APPENDIX D. GUIDANCE FOR THE DEVELOPMENT OF AN EROSION CONTROL PLAN

This appendix gives guidance on how to develop a comprehensive and complete Erosion Control Plan. Landowners, parties responsible for sediment waste discharges, stakeholders, interested persons, and agency personnel will hopefully find this appendix helpful for compiling the information needed for an Erosion Control Plan and writing the Plan.

An Erosion Control Plan is a document designed to describe, in detail, sediment waste discharge sites and how and when those sites are to be controlled. A sediment waste discharge site is an individual, anthropogenic erosion site that is currently discharging or has the potential to discharge sediment waste to waters of the State.

In order to develop a comprehensive and complete Erosion Control Plan, the following steps should be taken. Each step is described in detail in this appendix.

1. Identify and inventory existing sediment waste discharge sites, roads, stream crossings, and unstable areas. This information should then be compiled into the inventory section of an Erosion Control Plan.

2. Prioritize sediment waste discharge sites so that the most significant site has the highest priority for repair and control. This information should be compiled into a priority list within an Erosion Control Plan.

3. Identify the actions necessary to control sediment waste discharge sites. This information should be compiled into a sediment control practices section of an Erosion Control Plan.

4. Schedule the implementation of sediment control practices. This information should be compiled into a schedule within an Erosion Control Plan.

This appendix also includes a discussion on alternative documents, group-based Erosion Control Plans, and sediment assessment methods.

I. INVENTORY GUIDANCE

The purpose of an inventory is to identify existing sediment waste discharge sites. Since roads, stream crossings, and unstable areas are often the direct or indirect cause of sediment waste discharges, it is logical that roads, stream crossings, and unstable areas should be inventoried, even if such features are not currently discharging and do not pose a discharge threat. Following the inventory, however, prioritization, scheduling, control, and monitoring efforts should only be focused on anthropogenic sediment waste discharge sites.

A. Features to Inventory

The following features should be identified, inventoried, and compiled into an inventory section of an Erosion Control Plan:

1. Roads.

   A road is any vehicle pathway, including, but not limited to: paved roads, dirt roads, gravel roads, public roads and highways, private roads, rural residential roads and driveways, permanent roads, temporary roads, skid trails, and landings which are located on or adjacent to a road.

2. Sediment waste discharge sites that discharge or threaten to discharge greater than or equal to one cubic yard of sediment waste per year (≥ 1 yd^3/yr) or ten cubic yards of sediment waste over ten years (≥ 10 yd^3/ 10yrs).

   Sediment waste discharge sites that discharge or threaten to discharge less than 1 yd^3/yr or 10 yd^3/10yrs usually should not be included in an inventory. Such discharges are often too small to be a significant threat to water quality and should not be the primary focus of sediment waste discharge control efforts.

3. Stream crossings.

   A stream crossing is the location where a road crosses a stream channel. Drainage structures used at stream crossings include bridges, culverts, fords, and other structures.

4. Unstable areas.

   Please see the Glossary section of the TMDL Action Plan for the definition of an unstable area.

B. Contact Information

The inventory should contain the following contact information:

1. The name and contact information of the discharger(s).

2. The name and contact information of the individual(s) and/or group(s) that conducted and compiled the inventory (e.g., discharger, Resource Conservation District, hydrologist, consultant, etc.).

3. The approximate number of hours spent conducting and compiling the inventory.

C. Maps

The inventory should contain at least three maps, as described below:

1. Property Location Map.

   One map that shows the location of the discharger's property(ies). The Property Location Map should fit onto a sheet of paper no smaller than 8½ x 11" and no larger than 11 x 17". The Property Location Map should include a north arrow and the scale.

2. Property Detail Map.

   One or more maps that show (1) the locations of all inventoried sediment waste discharge sites; (2) the location of all inventoried roads; (3) the location of all inventoried stream crossings; (4) the location of all inventoried unstable areas; and (5) Class I, II, and III watercourses.

   Class III watercourses should be excluded from the Property Detail Map when mapping is infeasible. The Property Detail Map(s) should be as many pages as necessary to show adequate detail and at a scale that provides sufficient clarity and detail to show the location, nature, and extent of each sediment waste discharge site. At no time should the plan scale be less than 4" to the mile. The Property Detail Map(s) should include the discharger's property boundaries, the Township Range and Section, a north arrow, and the scale.

3. Soil Survey Map.

   One copy of the area of the Soil Survey Map that includes the location of the discharger's property(ies). Copies of the soil surveys are often available at county Resource Conservation Districts and, as of the date of this writing, online at www.ca.nrcs.usda.gov.

D. Information on Sediment Waste Discharge Sites

The inventory should contain the following information for each inventoried sediment waste discharge site:

1. The volume of sediment that has been eroded and the time period over which the erosion has occurred. This volume should be determined using an accurate method or model that relies on the best available science. See Section VII for more information on sediment assessment methods.

2. The volume of sediment that may potentially erode and the time period over which the erosion may occur. Again, the volume should be determined using an accurate method or model that relies on the best available science. See Section VII for more information on sediment assessment methods.

3. The percent of the sediment waste discharge site that is currently delivering sediment and/or has the potential to deliver sediment to a water body. A site that is eroding but is not delivering, nor has the potential to deliver sediment to a water body, is not a sediment waste discharge site and should not be included in an inventory.

4. Identification of the receiving water body by name and by stream class (i.e., Class I, II, III, or IV).

5. The distance from the source of the sediment waste discharge site to the receiving water body.

6. The erosion mechanism(s) associated with the sediment waste discharge site (e.g., surface erosion/overland flow, rill and gully erosion, mass wasting including landslides and earth flows, channel bank erosion, cut bank erosion, etc.).

7. The anthropogenic activity or structure that is/was the likely cause of the sediment waste discharge site (e.g., concentrated road drainage, improperly sized culvert, failed stream crossing, vegetation removal, etc.).

E. Information on Roads

The inventory should contain the following information for each inventoried road:

1. The road type (e.g., county road, state highway, private residential road and driveway, permanent road, temporary road, seasonal road, inactive road, trunk road, spur road, main haul road, skid trail, landing located on or adjacent to a road, ranch road, etc.).

2. The drainage of the road, including the road surface design (i.e., outsloped, insloped, or crowned), the presence or absence of rolling dips and their frequency if present, the presence or absence of inside ditches, the presence or absence of ditch relief culverts and their frequency if present, and the presence or absence of outside berms.

3. The surface material of the road (e.g., dirt, rock, pavement, etc.).

4. The season(s) or the percent of the year that the road is used.

5. The location and a description of each fill failure. A fill failure is the downslope movement of road fill, which is material that is placed in low areas, compacted, and built up to form the surface of a roadbed or landing.

6. The location of road segments that are within 100 feet of a water body. For each road segment meeting this criterion, an inventory should identify the water body by name and stream class (i.e., Class I, II, III, or IV). These road segments should be mapped on the Property Detail Map.

7. The location of road segments within the 100 year floodplain of a water body. For each road segment meeting this criterion, an inventory should identify the water body by name and stream class (i.e., Class I, II, III, or IV). These road segments should also be mapped on the Property Detail Map.

8. The location of road segments that are directly hydrologically connected to a water body. For each road segment meeting this criterion, an inventory should identify the water body by name and stream class (i.e., Class I, II, III, or IV). Hydrologic connectivity refers to the direct transport of water discharged from a given road to a water body.

9. Roads and road segments should be identifiable by name, and, if necessary, numbered by 1/10 of foot segments (e.g., start at road foot 0.0 and end at road foot 580.3. A gully is located at road foot 30.2).

F. Information on All Stream Crossings

An inventory should contain the following information for each inventoried stream crossing, regardless of the type of crossing:

1. The name and stream class (i.e., Class I, II, III, or IV) of the water body crossed by the road.

3. The crossing type (e.g., bridge, culvert, ford, Humboldt crossing, etc.).

4. The flow capacity of the crossing.

5. The potential, if any, of the crossing to deliver sediment from associated embankments and/or from a complete failure of the crossing. If the crossing is currently discharging or threatening to discharge sediment waste, the crossings should be considered a sediment waste discharge site. Depending on the volume of the discharge, it may be appropriate to include the crossing on the inventory as a sediment waste discharge site.

G. Information on Culverted Stream Crossings

An inventory should contain the following information for each inventoried, culverted stream crossing:

1. The culvert type (e.g., corrugated metal, plastic, round, pipe arch, plate arch, etc.).

2. The number of culverts present at each stream crossing.

3. The diameter of each culvert.

4. The approximate age or date of installation of each culvert, if known.

5. The physical condition of each culvert.

6. The height of the rust line, if present. The height of the rust line indicates water level, culvert capacity, and potential for failure. Inadequate capacity and high failure potential exists when the rust line is greater than ¼ the height of the culvert.

7. If multiple culverts are joined together, the condition of the joint between the culverts segments.

8. Culvert "passability." A culvert is passable when daylight is visible when looking through the culvert.

9. The alignment of each culvert in relation to the stream channel in terms of both horizontal and vertical orientation.

10. The condition of the culvert inlet, including the presence or absence of trash racks, the presence or absence of aggraded conditions upstream of the culvert, and the depth of deposited material if aggraded conditions are present.

11. The conditions of the culvert outlet, including the horizontal and vertical distance between the outlet and the natural stream channel or pool level (if present), the existence of any energy dissipaters, and the presence of any culvert extensions or flumes.

H. Information on Unstable Areas

An inventory should contain the following information for each inventoried unstable area:

1. The type of unstable area (e.g., landslide, debris torrent, earthflow, slump, etc.).

2. The estimated size of the unstable area (e.g., 300 feet long by 100 feet wide).

3. A statement that the unstable area is or is not discharging or threatening to discharge sediment to waters of the State, to the best of the preparer's ability.

4. A statement that the unstable area is or is not caused by natural processes or anthropogenic activities, to the best of the preparer's ability. If the unstable area is currently discharging or threatening to discharge sediment waste, and depending on the volume of the discharge, the crossings should be considered a sediment waste discharge site.

   The determination of cause may be indicated by several factors, including, but not limited to, clear association with an anthropogenic activity or structure (e.g., a road, drainage, or cut is located along the head scarp of a landslide; a landslide has occurred within a timber harvest unit).

II. PRIORITY LIST GUIDANCE

The purpose of a priority list is to describe the order of priority in which inventoried sediment waste discharge sites should be controlled.

A. Prioritization Criteria

The order of priority should be based on the threat the sediment waste discharge site poses to water quality and the feasibility of site control (i.e., the site with the highest threat to water quality and with the greatest feasibility of control should be the top priority).

Dischargers are certainly free to prioritize sediment waste discharge sites according to criteria other than threat to water quality and site control feasibility. Other factors may include cost, labor and equipment needs, permitting requirements, etc. The suggested criteria, however, is strongly recommended.

III. GUIDANCE FOR THE DEVELOPMENT OF SEDIMENT CONTROL PRACTICES

The purpose of developing sediment control practices is to identify and describe the actions that dischargers should take to control sediment waste discharges from inventoried and prioritized sediment waste discharge sites.

Sediment control practices include project design alternatives, engineering alternatives, scheduling alternatives, management measures, practices, and techniques that prevent, minimize, and/or control discharges or threatened discharges of sediment waste.

A. Guidance for the Selection of Sediment Control Practices

For each inventoried and prioritized sediment waste discharge site, dischargers should select all sediment control practices that will feasibly and reasonably prevent and minimize sediment waste discharges to the maximum extent possible. Prevention is the first step, minimization is the second.

Step 1: Selection of Prevention-Based Sediment Control Practices
Dischargers should begin by choosing sediment control practices that will prevent sediment waste discharges. Prevention involves keeping sediment from being generated, keeping sediment that has been generated from discharging to a water body, and stopping further discharges from a source that has already discharged sediment waste. Dischargers should then select just those sediment control practices that are feasible and reasonable to implement.

Step 2: Selection of Minimization-Based Sediment Control Practices
If any sediment waste discharge is expected to remain after prevention-intended sediment control practices, the discharger should then select practices that will minimize the discharge. Minimization involves reducing sediment waste discharges to the maximum

extent practical through feasible and reasonable sediment control practices. As with prevention, dischargers should then select just those sediment control practices that are feasible and reasonable to implement.

Practical solutions to prevent or reduce discharges should be evaluated and not rejected without reason. There may not be a single practice that will be effective. Rather, effective sediment control practices likely will be a composite of multiple practices with site-specific applications.

Feasible:
A sediment control practice is feasible if it is technically doable, can be carried out, and likely to be effective at preventing and/or reducing sediment waste discharges. For example, if removing a undersized culvert from a stream crossing would cause more sediment to be discharged (perhaps due to the need to re-open an access road) than would be saved if the culvert was left in place, than the practice is not feasible.

Reasonable:
Reasonability is linked to economics. A sediment control practice is reasonable if it is not cost prohibitive, extreme, or excessive on an industry wide basis. In determining reasonableness, the cost of planning design alternatives and control practices should be weighed against the impacts to water quality and the cost associated with those impacts.

B. Information for Sediment Control Practices

An Erosion Control Plan should contain the following information for each inventoried and prioritized sediment waste discharge site:

1. A description of the sediment control practice(s) selected to prevent sediment waste discharges and the sediment control practice(s) selected to minimize sediment waste discharges to waters of the State to the maximum extent possible.

2. If the sediment control practice(s) that would prevent or minimize sediment waste discharges to the maximum extent possible were not selected due to economic reasons, the discharger should include in their Erosion Control Plan a justification of their selection with an economic analysis showing the costs associated with each alternative and the cost associated with the impact to water quality.

3. An estimate of the total volume and the volume of per year of sediment waste that is expected to be kept from discharging to a water body by the sediment control practice(s). This volume should be determined using an accurate method or model that relies on the best available science. See Section VII for more information on sediment assessment methods.

4. The inspection and maintenance activities necessary for the short and long term upkeep and integrity of sediment control practices. At a minimum, each sediment waste discharge site should be inspected after the first four-inch rain event of the winter season, and following any significant storm over two inches thereafter the same season until the sediment waste discharge site is 100% vegetated and the drainage is functioning as designed.

IV. SCHEDULING GUIDANCE

The purpose of this section is to recommend a timeline for the development on an Erosion Control Plan and the implementation of sediment control practices.

For most properties in the North Coast Region, three years should be sufficient to develop and complete an Erosion Control Plan. However, the amount of time that it will reasonably take a discharger to complete an Erosion Control Plan will vary greatly depending on the size of the property, the number of sediment waste discharge sites, and available resources such as time and funding.

Similarly, the amount of time it will take to implement selected sediment control practices will vary greatly from property to property. Dischargers are encouraged to develop, to the best of their ability, a schedule that describes what sediment control practices and/or sites will be addressed each year until all sediment waste discharges from all the sites are controlled. Dischargers should be implementing sediment control practices as quickly as possible, or in other words, as quickly as is feasible and reasonable.

V. ALTERNATIVE DOCUMENTS

Landowners and dischargers may have already compiled much of the information recommended for inclusion in a Erosion Control Plan. Where possible, landowners and dischargers should use the information they already have, thereby reducing duplicity and effort. Documents which may have similar information to an Erosion Control Plan include, but are not limited to: Habitat Conservation Plans, Non-Industrial Timber Management Plans, Ranch Plans, and documents prepared under Fish Friendly Farming.

VI. GROUP-BASED EROSION CONTROL PLANS

Dischargers with similar land management activities may choose to develop and implement a collective or group-based Erosion Control Plan. The development and implementation of a collective document offers dischargers the ability to work together to solve existing sediment waste discharge problems while affording a measure of privacy.

The following guidance applies to dischargers that choose to develop and implement a group-based Erosion Control Plan:

1. All dischargers should still be responsible for ensuring the Erosion Control Plan is developed.

2. Where an individual discharger has multiple land management activities (e.g., ranching and timber harvesting), the group-based Erosion Control Plan should only cover the portion of the discharger's land that is used for land management activities that are similar to those of the remainder of the group.

3. The group-based Erosion Control Plan should include all the recommended elements of an Erosion Control Plan as described above, with the following exception: the Property Location Map, as described in Section I.C.2, should only show the perimeter boundary of the land covered by the collective documents. The interior ownership boundaries of each individual discharger need not be included. Shading or cross-hatching can be used to depict any properties within the perimeter that are not covered by the collective documents.

VII. SEDIMENT ASSESSMENT METHODS

The purpose of this section is to describe recommended sediment assessment methods and models and give examples.

A. Sediment Assessment Guidance

The assessment of sediment volumes described above in various elements of an Erosion Control Plan should consider all sediment delivery mechanisms, including surface erosion (overland flow, rill, and gully erosion), bank erosion, and mass wasting (landsliding). Additionally, the assessment of sediment volumes should use methods or models that accurately estimate sediment and rely on the best available science. The sediment assessment method used for the development of an Erosion Control Plan should be described in sufficient detail to allow evaluation of accuracy by others.

B. Recommended Sediment Assessment Methods

The recommended sediment assessment methods, when appropriately applied, include, but are not limited to:

1. the use of *Part X. Upslope Assessment and Restoration Practices* in the *California Salmonid Stream Restoration Manual, Third Edition* by Flosi et al. (2004);
2. measuring the volume of the eroded void of the sediment waste discharge site;
3. the use of the Revised Universal Soil Loss Equation;
4. the use of the Water Erosion Prediction Model (WEPP); and/or
5. any other appropriate method or model that accurately estimates sediment and relies on the best available science.

When any model is used to assess sediment volumes, the discharger should provide sufficient justification for use of the model and should describe validation procedures, calibration procedures, assumptions, and the range and source of error.