URS

June 22, 2009

Ms. Etayenesh (Ty) Asfaw
Environmental Policy Analyst
Water and Wetlands Department
National Association of Home Builders
1201 15th St. NW
Washington, DC 20005

Subject: Analysis of 2009 Draft Construction General Permit Risk Determination

Dear Ms. Asfaw:

URS Corporation (URS) is pleased to present this revised technical memorandum on the analysis of the 2009 Draft Construction General Permit Risk Determination. The technical memorandum was revised to address comments received from the California Building Industry Association. A similar analysis was performed last year (see June 2008 memorandum) using the previous Risk Calculation method under a 2008 Draft Construction General Permit. The 2009 Risk Calculation methods were revised based on public comment to address several issues of concern. An evaluation of the 2009 Risk Calculations resulted in an improved representation for the 14 project site surveyed in 2008. In contrast to the 2008 results for the 14 project sites, the Combined Risks are more reflective of a normal distribution with the Sediment Risk factors being slightly skewed low, and the Receiving Water Risk slightly skewed high. The Statewide and Probable Area of Development was assessed using the 2009 risk calculation. Results indicate the Combined Risk level to be more reflective of a normal distribution compared to the 2008 assessment. There are some corrections required within the 2009 Risk Calculation worksheets that are described within this memorandum, and recommendations to clarify risk factors and provide improved data sources.

Sincerely,

URS CORPORATION

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EFO:ml

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F I N A L   R E P O R T

ANALYSIS OF 2009 DRAFT CONSTRUCTION GENERAL PERMIT RISK DETERMINATION

Prepared for

Water and Wetlands Department
National Association of Home Builders
1201 15th St. NW
Washington, DC 20005

URS Project No. 20500319.00001

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ATS	Active Treatment System
CBIA	California Building Industry Association
CGP	Construction General Permit
COLD	Cold Freshwater Habitat Beneficial Use
CWA	Clean Water Act
GIS	Geographic Information System
K	Soil Erodibility Factor
LS	Hillslope-length Factor, L, and a Hillslope-Gradient Factor, S.
MIGR	Fish Migration Beneficial Use
NAL	Numeric Action Level
NOI	Notice of Intent
PRD	Permit Registration Documents
R	Rainfall Erosivity Factor
RWQCB	Regional Water Quality Control Board
SPAWN	Fish Spawning Habitat Beneficial Use
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
URS	URS Corporation

SECTION 1 INTRODUCTION

1.1 BACKGROUND

The California State Water Resources Control Board (SWRCB) released the Draft Construction General Permit (CGP) in April 2009. A previous Draft CGP had been release in 2008 and was followed by several comments and revisions resulting in the current 2009 Draft CGP. The CGP regulates stormwater and authorized non-stormwater runoff from construction sites. Under the Draft CGP conditions, to obtain coverage, dischargers must electronically file the Permit Registration Documents (PRDs), which includes a Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and other compliance related documents required by the CGP and mail the appropriate permit fee to the State Water Resources Control Board (SWRCB).

Many stakeholders supported the risk-based approach in the 2008 Draft CGP. However, assessment of the 2008 Risk Calculation procedures indicated results skewed toward high risk site identification. Public comment on the 2008 Draft CGP resulted in changes to the risk calculation approaches in an attempt to more equitably distribute sediment and receiving water risks in combination with an effective protection of waterbodies from construction site runoff impacts.

The 2009 Draft CGP contains an approach for estimating both sediment and receiving water risks separately, and an overall combined risk determination framework that reflects an applicable levels of implementation and monitoring for three risk levels.

A project's sediment risk and receiving water risk is calculated using the methodology in Appendix 1 of the 2009 Draft CGP. The discharger shall notify the SWRCB of the project's Risk Level determination(s) and shall include this as a part of the PRDs submittal. If it is determined that a discharger resides within more than one Risk Level designation, the Regional Water Board (RWQCB) may choose to break the project into separate levels of implementation.

1.1.1 Sediment Risk Factor Calculation

Figure 1-1 shows the Sediment Risk Factor Calculation Worksheet that is included in Appendix 1 of the CGP. The following factors are used to calculate sediment risk, which are based on the Revised Universal Soil Loss Equation (RUSLE):

- Rainfall Erosivity (R);
- Soil Erodibility (K); and
- Topography (LS).

Each of these factors is defined in Appendix 1 of the 2009 Draft CGP. These three factors are multiplied together to determine an erosion potential in tons per acre – specific to a temporal range defined in the R value. The 2008 Draft CGP also utilized a similar Sediment Risk Factor Calculation, but the benchmark conditions ranking the risk (*e.g.*, Low, Medium, and High) have been adjusted. The 2009 Site Sediment Risk Factor is defined as follows:

Low: <15 ton/acre
Medium: ≥15 and ≤75 tons/acre
High: ≥ 75 tons/acre

Figure 1-1
Sediment Risk Factor Worksheet - 2009

Sediment Risk Factor Worksheet	Entry
A) R Factor	
Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm to determine the R factor for the project site.	
http://cfpub.epa.gov/npdes/stormwater/waiver.cfm	
R Factor Value	40.11
B) K Factor (weighted average, by area, for all site soils)	
The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Refer to GIS Map provided or site-specific data (requires submittal of supporting data).	
K Factor Value	0.45
C) LS Factor (weighted average, by area, for all slopes)	
The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use GIS Map provided or LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.	
LS Factor Value	0.01
Watershed Erosion Estimate (=RxKxLS) in tons/acre	0.180495
Site Sediment Risk Factor Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >/=15 and <75 tons/acre High Sediment Risk: >/= 75	**Low**

1.1.2 Receiving Water Risk Factor Calculation

Figure 1-2 shows the Receiving Water Risk Factor Calculation Worksheet that is included in Appendix 1 of the 2009 Draft CGP. The Receiving Water Assessment Method was greatly simplified from the 2008 Draft CGP version with factors of concerns limited to the following receiving water risk factors:

- Discharges to a Clean Water Act (CWA) 303(d)-listed water body impaired by sediment.
- Discharge to a waterbody with designated beneficial uses of COLD, MIGR, or SPAWN.

The 2009 Draft CGP added MIGR as a beneficial use of concern. Each of these factors is generally described in Appendix 1 of the 2009 Draft CGP with reference to relevant internet sites. The scoring calculation was simplified to rankings of "Low" or "High". The "Medium" ranking was removed from the 2009 Draft CGP. If a project discharges to a waterbody meeting the CWA 303(d) or beneficial use designation, it received a "High" ranking. "Low" ranking designated dischargers do not discharge to those designated waterbodies.

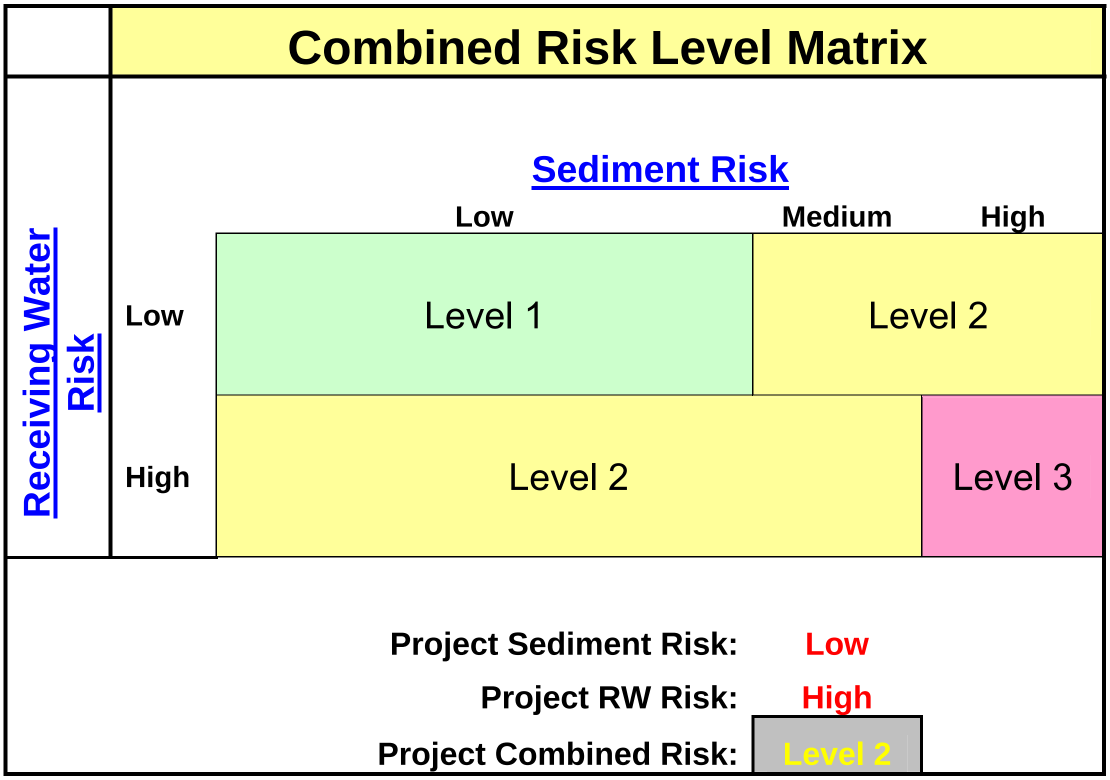
1.1.3 Project Risk Level

Results from the Sediment Risk Level and Receiving Water Risk Level Calculations are used to determine the project's Combined Risk, as defined in the matrix shown in Figure 1-3.

Figure 1-2
Receiving Water Risk Factor Worksheet - 2009

Receiving Water (RW) Risk Factor Worksheet	**Entry**	**Score**
A. Watershed Characteristics	**yes/no**	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? For help with impaired waterbodies please check the attached worksheet or visit the link below:	**Yes**	**High**
2006 Approved Sediment-impared WBs Worksheet		
http://www.waterboards.ca.gov/tmdl/303d_lists2006approved.html		
http://atlas.resources.ca.gov/imaps/atlas/app.asp		
OR		
A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY?		
http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp		

Figure 1-3
Combined Risk Level Matrix - 2009



1.2 OBJECTIVE

The objective of this study was to determine if the risk calculation method proposed in the 2009 Draft CGP reflected a normal distribution of risks for the 14 California Building Industry Association (CBIA) project sites surveyed during 2008. In other words, do most of the sites calculate to be Risk Level 2 with fewer sites calculated to be Risk Levels 1 and 3. Furthermore, another objective was to assess the results of the Risk Calculations for a Statewide and Probable Area of Development analysis.

SECTION 2 METHODOLOGY

URS assessed the project Risk Level calculation using two methods. The first method assessed Risk Level using risk factor data collected from CBIA projects – previously collected for the 2008 analysis. The second method assessed project Risk Level calculations statewide using Geographic Information System (GIS) tools combined with pertinent scenarios. Each of these methods is discussed in more detail below.

2.1.1 CBIA Surveys

In 2008, URS developed a survey form/questionnaire to evaluate the risk level of construction sites. The survey form/questionnaire included questions consistent with the risk factor criteria that were listed in the 2008 Draft CGP; a qualitative assessment was also requested. URS had received completed survey forms/questionnaires from 14 construction sites. URS reviewed and summarized the results of the survey forms, and independently checked the results of each risk factor.

In this 2009 analysis, Risk Calculations were determined using the previous assessment data modified to meet the 2009 changes to the Risk Calculations. Summarized below are the changes that were made to the 2008 Risk Calculation.

Sediment Risk Factor:

- R, K, and LS values for each of the 14 project sites remained the same. However, the benchmark conditions for determining the Risk designation (*i.e.*, "Low", "Medium", or "High") were changed as follows:
  - Low Sediment Risk changed from <1 ton/acre to <15 tons per acre;
  - Medium Sediment Risk changed from ≥ 1 and < 75 tons/acre to ≥ 15 and <75 tons/acre;
  - High Sediment Risk changed from ≥ 75 and < 500 tons/acre to ≥ 75 tons/acre; and
  - Extreme Sediment Risk is no longer used.

Receiving Water Risk Factor:

- The numeric scoring under the 2008 Receiving Water Risk Calculation is no longer used.
- The calculation is simplified to address sites that discharge to:
  - CWA 303(d) listed waterbodies impaired by sediment (direct or indirect discharge);
  - Waterbodies with beneficial uses of COLD, SPAWN, or MIGRATORY;
- A distance proximity to receiving water is no longer a factor (such as within 500 feet of a sensitive receiving water);
- Channel stability is no longer assessed;

- Construction within a sensitive receiving waterbody is no longer considered; and
- ATS use is no longer considered.

In summary, each CBIA project site was assessed to determine 1) the revised Sediment Risk Level; and 2) whether the project site discharged to COLD, SPAWN, or MIGR beneficial use waterbodies or to waterbodies listed on the 2006 CWA 303(d) list or having a TMDL for sedimentation/siltation/turbidity.

2.1.2 GIS Tools Combined with Various Scenarios

URS produced several GIS exhibits covering the State of California examining the sediment risk, receiving water risk, and combined risk factors where possible. A GIS shape file showing areas of probable development was also overlaid onto these figures. Sediment Risk Levels were calculated for both statewide and areas of probable development.

Sediment Risk Factor:

Sediment risk factor exhibits were produced for R, K, and S (L is project specific; several slope lengths scenarios were evaluated). Information for these GIS exhibits was obtained from the following sources:

- The R factor data was obtained from Jesse Pritts, US EPA Office of Water on May 11, 2009, and is shown in Figure 2-1
- The K- factor data was obtained from the NRCS soils data website (http://websoilsurvey.nrcs.usda.gov/app/), and is shown in Figure 2-2.
- The average pre-developed slope (S) was assumed to be the same as the average post-developed slope (S), in percent. The slope was determined from a digital terrain model, and is shown in Figure 2-3. The slope length factor, L, is project specific and its definition is graphically shown in Figure 2-4. A number of slope lengths were evaluated including slope lengths of <3 feet, 300 feet, and 1,000 feet. The relationship between L and S is described in Appendix 1 to the Draft CGP.

Figure 2-1
R-Value (Annual)

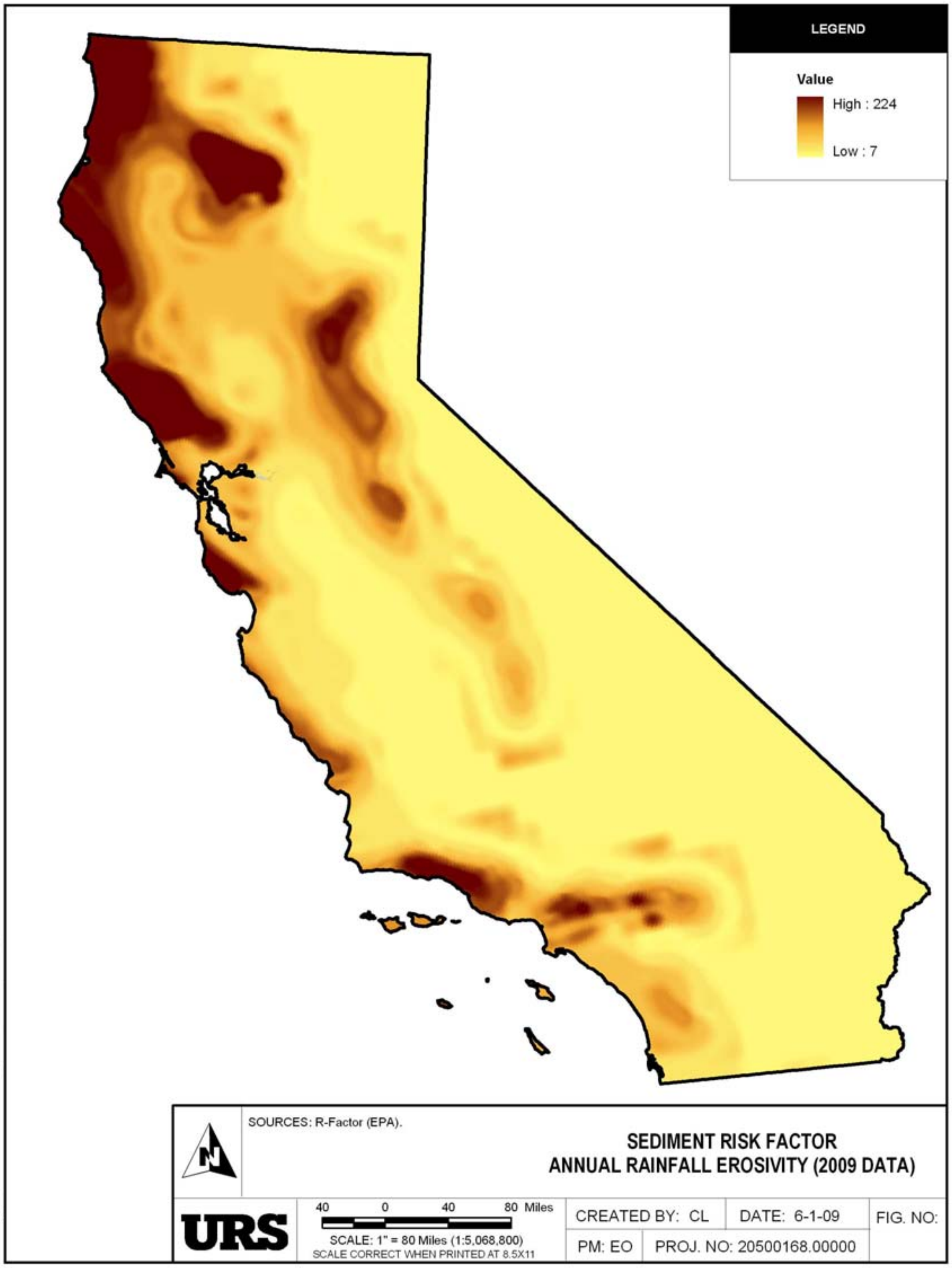


Figure 2-2
K-Factor

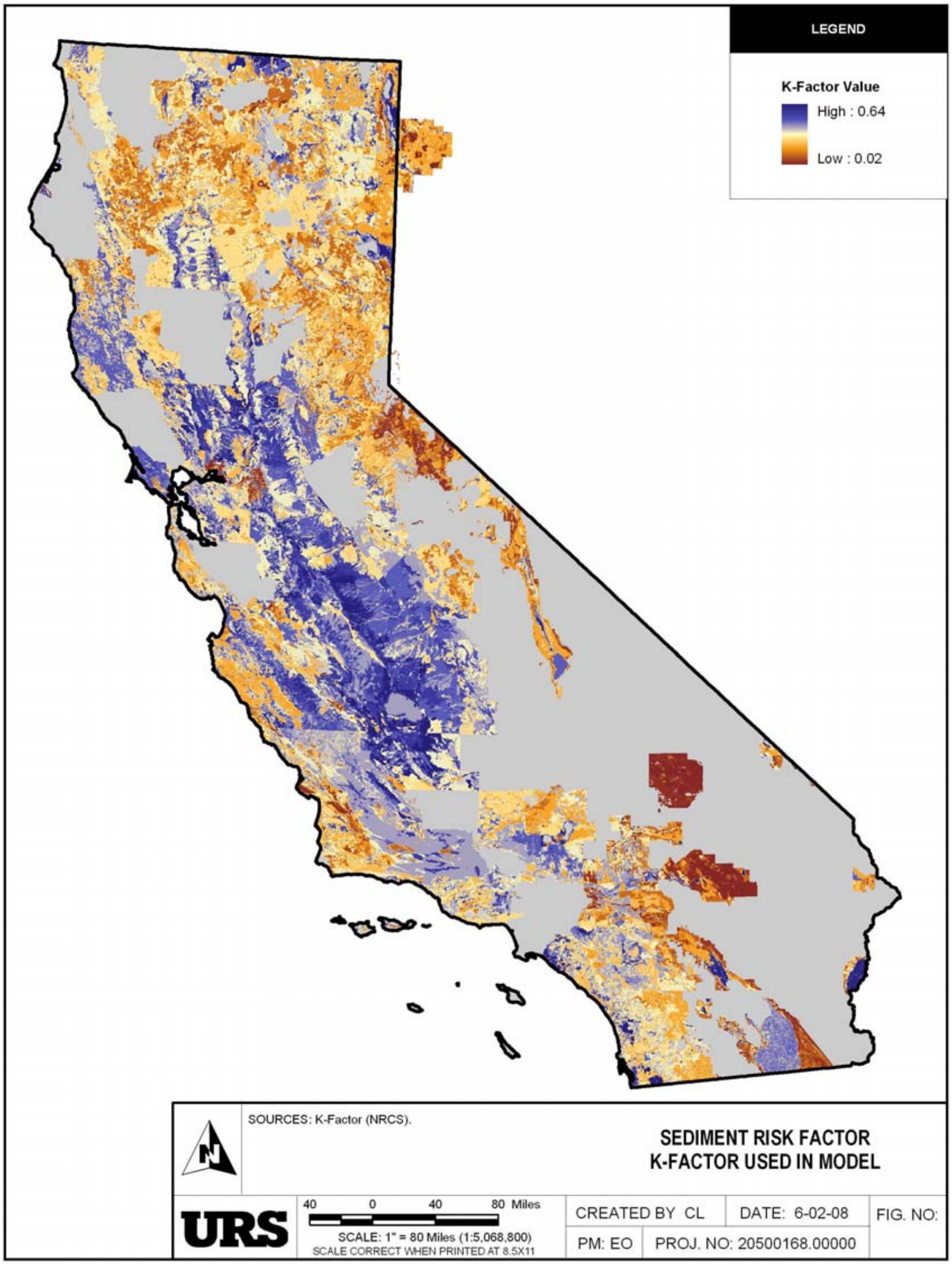
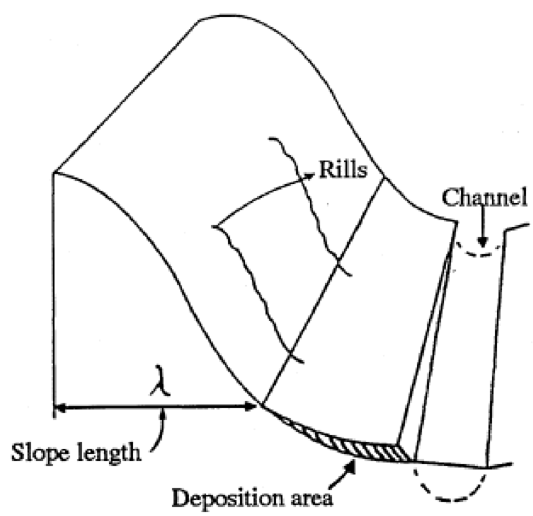


Figure 2-3
Slope (S)

Path: G:\gis\projects\1577\20500168\mxds\slope.mxd, 06/02/09, camille_hill

Figure 2-4
Slope Length (L)



Receiving Water Risk Factor:

URS developed a series of GIS shapefiles to determine the Receiving Water Risk factor. The definitions presented in Section 2.1.1 of this report were applied to this method. The following GIS exhibits were prepared:

- CWA 303(d)-listed receiving waters impaired by sediment.
- Receiving waters with COLD, SPAWN, or MIGR beneficial uses.

Watershed Definitions:

A Hydrologic Sub-area is a subdivision of a Hydrologic Area. A Hydrologic Sub-area is the 5th-level, 10 digit unit of the hydrologic unit hierarchy. Hydrologic Sub-areas have an approximate size of 125,000 acres.

A Planning Watershed is a subdivision of a Super Planning Watershed, which is a subdivision of a Hydrologic Sub-area. A Planning Watershed is the 7th –level, 14 digit unit of the hydrologic unit hierarchy. Planning Watersheds range in size from 3,000 to 10,000 acres.

Probable Developed Area:

The California Urban Biodiversity Analysis (CURBA) Model (John Landis, Michael Reilly, Pablo Monzon, and Chris Cogan; University of California, Berkeley), was used to generate predictions of future development. The model uses various types of geographic data to predict the location of development including: current location and type of farmland and urban development, slope and elevation data, location of roads and hydrographic features, wetlands and flood zones, proximity to jurisdictional boundaries, local growth policies, recent population and job growth, and population projects by county. For this study a shapefile of the Probable Developed Area through year 2020 was used; this shapefile was provided by Berkeley Economics Consulting.

SECTION 3 RESULTS

This section summarizes the results of the two methods used to calculate Risk Level.

3.1 2009 ASSESSMENT OF CBIA SURVEYS

URS modified data from the previous 2008 survey forms/questionnaires for the 14 project sites to reflect the conditions for the 2009 Risk Calculations. Each site's receiving waterbody required determination for the MIGR beneficial use designation; the other conditions were already determined. Table 3-1 summarizes the results of surveys and analysis.

Table 3-1
CBIA Survey Assessment - 2009

			Sediment Risk		Receiving Water Risk		
Builder	**County**	**Size (Acres)**	**URS Score**	**Contractor's Qualitative Assessment [1]**	**URS Score**	**Contractor's Qualitative Assessment [1]**	**Combined Risk**
Builder 2	Los Angeles	695.4	*Low*	High	*Low*	Medium	*Level 1*
Builder 5	Fresno	18	*Low*	Low	Low	Low	*Level 1*
Builder 6	Sacramento	152	*Low*	Medium	Low	Medium	*Level 1*
Builder 10	Riverside	144	*Low*	Medium	*Low*	Low	*Level 1*
Builder 12	Riverside	30	Low	Low	*Low*	Low	*Level 1*
Builder 1	Riverside	1048	Medium	High	High	Medium	*Level 2*
Builder 3	Sonoma	35.4	High	Medium	High	Low	Level 3
Builder 4	Sonoma	20.6	Medium	Low	High	Low	*Level 2*
Builder 7	El Dorado	32	High	Extreme	*High*	Medium	Level 3
Builder 8	Alameda	21.4	*Low*	Incomplete	High	Incomplete	*Level 2*
Builder 9	Contra Costa	24	*Low*	Incomplete	High	Incomplete	*Level 2*
Builder 11	Orange	42	*Low*	High	High	High	*Level 2*
Builder 13	San Diego	84.8	High	Medium	High	Low	Level 3
Builder 14	San Diego	443	*Low*	High	High	Medium	*Level 2*

1 – Assessments based on 2008 Draft CGP risk criteria. Note that "Extreme" reference is based on a Risk Level used in 2008 CGP.
Note – Combined Risk Levels indicated in *italics* represent changes from the 2008 assessment.

The adjustments made in the 2009 CGP risk assessment process resulted in considerable changes in the Sediment, Receiving Water, and Combined Risks as shown in Table 3-1. In general, risks were typically lower than that of the previous year's analysis. The following are notable differences in Risk Calculation results:

- The 2009 Sediment Risks are skewed low with 9 "Low", 2 "Medium" and 3 "High" being calculated.

- The 2009 Receiving Water Risks are slightly skewed high with 8 “High” and 5 “Low” being calculated.
- The Combined Risk calculations for the 14 project sites resulted in 5 “Level 1”, 6 “Level 2”, and 3 “Level 3”. These values are slightly skewed to “Level 1”, but more reflective of a normal distribution than the 2008 assessment.

3.2 GIS TOOLS COMBINED WITH VARIOUS SCENARIOS

Sediment Risk Factor:

The sediment risk was calculated for the state for three different slope lengths; a one-year project duration was assumed. The GIS model was also run for those areas of the state where Probable Development was designated. Refer to Figures 3-1 through 3-3 for a graphical presentation of the results for slope lengths of <3 feet, 300 feet, and 1,000 feet, respectively.

The following information can be derived from the supporting GIS exhibits and results:

- Annual R-value ranges from 7 to 224.
- K-factor was not mapped by NRCS for approximately 44% of the state (similar to the 2008 assessment). K factors were derived from the NRCS sources including existing soil surveys.
- The K-factor ranges from 0.02 to 0.64.
- In contrast to the 2008 analysis when the majority of the State and Probable Development Area were a Medium Sediment Risk Level, regardless of slope length, the 2009 Sediment Risk Level resulted in the majority of the State and Probable Development Area being a Low Sediment Risk Level. This is a result of the sediment risk level thresholds being modified in the 2009 CGP, as described in Section 2.1.1.

Figure 3-1
Sediment Risk Factor (L< 3 ft), Annual R-Value

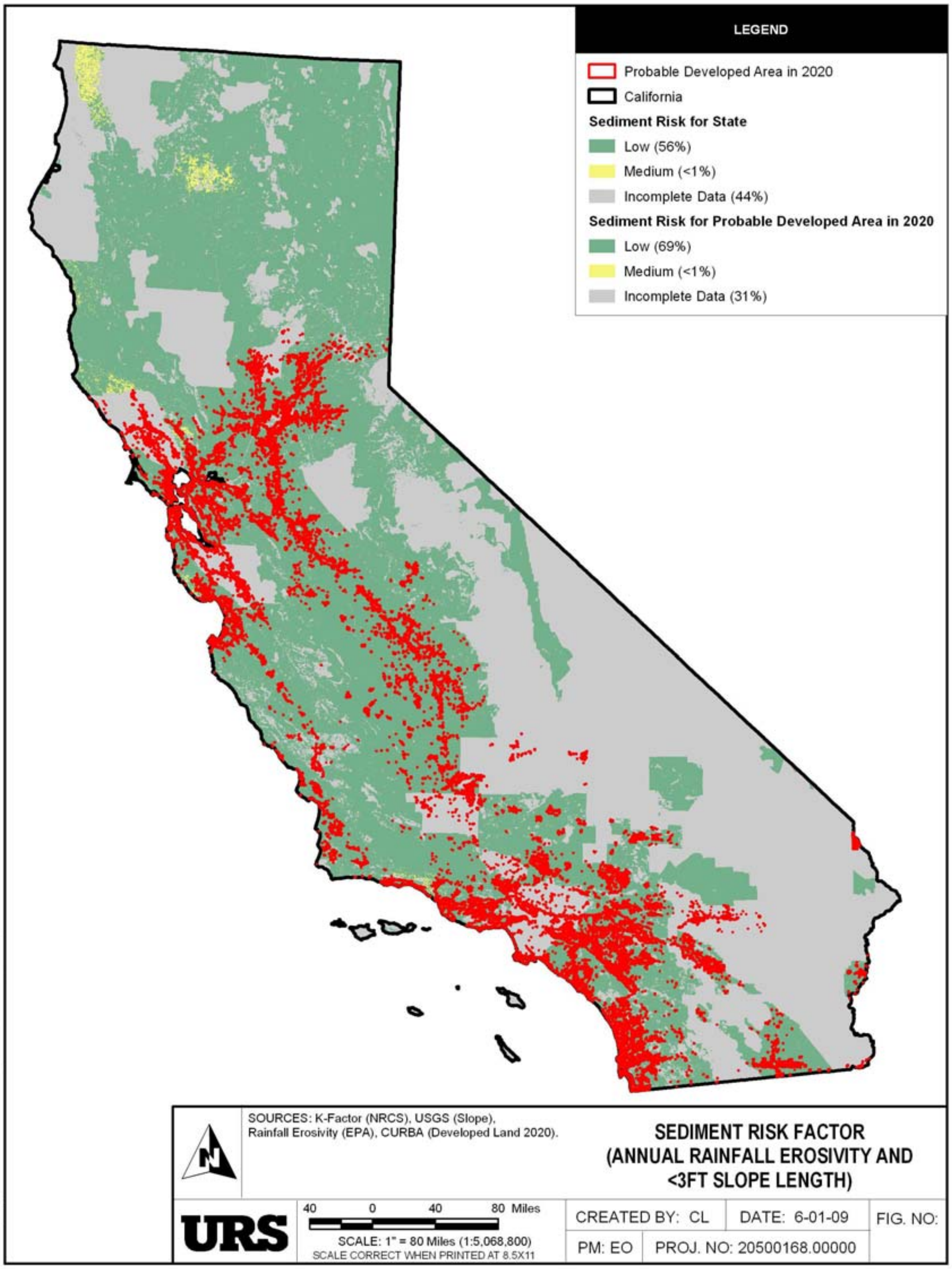


Figure 3-2
Sediment Risk Factor (L=300 ft), Annual R-Value

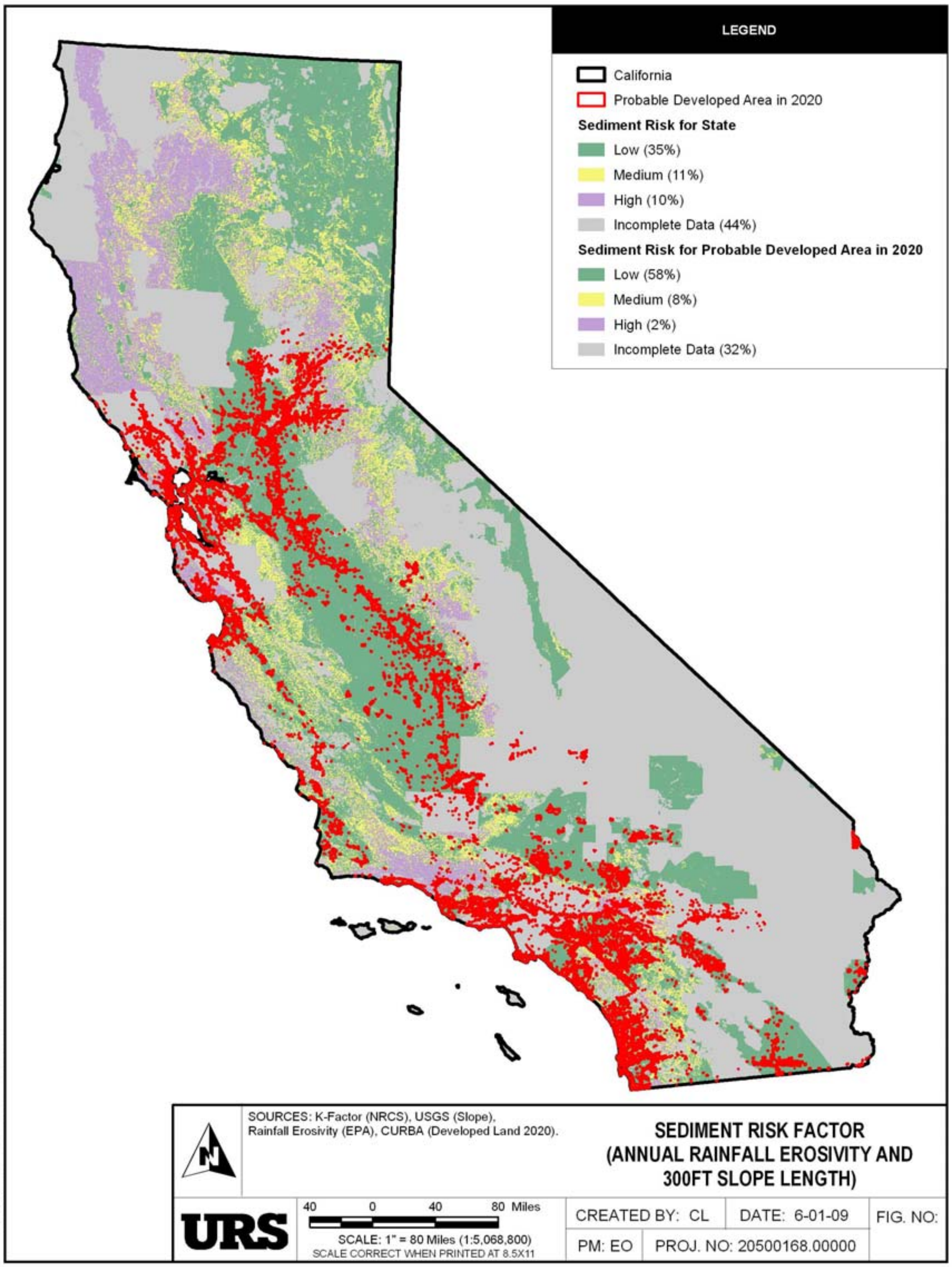
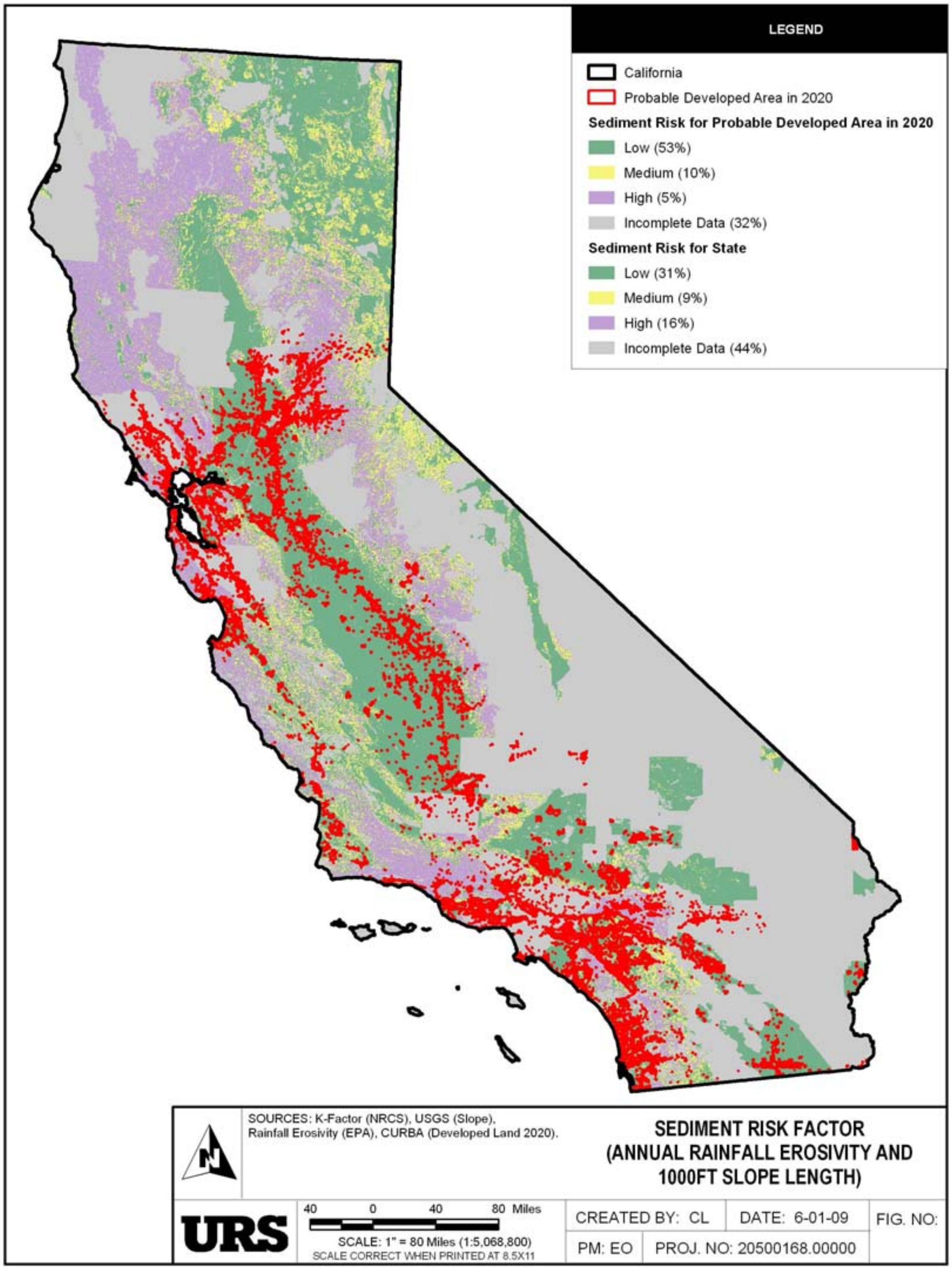


Figure 3-3
Sediment Risk Factor (L=1,000 ft), Annual R-Value



Receiving Water Factor:

Figures 3-4 and 3-5 illustrate waterbodies that meet the 303(d) sediment-impaired and COLD, SPAWN, and MIGR beneficial use criteria. The two figures display data based on Hydrologic Sub-areas and Planning Watersheds, respectively.

The CGP's simplified approach to assessing Receiving Water Risk results in a High designation whenever the subject watershed discharges to a waterbody meeting the 303(d) and/or beneficial use conditions. The following information was derived from these figures:

- 77 percent of the State meets the High Receiving Water Risk designation when defining the watershed as a Hydrologic Sub-area.

- 57 percent of the State meets the High Receiving Water Risk designation when defining the watershed as a Planning Watershed.

Figure 3-4
Receiving Water Risk According to Hydrologic Sub-areas

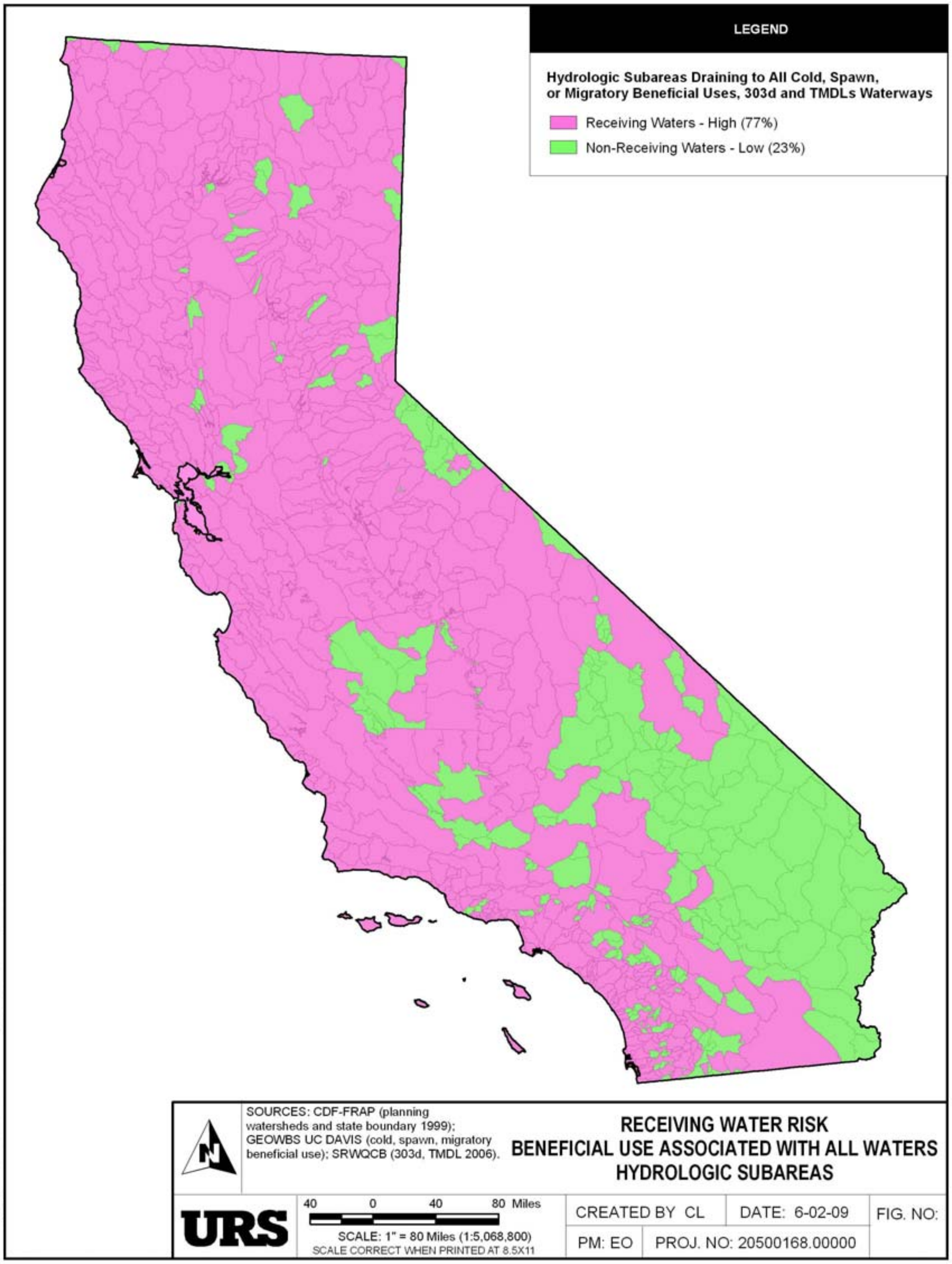
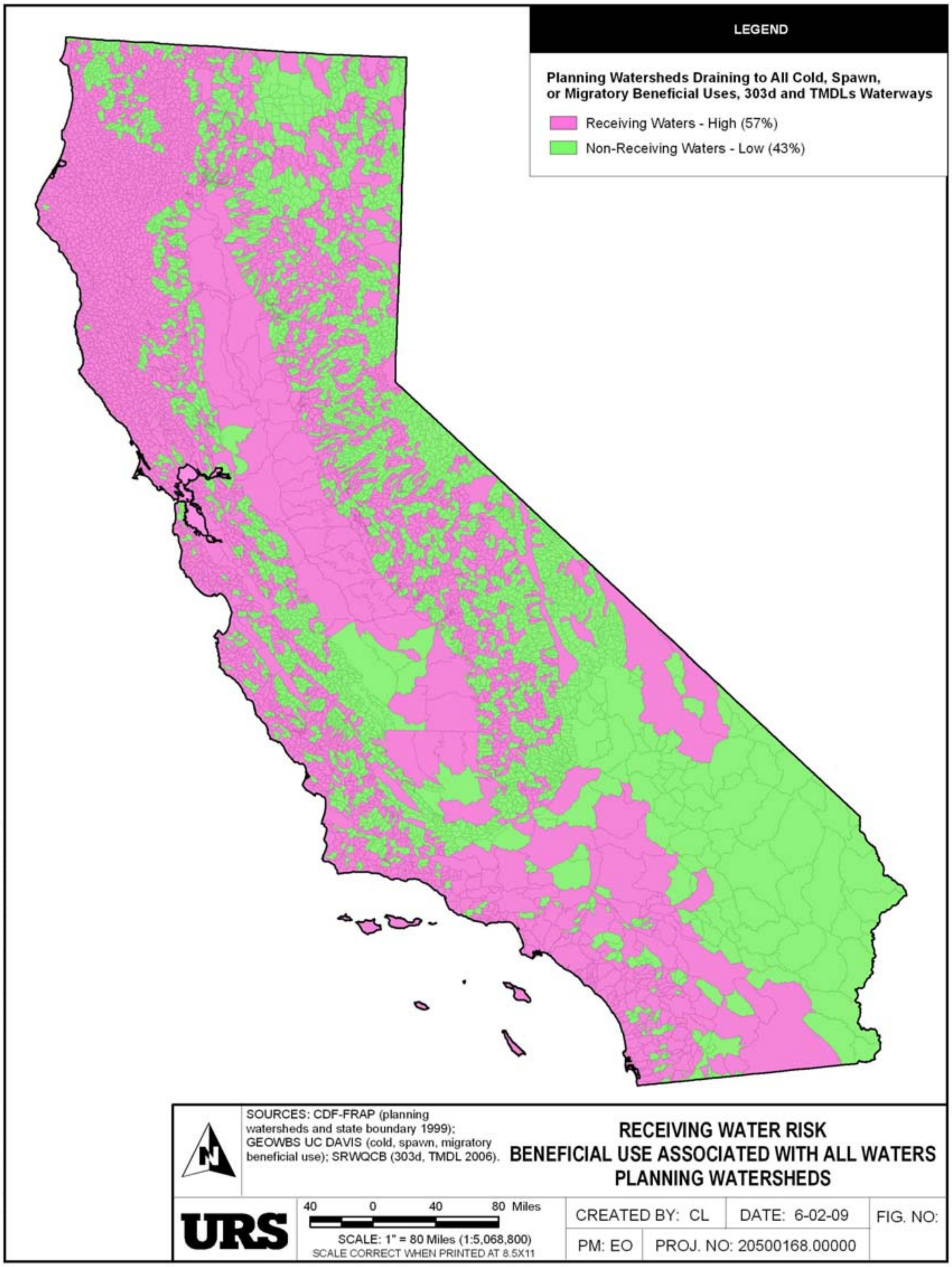


Figure 3-5
Receiving Water Factor (L=300 ft), Annual R-Value



Combined Risk Factor:

The Combined Risk calculation results exhibit a more normal distribution of the results as compared to the 2008 assessment. The majority of Risk is Level 2 with smaller percentages being Risk Level 1 and Risk Level 3. The more normal distribution of results is exhibited statewide and for Probable development areas. Figures 3-6 through 3-11 illustrate the Combined Risk calculation results for the State.

Figures 3-12 and 3-13 provide bar charts that illustrate the Combined Risk results for variations under statewide, Probable Areas of Development and within Planning Watersheds and Hydrologic Sub-areas, respectively.

Figure 3-6
Combined Risk Factor (L<3 ft), Annual R-Value for Planning Watershed

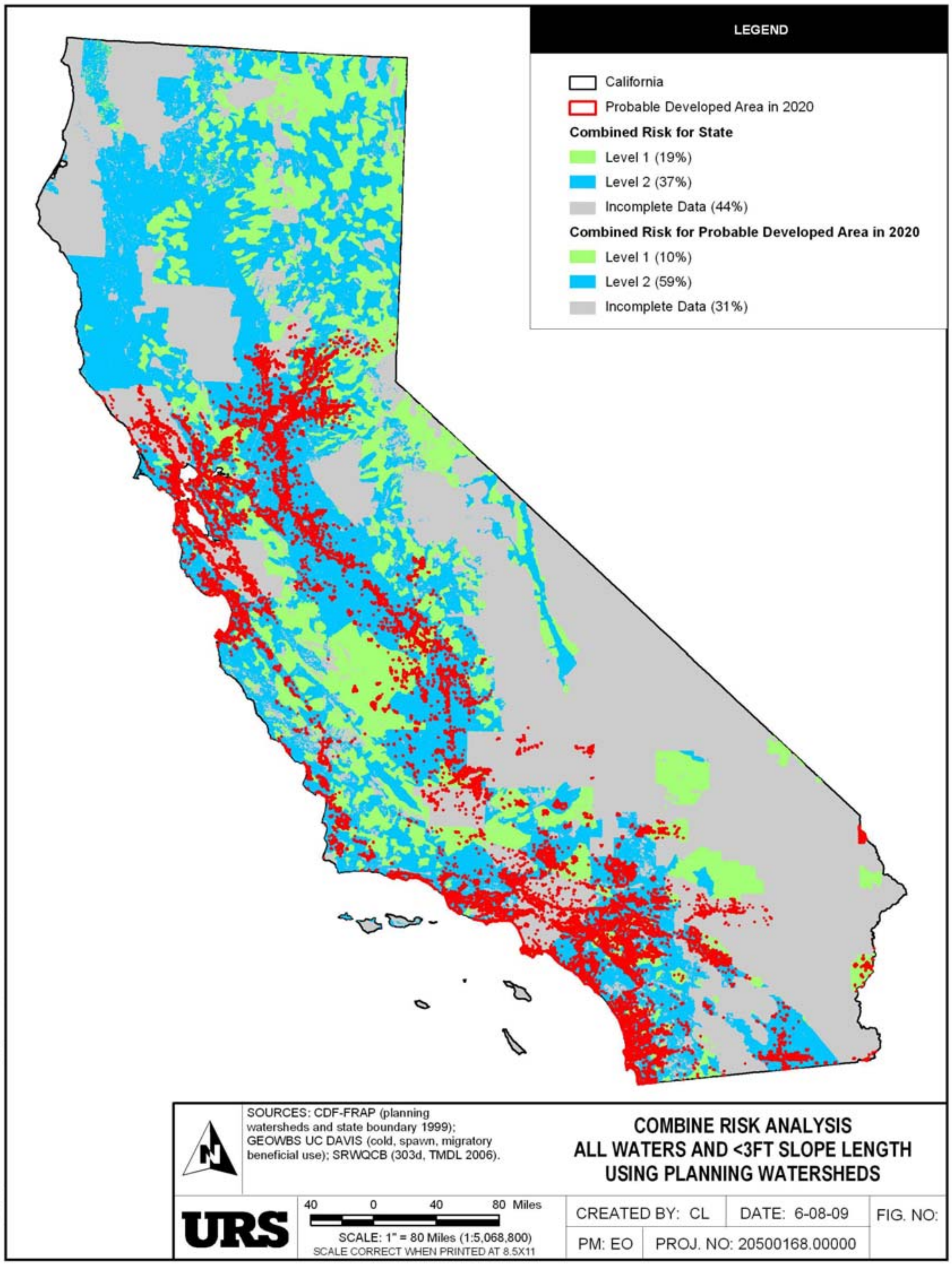


Figure 3-7
Combined Risk Factor (L<3 ft), Annual R-Value for Hydrologic Sub-areas

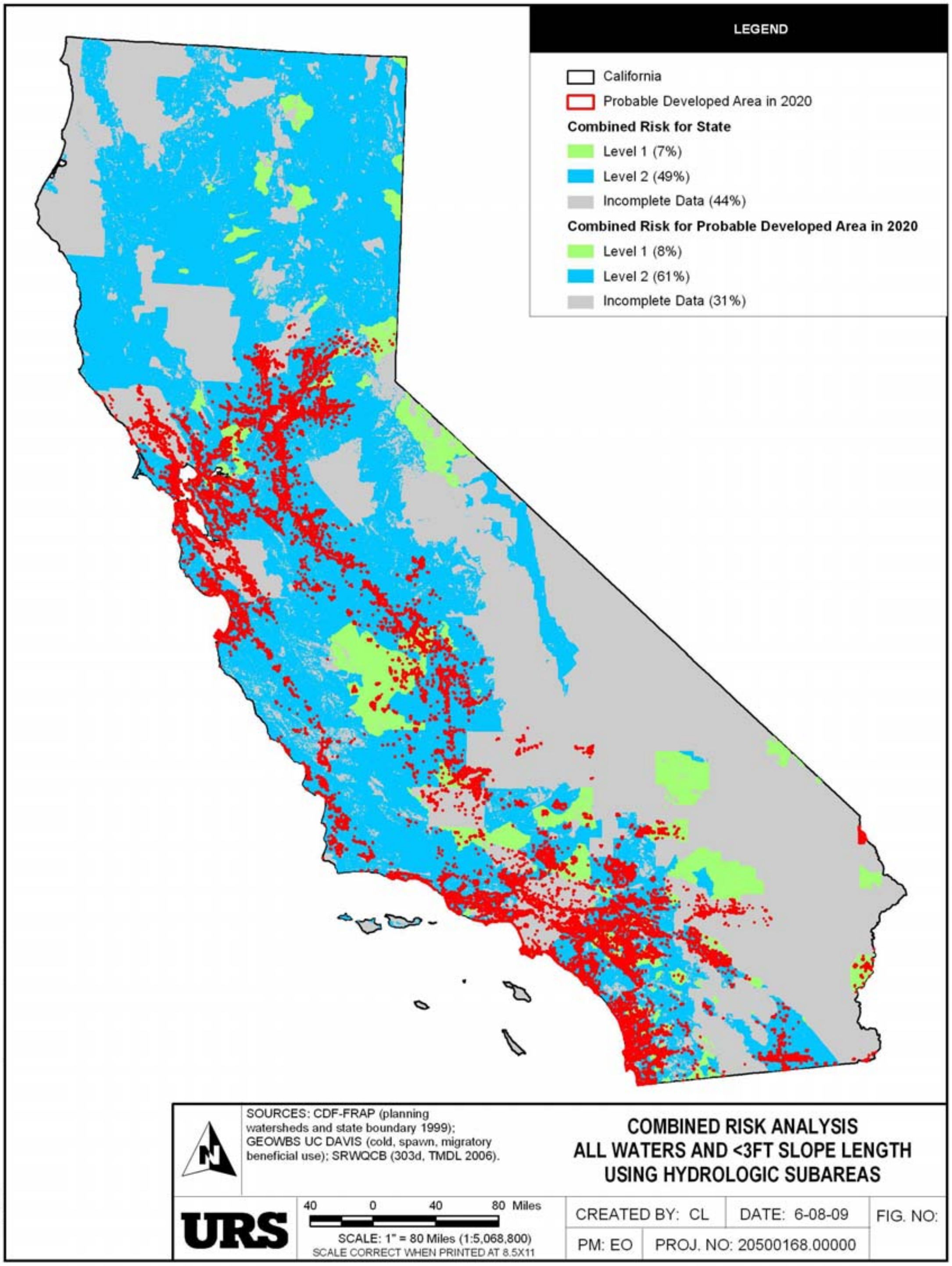


Figure 3-8
Combined Risk Factor (L=300 ft), Annual R-Value for Planning Watersheds

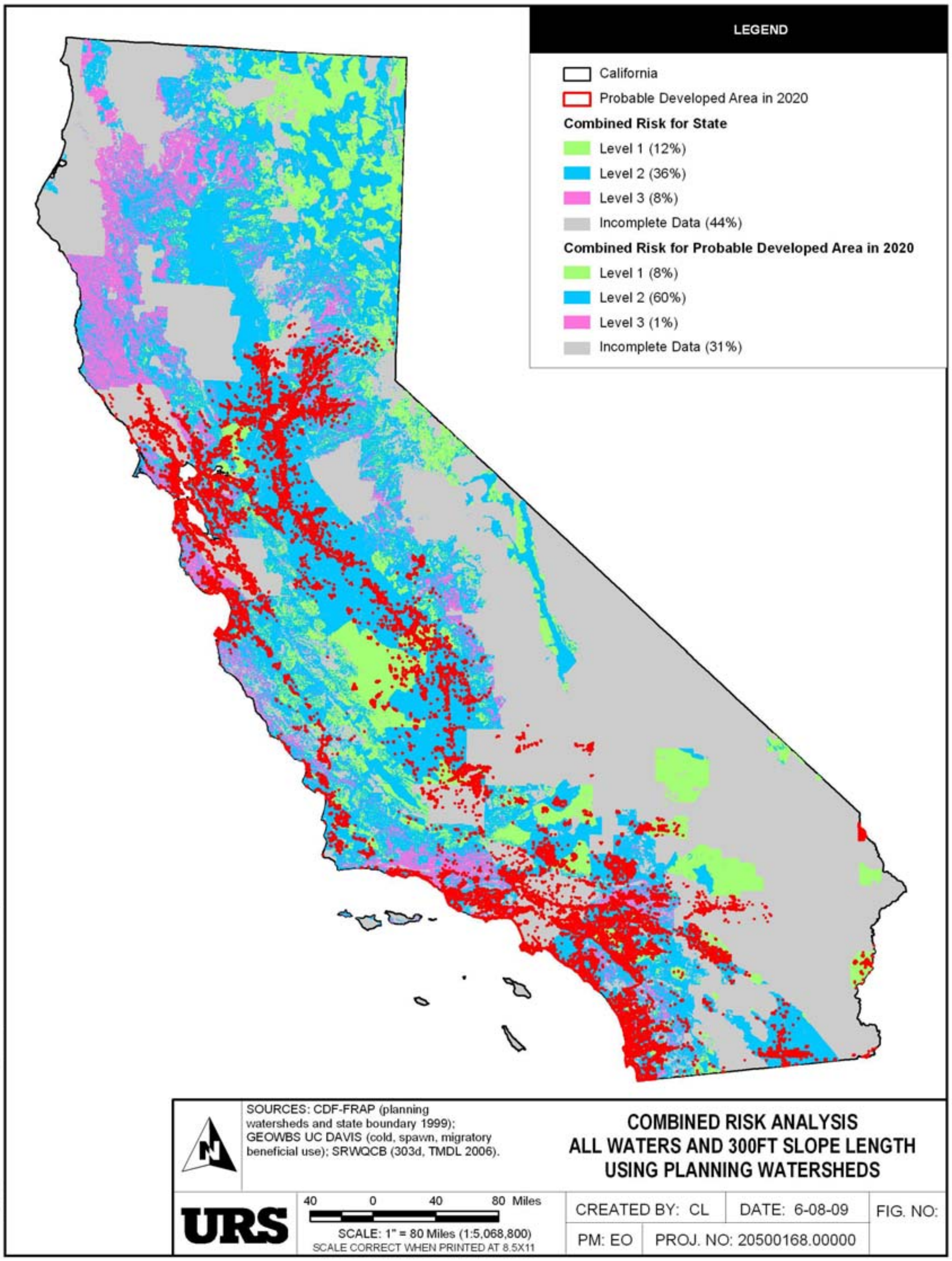


Figure 3-9
Combined Risk Factor (L=300 ft), Annual R-Value for Hydrologic Sub-areas

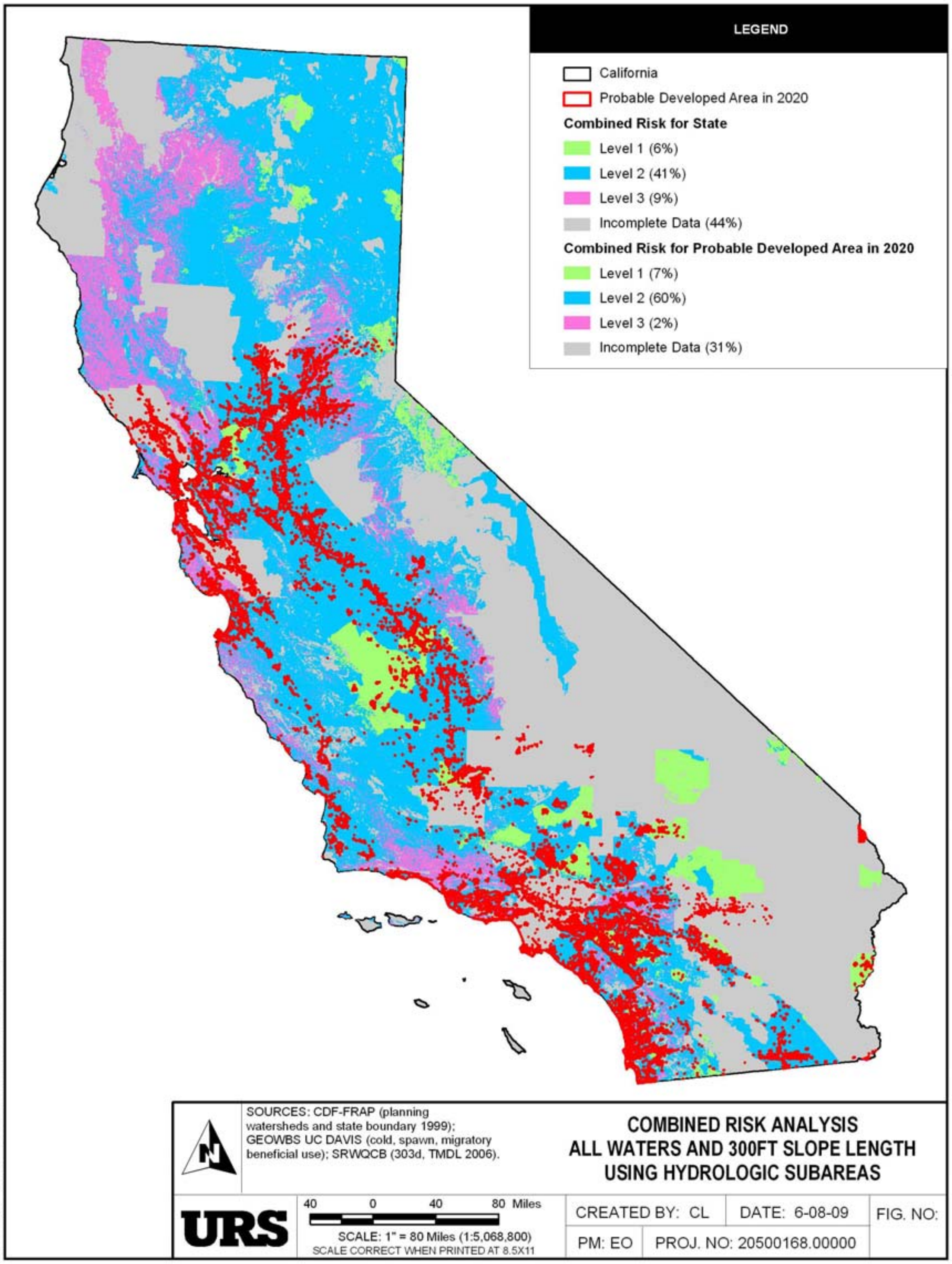


Figure 3-10
Combined Risk Factor (L=1000 ft), Annual R-Value for Planning Watersheds

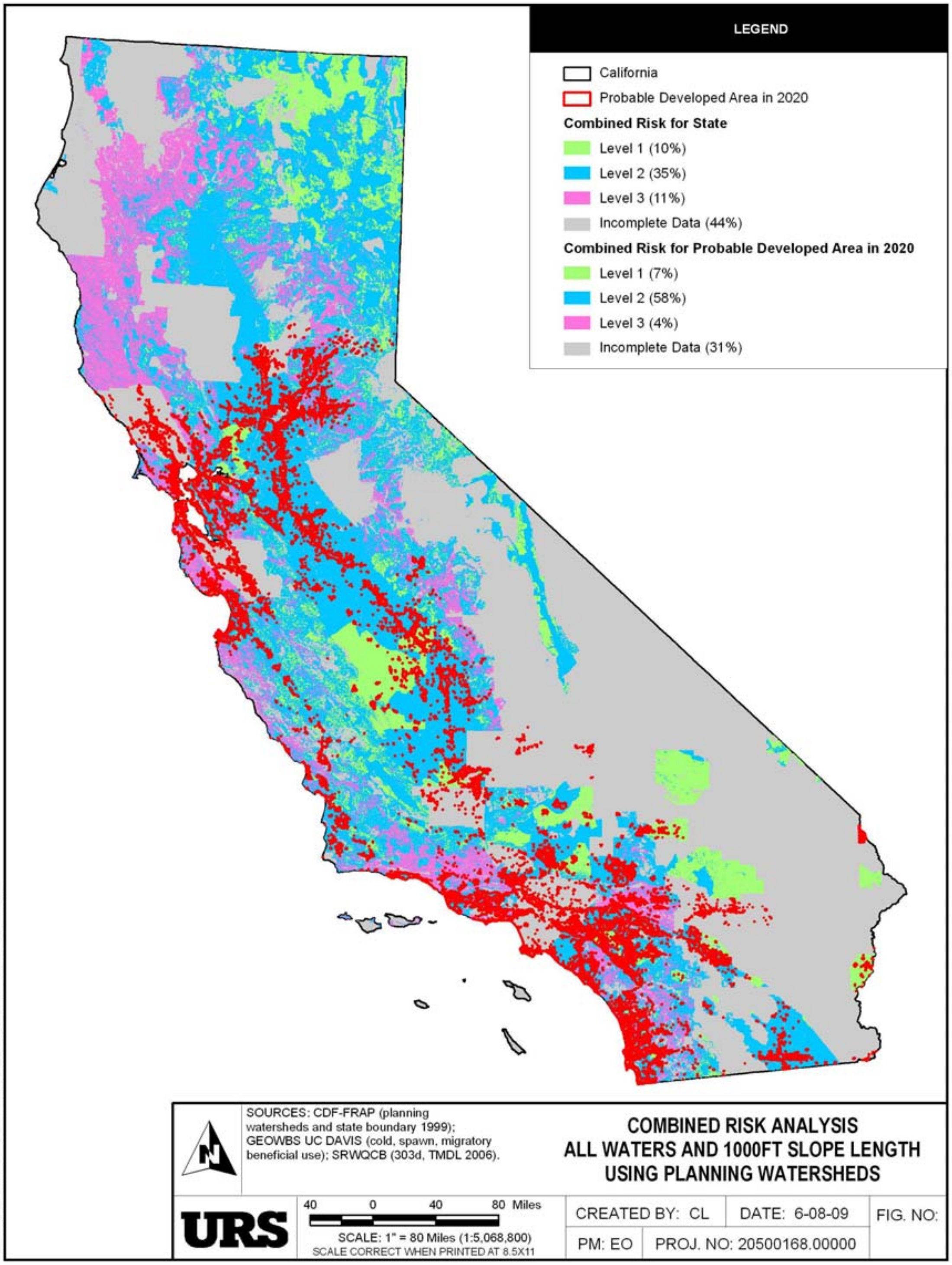


Figure 3-11
Combined Risk Factor (L=1000 ft), Annual R-Value for Hydrologic Sub-areas

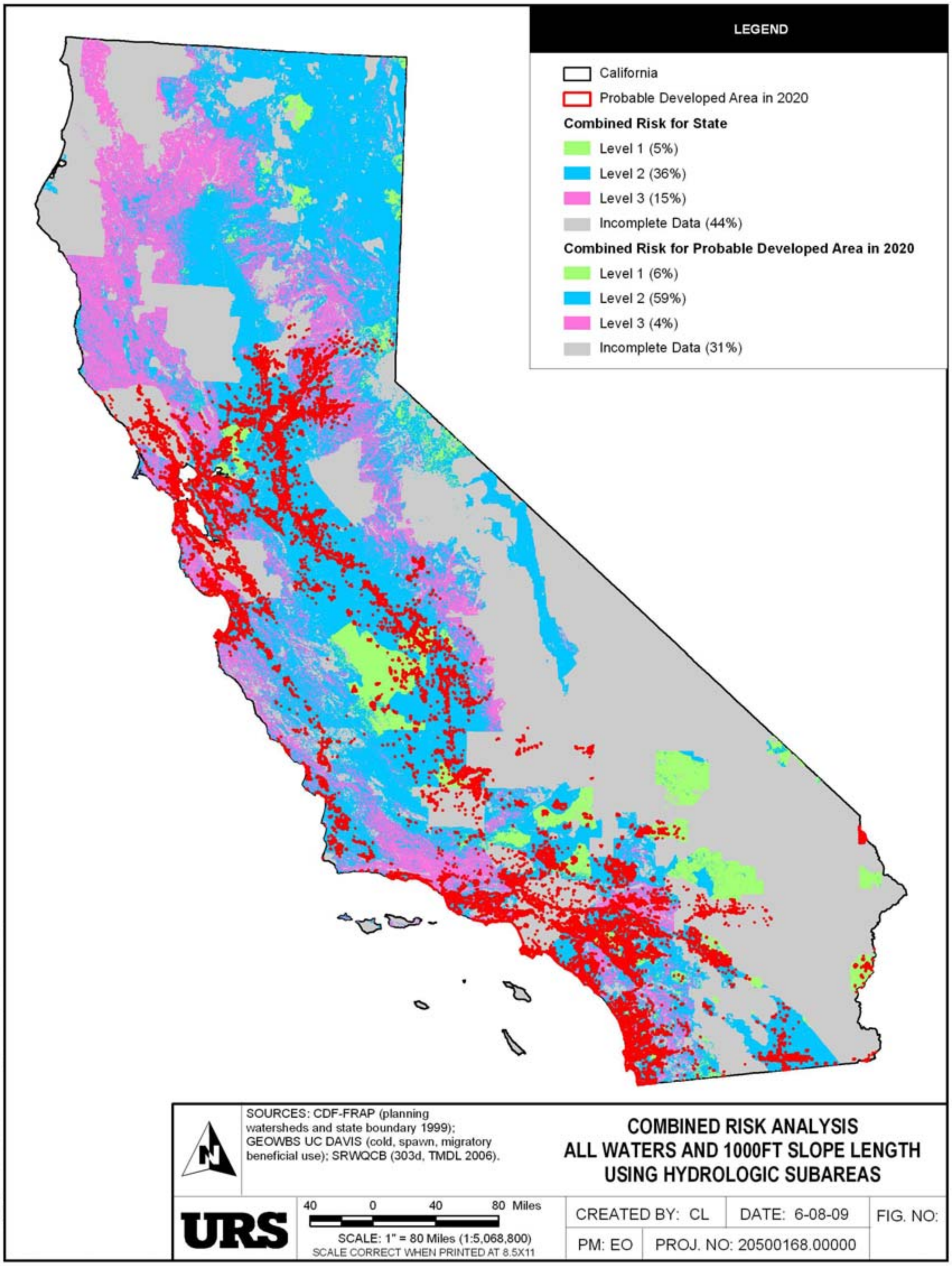
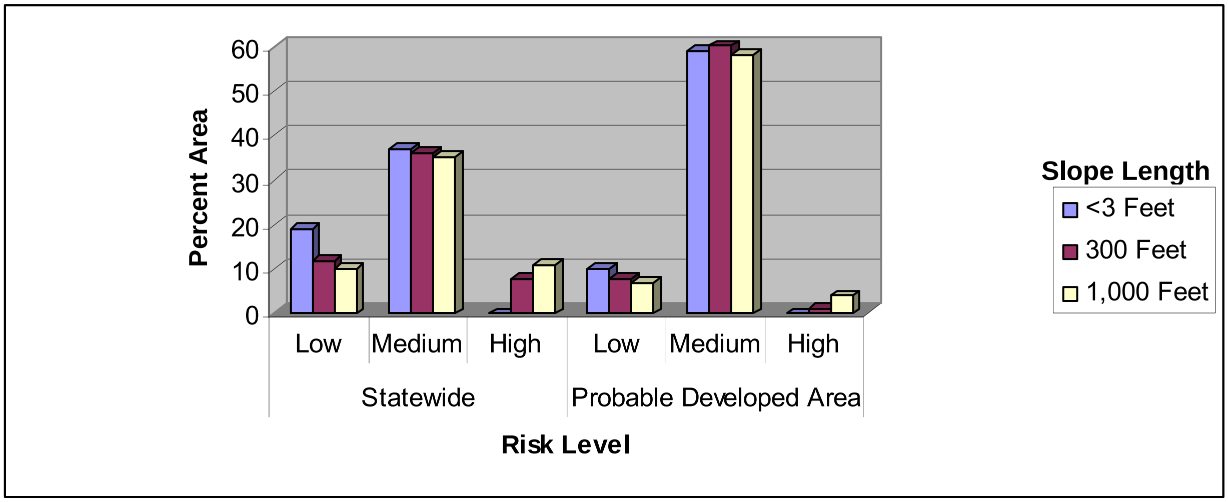
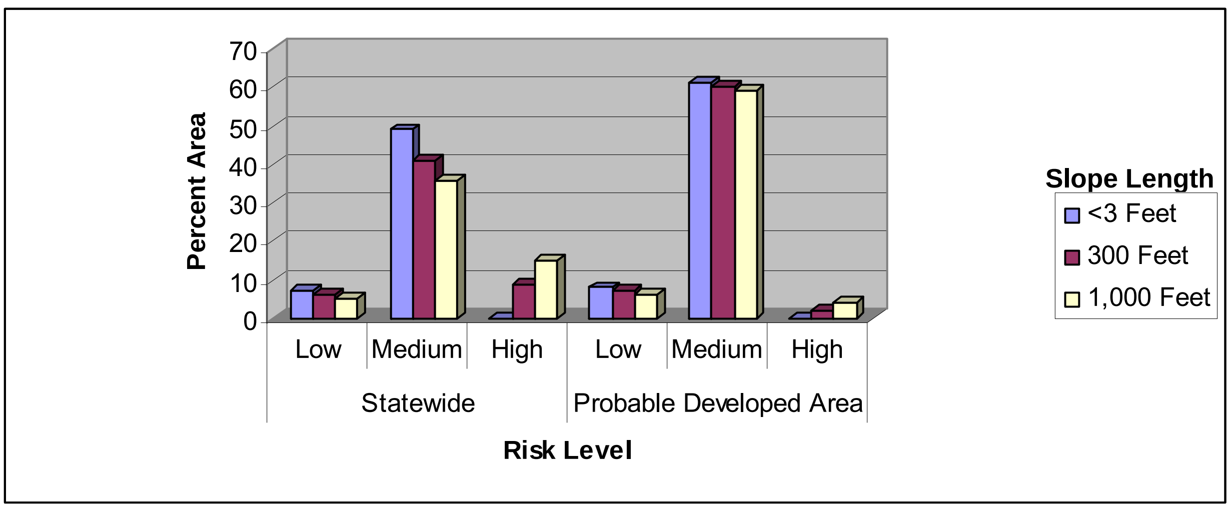


Figure 3-12
Combined Risks Results According to Planning Watersheds



Note: Risk Levels were not determined for 44% of the State and 31% of the Probable Developed Area because the K-factor was not mapped by NRCS.

Figure 3-13
Combined Risks Results According to Hydrologic Sub-areas



Note: Risk Levels were not determined for 44% of the State and 31% of the Probable Developed Area because the K-factor was not mapped by NRCS.

SECTION 4 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

Assessment of the CBIA survey under the 2009 CGP Risk Calculations showed a more normal distribution (compared to the 2008 assessment), and appears to offer a more equitable proportion of risks via the Level 1 through 3 designations.

The GIS analysis for the statewide and Probable Development Area assessment resulted in a considerable increase in the Low Sediment Risk compared to the 2008 assessment. This is clearly the result of redistribution of the benchmarks defining the Low designation – the categorical benchmark for the Low designation was less than 1 ton/acre for the 2008 Risk Calculation, whereas it is less than 15 tons/acres under the 2009 Risk Calculation.

The Combined Risk results for the 2009 analysis reflect a more normal distribution of risk levels under the Statewide analysis as compared to the 2008 analysis.

The complexity of the 2009 Risk Calculation method is considerably reduced from the 2008 Risk Calculation method; however, there are still some inconsistencies and issues that require further clarity within the 2009 Risk Calculation. Furthermore, there are other risk factors that have considerable influence on reducing the offsite discharge of sediment that could be addressed including:

- Phased disturbance and limiting the amount of disturbed land present at any one time.
- Self containment or in other words not allowing the site to discharge.
- Application of erosion and sediment control BMPs.

4.2 RECOMMENDATIONS

The following recommendations are provided to further improve the features of the Risk Calculation spreadsheet. Additionally, a discussion of observed errors or corrections with the Risk Calculations are presented.

- The 2009 Risk Calculation method is much simpler and easier to apply than the 2008 Risk Calculation method.
- Overall, the 2009 Risk Calculation method appears to result in a more normal distribution for the Combined Risk calculation results.
- Assessment under Planning Watersheds instead of Hydrologic Sub-areas provides more of a direct relationship of sediment risk from a construction site and receiving water risk. Therefore, Assessment within Planning Watersheds is more appropriate for representing the Combined Risk.
- When determining the R-value, the construction activity period should be defined as the time when initial earth disturbance begins and ends when final stabilization is obtained. Where vegetation is used for final stabilization, the date of installation of a practice that provides interim non-vegetative stabilization should be used for the end of the construction period.
- Reference to a web source should be provided as an alternative to collecting soil samples to determine the K factor. Reference to the NRCS soils data website (http://websoilsurvey.nrcs.usda.gov/app/) is recommended.
- The Risk Calculation spreadsheet refers to a GIS map for a combined KLS factor for watersheds within California. The areas for these KLS values are relatively large in area. The combined KLS value offers more complexity in understanding the meanings of K and LS (and L and S). This combined KLS factor provides a simple and likely a conservative method for determining the Sediment Risk value. The shapefiles for the GIS map should be provided for public review before the CGP is adopted.
- The Slope Length Factor (LS) is problematic. The Revised Universal Soil Loss Equation (RUSLE) is a model that predicts slope erosion. As used in this spreadsheet it requires selecting a single LS value to characterize the whole site. On a large complex project trying to characterize LS with a single value is not really possible because erosion, transport and deposition depend so much on location and surface hydraulics. There are other models or programs available that better address variable slope lengths on a project site. The RUSLE2 program has a profile routine that allows the entry of complex slopes and different soil compositions. However, this routine would represent only one section through the site. While it might be a better characterization of the conditions it still might not represent the real erosion hazard well. The Water Erosion Prediction Program (WEPP) is another option, which provides a means to integrate multiple slope profiles within a single drainage basin and could be a more appropriate tool for this application.

- The Receiving Water Risk worksheet includes internet links that are disconnected or no longer available including:
    - o http://www.waterboards.ca.gov/tmdl/303d_lists2006approved.html - the link is broken and the site goes to the SWRCB, but indicates that the page can not be found.
    - o http://atlas.resources.ca.gov/imaps/atlas/app.asp - the link is broken and page cannot be found.
- The Sediment Risk Calculation formula in the spreadsheet has not been edited to reflect the new benchmark conditions. The formula in Cell B14 is incorrect in the following ways:
    - o Low Sediment Risk is <15 tons/acre instead of <1 ton per acre
    - o Medium Sediment Risk is >= 15 and < 75 tons/acre instead of >=1 and 75 tons/acre
    - o High Sediment Risk is >= 75...need to remove Extreme from the formula
- The Combined Risk Level does not calculate correctly for the following combinations:
    - o High Sediment and Low Receiving Water
    - o Medium Sediment and High Receiving Water
- Other credits or options to reduce site risk could be pursued, including:
    - o Phased disturbance and limiting the amount of disturbed land present at any one time.
    - o Self containment or in other words not allowing the site to discharge.
    - o Application of erosion and sediment control BMPs.