

COUNTY OF HUMBOLDT EXTRACTION REVIEW TEAM (CHERT)

2023 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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Comments received will be summarized with responses in Final Draft
which will be available by July 1, 2024

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INTRODUCTION

This report presents an overview of the Humboldt County gravel extraction for the 2023 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 (then under a different name) in 1992 to provide scientific oversight on Mad River gravel extraction, which had arrived at an impasse over environmental concerns (discussed below). 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://humboldt.gov/252/Surface-Mining-Reclamation-Act-SMARA-Doc>

Four CHERT members were initially appointed by the Humboldt County Board of Supervisors in 1992. The team was selected for having expertise in hydrology, fluvial geomorphology, and river ecology, knowledge and skills necessary for addressing how to manage river gravel mining so as to provide the necessary raw materials for society's needs while minimizing harmful effects on river morphology and habitat. Two of those same four original members continue to serve through the present, and three new members were appointed by the Humboldt County Board of Supervisors in January 2023. The new members participated in all aspects of the CHERT program in 2023 and will lead CHERT activities in 2024 and beyond.

Annual Gravel Mining Review Process

Pre-extraction Process: The pre-extraction mining review process begins with CHERT scheduling field visits (typically May-July each year) for those operations planning to mine gravel in a given year. Site visits involve walking sites to observe the river's responses to the previous season's mining and discussing possible mining methods for the upcoming season. All individuals on the field visits, including CHERT, agency staff, operators and their representatives, discuss observations and insights, and ultimately come to consensus on conceptual mining plans for that season. Field discussions are supported with aerial photos and possibly topographic surveys. As a follow-up to the pre-extraction site visits, CHERT synthesizes the consensus with text and markings on aerial photos and distributes this to all concerned.

Once conceptual plans are developed, the operators' agents prepare submittals aiming to conform to field discussions and consensus. The operators' submittals include air photos depicting the site and layout of mining areas, topographic and hydrologic information, and a narrative 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 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. Most often post-extraction field visits are completed before high water. Unfortunately, sometimes not all sites can be visited because of high flows, but this is rare.

A goal is to visit all sites to observe the post-extraction conditions and effect any remediation, if needed, before the rivers rise with fall rainfall. On relatively rare occasions, post-extraction field and/or office reviews reveal problems with extraction implementation, most often with failing to meet approved extraction designs. Often, a problem can be resolved by re-grading within an extraction area. A worst-case scenario may involve replacing mined gravel onto the river bar if significant over-extraction has occurred. This has occurred only three times in the three decades of the CHERT program.

Post-extraction surveys and aerial photography are required to be done following completion of extraction. 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 required to be submitted to CHERT, CDFW, Corps, and NMFS by December 15 each year and provide a primary information source, along with field observations, for post-extraction reports.

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 what the river can provide while avoiding adverse effects on infrastructure and riparian habitat. At present, only the Mad River has constraints on the volume of gravel mined each year. Annual mining volumes limits are determined each Spring for the Mad River using a formula developed by the NMFS based on the previous winter’s stormflows. The method, called “Flow Estimated Volume”, or FEV, set the gravel mining volume cap for 2023 at 149,000 cubic yards (cy).

For the Eel River system, volume constraints (caps) exist for each individual operator. Because it is a much larger river system relative to annual mining volumes, it is assumed that the Eel River (and tributaries) need not have reach-wide mining volume constraints.

Site-specific measures are also recommended by CHERT to reduce or avoid both cumulative and localized potential mining effects. These may include, for example: 1) 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; 2) avoiding riparian vegetation both adjacent to and within mining areas; 3) buffering potential salmonid spawning riffles, among others.

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 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 <i>Satterlee Bar</i> on the main stem of the Eel River at Fort Seward, the <i>PL Bar</i> on the Van Duzen River, the <i>Branstetter Bar</i> on Bear River, the <i>Charles Bar</i> on Larabee Creek, and the <i>Cook Bar</i> 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)	An open-sided pit excavated down to moist gravel on floodplain surfaces that were too dry to support beneficial riparian plants, such as willows, cottonwoods and alders.

2023 EXTRACTION SUMMARIES

River Reach Extraction Volumes

In 2023, CHERT reviewed 41 extraction areas (some multiple times) distributed among 14 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 2023 was 614,278 cubic yards (cy). The total volume actually extracted was 476,222 cy, or about 78% of that approved for extraction.

Table 3. Humboldt County 2023 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	20	139,618	136,401	98%	27.3
Lower Eel River	2	12	255,454	181,338	71%	36.1
Middle Eel River	0	0	0	0	n/a	0
Van Duzen River	3	8	186,860	140,748	75%	29.2
South Fork Eel River	1	1	32,346	17,735	55%	1.9
Trinity River	0	0	n/a	n/a	n/a	n/a
Isolated Sites	0	0	n/a	n/a	n/a	n/a
Humboldt County Total =	14	41	614,278	476,222	78%	94

For the Mad River, as stated above, the 2023 volume cap was 149,000 cy. The volume of gravel actually mined in 2023 was 136,401 cy, as shown above in Table 3, or about 3,000 cy less than that approved. We note that gravel extraction of up to 20,000 cy is annually done by Blue Lake Rancheria from the Mad River, but is not included in this report as the Rancheria is not part of the CHERT program.

Tables 4-8 list site-specific 2023 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 Trinity River, Middle Eel River or isolated sites in 2023.

Table 4. Mad River gravel extractions in the 2023 extraction season. Red font indicates extraction exceeding 10% above (or 110% of) that approved. 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	6,115	5,762	94%	2.1
Eureka Ready Mix	Johnson-Spini Bar	1	wide shoreline skim	24,574	23,747	97%	4.8
Mercer Fraser Co.	Essex Bar	1	wide shoreline skim	2,796	2,774	99%	0.6
Garth Sundberg, Inc.	Simpson Bar	A	alcove	5,235	5,198	99%	0.3
Eureka Ready Mix	Christie Bar	A	narrow skim	1,990	2,123	107%	1.2
Eureka Ready Mix	Christie Bar	B	narrow skim	3,291	3,277	100%	1.0
Eureka Ready Mix	Christie Bar	C	narrow skim	1,625	1,755	108%	0.8
Eureka Ready Mix	Christie Bar	D	REE	12,693	11,868	94%	1.2
Eureka Ready Mix	Christie Bar	E	narrow skim	2,808	2,987	106%	1.1
Eureka Ready Mix	Christie Bar	F	narrow skim	9,731	9,964	102%	2.6
Eureka Ready Mix	Christie Bar	G	narrow skim	2,909	3,122	107%	1.2
GLJ Construction	Blue Lake Bar	A	narrow skim	12,044	12,875	107%	2.3
GLJ Construction	Blue Lake Bar	B	overflow channel skim	1,487	1,584	107%	0.5
GLJ Construction	Blue Lake Bar	C	narrow skim	3,750	2,812	75%	0.4
GLJ Construction	Blue Lake Bar	D	trench	5,134	3,816	74%	0.5
GLJ Construction	Blue Lake Bar	E	trench	1,650	1,565	95%	0.5
Eureka Ready Mix	Emmerson Bar	A	REE	14,550	14,028	96%	1.7
Mad River Sand and Gravel	Guynup Bar	1	narrow skim	21,090	20,752	98%	3.1
Mad River Sand and Gravel	Guynup Bar	2	narrow skim	3,764	4,323	115%	0.8
Mad River Sand and Gravel	Guynup Bar	3	off-channel skim	2,382	2,069	87%	0.7
River Reach Totals =	8	20	---	139,618	136,401	98%	27.3

Table 5. Lower Eel River gravel extractions in the 2023 extraction season. Red font indicates extraction exceeding 10% above (or 110% of) that approved.

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	narrow skim	6,073	8,501	140%	5.6
Mercer Fraser Co.	Sandy Prairie: Plant A	A2	narrow skim	63,671	24,850	39%	3.4
Mercer Fraser Co.	Sandy Prairie: Plant B	B1	narrow skim	7,232	3,197	44%	8.8
Mercer Fraser Co.	Sandy Prairie: Plant B	B2	alcove	23,781	16,188	68%	2.0
Mercer Fraser Co.	Sandy Prairie: Plant B	B3	narrow skim	21,432	23,186	108%	3.9
Mercer Fraser Co.	Sandy Prairie: Plant B	B4	trench	17,905	9,497	53%	1.2
Mercer Fraser Co.	Sandy Prairie: Plant B	B5	alcove	35,885	28,946	81%	3.3
Mercer Fraser Co.	Sandy Prairie: Plant B	B6	trench	15,682	9,178	59%	1.0
Eureka Ready Mix	Hauck Bar	A	alcove	37,874	33,433	88%	2.9
Eureka Ready Mix	Hauck Bar	B	trench	3,588	3,410	95%	0.3
Eureka Ready Mix	Hauck Bar	C	trench	7,208	6,244	87%	0.6
Eureka Ready Mix	Hauck Bar	D	narrow skim	15,123	14,708	97%	3.1
River Reach Totals =	2	12	---	255,454	181,338	71%	36.1

Table 6. Middle Eel River gravel extractions, 2023.

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, 2023.

Operator	Site	Area No.	Method	Approved Volume (cu. yds.)	Extracted Volume (cu. yds.)	Percent of Approved Volume	Extracted Area (acres)
Leland Rock	downstream	A	trench	32,875	20,222	62%	2.9
Leland Rock	downstream	B	narrow skim	10,735	1,768	16%	1.6
Leland Rock	downstream	C	narrow skim	18,153	18,066	100%	4.5
Leland Rock	upstream	D	narrow skim	5,369	5,369	100%	1.7
Van Duzen River Ranch	South Bank	A	trench	18,445	9,550	52%	1.1
Van Duzen River Ranch	North Bank	B	trench	9,240	4,110	44%	0.6
Van Duzen River Ranch	North Bank	C	narrow skim	71,810	67,615	94%	12.9
Bess	West Site	A	narrow skim	20,233	14,048	69%	3.9
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	---	186,860	140,748	75%	29.2

Table 8. South Fork Eel River gravel extractions, 2023.

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	32,346	17,735	55%	1.9
River Reach Totals =		1	---	32,346	17,735	55%	1.9

Humboldt County extraction volumes and surface areas aggregated by extraction method for 2023 are shown in Table 9. Narrow skims were the dominant extraction method used in 2023. In 2019-2021, REE was the dominant method because of poor replenishment due to low flows. However, in 2022 and 2023, bars that had not been skimmed for several years had extractable gravel (new deposition of adequate depth) and thus were relied upon for over half the gravel extracted in 2023. REEs were far less dominant in 2023 because of the increase of skimmable gravel, and because areas suitable for REEs are reserved for years when there is low replenishment on bars.

Table 9. Humboldt County gravel extraction volumes and areas by extraction method, 2023.

Extraction Method	No. of Areas	Extracted Volume (cy)	Percent of Total Volume	Total Area (acres)	Percent of Total Area
alcove	4	83,765	17.6%	8.5	9.0%
narrow skim	20	245,298	51.5%	63.9	67.6%
riparian enhancement extraction (REE)	2	25,896	5.4%	2.9	3.1%
off-channel skim	2	3,653	0.8%	1.2	1.3%
wet trench	9	67,592	14.2%	8.6	9.1%
wide shoreline skim	4	50,018	10.5%	9.4	9.9%
Humboldt County Totals =	41	476,222	100.0%	94.5	100%

PERFORMANCE ISSUES: 2023

To evaluate operator performance and compliance, CHERT and regulatory agency staff conduct post-extraction 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 and that all requirements of the Corps’ LOP 2015 are met. Overall, operator performance in conducting their 2023 operations consistent with approved mining plans was very successful, but problematic conditions were noted at a few sites, as described below.

Pre-extraction Preparations

Ideally, gravel operators will have pre-extraction information (cross sections, air photos) ready for pre-extraction site visits. Having this information at hand during the site visits helps inform participants as to the general condition of the mining site, interpreting the river’s response to previous mining, and responses to winter stormflows. Unfortunately, Spring surveys can be delayed by weather, as can obtaining air photos. Rather than wait for all materials, most often pre-extraction site visits are done with air photos but without cross sections. This is generally believed to be preferable to delaying the review process and winding up in a rush to complete mining and/or apply for operating season extensions in the fall.

At several sites pre-extraction narratives were either absent or incomplete. Having to request the required materials for pre-extraction reviews can delay approval of a mining plan and shift operations to later in the season. This can delay mining plan reviews and implementation of mining, sometimes triggering mining extension requests.

Over-extraction and Other Deviations from Approved Mining Plans

Although most extractions were below their approved volumes, several significantly exceeded their approved volumes, as mentioned above and shown in Tables 4-8. At most mined areas, the actual extraction volume was less than that approved.

Mined areas that extracted 10% or more above (or 110% of) their approved volumes are shown in red font in the preceding 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. Extraction volume exceeded approved volume by 10% or more at the Mad River Sand and Gravel site, Mad River (Table 4); and Mercer Fraser’s Sandy Prairie site on the Lower Eel (Table 5). All over-extractions (including those $\geq 10\%$) and any other problems observed during the course of gravel mining review are noted below.

Guynup Site, Mad River (Mad River Sand and Gravel): A skim (Area 2) was over-extracted by about 560 cy. The extraction floor was excavated one to two feet too deep in some areas, accounting for the over-extraction. This was visible in the field and on the post-extraction cross sections. Although the excess volume is not a big concern, the depth of cut will pond water after inundation; skims are required to drain after being inundated. The problem seems to have arisen because of some error in the grade control survey programming for the heavy equipment used for excavation. After discussion, it was agreed that better grade control should be ensured at this site going forward.

Christie Bar, Mad River (Eureka Ready Mix): On six of the seven skims at Christie Bar in 2023, the approved depth of cut was exceeded. While this was not apparent during the post-extraction field visit, it shows on the post-extraction cross sections. This resulted in slight over-extraction at the skims, although none exceeded the 110% threshold.

Simpson Bar, Mad River (G. Sundberg, Inc.): The sole extraction at this site was an alcove along the right bank just upstream of the mouth of Lindsay Creek. The post-extraction surveys did not plumb the full depth of the extraction, thus the reported extraction volume was less than actually extracted. Deep extractions as this are difficult to survey, especially because of unstable banks and deep water. The reported volume was less than that approved, so the actual extraction may have been close to that approved. In any case, the alcove will provide important habitat benefits that more than offset any over-extraction. Beaver activity was observed within the outlet of the alcove during the post-extraction field visit. This was seen as an enhancement for the alcove.

Sandy Prairie, Lower Eel River (Mercer Fraser Co.): At one of the skims (A1), the excavation depth exceeded that approved, leading to over-extraction by about 2,230 cy, or 140% (see Table 5). In the post-extraction narrative, the operator stated this was done intentionally so that the skim could drain after inundation. What this implies is that the pre-extraction design was flawed; skims are required to drain by sloping towards a lower elevation area suitable for handling the runoff. No one reviewing the pre-extraction plans caught this design flaw. However, ensuring effective drainage was the right course of action in this circumstance. But rather than learn of this months after extraction, the operator should have alerted review agencies and CHERT to the problem as soon as it was discovered. Further, future extraction plans need closer inspection by all involved to ensure drainage requirements are met.

Leland Rock Site: An alcove approved for extraction at this site was observed to have potentially adverse effects on adult salmon during a mid-season site visit. The alcove had been partially extracted when a temporary bridge was installed to access another extraction area. Adult salmon had been observed in the Eel River downstream of the site, and there was concern that they might encounter the extraction area during mining activities, and that this would impede migration. In the future, it was reiterated to the gravel operator that agencies must be notified before installing bridges. This is a condition of the operator's permit from the CDFW that was not observed in 2023.

The Van Duzen River delta, on which the Leland Rock site lies, is well known to have poor upstream adult salmon migration conditions, primarily because of shallow riffles, and has caused stranding at times past. Much effort has been taken there to temporarily improve conditions, including step-pool extractions, alcoves, etc. The operator has been amenable to performing such extractions for years, and in 2023, following completion of extraction, several shallow sections were excavated slightly to connect isolated deeper sections for improving early fall migration. Such activities often do not add to the operator's volume, thus create no revenue but cost the operator in terms of wages and fuel.

APPENDIX A: HISTORICAL EXTRACTION VOLUME SUMMARIES

Humboldt County Totals ("---" means unknown)				Mad River ("---" means unknown)			
Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent	Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	---	---	---	1992	115,000	115,000	100%
1993	---	---	---	1993	122,100	138,400	113%
1994	---	---	---	1994	134,500	134,898	100%
1995	---	---	---	1995	210,637	226,265	107%
1996	---	---	---	1996	203,998	189,517	93%
1997	---	---	---	1997	252,926	210,976	83%
1998	1,075,095	820,952	76%	1998	265,795	223,352	84%
1999	1,142,212	860,974	75%	1999	196,212	174,974	89%
2000	987,848	706,234	71%	2000	204,748	146,534	72%
2001	979,515	494,819	51%	2001	199,215	167,719	84%
2002	1,023,866	748,461	73%	2002	204,991	171,937	84%
2003	881,090	581,800	66%	2003	150,390	136,790	91%
2004	692,020	440,710	64%	2004	156,540	141,250	90%
2005	664,565	493,240	74%	2005	138,475	127,200	92%
2006	700,660	561,845	80%	2006	174,245	162,360	93%
2007	784,108	612,132	78%	2007	165,504	153,341	93%
2008	659,022	534,821	81%	2008	142,043	130,613	92%
2009	454,213	211,207	46%	2009	0	0	n/a
2010	562,303	374,313	67%	2010	111,439	86,246	77%
2011	774,582	505,805	65%	2011	147,380	143,124	97%
2012	553,704	384,514	69%	2012	111,317	100,329	90%
2013	362,222	226,362	62%	2013	80,525	76,919	96%
2014	376,467	285,527	76%	2014	69,322	66,743	96%
2015	400,919	272,240	68%	2015	70,230	69,719	99%
2016	545,275	463,382	85%	2016	145,769	142,510	98%
2017	563,540	363,297	64%	2017	153,778	113,841	74%
2018	456,236	368,681	81%	2018	83,945	80,270	96%
2019	522,886	465,564	89%	2019	143,727	126,460	88%
2020	384,617	266,403	69%	2020	60,680	56,609	93%
2021	397,045	332,048	84%	2021	68,760	71,008	103%
2022	465,081	361,597	78%	2022	68,376	68,671	100%
2023	614,278	476,222	78%	2023	139,618	136,401	98%
Totals	17,023,369	12,213,150	72%	Totals	4,492,185	4,089,976	91%
Averages	656,364	469,477	72%	Averages	140,405	127,535	91%

APPENDIX A (continued)

Lower Eel River ("---" means unknown)				Middle Eel River ("---" means unknown)			
Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent	Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	---	---	---	1992	---	---	---
1993	---	---	---	1993	---	---	---
1994	---	---	---	1994	---	---	---
1995	---	---	---	1995	---	---	---
1996	---	---	---	1996	---	---	---
1997	561,700	326,500	58%	1997	147,300	84,900	58%
1998	399,100	273,000	68%	1998	157,900	99,400	63%
1999	471,400	290,500	62%	1999	134,900	124,900	93%
2000	291,300	208,600	72%	2000	160,100	131,000	82%
2001	389,900	119,300	31%	2001	116,100	64,000	55%
2002	387,300	220,000	57%	2002	132,767	121,608	92%
2003	318,300	163,900	51%	2003	74,030	54,060	73%
2004	188,840	120,305	64%	2004	0	0	n/a
2005	199,370	166,280	83%	2005	0	0	n/a
2006	235,495	208,240	88%	2006	0	0	n/a
2007	243,097	177,334	73%	2007	89,990	64,424	72%
2008	237,955	215,760	91%	2008	0	0	n/a
2009	229,386	106,467	46%	2009	0	0	n/a
2010	208,286	188,730	91%	2010	0	0	n/a
2011	301,537	214,730	71%	2011	76,715	35,618	46%
2012	226,520	188,994	83%	2012	29,569	25,880	88%
2013	176,477	80,918	46%	2013	0	0	n/a
2014	127,671	97,232	76%	2014	59,298	45,394	77%
2015	168,581	94,954	56%	2015	48,146	39,350	82%
2016	179,659	151,456	84%	2016	82,276	78,731	96%
2017	183,063	102,683	56%	2017	59,409	44,316	75%
2018	163,775	145,540	89%	2018	27,853	24,570	88%
2019	129,476	126,350	98%	2019	84,345	82,147	97%
2020	154,619	98,786	64%	2020	0	0	n/a
2021	206,461	195,449	95%	2021	0	0	n/a
2022	234,947	162,234	69%	2022	0	0	n/a
2023	255,454	181,338	71%	2023	0	0	n/a
Totals	6,869,669	4,625,580	67%	Totals	1,480,698	1,120,298	76%
Averages	254,393	170,932	67%	Averages	54,841	41,493	76%

APPENDIX A (continued)

South Fork Eel River ("---" means unknown)				Van Duzen River ("---" means unknown)			
Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent	Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	---	---	---	1992	---	---	---
1993	---	---	---	1993	---	---	---
1994	---	---	---	1994	---	---	---
1995	---	---	---	1995	---	---	---
1996	---	---	---	1996	---	---	---
1997	67,700	74,700	110%	1997	120,000	81,600	68%
1998	75,400	70,100	93%	1998	119,100	103,700	87%
1999	85,400	75,900	89%	1999	159,900	108,800	68%
2000	75,700	53,700	71%	2000	194,800	121,300	62%
2001	66,000	43,100	65%	2001	161,700	85,600	53%
2002	58,163	48,122	83%	2002	202,500	167,400	83%
2003	87,060	54,660	63%	2003	175,100	123,000	70%
2004	80,730	50,745	63%	2004	179,045	92,610	52%
2005	82,770	36,480	44%	2005	159,090	123,170	77%
2006	92,000	35,075	38%	2006	134,910	104,750	78%
2007	90,737	73,956	82%	2007	152,773	113,184	74%
2008	32,358	24,833	77%	2008	209,176	137,850	66%
2009	40,170	24,986	62%	2009	175,132	73,236	42%
2010	42,864	27,732	65%	2010	169,041	69,917	41%
2011	36,063	14,244	39%	2011	175,724	71,903	41%
2012	19,039	0	0%	2012	142,191	47,760	34%
2013	27,588	17,212	62%	2013	63,111	41,713	66%
2014	32,341	24,754	77%	2014	74,701	51,404	69%
2015	20,610	15,129	73%	2015	85,978	53,088	62%
2016	34,863	23,657	68%	2016	92,995	67,028	72%
2017	36,679	17,010	46%	2017	108,686	76,526	70%
2018	34,751	20,306	58%	2018	108,276	79,609	74%
2019	38,724	14,451	37%	2019	126,614	116,156	92%
2020	34,885	8,476	24%	2020	134,433	102,532	76%
2021	22,642	6,547	29%	2021	99,182	59,044	60%
2022	38,800	11,610	30%	2022	122,958	119,082	97%
2023	32,346	17,735	55%	2023	186,860	140,748	
Totals	1,386,383	885,220	64%	Totals	3,833,976	2,532,710	66%
Averages	51,348	32,786	64%	Averages	141,999	93,804	66%

APPENDIX A (continued)

Trinity River ("---" means unknown)				Isolated Sites ("---" means unknown)			
Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent	Year	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent
1992	---	---	---	1992	---	---	---
1993	---	---	---	1993	---	---	---
1994	---	---	---	1994	---	---	---
1995	---	---	---	1995	---	---	---
1996	---	---	---	1996	---	---	---
1997	47,500	40,000	84%	1997	---	---	---
1998	35,000	28,100	80%	1998	22,800	23,300	102%
1999	64,300	66,900	104%	1999	30,100	19,000	63%
2000	18,000	22,200	123%	2000	43,200	22,900	53%
2001	46,600	15,100	32%	2001	0	0	n/a
2002	38,145	19,394	51%	2002	0	0	n/a
2003	76,210	49,390	65%	2003	0	0	n/a
2004	62,075	32,700	53%	2004	24,790	3,100	13%
2005	64,100	30,570	48%	2005	20,760	9,540	46%
2006	64,010	51,420	80%	2006	0	0	n/a
2007	42,007	29,893	71%	2007	0	0	n/a
2008	12,490	11,701	94%	2008	25,000	14,064	56%
2009	0	0	n/a	2009	9,525	6,518	68%
2010	30,673	1,688	6%	2010	0	0	n/a
2011	37,163	26,186	70%	2011	0	0	n/a
2012	25,068	21,551	86%	2012	0	0	n/a
2013	5,521	723	13%	2013	0	0	n/a
2014	13,134	0	0%	2014	0	0	n/a
2015	7,374	0	0%	2015	0	0	n/a
2016	9,713	0	0%	2016	0	0	n/a
2017	21,925	8,921	41%	2017	0	0	n/a
2018	17,109	0	0%	2018	0	0	n/a
2019	0	0	n/a	2019	0	0	n/a
2020	0	0	n/a	2020	0	0	n/a
2021	0	0	n/a	2021	0	0	n/a
2022	0	0	n/a	2022	0	0	n/a
2023	0	0	n/a	2023	0	0	n/a
Totals	738,117	456,437	62%	Totals	176,175	98,422	56%
Averages	27,338	16,905	62%	Averages	6,776	3,785	56%