

# Crime On Bus Routes

## An Evaluation of a Safer Travel Initiative

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# Overview of Presentation

- Context to research
  - Description of Operation Bream
  - Aims & objectives of Operation
  - Hypotheses we formulated to test
  - Methodologies used
- Evaluate changes along bus corridor
  - 1) Police Arrest Rates
  - 2) Demand for Police Service
  - 3) Recorded Crime
- Overall Conclusions

# Operation Bream

- 4 Week Intensive Police Operation (April/May 2002)
- Policed Single Bus Corridor
  - Combination of on bus/along bus corridor
  - On foot (with back up patrols vehicles)
  - Use bus as mode of transport
- Pilot Scheme
  - Multi agency approach
  - High visibility intensive policing
  - Boosted revenue protection (ticket officers)
  - Supported by traffic wardens, bus private security firm,
  - pilot high tech on bus CCTV (introduced on some buses)
  - Target criminals on and around bus corridor

# To Evaluate Scheme

- What are aims and objectives?
  - 1) To reduce crime and disorder along bus corridor
  - 2) Provide reassurance to the public and staff about the safety of using buses
- What are mechanisms to achieve this?
  - 1) Increase guardianship along bus route
  - 2) Potentially secondary benefits in vicinity of route
    - E.g. bus drivers more vigilant in reporting incidents
    - Passengers notice extra police presence

# Potential Outputs to Test

- Crime levels increase/decrease/no change
- Evidence of residual deterrence effect
  - effects of operation continue after finished
- If reduction
  - diffusion of benefit
    - Reduction in crime in other areas in the near vicinity of the action route
  - geographical displacement
  - crime-switch displacement

# Hypotheses to test

- Extent to which as result of operation..
  1. An increase in arrest rates for officers working on Operation Bream
  2. A reduction in calls for police service along the action route
  3. A decrease in recorded crime within and around the bus route
  4. A reduction in fear of crime along bus route

# Attribute Change to Scheme

- Action route and comparison area
- Change before, during, after
- Avoid counterfactual argument
- Account for what happen in absence of scheme
- Attribute change to result of operation (not just general changes in crime levels)
- Target area of Operation Bream not well defined

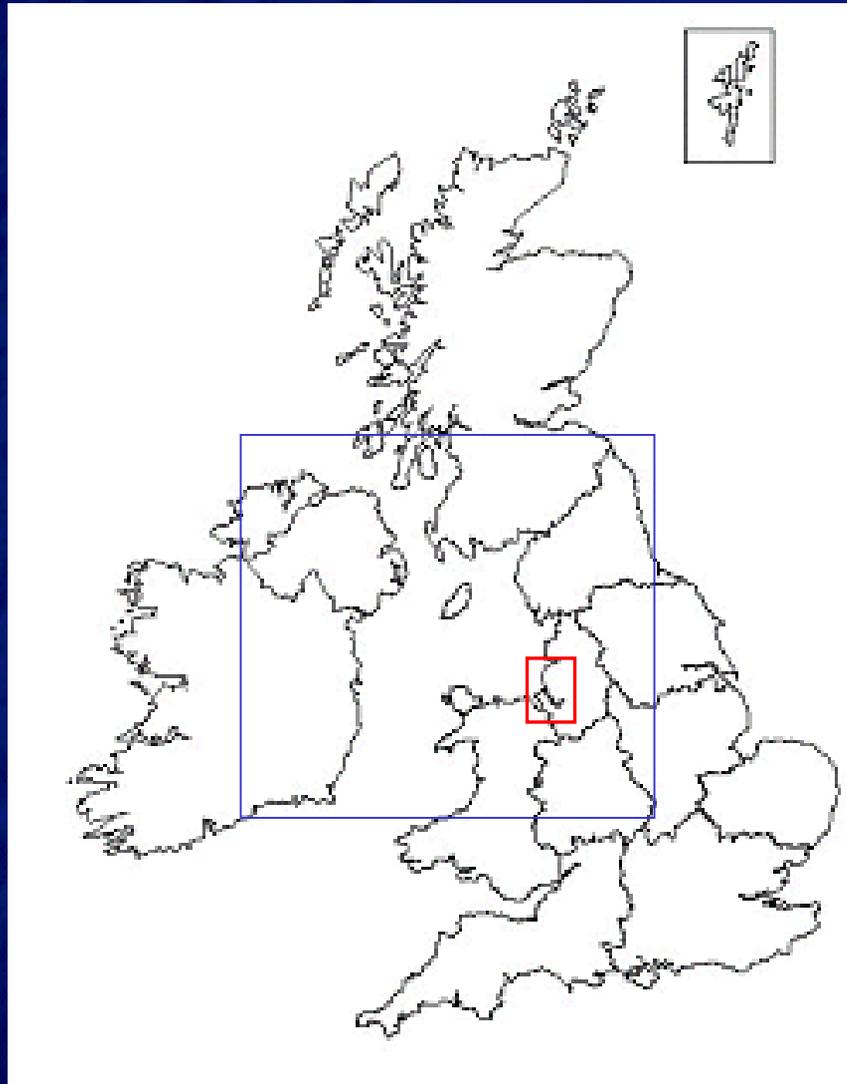
# Target Area / Operational Extent?

- Not geographically defined
  - unlike e.g. burglary reduction in specific area
- Bus corridor
  - all crime just on bus
  - all crime within certain distance of route (eg 200m)
  - all crime visible to officers patrolling route
  - how far venture from route
  - vary at different points along the route

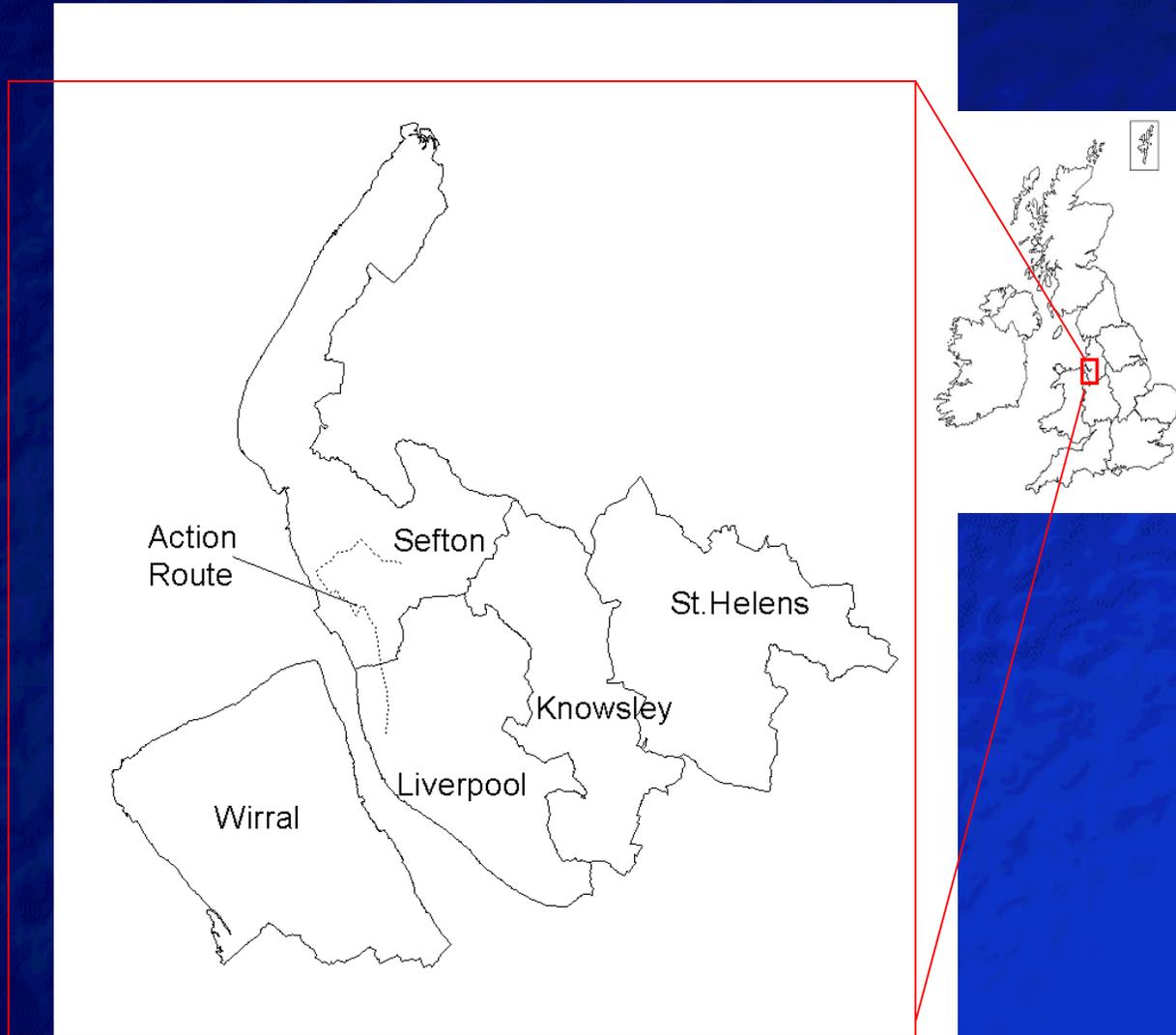
# Target Area?

1. Reduction in a Specific Target Area
  - eg within 200m of bus route
2. Distance over which the scheme might feasibly have an impact
  - How far from route impact
3. Combination of above
  - within 200 m of bus route (anecdotal evidence, Operation Seneca)
  - additional distances up to 500m (beyond which operation unlikely to impact)

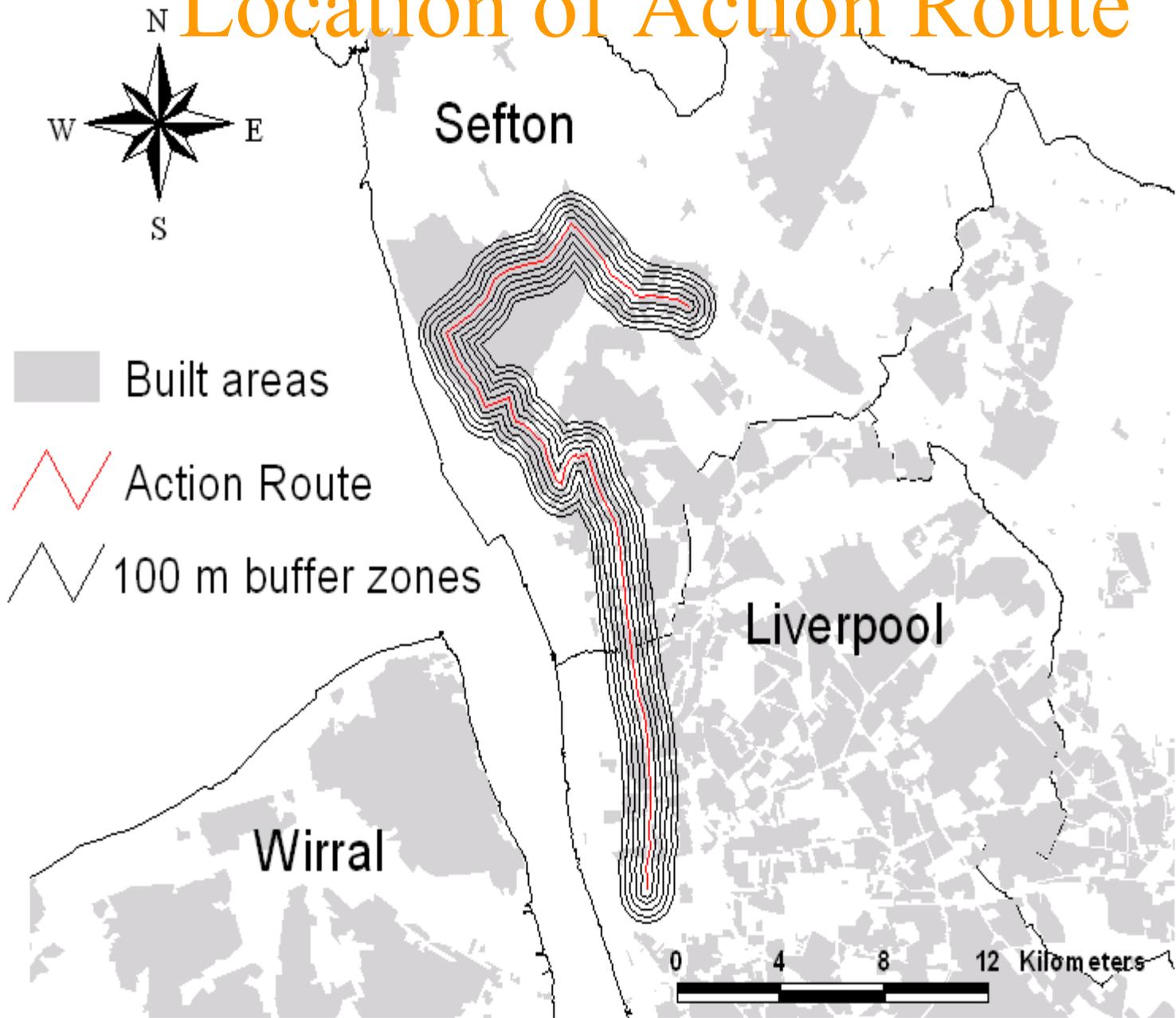
# Location of Action Route



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# Location of Action Route



# 1) Arrest Rates

- Officers performance before v's during
- 85 officers used, 90 arrests made
- Previous month arrest rates
  - low (15 days), med (20 days), high (25 days)
- 3 to 4 times higher during Bream
  - (factor in seasonal variation)
- t tests confirmed statistically results
- ~ 75 additional arrests than usual performance

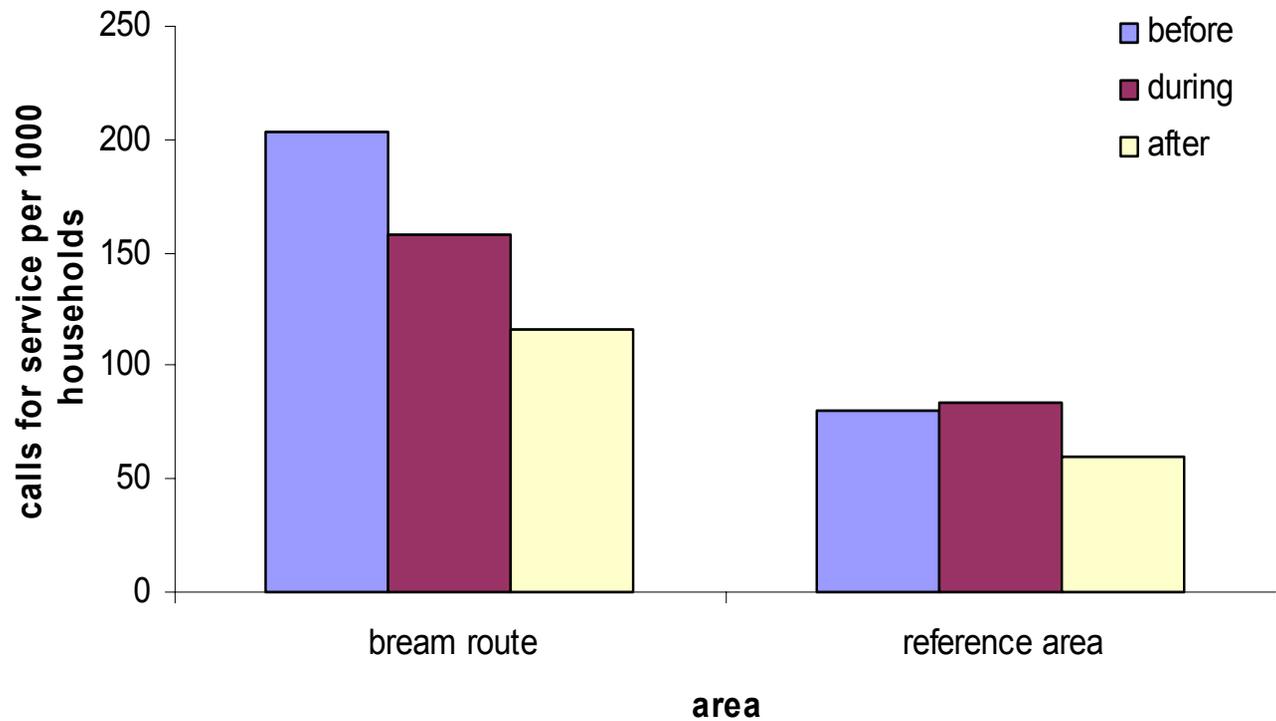
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	<b>Average daily arrest Rate (Bream)</b>	<b>Average daily arrest Rate (Merseyside)</b>
Baseline (low to high)	range 0.09 to 0.15	range 0.05 to 0.10
Operation Bream	0.41	range 0.06 to 0.10

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## 2) Calls for Police Service

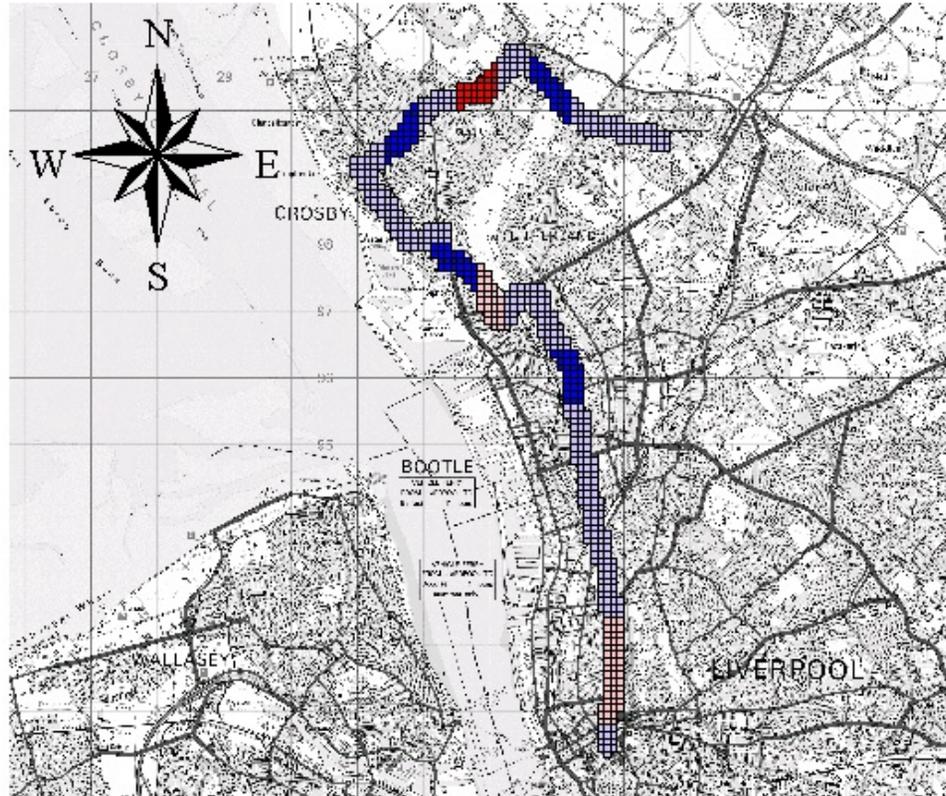
- 200m buffer zone around route
- Before (12 months), during, after (2 months due to subsequent operations) periods
- Remainder of Merseyside Reference Area
- Reference Area – slight increase during
- Action Area (Bream) - 22% decrease during



# Visual Inspection

- Heat Threshold Shading
- Police calls for disorder only
- Divide action area (within 200m)
- 21 Segments
- Calculate % change for each segment
- Change before - during

$$\text{Change} = \left[ \frac{\text{Total calls made during} - \text{total calls made before initiative}}{\text{Totals calls made before}} \right] * 100$$

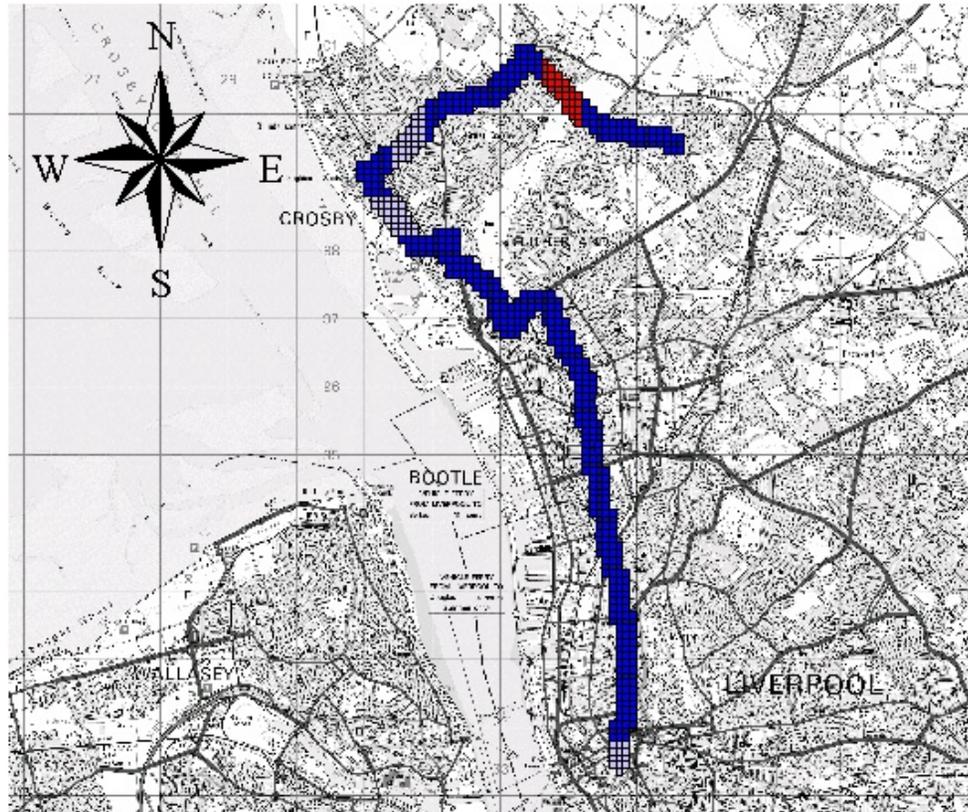


change before to during



1 0 1 2 Kilometers

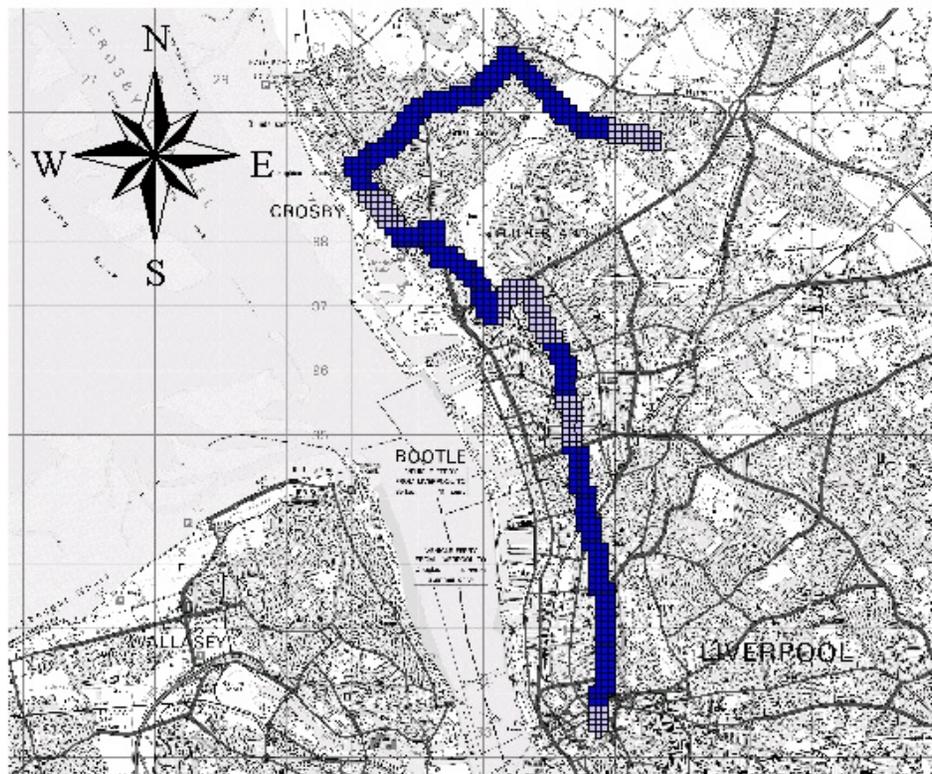




change during to after



1 0 1 2 Kilometers



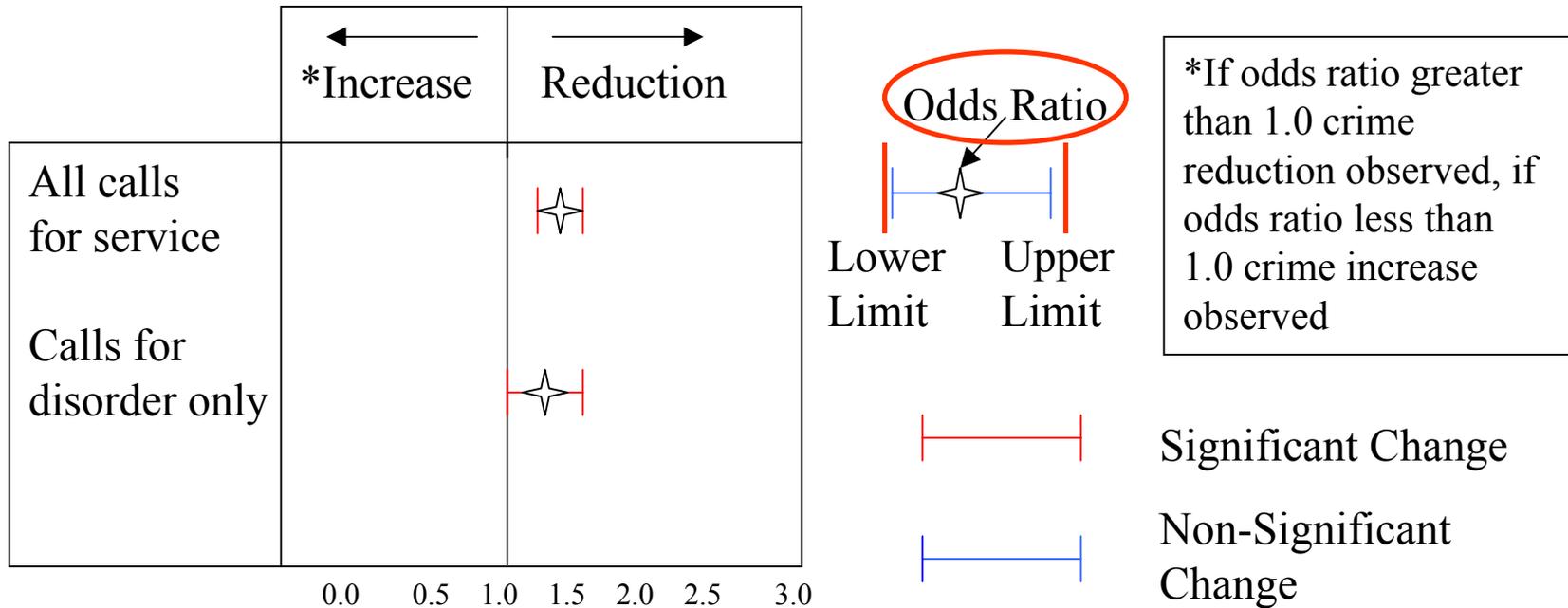
1 0 1 2 Kilometers

- change before to after
- <-20%
  - 20% to -5%
  - 5-5%
  - 5-20%
  - >20%

# Statistical Test for Significance

- Computed odds-ratios (Farrington and Welsh 2002)
- Standardised Measure of Effect Size
- Calculate standard error of odds ratio
  - =1. change in areas commensurate
  - <1. undesirable, action area increased w.r.t reference area
  - >1. desirable change, reduction in action compared to reference
  - Magnitude of change (1.50 implies 33% reduction (=1-1/1.5))
  - Forest Plots (odds ratios and 95% confidence limits)

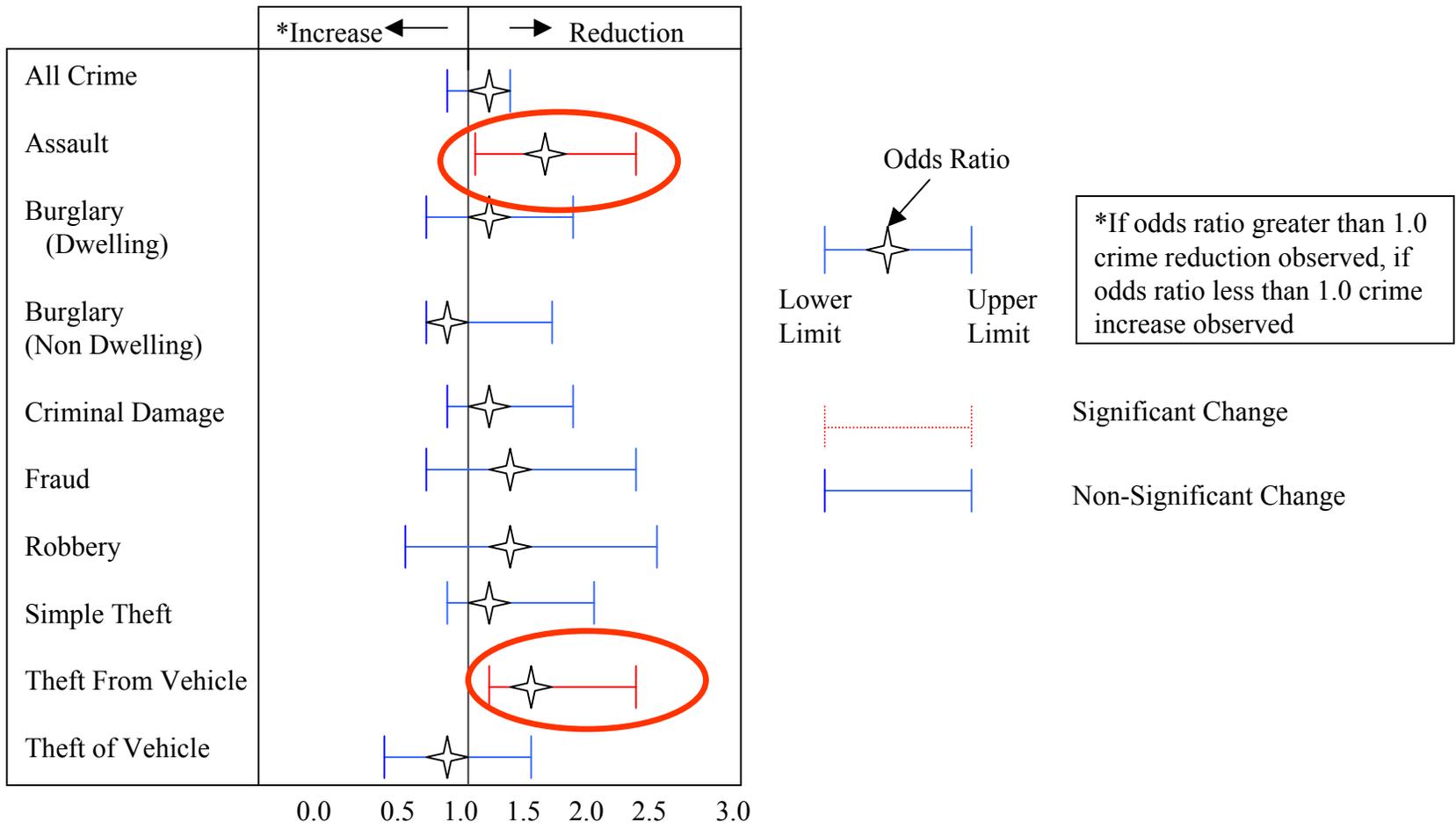
# Forest Plot



- Change along action route compared to reference area
- 200m buffer, before-during, 95% confidence intervals

### 3) Police Recorded Crime

- Reduction in specific target area?
- Before, during, after periods
- 200m buffer (action area)
- Number of selected crime types
- Odds ratios
- Forest Plots



- Reduction all crimes except burg non-dwell and theft of vehicle
- Significant changes, assault, theft from vehicle

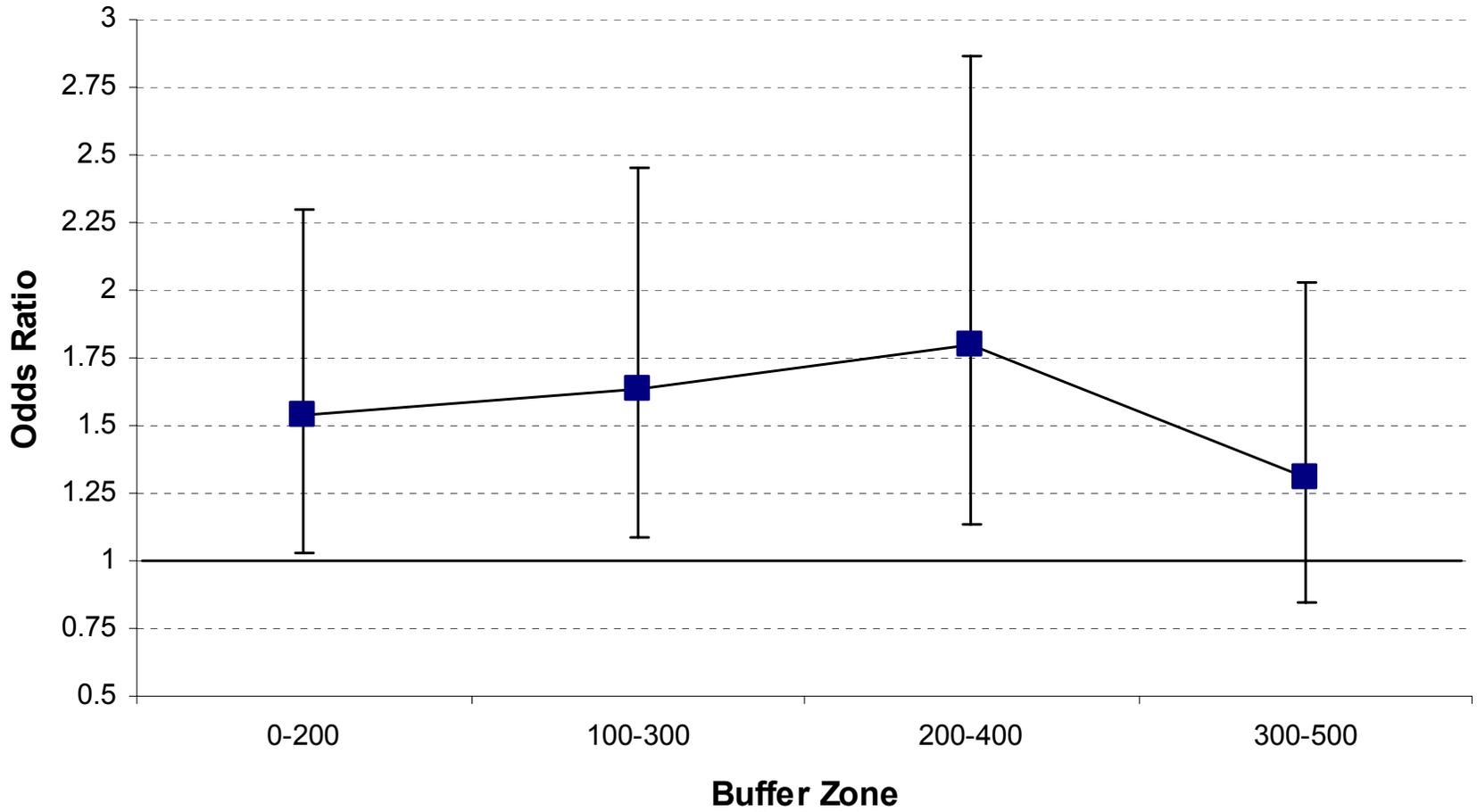
# Evidence of other change

- Residual deterrence effect
  - following the termination of the operation, crime level resumed to pre-operation level
- Only significant changes – reductions
  - no evidence of crime switch displacement
- Geographical Displacement of Crime?
- Diffusion of benefit?

# Distance over which operation feasibly have an impact

- Assault /Theft of vehicle (significant change)
- Concentric buffers
- 0-200,100-300,200-400,300-500m
- >500m unlikely due to scheme
- Significant reductions up to 400m
- Other crime types, no systematic patterns
- Unique change to assault and theft of vehicle –  
due to Bream

# Assault



# Conclusion

- Increase in arrest rates (3-4 times)
- Decrease in demand for police service
- Reduction in number of crime types
  - assault/theft from vehicle significant
- Displacement/diffusion of benefit difficult to measure (no defined operational boundary)
  - displacement/diffusion of benefit
  - or distance range of effect
- Questionnaires –passengers
  - Operation well received (especially during day)
  - Lack of pre-scheme survey (no statistical confidence)
  - Staff (well received, concern post scheme crime level)

# Future Operations

- Implement on other routes
  - 19 routes with higher levels of crime reported
- Planning of where and when to implement operations (need baseline information)
- Variations in operation
  - Uniformed police/plain clothed officers
  - Late Afternoon/Evening Shifts Most Effective
  - Length of Operation – more successful in first two weeks (3-4 days on different routes?)
- Sustainability

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