COUNTY OF HUMBOLDT EXTRACTION REVIEW TEAM (CHERT)

2021 POST-EXTRACTION REPORT

DISCUSSION DRAFT

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For the:

Humboldt County Board of Supervisors

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This report is being issued as a Discussion Draft.

Comments can be submitted during the 60-day public review period of
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to the Director of Humboldt County Planning and Building Department.

Comments received will be summarized with responses in Final Draft
which will be available by July 1, 2022

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INTRODUCTION

This report presents an overview of the Humboldt County gravel extraction for the 2021 mining season. Information on mining volumes, methods, and success of mine operators in meeting approved plans is reported herein. Representing Humboldt County, the County of Humboldt Extraction Review Team (CHERT) provided site-specific recommendations on extraction designs submitted by the operators and their consultants, as did agencies with regulatory and oversight responsibilities, including: 1) US Army Corps of Engineers (Corps), 2) National Marine Fisheries Service (NMFS), 3) California North Coast Regional Water Quality Control Board (NCRWQCB) and 4) California Department of Fish and Wildlife (CDFW). Recommendations were based on field reviews at each site, aerial photos, biological surveys, and topographic and hydrologic information provided by the operators as required by the US Army Corps of Engineers 2015 Letter of Permission (LOP 2015) and individual permits obtained by several operators. The LOP and associated documents are the primary federal instruments regulating gravel mining operations in Humboldt County. LOP 2015 can be accessed at: https://www.spn.usace.army.mil/Portals/68/docs/regulatory/LOP_2015-1.pdf. The NMFS Biological Opinion provides the basis for many of the LOP's standards and requirements; it can be accessed at: https://www.spn.usace.army.mil/Portals/68/docs/regulatory/Biological%20Opinions/HumboldtGravelLOPBO.pdf

The Humboldt County Board of Supervisors created CHERT in 1992 to provide scientific oversight on Mad River gravel extraction, which had arrived at an impasse over environmental concerns (discussed below). Four CHERT members were appointed by the Board with expertise in hydrology, fluvial geomorphology, and river ecology; three of those same four original members continue to serve through the present, and a new member was appointed in 2019. In 1997, the scope of CHERT services was expanded to include most riverine extraction sites throughout Humboldt County. Additional details on CHERT's role have been presented in earlier post-extraction reports found, along with other County gravel mining documents, at: http://humboldtgov.org/252/Surface-Mining-Reclamation-Act-SMARA-Doc

Annual Gravel Mining Review Process

Pre-extraction Process: The annual review process consists of visiting sites in the spring with operators and agency staff to observe post-winter conditions, note undesirable effects from the previous season's extraction (if any), and discuss a possible mining plan for the upcoming extraction season. The local NMFS staff were restricted from field participating in reviews in 2021 because of agency policy related to the Covid-19 pandemic. Instead, they participated as best they could via office reviews, telephone conversations and emailing. To assist with their review, CHERT posted numerous photos from the site reviews online and made them accessible to NMFS staff.

During field reviews, the mining site is walked to identify possible mining areas and methods that meet the regulations set forth by the agencies. Much discussion takes place, leading to a consensus on conceptual plans. Following the site reviews, the operators submit air photos, topographic and hydrologic information, and a mining proposal consistent with conceptual plans agreed to in the field. Occasionally, preliminary plans need revision, usually for logistical reasons, and a second field review may be needed.

When all issues have been resolved, CHERT issues a written recommendation. Once all parties accept a final version of the mining plan, and it is approved by the Corps, NMFS, NCRWQCB and CDFW, mining can begin provided all other agency permits have been obtained. Additional field reviews may be done while mining is taking place due to unexpected circumstances that might require alteration to an approved plan.

Post-extraction process: After mining is completed and before significant river rises, post-extraction field reviews are conducted in late summer or fall. Mad River post-extraction field visits were completed successfully. Unfortunately, some Eel (Sandy Prairie and Hauck) and Van Duzen River (Leland Rock) sites could not be fully visited because of high flows on the rivers. Each operator compiles a post-extraction submittal, including pre- and post-extraction topographic data, volume calculations, aerial photographs, and other pertinent data. These data are submitted to CHERT, CDFW, Corps, and NMFS.

On rare occasions, post-extraction field and/or office reviews reveal problems with extraction implementation. Often the problem can be resolved by re-grading an area within an extraction area, or redistributing woody debris over an area. A worst-case-scenario may involve replacing mined gravel onto the river bar if significant over-extraction has occurred. This has only occurred twice in the nearly three decades of the CHERT program.

Guiding Principles: CHERT develops recommendations based on two primary goals: 1) minimizing potential cumulative effects by ensuring that reach-scale mining volumes do not exceed sustainable levels, and 2) ensuring that site-specific methods of extraction (skimming, trenching, etc.) are appropriate for protecting local habitat. The concept of 'sustained yield' gravel extraction requires that gravel extraction volumes not exceed mean annual recruitment (an estimate of the long-term average annual supply of gravel to a specific reach of a river). Ensuring that annual mined gravel volumes are less than mean annual recruitment is an important management criterion for avoiding channel excessive bed degradation and habitat damage. Site-specific measures are also recommended by CHERT to reduce both cumulative and localized potential mining effects on riparian and aquatic habitat. These may include, for example, ensuring that skim floor elevations are sufficiently high to maintain low flow channel confinement so that small rises in river stage do not inundate skimmed surfaces too readily.

With time, experience on the rivers, and interaction with regulatory agencies, mine operators, and other stakeholders, the measures taken to protect river habitat and to improve program functioning are continually being refined. This feedback process, termed 'adaptive management', helps ensure that gravel mining and management improves resource protection, the quality of information provided by mine operators, and program efficiency. Problems occasionally arise, however, when either the river's response to previous mining results in undesirable river habitat conditions, or an operator deviated from an approved mining plan. Any such problems are described in the performance issues section of this report.

In addition to annually recurring activities (e.g., mining site reviews, extraction recommendations, annual post-extraction report preparation), CHERT occasionally participates in other activities. For example, CHERT prepared a technical analysis of Mad River physical channel conditions, riparian vegetation, and fish habitat in 2009 to support physical and biological assessments required for renewal of federal and state permits. Such analyses occur when requested by the County, the operators, or other stakeholders and with direction from the Humboldt County Board of Supervisors. CHERT also provides comments on drafts of various other documents, such as the Corps' updated letters of permission (LOP), NMFS biological opinions, etc.

Humboldt County Instream Gravel Extraction Sites and Extraction Terminology

Table 1 describes the geographic breakdown of Humboldt County mining reaches. CHERT classifies extraction techniques into twelve descriptive categories in Table 2.

Table 1. Description of river reaches used to sort and report extraction data.

Approximate Length (miles)	River Reaches
7	**Mad River:** The Mad River Reach extends approximately seven miles downstream from the Blue Lake Fish Hatchery to just below the Highway 299 Bridge near Arcata.
6	**Lower Eel River:** The Lower Eel River Reach extends approximately six miles downstream from the mouth of the Van Duzen River to near Fernbridge.
5	**Lower Van Duzen River:** The Lower Van Duzen River Reach extends upstream approximately five miles from the mouth of the Van Duzen River.
26	**Middle Reach of Eel River:** The Middle Reach of the Eel River extends upstream from Scotia (River Mile 20) for approximately 26 miles to River Mile 46.
17	**South Fork Eel River:** The South Fork Reach extends from Garberville (River Mile 33) upstream to Cooks Valley near the Mendocino County line (River Mile 50).

15	**Trinity River Reach:** The Trinity River Reach extends downstream about 15 miles from near Willow Creek into the Hoopa Valley.
	Isolated Sites: Five Humboldt County extraction sites are more or less isolated from the reaches described above. These are the *Satterlee Bar* on the main stem of the Eel River at Fort Seward, the *PL Bar* on the Van Duzen River, the *Branstetter Bar* on Bear River, the *Charles Bar* on Larabee Creek, and the *Cook Bar* on the North Fork of the Mattole River. Located in Trinity County, Dinsmore Bar on the Van Duzen River, operated by Mercer Fraser Co., is not part of the CHERT program but their volumes are included in this report.

Table 2. CHERT extraction methodology terminology and descriptions.

Narrow Shoreline Skim	A skim with one edge close to the low flow channel at or above the 35% flow elevation with a width no greater than 1/3 that of the unvegetated bar surface.
Wide Shoreline Skim	Same as above but wider.
Narrow Offset Skim	A skim that has a substantial vertical or horizontal offset from the low flow channel and a width no greater than 1/3 that of the unvegetated bar surface.
Wide Offset Skim	Same as above, but wider. Some may refer to this as a 'horseshoe' skim.
Dry Trench	A relatively long, linear shallow skim that remains above the water table at the time of excavation. When located in a secondary channel that normally dries up during the low flow season, it may be called an overflow channel skim.
Wet Trench	A trench sufficiently deep to intersect the water table at the time of excavation, designed for high water to flow through the trench.
Alcove	An excavation designed to simulate naturally occurring shoreline pools, typically located on the backside of meanders, that can provide deep, cool water during summer months and/or winter high velocity refuge.
Dry Alcove	Same as above, but to a depth above the water table at the time of excavation.
Fish Access Channel	A channel excavation that may include pools and incorporate large wood designed to temporarily improve fish migration access.
Riparian Enhancement Extraction (REE, formerly wetland pit)	A closed or open-sided pit excavated down to moist gravel on floodplain surfaces too dry to support beneficial riparian plants, such as willows, cottonwoods and alders. Unlike earlier versions that sustained year-round ponded water, designs are now shallower so that they go dry for some period each year to prevent non-native bullfrogs from successfully reproducing. It is hoped that these pits may create conditions favorable for native amphibians and beneficial riparian plants.

2021 EXTRACTION SUMMARIES

River Reach Extraction Volumes

In 2021, CHERT reviewed 33 extraction areas (some multiple times) distributed among 13 mining sites in Humboldt County (many sites had more than one extraction area). Appendix A provides historical gravel extraction volumes from the beginning of the CHERT program in 1992 (Mad River) and the expansion in 1997 (Eel River, Trinity River, and isolated sites added). As shown in Table 3, the total volume of gravel approved for extraction in 2021 was 397,045 cubic yards (cy). The total volume actually extracted was 332,048 cy, or about 84% of that approved for extraction. We note that gravel extraction of up to 20,000 cy annually done by Blue Lake Rancheria from the Mad River is not included in this report as the Rancheria of not part of the CHERT program.

Table 3. Humboldt County 2021 gravel extraction summary by river reach.

River Reach	No. of mined sites	No. of mined areas	Approved Volume (cu. yd.)	Extracted Volume (cu. yd.)	Percent of Approved Volume	Extracted Area (acres)
Lower Mad River	8	11	68,760	71,008	103%	20.3
Lower Eel River	2	13	206,461	195,449	95%	24.6
Middle Eel River	0	0	0	0	0%	0.0
Van Duzen River	2	8	99,182	59,044	60%	9.9
South Fork Eel River	1	1	22,642	6,547	29%	1.5
Trinity River	0	0	0	0	0%	0.0
Isolated Sites	0	0	0	0	0%	0.0
Humboldt County Total =	**13**	**33**	**397,045**	**332,048**	**84%**	**56**

Tables 4-8 list site-specific 2021 extraction information for each extraction area grouped by river reach. Sites are listed from downstream to upstream in each table. No gravel extraction was proposed for the Middle Eel River or isolated sites in 2021. For one site on the Trinity River (McKnight Bar, Mercer Fraser Co.) a proposal was submitted and then neither reviewed or implemented, by the operator's choosing. Although located in Trinity County and thus not a site receiving CHERT review, the Dinsmore Bar, operated by Mercer Fraser Co. submitted pre- and post-extraction reports to CHERT.

Mined areas that extracted 10% or more above (or 110% of) their approved volumes are shown in red font in the following tables. The 10% 'threshold' (i.e., extraction exceeding 110% of approved volume) has been used for years as an informal trigger for distinguishing over-extraction from unavoidable inaccuracies in pre- and post-extraction surveys and volume computations. The sites where extraction volume exceeded that approved by 10% or more were at the Mad River Sand and Gravel site, Mad River (Table 4); Mercer Fraser's Sandy Prairie site on the Lower Eel (Table 5); and the Leland Rock site on the Van Duzen River (Table 7).

Table 4. Mad River gravel extractions in the 2021 extraction season. The volumes listed in this table do not include gravel extracted by the Blue Lake Rancheria.

Operator	Site	Area No.	Method	Approved Volume (cu. yds.)	Extracted Volume (cu. yds.)	Percent of Approved Volume	Extracted Area (acres)
Eureka Ready Mix	O'Neill Bar	1	wide shoreline skim	4,036	3,632	90%	2.2
Eureka Ready Mix	Johnson-Spini Bar	1	wide shoreline skim	12,200	12,436	102%	7.0
Mercer Fraser Co.	Essex Bar	1	wide shoreline skim	1,775	634	36%	0.4
Garth Sundberg, Inc.	Simpson Bar	A	wide shoreline skim	2,592	2,592	100%	1.3
Eureka Ready Mix	Christie Bar	A	narrow shoreline skim	3,300	3,400	103%	2.4
Eureka Ready Mix	Christie Bar	B	Alcove/REE	12,936	12,769	99%	2.3
GLJ Construction	Blue Lake Bar	1	REE	7,141	5,504	77%	0.5
GLJ Construction	Blue Lake Bar	2	REE	4,664	5,121	110%	1.3
Eureka Ready Mix	Emmerson Bar	A	narrow shoreline skim	2,382	1,751	74%	0.6
Eureka Ready Mix	Emmerson Bar	B	Alcove	4,603	4,589	100%	0.6
Mad River Sand and Gravel	Guynup Bar	1	REE	13,131	18,580	141%	1.6
River Reach Totals =		**11**	**---**	**68,760**	**71,008**	**103%**	**20.3**

Table 5. Lower Eel River gravel extractions in the 2021 extraction season.

Operator	Site	Area No.	Method	Approved Volume (cu. yds.)	Extracted Volume (cu. yds.)	Percent of Approved Volume	Extracted Area (acres)
Eureka Ready Mix	Singley Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
County of Humboldt	Worswick Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Eureka Ready Mix	Drake Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Mercer Fraser Co.	Sandy Prairie: Plant A	A1	wet trench	32,872	21,612	66%	2.4
Mercer Fraser Co.	Sandy Prairie: Plant A	A2	REE	15,723	19,511	124%	2.2
Mercer Fraser Co.	Sandy Prairie: Plant A	C	REE	500	0	0%	0.0
Mercer Fraser Co.	Sandy Prairie: Plant B	B1	REE	30,977	32,629	105%	2.9
Mercer Fraser Co.	Sandy Prairie: Plant B	B2	narrow shoreline skim	7,565	6,351	84%	2.6
Mercer Fraser Co.	Sandy Prairie: Plant B	B4	narrow shoreline skim	37,788	36,490	97%	6.0
Mercer Fraser Co.	Sandy Prairie: Plant B	B4	wet trench	30,926	37,221	120%	2.9
Hansen Truck Shop	Hansen Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Eureka Ready Mix	Hauck Bar	B	REE	7,827	6,225	80%	0.7
Eureka Ready Mix	Hauck Bar	C	REE	446	248	56%	0.1
Eureka Ready Mix	Hauck Bar	D	REE	10,506	10,530	100%	1.0
Eureka Ready Mix	Hauck Bar	J1	fish channel	25,720	20,632	80%	3.4
Eureka Ready Mix	Hauck Bar	J2	fish channel	4,278	2,667	62%	0.3
Eureka Ready Mix	Hauck Bar	J3	fish channel	1,333	1,333	100%	0.1
River Reach Totals =		**13**	---	**206,461**	**195,449**	**95%**	**24.6**

Table 6. Middle Eel River gravel extractions, 2021.

Operator	Site	Area No.	Method	Approved Volume (cu. yds.)	Extracted Volume (cu. yds.)	Percent of Approved Volume	Extracted Area (acres)
Humboldt Redwoods Co.	Scotia Dam Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Humboldt Redwoods Co.	Truck Shop Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Humboldt Redwoods Co.	Three Mile Bridge Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Humboldt Redwoods Co.	Dinner Creek Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Humboldt Redwoods Co.	Elinor Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Humboldt Redwoods Co.	Larabee Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Humboldt Redwoods Co.	South Fork Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Humboldt Redwoods Co.	Bowley Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Humboldt Redwoods Co.	Maynard Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Humboldt Redwoods Co.	Vroman Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
River Reach Totals =		**0**	---	**0**	**0**	n/a	n/a

Table 7. Van Duzen River gravel extractions, 2021.

Operator	Site	Area No.	Method	Approved Volume (cu. yds.)	Extracted Volume (cu. yds.)	Percent of Approved Volume	Extracted Area (acres)
Leland Rock	upstream	B	REE	4,907	3,845	78%	0.4
Leland Rock	downstream	C	REE	6,874	4,912	71%	1.9
Leland Rock	downstream	D	REE	15,500	13,058	84%	1.2
Leland Rock	downstream	E	narrow shoreline skim	6,420	6,433	100%	2.1
Leland Rock	downstream	G	REE	32,905	0	0%	0.0
Leland Rock	upstream	H	REE	12,576	14,083	112%	1.3
Van Duzen River Ranch	n/a	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Tom Bess	West Site	A	narrow shoreline skim	16,000	13,000	81%	1.3
Tom Bess	West Site	B	narrow shoreline skim	4,000	3,713	93%	1.7
Humboldt County PWD	PL-Van Duzen Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Humboldt County PWD	Charles Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
River Reach Totals =	**3**	**9**	**---**	**99,182**	**59,044**	**60%**	**9.9**

Table 8. South Fork Eel River gravel extractions, 2021.

Operator	Site	Area No.	Method	Approved Volume (cu. yds.)	Extracted Volume (cu. yds.)	Percent of Approved Volume	Extracted Area (acres)
Wallan and Johnson	Wallan and Johnson Bar	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Randall Sand and Gravel	Home Bar	1	wide shoreline skim	8,039	0	0%	0.0
Randall Sand and Gravel	County Bar	2	wide shoreline skim	14,603	6,547	45%	1.5
Mercer Fraser Co.	Cooks Valley: MEN *	n/a	no extr. proposed	n/a	n/a	n/a	n/a
Mercer Fraser Co.	Cooks Valley: HUM *	n/a	no extr. proposed	n/a	n/a	n/a	n/a
River Reach Totals =		**2**	**---**	**22,642**	**6,547**	**29%**	**1.5**
* "HUM" is in Humboldt County, "MEN" is in Mendocino County							

Humboldt County extraction volumes and surface areas aggregated by extraction method for 2021 are shown in Table 9. Riparian enhancement extractions (REE) composed the largest proportion among all extraction methods in 2021. This method was relied on heavily in 2021 because of the poor gravel replenishment over the 2019-2021 winter high flow seasons.

Table 9. Humboldt County gravel extraction volumes and areas by extraction method, 2021.

Extraction Method	No. of Areas	Extracted Volume (cy)	Percent of Total Volume	Area (acres)	Percent of Total Area
alcove	1	4,589	1.4%	0.6	1.0%
fish channel	3	24,632	7.4%	3.8	6.6%
narrow offset skim	1	13,000	3.9%	1.3	2.2%
narrow shoreline skim	7	61,851	18.6%	17.1	29.5%
riparian enhancement extraction (REE)	15	147,015	44.3%	17.5	30.1%
wet trench	2	58,833	17.7%	5.3	9.1%
wide shoreline skim	6	25,841	7.8%	12.4	21.4%
Humboldt County Totals =	**35**	**335,761**	**100.0%**	**58.0**	**100%**

PERFORMANCE ISSUES: 2021

To evaluate operator performance and compliance, CHERT and regulatory agency staff conduct field reviews in the fall after completion of operations and review post-extraction documentation (cross sections, air photos, and other materials) to ensure approved mining plan design specifications were met. Overall, operator performance in conducting their 2021 operations consistent with approved mining plans was very successful, but problematic conditions were noted this past year by the CDFW during mid-season visits and during post-extraction field reviews, and are described here.

One area for improvement is in the preparation for field reviews. Gravel operators often did not come to pre-extraction site-visits with adequate materials for informing the review process. This can delay mining plan reviews and implementation of mining, often triggering mining extension requests. In addition, post-extraction field reviews on the Eel River in fall, 2021, were hampered by high river flows. The reviews were delayed by scheduling conflicts to November 12, 2021, after substantial rainfall and river rises. Many extraction areas could not be accessed or were inundated during the site reviews. CHERT will schedule post-extraction site reviews no later than end of October going forward.

Extraction Volumes

Although most extractions were below their approved volumes, several exceeded their approved volumes, as mentioned above. At most mined areas, the actual extraction volume was less than that approved, and three areas approved for extraction were left unmined by the operator's choice. Despite the excess volumes of extraction at several sites, no adverse field conditions were encountered during post-extraction field visits. That said, not all mined areas could be visited after extraction because of high flow conditions.

As shown in Tables 4-8, several mined areas extracted gravel volumes exceeding 10% or more above (or 110% of) their approved volumes (red font). The sites where extraction volume exceeded that approved by 10% or more were at the Mad River Sand and Gravel site, Mad River (Table 4); Mercer Fraser's Sandy Prairie site on the Lower Eel (Table 5); and the Leland Rock site on the Van Duzen River (Table 7). The over-extractions and any other problems observed during the course of gravel mining review are noted below.

Guynup Site (Mad River Sand and Gravel): An REE (Area 1) was over-extracted by over 4,000 cy. This possibility was discussed in the field during pre-extraction mining plan review. It was noted that the depth of the extraction, which needed to intersect the summer groundwater to achieve riparian restoration goals, would not be known beforehand. On implementation, the depth to groundwater was deeper than anticipated, so the extraction depth, and thus the extracted volume, exceeded that in the approved plan. Although the actual extraction volume exceeded the approved volume by more than 10%, this was anticipated and acknowledged as acceptable during the review process.

In addition, the location of the seasonal bridge crossing was not fully restored to the extent feasible after removal, with bridge abutment gravel remaining in piles near the low flow channel. This was observed too late to be resolved by completing restoration.

Sandy Prairie (Mercer Fraser Co.): The trench located within the middle channel (B4) was over-extracted by 6,000 cy. It appears that the pre-extraction volume was computed using shallower trench depths (approx. 5 feet) than implemented (approx. 10 feet). The trench bottom on the pre-extraction cross sections was set to an elevation of 10 feet, making the trench appear shallower on the approved pre-extraction plan than is typical. This seems an engineering error rather than over-extraction as trenches are commonly deeper than those shown on the approved plan. Mercer Fraser Co. should check with their engineer/surveyor to ascertain what occurred. That said, the approved pre-extraction plan should be followed regardless of an oversight on the part of the operator or consultant, or revised if an error is discovered.

Approved extraction volume at Area A2 (REE) was also exceeded, with 124% of approved volume extracted, or almost 4,000 cy more than approved. It is unclear how the post-extraction volume was computed give that only one extraction cross section intersected the extraction area. That also makes it impossible to examine where approved boundaries were transgressed. The guidelines for extraction cross section coverage in LOP 2015 should be adhered to in future to provide for accurate, verifiable extraction volumes and documentation of post-extraction ground conditions.

The total over-extracted between the two areas described above approaches 10,000 cy, a substantial volume. Although the total extracted volume for the site was less than that approved, the volume at each specific extraction area must not be exceeded.

CHERT also notes there is a gross error in the post-extraction volume calculations for the approved volume at the B4 skim; 66,823 cy is shown rather than the actual approved volume of 37,788 cy.

In addition, the CDFW found several non-compliance issues at Sandy Prairie, including:

- The seasonal bridge installation within the Plant A portion of the site failed to span the wetted channel to the maximum length feasible.

- Damage had been done to riparian vegetation in the Plant A portion of the site.

- They observed an excavator crossing the wetted channel rather than using the seasonal bridge installed for this purpose.

It was also noted by both CHERT and CDFW that unfavorable fish-passage conditions existed in the project area because of un-replenished trenches from last year's mining. Trenches adjacent to the low-flow channel that remain unreplenished going into the subsequent year's mining tend to split the streamflow, sometimes leading to inadequate flow depths for upstream migrating adult salmon.

Leland Rock Site: Approved extraction was exceeded by approximately 1,500 cy at Area B, a relatively small REE extraction. As with the Guynup site (above), the extraction depths for REE extractions must intersect the summer groundwater to meet the goals for riparian enhancement. But because they cannot be accurately known before extraction, the depths, and therefore volumes, of actual extraction will often vary from those approved.

Bess Site: The CDFW discovered several issues during the extraction season at the Bess site. These were written up in a letter of non-compliance, and included:

- The approved mining plan included a narrow offset skim along the outside of a bend. The design called for the upstream end of the extraction stopping short of daylighting at the existing channel, but the operator had removed this gravel 'plug'. Upon discovery, the CDFW requested the operator replace the gravel, which was done.

- A low flow stream-crossing used to access the extraction areas was constructed of unwashed rock, fine sediment and crushed/damaged plastic culverts. Use of the crossing resulted in direct delivery of sediment to the Van Duzen River and elevated turbidity downstream. The crossing did not meet requirements of the operator's permits.

- The CDFW also discovered a lengthy trail of leaked hydraulic fluids where heavy equipment had been used on the gravel bar near the extraction areas. They requested the fluids be cleaned up, and they were.

APPENDIX A: HISTORICAL EXTRACTION VOLUME SUMMARIES

Humboldt County Totals ("---" means unknown)			
Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	---	---	---
1993	---	---	---
1994	---	---	---
1995	---	---	---
1996	---	---	---
1997	---	---	---
1998	1,075,095	820,952	76%
1999	1,142,212	860,974	75%
2000	987,848	706,234	71%
2001	979,515	494,819	51%
2002	1,023,866	748,461	73%
2003	881,090	581,800	66%
2004	692,020	440,710	64%
2005	664,565	493,240	74%
2006	700,660	561,845	80%
2007	784,108	612,132	78%
2008	659,022	534,821	81%
2009	454,213	211,207	46%
2010	562,303	374,313	67%
2011	774,582	505,805	65%
2012	553,704	384,514	69%
2013	362,222	226,362	62%
2014	376,467	285,527	76%
2015	400,919	272,240	68%
2016	545,275	463,382	85%
2017	563,540	363,297	64%
2018	456,236	368,681	81%
2019	522,886	465,564	89%
2020	384,617	266,403	69%
2021	397,045	332,048	84%
Totals	**15,944,010**	**11,375,331**	**71%**
Averages	**664,334**	**473,972**	**71%**

Mad River ("---" means unknown)			
Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	115,000	115,000	100%
1993	122,100	138,400	113%
1994	134,500	134,898	100%
1995	210,637	226,265	107%
1996	203,998	189,517	93%
1997	252,926	210,976	83%
1998	265,795	223,352	84%
1999	196,212	174,974	89%
2000	204,748	146,534	72%
2001	199,215	167,719	84%
2002	204,991	171,937	84%
2003	150,390	136,790	91%
2004	156,540	141,250	90%
2005	138,475	127,200	92%
2006	174,245	162,360	93%
2007	165,504	153,341	93%
2008	142,043	130,613	92%
2009	0	0	n/a
2010	111,439	86,246	77%
2011	147,380	143,124	97%
2012	111,317	100,329	90%
2013	80,525	76,919	96%
2014	69,322	66,743	96%
2015	70,230	69,719	99%
2016	145,769	142,510	98%
2017	153,778	113,841	74%
2018	83,945	80,270	96%
2019	143,727	126,460	88%
2020	60,680	56,609	**93%**
2021	68,760	71,008	**103%**
Totals	**4,284,191**	**3,884,904**	**91%**
Averages	**142,806**	**129,497**	**91%**

APPENDIX A (continued)

Lower Eel River ("---" means unknown)			
Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	---	---	---
1993	---	---	---
1994	---	---	---
1995	---	---	---
1996	---	---	---
1997	561,700	326,500	58%
1998	399,100	273,000	68%
1999	471,400	290,500	62%
2000	291,300	208,600	72%
2001	389,900	119,300	31%
2002	387,300	220,000	57%
2003	318,300	163,900	51%
2004	188,840	120,305	64%
2005	199,370	166,280	83%
2006	235,495	208,240	88%
2007	243,097	177,334	73%
2008	237,955	215,760	91%
2009	229,386	106,467	46%
2010	208,286	188,730	91%
2011	301,537	214,730	71%
2012	226,520	188,994	83%
2013	176,477	80,918	46%
2014	127,671	97,232	76%
2015	168,581	94,954	56%
2016	179,659	151,456	84%
2017	183,063	102,683	56%
2018	163,775	145,540	89%
2019	129,476	126,350	98%
2020	154,619	98,786	64%
2021	206,461	195,449	95%
Totals	**6,379,268**	**4,282,008**	**67%**
Averages	**255,171**	**171,280**	**67%**

Middle Eel River ("---" means unknown)			
Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	---	---	---
1993	---	---	---
1994	---	---	---
1995	---	---	---
1996	---	---	---
1997	147,300	84,900	58%
1998	157,900	99,400	63%
1999	134,900	124,900	93%
2000	160,100	131,000	82%
2001	116,100	64,000	55%
2002	132,767	121,608	92%
2003	74,030	54,060	73%
2004	0	0	n/a
2005	0	0	n/a
2006	0	0	n/a
2007	89,990	64,424	72%
2008	0	0	n/a
2009	0	0	n/a
2010	0	0	n/a
2011	76,715	35,618	46%
2012	29,569	25,880	88%
2013	0	0	n/a
2014	59,298	45,394	**77%**
2015	48,146	39,350	82%
2016	82,276	78,731	96%
2017	59,409	44,316	75%
2018	27,853	24,570	88%
2019	84,345	82,147	97%
2020	0	0	n/a
2021	0	0	n/a
Totals	**1,480,698**	**1,120,298**	**76%**
Averages	**59,228**	**44,812**	**76%**

APPENDIX A (continued)

South Fork Eel River ("---" means unknown)

Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	---	---	---
1993	---	---	---
1994	---	---	---
1995	---	---	---
1996	---	---	---
1997	67,700	74,700	110%
1998	75,400	70,100	93%
1999	85,400	75,900	89%
2000	75,700	53,700	71%
2001	66,000	43,100	65%
2002	58,163	48,122	83%
2003	87,060	54,660	63%
2004	80,730	50,745	63%
2005	82,770	36,480	44%
2006	92,000	35,075	38%
2007	90,737	73,956	82%
2008	32,358	24,833	77%
2009	40,170	24,986	62%
2010	42,864	27,732	65%
2011	36,063	14,244	39%
2012	19,039	0	0%
2013	27,588	17,212	62%
2014	32,341	24,754	77%
2015	20,610	15,129	73%
2016	34,863	23,657	68%
2017	36,679	17,010	46%
2018	34,751	20,306	58%
2019	38,724	14,451	37%
2020	34,885	8,476	24%
2021	22,642	6,547	29%
Totals	**1,315,237**	**855,875**	**65%**
Averages	**52,609**	**34,235**	**65%**

Van Duzen River ("---" means unknown)

Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	---	---	---
1993	---	---	---
1994	---	---	---
1995	---	---	---
1996	---	---	---
1997	120,000	81,600	68%
1998	119,100	103,700	87%
1999	159,900	108,800	68%
2000	194,800	121,300	62%
2001	161,700	85,600	53%
2002	202,500	167,400	83%
2003	175,100	123,000	70%
2004	179,045	92,610	52%
2005	159,090	123,170	77%
2006	134,910	104,750	78%
2007	152,773	113,184	74%
2008	209,176	137,850	66%
2009	175,132	73,236	42%
2010	169,041	69,917	41%
2011	175,724	71,903	41%
2012	142,191	47,760	34%
2013	63,111	41,713	66%
2014	74,701	51,404	69%
2015	85,978	53,088	62%
2016	92,995	67,028	**72%**
2017	108,686	76,526	70%
2018	108,276	79,609	74%
2019	126,614	116,156	92%
2020	134,433	102,532	76%
2021	99,182	59,044	60%
Totals	**3,524,158**	**2,272,880**	**64%**
Averages	**140,966**	**90,915**	**64%**

APPENDIX A (continued)

Trinity River ("---" means unknown)			
Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	---	---	---
1993	---	---	---
1994	---	---	---
1995	---	---	---
1996	---	---	---
1997	47,500	40,000	84%
1998	35,000	28,100	80%
1999	64,300	66,900	104%
2000	18,000	22,200	123%
2001	46,600	15,100	32%
2002	38,145	19,394	51%
2003	76,210	49,390	65%
2004	62,075	32,700	53%
2005	64,100	30,570	48%
2006	64,010	51,420	80%
2007	42,007	29,893	71%
2008	12,490	11,701	94%
2009	0	0	n/a
2010	30,673	1,688	6%
2011	37,163	26,186	70%
2012	25,068	21,551	86%
2013	5,521	723	13%
2014	13,134	0	0%
2015	7,374	0	0%
2016	9,713	0	0%
2017	21,925	8,921	41%
2018	17,109	0	0%
2019	0	0	n/a
2020	0	0	n/a
2021	0	0	n/a
Totals	**738,117**	**456,437**	**62%**
Averages	**29,525**	**18,257**	**62%**

Isolated Sites ("---" means unknown)			
Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	---	---	---
1993	---	---	---
1994	---	---	---
1995	---	---	---
1996	---	---	---
1997	---	---	---
1998	22,800	23,300	102%
1999	30,100	19,000	63%
2000	43,200	22,900	53%
2001	0	0	n/a
2002	0	0	n/a
2003	0	0	n/a
2004	24,790	3,100	13%
2005	20,760	9,540	46%
2006	0	0	n/a
2007	0	0	n/a
2008	25,000	14,064	56%
2009	9,525	6,518	68%
2010	0	0	n/a
2011	0	0	n/a
2012	0	0	n/a
2013	0	0	n/a
2014	0	0	n/a
2015	0	0	n/a
2016	0	0	n/a
2017	0	0	n/a
2018	0	0	n/a
2019	0	0	n/a
2020	0	0	n/a
2021	0	0	n/a
Totals	**176,175**	**98,422**	**56%**
Averages	**7,341**	**4,101**	**56%**