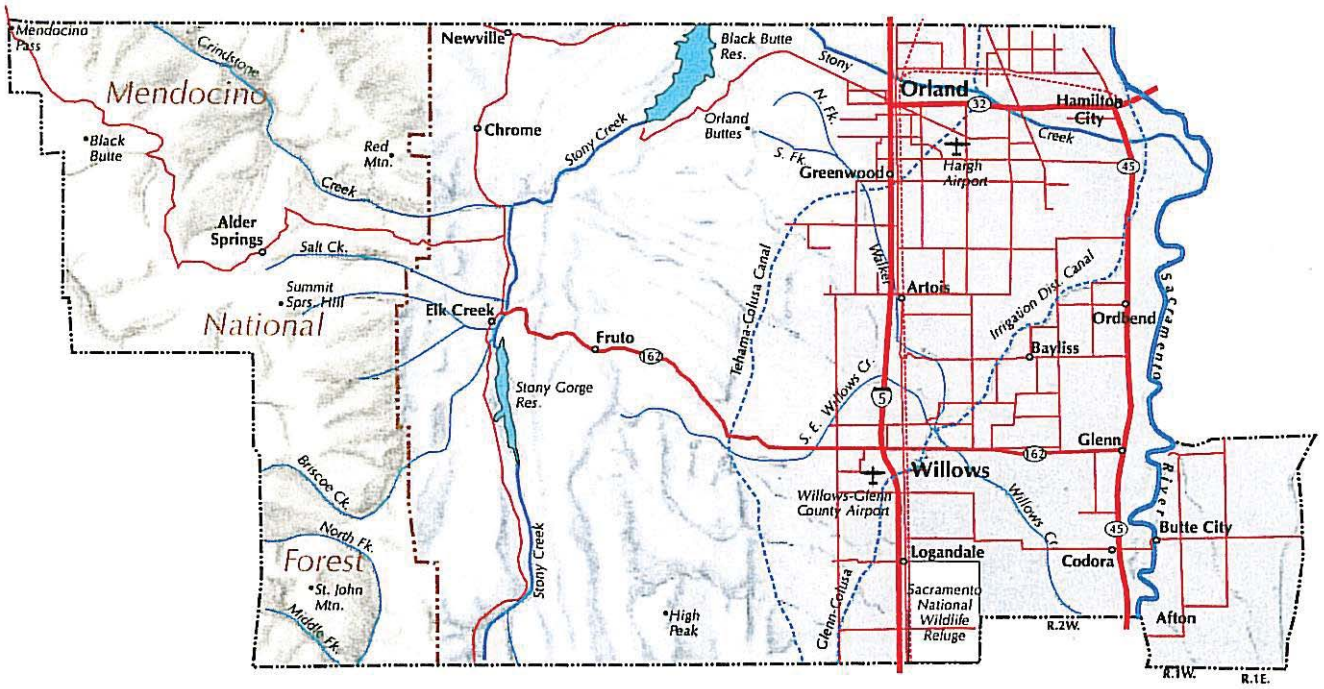
GLENN COUNTY
AGGREGATE RESOURCE MANAGEMENT PLAN
Initial Phase Report



October, 1997

Glenn County Planning Commission

Resolution 9704, October 15, 1997

Glenn County Board of Supervisors

Resolution 97144, Adopted December 2, 1997

Glenn County Transportation Commission

Approved December 3, 1997

Funded in part by a grant from Caltrans
to the Glenn County Transportation Commission

GLENN COUNTY

AGGREGATE RESOURCE MANAGEMENT PLAN
INITIAL PHASE REPORT

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Purpose of the ARMP

This Aggregate Resource Management Plan Initial Phase Report (ARMP or the Plan) has been prepared as part of the Glenn County General Plan to serve as a management tool for government and industry. This is the Initial Phase Report of the Aggregate Resource Management Plan. A future phase of the program would include the following:

a. Establishment of a "Redline" for Lower Stony Creek (below Black Butte Dam);

b. Exploration, in depth, of the feasibility of various alternatives to gravel mining in Stony Creek which are listed in this Plan under Section 1.2.4;

c. Development of a cross-sectional analysis and a program to monitor riverbed elevations in Stony Creek;

d. Development of a comprehensive, enforceable plan of action to minimize future mining operation impacts to the transportation and other public infrastructure in Glenn County; and

e. Development of a Master Environmental assessment for Lower Stony Creek.

The ARMP establishes goals and policies for extraction of aggregate material in Glenn County as well as policies and performance standards designed to sustain and encourage economic activity while minimizing environmental impacts. Primary purposes of the ARMP are to:

- Establish a framework for decision making;
- Minimize land use conflicts that inhibit resource development;
- Aid in the evaluation of future mining proposals and review of discretionary approvals for expansion of existing operations;
- Provide for environmental protection; and
- Serve as a guide to assist in mine and reclamation planning.

As background, the Plan provides an overview of known resources and their uses, and historic and potential future extraction regions.

Key Provisions of the ARMP

Primary provisions of the Plan are expressed as goals and policies. The County's goals relate to aggregate resource protection and regulation of mining. Actions the County will take to implement the goals and policies of the ARMP are expressed in the implementation plan, and in the Performance Standards that the County will require mining operations to meet. Additional tools for implementation are the Standard Conditions of Approval, to be used in approving use permits for mining. Key provisions of the Plan include:

- Protection of aggregate resource areas from incompatible uses;
- Proposed new zone district and rezoning program;
- Protection of prime farmland;
- Discourage mining of prime farmland, and where it is mined, require reclamation to prime agricultural production;
- Protection of creek channels from effects of mining;
- Encourage mining off-channel;
- Set policies and standards limiting effects of traffic and noise generated by mining;
- Protect existing wildlife habitat and encourage reclamation to create new habitat areas; and
- Require that mining plans include measures to ensure that mining does not adversely affect instream infrastructure.

1.0 INTRODUCTION

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1.1 PURPOSE AND NEED

1.1.1 Purpose and Intended Uses

This Aggregate Resource Management Plan (ARMP or the Plan) has been prepared as part of the Glenn County General Plan to serve as a management tool for government and industry. The ARMP establishes goals and policies for extraction of aggregate material in Glenn County as well as policies and performance standards which will sustain and encourage economic activity while minimizing environmental impacts. The ARMP was developed based on a preliminary assessment of existing mining operations and Glenn County's aggregate resources.

Primary purposes of the ARMP are to:

- Establish a framework for decision making;
- Minimize land use conflicts that inhibit resource development;
- Aid in the evaluation of future mining proposals and review of discretionary approvals for expansion of existing operations;
- Provide for environmental protection; and
- Serve as a guide to assist in mine planning.

Goals, policies, implementation measures, performance standards, and standard conditions of approval of this Plan will be used in planning for aggregate resource development and permitting of future operations. The goals of the Plan are general and are the basis for the policies. The policies of the Plan express the County's choice of direction on issues surrounding aggregate mining. The implementation measures identify ways in which the County will implement the policies of the Plan. The goals, policies, and implementation measures of the ARMP will be adopted as part of the General Plan Policy Plan.

The performance standards and standard conditions of approval will be used in review and approval of use permits for mining operations and of reclamation plans. The performance standards set the basic levels of

compliance required of mining operations. The standard conditions of approval will be used as the basis for developing conditions of approval for specific mining operations permits. The standard conditions of approval will be applied to specific projects as appropriate for each project. Additional project-specific conditions may be required.

1.1.2 Scope of the ARMP

The Aggregate Resource Management Plan is a policy document expressing the County's intentions in sustaining the mining industry while managing Glenn County's aggregate resources. The policies expressed in this document set forth the County's approach to designation of land uses in areas of identified aggregate resources, balancing the needs for development and production of aggregate resources with protection of the environment and public infrastructure, and review and approval of mining and reclamation permits. Regulation, and enforcement of regulations, will be a part of implementation of this Plan. The County's Zoning Ordinance and Mining Ordinance are among the tools the County will use in the implementation of this Plan. The Zoning Ordinance is used in regulating uses of land containing aggregate resources, including issuing use permits for mining operations. The Mining Ordinance is used in review and approval of reclamation plans.

It is the County's intent to be able to meet future demand for aggregate products using resources available, or those that can be developed, within the County, rather than relying on products imported from other counties. Aggregate produced in the County is also exported to regional locations, further increasing the County's economic productivity. The ARMP is therefore intended to address aggregate mining that occurs, or that may occur, throughout the entire County. For this reason, the Plan does not focus on existing mining, which is conducted within a limited region, but includes goals, policies, and standards that could be applied throughout all of the unincorporated areas of Glenn County where aggregate resources are currently being mined or could be mined in the future.

In order to provide a background for the policy statements in the Plan, the ARMP identifies currently known areas of aggregate deposits in the County and provides an overview of issues associated with aggregate mining in general, and with existing mining operations in particular. Issues related to land use conflicts and the environment are also discussed.

The majority of aggregate mining in the County has historically been conducted along Stony Creek, especially along the approximately 20-mile portion of the streambed from Black Butte Reservoir to the Sacramento River. Controversy over environmental impacts and land use conflicts has resulted from construction of the Black Butte Dam, which restricted replenishment of stream deposits, from increased demand for aggregate to support regional development, and from expansion of urbanization. Due to these issues and increasing federal and State regulatory control over stream channels, the continuance of future in-channel mining in Stony Creek is questionable. However, it is neither the authority nor intent of this Plan to eliminate in-channel mining conducted in accordance with existing rights and in compliance with current laws and regulations. Other efforts are underway to address conflicts related to uses of Stony Creek, including the Bureau of Reclamation's *Lower Stony Creek, Fish, Wildlife and Water Use Management Plan*. It is an intent of this ARMP to minimize additional future conflicts by

providing a framework for evaluation of future mining within Stony Creek. It is also an intent of the ARMP to provide incentives for future mining to be conducted in areas less subject to land use conflict and environmental concern.

Aggregate mining can be conducted in a variety of ways, depending on where the resources are located. Aggregate associated with alluvium can occur directly in stream channels. This material is mined by skimming or excavating material from the channel. Aggregate associated with alluvium can also occur on ancient streambeds or on the banks of the existing stream. This material is mined by scraping or excavating in off-channel locations adjacent to the streambed. Aggregate material can also be produced in quarries off-channel in older alluvium or in areas not associated with alluvium where hard rock is excavated and crushed into various sizes, according to the type of product needed. The ARMP covers all of these production methods and locations.

While the ARMP discusses current issues and resources, it is not a technical document intended to resolve site-specific issues. Technical and environmental evaluation necessary to support continued and future operations is required for compliance with the California Environmental Quality Act (CEQA), as applicable, and other laws and regulations. The ARMP does contain performance standards and standard conditions of approval designed to minimize environmental impacts.

The ARMP will become part of the County General Plan, which will be reviewed and updated regularly in accordance with State guidelines. As a part of the General Plan, the ARMP necessarily embraces a vision of future aggregate production, and plans for such with a perspective of the next 20 years.

1.1.3 Mineral Classification Study

SMARA requires the State to identify and classify significant areas which are urbanized or subject to urban expansion that would preclude extraction of minerals, including aggregate material. This mineral land classification and subsequent designation of areas within the County that may contain significant aggregate resources is prepared by the State Geologist. This has not been done for Glenn County, and areas of known or proven resources are limited to existing mining areas. In 1995, the State Geologist initiated a mineral classification study, which is scheduled to be completed in late 1996. Upon publication of the mineral classification study, the County must establish mineral resource management policies and mineral resource zones to be incorporated into the General Plan. The Glenn County General Plan already contains a number of goals and policies related to aggregate resources.

This ARMP is being prepared concurrently and in anticipation of the mineral classification study; the Plan will be amended to reflect the designated resource areas when the data becomes available.

1.1.4 Current Issues

While it is not within the scope of this Plan to resolve all of the current issues surrounding mining, especially site-specific issues, the Plan has been prepared with the knowledge of the key factors of concern, recognizing both the need for a viable local aggregate industry and the need to minimize significant environmental effects. Ongoing concerns expressed by local operators and State and

federal agency representatives have included the following:

- Proposed off-channel pit mining along Stony Creek and the possible effects (particularly concerning pit capture and the integrity of the barrier between a pit and the channel) on the Creek.
- Changes in Stony Creek channel elevations due to altered sediment loads, associated with aggregate mining, which could affect existing infrastructure, including bridges.
- Problems for mine operators when the Stony Creek channel is used by the Glenn-Colusa Irrigation District and the Tehama-Colusa Canal Authority to transport irrigation water during the summer months.
- California Department of Fish and Game (CDFG) concerns about the declining fish populations in Stony Creek.
- Bank erosion along Stony Creek.
- The need for a gravel budget along Stony Creek. Since there is no gravel recruitment in lower Stony Creek because of Black Butte Dam, questions have been raised concerning whether there should continue to be gravel extraction. The gravel budget, based on gravel recruitment, would be zero plus the effect of bank erosion.
- The relationship between gravel extraction and groundwater recharge.
- The need to develop a "redline" to limit gravel extraction in Stony Creek. This would be the surveyed elevation showing where gravel could and could not be extracted at various locations.

These and other concerns reflect the diverse interests and sometimes competing desires for the uses of Stony Creek. Stony Creek is not unusual in this regard; streams throughout California are currently the subject of intense scrutiny by local, State and federal agencies, industry and landowners, and resource managers. The characteristics of modern streambeds are a direct result of the competing influences of agriculture (farming, grazing and related vegetation removal, and land leveling), flood control, water diversion, bridge and road construction, and aggregate extraction. The surface flow characteristics and channel morphology of Stony Creek have similarly been affected. Determining what the desired characteristics are and deciding among competing land uses is a current subject of debate.

This is the Initial Phase Report of the Aggregate Resource Management Plan. A future phase of the program would include the following:

a. Establishment of a "Redline" for Lower Stony Creek (below Black Butte Dam);
b. Exploration, in depth, of the feasibility of various alternatives to gravel mining in Stony Creek which are listed in this Plan under Section 1.2.4;
c. Development of a cross-sectional analysis and a program to monitor riverbed elevations in Stony Creek;
d. Development of a comprehensive, enforceable plan of action to minimize future mining operation impacts to the transportation and other public infrastructure in Glenn County; and

e. Development of a Master Environmental assessment for Lower Stony Creek.

1.2 RELATIONSHIP TO OTHER PLANS, LAWS, AND REGULATIONS

1.2.1 Relationship to the Glenn County General Plan

The General Plan for Glenn County, adopted in June 1993, is a long-range statement of public policy for the use of public and private lands within the unincorporated areas of Glenn County. These public policies establish a generalized pattern of land use for a 20-year period through the year 2012, which is the foundation of a more detailed implementation plan.

The pattern of land use identified in the General Plan attempts to balance the economic and social needs of the public with the inherent characteristics of the land, plant and animal life, and air and water conditions. It uses broad general language regarding aggregate mining operations. Since aggregate is an important natural resource in Glenn County, it is essential to have sound policies to guide mining and reclamation in the future. When the ARMP is approved it will be adopted as an element of the General Plan.

Minerals and energy resources, including aggregate resources, are discussed in Section 5.1.5 of the General Plan, which includes the following General Plan goals, policies, and implementation strategies.

NRG-5 Conservation and Protection of Non-Renewable Mineral and Energy Resources

Policies: It shall be the policy of Glenn County to:

NRP-70 Encourage a resource management role for the County.

NRP-71 Require that mineral extraction operations within streams as well as dry land deposits be performed in a way that is compatible with surrounding land uses, does not adversely affect the environment, and which mitigates related impacts through site-specific mitigation measures.

NRP-72 Establish mitigation fees for development which does not compensate for environmental impacts.

NRP-73 Include the Stony Creek fan aggregate resource overlay on the groundwater recharge overlay to the Land Use Diagram and reference the overlay when reviewing development proposals in order to protect the resource from future incompatible encroachment, including overcovering by houses and other forms of development.

NRP-74 Ensure proper management of the Stony Creek aggregate resource.

NRP-75 Require that adequate security be posted to ensure that surface mining reclamation plans are implemented.

NRP-76 Petition the State Geologist to designate and protect mineral resources in the County from incompatible uses.

NRP-77 Require a Master Environmental Assessment and Aggregate Resource Management Plan to be completed on Stony Creek for gravel operations in cooperation with the Glenn County Resource Conservation District.

Implementation Strategies, Programs and Priorities:

NRI-47 Amend the Glenn County Zoning Code to require conditional use permits for mineral extraction operations in all zones where mineral extraction may occur.

NRI-48 Develop a Stony Creek Fan Aggregate Resource Management Plan following the preparation of a Master Environmental Assessment, with review authority by the

Resource Conservation District. After the Aggregate Resources Management Plan is complete, request State designation to protect identified mineral resources from incompatible uses.

This Aggregate Resource Management Plan is a County-wide plan setting forth County policies related to aggregate mining in all areas of the County. Upon public review and consideration by the Board of Supervisors, it is intended that this ARMP would be adopted as an element of the General Plan. The ARMP will add specificity to the existing General Plan policy direction.

1.2.2 Relationship to the California Surface Mining and Reclamation Act

The County's regulatory efforts for aggregate resource areas are framed by the California Surface Mining and Reclamation Act of 1975 (SMARA). SMARA created the regulatory framework for the mining industry, by identifying the extraction of minerals (including aggregate) as an essential element to the continued economic well-being of the State. SMARA includes provisions that encourage the production and conservation of minerals to ensure that an adequate supply will be available for continued economic growth in the State while safeguarding the environment. In addition, SMARA requires all vested and new excavations to obtain approval of a reclamation plan describing the methods to be employed in ensuring that the site could be beneficially used once mining operations have been completed.

Over the past few years, SMARA has been amended a number of times to address issues not foreseen in the original legislation. Lead agencies are now required to annually inspect each mine location within their jurisdiction to monitor reclamation compliance. Each mine operator is required to estimate and establish financial assurances, as a guarantee that money will be available to properly reclaim the site, should the operator abandon the site or be otherwise financially incapable of completing reclamation (SMARA Article 5, §2773.1). In addition, the State Mining and Geology Board (Board) has adopted Reclamation Standards in order to ensure that reclamation work is implemented consistently (SMARA Article 9, §3700 - 3713). A local jurisdiction (lead agency) must follow the SMARA requirements but may adopt stricter measures for mining and reclamation where it deems it appropriate.

In addition to ensuring that mined lands are reclaimed, that environmental effects of mining are minimized, and residual hazards are eliminated, SMARA was designed to address the loss of regionally significant aggregate deposits to incompatible land uses, such as urban growth and expansion, that restrict or preclude mining. To assist lead agencies in locating, inventorying and mapping mineral deposits, SMARA requires the State Geologist to map out areas of the State which are subject to urban pressures to develop, in order to determine the presence or absence of significant mineral resources before they are lost. Areas are classified as Mineral Resource Zones (MRZ) as follows:

MRZ-1: Areas where adequate information indicates that no significant mineral deposits are present or where it is judged that little likelihood for their presence exists.

MRZ-2: Areas where adequate information indicates that significant mineral deposits are present or where it is judged that a high likelihood for their presence exists.

MRZ-3: Areas containing mineral deposits, the significance of which cannot be evaluated from available data.

MRZ-4: Areas where available information is inadequate for assignment to any other MRZ zone.

An additional designation, SZ, indicates areas of scientific significance.

SZ: Areas containing unique or rare occurrences of rocks, minerals, or fossils that are of outstanding scientific significance are classified in this zone.

This information is then transmitted to the lead agency so that mineral resource management policies can be incorporated into the General Plan to protect significant mineral deposits and ensure that they will be available when needed. Upon receipt of the State Geologist's Mineral Land Classification report, the County has 12 months to incorporate mineral resource management policies into its General Plan.

The State Geologist's Mineral Land Classification report for Glenn County has not been completed. This ARMP will be amended at the time the report is completed to incorporate its findings.

In addition, §3676 of the State Mining and Geology Board Regulations requires that mineral resource management policies incorporate, but not be limited, to the following:

1. A summary of the information provided by the State Geologist's classification study prepared for the County, together with maps of the identified mineral deposits or incorporation by reference of the classification and/or designation maps provided by the State Geologist; and a discussion of State policy as it pertains to mineral resources in the County.

2. Statements of policy in accordance with SMARA §2762 which requires that within 12 months of receiving the mineral information from the State Geologist, and within 12 months of the designation of an area of statewide or regional significance within its jurisdiction, the County shall establish mineral resource management policies to be incorporated into the general plan which will: (a) recognize mineral information classified by the State Geologist and transmitted to the Board; (b) assist in the management of land uses which affect areas of statewide and regional significance; and (c) emphasize the conservation and development of identified mineral deposits.

3. Implementation measures that: (a) discuss the location of identified mineral deposits and distinguish within those areas between resources which are designated for conservation and those which may be permitted for future extraction; (b) provide appropriate maps to clearly define the extent of identified mineral deposits, including those resources designated for conservation and those which may be permitted for future extraction; (c) include at least one of the following:

   i. Adopt appropriate zoning that identifies the presence of identified mineral deposits and restricts the encroachment of incompatible land uses in those resource areas that are to be conserved.

   ii. Require that a notice describing the presence of identified mineral deposits

be recorded on property titles within the affected area.

iii. Impose conditions of approval upon incompatible land uses in and around areas which contain identified mineral deposits, in order to mitigate any significant land use conflicts.

Section 2774 of SMARA requires that every lead agency adopt ordinances that establish procedures for the review and approval of reclamation plans, financial assurances, and surface mining permits. Regulations must be periodically reviewed and revised, as necessary to ensure that they remain in accordance with State policy.

Pursuant to SMARA §2762, the ARMP will be submitted to the State Mining and Geology Board for review and comment prior to adoption. Any future proposed amendments to the ARMP and its policies will also be sent to the Board for review and comment, prior to their adoption. Similarly, §2774 of SMARA requires the mining and reclamation ordinances be reviewed by the Board, and certified as being in accordance with State policy.

SMARA is administered at the State level by the Department of Conservation (DOC). To fulfill the reclamation requirements of SMARA, the DOC oversees compliance efforts of local governments and mine operators, comments on lead agency surface mining and reclamation ordinances, provides technical expertise and assistance in review of reclamation plans, and provides environmental services, as needed.

1.2.3 Relationship to Other Regulations and Plans

Aggregate mining operations typically require review and approval of a number of permits by agencies at the local, State, and federal levels. Below is an example of some of the key agencies likely to review a request for permits to mine aggregate in Glenn County. A complete list of agencies and their requirements is presented in Appendix A.

Glenn County

Resource, Planning, and Development Department: Review and approval of Use Permit/Mining Permit; Reclamation Plan and Financial Assurance; and environmental review under the California Environmental Quality Act (CEQA).

Public Works Department: Review and approval of a grading permit for excavation and fill activities; building permits for any construction activities; encroachment permits for crossing rights-of-way or flood control facilities; and maintenance of County-owned bridges.

Air Pollution Control District (APCD): Review and approval of permits to construct and operate the aggregate processing, concrete batch, and asphalt batch plants and power generators; regulates and monitors fugitive dust (PM_{10}).

County Sheriff's Department: Review and approval of business plans, emergency plans, and spill prevention and control plans.

State Agencies

California Department of Fish and Game (CDFG): Regulatory authority over any impacts to endangered species of plants or wildlife except for certain fisheries which are regulated by the National Marine Fisheries Service. Mining operations in stream channels would likely be required to enter into a streambed alteration agreement with CDFG (F&G Code 1603).

Regional Water Resources Control Board (RWQCB): Regulates stormwater discharge under the National Pollutant Discharge Elimination System (NPDES) permit process. The RWQCB requires mine operators to obtain industrial stormwater permits for extraction and processing facilities. Mining operators washing materials may also be required to file a Report of Waste Discharge (RWD) to the RWQCB, Central Valley Region before discharging water containing fine-grained materials.

California Department of Transportation: Responsible for construction and maintenance of the State's highways, including bridges over stream channels. Extraction of aggregate material from stream channels could result in stream channel degradation and lateral channel migration, which could impact structures by undermining them.

State Lands Commission: Issues permits for exploration for minerals on public lands, and issues leases and easements for mining on State-owned lands, including rights-of-way. The State Lands Commission is also a trustee agency for the public trust for natural resources.

Federal Agencies

401 Clean Water Act Certification: This is the "storm water discharge permit" that allows for the construction or operation of facilities, which may result in any discharge into the "waters of the United States" (waters) (formerly only navigable waters). "Waters" is generally defined as surface waters, including lakes, rivers, streams, wetlands, and coastal waters. "Any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable waters at the point where the discharge originates or will originate,..."

In California, a National Pollutant Discharge Elimination System (NPDES) permit is required. In Glenn County, the permit will be issued by the Central Valley Regional Water Quality Control Board to ensure that contaminants are contained at the site both during and after construction and during operation. NPDES storm water discharge permits allow states and the EPA to track and monitor sources of storm water pollution. Facilities with a "storm water discharge associated with industrial activity," including mining and oil and gas operations with "contaminated" storm water discharges and/or construction sites disturbing 5 or more acres, must apply for a storm water permit.

United States Army Corps of Engineers (Corps): Responsible for reviewing and approving plans which would place any fill material within a wetland or "waters of the United States." These activities are regulated

under §404 of the Federal Clean Water Act (CWA) which is administered by the Corps. Mining operations in stream channels may affect wetlands or may require access roads which are considered to be "fill" under the CWA. Other mining activities, including stockpiling may also be considered to be "fill." In addition, under the Tulloch rule, most disturbance of Waters of the United States will also require a 404 permit.

United States Fish and Wildlife Service: Responsible for compliance with the Federal Endangered Species Act through a Section 7 Consultation if a project requires a federal agency permit, or a Section 10A for projects with no federal permits required.

1.2.4 CEQA Requirements

CEQA Guidelines §15378 defines a "project" under CEQA as including "adoption and amendment of local General Plans or elements thereof." This Plan, therefore, is considered to be a project under CEQA. Environmental review will take place during public review of the draft ARMP.

1.2.5 Alternatives

The following planning alternatives will be explored, in depth, in a subsequent phase of the Aggregate Resources Management Plan:

a. *No ARMP Project (Do Nothing).*

The "Do Nothing" alternative would result in continued conflict between the aggregate producers and persons and public agencies involved in regulating the gravel industry. This alternative means that the Aggregate Resources Management Plan would not be adopted and no vision for the future of the aggregate industry set forth. Both the applicants for gravel extraction projects and the agencies would continue making decisions on a case-by-case basis.

b. *No Vested Mining ARMP Project (Do Nothing further).*

This alternative would explore the possible options to stop all mining in the Lower Stony Creek Channel including those with vested rights.

c. *Purchase of vested rights from the miners and potential funding source(s).*

This option includes the purchase of mining rights for vested miners. At this point, no one has approached the miners to ask them what would be required for this type of buy-out.

d. *Formation of a Mining Assessment District wherein landowners may reassign their instream extraction "rights" to the miners under contract(s) which provide(s) royalties for standardized management of Lower Stony Creek.*

A Mining Assessment District or a Stony Creek District could be formed to raise funds for the protection and management of Stony Creek. The funds could be raised from taxes and/or grants.

e. *Relocation of State Route (SR) 32, perhaps north of Orland and Hamilton City to avoid a Stony Creek crossing.*

The relocation of SR32 has been considered by the City of Orland in several of their plans. The relocation of SR32 from Hamilton City to Interstate 5 would require realignment of SR32 to avoid a Stony Creek crossing. This would require a feasibility analysis.

f. *Establishment of project specific redlines.*

The establishment of project specific redlines would be a technical study that could probably be done at a reasonable cost. There would have to be a program to enforce the redlines once they were established for the ongoing operations with vested rights.

g. *Establishment of redlines only in the vicinity of monitored transportation structures.*

Establishment of redlines in the vicinity of bridges would be a technical study that could be done with computer modeling. The enforcement mechanism for the redlines should be in place prior to spending funds on such a study.

h. *Re-alignment of channel near structures to optimize hydraulic design capacity of existing structures.*

Re-alignment of the channel near structures to optimize hydraulic design capacity of existing structures would be explored in this alternative. An assessment of the proposed re-alignment needs to demonstrate a benefit and not a liability.

2.0 AGGREGATE USES, DEMAND, AND AVAILABILITY

2.0 AGGREGATE USES, DEMAND, AND AVAILABILITY

2.1 AGGREGATE USES AND SPECIFICATIONS

Aggregate refers to any combination of sand, gravel, and crushed rock in their natural or processed state. Aggregate products are essential for all construction uses where strength, durability, and resistance to distortion are required on a large scale.

Aggregate products are used in nearly all residential, commercial, and industrial building construction and in most public works projects such as roads and highways, bridges, dams, airports, and water and sewer systems, as well as the rebuilding and maintenance of these structures and systems. Building construction in Glenn County includes many of these examples of aggregate use. Maintaining local availability of aggregate products is important in containing the cost of construction and maintenance. Further, the mining industry can be a locally important employer and contributor to the economy.

Aggregate is the principal component of the following building materials:

Portland Cement Concrete (PCC)

This material is commonly referred to as "cement concrete" or "concrete." Between 60 and 75 percent of its volume is made up of aggregate. The remainder of PCC is a binder which is made from combinations of limestone, marl (sand or silt with a high calcium carbonate content), or other calcareous (calcium bearing) material and clay, shale or similar substance and water. Concrete is a principal building material for bridges, foundations, and many roads.

Asphalt Concrete (AC)

This material is commonly referred to as "asphalt," "asphaltic concrete," or "blacktop." Approximately 75 percent of its volume is made up of aggregate. The aggregate is held together by asphalt cement, a binder consisting of semi-solid hydrocarbons remaining after lubrication oils and fuel oils have been removed from petroleum. Asphalt concrete is used almost exclusively for road and parking surfaces. It is more flexible and less costly for these uses than PCC, but has a shorter useful life.

Road Base

Road base is the layer of aggregate directly beneath the road surface. Since it is not mixed with a binder it consists entirely of aggregate. Its function is to provide a solid base for the road surface to lay on. It must have the ability to transfer wheel loads to the underlying layers without permanent deformation. In addition, it must resist breakdown and continual compression from traffic use.

Road Sub-base

The function of the sub-base is similar to that of the road base. Like the road base above it, it consists entirely of aggregate and must resist deformation without the benefit of a binder. This layer lies beneath the road base, and as a result, wheel loads and the need to resist deformation are not as severe.

Fill

This category is a catch-all for a wide range of aggregate uses ranging from general construction fill for altering landforms to trench backfill and pipe bedding. Depending on the use, this material can consist of crushed and graded aggregate and sand (for pipe bedding) or soil and largely non-aggregate materials (for construction fill).

Rip-Rap

Rip-rap consists of large cobbles or boulders generally in excess of 1 foot in diameter. It is used to protect creek banks and shorelines from the erosive forces of current or wave action. It is also used on culvert outflows to absorb energy and minimize soil erosion.

2.2 AGGREGATE DEMAND

The local demand for aggregate material can be met through existing sources in the County. Glenn County is also a net exporter of aggregate materials to the region.

The primary locations for existing mining in Glenn County are on and adjacent to Lower Stony Creek. In-channel river sediments typically make excellent construction aggregate and are generally less labor intensive and therefore less costly to mine and process. The sand and gravel in the bed load is physically abraded and becomes naturally graded, sorted, and rounded. Extraction of aggregate material from Lower Stony Creek in 1992 was 686,158 tons, or 79 percent of the County's total. In 1992, 180,069 tons of aggregate material were extracted from off-channel pits in Glenn County, representing 21 percent of the total of aggregate material produced in the County.

2.3 GENERAL LOCATIONS OF AGGREGATE RESOURCES

2.3.1 Geologic Overview

Glenn County is located within two geomorphic provinces - the eastern one-third of the County is located in the Sacramento Valley while the western two-thirds is located in the Coast Range. The Sacramento Valley is characterized by nearly level terraces, smooth alluvial fans, narrow flood plains, and water filled basins. West of the Valley province is the Coast Range, which includes foothills increasing in elevation from the westerly edge of the Valley to approximately 2,000 feet above mean sea level (msl); and the mountains, rising in elevation to over 7,500 feet above msl. The foothills consist of smooth rolling to steep hills and narrow valleys with distinct south to north drainages.

The eastern one-third of Glenn County, located in the Sacramento Valley geomorphic province, is characterized by geologic materials consisting primarily of

unconsolidated Pleistocene and Recent sediments including alluvial fan deposits, stream channel deposits of the Sacramento River and its tributaries, and inland basin deposits.

There are five general soil types in Glenn County ranging from mountain soils associated with the Coast Range to the soils associated with more recent alluvial fans and flood plains, such as those located along Lower Stony Creek and the Sacramento River. These soils generally consist of shallow to deep, well-drained to excessively drained gravelly and non-gravelly stratified material, soils which naturally contain construction grade aggregate material.

Generalized geologic information for the County is available and is shown on Figure 2-1. Aggregate resources are generally present in economical form in the eastern portion of Glenn County. Soil types found in that area that may contain aggregate resources are described, as follows:

Stream Channel Deposits: Stream channel deposits consist of unconsolidated deposits of sand and gravel occurring within and adjacent to the active stream channel of Lower Stony Creek and the Sacramento River.

Undifferentiated Alluvium: Unconsolidated deposits of clay, silt and sand, with occasional stringers of gravel. Occurs both as fillings in tributary valleys and as broad plains formed by the coalescing of alluvial fans.

Recent Alluvial Fan Deposits: Unconsolidated deposits of silt, sand, and gravel.

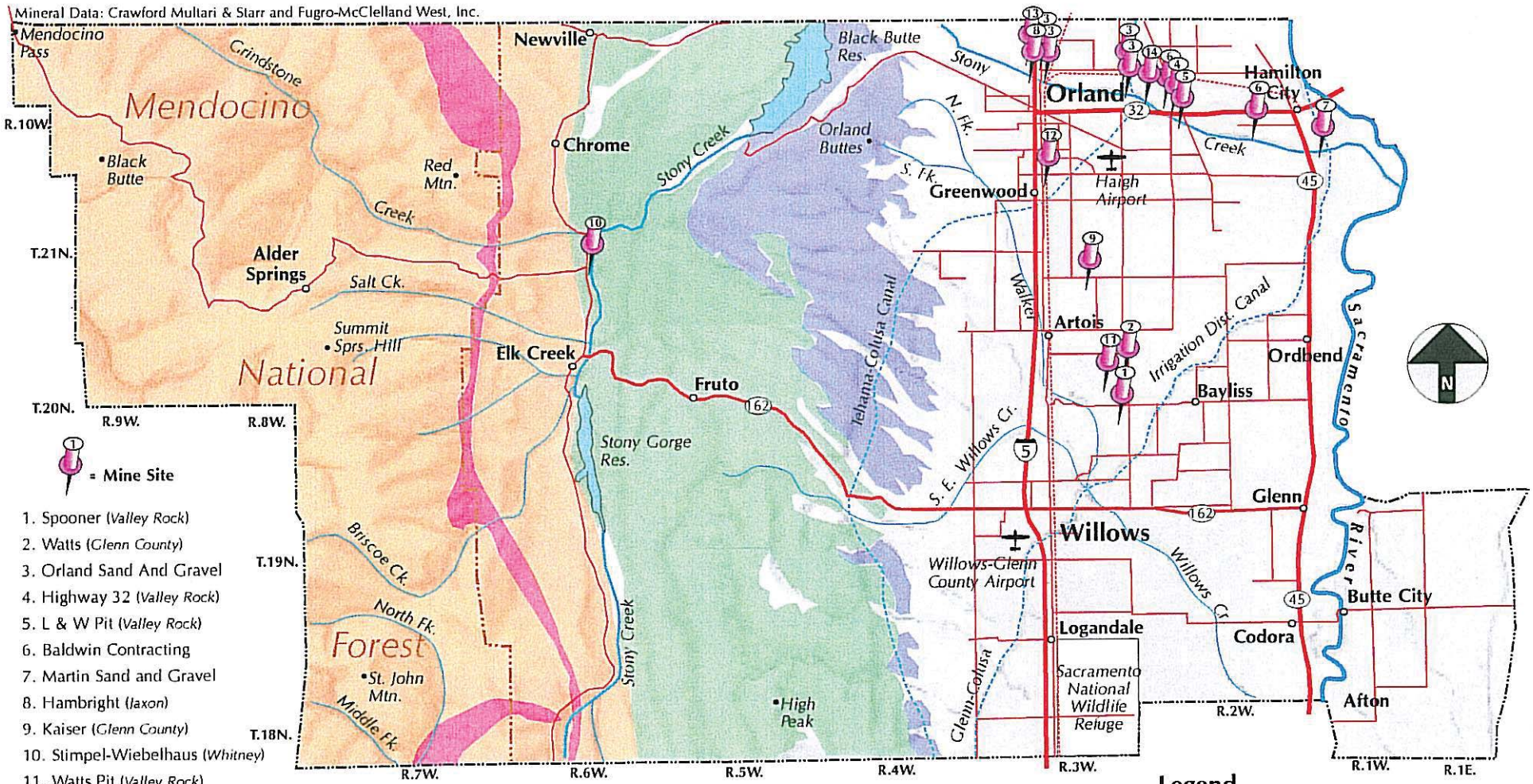
Younger Alluvial Fan Deposits: Essentially unconsolidated deposits of silt, sand, and gravel.

2.3.2 Mineral Land Classification Project

The Department of Conservation Division of Mines and Geology has completed, in August, 1997, the report: *Mineral Land Classification of Concrete-Grade Aggregate Resources in Glenn County, California.* The study classifies areas of the County as to their presence or absence of significant sand and gravel deposits that are suitable as sources of concrete aggregate.

The classification is incorporated by reference as part of this Aggregate Resource Management Plan. Major findings of the classification report are as follows:

- Pursuant to SMARA, over 39 square miles of the County containing demonstrated or inferred aggregate resources have been classified as MRZ-2a or MRZ-2b. The resources in those areas are adequate to meet the needs for the next 50 years provided that additional permits are granted.
- The estimated available aggregate resources within the areas classified MRZ-2a and MRZ-2b are calculated to be 1,031 million tons. Of this resource, 61 million tons are identified as reserves (permitted resources) as of the end of 1996.
- About 41 million tons of sand and gravel are impounded behind the Black Butte Dam. The sediments impounded behind the dam are classified MRZ-2b for concrete-grade aggregate resources. The material is composed of the same material that is currently being exploited in the lower reaches of Stony Creek, however the quality of the deposit is probably lower because it likely contains large amounts of silt and clay.
- Glenn County is a net exporter of construction aggregate resources. In the last 2 years, approximately 80% of construction aggregate produced in Glenn County was exported to neighboring counties, mostly Butte County. Other important market areas are the counties of Tehama and Colusa. Minor market areas are in Lake, Shasta, Trinity, Plumas, and Lassen counties.



Generalized Geology

Glenn County, California

Figure 2-1

- Based on past production for 1965-1995, the anticipated consumption of aggregate in the Glenn County market areas through 2046 is estimated to be 77 million tons. Should unforseen events occur, such as massive urban renewal, disaster reconstruction, or major recession, the aggregate demand could change considerably.

- Of the 77 million tons needed for the next 50 years, 33%, or 27 million tons, must be of PCC quality and 33%, or 27 million tons, must be of AC quality.

- Based on our projection, the 61 million tons of reserves will be depleted in 42 years--by 2038. Thus, to meet future demand additional resources need to be permitted for mining, or alternative resources used.

3.0 EXISTING CONDITIONS AND MINING ISSUES

3.0 EXISTING CONDITIONS AND MINING ISSUES

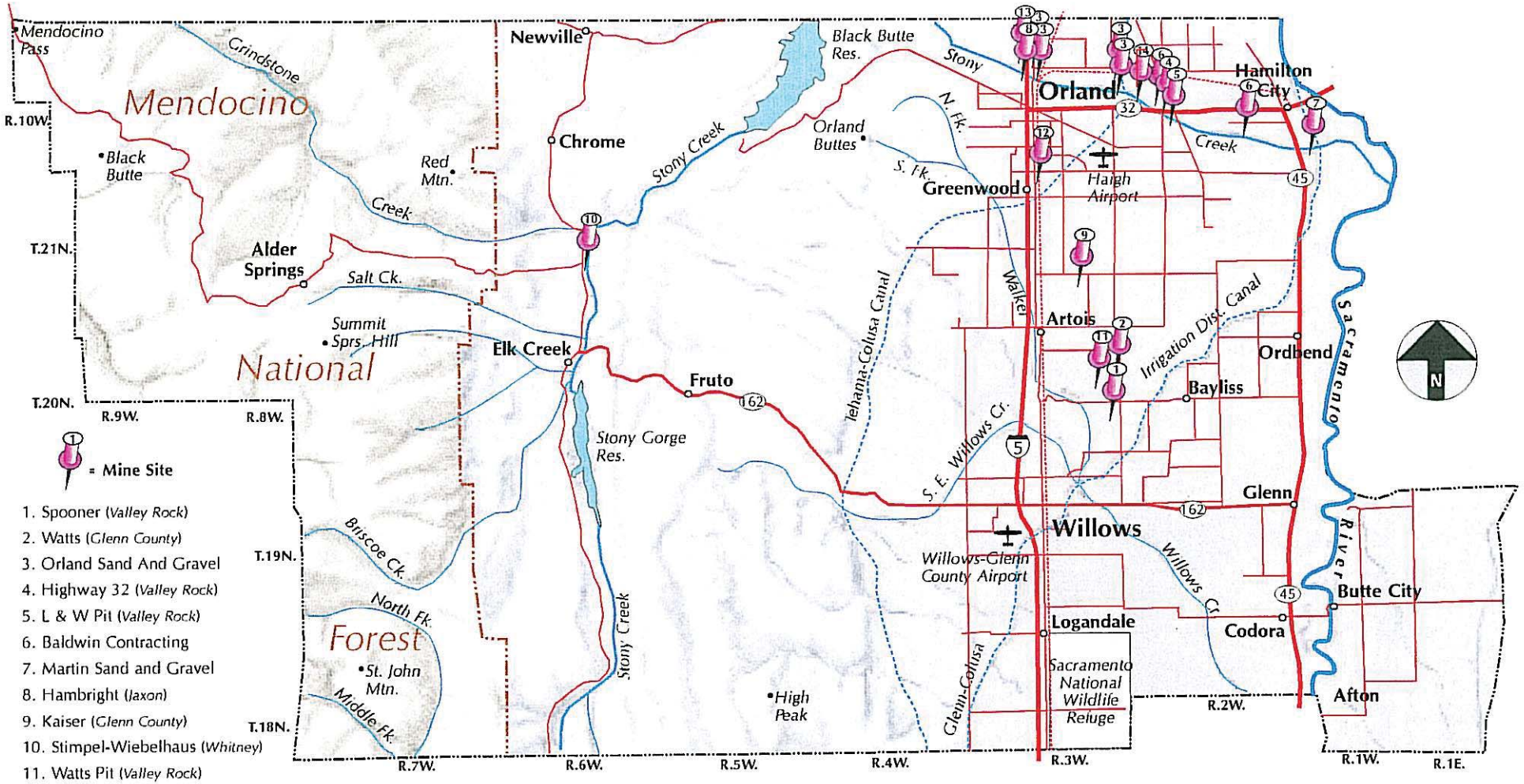
3.1 EXISTING AND FUTURE MINING OVERVIEW

Aggregate resources in Glenn County consist of sand and gravel extracted through in-channel mining, off-channel mining adjacent to stream channels, and off-channel mining associated with an old Stony Creek fan which has left gravel deposits in a north-south path through the valley part of the County. Off-channel mining has not been conducted extensively. Off-channel mining is now being proposed adjacent to the south side of lower Stony Creek, as pressure from State and federal agencies to cease mining activities in stream channels increases. Hard rock quarry mining has not occurred in Glenn County due to the longer distances to potential sources, and due to the available supply of aggregate associated with the tributaries of the Sacramento River.

Commercial mineral extraction (including aggregate mining) is permitted with a conditional use permit in the Agricultural Exclusive (AE) zone.

There are currently 15 permitted operations in Glenn County with an additional one proposed. Ten of these are located off-channel adjacent to the active stream channel of lower Stony Creek, while the other five are quarries, where alluvial deposits associated with the old Stony Creek alluvial fan are extracted. These sites are shown generally on Figure 3-1. Figure 3-2 provides an index to the specific locations of mining operations (Figures 3-3 to 3-6). There are six sites along lower Stony Creek generally located in and around Orland and Hamilton City (Figures 3-3 and 3-4); another four sites (including two operated by the County) near the community of Artois (Figure 3-5); and one operation in lower Stony Creek near the community of Elk Creek (Figure 3-6). The proposed mine site is along lower Stony Creek. All mining and reclamation activities at these operations are being conducted under approved conditional use permits and/or reclamation plans.

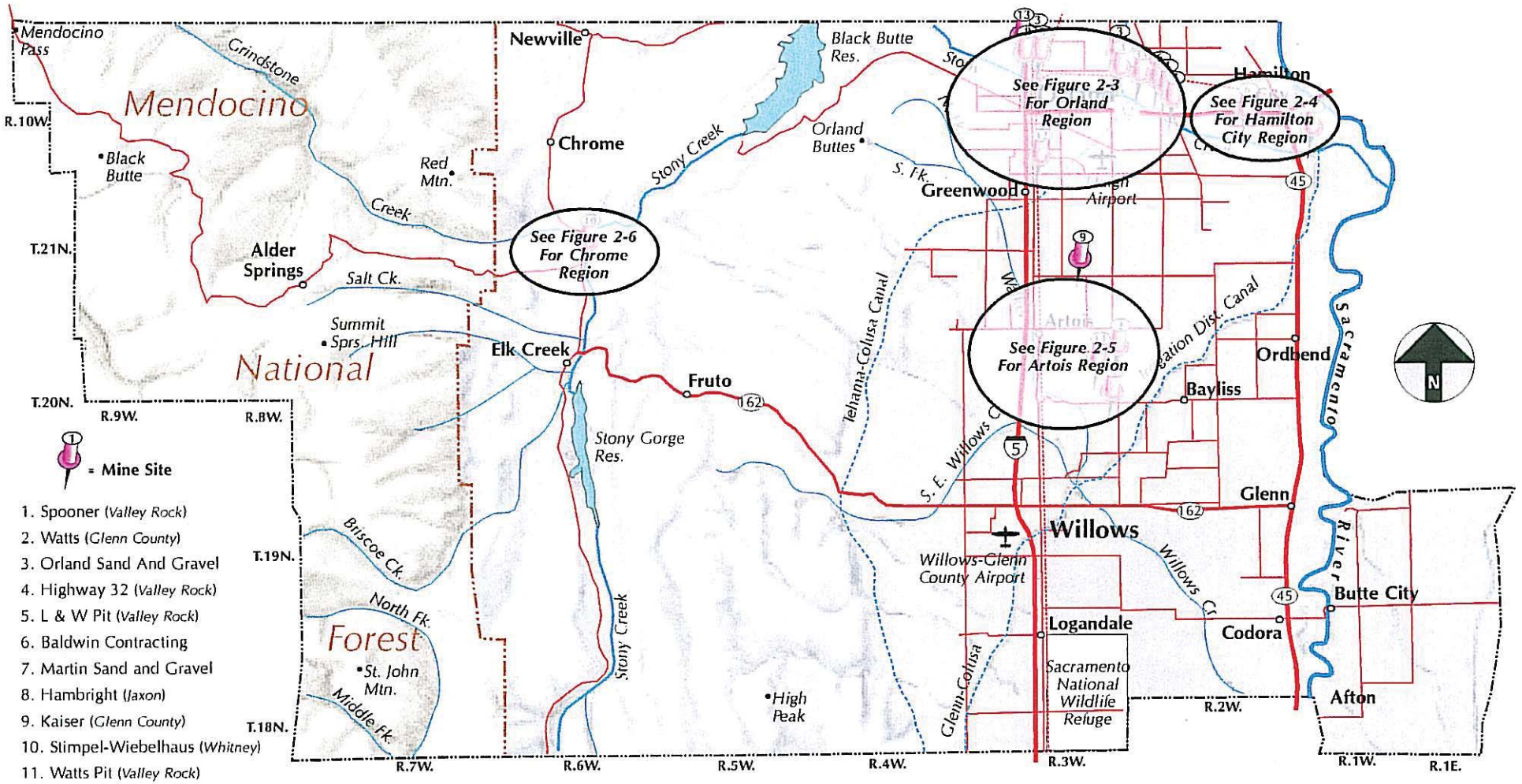
Gravel extraction from Stony Creek in 1992 was 686,158.53 tons or 79 percent of the gravel extracted in the County. The primary location for in-channel mining in Glenn



Existing Aggregate Mine Locations

Glenn County, California

Figure 3-1



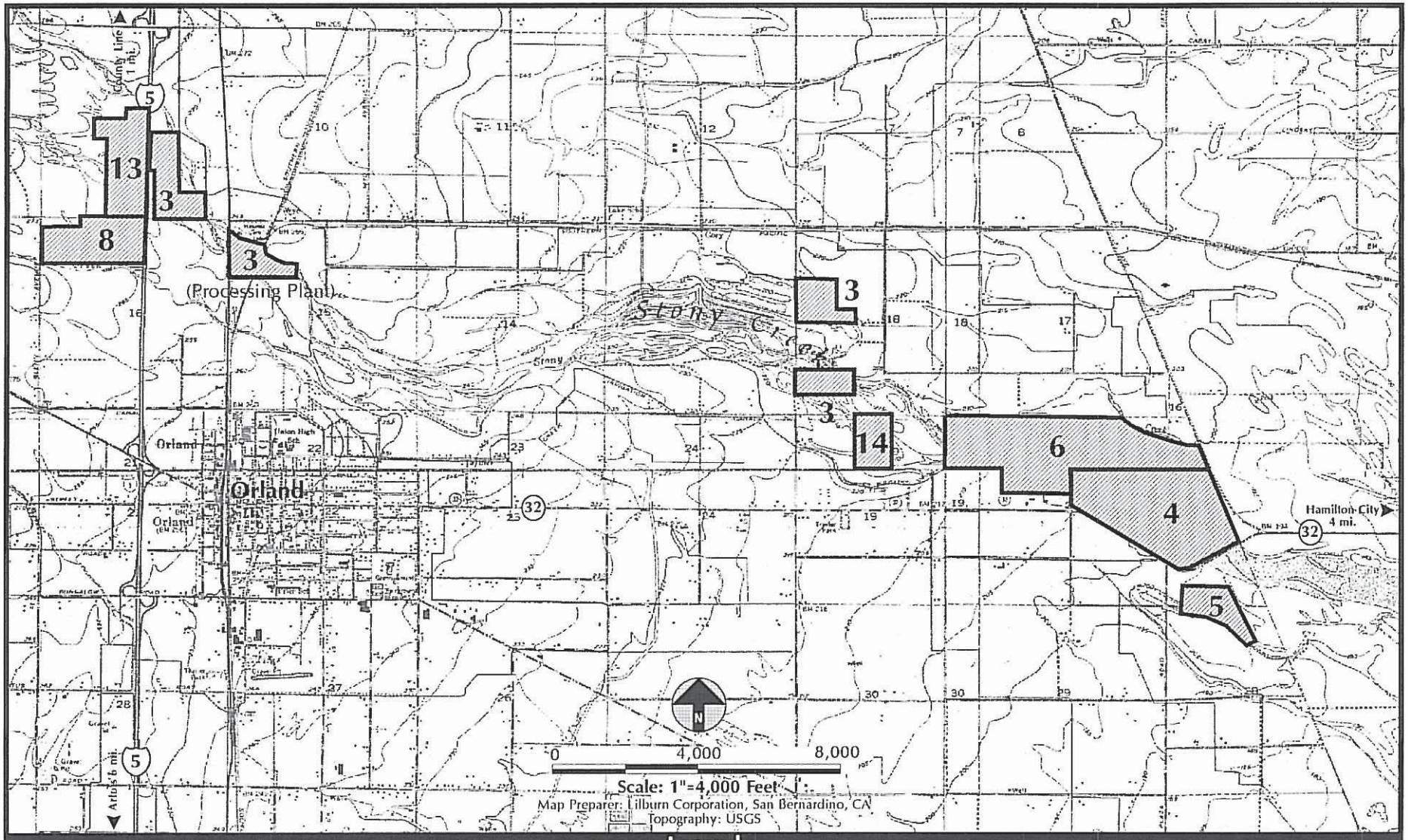
= Mine Site

1. Spooner (*Valley Rock*)
2. Watts (*Glenn County*)
3. Orland Sand And Gravel
4. Highway 32 (*Valley Rock*)
5. L & W Pit (*Valley Rock*)
6. Baldwin Contracting
7. Martin Sand and Gravel
8. Hambright (*Jaxon*)
9. Kaiser (*Glenn County*)
10. Stimpel-Wiebelhaus (*Whitney*)
11. Watts Pit (*Valley Rock*)
12. I-5 Pit (*Valley Rock*)
13. Orland Asphalt (*Jaxon*)
14. Jasper (*Jaxon*)

Mining Regions Index

Glenn County, California

Figure 3-2



Legend

Active Mine Sites

3. Orland Sand & Gravel
4. Valley Rock Products
5. Valley Rock Products (L & W Pit)
6. Baldwin Contracting
8. Jaxon Enterprises (Hambright)
13. Jaxon Enterprises (Orland Asphalt)
14. Jaxon Enterprises (Jasper)

General

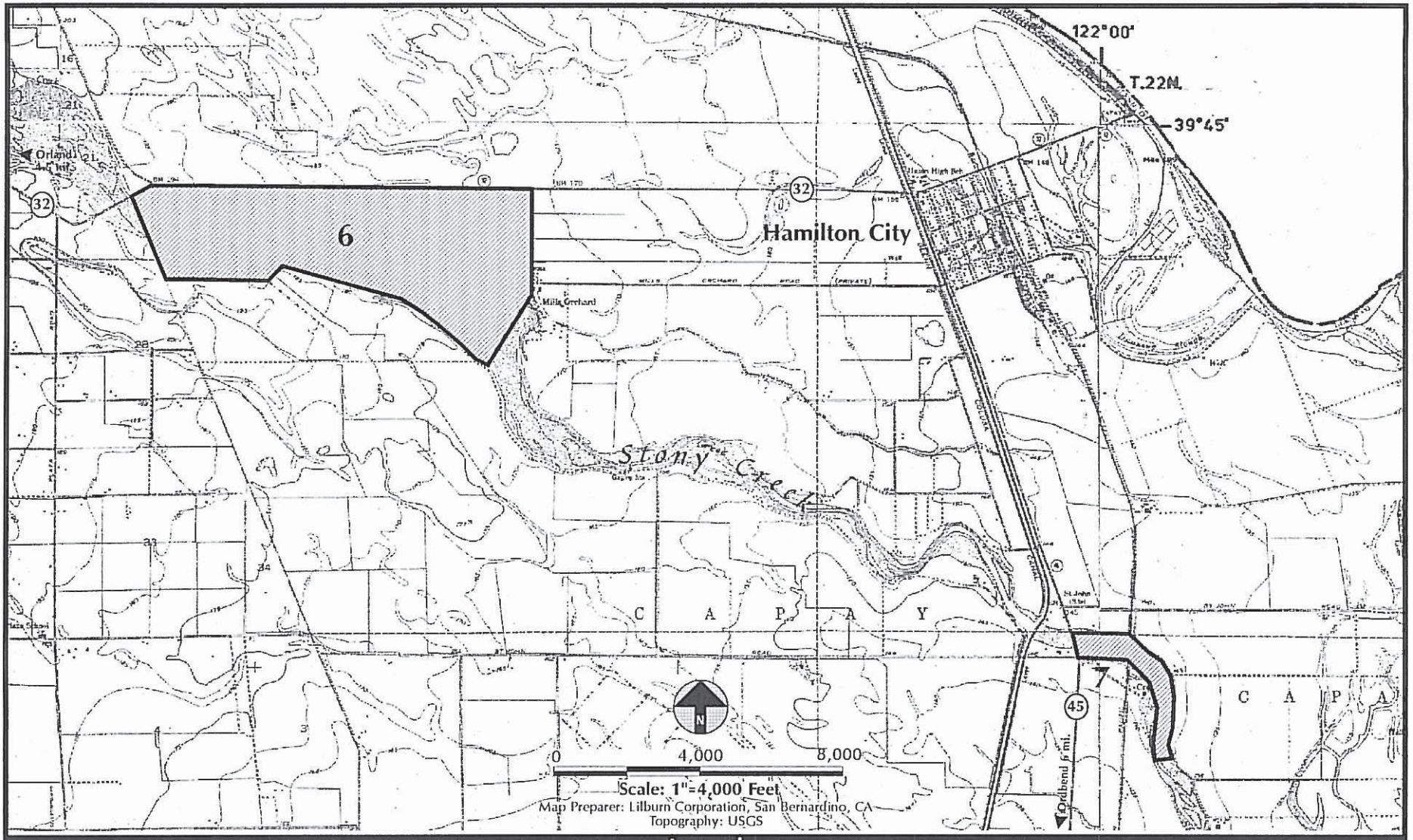
Limits of Mining Activities

10 Reference Number (Active Mine Sites))

Orland Region

Glenn County, California

Figure 3-3



Legend

Active Mine Sites

6. Baldwin Contractors (North Valley Ready Mix)

7. Martin Sand and Gravel

General

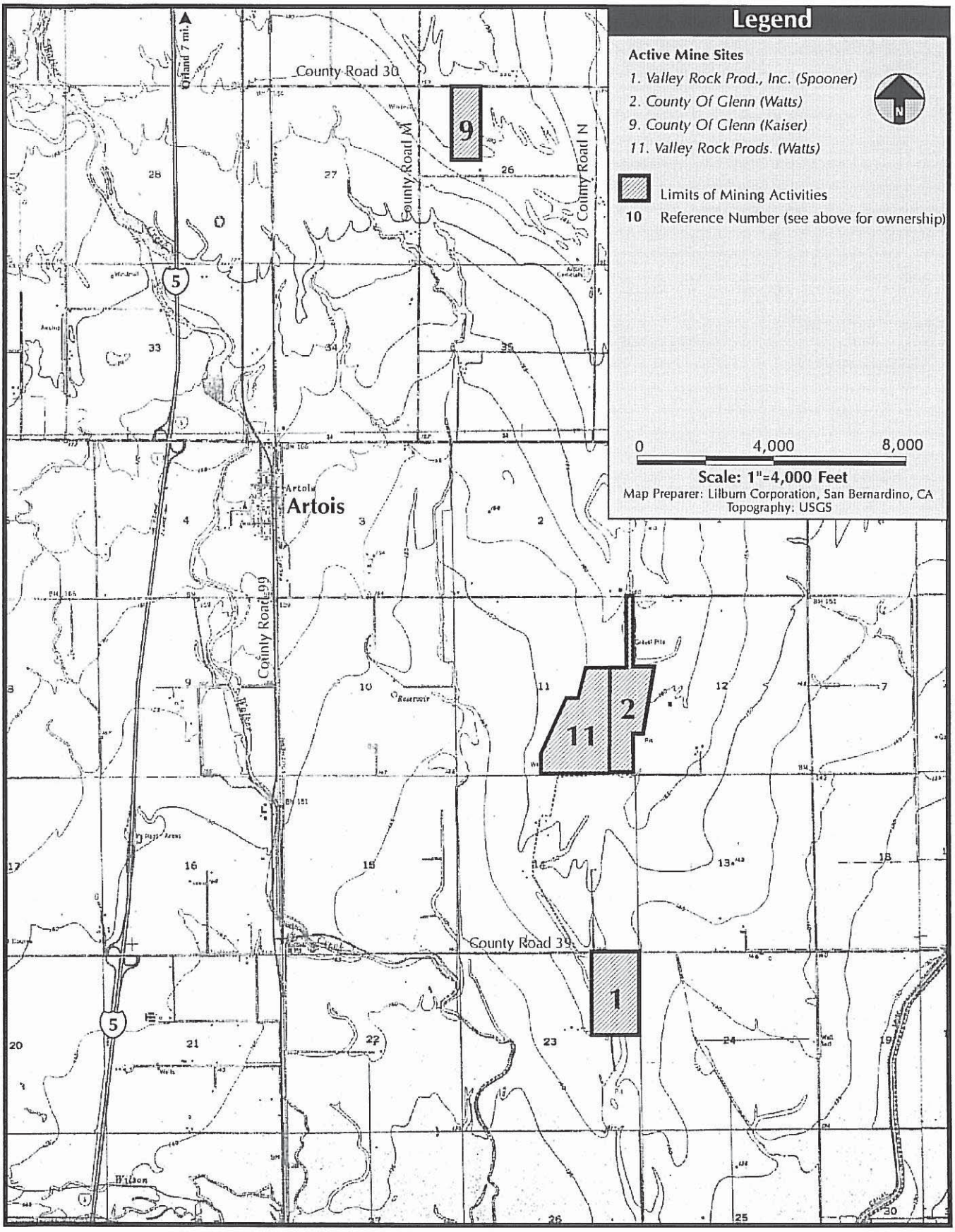
Limits of Mining Activities

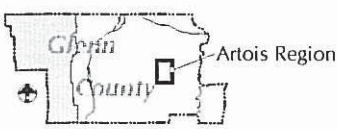
10 *Reference Number (Active Mine Sites))*

Hamilton City Region

Glenn County, California

Figure 3-4

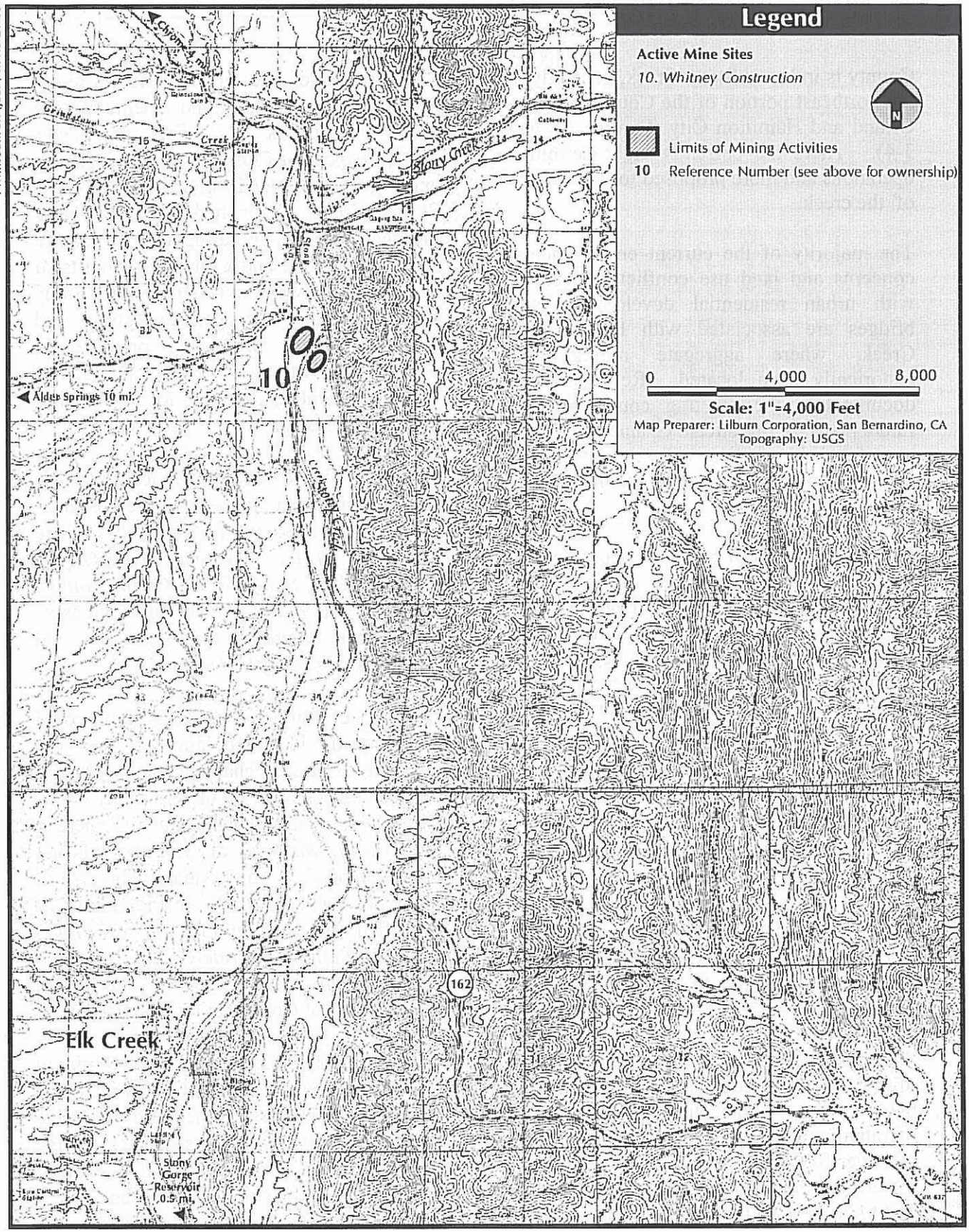


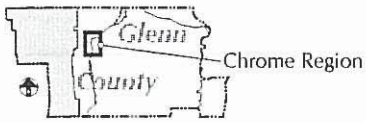


Artois Region

Glenn County, California

Figure 3-5





Chrome Region

Glenn County, California

Figure 3-6

County is in lower Stony Creek, generally in the northeast portion of the County between Orland and Hamilton City (Figures 3-3 and 3-4). There are currently eight permitted operations and more proposed for this stretch of the creek.

The majority of the current environmental concerns and land use conflicts associated with urban residential development and bridges are associated with lower Stony Creek, where aggregate mining has historically been located. Recent studies documenting the existing conditions and future plans for this stream channel have been completed by parties with an interest in management of the stream channel. This effort is continuing.

Caltrans Division of Structures completed a study entitled, *Geomorphic Study of Bed Degradation in Stony Creek, Glenn County California* (Swanson and Kondolf, 1991). This study examined changes occurring in Stony Creek and the causes of these changes, in order to address problems at Caltrans Highway 32 bridge. The study discusses the effects on Stony Creek associated with Black Butte Dam and effects associated with aggregate mining operations in the stream channel.

Another study, entitled *Fluvial Processes and Recent Channel Changes Along Lower Stony Creek;* Glenn County California, is a Master's Thesis at California State University Chico, prepared by Janine Arano in 1993, was prepared using similar methodology as the Caltrans study to evaluate changes in lower Stony Creek. This was a more general study of lower Stony Creek concerned mainly with bank erosion. This study concluded that maintaining a safe yield of gravel harvesting in lower Stony Creek and stopping channel lowering would require an almost complete halt to large-scale mining activities.

The Bureau of Reclamation is currently investigating the issues, and assembling the *Lower Stony Creek Fish, Wildlife and Water Use Management Plan.* This plan describes existing conditions and current practices in the Stony Creek Watershed, and provides management options designed to balance social, historical, and economic benefits of Stony Creek, with consideration to Stony Creek ecology. Management options and recommendations are being prepared in coordination with a task force comprised of various federal, State, and local agencies, industry, and others.

The U.S. Fish and Wildlife Service (USFWS) prepared a report addressing the Tehama-Colusa Canal at Stony Creek entitled, *Reverse Operation of the Constant Head Orifice Located Along Stony Creek, Glenn County, California* (1993), which has extensive information regarding the vegetation and wildlife along Stony Creek.

Off-channel mining in Glenn County would likely occur in floodplains, on terraces adjacent to stream channels or in alluvial deposits associated with the old Stony Creek alluvial fan. Mining could occur elsewhere in the County, wherever alluvial deposits are located depending on the quality and size of the deposit and economic considerations as identified in the report, *Mineral Land Classification of Concrete-Grade Aggregate Resources in Glenn County, California* (Department of Conservation, August 1997).

The most likely places for off-channel mining operations to occur in Glenn County are in the floodplain of streams, adjacent to the active stream channel; on terraces adjacent to the stream channels in alluvial deposits associated with the old Stony Creek alluvial fan.

3.2 EXISTING MINING AND CURRENT ISSUES

Table 3-1 shows the permit numbers for current active mining operations in Glenn County.

3.2.1 Chrome Region

The primary source of aggregates currently mined in upper Stony Creek is from Elk Creek below the Stony Gorge reservoir and dam. Waterflows below the dam are seasonally significant with considerable deposition of aggregates. Existing mining operations in this region are shown on Figure 3-6.

3.2.2 Orland Region

Water flows in lower Stony Creek (Figures 3-3 and 3-4) are regulated by the releases from the Black Butte Dam. Black Butte Dam was built for flood control and is operated by the Army Corps of Engineers. During the winter months, the decision on release of water is made at the Corps office in Sacramento. During the irrigation season, the decision on release of water is made by the U.S. Bureau of Reclamation for the benefit of the water users downstream.

The primary source of aggregate resources in this section of Stony Creek is from bank erosion. Construction of the dam reduced the average annual flow in the creek by one half, dropping sediments upstream and eliminating substantial gravel replenishment from Upper Stony Creek. Lower Stony Creek flows across the alluvial fan built up by sediment eroded and transported from the upper basin onto the relatively flat valley floor. As the stream has eroded into terrace deposits, the active channel has been effectively widened. This is reflected in an increase in active channel area from 552.5 acres in 1967 to 823.5 acres in 1990 (Swanson and Kondolf, 1991).

Figure 3-1 shows the location of mining operations in this region. Valley Rock Products, Inc. and Baldwin Contracting Company have "vested rights" to operate in this portion of the stream channel. Orland Sand and Gravel and Martin Sand and Gravel also share "vested rights" to mine in Stony Creek. A vested operator is one who was permitted to operate prior to January 1, 1976, and has been operating with no substantial changes to the operation beyond what is allowed by SMARA, §2776. However, CDFG issues annual agreements separately from SMARA that can be more restrictive to the extent of mining allowed than the vested rights regulation.

Jaxon Enterprises operates a gravel mine just west of the Interstate 5 (I-5) bridge. The Marie Z. Arbuckle Trust has also applied for a gravel extraction operation west of the Jaxon Enterprises locations. Jaxon Enterprises has also received permits to operate a mine on either side of Hambright Creek just west of I-5.

Stony Creek is spanned laterally by the Caltrans bridge at I-5, the County bridge at County Road 99W, the Southern Pacific Railroad bridge, and the Tehama-Colusa Canal along this reach. The Tehama-Colusa Canal crosses under Stony Creek just east of Orland, east of County Road N. The Tehama-Colusa Canal has a siphon to allow the water in the Canal from the Sacramento River to pass under Stony Creek. Immediately upstream of the Tehama-Colusa Canal is a structure known as a Constant Head Orifice (CHO) which was built as part of the Canal to deliver water from the Canal to Stony Creek.

Table 3-1
Permit Numbers For Mining Operations in Glenn County

Mining Operation	Conditional Use Permit		RP		Vested Right	Expiration Date
	Number	Date	Number	Date		
Whitney Construction						
CA Mine ID#91-11-008	CUP #86-09	9/86	RP#86-08		No	8/19/2002
Jaxon Enterprises						
Road 7 Stony Creek Site CA Mine ID#91-11-0007	CUP #86-15	1/6/87	RP#86-11		No	1/6/2007
Hambright Creek Project CA Mine ID#91-11-0015	CUP #94-01				No	None
Orland Sand and Gravel						
CA Mine ID#91-11-0004			RP#86-02	8/86	Yes	None
Valley Rock Products, Inc.						
Highway 32 Site CA Mine ID#91-11-0006	CUP#86-18 (Processing only)	1/21/87	RP#86-07		Yes	1/20/2003
I-5 Site CA Mine ID#91-11-0012	CUP#92-02	3/18/92	RP#92-01		No	None
L&W Pit CA Mine ID#91-11-0014	CUP#93-09	3/28/96			No	None
Spooner Pit CA Mine ID#91-11-0005	CUP#82-59	12/82			Yes	None
Watts Pit CA Mine ID#91-11-0013	CUP#93-08	11/17/93			No	11/17/98
Baldwin Contracting						
CA Mine ID#91-11-0003	CUP#80-34 (combined previous permits)				Yes	None
Martin Sand and Gravel						
CA Mine ID#91-11-0009			RP#86-01	6/86	Yes	None
County of Glenn						
Watts Pit CA Mine ID#91-11-0001			RP#86-06	9/3/86	Yes	None
Kaiser Pit CA Mine ID#91-11-0002			RP#90-01	11/21/90	Yes	None

The CHO is used to redivert water from Stony Creek from April 1 to May 15 and from September 15 to October 29 to augment Red Bluff diversion dam supplies to the Tehama Colusa Canal, in order to meet fish passage requirements at the Red Bluff diversion dam on the Sacramento River.

Orland Sand and Gravel has a small gravel extraction operation just east of County Road 99W. Jaxon Enterprises operates the Jasper Gravel Extraction Operation east of County Road P. The Valley Rock Products, Inc. gravel extraction operation is located upstream of the State Route 32 (SR 32) bridge. Figure 3-1 shows the location of each of these operations.

3.2.3 Hamilton City Region

Since construction of the SR32 bridge in 1976, the channel in this locale has been degraded up to 16 feet under the east end of the bridge exposing the footings of the five easterly support piers. The rest of the channel under the bridge has rapidly degraded 5 to 7 feet. (Swanson and Kondolf, 1991).

Baldwin Contracting Company is the main gravel extractor downstream from the SR 32 bridge.

3.2.4 Sacramento River

There has been some gravel extraction along the Sacramento River in the past; however, there are no permitted mining operations along the Sacramento River at this time in either Glenn County or in neighboring Butte County.

3.2.5 Artois Region

Pit mining is being carried out by the Glenn County Public Works Department at the Kaiser Pit on County Road 30, and at the Watts Pit on County Road 35. Valley Rock Products also has mining operations at the Spooner Pit on County Road 39, the Watts Pit north of County Road 39 and at the I-5 Pit north of County Road 25.

Gravel pits located on the east and west side of I-5 north of County Road 25 were created by Caltrans for the construction of I-5. The Valley Rock I-5 site on the east side of I-5 has been used as a gas well drilling mud disposal site and could be remined for clay or bentonite like cap soils at some future date.

There are historic gravel pits in Glenn County such as the Southern Pacific Railroad pit near County Road 99W and south of County Road 27, which were not reclaimed according to current SMARA standards. There are other gravel pits north of Willows which are filled with water. One of these areas has been reclaimed as County Park at Road 48.

3.3 MINING METHODS AND EQUIPMENT

Gravel Bar Skimming

In-channel aggregate deposits are typically removed by "gravel bar skimming" which involves the removal of the upper portions of bars, at or above the thalweg level of the creek. The thalweg is a line in the stream channel representing the low point of the low water channel. Gravel bar skimming is currently the most commonly used mining technique in Glenn County. Disturbance of banks, riparian vegetation and flowing portions of the creek is usually prohibited. Vertical and lateral mining limits are

established on a site-specific basis to reduce or prevent channel degradation and bank damage. These limits are monitored annually through preseason and post season cross sections during years that mining takes place.

The skimming technique used depends on the type of equipment available to the operator and the thickness of the deposit. Ideally, thin deposits are harvested using paddle wheel scrapers. These scrapers can be accurately adjusted for depth of cut and are capable of uniformly harvesting shallow deposits.

Front loaders are often used for thick deposits, where the operator can scoop, rather than scrape, gravel from a bar. Front loaders are used for loading trucks or moving stockpiles.

In addition to skimming, mining can involve excavation below the level of seasonally replenished aggregate. This method is in use in the area east and west of the Highway 32 bridge.

Quarrying

Off-channel mining in the floodplain and on terraces adjacent to the active stream channels, is generally conducted using the same methods and equipment as activities conducted in the stream channel itself. Off-channel mining in the old Stony Creek alluvial fan deposits are excavated from pits.

Depending on the thickness of the deposits, off-channel mining can be done either by skimming, using scrapers as is done in the stream channel, or by excavating pits using dozers and front-end loaders. Depth is contingent on aggregate quality, the number of clay lenses present and the depth of groundwater.

Off-channel pit mining can maximize the yield of aggregate while producing a benefit to wildlife. The aggregate yield is maximized by creating few but deep ponds, while wildlife benefit is maximized by creating more and shallower ponds, as the edges of the pond are of the greatest wildlife value.

An edge is the interface between two habitats. It is the area where species common to both the pond and the surrounding area congregate and is, therefore, the most valuable and heavily used habitat. An edge is increased by emphasizing numerous small to medium ponds over single large ponds and by constructing ponds with irregular contours. These irregular contours are formed naturally as the pond is designed around existing trees or other vegetation. The result is a natural-appearing pond with large established vegetation on its banks. Upon completion of the pond, the existing bank vegetation is enhanced as necessary with plantings from local riparian species. The banks are left at a slope no greater than 2:1 to ensure safety. Rock or gravel islands may be created to enhance wildlife use.

On very large ponds, draglines may be a cost-effective means of excavation. However, they are expensive, less efficient, and lack the adaptability of the other equipment commonly used by the industry. These disadvantages may be overcome by the economy of scale on a large project where costs can be amortized over a long period of time. On large, deep ponds where excavation would have to occur in the wet areas, a dragline may be the only piece of equipment capable of doing the job (Lake County, 1992).

Ponds are discouraged in the following areas:

- On prime farmland under agricultural production;

- In areas of existing high-quality wildlife habitat such as riparian woodland and wetlands; and

- Where the structural integrity of the active stream channel could be endangered by the excavation.

3.4 POTENTIAL LAND USE CONFLICTS AND ENVIRONMENTAL ISSUES

Off-channel floodplains and stream terraces support land uses that may conflict with mining activities. The alluvial material provides rich soils which can support agricultural uses ranging from pasture land to vineyards and orchards depending on the depth and type of the soils. In addition, the relatively flat nature of the stream terraces and their association with streams make them preferred residential sites. The very nature of the situation makes these areas prime open space as well, often offering scenic vistas and recreational opportunities.

Off-channel mining may not conflict with all potential land uses. Agricultural uses can often be reinitiated following site reclamation. River terraces can be graded to accommodate residential uses and quarries can be reclaimed as lakes, providing reservoir storage or recreation. The temporary nature of off-channel mining provides an opportunity for phased development.

Other land use conflicts are similar to those associated with in-channel mining activities described above. The *Glenn County Natural Resources Paper* prepared as a part of the General Plan, includes the following description: "...Surrounding agricultural operations and rural residential areas which depend on groundwater may experience changes in water quantity and quality. The principal types of conflicts with residential uses are traffic, dust generation and noise. There is a particular problem in the West Orland area where the only access to facilities on lower Stony Creek is through local roads in a rural residential development..."

Conflicts between in-channel mining and other land uses can be related to economics. For example, bank erosion caused by changes in stream morphology can result in the loss of agricultural soils, fisheries habitat and riparian vegetation; which in turn can reduce the potential for agricultural production and recreational opportunities.

Conflicts may also arise when there is a residential population nearby that may object to the noise, fugitive dust and large vehicle traffic on the local roadway system. The mining operation may be seen as a nuisance.

The aesthetic value of the creek channel as a scenic resource may also be affected depending on the location, design and type of the operation.

Environmental impacts associated with mining operations in stream channels can potentially include:

Geology and Soils

Adverse changes to stream channels such as:

- Loss of prime agricultural soils.
- Loss of sediment.
- Bank oversteepening and failure.
- Lateral bank erosion.
- Dewatering of floodplain and terrace.

- Unstable pit slopes.
- Undercutting or destabilization of in-stream facilities, including bridges and water conveyance facilities.

Hydrology and Water Quality

- Water quality and supply, turbidity from stream crossings and wash water ponds.
- Potential alteration of groundwater flow.
- Potential alteration of flood or erosion capacity.
- Potential effects on surface water and groundwater quality.
- Potential effects on groundwater recharge.
- Dewatering and groundwater withdrawals may affect local groundwater supplies.

Stream Morphology

- Channel degradation.
- Loss of channel confinement with resultant braiding.
- Head cutting and downstream erosion.
- Lateral bank erosion on stream channel side.
- Potential "pit capture" by the creek, resulting in changes in stream configuration.

Fisheries, Endangered Species, and Critical Habitat

- Degradation, reduction or removal of habitat to the detriment of plant and animal species of concern.
- Long-term habitat loss due to destabilized channel banks or declining groundwater.
- Disturbance to wildlife due to mining operations.
- Long-term loss of riparian habitat.

Aesthetics

- Visual impact of equipment or stockpiled materials, light and glare.
- Alteration of scenic resources including vegetation and topography.

Traffic/Circulation

- Truck traffic effects on roadways may reduce levels of service and cause safety and road maintenance problems on substandard roads.
- Streambed degradation can cause erosion in the vicinity of bridges, pipelines, and other public facilities causing destabilization of foundations.

Noise

- Mining operation noise effect on sensitive receptors.
- Mining operation noise effect on sensitive wildlife species.

Hazardous Materials

- Accidental spill or contamination of streams or groundwater by hazardous materials.

Air Quality

- Process plant dust emissions.
- Mining and haul truck dust emissions.
- Equipment, truck and power generation exhaust emissions.
- Dust emissions during excavation.

Cultural Resources

- Impacts to prehistoric and historic resources.

Agriculture

- Loss of agricultural production on prime agricultural soils until reclamation was completed.
- Very deep quarries reduce available surface area upon reclamation due to unusable side slopes.
- Potential conflicts with Williamson Act contracts for agricultural lands.
- Impacts on agricultural soils located near banks which may be susceptible to erosion and channel widening.

3.5 MITIGATING IN-STREAM MINING IMPACTS

A number of approaches have been employed statewide to limit the effects of aggregate extraction by mining operations in stream channels, based either on limits to extraction quantities or observed channel effects.

Limit Gravel Extraction to Replenishment Rate

One approach is to estimate the replenishment rate (the rate at which gravel is transported into the extraction reach from upstream) and to permit that quantity to be mined. Gravel "replenishment" or "recruitment" occurs as upstream erosion moves material through the stream system. Because the Stony Creek stream system is now interrupted by Black Butte Dam, erosion below the dam is the only source of replenishment in lower Stony Creek. It is estimated that the gravel extraction from Stony Creek below Black Butte Dam exceeds the current replenishment rate.

If the sediment load of a river or creek is artificially reduced without reducing the magnitude of the flows, the flows will still possess the excess energy capable of moving sediment, and the stream will tend to erode its bed and banks. Thus, channel incision and instability may result downstream of extraction sites even if the extraction rate does not exceed the replenishment rate. This can also be attributed to a reduction in sediment load created by impounding water behind Black Butte Dam. Flows released below the dam are sediment free and "hungry." They have a greater capacity to dissolve sediment. This is compounded with a reduction in historical flows. The dam outlet now releases approximately half the historic flow of the creek which could contribute to stream meandering, bed expansion and ultimate bank

erosion. Bank erosion would in turn contribute to aggrading of sediments.

Limit Gravel Extraction to a Specified Depth

Another approach is to limit the depth of extraction, but unless this is expressed in terms of an absolute elevation, the constraint may be meaningless. Permits often specify "x feet below the channel bed" or prohibit excavation "below the water level" without defining the water level. Another approach has been to prohibit excavation below the thalweg, but the thalweg is redefined each year. Such approaches deal only with the excavation itself, not with the resulting degradation, which can result in progressively lower bed elevations.

Establishment of a Redline

Another approach is to define limits to degradation expressed in reference to a permanent benchmark, commonly termed a "redline." This approach requires documentation of creek bed elevations by aerial photography or by surveying of channel cross sections (Humboldt County, 1993; Kondolf and Swanson, 1992). Sediment transport modeling is required to estimate the rate of transport, recharge and channel elevation. Many models will not produce bank erosion estimates. The Fluvial 12 model is a well recognized method of modeling the sediment transport with a defined channel.

3.6 MITIGATING OFF-CHANNEL MINING IMPACTS

Moving mining operations from the creek channels to off-channel areas has been suggested as a solution to the adverse effects of mining in the creek channels. While such action could alleviate certain current concerns, alternative concerns are at issue in other jurisdictions where off-channel mining is proposed. Off-channel mining can involve large areas of surface disturbance, disrupting agricultural activities. It is generally desired that the amount of prime farmland disturbed for mining should be minimized, and that prime farmland be returned to agricultural use at reclamation.

In order to reduce the area of land disturbed for mining, off-channel mining can involve excavation of deep pits. Reclamation of these pits to an alternative use can be challenging. Design and review of reclamation plans should ensure that a feasible use will be made of the pit following reclamation. Deep pits can also intersect the groundwater table, requiring attention to issues surrounding groundwater storage, flow, and quality. Site drainage design and requirements for groundwater monitoring and pit lake water monitoring can address these issues. Other issues, including potential safety concerns regarding the pit lakes created by this form of mining should be addressed by requirements for slope design and access restrictions as well as lake water monitoring. Some issues, such as noise, air quality, and traffic may be similarly applicable to either in-stream or off-channel locations, and similarly mitigated.

4.0 GOALS AND POLICIES

4.0 GOALS AND POLICIES

The goals and policies outlined in this section, in conjunction with the implementation plan contained in Section 5.0, constitute the body of the Aggregate Resource Management Plan (ARMP). The ARMP will serve as a management tool for government and industry to guide the existing and future extraction of aggregate material and reclamation in Glenn County. Goals and policies are numbered. Explanatory material is in italics and does not constitute policy.

4.1 GOALS

The goals set forth in this ARMP define the direction the County intends to take in the management of aggregate resources over the next 20 years (the approximate life of the ARMP), to sustain economic activity while minimizing land use conflicts and environmental impacts. The goals identified below apply to aggregate mining throughout the County.

Goal 1

Manage aggregate resources to assure an adequate supply of aggregate resources for future growth and development and maintenance of an economically viable and competitive local aggregate industry.

Example: *Establish projected aggregate needs that correspond to General Plan goals and growth projections.*

Goal 2

Protect lands containing identified aggregate resources from the encroachment of incompatible land uses so that these resources remain available for future use, as needed.

Example: *Monitor and discourage land use that would conflict with existing or future aggregate extraction. Designate aggregate resource areas to be set aside for future use.*

Goal 3

Encourage the location of interim compatible uses such as recreation, watershed, agriculture, flood control and open space/habitat in areas of aggregate resources.

Example: *Once aggregate resource areas are identified, future non-aggregate land uses should be transitional and consistent with future extraction activities.*

Goal 4

Encourage and support innovative mining techniques which prevent or minimize adverse environmental effects.

Example: *Provide consultation and guidance on successful operation and reclamation techniques for in-channel and off-channel extraction during pre-application consultation. Monitor and document successful mining techniques as a function of its SMARA lead agency status.*

Goal 5

Minimize changes to stream channels such as channel degradation, sediment loss, bank erosion, channel widening and dewatering, that can be caused by mining activities.

Example: *Review proposed in-stream mining plans for adverse effects on the channel. Encourage beneficial uses of the creek.*

Goal 6

Eliminate or minimize hazards to public health and safety associated with mining.

Example: *Develop and recommend standard conditions of approval to minimize public exposure to mine operations.*

Goal 7

Ensure that mined areas are reclaimed to a useable condition.

Example: *Examples of future uses after reclamation include, but are not limited to: restored local creeks and reestablished fish and wildlife habitats; retention basins for flood control; or agriculturally productive land.*

Goal 8

Provide for effective and systematic reclamation and monitoring of aggregate mining projects.

Example: *Develop standardized inspection procedures for ongoing operations. Prepare mitigation monitoring plans for adoption with approval of mine application.*

Goal 9

Reduce conflicts and environmental effects where associated with in-channel mining, by encouraging alternatives such as off-channel mining and aggregate recycling.

Example: *Establish standard conditions of approval for off-channel mining activities that encourage and facilitate this alternative.*

Provide tax incentives for aggregate operations resulting in agricultural or open space conversion upon reclamation.

Goal 10

Maintain Glenn County's scenic quality while ensuring continued development of aggregate resources.

Example: *Incorporate landscape planning and buffering for visual screening into plan designs. Require viewshed renderings of proposed mines as part of the review process where appropriate.*

4.2 POLICIES

Policies are statements that guide the decision-making process, serve to standardize the decisions made for individual projects, and consistently guide resource management in a direction that will accomplish the goals established. The use of "should" in the language of the policy means that the action is

recommended but discretionary. The use of "shall" in the language of the policy means it is mandatory.

To meet the goals of conservation of aggregate resources for future production, while maintaining the high quality of life in Glenn County, a number of policies have been formulated to ensure a supply of aggregate resources for future growth and development. Policies in support of goals are listed by issue area as follows. Policies are identified as ARP (Aggregate Resources Policy) and numbered. Explanatory material is in italics and does not constitute policy.

4.2.1 Land Use

The following policies are proposed to minimize land use conflicts between aggregate mining and adjacent land uses including residential uses, agricultural uses and open space.

ARP-1 Prevent encroachment of incompatible land uses on or near areas of existing mines or classified designated aggregate resources, causing mining operations to potentially be regarded as a nuisance. Uses that are incompatible with aggregate mining shall be discouraged within and adjacent to existing or potential future aggregate mining areas. Incompatible uses include residential, retail commercial, business professional, and public.

ARP-2 Following completion of the Mineral Land Classification by the State Geologist, consider establishing an Aggregate Resource Overlay Zone or other zoning category that will protect aggregate resources from encroachment by incompatible land uses. Work with the cities in the county to protect aggregate resource areas within the city spheres of influence as well.

ARP-3 Aggregate mining operators shall be discouraged from mining or conducting mining-related functions within 0.25 mile of an existing residential area, unless mitigation measures will successfully reduce impacts to an acceptable level as determined in the review process.

ARP-4 Off-channel mining shall be discouraged on prime agricultural soils in areas of Class I and II soils (defined by the NRCS), unless the County determines that the site is not suitable as agricultural land, or otherwise determines that aggregate mining is a higher or better use of the site. Where mining of Class I and II soils is allowed, require reclamation to agricultural use.

4.2.2 Geology

The following policies are proposed to minimize changes to stream channels including channel degradation, loss of sediment, bank oversteepening and/or failure, lateral bank erosion, loss of channel confinement with resulting braiding and dewatering of floodplains and/or terraces. The objective of these policies is to contribute to the maintenance of creek systems in a naturally stable and non-erosive condition.

ARP-5 Maintain and enhance, where feasible, natural creek systems and floodways capable of conveying flood waters to minimize risk to essential channel features. Mining

activities causing excessive erosion shall not be permitted.

ARP-6 Support programs that promote maintenance and/or restoration of the stream channel.

ARP-7 A determination that the total volume of aggregate removed from the site will not exceed the recharge capacity of the stream at the location of the mine site shall be required prior to the issuance of a mining permit.

ARP-8 To control erosion, in-channel quarry slopes should be mined, maintained and reclaimed in a stable configuration.

4.2.3 Hydrology

The following policies are proposed to minimize adverse changes to stream channel morphology and gravel recruitment:

- Removal of banks;
- Extraction in excess of recharge;
- Extraction below the thalweg;
- Straightening or smoothing of the stream channel;
- Improper thalweg realignment; and
- Alteration to bedload transport equilibrium.

ARP-9 Establish an average annual transport budget and allowable extraction limit that permits in-stream extraction without permanent long-term streambed aggradation or degradation.

ARP-10 Maintain a balance in stream channels between aggradation and degradation that reflects the natural replenishment of aggregate by managing aggregate production so that only the net accumulation of aggregate is extracted.

ARP-11 Mining and mining related activities shall be limited to a depth above the thalweg or redline specified for each project. In-stream mining operations shall be required to mine above the thalweg.

ARP-12 Mining in creek reaches which have regularly experienced channel degradation shall be limited to that which is necessary for erosion control or flood protection.

ARP-13 The use of surface waters as wash water for processing aggregate shall not be allowed to put riparian habitat or fisheries at risk, or deprive downstream water users of their allotted shares.

ARP-14 Mining activities shall be operated and reclaimed in a manner which protects surface waters from erosion induced turbidity and sedimentation.

ARP-15 Mining operations shall be designed and operated to protect groundwater recharge areas from infiltration of contaminants and to maintain recharge capacity.

4.2.4 Fisheries, Endangered Species, and Critical Habitat

The following policies are proposed to minimize adverse impacts to fish, wildlife and plants and their habitats; and to promote the reclamation of mining sites, where appropriate, into viable habitat.

ARP-16 Require that mining projects be designed to avoid significant direct and indirect loss of, or damage to riparian habitat, wetlands, and/or other biologically sensitive habitat without appropriate mitigation.

ARP-17 Rare, threatened or endangered plant and wildlife populations that may be located within areas where aggregate mining currently occurs or in areas containing significant aggregate resources that would likely be developed in the future, shall be identified. Require mapping of these areas and measures to avoid them or provide compensation through habitat reserves, reclamation/revegetation and/or other appropriate mitigation.

ARP-18 Coordinate with the Bureau of Reclamation in its implementation of the Lower Stony Creek Fish, Wildlife, and Water Use Management Plan.

ARP-19 Limit mining in environmentally sensitive areas to flood control, erosion control, and wildlife habitat enhancement.

ARP-20 Encourage mining to take place off-channel. For in-channel mining, encourage projects that minimize significant adverse effects to creeks or emphasize restoration of previously damaged creeks.

4.2.5 Aesthetic Resources

The following policies are proposed to maintain the scenic quality of Glenn County while ensuring the continued development of aggregate resources.

ARP-21 Require that mining plans include measures to minimize impacts on scenic viewsheds by shielding mining operations (pits, equipment storage, stockpiles, etc.) from highways, residential neighborhoods and other adjacent sensitive land uses.

4.2.6 Traffic and Circulation

Mining operations include haul and concrete mix trucks, as well as personal vehicles (cars and light trucks) that would use the local roadway system. The following policies are proposed to minimize adverse impacts to existing roadways.

ARP-22 Assure that aggregate materials can be transported without significant reductions in level of service, public safety and road conditions.

ARP-23 Points of ingress/egress from mining sites to public roads shall be constructed to allow large trucks to enter and leave the site with minimal interference to traffic. These access points shall have the appropriate signage posted, acceleration and deceleration lanes, turn lanes and other safety features installed, where

needed, to further reduce traffic hazards.

ARP-24 Aggregate material (including raw material as well as finished products such as asphalt and concrete) shall not be transported on any roads which are not designed for heavy truck traffic.

ARP-25 Mine operators shall be responsible for the safe operation and proper maintenance of vehicles used by employees and/or subcontractors, or others hauling or purchasing aggregate under contract to the operator.

4.2.7 Noise

Noise associated with aggregate mining comes from many sources including the use of heavy equipment, the operation of the processing plant, and, in some cases, blasting to make more aggregate available for processing. The following policies are proposed to develop aggregate resources while maintaining offsite noise levels that meet the standards of the General Plan.

ARP-26 Locate haul routes and points of ingress and egress away from sensitive receptors when possible.

ARP-27 Maintain acceptable noise levels at property lines of mining sites consistent with the policies of the County General Plan.

ARP-28 Require that mining plans be designed to locate mining components at the site in order to take advantage of opportunities to use natural site features to reduce noise impacts.

ARP-29 Require temporal or seasonal limits on mining activities when necessary to reduce noise to acceptable levels.

4.2.8 Hazardous Material Spill Prevention and Containment

The following policies are designed to protect surface and groundwater from accidental spills or contamination by hazardous materials that may be used in the mining and/or processing of aggregate.

ARP-30 Assure public health and safety through the proper handling, storage and disposal and management of fuels, oils, and other potential contaminants used for mining operations. The preparation of a Business Plan and Spill Prevention and Counter Measure Plan shall be required from every new aggregate mine operator in the County.

4.2.9 Air Quality

The following policies are designed to maintain acceptable air quality levels in Glenn County.

ARP-31 Coordinate project review with the APCD.

ARP-32 Mining projects shall incorporate measures to adequately reduce dust emissions.

ARP-33 Ensure that sensitive air quality receptors are not subjected to significant levels of air emissions from mining projects.

Sensitive air quality receptors include hospitals, schools, and recreation areas.

4.2.10 Economics

The following policies shall be implemented to assure a healthy, prosperous and long-term aggregate industry and an adequate supply of construction aggregate to support growth and prosperity in Glenn County.

ARP-34 Encourage the local building industry to use local supplies of aggregate rather than imported materials.

ARP-35 Encourage the aggregate industry to continue to employ local residents.

ARP-36 Plan future development such that it will not interfere with the use of identified aggregate resources.

See also ARP-1 and ARP-2.

ARP-37 Designate areas of critical aggregate resource value and identify those areas within County planning documents to ensure their protection from alternative uses.

ARP-38 Monitor aggregate extraction in a manner that supports the ability of mining operations to perform long-range business planning and implement approved mining and reclamation plans. The costs to the County to administer and monitor the aggregate industry should be borne by the operators.

4.2.11 Cultural Resources

The following policy shall be implemented to ensure the preservation of cultural resources should they be encountered during mining activities.

ARP-39 Require as a part of applications for mining permits, a cultural resources survey of areas proposed for mining, and a plan for avoidance or protection of archaeological and historical sites.

4.2.12 Agriculture

ARP-40 Prime farmland used for agricultural production prior to mining shall be returned to agricultural production upon reclamation.

ARP-41 Encourage agricultural production on reclaimed land where appropriate. Also, in areas where operators are mining in phases, encourage agriculture as an interim use.

ARP-42 Allow aggregate mining on land under Williamson Act contract only when prime farmland will be reclaimed to prime agricultural use following reclamation. Non-prime farmland under contract may be reclaimed to agriculture or other appropriate open space uses, including wildlife habitat.

4.2.13 Reclamation

ARP-43 Reclamation plans for mining sites in areas where fish, wildlife or plant habitat will be, or has been, adversely affected shall incorporate designs with confidence levels for successful establishment of habitat.

ARP-44 New wildlife habitat creation shall be encouraged when possible as a part of reclamation, even if mining

operations have not damaged existing habitat.

ARP-45 Reclamation plans that include the establishment of native plant communities shall be encouraged.

ARP-46 Financial assurances for the success of reclamation plans shall provide sufficient funds for monitoring, maintenance and/or replacement of revegetation until successful revegetation has been achieved. A schedule for periodic monitoring, at established intervals, shall be included to effectively monitor the revegetation program.

ARP-47 Require that reclamation plans be prepared so that the result is a net gain in visual quality. This can be accomplished through reclamation to agricultural use, water resources, riparian habitat or vegetated open space.

4.2.14 Bridges and Other Structures

ARP-48 Require that mining plans include measures to ensure that mining does not adversely affect existing in-stream infrastructure, including bridge structures, abutments, and approaches.

ARP-49 Mining plans shall include measures to ensure that mining activities will not adversely impact existing in-stream canal systems, siphons, or appurtenant structures.

5.0 IMPLEMENTATION PLAN

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The Implementation Plan consists of a series of measures to implement or carry out the goals and policies of the ARMP, set forth previously in Section 4.0.

The County's General Plan includes two implementation strategies for aggregate resources.

NRI-47 Amend the Glenn County Zoning Code to require conditional use permits for mineral extraction operations in all zones where mineral extraction may occur.

NRI-48 Develop a Stony Creek Fan Aggregate Resource Management Plan following the preparation of a Master Environmental Assessment, with review authority by the Resource Conservation District. After the Stony Creek Fan ARMP is complete, request State designation to protect identified mineral resources from incompatible uses.

The County and the RCD have not prepared an MFA and Stony Creek Fan Aggregate Resource Management Plan (ARMP). This will be done in a future phase of the Aggregate Resource Management Plan. A future phase could tackle the more complex evaluation of what can be done to mitigate the impacts of vested interests and the cumulative effects of vested and non-vested instream mining interests on public infrastructure. A comprehensive cross-sectional analysis will be required to establish non-arbitrary site-specific redlines and/or static datum thalweg standards necessary for real curtailment of overdraft extraction of Lower Stony Creek instream aggregate. A number of other agencies are preparing studies and plans for Stony Creek. State designation of resources can take place only after the mineral land classification is complete. This ARMP is a County-wide policy plan for all aggregate mining in Glenn County. The County and RCD may implement General Plan Policy NRI-48 in the future.

Additional implementation strategies designed to carry out the goals and policies of the ARMP are identified in this section. Implementation measures are identified as ARI (Aggregate Resource Implementation Measure) and numbered. Explanatory material is in italics.

5.1 LAND USE

The following implementation measures will implement policies ARP-1, ARP-2, ARP-3, ARP-36, and ARP-37.

ARI-1 Consider establishing aggregate resource protection overlay zones in the zoning ordinance based on known resource value and compatibility with existing land uses. The Aggregate Resource Protection Overlay Zone will be used in conjunction with agricultural, industrial, and open space zones.

The Aggregate Resource Protection Overlay zones should reflect the value of the aggregate resources and County policy concerning future extraction of that resource. One overlay zone should be for those areas where valuable mineral resources are known to exist and the County intends to allow future mining of those resources. This overlay zone would be called the Aggregate Resources Protection Overlay Zone.

Where existing land uses are incompatible with mining and would therefore preclude aggregate resource extraction, a second aggregate resource protection overlay zone should be used that recognizes the resource, and would allow mining if the existing land uses should be replaced with those that would be compatible with mining. An example of the latter would be if existing land uses are residential and the area later began to be converted to an industrial area. This overlay zone could be called the Aggregate Resources Reserve Overlay Zone.

ARI-2 Establish and incorporate into the Zoning Ordinance standards regarding compatible land uses, setbacks, slope stability, buffers, and screening for both mining and incompatible uses.

Land uses within and adjacent to the Aggregate Resource Protection Overlay Zone should be regulated both to protect mineral resource areas and mining operations from encroachment by incompatible uses and to protect other land uses from the effects of mining. The Performance Standards in this Plan establish the baseline for these standards.

ARI-3 The following land uses are considered incompatible with aggregate resources and shall not be allowed within the Aggregate Resources Protection Overlay Zone.

- Residential
- Retail commercial
- Business professional
- Public and quasi public education and active recreational uses

Other public uses such as sewage treatment plants or other essential public infrastructure uses or open space may be considered compatible uses.

ARI-4 Identify areas of planned development of uses incompatible with mining uses within mineral resource zones, and take one of the following actions to minimize potential conflicts.

- Rezone undeveloped areas currently zoned for uses incompatible with mining to uses

that would be compatible with mining.

- Where incompatible uses exist, apply the Mineral Resources Reserve Overlay Zone described in AP-1 to the area.

The following implementation measure will implement Policy ARP-4.

ARI-5 Include aggregate mining as a compatible use within agricultural zones, agricultural preserves, and for Williamson Act contracts. Establish standards for mining agricultural lands.

The Performance Standards in this Plan establish the baseline for these standards.

5.2 GEOLOGY AND SOILS

The following implementation measures will implement Policies ARP-5 and ARP-8.

ARI-6 Implement a performance standard and standard conditions of approval for mining permits, requiring measures to prevent bank erosion.

See Performance Standard PS-7.

The following implementation measures will implement Policies ARP-6, ARP-7, ARP-9, ARP-10, ARP-11, and ARP-12. Other measures implementing these policies are found in Section 5.3, Hydrology.

ARI-7 Determine streambed transport capacity and recharge capacities for Stony Creek and other waterways subject to in-stream aggregate mining.

ARI-8 Determine quantitatively how much of the transport and sediment recharge capabilities of the creek are absorbed by existing mining permits.

ARI-9 Establish performance standards and allocations to ensure that extraction of in-channel aggregate shall not exceed the average annual replenishment level (annual bedload), except when the bedload from a previous flood is greater than the average annual replenishment. Exempt projects accomplishing fishery enhancement, flood control or bank protection from the allocations where such projects would not result in adverse effects on the stream channel or in-stream facilities.

5.3 HYDROLOGY AND STREAM MORPHOLOGY

The following implementation measures will implement Policies ARP-6, ARP-7, ARP-9, ARP-10, ARP-11, and ARP-12. Other measures implementing these policies are found in Section 5.2, Geology and Soils.

ARI-10 Require grade control devices where appropriate to prevent channel incision and degradation. Design devices to allow fish passage where necessary.

ARI-11 Establish standard conditions of approval requiring in-channel mining operations to identify and maintain elevation controls for in-channel mining. Conditions of approval shall also require annual monitoring.

ARI-12 Require coordination of extraction plans with County and regional flood control efforts to maintain channel capacity and flow dynamics.

ARI-13 Where appropriate, allow reclamation plans to include reclamation of mine pits as retention basins for flood control.

The following implementation measures will implement Policies ARP-13, ARP-14, and ARP-15.

ARI-14 Establish performance standards and standard conditions of approval ensuring that in-stream mining will not result in decreased infiltration capacity of the creek beds along reaches that provide substantial amounts of groundwater recharge.

ARI-15 Require and monitor implementation of RWQCB requirements for protection of surface and groundwater quality.

ARI-16 Allow use of surface water for aggregate processing only where it can be ensured that such use does not result in a significant net loss of flow in the creek that conflicts with other beneficial uses.

5.4 FISHERIES, ENDANGERED SPECIES, AND CRITICAL HABITAT

The following implementation measures will implement Policies ARP-17, ARP-18, ARP-19, ARP-20, and ARP-21.

ARI-17 For all mining plans, require identification of rare, threatened, or endangered plant and wildlife populations and/or habitat that may be located on proposed mining sites. Require mining and reclamation plans to be designed either to avoid such populations or habitat or to replace disturbed habitat on a 1:1 basis.

A habitat mitigation banking program could be established to provide appropriate areas for restoration and/or enhancement of habitat to replace that lost to mining.

ARI-18 Identify areas where fish, wildlife or plant habitat has been adversely affected by past mining operations. Establish a program to restore or enhance habitat in these areas.

ARI-19 Identify which areas with valuable mineral resources are environmentally sensitive. Restrict mining in these areas to flood and erosion control.

Environmentally sensitive areas identified should be those for which appropriate and adequate mitigation of the effects of mining is either not available or would not be feasible.

ARI-20 Provide incentives to locate mining off-channel. Incentives can include permit fee waivers, streamlined processing procedures, longer permit terms for off-channel mining, and county-initiated rezoning for aggregate resource areas off-channel.

5.5 AESTHETIC RESOURCES

The following implementation policies will implement Policy ARP-21. Other implementation policies that will implement Policy ARP-21 are ARI-2, ARI-3, and ARI-4.

ARI-21 Where aggregate mining operations will be located within 0.50 mile of public roads, residential areas, or public parks, require visual screens as a part of mining plan design.

ARI-22 Require reclamation plans to include design measures to ensure that the reclaimed site is visually compatible with the surrounding areas.

The performance standards describe screens.

5.6 TRAFFIC AND CIRCULATION

The following implementation policies will implement Policies ARP-22, ARP-23, ARP-24, and ARP-25.

ARI-23 For each mining project, require identification of haul routes and a study of the capacity of the roadways on the proposed haul routes to support the level of truck traffic proposed. Permit applications shall contain detailed project descriptions including identification of access roads and their condition, descriptions of all project components and future expansion plans. Haul routes shall, to the degree feasible, avoid incompatible areas, such as residential areas and schools.

ARI-24 For each mining project, require that points of ingress and egress to public roads be identified and improved to provide safe access for trucks. As a condition of approval, require the installation of appropriate signs, acceleration and deceleration lanes and other safety measures as necessary to minimize traffic hazards.

ARI-25 Mine operators shall be financially responsible for the repair of all verifiable road damage resulting from their use of road. The County shall impose requirements for mine operators to enter into roadway maintenance agreements which would apply to roads used by the operator for hauling aggregate and would fund additional road maintenance costs incurred due to use of the roads by the operator.

5.7 NOISE

The following implementation policies will implement Policies ARP-26, ARP-27, ARP-28, and ARP-29.

ARI-27 As necessary, include in permit conditions of approval specifications on the plant location, hours, and days of operation, fencing, truck traffic, property line and building setbacks, stockpile replacement berms, and other measures necessary to reduce noise to be in compliance with the General Plan and local noise ordinances.

ARI-27 As a condition of approval, require that noise complaints be investigated and when necessary, be followed up with monitoring and

enforcement to be paid for by a mitigation monitoring fund established by the operator.

5.8 HAZARDOUS MATERIAL SPILL PREVENTION AND CONTAINMENT

The following implementation policy will implement Policy ARP-29.

ARI-28 Require a Business Plan and Spill Prevention and Counter Measures Plan where hazardous materials will be used or stored.

5.9 AIR QUALITY

The following implementation policy will implement Policy ARP-31.

ARI-29 Require that applicants for mining projects apply to the Air Pollution Control District for an Authority to Construct permit concurrent with the Conditional Use Permit. Approval of the appropriate permit from the APCD shall be a condition of approval of the use permit.

The following implementation policies will implement Policy ARP-32.

ARI-30 Require the submittal of a fugitive dust control plan with all use permits.

ARI-31 Encourage the use of Best Available Control Technology (BACT) to limit emissions and preserve air quality.

The following implementation policies will implement Policy ARP-33.

ARI-32 Permit applications shall contain detailed project descriptions including identification of access roads and their conditions, descriptions of all project components and future expansion plans.

5.10 ECONOMICS

The following implementation policies will implement Policies ARP-34 and ARP-35.

ARI-33 As a condition of approval of development projects, encourage the use of local supplies of aggregate.

ARI-34 As a condition of approval of mining permits, encourage the use of local labor in mining operations.

The following implementation policies will implement Policies ARP-36, ARP-37, and ARP-39.

ARI-35 The County shall monitor and regulate aggregate extraction in a manner that supports the operator's ability to perform long-range business planning as an incentive to ensure the diligent completion of project responsibilities.

ARI-36 Provide timely and efficient review and approval of appropriate mine permit applications.

ARI-37 Establish appropriate monitoring and enforcement fee schedules for aggregate mining permits.

5.11 CULTURAL RESOURCES

The following implementation policies will implement Policy ARP-39.

ARI-38 Cultural resources shall be identified and recorded during the review of all mining permit applications in coordination with regional and State agencies.

ARI-39 Require mining plans to identify areas of cultural resources avoidance or protection.

5.12 AGRICULTURE

The following implementation policies will implement Policies ARP-40, ARP-41, and ARP-42.

ARI-40 Require that prime farmland in agricultural production within 3 years prior to application for the mining permit be reclaimed to agriculture under the standards set forth in SMARA. Implement this requirement as a condition of approval.

Under these standards, prime farmland reclaimed to agriculture must be reclaimed to a level of production at least equal to that proceeding mining.

ARI-41 Agriculture shall be used as an interim use on agricultural land where appropriate during phasing of mining activities.

ARI-42 Establish aggregate mining as a compatible use for land under Williamson Act contract where prime farmland will be reclaimed to prime farmland.

ARI-43 Require that reclamation of lands under Williamson Act contract to agriculture be completed within 10 years following initiation of mining.

5.13 RECLAMATION

The following implementation policies will implement Policies ARP-43, ARP-44, ARP-45, ARP-46, and ARP-47.

ARI-44 Require reclamation plans to include re-establishment of native plant communities or appropriate alternative uses. Reclamation plans shall remain in effect for a sufficient time following project completion to assure successful revegetation.

ARI-45 Require that financial assurance for reclamation plans, as required under SMARA, shall include sufficient funds for monitoring and maintenance of revegetation until successful criteria has been achieved.

ARI-46 Require that Reclamation Plan designs shall ensure that grading and revegetation and establishment of a second use will be visually compatible with the surrounding area.

ARI-47 Require that reclamation make use of native plants that provide valuable wildlife habitat, maintain and enhance the watershed, increase raptor forage and provide for compatible aesthetics when reclaiming sites to open space or wildlife habitat.

5.14 BRIDGES AND OTHER STRUCTURES

The following implementation policy will implement Policy ARP-48.

ARI-48 Require that the conditions of approval for new and expanded mining operations include provision of financial assurances for the monitoring and maintenance and/or replacement as needed of in-stream infrastructure, including bridge structures, abutments, and approaches, and canals and siphons affected by that mining operation.

ARI-49 Enforce conditions of approval of mining permits.

ARI-50 Provide incentives to locate mining off-channel. Incentives can include permit fee waivers, streamlined processing procedures, longer permit terms for off-channel mining, and county-initiated rezoning for aggregate resource areas off-channel.

6.0 SUGGESTED PERFORMANCE STANDARDS AND STANDARD CONDITIONS OF APPROVAL

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Introduction

These suggested standards shall apply where necessary to all aggregate operations and related activities conducted in unincorporated portions of the County pursuant to approved mining permits and reclamation plans. Standard Conditions of Approval shall be incorporated where appropriate into approved mining permits.

6.1 SUGGESTED PERFORMANCE STANDARDS

Land Use

PS-1 Compatible uses with mining are those uses that do not result in concentrations of people within 0.25 mile of the mine site. Industrial uses are compatible uses.

PS-2 Land uses compatible with the Aggregate Resources Protection Overlay Zone shall be those that meet the following standards:

- Uses that do not result in concentrations of people (densities higher than 1 housing unit per 20 acres) within 0.25 mile of identified aggregate resources.
- Uses that do not permanently overcover land containing identified significant aggregate resources.
- Uses that do not introduce sensitive air quality or noise receptors within 0.25 mile of identified aggregate resources.

PS-3 Mining operations shall be set back from property lines and public roads at least 100 feet unless adjacent to another mining operation. Setbacks shall be landscaped with vegetation compatible with surrounding lands unless the reclamation plan calls for other types of vegetation.

Geology and Soils

PS-4 Upon the completion of operations, grading and revegetation shall minimize erosion and convey surface runoff to natural outlets or interior basins. The condition of the land shall allow sufficient drainage to prevent water pockets or undue erosion. Stormwater drainage shall be designed so as to prevent flooding on surrounding properties and County rights-of-way.

PS-5 All areas of a mining site shall be graded and vegetated to minimize erosion. Such grading and revegetation shall be completed before the start of the rainy season, or no later than November 1 or as otherwise stated in the reclamation plan.

PS-6 All final reclaimed slopes shall have a minimum safety factor equal to or greater than the critical gradient as determined by an engineering analysis of the slope stability. Final slopes less than 5 feet below groundwater shall be designed in accordance with the reclaimed use.

PS-7 Projects that include gravel bar skimming shall include measures to prevent bank erosion including establishing setbacks upstream and downstream, preserving riparian bank vegetation, grading banks to stable slopes and or constructing levees and other erosion control devices, or limiting overall extraction.

PS-8 Final grading and drainage shall be designed to prevent future discharge of sediment above pre-mining levels.

Hydrology

PS-9 Operations shall minimize alterations to natural drainage systems. Stormwater shall not be accumulated onsite unless necessary to control flooding, erosion, or siltation of adjacent and downstream watercourses. Operations shall incorporate the "best management practices" into the Storm Water Pollution Prevention Plan required by the Regional Water Quality Control Board (RWQCB). Operations along stream channels shall obtain the appropriate permits and comply with the requirements of the RWQCB, California Department of Fish and Game (CDFG), and the Army Corps of Engineers (Corps). Where gravel is removed and the area is to be reclaimed as a storm water retention pond, natural drainage systems may be altered and storm water retained onsite. Also, in terrace pits it may be preferred to retain storm water on the site.

PS-10 When silt basins are used to store water during periods of surface runoff they shall be equipped with sediment control and removal facilities and protected spillways designed to minimize erosion when such basins have an outlet to lower ground and/or to Stony Creek.

Fisheries, Endangered Species, and Critical Habitat

PS-11 Reclamation plans shall include detailed revegetation and habitat enhancement plans for reclamation of areas of existing or planned habitat.

PS-12 Areas to be reclaimed to wildlife habitat shall be reclaimed to habitat value equal to or greater than that existing prior to mining.

PS-13 Revegetation methods shall be appropriate to the topography, soil, and climate conditions of the site and shall incorporate shrubs, trees, and other vegetation native to the area. The natural regrowth of riparian vegetation shall be encouraged on disturbed areas adjacent to streams and water bodies. The standards contained in the 1992 Revegetation Technical Report (available at the Resource, Planning, and Development Department) will be applied where applicable. Revegetation areas shall be inspected at least once a year by the County to determine the need for additional planting until criteria for success have been met.

PS-14 Mined slopes shall have soil added where needed to support the type of revegetation proposed. Topsoil, overburden, aggregate processing sediment, and other native earth materials shall be used to the maximum extent feasible in this process.

PS-15 In order to support fisheries, ensure that fish can navigate upstream with little difficulty. If necessary, install adequate culverts, limit or eliminate road crossings of the natural stream, and take preventative action not to create holes that would strand fish.

PS-16 Mining operations shall comply with SWRCB turbidity standards for Stony Creek.

PS-17 Maintain native vegetation and limit invasive exotics. As necessary, remove giant reed and false bamboo, which create poor habitat. Otherwise, avoid disturbing bamboo, which could result in dispersal to new areas.

Aesthetic Resources

PS-18 Nighttime lighting shall be located and designed to minimize offsite glare. Lighting shall be arranged and controlled so as not to illuminate public rights-of-way or adjacent properties.

PS-19 During operations, the site shall be kept free of debris and maintained in a neat and orderly manner so as not to create any hazardous or unsightly conditions. All overburden shall be stockpiled and all stumps, brush, or other debris resulting from excavation and/or processing shall be properly disposed.

PS-20 Mining operations shall be screened from aesthetically sensitive adjacent non-mining land uses and public roads considered as scenic routes. Screening shall include vegetation, but it may also include fences or berms.

PS-21 Permanent piles of mine waste and/or overburden shall be stabilized and contoured to conform visually and functionally with the surrounding topography. Berms and swales should generally parallel and angle downstream towards the creek, instead of perpendicular to it.

Traffic and Circulation

PS-22 Operations shall provide off-street parking sufficient to accommodate customers, employees, and mining equipment.

PS-23 Public access roads shall meet the design requirements of the General Plan and related standards. Traffic levels on public access roads shall not exceed the acceptable levels identified in the General Plan.

PS-24 Upgrading of haul routes may be required as a permit condition for some mining operations where necessary to accommodate truck weights and prevent traffic hazards.

PS-25 The first 75 feet of access road intersecting a County-maintained road shall be surfaced in a manner approved by the Public Works Department, with an approach constructed to County standards. Traffic control and warning signs shall be installed as required by the County Public Works Department.

PS-26 Those portions of designated truck haul routes that include County-maintained roads shall be posted as such, in accordance with the Public Works Department, to facilitate law enforcement and public safety. Private truck haul routes shall be used where possible, in order to reduce impacts to public roads.

Noise

PS-27 The hours of operation for aggregate mining shall be limited to hours determined to be compatible with surrounding uses.

PS-28 Operations shall be conducted to reduce noise to acceptable levels for nearby sensitive receptors. The maximum acceptable noise levels for aggregate operations shall be the standards contained in the County's General Plan and regulations adopted to support and enforce those standards.

Air Quality

PS-29 Operations and equipment used in the extraction, processing, or transportation of aggregate materials shall comply with the air quality regulations of the Glenn County Air Pollution Control District.

PS-30 Access roads and entrances to mine operations from public roads shall be paved or otherwise surfaced and maintained to reduce aggregate or other materials from being deposited onto the public right-of-way. Public and private haul routes shall be maintained as necessary to prevent dust.

Agriculture

PS-31 Where agricultural land is mined, the following standards shall apply:

- Prime farmland shall be reclaimed to prime farmland under the applicable SMARA standards.

- Non-prime farmland shall be reclaimed to productive agriculture or to wildlife habitat under the applicable SMARA standards.
- Agricultural soils shall be removed, stockpiled in such a way as to preserve fertility, and replaced on the agricultural lands during reclamation.
- Agricultural production shall continue on each phase of a mine site until the season in which mining of that phase begins.

Reclamation

PS- 32 Aggregate operations shall have approved reclamation plans with the following contents required by SMARA:

- Names and addresses of the operator and persons designated as an agent.
- Anticipated quantity and type of materials to be mined.
- Proposed initiation and termination dates for the project and each phase.
- Maximum anticipated depths and elevations of mining stated in terms of static datum such as an elevation above mean sea level.
- Description of the mining plan and a schedule of when reclamation will be initiated.
- Maximum rates of production.
- Proposed processing operations, importing of materials, and haul routes for importing and distribution.
- Legal description of the lands that will be affected by the operations.
- Description of the proposed or potential uses of the site after reclamation.
- Description of the manner of reclamation, including how contaminants will be controlled, mining wastes will be disposed of, and affected streambed channels and stream banks will be rehabilitated to reduce erosion and sedimentation.
- Assessment of the reclamation plan's effect on future mining in the area.
- Statement that the applicant accepts responsibility for reclaiming the mined lands.
- Other information required by the County regarding how the site will be reclaimed to a condition suitable for other beneficial uses.

PS-33 Reclamation shall begin as soon as possible during the mining process and in all cases shall be completed within the schedule stated in the approved reclamation plan.

PS-34 Reclamation shall reduce to levels of risk acceptable to the County identified hazards to public health and safety, including unstable slopes, dangerous equipment, toxic

substances, water pollution, disease vectors, and access to adjacent properties.

6.2 SUGGESTED STANDARD CONDITIONS OF APPROVAL

1. Mine operators shall ensure the security of the site, protect the public, and prevent trespassing through the use of fencing, gates, warning signs, site patrols, or similar methods, as appropriate.

2. Operators shall obtain permits and approvals required by other agencies having jurisdiction over the mining operations and shall provide copies to the County Resource, Planning, and Development Department.

3. Open pits presenting a public safety hazard during operation or following reclamation shall be fenced with a material approved by the County prior to the commencement of excavation. Fencing may enclose the property of which the mining site is a part, the mining site, or both. In addition, signs shall be installed at the project site boundaries and access roads, indicating that the excavation area is a danger zone.

4. A copy of the operator-approved Business Emergency Response Plans and the approved Spill Prevention Control and Countermeasure Plans shall be submitted to the Glenn County Health Department, prior to the commencement of mining.

5. The permittee shall provide to the County Health Department an accurate plot plan locating features of the operation, including, but not limited to, the storage, containment, and use of hazardous materials, vehicle fuels and lubricants used as a part of the mining process prior to commencement of operations.

6. The permittee shall file with the Glenn County Office of Emergency Services a business plan for the handling, containment and disposal of hazardous materials used in the operation prior to any excavation at the site.

7. All equipment shall have containment pans and dikes, or other facilities approved by the County Health Department to contain hazardous material spills.

8. Stockpiled soils shall be vegetated, enclosed, covered, or adequately watered to reduce fugitive dust emissions.

9. Disturbed soil and unpaved roads shall be adequately watered to minimize fugitive dust.

10. Inactive portions of the site shall either be seeded or watered until vegetation is grown or shall be stabilized using methods such as chemical soil binderies, jute netting, or other APCD approved methods.

11. Gravel extraction operations shall not occur when the wind speeds (as instantaneous gusts) exceed 15 miles per hour. The permittee shall install a wind measuring device approved by

the Glenn County Air Pollution Control District at the site, prior to any gravel extraction at the site. This wind measuring device shall be continuously maintained by the permittee.

12. The posted speed of 10 miles per hour shall be required for all onsite operations unless otherwise specified by the Air Pollution Control District. Alternatively, the permittee may pave the haul roads.

13. Exposed banks shall be planted with stabilizing vegetation prior to the completion of each phase, or annually for the area disturbed, whichever occurs first, and the vegetation shall be continuously maintained.

14. Material spillage on public roads shall be cleaned up by the operators.

15. Haul truck loads shall be trimmed to 6 inches below the top of trailer side and water sprayed or covered.

16. Water spray racks to wet loads and to wash truck sides to reduce offsite spillage shall be required.

17. Operational heavy equipment shall be kept in good working order to reduce emissions and minimize the leakage of oils and fuel.

18. Water bodies shall be constructed and maintained to minimize the harborage of vectors, such as mosquitos; the permittee shall contract with the Glenn County Mosquito Abatement and Vector Control District, or other appropriate agency for the control of mosquitos, and shall use the best available technology for vector control.

19. A fund shall be established by the operator to pay for monitoring of permit conditions and mitigation measures.

20. The applicant shall deposit $2,000.00 (or more based on the environmental situation and required compliance measures) into a Resource, Planning, and Development Department trust account for the purposes of Mitigation Monitoring pursuant to Section 21081.6 of the California Public Resource Code within ten (10) working days of issuance of this Conditional Use Permit. The balance $2,000.00 shall be maintained in the account at all times and shall be replenished upon notification by the Resource, Planning, and Development Department. This balance shall continue to be required until the site has been fully reclaimed and all mitigation monitoring has been completed.

21. If human skeletal remains are encountered during excavation, all work within 75 feet shall immediately stop, and the County Coroner shall be notified immediately. If any cultural resources, such as chipped or ground stone, historic debris, building foundations, or paleontological materials are encountered during excavation, then all work within 75 feet shall immediately stop and the Director shall be notified at once. Cultural resources found on the site shall be recorded by a qualified

archaeologist and the information shall be submitted to the County.

22. Operations shall have procedures for identification of protection items of archaeological, paleontological, and historical value. These procedures shall include education of workers on recognition and importance of cultural resources, notifications of the appropriate parties if any items of value are identified and implementation of the retrieval and review measures established by those parties.

23. The permittee shall be responsible for all required Fish and Game fees.

24. The permittee shall submit an annual report to the Planning Commission on June 1 of each year, documenting the wildlife species that have used the site in the previous year.

25. Prior to any construction at the site the permittee shall apply for and receive a permit from the Glenn County Building Inspector.

26. Mining operators and owners responsible for the reclamation of mined lands shall submit effective financial assurances to the County to ensure the completion of approved reclamation activities including all required revegetation. The content and form of the assurances shall meet SMARA and County requirements. The amount of the assurances shall be sufficient to cover all costs associated with reclamation and may be adjusted annually to reflect phasing or progress of mining and reclamation activities. Financial assurances shall not be released until the County determines in writing that the required reclamation has been completed.

27. The mine operator shall be financially responsible for the repair of all verifiable road damage resulting from use of the road by mine vehicles.

28. The mine operator shall enter into a roadway maintenance agreement with the County for haul roads.

29. If upon approval of this Conditional Use Permit, any health or safety hazard arises due to the operation allowed by this Conditional Use Permit, the Planning Commission shall hold a Public Hearing to hear comments and, after consideration, shall take appropriate action, including, amending the Conditions of Approval or revoking the permit.

30. The permittee shall allow unannounced periodic site inspections by County officials and federal and State agency representatives in order to evaluate continuing compliance with the Conditional Use Permit and the terms and conditions prescribed herein.

31. The mine operator shall be financially responsible for the repair of any and all structural damage to Tehama-Colusa Canal facilities which result from the effects of streambed erosion caused by or exacerbated by aggregate resource extraction activities.

32. The mine operator shall be financially responsible for the repair of any and

all structural damage to public infrastructure which result from the effects of streambed erosion caused by or exacerbated by aggregate resource extraction activities. The fund amount and the quantifiable effects of a new mining permit upon streambed erosion shall be based on sedimentation and streambed studies prepared and circulated prior to the public hearing as part of the CEQA analysis as approved by the County.

7.0 BIBLIOGRAPHY

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APPENDICES

APPENDIX A: Potential Permits, Approvals, and Processes for Mining Projects in California

APPENDIX A
POTENTIAL PERMITS, APPROVALS, AND PROCESSES FOR MINING PROJECTS IN CALIFORNIA

Agency/Department	Permit/Approval/Process	Required For
FEDERAL AGENCIES		
Federal Land Managers (e.g., BLM, U.S. Forest Service)	**Plan of Operations, Reclamation Plan.** (43 CFR 3802 *et seq.* 36 CFR 228 *et seq.*).	• Surface disturbing activities.
	Environmental Review. (NEPA, 42 USC 4321 *et seq.*). **Cultural/Paleontological Resource Permit.** (16 USC 470). **Archeological Resources Protection Act Survey.** (16 USC 469 *et seq.*).	• Evaluation of environmental impacts. • Survey/excavation activities. • Avoidance of archeological resources.
Bureau of Land Management	**Right-of-Way Grant.** (FLPMA, 43 USC 1701 *et seq.*).	• Easements on BLM-managed lands.
	Temporary Use Permit. (43 USC 1701 *et seq.*).	• Activities for less than 3 years.
Forest Service	**Special Use Permit, Easement, Lease.** (43 USC 1701 *et seq.*; 16 USC 522 *et seq.*).	• Easements on Forest Service Lands. • Commercial use of existing road.
Army Corps of Engineers	**Individual/Nationwide Section 404 Discharge Permit.** (Clean Water Act, 33 USC 1341)	• Discharge of dredge/fill material into "waters of the United States," including wetlands.
	Section 10 Permit. (33 USC 401, 403).	• Activities, including placement of structures, affecting navigable waters.
Fish and Wildlife Service	**Biological Assessment, Section 7 Consultation, Biological Opinion.** (Endangered Species Act, 16 USC 1531-1544).	• Avoidance of federally-listed endangered/ threatened species.
	Endangered Species Act Take Permit. (Section 10).	• Incidental take of federally-listed species, (if anticipated).
Environmental Protection Agency (EPA)	**Prevention of Significant Deterioration (PSD) Permit; New Source Performance Standards Notifications.** (Clean Air Act, 432 USC 7401-7642).	• Potential air impacts from certain size sources in clean air areas. • Installation and operation of certain mining facilities.
	Chemical Release Notifications and Chemicals Handled Inventory. (42 USC 11001 *et seq.*).	• Response actions, if emergency response is necessary.
Federal Highway Administration	**Encroachment Permits.** (23 USC 109, 116, 123).	• Encroachments on federal highway rights-of-way.

Potential Permits, Approvals, and Processes for Mining Projects in California (Continued)

Agency/Department	Permit/Approval/Process	Required For
Bureau of Alcohol, Tobacco and Firearms	**Purchase, Storage, or Transportation of Explosives Permit.** (27 CFR 55).	• Purchasing explosives from an out-of-state source, transporting explosives across State line, storing explosives.
Mine Safety and Health Administration (30 USC 801 *et seq.*; 30 CFR 50.1 *et seq.*).	**Standards for open pit and underground mines.** (30 CFR 56, 57).	• Worker health and safety.
	Legal Identity Report for Surface Operations.	• Identifying type of operation, location and ownership.
	Notice of Commencement of Operations.	• Tracking mining activities.
	Emergency Fire, Evacuation, and Rescue Plan.	• Potential emergency situations.
	Record of Inspection of Self-Propelled Equipment.	• Equipment use.
	Record of Testing the Resistance of Electrical Ground System.	• Ensuring safe installation, repair, or modification of electrical ground systems.
	Miner Training Program.	• Educating workers.
	MSHA Identification Number.	• Tracking mine sites.
STATE AGENCIES		
State Water Resources Control Board. Regional Water Quality Control Boards	**General Construction Activity Stormwater Permit. Notice of Intent.** (40 CFR Part 122).	• Stormwater discharges associated with construction activity.
	General Industrial Activity Stormwater Permit. Notice of Intent. (40 CFR Part 122).	• Stormwater discharges associated with industrial activity, unless covered by individual NPDES Permit.
	National Pollutant Discharge Elimination System Permit. (33 USC 1251 *et seq.*).	• Discharges of waste that might affect groundwater quality.
	Spill Prevention Control and Countermeasures Plan. (Health and Safety Code 25270 *et seq.*; 40 CFR Part 112).	• Underground storage of petroleum of 42,000+ gallons. Above ground storage with 10,000+ gallons; or any spill affecting surface waters, single waters, single tank of 600 gallons or 1,320 total.
	Water Quality Certification. (33 USC 1251 *et seq.*), if project requires Army Corps of Engineers 404 permit.	• Discharge into "waters of the U.S.," including wetlands.

Potential Permits, Approvals, and Processes for Mining Projects in California (Continued)

Agency/Department	Permit/Approval/Process	Required For
State Water Resources Control Board, Division of Water Rights	**Permit to Appropriate Water.** (Water Code 1200 *et seq.*).	• Diverting water.
	Statement of Water Diversion and Use.	• Diverting water under a riparian claim or claim of appropriate right initiated prior to December 14, 1914.
Department of Water Resources	**Approval of Plans and Specifications to Construct or Enlarge a Dam or Reservoir and Certificate of Approval to Store Water.** (Water Code 6000 *et seq.*).	• Constructing or enlargement of dam or reservoir of certain size (e.g., tailings ponds).
Department of Fish and Game	**Lake/Streambed Alteration Agreement.** (Fish and Game Code 1603).	• Change in natural state of river, stream, lake which affects fish or wildlife resource.
	California Endangered Species Act Section 2081 Permit. (Fish and Game Code 2081).	• Incidental take of State-listed threatened/ endangered species or habitat (if anticipated).
State Office of Historic Preservation	**Section 106, National Historic Preservation Act.** (16 USC 470; 36 CFR 62; 36 CFR 65).	• Avoidance of historic, architectural, archaeological, or cultural characteristics of properties that meet National Register Criteria.
State Lands Commission	**Prospecting Permit.** (Public Resources Codes (PRC) 6890 *et seq.*).	• Exploring for minerals on State lands.
	Minerals Leases and Easements. (PRC 6801 *et seq.*).	• Use of State-owned lands including rights-of-way.
California Coastal Commission	**Coastal Development Permit.** (PRC 30000 *et seq.*).	• Development within the Coastal Zone.
Department of Transportation (CALTRANS)	**Encroachment Permit.**	• Encroachments on State highway rights-of-way.
Division of Occupational Safety and Health (Cal-OSHA), Mining & Tunneling Unit	**Underground Mine Classifications.**	• Underground mines prior to commencing operations.
	Notification and Prejob Safety Meeting.	• Underground mining operations.
	Underground Diesel Permit.	• Underground use of diesel engines.
	Certifications and Licenses: **Cranes** **Gas Tester** **Licensed Blaster**	• Cranes used in lifting service over 3 tons rated capacity inspected annually. • Detecting toxic and/or combustible gases in underground mines. • Detonating or supervising use of explosive or blasting.

Potential Permits, Approvals, and Processes for Mining Projects in California (Continued)

Agency/Department	Permit/Approval/Process	Required For
	Permission, Acceptance and Requirements: **Belt Conveyor/Ventilation Fan** **Gassy/Extrahazardous Installations** **Hoists/Shaft Conveyances**	• Underground mines. • Gassy or Extrahazardous mine/tunnel. • First Class mine hoists and shaft conveyances.
California Highway Patrol	**Hazardous Material Transportation License.**	• Transporting explosives.
LOCAL AGENCIES		
County/City (Planning Departments/Commissions)	**Use Permit/Mining Permit.** (SMARA, PRC 2710 *et seq.*); county/city land use ordinances.	• Avoidance of environmental impacts.
	Reclamation Plan and Financial Assurance. (PRC Section 2710 *et seq.*). Note: Local agency must consult with the State Department of Conservation.	• Ensuring sites are returned to beneficial end uses.
	General Plan Amendment.	• Activities inconsistent with General Plan.
	Zone Change.	• Activities inconsistent with zone class.
	Environmental Review. (CEQA, PRC 21000-21177).	• Evaluating environmental impacts.
	Storage tanks regulation.	• Storage of regulated materials.
County/City Public Works Department	**Grading Permit.**	• Excavation and fill activities.
	Road Encroachment.	• Activities within County rights-of-way.
	Encroachment Permit.	• Crossing of local flood control facilities or rights-of-way.
	Transportation Permit.	• Transporting of overloads on County road rights-of-way.
	Building Permit.	• Constructing structures.
County/City Environmental Health Services	**Hazardous Materials Business Plan.** (Health and Safety Code Chapter 6.95). **Hazardous Materials Inventory.** (Health and Safety Code Chapter 6.95).	• Hazardous materials over Federal Threshold Planning quantities. • Acutely hazardous materials over threshold quantities.
	Risk Management Prevention Program. (Health and Safety Code Chapter 6.95). **Acutely Hazardous Materials Registration.** (Health and Safety Code Chapter 6.95).	• Extremely Hazardous Materials over threshold quantities. • Acutely hazardous materials over threshold quantities.
	Small Water System Domestic Water Permit.	• Avoiding impact to domestic water supplies.

Potential Permits, Approvals, and Processes for Mining Projects in California (Continued)

Agency/Department	Permit/Approval/Process	Required For
County Fire Warden	**Fire Protection Plan.**	• Ensuring adequate fire water storage, mains and hydrants and access to accommodate fire fighting equipment.
County or Regional Air Pollution Control Districts/Air Quality Management Districts	**Authority to Construct.** (Local district rules, per Health and Safety Code 42300 *et seq.*).	• Emissions from a stationary source.
	Permit to Operate. (Local district rules).	• Equipment emitting pollutants from a stationary source.

APPENDIX B: Glossary of Technical Terms

APPENDIX B
GLOSSARY OF TECHNICAL TERMS

aggregate. A hard, inert material composed of fragments which show a wide and gradational range in sizes, and which can be bound together into a coherent mass by means of a cementing material such as portland cement, gypsum plaster, or asphalt.

aggradation. The process of building up a surface by deposition.

bank erosion. Erosion of streambanks is a source of sediment when banks are being supplied with sediment from upslope by creep or other mass wasting processes. Bank erosion also produces sediment when the eroded banks are terraces higher than the present floodplain. A stream flowing across a floodplain, without undergoing any systematic widening does not produce a net sediment influx to the channel when it erodes its banks, because the volume of sediment eroded from the outside of a bend is roughly equal to the volume deposited on the inner bank.

bed load. Bed load consists of the coarser fraction (sand, gravel, and cobbles) and is transported very near the stream bed by saltation (sliding, rolling, and skipping) and streambed creep.

bed material. Bed material is the material that composes the stream bed. This usually includes most of the bed load and fractions of the suspended load.

bench interval. The difference in vertical elevation between any two consecutive benches.

braided river. A river containing two or more interconnecting channels separated by unvegetated gravel bars, sparsely vegetated islands, and occasionally, heavily vegetated islands.

channel. A natural or artificial waterway of perceptible extent which periodically or continuously contains moving water. It has a definite bed and banks which serve to confine water.

channel morphology. The physical shape, size and characteristics of a stream channel in relation to the hydraulic factors of velocity, roughness, flow and flow frequency.

degradation. The general lowering or downcutting of the land or channel by erosive processes.

dredge. Large floating contrivance utilized in underwater excavation for the purpose of removing overburden from submerged ore bodies prior to open pit mining, or to recover subaqueous deposits having commercial value.

flow line. The line formed by the boundary between the flowing water and exposed surface of the gross channel.

gravel. Fragments of rock larger and coarser than sand, worn by the action of air or water, two millimeters to three inches in size.

gravel bar skimming and pitting. Removal of alluvial (generally sand and gravel) stream deposits during periods of low water flow.

groundwater. All subsurface water that is below the water table.

groundwater recharge. Replenishment of groundwater by precipitation, runoff or by artificial methods.

hardrock quarry. A surface excavation created for the mining of bedrock geologic deposits, or soil for fill, construction or other purposes together with its processing and shipping.

headward erosion. The upstream movement of the zone of maximum erosion that develops at a zone of steepened gradient called a "knickpoint." In areas of gravel mining, headward erosion normally begins where the stream flows into a pit and migrates upstream.

in-channel mining. Excavation of sand and gravel from stream bed deposits above the mean low water level or stream bottom, whichever is higher, also referred to as stream by skimming or gravel bar skimming.

longitudinal gradient. The slope of the stream channel bottom as determined by a series of channel thalwegs. The "longitudinal gradient of the gross channel" is determined by the elevations of gravel bars measured at the center line of the gross channel equidistant from each ordinary high water mark.

mine. Mine includes all mineral bearing properties of whatever kind of character, whether underground, or in a quarry or pit, or any other source from which any mineral substance is obtained.

mining. The process or business of taking mineral substances from a pit, quarry or excavation in conjunction with other permitted construction activities.

monitoring. The collection of environmental, scientific, or engineering data by either continuous or periodic sampling methods.

open pit operation. Surficial mining, in which the valuable rock is exposed by removal of overburden.

overburden. Earth materials which overlie resource deposits and which must be removed prior to resource extraction.

oversize gravels. Any stream-worked rock material not passing a 3-inch screen.

reclamation. The combined process of land treatment that minimizes water degradation, air pollution, damage to aquatic or wildlife habitat, flooding erosion, and other adverse effects incidental to underground mines, so that mined lands are reclaimed to a usable condition which is readily adaptable for alternate land uses and create no danger to public health and safety.

The process may extend to affected lands surrounding mined lands, and may require backfilling, grading, resoiling, revegetation, soil compaction, stabilization or other measures.

rehabilitation. Re-establish a stable ecosystem, capable of replacing the ecological functions of the original ecosystem.

replenishment/recruitment. The total amount of solid material that is transported by the river annually, during high flows.

revegetation. Establish vegetation on disturbed lands.

restoration. The process of intentionally altering a site to establish a defined, indigenous, historic ecosystem. The goal of this process is to emulate the structure, function, diversity and dynamics of the specified ecosystem.

riparian vegetation. Vegetation along rivers, streams, creeks, lakes or tidewaters characterized by the presence of approximately 20 percent or more by number of any of the following species of trees:

Cottonwood	Willows
Box elder	White alder
Black walnut	Oregon ash
Big-leaf maple	California buckeye

riverbed erosion. Rivers that are cutting downward produce sediments by the development of canyons or valleys. The grain-size distribution of sediment contributed to the river is determined by the range in grain sizes composing the geologic material through which the river is incising and the transporting ability of the river.

sand. Inorganic particles between 0.05 millimeters and 2.0 millimeters in diameter.

sediment load. Sediment load consists of the suspended load and the bed load.

scour. The removal of sediment from the channel and bank area of a stream by the action of fluid flow and degradation.

slope ratio. The ratio of change in horizontal distance to the change in vertical elevation expressed as two numbers separated by a colon (e.g., 2:1)

stream bed skimming (gravel bay skimming). Excavation of sand and gravel from stream bed deposits above the mean summer water level or stream bottom, whichever is higher.

suspended load. Suspended load or wash load consists of the finer fractions (clay, silt, and sand) of the sediment load and is usually distributed, but not uniformly, throughout the stream depth.

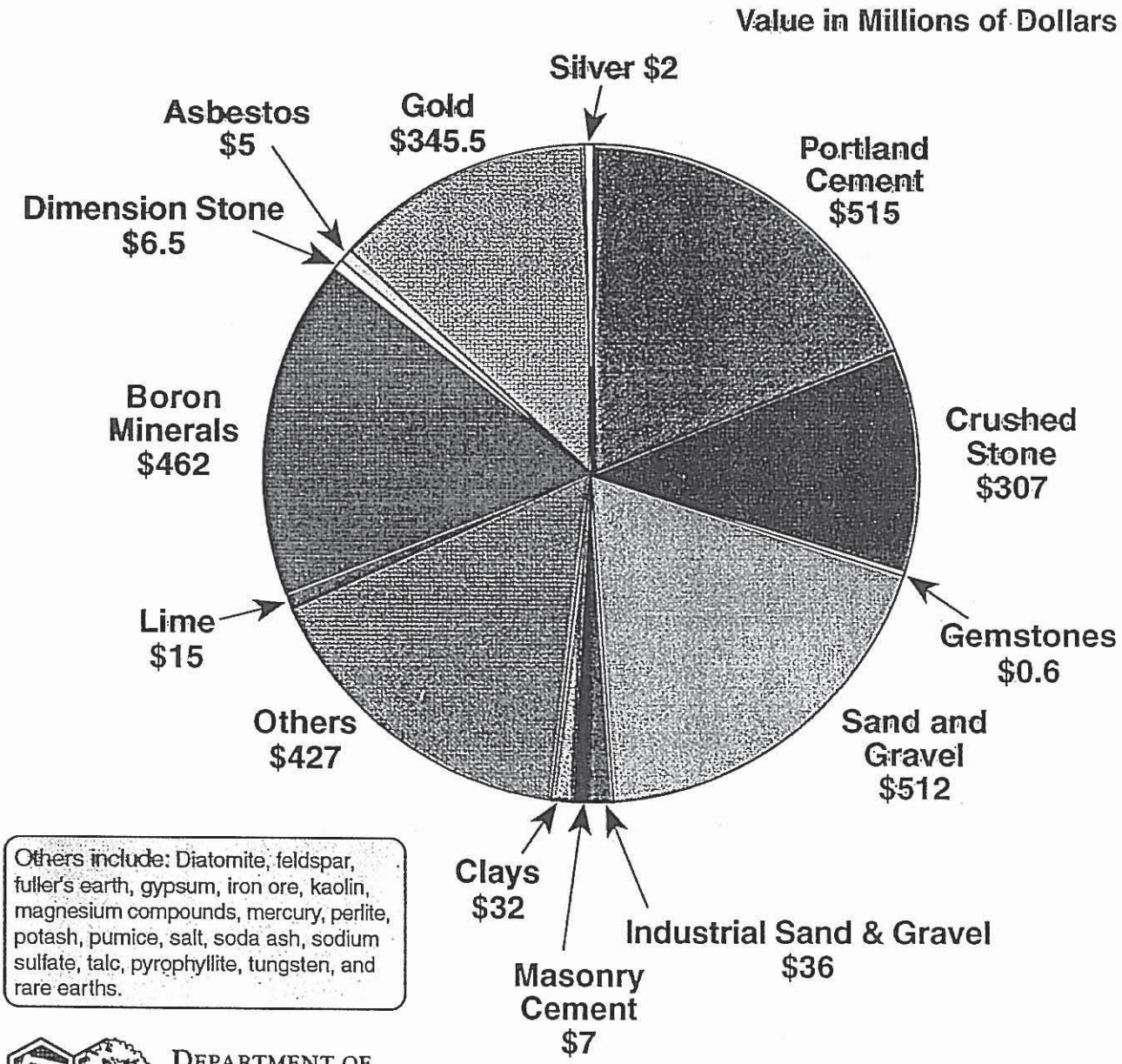
tailings processing operation. Reprocessing of refuse material resulting from processing of ore.

thalweg. The hypothetical line connecting the lowest or deepest points of a stream.

transmissivity. The rate of flow of groundwater through a unit width of an aquifer under a unit hydraulic gradient. Transmissivity is equal to the permeability times the saturated thickness of the aquifer.

water erosion. Water erosion occurs when the intensity of rainfall exceeds the infiltration capacity of the soil, and overland flow is generated. In arid and semiarid regions, runoff and erosion are generated during storms over widespread portions of the landscape, producing largely silt- and sand-sized sediment. Surface erosion produces sand-sized and smaller sediments.

California Nonfuel Minerals – 1995
Total Value $2.7 Billion



Others include: Diatomite, feldspar, fuller's earth, gypsum, iron ore, kaolin, magnesium compounds, mercury, perlite, potash, pumice, salt, soda ash, sodium sulfate, talc, pyrophyllite, tungsten, and rare earths.

DEPARTMENT OF CONSERVATION
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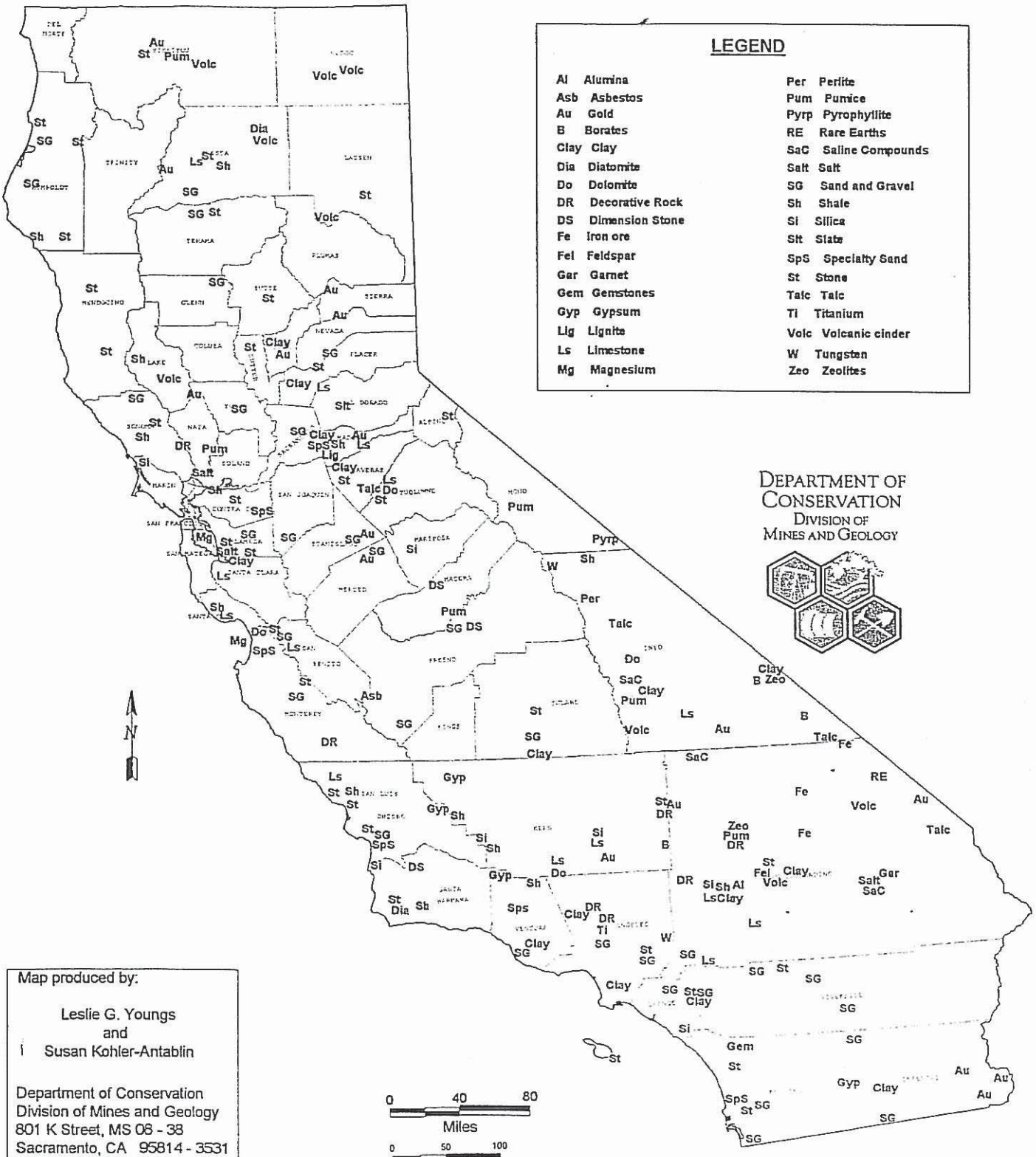
Data from U.S. Geological Survey
Mineral Information Service

CALIFORNIA

Principal Mineral - Producing Localities



Map produced by:

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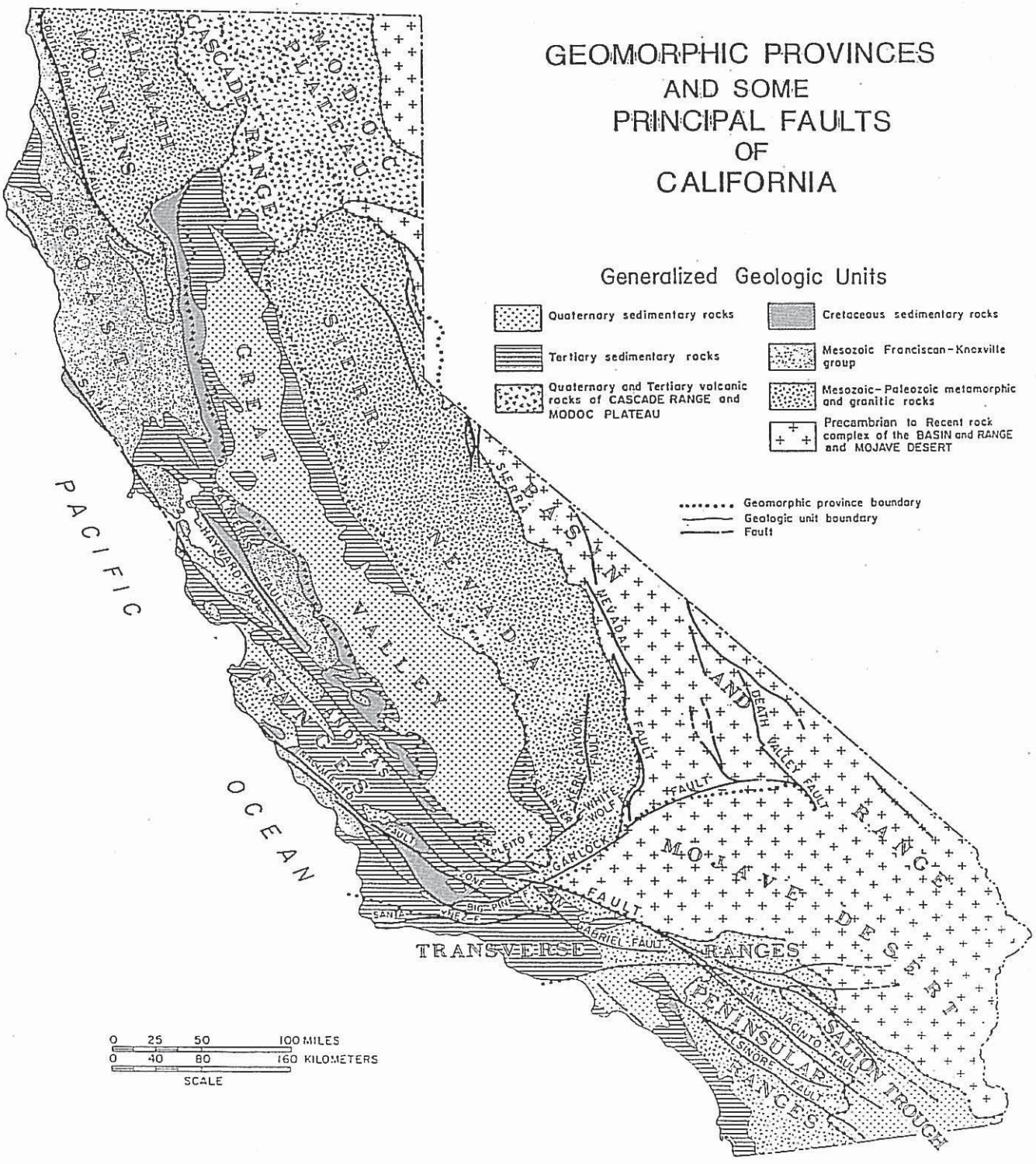
CALIFORNIA DEPARTMENT OF CONSERVATION
DIVISION OF MINES AND GEOLOGY

DMG NOTE 36

GEOMORPHIC PROVINCES AND SOME PRINCIPAL FAULTS OF CALIFORNIA



Rev. 5/86

APPENDIX D: Typical Unit Weights

APPENDIX C: Statewide Mining Information

APPENDIX D – TYPICAL UNIT WEIGHTS

Crushed Rock
(Typical Unit Weights)

Size (in inches)	Material	Pounds per Cubic Yard
1½ x ¾	Crushed	2633
1½ x 1½	Crushed	2484
1 x ½	Crushed	2522
¾ x ½	Crushed	2506
¾ x ¼	Crushed	2500
½ x ¼	Crushed	2360
2½ x 1½	Crushed	2614
4 x 2		2489
1½	Asphaltic Base Class 2	3051
¾	Asphaltic Base Class 2	2981
1½	Road Rock	3029
¾	Road Rock	2781
2½	Sub-base	3024
	Bank Run	2754
4 x 12	Riprap	2800
6 x 18	Riprap	2700

Sand and Gravel
(Volume/Weight Equivalents)

1 Cubic Foot	0.06	Tons
1 Cubic Yard	1.60	Tons
1 Acre Foot	2500	Tons