UPDATE for PILOT PROJECT for an ASSESSMENT of

ROAD DERIVED SEDIMENT for

ROAD 450 of JDSF

Agenda

- Overview
- Data collection
- Ranking
- GIS
- Examples of capabilities
- Next Steps

A data system for road management

Data management system that covers every phase from collection, storage, retrieval, updating, and publishing

- Supports analyses, budgeting, short and long term monitoring
- Integrates with other data streams and routines
- Facilitates document development
- Builds a reference library of studies, standard drawings, photos
- Provides observations and recommendations across a range of scales
- Provides a framework for an overall road management plan

KEY FEATURES

- 1 Road segment data
- 2 Watercourse crossing data
- 3 Perched fill
- 4 Information regarding the condition of landings.
- 5 Data that can be used to estimate sediment savings associated with mitigations.
- a. Queries that draw from all four data tables

Data Resources

- Field data –measurements, observations including almost 15 miles along Rd 450

Other data collected and compiled into the data system

- Aerial and field photos
- Specific reports
- Regional Geology and Landslides
- Regional landslide hazards
- Soils
- Topography LIDAR data, DEM-derivatives
- Stream network
- Special investigations

ROUTE NAME

ORIGIN DATE

distance miles	distance feet	feature (begin)	feature (end)	offset (+/-)	xing-id	seg-id

General data log

Drainage Xing	culvert, wc
	culvert, xdn
	seep, spring, stream
	diversion, blocked
	humbodt
	bridge
	ford, dip
Erosion	sed deposits
	gully, rill
	ditch incision
	toe eroded by stream
Mass wasting	perched fill
	crack
	scarp
	cut slump
	fill slump
	slide area
Control Pt	rd intsct
	gps
	photopoint
	gate
Road Segment Detail	isd, osd
	insloped outsloped
	berm
	switchback
	climb
	thru-fill
	thru-cut
Activities	realigned
	abandon, decommiss
	reconstructed
	maintained

Infrastructure assets	landing
	skid trail
	dam
	reservior
	pipeline
	powerline
	quarry
Rd surface	bare surfac
	rocked
	paved
	vegetated
	insloped, o

Roads Survey Data for JDSF

lmo 9-13-06

GENERAL CONDITION

project:	rd_name:		rd_num:
seg_id:	srvy_date:	srvy_by:	*(three letter initial)*
GPS info:			
rank : **low** **med**ium **high** **immed**iate		*bold letters indicate data input entry*	
rd_origin:	begin:	end:	tool: **od**o**m**eter **str**ing
surface:	**b**edrock **d**irt **f**ill **g**ravel **m**ixed **p**aved		
surf_con:	**g**ully **i**ntact **r**ill **s**oft **h**ard		
passable:	**2wd** **4wd** **atv** **bicycle** **foot** **horse**		
rd_grade:	rd_width:	downgrade direction:	
i_o_slope:	in (**- %**):	out (**+ %**):	**0%** **c**rowned **v**ariable
rd_cov_den:	**low** **med**ium **high**		
rd_cov_typ:	**a**rmored **b**areground **d**uff **g**rass **s**hrubs **t**rees		
drain adequate:	**y**es **n**o		
rd_design:	**c**ut/**f**ill **f**ull/**c**ut **f**ull/**f**ill **s**urface_**r**oad **t**hru/**c**ut		
position:	**lower 1/3** **mid 1/3** **riparian** ridge_top **upper 1/3**		
ns_above:	%	ns_below: %	
geomorph:	**c**olluvial_**f**illed_**ho**llow **d**isrupted_**g**round **d**ebris_**s**lide_**s**lope **f**lood_**p**lain **i**nner_**g**orge **l**and**s**lide **t**errace		

SPECIFIC CONDITIONS

	CUT	FILL	COMMENTS
slope length:			
grade:			
cover type:	**a**rmored **b**are **d**uff **g**rass **s**hrubs **t**rees	**a**rmored **b**are **d**uff **g**rass **s**hrubs **t**rees	
cover density:	**low** **med**ium **high**	**low** **med**ium **high**	
erosion:	**low** **med**ium **high** **fail**	**low** **med**ium **high** **fail**	
delivery potential:	**low** **med**ium **high**	**low** **med**ium **high**	

	IS ditch	OS ditch	COMMENTS
width:			
depth/height:			
continuous:	**y** **n**	**y** **n**	
dist_drain:			
ditch_arm:	**y** **n**	**y** **n**	
ditch_cov (veg):	**y** **n**	**y** **n**	
functional:	**g**ood **f**air **p**oor	**g**ood **f**air **p**oor	
eroding:	**y** **n**	**y** **n**	
hydrologically connected:	**y** **n**	**y** **n**	
breached:	not applicable		

Road segment summary form

Watercourse crossing description form

p. 1-2

WATERCOURSE CROSSINGS SURVEY FOR JDSF lmo 9-8-06

CROSSING ID & LOCATION

xing_id *bold letters indicate data input entry*

type: **bridge** **culvert** **dip** **ford** **hum**boldt **isd**-divert **un**drained-**fill** **xd**rain

road name: road_num:

seg_id

survey date:

survey by *(three letter intial):*

measurement origin:

xing_loc:

road width:

road grade:

remediation rank: **low** **med**ium **high** **imme**diate

stream class: **1** **2** **3** **4**

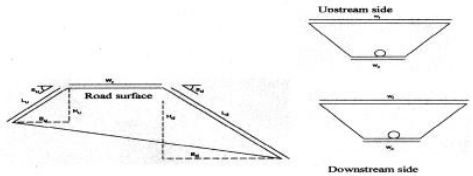
Gps info:

GENERAL CONDITIONS

CROSSING PROBLEMS			COMMENTS
excess runoff	**y**	**n**	
accel erosion	**y**	**n**	
excess sed delivery	**y**	**n**	
excess channel debris upstream	**y**	**n**	
xing fill undermined	**y**	**n**	
unsafe	**y**	**n**	
piping	**y**	**n**	
hydro connect	**y**	**n**	
x-drain outlet chnl eroding	**y**	**n**	

CULVERT ADEQUACY				
adequate size	**y**	**n**		
channel size:culvert	less than	**equal**	greater than	
channel grade:culvert grade	less than	**equal**	greater than	
culvert set	**high**	**correct**	**low**	
diversion	**y**	**n**	**p**otential	length: / depth:
culvert easily plugged	**y**	**n**		

	Inlet		Outlet		
opening condition as %					
sed basin	**y**	**n**	**y**	**n**	
sed wedge	**y**	**n**	**y**	**n**	
scour	**y**	**n**	**y**	**n**	
headcut	**y**	**n**	**y**	**n**	



Identified and ranked the following

- Road segments
- Watercourse crossings
- Landings
- Smaller scale sediment sources

A rank of high, medium, or low was assigned to each road segment, landing, and watercourse crossing. The rank is a subjective judgment in regards to the reduction in sediment yield or hazard that repair or rehabilitation may provide.

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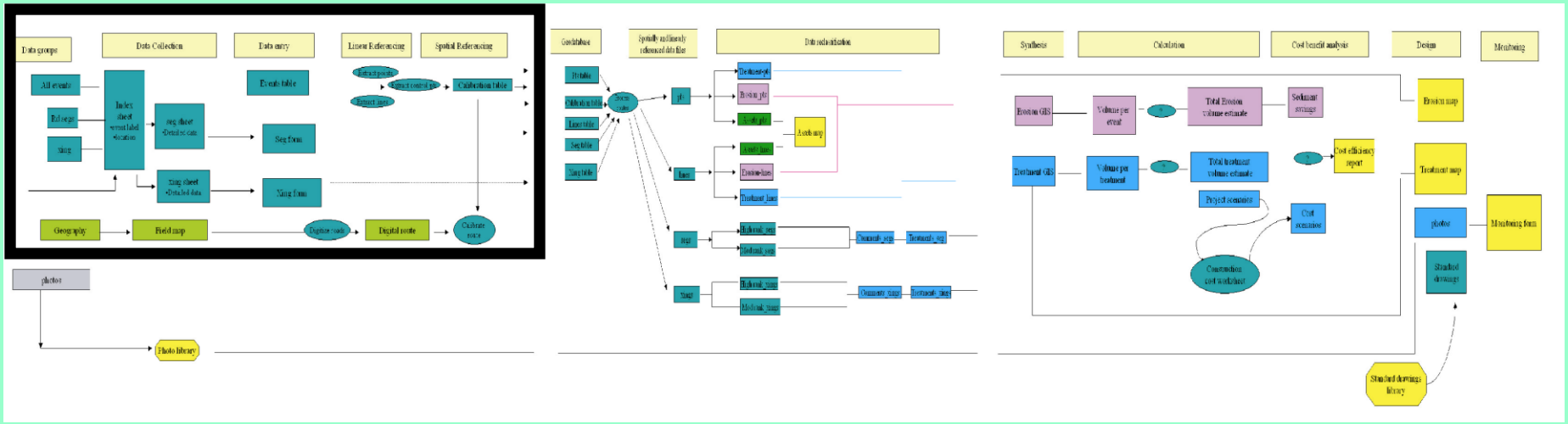
Identified other features

- utilities,
- housing,
- other facilities.

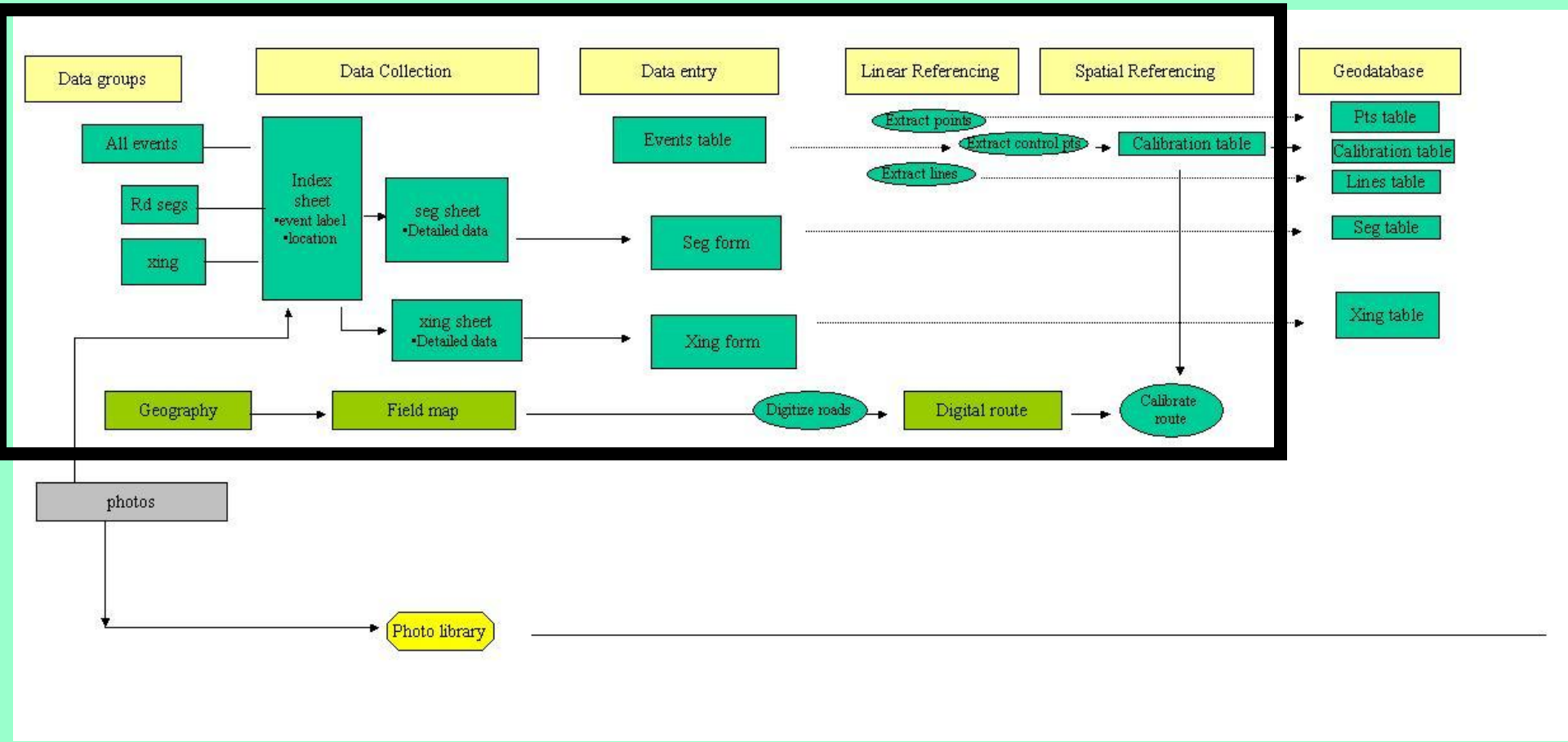
GIS Organization

- GIS and geodatabase serves as the hub for new and existing data, including
  - data that may be collected in the future,
  - spatial and statistical analyses,
  - various erosion models,
  - Document-ready graphs, tables, maps
  - Identifies both linear and spatial coordinates

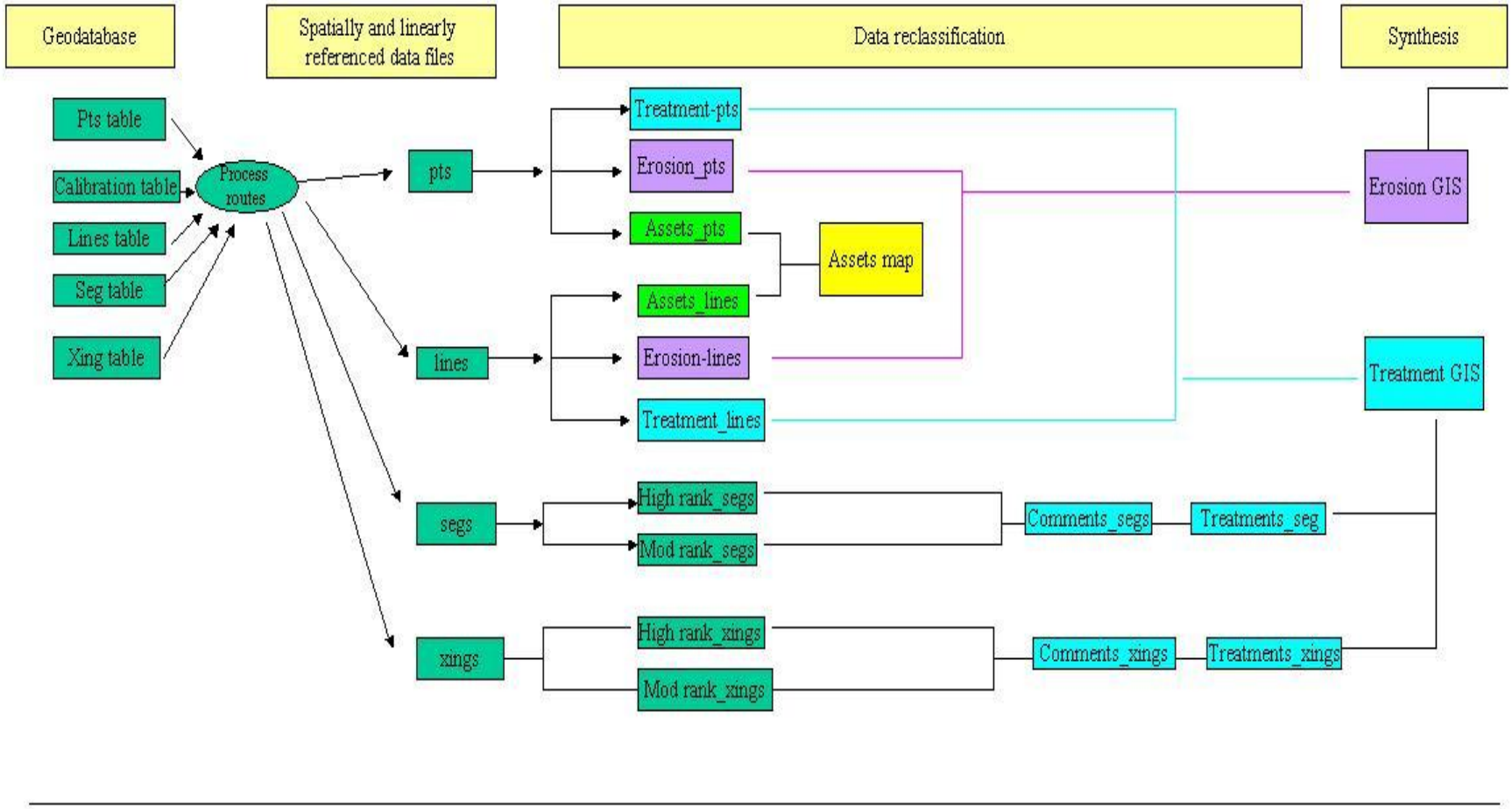
DATA ORGANIZATION – a logical scheme based on actual work flow that is flexible and can grow as new information is developed



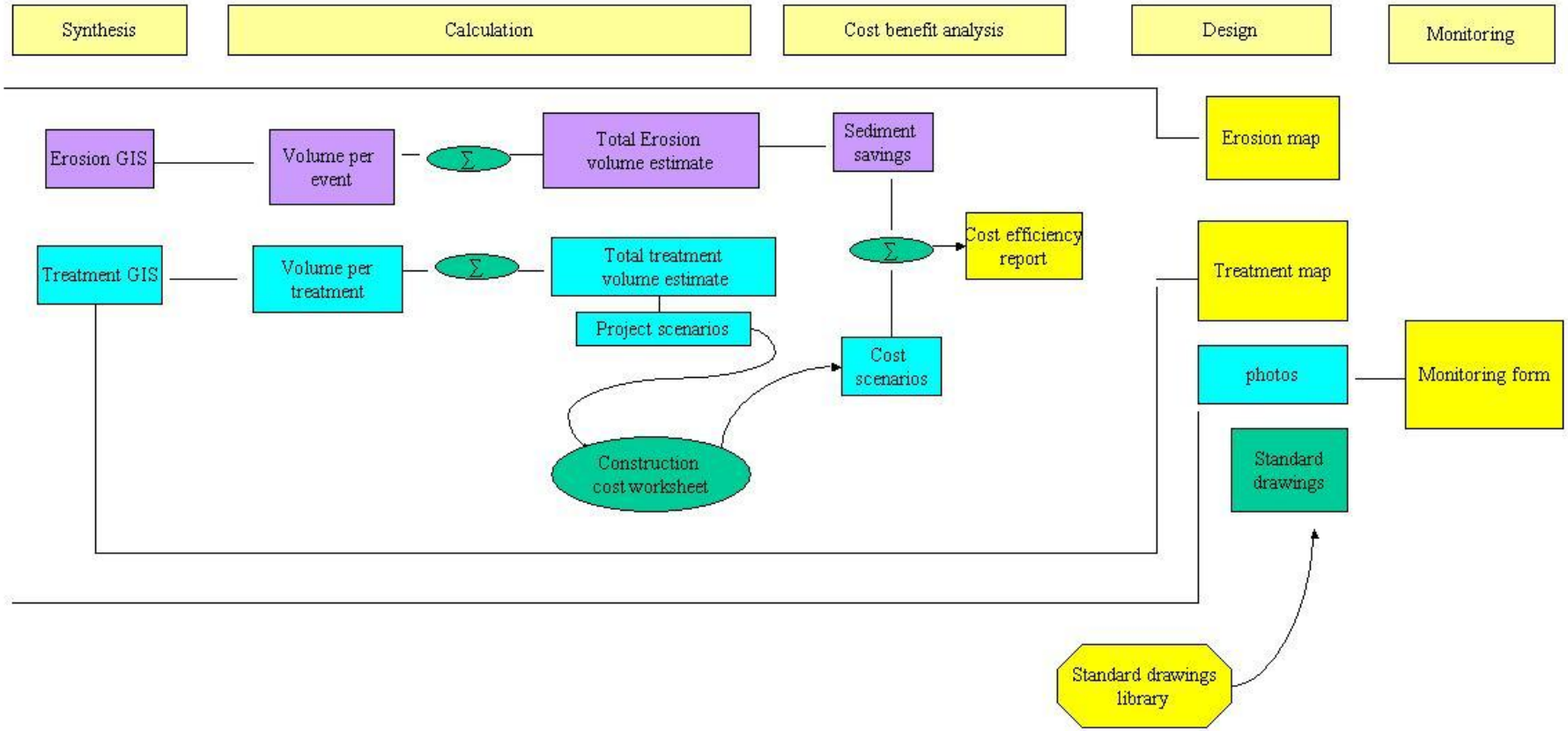
DATA COLLECTION, DATA ENTRY

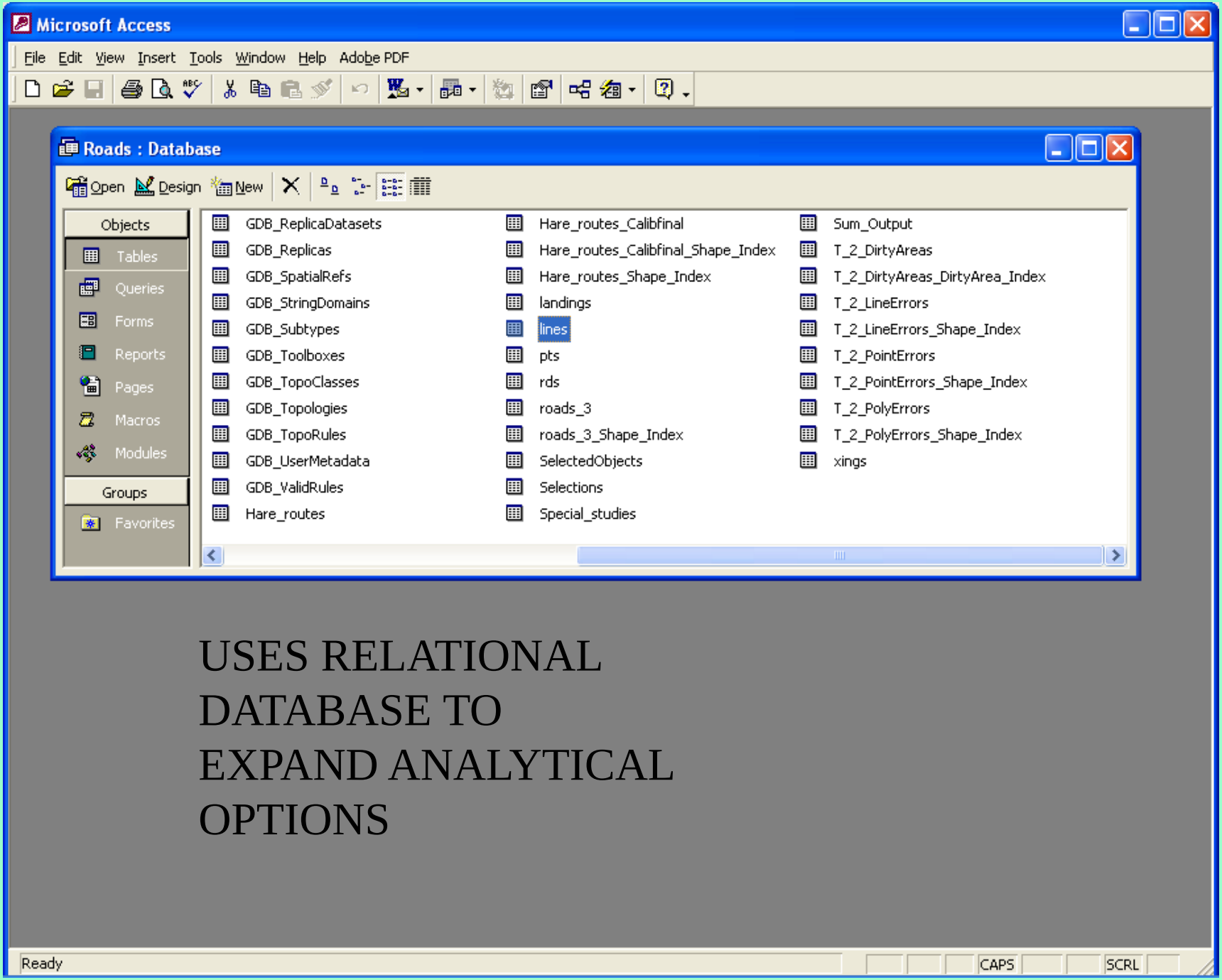


EXAMPLE PROCESSESS

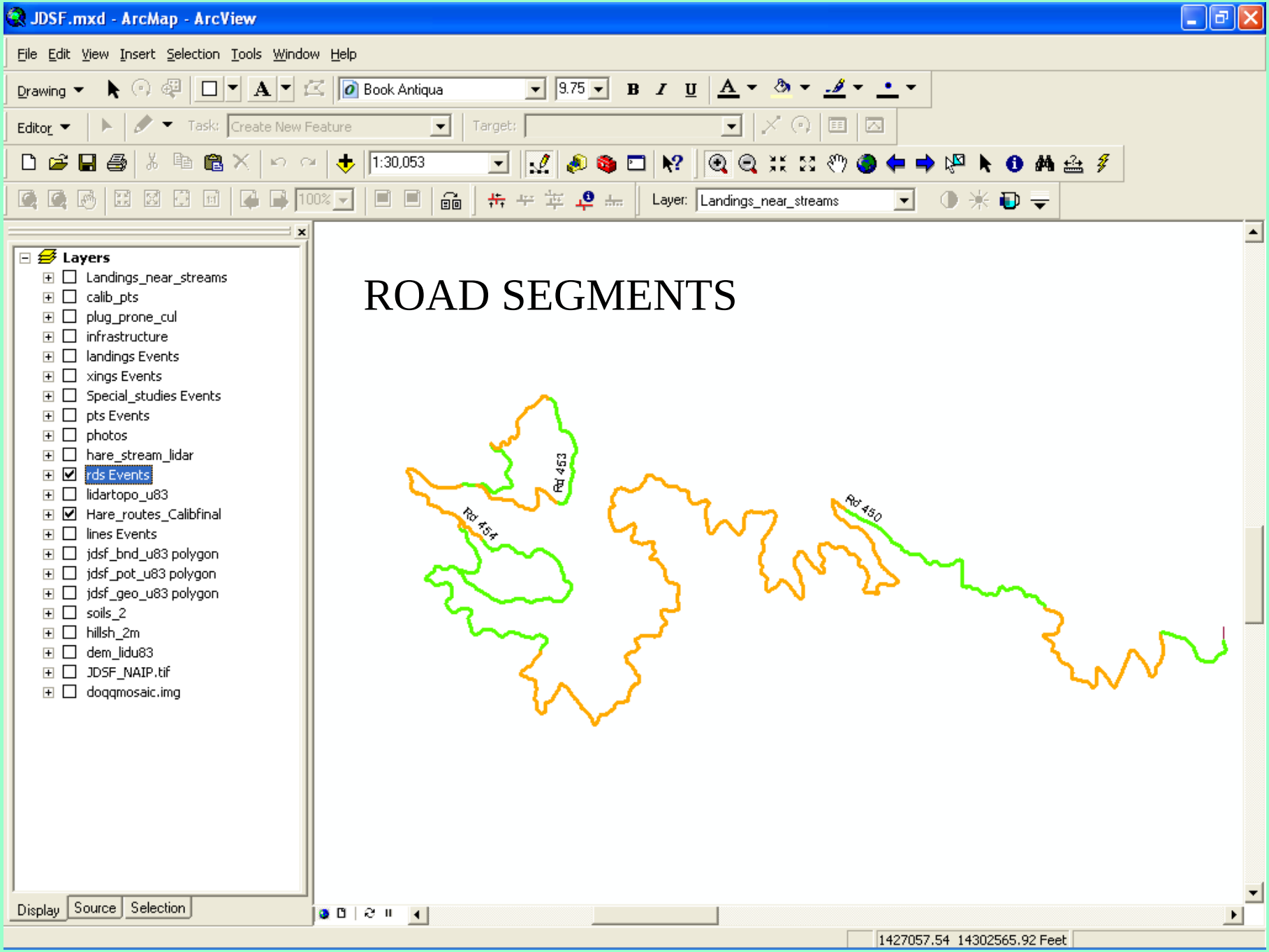


EXAMPLE PRODUCTS





USES RELATIONAL DATABASE TO EXPAND ANALYTICAL OPTIONS


JDSF.mxd - ArcMap - ArcView
File Edit View Insert Selection Tools Window Help
Drawing
Book Antiqua
9.75
Editor
Task: Create New Feature
Target:
1:30,053
Layer: Landings_near_streams
Layers
Landings_near_streams
calib_pts
plug_prone_cul
infrastructure
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xings Events
Special_studies Events
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photos
hare_stream_lidar
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lidartopo_u83
Hare_routes_Calibfinal
lines Events
jdsf_bnd_u83 polygon
jdsf_pot_u83 polygon
jdsf_geo_u83 polygon
soils_2
hillsh_2m
dem_lidu83
JDSF_NAIP.tif
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ROAD SEGMENTS
Rd 453
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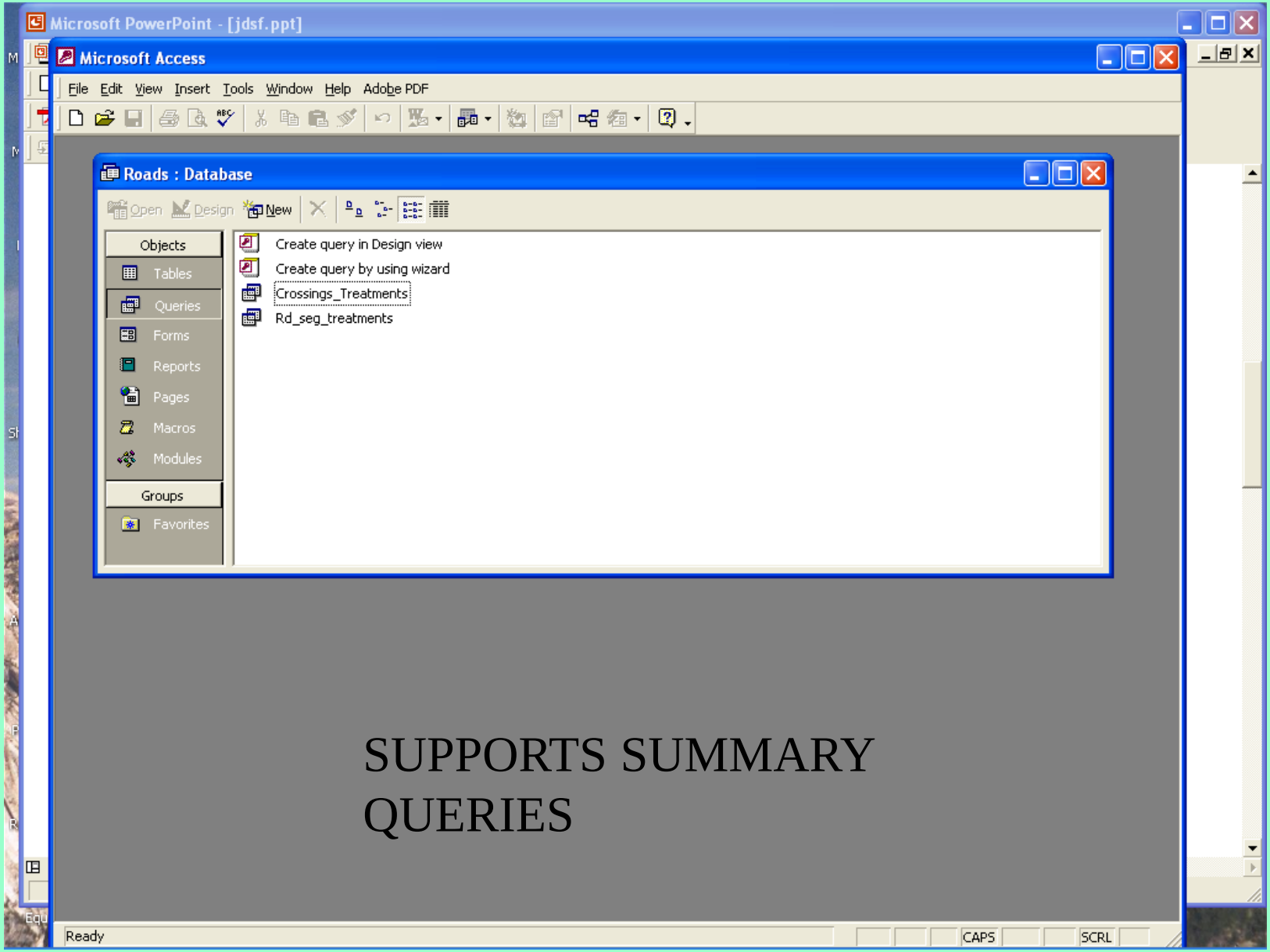
Rd 450
1427057.54 14302565.92 Feet



SUPPORTS SUMMARY QUERIES

Microsoft Access - [Rd_seg_treatments : Select Query]

File Edit View Insert Format Records Tools Window Help Adobe PDF

SEG_ID	RANK	COMMENTS	ROCK_RD	CLOSE_RD	IN_RD	PULL_BK_RD	ADD_WBRK
450_2	med	Control erosion from skid trail					
450-1	low	Control erosion from skid trail					x
450-10	low	Control erosion due to other rd					
450-11	med	Several erosion issues					
450-12	low	Control erosion from skid trail					
450-3	med	Control erosion due to landings					
450-4	low	Generally stable					
450-5	low	Control erosion due to other rd	x		x		
450-6	med	More erodible soils	x				x
450-7	med	More erodible soils			x		x
450-8	med	Control erosion from skid trail				x	x
450-9	low	Control erosion from skid trail					
450D_1	ne	not evaluated					
450E_1	ne	not located					
453_1	med	Several erosion issues					
453_2	low	Rocky ground, more stable					
453_3	med	Drainage problem from Rd 450		x			
454_1	med	Fill failure, cut slumps, regrading					
454_2	low	Generally stable					

GREATLY SIMPLIFIES THE TASK OF VIEWING AND SORTING DATA

Record: 1 of 19

Datasheet View CAPS SCRL

Microsoft Access - [Crossings_Treatments : Select Query]

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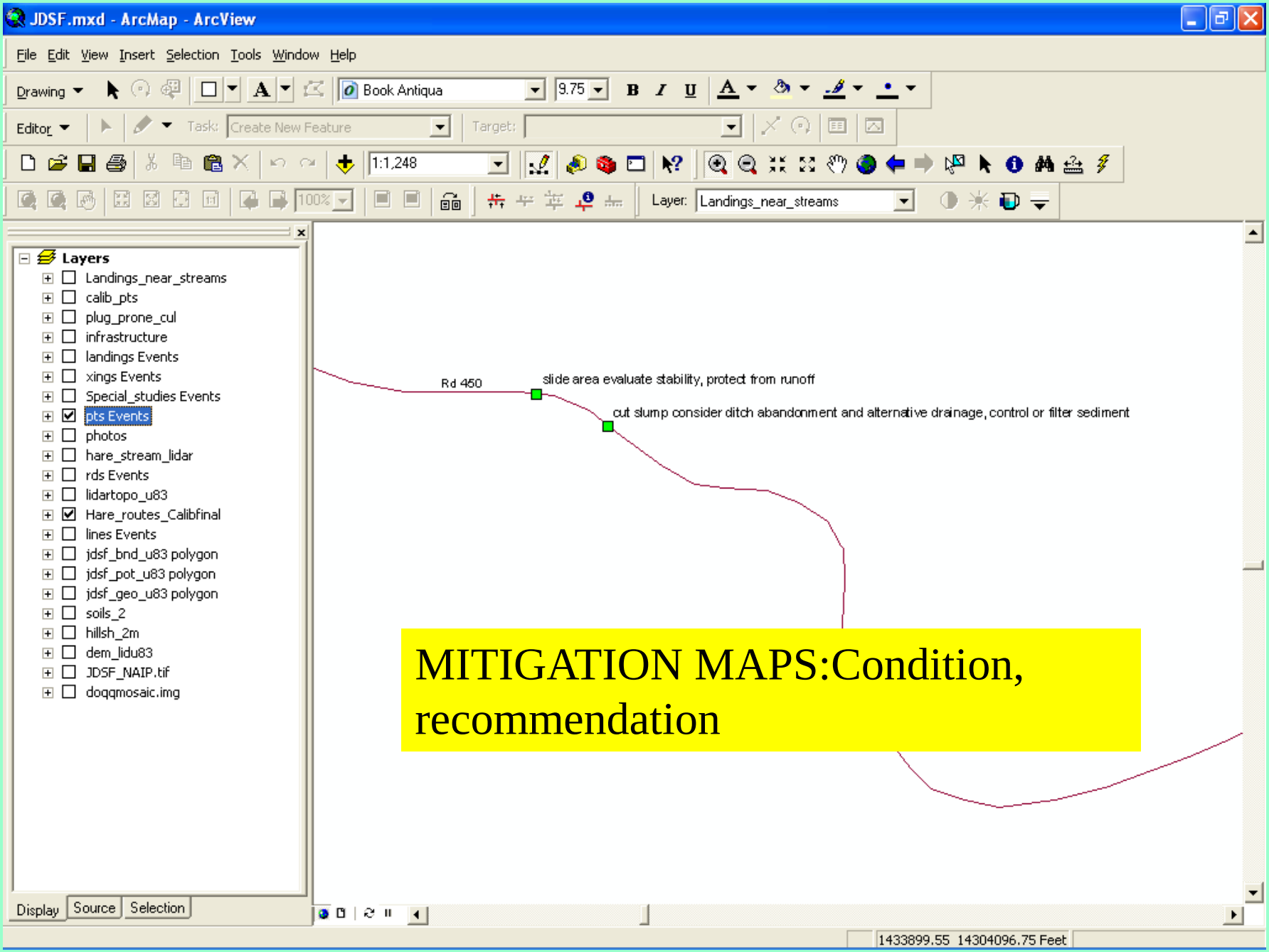
XING_ID	RANK	CONTRL_ROF	ADD_ARMOR	DIVERT_DRN	REPAIR_FIL	AD_CRT_DIP	UGRD_INLET	ADD_EN_DIS	RM
450_x102	high								
450_x108	high		x		x			x	
450_x109	med								
450_x110	med								
450_x111	med		x			x			
450_x119	med		x						
450_x126	med				x	x			x
450_x128	med	x						x	
450_x133	high				x				
450_x15	high					x			x
450_x17a	high			x		x			
450_x19	med								x
450_x48a	high			x	x		x	x	
450_x51	med				x				x
450_x66a	med	x		x		x	x		
450_x69a	med	x		x			x	x	
450_x78	med	x							
453_x2	med								x
453_x3	med								
453_x4	high				x	x			
454_x5	high								
450_x91	med								

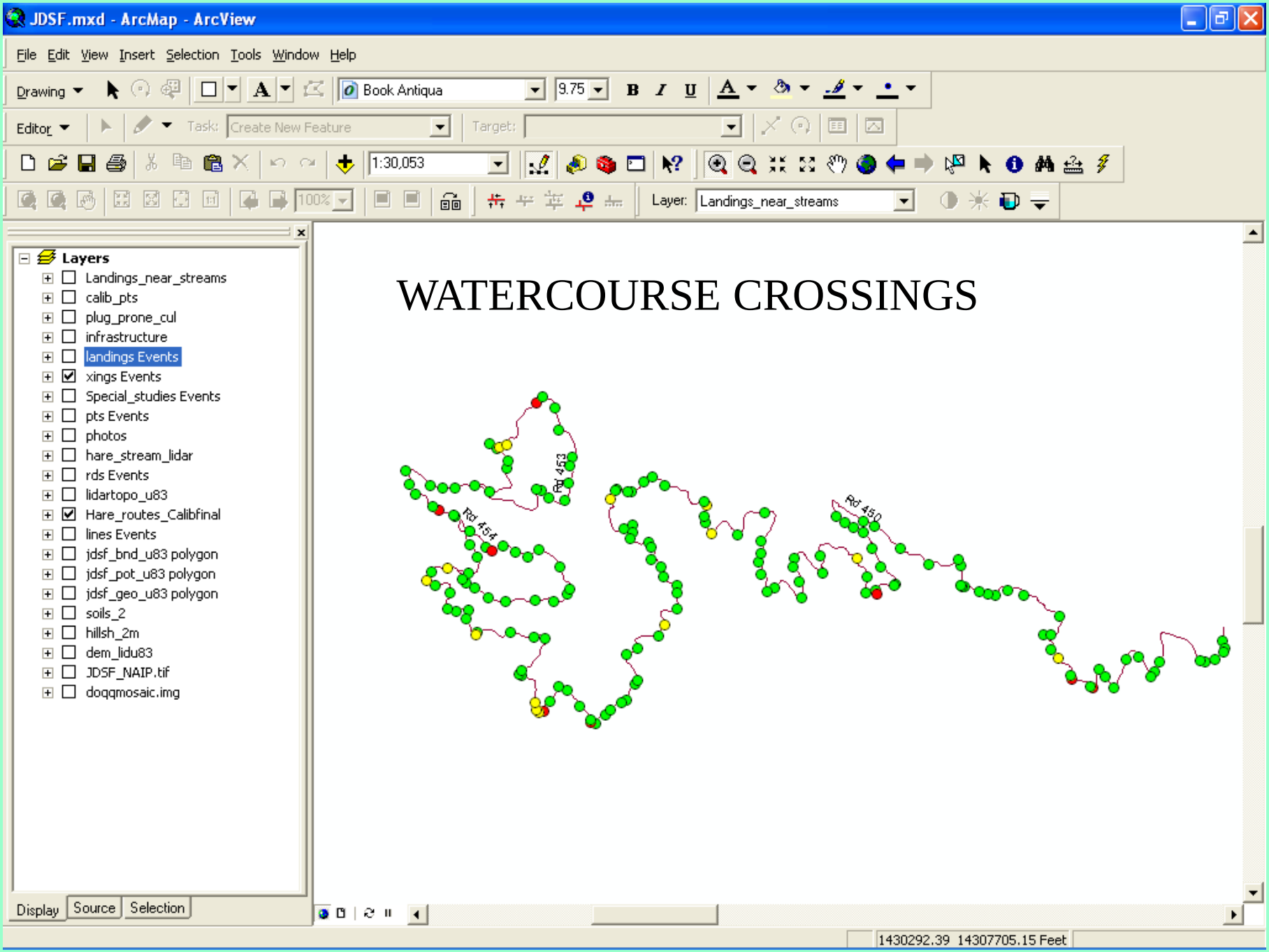
MITIGATION QUERY

Record: 1 of 22

Datasheet View CAPS SCRL



MITIGATION MAPS:Condition, recommendation


JDSF.mxd - ArcMap - ArcView
File Edit View Insert Selection Tools Window Help
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Book Antiqua
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Editor
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photos
hare_stream_lidar
rds Events
lidartopo_u83
Hare_routes_Calibfinal
lines Events
jdsf_bnd_u83 polygon
jdsf_pot_u83 polygon
jdsf_geo_u83 polygon
soils_2
hillsh_2m
dem_lidu83
JDSF_NAIP.tif
doqqmosaic.img
Display
Source
Selection
WATERCOURSE CROSSINGS
Rd 453
Rd 454
Rd 450
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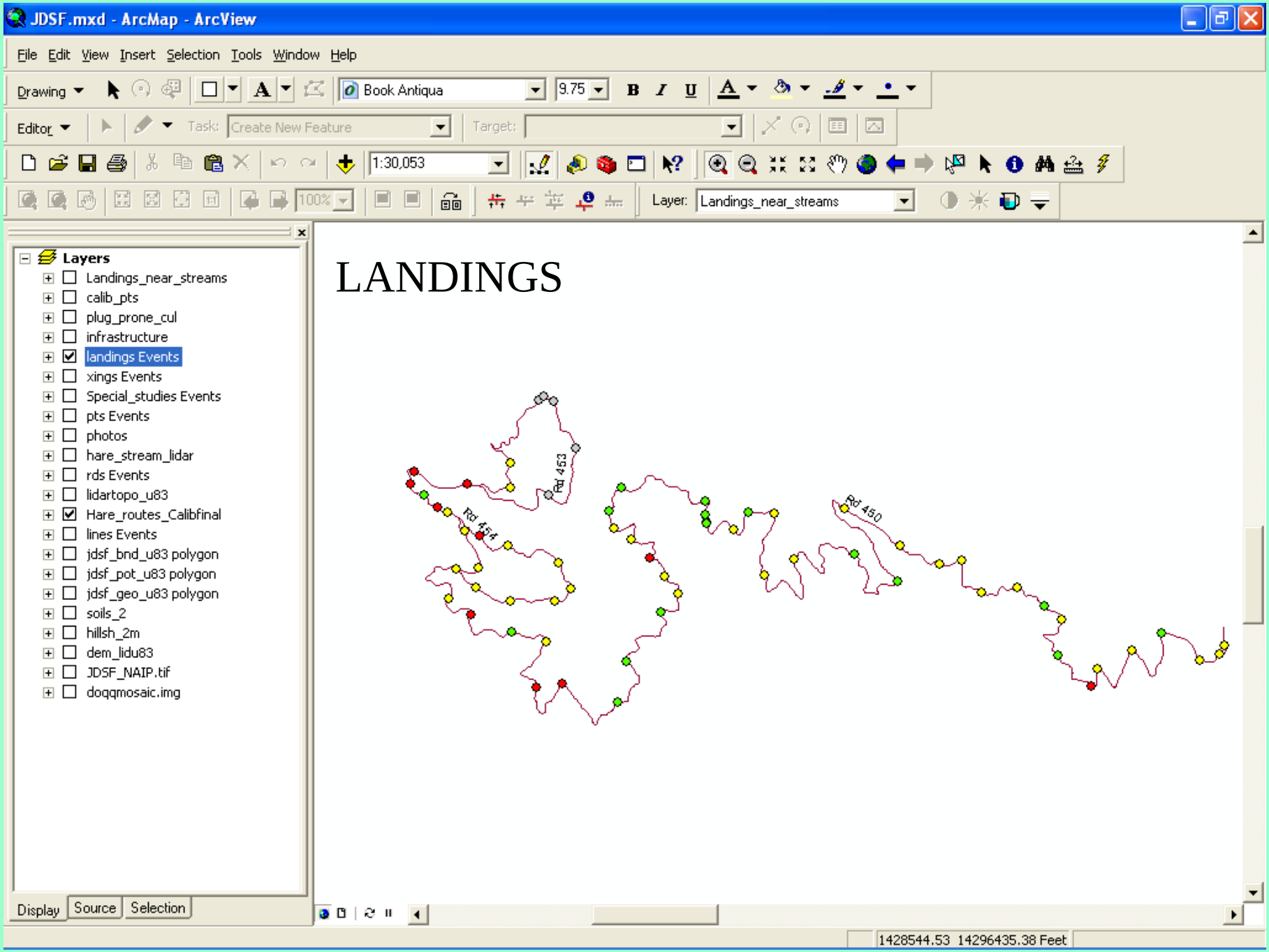
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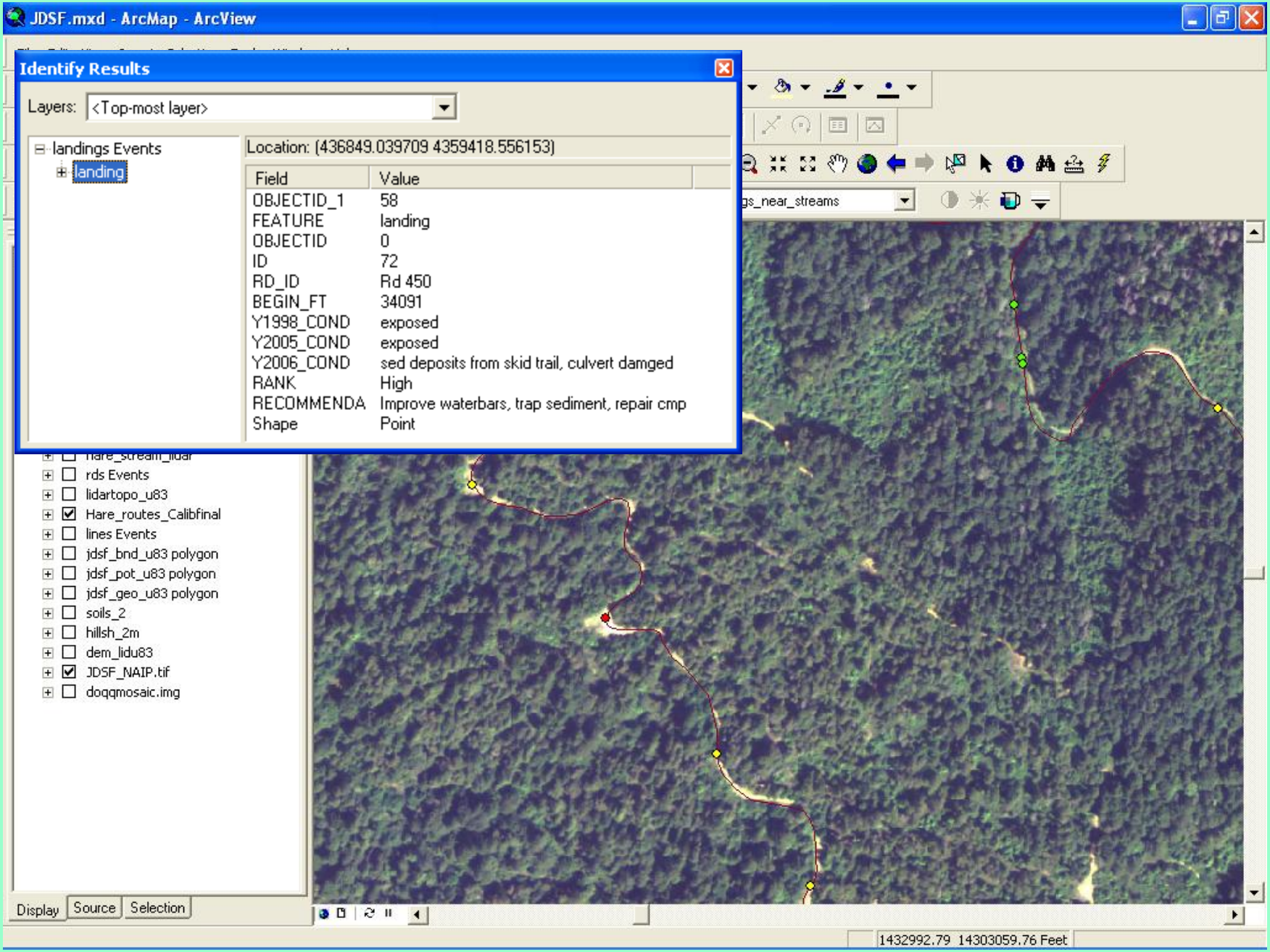
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Identify Results
Layers: <Top-most layer>
landings Events
landing
Location: (436849.039709 4359418.556153)
Field | Value
OBJECTID_1 | 58
FEATURE | landing
OBJECTID | 0
ID | 72
RD_ID | Rd 450
BEGIN_FT | 34091
Y1998_COND | exposed
Y2005_COND | exposed
Y2006_COND | sed deposits from skid trail, culvert damged
RANK | High
RECOMMENDA | Improve waterbars, trap sediment, repair cmp
Shape | Point
rds Events
lidartopo_u83
Hare_routes_Calibfinal
lines Events
jdsf_bnd_u83 polygon
jdsf_pot_u83 polygon
jdsf_geo_u83 polygon
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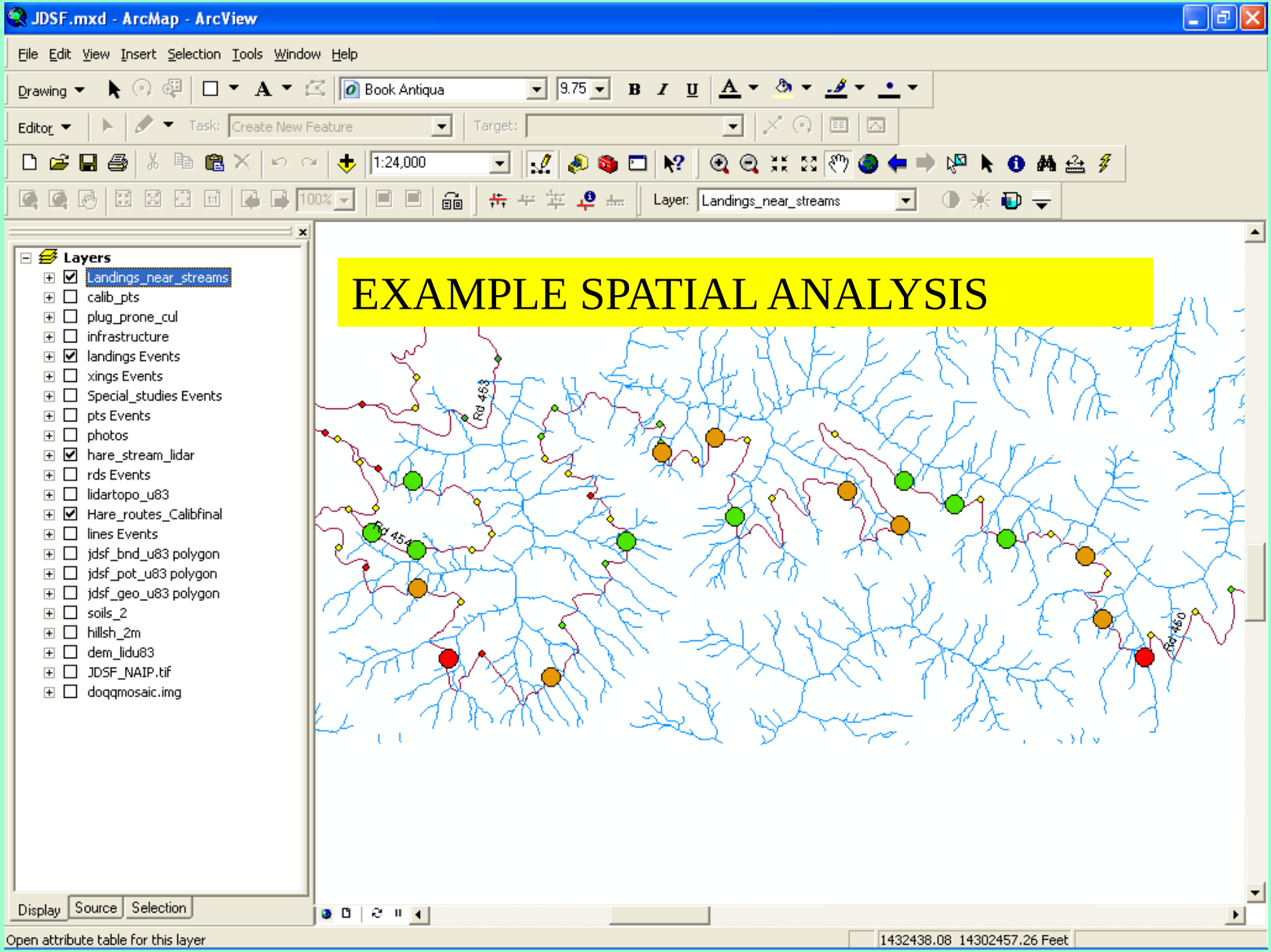
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Layers
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pts Events
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rds Events
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Hare_routes_Calibfinal
lines Events
jdsf_bnd_u83 polygon
jdsf_pot_u83 polygon
jdsf_geo_u83 polygon
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hillsh_2m
dem_lidu83
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Selection
EXAMPLE SPATIAL ANALYSIS
Rd 463
Rd 454
Rd 450
Open attribute table for this layer
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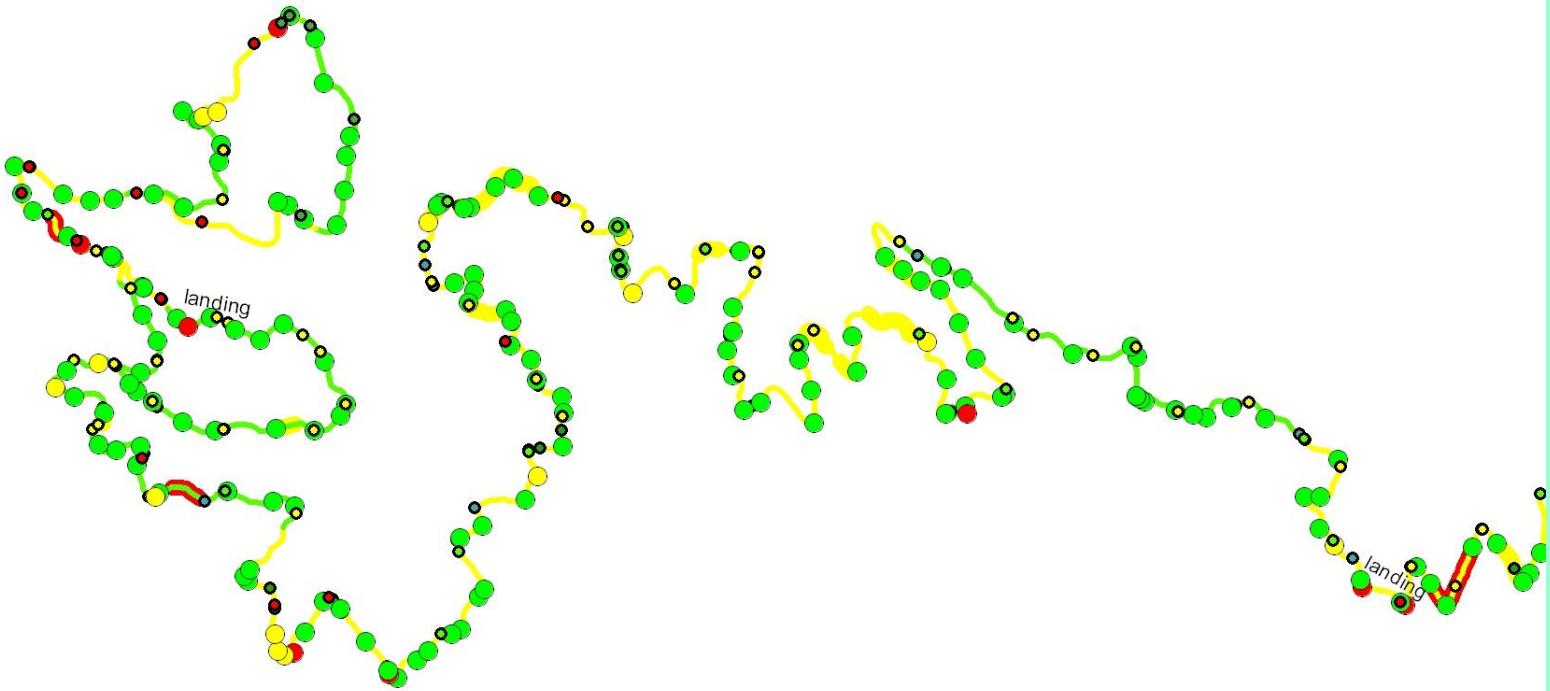
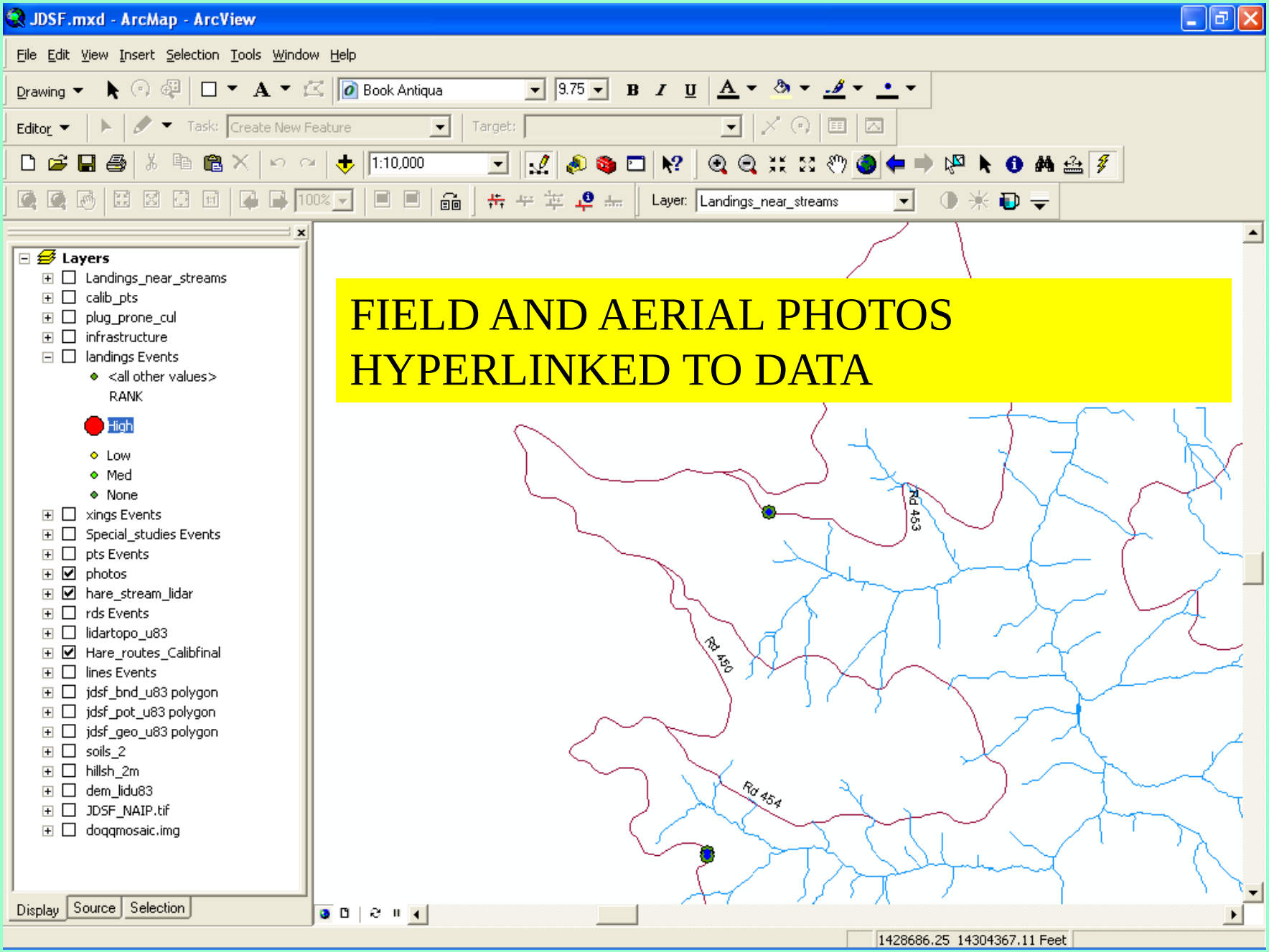
Composite map

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Layers
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calib_pts
plug_prone_cul
infrastructure
landings Events
<all other values>
RANK
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Low
Med
None
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Special_studies Events
pts Events
photos
hare_stream_lidar
rds Events
lidartopo_u83
Hare_routes_Calibfinal
lines Events
jdsf_bnd_u83 polygon
jdsf_pot_u83 polygon
jdsf_geo_u83 polygon
soils_2
hillsh_2m
dem_lidu83
JDSF_NAIP.tif
doqqmosaic.img
Display
Source
Selection
FIELD AND AERIAL PHOTOS
HYPERLINKED TO DATA
Rd 453
Rd 450
Rd 454
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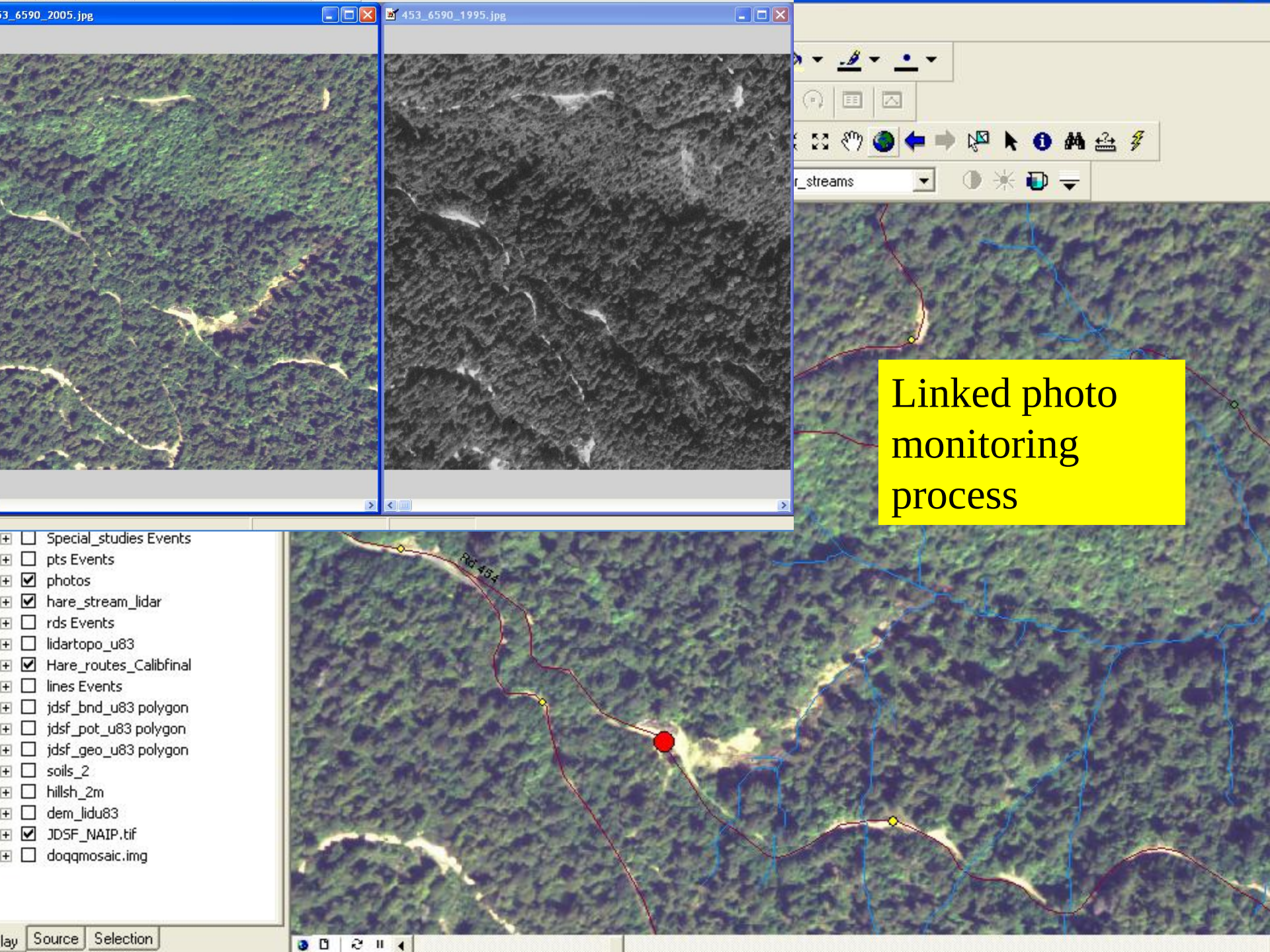
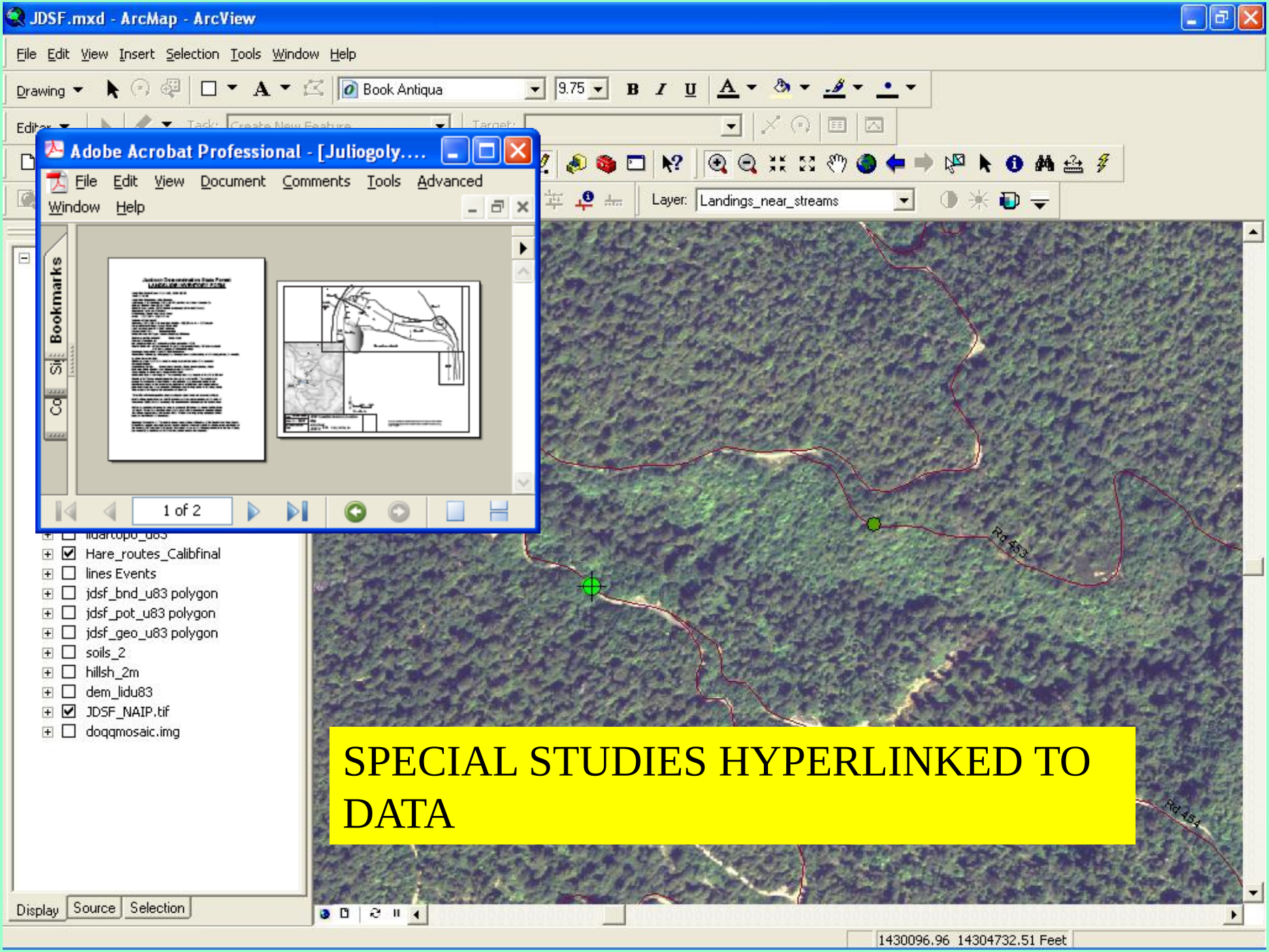


Linked photo monitoring process



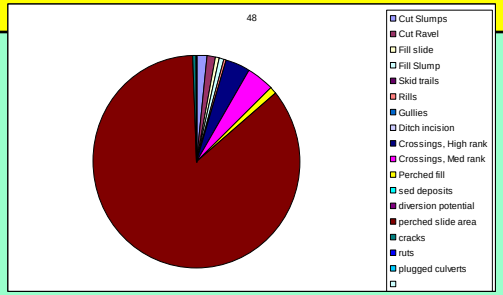
SPECIAL STUDIES HYPERLINKED TO DATA

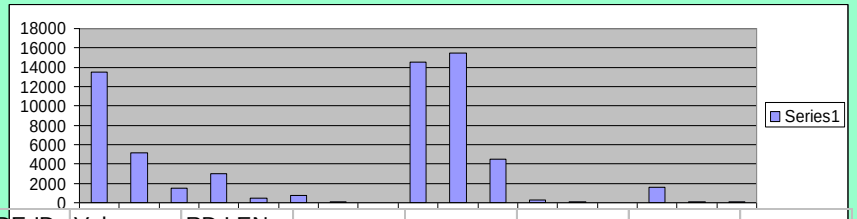
EXAMPLES

Long term monitoring

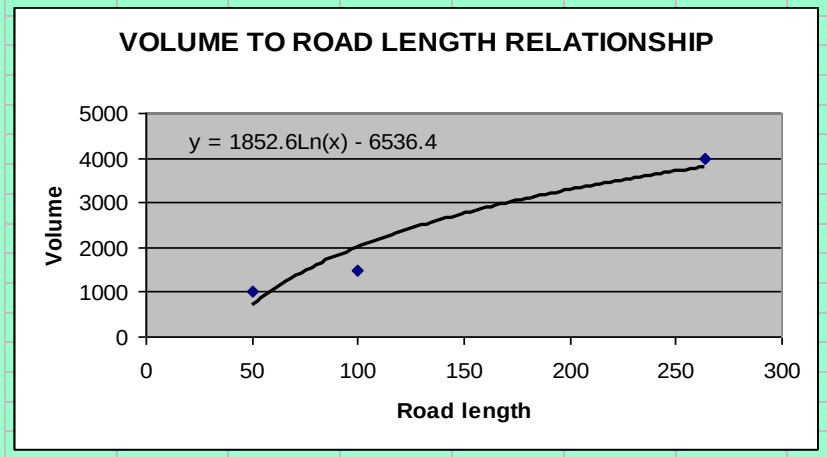
- Set up for long term documentation and monitoring
- Tracking change over time
- As well as management tracking of activities

VARIOUS GRAPHICS

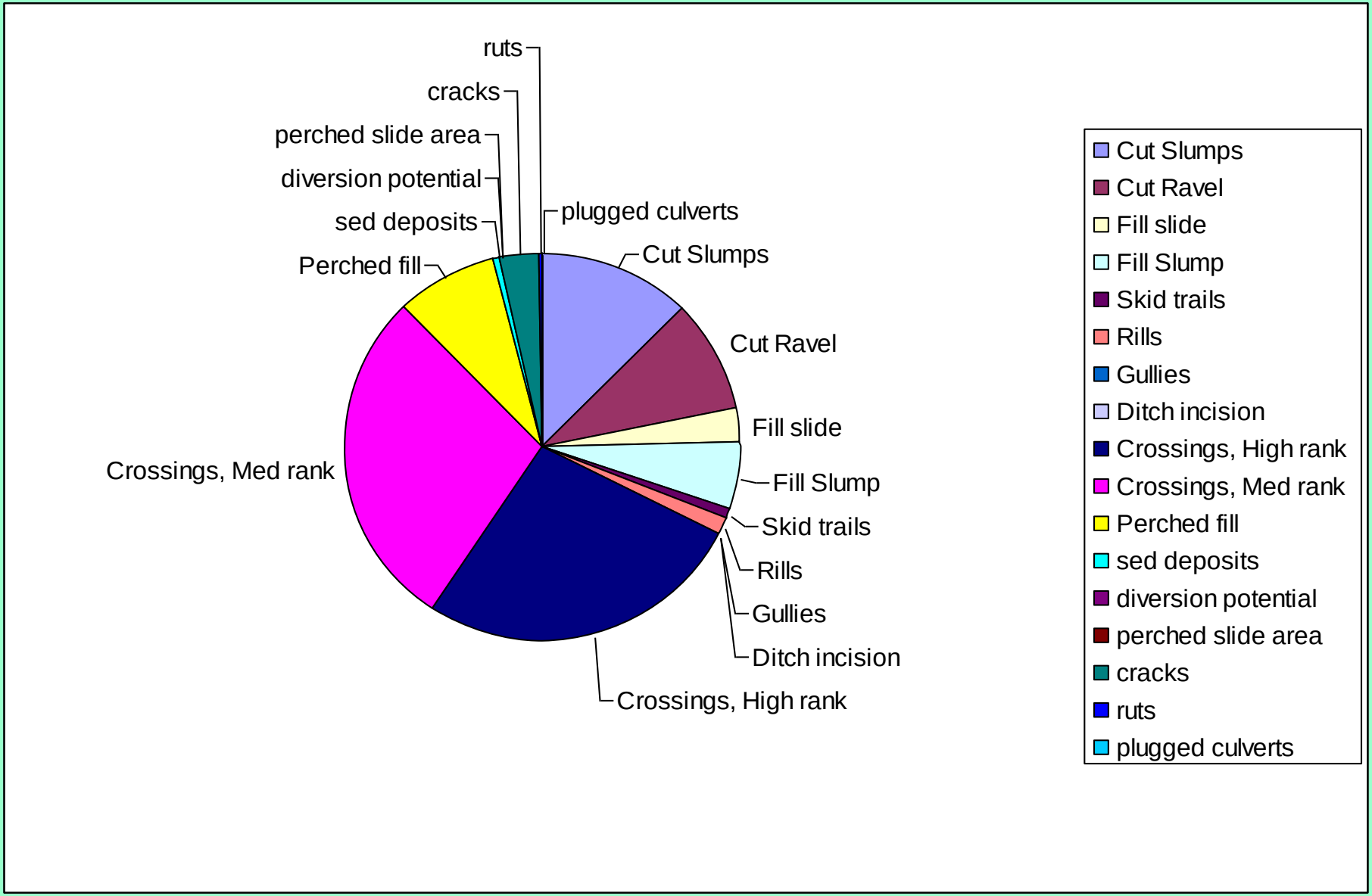


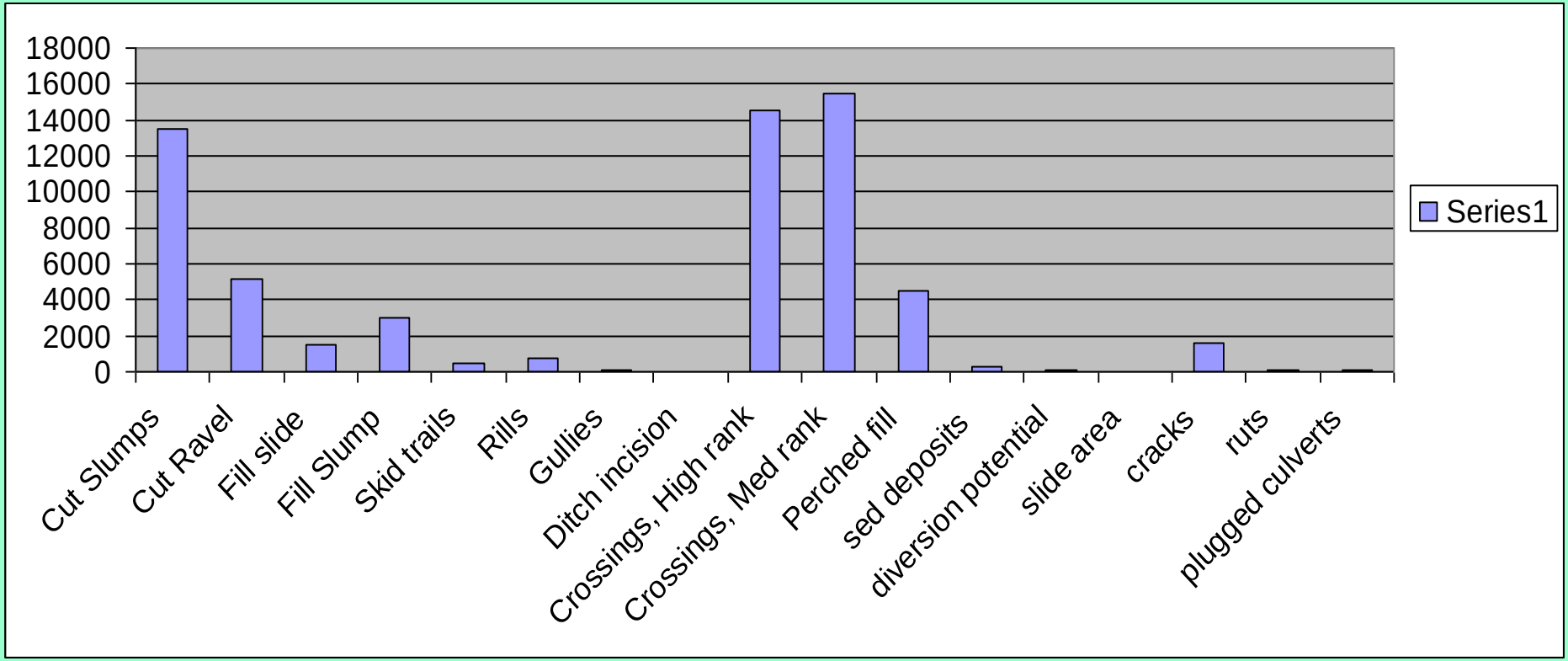


SLIDE ID	Vol cy	RD LEN
Slide A	4000	264
Slide B	1500	100
Slide C	1000	50
	6500	



SEDIMENT SOURCES EXCLUDING MASS WASTING

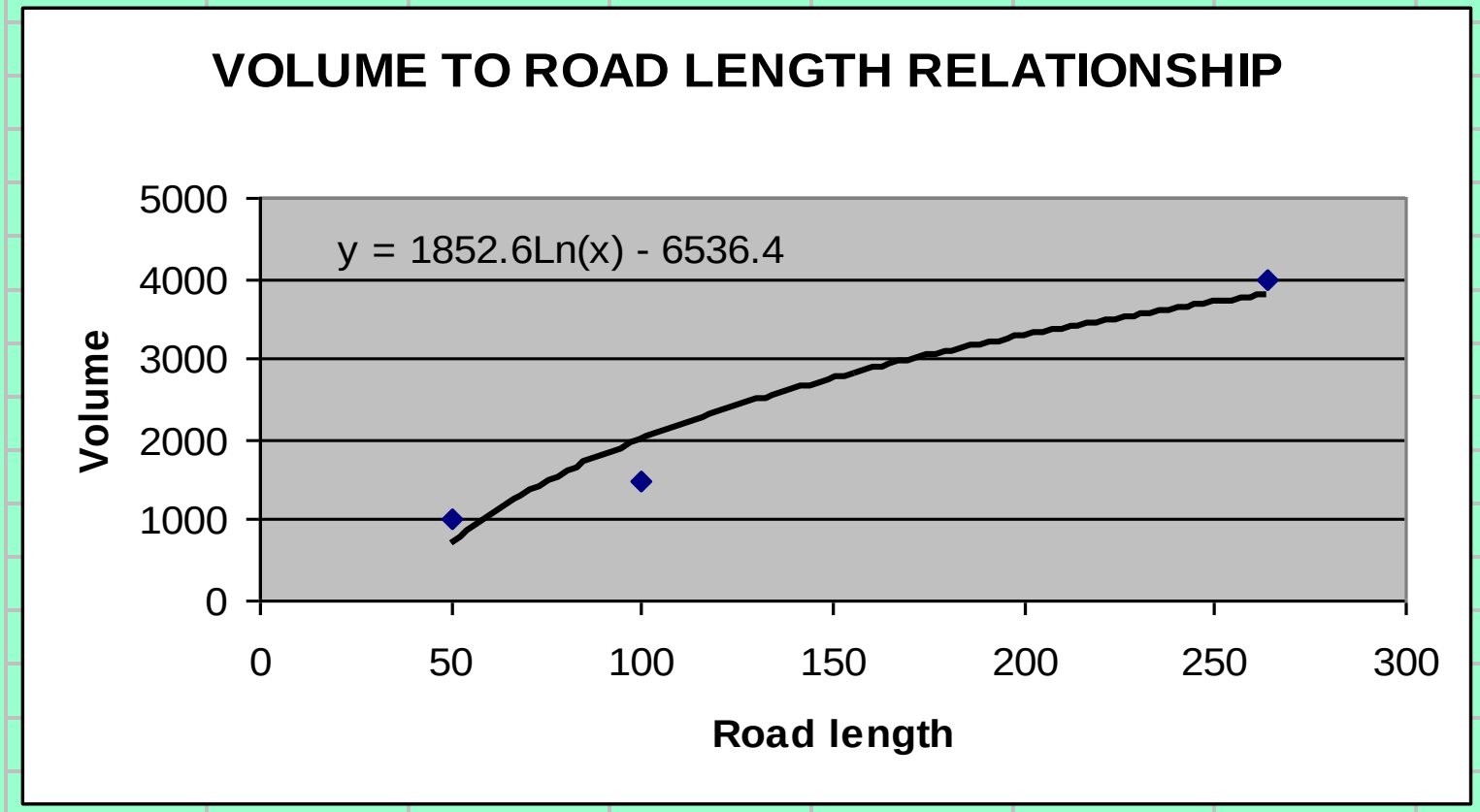



18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Cut Slumps
Cut Ravel
Fill slide
Fill Slump
Skid trails
Rills
Gullies
Ditch incision
Crossings, High rank
Crossings, Med rank
Perched fill
sed deposits
diversion potential
slide area
cracks
ruts
plugged culverts
Series1

	high						
Cumulative Measured Length	Cumulative Length pts	Total length	x-sect area	cumulative vol, cuft	TOTAL Sediment		
	675	675	10	6750	Cut Slumps		
370	150	520	10	5200	Cut Ravel		
	150	150	10	1500	Fill slide		
	300	300	10	3000	Fill Slump		
	224	224	2	448	Skid trails		
3485	250	3735	0.2	747	Rills		
	50	50	1	50	Gullies		
				0	Ditch incision		
				538	Crossings, High rank		14526
				573	Crossings, Med rank		15471
	150	150	30	4500	Perched fill		
1214	340	1554	0.2	310.8	sed deposits		
474	40	514	0.2	102.8	diversion potential		
106	150	256	1260	322560	perched slide area		256
	80	80	20	1600	cracks		
370	50	420	0.2	84	ruts		
		58	1	58	plugged culverts		
				48	1987 slide		
				348021.6			
			cubic yards	13921			

Nominal length	Cumulative Length along		Assumed Delivery			Cumulative Volume	
25	675		high				
50	150		high				
50	150		high				
50	300		mod				
8	224		mod				
50	250		low				
50	50		high				
0			low				
			high			538	
			mod			573	
50	150		mod				
20	340		high				
20	40		low				
50	150		high				
20	80		mod				
50	50		low				
			high				
		Cumulative Measured Length	Cumulative Length pts	Total length	x-sect area	cumulative vol, cuft	TOTAL Sediment
			675	675	10	6750	Cut Slumps
		370	150	520	10	5200	Cut Ravel
			150	150	10	1500	Fill slide
			300	300	10	3000	Fill Slump
			224	224	2	448	Skid trails
		3485	250	3735	0.2	747	Rills
			50	50	1	50	Gullies
						0	Ditch incision
						14526	Crossings, High rank
						15471	Crossings, Med rank
			150	150	30	4500	Perched fill
		1214	340	1554	0.2	310.8	sed deposits
		474	40	514	0.2	102.8	diversion potential
		106	150	256	1260	322560	perched slide area
			80	80	20	1600	cracks
		370	50	420	0.2	84	ruts
				58	1	58	plugged culverts
						48	1987 slide
						376907.6	

SLIDE ID	Vol cy	RD LEN
Slide A	4000	264
Slide B	1500	100
Slide C	1000	50
	6500	



Backcountry Road Construction and Re-Engineering Project Cost Estima

Road Name:

Item	Equipment, Labor DPR Hours each Using Formula	Fill in No.						DPR Rate	Contract Rate		DPR Cost
Road Brushing & Clearing, Light	**12' road bed**			**feet**							
	Hydro Ax	**0.00**	@	150.00	feet per	hour	@	$180.00	200.00	per hour	**$0.00**
	Excavator	**0.00**	@	150.00	feet per	hour	@	$85.00	150.00	per hour	**$0.00**
	Dozer	**0.00**	@	400.00	feet per	hour	@	$62.00	115.00	per hour	**$0.00**
	Dump Truck	**0.00**	@	150.00	feet per	hour	@	$55.00	70.00	per hour	**$0.00**
	Tree Felling/Bucking	**0.00**	@	50.00	feet per	hour	@	$25.11	34.00	per hour	**$0.00**
Road Brushing & Clearing, Medium	**12' road bed**			**feet**							
	Hydro Ax	**0.00**	@	120.00	feet per	hour	@	$180.00	200.00	per hour	**$0.00**
	Excavator	**0.00**	@	120.00	feet per	hour	@	$85.00	150.00	per hour	**$0.00**
	Dozer	**0.00**	@	320.00	feet per	hour	@	$62.00	115.00	per hour	**$0.00**
	Dump Truck	**0.00**	@	120.00	feet per	hour	@	$55.00	70.00	per hour	**$0.00**
	Tree Felling/Bucking	**0.00**	@	45.00	feet per	hour	@	$25.11	34.00	per hour	**$0.00**
Road Brushing & Clearing, Heavy	**12' road bed**			**feet**							
	Hydro Ax	**0.00**	@	90.00	feet per	hour	@	$180.00	200.00	per hour	**$0.00**
	Excavator	**0.00**	@	90.00	feet per	hour	@	$85.00	150.00	per hour	**$0.00**
	Dozer	**0.00**	@	240.00	feet per	hour	@	$62.00	115.00	per hour	**$0.00**
	Dump Truck	**0.00**	@	90.00	feet per	hour	@	$55.00	70.00	per hour	**$0.00**
	Tree Felling/Bucking	**0.00**	@	40.00	feet per	hour	@	$25.11	34.00	per hour	**$0.00**
Road Brushing											

Build in a cost estimator

A data system for road management

Data management system that covers every phase from collection, storage, retrieval, updating, and publishing

- Supports analyses, budgeting, monitoring
- Integrates with other data streams and routines
- Facilitates document development
- Builds a reference library of studies, bmp's, photos, etc.
- Provides observations and recommendations across a range of scales

Next Steps

- Get input from JDSF
- Modify as appropriate
- Finish the rest of road 450
- Meet again with refined product
- Generate final pilot project report and associated GIS project

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Pointer 39°23'05.07" N 123°43'51.40" W elev 614 ft
Streaming |||||||||| 100%
Eye alt 6647 ft

KOMATSU