Indonesia: Road Safety Risk Analysis Tools

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Indonesia Crash Statistics and Trends

Reported

Source: 2016, Indonesia National Police

93% crashes involve VRUs
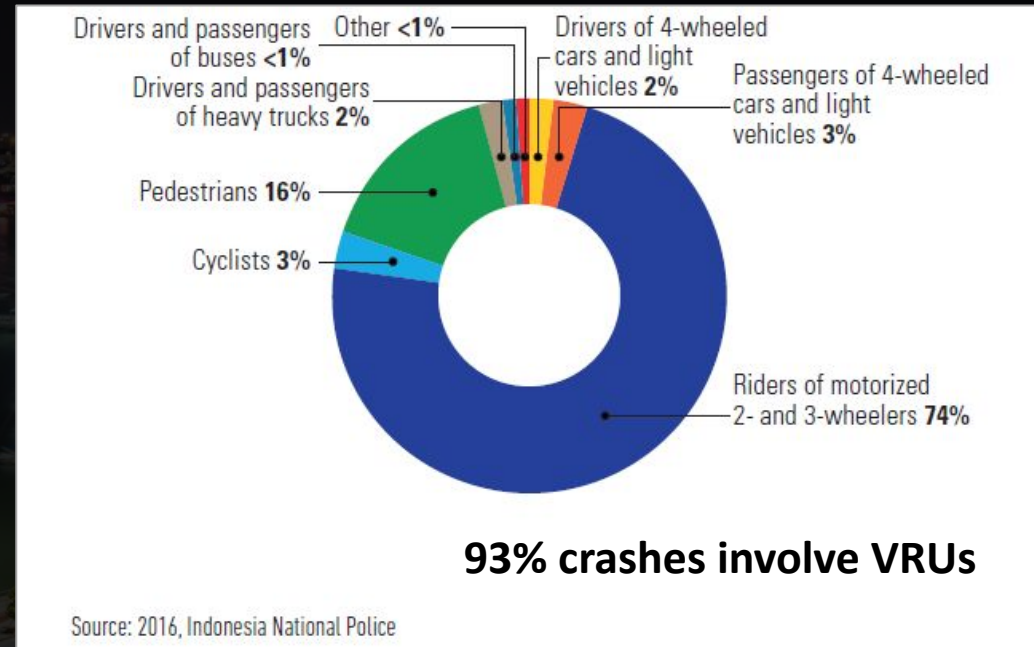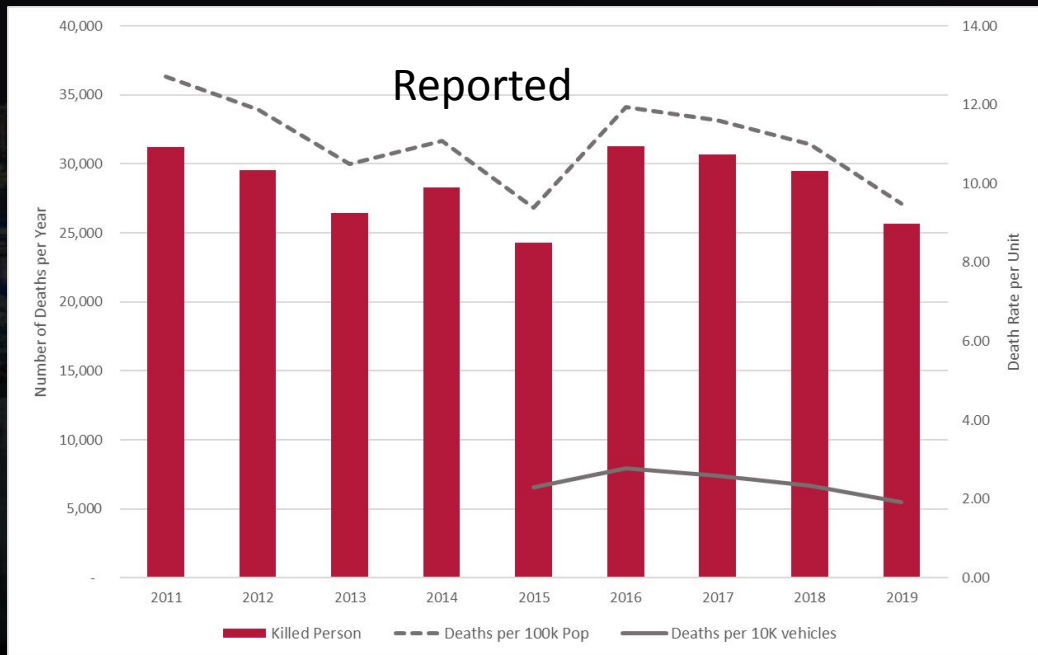
- Considerable Variability in Reporting
- Death rate in range 25,000 to 49,000
- Mid-range estimate of **37,000 deaths per annum**
- **Death per 100,000 population of 13.7**
- Lower than global average of 18.2 and MIC of 20.

NZ - 7.8
Australia – 4.5
USA – 12.4
Sweden – 2.2

Population - 275M

Vehicles – 130M plus

Indonesian Project Overview

- Client: Indonesian - Australian Partnership for Infrastructure (KIAT)

- IRAMS-DC project covers asset management, bridge inspections & road safety

- Contract focuses on National Highway Network of 47,000km
- This network is managed by Bina Marga (or DGH)
- DGH only manage infrastructure (not speed limits etc.)

- Road Safety Program Consists of:
  - Development of KPIs (and SPIs)
  - Development of Safety Performance Functions (SPFs)
  - Star Ratings and SRIP using InaRAP (iRAP)
  - Blackspot investigation – Capacity Building
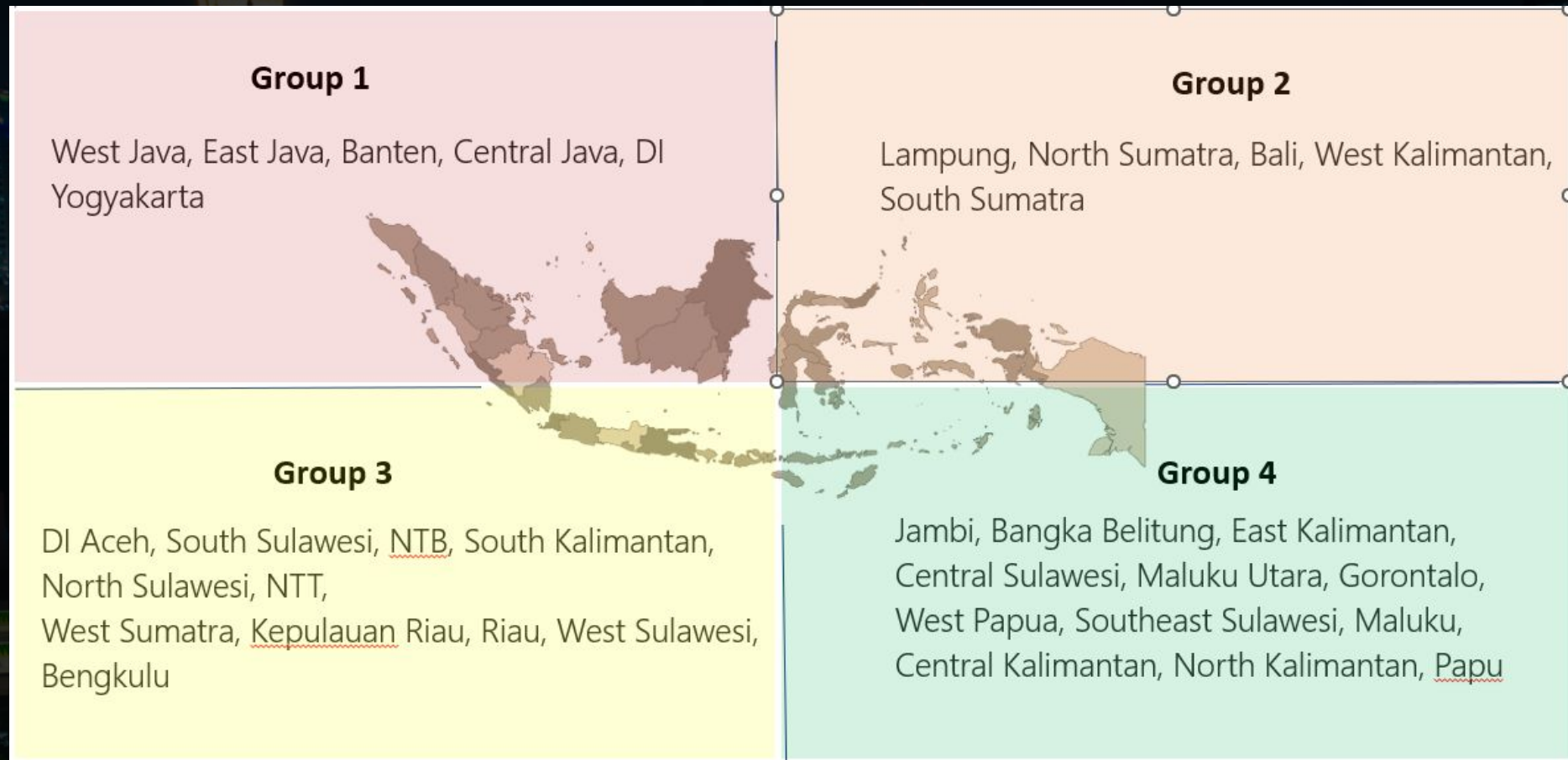 - Development of Safety Forward Works Programs

Risk Maps – from Safety Performance Functions

- Model categories:
  - Land Use Types
    - True Urban,
    - Rural Shopping,
    - Rural Housing and
    - True Rural
  - Road Stereotypes
    - Number of Lanes (99% coverage)
    - One-way vs two-way

- Model Parameters
  - All Vehicle Crashes (mostly 2/3 wheelers)
  - Pedestrian Crashes
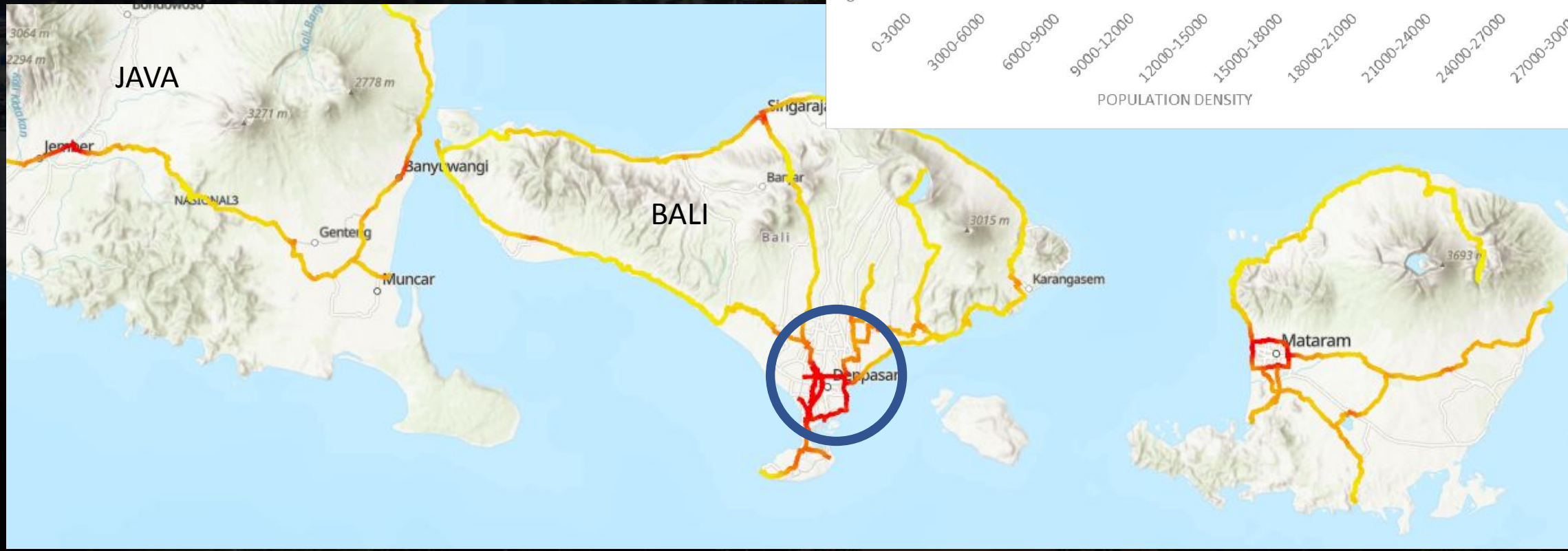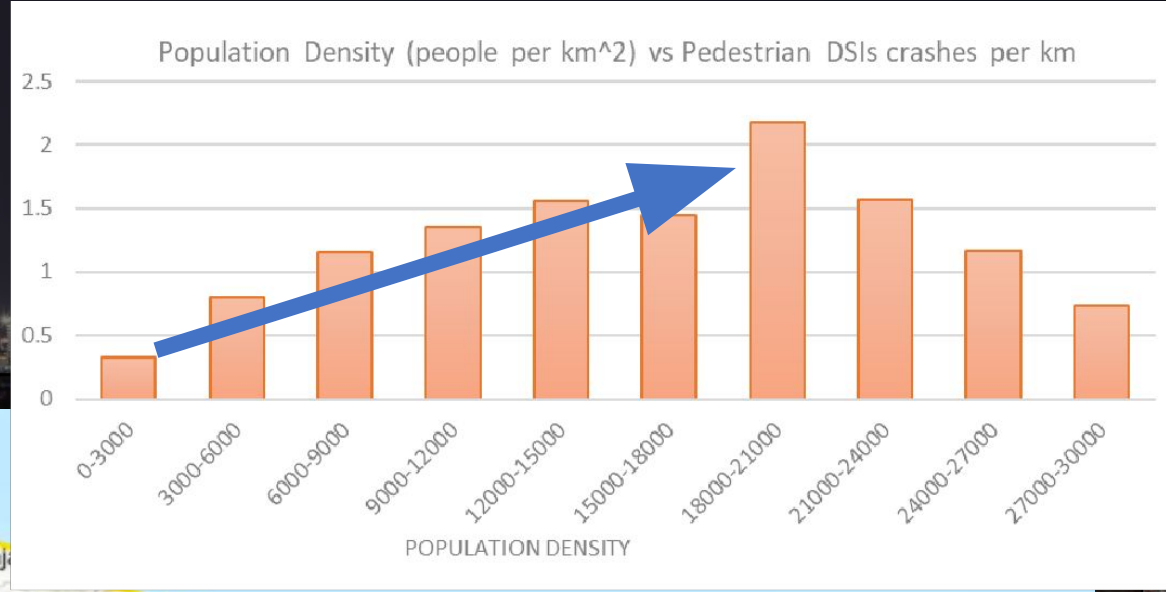 - Daily traffic volume (4 wheelers)
  - Length of link

SPF Models

Land use and Stereotype combination	SPF Used	e^a	b	c	d (G1)	d (G2)	d (G3)	d (G4)
True_Urban_22UD	True_Urban_22UD	0.113	0.32721	0.92613	1	0.678	0.333	0.737
True_Urban_42UD	True_Urban_42UD	0.55	0.1817	0.9832	1	1	1	1
True_Urban_42D	True_Urban_42D	0.29	0.07247	0.89759	1	0.291	1.275	2.769
True_Urban_4+2D	True_Urban_4+2D	0.29	0.07247	0.89759	1	0.291	1.275	2.769
True_Rural_22UD_LR	True_Rural_22UD_LR	0.0193	0.55659	0.77679	1	0.915	0.573	0.32
True_Rural_22UD_HR	True_Rural_22UD_HR	0.00488	0.72452	0.695	1	0.85	0.407	0.161
True_Rural_42UD	True_Rural_42UD	0.0664	0.4296	1.0288	1	1	1	1
True_Rural_4+2D	True_Rural_4+2D	0.0116	0.5895	1.0168	1	1	1	1
Rural_Housing_22UD_LR	Rural_Housing_22UD_LR	0.0298	0.4778	0.9915	1	1.016	0.599	0.433
Rural_Housing_22UD_HR	Rural_Housing_22UD_HR	0.00174	0.7969	1.0956	1	1.046	0.725	0.282
Rural_Housing_42UD	Rural_Housing_42UD	0.0664	0.4296	1.0288	1	1	1	1
Rural_Housing_4+2D	Rural_Housing_4+2D	0.0116	0.5895	1.0168	1	1	1	1
Rural_Shopping_22UD_LR	Rural_Shopping_22UD_LR	0.133	0.3424	0.9718	1	0.978	0.571	0.303
Rural_Shopping_22UD_HR	Rural_Shopping_22UD_HR	0.0182	0.5329	1.1695	1	1.537	0.698	0.161
Rural_Shopping_42UD	Rural_Shopping_42UD	0.0664	0.4296	1.0288	1	1	1	1
Rural_Shopping_4+2D	Rural_Shopping_4+2D	0.331	0.268	1.0467	1	0.946	0.368	0.227

SPF Province Groups

Group 1

West Java, East Java, Banten, Central Java, DI Yogyakarta

Group 2

Lampung, North Sumatra, Bali, West Kalimantan, South Sumatra

Group 3

DI Aceh, South Sulawesi, NTB, South Kalimantan, North Sulawesi, NTT,
West Sumatra, Kepulauan Riau, Riau, West Sulawesi, Bengkulu

Group 4

Jambi, Bangka Belitung, East Kalimantan, Central Sulawesi, Maluku Utara, Gorontalo, West Papua, Southeast Sulawesi, Maluku, Central Kalimantan, North Kalimantan, Papu

Pedestrian Flow Surrogate - Population Density
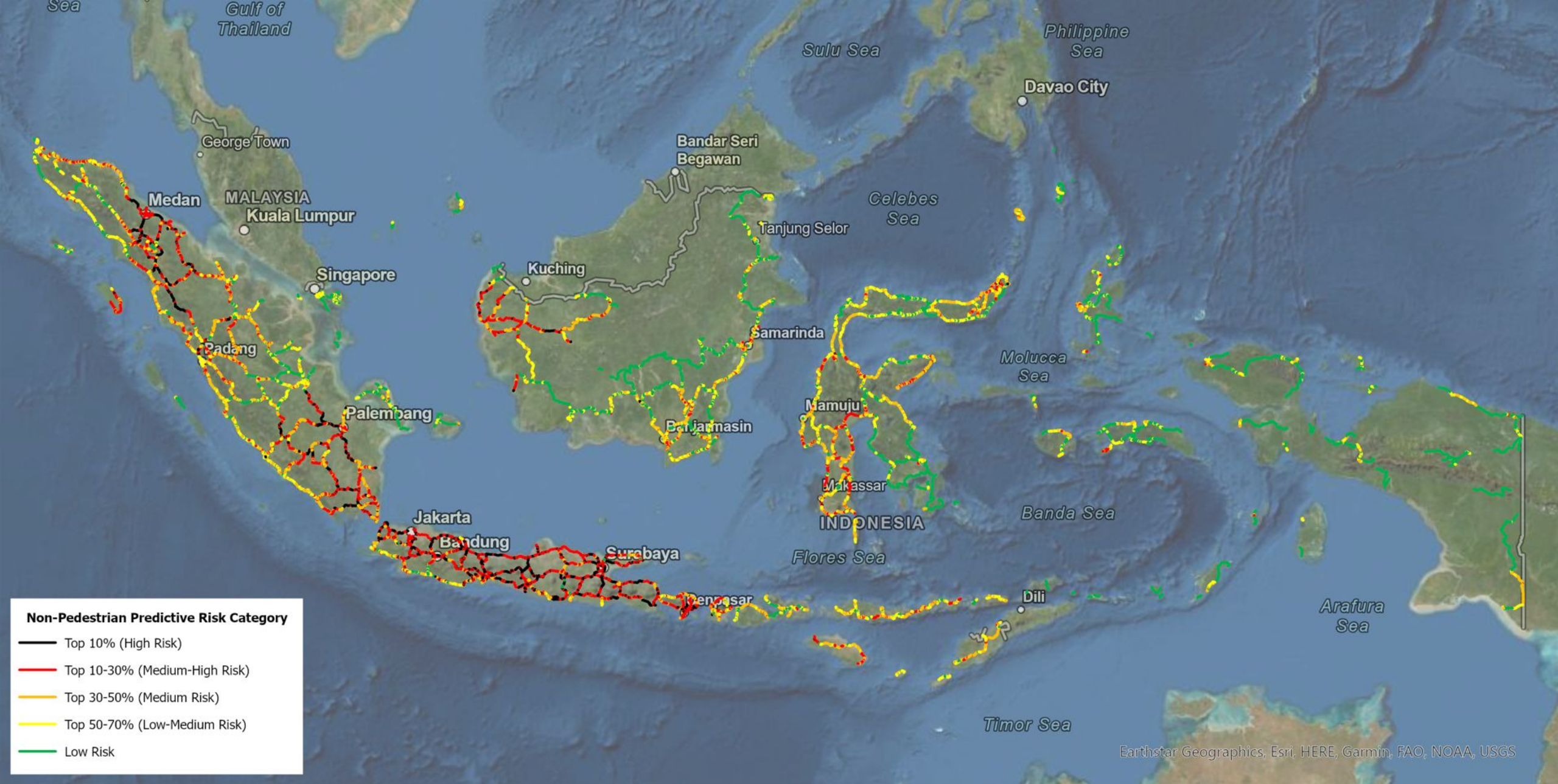
Non-Pedestrian Predictive Risk Category

- —— Top 10% (High Risk)
- —— Top 10-30% (Medium-High Risk)
- —— Top 30-50% (Medium Risk)
- —— Top 50-70% (Low-Medium Risk)
- —— Low Risk

High Risk Network- Vehicle

Non-Pedestrian Predictive Risk Category
- Top 10% (High Risk)
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- Low Risk

InaRAP

- Approx. 8,000km of 47,000km

- 75% of travel on around 15,000km

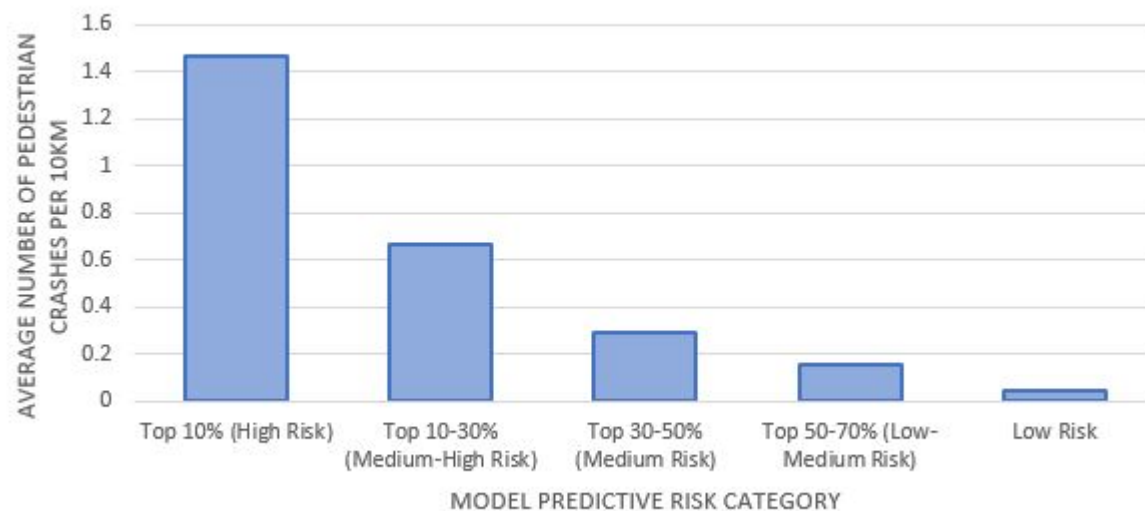Star Rating

Smoothed | Before | Show Legend
Raw | After | Hide Legend

Map | Satellite

Model Validation

Non-Pedestrian Crashes, all provinces / Pedestrian Crashes, all provinces
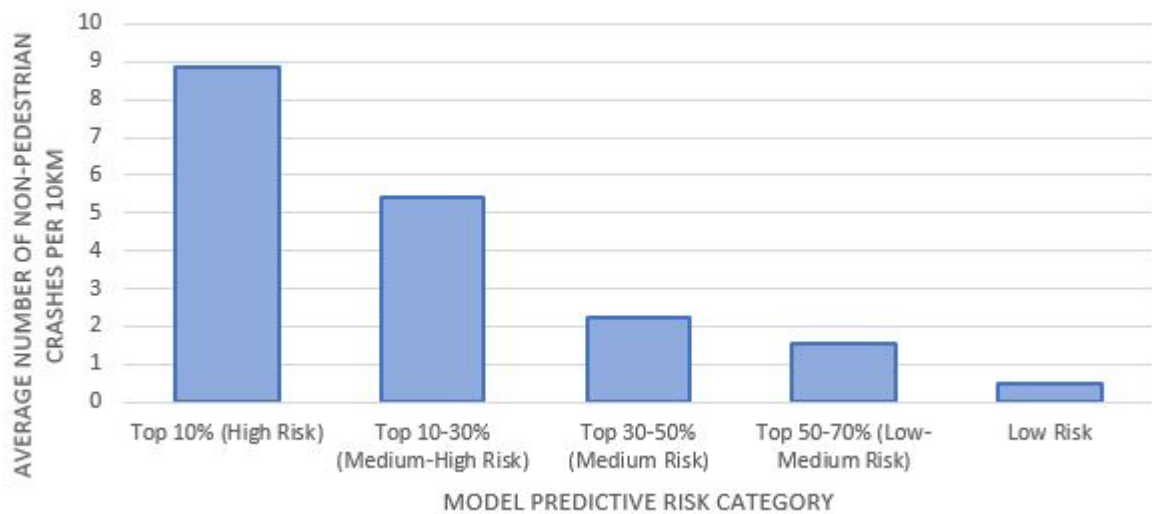
Bali Case Study

VEHICLE

Non-Pedestrian Predictive Risk Catagory
- Low risk
- Top 10- 30% (Medium-High Risk)
- Top 10% high risk (High Risk)
- Top 30- 50% (Medium Risk)
- Top 50- 70% (Low-Medium Risk)

PEDESTRIAN

Pedestrian Predicted risk
- Low risk
- Top 10- 30% (Medium-High Risk)
- Top 10% high risk (High Risk)
- Top 30- 50% (Medium Risk)
- Top 50- 70% (Low-Medium Risk)

Bali Case Study – LOSS & High Risk Network

LOSS

LOSS (Level of Safety Service)
- ☐ #N/A
- 🟩 1
- 🟨 2
- 🟧 3
- 🟥 4
- ⬛ 5

High risk Network

Pedestrian Predicted risk
- 🟥 Top 10- 30% (Medium-High Risk)
- ⬛ Top 10% high risk (High Risk)
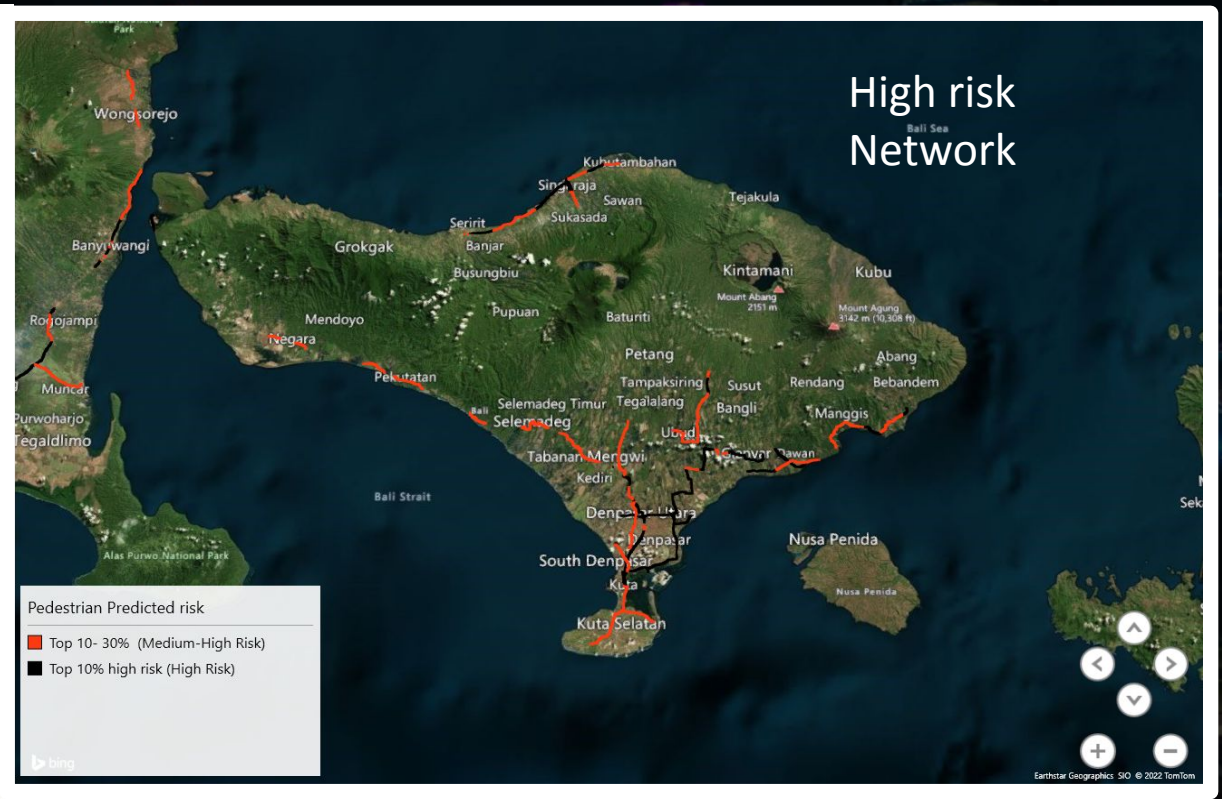
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SPF Province Groups