An Introduction to Roads

- Why are roads so bad?
- What are roads actually made of?

Roads in the US

- 6.3 million km of roads in U.S. (USDOT 2012)
- 4.8 million ha of land and water bodies removed
- Cover 1% of the U.S.
- Influence 15 to 20% of U.S. land area
- 16% total land area in lower 48 is within 100 m of a road

Pitch Lake, Trinidad
Direct effects

- Creates barriers
- Restricts water levels
- Individual deaths from road construction or hit-and-runs
- Restricts and interrupts movements
- Species richness
- More exposed/visible to predators
- Lower success at breeding sites

Indirect effects

- Temporal and spatial variation in movements
- Chemical alteration of the environment
- Isolation of subspecies and subpopulations (gene flow)
- Population stability (more tolerant species can outcompete others)
- Difficult to quantify due to lack of data

Eigenbrod et al. 2005 study

- Negative correlation between traffic density and species richness
- Decrease in abundance of six common species with an increase in traffic density
Contributing Factors to Non-Vehicular Deaths

- Roads affect more than just amphibian movements and the lack thereof (squishing)
- Non-porous materials
  - Concentrates other pollutants

Mitigating the Problem

- Research (need more long-term studies/surveys)
- Drift fencing system aka "amphibian tunnels"

Possible Solution: Porous Asphalt

- Asphalt rests on a stone bed
  - Must be 18-36 inches deep
- Allows water to be absorbed
- Has a long life span
It’s the primary cause of mortality because…

Roads, unlike disease or bacteria, cause both direct and indirect mortality.