SEDIMENT DISCHARGE AND EROSION ASSESSMENT REPORT (SDEAR)

BUENA VISTA COALITION
WASTE DISCHARGE REQUIREMENTS GENERAL ORDER FOR GROWERS WITHIN THE TULARE LAKE BASIN AREA THAT ARE MEMBERS OF A THIRD-PARTY GROUP
Order R5-2013-0120

BSK E15-007-01F

PREPARED FOR:

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FEBRUARY 3, 2015

SEDIMENT DISCHARGE AND EROSION ASSESSMENT REPORT (SDEAR) BUENA VISTA COALITION

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BSK E15-007-01F

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Table of Contents

1 INTRODUCTION 1

2 RISK CALCULATION 1

2.1 ESTIMATED ANNUAL SOIL LOSS 1

2.3 RECEIVING WATER BODIES 2

3 RISK DETERMINATION 3

4 REFERENCES 3

Figures

Figure 1: Vicinity Map
Figure 2: Isoerodent Values (R)
Figure 3: Soil-Erodibility (K)
Figure 4: Length Slope Factor (LS)
Figure 5: RULSE Estimated Soil Loss
Figure 6: Rivers/Stream
Figure 7: High Risk Areas

1 INTRODUCTION

BSK Associates (BSK) has prepared this Sediment Discharge and Erosion Assessment Report (SDEAR) for the Buena Vista Water Quality Coalition (Coalition). The boundaries of the Coalition are presented on Figure 1. This SDEAR is required by Section VIII (F) of the California Regional Water Quality Control Board (CRWQCB) Order R5-2013-0120 "*Waste Discharge Requirements General Order for Growers within the Tulare Lake Basin Area that are Members of a Third-Party Group*".

Section VI of the Monitoring and Reporting Program (MRP) of the order states:

> *"The third-party shall prepare a Sediment Discharge and Erosion Assessment Report. The report shall be submitted to the Executive Officer for review. The goal of the report is to determine which irrigated agricultural areas within the Western Tulare Lake Basin Area are subject to erosion and may discharge sediment that may degrade surface waters. The objective of the report is to determine which Member operations are within such area, and need to develop a Sediment and Erosion Control Plan. The report must be developed to achieve the above goal and objective and must at a minimum, provide a description of the sediment and erosion areas as a series of ArcGIS shape files with a discussion of the methodologies utilized to develop the report."*

This report presents the discussion of methodologies utilized to develop the report. The ArcGIS shape files are submitted as a separate attachment.

2 RISK CALCULATION

The potential risk is based on two factors. The estimated annual soil loss and the estimated distance to a surface water body. A discussion of these two factors is presented in the following sections.

2.1 ESTIMATED ANNUAL SOIL LOSS

BSK adapted the Revised Universal Soil Loss Equation (RUSLE) to estimate annual soil loss. BSK selected the RUSLE method as the CRWQCB has developed and adapted this method for use with the California's *National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities*. The CRWQCB develop GIS information for the factors used in the RULSE equation.

RULSE is composed of six factors that are used to calculate an estimated loss of top soil due to rainfall erosion. The RULSE equation is presented below:

$$A = (R) \times (K) \times (L) \times (S) \times (C) \times (P)$$

Where,

A – Estimated soil loss in tons per acre per year (tons/acre-yr)
R – Rainfall Erosivity
K – Soil Erosivity
L – Length of the slope
S – Steepness of the slope
C – Crop coefficient
P – Practice coefficient

The length of the slope (L) and the steepness of the slope (S) were combined by the CRWQCB in their GIS data set and are therefore presented together as the factor LS. It is noted for this discussion the crop coefficient and the practice coefficient are conservatively taken as 1 for this discussion and are therefore excluded.

Rainfall erosivity is presented as isoerodent maps in the US EPA *Stormwater Phase II Final Rule* (Revised 2012). The isoerodent maps developed for the area surrounding the Coalition are presented on Figure 2. The closest isoerodent line to the Coalition boundary is 10, therefore an R value of 10 was used for calculations throughout the Coalition.

GIS data for K and LS are available from the State Water Resources Control Boards' ftp server at ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk . The K factor for the Coalition is presented on Figure 3, and LS is presented on Figure 4.

Combining the GIS data for R, K and LS provides an estimated soil loss in tons per acre per year (ton/acre-yr) which is presented on Figure 5.

2.2 APPLICABLE SOIL LOSS THRESHOLDS

The National Resources Conservation Service (NRCS) classification for sustainable agriculture soil loss is 5 tons/acre (McCormack, 1982). This is a conservative value compared to the CRWQCB's *NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* which uses a threshold of 15 tons/acre per project length as the threshold between low sediment erosion risk and medium sediment erosion risk.

BSK chose the 5 tons/acre-yr threshold as it is more conservative value and is used by the NRCS as a sustainable agricultural practice.

2.3 RECEIVING WATER BODIES

The Coalition's sampling and analysis plan includes surface water sampling of canals and drains through the Coalition's boundaries. BSK could not identify natural surface water bodies that were adjacent to agricultural (farm) operations. Therefore these water bodies are used as potential receiving water

bodies, although through maintenance and the operation of man-made (i.e. concrete, metal) structures, sediment accumulation throughout this system can be minimized. The location of these canals and drains are presented on Figure 6.

For purposes of this discussion, BSK assumes that no farmland is greater than 500 meters in length. Farms located at a greater distance are presumed to have discharge which would be comingled or infiltrated before reaching surface water bodies. Therefore, areas farther than 500 meters from the surface water receiving bodies are excluded from further analysis.

3 RISK DETERMINATION

The estimated soil loss (Figure 5) was overlaid with the 500 meter surface water boundaries (Figure 6) to determine areas of high sedimentation risk. These areas are presented on Figure 7.

The final risk determination indicates that that all farms within the Coalition would meet the “low risk” criteria in regards to sedimentation of water bodies.

4 REFERENCES

SWRCB. *State Water Resources Control Board: Division of Water Quality. Construction general Permit Fact Sheet, 2009, amended by 2019-0014 Department of Water Quality*, page 28, January 30, 2015.

McCormack D.E., Young K.K., Kimberlin L.W. 1982. *Current criteria for determining soil loss tolerance In Determinants of Erosion Tolerance, ed*. Karl D.M., 95-111. Madison: American Society of Agronomy.

FIGURES

Coalition Boundary

Legend

Coalition Boundary (Buena Vista Coalition)

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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N W E S

0 2.5 5 10 Miles

1 inch = 5 miles

Date Saved: 2/3/2015

By: MBC

Coordinate System:
NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Projection: Lambert Conformal Conic
Datum: NAD 1983 2011
Units: Foot US

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Figure 1
Vicinity Map
BSK Project E1500701F

Document Path: T:\GIS-Files\Project-Files\E1500701F - Buena Vista SDEAR\Figure 1 Vicinity Map.mxd

Document Path: T:\GIS-Files\Project-Files\E1500701F - Buena Vista SDEAR\Figure 2 IsoR values.mxd

Coalition Boundary

Legend

- Coalition Boundary (Buena Vista Coalition)
- Isoerodent Value Contour

BSK Associates Engineers & Laboratories

N W E S

0 4 8 16 Miles

1 inch = 8 miles

Date Saved: 2/3/2015

By: MBC

Data Source: SWRCB, ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/RUSLE/RUSLE_R_Factor/ accessed Jan. 2015

Coordinate System:
NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Projection: Lambert Conformal Conic
Datum: NAD 1983 2011
Units: Foot US

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Figure 2
Isoerodent Values
BSK Project E1500701F

Coalition Boundary

Legend

- Coalition Boundary (Buena Vista Coalition)

Soil-Erodibility Factor (K)

- 0.15 - 0.16
- 0.17 - 0.18
- 0.19 - 0.2
- 0.21 - 0.22
- 0.23 - 0.24
- 0.25 - 0.26
- 0.27 - 0.28
- 0.29 - 0.3
- 0.31 - 0.32
- 0.33 - 0.34
- 0.35 - 0.36
- 0.37 - 0.38
- 0.39 - 0.4
- 0.41 - 0.42
- 0.43 - 0.44

Document Path: T:\GIS-Files\Project-Files\E1500701F - Buena Vista SDEAR\Figure 3 K values.mxd

N W E S

0 2.5 5 10 Miles

1 inch = 5 miles

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Date Saved: 2/3/2015

By: MBC

Data Source: SWRCB, ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/RUSLE/RUSLE_K_Factor/ accessed Jan. 2015

Coordinate System:
NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Projection: Lambert Conformal Conic
Datum: NAD 1983 2011
Units: Foot US

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Figure 3
Soil-Erodibility Factor (K)
BSK Project E1500701F

Document Path: T:\GIS-Files\Project-Files\E1500701F - Buena Vista SDEAR\Figure 4 LS values.mxd

Coalition Boundary

Legend

- Coalition Boundary (Buena Vista Coalition)

Length Slope Factor (LS)

- 0.1 - 2
- 2.1 - 4
- 4.1 - 6
- 6.1 - 8
- 8.1 - 10
- 10.1 - 12
- 12.1 - 14
- 14.1 - 16
- 16.1 - 18

N W E S

0 2.5 5 10 Miles

1 inch = 5 miles

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Date Saved: 1/30/2015

By: MBC

Data Source: SWRCB, ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/RUSLE/RUSLE_LS_Factor/ accessed Jan. 2015

Coordinate System:
NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Projection: Lambert Conformal Conic
Datum: NAD 1983 2011
Units: Foot US

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Figure 4
Length Slope Factor (LS)
BSK Project E1500701F

Document Path: T:\GIS-Files\Project-Files\E1500701F - Buena Vista SDEAR\Figure 5 soil loss.mxd

Coalition Boundary

Legend

- Coalition Boundary (Buena Vista Coalition)

RUSLE Estimated Soil Loss (tons/acre, one year)

- 0 - 5
- 5.1 - 10
- 10.1 - 15
- 15.1 - 20
- 20.1 - 25
- 25.1 - 30
- 30.1 - 35
- 35.1 - 40
- 40.1 - 45
- >45

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0 2.5 5 10 Miles

1 inch = 5 miles

Date Saved: 2/2/2015

By: MBC

Coordinate System:
NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Projection: Lambert Conformal Conic
Datum: NAD 1983 2011
Units: Foot US

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Figure 5
RUSLE Estimated Soil Loss
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Document Path: T:\GIS-Files\Project-Files\E1500701F - Buena Vista SDEAR\Figure 6 Riversa.mxd

Coalition Boundary

Legend

- Coalition Boundary (Buena Vista Coalition)
- Rivers/Streams (Canals)
- 500 Meter Buffer Rivers/Streams (Canals)

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N W E S

0 2.5 5 10 Miles

1 inch = 5 miles

Date Saved: 2/3/2015

By: MBC

Data Source: RiverStreams (Canals) Location from Buena Vista Water Storage District GIS files, supplied January 2015

Coordinate System:
NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Projection: Lambert Conformal Conic
Datum: NAD 1983 2011
Units: Foot US

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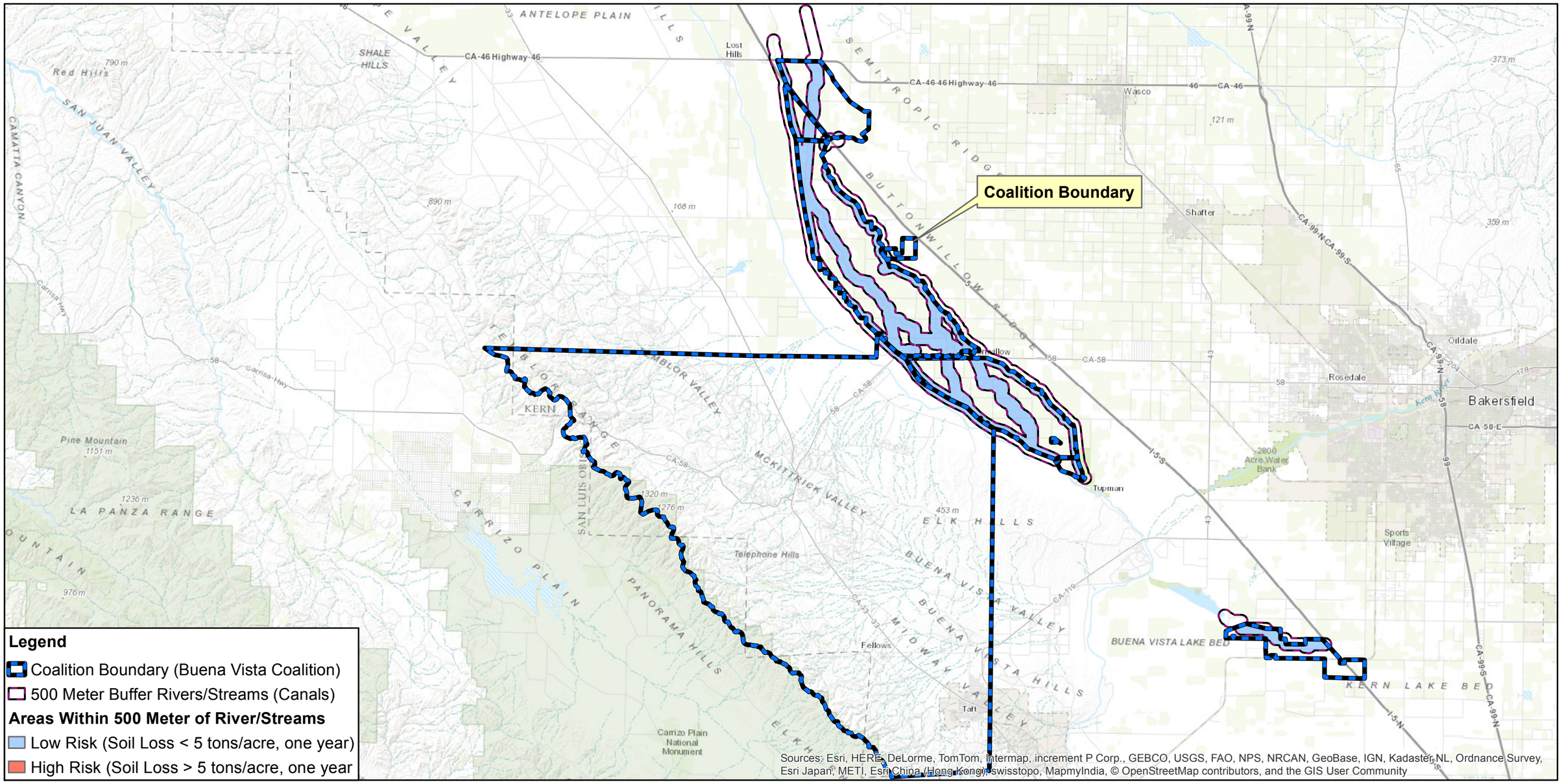
Figure 6
Rivers/Stream
BSK Project E1500701F

Document Path: T:\GIS-Files\Project-Files\E1500701F - Buena Vista SDEAR\Figure 7 High Risk.mxd



Legend

- Coalition Boundary (Buena Vista Coalition)
- 500 Meter Buffer Rivers/Streams (Canals)

Areas Within 500 Meter of River/Streams

- Low Risk (Soil Loss < 5 tons/acre, one year)
- High Risk (Soil Loss > 5 tons/acre, one year

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N W E S

0 2.5 5 10 Miles

1 inch = 5 miles

Date Saved: 2/3/2015

By: MBC

Data Source: RiverStreams (Canals) Location from Buena Vista Water Storage District GIS files, supplied January 2015

Coordinate System:
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Figure 7
High Risk Areas
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