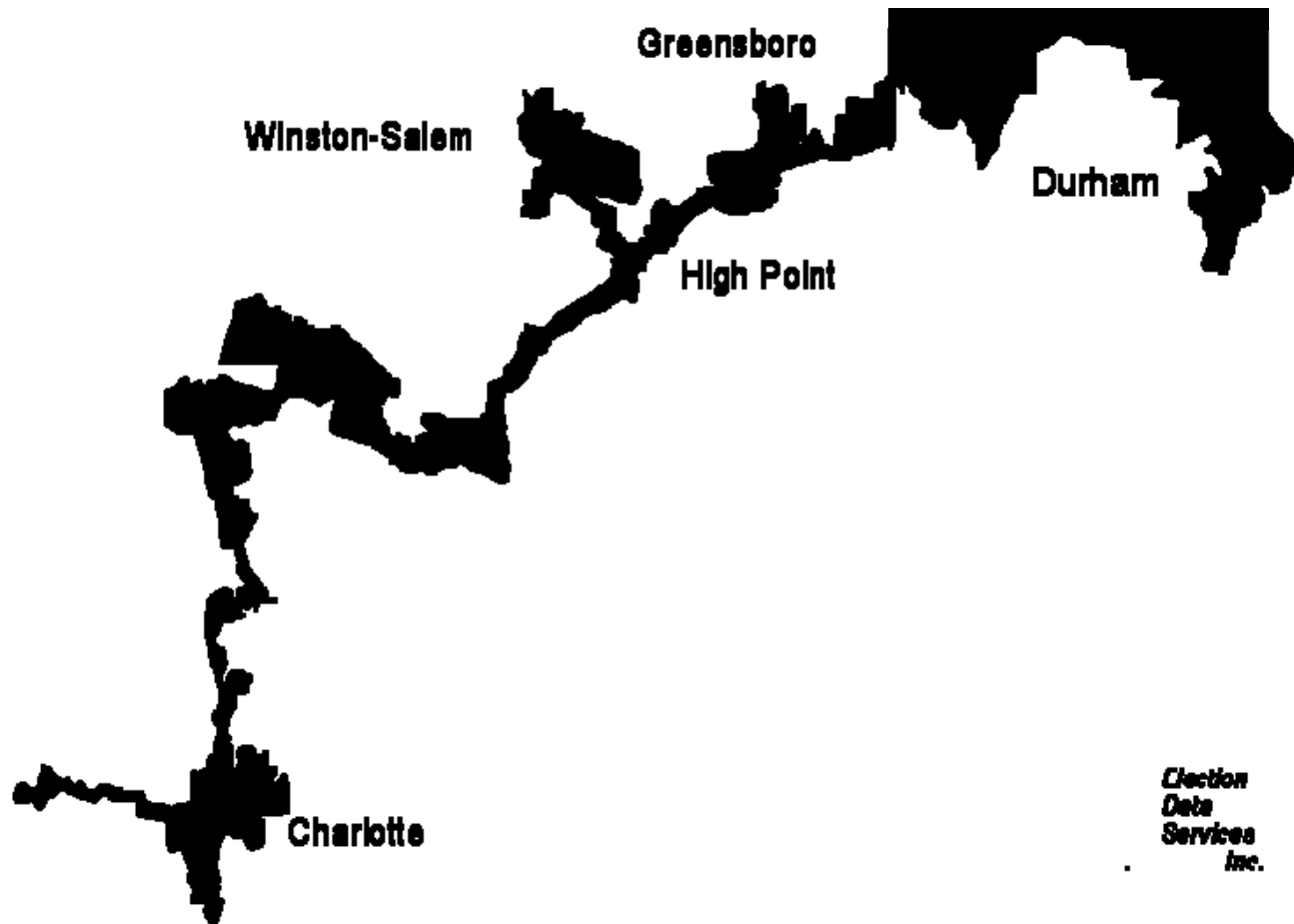
?



# Contiguity in the real world: NC 1990

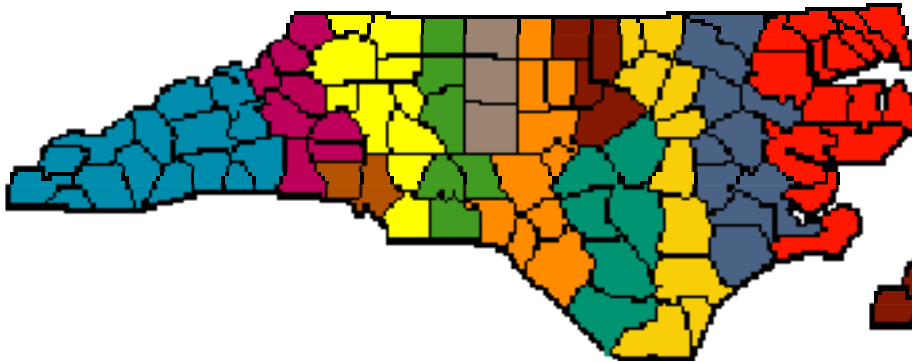


# 12<sup>th</sup> District Close-up

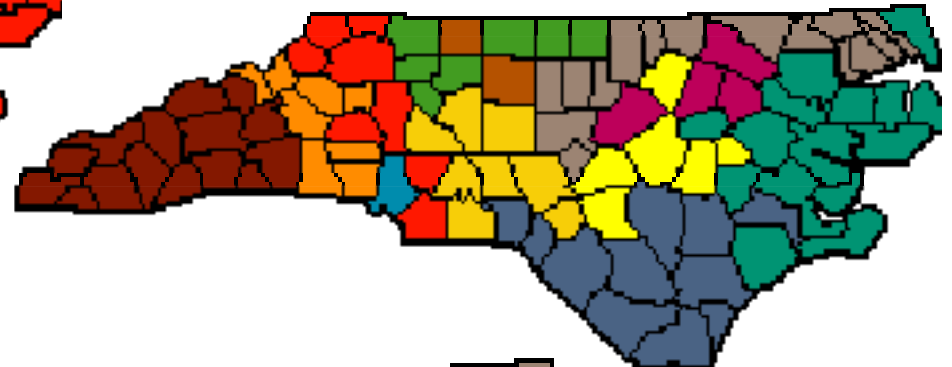


# An aside: “Machine politics” in *The American Scientist*

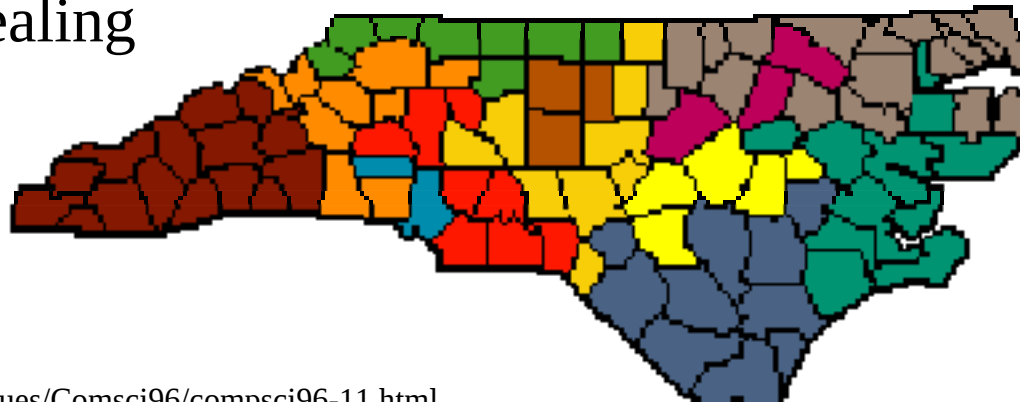
Cake-cutting algorithm



Greedy algorithm



Simulated annealing

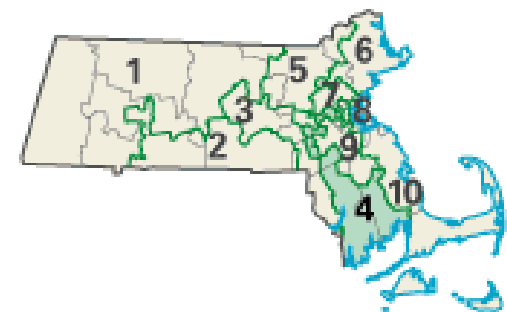


# Contiguity in Mass. 4<sup>th</sup> CD, 2000

## *Congressional District 4*



- 4** Congressional District
- Bristol County



*Massachusetts (10 Districts)*

# Equal population

- Implied by having districts
- Bad: Many states before 1960s
  - Illinois in 1940s (112k-914k)
  - Georgia in 1960s (272k-824k)
- Good: equality?

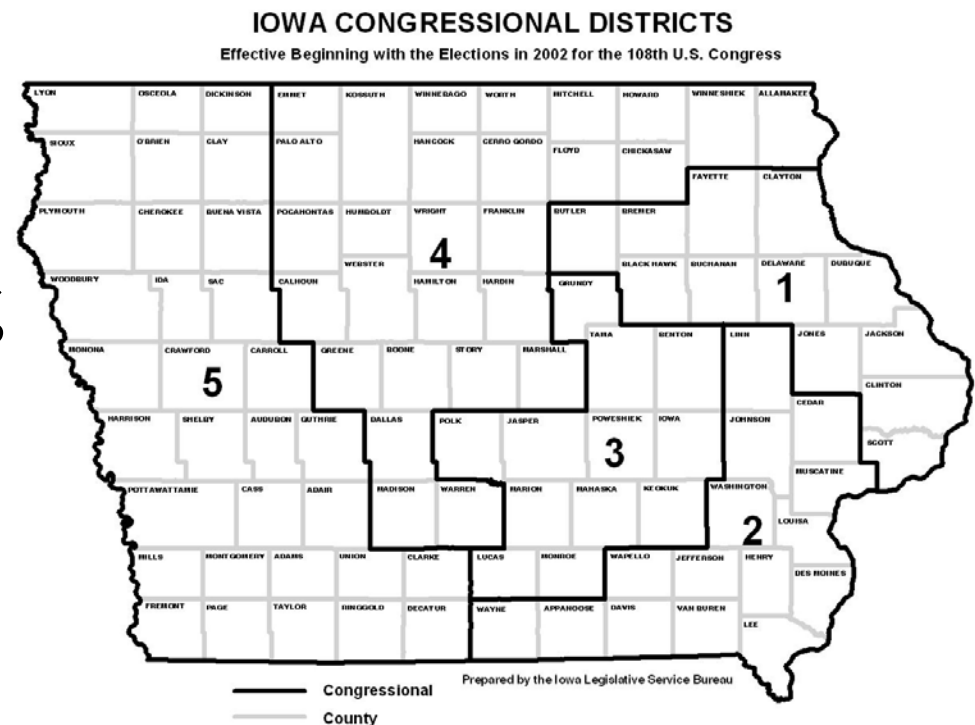
# Equality in 2000

|               | <b>Ideal District Size</b> | <b>Percent Overall Range</b> | <b>Overall Range (# of people)</b> |                | <b>Ideal District Size</b> | <b>Percent Overall Range</b> | <b>Overall Range (# of people)</b> |
|---------------|----------------------------|------------------------------|------------------------------------|----------------|----------------------------|------------------------------|------------------------------------|
| Alabama       | 636,300                    | 0.00%                        | -                                  | Montana        | N/A                        | N/A                          | N/A                                |
| Alaska        | N/A                        | N/A                          | N/A                                | Nebraska       | 570,421                    | 0.00%                        | 0                                  |
| Arizona       | 641,329                    | 0.00%                        | 0                                  | Nevada         | 666,086                    | 0.00%                        | 6                                  |
| Arkansas      | 668,350                    | 0.04%                        | 303                                | New Hampshire  | 617,893                    | 0.10%                        | 636                                |
| California    | 639,088                    | 0.00%                        | 1                                  | New Jersey     | 647,257                    | 0.00%                        | 1                                  |
| Colorado      | 614,465                    | 0.00%                        | 2                                  | New Mexico     | 606,349                    | 0.03%                        | 166                                |
| Connecticut   | 681,113                    | 0.00%                        | 0                                  | New York       | 654,360                    | 0.00%                        | 1                                  |
| Delaware      | N/A                        | N/A                          | N/A                                | North Carolina | 619,178                    | 0.00%                        | 1                                  |
| Florida       | 639,295                    | 0.00%                        | 1                                  | North Dakota   | N/A                        | N/A                          | N/A                                |
| Georgia       | 629,727                    | 0.01%                        | 72                                 | Ohio           | 630,730                    | -                            | -                                  |
| Hawaii        | 582,234                    | -                            | -                                  | Oklahoma       | 690,131                    | -                            | -                                  |
| Idaho         | 646,977                    | 0.60%                        | 3,595                              | Oregon         | 684,280                    | 0.00%                        | 1                                  |
| Illinois      | 653,647                    | 0.00%                        | 11                                 | Pennsylvania   | 646,371                    | 0.00%                        | 19                                 |
| Indiana       | 675,609                    | 0.02%                        | 102                                | Rhode Island   | 524,160                    | 0.00%                        | 6                                  |
| Iowa          | 585,265                    | 0.02%                        | 134                                | South Carolina | 668,669                    | 0.00%                        | 2                                  |
| Kansas        | 672,105                    | 0.00%                        | 33                                 | South Dakota   | N/A                        | N/A                          | N/A                                |
| Kentucky      | 673,628                    | 0.00%                        | 2                                  | Tennessee      | 632,143                    | 0.00%                        | 5                                  |
| Louisiana     | 638,425                    | 0.04%                        | 240                                | Texas          | 651,619                    | 0.00%                        | 1                                  |
| Maine         | 637,462                    | -                            | -                                  | Utah           | 744,390                    | 0.00%                        | 1                                  |
| Maryland      | 662,061                    | 0.00%                        | 2                                  | Vermont        | N/A                        | N/A                          | N/A                                |
| Massachusetts | 634,910                    | 0.39%                        | -                                  | Virginia       | 643,501                    | 0.00%                        | 38                                 |
| Michigan      | 662,563                    | 0.00%                        | 1                                  | Washington     | 654,902                    | 0.00%                        | 7                                  |
| Minnesota     | 614,935                    | 0.00%                        | 1                                  | West Virginia  | 602,781                    | -                            | -                                  |
| Mississippi   | 711,165                    | 0.00%                        | 10                                 | Wisconsin      | 670,459                    | 0.00%                        | 5                                  |
| Missouri      | 621,690                    | 0.00%                        | 1                                  | Wyoming        | N/A                        | N/A                          | N/A                                |

Source: National Conf. of State Leg.

# Respect for existing political communities

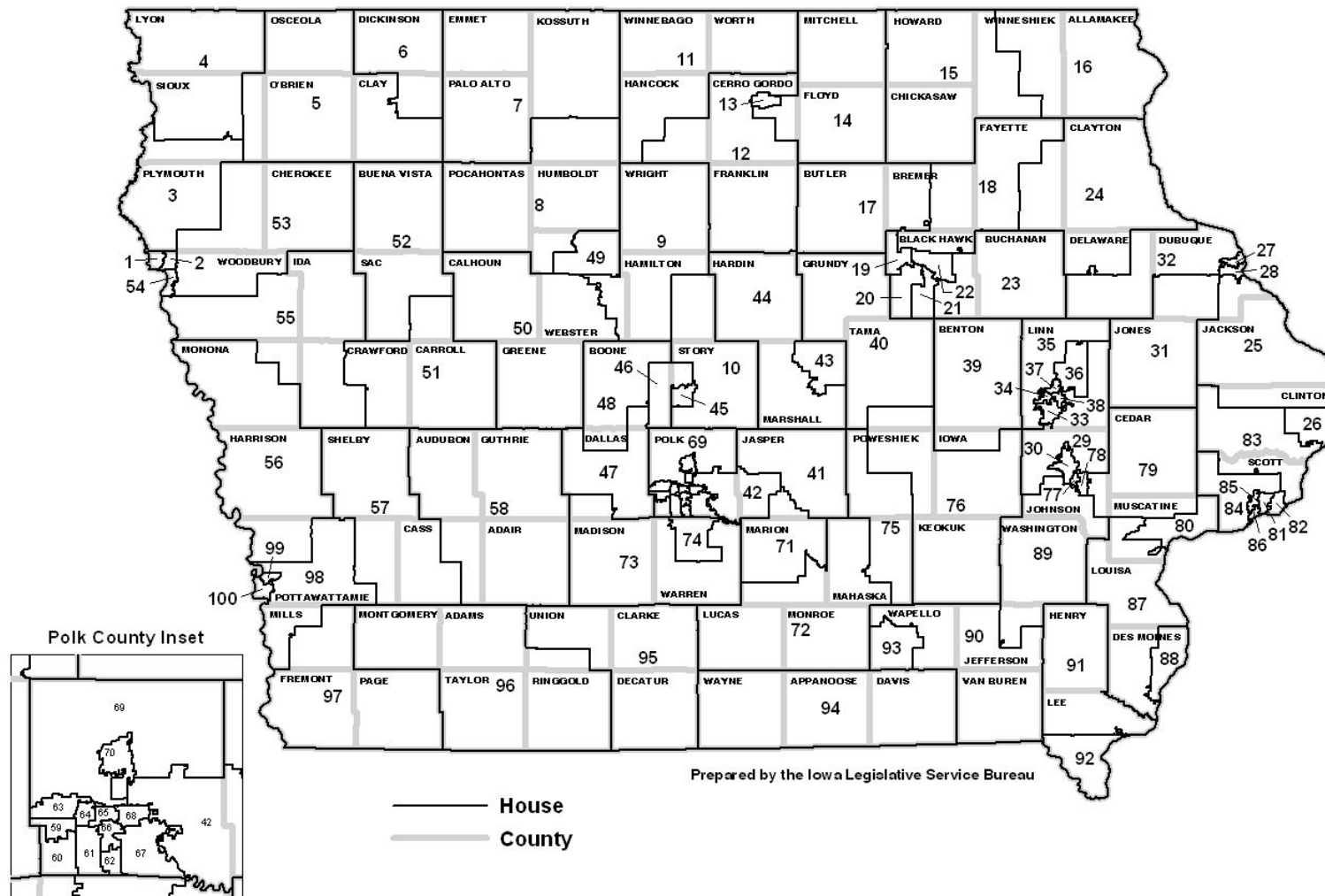
- Iowa
- Politicians like it
- May be better for citizens
- Getting more difficult with computer drafting of districts and (nearly) equal populations



# But, the Assembly's another matter

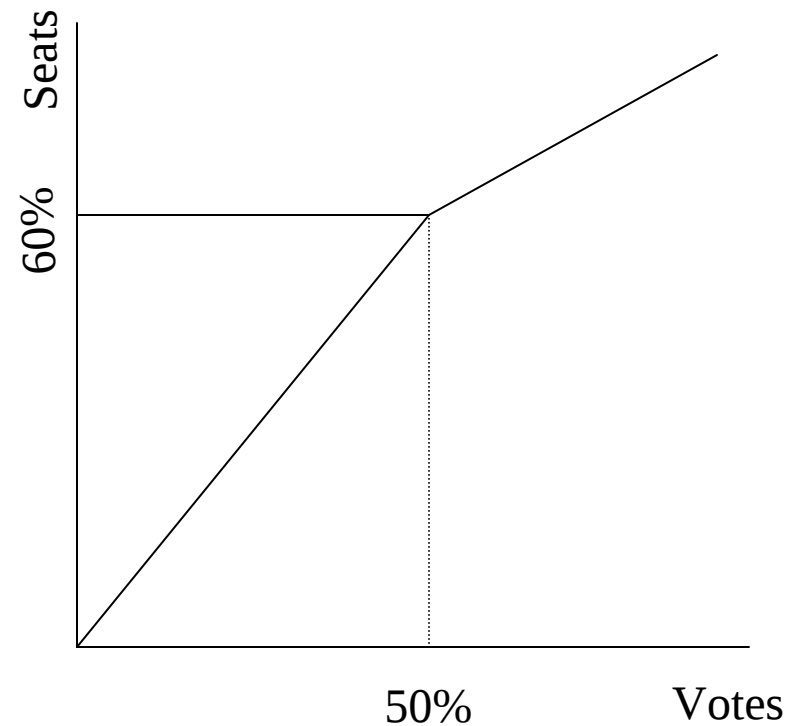
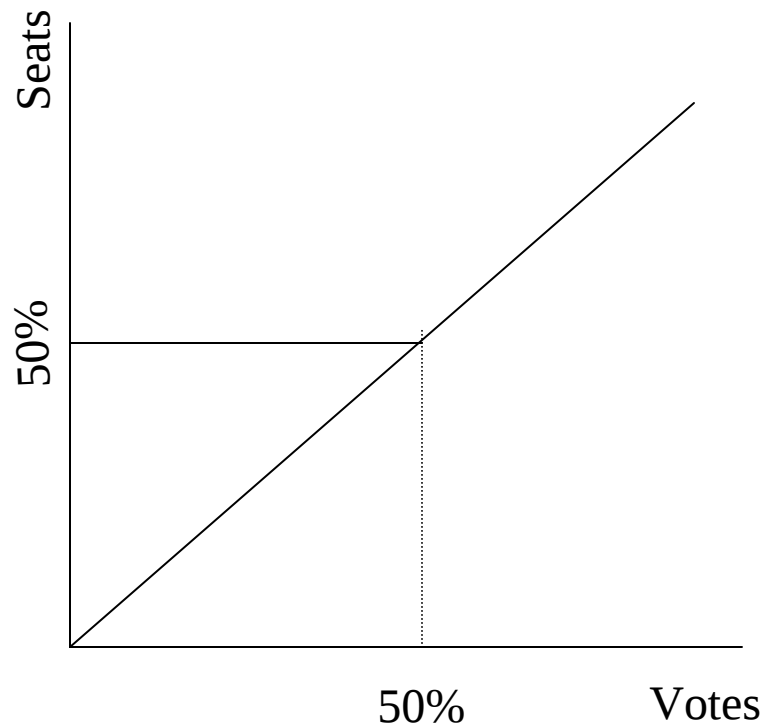
## IOWA HOUSE DISTRICTS

Effective Beginning with the Elections in 2002 for the 80th Iowa General Assembly



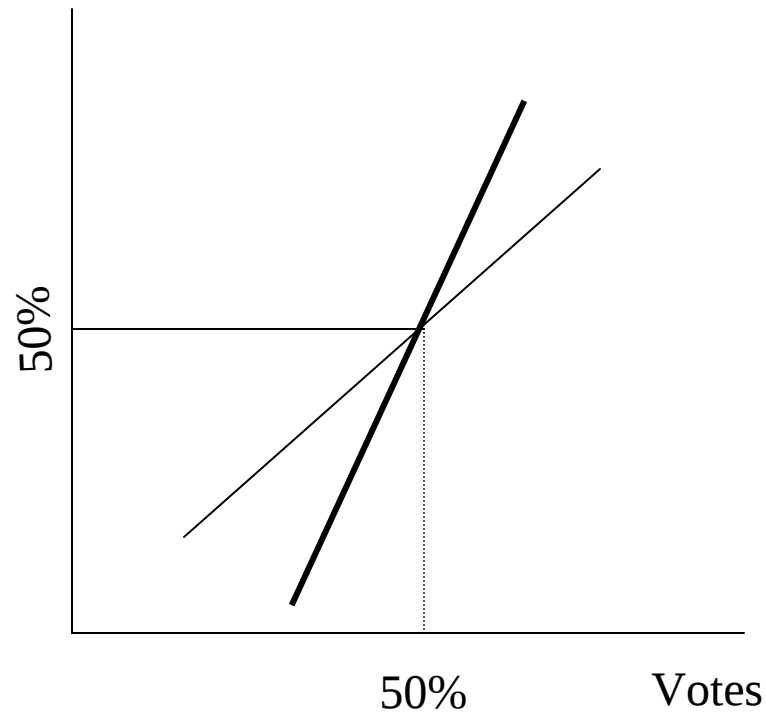
# Partisan Fairness

- Results should be symmetrical
- Results should be unbiased



# Partisan Fairness

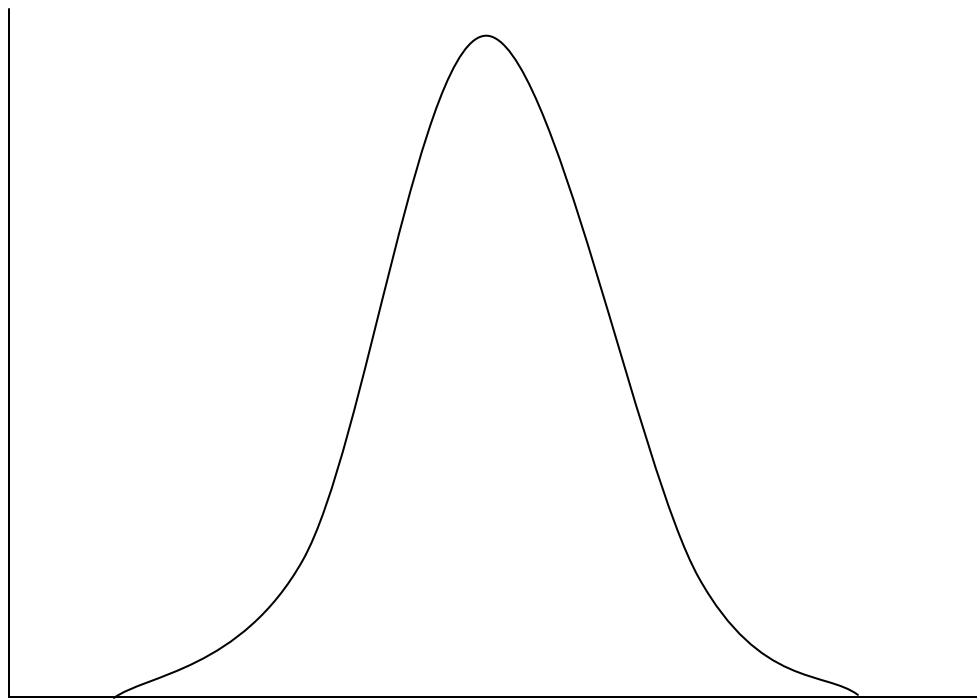
- What is the right responsiveness?



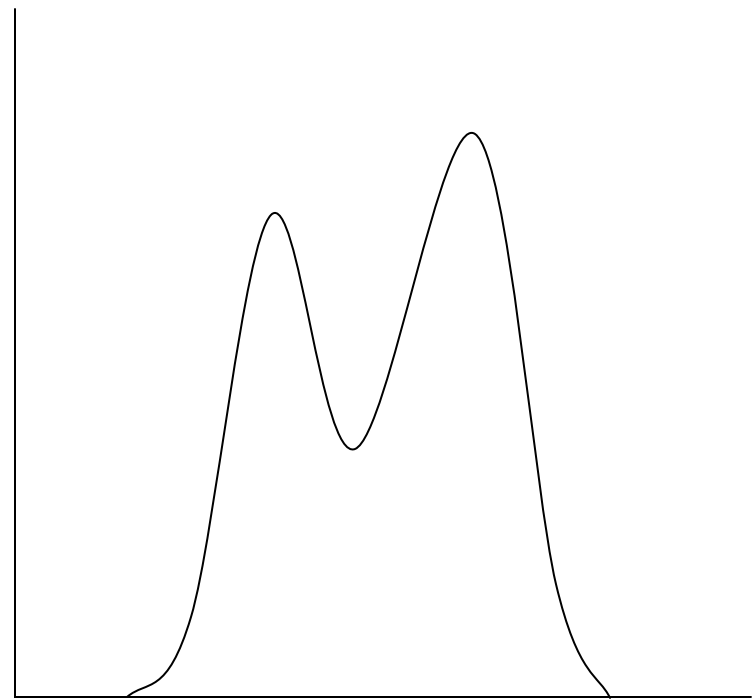
# Swing ratio

- Measure of responsiveness
- Concept:
  - Swing ratio =  $\Delta\text{Seats}_p / \Delta\text{Votes}_p$
- Various ways to measure

# Why the swing ratio is rarely 1

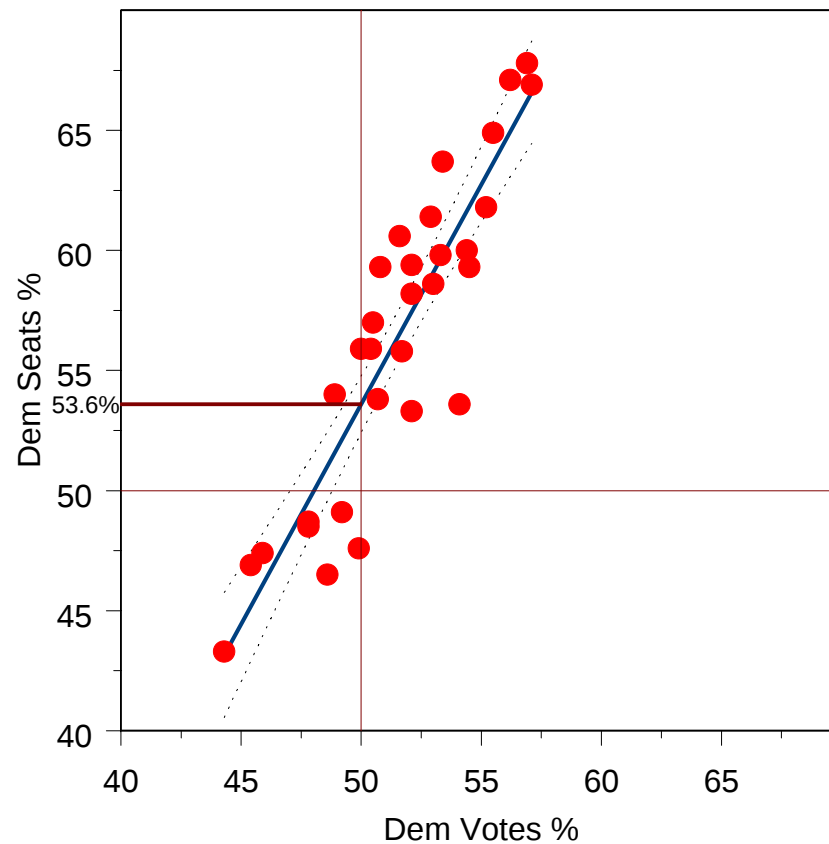


% Dem vote



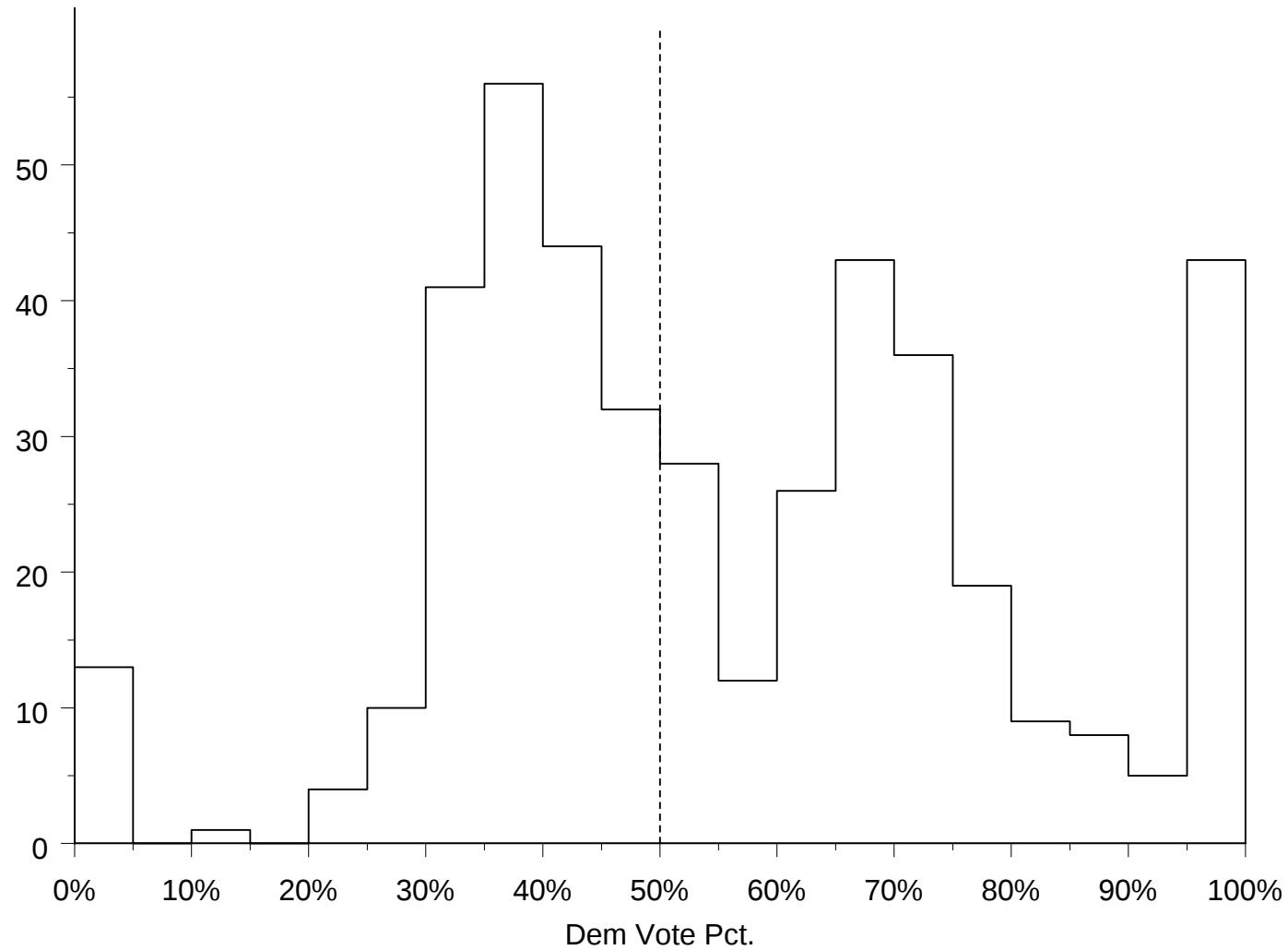
% Dem vote

# Empirical swing ratio (with data from 1946-2006)

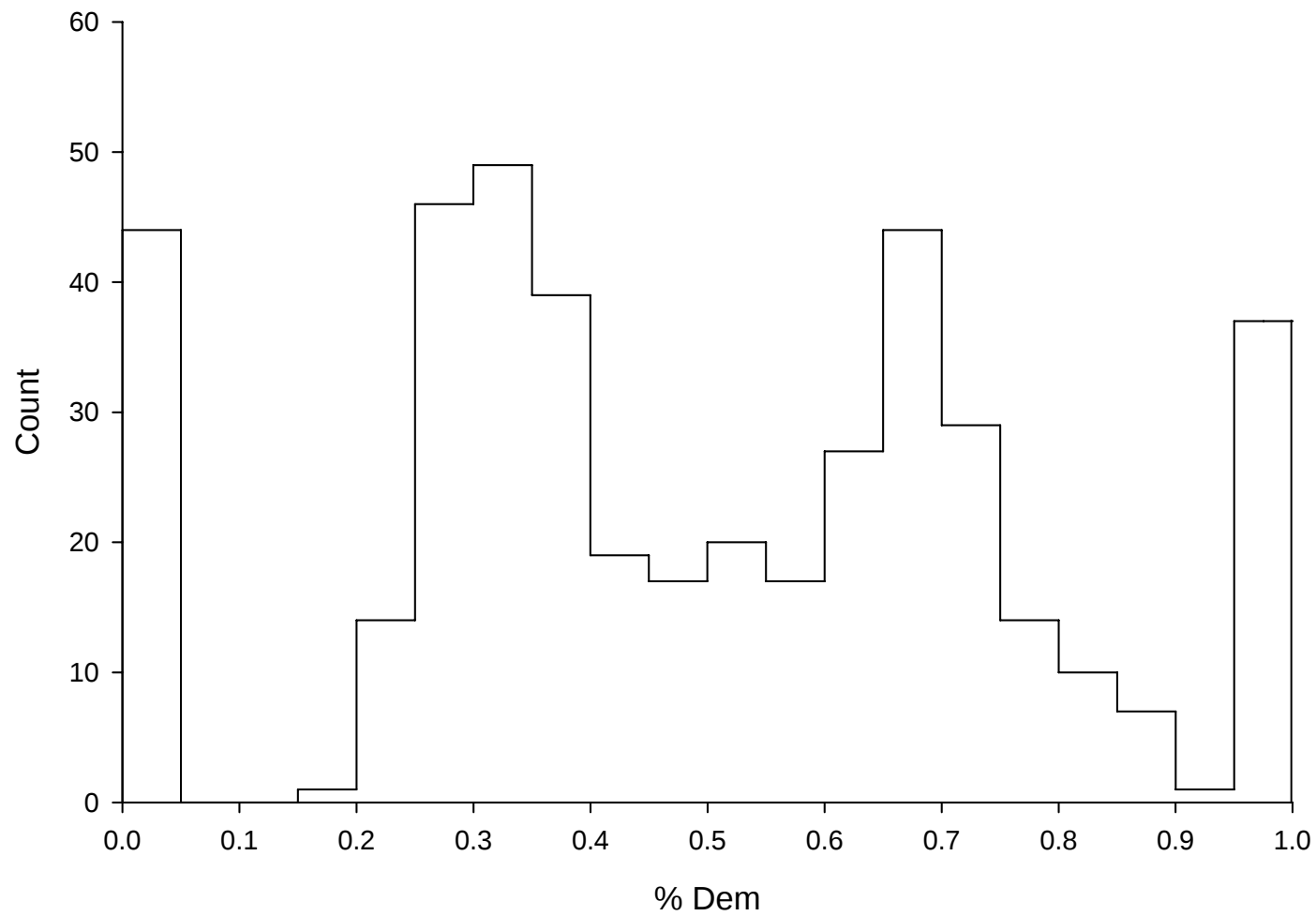


Swing ratio =  
1.83:1

# Mayhew Diagram 2006



# Mayhew Diagram, 2002



# Racial fairness

- From 15<sup>th</sup> amendment
  - “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
  - Prevented dilution
  - 1980: Mobile v. Bolden
    - S.C. says you have to show intent
  - 1982: VRA extension allows *effect*
  - 1990: Justice dept. moved to requiring *maximizing* minority representation through pre-clearance

# Some Court Cases

- Equal population
  - Colgrave v. Green (1946): “political question”
  - Baker v. Carr (1962): Tennessee state districts
  - Gray v. Sanders (1963): Ga. unit rule
  - Wesberry v. Sanders (1964): “one person, one vote” doctrine
  - Veith v. Pennsylvania (2002): no deviation allowed

# VRA Cases

- 1965: Dilution outlawed
- 1982: Extension + Republican DOJ = Racial gerrymanders
- 1993: Shaw v. Reno
  - Race must be narrowly tailored to serve a compelling gov't interest, or....
  - Sandra is the law
  - Non-retrogression doctrine
  - Districting overturned in GA, NC, VA, FL, TX, LA, NY (but not IL)
- Page v. Bartels (2001): incumbency protection OK, even if it's only minority incumbents

# A Word about Massachusetts

