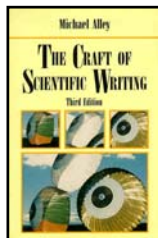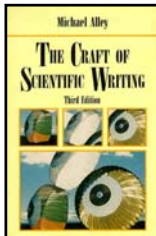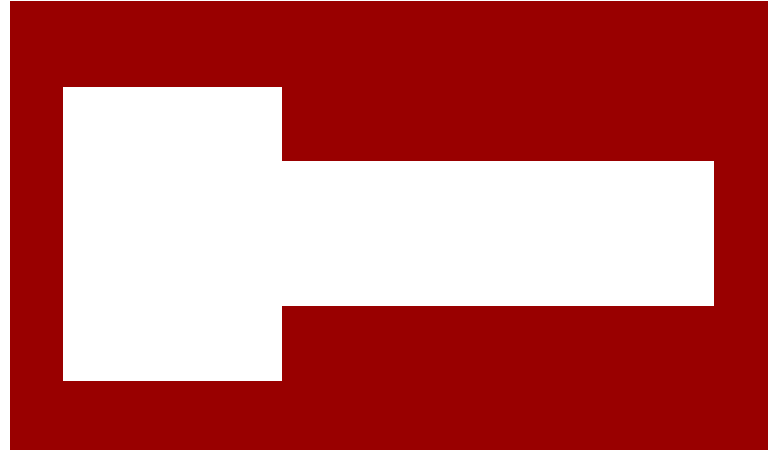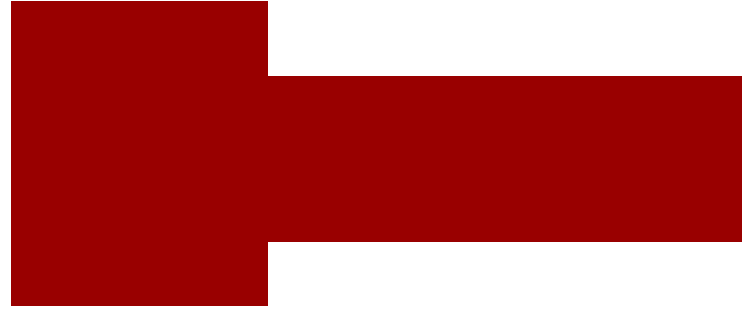# Proposals
in Scientific Writing

These visuals, which are used in graduate and undergraduate engineering courses at Virginia Tech, come from Chapter 12 in *The Craft of Scientific Writing* (3rd ed., Springer-Verlag).

Writing Proposals

But in science the credit goes to the man who convinces the world, not to the man to whom the idea first occurs.

Sir Francis Darwin

You can divide proposals into three classes
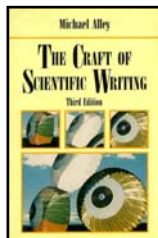
| Solicited proposal in which client wants specific work | Defense proposal to build fighter jet |

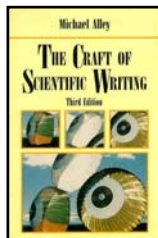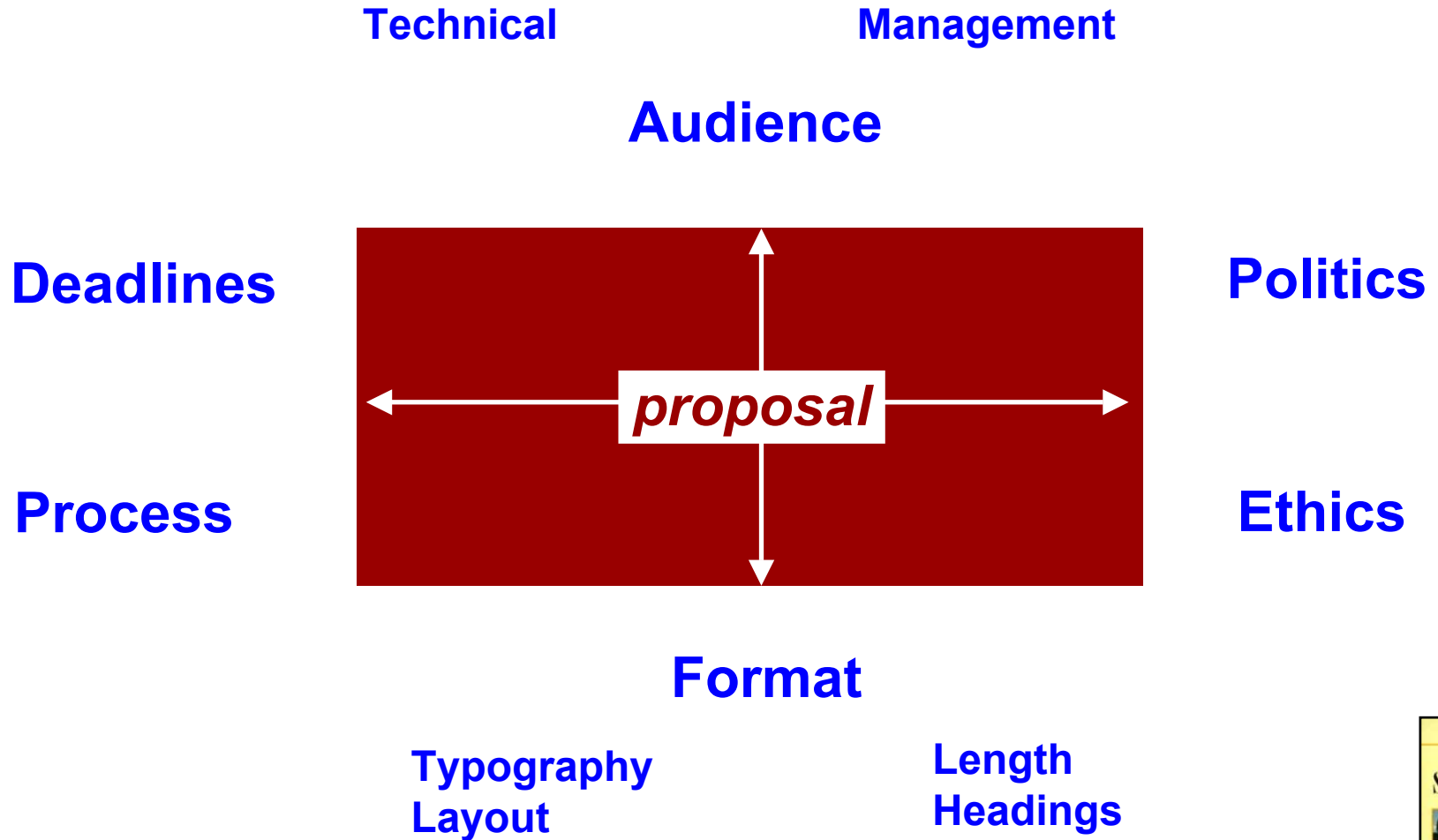| Solicited proposal in which client wants general work | NSF research proposal |

| Unsolicited proposal in which client is asked to fund work | Engineer suggesting a new manufacturing process to management |

A proposal is a plan for solving a problem

Technical   Management

Audience

Deodlines   *proposal*   **Politics**

Process   **Ethics**

Format

Typography   Length
Layout   Headings

Understanding the readers' needs is important in requested proposals

Question has arisen over whether pollution is killing the fish in Fire Lake

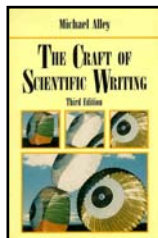**Criteria for RFP for counting of fish:**
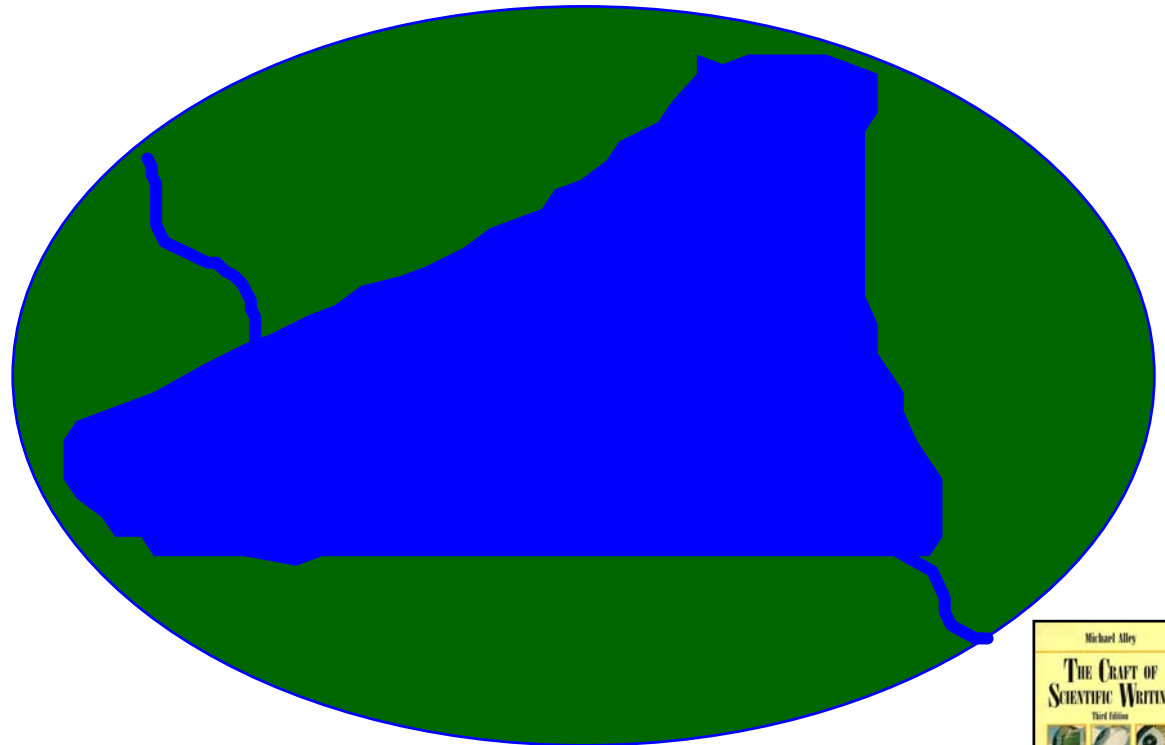
Costs of count?
Schedule for count?
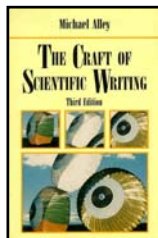Qualifications of counter?
Accuracy of count?
Kind of results?
Effect of counting on fish population?

The proposal's kernel is the statement of the problem and the proposed plan
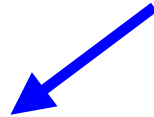
Statement of Problem

Proposed Plan

A proposal presents a statement of the problem

New methods are needed to detect plastic explosives in airline baggage

**Plastic explosives pose a serious threat to air travel**

- **Statistics on the aircraft downed by plastic explosives**

- **Example aircraft downed by plastic explosives (Pan Am Flight 103)**

Conventional methods cannot effectively detect plastic explosives

- **Problems that conventional x-rays have detecting plastic explosives**

- **Problems that dogs have detecting plastic explosives**

Evidence that conventional methods failed in detecting plastic explosives
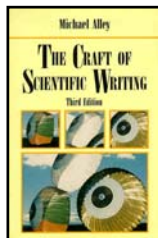
The proposed plan defines the scope and limitations of the work

**Size of specific airport not considered**

Methods not considered: conventional x-rays hand searches dogs

Evaluation of Methods to Detect Plastic Explosives in Airline Baggage

Three methods:
x-ray backscatter system
nitrogen sniffer system
thermal neutron system

Criteria for evaluation:
accuracy of detection
false alarm rate
cost (initial, maintenance)
speed
ease of use

Effectiveness at detecting conventional explosives not considered

Michael Alley
THE CRAFT OF SCIENTIFIC WRITING
Third Edition
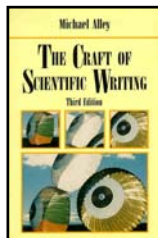
The proposed plan shows
how the work will be performed

Evaluation of Methods for Detecting
Explosives in Airline Baggage

Criteria for Comparison

Cost

      initial cost

      maintenance cost

Accuracy

      explosive types detected

      percentage detected

      false alarm rate

Ease of Operation

Speed

Methods for Comparison

Literature Review: cost

Experimental Test on 1000 bags:

      accuracy

      speed

Survey of Users: ease of operation
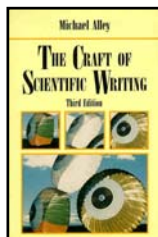
The proposed plan shows why you're the one to do the work

Budget

Qualifications

Résumé

Education	University of Texas MS, Mechanical Engineering August 1995
	University of Wisconsin BS, Mechanical Engineering May 1993
Experience	Ford Motor Company 1997–present Manager
	Cummins 1995–1996 Research Engineer
Awards	Steuber Award, 1992 Phi Kappa Hi, 1993 Dean's List, 1991–1993

Schedule

Phase I

Phase II

Phase III

Phase IV

Phase V

Michael Alley
THE CRAFT OF SCIENTIFIC WRITING
Third Edition
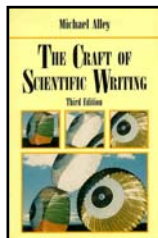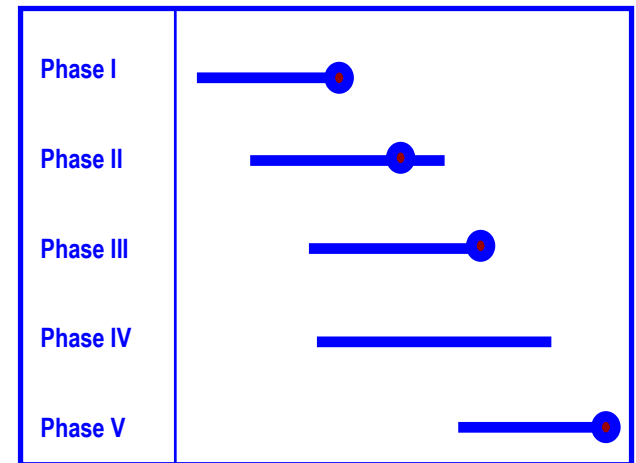
Examples anchor abstract generalities
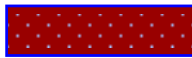
By the late Middle Ages, cities throughout Europe were building Gothic cathedrals. The only way, however, that architects could test a new design was to build the cathedral, a process that took more than forty years. Unfortunately, many cathedrals caved in during or after construction. What took forty years to test in the Middle Ages could have been done in minutes on a supercomputer.
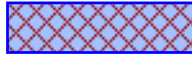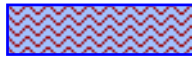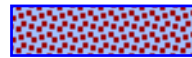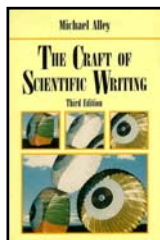
William Wilson

Deductive reasoning depends on definition
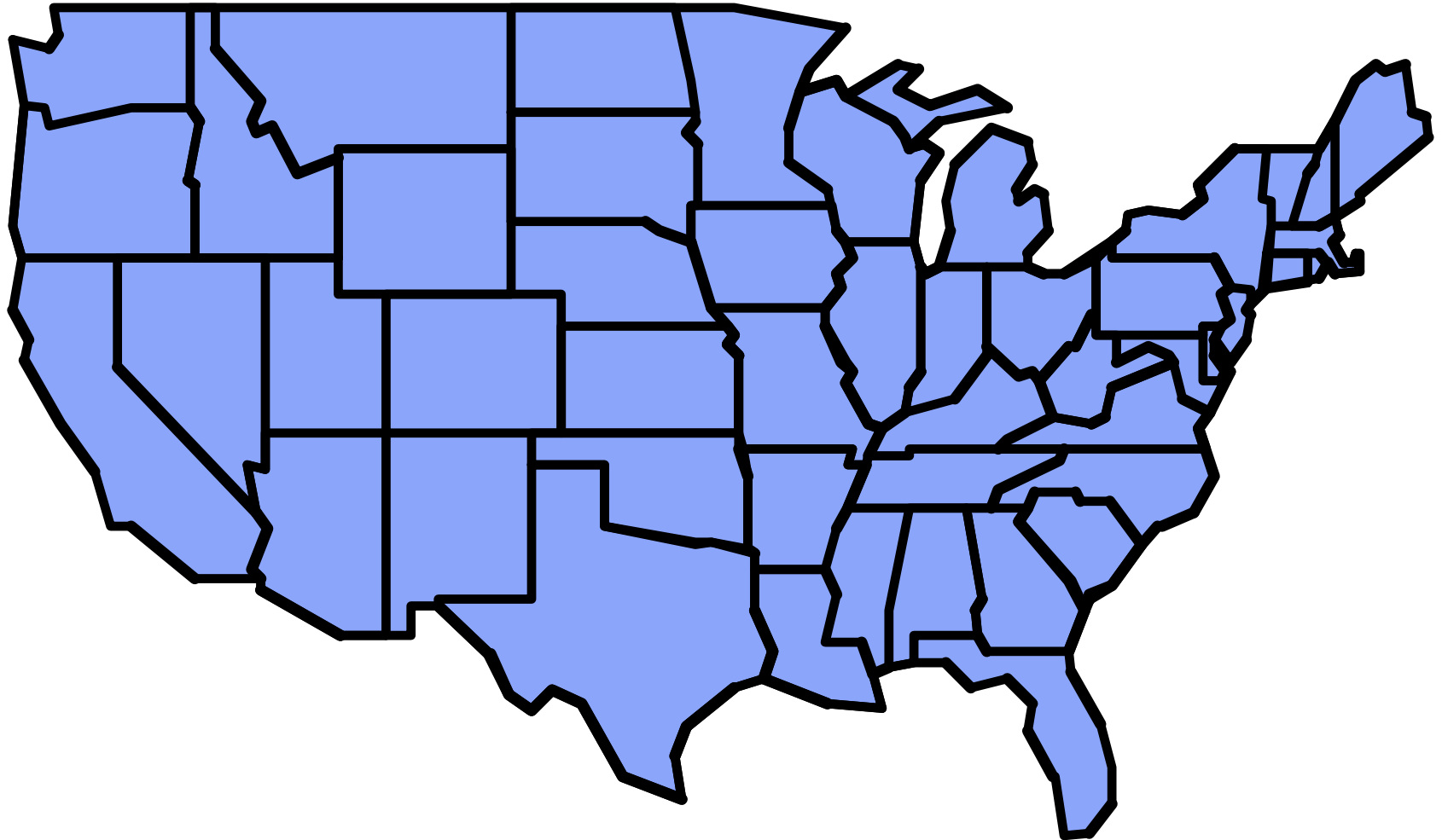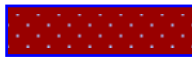
Legend	
Annual rainfall > 48 inches	Coastal sedimentation
More than 120 freezing days	High seismic hazard
High relief and mountains	Limits of glaciation

Deductive reasoning depends on definition

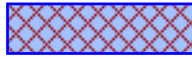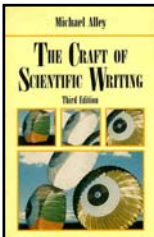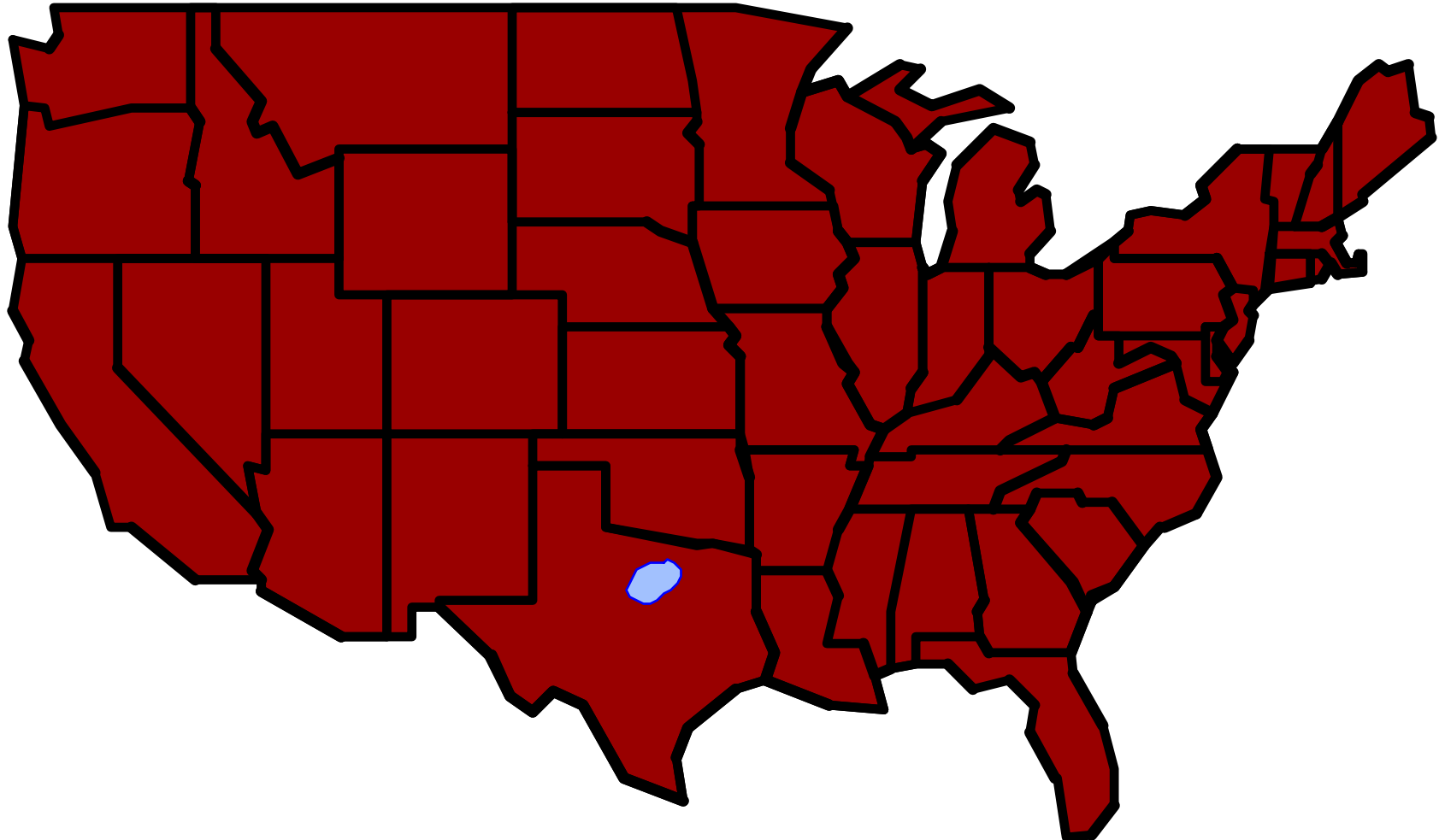Annual rainfall > 48 inches
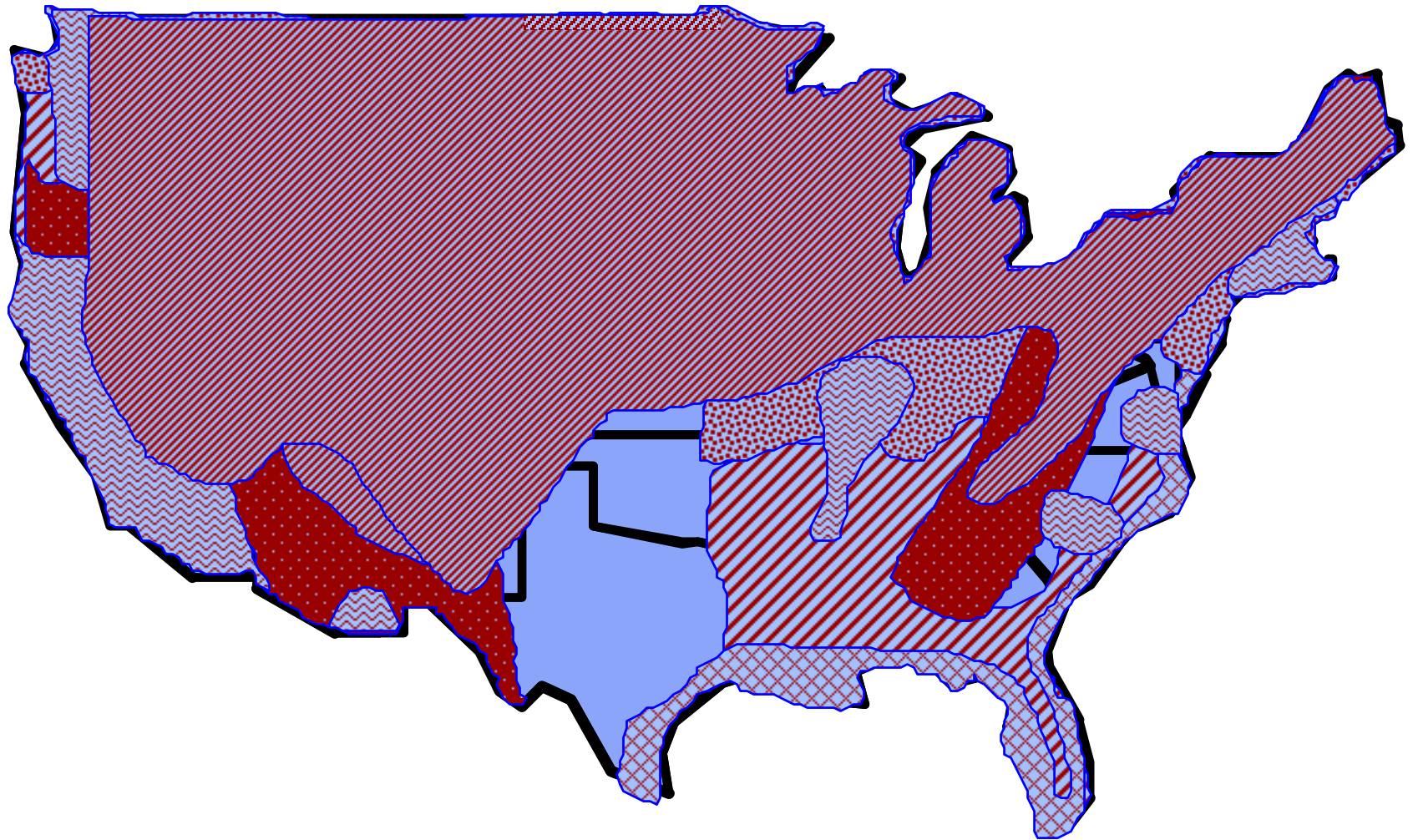
More than 120 freezing days

High relief and mountains

Coastal sedimentation

High seismic hazard

Limits of glaciation

Deductive reasoning is compelling
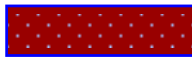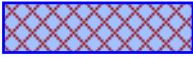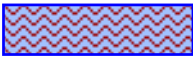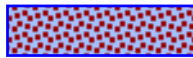

Annual rainfall > 48 inches

More than 120 freezing days

High relief and mountains

Coastal sedimentation

High seismic hazard

Limits of glaciation