Estimating Mitigation Need

A GIS-based Methodology for Regional Advance Mitigation Planning

Overview

- Advance Mitigation Basics
- Purpose and Need for a Methodology for Estimating Mitigation Needs
- Methodology Walkthrough
- Next Steps

Advance Mitigation Basics

- Refers to mitigation *in advance:*
  - Of incurrence of impacts
  - Of project delivery
  - Of projects being programmed and having preferred alternatives selected
    - Projects identified from long range transportation plans
- Goals of Advance Mitigation
  - To <u>improve project delivery outcomes</u> by having appropriate mitigation already in place when needed
  - To <u>improve environmental outcomes</u> by consolidating potential compensatory mitigation needs from multiple projects in a given area and investing them strategically to address conservation priorities
    - Landscape scale mitigation
  - To <u>improve mitigation</u> outcomes by having better planned and delivered mitigation projects that are successful and compliant
- Refers to compensatory mitigation, but also to avoidance and minimization
  - Early identification of resources to avoid
  - Early identification of needs that may require structural design elements – wildlife crossings and fish passage barrier remediation

General Process

- Regional Assessment
  - Planning phase of advance mitigation.
  - Coordinate with planning, SHOPP tool to identify upcoming transportation projects
  - Identify eco-regional groupings of the transportation projects
    - Establish Regions for which advance mitigation projects will be created
  - Coordinate with CDFW and other resource agencies to identify conservation priority locations and resources of concern in these eco-regions
    - MAP-21 §1310 & §1311
    - Planning product to be adopted into environmental documents of the action plan
  - Perform Impact Assessment to obtain an estimation of resources that must be avoided, transportation projects that will need structural elements incorporated into design for minimization, and potential compensatory mitigation need
- Action Plan
  - Project development phase of advance mitigation projects
    - PID, PAED, PS&E, RTL
  - Given the findings of the regional assessment(s), what advance mitigation projects will be needed and how will they be implemented and funded?
  - CEQA/NEPA for advance mitigation projects
    - MAP-21 §1310 & §1311
    - Planning product to be adopted into environmental documents of the transportation projects
- Implementation
  - Bidding and construction phases
  - Advance mitigation projects can use a variety of bidding mechanisms
  - Can be third party (preferred) or Caltrans-owned and operated

Regional Assessments

- The Regional Assessment is a document that:
  - Defines a geographical “Region”:
    - Common ecological area (e.g., watershed, eco-region)
    - Has multiple transportation projects in long-range transportation plans that may require compensatory mitigation
  - Identifies critical and protected resources and conservation priorities
    - Protected areas, easements
    - Mitigation banks, HCPS/NCCPs
    - Biodiversity hotspots
    - Wildlife corridors/fish passage barriers
    - Designated critical habitat, listed species habitat
  - Assesses the mitigation need in that region
    - Identifies resources to be avoided – informs design
    - Identifies where structural elements may be needed – informs design
    - Identifies quantity and type of compensatory mitigation needed
  - Conducive to a GIS-based Methodology

Purpose and Need for Estimating Mitigation Needs

- Need a reasonable estimate of projected mitigation need in order to justify funding ahead of project programming
- In estimating, err on the side of overestimating impacts

These tools are meant strictly to produce an estimate of potential compensatory mitigation need based on anticipated projects presented in long-range transportation plans. The methods are not a substitute for, nor do they pre-empt the requirement for conducting detailed project-level environmental scoping to inform the programming of individual projects, nor do they preclude the requirements under CEQA and NEPA to conduct environmental review of the project to select the least environmentally damaging project alternative. No endorsement of a project alternative is implied by the use of RAMP methods.

Mitigation Need Estimate Methodology

- GIS overlay methodology
  - Project footprints intersected with natural resource layers
- Footprints
  - Convert CRPM data into line data
  - Generate buffer to represent roadway
  - Generate buffer around the roadway to represent impact area
- Select resource layers and display
  - NWI
  - Hydrology
  - Vegetation (CWHR habitat types)
  - Others
- Intersect footprint layer with resource layers
  - Calculate areas
  - Interpret, aggregate

A Reference Manual for Caltrans Staff on Regional Advance Mitigation Impact Assessment Methods

Prepared for California Department of Transportation

Prepared by University of California, Davis

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March 2015

Photo Credit: Patrick Huber

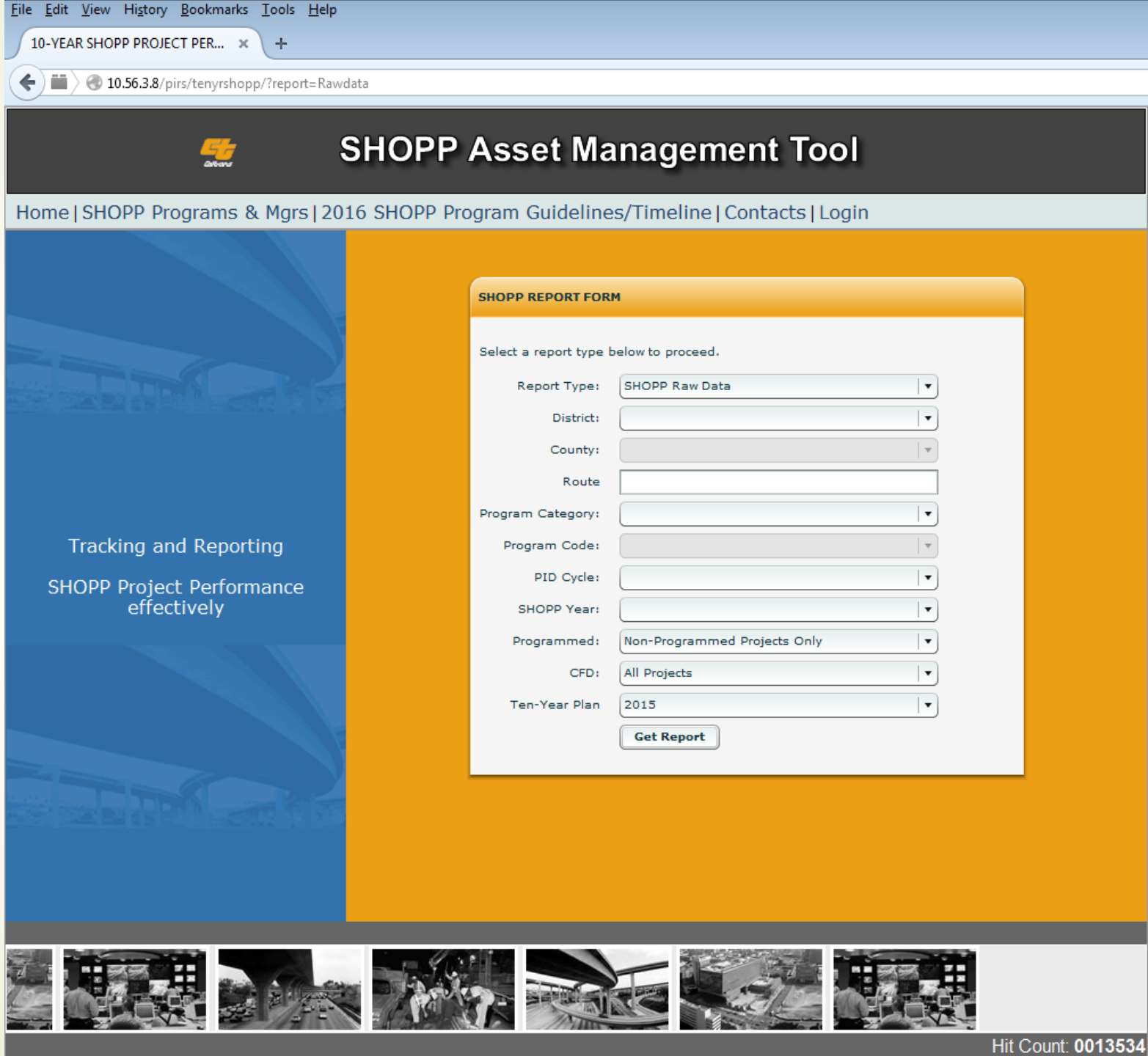
Funding for this work was provided by Caltrans, contract number 74A0711.

Identify a Region

- Get transportation projects
  - Convert CRPM data into line data
  - Overlay with orthoscopic imagery to find width of each roadway
  - Add attribute field for widths, generate buffer based on this field to create polygons for existing roadway
  - Add field for project type, join table of footprint buffer widths
  - Generate buffer around roadway buffer to represent project footprint
- Look for geographical/ecological groupings
  - Overlay footprints with environmental data to find logical groupings
  - Can use eco-regions, sub-eco-regions, watersheds of various scales

Get transportation Projects

- For SHOPP .240, pull projects from the non-programmed projects in the most current Ten Year Plan
- http://10.56.3.8/pirs/TenYrShopp/index.cfm



Ten-Year SHOPP - Raw Data

TYP:2C District:ALL County:A Route:/ Progran Progcode PID Cycl SHOPP Year:ALL Programmed?:NO CFD:ALL

ID	Ten-Year Plan	District	County	Route	BackPM	AheadP	Project Location	Project Description	Program Code	Perf Outp
9027	2015	'01	MEN	128	0.2	45.09	Near Navarro, from east of Route 1 to west of Flynn Creek Bridge # 10-0079.	Rehabilitate culverts.	'201.151	
9205	2015	'02	TEH	'005	0	42.12	On Interstate 5 in Tehama County	Upgrade MBGR and possilby flatten some slopes.	'201.015	
9208	2015	'05	SLO	101	36.5	55.7	At various locations	Median Barrier, culvert extenstion	'201.015	
9211	2015	'06	KER	'058	19.2	77.2	Various locations from McKittrick to east of State Route 223	Construct Shoulders and Upgrade/Install Guardrails	'201.015	
9212	2015	'06	TUL	198	0	44.1	Various locations from Fresno County to Sequoia National Park	Construct Shoulders and Upgrade/Install Guardrails	'201.015	
9213	2015	'08	RIV	'010	0	156	Various locations from San Bernardio County Line to Arizona State Line	Rumble strips / upgrade guardrail	'201.015	
9214	2015	'12	ORA	'005	34	42.38	In Orange county, from 57 to 91on route 5	Upgrade right side barrier, end treatments and bridge railing connections	'201.015	
9215	2015	'12	ORA	'073	10	28.02	Rte. 73 from Rte. 5 to Rte. 405	MBGR Upgrade	'201.015	
9216	2015	'12	ORA	'091	R0.0	6.119	In Orange county, from LA/ORA county line to Route 5	Upgrade right side barrier, end treatments and bridge railing connections	'201.015	
9217	2015	'12	ORA	'091	R3.72	6.11	In Orange county, from Route 5 to Route 57	Upgrade right side barrier, end treatments and bridge railing connections	'201.015	
9218	2015	'02	SHA	'005	57.41	57.41	Bridge # 06-0111 Sims Road UC	Replace Superstructure (or Replace Bridge)	'201.110	
9219	2015	'02	SHA	'005	66.8	67	Bridge # 06-0095 Craig View Drive UC	Replace Bridge	'201.110	
9220	2015	'03	PLA	'080	0.27	63.52	In Placer and Nevada Counties on SR 80. Bridge Number 190038, 19-0091, 19-0	Rehab and Replace Deck, substructure and bearings. Upgrade railing, seisn	'201.110	
9221	2015	'03	YOL	'080	R11.31	R11.31	Sacramento BOH - (#22-0026 R/L)	Bridge Rehab	'201.110	
9222	2015	'04	ALA	580	R8.0	R8.0	Greenville OH # 33-0121R	Substructure Rehab	'201.110	
9223	2015	'04	CC	580	1.17	1.17	Stege Drain # 28-0091	Replace superstructure	'201.110	
9224	2015	'04	SM	101	7.13	7.13	Cordilleras Creek #35-0019	Replace bridge	'201.110	
9225	2015	'04	SON	101	7.65	7.65	Petaluma Blvd OC # 20-0159	Replace bridge	'201.110	
9228	2015	'05	SLO	'001	0.1	0.1	In San Luis Obispo County near the City of Guadalupe at the Santa Maria River	Rehabilitate bridge deck and replace rail	'201.110	
9230	2015	'07	LA	210	36	38	Hinge Replace 53 1867 2018 SHOPP 21/22FY rtl 09/21	In LA CO San Gabriel River BR 53 1867	'201.110	
9231	2015	'07	LA	405	0	45	IN LA CO RTE 405	Bridge Rehab. 2022 SHOPP 24/25 FY rtl january 2025	'201.110	
9232	2015	'07	LA	710	22.17	22.17	IN LA CO RTE 710 BR 53 0840 HOBART YD OH 2020 SHOPP 23/24 FY RTL January 2	Bridge Paint	'201.110	
9233	2015	'07	LA	710	22.66	22.66	IN LA CO RTE 710 BR 53 0842 EAST YD OH....2020 SHOPP 22/23 FY RTL January 20	Bridge Paint	'201.110	
9235	2015	'11	SD	'075	20.5	21.5	San Diego-Coronado Bridge (Br# 57 0857)	Foundation Rehabilitation I-1	'201.110	
9239	2015	'04	ALA	'084	17.2	17.2	Arroyo De La Laguna 33-0043	Scour mitigation	'201.111	
9240	2015	'04	NAP	'029	39.08	39.08	Garnette Creek Bridge # 21-0005	Scour replace bridge	'201.111	
9241	2015	'04	NAP				Napa River BOH 21-0049, Arroyo De La Laguna 33-0043	Scour mitigation	'201.111	
9242	2015	'05	SB	'001	M33.1	M33.1	San Antonio Br (51 0237L/R)	LONG LEAD Construct Sheet Pile	'201.111	
9244	2015	'10	ALP	'088	12.5	12.5	W. Fork Carson River Bridge (#31-0014)	Bridge Scour Mitigation	'201.111	
9245	2015	'10	MER	165	7.17	7.17	CCID Main Canal & Merced River	Bridge Scour Mitigation	'201.111	
9246	2015	'01	HUM	'036	11.4	34.52	Hely Creek #4-92, Little Larabee Creek #4-102, Butte Creek #4-116	Bridge Rail replacement/upgrade	'201.112	
9247	2015	'03	BUT	'099	13.25	45.92	Bridge #'s: 12-0081, 12-0030, 12-0119, 12-0118, 12-0122, 12-0121, 12-0104Y	Bridge Rail Replacement	'201.112	
9248	2015	'03	GLE	162	43.5	84.2	19 Bridges: Br. No.'s 11-10(PM's 67.74), 14(75.64), 23(81.63), 24(82.01), 26(84.11	Rail Upgrade	'201.112	
9249	2015	'04	SCL	101	0.01	4.2	BR#37-0008R, 0007, 0006R, 0008L, 0105, 0146, 0006L	Bridge Rail Replacement/Upgrade	'201.112	
9250	2015	'04	SM	101	0.01	23.4	BR#35-0126, 0018, 0131S, 0155, 0081G, 0113, 0087, 0017, 0140	Bridge Rail Replacement/upgrade	'201.112	
9251	2015	'07	LA	101	0	20	IN LA CO RTE 101 Br No 53 0582, 0617; RTE 10 Br No 53 0655L; RTE 002 Br No 53 0	upgrade bridge rail. 2020 SHOPP 22/23 FY rtl 01/23.	'201.112	
9252	2015	'07	LA	103	0.9	0.9	IN LA CO RTE 103 Br 53 2627 Anaheim St OH	upgrade bridge rail	'201.112	
9253	2015	'07	VEN	'033	2.5	30.5	IN VEN CO RTE 33 Br No 52 0041, 0042, 0078, 0184L/R, 0185L/R	upgrade bridge rail	'201.112	

Converting

- ArcMap Postmile Toolbar
- Postmile Validation Wizard
- The spreadsheet needs to be prepared before hand
  - Follow the tips on the website
  - Eliminate unneeded columns
- Once imported into ArcMap, there may need to be some manual adjustments
  - Along the county boundaries, the postmiles may not match up exactly to the postmile point files
    - http://onramp/tsi/o

Preparing Data Files for the Postmile Toolbar Validation Wizard

Background:

The Postmile Toolbar is a desktop application used in ArcMap to validate, display and generate spatial data from postmile-referenced data. It is comprised of the Postmile Validation Wizard and the Postmile Query Tool.

Recommendation:

The Postmile Toolbar Validation Wizard is a part of the ArcMap Postmile Toolbar application. It is used to validate postmile data values and create point or linear spatial data layers. Common input data formats include text (.txt), comma-separated-value (.csv), and dbase (.dbf) files.

Personal Geodatabase Creation/Import Instructions:

The Postmile Validation Wizard can directly process simple input data files, but it is recommended to convert input data files into a table in a ArcGIS Personal Geodatabase. You start by creating a new Personal Geodatabase in ArcCatalog. The next step is to your input data file into the new geodatabase. Follow these instructions:

Personal Geodatabase Creation/Import Instructions :

Before you begin, make sure the input data fields/column names have the following conventions:

1. must contain only letters, numbers and underscores
2. must start with a letter character
3. must not exceed ten characters
4. must be formatted as text

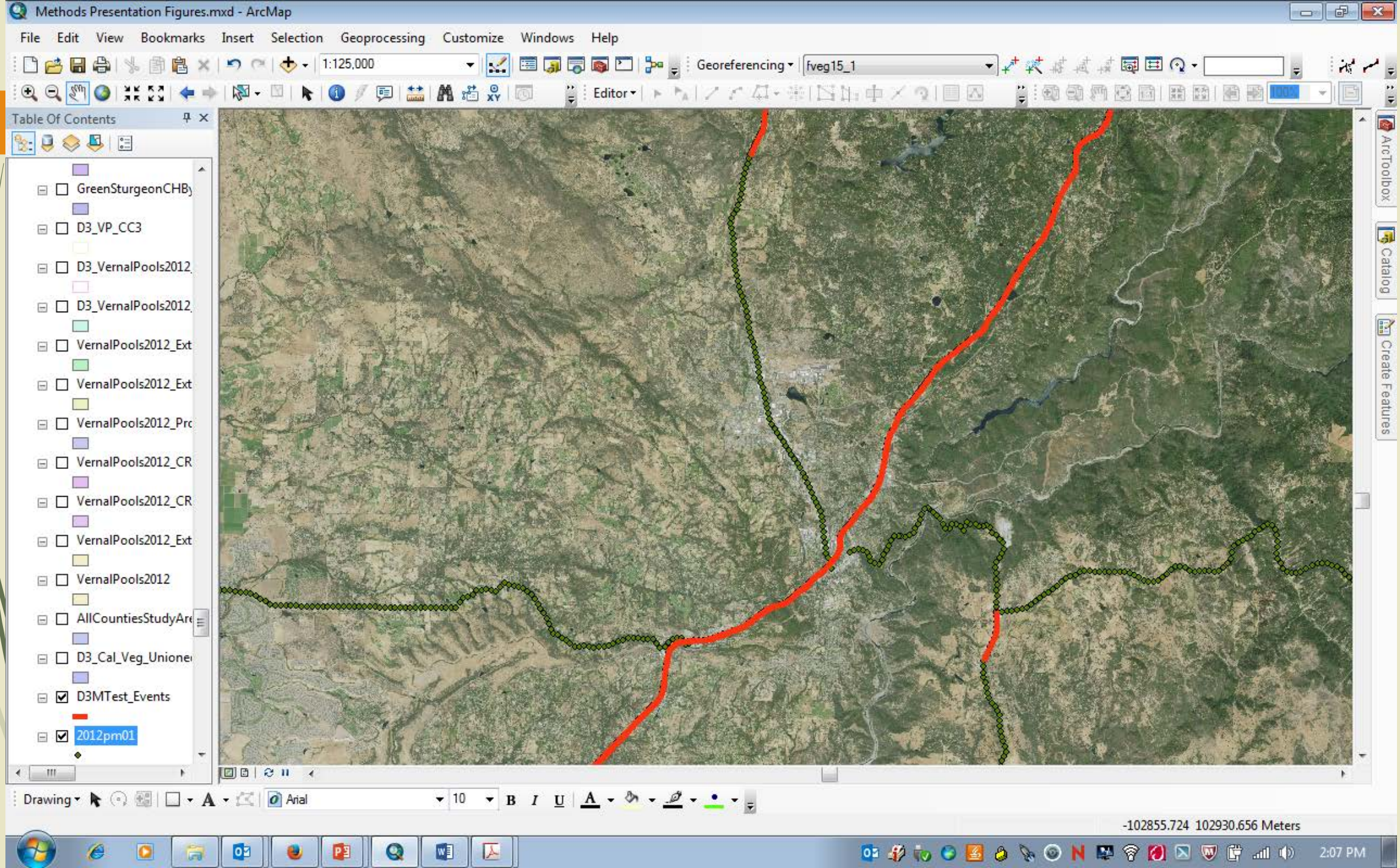
I. Create a new Personal Geodatabase using ArcCatalog
(Do not create the new geodatabase in Access)

1. Open ArcCatalog
2. In ArcCatalog, right-click the file folder in the ArcCatalog "tree" where you want the create the new personal geodatabase
3. Point to New > Personal Geodatabase
4. Type a new name, if desired, and click Enter
5. Close ArcCatalog

II. Import data file into the new personal geodatabase:

1. Open your personal geodatabase with Access
2. Click File > Get External Data > Import ...
3. Navigate to your input data file location
4. Click 'Files of Type' and select the appropriate type (csv, etc) for your file
5. Locate the input data file and click Import (Wizard will start)
6. for text, csv files , select Delimited
7. for Excel files, select the appropriate sheet
8. Click Next
9. Select the appropriate 'delimiter' that separates the fields
10. for text and csv files, it's usually 'comma'
11. Select the First Row Contains Field Names checkbox, and click Next
12. Select to store the data 'In A New Table', and click Next
13. Under Field Options, select No for Indexed, and click Next
14. Select the No Primary Key checkbox, and click Next
15. Name the table, if desired, and click Finish to complete the import
16. Close Access

This completes the preparation process for input data files. When you use the Postmile Validation Wizard, you will be using your new, populated geodatabase feature class as your input data.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Develop Project Footprints

- Overlay roadway line feature layer with orthoscopic imagery (e.g. NAIP)
- Add a field for roadway buffer width
- For each road, measure the average width of the road and enter that value in the field.
- Generate a buffer around the roadways using the roadway buffer width field
- Join roadway project data to the roadway buffers
- Add a field for project type
- Join a table with project type and footprint buffer widths for that project type
- Generate a second buffer around the roadway buffer based on the footprint buffer width field. This buffer will provide the buffer footprint

Proejct Type	Buffer Distance
Construct new interchange	220
Interchange improvement/reconstructior	220
New bridge	100
Seismic retrofit	100
Realignment	40
Widen Road 1 Lane	20
Widen Road 2 Lane	40
Widen Road 3 Lane	60
Widen Road 4 Lane	80
Widen Road 5 Lane	100
Widen Road 6 Lane	120
Bridge rail replacement/upgrade	20
Bridge scour or other bridge work	20
Drainage system restoration (culverts)	20
Construct turn lane	15
Widen shoulder	15
Pedestrian facility	10
Roadside rest area/park and ride	10
Install traffic lights/signs/TOS	5
Install ramp metering	5
N/A	0
Stabilize slope	30

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  - WETLAND_TY
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  - Freshwater Emer
  - Freshwater Fores
  - Freshwater Pond
  - Lake
  - Other
  - Riverine
- D3_CalVegCAMP

ArcToolbox Catalog Create Features

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Species Impact Estimation

- Add vegetation layer to represent species habitat
  - CWHR Code
  - Use best available spatial data set
    - VegCAMP
    - CalVeg
    - FRAP
- For each Listed and special status species in the region
  - Create centroid point layers from the CNDDB occurrences
  - Generate 2 mile and 4 mile buffers around them (to produce a range of values
- Intersect theses buffers with both the vegetation and roadway footprint layer
- Select the appropriate habitat types by CWHR code from the intersection layer
  - Use the CWHR database
  - Use High value habitat types
- Calculate the impact area
  - Add field for area
  - “Calculate Geometry” in the field
  - Produce a summary table adding the area values

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- D3_Counties
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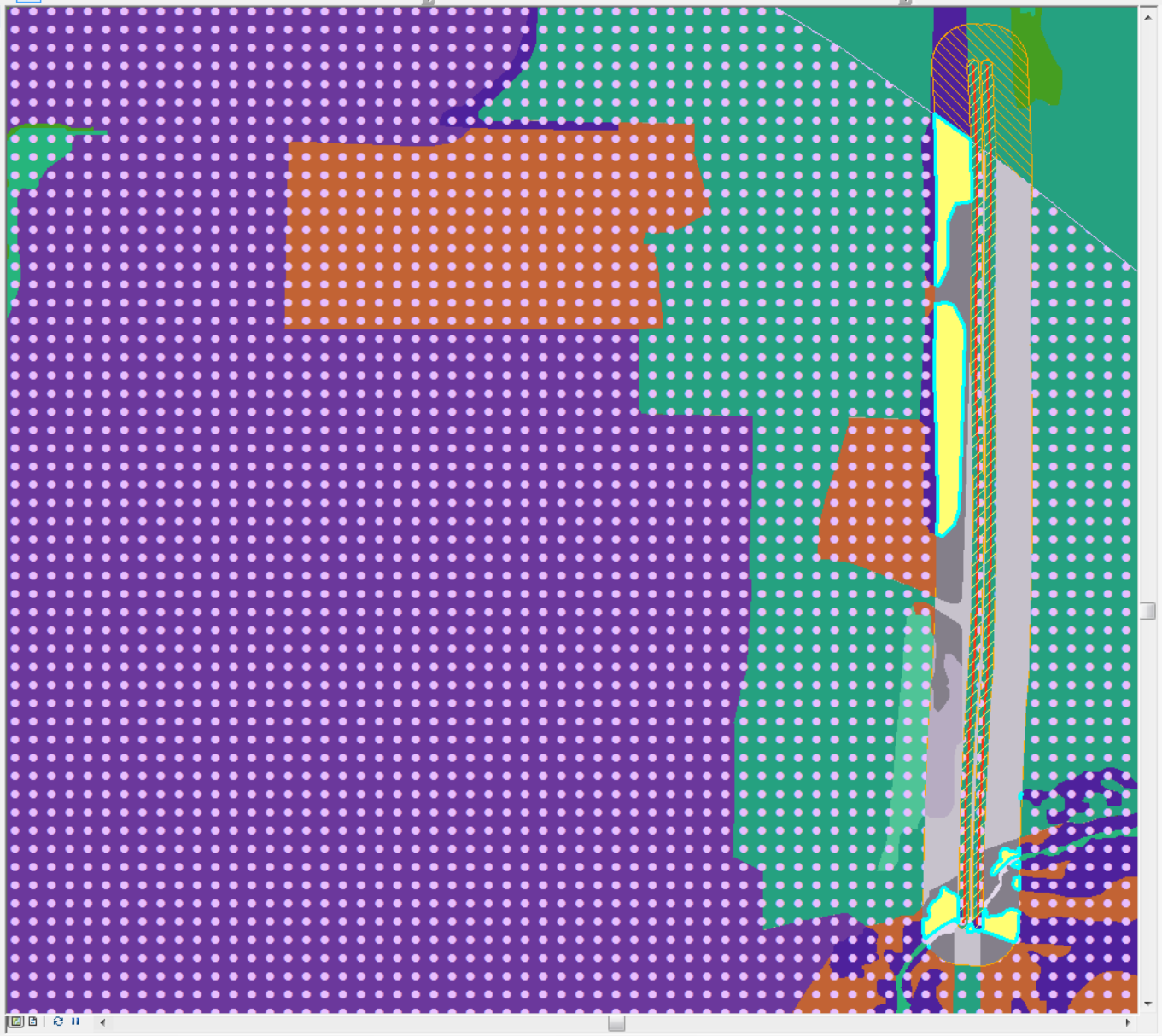

Table

WYBC_Habitat_Impacts_per_CalVegCAMP

FromBufDst	ToBufDist	county	route	bpm	epm	prdescr	CWHRCODE	Area_Acres
2	4	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	VRI	0.00048
2	4	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	VRI	5.151935
2	4	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	VRI	6.187855
2	4	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	VRI	0.239271
2	4	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	VRI	0.029665
2	4	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	VRI	0.057196
2	4	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	VRI	0.896037
2	4	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	VRI	0.006658
2	4	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	VRI	0.789333
2	4	BUT	99	45.5	45.5	SUB-SCOUR MITIGATION	CRP	0.102397
2	4	BUT	99	45.5	45.5	SUB-SCOUR MITIGATION	CRP	0.004926

0 (9 out of 11 Selected)

WYBC_Habitat_Impacts_per_CalVegCAMP

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Number of features selected: 9

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Wetlands Impact Analysis

- Start with footprint layer
- Add NWI data layer
- Intersect footprint with NWI
- Calculate impacts in attribute resulting table
  - Add area field
  - Calculate Geometry
- Produce summary table, adding impacts

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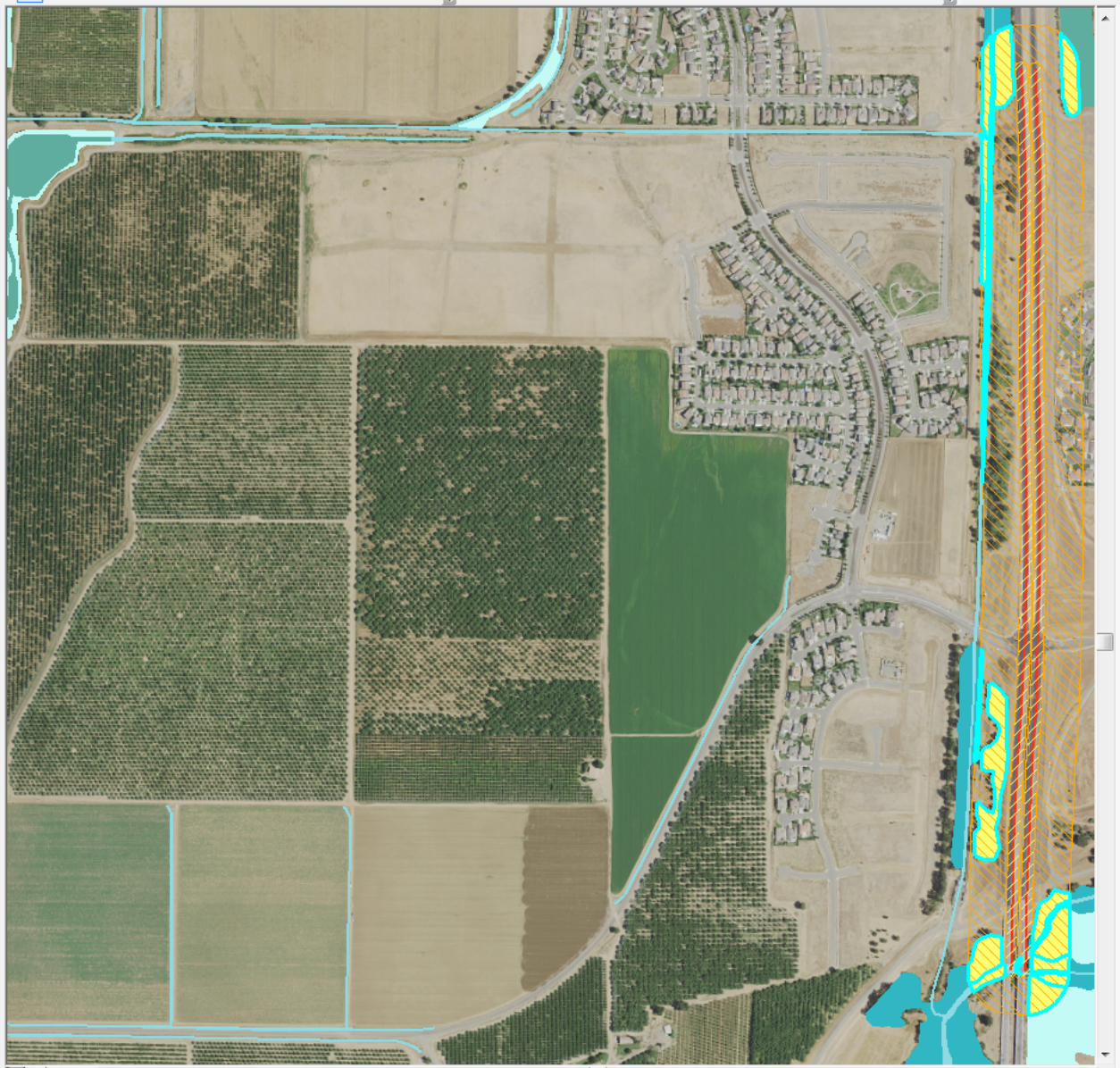

Table

WetlandsXFPSep

WETLAND_TY	count	route	bpm	epm	prdescr	Impact (acre
Freshwater Forested/Shrub Wetland	NEV	49	8.8	0	FIX HIGHWAY EMBANKMENT	0.041964
Lake	NEV	80	28	28	SUB STRUCTURE MITIGATION AND BRIDGE DECK POLYE	0.186247
Freshwater Pond	PLA	65	R15	R23.8	CONSTRUCT SOUTHBOUND LANES	0.647
Freshwater Emergent Wetland	PLA	65	R15	R23.8	CONSTRUCT SOUTHBOUND LANES	0.003848
Freshwater Pond	PLA	65	R15	R23.8	CONSTRUCT SOUTHBOUND LANES	0.319164
Freshwater Emergent Wetland	PLA	65	R15	R23.8	CONSTRUCT SOUTHBOUND LANES	0.109015
Freshwater Pond	PLA	65	R15	R23.8	CONSTRUCT SOUTHBOUND LANES	0.278164
Freshwater Emergent Wetland	PLA	65	R15	R23.8	CONSTRUCT SOUTHBOUND LANES	0.008963
Freshwater Emergent Wetland	PLA	80	5.1	14.5	PAVEMENT REHAB AND OVERLAY	0.007844
Freshwater Forested/Shrub Wetland	PLA	80	34.9	34.9	REPAIR CUT SLOPE	0.067475
Riverine	PLA	80	34.9	34.9	REPAIR CUT SLOPE	0.018134
Lake	PLA	80	34.9	34.9	REPAIR CUT SLOPE	0.130542
Riverine	PLA	80	34.9	34.9	REPAIR CUT SLOPE	0.125845
Freshwater Emergent Wetland	PLA	89	0	T8.6	REHAB PAVEMENT AND DRAINAGE SYSTEM	0.453595
Freshwater Emergent Wetland	PLA	89	0	T8.6	REHAB PAVEMENT AND DRAINAGE SYSTEM	0.044593
Freshwater Emergent Wetland	PLA	89	0	T8.6	REHAB PAVEMENT AND DRAINAGE SYSTEM	0.04374
Freshwater Emergent Wetland	PLA	89	0	T8.6	REHAB PAVEMENT AND DRAINAGE SYSTEM	0.058629
Riverine	PLA	89	0	T8.6	REHAB PAVEMENT AND DRAINAGE SYSTEM	0.206904
Freshwater Forested/Shrub Wetland	PLA	174	1.7	2.4	REHABILITATE CULVERTS	0.004097
Freshwater Forested/Shrub Wetland	PLA	174	1.7	2.4	REHABILITATE CULVERTS	0.064461
Freshwater Forested/Shrub Wetland	PLA	174	1.7	2.4	REHABILITATE CULVERTS	0.007258
Freshwater Forested/Shrub Wetland	PLA	174	1.7	2.4	REHABILITATE CULVERTS	0.068015
Freshwater Emergent Wetland	PLA	267	0	6.8	PAVEMENT REHAB AND WIDEN SHOULDERS	0.633142
Freshwater Emergent Wetland	SAC	5	14.3	15.2	CONSTRUCT NEW INTERCHANGE	0.522141
Riverine	SAC	50	22.1	23.1	CONSTRUCT INTERCHANGE	0.00632
Freshwater Emergent Wetland	SAC	50	22.1	23.1	CONSTRUCT INTERCHANGE	0.147548
Freshwater Emergent Wetland	SAC	50	22.1	23.1	CONSTRUCT INTERCHANGE	0.282794
Riverine	SAC	50	22.1	23.1	CONSTRUCT INTERCHANGE	0.984102
Freshwater Emergent Wetland	SAC	99	35.4	36	CONSTRUCT INTERCHANGE(FULL SQUARE PARTIAL CL	0.122557
Riverine	SUT	99	27.7	27.7	EXPAND PARK AND RIDE FACILITY	0.661029
Riverine	SUT	99	R31.2	R31.2	WIDEN AND SIGNALIZE OFFRAMPS	0.16878
Riverine	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.995704
Freshwater Forested/Shrub Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	1.135235
Freshwater Forested/Shrub Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.614442
Freshwater Forested/Shrub Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.741917
Freshwater Pond	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.908702
Freshwater Forested/Shrub Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.14514
Freshwater Forested/Shrub Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	2.308039
Freshwater Forested/Shrub Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.894903
Freshwater Forested/Shrub Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.592199
Riverine	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.092335
Freshwater Emergent Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.974381
Freshwater Forested/Shrub Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.008881
Freshwater Forested/Shrub Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.397162
Freshwater Forested/Shrub Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.264432
Freshwater Emergent Wetland	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.753304
Riverine	YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	0.49019

(16 out of 71 Selected)

Number of features selected: 16

-133554.025 107964.749 Meters

Calculate Stream Impacts

- Start with Footprint layer
- Add National Hydrology Dataset Flowline
  - Line feature
- Join a table providing stream corridor width based on stream order
- Generate buffer around streams based on buffer width field
- Intersect stream buffer with footprint layer
- Calculate impact area in the resulting attribute table
  - Add field
  - Calculate geometry
- Produce a summary table

Methods Presentation Figures.mxd - ArcMap

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Table

D3_Stream_Impacts_Separate_Footprints

county	route	bpm	epm	prdescr	Impact (acres)
PLA	28	9.2	10.3	INSTL CURB,GTRS,SDWLK,SGNL & DRAIN	0.060596
PLA	28	9.2	10.3	INSTL CURB,GTRS,SDWLK,SGNL & DRAIN	0.062293
PLA	28	9.2	10.3	INSTL CURB,GTRS,SDWLK,SGNL & DRAIN	0.064828
PLA	28	9.2	10.3	INSTL CURB,GTRS,SDWLK,SGNL & DRAIN	0.061385
BUT	99	45.5	45.5	SUB-SCOUR MITIGATION	0.139004
YOL	80	0.2	5.7	SHOULDERS TO BE WIDENED	1.346331
ED	50	67.6	72.9	STORM WATER QUALITY IMPROVEMENTS	0.061536
ED	50	67.6	72.9	STORM WATER QUALITY IMPROVEMENTS	0.032874
ED	50	67.6	72.9	STORM WATER QUALITY IMPROVEMENTS	0.073436
ED	50	67.6	72.9	STORM WATER QUALITY IMPROVEMENTS	0.060807
ED	50	67.6	72.9	STORM WATER QUALITY IMPROVEMENTS	0.126062
ED	50	67.6	72.9	STORM WATER QUALITY IMPROVEMENTS	0.061573
ED	50	67.6	72.9	STORM WATER QUALITY IMPROVEMENTS	0.204528
ED	50	67.6	72.9	STORM WATER QUALITY IMPROVEMENTS	0.135575
ED	50	67.6	72.9	STORM WATER QUALITY IMPROVEMENTS	0.786954
ED	50	67.6	72.9	STORM WATER QUALITY IMPROVEMENTS	0.121883
ED	50	73.7	75.4	STORM WATER QUALITY IMPROVEMENTS OVERLAY, WIDEN SHLDR, REPL CULVERTS	0.112206
ED	50	73.7	75.4	STORM WATER QUALITY IMPROVEMENTS OVERLAY, WIDEN SHLDR, REPL CULVERTS	0.060462
ED	50	73.7	75.4	STORM WATER QUALITY IMPROVEMENTS OVERLAY, WIDEN SHLDR, REPL CULVERTS	0.065718
ED	50	77.3	79.3	STORM WATER QUALITY IMPROVEMENTS	0.060494
ED	50	77.3	79.3	STORM WATER QUALITY IMPROVEMENTS	0.082105
ED	50	77.3	79.3	STORM WATER QUALITY IMPROVEMENTS	0.062564
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.062355
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.060375
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.077613
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.124705
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.146959
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.061471
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.12576
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.062031
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.062448
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.060739
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.115579
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.155137
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.076019
ED	89	8.6	13.8	STORM WATER QUALITY IMPROVEMENTS O/L, ADD DIKES AND RETENTION BASINS	0.060294
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.06313
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.066065
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.032535
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.066463
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.074087
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.035891
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.06047
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.025829
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.130474
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.078796
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.091791
ED	89	18	24.9	STORM WATER QUALITY IMPROVEMENTS O/L, WIDEN, ADD DIKES & RET BASINS	0.094266

(1 out of 252 Selected)

D3_Stream_Impacts_Separate_Footprints

-132946.142 107876.369 Meters

Next Steps

- Currently testing these methods against permitted projects in District 3, comparing estimated impacts to actual impacts
- Sources of discrepancies
  - Project footprint size
  - Habitat type classification
  - Avoidance and minimization
  - Field studies
- Revise Methods in consultation with the resource agencies
- Publish guidance
- Provide training