2 Iowa Safety Efforts:

Analyst Tool

&

Location Aggregation Project

FHWA SafetyAnalyst
Technical Working Group
Annual Meeting
July 8, 2003

Iowa Department of Transportation

Highway Division, Engineering Bureau,
Office of Traffic and Safety
Phone: (515) 239-1557 Fax: (515) 239-1891

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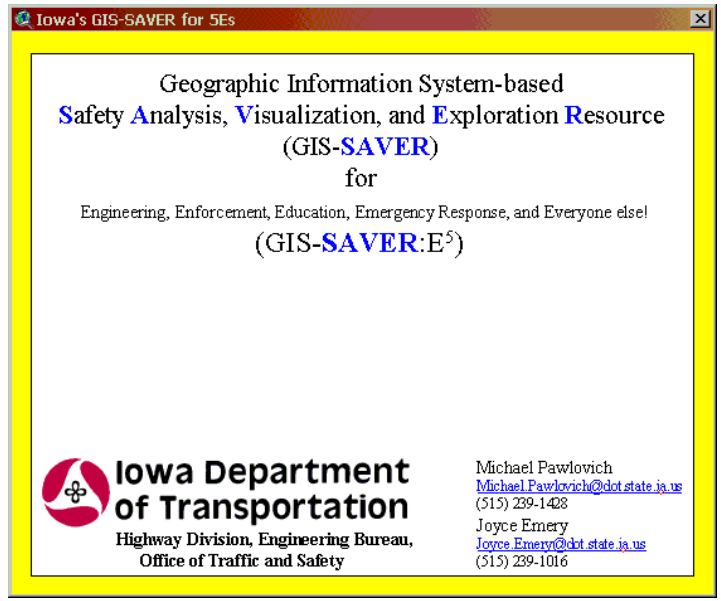
http://www.dot.state.ia.us/crashanalysis/

Geographic Information System-based Safety Analysis, Visualization, and Exploration Resource (GIS-SAVER) for

Engineering, Enforcement, Education, Emergency response, and Everyone else!

(GIS-SAVER:E^5)



Marion TraCS Data Examples (MARS data)

Iowa Department of Transportation

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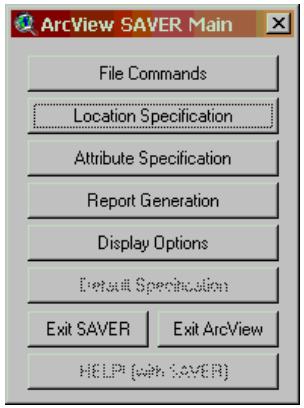
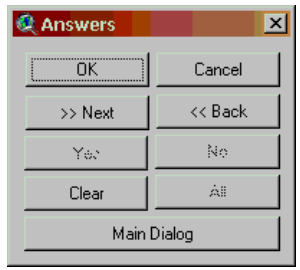
(515) 239-1016

http://www.dot.state.ia.us/crashanalysis/ → SAVER

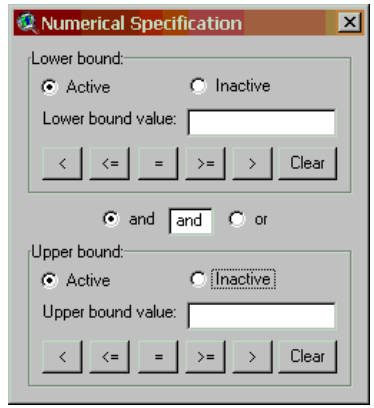
Interface/GUI

Buttons:

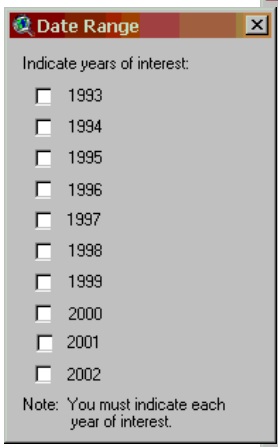




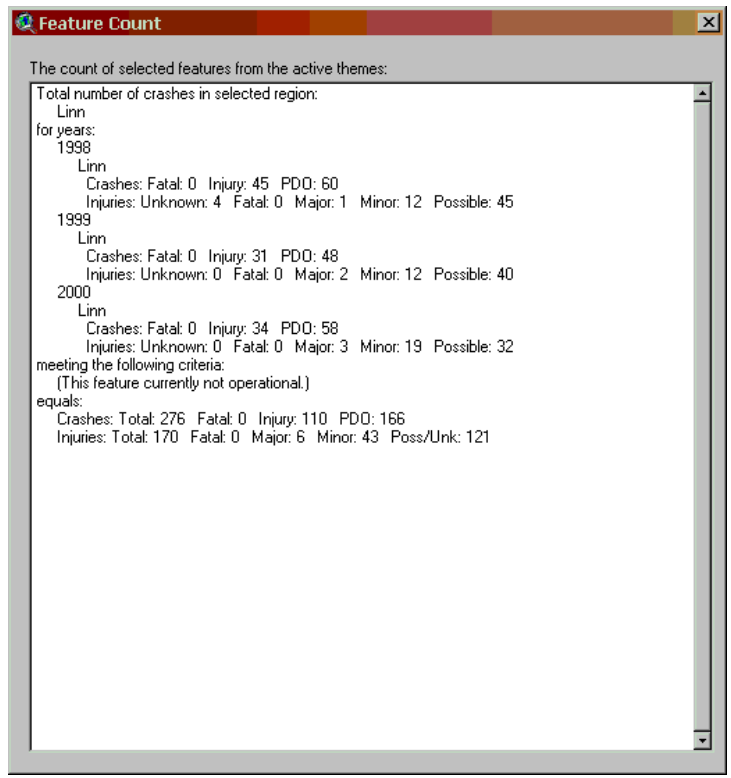
Input:
(e.g., Driver Age range)



Checkboxes:
(e.g., Data Years or County(ies))

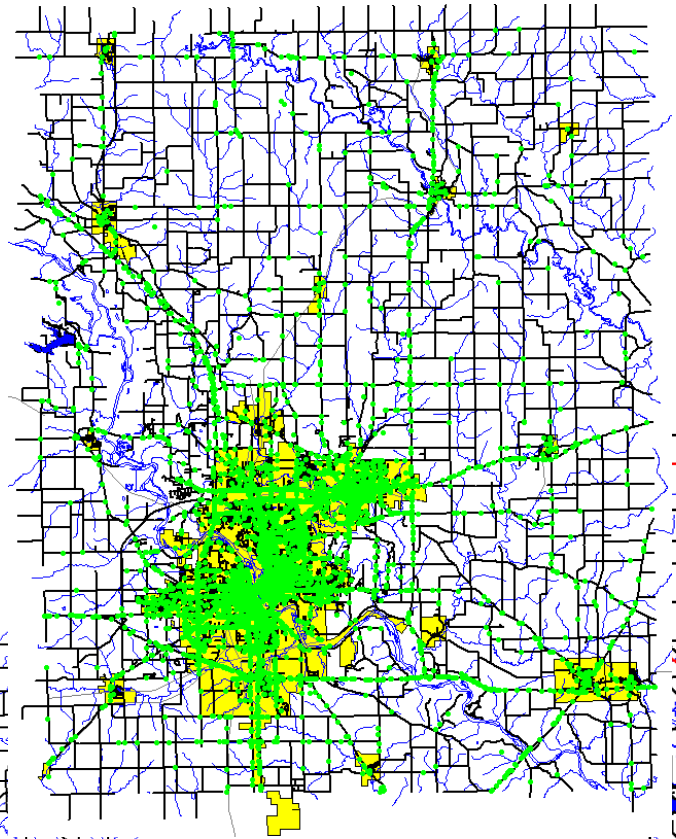


Report:
(e.g., Count of Selected Features)

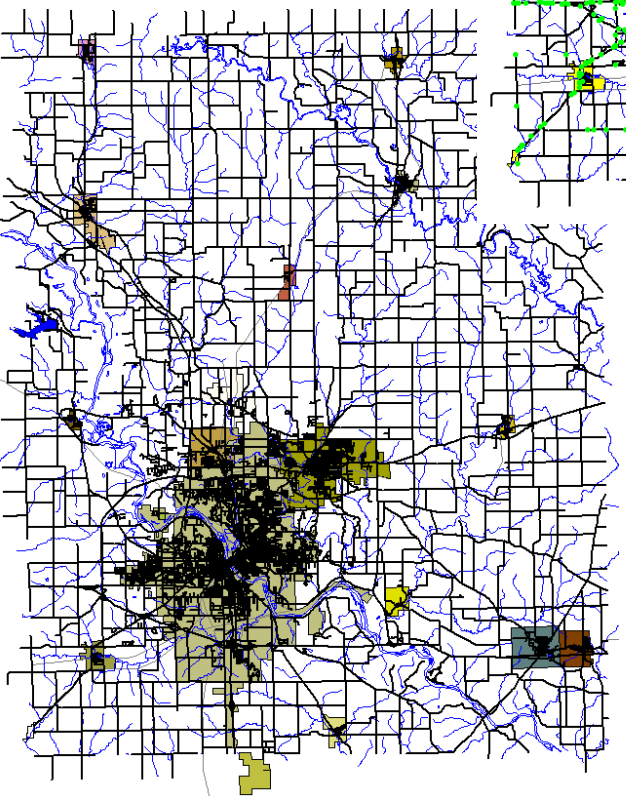


Maps

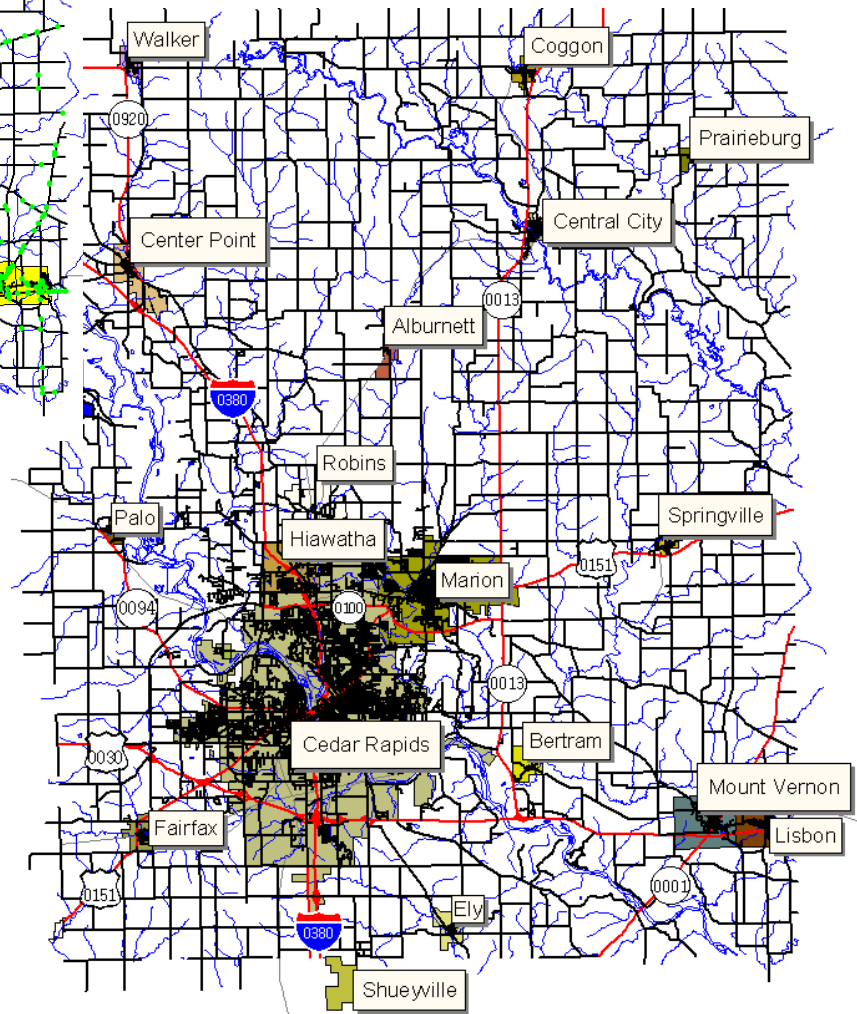
Standard:



Cities color-coded:

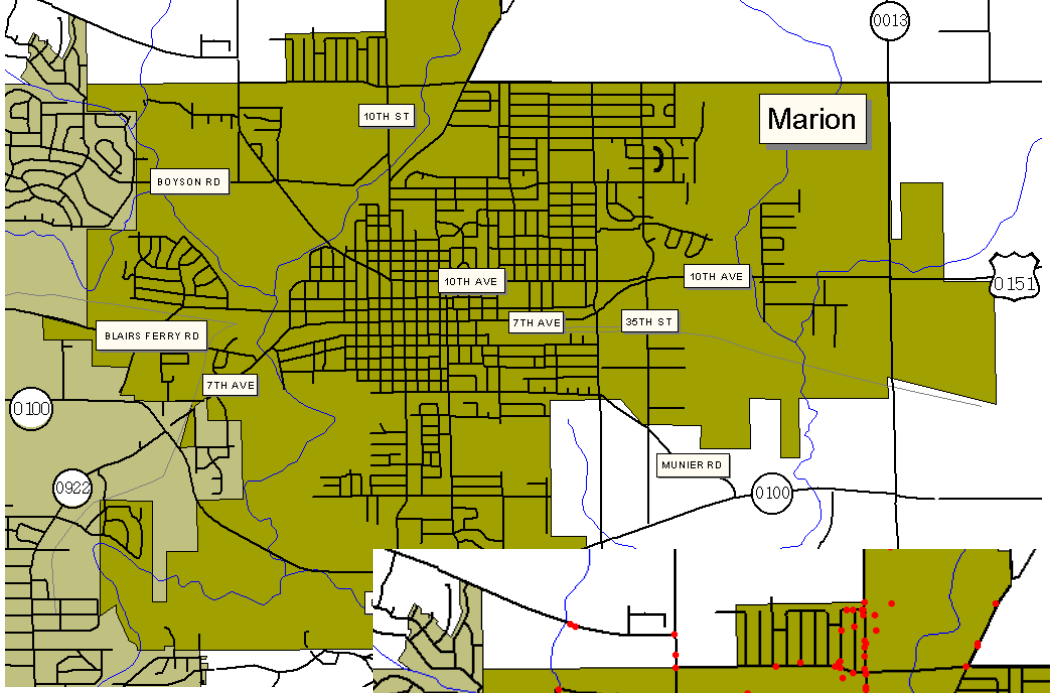


Cities color-coded and named/
Major roads identified:

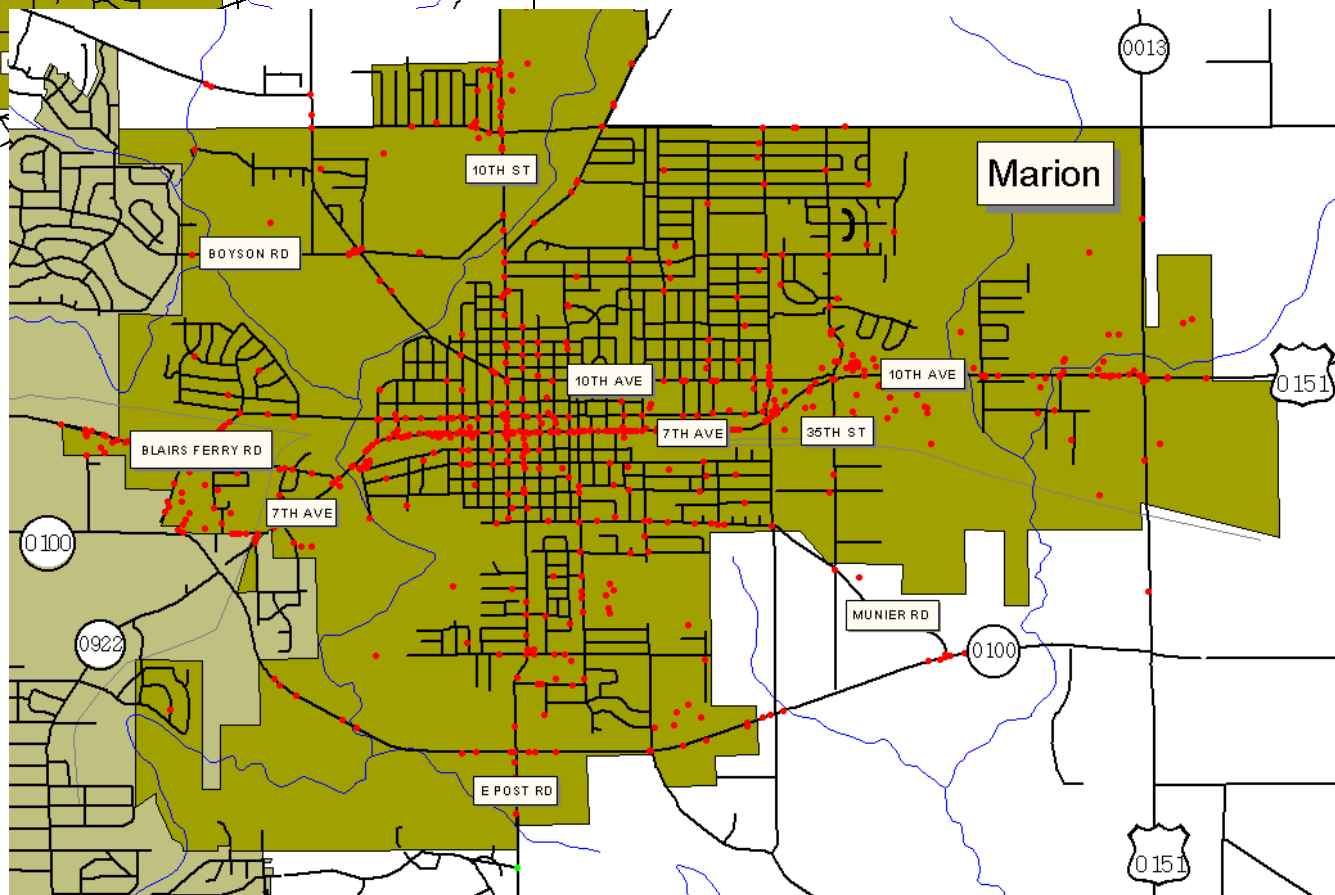


Maps

City extent w/ major streets identified:



City extent w/ major streets identified AND w/ crash points (i.e., red dots):

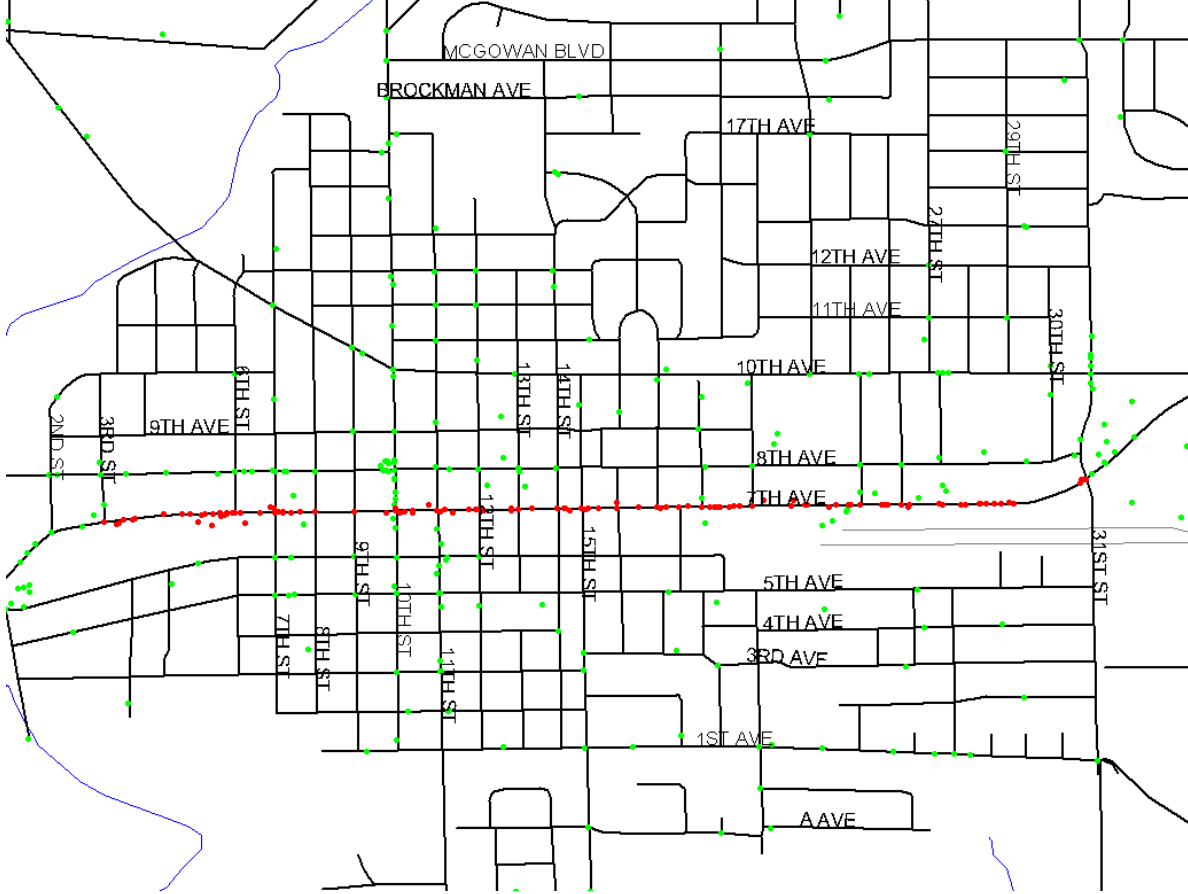


Note: The crashes on this map are 2001-June 2002, TraCS-derived, city of Marion crashes.

Further Note: Will be able to map other TraCS data types (i.e., ECCO, MOWI, ICIS, CIRF, VSIS) as long as they have Location Tool (or x,y) coordinates

Maps

Zoomed in to area of interest w/ streets identified:

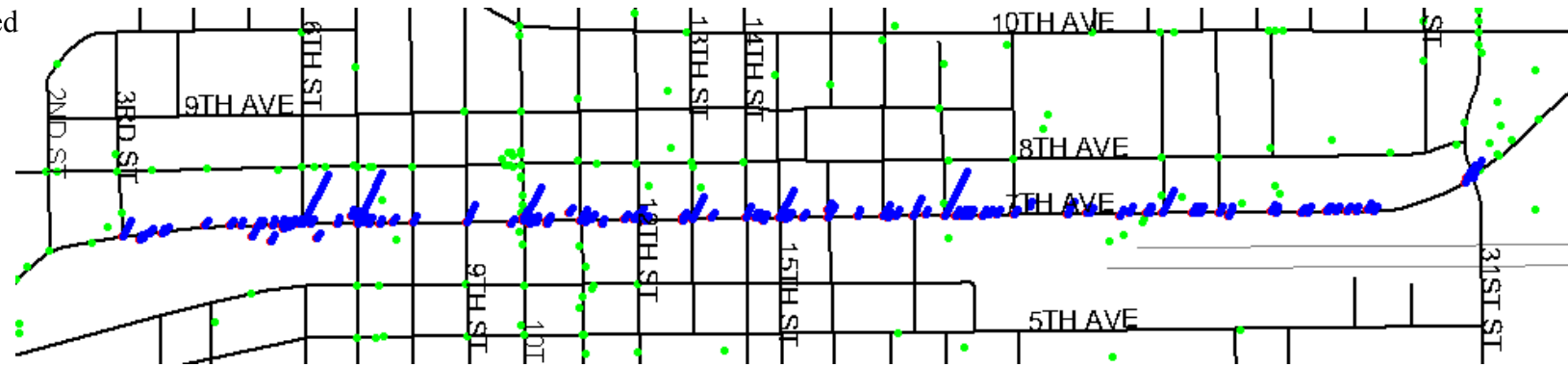


Notes:

Selected crash points are noted in red. Green dots are unselected crash points.

Also, several crashes can occur at one point…so the presence of a dot doesn't necessarily equal 1 crash.

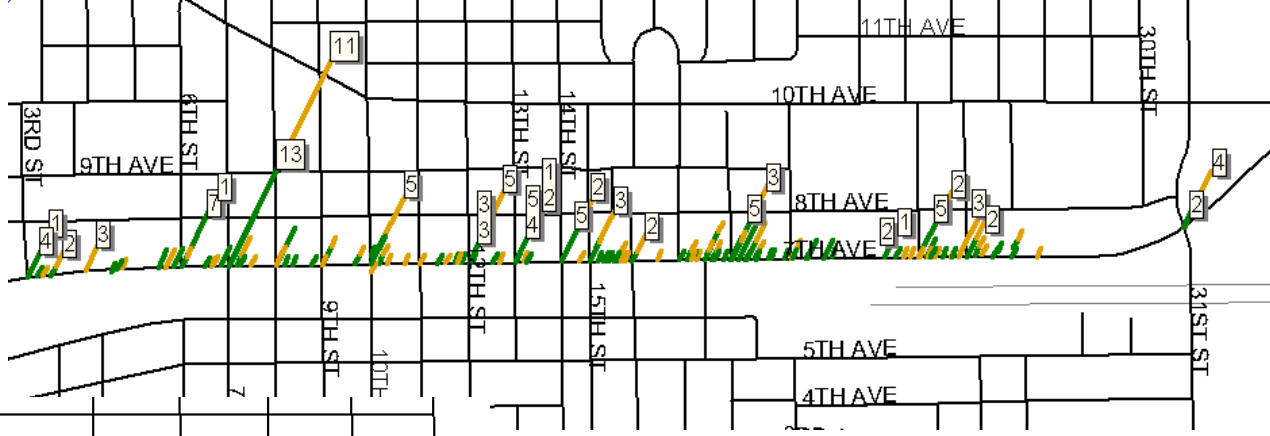
"Stacking" of selected crash points displays number of crashes:



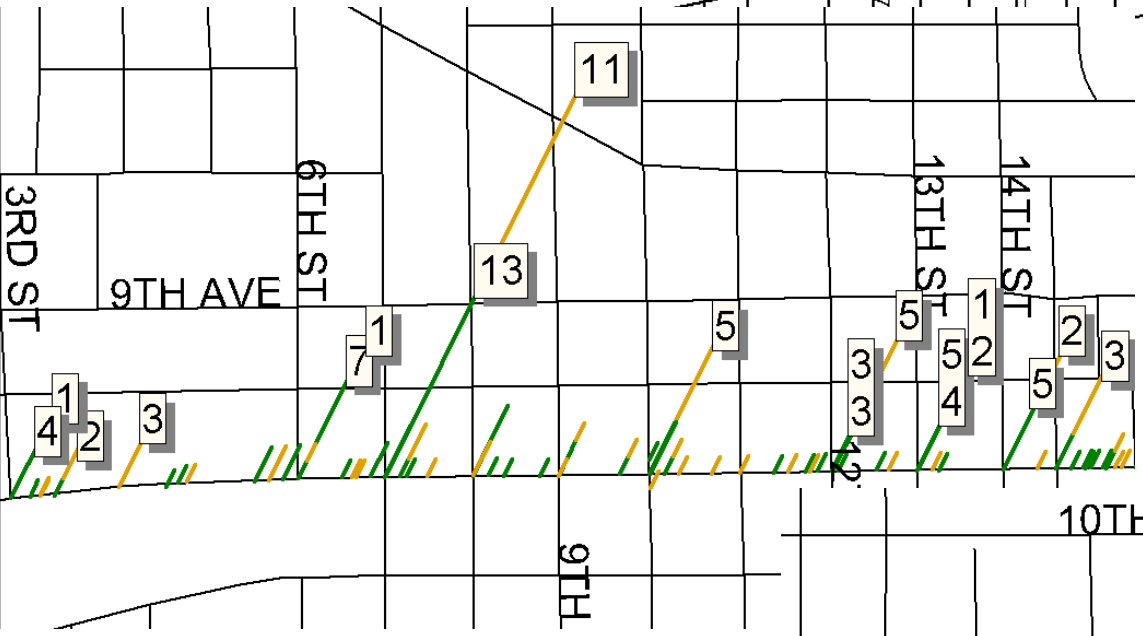
Note: Look for height of stacks and density/spread of stacks to determine possible problem areas.

Maps

Thematic "stacking" of selected crash points displays number of crashes as well as certain attributes (e.g., Crash Severity):



Zoomed in on western extent:



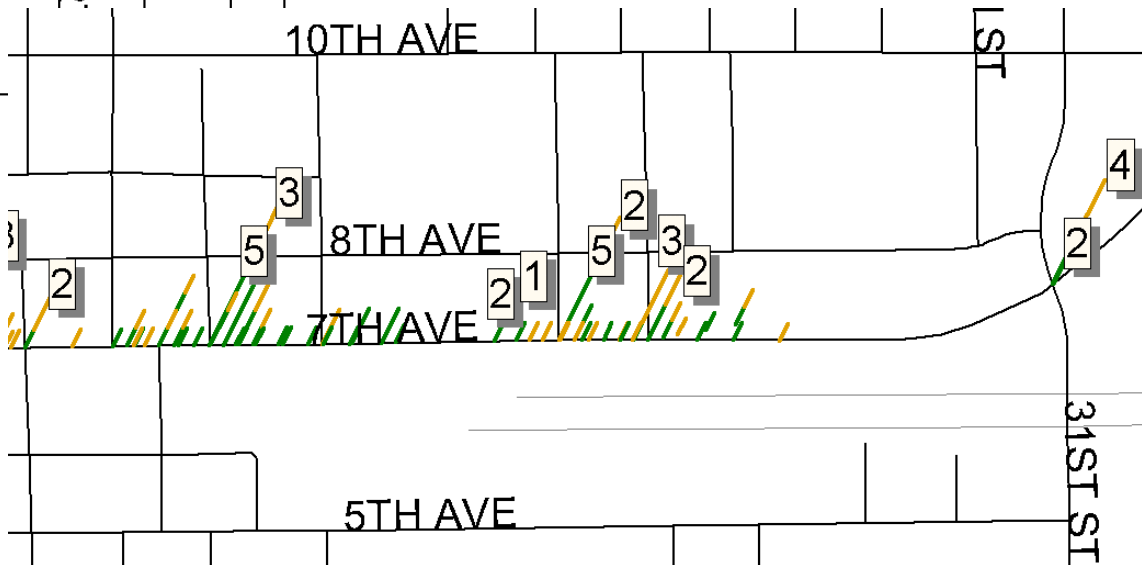
Notes:

In these maps, green = Property Damage Only crash and yellow-orange = Injury crash.

"Stacking" can be done on almost any attribute in the database.

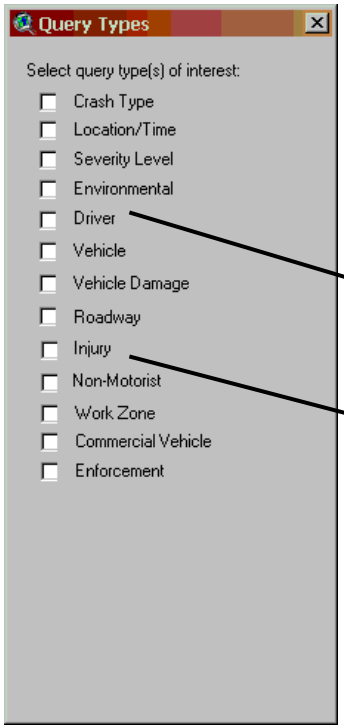
"Tagging" the stacks w/ counts (e.g., severity counts) can be done.

Zoomed in on eastern extent:

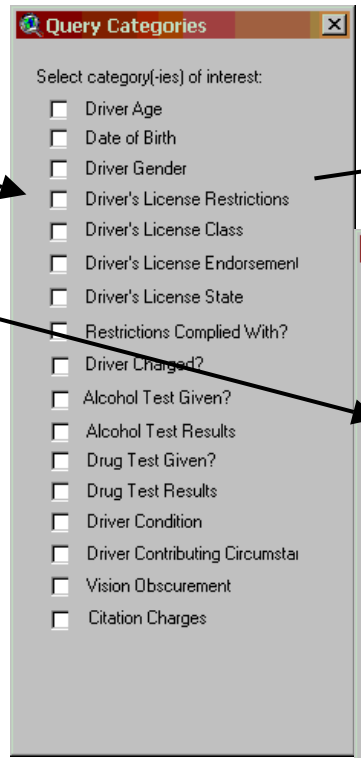


Queries

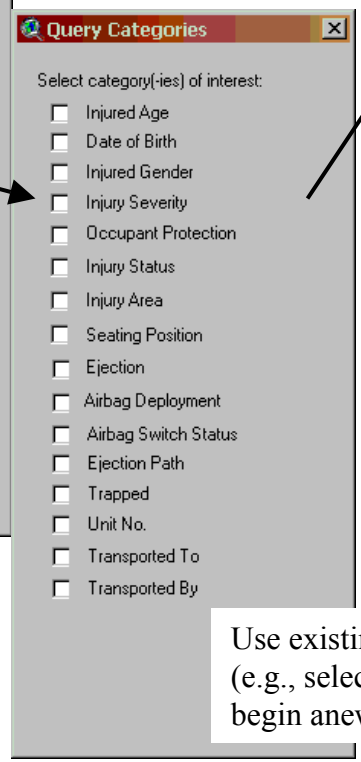
Query on any database attribute (categorized by type):



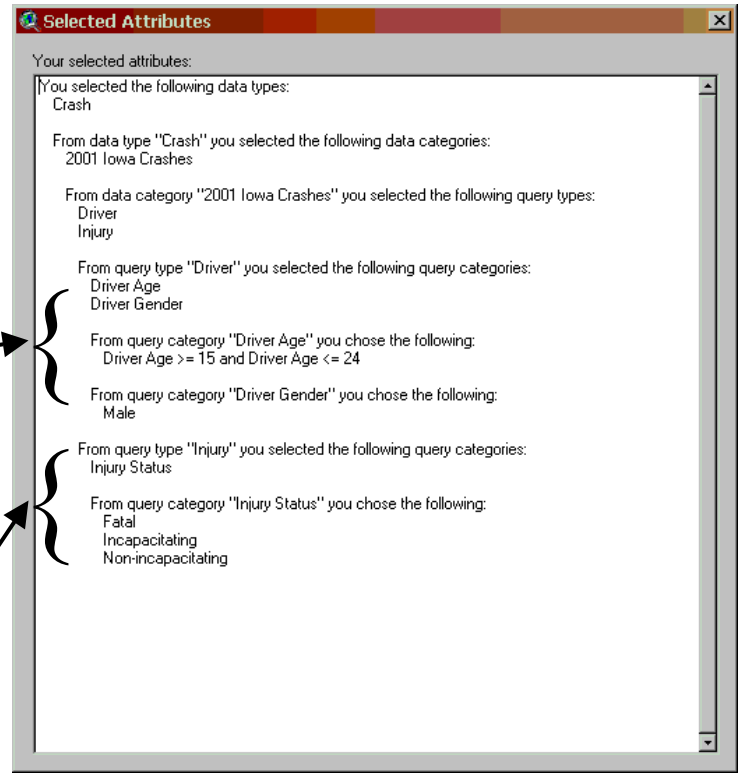
e.g., Driver-related data:



e.g., Injured Person data:

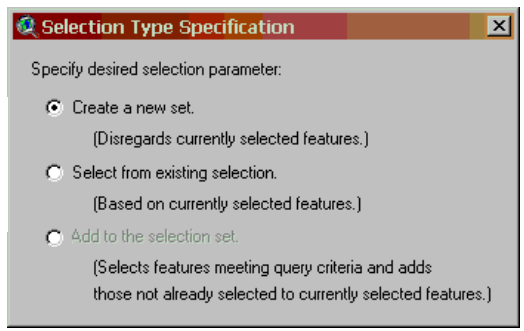


Report of Query choices:



i.e., All crashes that include 15-24 Males **AND** Injuries that were Fatal, Incapacitating, or Non-incapacitating.

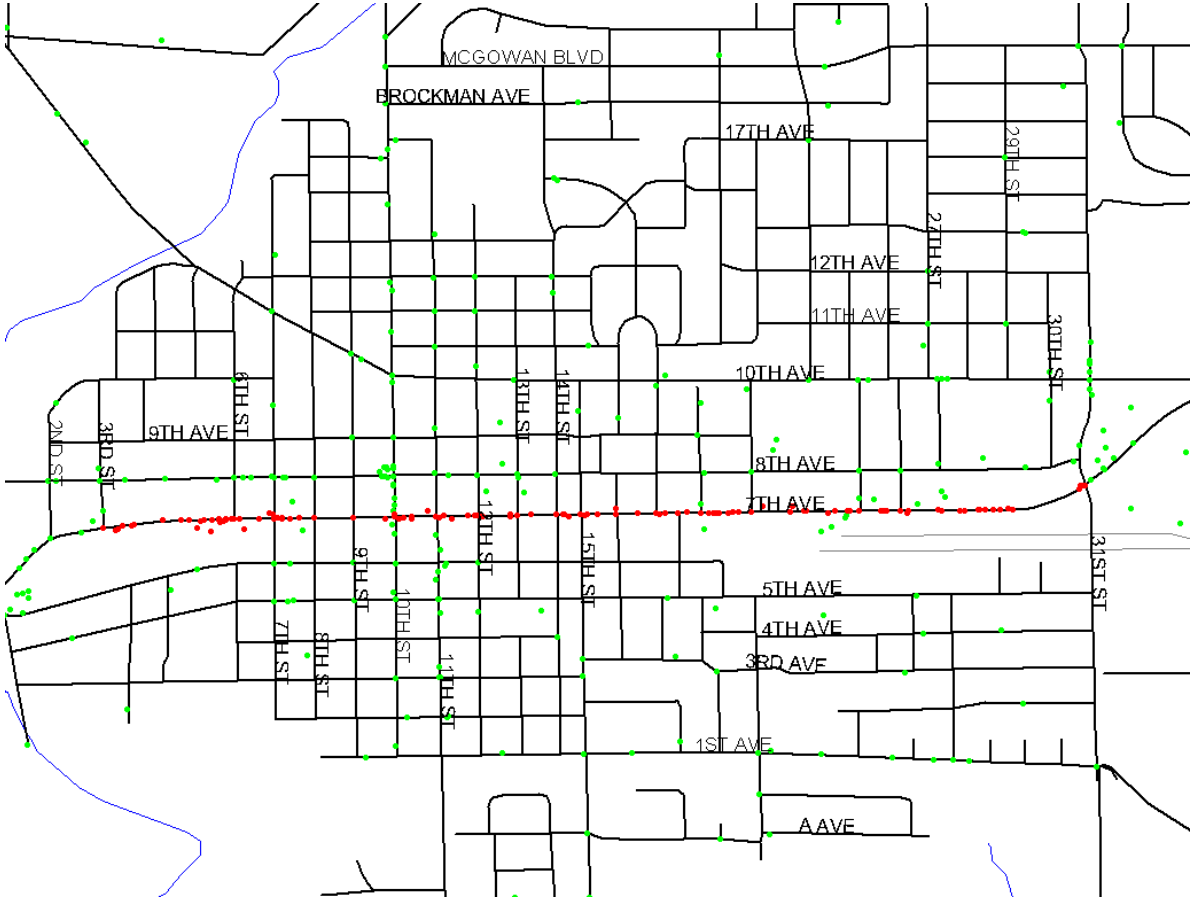
Use existing selection set (e.g., selected crashes) OR begin anew:



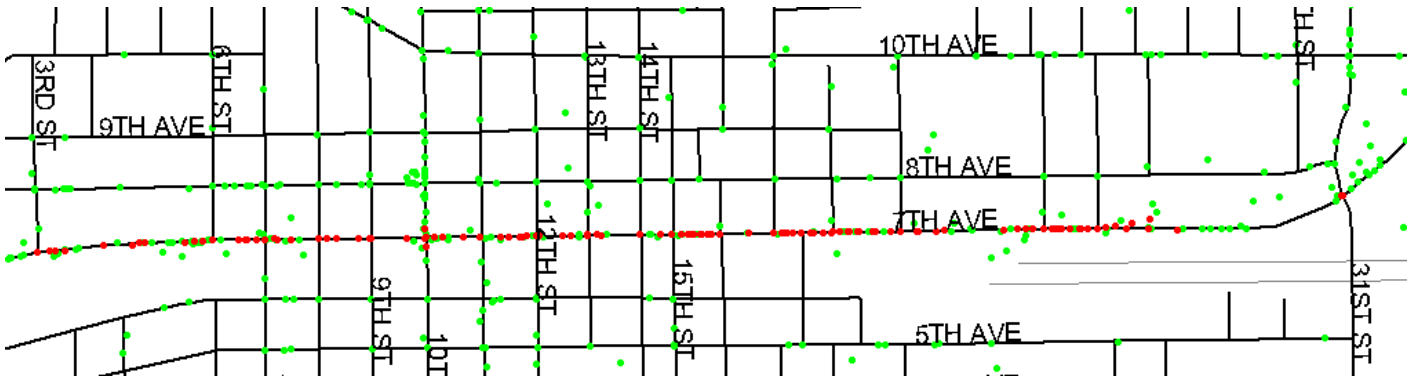
Queries

Selection set changes…

From:



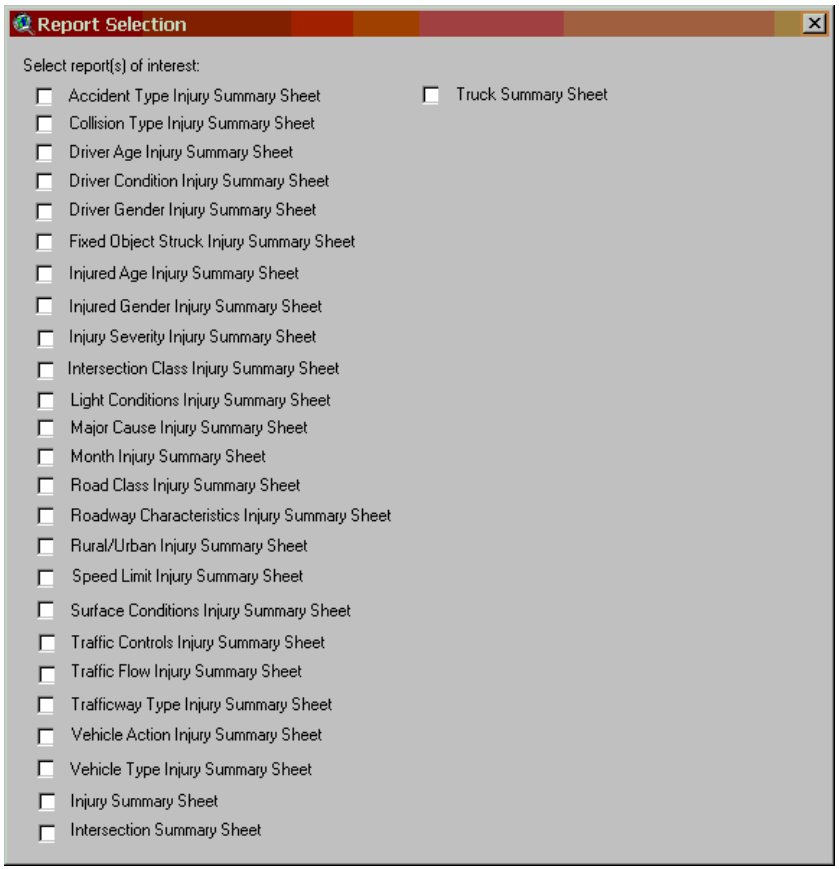
To:



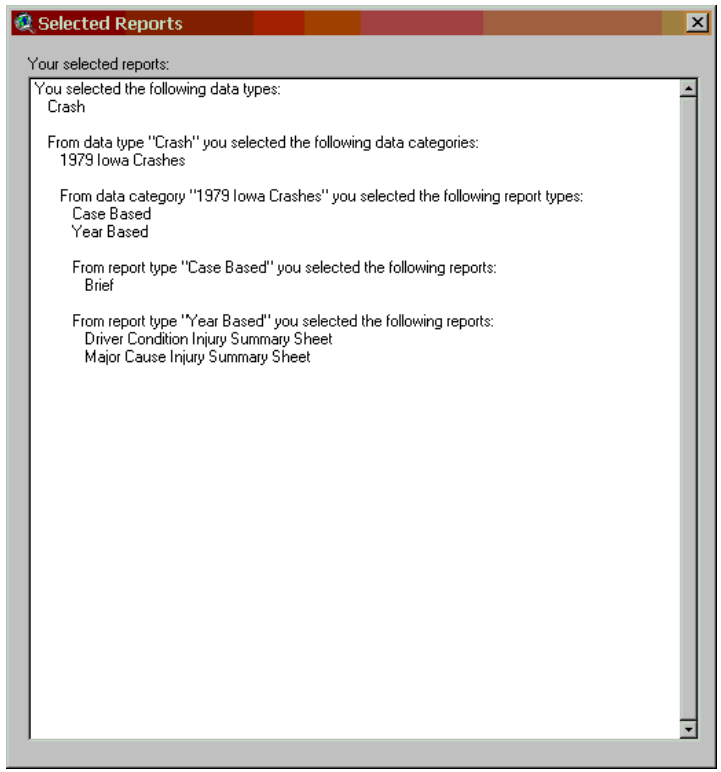
Note: There are green dots along the selected route after the query. There may even be red dots on top of green dots or vice versa. Another "stacking" would be advisable.

Reports

Select reports similarly…e.g.,



Selected reports:



Note: The selected reports are run on the active selection set (i.e., the red dots).

Reports

Case-based:

_Case Based: Brief

Crash_Key	CaseNumber	County	Acc_Type	Coll_Type	MajorCause	CSeverity	PropDmg	Day	Date	Time	TravelDir	Veh_Action	ISeverity
1998000528	8000602	Linn	Collision: Vehicle in Traffic		Inexperienced Driver	Property Damage Only	2000	Friday	10298	750	North	Changing Lanes	
											North	Going Straight	
1998000728	8000839	Linn	Collision: Vehicle in Traffic		Inattentive/Distracted	Property Damage Only	2000	Saturday	10398	900	East	Stopped in Traffic Lane	
											East	Going Straight	
1998001684	8001986	Linn	Collision: Vehicle in Traffic	Broadside/Right Angle	Ran Traffic Signal	Injury	6000						
1998001708	8002015	Linn	Collision: Vehicle in Traffic		Following Too Close	Property Damage Only	1250						
1998001876	8002221	Linn	Collision: Vehicle in Traffic		Unknown	Property Damage Only	2992						
1998003050	8003687	Linn	Collision: Vehicle in Traffic	Broadside/Left Entering	Ran Traffic Signal	Injury	5000						
1998004686	8005690	Linn	Collision: Fixed Object	Single	Speed Too Fast for Conditions	Property Damage Only	7000						
1998004744	8005761	Linn	Collision: Vehicle in Traffic	Broadside/Right Angle	FTYROW from Driveway	Property Damage Only	1500						
1998004870	8005912	Linn	Collision: Vehicle in Traffic	Rear End	Inattentive/Distracted	Property Damage Only	3000						
1998006087	8007453	Linn	Collision: Vehicle in Traffic	Rear End	Following Too Close	Property Damage Only	1900						
1998006120	8007500	Linn	Collision: Vehicle in Traffic	Head-on/Left Entering	Ran Traffic Signal	Injury	4000						
1998007217	8008895	Linn	Collision: Vehicle in Traffic	Rear End/Left Turn	Inattentive/Distracted	Injury	2500						

Year-based Major Cause:

_Year Based: Major Cause Injury Summary Sheet (Textual)

Year	MajorCause	TotalCrash	FatalCrash	InjCrash	PDOCrash	TotalInj	Fatalities	MajorInj	MinorInj	PossInj	UnkInj
1998	Ran Traffic Signal	6		5	1	10			3	7	
	Left of Center - Not Passing	2			2						
	FTYROW from Yield Sign	1		1		1				1	
	FTYROW Making Left Turn	8		3	5	3		1		2	
	FTYROW from Driveway	4		1	3	3				3	
	Speed Too Fast for Conditions	11		5	6	9			2	7	
	Improper Lane Change	1			1						
	Following Too Close	6		1	5	1				1	
	No Signal/Improper Signal	1			1						
	Failure to Have Control	18		10	8	14			2	8	4
	Inattentive/Distracted	6		2	4	2				2	
	Vision Obscured	2		1	1	1				1	
	Inexperienced Driver	1			1						
	Other	7		2	5	2				2	
	Unknown	31		14	17	16			5	11	
1999	Ran Traffic Signal	8		3	5	5			2	3	
	Ran Stop Sign	1			1						
	Passing - Interfered with Other	3			3						
	Left of Center - Not Passing	1			1						
	FTYROW at Uncontrolled Inter	1			1						
	FTYROW from Stop Sign	5		1	4	1				1	
	FTYROW Making Left Turn	11		4	7	8			4	4	
	FTYROW from Driveway	4		2	2	3				3	
	FTYROW Other	1			1						
	Speed Too Fast for Conditions	2		2		4		1	1	2	
	Exceeding Speed Limit	2		2		6				6	
	Improper Lane Change	2			2						
	Following Too Close	6		3	3	3			1	2	
	Failure to Have Control	9		5	4	9			2	7	
	Inattentive/Distracted	2			2						
	Driver Confused	1			1						
	Inexperienced Driver	1			1						
	Other	1			1						
	Unknown	18		9	9	15		1	2	12	
2000	Ran Traffic Signal	3		1	2	1			1		
	Passing - Interfered with Other	1			1						
	Left of Center - Not Passing	1		1		4			3	1	
	FTYROW at Uncontrolled Inter	2		2		2			1	1	
	FTYROW from Stop Sign	4		1	3	1		1			
	FTYROW Making Left Turn	12		6	6	6			4	2	
	FTYROW from Driveway	3			3						
	FTYROW Other	2		2		3			1	2	
	Speed Too Fast for Conditions	3		1	2	2			1	1	
	Exceeding Speed Limit	1			1						
	Improper Turn	1			1						
	Improper Lane Change	4			4						
	Following Too Close	8		3	5	6				6	
	Improper Backing	1			1						
	Failure to Have Control	17		8	9	13			3	10	
	Inattentive/Distracted	2		1	1	1				1	
	Vision Obscured	2			2						
	Inexperienced Driver	1			1						
	Other	2		1	1	1				1	
	Unknown	22		7	15	14		2	5	7	

Year-based Driver Condition:

_Year Based: Driver Condition Injury Summary Sheet (Textual)

Year	Driv_Cond	TotalCrash	FatalCrash	InjCrash	PDOCrash	TotalInj	Fatalities	MajorInj	MinorInj	PossInj	UnkInj
1998	Apparently Normal	105		45	60	62		1	12	45	4
	Fatigued	2			2						
	Drinking (Not Impaired)	1		1		1				1	
	Unknown	7		2	5	2			1		1
1999	Apparently Normal	79		31	48	54		2	12	40	
	Physical Defect	1		1		2				2	
	Infirmities of Age	2			2						
	Drinking (Impaired)	1		1		1				1	
	Unknown	10		3	7	5			2	3	
2000	Apparently Normal	91		34	57	54		3	19	32	
	Fatigued	1		1		4				4	
	Apparently Asleep	1			1						
	Ill	1		1		2		2			
	Drinking (Impaired)	1			1						
	Other	1			1						
	Unknown	8		4	4	4			3	1	

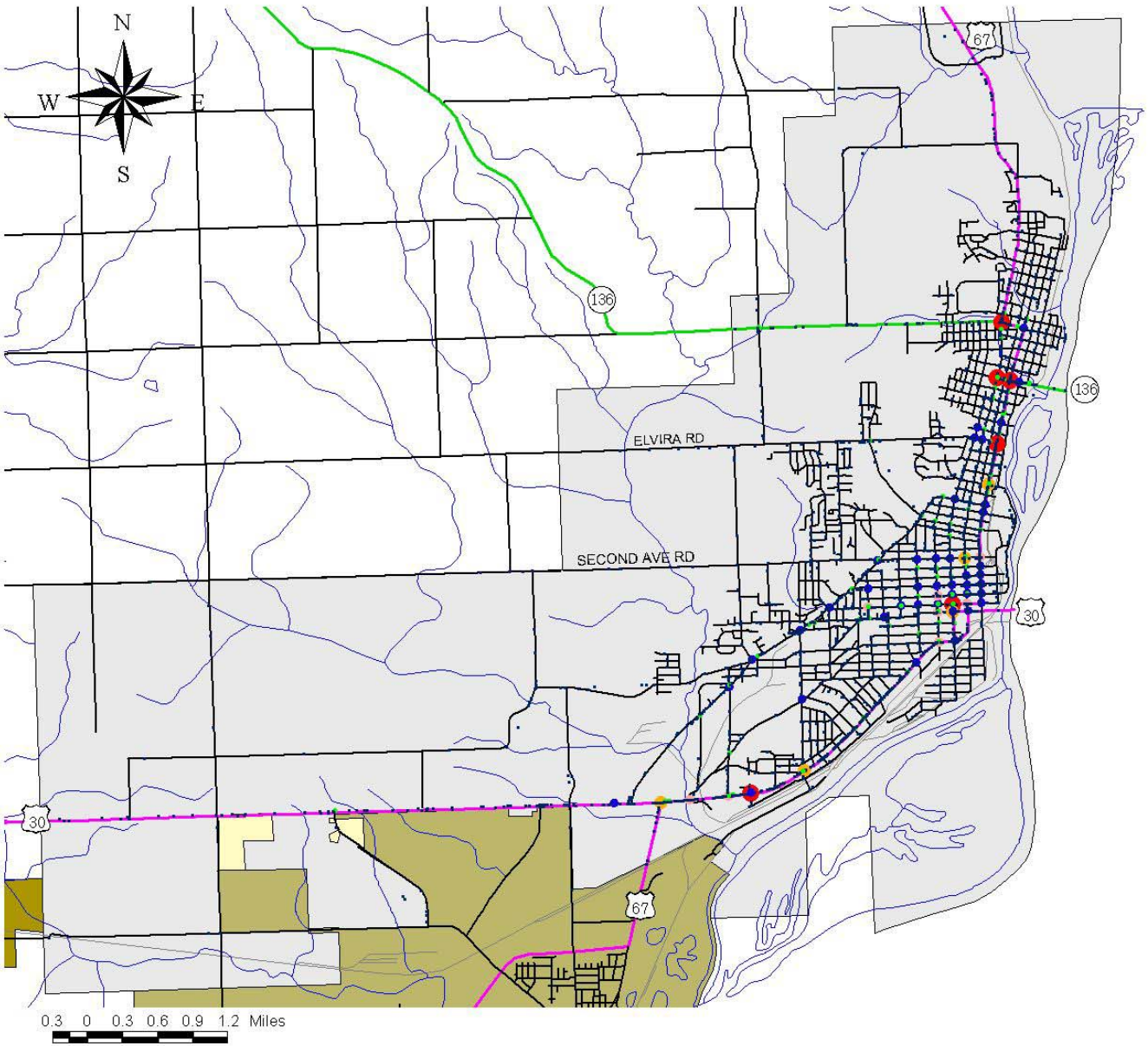
Note: The number of available reports will increase over time and as user suggestions are received.

SAVER

Note: This handout can be found online at http://www.dot.state.ia.us/crashanalysis/ → SAVER

- Requires ArcView 3.2 or 3.3
  - Program file is **free** but needs ArcView (i.e., SAVER runs within ArcView)
  - Plans for acquiring/disbursing copies of ArcView to agencies w/ **free** training
- SAVER is in **continual** development
  - Base features exist
  - Distribution in progress → targeted based on prioritized list
    - DOT internal (districts, TAS, others)
    - State Patrol
    - Cities: Des Moines, Urbandale, Marion, Ames, Iowa City, Quad Cities, others…
    - TEAP Consultants
  - Further refinement of:
    - Reports
    - Data types (i.e., beyond crashes → roads, rails, corporate limits, others (any))
  - Interface is a continual effort as user comments are received
  - Future version, Visual Basic (VB)-SAVER, will not require ArcView (~ $100/free?)
- SAVER works w/ TraCS local databases
  - TraCS → SAVER converter: Converts from Access to DBase
  - Includes non-crash data: CIRF, ECCO, VSIS, MOWI

Further Examples…



1996-2000 Crash History

City of Clinton, Iowa

High Crash Frequency Locations

Crash Frequency

- 0 - 5
- 6 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 71

Clinton Roads

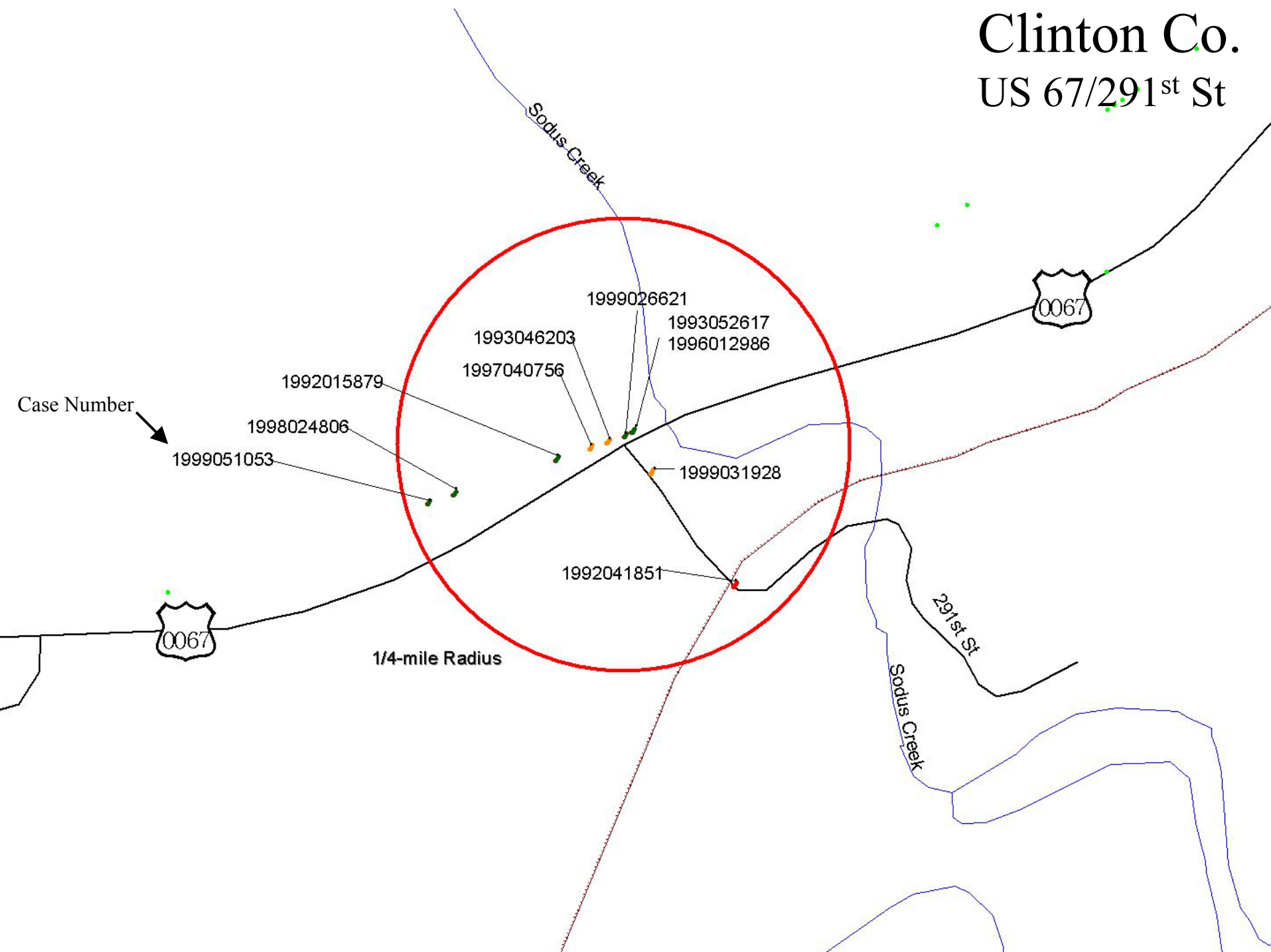
- US Highway
- Iowa Highway

Iowa Department of Transportation
Highway Division, Engineering Bureau,
Office of Traffic and Safety

April 29, 2003

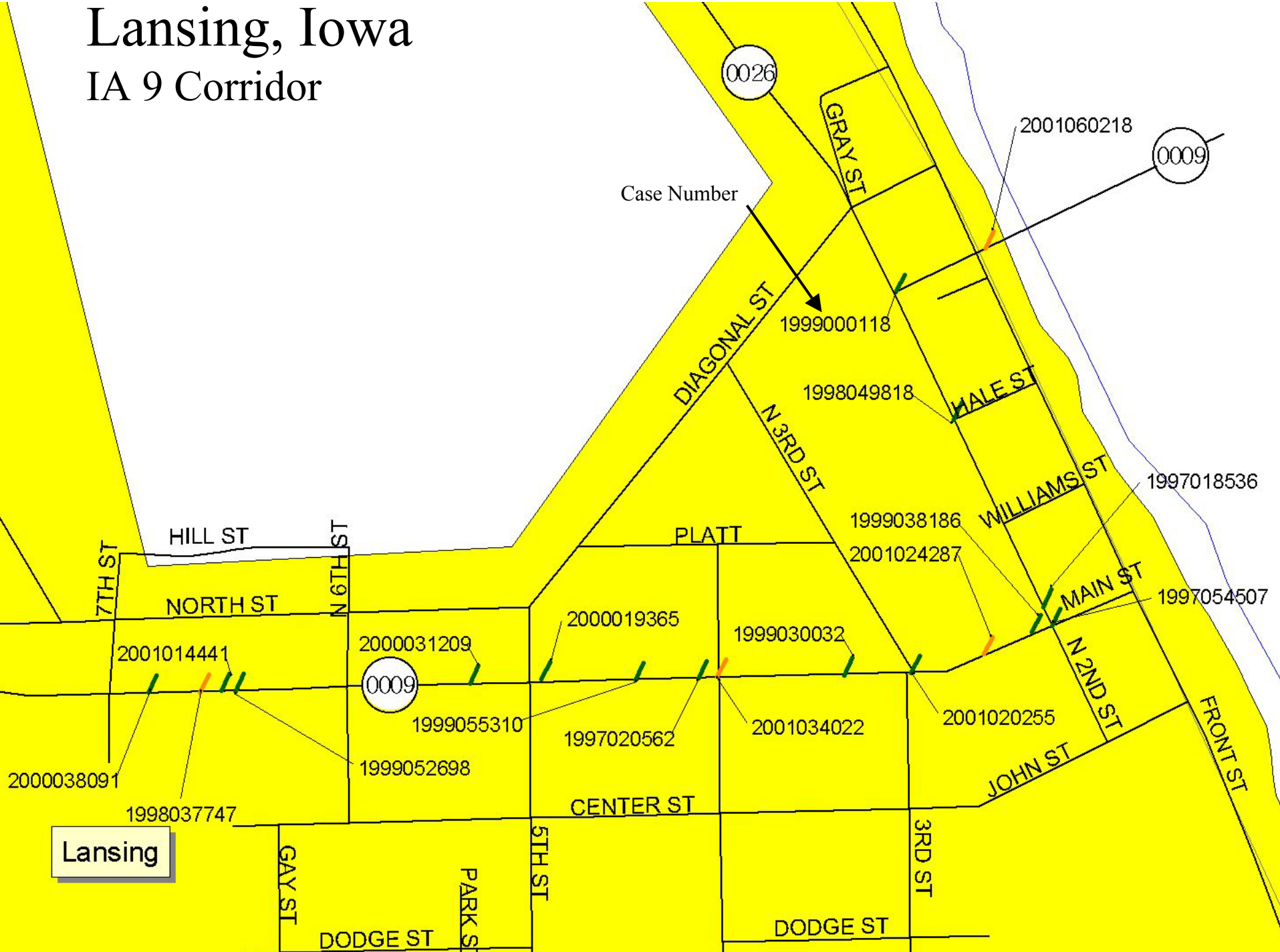
Clinton Co.

US 67/291st St

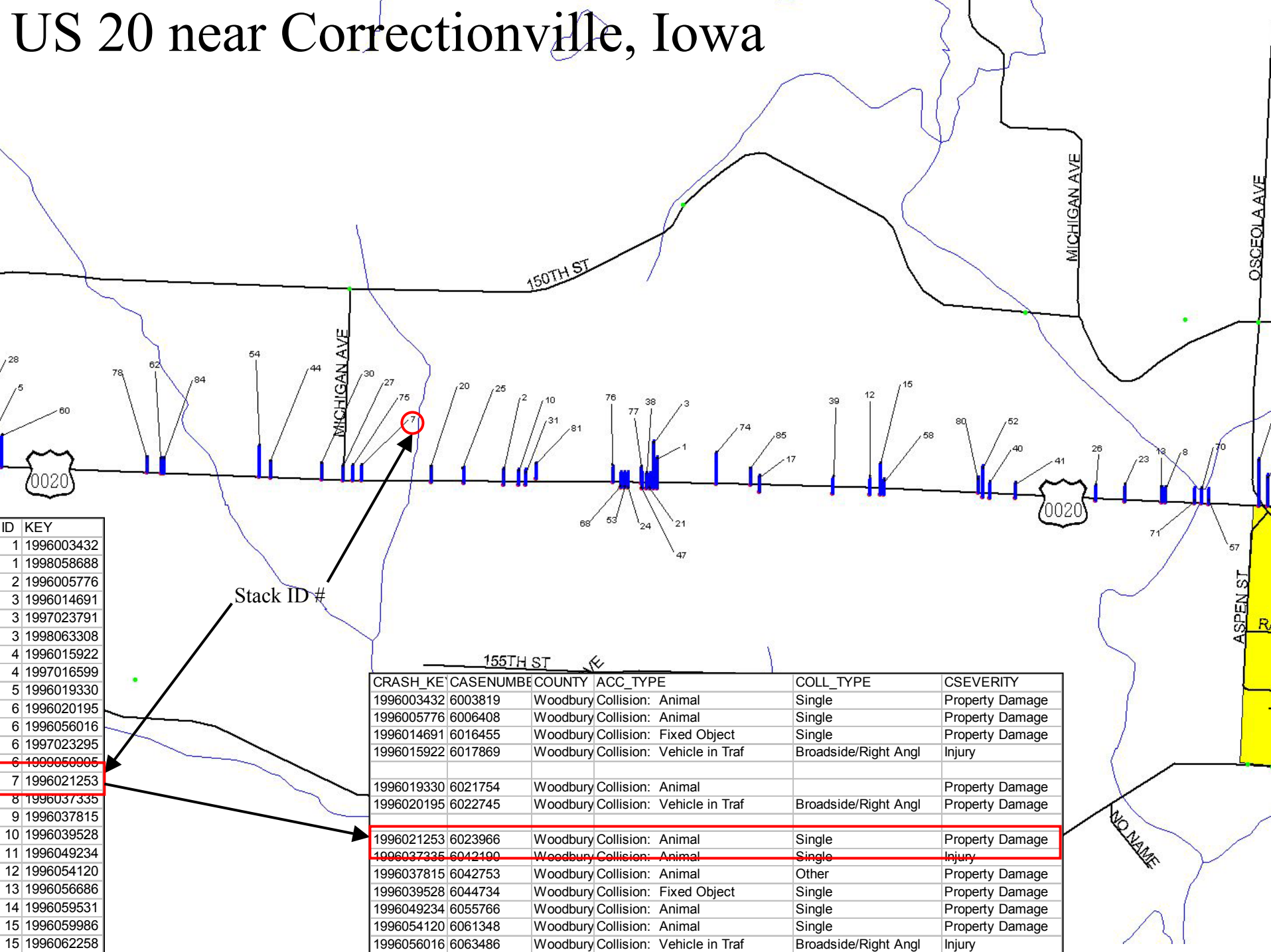


Lansing, Iowa

IA 9 Corridor



US 20 near Correctionville, Iowa

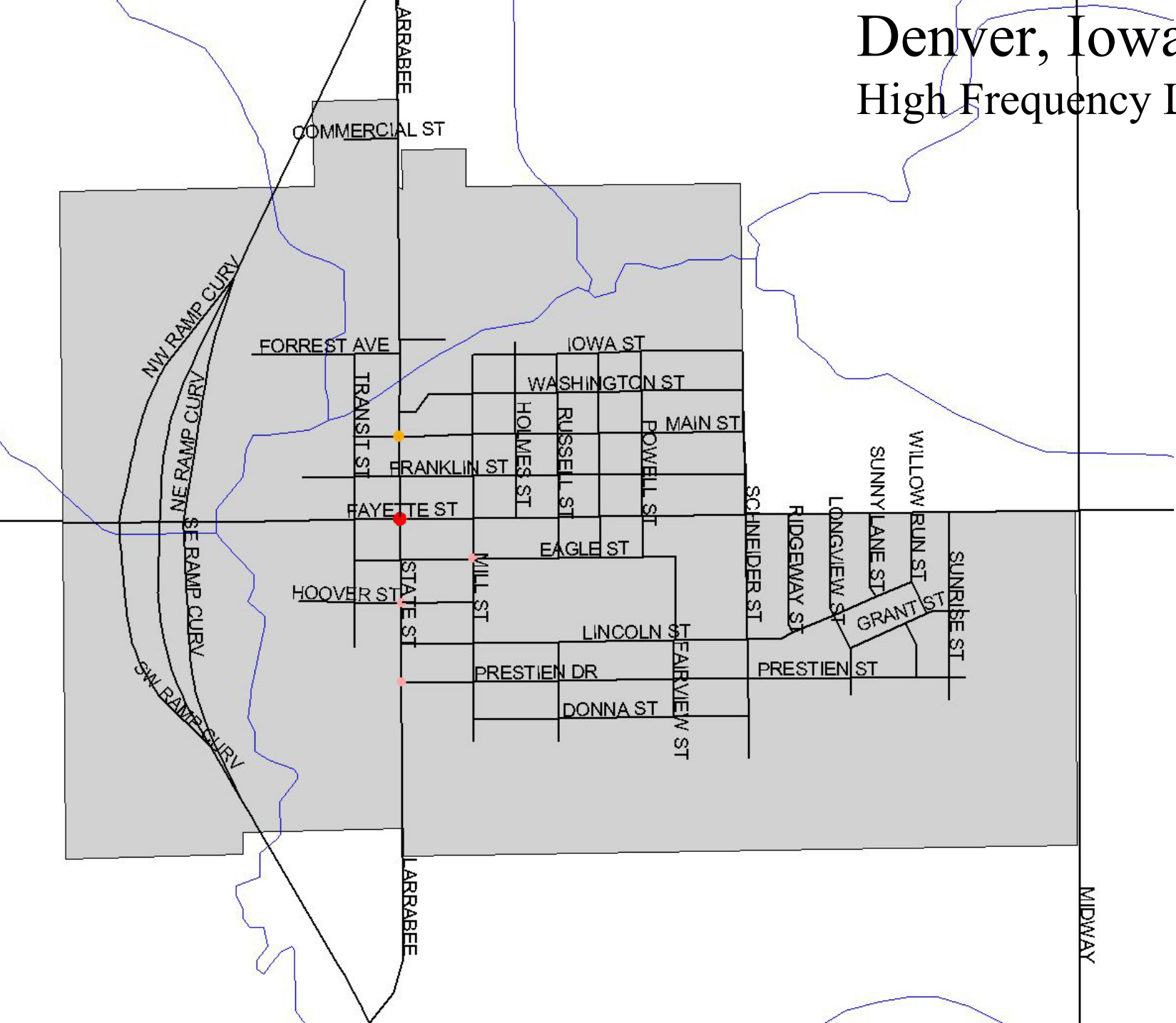


ID	KEY
1	1996003432
1	1998058688
2	1996005776
3	1996014691
3	1997023791
3	1998063308
4	1996015922
4	1997016599
5	1996019330
6	1996020195
6	1996056016
6	1997023295
6	1999050005
7	1996021253
8	1996037335
9	1996037815
10	1996039528
11	1996049234
12	1996054120
13	1996056686
14	1996059531
15	1996059986
15	1996062258

CRASH_KE	CASENUMBE	COUNTY	ACC_TYPE	COLL_TYPE	CSEVERITY
1996003432	6003819	Woodbury	Collision: Animal	Single	Property Damage
1996005776	6006408	Woodbury	Collision: Animal	Single	Property Damage
1996014691	6016455	Woodbury	Collision: Fixed Object	Single	Property Damage
1996015922	6017869	Woodbury	Collision: Vehicle in Traf	Broadside/Right Angl	Injury
1996019330	6021754	Woodbury	Collision: Animal		Property Damage
1996020195	6022745	Woodbury	Collision: Vehicle in Traf	Broadside/Right Angl	Property Damage
1996021253	6023966	Woodbury	Collision: Animal	Single	Property Damage
1996037335	6042190	Woodbury	Collision: Animal	Single	Injury
1996037815	6042753	Woodbury	Collision: Animal	Other	Property Damage
1996039528	6044734	Woodbury	Collision: Fixed Object	Single	Property Damage
1996049234	6055766	Woodbury	Collision: Animal	Single	Property Damage
1996054120	6061348	Woodbury	Collision: Animal	Single	Property Damage
1996056016	6063486	Woodbury	Collision: Vehicle in Traf	Broadside/Right Angl	Injury

Denver, Iowa

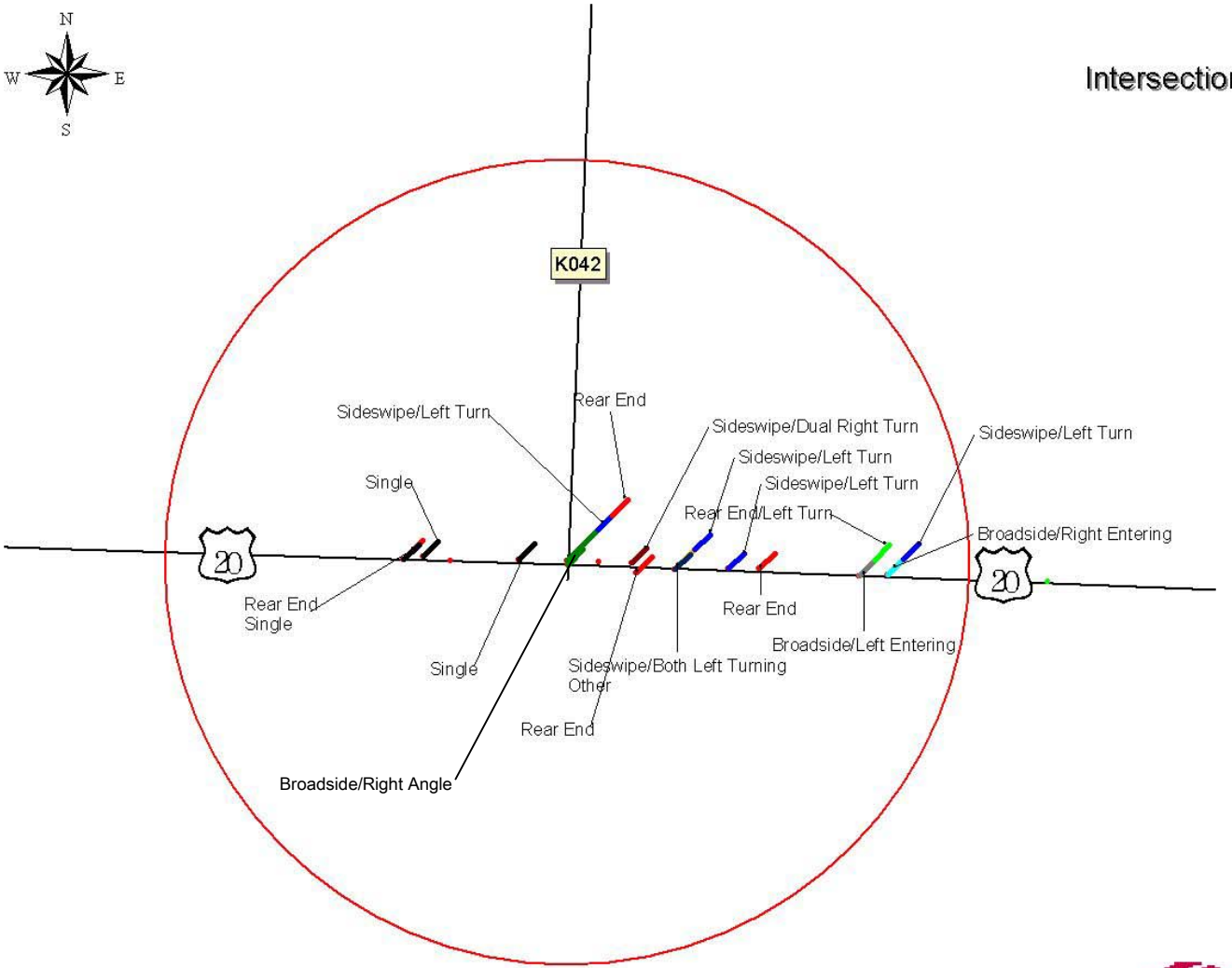
High Frequency Locations



1996-2000 Crash History

Intersection of US 20/Co. Rd. K42 (Dallas Ave)

Woodbury Co.



Collision Type

- Rear End
- Rear End/Left Turn
- Sideswipe/Left Turn
- Sideswipe/Dual Right Turn
- Broadside/Right Angle
- Broadside/Right Entering
- Broadside/Left Entering
- Sideswipe/Both Left Turning
- Other
- Single

0.05 0 0.05 0.1 0.15 0.2 Miles

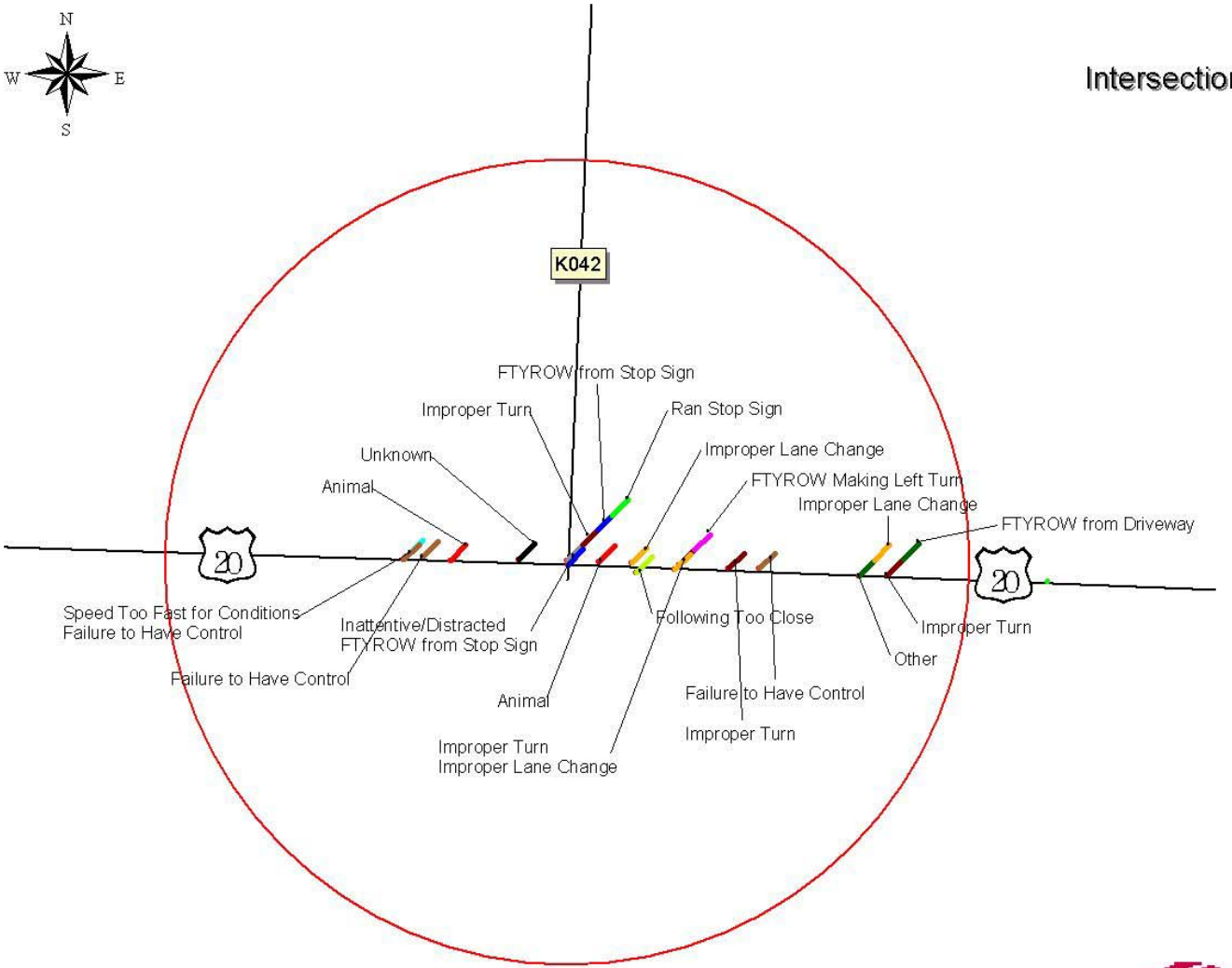
Iowa Department of Transportation
District 3 Traffic Tech

May 1, 2003

1996-2000 Crash History

Intersection of US 20/Co. Rd. K42 (Dallas Ave)

Woodbury Co.



Major Cause

- Animal
- Ran Stop Sign
- FTYROW from Stop Sign
- FTYROW Making Left Turn
- FTYROW from Driveway
- Speed Too Fast for Conditions
- Improper Turn
- Improper Lane Change
- Following Too Close
- Failure to Have Control
- Inattentive/Distracted
- Other
- Unknown

0.05 0 0.05 0.1 0.15 0.2 Miles

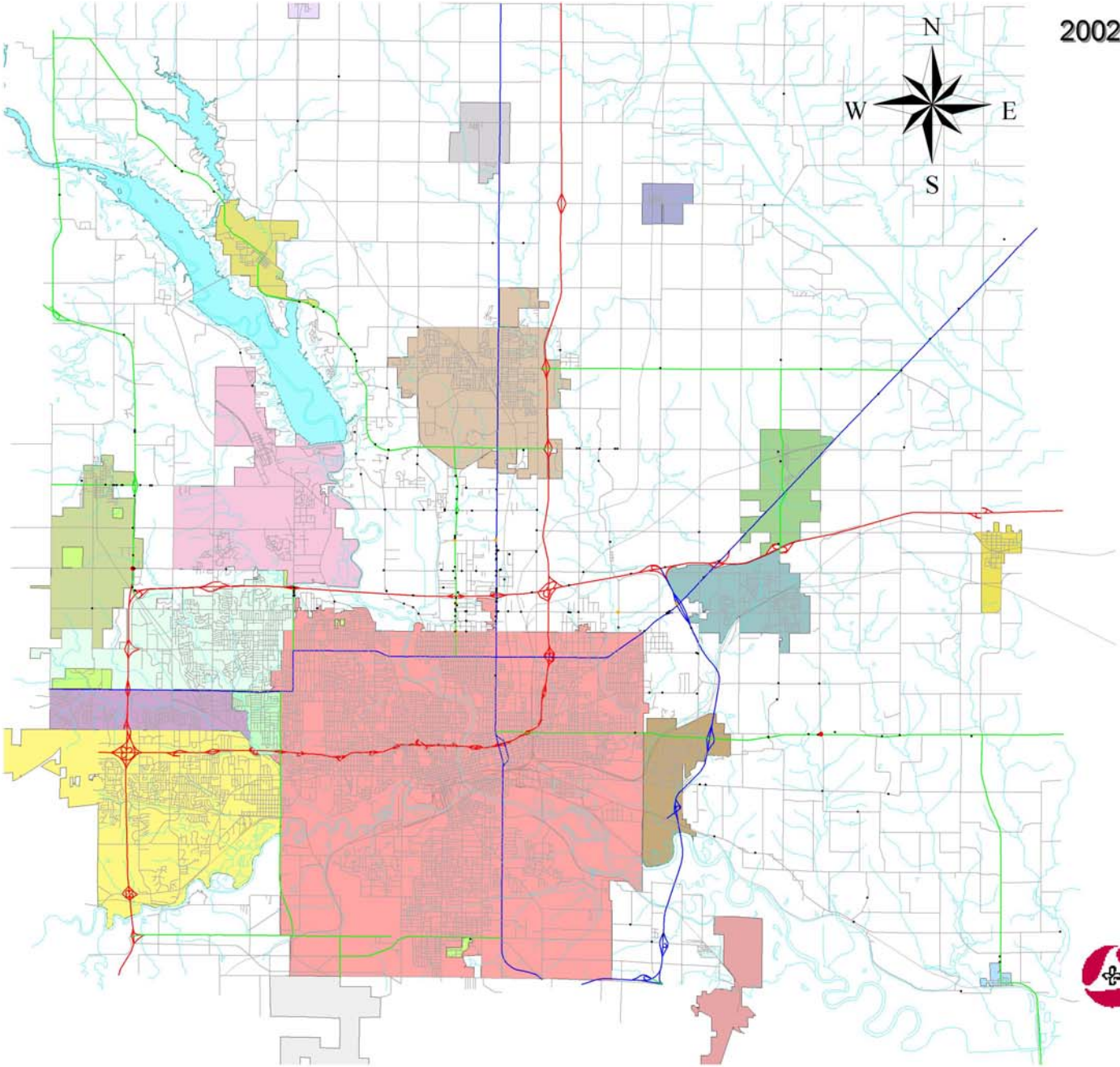
Iowa Department of Transportation
District 3 Traffic Tech

May 1, 2003

2002-2003 TraCS Collected Crashes

Polk County Sheriff's Dept.

Crash Frequencies



Crash Frequencies

- 1
- 2
- 3

Polk Roads

- Interstates
- US Highways
- Iowa Highways

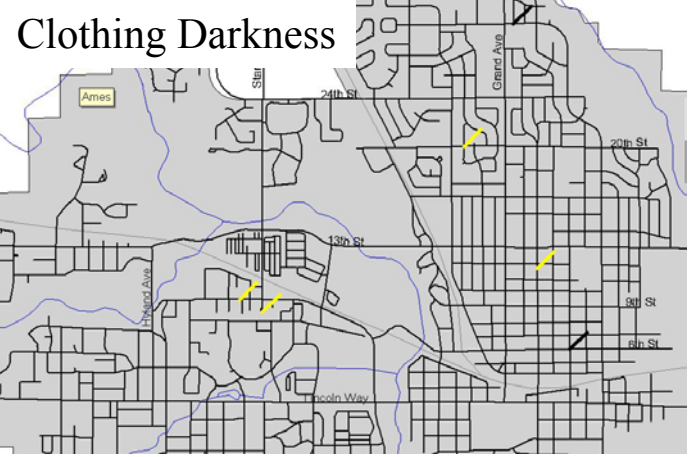
Iowa Department of Transportation
Highway Division, Engineering Bureau,
Office of Traffic and Safety

April 29, 2003

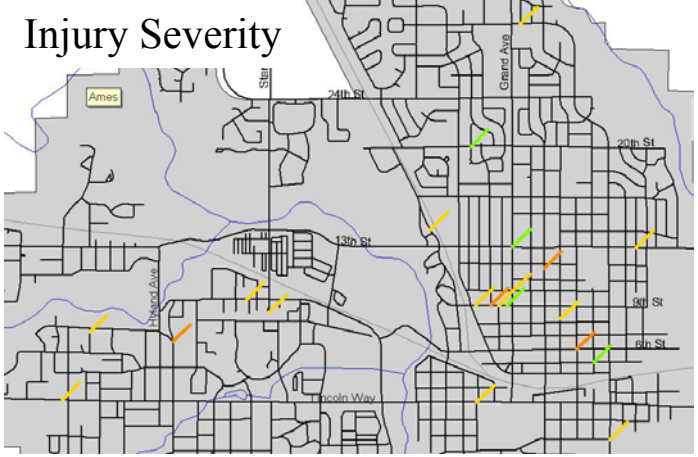
Ames, Iowa

Crashes involving pedestrians <= 12 – part of a 6th Grade project

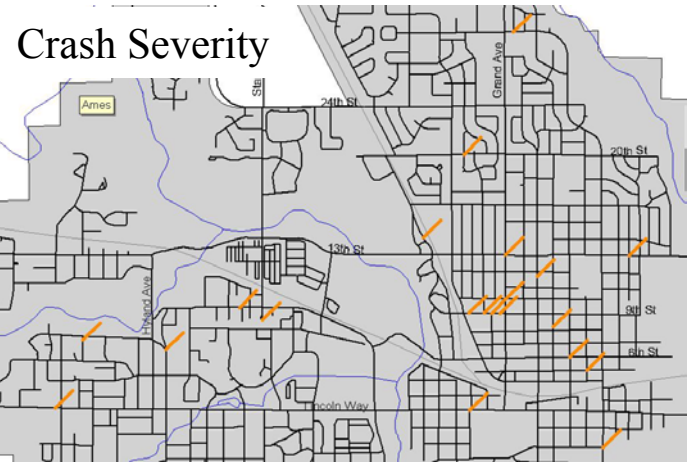
Clothing Darkness



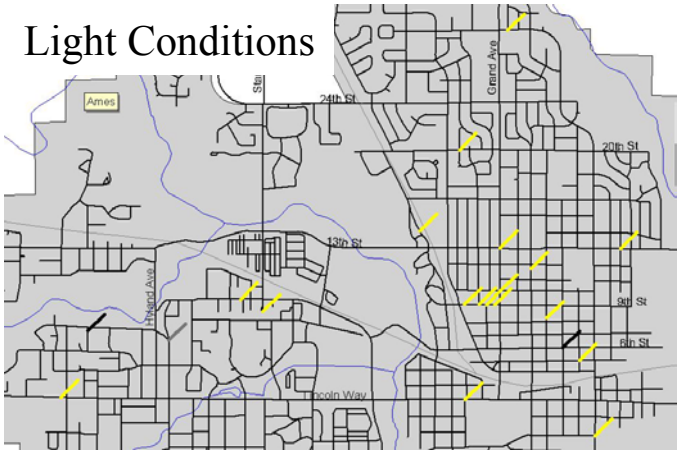
Injury Severity



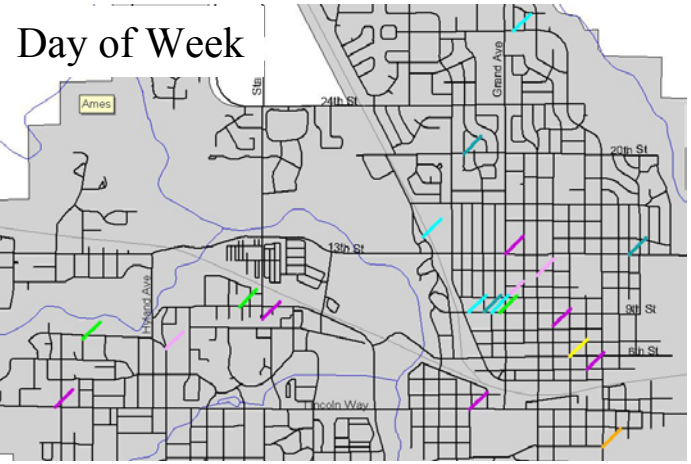
Crash Severity



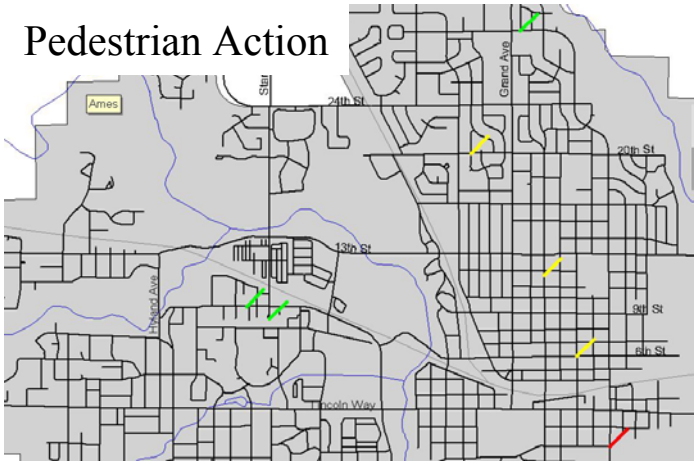
Light Conditions



Day of Week



Pedestrian Action



Stack Thematic Lines: Crash - 1979 Iowa Format - Clothing Darkness
- Generally Light
- Generally Dark

Stack Thematic Lines: Crash - 1979 Iowa Format - Pedestrian Action
- Crossing - Against Signal
- Crossing - Not at Crosswalk
- Ran Onto Roadway

Stack Thematic Lines: Crash - 1979 Iowa Format - Injury Severity
- Major (Incapacitating)
- Minor (Bruises/Abrasions)
- Possible (Complaint of Pain)

Stack Thematic Lines: Crash - 1979 Iowa Format - Light Conditions
- Day
- Dusk
- Dark - Lighted Roadway

Stack Thematic Lines: Crash - 1979 Iowa Format - Severity
- Injury

Stack Thematic Lines: Crash - 1979 Iowa Format - Day of Week
- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday

Stack Total Lines: Crash - 1979 Iowa Format