

COUNTY OF HUMBOLDT EXTRACTION REVIEW TEAM (CHERT)

2016 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, 2017**

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INTRODUCTION

This report presents an overview of the Humboldt County gravel extraction for the 2016 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, and topographic and hydrologic information provided by the operators as required by the US Army Corps of Engineers 2015 Letter of Permission (LOP) and individual permits obtained by several operators. The 2015 LOP and associated documents are the primary federal instruments regulating gravel mining operations in Humboldt County.

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. Four CHERT members were appointed by the Board with expertise in hydrology, fluvial geomorphology, and river ecology; those same four members continue to serve through the present. In 1996, 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.org/252/Surface-Mining-Reclamation-Act-SMARA-Doc>

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. Later, operators submit air photos, topographic and hydrologic information, and a mining proposal, occasionally followed by a second field review. CHERT then issues a written recommendation, which may suggest changes to reflect either CHERT's or an agency's concerns. Once all parties accept a final iteration 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 field reviews are conducted after mining is completed in late summer or fall. Each operator then compiles a post-extraction data set, 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.

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 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 skim 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.

A relatively new gravel mine site was recently permitted by federal regulatory agencies and extracted gravel from the Mad River for the first time in 2011. The operator of this site, the Blue Lake Rancheria, was not required to obtain permits from the State of California or Humboldt County, and consequently, operates outside of the CHERT program. Their mining plans are reviewed by the US Army Corps of Engineers and National Marine Fisheries Service. They receive no CHERT review, nor do they provide mining information to CHERT, so this report contains no information from the Rancheria's mining operations. Consequently, the volume of gravel mined from the Mad River since 2011 has been greater than that reported by CHERT.

Although Eel River cross sections (covering mining reaches in the Lower Eel and Van Duzen rivers, the Middle Reach Eel above Scotia, and the South Fork Eel) have been surveyed since about 1997 and have been used in the annual mining review process, a quantitative, longer-term cross section analysis had not been done until early 2009. As part of the renewal of federal and state permits, a multi-year analysis of cross sections was prepared by CHERT to support impact evaluation and refine protection/mitigation strategies. The Eel River cross section report also provides essential information for updating environmental analyses of Eel River gravel mining. As mentioned above, CHERT reports, including the Eel River cross section analysis, can be found at and downloaded from the Humboldt County Planning and Building Department's website: <http://humboldt.gov/252/Surface-Mining-Reclamation-Act-SMARA-Doc>

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 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. |

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. |
| 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. |
| Wet Alcove | An excavation designed to simulate naturally occurring shoreline pools, typically located at the downstream ends of naturally occurring scour channels 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. |
| Wetland Pit | A strategically located and designed pit simulating a remnant channel feature, such as an oxbow pond; sometimes provided with a small outlet channel. |
| Terrace Skim | A free-draining skim located on a low terrace above typical high water. |
| Terrace Pit | A pit excavated on a low terrace with an outlet provided to allow water to freely enter and exit the pit with changes in river stage. |

2016 EXTRACTION SUMMARIES

River Reach Extraction Volumes

In 2016, CHERT reviewed 33 extraction areas (some multiple times) distributed among 16 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 2016 was 545,275 cubic yards (cy). The total volume actually extracted was 463,382 cy, or about 85% of that approved for extraction. As mentioned above, any gravel extraction done by Blue Lake Rancheria from the Mad River is not included in this report.

Table 3. Humboldt County 2016 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 | 9 | 13 | 145,769 | 142,510 | 98% | 30.3 |
| Lower Eel River | 3 | 11 | 179,659 | 151,456 | 84% | 19.6 |
| Middle Eel River | 1 | 3 | 82,276 | 78,731 | 96% | 9.4 |
| Van Duzen River | 2 | 4 | 92,995 | 67,028 | 72% | 13.6 |
| South Fork Eel River | 1 | 2 | 34,863 | 23,657 | 68% | 3.6 |
| Trinity River | 0 | 0 | 9,713 | 0 | 0% | 0.0 |
| Isolated Sites | 0 | 0 | 0 | 0 | n/a | 0.0 |
| Humboldt County Total = | 16 | 33 | 545,275 | 463,382 | 85% | 76.5 |

Tables 4-9 list site-specific 2016 extraction information for each extraction area grouped by river reach. Sites are listed from downstream to upstream in each table. There was no gravel extraction from the Trinity River or isolated sites in 2016, although one site (Willow Creek) had an approved mining plan but wasn't extracted.

Table 4. Mad River gravel extractions in the 2016 extraction season. The volumes listed in this table do not include any taken 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 | 7,153 | 6,980 | 98% | 3.0 |
| Miller Family Trust | Miller Bar | 1 | narrow shoreline skim | 2,934 | 3,068 | 105% | 0.8 |
| Eureka Ready Mix | Johnson-Spini Bar | 1 | narrow shoreline skim | 1,101 | 1,242 | 113% | 0.5 |
| Eureka Ready Mix | Johnson-Spini Bar | 2 | wide shoreline skim | 41,204 | 38,908 | 94% | 7.7 |
| Mercer Fraser Co. | Essex Bar | 1 | wide shoreline skim | 3,297 | 3,297 | 100% | 0.7 |
| Eureka Ready Mix | Leta-Johnson Bar | 3 | dry trench | 1,110 | 653 | 59% | 0.2 |
| Eureka Ready Mix | Leta-Johnson Bar | 2 | narrow shoreline skim | 11,008 | 10,961 | 100% | 2.5 |
| Eureka Ready Mix | Christie Bar | 1 | narrow shoreline skim | 8,258 | 8,810 | 107% | 2.8 |
| GLJ Construction | Blue Lake Bar | A | overflow channel skim | 1,922 | 1,748 | 91% | 0.5 |
| GLJ Construction | Blue Lake Bar | B | wet trench | 9,898 | 8,919 | 90% | 1.1 |
| GLJ Construction | Blue Lake Bar | C | narrow offset skim | 8,096 | 6,391 | 79% | 0.9 |
| GLJ Construction | Blue Lake Bar | D | narrow offset skim | 3,502 | 3,613 | 103% | 1.1 |
| GLJ Construction | Blue Lake Bar | E | wet alcove | 1,400 | 1,337 | 96% | 0.2 |
| Eureka Ready Mix | Emmerson Bar | 1 | narrow shoreline skim | 7,046 | 7,022 | 100% | 1.5 |
| Eureka Ready Mix | Emmerson Bar | 2 | narrow offset skim | 7,506 | 8,887 | 118% | 1.6 |
| Mad River Sand and Gravel | Guynup Bar | 1 | narrow offset skim | 10,889 | 8,551 | 79% | 1.7 |
| Mad River Sand and Gravel | Guynup Bar | 2 | narrow offset skim | 8,460 | 9,773 | 116% | 1.6 |
| Mad River Sand and Gravel | Guynup Bar | 3 | narrow shoreline skim | 10,985 | 12,350 | 112% | 1.9 |
| River Reach Totals = | | 13 | --- | 145,769 | 142,510 | 98% | 30.3 |

Table 5. Lower Eel River gravel extractions in the 2016 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 extraction proposed | n/a | n/a | n/a | n/a |
| County of Humboldt | Worswick Bar | 1 | dry alcove | 22,831 | 15,936 | 70% | 2.9 |
| Mallard Pond | Drake Bar | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| Mercer Fraser Co. | Sandy Prairie: Plant A | A1 | wet trench | 18,963 | 18,197 | 96% | 1.5 |
| Mercer Fraser Co. | Sandy Prairie: Plant B | B1 | wet trench | 22,794 | 22,351 | 98% | 1.6 |
| Mercer Fraser Co. | Sandy Prairie: Plant B | B2 | wet trench | 34,032 | 22,333 | 66% | 2.2 |
| Mercer Fraser Co. | Sandy Prairie: Plant B | B3 | narrow shoreline skim | 22,105 | 15,633 | 71% | 3.9 |
| Hansen Truck Shop | Hansen Bar | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| Eureka Ready Mix | Hauck Bar | 1* | narrow offset skim | 29,395 | 25,125 | 85% | 2.8 |
| Eureka Ready Mix | Hauck Bar | 2 | wet trench | 8,269 | 9,200 | 111% | 1.0 |
| Eureka Ready Mix | Hauck Bar | 3 | narrow offset skim | 21,270 | 22,681 | 107% | 3.7 |
| River Reach Totals = | | 11 | --- | 179,659 | 151,456 | 84% | 19.6 |

* Hauck Area 1 is contiguous with Rock Area 1; the Hauck volume for Area 1 is that portion on the Hauck site.

Table 6. Middle Eel River gravel extractions, 2016.

| 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 extraction proposed | n/a | n/a | n/a | n/a |
| Humboldt Redwoods Co. | Lower Truck Shop Bar | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| Humboldt Redwoods Co. | Upper Truck Shop Bar | 1 | wet trench | 29,864 | 29,042 | 97% | 1.1 |
| Humboldt Redwoods Co. | Three Mile Bridge Bar | 2 | narrow skim | 22,819 | 20,923 | 92% | 4.7 |
| Humboldt Redwoods Co. | Dinner Creek Bar | 3 | dry alcove | 29,593 | 28,766 | 97% | 3.6 |
| Humboldt Redwoods Co. | Elinor Bar | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| Humboldt Redwoods Co. | Larabee Bar | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| Humboldt Redwoods Co. | South Fork Bar | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| Humboldt Redwoods Co. | Bowley Bar | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| Humboldt Redwoods Co. | Maynard Bar | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| Humboldt Redwoods Co. | Vroman Bar | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| River Reach Totals = | | 3 | --- | 82,276 | 78,731 | 96% | 9.4 |

Table 7. Van Duzen River gravel extractions, 2016.

| Operator | Site | Area No. | Method | Approved Volume (cu. yds.) | Extracted Volume (cu. yds.) | Percent of Approved Volume | Extracted Area (acres) |
|-----------------------------|-----------|----------|------------------------|----------------------------|-----------------------------|----------------------------|------------------------|
| Leland Rock | A | 1 | wide offset skim | 18,000 | 17,808 | 99% | 4.0 |
| Leland Rock | B | 2 | wet trench | 20,000 | 15,422 | 77% | 1.3 |
| Leland Rock | C | 3 | wet trench | 30,000 | 13,225 | 44% | 3.0 |
| Leland Rock | 1* | 4 | narrow offset skim | 5,000 | 5,000 | 100% | 0.8 |
| Van Duzen River Ranch | n/a | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| Tom Bess | West Site | A | wet trench | 7,233 | 4,022 | 56% | 0.4 |
| Tom Bess | West Site | B | narrow shoreline skim | 1,422 | 1,231 | 87% | 1.0 |
| Tom Bess | West Site | C | narrow shoreline skim | 1,791 | 1,419 | 79% | 0.7 |
| Tom Bess | West Site | D | narrow shoreline skim | 9,549 | 8,901 | 93% | 2.4 |
| River Reach Totals = | | 4 | --- | 92,995 | 67,028 | 72% | 13.6 |

* Rock Area 1 is contiguous with Hauck Area 1; the Rock volume for Area 1 is that portion on the Rock site.

Table 8. South Fork Eel River gravel extractions, 2016.

| 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 extraction proposed | n/a | n/a | n/a | n/a |
| Randall Sand and Gravel | Home Bar | 1 | wide shoreline skim | 27,019 | 16,937 | 63% | 2.2 |
| Randall Sand and Gravel | County Bar | 2 | narrow shoreline skim | 7,844 | 6,720 | 86% | 1.4 |
| Mercer Fraser Co. | Cooks Valley: MEN * | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| Mercer Fraser Co. | Cooks Valley: HUM * | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| River Reach Totals = | | 2 | --- | 34,863 | 23,657 | 68% | 3.6 |

* "HUM" is in Humboldt County, "MEN" is in Mendocino County

Table 9. Trinity River gravel extractions, 2016.

| Operator | Sites | Area No. | Method | Approved Volume (cu. yds.) | Extracted Volume (cu. yds.) | Percent of Approved Volume | Extracted Area (acres) |
|-----------------------------|-------------------|----------|------------------------|----------------------------|-----------------------------|----------------------------|------------------------|
| Mercer Fraser Co. | Willow Creek Site | 1 | narrow shoreline skim | 985 | 0 | 0% | 0.0 |
| Mercer Fraser Co. | Willow Creek Site | 2 | wide shoreline skim | 8,728 | 0 | 0% | 0.0 |
| Mercer Fraser Co. | McKnight Bar | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| Klamath Trinity Aggregates | Rowland Bar | n/a | no extraction proposed | n/a | n/a | n/a | n/a |
| River Reach Totals = | | 2 | --- | 9,713 | 0 | 0% | 0.0 |

Humboldt County extraction volumes and surface areas by method for 2016 are shown in Table 10.

Table 10. Humboldt County gravel extraction volumes and areas by mining method, 2016.

| Extraction Method | No. of Areas | Extracted Volume (cy) | Percent of Total Volume | Area (acres) | Percent of Total Area |
|---------------------------------|--------------|-----------------------|-------------------------|--------------|-----------------------|
| alcove | 3 | 46,039 | 10% | 6.7 | 9% |
| dry trench | 1 | 653 | 0% | 0.2 | 0% |
| narrow offset skim | 5 | 90,021 | 19% | 14.2 | 19% |
| narrow shoreline skim | 8 | 98,280 | 21% | 24.1 | 32% |
| wet trench | 9 | 142,711 | 31% | 13.2 | 17% |
| wide offset skim | 1 | 17,808 | 4% | 4.0 | 5% |
| wide shoreline skim | 4 | 66,122 | 14% | 13.6 | 18% |
| Humboldt County Totals = | 28 | 461,634 | 99.6% | 76.0 | 91% |

PERFORMANCE ISSUES: 2016

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 2016 operations consistent with approved mining plans was very successful, and no problematic conditions were noted this past year during post-extraction field reviews. Although most extractions were below their approved volumes, several sites exceeded approved volumes, but only by relatively minor amounts. Given the calculation methods used (double-end-area), the large scale of most operations and the large heavy equipment used for extraction, some level of volume deviations are to be expected and are not considered significant in most cases.

We set an arbitrary threshold of 10% *above* approved volume (or 110% *of* approved volume) for mentioning in this section as a performance issue. It should be noted that while the percent over-extracted can be useful for evaluating performance, 10% of a large extraction volume can be of more significance than 10% of a small volume. For example, if an approved extraction of 30,000 cy is over-extracted by, say, 3,300 cy (an extraction of 111% of that approved), this could very well lead to impacts, depending on how the over-extraction was configured on the ground. Conversely, an over-extraction of 10% at a small volume extraction area may amount to only a few hundred cubic yards, in which case there would likely be no impacts.

At several mined areas, the actual extraction volume was much less than that approved. This does not present a problem as long as the extracted area is left in a condition that meets design objectives and mitigations (see Introduction and LOP 2015).

Problems noted in 2016

- Randall Sand and Gravel (South Fork Eel River): Although under-extraction occurred at several cross sections at Home Bar, post-extraction configurations do not indicate any fish stranding or drainage problems. Several cross sections at the County Bar were excavated about one foot lower than approved. Extracted volume there was less than that approved because the extraction area ended farther downstream (shorter) than approved. As with Home Bar, post-extraction configurations do not indicate any fish stranding or drainage problems.
- Eureka Sand and Gravel Hauck Bar (Hauck Bar, Lower Eel River): The volume extracted from the wet trench (Area 2) was about 1,000 cy (111%, Table 5) more than that approved. This is considered to be insignificant given that post-extraction surveys can be difficult in trenches due to the deep water and side slope collapse. Further, had the operator proposed a larger volume for this area by slight lengthening of the trench, it would likely have been approved. Both of the skims at this site (Areas 1 and 3) were done in excellent conformance with approved plans.
- Mad River Sand and Gravel (Mad River): Two of the three approved extraction areas (Areas 2 and 3) were over extracted by over 1,000 cy (116% and 112%, respectively, over that approved; Table 4) according to the volume calculations included with the post-extraction submittal. It is unclear where and by how this occurred from the cross sections; they look as though, if anything, actual extraction would have been slightly less than that approved. The operator's consultant should review all calculations and try to resolve this discrepancy. For the site as a whole, over-extraction was only about 300 cy, or 1% above that approved.

In addition, monitoring cross sections 0.1, 1, and 2 were not completely surveyed across areas of the channel inundated by the previous winter's high flows. It is possible that the surveys were indeed completed, but the plotting did not show the entire surveyed portion. We hope that the latter is what occurred. If the surveys were incomplete, that compromises any future geomorphic analyses that will be done using those cross sections. We request the operator determine exactly what happened, relay that to CHERT, and ensure their consultant understands how to fully comply with LOP-2015 in future work.

- Eureka Sand and Gravel (Emmerson Bar, Mad River): The skim at Area 2 was over-extracted by just over 1,000 cy (118% of that approved; Table 4). This appears to have occurred because the extraction was slightly wider than approved at several cross sections. That said, no impacts to habitat or drainage problems were observed during the post-extraction field review.

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% |
| Totals | 13,619,686 | 9,579,338 | 70% | Totals | 3,773,301 | 3,436,716 | 91% |
| Averages | 716,826 | 504,176 | 70% | Averages | 150,932 | 137,469 | 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% |
| Totals | 5,541,874 | 3,613,200 | 65% | Totals | 1,309,091 | 969,265 | 74% |
| Averages | 277,094 | 180,660 | 65% | Averages | 65,455 | 48,463 | 74% |

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% |
| Totals | 1,147,556 | 789,085 | 69% | Totals | 2,946,967 | 1,839,013 | 62% |
| Averages | 57,378 | 39,454 | 69% | Averages | 147,348 | 91,951 | 62% |

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 |
| Totals | 699,083 | 447,516 | 64% | Totals | 176,175 | 98,422 | 56% |
| Averages | 34,954 | 22,376 | 64% | Averages | 9,272 | 5,180 | 56% |