



# DAY 2

*CARTOGRAPHIC DESIGN:*  
*Cartographic Design Principles*  
*Symbology*  
*Type*  
*Map Compilation*

# Cartographic Design Principles

# From the outset...

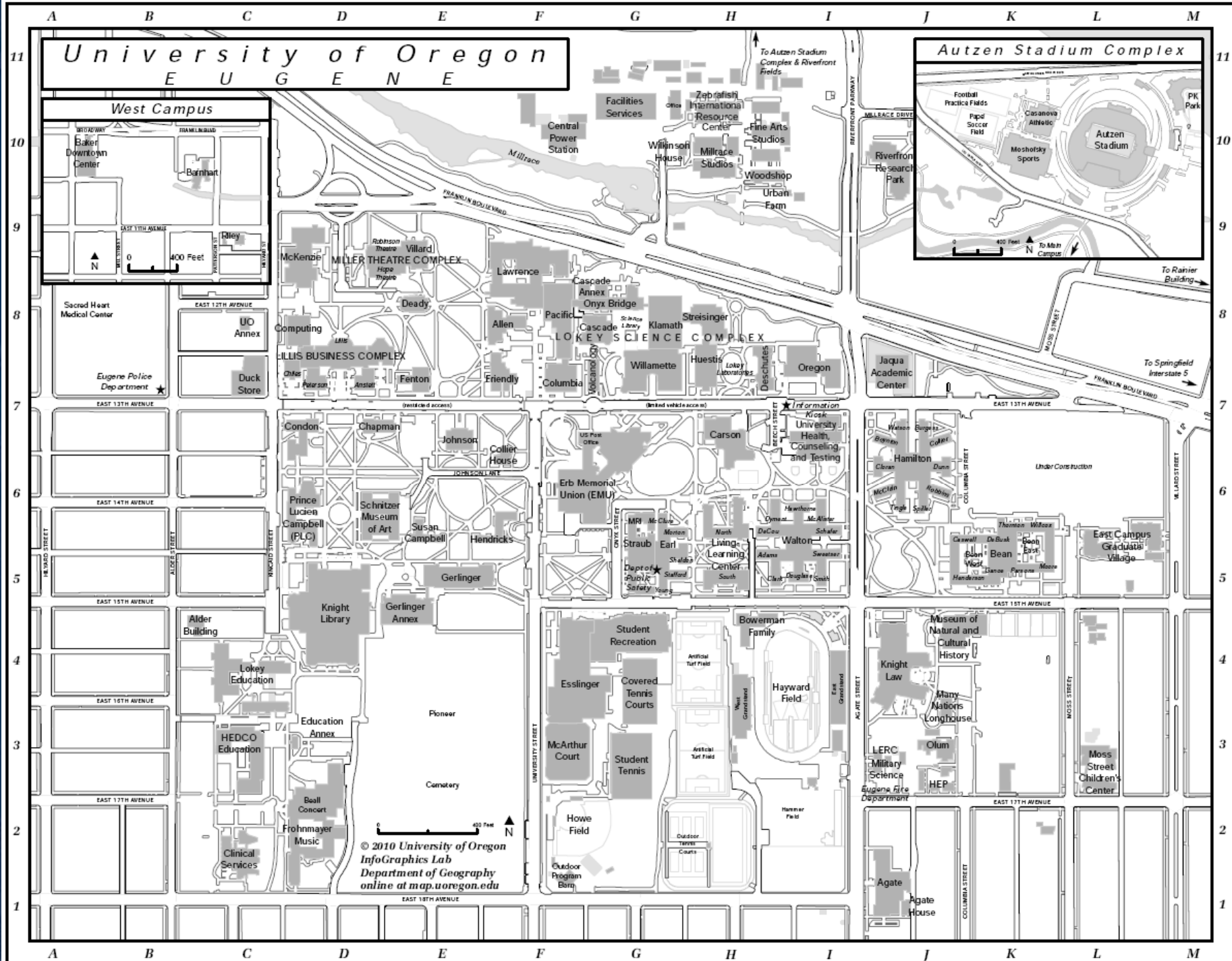
- ...know your message
- ...know your audience
- ...design for the medium
- These will guide your decisions about
  - map projections
  - generalization
  - symbology
  - labeling
  - map elements (scale bars, legends, north arrows, etc.)
  - page layout
  - **everything!**

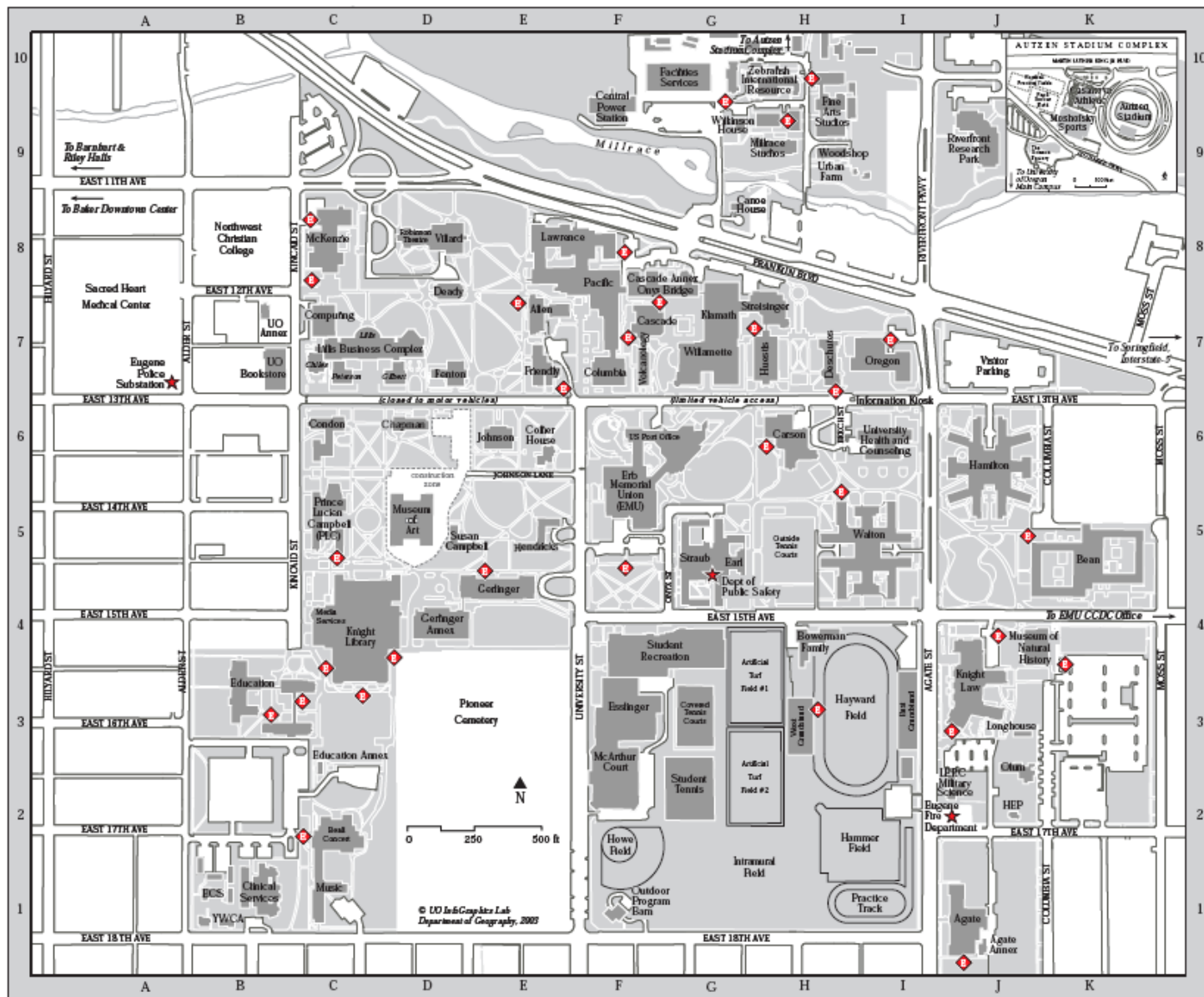
# A couple of cartographic terms...

- Substantive objective
  - **What** you are showing – the “substance” of the map’
  - The map is the MAIN thing!!!!
  - Map elements support the map
    - these should be informative , not just take up space
    - legend, title, inset maps, text blocks, logos, north arrow, scale
- Affective objective
  - **How** you are showing it – the “affect” of the map
  - Sets the mood
  - Use map to promote it
    - content
    - colors, text, symbols
  - Use map elements to promote this
    - bounding box, north arrow, scale
    - text, color
    - images, graphs, other graphics
    - others

# Examples courtesy of the University of Oregon InfoGraphics Lab







# UNIVERSITY OF OREGON EUGENE

## Emergency Call Box Locations on the University of Oregon Campus

◆ Emergency Callbox ★ Other Emergency Services

AAA Studios (H10)	West end (outside)
Millrace Studios 1 (H9)	East end (inside) West end (inside)
Millrace Studios 2 (H9)	Center (inside)
Millrace Studios 3 (H9)	East entrance (inside)
Agate Hall (J1)	South end (outside) Second floor center (inside)
Allen Hall (E7)	Northwest corner (inside)
Boall Concert Hall (C2)	West entrance (outside)
Bean Complex (K5)	Northwest corner (outside)
Carson Hall (H8)	West entrance (outside)
Cascade Hall (F7)	West (outside) Between Cascade Hall and Onyx Bridge (outside)
Deschutes Hall (H7)	South side on 13th Ave (outs)
Education Building (B3)	Southwest corner courtyard (outside) Southwest (outside)
Erb Memorial Union (F5)	South of visitor parking lot in quad open space (outside)
Cerlinger Hall (E5)	Northwest entrance (outside) First floor locker facilities (inside)
Hayward Field (H3)	North and West Grandstand
Huestis Hall (H7)	Northwest entrance (outside)
Knight Law (J4)	South side (outside)
Knight Library (C4)	First, second, third, fourth floors near north, south east and west stairwells (inside) West, south, east sides (outside)
McKenzie Hall (C8)	East side (outside) South side courtyard (outside)
Lawrence Hall (F8)	East side (outside) First floor halls, studios (inside) Second, third, fourth floor studios (inside)
Museum of Natural History (J4)	East side (outside) West side (outside)
Oregon Hall (I7)	North entrance (outside)
Physical Plant (C10)	South entrance (outside)
Prince Lucien Campbell (C5)	Southwest entrance (outside)
University Street & 13th Ave (E7)	Northwest corner of intersection
Walton Complex (H5)	Northwest corner (outside)



## Parking and Transportation

*E U G E N E*





UNIVERSITY  
OF OREGON

## University of Oregon Commencement Ceremonies Spring 2009



Ceremonies



Information Booth



Flower Booth



Alumni Association Photo Area



LTD Bus Stop



EmX Stop



Designated Ceremony Parking

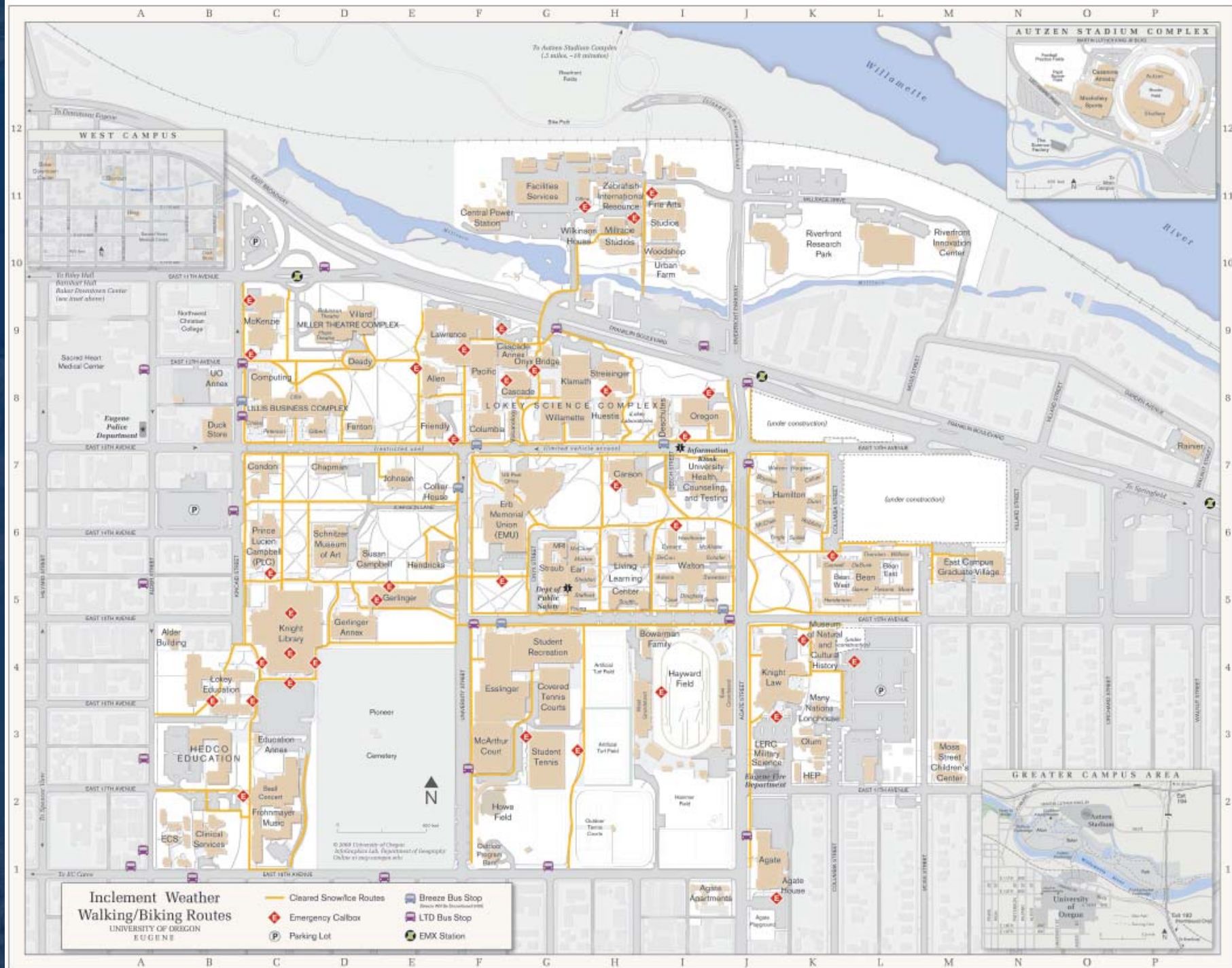


ADA Parking



ADA Drop off/ Shuttle Stop



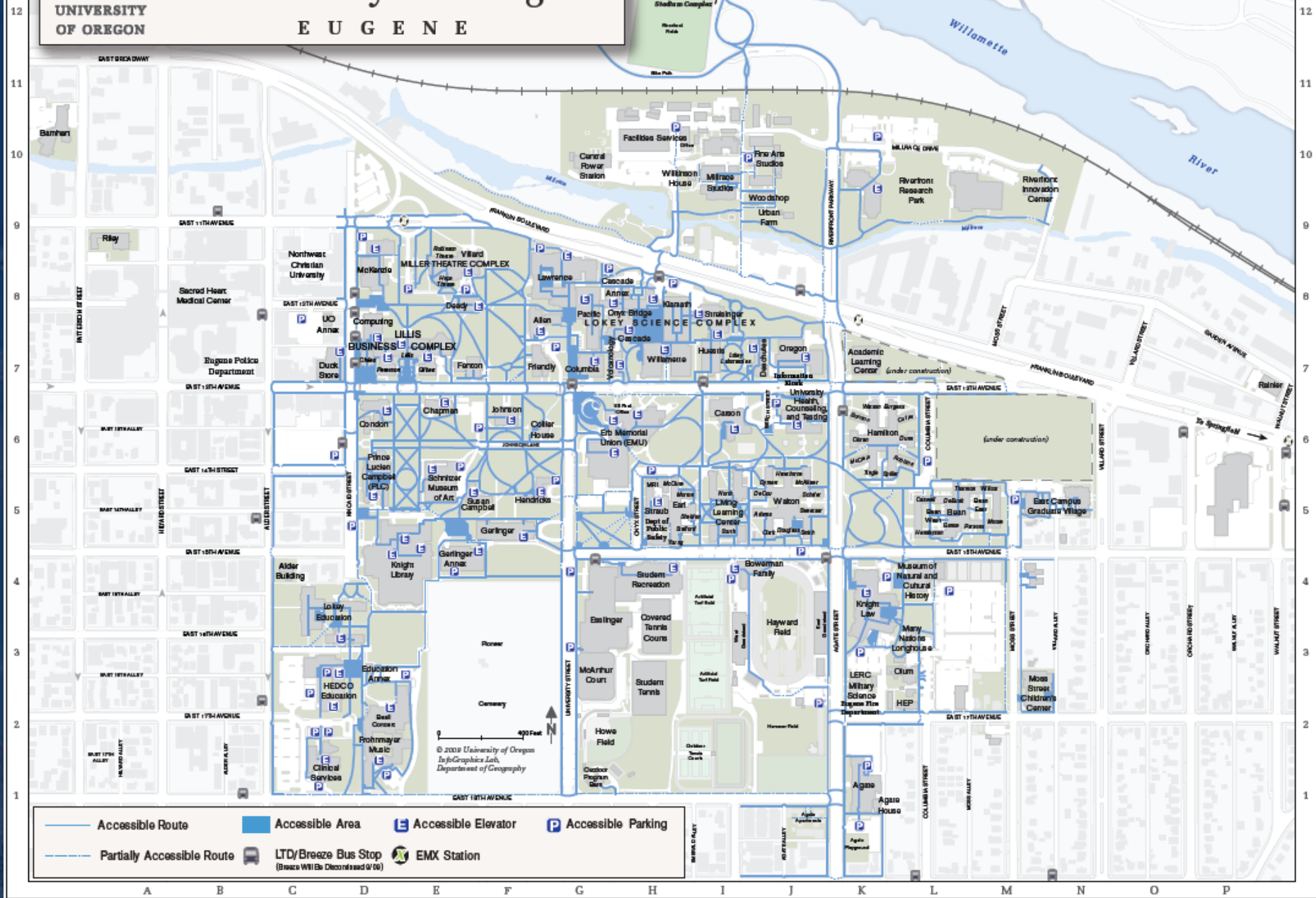


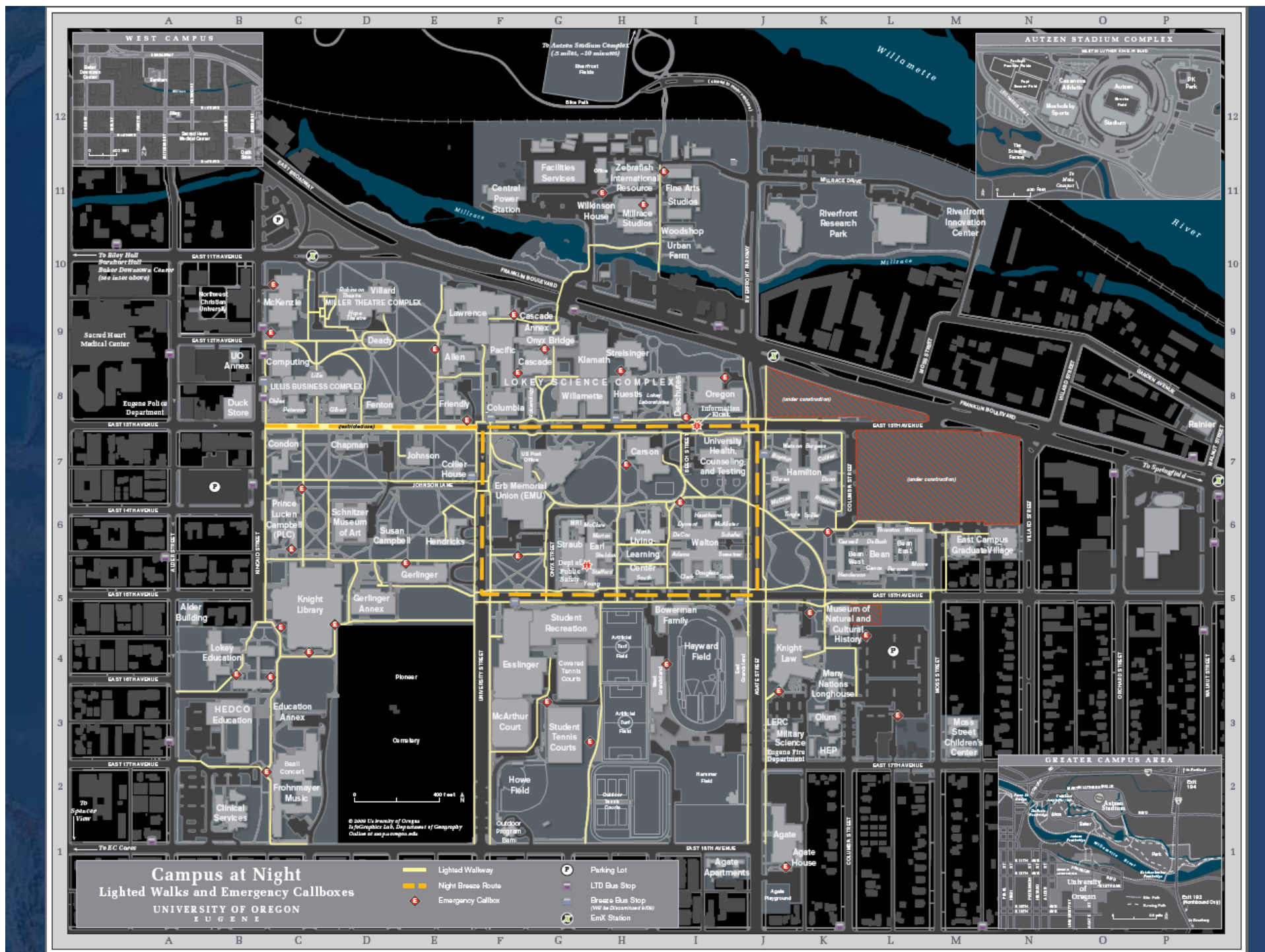


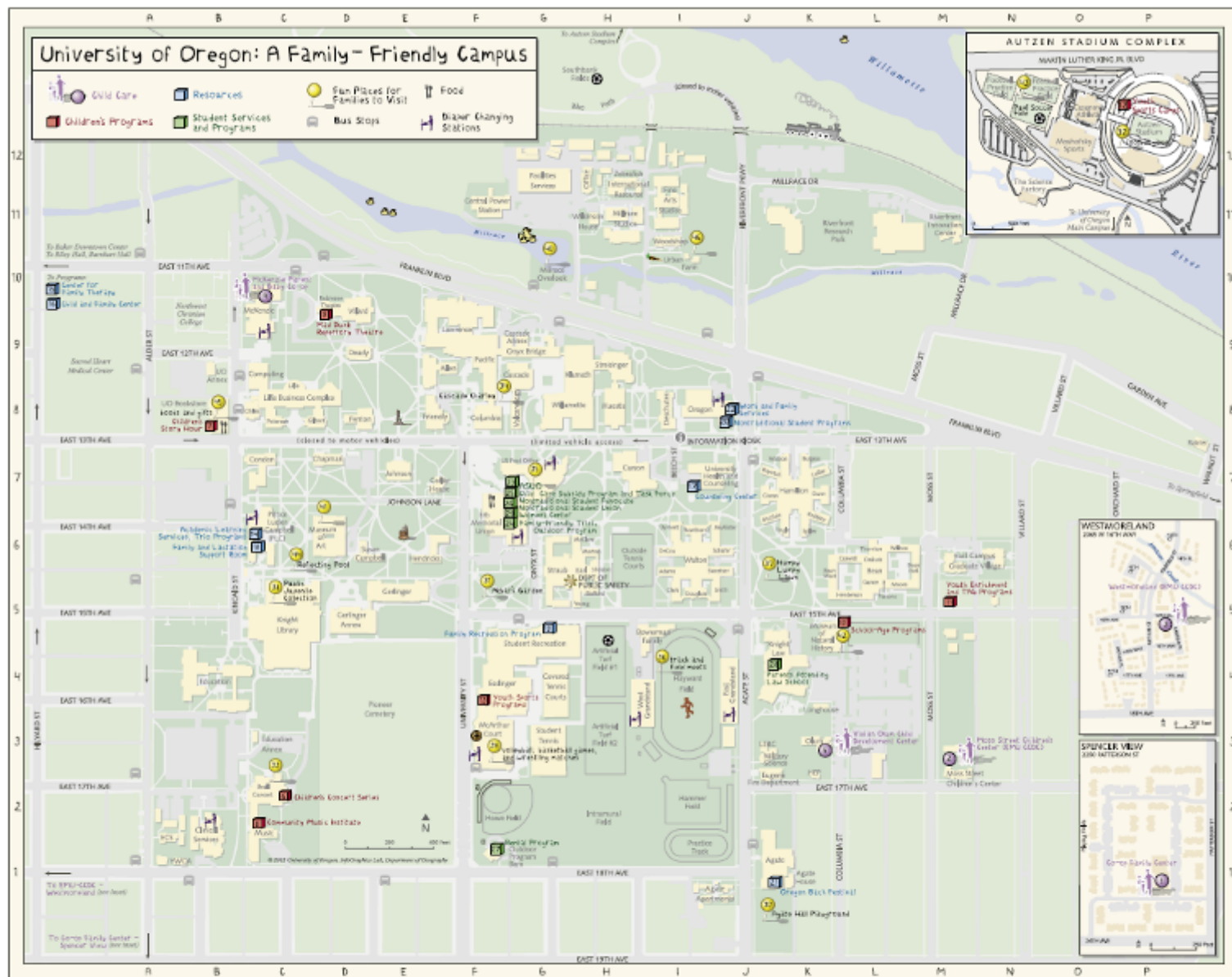
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# Accessibility at the University of Oregon

EUGENE







#### CHILD CARE

- Co-op Family Center
- Miss Street Children's Center, 5th Memorial Union Child Care and Development Center
- Westwoodland, Co Memorial Union Child Care and Development Center
- McIntosh Parents and Baby Group
- Wish Ours Child Development Center

#### CHILDREN'S PROGRAMS

- Children's Concert Series, School of Music
- Children's Story Hour, UO Libraries
- Community Music Institute, School of Music
- Mail Clerk Puppetry Theatre
- Museum of Natural History School Age Programs
- Youth Enrichment and TAG Programs

#### YOUTH SPORTS

- Youth Sports Camps, Park (Agile Athletics)
- Youth Sports Programs, Physical Activity and Recreation Services

#### ACADEMIC SERVICES

- Center for Family Therapy
- Crisis and Family Center
- Family and Lactation Support Room
- Family Reunion Program, Physical Activity and Recreation Services
- National Student Program, Office of Student Life

#### RECREATION

- Oregon Week Festival
- Walk and Family Services

#### STUDENT SERVICES

- Child Care Subsidy Program and Task Force, Associated Students of the University of Oregon
- Family Friendly Trip, Outdoor Program
- National Student Advocate, Associated Students of the University of Oregon
- National Student Union, Associated Students of the University of Oregon
- Outdoor Program Panels

#### STUDENT SERVICES

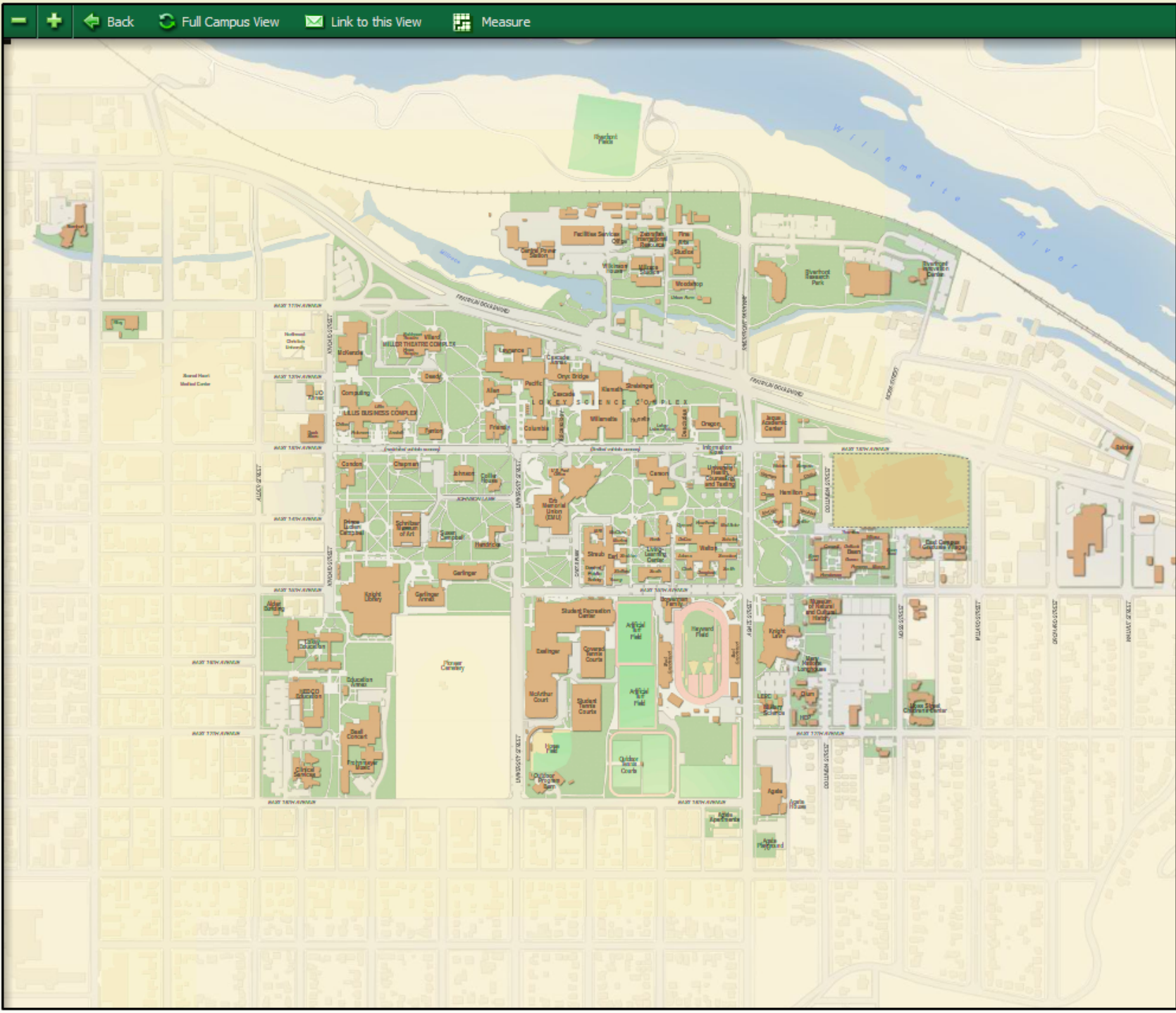
- Parents Attending Law School
- Myer's Center, Associated Students of the University of Oregon

#### STUDENT SERVICES

- Agile Hill Playground
- Autism Garden
- Autism Station
- Deaf Concert Hall
- Decade Cherry
- 5th Memorial Union
- Huguenot Hall
- Hungry Lumpy Lawn
- Knight Library, Public Juvenile Collection

#### STUDENT SERVICES

- McArthur Court
- Midway
- Museum of Natural History
- Popl Zacher Field
- Reflecting Pool
- UO Book Store
- Urban Farm





# USA Track And Field Championships University of Oregon June 2009

- Entrance/Bag Check
- ADA Parking
- Public / Media
- Shuttle Stop
- Ticket Sales
- Race Walk
- Tents

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0 100 Feet

UNIVERSITY STREET

EAST 15TH STREET

Track Town Plaza

- Starting Block
- Food and Beverage
- Merchandise
- Friends and Family
- Stage

Track Town Plaza

Will Call Office  
Bowerman Family

Hayward Field

West Grandstand

East Grandstand

Race Walk

Esslinger

Tennis Courts

McArthur Court

Student Tennis Courts

Howe Field

Outdoor Program Barn

Athlete Area

Athlete Area

Hammer Field

Public Access to Hammer Field

USATF Merchandise

ADA Hammer Field Access

AGATE STREET

EAST 18TH STREET

Temporary Autzen Shuttle Stop  
Day of Race Walk

Agate Street CLOSED Saturday until 9:30am & Sunday until 10:30am

Autzen Shuttle Stop

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# Design Planning

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- Visual balance – all elements balanced, aligned, thoughtful use of white space
- Visual flow – movement of the eye across the page
- Relative importance of map elements
- Sketch map – starts you thinking, not the end

# Sketch Map

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- The place of interest
- The distribution being mapped
- The relative position of the data in the distribution being mapped
- The map elements
- The relative position of the map elements

# ELEVATIONS & RELIEF



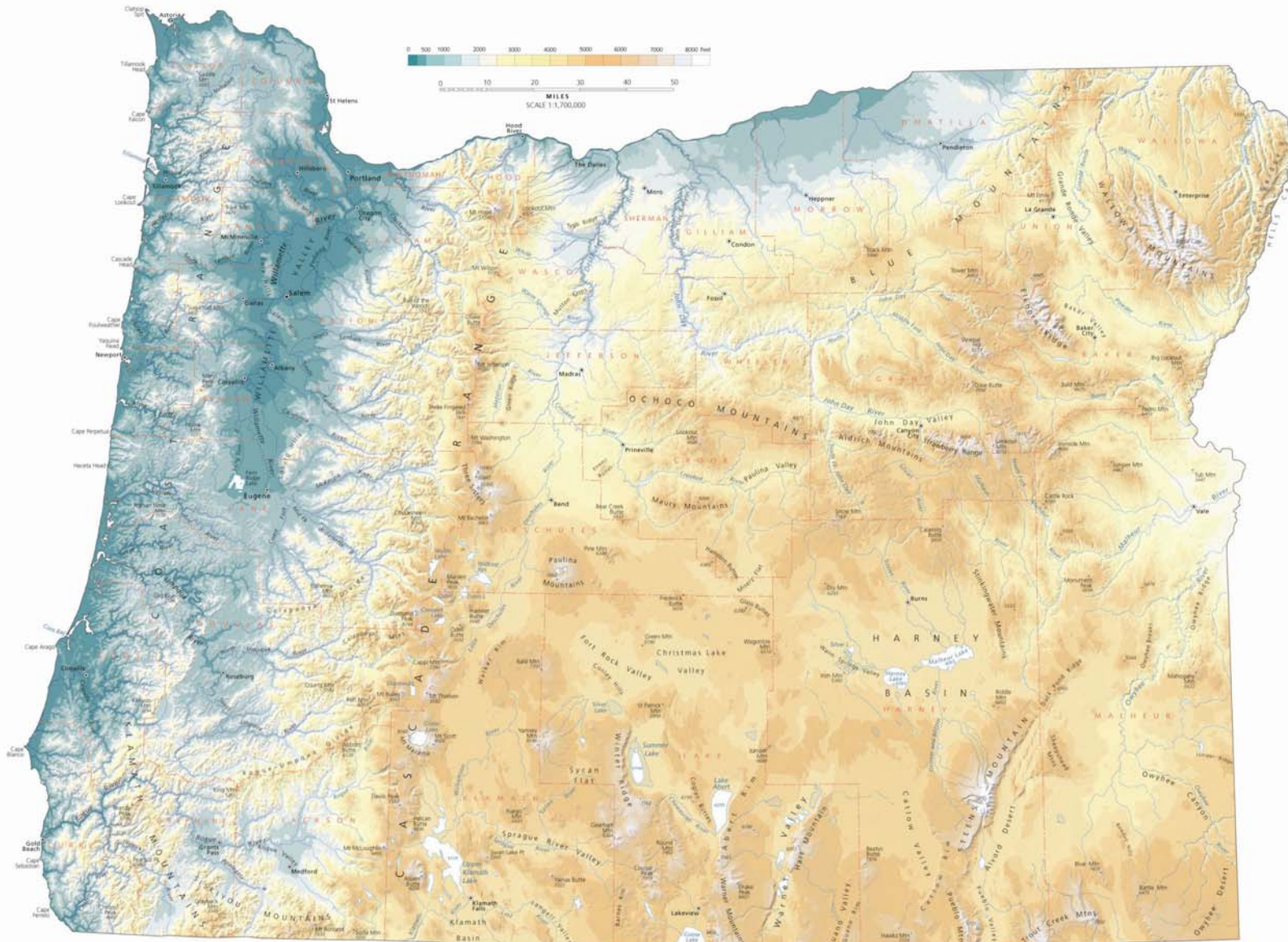
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# ELEVATIONS & RELIEF



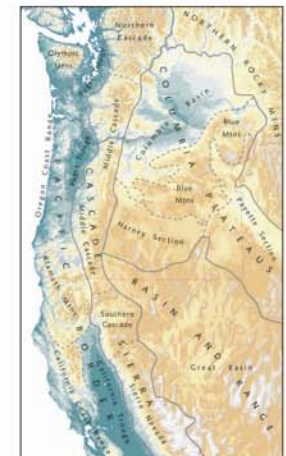
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## Landforms: Elevation

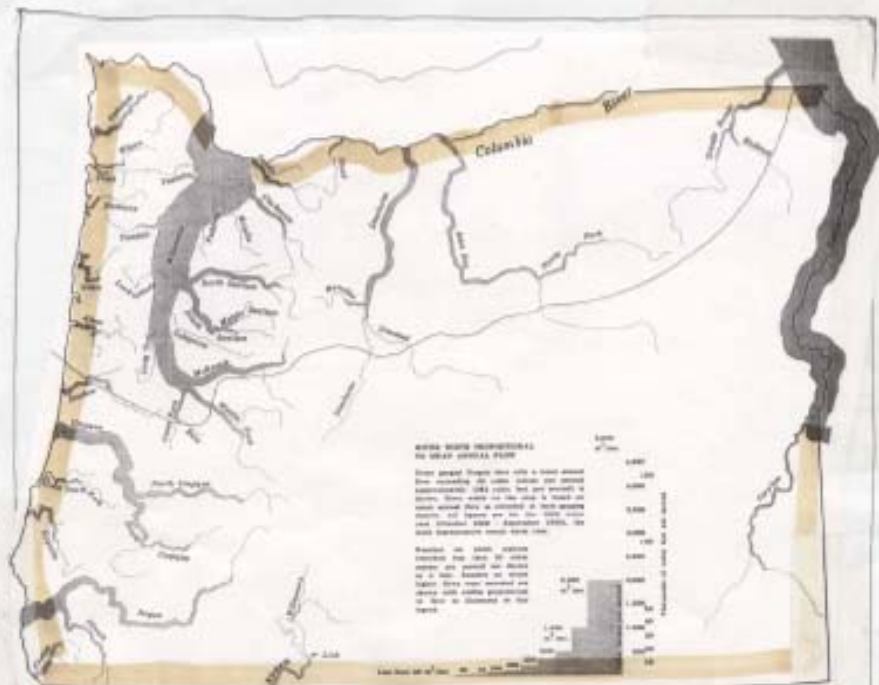


The state's most profound topographic feature, the Cascade Mountain Range, rises nearly two miles above sea level. These towering volcanic peaks set apart the eastern two-thirds of the state as a mile-high desert. To the west, Oregon's Coast Range is being elevated slowly while the Willamette Valley, already near sea level, is sinking. This movement is apparent today at raised beaches and headlands; it will be unmistakably apparent in the Willamette Valley far in the future when sea water begins to invade the valley. Barring intervention, the area will become Willamette Sound, like its northern counterpart, Puget Sound. Heavily eroded drainage systems and long, meandering estuaries give the western edge of the continent a ragged appearance. The political boundaries of Oregon position the state at the crossroads of many massive landform regions called physiographic provinces. Only 40 percent of the Klamath Mountains project into southwest Oregon from California, while in the northeast the Blue Mountains are almost fully within the state's boundaries. The Cascade Range, extending from Northern California across Oregon and Washington into British Columbia, has about 35 percent of its length in Oregon; the Coast Range is shared almost evenly with Washington. The Columbia Plateau has roughly 20 percent of its exposure in north-central Oregon, but less than 5 percent of the vast Basin and Range province lies in south-central Oregon. Representing about 12 percent of the whole, the Owyhee Plateau, part of the Payette section that reaches into the southeastern corner of Oregon, is the southwestern end of a linear track of volcanic activity that stretches through Idaho and Wyoming.

**Physiographic Provinces and Sections**



# STREAM FLOW



# STREAM FLOW

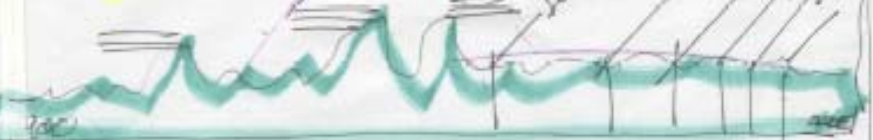


WATER RESOURCES WILLIAMS  
Total record available

notes on droughts  
wet periods



notes on dams & actual stream flow



## Streamflow

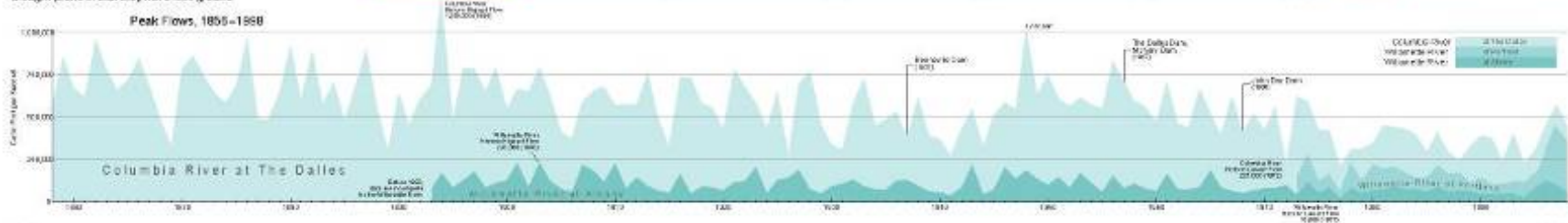
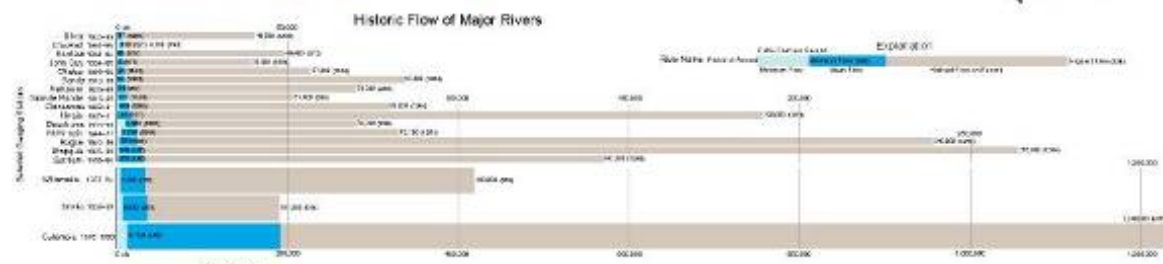
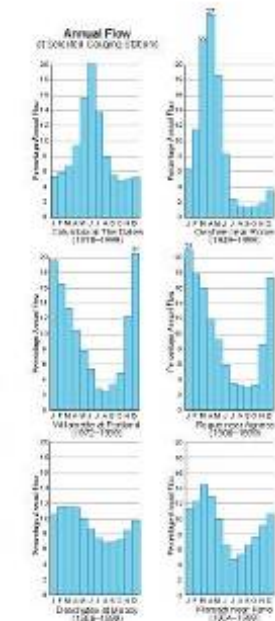
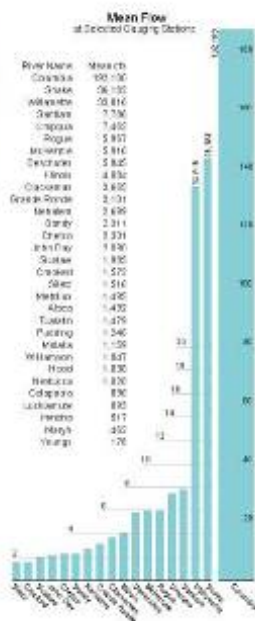
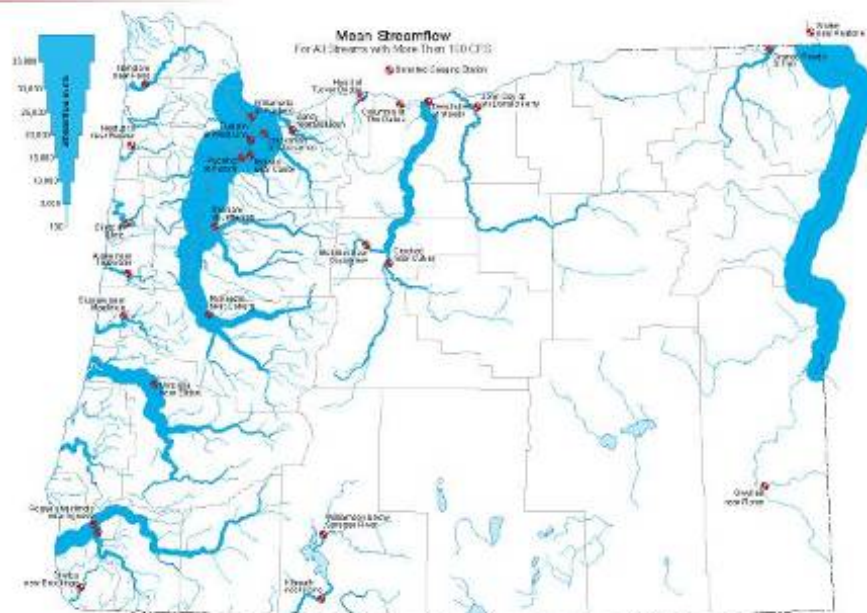
Western Oregon is blessed with an abundance of notable rivers, while Eastern Oregon's rivers are smaller and more widely spaced. Average flows are 8,000 cubic feet per second (cfs) or more in the five big rivers of Western Oregon, the Willamette, the Umpqua and the Rogue. In contrast, flows are just 1,000 to as little as a few hundred cfs in the largest rivers of Eastern Oregon: the Klamath, John Day, Umatilla, Grande Ronde, Malheur and Owyhee. Only the Deschutes River, which drains the eastern flank of the Cascades, rivals the large Western Oregon rivers in flow, though it is dwarfed by the Columbia.

**Seasonal variation in streamflow** influences water availability for human use, as well as ecological conditions in rivers. Large rivers have relatively low flow during the summer and fall. The greatest monthly flow is five to ten times larger than the flow in the driest months. In many rivers a portion of river flow is stored in reservoirs during the winter and spring months to supply needs such as irrigated agriculture and drinking water during the dry months. The Des Moines River, fed by a number of large springs rather than exclusively by surface runoff, has the most even monthly flow of any large Oregon river.

Some rivers have peak flows closely tied to rainfall, while others are controlled by snowmelt. In the Willamette and Rogue Rivers, the highest flows occur in the heavy rain months of December and January. In higher elevation river basins where colder temperatures prevail, winter precipitation is stored as snow, and the peak flows are shifted to spring (April on the Owyhee River, June on the Columbia River at The Dalles).

Oregon's largest recorded flood occurred in December 1964 on many rivers in Western and north-central Oregon (although the 1894 flood was larger on the Columbia River). The February 1996 flood in Western Oregon was potentially as big as the 1964 flood, but more flood control dams were in place in 1996. The historic peak flow records for the Willamette River (bottom of page) show the effectiveness of flood control dams after 1955.

During droughts, flow may drop to 3 percent or less of average. Rivers such as the Illinois, Chetop and Nehalem are drought-prone in that they have less ground



# Cartographic Design Principles – review!

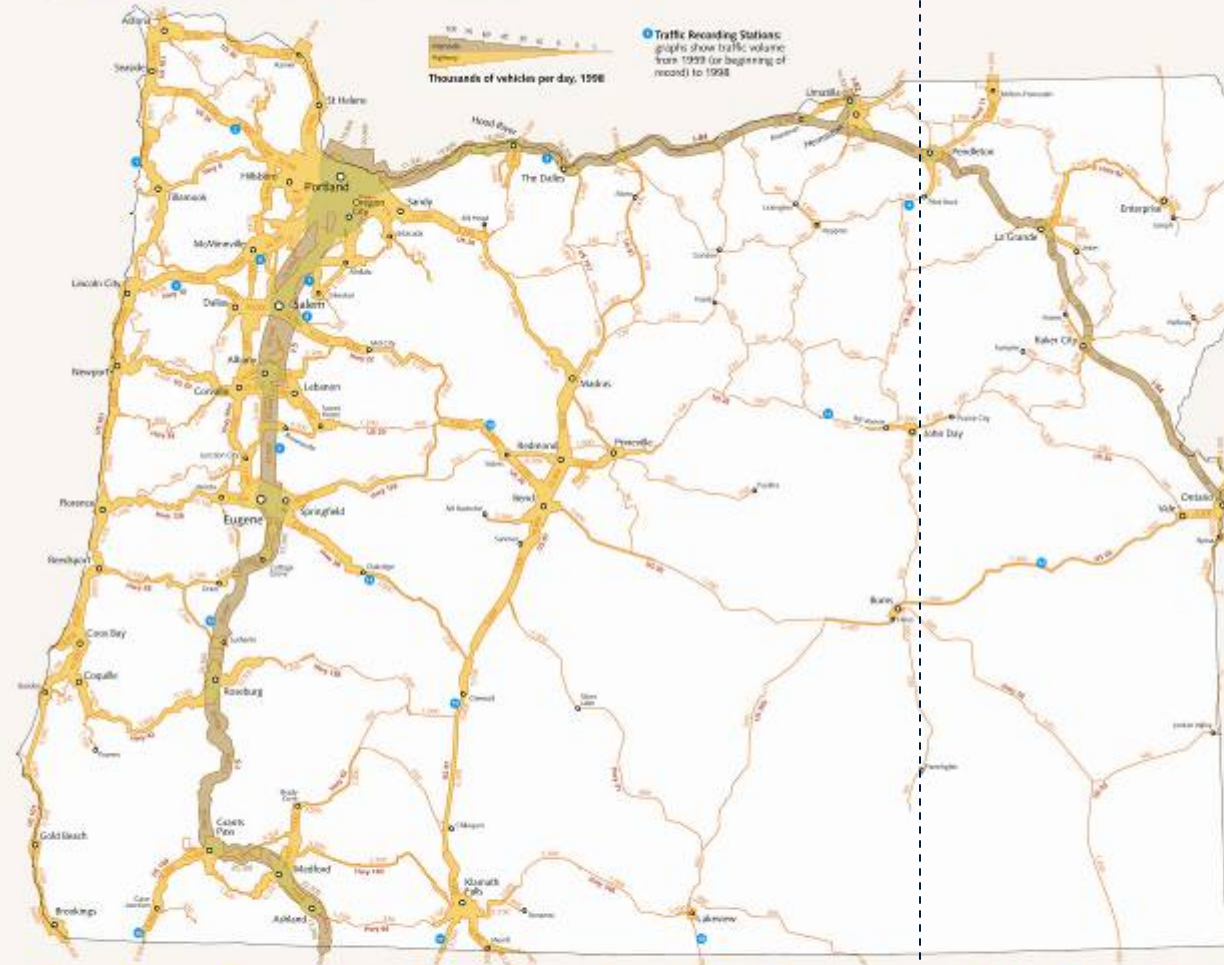
- Generalization - Coastline
- Figure-ground - Whitewash
- Visual hierarchy – Administrative boundaries, rivers, labels
- Legibility - labels
- Visual balance – let's take a look!
- Visual flow
- Symbolization
- Typography

# Controls on Map Design and Compilation

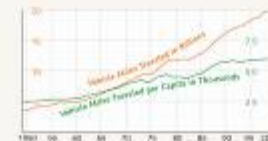
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- Purpose – substantive / affective
- Reality – shape, complexity, color
- Available data – data quality / symbolization
- Map scale – smaller scale - less feature detail
- Audience – old / young, experienced / not
- Conditions of use – light, distance, time to read map, medium, etc.
- Technical limits – plan for these at the start

## Highway Traffic



Daily traffic volumes at selected locations across the state are shown across three time periods. These data were collected by the Oregon Department of Transportation (ODOT) as part of the 1998 National Highway Traffic Survey. The data are presented in thousands of vehicles per day.



The number of vehicles miles traveled (VMT) has increased substantially in the past 10 years. The rate of VMT growth is expected to moderate as population growth slows, as growth in the number of vehicles per household declines, and as a combination of these factors.

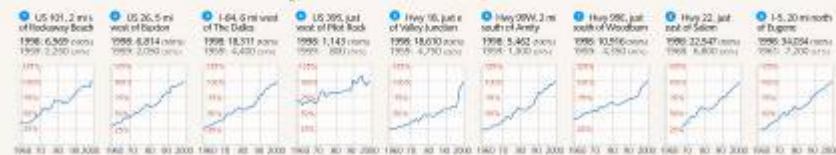
## Highway Traffic

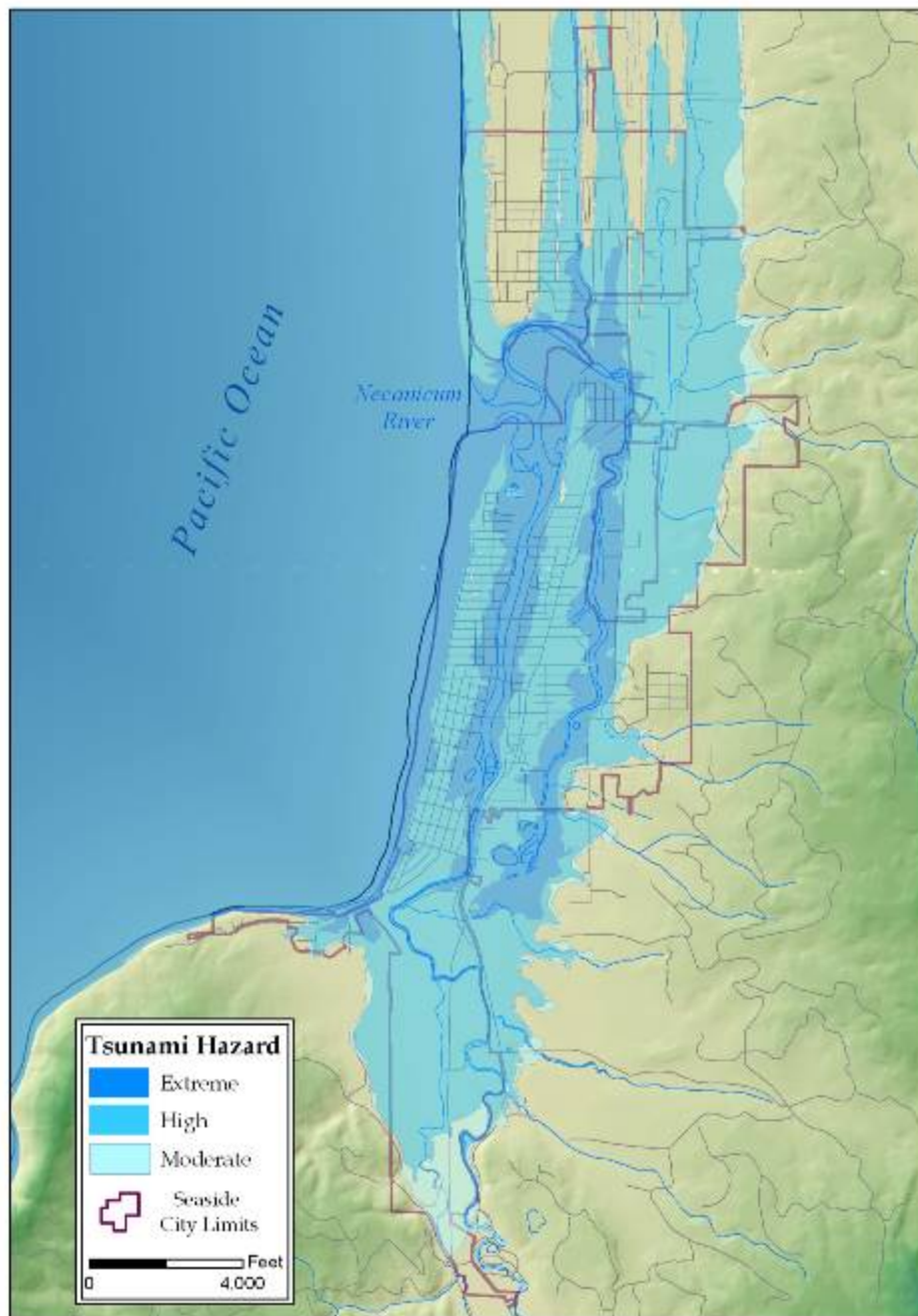
Highway traffic volumes are greatest in Oregon's five metropolitan areas (Corvallis, Eugene-Springfield, Medford-John Day, Salem and Portland) and in major urban areas such as Albany, Bend, Coos Bay-North Bend, Klamath Falls and Roseburg. In 1998, the highest volumes statewide were on I-5 (Riverside Freeway) about three miles east of its interchange with I-5 in Portland, where approximately 164,000 vehicles traveled daily. Nearly the same number of vehicles used I-5 near its interchange with I-5 in Portland.

Highest volumes (136,000 daily) on I-5 are near its interchange with Hwy 217 in the Tigard-Lake Oswego area south of Portland. Volumes on portions of I-405 also exceed 100,000 vehicles daily.

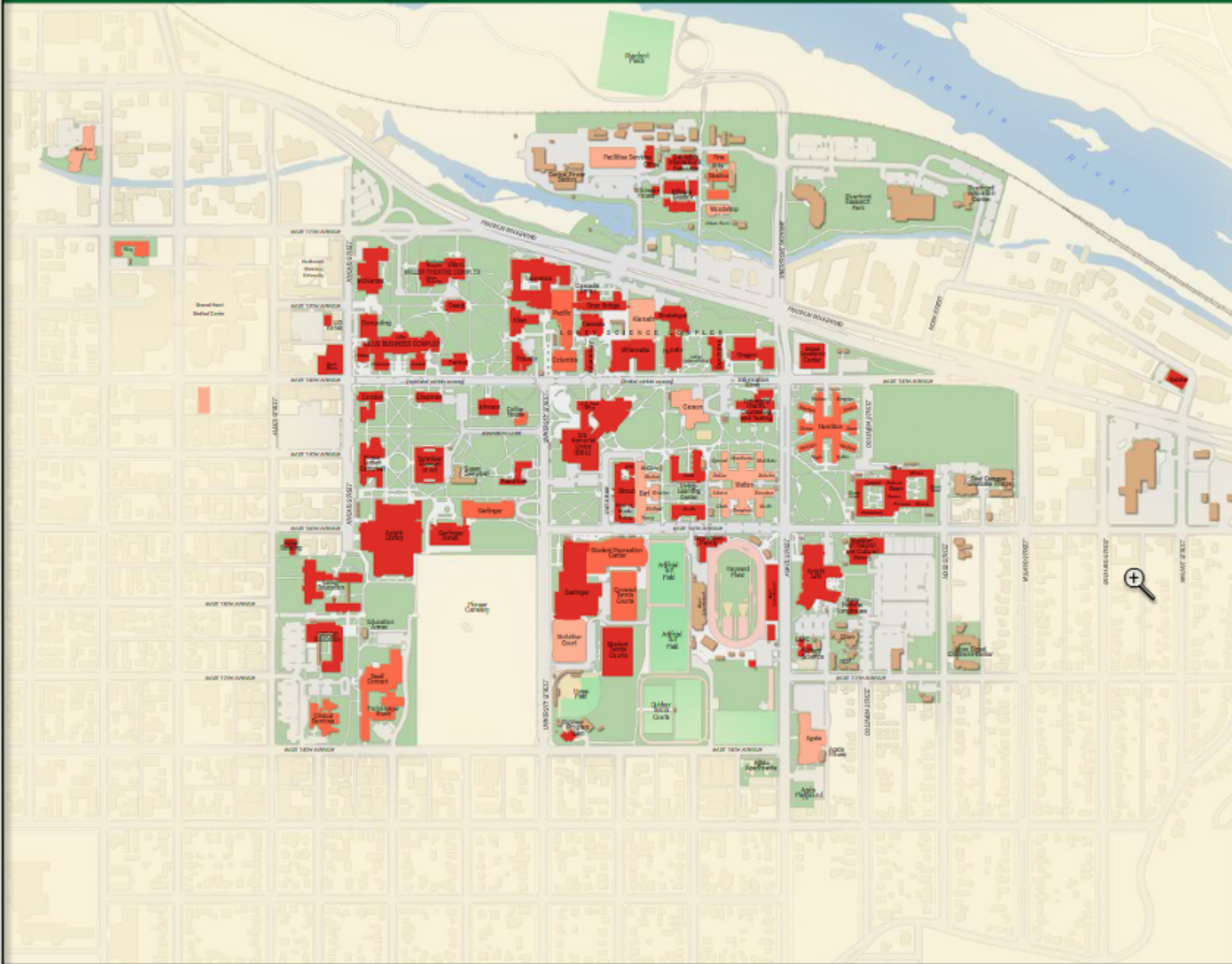
Representative daily volumes at other locations on I-5 were approximately 40,000 in Medford and Roseburg, 55,000 in Eugene, 40,000 in Albany and 70,000 in Salem. For I-5, volumes range from 10,000 to 20,000 vehicles daily between Portland and Pendleton, and from 3,000 to 10,000 daily between Pendleton and the Idaho border. On non-interstate highways outside metropolitan areas, traffic volumes are highest on major federal and state highways, including US 97, US 101 and several routes over the Cascade Mountains and between the Oregon Coast and I-5.

Since 1990 the number of Oregon's licensed drivers has increased at about the same rate as population growth while the number of registered vehicles has increased more rapidly. Licensed drivers outnumbered registered vehicles at mid-century, but by 2000, there were about 1.6 vehicles per licensed driver.





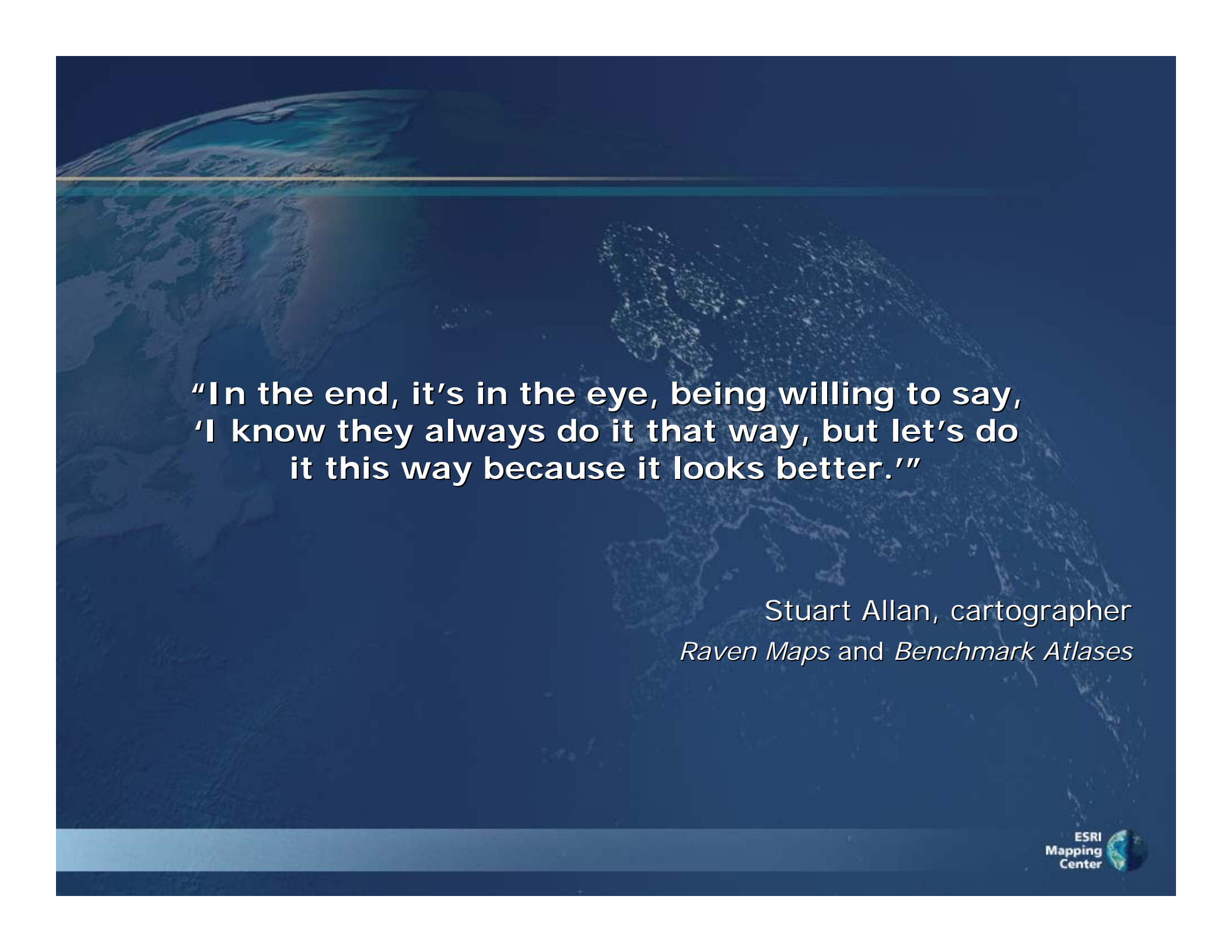
## Campus Wireless Coverage



# Design Excellence

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- Standards and conventions versus innovation and creativity
- Important factors
  - basic sense of design
  - practice in applying cartographic principles
- Both are developed through experience
- In the beginning, good idea to rely on the expertise of others
  - copying is the highest form of flattery
  - copyright in cartography



**"In the end, it's in the eye, being willing to say,  
'I know they always do it that way, but let's do  
it this way because it looks better.'"**

Stuart Allan, cartographer  
*Raven Maps and Benchmark Atlases*

## Exercise: Explore a Map Layout

*resources.esri.com >  
Map Templates >  
Download and apply... >  
Community Trails Map*