Visual Hierarchy with Figure-Ground
Layout
Typography
Label Placement

FIT3179 Data Visualisation
Week 6 – Part 2

Lecture Content

- Visual hierarchy with figure-ground using variation in type and colour.
- Layout: arrangement of elements
- Typography: Selection of typefaces (serif/sans serif, weight, kerning)
- Type faces for showing quality and quantity
- Label placement for point marks

Learning outcomes

- You can apply figure-ground to create a hierarchy between features to create visualisations that are easier to read, more captivating, easier to memorise, and look nicer.
- You can arrange elements on your canvas to guide the user.
- You are familiar with typographic vocabulary, concepts and principles.
- You can select typefaces and vary type to express quantities and qualities.
- You can place labels for points with a clear visual association

Visual Hierarchy with Figure-Ground

Visual Hierarchy

Graphical representation in which elements are ranked according to their importance.

Important elements are graphically

emphasized

and less important elements are

de-emphasized.

Figure-Ground

Figure-Ground

Visual depth for accentuating one object over another, based on the perception that one object stands in front of another and appears to be closer to the reader.

Figures: important objects, become objects of attention and standout from the background

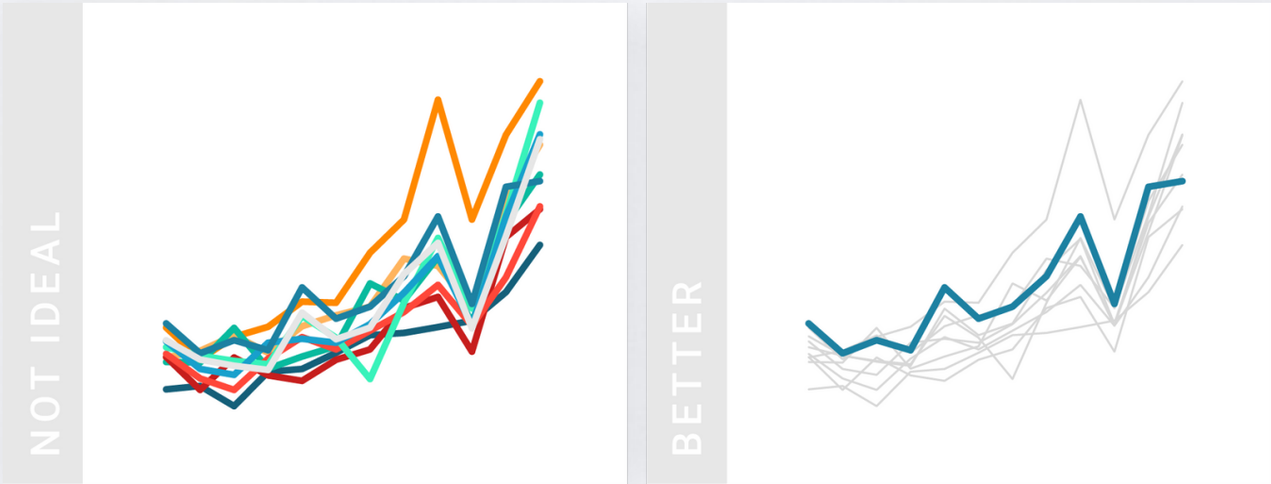
Grounds: things less important, the background.

Figure

- Jump out!
- Most important elements
- Distinct shape, saturated colour
- Large or bold type
- Text is often a figure symbol (but not always)

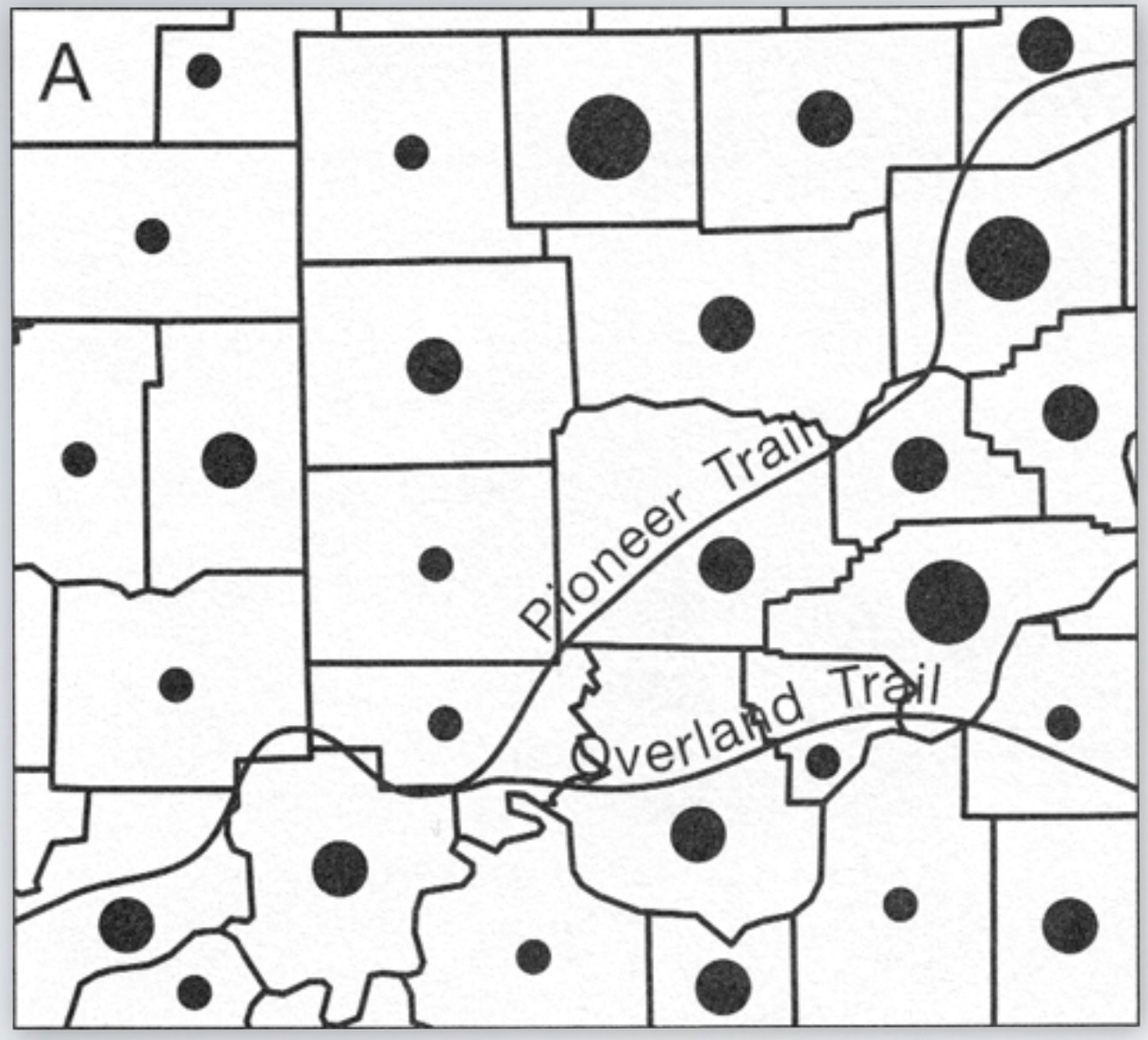
Ground

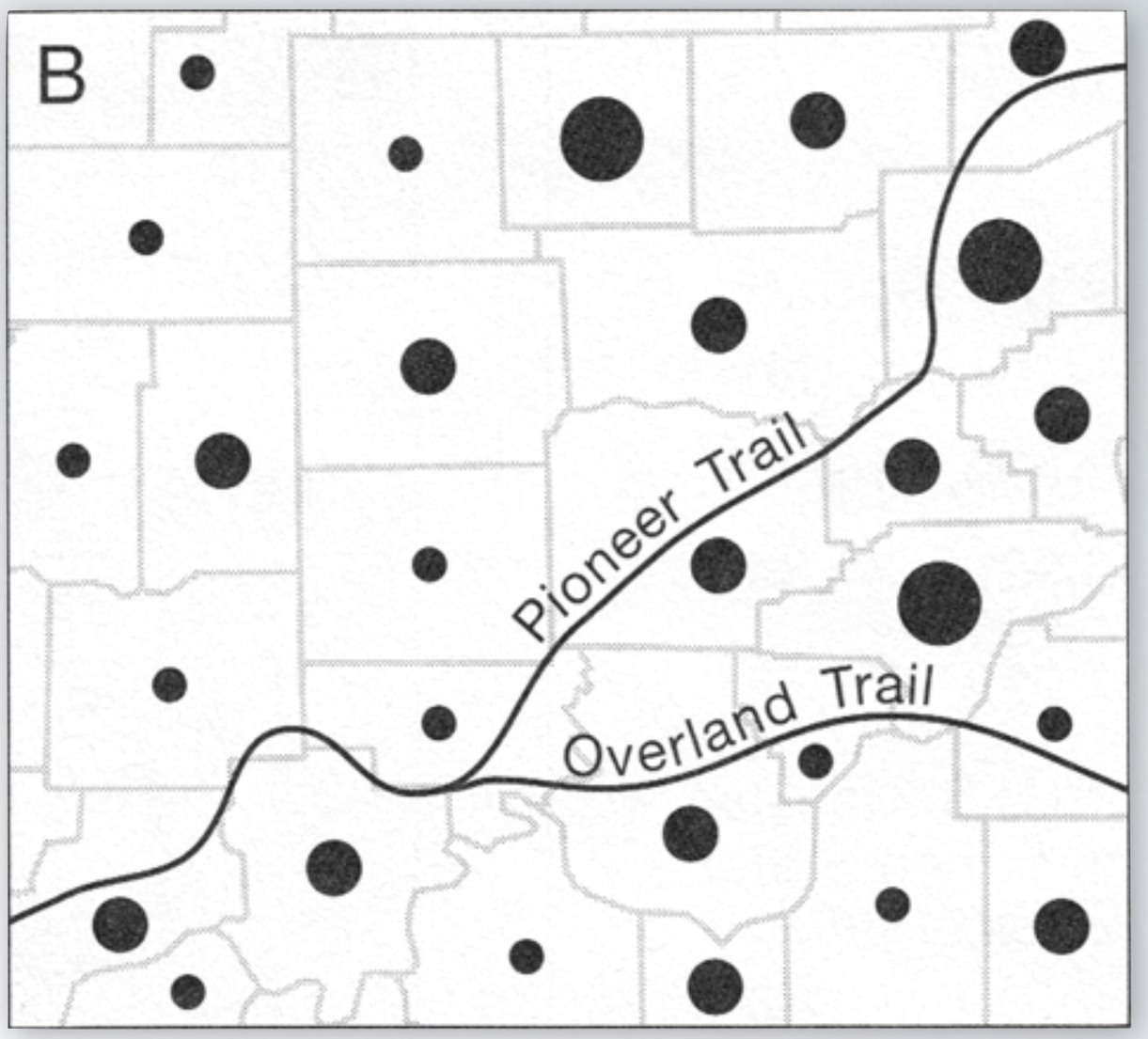
- Fall back…
- Less important meaning
- Bright and desaturated colour
- Small or thin type



Lisa Charlotte Rost
https://blog.datawrapper.de/colors/

Figure: Dark circles, lines and lables.





Ground: Bright grey boundaries.

Monthly spend
MILLIONS
$10
$9
$8
$7
$6
$5
$4
$3
$2
$1
$0
7.5 Mio
JUNE: the marked expected increase in spending is due to planned purchase of x, y, and z.
We expect spending of roughly $4M per month the rest of year.
$1.8
$2.3
$1.9
$2.4
Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec
ACTUAL
FORECAST

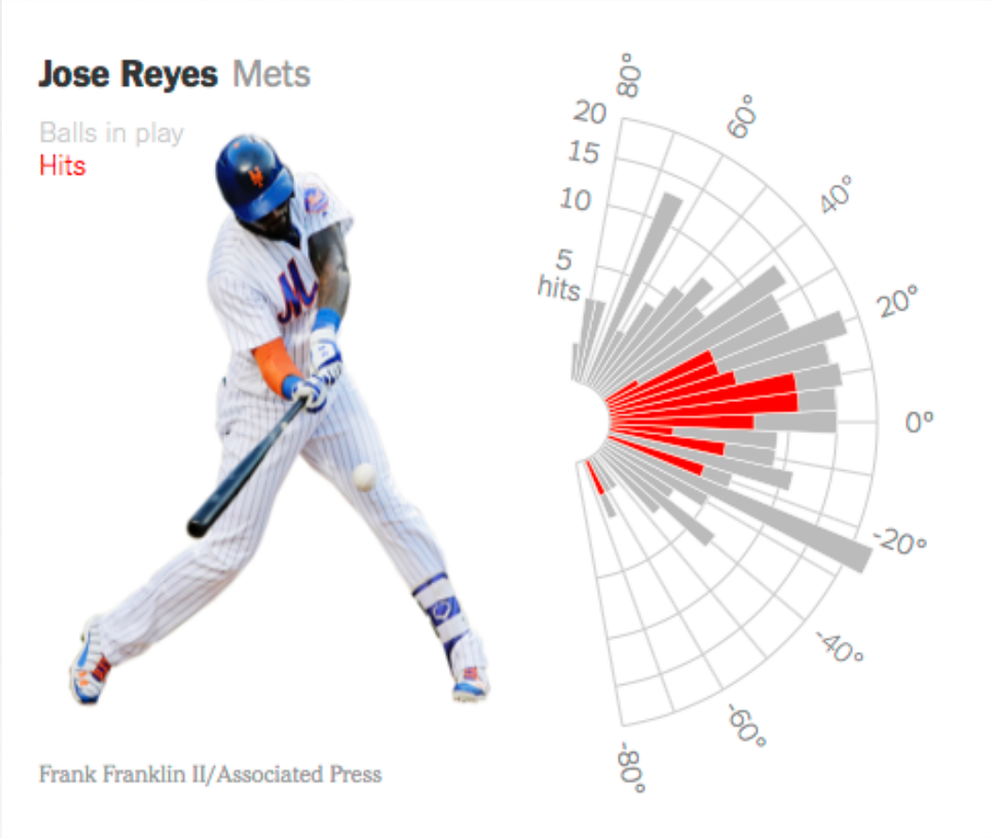
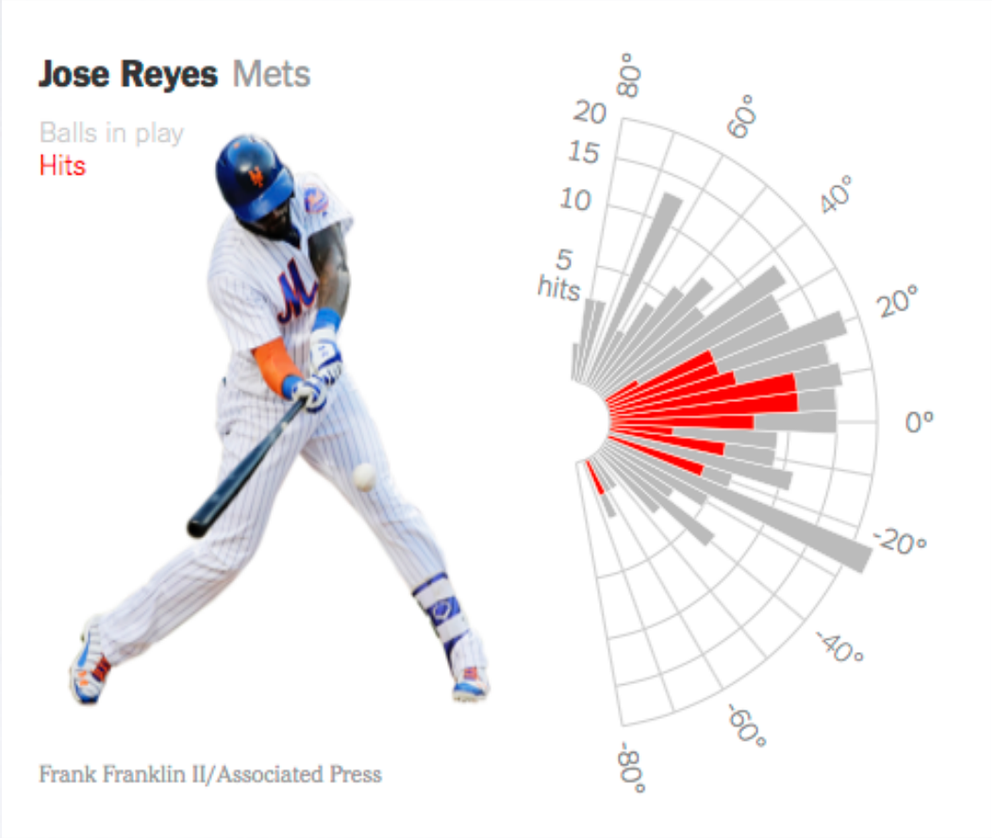

Jose Reyes Mets
Balls in play
Hits
Frank Franklin II/Associated Press
80°
60°
40°
20°
0°
-20°
-40°
-60°
-80°
20
15
10
5
hits

Figure:

Typeface with bigger weight, saturated/black colour, bold lines/red bars.



Ground:

Smaller typeface, grey colour.

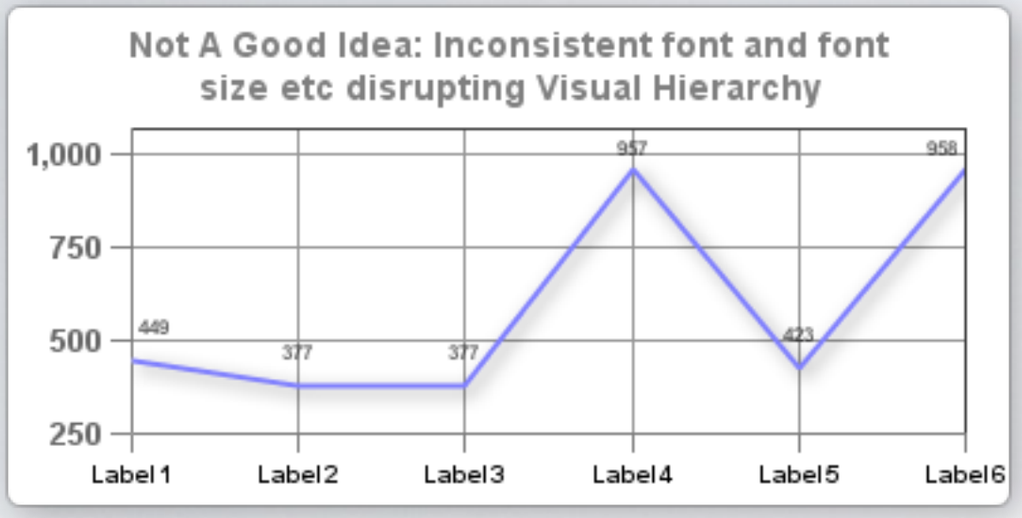
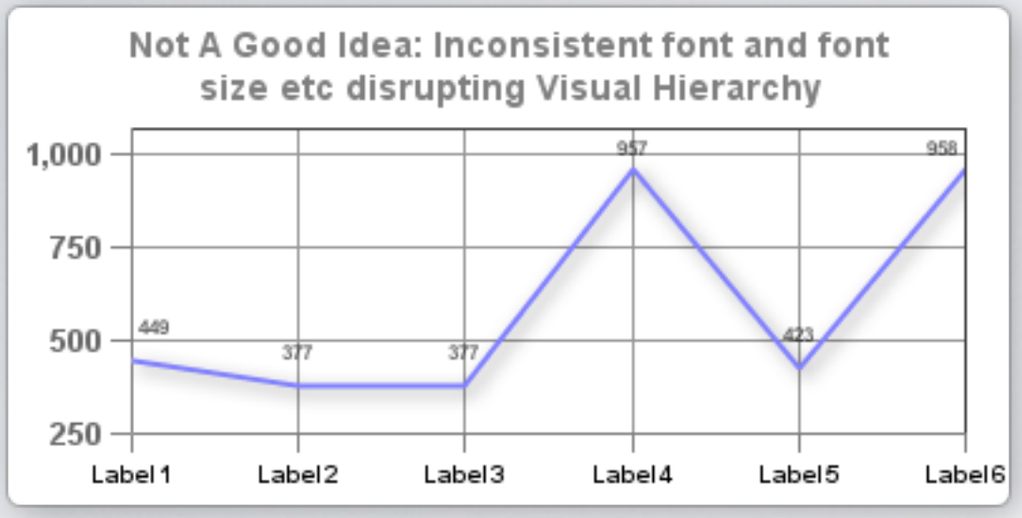
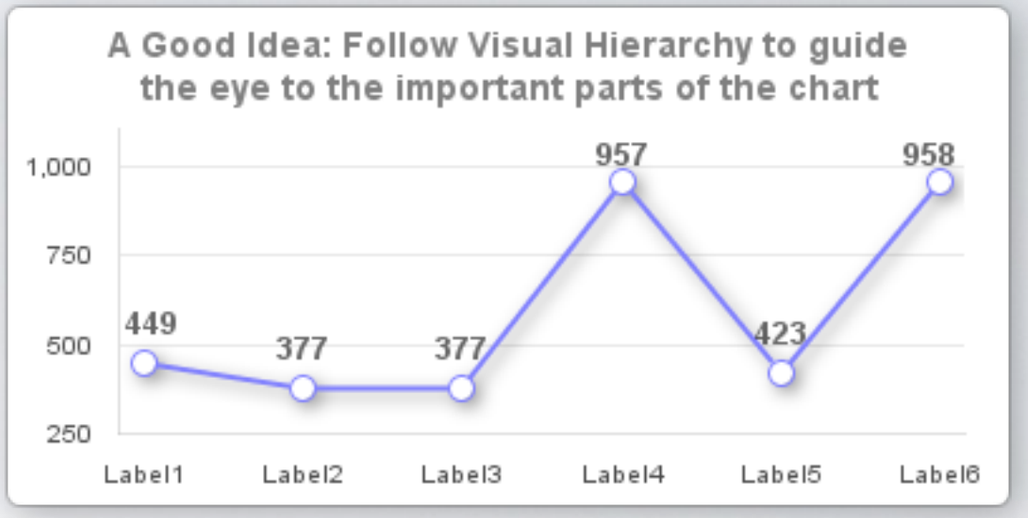

Not A Good Idea: Inconsistent font and font size etc disrupting Visual Hierarchy
1,000
750
500
250
449
377
377
957
423
958
Label 1
Label 2
Label 3
Label 4
Label 5
Label 6

Figure:
Larger typeface with bigger weight. Point marks accentuating values.





Ground:
Smaller typeface.

The Storm's Impact in Puerto Rico

Around San Juan

About 600 people took refuge in **Roberto Clemente Coliseum** in San Juan, the capital and the largest city in Puerto Rico. The storm ripped off parts of the roof, and it forced people to the second and third floors of the stadium. In nearby **Cataño,** the town's mayor told a radio station that 80 percent of the zinc-roofed homes in the Juana Matos neighborhood were destroyed.

Along the Río de la Plata

Five spillways of **La Plata dam** were opened in advance of the storm in an attempt to avoid overflow and flooding. Still, La Plata river swelled to more than 11 feet above flood stage near **Toa Alta** and **Comerío** on Wednesday morning, and flash flood warnings were issued in **Naranjito, Dorado** and **Toa Baja**, other municipalities near the river.

In the Southeast

The storm made landfall at **Yabucoa**, where more than 34,000 people live, shortly after 6 a.m. Eastern. In **Guayama**, Reuters reported that storm waters turned streets into fast-running rivers carrying wind-downed debris.

Figure: Saturated colours and black labels for hurricane path and impacted towns.

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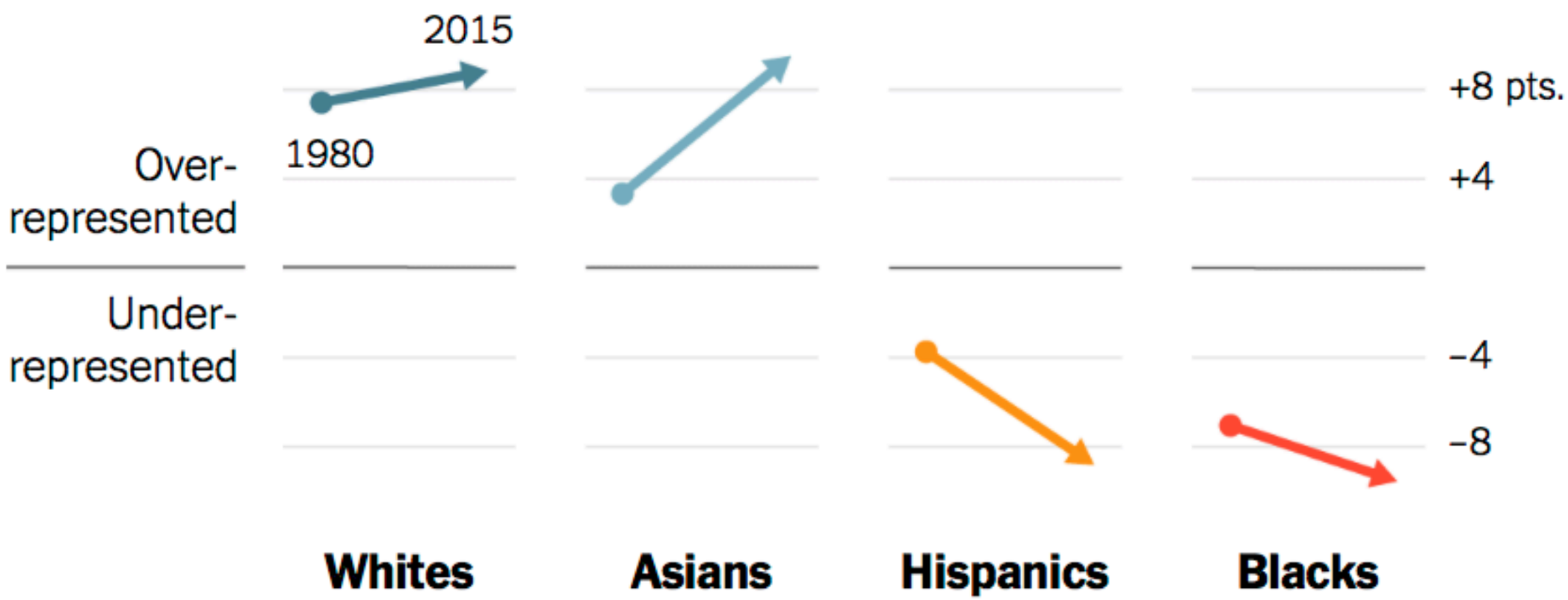
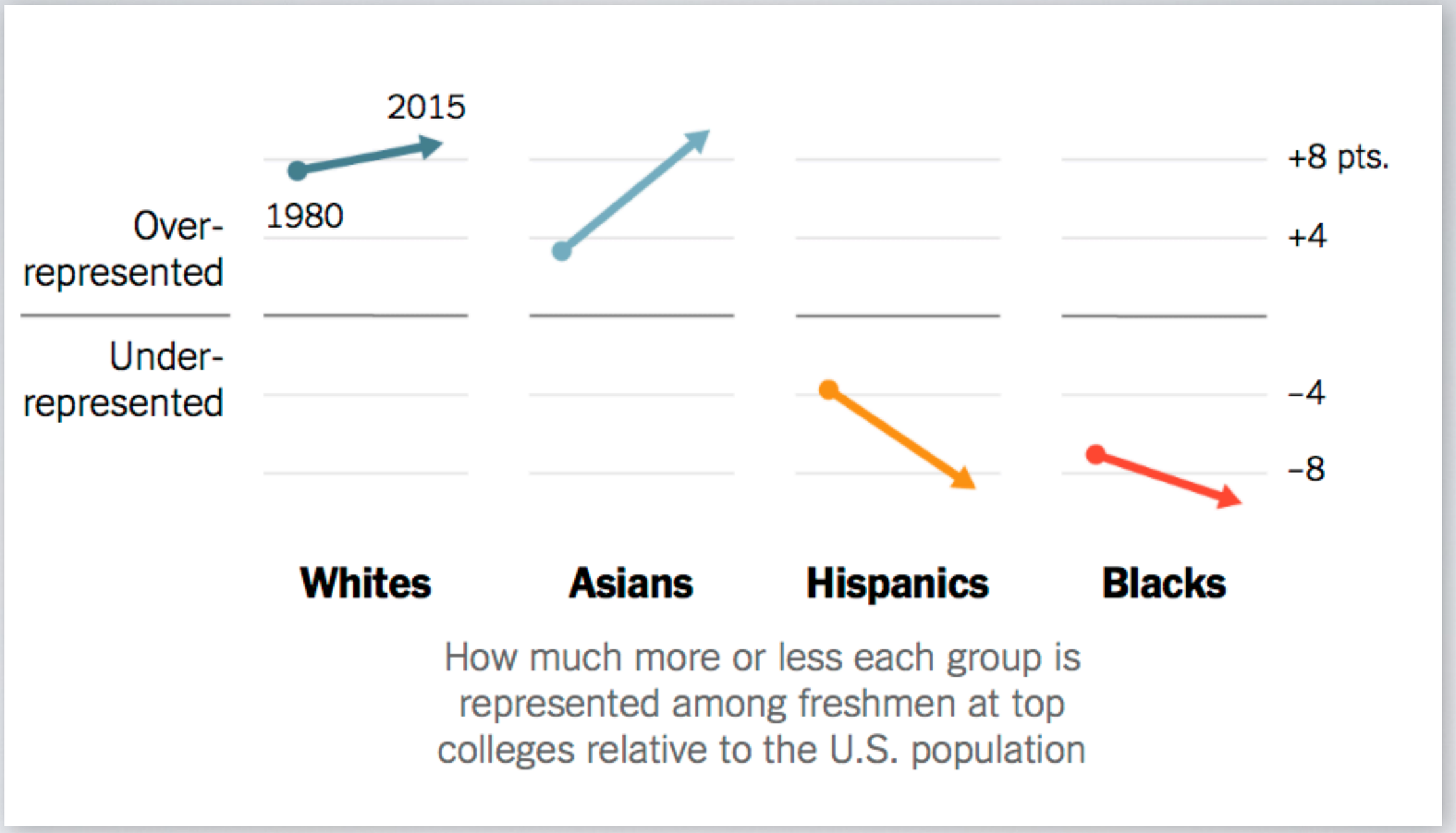
Ground: Bright grey map, desaturated roads & rivers, labels in grey and light weight.

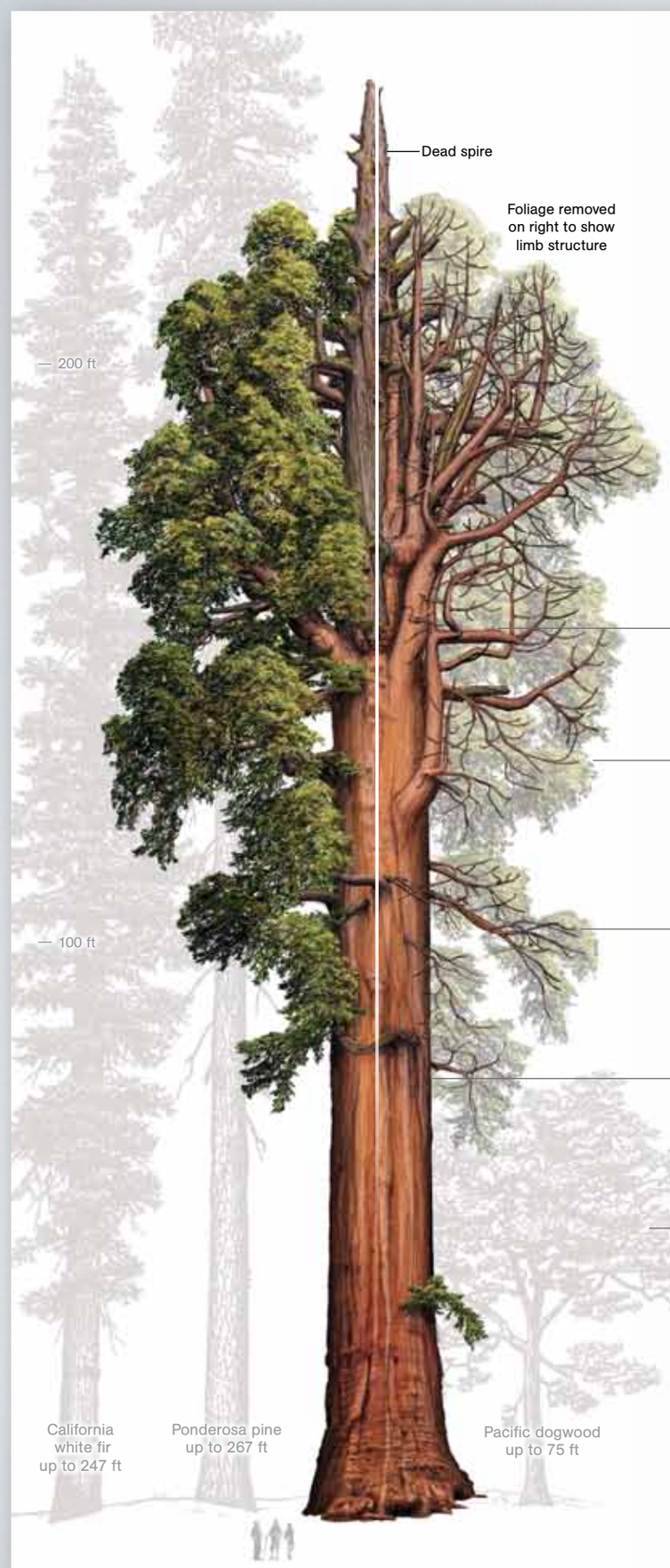


How much more or less each group is represented among freshmen at top colleges relative to the U.S. population

Figure: Arrows with saturated colour, bold and large type.



Ground: Bright grey reference lines, small labels, grey text.



THE PRESIDENT
Sequoiadendron giganteum
HEIGHT: 247 feet
AGE: at least 3,200 years
DIAMETER AT BASE: 27 feet
TOTAL VOLUME: 54,000 cubic feet

LIMBS The four largest limbs range in diameter from five to nearly seven feet; the largest is about 60 feet long. The tree's total number of branches: 534.

FOLIAGE The scientists who measured every part of the tree estimate it has nearly two billion leaves and more than 82,000 cones. Each cone, the size of a chicken's egg, holds about 200 seeds.

SHAPE The President reached its current height well over a thousand years ago but continues to expand in volume of wood, its crown growing more intricate.

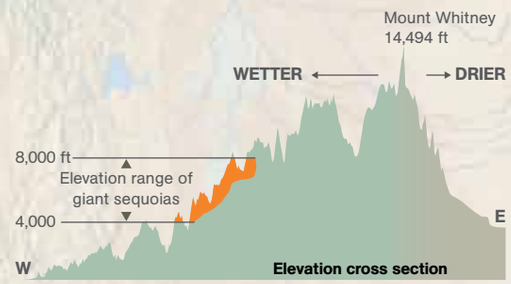
SCARS Fire damage extends 50 feet up one side of the trunk. The top 40 feet of the main trunk, struck by lightning, has been dead for more than a thousand years.

GROVES Sequoias rarely grow in pure stands, but by sheer size they dominate their groves, which hold a variety of tree species.

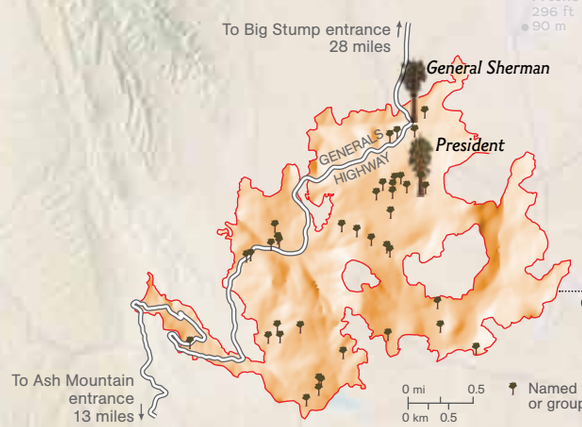
MARTIN GAMACHE AND MATTHEW TWOMBLY, NGM STAFF
ART: ROBERT VAN PELT, HUMBOLDT STATE UNIVERSITY (HSU)
SOURCES: STEVE SILLETT, HSU; BLM; NATIONAL PARK SERVICE; USGS; BILL KRUSE, KRUSE IMAGING; DWIGHT WILLARD; SIERRA NEVADA ECOSYSTEM PROJECT; D'ARCY TRASK, CYARK

Where the Giants Grow

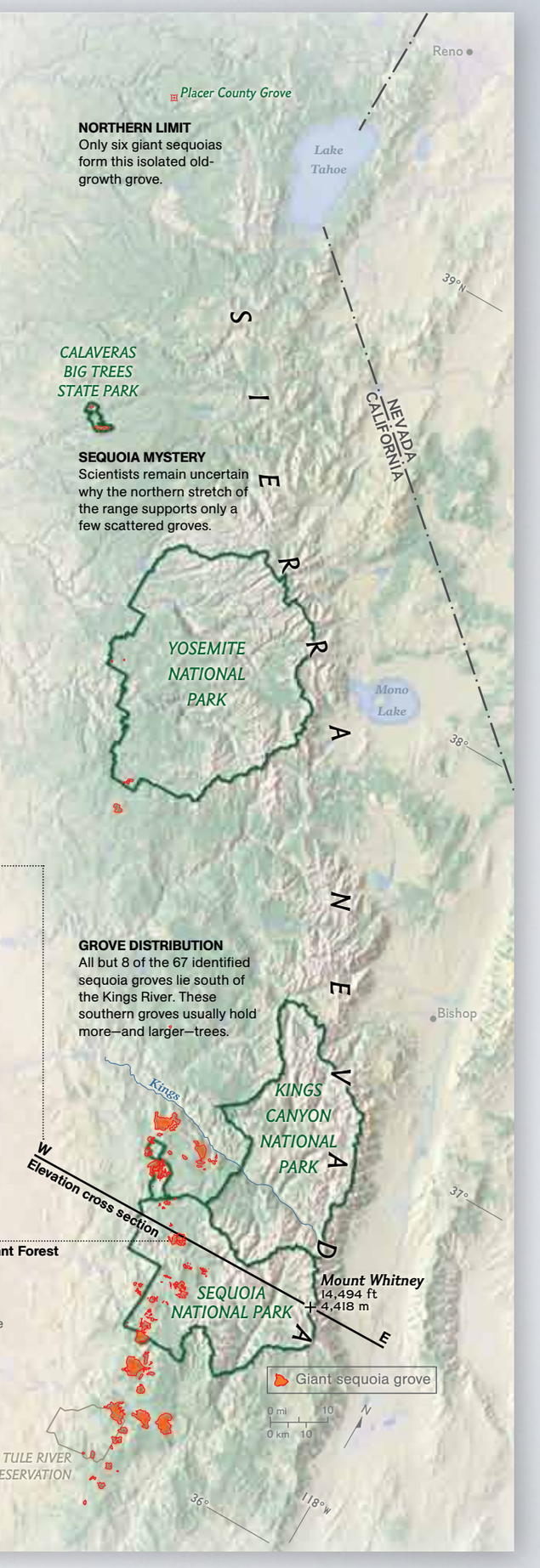
A slender, 250-mile-long corridor on the western slope of the Sierra Nevada is the giant sequoia's only natural habitat. No tree surpasses it in volume of wood. Fortunately, logging proved impractical, and in 1890 many of the titans gained protection with the creation of Sequoia and Yosemite National Parks.



SEQUOIA SWEET SPOT Conditions that suit the tree's growth and reproduction exist in a narrow elevation range. The Sierra's eastern slope is too dry for sequoias, which need rain and the deep moisture of heavy snowmelt.



CATHEDRAL OF TREES The Giant Forest, a grove in Sequoia National Park, protects 41 named sequoias and sequoia groups, including the President and, measuring only slightly bigger, Earth's most massive tree, the General Sherman.



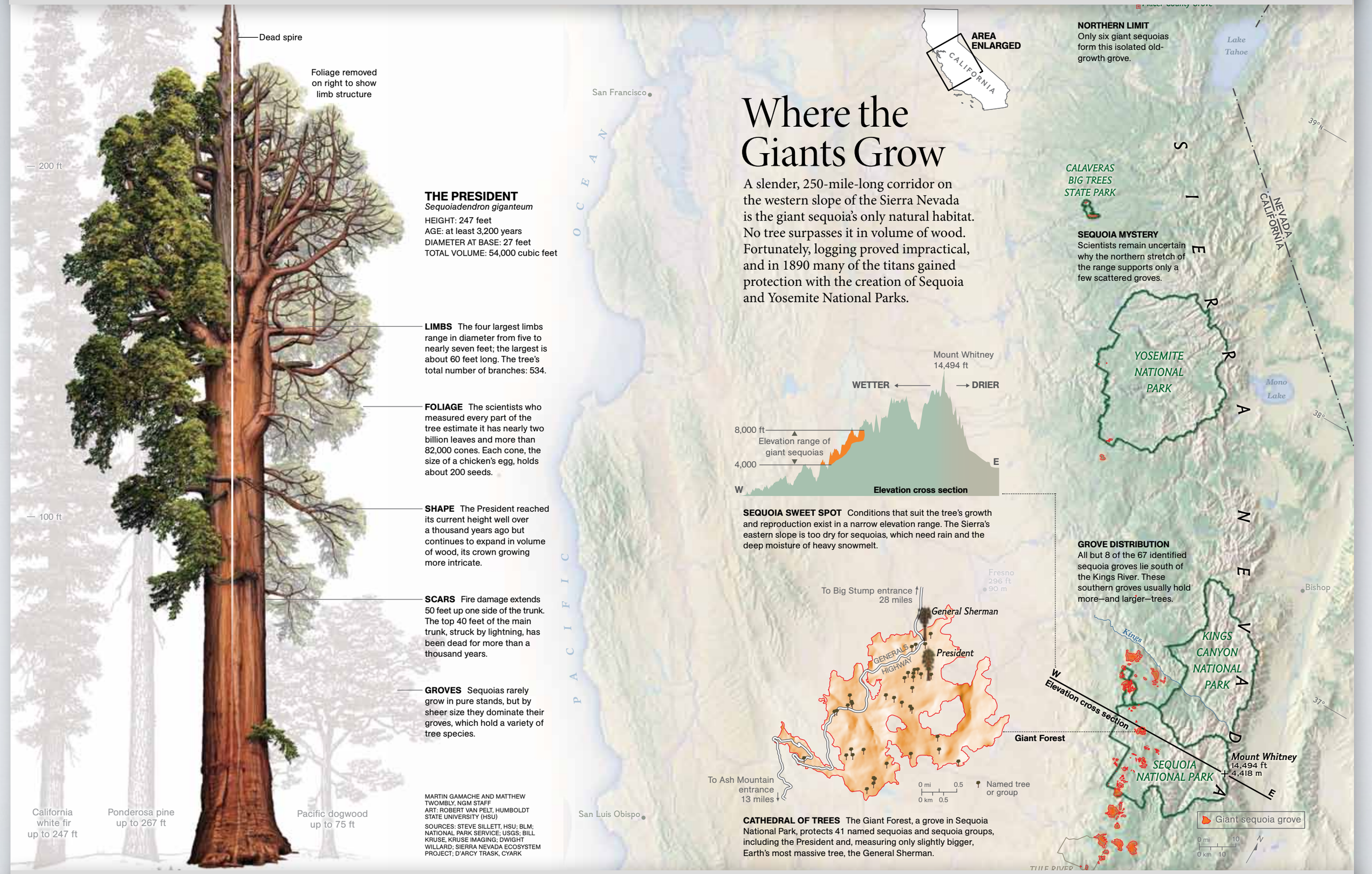
NORTHERN LIMIT Only six giant sequoias form this isolated old-growth grove.

SEQUOIA MYSTERY Scientists remain uncertain why the northern stretch of the range supports only a few scattered groves.

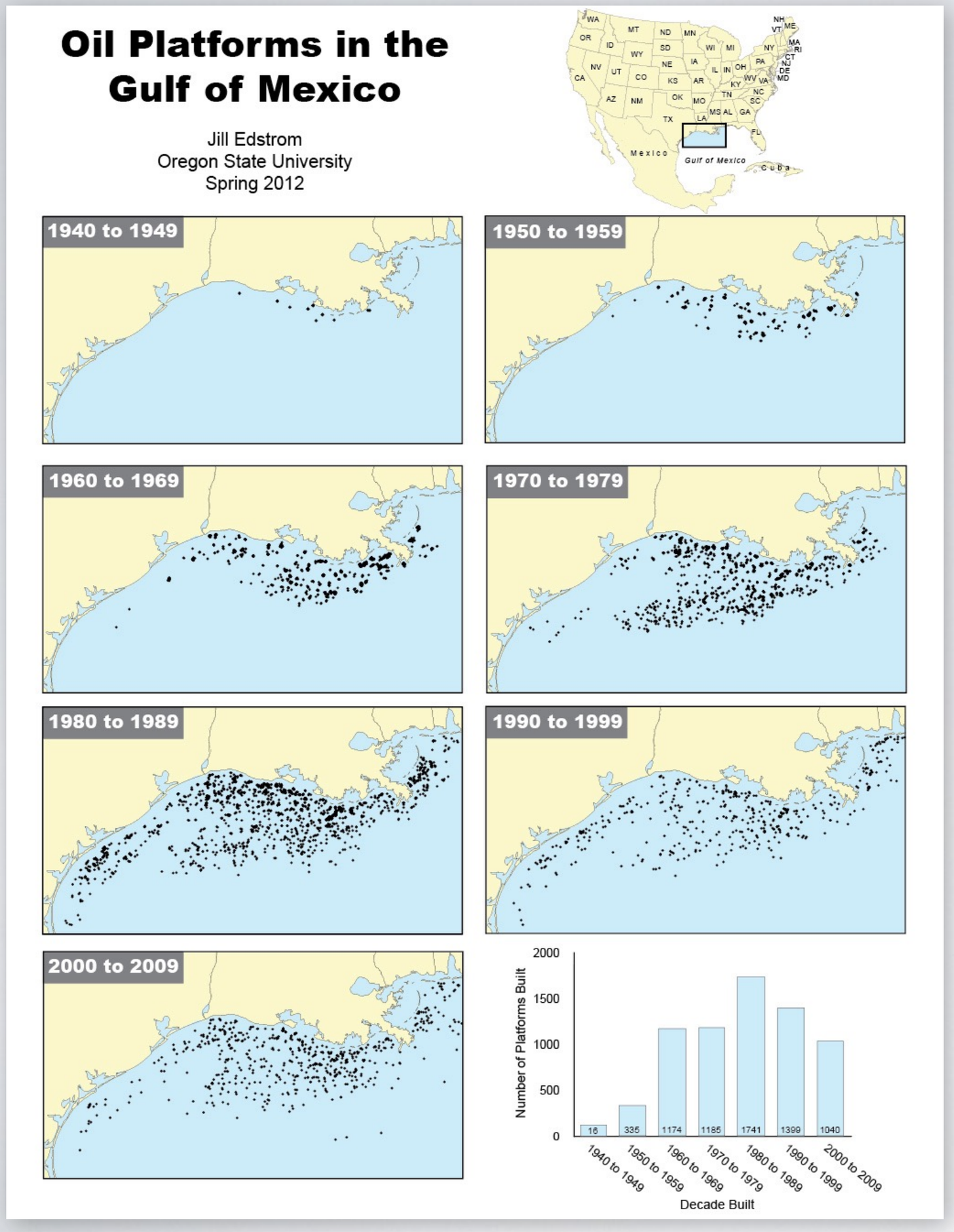
GROVE DISTRIBUTION All but 8 of the 67 identified sequoia groves lie south of the Kings River. These southern groves usually hold more—and larger—trees.

San Francisco
PACIFIC OCEAN
San Luis Obispo

Figure: High-contrast and saturated images and diagrams.



Ground: Low-contrast and desaturated images (trees) and map (where irrelevant).



Visual hierarchy with colour

Only 5 colours
- black
- white
- yellow
- blue
- gray

Reduce the number of different colours in and around your map to create a visual hierarchy.

Here: black for figure, pale blue and bright yellow for ground.

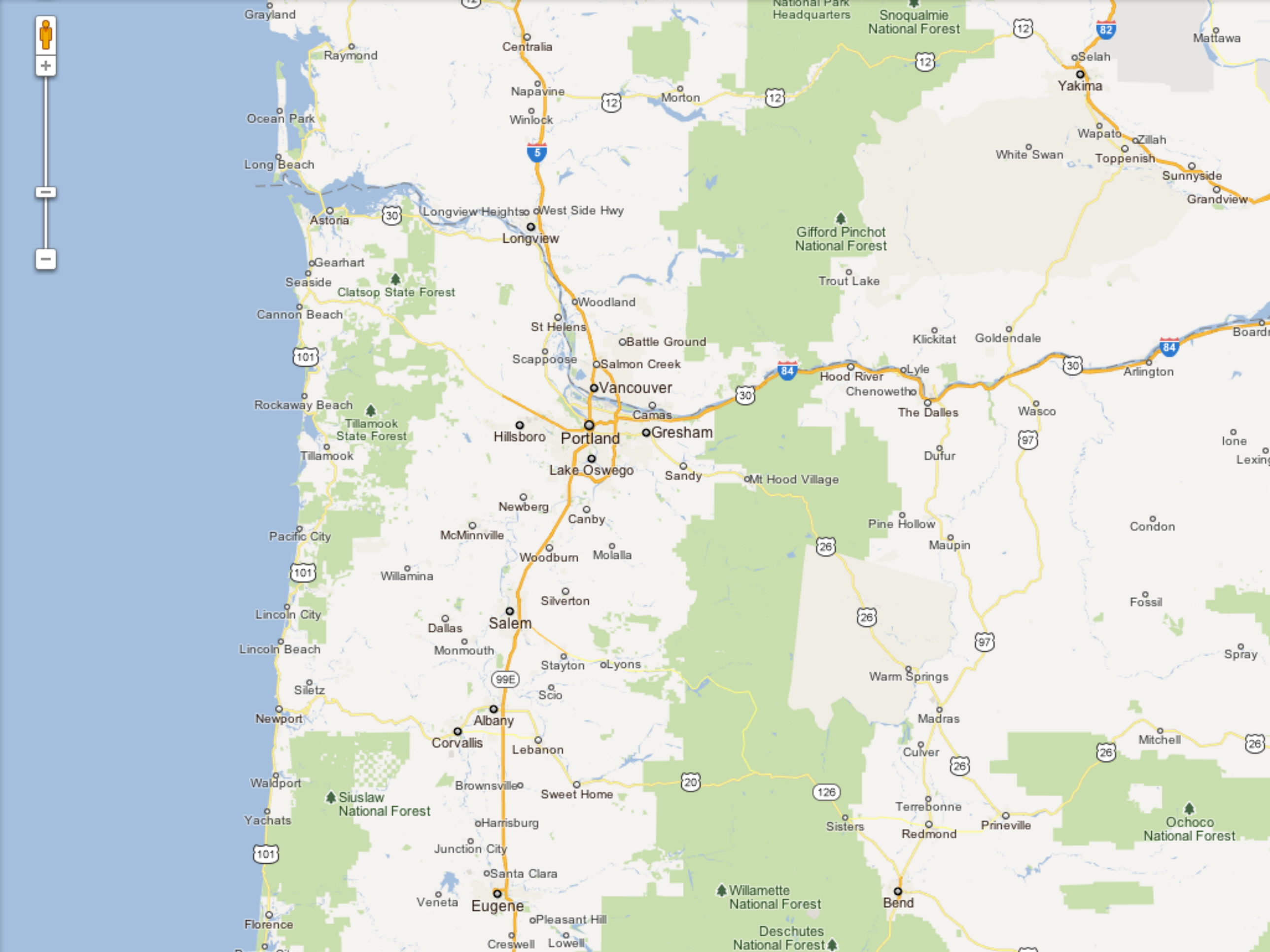
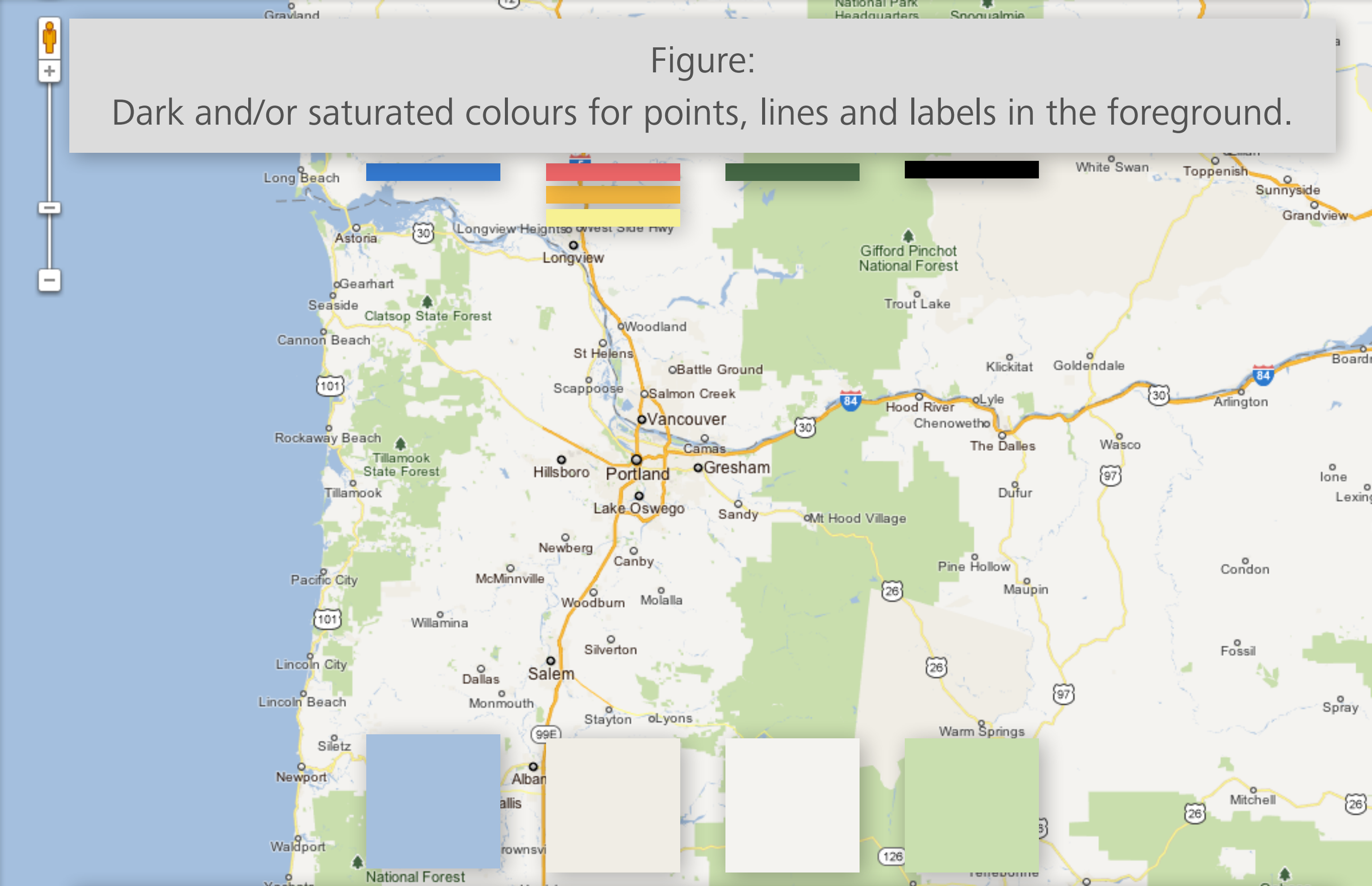

Grayland
Raymond
Centralia
National Park Headquarters
Snoqualmie National Forest
Selah
Yakima
Mattawa
Napavine
Winlock
Morton
Ocean Park
Long Beach
Wapato
Zillah
White Swan
Toppenish
Sunnyside
Grandview
Astoria
Longview Heights
West Side Hwy
Longview
Gifford Pinchot National Forest
Gearhart
Seaside
Clatsop State Forest
Trout Lake
Cannon Beach
Woodland
St Helens
Battle Ground
Klickitat
Goldendale
Scappoose
Salmon Creek
Hood River
Lyle
Arlington
Vancouver
Chenowetho
Rockaway Beach
Camas
The Dalles
Wasco
Tillamook State Forest
Hillsboro
Portland
Gresham
Tillamook
Dufur
Lake Oswego
Sandy
Mt Hood Village
Newberg
Canby
Pine Hollow
Condon
Pacific City
McMinnville
Maupin
Woodburn
Molalla
Willamina
Silverton
Fossil
Lincoln City
Salem
Dallas
Lincoln Beach
Monmouth
Stayton
Lyons
Spray
Warm Springs
Siletz
Scio
Newport
Albany
Madras
Corvallis
Lebanon
Mitchell
Culver
Waldport
Brownsville
Sweet Home
Siuslaw National Forest
Terrebonne
Yachats
Harrisburg
Sisters
Redmond
Prineville
Ochoco National Forest
Junction City
Santa Clara
Willamette National Forest
Veneta
Eugene
Bend
Florence
Pleasant Hill
Deschutes National Forest
Creswell
Lowell

Figure:

Dark and/or saturated colours for points, lines and labels in the foreground.



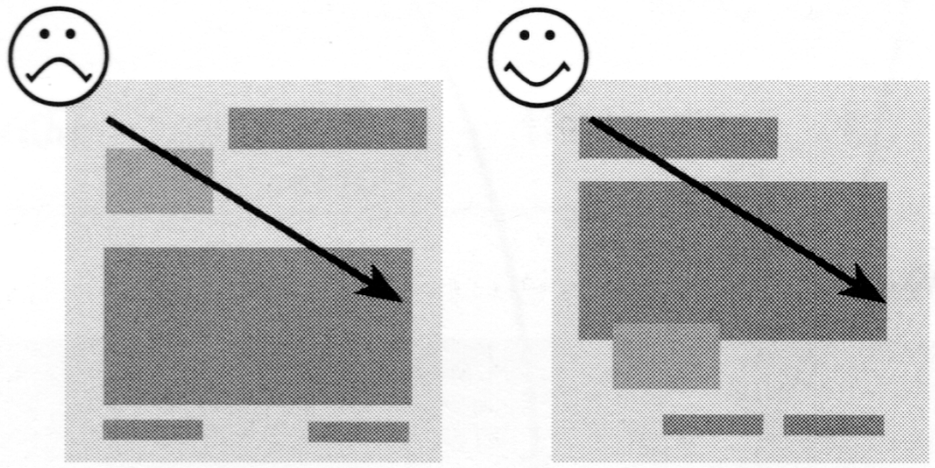
Ground:

Bright and desaturated colours for areas in the background.

Layout

Viewing Path

Try assuming that reading a map follows a **path,** like reading a page in a book, from the upper left to the lower right. Arrange map pieces so that those that should be seen first are in the upper left of the map – unless, of course, your language reads from right to left.



Krygier, J. and Wood, D. 2011. Making Maps, A Visual Guide to Map Design for GIS.

NORTH AMERICA
IN THE AGE OF DINOSAURS

Produced by the Cartographic Division
National Geographic Society
GILBERT M. GROSVENOR, CHAIRMAN
REG MURPHY, PRESIDENT AND CEO
WILBUR E. GARRETT, EDITOR, NATIONAL GEOGRAPHIC MAGAZINE
ALLEN CARROLL, DIRECTOR OF CARTOGRAPHY
JOHN F. SHUPE, CHIEF CARTOGRAPHER

A fabulous array of dinosaurs ranged across North America during the Mesozoic era. Descendants of ancient reptiles, dinosaurs had evolved as continents shifted, climates changed, and plants blossomed into modern forms. Diverse in size, shape, and behavior, dinosaurs faced no animal challenge. Yet none survived an end-of-era cataclysm. Perhaps they perished after a gigantic asteroid flung enormous amounts of pulverized rock into the atmosphere. The global cooling and darkness that likely followed are prime suspects in the snuffing out of flying reptiles, scores of marine creatures, and the lost lords of earth.

THE CONTINENTS SHAPE UP

At the dawn of the dinosaur age, some 15 million years after the Mesozoic era began, continental plates were crowded together into the supercontinent Pangaea. After early dinosaurs established themselves throughout this landmass, the continents drifted apart. By 74 million years ago, the time of this map, North America was taking its present shape. Soon, at full flood, separated the North American continent into sections and split Asia from Europe.

24 Million Years Ago

DINOSAUR FOSSIL DISTRIBUTION
Late Cretaceous
Early Cretaceous
Late and middle Jurassic
Early Jurassic
Triassic

Dot in the symbol identifies site that includes footprints, most indicates marine reptile fossils.

The Tanks:
ANKYLOSAURS

Intimidating ankylosaurs wore bony-plated armor primarily for defense—they were peaceful plant-eaters. The heaviest browsers belonged to two families: Ankylosauridae, with heavy clubs at the end of their tails, and Nodosauridae, without. *Edmontonia*, one of the last of North America's Nodosaurids, probably hunkered down and waited for a predator to retreat. *Euoplocephalus*, the most common of North America's Ankylosaurids, could have clubbered an attacker's legs with its tail club. Bony eyelids gave extra protection. At two and a half tons, it weighed almost half as much as an African elephant.

Giants Among Giants:
SAUROPODS

Enormous in its own time, the 30-ton *Alamosaurus* was a dwarf compared with earlier sauropods, which may have reached a hundred tons. A herbivore, *Alamosaurus* probably browsed through forests and moved to new feeding grounds in herds, the adults protecting the young. Its sheer mass must have deterred most predators, but it could also lash out with its long tail or slash out with the large curved claw on each elephantine foot. Some scientists suggest that *Alamosaurus* may have reared up and crushed attackers with its massive legs.

Duckbills and Boneheads:
HADROSAURS AND PACHYCEPHALOSAURS

Hoots, honks, and bellows of the bipedal hadrosaurs may have rung across lowland plains and meandering rivers like the sounds of a noisy zoo. The hollow crests of *Parasaurolophus*, *Lambeosaurus*, and *Corythosaurus* probably resonated their calls. Though otherwise similar to these animals, *Saurolophus* had a solid crest, and *Edmontosaurus* none at all. Crests and calls could have been mating displays. After mating, females likely nested in colonies and tended their broods after hatching.

Hadrosaurs cropped twigs, pine needles, leaves, and seeds with a wide toothless beak, which has given them the nickname "duckbills." Banks of as many as 2,000 grinding teeth chewed thoroughly.

Another group of herding herbivores, pachycephalosaurs such as *Stygimoloch* and *Pachycephalosaurus*, roamed upland areas. Males may have butted their thick-boned, domed heads, animals' dominance and who protect.

Fossilized impressions of some dinosaurs' skin reveal texture, but their coloring is always fascinating.

The Rhino Dines:
CERATOPSIANS

The plant-eating ceratopsians bristled with an armory of horns and neck shields. Some, like *Pachyrhinosaurus* and *Styracosaurus*, weighed several tons and would have been formidable foes to any predator. Males' shields may also have intimidated rivals or helped attract mates.

Undisturbed, these hoof-footed quadrupeds browsed quietly in herds on open plains, snipping bunches of tough plants with their pointed, bony beaks, then chewing with scissor-like teeth.

Unlike *Anchiceratops* and *Triceratops*, the 200-pound *Leptoceratops* (left) had no horns and almost no shield. Though it lived at the same time as its shielded relatives, its small size, gait, bipedal gait, and clawed toes set it apart.

Along with hadrosaurs, the ceratopsians appear to have been the most numerous of the continent's dinosaurs in the late Cretaceous.

Bird Mimics:
ORNITHOMIMIDS AND TROODONTIDS

Amid the other dinosaurs—the massive, the fantastically crested and horned—lived smaller, slender-bodied creatures reminiscent of birds. Dinosaurs' only living relatives. Flying-necked, slightly built, large *Dromiceiomimus* belongs to the Ornithomimidae (bird-mimic) family. Its running speed—some 30 miles an hour, as fast as an ostrich—and keen eyesight enabled it to escape predators and perhaps to catch such quick prey as insects, small mammals, and lizards. It also probably used its toothless beak to browse on leaves, fruits, and seeds. Its light, flexible skull and neck bones allowed it to maneuver food into its mouth with great speed and precision.

Troodon, from a different family, developed similar body lines as well as a brain whose relative size matches those of some modern birds and mammals.

This speedy carnivore, with opposable digits on its hands, probably hunted a variety of small animals. Many of its saw-edged teeth have been found in hadrosaur nests, suggesting that it often fed on their young.

THE ENVIRONMENT

Great sun-warmed seas covered much of the earth during the late Cretaceous, a time of mild climates and ice-free polar regions. Densely forested with sequoia-like trees, Alaska felt winter's chill but saw little frost.

The Western Interior Seaway, almost a thousand miles wide at times, flooded one-third of North America. The modern Gulf Coast was underwater, a huge bay spread over the confluence of the Ohio and Mississippi Rivers, and an arm of the sea stretched across the Hudson Bay area to the North Atlantic.

On land, flowering plants ancestral to magnolias, roses, oaks, and walnuts spread among the conifers, ferns, and palmlike cycads that had dominated most of the Mesozoic. Geologic pressures were thrusting up many of the world's high mountain ranges, including the Rockies.

LIFE IN THE INLAND SEA

Leviathans as strange as the dinosaurs on land included mosasaurs (marine lizards) such as the *Tylosaurus* and *Halisaurus*. These relatives of today's monitor lizards were top predators of the inland sea. Covered with diamond-shaped scales, they undulated their slim bodies and long, flat tails to move through the water like eels. Front fins probably enabled the animals to turn quickly, and back fins acted as stabilizers. Some *Tylosaurus* fossils preserve meals being digested: fish, flightless swimming birds, and even other mosasaurs.

Mosasaurs also ate giant squid and a now extinct class of spiral-shelled molluscs called ammonites—and left bite marks still visible on fossilized remains.

Fish swallowed squid whole. One eight-foot specimen ate such a large squid that it must have choked to death with its victim's tentacles hanging out of its mouth.

One of the largest fish ever, *Xiphactinus* was longer than modern swordfish. It ate a variety of other fish, and its cousin *Gillicus*, usually about half its size, was apparently a favorite.

Elasmosaurus, a plesiosaur (marine reptile) with no living relatives, also preyed on fish. Moving its oarlike limbs up and down to swim, it may have approached schools from below, positioning its long neck so as to attack from beneath the belly and to the rear of prey—their blind spot. Like the alligator of today it swallowed stones, perhaps for the same reasons—to grind up food in a gizzard and to provide ballast.

Largest of sea turtles, the rare *Archelon* most likely swam as its living relatives do, working its paddles like birds' wings.

Still missing from the fossil record are many of the smaller animals that must have supported these large marine predators.

Flesh-eaters:
TYRANNOSAURS

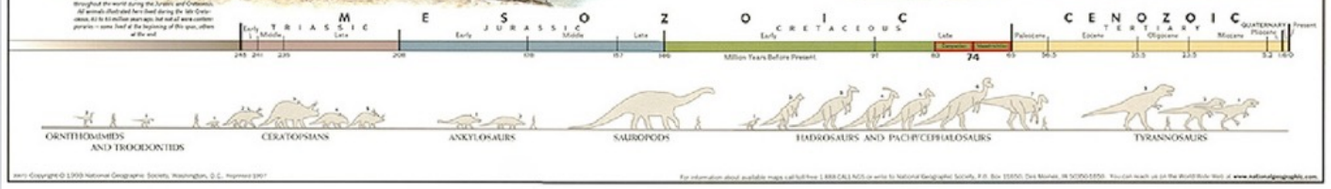
Striding on trunklike legs, the seven-ton *Tyrannosaurus* towered among the trees. Though smaller, its relatives *Daspletosaurus* and *Albertosaurus* looked no less savage. All had massive heads, lethal serrated teeth, arms capable of lifting hundreds of pounds, sharp claws on birdlike feet and on two-fingered hands.

Were these—the biggest of all carnivores—terrifying predators, lumbering carrion feeders, or something of both? Some experts believe that *Tyrannosaurus* ambushed prey, slamming its open jaws into unprotected flesh. Others think that the hands could have held prey like a meat hook while the jaws did their deadly work. Perhaps the feet dealt crippling kicks. In shared hunting grounds *Daspletosaurus* might have stalked the horned ceratopsians, while the slighter *Albertosaurus* took off after bipedal hadrosaurs.

Carcasses of animals felled by accident or nature may have supplemented the tyrannosaurs' hunting—or made up their entire diets if they were not agile enough to bring down prey themselves.

Nomads of the Mesozoic
Fossil records suggest that dinosaurs migrated over land bridges between continents during the Cretaceous. Asia and western North America shared similar ankylosaurs, tyrannosaurs, ceratopsians, and advanced hadrosaurs. Europe and western North America have related iguanodons and primitive hadrosaurs. Large herds may have migrated seasonally along part of western North America.

March of the Dinosaurs
Dinosaurs evolved during the Triassic period and spread throughout the world during the Jurassic and Cretaceous. All animals illustrated here lived during the late Cretaceous, 65 to 83 million years ago, but not all were contemporaries—some lived at the beginning of this span, others at the end.



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IN THE AGE OF DI

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Intimidating ankylosaurs wore bony-plated armor primarily for defense—they were peaceful plant-eaters. The heaviest browsers belonged to two families: Ankylosauridae, with heavy clubs at the end of their tails, and Nodosauridae, without. *Edmontonia*, one of the last of North America's Nodosaurids, probably hunkered down and waited for a predator to retreat. *Euoplocephalus*, the most common of North America's Ankylosaurids, could have clubbered an attacker's legs with its tail club. Bony eyelids gave extra protection. At two and a half tons, it weighed almost half as much as an African elephant.

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The plant-eating ceratopsians bristled with an armory of horns and neck shields. Some, like *Pachyrhinosaurus* and *Styracosaurus*, weighed several tons and would have been formidable foes to any predator. Males' shields may also have intimidated rivals or helped attract mates.

Undisturbed, these hoof-footed quadrupeds browsed quietly in herds on open plains, snipping bunches of tough plants with their pointed, bony beaks, then chewing with scissor-like teeth.

Unlike *Anchiceratops* and *Triceratops*, the 200-pound *Leptoceratops* (left) had no horns and almost no shield. Though it lived at the same time as its shielded relatives, its small size, gait, bipedal gait, and clawed toes set it apart.

Along with hadrosaurs, the ceratopsians appear to have been the most numerous of the continent's dinosaurs in the late Cretaceous.

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Amid the other dinosaurs—the massive, the fantastically crested and horned—lived smaller, slender-bodied creatures reminiscent of birds, dinosaurs' only living relatives. Flying-necked, slightly built, large *Ornithomimus* belongs to the Ornithomimidae (bird-mimic) family. Its running speed—some 30 miles an hour, as fast as an ostrich—and keen eyesight enabled it to escape predators and perhaps to catch such quick prey as insects, small mammals, and lizards. It also probably used its toothless beak to browse on leaves, fruits, and seeds. Its light, flexible skull and neck bones allowed it to maneuver food into its mouth with great speed and precision.

Troodon, from a different family, developed similar body lines as well as a brain whose relative size matched those of some modern birds and mammals.

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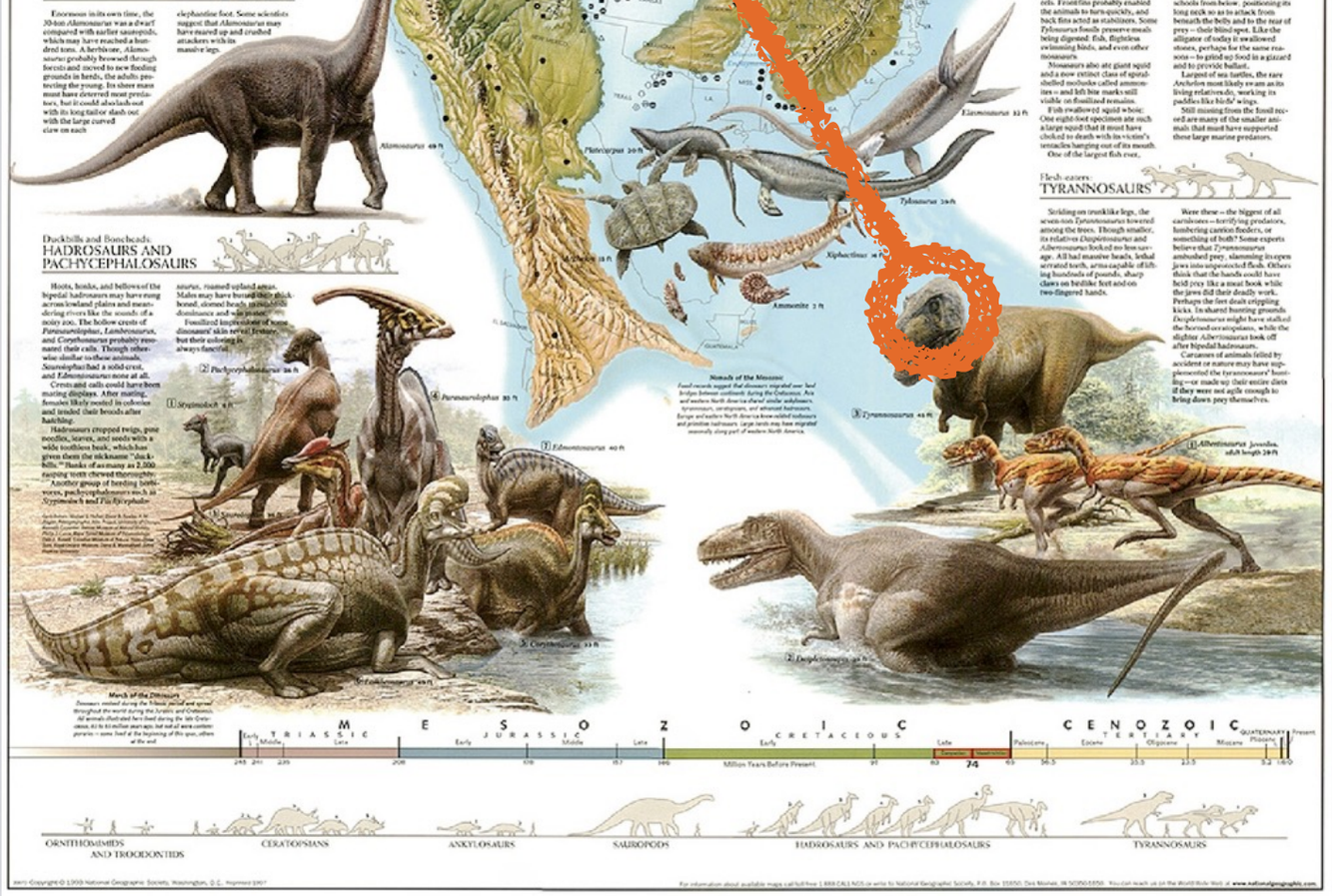
Fish Dominate Earth
Flying reptiles filled the skies as the largest of marine creatures ruled the water. Bony fish, such as the 30-foot-long Xiphactinus, were probably the top predators, using their sharp teeth to slash and swallow their prey whole. Fast, streamlined, they hunted near the sea and collected fat in a pocket on the head. In some, that fat or oil was flammable and large, as in modern fish.

Transverse Mercator Projection
SCALE 1:19:10,000 OR 1 INCH = 303 MILES



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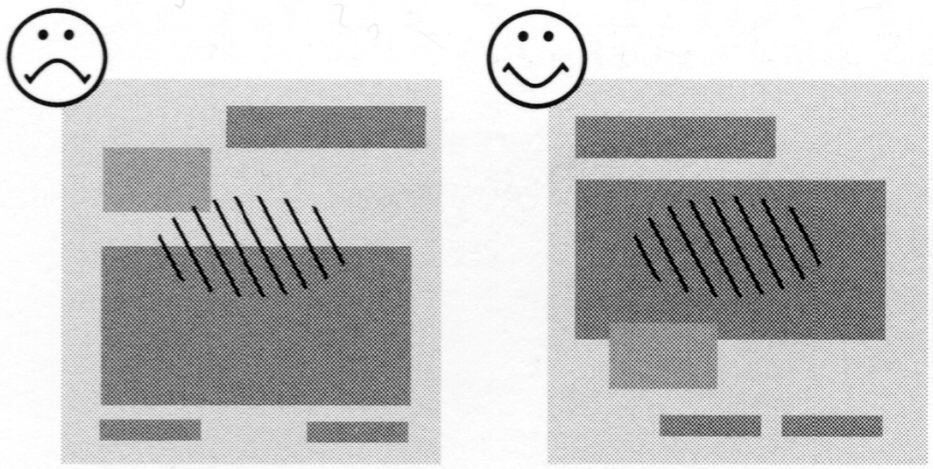
Visual Center

The **visual center** of a map is slightly above the actual center. Centering implies importance. Try positioning map pieces so that the most important are near the visual center of the map. The map reader may focus near this center and assume the elements there are most important.



Krygier, J. and Wood, D. 2011. Making Maps, A Visual Guide to Map Design for GIS.

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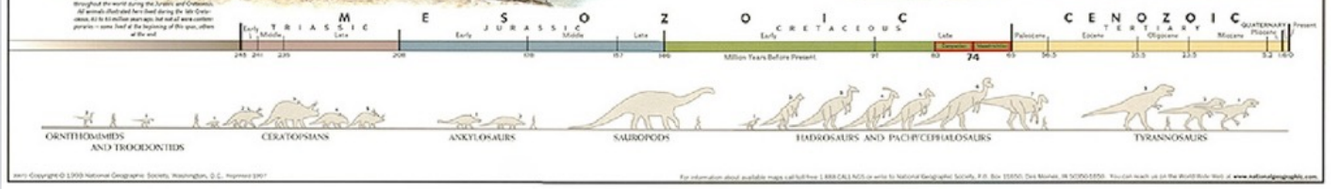

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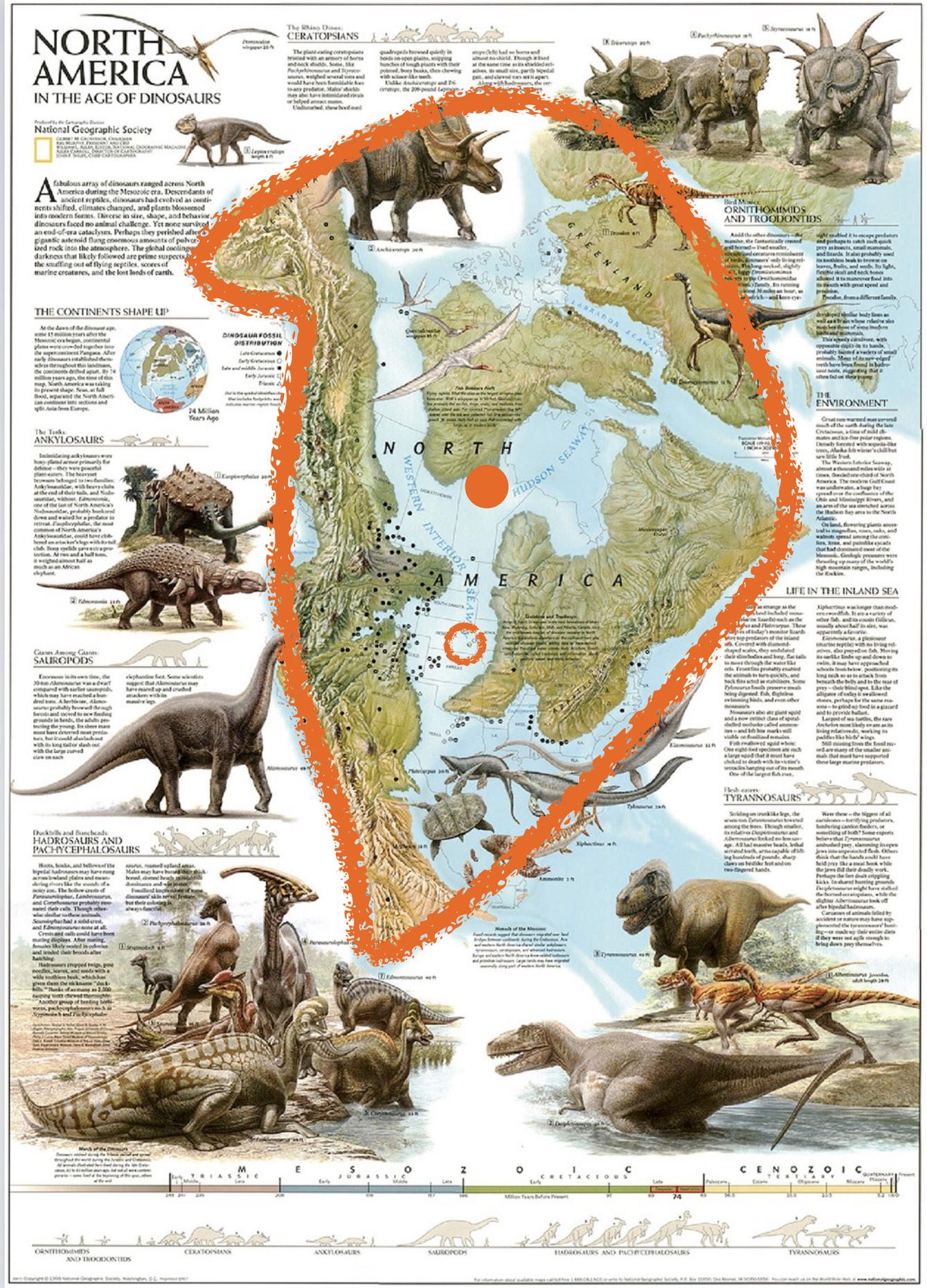

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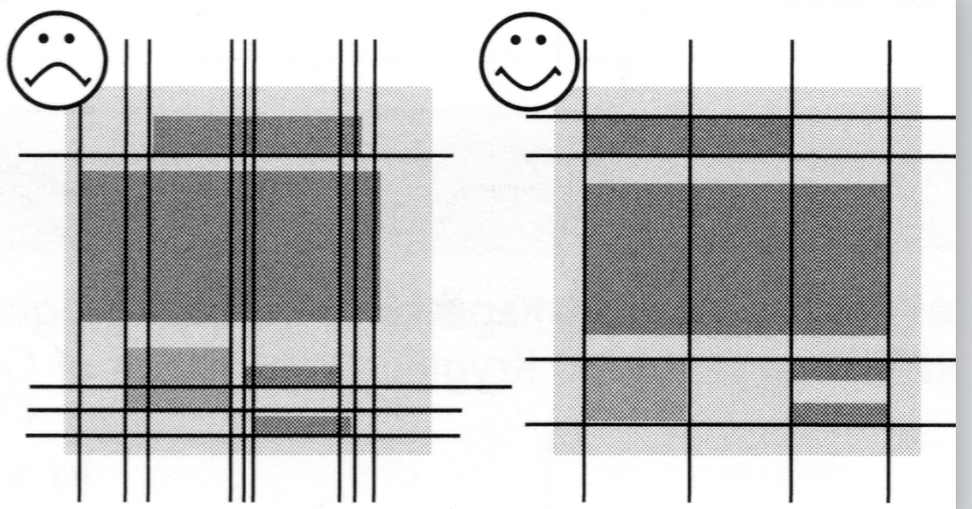
Sight Lines

Sight-lines are invisible horizontal or vertical lines that touch the top, bottom, or sides of map elements. Minimizing the number of sight-lines reduces disjointedness and stabilizes and enhances map layout. This allows your map's readers to focus on the map's subject.



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NORTH AMERICA
IN THE AGE OF DINOSAURS

Produced by the Cartographic Division
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At the dawn of the dinosaur age, some 15 million years after the Mesozoic era began, continental plates were crowded together into the supercontinent Pangaea. After early dinosaurs established themselves throughout this landmass, the continents drifted apart. By 74 million years ago, the time of this map, North America was taking its present shape. Soon, at full flood, separated the North American continent into sections and split Asia from Europe.

24 Million Years Ago

DINOSAUR FOSSIL DISTRIBUTION
Late Cretaceous
Early Cretaceous
Late and middle Jurassic
Early Jurassic
Triassic

Dot in the symbol identifies site that includes footprints, most indicates marine reptile fossils.

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Intimidating ankylosaurs wore bony-plated armor primarily for defense—they were peaceful plant-eaters. The heaviest browsers belonged to two families: Ankylosauridae, with heavy clubs at the end of their tails, and Nodosauridae, without. *Edmontonia*, one of the last of North America's Nodosaurids, probably hunkered down and waited for a predator to retreat. *Euoplocephalus*, the most common of North America's Ankylosaurids, could have clubbered an attacker's legs with its tail club. Bony eyelids gave extra protection. At two and a half tons, it weighed almost half as much as an African elephant.

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Enormous in its own time, the 30-ton *Alamosaurus* was a dwarf compared with earlier sauropods, which may have reached a hundred tons. A herbivore, *Alamosaurus* probably browsed through forests and moved to new feeding grounds in herds, the adults protecting the young. Its sheer mass must have deterred most predators, but it could also lash out with its long tail or slash out with the large curved claw on each elephantine foot. Some scientists suggest that *Alamosaurus* may have reared up and crushed attackers with its massive legs.

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Hoots, honks, and bellows of the bipedal hadrosaurs may have rung across lowland plains and meandering rivers like the sounds of a noisy zoo. The hollow crests of *Parasaurolophus*, *Lambeosaurus*, and *Corythosaurus* probably resonated their calls. Though otherwise similar to these animals, *Saurolophus* had a solid crest, and *Edmontosaurus* none at all. Crests and calls could have been mating displays. After mating, females likely nested in colonies and tended their broods after hatching.

Hadrosaurs cropped twigs, pine needles, leaves, and seeds with a wide toothless beak, which has given them the nickname "duckbills." Banks of as many as 2,000 grinding teeth chewed thoroughly.

Another group of herding herbivores, pachycephalosaurs such as *Stygimoloch* and *Pachycephalosaurus*, roamed upland areas. Males may have butted their thick-boned, domed heads, animals' dominance and who protect.

Fossilized impressions of some dinosaurs' skin reveal texture, but their coloring is always fascinating.

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The plant-eating ceratopsians bristled with an armory of horns and neck shields. Some, like *Pachyrhinosaurus* and *Styracosaurus*, weighed several tons and would have been formidable foes to any predator. Males' shields may also have intimidated rivals or helped attract mates.

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Along with hadrosaurs, the ceratopsians appear to have been the most numerous of the continent's dinosaurs in the late Cretaceous.

Bird Mimics:
ORNITHOMIMIDS AND TROODONTIDS

Amid the other dinosaurs—the massive, the fantastically crested and horned—lived smaller, slender-bodied creatures reminiscent of birds. Dinosaurs' only living relatives. Flying-necked, slightly built, large *Dromiceiomimus* belongs to the Ornithomimidae (bird-mimic) family. Its running speed—some 30 miles an hour, as fast as an ostrich—and keen eyesight enabled it to escape predators and perhaps to catch such quick prey as insects, small mammals, and lizards. It also probably used its toothless beak to browse on leaves, fruits, and seeds. Its light, flexible skull and neck bones allowed it to maneuver food into its mouth with great speed and precision.

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Leviathans as strange as the dinosaurs on land included mosasaurs (marine lizards) such as the *Tylosaurus* and *Halisaurus*. These relatives of today's monitor lizards were top predators of the inland sea. Covered with diamond-shaped scales, they undulated their slim bodies and long, flat tails to move through the water like eels. Front fins probably enabled the animals to turn quickly, and back fins acted as stabilizers. Some *Tylosaurus* fossils preserve meals being digested: fish, flightless swimming birds, and even other mosasaurs.

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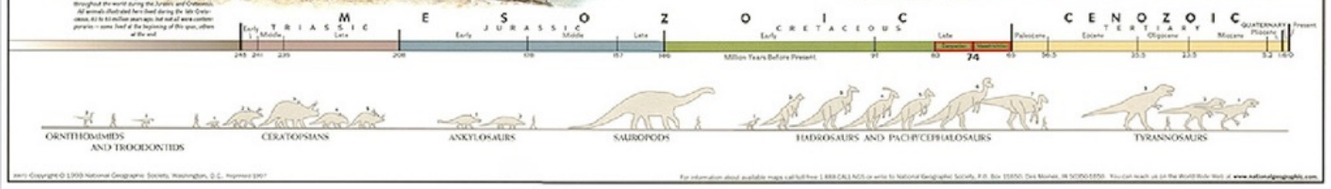
Nomads of the Mesozoic
Fossil records suggest that dinosaurs migrated over land bridges between continents during the Cretaceous. Asia and western North America shared similar ankylosaurs, tyrannosaurs, ceratopsians, and advanced hadrosaurs. Europe and western North America have related iguanodons and primitive hadrosaurs. Large herds may have migrated seasonally along part of western North America.

March of the Dinosaurs
Dinosaurs evolved during the Triassic period and spread throughout the world during the Jurassic and Cretaceous. All animals illustrated here lived during the late Cretaceous, 65 to 83 million years ago, but not all were contemporaries—some lived at the beginning of this span, others at the end.



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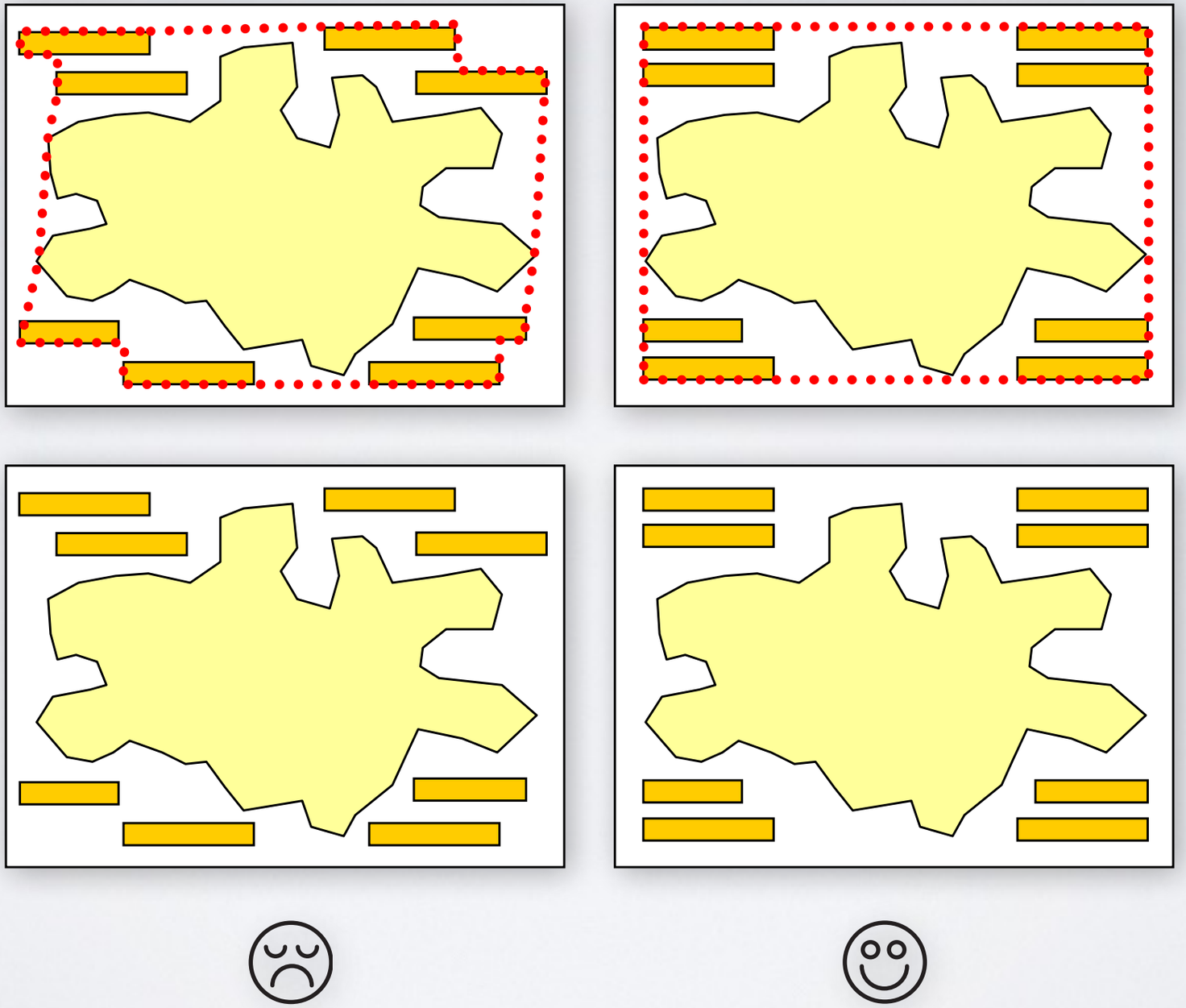
WESTERN INTERIOR SEAWAY
LABRADOR SEAWAY
TRIASSIC
JURASSIC
CRETACEOUS
CENOZOIC
Million Years Before Present

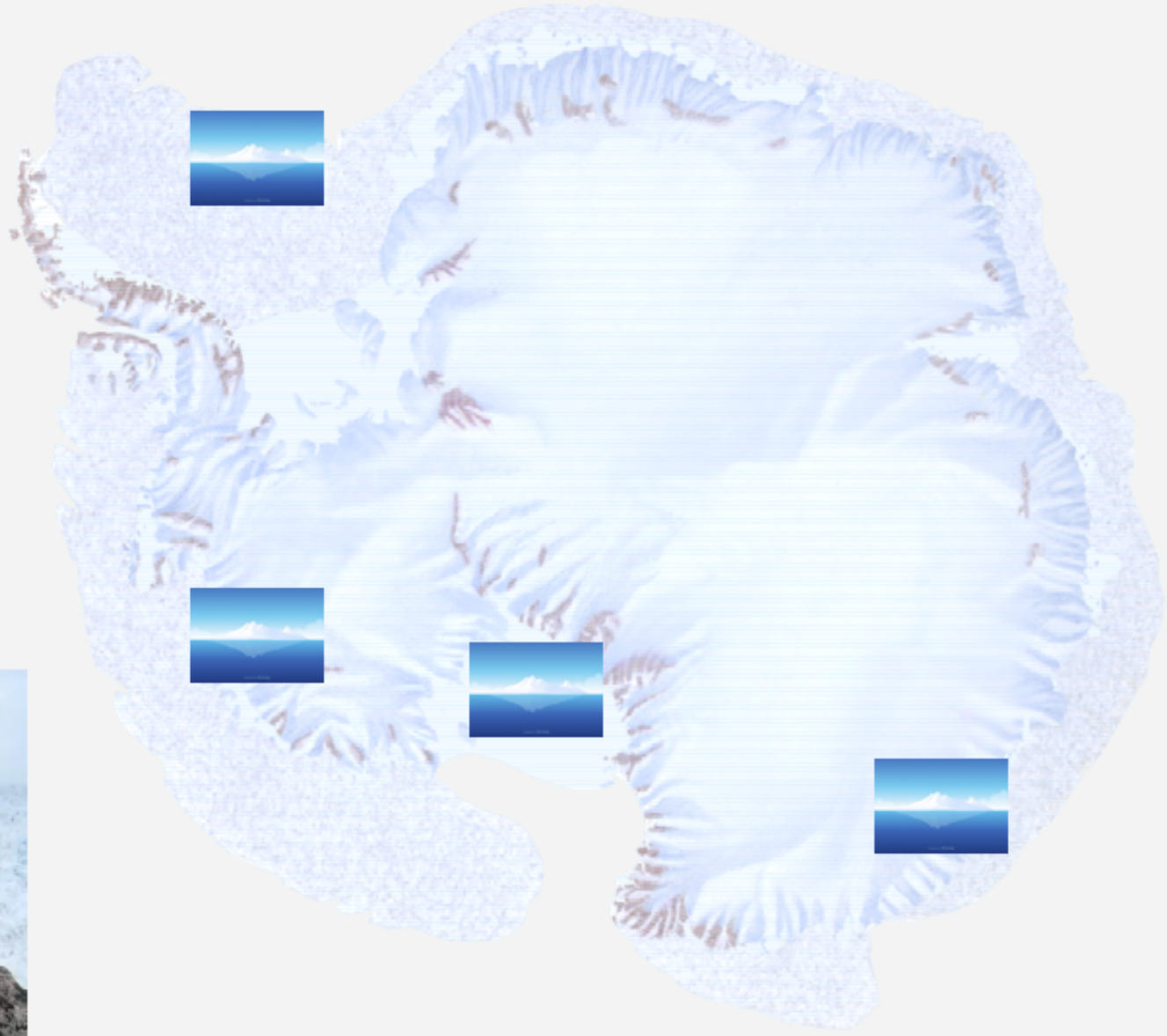
Alignment with Invisible Frame



ICE CALVING

ANTARCTICA

Calving occurs when a portion of ice breaks away from the main mass of a glacier. Calving is the process that forms icebergs. Calving events can be the size of a softball to the size of Connecticut, and maybe even bigger. In the last 30 years, monitoring of calving events has gotten much better, with scientists using satellites to track and even measure the newly formed icebergs.



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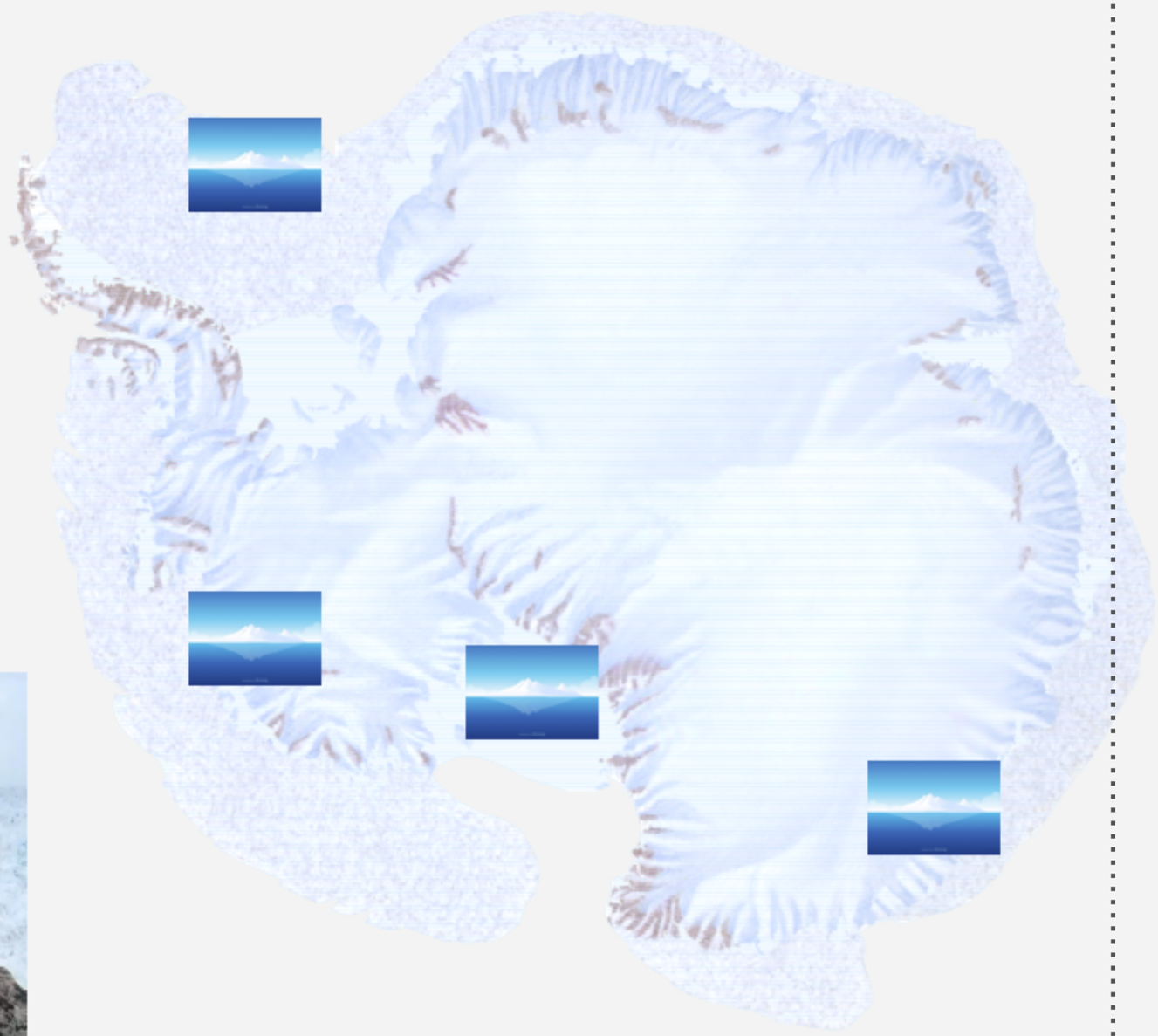
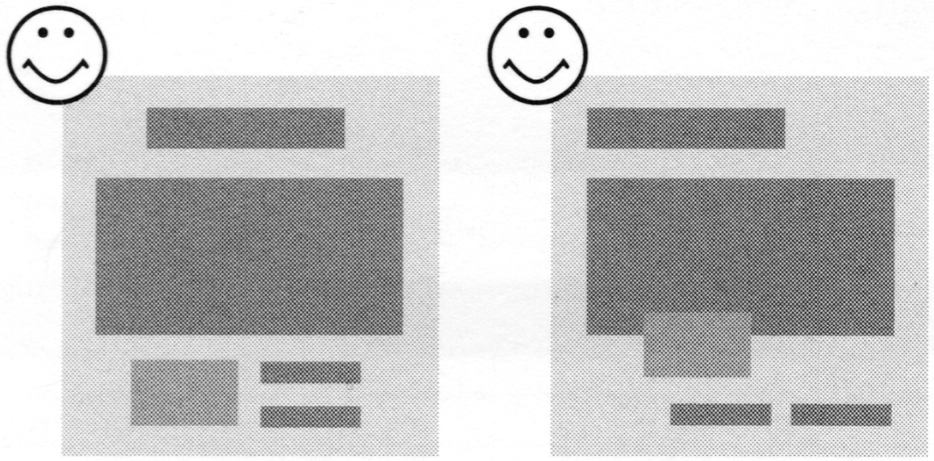
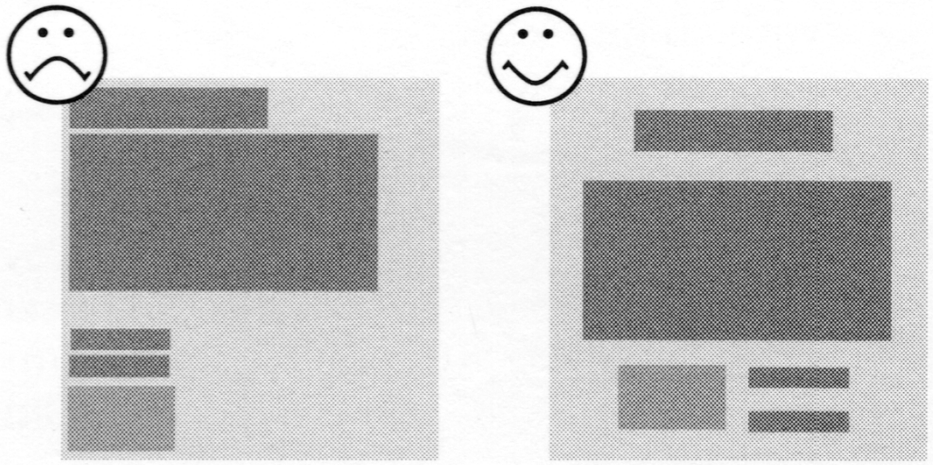


Symmetry and Balance

Symmetry can be thought of as balance around a central vertical axis. Symmetrical balance (left) feels traditional, conservative, and cautious. Asymmetry (right) depends on off-center weights and balances. It typically feels modern, progressive, complex, and more creative.



Balance can be assessed when all your map pieces are in place. Map pieces vary in weight: some seem heavier, others lighter. Does your arrangement seem off-balance? Unless you want to suggest a lack of balance to your readers, rearrange your map pieces for better balance.



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Another group of herbivorous, pachycephalosaurs—*Stygimoloch* and *Pachycephalosaurus*—[illegible]

Fossilized impressions of some dinosaurs' skin reveal texture, but their coloring is always fanciful.

1 Stygimoloch 4 ft
2 Pachycephalosaurus 20 ft
4 Parasaurolophus 30 ft
3 Edmontosaurus 40 ft
5 Corythosaurus 30 ft

The Horned Terror:
CERATOPSIANS

The plant-eating ceratopsians bristled with an armory of horns and neck shields. Some, like *Pachyrhinosaurus* and *Styracosaurus*, weighed several tons and would have been formidable foes to any predator. Males' shields may also have intimidated rivals or helped attract mates.

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Triceratops 30 ft
4 *Pachyrhinosaurus* 18 ft
5 *Styracosaurus* 18 ft

1 *Leptoceratops* length 6 ft

2 *Anchiceratops* 20 ft

3 *Triceratops* 30 ft

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Albertosaurus juvenile, adult length 20 ft

3 *Tyrannosaurus* 45 ft

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Dot in the symbol identifies site that includes footprints; wave indicates marine reptile fossils.

Fun Dinosaur Facts
Flying reptiles. Had the wing span of a large plane. Weighed as much as a pony. Quetzalcoatlus has probably the oil, fish, frogs, crabs, and mollusks from shallow inland seas. Far coastal Pterodactyls (the 50ft wingspan) ate the sea and collected fish from a pelican-like pouch. It seems likely that it was fish-oriented with large, as in modern birds.

Skeletons and Tracksites
Active fossil finds (in red) are in the most favorable of sites: Alberta, Colorado, Utah, and Alberta, Canada, are the continents centers of dinosaur remains in North America. Equally rich deposits of the continent have also yielded dinosaur tracks; some are from the Mesozoic period, others are Paleozoic footprints. Some contain both dinosaurs, birds and mammals—evidence of a transition from reptiles to mammals and birds, perhaps.

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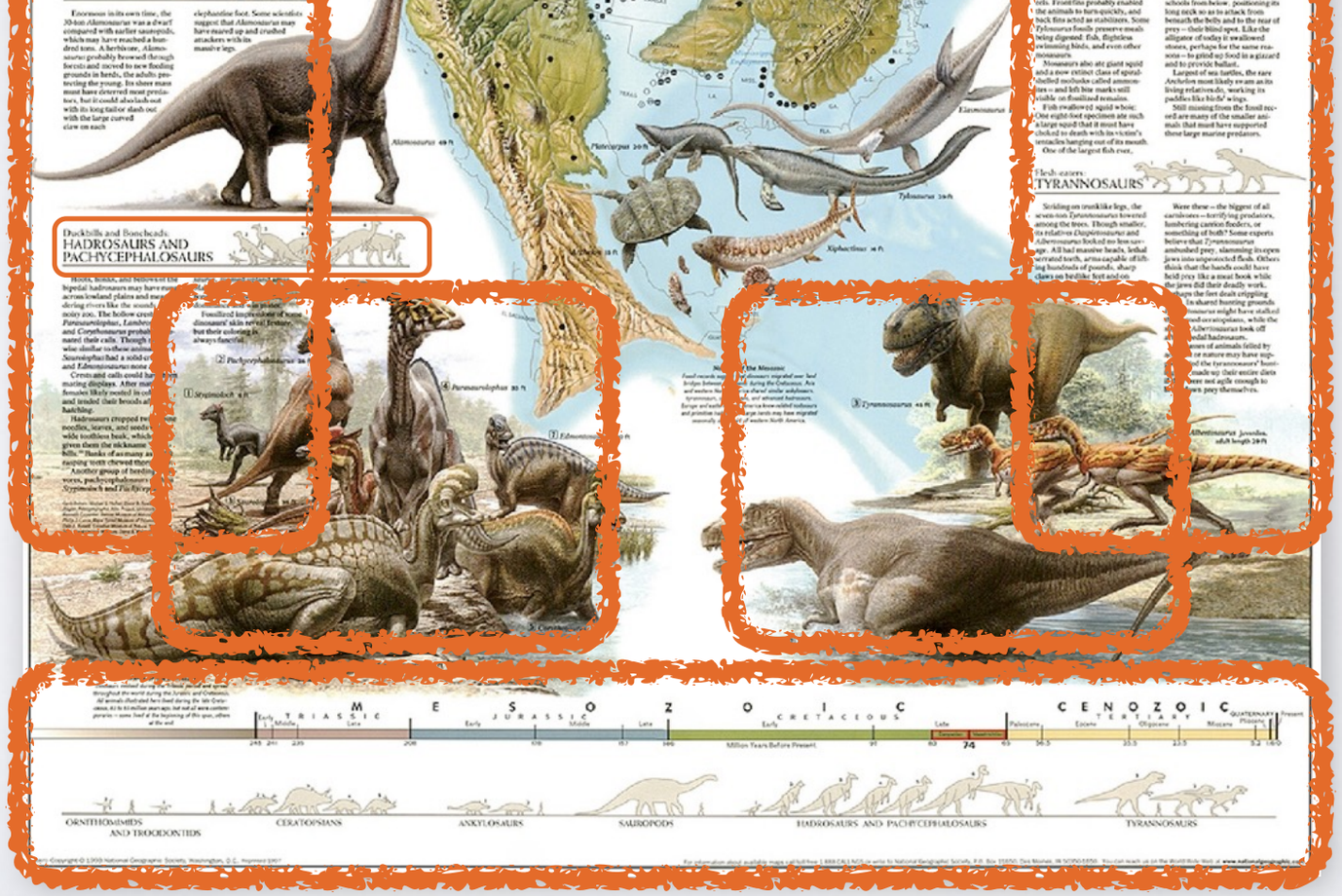

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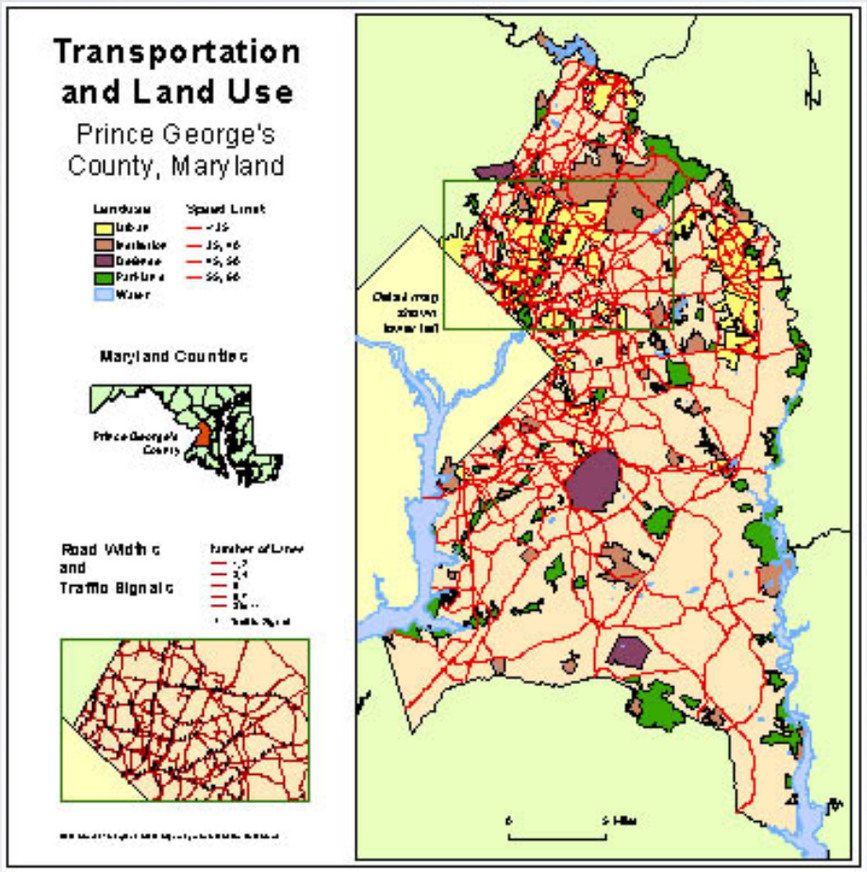
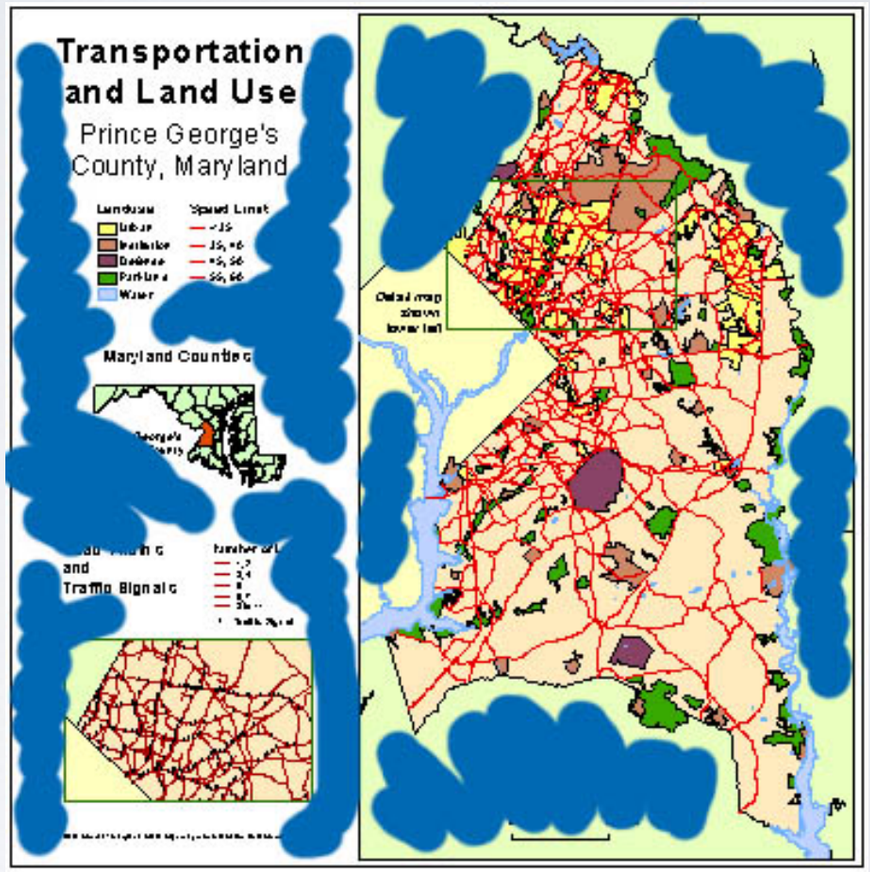
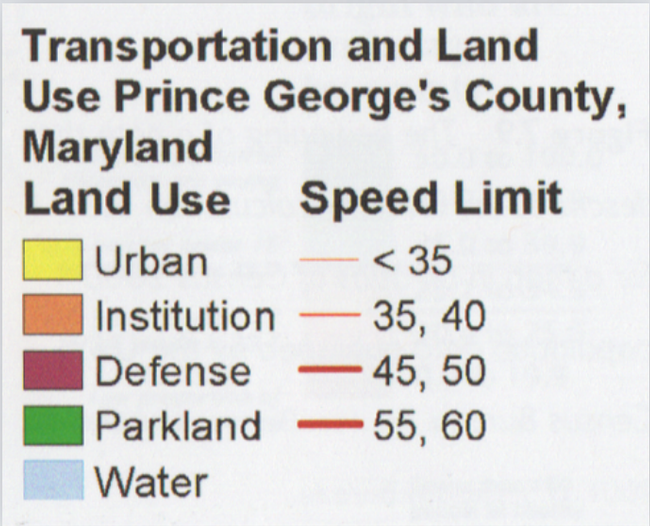
Balance with White Space

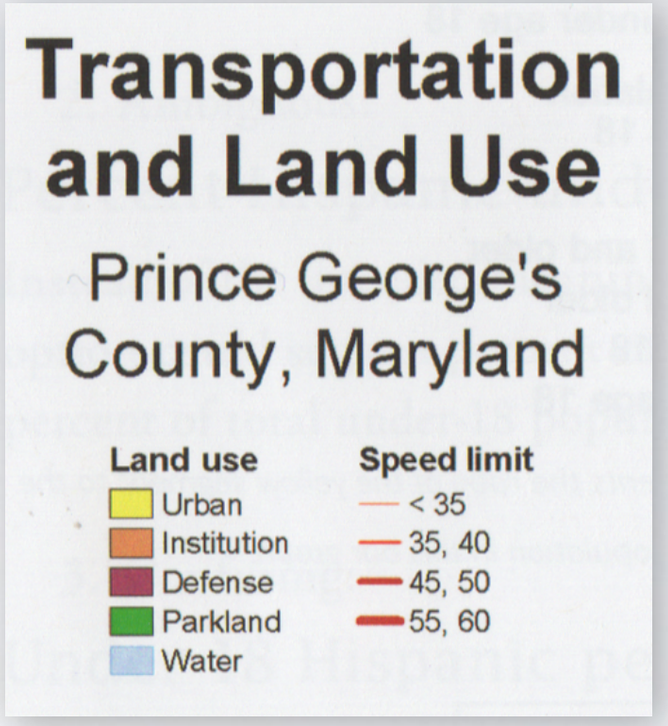




White space is a useful visual element.
There is no need to completely fill space.
Use empty space as a design element.

Visual Hierarchy with Layout





These are the alignments

On today's front page

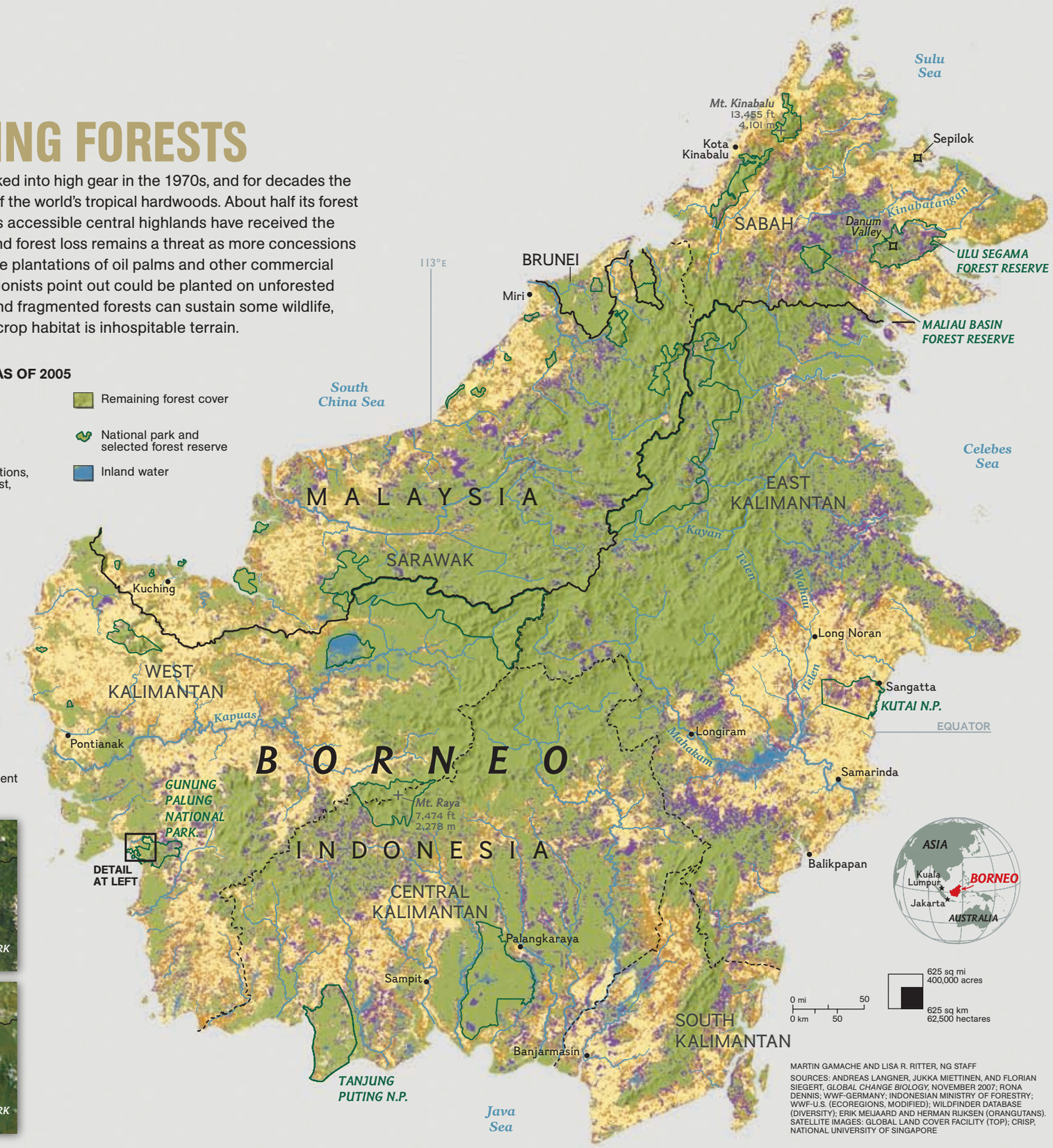
Chris Clarke
https://twitter.com/chrisclarkecc/status/1030427288096186368

VANISHING FORESTS

Logging on Borneo kicked into high gear in the 1970s, and for decades the island provided much of the world's tropical hardwoods. About half its forest cover remains. The less accessible central highlands have received the most protection; lowland forest loss remains a threat as more concessions are granted for lucrative plantations of oil palms and other commercial trees, which conservationists point out could be planted on unforested land. Even degraded and fragmented forests can sustain some wildlife, but a plantation's one-crop habitat is inhospitable terrain.

BORNEO LAND COVER AS OF 2005

- Deforested between 2002–2005
- Degraded lowland forest and regrowth
- Palm oil and tree plantations, heavily fragmented forest, agriculture, bare soil, and aquaculture
- Remaining forest cover
- National park and selected forest reserve
- Inland water



MARTIN GAMACHE AND LISA R. RITTER, NG STAFF

SOURCES: ANDREAS LANGNER, JUKKA MIETTINEN, AND FLORIAN SIEGERT, *GLOBAL CHANGE BIOLOGY*, NOVEMBER 2007; RONA DENNIS; WWF-GERMANY; INDONESIAN MINISTRY OF FORESTRY; WWF-U.S. (ECOREGIONS, MODIFIED); WILDFINDER DATABASE (DIVERSITY); ERIK MEIJAARD AND HERMAN RIJKSEN (ORANGUTANS). SATELLITE IMAGES: GLOBAL LAND COVER FACILITY (TOP); CRISP, NATIONAL UNIVERSITY OF SINGAPORE

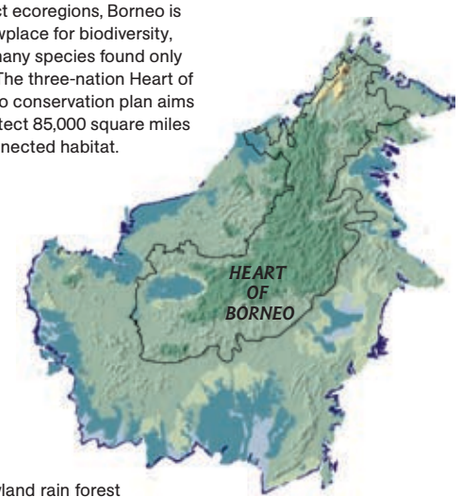
TATTERED DEFENSES

Satellite images of Gunung Palung National Park reveal how logging stripped the bordering lands and invaded the park. New park management has stemmed the damage.

A Wealth of Species

NATURAL HABITATS

A tropical island with seven distinct ecoregions, Borneo is a showplace for biodiversity, with many species found only here. The three-nation Heart of Borneo conservation plan aims to protect 85,000 square miles of connected habitat.



- Lowland rain forest
- Montane rain forest
- Peat swamp forest
- Montane alpine meadow
- Freshwater swamp forest
- Mangrove
- Heath forest

SPECIES DIVERSITY

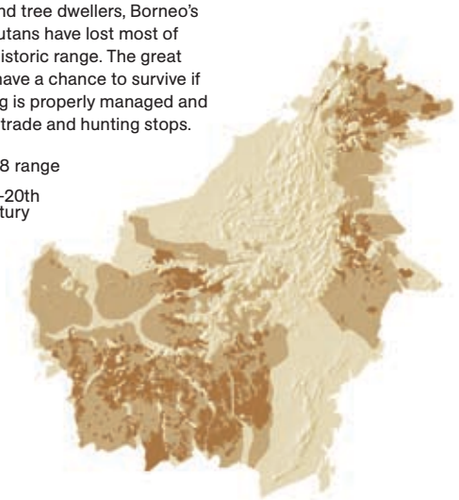
	Endemic to Borneo	Total
Mammals	44	222
Birds	74	420
Reptiles	91	254
Amphibians	114	149
Fish	160	430
Dipterocarps*	155	267

*TROPICAL HARDWOOD TREES

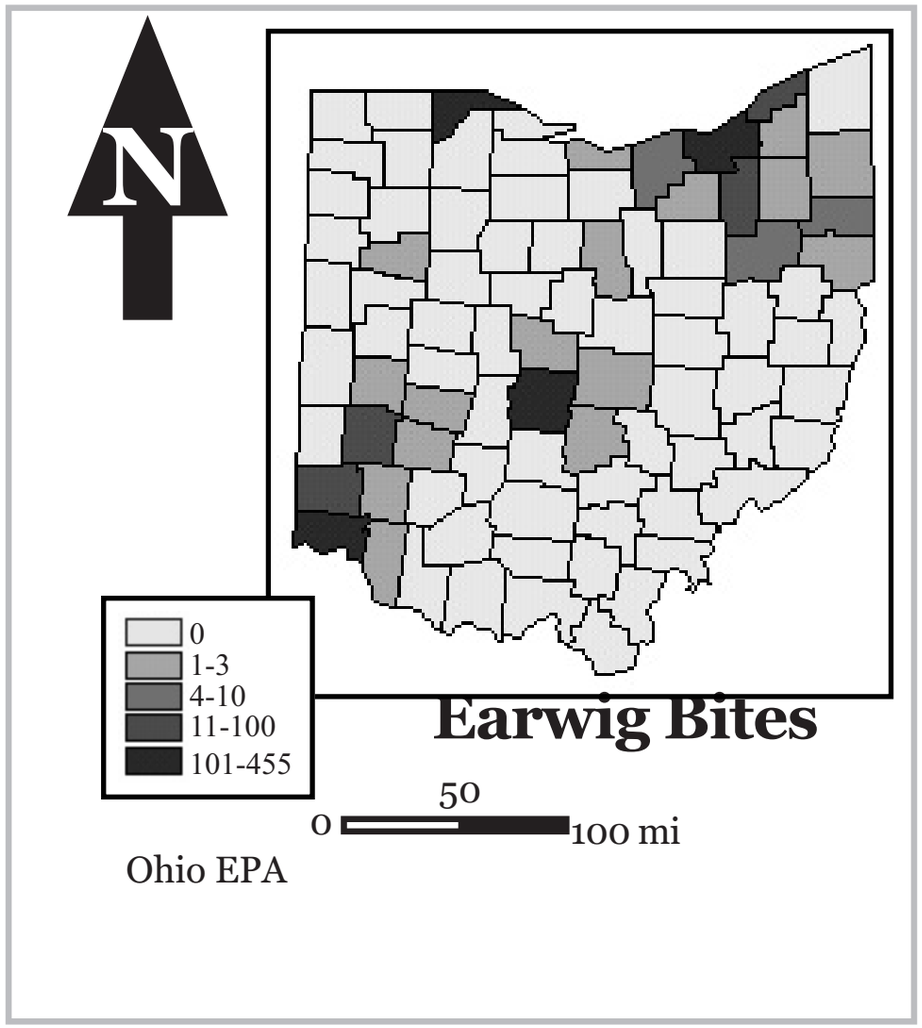
FATE OF ORANGUTANS

Lowland tree dwellers, Borneo's orangutans have lost most of their historic range. The great apes have a chance to survive if logging is properly managed and illegal trade and hunting stops.

- 2008 range
- Mid-20th century



Poor



Better

Typography

Type Family, Typeface, Font, Glyph

Type Family Typeface Font

Type Family, Typeface, Font, Glyph

- Type family: variations of a single typeface (standard, bold, condensed, italic…)
- Typeface: a set of letters and numbers with a unique design
- Font: a subset of a typeface, including all letters and numbers of a specific size. Font is often used to mean typeface.
- Glyph: an element of writing (“the shape of a character”)

a ㅂ ü ø 具

Serif

Times, Garamond and Bodoni are a serif typefaces.
Serifs are traditional and antiquated.
Print newspapers use serif typefaces.
Rather not for diagrams and maps.

Sans serif

Helvetica, Myriad, Arial, Univers, and Frutiger are sans serif typefaces.
Sans serifs are modern and new.
Individual words (as on diagrams and maps) tend to be easier to read.

LAETITIA
"Wildfire Ridge"
Pinot Noir
Arroyo Grande Valley
2008

PUNTO Y COMA
GARNACHA VIÑAS VIEJAS 2009
BY CASTILLO DE MALUENDA

serif

sans serif

Sans serif is often easier to read on diagrams and maps.

Typefaces

- Generally use sans serif: Open Sans (by Google, free), Myriad, Frutiger (expensive), Lucida Grande, Lucida Sans, Univers (expensive), Helvetica

- Avoid Comic, **no impact**, no handwriting, *not this*, NOT THAT, and no fixed width type for general purpose information visualisation…

  … unless you are visualising superhero comics, western saloons, or the decline of typewriters.

Type Weight

More important Less important

Bold
Heavy
Black

Medium

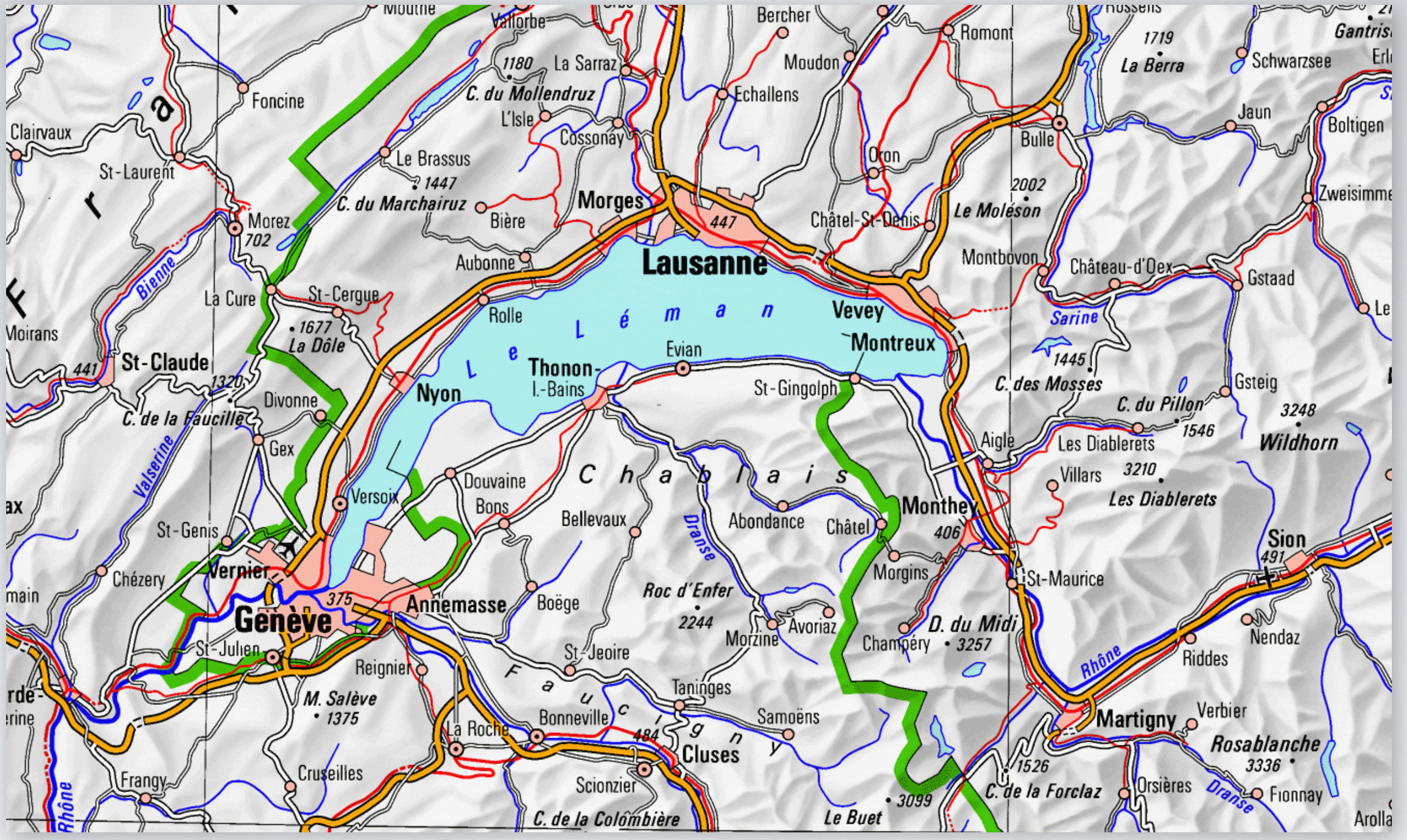
Regular
Normal

Light
Thin

Abc **Abc** **Abc** Abc Abc Abc Abc
Abc ***Abc*** ***Abc*** *Abc* *Abc* *Abc* *Abc*

Quantity or Quality?

Size	Large	Intermediate	Small	Tiny
Weight	**Bold**	**Medium**	Regular	Light
Italic		*Italic*	Regular	
Case		UPPER CASE	Mixed Case	
Colour		Blue	Black	



Cossonay

Morges

Lausanne

Vary type size and weight for quantities.

Vary typeface, case colour, italic/regular for qualities.

Vary size, weight, colour, italic/regular to highlight important information.

Typefaces

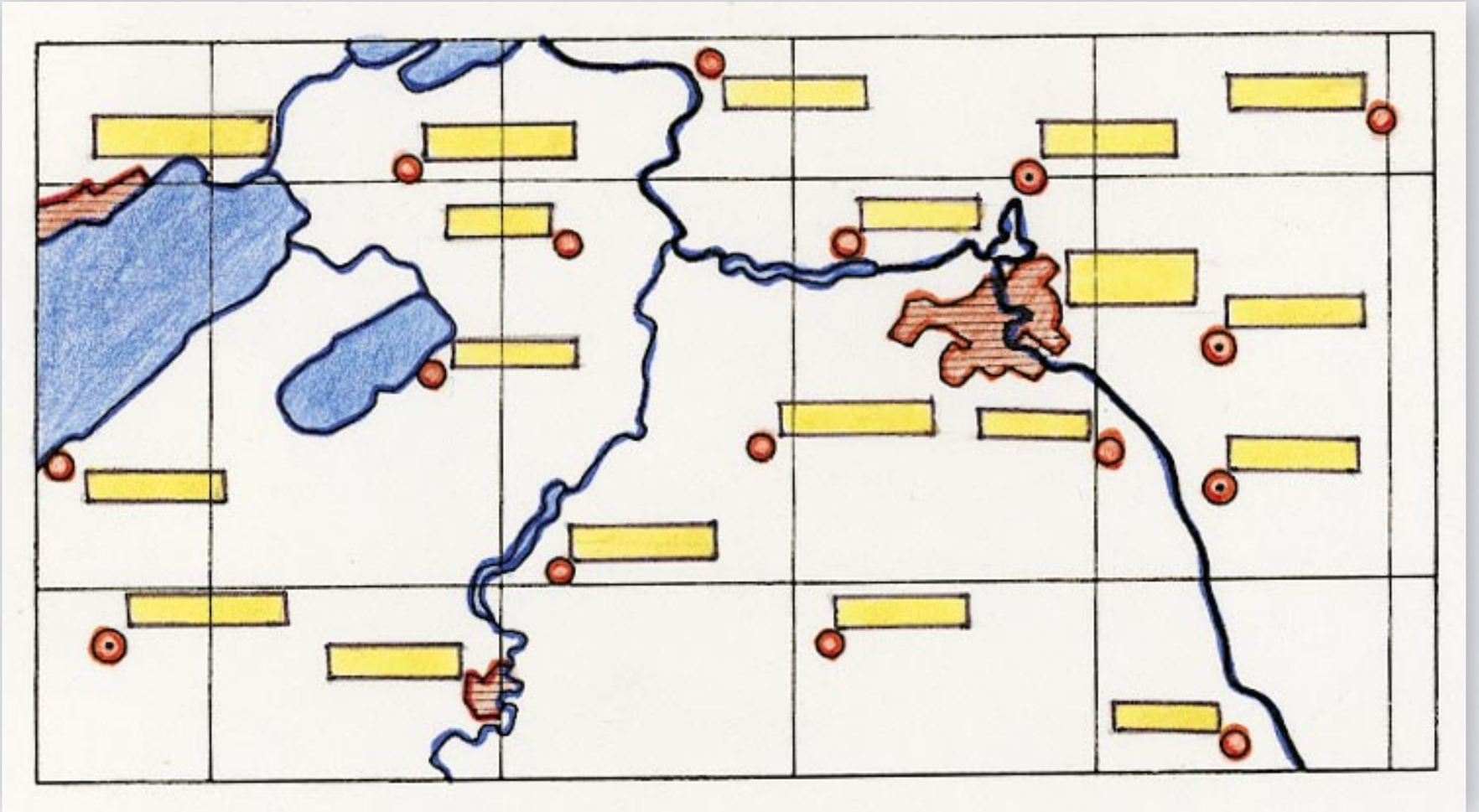
- Generally use a single type family, but vary weight, size, case, italic/regular, and colour to create a visual hierarchy / figure-ground.
- If your really need, use a maximum of 2 type families, but make sure they go well together (this is difficult to get right!). Generally combine one serif and one sans serif type family.

Label Placement

Type Placement Principles for Best Readability

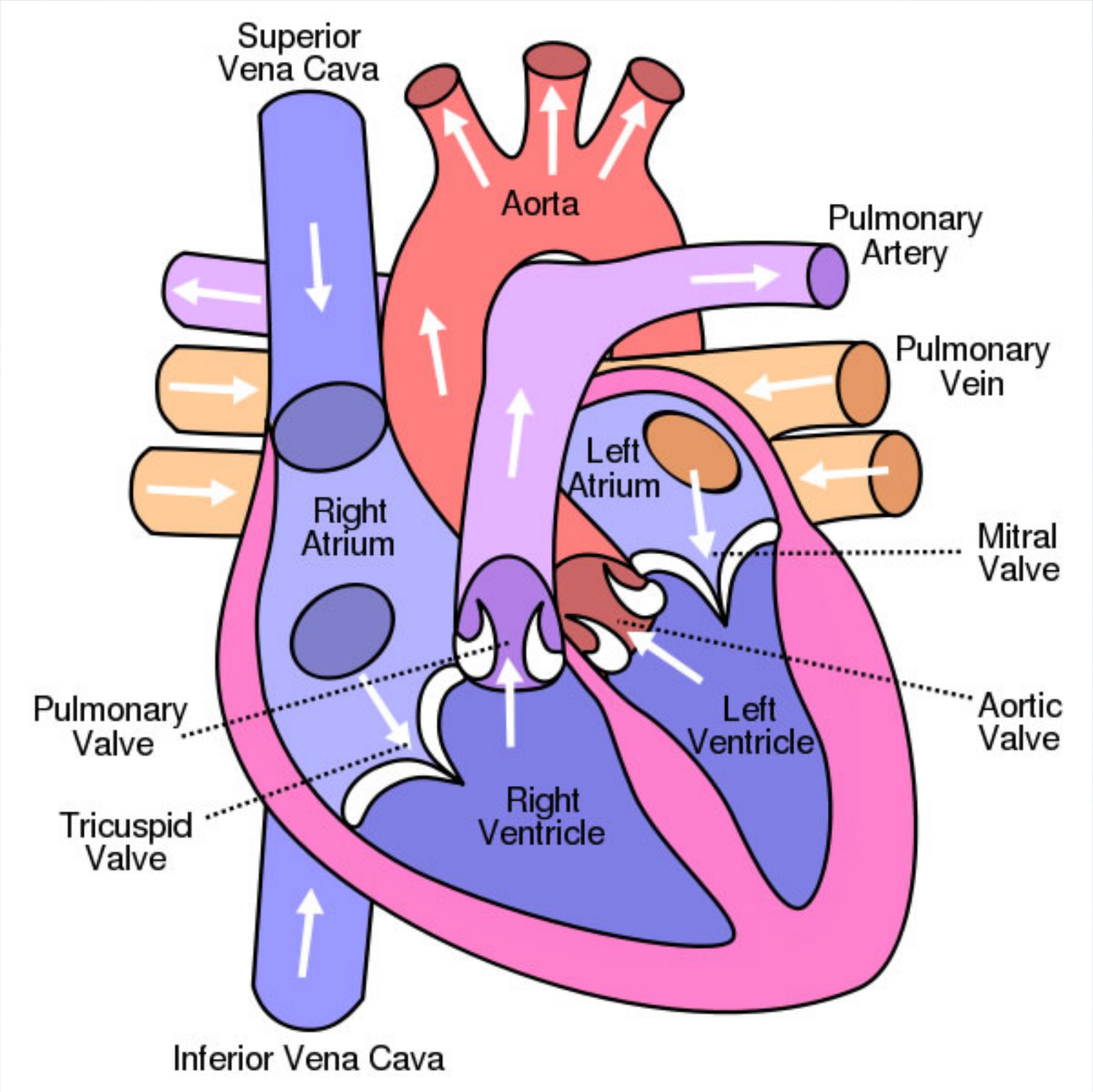
1. No overlapping labels.
2. Labels must be at visual top level.
3. Labels must not cover important diagram or map features
4. Clear visual association between label and labeled feature

Label Placement Preference



No overlapping labels. Place top right of point if possible.

Clear Visual Association


Superior
Vena Cava
Aorta
Pulmonary
Artery
Pulmonary
Vein
Left
Atrium
Right
Atrium
Mitral
Valve
Pulmonary
Valve
Aortic
Valve
Left
Ventricle
Tricuspid
Valve
Right
Ventricle
Inferior Vena Cava

Nutrition Facts

8 servings per container

Serving size **2/3 cup (55g)**

Amount per serving

Calories **230**

	% Daily Value*
Total Fat 8g	**10%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 160mg	**7%**
Total Carbohydrate 37g	**13%**
Dietary Fiber 4g	**14%**
Total Sugars 12g	
Includes 10g Added Sugars	**20%**
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

QANTAS

Business.

Carrier
QANTAS AIRWAYS

Flight
QF 444

Date
08SEP

Boarding
1510

Name
MASON/KEITH MR

Seat
4K

Class
BUSINESS

From
MELBOURNE
Terminal 1

To
SYDNEY
Terminal 3

SEQ NBR
182

Gate

Service Information
FF GOLD ONEWORLD SAPH
odpu 5000 pts melsyd

ETKT

Flight
QF 444

Date
08SEP

Name
MASON/KEITH MR

Seat
4K

Class
BUSINESS

From
MEL

To
SYD

SEQ NBR
182

Carrier
QANTAS

qantas.com

Please be at the boarding gate
well ahead of departure time

International Typographic Style

A new graphic design style emerged in Switzerland in the 1950s that would become the predominant graphic style in the world by the '70s. Because of its strong reliance on typographic elements, the new style came to be known as the International Typographic Style.

The style was marked by: 1) the use of a mathematical grid to provide an overall orderly and unified structure; 2) sans serif typefaces (especially Helvetica, introduced in 1961) in a flush left and ragged right format; and 3) black and white photography in place of drawn illustration. The overall impression was simple and rational, tightly structured and serious, clear and objective, and harmonious.

The style was refined at two design schools in Switzerland, one in Basel led by Armin Hofmann and Emil Ruder, and the other in Zurich under the leadership of Joseph Muller-Brockmann. All had studied with Ernst Keller at the Zurich School of Design before WWII, where the principles of the Bauhaus and Jan Tschichold's New Typography were taught.

The new style became widely synonymous with the "look" of many Swiss cultural institutions which used posters as advertising vehicles. Hofmann's series for the Basel State Theater and Muller-Brockmann's for Zurich's Tonhalle are two of the most famous. Hofmann's accentuation of contrasts between various design elements and Muller-Brockmann's exploration of rhythm and tempo in visual form are high notes in the evolution of the style.

Rational

Tightly structured

Harminous

Objective

Clear

Serious

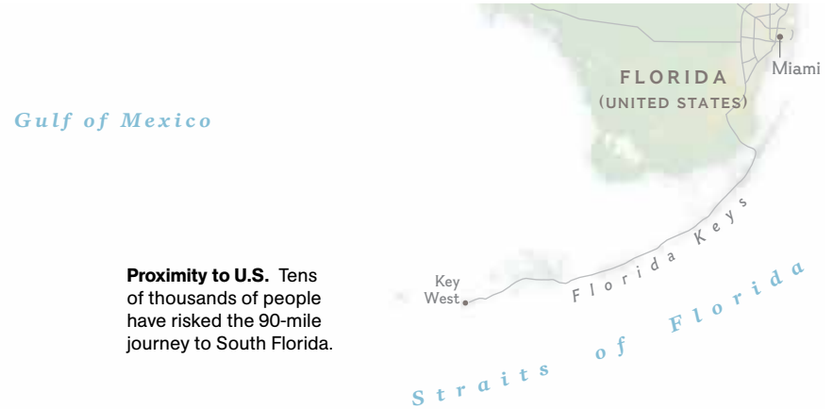
Simple

Salon Air France
Air France Lounge
AIRFRANCE
Portes
Gates
L21 à to L36

E35
E43
2
13
San Gottardo 86 km
San Bernardino 58 km
Bellinzona 11 km
Locarno 26 km
Radio
RSI
96,1
SOS

CAN CUBA STAY AFLOAT?

Hampered by the U.S. embargo and the collapse of the U.S.S.R. in 1991, Cuba's economy has floundered. Today it is precariously propped up by Venezuelan aid. Production of sugar—and most agricultural and industrial products—has plummeted since the 1959 revolution. Its best hope for growth: oil, nickel—and people. Tourism is up, along with cash sent to residents from abroad.



Proximity to U.S. Tens of thousands of people have risked the 90-mile journey to South Florida.

Oil International partners are searching for oil offshore—estimates of reserves range from 5-9 billion barrels. Cuba currently depends on oil from Venezuela.

Sugar Once a cash crop, sugar is now a negligible export. A 2002 effort to tighten productivity resulted in abandoned mills, fields of weeds, and a 66 percent drop in output.

2010 Sugar cultivation area

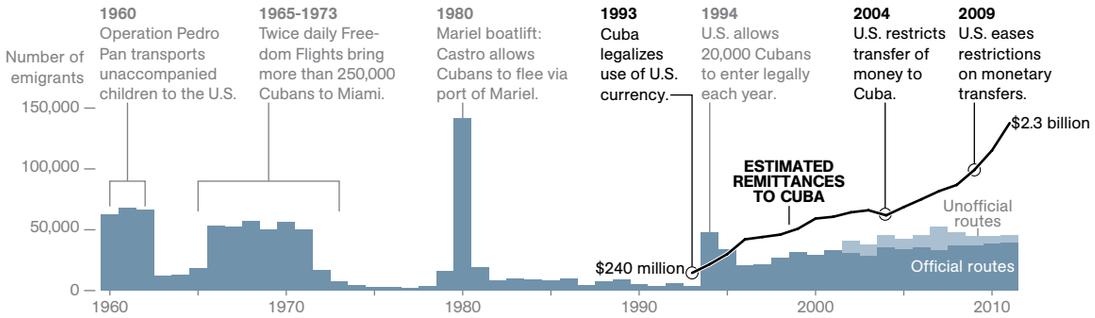
Nickel A joint Canadian-Cuban venture sends nickel, now Cuba's largest export commodity, from mines in Holguín to refineries in Alberta.

CUBANS OUT, DOLLARS IN

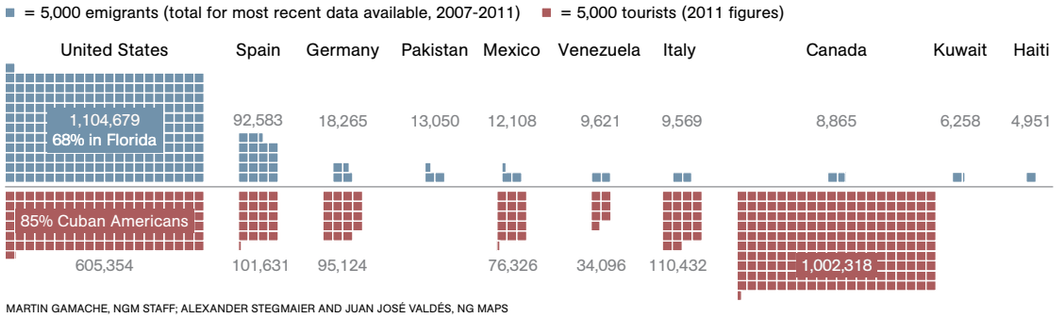
Among the most reliable sources of hard currency are the billions in remittances flowing in from the Cuban diaspora and the more than two billion dollars spent annually by tourists. The number of people leaving the island each year fluctuates with the twists and turns of politics and policy.

Cuban native and NGS cartographer Juan Valdés narrates an emigration time line.

Postrevolutionary emigration and remittances

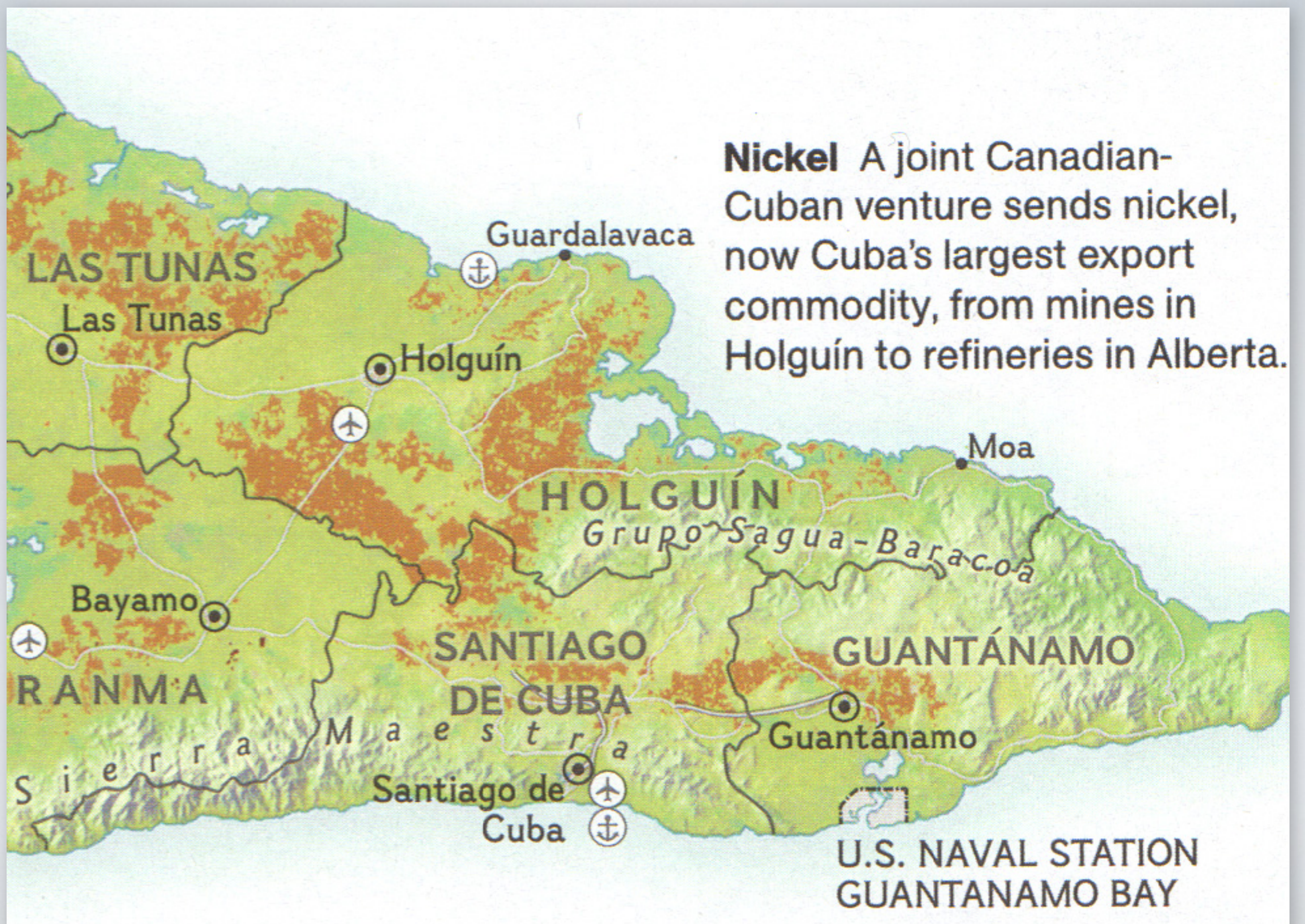


Cuban nationals abroad and tourists by country of origin



MARTIN GAMACHE, NGM STAFF; ALEXANDER STEGMAIER AND JUAN JOSÉ VALDÉS, NG MAPS

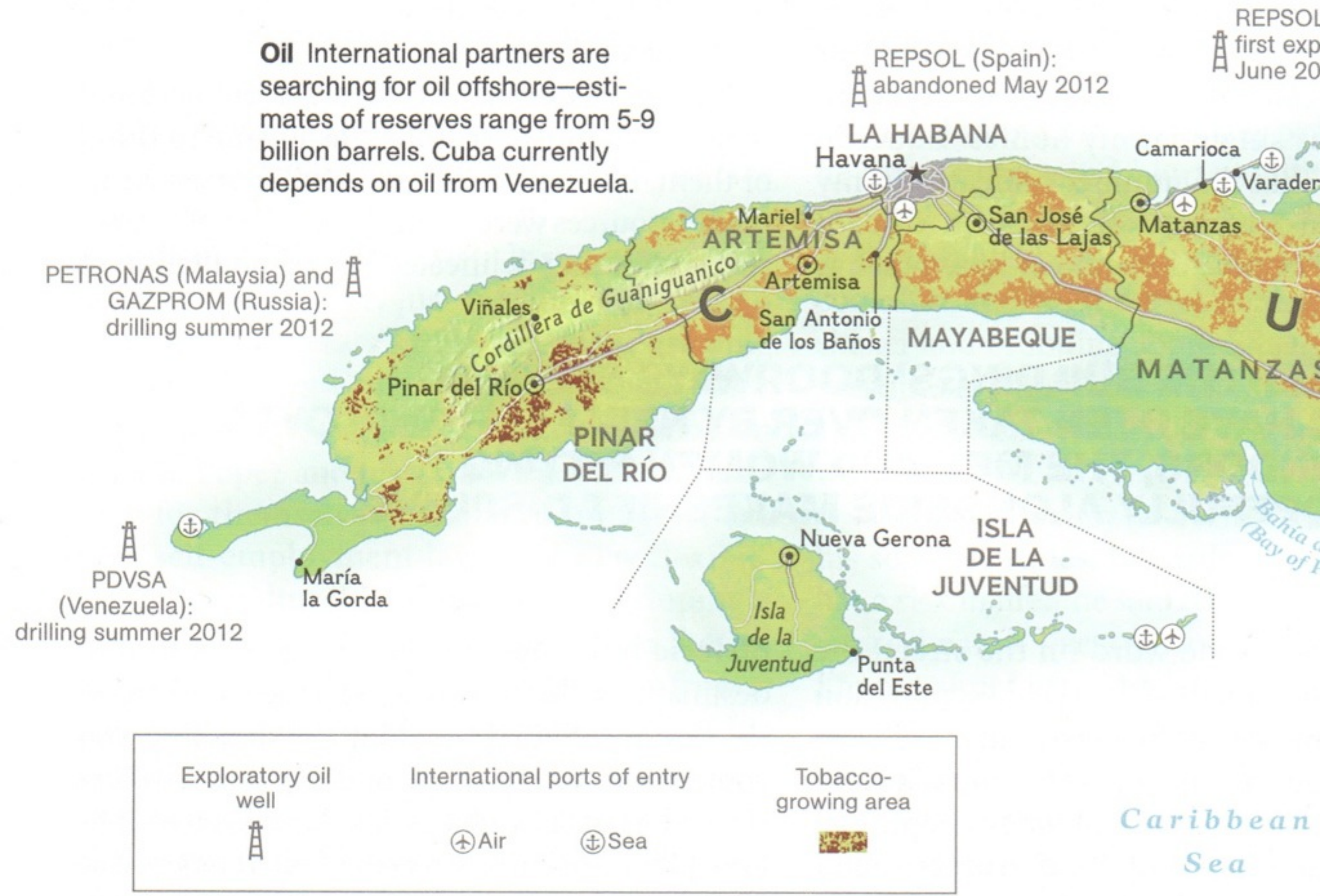
SOURCES: CUBAN NATIONAL STATISTICS OFFICE; FAO; U.S. CENSUS; U.S. CUSTOMS AND BORDER PROTECTION; UN STATISTICS DIVISION; DEVELOPMENT RESEARCH CENTRE ON MIGRATION, GLOBALISATION AND POVERTY; MIGRATION POLICY INSTITUTE; EMILIO MORALES AND JOE SCARPACI, HAVANA CONSULTING GROUP; ARCH RITTER, CARLETON UNIVERSITY; JORGE R. PIÑON, UNIVERSITY OF TEXAS AT AUSTIN; MODIS LAND COVER, NASA LP DAAC

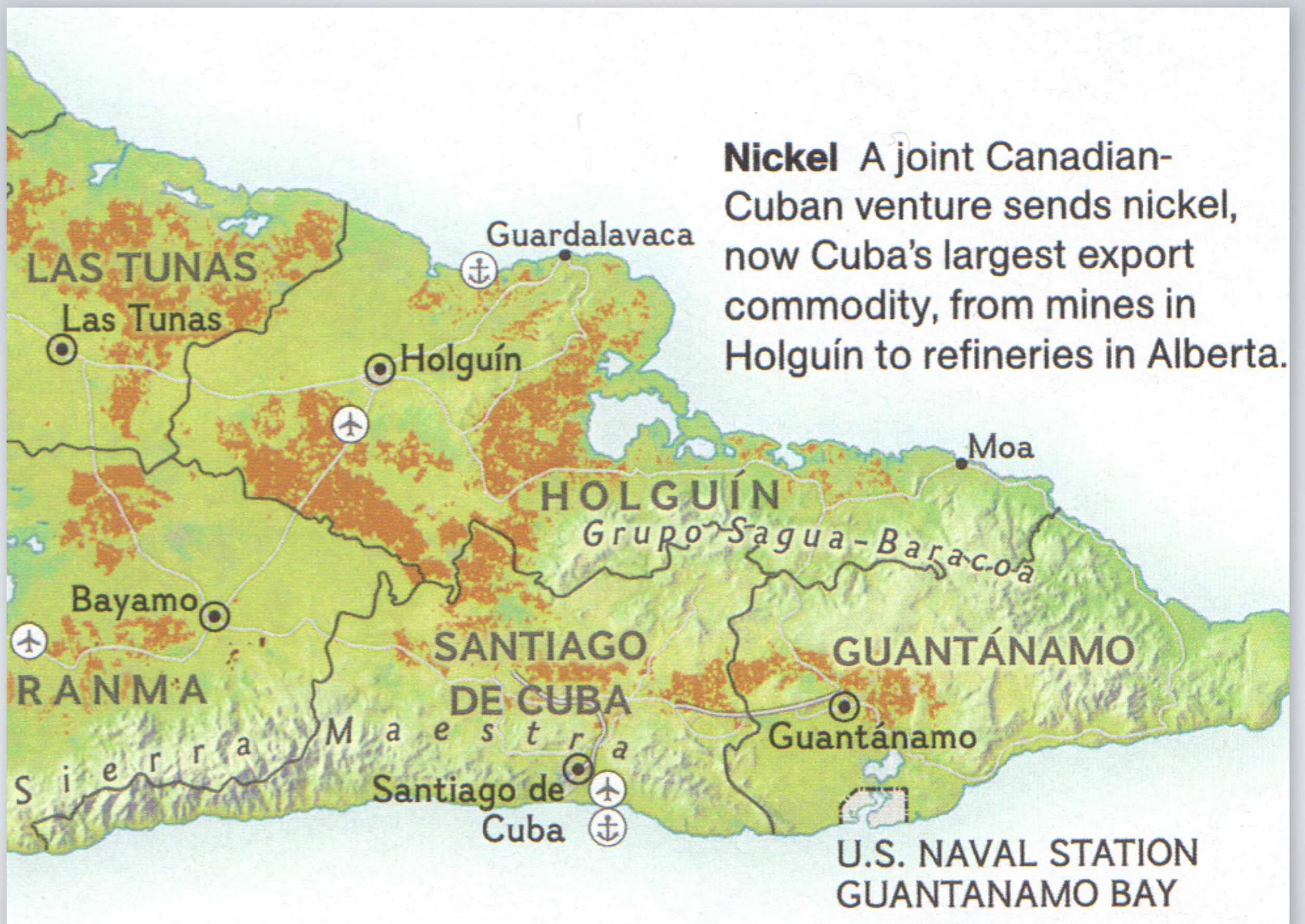


Nickel A joint Canadian-Cuban venture sends nickel, now Cuba's largest export commodity, from mines in Holguín to refineries in Alberta.

National Geographic, November 2012, p. 40–41 (section)

Oil International partners are searching for oil offshore—estimates of reserves range from 5-9 billion barrels. Cuba currently depends on oil from Venezuela.





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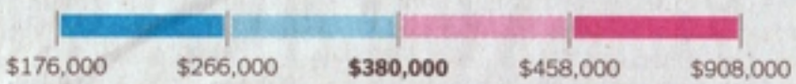
National Geographic, November 2012, p. 40–41 (section)

Bulle
827
Bannans
Le Drugeon
826
du La
839
Dompierre-
les-Tilleuls
La Rivière-Drugeon
Ste-Colombe
Granges-Narboz
La Cluse
861
Le Frambourg
Frasne
852
Bouverans
Oye-
et-Pallet
Montagne
du Laveron
1112
Friard
1000
La Planée
Etang
de Frasne
Etang
Berthelot
L'Entonnoir
Les Grangettes
Malpas
Les Four
Montperreux
874
Le Drugeon
Vaux-
et-Chantegrue
St-Point-Lac
Chaudron
1107
850
Bonnevaux
Lac de Saint-Point
850
Mignovillard
Forêt
de Mignovillard
Malbuisson
Touillon-
et-Loutelet
Mont d
Les Hôpit
Vieux
Granges-
Ste-Marie
St-Antoine
Lac
de Remoray
Labergement-
Ste-Marie
Les Hô
Neufs
Remoray
907
856
1007
Fourcatier-et-

The 1% Next Door

A household must earn more than **$380,000** to rank in the top 1 percent of all American households. But to be in the top 1 percent in Laredo, Tex., a household needs to earn much less — $228,000.

Amount a household must earn annually to be in the top 1% of a given metropolitan area



LOWEST INCOME REQUIRED TO BE IN THE LOCAL 1%

Jamestown, N.Y.
$176,000

HIGHEST INCOME REQUIRED TO BE IN THE LOCAL 1%

Stamford, Conn.
$908,000

Bold indicates the 25 metropolitan areas with the **highest** and **lowest** incomes required to be in the local 1%

Bellingham $346,000
Bremerton $374,000
Seattle $408,000
Olympia $283,000
Tacoma $287,000
Spokane $341,000
Yakima $271,000
Portland $343,000
Richland $299,000
Salem $316,000
Eugene $301,000
Medford $300,000
Boise $306,000
Redding $323,000
Chico $285,000
Reno $397,000
Salt Lake City $342,000
Santa Rosa $404,000
Yuba City $290,000
Vallejo $385,000
Yolo $412,000
Provo $340,000
San Francisco $558,000
Sacramento $371,000
Oakland $469,000
Stockton $317,000
San Jose $517,000
Modesto $307,000
Santa Cruz $422,000
Merced $326,000
Salinas $377,000
Fresno $357,000
San Luis Obispo $382,000
Visalia $266,000
Las Vegas $362,000
Santa Barbara $456,000
Bakersfield $296,000
Ventura $461,000
Los Angeles $467,000
Riverside $331,000
Orange County $488,000
San Diego $428,000
Phoenix $381,000
Yuma $215,000
Tucson $333,000
Billings $308,000
Fort Collins $388,000
Greeley $300,000
Boulder $463,000
Denver $426,000
Grand Junction $319,000
Colorado Springs $309,000
Pueblo $258,000
Santa Fe $378,000
Albuquerque $307,000
Las Cruces $242,000
Lubbock $330,000
El Paso $257,000
Odessa $419,000
Fargo $383,000
Duluth $362,000
St. Cloud $357,000
Minneapolis $428,000
Eau Claire $320,000
Wausau $318,000
Rochester $469,000
Appleton $359,000
Green Bay $359,000
Madison $372,000
Milwaukee $361,000
Sioux Falls $400,000
Janesville $315,000
Racine $327,000
Waterloo $301,000
Rockford $273,000
Kenosha $356,000
Cedar Rapids $322,000
Chicago $480,000
Des Moines $350,000
Iowa City $332,000
Davenport $336,000
Omaha $366,000
Lincoln $320,000
Kansas City $359,000
Columbia $361,000
Topeka $333,000
St. Louis $359,000
Wichita $336,000
Springfield $291,000
Joplin $271,000
Tulsa $340,000
Fayetteville $303,000
Oklahoma City $353,000
Fort Smith $301,000
Amarillo $322,000
Little Rock $309,000
Dallas $425,000
Shreveport $326,000
Fort Worth $399,000
Longview $362,000
Monroe $357,000
Jackson $325,000
Tyler $419,000
Waco $284,000
Killeen $323,000
Lake Charles $334,000
Baton Rouge $358,000
Austin $418,000
Bryan $338,000
Beaumont $313,000
Lafayette $358,000
San Antonio $357,000
Houston $423,000
Galveston $359,000
Brazoria $372,000
Laredo $228,000
Corpus Christi $353,000
McAllen $256,000
Brownsville $233,000
Saginaw $328,000
Flint $179,000
Grand Rapids $317,000
Lansing $295,000
Detroit $337,000
Kalamazoo $308,000
Ann Arbor $359,000
Benton Harbor $321,000
Jackson $227,000
Cedar Rapids $322,000
Chicago $480,000
South Bend $319,000
Toledo $335,000
Cleveland $350,000
Erie $319,000
Des Moines $350,000
Iowa City $332,000
Davenport $336,000
Gary $299,000
Elkhart $334,000
Akron $339,000
Youngstown $229,000
Omaha $366,000
Peoria $388,000
Fort Wayne $306,000
Lima $263,000
Lincoln $320,000
Bloomington $379,000
Lafayette $296,000
Columbus $362,000
Canton $272,000
Harrisburg $339,000
Reading $315,000
Champaign $334,000
Indianapolis $339,000
Dayton $290,000
Pittsburgh $394,000
Altoona $378,000
Philadelphia $425,000
Atlantic City $385,000
Bloomington $320,000
Hamilton $323,000
York $323,000
Lancaster $347,000
Wilmington $410,000
Vineland $257,000
Terre Haute $241,000
Cincinnati $358,000
Johnstown $237,000
Hagerstown $271,000
Baltimore $433,000
Dover $266,000
Evansville $319,000
Louisville $320,000
Washington $513,000
Lexington $359,000
Charlottesville $451,000
Richmond $410,000
Roanoke $337,000
Lynchburg $255,000
Norfolk $322,000
Clarksville $201,000
Johnson City $315,000
Greensboro $344,000
Raleigh–Durham $395,000
Greenville $325,000
Rocky Mount $265,000
Nashville $381,000
Knoxville $345,000
Asheville $362,000
Hickory $306,000
Jacksonville $255,000
Memphis $375,000
Florence $270,000
Chattanooga $350,000
Charlotte $384,000
Fayetteville $262,000
Wilmington $362,000
Huntsville $331,000
Athens $392,000
Greenville $328,000
Columbia $334,000
Myrtle Beach $314,000
Decatur $240,000
Birmingham $350,000
Atlanta $407,000
Augusta $305,000
Charleston $359,000
Tuscaloosa $316,000
Auburn $291,000
Columbus $286,000
Macon $271,000
Savannah $347,000
Montgomery $307,000
Dothan $281,000
Tallahassee $358,000
Jacksonville $395,000
Mobile $332,000
Pensacola $319,000
Panama City $308,000
Gainesville $383,000
Biloxi $313,000
Fort Walton Beach $274,000
Ocala $276,000
Daytona Beach $312,000
New Orleans $362,000
Tampa $373,000
Orlando $379,000
Lakeland $314,000
Melbourne $335,000
Sarasota $387,000
Fort Pierce $382,000
Anchorage $423,000
Punta Gorda $273,000
West Palm Beach $451,000
Honolulu $365,000
Fort Myers $401,000
Fort Lauderdale $400,000
Naples $486,000
Miami $408,000
Portland $340,000
Glens Falls $271,000
Utica $228,000
Lawrence $503,000
Albany $314,000
Fitchburg $269,000
Lowell $336,000
Syracuse $305,000
Worcester $284,000
Boston $529,000
Springfield $299,000
Brockton $286,000
Barnstable $402,000
Rochester $319,000
Providence $331,000
New Bedford $292,000
Buffalo $308,000
Dutchess Co. $402,000
Hartford $458,000
Binghamton $258,000
Newburgh $346,000
New Haven $377,000
Jamestown $176,000
Danbury $668,000
Bridgeport $659,000
New York $609,000
Stamford $908,000
Bergen $578,000
Nassau Co. $607,000
Scranton $313,000
Newark $590,000
Jersey City $430,000
State College $303,000
Allentown $354,000
Middlesex $568,000
Trenton $584,000
Monmouth $522,000

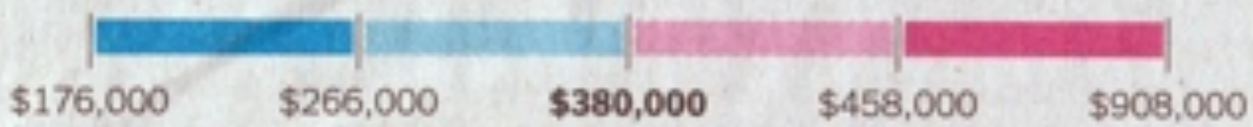
Source: New York Times analysis of University of Minnesota Population Center data

ROBERT GEBELOFF, FORD FESSENDEN AND ALICIA DeSANTIS/THE NEW YORK TIMES

The 1% Next Door

A household must earn more than **$380,000** to rank in the top 1 percent of all American households. But to be in the top 1 percent in Laredo, Tex., a household needs to earn much less — $228,000.

Amount a household must earn annually to be in the top 1% of a given metropolitan area



Vallejo $385,000
Yolo $412,000
Provo $340,000
Cedar Rapids $322,000
Chicago $480,000
San Francisco $558,000
Sacramento $371,000
Des Moines $350,000
Iowa City $332,000
Davenport $336,000
Gary $299,000
Oakland $469,000
Stockton $317,000
Omaha $366,000
Peoria $388,000
Fort Collins $388,000
Greeley $300,000
Lincoln $320,000
Bloomington $379,000
San Jose $517,000
Modesto $307,000
Boulder $463,000
Denver $426,000
Champaign $334,000
Santa Cruz $422,000
Merced $326,000
Kansas City $359,000
Columbia $361,000
Grand Junction $319,000
Colorado Springs $309,000
Salinas $377,000
Fresno $357,000
Topeka $333,000
St. Louis $359,000
Pueblo $258,000
San Luis Obispo $382,000
Visalia $266,000
Las Vegas $362,000
Wichita $336,000
Santa Barbara $456,000
Bakersfield $296,000
Ventura $461,000
Springfield $291,000
Santa Fe $378,000
Joplin $271,000
Los Angeles $467,000
Riverside $331,000
Tulsa $340,000
Fayetteville $303,000
Albuquerque $307,000
Orange County $488,000
Oklahoma City $353,000
Fort Smith $301,000
Amarillo $322,000
San Diego $428,000
Memphis $375,000
Florence $270,000
Phoenix $381,000
Little Rock $309,000
Yuma $215,000
Decatur $240,000
Tucson $333,000
Lubbock $330,000
Las Cruces $242,000
Dallas $425,000
Shreveport $326,000
Tuscaloosa $316,000
Fort Worth $399,000
Longview $362,000
Monroe $357,000
Jackson $325,000
El Paso $257,000
Tyler $419,000
Odessa $419,000
Waco $284,000
Kileen $323,000
Lake Charles $334,000
Baton Rouge $358,000
Biloxi $313,000
Austin $418,000
Bryan $338,000
Beaumont $313,000
Lafayette $358,000
San Antonio $357,000
Houston $423,000
Galveston $359,000
New Orleans $362,000
Brazoria $372,000
Laredo $228,000
Corpus Christi $353,000
McAllen $256,000
Anchorage $423,000
Brownsville $233,000
Honolulu $365,000