Complete Streets

DESIGNING FOR BICYCLIST SAFETY

WORKSHOP LEARNING OUTCOMES

- Describe core bicyclist safety concepts
- Distinguish between various bicyclist facilities
- Identify innovative design features to enhance bicyclist safety
- Relate national objectives and priorities to improve bicycle travel
- Identify means of assessing quality of bicyclist facilities

NOTE OF CAUTION

The knowledge and practice of designing for bicyclists is rapidly changing. Images in these materials and other guidelines may be outdated. Always check for the latest MUTCD interim and experimental TCD's.

Designing for Bicyclist Safety

IMPERATIVE FOR IMPROVEMENT

LEARNING OUTCOMES

- Discuss the opportunities to improve bicycle travel
- Identify key safety factors for bicyclists

WHAT ARE THE OPPORTUNITIES?

- 50 % of trips are ≤ 3 miles
- > 1/3 of U.S. adults say they would commute by bike if safe facilities were available
- 1 out of every 11 U.S. households do not own an automobile

BICYCLIST SKILL & COMFORT

Experienced & Confident

- Navigate on streets
- Some prefer bike lane, shoulders, shared-use paths when available
- Prefer direct route
- Speeds up to 25 mph on level and 45 mph on downgrade
- Longer trips

Casual/Less Confident

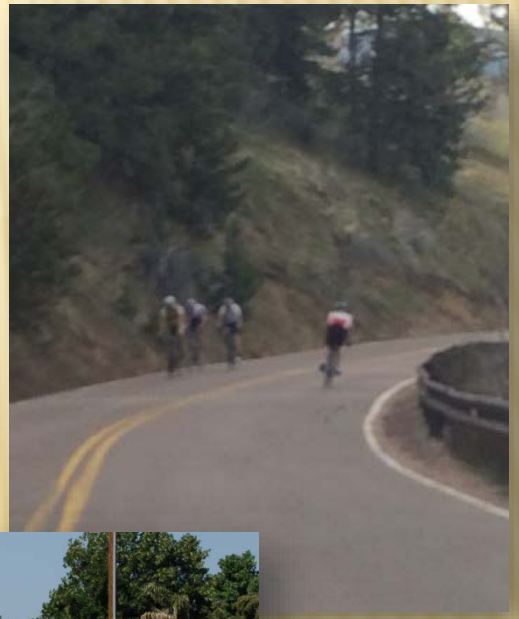
- Difficulty gauging traffic or unfamiliar with rules of road
- Prefer shared use paths or bike lanes on low volume streets
- Prefer separation from traffic
- May ride on sidewalk
- Avoid traffic
- Speeds of 8 to 12 mph
- Trips of 1 to 5 miles

BICYCLIST CHARACTERISTICS

- Reasons for bicycling
  - Recreation 26.0%
  - Exercise or health reasons 23.6%
  - To go home 14.2%
  - Personal errands 13.9%
  - To visit a friend or relative 10.1%
  - Commuting to school/work 5.0%
  - Bicycle ride 2.3%
  - Other 4.9%

BICYCLIST CHARACTERISTICS

- Preferences
  - Feel safe
  - Feel secure
  - Lower speed
  - Lower volume
  - Lower truck %
  - Fewer lanes



- Behaviors
  - Violate traffic control
  - Slow on uphill
  - Fast on downhill

DEATHS AND INJURIES

In 2015

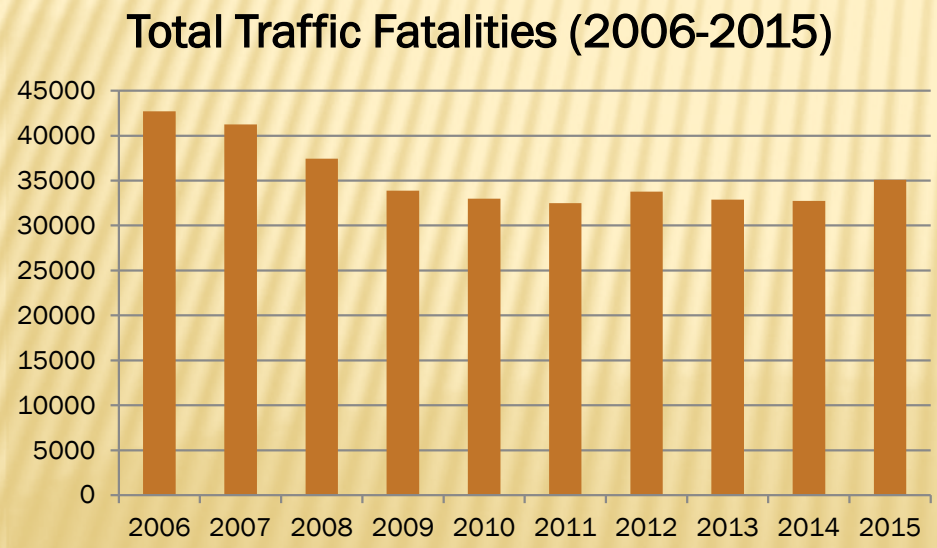
- 818 killed
- 45,000 injured
- Cyclists accounted for 2.3% of all traffic fatalities

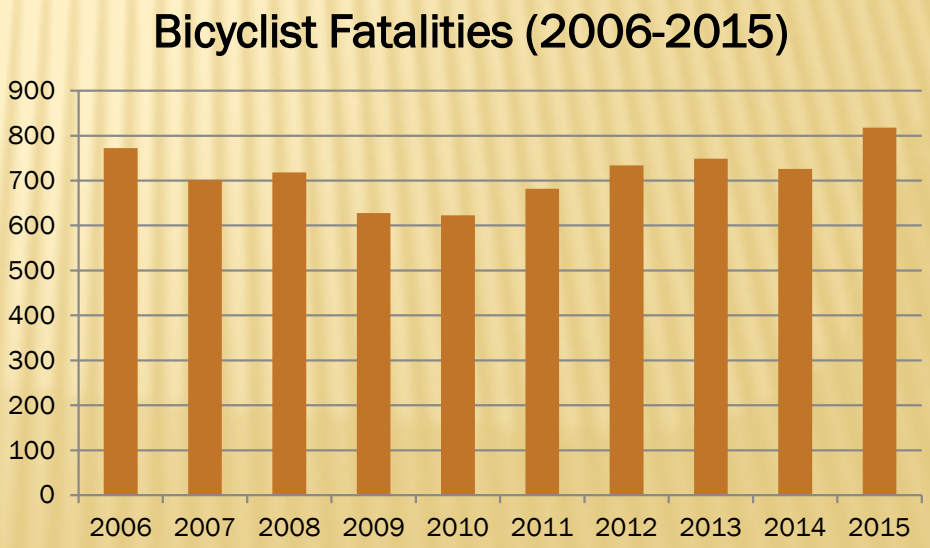
...but make up 1% of all trips.

BICYCLE FATALITIES BY YEAR

From 2006 to 2015

- Total traffic fatalities decreased by 18%
- Bicyclist fatalities increased by 6%

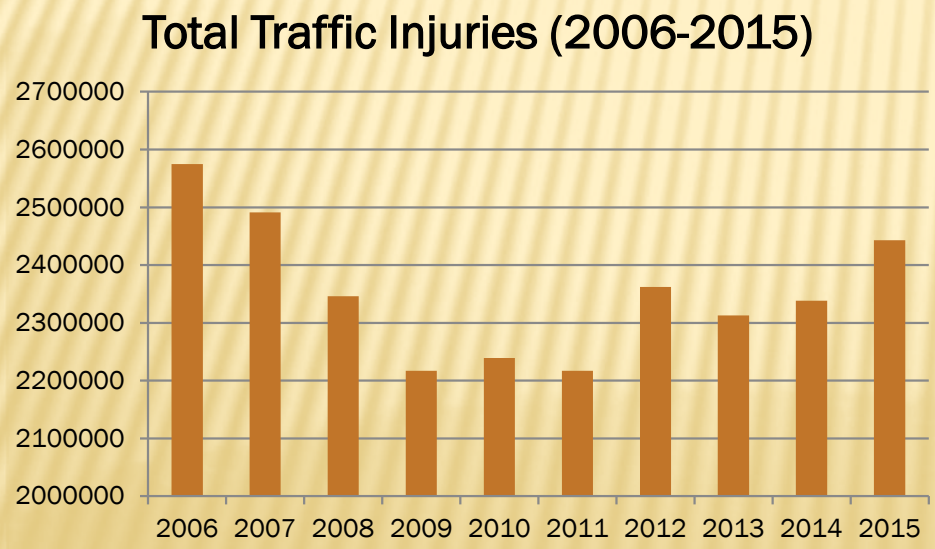


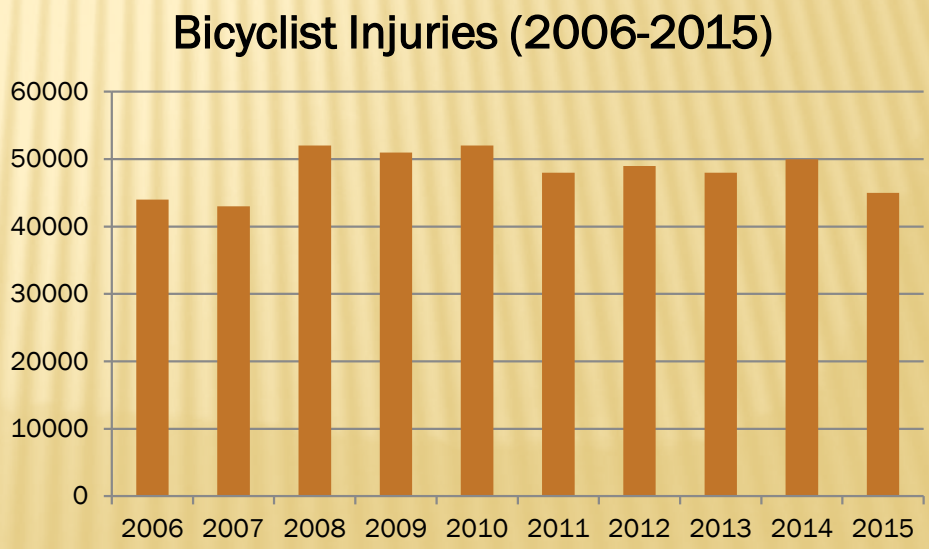


BICYCLE INJURIES BY YEAR

From 2006 to 2015

- Total traffic injuries decreased by 5%
- Bicyclist injuries increased by 2%



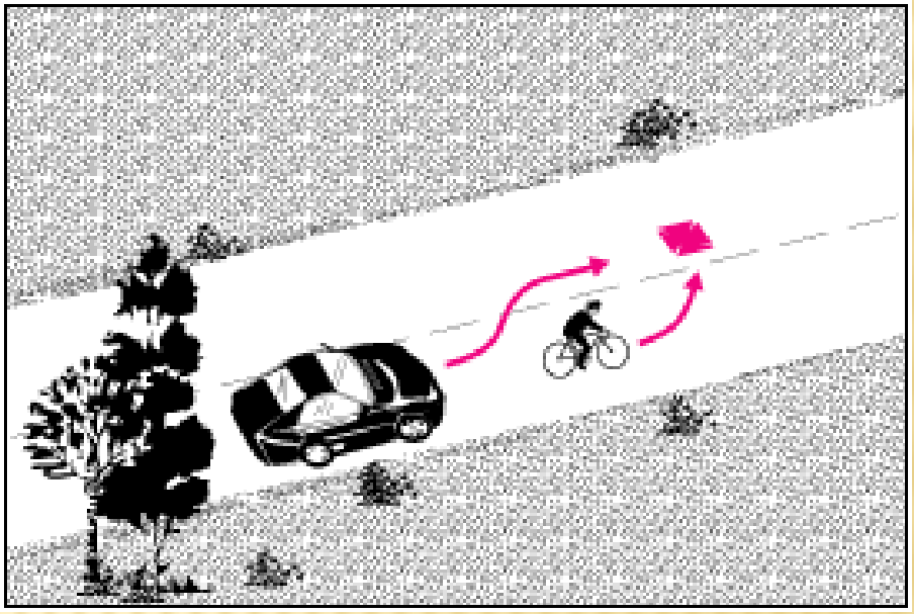


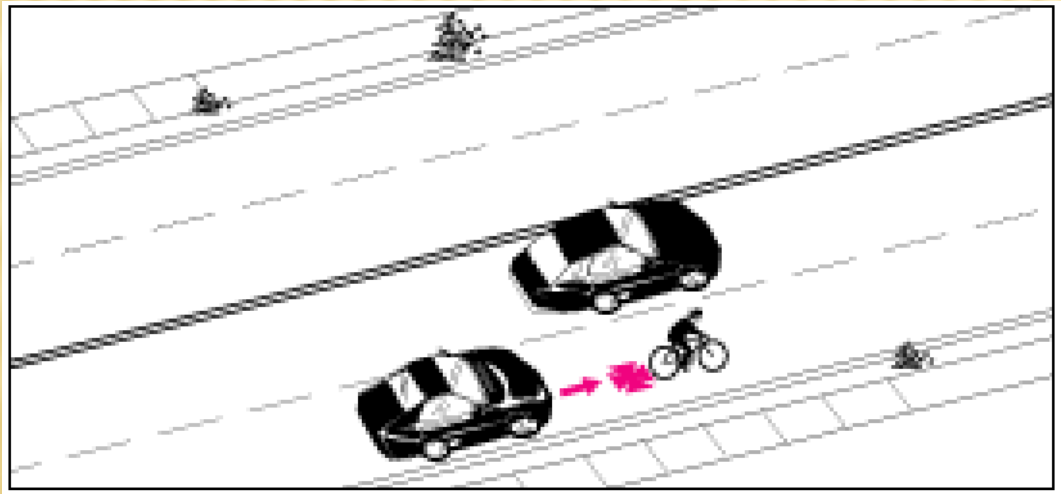
BICYCLE CRASH CHARACTERISTICS

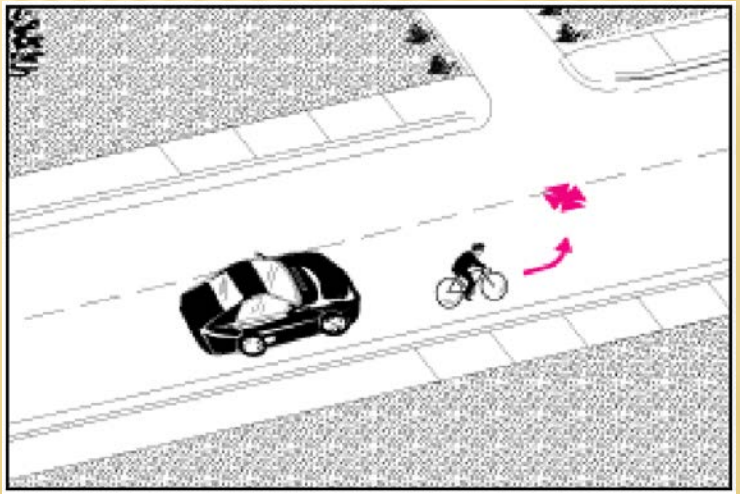
- 57% of fatalities at non-intersection locations
- 58% of injuries at intersections

MOST COMMON CRASHES

- Rural
  - **Turn/merge into path of motorist**
  - Motorist overtaking

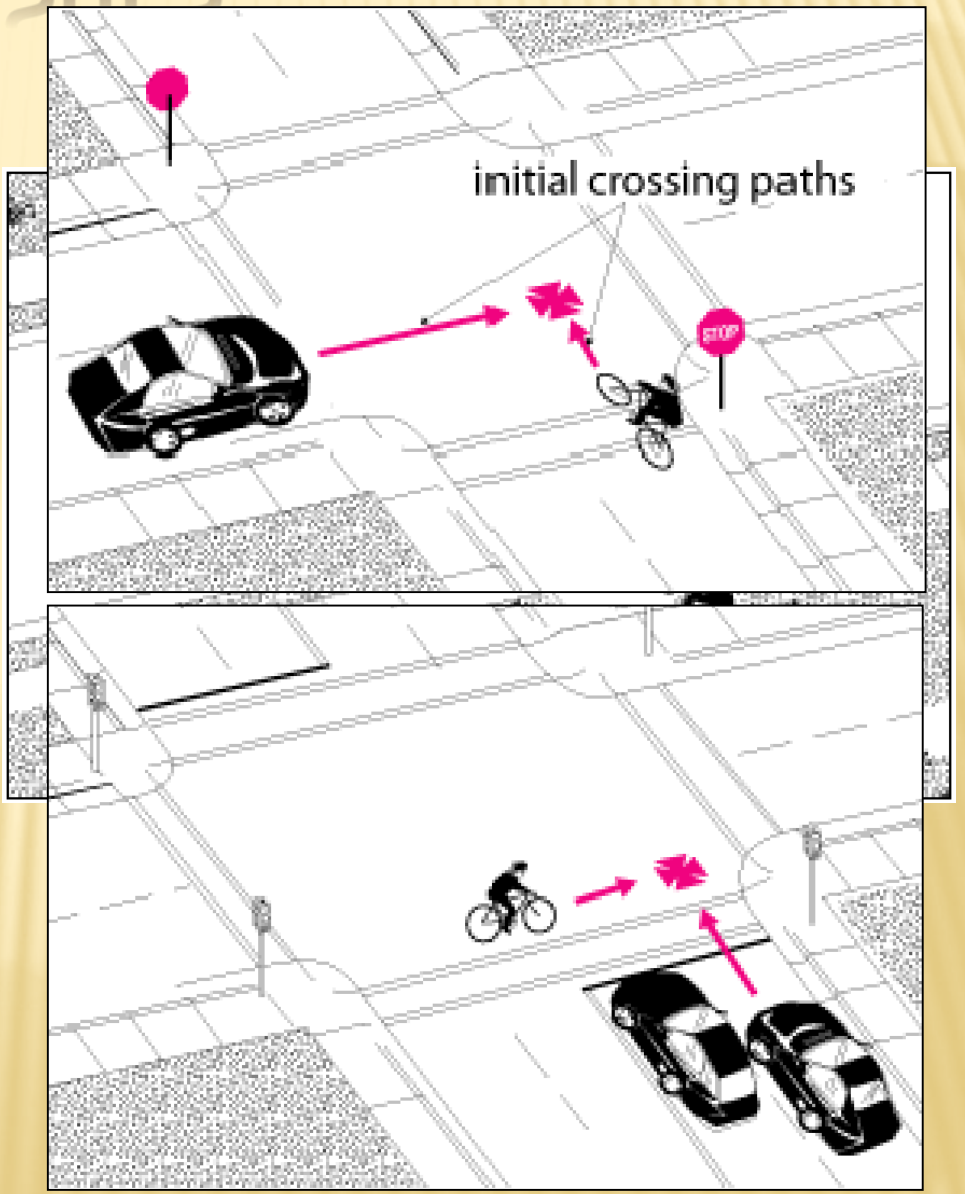




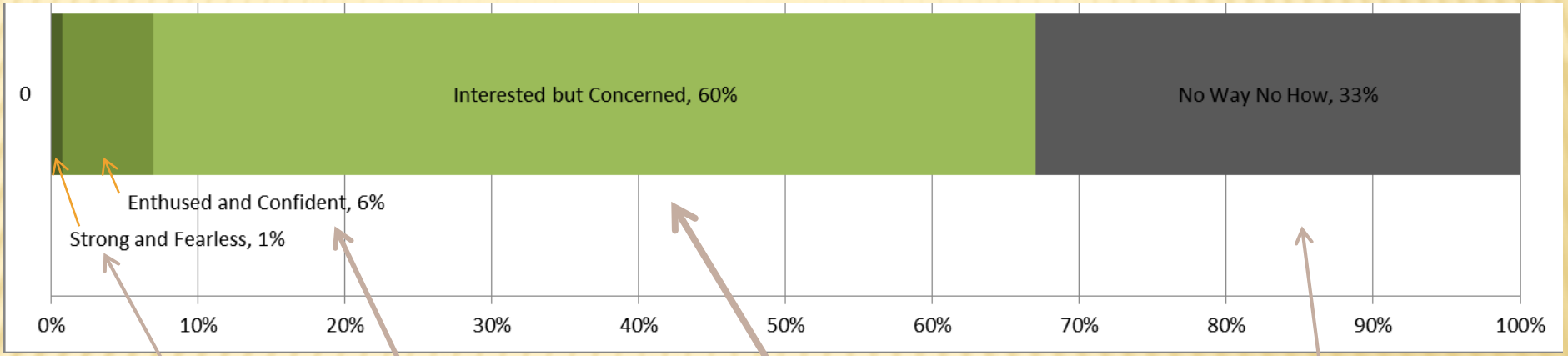


MOST COMMON CRASHES

- Urban
  - Motorist failed to yield
  - Bicyclist failed to yield at midblock
  - Bicyclist failed to yield at intersection



TYPES OF BICYCLISTS – CITY OF PORTLAND



Strong & Fearless

Enthused & Confident

Interested, but Concerned

Not Interested

LEVELS OF TRAFFIC STRESS (LTS)

- LTS 1: Suitable for almost all
- LTS 2: Suitable to most adult cyclists
- LTS 3: More traffic stress
- LTS 4: Strong and fearless

LEVELS OF TRAFFIC STRESS (LTS)

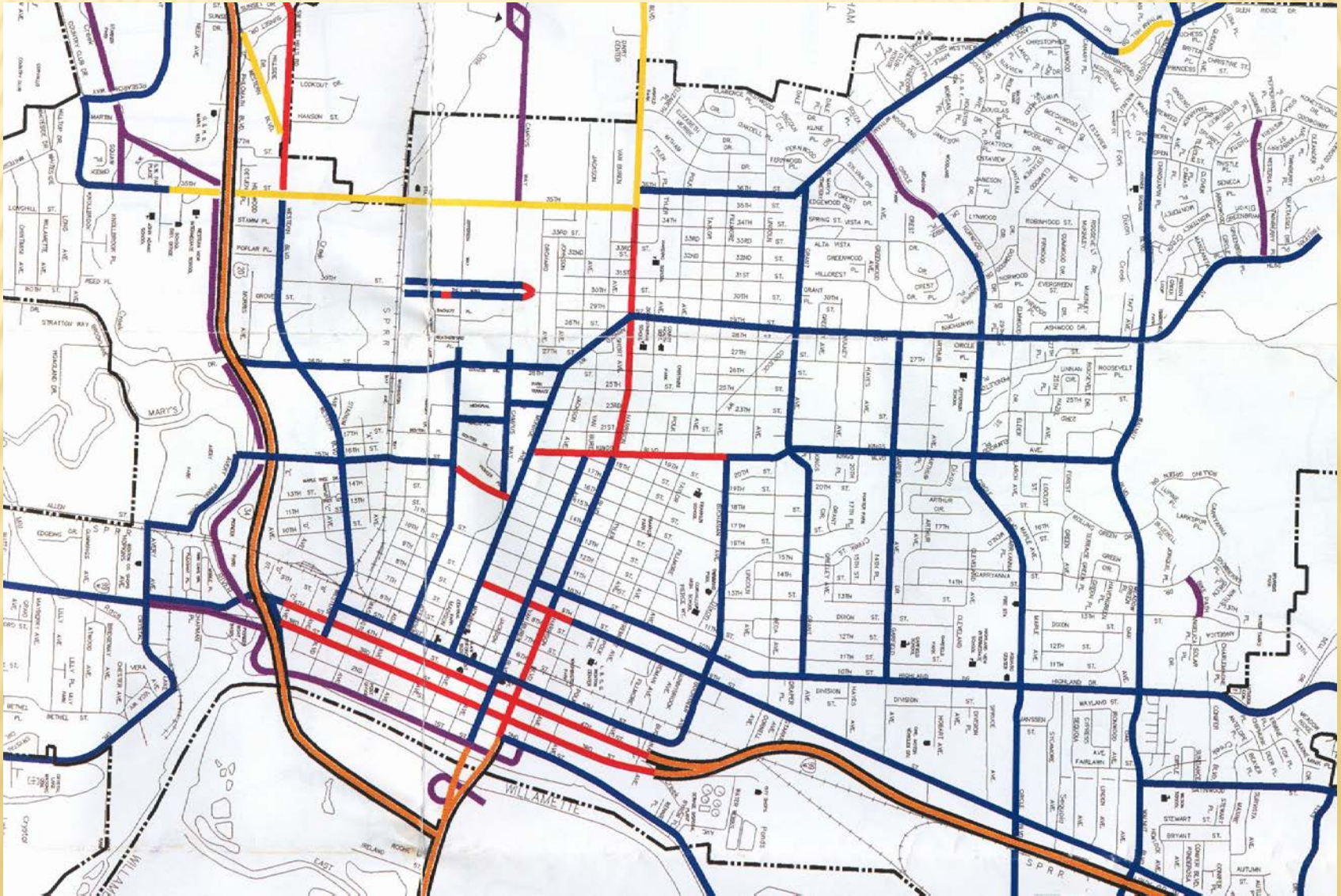
Levels of Traffic Stress			
LTS 1	LTS 2	LTS 3	LTS 4
• Physically separated from traffic or low-volume, mixed-flow traffic at 25 mph or less • Bike lanes 6 ft wide or more • Intersections easy to approach and cross • Comfortable for children	• Bike lanes 5.5 ft wide or less, next to 30 mph auto traffic • Unsignalized crossings of up to 5 lanes at 30 mph • Comfortable for most adults • Typical of bicycle facilities in Netherlands	• Bicycle lanes next to 35 mph auto traffic, or mixed-flow traffic at 30 mph or less • Comfortable for most current U.S. riders • Typical of bicycle facilities in U.S.	• No dedicated bicycle facilities • Traffic speeds 40 mph or more • Comfortable for "strong and fearless" riders (vehicular cyclists)

CASUAL/LESS CONFIDENT

In order for this group to regularly choose bicycling as a mode of transportation, a physical network of visible, convenient, and well-designed bicycle facilities is needed.

AASHTO Guide for the Development of Bicycle Facilities 2012

WELL-CONNECTED NETWORK



Designing for Bicyclist Safety

CORE SAFETY CONCEPTS

KEY SAFETY FACTORS

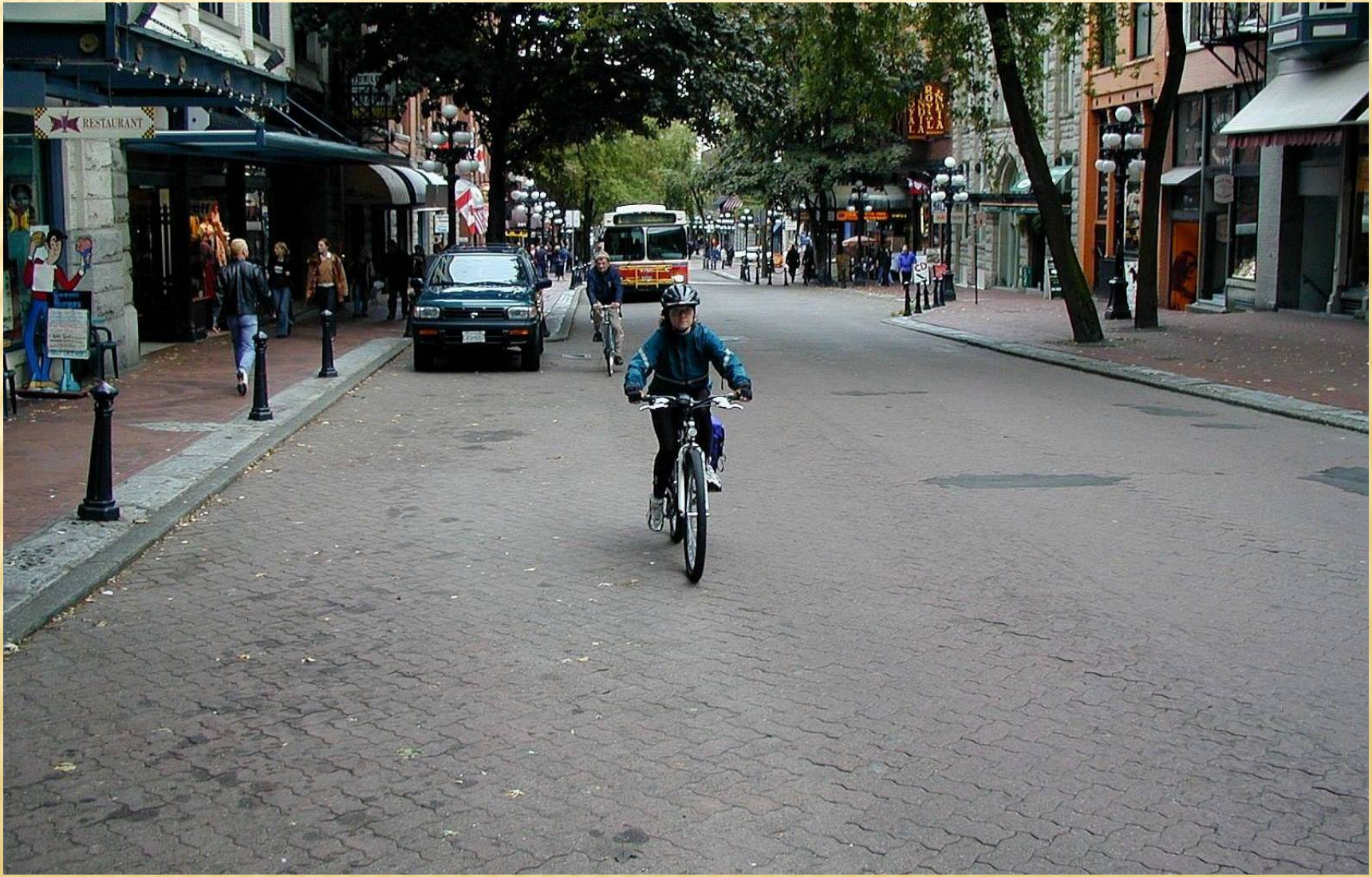
Important Message

- Speed
- Number of lanes
- Visibility
- Traffic volume & composition
- Conflict points
- Proximity
- Bike control
- Connectivity

COMPLETE STREET

Portland, Oregon

BICYCLIST ORIENTED: LOW RISK

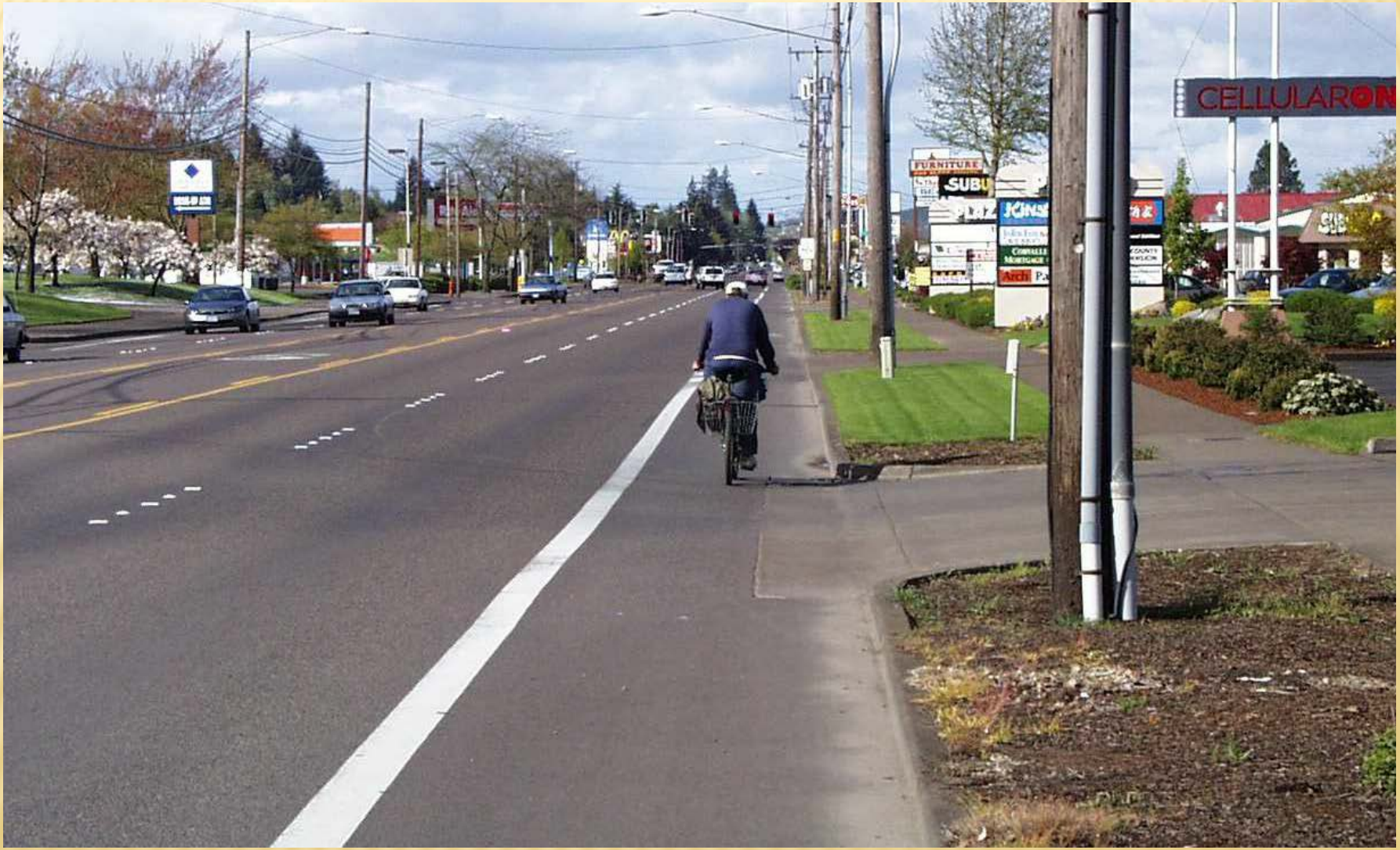


Vancouver, British Columbia

AUTO ORIENTED: HIGH RISK

Las Vegas, Nevada

PROVIDE SPACE ON STREET…



Corvallis, Oregon

…OR SLOW DOWN TRAFFIC

Corvallis, Oregon

Where can we put bicyclists?

Corvallis, Oregon

How can we design to better include bicyclists?

Designing for Bicyclist Safety

SUMMARY THOUGHTS

LEARNING CHECK

- How long are typical trips for the casual, less confident rider?
  a) 1 to 5 miles
  b) 5 to 8 miles
  c) 10 to 12 miles

LEARNING CHECK

- What percentage of trips in the U.S. are less than 3 miles?

a) 37 %

b) 50 %

c) 60 %

LEARNING CHECK

- Most bicycle facilities in the U.S. are what level of traffic stress?
  a) LTS 1
  b) LTS 2
  c) LTS 3
  d) LTS 4

LEARNING CHECK

- What level of traffic stress is comfortable for most adult bicyclists?
  a) LTS 1
  b) LTS 2
  c) LTS 3
  d) LTS 4

LEARNING OUTCOMES

- Discuss the opportunities to improve bicycle travel
- Identify key safety factors for bicyclists

Designing for Bicyclist Safety

QUESTIONS