EUREKA READY MIX EMMERSON BAR RECLAMATION PLAN

Renewal
CUP-25-91X/SMR-06-91X/SMP-06-91X

Applicant
Eureka Ready Mix
4945 Boyd Road
Arcata, CA 95521

Prepared By

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Date

7/26/2022

Table of Contents

I GENERAL INFORMATION

For a detailed discussion of the project, potential impacts, reclamation, performance standards and project monitoring, please see Sections II., III., V., VI., and VII.

1. **Project Name**

Emmerson Bar - Surface Mining and Reclamation Plan.

2. **Project Description:** Application for a Conditional Use Permit/Mining Plan/Reclamation Plan for the seasonal extraction in Humboldt County of sand and gravel per year from river gravel bars.

Eureka Ready Mix is applying for a fifteen (15) year extension of the Reclamation Plan (SMR-06-91) covering the existing Emmerson gravel extraction site on the Mad River in Humboldt County, California. The County of Humboldt (Case #SMR-06-91; File #312-151-15) permits this project per a (50,000 CY) Vested Rights Determination. Since the project operates under a vested right, it is expected to operate in perpetuity.

3. **Other Approvals Required:** Division of Mines and Geology Mine I.D., U.S. Army Corps of Engineers Section 404 permit, Lake and Streambed Alteration Agreement with CA Dept. of Fish and Game, Regional Water Quality Control Board Clean Water Act Section 401 Certification .

4. **Applicant:**
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5. Operator:
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Arcata, CA 95521
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6. Property Owner and Owner of Mineral Rights
Moralis Properties LLC
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Mckinleyville, CA 95519

7. Agent
Michael A. Atkins, RPF#2613
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6. Site Location and Vicinity Maps

Emmerson Bar (Sections 29 and 30, T6N, R2E and APN 025-161-006; 312-151-015, 019) is approximately 230 acres in size. The land use designations for the abovementioned parcels are as Rural, Vacant. Most of the surrounding land use is industrial, agricultural, or rural/ improved. The property(s) is located immediately upstream (east) of the Mad River Bridge on Hatchery Road, near the City of Blue Lake, Humboldt County, California.

Ancillary Areas

1) The short haul road segment located east of Hatchery Road: The road provides access to the seasonal temporary bridge crossing. Reclamation will consist of permanently barricading the road with K-rail. Due to channel migration into the left bank, which has resulted in extensive bank erosion, there is little riparian corridor remaining in the area to revegetate. Additional measures will be implemented as described in Department of Fish and Game Lake Or Streambed Alteration Agreement ("LSAA") No. RI-04-0391, included as Attachment A. Reclamation of the seasonal bridge crossing within the active channel will be reclaimed as follows. In years when a summer low-flow channel crossing is required, and upon completion of annual excavation activities, the bridge will be removed, transported off-site, and stored at or above the 100-year floodplain. The nearside bridge abutment is removed in a manner that minimizes potential turbidity. The constructed roadbed is graded from the water's edge to reestablish the approximate contour elevation and condition that existed prior to construction.

2) Western portion of APN 312-151-019: This area includes existing haul roads and access roads, a stockpile storage area, and designated equipment maintenance, fueling and parking areas utilized during extraction. Existing haul roads located outside the active channel (upper terrace) essentially stay in place to allow access to the Mad River. The existing access roads to the bar are permanent and have a hardened surface that is resistant to erosion. There is typically no topsoil to replace over the temporary portion of haul roads on the gravel bars themselves. Reclamation of the existing stockpile area and access road will occur at end-

of-project. The area will be leveled to original grade, scarified, and revegetated as described in the LSAA. Additional management practices of the stockpile can be found in the LSAA. The designated equipment maintenance, fueling, and parking area utilized during extraction operations occurs directly on the stockpile access road and will be reclaimed as described above.

7. Access Route

Access and removal routes are as follows:

From Eureka travel northbound along Highway 101 towards Arcata and exit east on Highway 299. Travel east along Highway 299 and take the Blue Lake Exit exit at the town of Blue Lake then turn South on Hatchery Road.

Primary access to the site is a seasonal access road located 0.3 miles south of the Mad River Bridge on Hatchery Road (5L015). It should also be noted that the bar is situated at the confluence of the Main Stem, Mad River and the North Fork, Mad River. Ancillary areas are located upland from the bar, which include various access and haul roads, a temporary bridge crossing, aggregate stockpile staging and storage areas, equipment storage, maintenance, and fueling

8. Lead Agency Information

Humboldt County Planning and Building
Department
3015 H Street, Eureka, CA 95501
(707) 445-7541

9. Limitations on Operations

The Mining Activities shall be generally take place during daylight hours Monday through Friday from 7:00 a.m. to 7:00 p.m. and 8:00 a.m. to 5:00 p.m. on Saturdays.

10. Project Commencement Date

This quarry operation is expected to commence immediately following the Lead Agencies approval of the Surface Mining and Reclamation Plan.

11. Project Termination Date

The proposed project termination date is 15 years from the approval of the Conditional Use Permit. Due to the length of time the Lead Agency review requires, the actual date of the public meeting and subsequent approval cannot be determined at a level that would establish actual dates.

12. "Benchmark" Stations

Permanent monitoring "benchmark" locations have been established at the site in accordance with the Lead Agencies Interim Adaptive Management Plan and will continue to be utilized throughout the duration of the project. The "benchmarks" are annually surveyed by Trinity Valley Consulting Engineers, and have coordinates established utilizing a datum (NGVD 88 & NAD 83) required by the Army Corps of Engineers as well as the Lead Agency. These locations shall be utilized as control points with which to monitor annual extracted volumes of aggregate materials. The monitoring of extracted volumes shall be generated on an annual basis for active mining pursuant to this project.

13. Proposed Subsequent Use

Land use at the site will remain consistent with the current zoning. Due to the inherent nature of the instream setting, the site is annually reclaimed and replenished. The proposed projects lacks any infrastructure that would have to be removed and there are currently no plans on behalf of the land owner to change the land use or zoning from its current state.

The proposed project will consist of upland stockpiles well above the 100 year flood elevation. There are currently no plans to change the landuse or zoning from its current state by the land owner however, the county has several alternatives and the planning commission alternative would change the zoning to Conservation Flood Plain (CF).

14. Future Mining

Mining from within the active channel of a river such as this provides the site with annual reclamation and replenishment of aggregate materials. The proposed project has no impact on the sites ability to provide for future mining activities. At the conclusion of the 15 year CUP at this site, the site will still provide mining opportunities.

II ENVIROMENTAL INFORMATION

1. Environmental Setting

The Emmerson Bar is located approximately 1500 feet South of downtown Bluelake in Humboldt County, California (Longitude of approximately-40,52'28 N and Latitude of 123,59'32 W) (Humboldt County 2015). The project consists of annually extracting aggregate from a river bar within the ordinary high water mark of the Mad River and within USACOE jurisdiction (HCPBD 1994).

The upper portion of the lower Mad River basin lies in a mountainous region, mostly forested with redwood and Douglas-fir trees. The forest distribution is described as being 37% fir forest, 24% redwood and 20% oak woodlands with small portions of annual grasses and pines. The river flows through confined topography, aligned along a northwestern trend. The lower and middle sections of the Mad River watershed are located in Humboldt County, almost entirely east of Highway 101, approximately 300 miles northwest of San Francisco, 15 miles north and east of Eureka. The river flows northwesterly, through or alongside the towns of Kneeland, Blue Lake, McKinleyville, and Arcata within the lower watershed. The lower portion of the river enters and flows along a broad alluvial valley beginning in close proximity to the Mad River Fish Hatchery, 1.5 miles upstream of Blue Lake. Topography becomes somewhat confined again as it reached the Annie and Mary Railroad (A&MRR) bridge and the Hwy 299 bridge. Below the 299 bridge, along the Arcata Bottoms, the river crosses a deltaic floodplain to its mouth.

Land use in the surrounding area is a mixture of private and industrial timber lands with the communities of Glendale and Blue Lake close by. Private lands include rural residential development, agriculture, highway commercial, recreational, as well as nearby retail commercial activities along Hwy 299 in Glendale and Blue Lake (HCDCDS 2008). The climate of the Mad River basin is typical of north coast valleys and is characterized by heavy annual rainfall concentrated in the cool winter months, ranging from 40 inches along the coast to approximately 65 inches near Sweasey Dam, and a relatively dry, moderate summer. The upland slopes are covered by a mixed conifer-hardwood forest matrix, experiencing intensive historical logging activities, while the lower valley area has been largely converted to

agricultural use with some urban areas interspersed throughout the valley. The active channel and floodplain are characterized by a variety of annual plants that grow during extended periods of low stream flow (HCDCDS 2008).

The project area utilized for gravel extraction operations at the Emmerson Bar totals approximately 15 acres. The approximate 15 acre permit area is located on 3 Parcels totaling approximately 230 Acres.

Aggregate extraction techniques to be employed at the site vary due to concerns related to federally listed anadromous fisheries species present within this river reach. As such NOAA Fisheries has designed descriptions for various techniques to be assessed and utilized when conditions are provided for a preferred alternative. These techniques are provided in further detail below as described within the Biological Opinion prepared for the Mad River (inclusive of this site).

Alternative extraction techniques will be used in place of Standard Method, if the involved agencies determine that such methods could be used to minimize impacts or enhance aquatic or riparian habitat. In the reach upstream of the A & M Railroad Bridge, extraction methods with a habitat improvement component will be given priority, if applicable at the site.

Extraction operations include excavating, grading, loading, and transporting sand and gravel from dry gravel bars to processing plants or existing, adjacent stockpile sites located at or above the 100-year floodplain. Excavation typically consists of removing the top layers of gravel on bars with heavy equipment such as dozers, loaders and dump trucks. A variety of gravel extraction and non-extraction activities are proposed that may be applied on a site-specific basis depending on gravel bar characteristics and proximity to sensitive salmonid habitat. The proposed activities are sorted into four groups according to their objectives:

- standard extraction methods,
- extraction methods with a habitat improvement component,
- committed habitat improvement actions, and
- optional habitat improvement actions.

In general, extraction methods change as the supply of gravel on easily accessible sites is reduced. The numbers of extraction sites following winters with high recruitment levels are typically less than those seasons following low recruitment winters, because fewer sites are needed to obtain planned volumes during high recruitment years than low recruitment years. In the reach upstream of the A&M RR Bridge, extraction methods with a habitat improvement component will be given priority, if applicable at the site.

Standard Extraction Methods

The primary objective of standard extraction methods is to extract commercial quantities of aggregate. Identification of specific extraction methods will occur during the annual pre-extraction planning process and will be proposed as part of the CHERT recommendation to the Corps for permitting by Letter of Modification (LOM) issued annually under the 10-year permit. These methods are generally used when there are sufficient aggregate deposits in easily accessible locations, such as exposed gravel bar surfaces.

Extractions located at or above the 2-year flood level will be limited so that no more than 10 percent of the area above the 2-year flood level is disturbed by mining at any given time. The 10 percent disturbance rate will be calculated on a per-bar basis so that regardless of ownership, no more than 10 percent of the 2-year and above floodplain associated with a given bar is disturbed at any time.

Narrow Skim

Narrow skims are no more than one-third of the bar width, as measured at the widest part of the bar, follow the shape of the bar feature, maintain the point of maximum height of the bar, and trend in the general direction of stream flow. These skims maintain a vertical offset corresponding to the water surface elevation of the 35-percent exceedance flow. Finished skims are free-draining and slope either toward the low-flow channel or in a downstream direction. These skims avoid the head-of-bar buffer, defined as the upstream one-third of the exposed bar surface. As described previously, the head-of-bar buffer may be decreased on a case-by-case basis provided that the extraction area narrows, tapering smoothly to a point, and remains below the upstream cross-over riffle. Narrow skims will retain the maximum lateral bar height.

Horseshoe Skim
Horseshoe skims remove gravel from the downstream two-thirds of gravel bars. A lateral edge-of-water buffer is maintained along the low-flow channel. The finished grade of the extraction area will have a downstream gradient equal to the river and a flat cross slope, and will be no lower than 1-foot above the low-flow water surface elevation as identified during the pre-extraction review. Cut-slopes will be left at a 2:1 (horizontal: vertical) slope except along the upstream side at the head-of-bar buffer where a 6:1 slope will be established. There will be at least a 15-foot offset buffer from the bank. The extraction surface will daylight along the downstream one-third to one-fifth of the bar to facilitate drainage following high runoff events. The horizontal and vertical offsets are intended to remove the excavation area away from the low-flow channel. Due to less frequent flow inundation, horseshoe-shaped skims may take larger flow events to replenish than traditional skim designs, depending on the unaltered bar height between the excavation and the stream.

Traditional Skim
Traditional skims do not exceed one-half of the bar width as measured at the widest point of the bar. This method does not extend beyond the upper one-third head-of-bar buffer and maintains a minimum skim floor at the water surface elevation of the 35-percent exceedance flow. This method will only be used at the Essex Bar and on gravel bars downstream of the A&M RR Bridge.

Secondary Channel Skims
Secondary channel skims are elongated, shallow skims in the area of dry, secondary channels, designed to be free-draining and open at either end so as to not impede fish passage/migration and to prevent any potential fish stranding. The upstream riffle crest, or elevation control of secondary channels, will not be affected by extraction proposals. The minimum skim floor of these excavations will be set at the 35-percent exceedance flow elevation.

Standard Trench
A trench is generally a long, narrow excavation parallel and adjacent to, but outside of, the wetted perimeter of the channel. Trenches will be connected to the wetted channel at the upstream and downstream ends to prevent entrapment of fish. This method will not be used

upstream of A&M RR Bridge due to the presence of spawning habitat (CHERT 2008).

Extraction Methods with Habitat Improvement Components

Extraction methods with habitat improvement components are those that allow for harvesting of commercial quantities of aggregate, but also have a primary or secondary objective of providing habitat improvement. These methods include wet and dry floodplain pit excavations, restorative secondary channel skims, oxbow and alcove development, migration channel extractions, and high terrace skims. Other options may be developed by the applicants and NMFS that will allow for both the extraction of commercial quantities of aggregate and aquatic habitat improvement. Identification of specific methods will occur during the pre-extraction planning process and will depend on site conditions at that time.

Wet Floodplain Pits

Wet floodplain pits are irregularly shaped excavations (to avoid excavating riparian vegetation) located on the floodplain surface. Wet pits are typically shallow and allow for gravel extraction away from frequently inundated gravel bar surfaces and most salmonid habitat features. Floodplain pits will be located on surfaces at or above the 2-year flood elevation. Wet pits may have vegetation, either existing or planted, around their perimeter, and may contain some type of cover elements, such as woody debris. These features may also fill in with fine sediment, creating a seedbed in which native riparian vegetation could become established. Lower elevation wet pits should have a connection to the low-flow channel, or other frequently inundated secondary channel, to allow for seasonal salmonid use and reduce salmonid entrapment potential. The pits will be monitored for salmonids stranding after high flows have receded. The pre-extraction plan will include a monitoring plan that assesses the risk of salmonid stranding and includes a fish rescue plan.

Dry Floodplain Pits

Dry floodplain pits are irregularly shaped excavations (to avoid excavating riparian vegetation) located on the three- to five-year return interval floodplain surface and should not have a secondary channel inlet. An outlet connection to a secondary channel will be constructed

to reduce entrapment potential and to provide velocity refuge during very high flows. The floor of the pit will not extend into the groundwater table. Dry pits will only fill with sediment during very high-flow events, on the order of every three to five years, and typically over a multi-year period. Dry pits may have vegetation, either existing or planted, around their perimeter. These features may also fill in with fine sediment that creates a seedbed in which native riparian vegetation could become established. The pits will be monitored for salmonid stranding after high flows have receded. The pre-extraction plan will include a monitoring plan that assesses the risk of salmonid stranding and includes a fish rescue plan.

Secondary Channel Skims
Secondary channel skims are described above. With proper design (e.g., variable topography, small side alcoves, introduction of anchored woody debris) these extractions can be used to create or improve high-flow habitat for salmonids. These channels could also be used as upstream adult salmonid migration corridors when water velocities in the main channel are high.

Oxbows
Oxbow extractions are narrow (average low-flow channel or less), linear, off-channel excavations along historical channel locations, typically defined on aerial photographs by curvilinear vegetation colonization, muted secondary channels, or as the toe of a moderate to high terrace or valley margin. Features should be located in the downstream half of the bar to minimize channel capture and could be excavated deeper than the adjacent thalweg. Natural oxbows that intercept hyporheic flow have historically been utilized by juvenile salmonids for rearing with good success. Oxbows could have willow vegetation and large woody debris placed in them to enhance their cover habitat.

Alcoves
Alcove extractions are typically located on the downstream end of gravel bars, where naturally occurring alcoves form and may provide velocity refuge for juvenile salmonids during high flows, and potential thermal refuge for juvenile salmonids during the summer season. Alcove extractions are irregularly shaped to avoid disturbance of riparian vegetation, and are open to the low-flow channel on the

downstream end to avoid stranding salmonids. Alcoves are extracted to a depth either above or below the water table.

Migration Channel Excavation
Migration channels may be excavated in those locations where upstream fish passage into tributary channels is impeded by sediment deposits. These channels are constructed to connect main-stem channels to tributaries at lower flows than found in the pre-project condition, thus allowing easier access for upstream migrating adult salmonids, over a wider range of flows.

High Terrace Skim
High terrace skims extract gravel from the 10-year or greater floodplain. This area is excavated to the 35-percent exceedance flow elevation to promote backwatering and fine sediment deposition at higher flows. This extraction is expected to foster riparian vegetation development by creating a suitable seedbed that is at a low enough elevation so seedling roots can gain access to summer groundwater. Riparian vegetation establishment could also be enhanced by direct planting. The extraction may be phased over a number of seasons to cover the planned area. However, once a surface has been extracted, the subsequent riparian vegetation growth will preclude the site's use as an active extraction area well into the future (CHERT 2008).

Reclamation consists of ensuring the bar is left in a configuration so as not to increase the danger of trapping salmonids. Aggregate materials will be loaded on to trucks or off-road haulers, and be transported to the stockpile locations on site and at the existing permitted site in Guintolli or promptly taken to Eureka Ready Mix to be processed. Alternative extraction methods also include designs targeting salmonid habitat restoration (e.g. large woody debris installation).

2. Geology/Topography/Soils
The Mad River basin, with a drainage area of 497 square miles is dominated by confined bed rock walls within its upper and middle reaches, transitioning into the lower 12 mile alluvial reach. The Mad River basin lies entirely within Humboldt County, California and enters the Pacific Ocean just north of the City of Arcata. The project is located within a reach designated as "Lower Mad River" and begins where the river enters a broad alluvial valley (up to 2 mi. wide) at the hatchery,

upstream from the City of Blue Lake. The project is located at approximately 50 feet above sea level (Stillwater Science 2010).

Most of the geology underlying the Mad River basin is that of the late Jurassic to late Cretaceous rocks of the Franciscan formation. Due to the steep terrain, locally weak earth materials, frequent seismic activity, and high levels of precipitation, many hill slopes in the Mad River basin are susceptible to mass wasting and surface erosion. The area is one of the most seismically active in the United States and active tectonicism helps contribute to high sedimentation rates observed in the basin through shearing of bed rock and uplift. The basin is one of several in coastal northern California with suspended sediment discharges of 5 to 50 times those of comparable size basins in the United States. Earthflows are recognized as one of the significant sediment sources in the region (Kelsey 1977).

For this reason, the Mad River and its tributaries are subject to high sediment loads. The presence of long-term high sediment loading within the Mad River system is demonstrated by the presence of extensive alluvial deposits throughout the area. In many cases, human activities in the watershed have resulted in significant increases in erosion and subsequent sedimentation (USEPA 2007). The Mad River Total Maximum Daily Loads (TMDLs) for sediment and turbidity are being established in accordance with Section 303(d) of the Clean Water Act, because the State of California has determined that the water quality standards for the Mad River are not met due to excessive sediment and turbidity. In accordance with Section 303(d), the State of California periodically identifies "those waters within its boundaries for which the effluent limitations... are not stringent enough to implement any water quality standard applicable to such waters." In 1992, EPA added the Mad River to California's 303(d) impaired water list due to elevated sedimentation/siltation and turbidity, as part of listing the entire Mad River basin, and consequently a TMDL analysis was completed for the Mad River (USEPA 2007).

The morphology at this site consists of the downstream extent of the broad alluvial reach that terminates near the downstream end of the project where another confined reach begins at the Annie and Mary Railroad (A&MRR) and extends downstream to the Highway 299

bridge. Common trends in these low gradient alluvial reaches are meandering pool/riffle morphology (Stillwater Science 2010).

The project area has been mapped in Soils of Western Humboldt County (1965). No prime agricultural soils were identified that would be impacted by project activities. Soil-vegetation mapping units of the area rate the surrounding soils as either an industrial area in the case of the stockpile and processing area or highly productive for agricultural activities to the west where no activities are proposed. No topsoil occurs within the extraction areas (Humboldt County 2014).

Division of Mines and Geology Special Publication 42 does not show any Alquist-Priolo earthquake zones within the project area. Resource mapping indicates that the closest seismic feature is an active fault (Blue Lake Fault) running in a north/south direction and located approximately 0.5 miles east of the project site. Humboldt County in general is at risk for strong ground shaking. In the North Coast Ranges, landslides and soil slips are common due to the combination of sheared rocks, shallow soil profile development, steep slopes, and heavy seasonal precipitation (NR&H Report; pg. 10-9).

3. Hydrology

The Mad River drains 497 Square Miles in Humboldt County, California, and enters the Pacific Ocean just north of Arcata, with an average discharge of 15500 cfs (cubic feet/second). The drainage basin is underlain by highly erodible Franciscan Formation, which yields high loads of sand and gravel. The Mad River is confined within bedrock walls for most of its course, but its lower 12 miles are alluvial (Stillwater Science 2010). This reach, designated the "Lower Mad River" begins where the river enters a broad alluvial valley (up to 2 mi. wide) at the hatchery, upstream of Blue Lake. Major land uses in the Mad River that have affected the channel include dams, water development, highways and bridges, river engineering (flood control levees, rip-rapping, etc.), logging, agriculture, gravel extraction, urban development, road building, and recreation (HCDCDS 2008).

The major tributaries of the Mad River include the North Fork Mad River, with a drainage area of approximately 50 mi2, which enters the Mad River on the flood plain approximately 2 miles downstream from the hatchery; Canon Creek, with a drainage area of approximately 16

mi2, which is tributary to the Mad approximately 1.5 miles downstream of the old Sweasey Dam site (river mile 19.6); and Lindsay Creek, which enters the Mad approximately 200 ft. below the Annie and Mary Railroad (A&MRR) bridge, and has a drainage area of approximately 17 mi2. Other smaller tributaries also flow into the Mad River within the project area including Pilot Creek, Hall Creek and Mill Creek (Stillwater Science 2010).

The main-stem Mad River was listed as water quality limited due to sediment and temperature by the State of California. A Total Maximum Daily Load (TMDL) analysis was scheduled for completion in 2001 by the EPA under Section 303(d) of the Clean Water Act (USEPA 2006). The Mad River's TMDL assessment classifies the Mad River watershed into four hydrogeological subareas; the subarea of interest to gravel extraction is the Lower Mad River subarea, which includes the North Fork of the Mad and its tributaries, Powers Creek, and Lindsay Creek (USEPA 2007a). Land uses that contribute sediment and turbidity in the Lower Mad River subarea are grazing and other agricultural uses, timber harvest, recreation, residential, transportation that includes highway bridges, municipal water supply, and gravel mining.

For the entire Mad River basin, landslides are the dominant natural sediment-producing sources, and roads are the dominant management related sources; road-related landslides and surface erosion contribute 62% of the sediment in the basin as a whole. In the Lower/North Fork subarea, 73% of the suspended sediment is road related, which is consistent with the highest road densities in the Mad River basin being found in the Lower/North Fork subarea (USEPA 2007a). Suspended sediment associated with gravel extraction would be included in "Total management related" sources, but gravel extraction was not considered a source in the modeling assessments that are the bases of the TMDLs.

CHERT recommendations and agency permits specify that skimming be performed at or above the bar elevation that corresponds to the 35% exceedance flow. One reason the 35% exceedance flow elevation was selected is that the river's suspended sediment is very high by the time water begins to flow over the bar surface. CHERT scientists have observed that at that flow, infiltration of precipitation

moves fines from the surface to subsurface. By extending the time it takes the river to begin flowing over the extracted bar surface, there is more opportunity for precipitation to wash fines downward into the gravel profile, rather than washing them into the low-flow stream while water is still clear (CHERT 2008). The Glendale-Simpson project area is situated near River Mile (RM) 7, estimated using the map provided by the 2014 Mad River SPEIR. The wetted channel width at high flow varies from approximately 450 feet in the more confined reaches to approximately 1000 feet at the primary extraction area.

The PEIR (1994) stated that "the Mad River and its environments is a dynamic system, constantly changing. Because of the dynamic nature of the river system, it is not possible to forecast with precision how the river environment will change. This precludes the possibility of a fixed formula-based management and monitoring program. An objective of this preferred alternative management plan is to develop over time a dynamic set of adaptive mining and reclamation strategies that will respond to changes in the environment and in our understanding of the environment". Since the PEIR (1994), operators, consultants and CHERT have designed extractions within estimates of long-term and annual replenishment to minimize cumulative effects of extraction to Pacific salmonid habitat, and using scientific review of each extraction site to assess site-level replenishment to minimize effects to Pacific salmonids and their habitat on the site-scale. Natural bedload transport processes and rates determine annual extraction amounts, and are assessed annually on a site-specific basis and cumulatively for the Lower Mad River.

The proposed action for the lower Mad River addresses potential effects of instream gravel mining through the use of two components, as previously implemented, that are based on experience gained from the past ten years of scientific review and mitigation of the gravel extraction program on the lower Mad River and include: 1) avoiding or reducing cumulative effects at the reach scale through long-term monitoring and extraction volumes that are constrained within estimates of long-term and annual replenishment; and 2) minimizing localized site-specific effects through annual monitoring, reviews and extraction methods that are designed to minimize effects at each site.

The bedload replenishment rate for the Lower Mad River has been continually refined over time due to concerns regarding potential degradation and its physical and resulting biological impacts to the system. Lehre et al. (1993) estimated long-term bedload sediment yield based on available observations of sediment transport in the river, regional rates of sediment yield, and evidence for changes in bed elevation between 1960 and 1992 — this estimate had been used to constrain extraction volumes since the PEIR (1994). Kondolf (2001) computed an average annual replenishment of 272,000 cy using estimates of sediment storage changes. This estimate is approximately one-third higher than Lehre et al. (1993). The two estimates are for different time periods, during which the channel probably behaved differently (Kondolf 2001).

However, Kondolf's (2001) estimate is based on better and more representative channel survey data including cross sections previously surveyed by the ACOE in 1970. Kondolf (2001) recommended improving and updating the sediment sampling database to improve future estimations. Concern was expressed that potential errors may have been hidden in residual terms used in these calculations, Kondolf s (2001). Therefore, the ACOE utilized further analysis to calculate average annual replenishment for the lower Mad River is (Knutti 2003). However, due to increasing concerns related to anadromous fisheries resources NOAA Fisheries developed additional data related to replenishment that stands as the mode of analysis when annually reviewing extraction quantities from within the system.

The extraction volume based on a fraction of the recruitment and applying the upper and lower limits is termed "sustainable extraction volume" (SEV). The annual recruitment estimate will be based on methods explained in Appendix A to calculate the SEV (NMFS 2010). The SEV will have an extraction limit of 175,000 cubic yards (cy), SEVUL, on high recruitment years and an extraction limit of 62,000 cy, SEVLL, on low recruitment years. If there are more than two years in a row of deficit (Appendix A) where the SEVLL, is higher than the calculated SEV, then extraction volume will be set at the calculated SEV rather than the SEVLL. The SEV value is used to make annual target estimates for the sites above the A&M RR Bridge, the upper reach sites. The extraction volumes of the lower reach sites, below the A&M RR Bridge, are limited only by the site controls and the upper

limit of the operation. The target annual extraction volume at each site will be estimated using the relationships in Table I. As our project area is above the A&M RR bridge, we will be using the SEV value to make annual estimates.

For low recruitment years, when the SEV is less than 70,000 cy, an operator may choose to defer the extraction per bar until the following year. Extraction volume following a year of no extraction can be the current year SEV plus the previous year's volume as long as the total extracted volume at the site is less than the maximum amount, and the overall Mad River extraction volume is within the SEVUL of 175,000 cy. Volume will only be deferred for one year. The intent of the banking strategy is to reduce disturbance during low flow years and encourage bar recovery without penalizing the gravel operators.

In general, when either aggradation or degradation of bed deposits, in relation to the annual replenishment rate, occurs within a flood plain there is a potential for significant erosion and sedimentation during flood conditions. A change in a river's channel geometry or meander wavelength may also alter the direction and location of the river's erosive force causing a change in the meander pattern of the river. This change may possibly aggravate stream bank erosion both upstream and downstream of the extraction site. Changes in riverbed morphology are generally attributable to large flood events, rather than gravel extraction (USEPA 2007a). Because of the magnitude of the other forces affecting sediment flow, at the past and projected rate of extraction, the gravel mining operations at the Emmerson Bar site are not expected to alter these erosion and sedimentation processes.

4. Vegetation/Wildlife

A major part of the Mad River basin is covered by conifer forests. Forested areas are predominantly mixed conifer types, such as coast redwood, Douglas-fir, White Fir and Sitka Spruce, which have been extensively developed for marketable timber. The remainder of the basin is covered by woodland (oaks and other hardwoods) and open prairies. The Draft Humboldt County General Plan (HCDCDS 2008) describes the Mad River watershed as being 80% fir, 37% redwood and 20% oak woodlands.

The gravel bars are, for the most part, un-vegetated due to high flows and annual bar scour. There are deciduous riparian trees (alders, willows) along the edge of the channel anchored into fissures in bedrock substrate both within and outside the bankfull channel. Willow scrub is located in isolated patches on both gravel bars (Berg, pg. 122).

Riparian habitat types along the project reach of the Glendale-Simpson project area can be described as upland forest and scrub (Coast redwood, Douglas-fir, alder and big-leaved maple, coyote brush, thimbleberry, Himalaya berry), willow scrub and shrub, and palustrine scrub (coyote brush, pampus grass, poison hemlock) within the assessment area. The proposed extraction areas will typically be desiccated aggregate areas completely devoid of vegetation with the exception of annual forbes. Compliance with state and federal permits require that extraction areas do not contain woody vegetation greater than 2 inches Diameter at Breast Height (dbh) or greater than 1/4 acre in contiguous size. Even with this standard, annual agency review with state federal and local representatives typically avoid all woody vegetation and in fact typically recommend buffers of 25 feet from small willow patches or other woody species. Most gravel bars within these reaches are exposed annually to scouring winter flows, and only small, young patches of willow scrub and shrubs able to take hold in relatively low velocity areas are present or are deposited by annual deposition in areas experiencing in higher velocity flows. In several areas of the extraction reach, the active baseflow channel is directly adjacent to upland vegetation. These descriptions support a plethora of observation based analysis, in which riparian vegetation establishment and inundation frequency obviously play a major role in within the riparian corridor. Thus, given the extraction standards and areas in which aggregate extraction take place it makes sense that these areas experience greater inundation frequencies throughout out the year and thus have a substantial lack of riparian vegetation.

In general, riparian habitat quantity (area) has not increased since the formation of CHERT, but riparian habitat quality has increased. Although riparian vegetation acreage has not increased significantly since the CHERT program began, a number of extraction practices have increased the quality of riparian habitat. One such extraction practice is the creation of "gravel pit wetlands," which mimic "oxbow

lakes common in wide alluvial rivers" (Trush 2008a). The wetland pits are expected to be short-lived because they are typically obliterated by high flows within 2-5 years after their construction, depending on storm intensities. During the time that the wetland pits are present, they "provide abundant, high-quality avian and amphibian habitat" (Trush 2008a). In addition, CHERT recommendations minimize: 1) "any disturbance of existing woody riparian vegetation", and 2) "interference with the gradual colonization of recent depositional surfaces, aggrading floodplains, and re-worked flood terraces" that are created as the channel migrates naturally (Trush 2008a), which together limit gravel extraction's effects on riparian vegetation.

During hydrologic years of normal rainfall, at the Glendale-Simpson site, the bars are scoured by winter and spring waters, resulting in low-water vegetation characterized by annual herbaceous species. Perennial herbaceous species and some woody species have also been able to colonize and persist on the bar, resulting in riparian stands with some wildlife habitat value. These woody species include young sandbar willow and red alder, while the herbaceous vegetation includes sweet white clover, Dalmatian toadflax, rough cocklebur, brooklime, panicled bulrush, pearly everlasting, and grasses.

Other vegetation types found within the project area include Douglas fir, madrone, black and canyon live oaks, big leaf maple, black cottonwood, coyote brush, poison oak, himalaya berry, California blackberry, California wild grape, English ivy, pennyroyal, and various grasses and forbs.

Wildlife species in the watershed area represent a high degree of diversity, reflecting the influences of elevation, climate, topography, and vegetation. Characteristic species of forested areas of the Pacific Northwest are relatively abundant. These include black bear, black-tailed deer, northern flickers and other woodpeckers, alligator lizards, and newts. Numerous species with special status inhabit the Mad River watershed as well. The California Department of Fish & Game database for the northern spotted owl provides information on numerous known territories for the species in the watershed (density of one territory per 4,800 surface acres). Historical NSO surveys have confirmed absence surrounding the site. All three North American accipiters (Cooper's hawk, sharp-shinned hawk, northern goshawk)

occur in the watershed, however, timber stands within the vicinity lack sufficient habitat for the northern goshawk. Black salamanders and tailed frogs are found in the forested areas. Riparian-associated wildlife species also exhibit a high degree of diversity and density. Bird species richness is high compared to other riparian locations in the west. Species sighted in the watershed during surveys include numerous special status species such as the willow flycatcher, yellow-breasted chat, yellow warbler, and black-capped chickadee. Early spring migrant willow flycatchers occasionally were detected as migrants one time only and not repeated on return visits except for known summer presence within the vicinity of the fish hatchery. Species was detected more than twice within the months of June and July since 2006. Willow flycatcher is well documented to have juvenile migrants utilizing the corridor and adult occurrence have been documented. Rare raptors are present as well, including bald eagle, peregrine, and merlin. A variety of shorebirds and waterfowl inhabit the basin and include herons, egrets, sandpipers, wood ducks, and mergansers. The composition of riparian bird community is likely to have changed as a result of increases and decreases in acreages of riparian vegetation during large scouring events and subsequent lack thereof.

Riparian mammals occurring along the mainstem Mad River include numerous rodent species, whose distributions are linked to the distribution of riparian vegetation. Larger, semi-aquatic species occur as well, including beavers and river otters. The native herpetofauna includes three species of special concern (western pond turtle, yellow-legged frog and the northern red-legged frog). Introduced bullfrogs have been observed within this reach (Hess 1996), with potentially deleterious effects on native amphibians, fishes, and waterfowl, although the bullfrog has not been observed specifically at this site.

Portions of the project area can be considered to be environmentally sensitive habitat. The sensitive habitat consists of several different kinds and can be classified as follows:

1) The riverine habitat of the river channels and the occasional ponds that form under summer low water conditions provide habitat for invertebrates, fish, amphibians such as frogs and salamanders, invertebrate-eating birds and various mammals including river otters

and beavers and other mammals that come to the river to forage (such as bear, deer and raccoon).

2) The exposed cobble in the gravel bars adjacent to the low-flow channels provides roosting habitats for one avian species; killdeer, but otherwise represents one of the sparsest habitats in terms of wildlife diversity and numbers. Of the three habitats listed here this is the general area where extraction activities actually occur.

3) The riparian scrub habitat (Palustrine Scrub-Shrub Wetland; broad-leaved deciduous) occurs on "islands" next to the low flow channels and is the most extensive plant community within the active channel. Portions of this habitat are inundated every winter during high river flows. The Mixed Willow Series dominates the vegetation growing within the riparian scrub habitat. The understory is minimal and is comprised of weedy annual grasses and forbs. Only a sparse covering (40%) of shrubs is found in this community. This primarily includes narrow-leaved willow, shiny willow, red willow with the occurrence of red alder and black cottonwood in varying densities. The riparian scrub habitat supports a variety of wildlife species, including black bear, deer and a number of small mammals such as raccoon, striped skunk, gray fox, rodents and rabbits, and many bird species that use the areas for foraging, nesting and cover.

Two additional types of general habitat can be found near the property beyond that described above. These include the mixed conifer stands surrounding the Mad River valley and the agricultural-orchard-rural residential areas on surrounding lands within the Glendale area. Mammals typical to these areas include black-tailed deer, raccoon, opossum, fisher, mink, skunk, porcupine, brush rabbit, pocket gophers, wood rats, and deer mice. Representative reptiles and amphibians include the northern red-legged frog yellow-legged frogs, Pacific giant salamanders, rough-skinned newts and garter snakes. Although present in the Mad River Basin, the Bald eagle is more abundant inland particularly around the Ruth Lake Reservoir.

In general, the lower Mad River provides summer rearing habitat for juvenile salmonids, late summer/fall holding areas for adults, smolt and pre-smolt outmigration habitat and is a fall/winter migration route for adult salmonids. While redds have been observed near some of the extraction areas the biological opinion generally considers the

spawning reach to extend upstream from the Anny Mary Railroad bridge located just below the project site. Designated critical habitat for Southern Oregon/Northern California Coasts (SONCC) Coho salmon encompasses accessible reaches of all rivers (including estuarine areas and tributaries) between the Mattole River in California and the Elk River in Oregon. Designated critical habitat for Coastal California (CC) Chinook salmon includes all river reaches and estuarian areas accessible to listed Chinook salmon from Redwood Creek (Humboldt County, California) to the Russian River (Sonoma County, California). The anadromous species utilizing the Mad River (SONCC Coho salmon, CC Chinook salmon, and Northern California (NC) steelhead) are listed as threatened species under the Endangered Species Act.

The California Department of Fish and Game has operated a fish hatchery on the Mad River since 1971. It was established as an enhancement hatchery to supplement ocean fish stocks to catchable levels and provide for sport fishing opportunities in the Mad River. The hatchery currently releases about150, 000 juvenile steelhead annually in the spring. It is also used as a rearing facility for salmonids that originate from and will be released back into other basins. The hatchery also raises rainbow trout for local put-and-take fisheries. Between 1990 and 2000, the hatchery released between 134,000 and 1,440,460 Age 1+ juvenile steelhead in the Mad River (Zuspan and Sparkman 2002).

In addition to critical habitat designations for listed Pacific salmonids, Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Act (MSA) require heightened consideration of habitat for commercial species in resource management decisions, including EFH for SONCC oho salmon and CC Chinook salmon, trout and their designated critical habitats are currently listed as 'Threatened' under the Federal Endangered Species Act and in the past have been among the most important species with regard to commercial and sport fisheries(Mad River Pop. 2014).

Further, state listing of Coho salmon requires that operations covered by a 1600 permit be fully mitigated with respect to potential impacts to Coho salmonids, SONCC Coho salmon, Upper Klamath-Trinity Chinook salmon, and KMP steelhead utilizing mainstem habitat at the Glendale Simpson site.

The project area is mainly important for anadromous fisheries as a migration route to and from the upstream spawning grounds; however some spawning has been noted in this reach of the Mad River as it is located at the furthest downstream extent of what is generally considered the spawning reach. Downstream migration of juvenile salmon and steelhead occurs early spring so as to avoid low flows and high temperatures. Most downstream migration occurs in evening hours. Downstream migration of juvenile salmonids is concentrated prior to or at the beginning of normal extraction periods on the Mad River.

Major problems within the watershed include sedimentation and elevated temperatures lethal to salmonids, TMDLs have been established for these factors. The mainstem Mad River was listed as water quality limited due to sediment by the State of California. A Total Maximum Daily Load (TMDL) analysis was scheduled for completion in 2001 by the EPA under Section 303(d) of the Clean Water Act (Berg, pg. 120).

Reductions in anadromous fish populations have occurred in the Mad River. Some of the major factors commonly cited as possible causes of salmonid reductions include the construction of the Matthews Dam (and subsequent reduced stream flows), sedimentation from the old Sweasey Dam, the 1964 flood, over-harvest of salmon, and intensive logging practices. Fish habitat in the basin is limited by reduced flows and the physical condition of the Mad River and its tributaries. Historical spawning beds composed of clean gravel and cobble have become embedded with filament deposits. The habitat losses resulting from the sedimentation of the river have reduced the reproductive carrying capacity of this portion of the Mad River (NMFS 2010, NOAA 1996).

Southern Oregon, North Coast California Coho CC salmon
Southern Oregon, North Coastal California Coho ESU California coho salmon life history is typified by four life stages (CDFG Undated): Adult upstream migration: "Adult coho salmon enter fresh water from September through January to spawn. Coho salmon move upstream after heavy rains have opened the sand bars that form at the mouths of many California coastal streams, but may enter larger rivers earlier."

In the upper reaches of these streams, spawning generally peaks in November and December, but timing varies by stream and/or flow (CDFG Undated).

Spawning and Egg Development: "In California, spawning occurs mainly from November to January, although it can extend into February or March if drought conditions are present... In the Mad River, spawning occurs in November and December. Females usually choose spawning sites near the head of a riffle, just below a pool, where the water changes from laminar to turbulent flow and there is a medium to small gravel substrate. The flow characteristics through the redds [fish eggs' "nests"] usually ensure good aeration of eggs and embryos, and the flushing of waste. Larger Coho salmon produce more eggs and there is a definite tendency for fecundity [reproductive success] to increase. In California, eggs incubate in the gravels from November through April. The incubation period is [shorter if water temperature is higher]... California Coho salmon eggs hatch in about 48 days at 48°F, and 38 days at 51.3°F. After hatching, the alevins (hatchlings) are translucent in color. This is the Coho salmon's most vulnerable life stage, during which they are susceptible to siltation, freezing, gravel scouring and shifting, desiccation, and predation. Alevins remain in the interstices of the gravel for 2 to 10 weeks until their yolk sacs have been absorbed, at which time their color changes to that more characteristic of fry. The fry are silver to golden with large, vertical, oval, dark parr marks along the lateral line that are narrower than the spaces between them" (CDFG Undated).

Fry and juveniles rearing: "Fry emerge from the gravel between March and July, with peak emergence occurring from March to May... They seek out shallow water, usually moving to the stream margins, where they form schools. As the fish feed heavily and grow, the schools generally break up and individual fish set up territories. At this stage, the fish are termed parr (juveniles). As the parr continue to grow and expand their territories, they move progressively into deeper water until July and August, when they inhabit the deepest pools. This is the period when water temperatures are highest, and growth slows. Rearing areas used by juvenile Coho salmon are low-gradient coastal streams, lakes, sloughs, side channels, estuaries, low-gradient tributaries to large rivers, beaver ponds, and large slackwaters. The most productive juvenile habitats are found in smaller streams with

low-gradient alluvial channels containing abundant pools formed by large woody debris. Adequate winter rearing habitat is important to successful completion of coho salmon life history" (CDFG Undated).

Smolt outmigration: "After one year in fresh water, smolts begin migrating downstream to the ocean in late March or early April. In some years, outmigration can begin prior to March and can persist into July. Peak downstream migration in California generally occurs from April to early June. Factors that affect the onset of outmigration include the size of the fish, flow conditions, water temperature, dissolved oxygen (DO) levels, day length, and the availability of food. Low stream productivity, due to low nutrient levels or cold water temperatures, can contribute to slow growth, potentially causing coho salmon to postpone outmigration.

Steelhead

Steelhead are reported to exhibit the most complex and variable life history of the Pacific salmonids. They can be freshwater resident or anadromous; the anadromous steelhead can spend up to 7 years in fresh water before smolting, and then up to 3 years in the ocean before first spawning (NOAA 1996). Further, they are classified into two types, the summer steelhead (that matures in freshwater, requiring several months to mature and spawn), and the winter steelhead (that matures in the ocean, entering fresh water ready to spawn). The Mad River supports both summer and winter steelhead.

Spawning and egg development: Steelhead can spawn more than once before dying, unlike Pacific salmon. Intermittent streams may be used for spawning, and cover is important because steelhead can enter streams weeks before they spawn. Summer steelhead utilize habitat that is not fully utilized by winter steelhead, and often spawn farther upstream than winter steelhead (NMFS 2004a). Steelhead egg incubation time is dependent on water temperature, varying from 1.5 to 4 months, generally between February and June. Fry and juveniles: Fry inhabit shallow water along banks of perennial streams. Summer rearing occurs in "faster parts of pools" (NMFS 2004a). Winter rearing occurs across a wide range of fast and slow velocity habitats, but is characterized primarily by complexity such as large in-stream wood. Larger and older juveniles will move downstream to rear in larger

tributaries and the mainstem. "Rearing is usually 2 years in California ESUs" (NMFS 2004a).

California Coast Chinook Salmon ESU

Chinook salmon runs are designated by adult upstream migration timing. Spring-run Chinook are now only found on the Rogue, Klamath, and Trinity rivers. The Mad River supports "sizeable populations" of fall-run Chinook salmon (NMFS 2004a), however, the species listing status is "threatened" and Critical Habitat has been designated. Adult upstream migration: Timing depends on the size of the river (NMFS 2004a). In the larger river systems (Rogue, Upper Klamath, and Eel), fall-run Chinook return to fresh water in August and September. In coastal rivers (presumably including the Lower Mad River), the fall-run begins in late October.

Spawning and egg development: On the larger river systems, spawning occurs in late October and early November. In smaller coastal rivers like the Lower Mad River, the peak spawning period is during late November into December, and often extending into January. Eggs resulting from the fall run spawning incubate and emerge from December into mid-April. Although the Chinook salmon ESU covers naturally spawned populations, worthy of mention is the Mad River Hatchery fall-run program. Fry and juveniles: Fry use woody debris and cobble interstitial spaces as cover, but as they grow their habitat preferences change to deeper water with slightly higher velocity. "Data from the Mad River... indicate that emergent Chinook salmon fry develop rapidly following emergence... The months of May and June accounted for 91.5% of the total capture of migrating young-of-the-year Chinook salmon in 2001" (Sparkman 2002, as cited by NMFS 2004a).

Salmon Trends

In the mainstem Lower Mad River, "habitat was quantified for three anadromous salmonid life history stages:

- 2+ juvenile steelhead rearing,
- 1+ juvenile coho salmon, and
- adult salmon and steelhead upstream migration."

Results from Trush (2008b) indicated a dramatic decline in juvenile 1+ coho habitat area from the mid-1940s to the mid-1960s, possibly resulting from large floods of the 1950s and 1960s. Then, after a recovery in habitat through the 1970s and 1980s, juvenile 1+ coho habitat abundance since WY1994 (since the CHERT adaptive management program began) has trended slightly upward.

In general, "there has been modest, overall improvement [in habitat area of the three salmonid life stages] since 1994 and significant improvement compared to habitat abundance in the 1950s through early 1980s" (Trush 2008b). Except for a very recent increase in anadromous salmonid habitat in 2007, habitat area has recovered to pre-1955 and 1964 flood levels and remained fairly constant over the span of CHERT adaptive management. From this we can conclude that major historic floods dominate habitat changes and that any effects of the present extraction program are relatively small or non-existent. Extraction strategies at this site continue to consider incorporating, where possible, the cooler water seeps and access to bedrock scour pools and overhanging vegetation into the designs that allows healthy cover for rearing salmonids.

Foothill Yellow Legged Frogs

Foothill Yellow-Legged Frogs are fairly common on the rocky perennial river tributaries within the forest and are fairly common along rivers throughout the north coast. While literature lends overall evidence that they prefer higher gradient, shallower streams with more canopy cover and less vegetative streamside cover than do the Northern Red-Legged Frog the overwhelming observations established over the last 15 years depicts this species preferring open canopy cover for thermoregulation.

Breeding sites for these frogs are shallow with slow flowing water with pebble and cobble substrate. The adults and sub-adults preferred river bars along both riffles and pools, with some shade. Occasionally, it was found in other riparian habitats such as backwater, isolated pools, or slow moving water with mud substrate. In the spring, adult frogs congregate along gravel/cobble river bars, where breeding occurs in shallow, slow flowing water. "Previous literature reports breeding to occur from late March through May, with oviposition for any single population being concentrated to a 2-week period... in the Trinity

River, breeding activity occurs over a 3-month period from April through late June" (Ashton et al. 1997) with most oviposition occurring in May and early June. Eggs hatch in 27 to 36 days, but incubation is temperature dependent and this time period may be longer due to cold water dam releases (Ashton et al. 1997). Growth to maturity is also temperature dependent; some individuals may reproduce as early as 6 months after metamorphosis (Jennings 1988, as cited by Ashton et al. 1997).

Northern Red-Legged Frog

The Northern Red-Legged Frogs require freshwater ponds, pools in slow streams, marshes, or reservoirs with submerged vegetation for egg attachment and emergent vegetation for cover. They are sometimes found in damp woods and meadows away from water bodies, especially during wet weather (Geoffrey 2008). Breeding occurs in late winter and early spring with young being completely transformed into adults by mid-summer. Eggs require 30 to 45 days to hatch, occurring in March or April and metamorphosis occurs 11 to 14 weeks later in June or July. Breeding red-legged frogs have been found in many of the freshwater marshes and ponds in the lower Mad River area. This species is not common within most of the forest and suitable habitat is limited. This species has declined in abundance in portions of its range. Threats to this species include: fragmentation, alteration, or loss of habitat resulting in increased water temperatures, decreased pool depth, or decreased riparian vegetation; and introduction of exotic fishes and/or bullfrogs. The Northern Red-Legged Frog has not been observed within the project reach (HCPBD 2014).

Southern Torrent Salamanders

Southern Torrent Salamanders are mainly aquatic, but capable of terrestrial activity, living primarily in seeps and headwater streams where the water remains cold year around. Aquatic larvae live in clear shallow water and still murky creeks with accumulated leaves. These salamanders are typically found in disjunct populations on north-facing slopes and relatively high elevations or in mature to old-growth forests. Although placed under the "Least Concern" and "California Species of Special Concern" category this species has a wide distribution and relatively large population. The most prominent concerns for this

species include urbanization and temperature rise due to climate change. STS's have never been documented within or adjacent to the project area (AmphiWeb 2008, Stebbins and Lowe).

Northwestern Pond Turtle

The northwestern pond turtle is found "downstream at least to the Blue Lake bridge area" but "its status along the Mad River needs documenting" (MRB 1993). In northern California, it basks intermittently in the morning, and then in late afternoon or early evening they begin foraging. In one population in a northern California stream, a male home range was estimated to be 2.4 acres; the female's range was much smaller (0.6 acres). It can be found in a wide range of wetland habitats including "rivers and streams (both permanent and intermittent), lakes, ponds, reservoirs, permanent and ephemeral shallow wetlands, abandoned gravel pits, stock ponds, and sewage treatment lagoons" (Holland 1994, as cited by Lovich Undated). It is active from February to November, and is often observed basking on surfaces above water. During summer droughts, it can bury itself in soft bottom mud. Breeding occurs between April and August, when females climb onto stream or pond margins, to dig a nest. In northern California and Oregon, hatchlings remain in the nest through the winter (Holland 1994, as cited by Lovich Undated). Federal agencies have designated this species as a sensitive species. Wetland habitat destruction is their single greatest threat; predation by bullfrogs is also noted (Lovich Undated).

Bullfrogs

Information on bullfrogs specific to the Mad River was scarce. The report supporting the 1994 PEIR for gravel extraction simply states "in the study area, the bullfrog's specific status needs to be determined" (MRB1993). It is present throughout much of the United States and is the largest frog in North America. It is highly aquatic and never strays far from permanent water (USFS Undated), preferring water with thick aquatic vegetation.

Breeding is from February through July in permanent water bodies (USFS Undated). Some tadpoles overwinter before transforming into adults. Adults spend winters in the soft muddy bottoms of ponds, lakes, or other water bodies. Fuller (2008) concluded that bullfrog control should be focused on its breeding habitat, which became greater after dam construction and operation.

Bullfrog populations are likely to continue to grow, assuming they continue responding favorably to disturbed aquatic environments and that more aquatic environments are disturbed due to development, change in surface and groundwater regimes, water quality, and climate change. Gravel operations do not purposefully affect bullfrogs beneficially, but beneficial habitat conditions are similar to other amphibians such as red-legged and foothill yellow-legged frogs, and northwestern pond turtles. Fuller (2008) suggests that limiting bullfrog breeding sites would be an effective means of controlling bullfrog populations.
Bullfrog habitat is created by man-made structures and natural river processes. Artificial structures include stock ponds, and wetland pits and alcoves created during extraction. Naturally created bullfrog habitat includes oxbows or alcoves. The original intent of the wetland pit and alcove extractions was to create aquatic habitat, specifically red-legged frog habitat; therefore, limiting wetland pits and alcoves to control bullfrogs would also decrease habitat for red-legged frogs. Suppression of bullfrogs, rather than eradication, is a realistic goal, if red-legged frog habitat is to be simultaneously conserved or recovered. Suppression techniques could include:

Identifying inundation frequencies and elevations, and relating them to the bullfrog's 2-year breeding and rearing requirements. Inundation frequencies and elevations could be identified by mid-winter aerial photography, field observation, or computer modeling.

Reviewing and/or determining life history requirements of bullfrogs and red-legged frogs that could be used to favor red-legged frogs.

This site has and will continue to participate in biological monitoring standards developed initially in conjunction with the Army Corps of Engineers, the California Department of Fish and Game, and the County of Humboldt. Monitoring standards have evolved and incorporated new techniques and guidelines as new information was gathered, through various consultations with NOAA Fisheries, as well as new species being listed. This monitoring strategy is well recognized and has been referred to by several agencies as state of the art, due to its ability to assimilate new information garnered and respond in an adaptive manner.

In addition to the original limitations developed in conjunction with Local, State, and Federal permitting additional limitations on operations have been developed by agency staff in response to biological information garnered over the course of the last 14 years.

Limitations such as more restrictive work seasons, bridge installation requirements, retention of large woody debris (LWD) and extraction design requirements represent specific changes that have occurred over the last 14 years. The ACOE 404 Permit No. 27404N has been provided as attachment 1 and contains a comprehensive list of operational restrictions, while the Biological Opinion (attachment 2) provides a biological rational for these restrictions. These restrictions were developed by numerous biological consultants and agency representatives and are deemed necessary to protect any common or listed wildlife species (AmphiWeb 2008, Fuller 2008).

5. Archeological Resources

The project area contains no known historical, archeological, or paleontological resources, or human remains based on review of County Resource information from the Natural Resources Division of the County Public Works Department (during previous project approval). The extraction area has been utilized for a significant period of time as both a historical extraction and stockpiling site and subsequent storage area and no significant finds of historical archeological, or paleontological resources, or human remains have occurred during this time period. Cumulative impacts to cultural resources are not cumulatively considerable since no cultural resources are known to exist or have been found on the site (HCDCDS 2008).

In the event that any prehistoric, historic, or paleontological resources are discovered during project operations, all work within fifty feet of the resource shall be halted and the operator shall consult a qualified archaeologist or paleontologist to assess the significance of the find. If any find were determined to be significant by the qualified archaeologist and/or paleontologist, then representatives from GRS Inc. and the qualified archaeologist and/or paleontologist would meet to determine the appropriate course of action. All significant cultural materials recovered shall be subject to scientific analysis, professional

museum curation, and a report prepared by the qualified archaeologist and/or paleontologist according to current professional standards.

Should human remains be encountered, the County Coroner shall be contacted immediately. Should the Coroner or archaeologist determine that the remains are likely those of a Native American, the California Native American Heritage Commission shall also be contacted. The Heritage Commission will then consult with the most likely Native American descendants from the area to determine appropriate treatment of the remains.

6. In-Stream Mining

The Mad River drains approximately 497 square miles of the Coast Range Geomorphic Province and empties into the Pacific Ocean north of Humboldt Bay in Humboldt County, California with an average discharge of 15500 cfs (cubic feet/second). The basin is about 100 miles in length and averages six miles wide. Elevations range from sea level at the mouth to 3,000 feet along the western ridge to 6,000 feet in the headwaters. Vegetation in the watershed is composed of early to late seral coniferous forests, hardwoods, and grasslands. Rainfall averages 40 inches along the coast to over 80 inches at the higher elevations (HCDCDS 2008).

Annual discharge for the Mad River and the daily average discharge in the watershed is seasonally dependent, with most large runoff events occurring during the winter. During November–March, the high flow period, the average daily discharge is approximately 2,000–5,000 cfs. Flows can vary greatly during the winter with maximum mean daily discharges exceeding 30,000 cfs during wet years while under 1,000 cfs in dry years (Graham Matthews & Associates 2007). High flows in the watershed tend to be of short duration, returning to winter base flow within a week flowing the peak event (Graham Matthews & Associates 2007). At the USGS Arcata gage, the average annual discharge of the Mad River Basin is approximately 1,000,000 acre-ft. For the record period of 1982 - 2000, the "drier than normal years" average annual discharge was 488,629 acre-feet while the "wetter than normal years" average annual discharge was 1,434,857 acre-feet (HBMWD 2004).

MAR is the average annual supply of bed material load delivered to a river reach by high flows. The bed material load is transported by river flows and includes the coarser sediment sizes (sand and gravel) that are deposited in the form of gravel bars and flood terraces. CHERT scientists believe that we can measure MAR changes only on decadal, not annual, time scales as the river experiences alternating periods of high and low recruitment due to large catastrophic floods and/or high and low erosion and sediment loading rates, in the contributing watershed upstream. The MAR concept allows us to quantify a sustainable volume of extractable sand and gravel for a reach, termed "sustained yield". In the 1994 PEIR, many geomorphic impacts were listed as being potentially caused by gravel extraction. Geomorphic impacts listed included increases in bed degradation (lowering), bank destabilization, and bank erosion. Many of the biological impacts were closely related to geomorphic ones, and included creation of shallow channels that impede fish migration, and creation of topographic barriers at tributary mouths that would also impede fish migration. The benefits of trenching in aggraded reaches versus its potential detrimental effects in degraded reaches were also discussed in the 1994 PEIR. Since the mid-1990s, downstream bars have generally aggraded (elevation of channel bed has increased), while upstream bars have degraded (channel bed elevation has decreased). Based on longitudinal profiles, at the upstream bars, mean elevations have been generally decreasing spatially and temporally since 1997. At downstream bars, mean elevations have been increasing spatially and temporally since 1993.

Channel confinement is indicated by the differences between the mean and thalweg elevations; the greater the difference, the greater the channel confinement. Since the late 1990s, channel confinement was not consistently increasing or decreasing, as measured by the differences in mean and thalweg elevations (HCPBD 2014).

As metrics for channel stability, active channel widths and active channel surface areas were defined and measured, using the cross sections and aerial photographs provided by the gravel operators, from 1992 to 2007 (Lehre et al. 2005, 2009). The active channel was defined as that portion of the river corridor with frequent sediment deposition or scour; "frequent" means "at least once every several years" (Lehre et al. 2005). Active channel widths and surface areas

were also determined to indicate whether the active channel expanded or contracted over time and in response to floods and/or mining. Bank erosion was also estimated using the cross sections and aerial photographs, but for a shorter time period (1998 to 2007) in the recent CHERT analysis (Lehre et al. 2005, 2009) since earlier bank erosion was evaluated in the 1997 post-extraction report.

Channel width, as defined by the distance from one side of a cross section to the other at the reference elevation, is "strongly affected by geomorphic setting" (Lehre et al. 2005). At the upstream bars, cross sections are wide and large width increases are common. At the downstream bars, where the channel is bounded by erosion-resistant banks, channel width remained relatively constant.

Sustained yield extraction, a concept that is accepted by CHERT scientists, appears to be acceptable to NMFS scientists based on issuance of their July 2010 Biological Opinion. The concept requires that one accept that if instream gravel extraction occurs at a rate less than the river's ability to recruit new gravel, and if extraction occurs in ways that consider habitat maintenance and restoration, then effects based on morphological changes will be less than significant. To estimate the extractable volume that maintains a sustained yield extraction rate, CHERT and NMFS have created two definitions. CHERT defines sustained yield extraction as some percentage of the Mean Annual Recruitment (MAR). NMFS defines sustained yield extraction as Fractional Extraction Volume (FEV), which is estimated using a spreadsheet calculator developed by NMFS. Differences between the sustainable fraction of MAR and FEV may be important to the long term volumes of extractable gravel (HCPBD 2014).

Whether or not gravel extraction affects stream temperature has not been determined for the lower Mad River. If extraction removed riparian vegetation, then air temperature, relative humidity, and percent shade would be affected, depending on the density and acreage of riparian vegetation removed. The location of the vegetation relative to the low flow channel position is also important. Gravel extraction does not determine or affect flow magnitude and timing; the opposite (flow magnitude and timing dictate gravel extraction) is a closer representation of what actually occurs. On the lower Mad River, flow is

dependent on natural processes and on the activities of the Humboldt Bay Municipal Water District (HBMWD).

The HBMWD continues to augment flow in the Lower Mad River during the summer months. To provide water to both existing residential users and prospective industrial users, the HBMWD stores water in Ruth Reservoir, located in the upper part of the Mad River watershed. During summer months, water is released from the reservoir for hydropower purposes and to meet low flow requirements below Essex. The HBMWD reports that prior to development of their system, portions of the Lower Mad would "go dry" (HBMWD 2004). The required low flows maintain the lower channel flows at levels greater than under "natural" conditions (HBMWD 2004).

The mainstem Mad River was listed as water quality limited due to sediment by the State of California. A Total Maximum Daily Load (TMDL) analysis was scheduled for completion in 2001 by the EPA under Section 303(d) of the Clean Water Act (USEPA 2007).

The Simpson- Glendale project area is situated near River Mile (RM) 7. The entire gravel bar is inundated at bankfull discharge levels and portions of the property are within the 100-year flood plain. Potential concerns could include upstream/downstream scour, changes in river energy causing erosion of river banks, riparian habitat changes, and sediment input in the river.

In general, when either aggradation or degradation of bed deposits, in relation to the annual replenishment rate, occurs within a flood plain there is a potential for significant erosion and sedimentation during flood conditions. A change in a river's channel geometry or meander wavelength may also alter the direction and location of the river's erosive force causing a change in the meander pattern of the river. This change may possibly aggravate stream bank erosion both upstream and downstream of the extraction site. Changes in riverbed morphology are generally attributable to large flood events, rather than gravel extraction. Because of the magnitude of the other forces affecting sediment flow, at the past and projected rate of extraction, the gravel mining operations at the Glendale-Simpson site are not expected to alter these erosion and sedimentation processes. The maximum permitted volume of extraction at the site is 175,000 cubic

yards. On high recruitment years and an extraction limit of 62,000 cy, SEVLL, on low recruitment years. If there are more than two years in a row of deficit where the SEVLL, is higher than the calculated SEV, then extraction volume will be set at the calculated SEV rather than the SEVLL. The SEV value is used to make annual target estimates for the sites above the A&M RR Bridge, the upper reach sites. The extraction volumes of the lower reach sites, below the A&M RR Bridge, are limited only by the site controls and the upper limit of the operation. The target annual extraction volume at each site will be estimated using the relationships in Table I. As our project area is above the A&M RR bridge, we will be using the SEV value to make annual estimates (HCPBD 2014).

7. Air Resources

The Emmerson Bar site is located in a sparsely developed rural setting and operations are limited to extraction activities required to remove a relatively small volume of aggregate material within a short time frame (2-3 weeks).

The project site is located in Humboldt County, which lies within the North Coast Air Basin (NCAB). The NCAB extends for 250 miles from Sonoma County in the south to the Oregon border. The climate of NCAB is influenced by two major topographic units: the Klamath Mountains and the Coast Range provinces. The climate of the Mad River Basin is typical of north coast valleys and is characterized by heavy rainfall concentrated in the cool winter months ranging from 40 inches along the coast to approximately 65 inches near Sweasey Dam, and a relatively dry, moderate summer. Predominate wind direction is typically from the northwest during summer months and from the southwest during storm events occurring during winter months.

Summers are generally warm with infrequent precipitation and early morning fog, and winters are cool and humid. About 80 percent of the annual precipitation, most of which is rainfall, occurred between November and March. Snowfall occurs during winter months at elevations above 2,000 feet and commonly accumulates to significant depths at elevations above 4,000 feet. Annual precipitation varies from

less than 40 inches at lower elevations to more than 80 inches at higher elevations. Precipitation for the entire basin averages about 55 inches per year (HCDCDS 2008).

The only standard currently listed as non-attainment in the North Coast Air Basin is the state standard for particulate PM-10. The NCAB, along with most of the rest of California, does not meet the ambient levels the state sets for PM-10, the federal PM-10 standard is three times the level set by California. While the percentage of days in the year the state standard has been exceeded has been decreasing over the past few years, the standard is still exceeded on several days every year, usually in the winter months when wood stoves are predominantly used for providing heat to residences and outside of the proposed operating season.

Two types of air pollutants could result from this project. One is emissions from licensed extraction equipment and trucks used for transporting the gravel off-site. The other is dust from extraction, and transport activities (CARB 2014, HCDCDS 2008).

The project will result in similar truck traffic levels as has occurred in the past, consisting of approximately 4 trucks per day during the construction season. This could increase to a maximum of 8 trucks per day during heavy activity such as emergency road repairs. Extraction activities at this site are typically completed within a three weeks time frame and therefore produce little if any traffic throughout the remainder of the year. Vehicles will be maintained to meet emission standards and off-road equipment has undergone review through the Diesel off-road On-line Reporting System (DOORS). Through this system the Operator will continue to update its fleet through emissions retrofitting and new vehicle acquisition to comply with the Air Resource Board standards. Due to the small scale of the project, emissions from vehicles will be insignificant, especially when compared to the amount of traffic that already occurs on Hwy 299 (HCDCDS 2008).

Extraction and hauling activities can produce high fugitive dust levels during certain times of operation. The major sources of dust at the site would be from extraction on the gravel bar, and truck traffic on the dirt access roads. Most of the dust that could cause a possible nuisance would be most attributable to truck traffic on the dirt access roads, with

dust being carried upstream by the prevailing winds that generally travel up the river valley during the day. Dust associated with truck traffic would be trapped by the surrounding dense vegetation and would be less noticeable. Dust would only be created during the time the extraction, and hauling occur, and would be substantially decreased by periodic watering of the extraction areas, and access roads.

USEPA (1995) has determined that at an average wind speed of 10 m.p.h. most dust (30 to 100 p.m in size) generally settles out of the atmosphere within 300 feet of the source, with larger particles traveling less distance and smaller particles traveling a longer distance. Most of the extraction areas, and hauling roads are more than 300 feet from the nearest residences and recreational areas.

The extraction activity will not conflict with or obstruct implementation of the State Air Quality Implementation Plan (SIP) for California. In 1996 the Army Corps of Engineers (ACOE) determined the following in regards to a section 404 permit for the Mad River sites*: "Project activity would have minor, short-term impacts on air quality in the vicinity of the project site. Based on the relatively minor size of the proposed project and limited to an evaluation of the air quality impacts only within Corps of Engineers jurisdictional areas, the Corps has determined that the total direct and non-direct project emissions would not exceed the de minimus threshold levels of 40 CFR 93.153. Therefore, the proposed project would conform to the State Air Quality Implementation Plan (SIP) for California".*

Activity in the project area would continue to require meeting NCUAQMD Air Quality standards, including Regulation 1, which prohibits nuisance dust generation and is enforceable by the district. The North Coast Unified Air Quality Management District currently enforces dust emissions utilizing the CA Health and Safety Code (Section 41701) which limits visible emissions that exceed 40% density to a maximum of 3 minutes for any one-hour period (NCUAQMD 2014).

There are currently no air quality problems identified in this region, and as proposed this project will not result in a violation of ambient air quality standards either individually or cumulatively in the area. The

only sensitive receptors are the residences in the vicinity, however, due to the limited extraction activity that will occur, the rapid dissipation of the dust and the low density of residences, impacts will not be significant (CARB 2014, HCDCDS 2008).

8.Noise

Noise generated by the approval of this project would be similar to noise levels from past extraction/processing at the adjacent extraction site that has been in operation approximately 50 years. No new noise sources are proposed. The project is located along Highway 299 approximately 1200 feet west of the town of Blue Lake. Sources of noise in the project area and surrounding areas are generated by traffic on Highway 299, the Mad River, heavy equipment use during extraction activities at the Glendale-Simpson Bar and adjacent extraction sites, and equipment use during agricultural operations on nearby lands. This operation is the primary noise source as measured adjacent to the extraction area at times of operation. Noise sources that result from this project will include front-end loader, bulldozer, excavator, and dump trucks.

Ambient noise levels in the project area and surrounding areas are relatively elevated due to the close proximity of Highway 299, and the Mad River. To date the adjacent aggregate extraction projects have not had a single complaint of noise generated from the site.

The sensitive receptors in the vicinity of the project site include rural residences, and recreationists using the river. There are residences just within 500 feet of the extraction areas. Noise levels of 60dBA would be reached at approximately 400 feet in distance and approximately 68dBA at 250 feet away. Rural residences that exist within 1,000 feet of the processing site where dba readings would diminish beyond the previous levels substantially.

This project is adjacent to another aggregate extraction site (existing permitted activity) and proposes no perceptible increase in noise generation above current levels. Due to the limited extraction activity that will occur, the rapid removal of material and equipment, the lack of processing facilities, the low density of residences and recreationists, impacts are not significant. This project is completed within a very small-time frame when viewed in comparison to other extraction sites

located throughout the county. Operating hours during active mining are expected to run Monday through Friday from 7:00 a.m. to 7:00 p.m. and 8:00 a.m. to 5:00 p.m. on Saturdays. Throughout the life of the permit, there will be significant periods of inactivity when no noise will be generated.

9.Land Use

The site is located approximately 1500 feet South of the town of Blue Lake and consists of a stretch of the Mad River where the broad alluvial reach constricts at the downstream end of the project reach. Associated gravel deposits occur on the western portion of the project site.

Moderately steep forested hill slopes adjoin the western side of the valley, while terraced flat topography adjoins the eastern side. Land use in the surrounding area is a mixture of private and industrials timberlands. Private lands include rural residential development, agriculture, highway commercial, recreational, as well as nearby retail commercial activities along Hwy 299 in Blue Lake, 1500 feet to the North. Above the valley and terraces, the surrounding land use is predominantly timberland.

Adjacent lands are zoned Agricultural Exclusive (20 acre minimum parcel size), Agricultural General (2.5 acre minimum parcel size), and Residential Suburban (1 acre minimum parcel size/allowing mobile homes), and utilized generally for agriculture, residential suburban, rural residential, highway commercial, open space, and wildlife habitat.

The Humboldt County General Plan - Frame Work Plan recognizes the importance of existing gravel extraction sites as follows:

"Sand, gravel and rock, being necessary to construction and development, are an essential component for the continued well-being of the County. They are the basis for much of the construction materials for roads, concrete, stream bank protection, erosion control, septic systems and passive solar projects. Importation of these materials would raise costs and negatively impact the development and maintenance within the County. It is important to protect specific sites and haul routes against land use incompatibilities to assure the continued utilization of this resource."

This project is consistent with the following goals and policies of the Humboldt County General Plan, Framework Plan, applicable to mineral resources:

§2532 GOALS

1. To assure the long-term availability of adequate supplies of mineral resources, to protect mineral resource areas from incompatible land uses and to minimize adverse environmental impacts.

§2533 POLICIES

1. Maintain and update maps of the County's identified mineral deposits.
2. Plan future development such that it will not interfere with the utilization of identified mineral deposits.
3. Ensure adverse environmental effects are prevented or mitigated to the fullest extent feasible and that mined lands are reclaimed to a usable condition which is readily adaptable for alternative land uses under the General Plan.
4. Encourage the production and conservation of minerals, while preserving to the maximum extent feasible the values relating to recreation, watershed, wildlife, range and forage, science, and aesthetic enjoyment.
5. Ensure elimination of residual hazards to the public health and safety.
6. Prevent the disruption of community character in siting and planning mineral resource extraction operations.
7. Require mineral haul routes to avoid incompatible areas such as landslides, highly erodible soils, residential areas, and schools, if feasible.
8. Permit conditions for mineral extraction operations should address allowable dust and noise levels, hours of operation, fencing, traffic, access, setbacks and other means to reduce conflicts with adjacent development.
9. Extraction of instream sand gravel is not to exceed the average annual replenishment level (annual bedload), except when the bedload left from a previous flood is greater than the average annual replenishment or if the projects emphasize fishery enhancement, flood control or bank protection.
10. Bank protection shall be permitted to: (1) Maintain necessary public or private roads, (2) Protect principal structures in danger from erosion, (3) Protect lands designated Agriculture-Exclusive from erosion.

11. Evaluate significant water diversion projects which would reduce the replenishment rate of gravel in streams as to the impact they would have on local mineral supply in Humboldt County.

Section 314-60.1 of the Humboldt County General Plan states: "Surface removal of minerals and natural materials, including building and construction materials to be used for commercial purposes, shall be allowed in any zone with a Use Permit (HCDCDS 2008)."

10. Aesthetics

The project area is located along the Mad River approximately 1500 feet South of the town of Blue Lake, consisting of a stretch of the Mad River with bends at the upstream and downstream extents. Associated gravel deposits occur below ordinary high water (OHW) on the project site.

The project site (Sections 29 and 30, T6N, R2E and APN 025-161-006; 312-151-015, 019), according to the County of Humboldt Planning and Development website, the general plan designation for the parcels is AE, CF, B5) (Humboldt County 2015). Land use in the surrounding area is a mixture of private and industrial timber lands with the communities of Glendale and Blue Lake close by. Private lands include rural residential development, agriculture, highway commercial, recreational, as well as nearby retail commercial activities along Hwy 299 in Glendale and Blue Lake (HCDCDS 2008).

Glendale-Simpson Bar is a privately owned parcel on the Mad River, behind closed gates and with limited access. Although this is a private site, adjacent to other gravel mining operations, there are nearby public lands that citizens use recreationally. However, because the time frame of the gravel mining operation is so small, the proposed gravel mining will have no significant impacts on the aesthetics of the area. Use will be limited to a few weeks of the year and material will be stockpiled offsite or directly taken to a processing plant. No new roads are being constructed, vegetation will remain the same and annual inundation will clear any signs of use. Nevertheless, mitigation measures such as operating hours and timing have been generally defined and the site is rather small which would reduce the duration of

operations. We anticipate no significant impacts to the aesthetics of the environment.

11. Roads and Traffic Assessment
Access to the processing site is directly off of Highway 299. Highway 299 is an approximately 40 foot wide striped, semi shouldered Highway in good condition. The last average annual daily traffic volume (AADT) of 2950 back/1900 ahead vehicles on Hwy 299 was taken in 2001 by Caltrans. Hwy 299 provides access to the Six Rivers National Forest Lands, Mad River recreation areas, rural residences, commercial and agricultural operations (HCDCDS 2008).

Access to the extraction area is provided by a private drive behind a locked gate on the Sundberg ownership. This road is utilized by GRS Sundberg Construction during project operations with permission from the property owner. The access road to the extraction areas is a minimum 16 foot wide gravel road in fair condition with turnouts available.

During the construction season, off-site traffic generated by the project consists of approximately 20 truck loads per day during normal operating levels. At times, depending on job specific contract requirements, this amount has increased to a maximum of 60 truck loads per day. During off-season months, no traffic will be created while the extraction area is dormant. Traffic generated by this project during summer months makes up a small portion of the traffic utilizing Highway 299. The design capacity of the roadways is well above current use and this project typically takes 2 to 4 weeks to complete.

12.Water Use
It is expected that water will be used on-site for dust control and to be compliant with all air quality regulations. The mining site and access road will be sprinkled as needed throughout the periods when operations are active. Water will raw and untreated water from the project site or from Humboldt Bay Municipal Water District (HBMWD).

III. — MINING PLAN / PLAN of OPERATIONS

A. Project Overview

As proposed herein, the project excavation site is approximately 15 acres and has an approved maximum annual extraction volume of 50,000 cubic yards. The annual extraction amounts are determined thru process outlined in the Mad River Biological opinion and are adjusted annually based on waterflows.

Site conditions and historic monitoring indicates that extraction at average historical levels is appropriate at this site and that such operations will not cause immediate nor cumulative significant adverse environmental impacts.

This proposal is applying for a renewal of a conditional use permit and Surface mining and reclamation plan (CUP-25-91X/SMR-06-91X). This project will remain consistent with the previous terms and conditions found within the previous permits.

The proposal is for the continued extraction of up to 50,000 cubic yards of aggregate (sand and gravel) on an annual basis. The ongoing operation will continue to extract material as long as material is available. Aggregate materials will be extracted, loaded onto trucks and transported to an off-site location or remain on site where processing and storage will occur.

1. Acreage Permitted

The project site consists of approximately 15 acres in total. Historically only limited areas would be disturbed in any year based on extraction and resource markets. The area subject to this Reclamation Plan will be determined as part of the permit renewal process.

2. Acreage Disturbed

Acreage disturbed in any given year as a result of extraction activities will be dependent annual allocation determined by procedures in the Mad River Biological Opinion thru annual consultation be the county CHERT inspection team.

3. Acreage Reclaimed

Acreage to be left in a reclaimed manner will be dependent on the amount of acreage disturbed as described above. Reclamation is limited to disturbed areas as described in the Reclamation Plan (Chapter IV).

TABLE 1
DESCRIPTION OF APPROXIMATE PROJECT AREA (ACRES), 2022

	Total Acreage (Approx.)
Parcel Size	230
Approximate Permit Boundary	15

4. Site History

The Emmerson Bar is located approximately 1500 feet South of downtown Bluelake in Humboldt County, California (Longitude of approximately-40,52'28 N and Latitude of 123,59'32 W) (Humboldt County 2015). The project consists of annually extracting aggregate from a river bar within the ordinary highwater mark of the Mad River. The site has been historically excavated for gravel in the past under previous permits.

Area of Importance

The Emmerson Bar site has provided aggregate materials that have been continually used by private contractors and public agencies. Cal Trans has utilized aggregate materials from this site for

construction and maintenance along Highways 299. In addition materials from this site help supply local public and private projects.

The market area for the site is generally defined as the area within a 70 mile radius the town of the Glendale and Arcata area , It is anticipated that as additional funding becomes available for road maintenance, an increased need for aggregate materials will occur. Since aggregate materials from this site are stored and processed a short distance away, these materials are of paramount importance for local construction and improvement projects.

The Humboldt County General Plan — Frame Work Plan recognizes the importance of existing gravel extraction sites as follows:

"Sand, gravel and rock, being necessary to construction and development, are an essential component for the continued well-being of the county. They are the basis for much of the construction materials for roads, concrete, streambank protection, erosion control, septic systems and passive solar projects. Importation of these materials would raise costs and negatively impact the development and maintenance within the County. It is important to protect specific sites and haul routes against land use incompatibilities to assure the continued utilization of this resource."

B. Mining Plan

Maps of operations — See Figures Example Pre-Extraction plans for project site details

A. Site Description

The operation will primarily involve excavation, using an excavator and/or tractor. The aggregate is then loaded and shipped to nearby processing

facilities. The duration and intensity of the operations will be dependent on annual volume allocation, but can be expected to be active on an incidental basis on a seasonal bases for more than the fifteen-year maximum permit term.

Extracted materials will be trucked and stockpiled at the processing facility in Glendale or Arcata near the extraction area. These materials will be used in the future for road construction, production of concrete other purposes. Processing will primarily consist of washing, screening, crushing and sorting but may be extended to allow other processing allowed by the Zoning Ordinance for the Heavy Industrial zone.

Production Schedule

The applicant proposes to remove up to 50,000 cubic yards of aggregate on an annual basis, intermittent peak activity is anticipated only during the extraction season outlined in the Mad River Biological Opinion, but may occur during anytime of the approved extraction season. The duration and intensity of operation will be dependent on approved annual volume can be expected to be active on a seasonal basis for the next fifteen plus years.

C. Plan Details

a. Topsoil

There is no native topsoil located within the extraction area. No topsoil will subsequently be required to be removed or stockpiled. Surrounding land is similarly situated with gravelly substrate, and when irrigated produces minimal cover with little or no topsoil horizon development.

b. Overburden

No overburden exists at the extraction site.

c. Mine Waste

No waste is produced from this type of project. All materials will be trucked off-site. Due to the nature of the activity and the proposed methods of extraction, no waste will be either retained on-site or disposed of off-site. No discharge from industrial activities into state waters occurs.

d. Extraction Methods

See Chapter II (1) for details on extraction activities.

e. Water requirements

No water use is required for extraction activities. Watering for dust control along the haul road may occur in conjunction with trucking of raw materials.

f. Water Impoundments and Diversions

N/A

g. Wastewater Treatment

By the nature of the described extraction activities, no wastewater is produced by this operation. Portable chemical toilets are provided for employees and are maintained by a pumper licensed in Humboldt County.

h. Contaminants

No servicing of equipment (fueling or lubricating) occurs within the extraction area. In the event of an accidental fuel or lubricant leak (i.e. hydraulic lines, etc.), operators have been instructed to move equipment to safer high ground (roadway or upper bench). If gravel is contaminated with a spill, the material will be removed and properly disposed of.

i. Processing

No processing will occur within the project area.

j. In-Stream Mining

Approved mining of instream resources is described in section II and are permitted and regulated under the Mad River Biological Opinion and CDFW Streambed alteration permit. Approved operation also include a installation of a seasonal crossings over low flow river channels to facilitate gravel transport, and access to extraction areas. This is essentially a continuation of a previous permitted operation. A minimum fifteen year approval is proposed and is supported based on analysis of submitted monitoring information.

D. Extraction Location

The site area along the existing gravel bar is proposed for mining. The primary activity has and will continue to occur adjacent to the low flow river channel. This area is subject to frequent inundation resulting in annual replenishment. The area adjacent to the active channel will continue to be mined using skimming as the primary mode of extraction, additional extraction techniques would include fish enhancement extraction techniques such as the development of alcove's and fish access channels. Other alternatives may be an option but will be subject to annual conditions and specific management purposes.

Reclamation of extraction the extraction area is completed on an annual basis through extraction design and is left in a reclaimed manner at the end of the extraction season. The extraction area will be re-contoured as a function of natural flow events and annual high flow events. Mitigation imposed as part of the project and final extraction slopes allow natural processes to reclaim the site on an annual basis and not significantly impact natural geomorphic processes or channel configuration. Extraction has been designed to complement the natural processes resulting in no significant impacts.

Of the approximate 15 acres located below the Ordinary High Water (OHW) level of the river, it is estimated that approximately 2-4 acres will

be utilized for gravel extraction on a annual bases. This area will be available for extraction activity depending on the location of the river and the condition of the gravel bar.

Topography at the end of each extraction season is described in this Reclamation Plan and is further specified annually by approvals from local, state, and federal agencies such as the County annual extraction approval process, 1603 Agreements with the CA Department of Fish and Wildlife (DFW), and letters of permission (LOP) or individual permits (Section 404) with the Army Corps of Engineers (ACOE). Annual monitoring and extraction information will be submitted to the appropriate agencies as part of the annual review requirements.

F. Extraction Depth

Extraction through various skimming techniques and designs is the primary mode of extraction. The morphology of this type of site generally consists of gravel bars on a straight or sometimes meandering portion of the river channel. The primary method of extraction will continue to be bar skimming. Skimming would generally be conducted with a loader or scraper starting generally at a minimum elevation of one foot above the low water channel and proceeding with a longitudinal slope equal to the river and/or a cross bar slope of 0% to 2%. Reclamation for this option consists of ensuring the bar is left in a 'free-draining' configuration so as not to trap fish, and encourage future gravel recruitment.

Other extraction techniques have been utilized to respond to annual conditions of channel morphology. When specifically proposed as part of an annual extraction plan, such plans will be approved by the County (currently through the CHERT process), DFG as part of the 1603 agreement process, and/or the Army Corps of Engineers through their 404 or LOP process. For instance resource agencies may desire wet pit or alcove options to improve fish holding and passage or other needs, as has historically occurred here and is done at other locations on the Mad River. Wet pit mining and/or trenching also occurs typically adjacent to, but outside of the river channel and may at times be utilized to increase channel capacity and/or maintain the adjacent bar morphology to

encourage subsequent gravel recruitment. This method is also utilized to reduce bank erosion, create deep water habitat, and to reduce the aerial extent of excavation. Some grading may also occur along off-channel areas, consisting of removing high areas or terrace deposits. This may be proposed to increase overflow channel capacity, riparian vegetation, and habitat values. Such grading will occur will occur in a manner that does not lower the flow regime of the channel, and would not remove established riparian vegetation or cause depressions that would increase the danger of trapping salmonids at high flows. Any such proposal would require County, Department of Fish and Wildlife (DFG), and Army Corps of Engineers (ACOE) approval.

G. Extraction Standards

Since 1992 regulatory extraction standards have been modified on an almost annual basis, as techniques of monitoring and review are field-tested and refined to suit site specific conditions on local rivers. The extraction standards described below may therefore be modified during the annual review process, if the operator, County, Department of Fish and Game, and Army Corps of Engineers agree alternate standards will adequately protect river resource values.

The following standards have been incorporated into this project's Proposed Mitigation Measures.

1. At the time of extraction, a vertical buffer (freeboard) of at least one foot will be maintained between the stream water surface and the extraction area.

2. The residual bar slope will:

a. Generally follow the slope of the water level in an upstream and downstream direction and maintain a vertical buffer of at least one foot; or

b. Generally follow the annual pre-extraction downriver bar slope; or

c. Slope towards the water with a grade of at least 0.5%

2. Subsurface extraction will generally slope in an upstream and downstream direction.

Changes to the above format may occur only after regulatory agency approval pursuant to County, Army Corps of Engineers annual approval process, and the Department of Fish and Wildlife Stream Alteration Agreement Process.

I. Seasonal Stream Crossing

Much of the extraction area is currently on the northern side if the low flow channel of the Mad River, however a small portion of the bar along the western boundary of the site can be separated from the haul road. To allow access for extraction and hauling equipment, the applicant proposes to install a single seasonal crossing. This crossing would consist of a railroad flatcar placed on gravel abutments with a minimum clearance above the water surface. Approximately 200 cubic yards of gravel would be scraped from adjoining areas to form each of the abutments for the crossing. The crossing will be removed at the end of each extraction season and the abutment material will be regarded to blend in with surrounding topography.

J. Annual Extraction Plan Review

This adaptive management program, with its annual review by the Humboldt County CHERT Team and Consulting Agencies will regulate and monitor gravel extraction, gravel replenishment, and bed morphology to assure that a degree of dynamic equilibrium is maintained.

Extraction as described herein and proposed in annual submittals will be designed based on annual conditions and monitoring information. Annual high flow events (particularly such as occurred in January and March of 1995, December of 1996 and January of 1997) may alter specifics for extraction standards on an annual

basis. Mining will follow the adaptive management strategies outlined below.

Extraction for a given season will occur after preparation of a specific operating plan for mining and reclamation developed on the basis of annual assessments and monitoring of the proposed project site. Annual assessments and site evaluation will be used to determine when, where and how aggregate can be extracted in a manner providing for reclamation while reducing or preventing potential impacts. The County, Department of Fish and Wildlife, NOAA Fisheries and Army Corps of Engineers have developed a monitoring and adaptive management program that includes annual scientific reviews and recommendations by other agencies. This program which has been subject to annual revision will continue to be followed.

Monitoring and adaptive management strategies will determine the appropriate locations and volumes to be extracted based on current bar configuration. Extraction plans will identify appropriate areas of mining as well as appropriate volumes.

The applicant will continue to develop cross-sectional data and/or other monitoring information based on field surveys in accordance with accepted monitoring standards, such as those presently conducted by the operator in cooperation with Regions 1 and 3 of the Department of Fish and Wildlife, the Army Corps of Engineers, and NOAA Fisheries. As information is analyzed these monitoring standards are subject to revision by resource agencies.

K. Annual Bar Morphology Analysis

These cross-sections would show any sequential changes in bar and river configuration, if that was occurring. When extraction is proposed to occur during the season the appropriate cross-sections will be re-measured and supplemented as necessary with additional cross sections. After the extraction season, cross-sections will be used to

monitor conformance to extraction prescriptions, volume extracted, and post-extraction bar configuration. These cross-sections have been, and will continue to be analyzed and utilized in developing annual extraction plans.

L. Management Principles and Practices

Dates of operation, elevation and slope limitations may change annually as approved by the County, Department of Fish and Wildlife, NOAA Fisheries and Army Corps of Engineers through extensions or modifications of operating conditions.

1. Extraction will occur adjacent to but outside of the live stream, or in existing or overflow channels for an alternative source of material, maintaining slopes towards the downriver portions of the bar.

2. Subsurface extraction adjacent to but outside of the live stream will continue as a method to enhance fishery values by creating a deeper and colder environment for holding (thermal refuge) and passage for smolts and adult salmonids. (This will only be proposed if recommended by a qualified fisheries biologist).

3. Extraction of gravel will occur in a manner that represents a final reclamation configuration for the gravel bar for the year.

4. Post-mining topography of gravel bars will be consistent and homogenous with the upstream and downstream topography.

5. Potential tools and methodologies that will be periodically utilized to assist in Managing Aggregate Resources.

- Annual reports of extraction/ replenishment submitted to government agencies by operators and their consultants.

- Annual record keeping and reporting of extraction volumes, finished site elevations and project characteristics.
- Periodic field inspections to identify fish and wildlife species presence/use at this site. - Studies of fisheries resources and salmonid use of area.

- Aerial photography, on-site photography and videotaping of site conditions.

- Standardization of cross-section locations and methodologies.

- Continuing compilation and analysis of historical and current data, particularly as a result of monitoring at the project site and in conjunction with information developed by others, including resource agencies.

- Enhancement programs for the development of fishery and wildlife habitat, etc., to be implemented by the operator working in concert with agency personal, river consultants and other professionals.

6. Standards and/or protocols for some of the physical and biological information listed above has been formalized and accepted by both federal and state agencies. These will further define the monitoring/management that will occur at this site. Such standards, since they are subject to annual change, will become part of the project as required by the Army Corps 404 Individual Permit or "Letter of Permission" permit process (for example) rather than incorporating them into the Project Description herein described.

7. The exact method of extraction will be determined based on annual river conditions. The County, Army Corps of Engineers and the California Department of Fish and

Game will continue to receive specific annual extraction plans for their review and comment.

IV. RECLAMATION PLAN

A. Proposed Use of Site Afterwards

The existing aggregate extraction site has historically involved aggregate removal from the exposed bar surface within the property. Previously this site received County approval in 2007 for an annual extraction rate of up to 50,000 cubic yards.

The Emmerson Bar site is strategically located in a market area that is important to federal, state, County, and local construction projects in Humboldt County. It is for both local and regional importance that this extraction site continues to operate, since it helps ensure a nearby source of aggregate is available to the community.

Much of the immediate area is used for rural residential with pasture for livestock, tree crops, and gardens. A small commercial lot is located directly across the County Road from the entrance to the haul road. The parcel slopes sharply into the river basin, and has been historically used as a site for mining. As a result, the site quality in relation to timber production is very poor. It is anticipated that the extraction area would be utilized for floodway management, wildlife habitat, and recreation if extraction activities cease.

B. Reclamation Activity

Reestablishment of berms across access roads during winter months and any necessary grading activities for drainage and/or erosion control purposes will continue to occur as annual management activity occurring at the extraction site. Revegetation of the project area is not appropriate. Native grass seed will be planted in select places as needed for drainage and/or erosion control. Naturally occurring species have colonized the gravelly areas in less active

portions of the extraction site, and will be left until the area is needed. At present it is not anticipated that any erosion control will be necessary for areas exceeding 1,000 square feet. The extraction area in the active channel will be left in a reclaimed condition at the end of extraction each year, and will be consistent and homogenous with the upstream and downstream topography. Prior to October 15th grading will be completed on the gravel bar, and on November 1st extraction ceases unless extended by the appropriate agencies through their permitting process. In conjunction with the end of the extraction season, the Operator is responsible for removing any and all machinery equipment, waste or other evidence of the operation from the river channel and gravel bar. Subsequent annual high flows recontour the extraction area.

The Operator will be responsible for smoothing out the river bar so that no topographic features remain that degrade the environment (such as ponding, erosion, sedimentation or stream channel alteration). Site specific requirements are also required seasonally by annual County approval, CA Department of Fish and Wildlife (DFG) for seasonal completion through the Stream Alteration Agreement (1603), and by the Army Corps of Engineers (ACOE) as part of the Individual Permit (Section 404).

If surface mining activity were to cease, no further reclamation of extraction areas would be necessary, other than that preformed on an annual basis. Access roads to the river would remain for property access and management activities, but these would be bermed annually prior to the onset of winter. The river would be utilized for open space/recreational purposes, and private property access.

See the overall Performance Standards Section (V) Reclamation Standards.

C. Schedule of Reclamation Activities

The Gravel bar will be left in a reclaimed condition at the end of each extraction season, as specified during annual review and verified by

annual agency site inspections, including the County, the Department of Fish and Wildlife and the Army Corps of Engineers. Berms across the access road are required prior to each winter as part of meeting Regional Water Quality Control Board specifications. These activities will continue to occur each year, meeting reclamation specifications and can be confirmed as part of the County's annual SMARA inspections.

D. Post Mining Topography

The post mining topography of the extraction area will be left in a manner representing reclamation, as described in more detail earlier in this document. Natural bedload transport processes will also continue to annually be a factor at site with the advent of annual high water flowing over the bar, depositing gravel and reshaping the bar. Cross-section will be done to establish the baseline condition for extraction proposals and annual review criteria by resource agencies. Cross-sections will continue to be performed by experienced professionals in a manner that allows cross-sections to be reestablished should flooding substantially change the site. A permanent benchmark has been established on site, and tied to both NGVD & NAVD elevations. Pre and post-mining cross-section information will be submitted to Humboldt County, CA Department of Fish and Wildlife (DFW), and the Army Corps of Engineers (ACOE), on an annual basis as long as information is required by those agencies.

The riverbanks adjacent to the extraction site consist of bedrock, riprapped banks, and or aggregate deposits. Extraction does not occur adjacent to erosional riverbanks; slopes will not be destabilized. Site observations and analysis of aerial photographs and cross-sections have determined the acceptability of currently proposed extraction methods and locations. The river bank on the western side of the river where extraction and hauling will occur is currently heavily vegetated, and will not be degraded by extraction activities. Therefore no planting is currently proposed.

E. Reclamation on Future Mining

Annual extraction at the Applicants ownership will not affect the opportunity to continue to mine at this location or adjacent lands.

F. Public Health and Safety

Public health and safety concerns include both on-site and off-site impacts. The project will not have a significant increase of risk to people on-site due to the following: it is an isolated location; access is controlled by a locked gate; material to be extracted is structurally stable and; no attractive nuisance to encourage trespass exists.

Equipment requiring fuel will be filled off-site; subsequently no fuel storage will occur on site. No 'abandoned' equipment, structures, refuse, etc. associated with extraction activity will remain within extraction areas after extraction has been discontinued.

G. Control of Contaminants

The potential for contaminants is limited to operation related activities such as equipment leaks or spills. Such contaminants from equipment shall continue to be controlled through proper equipment maintenance and operation; all equipment maintenance work will be conducted off of extraction areas. Any materials contaminated from equipment leaks or spills will be properly disposed of, as required by state and federal laws.

In the event of an accidental fuel or lubricant leak (i.e. hydraulic lines, etc.), operators have been instructed to move equipment to safer high ground (roadway or upper bench). If gravel is contaminated with a spill, the material will be removed and properly disposed of.

H. Revegetation

The extraction area is located outside of established riparian areas. The flood washed portion of the gravel bar contains primarily annual

vegetation. Natural processes of removal by flood and replacement by deposition annually renews vegetation to these areas. Site reviews and annual aerial photographs show that existing riparian vegetation is not affected by extraction activities. The gravel bar on the Applicants ownership is similarly vegetated as adjacent un-mined gravel bars. No established vegetation is proposed to be removed from the stream channel and as a result, other than natural reoccurrence no revegetation is proposed. These management decisions will be based on a specific year's extraction proposal and management considerations and reviewed by agencies as part of the annual review process.

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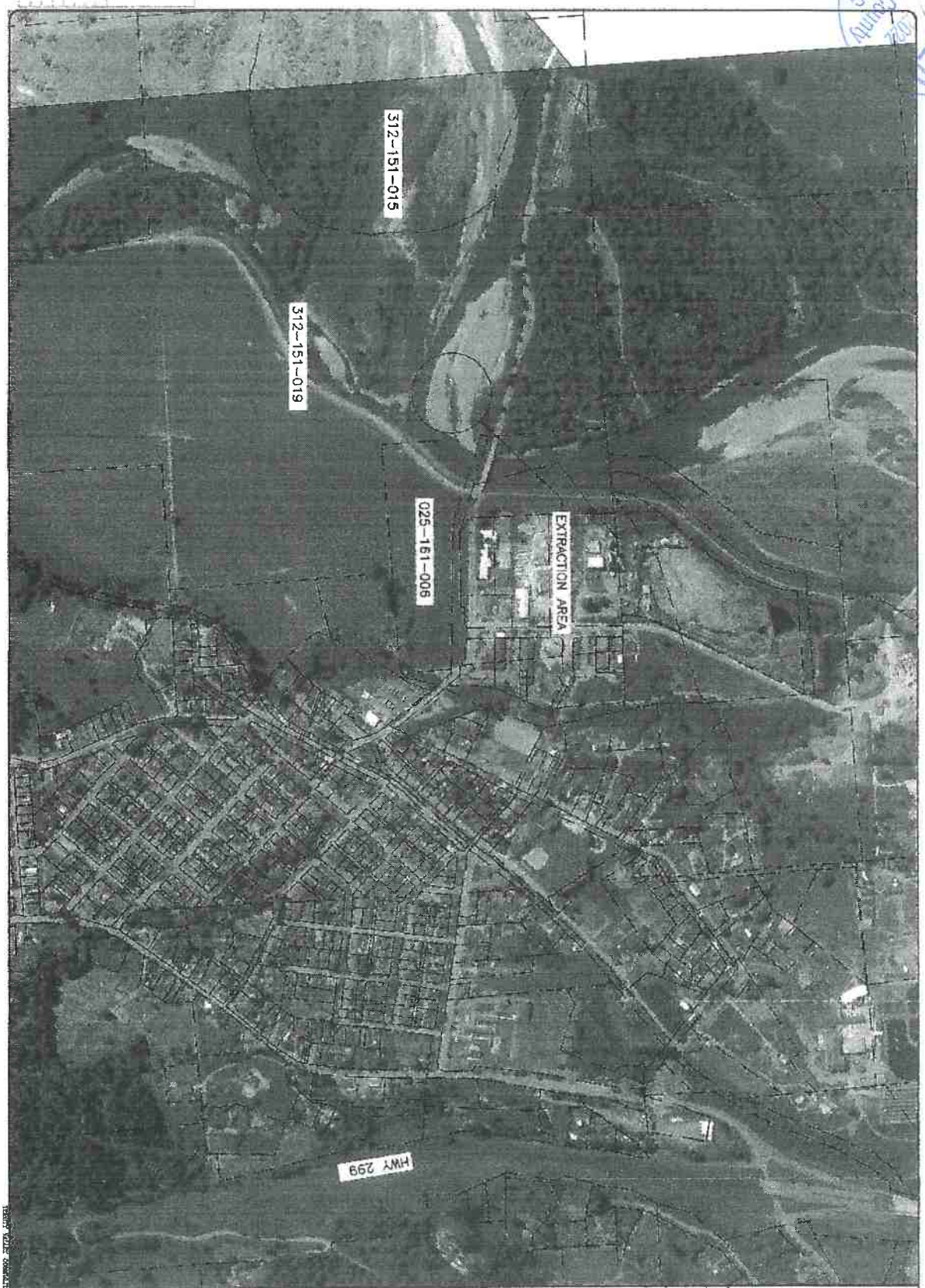
ATTACHMENT A



MAD RIVER - EMMERSON BAR OVERVIEW

HUMBOLDT, CALIFORNIA

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ATTACHMENT B