COUNTY OF HUMBOLDT EXTRACTION REVIEW TEAM (CHERT)

2012 POST-EXTRACTION REPORT

DISCUSSION DRAFT

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For the:

Humboldt County Board of Supervisors

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INTRODUCTION

This report presents an overview of the Humboldt County gravel extraction for the 2012 season. Information on mining volumes, methods, and success of mine operators in meeting approved plans are 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), and 3) California Department of Fish and Wildlife (CDFW, formerly California Department of Fish and Game). Recommendations were based on field reviews at each site including reviews of aerial photos and topographic and hydrologic information provided by the operators as required by the US Army Corps of Engineers 2010 Letter of Permission (LOP), and individual permits obtained by several operators. The LOP, which will remain the primary instrument regulating gravel mining operations in Humboldt County through 2015, can be found at: http://www.spn.usace.army.mil/regulatory/PN/2010/2007-00857LOP.pdf

For background, The Humboldt County Board of Supervisors created CHERT in 1992 to provide scientific oversight to 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, and 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 in Humboldt County. Additional details on CHERT's role have been presented in earlier post-extraction reports, that can be found at: http://co.humboldt.ca.us/planning/smara/default.asp?inc=slm

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 current season. Later, operators submit air photos, topographic and hydrologic information, and a mining proposal, which is typically followed by a second field review. CHERT then issues a written recommendation, which may or may not include suggested changes to reflect either CHERT's or an agency's concerns. When all parties accept a final iteration of the mining plan, it is approved by the Corps and CDFW and mining can begin, providing all other agency permits have been obtained. In rare occasions, a field review may be done while mining is taking place due to unexpected circumstances that might require an alteration in 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 bases recommendations on two areas of concern: 1) minimizing potential cumulative effects by ensuring that reach-scale mining volumes do not exceed that which is sustainable, 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). Actual mined gravel volumes are typically well below mean annual recruitment. Site-specific measures are also recommended by CHERT to reduce both cumulative and localized potential effects of mining on riparian and aquatic habitat. These may include, for example, ensuring that skim floor elevations are high enough to maintain low flow channel confinement so that small rises in river stage do not inundate skim surfaces too readily.

Through 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 refined. This feedback process, termed 'adaptive management', is essential to help ensure that gravel mining and management improves with respect to resource protection, the quality of information provided by mine operators, and program efficiency. Problems can 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.

In addition to recurring activities (mining site reviews, extraction recommendations, annual post-extraction report preparation), CHERT participated in preparing a Mad River supplemental programmatic environmental impact report (SPEIR) which is in the final stages of preparation as of this writing. Technical analyses of Mad River physical channel conditions, riparian vegetation, and fish habitat were completed in 2009 to support both the SPEIR update and biological assessments required for renewal of federal and state permits. An update to that analysis will be completed in 2013.

A 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 any 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 in 2012 was greater than presented here by an amount unknown to CHERT.

Although Eel River cross section data (covering mining reaches in the Lower Eel and Van Duzen rivers, the Middle Reach Eel above Scotia, and the South Fork Eel) have accumulated since about 1997 and have been used in the annual mining review process, a quantitative, longer-term analysis of them had not taken place until early 2009. As part of the renewal of federal and state permits, this longer-term analysis of cross sections was prepared to support impact evaluation and protection/mitigation strategies. The Eel River cross section report also provides the essential foundation for updating environmental documentation for Eel River gravel mining. As mentioned above, as CHERT reports are completed, they can be found at, and downloaded from, the Humboldt County Community Development Service's website: http://co.humboldt.ca.us/planning/smara/default.asp?inc=slm

Humboldt County Instream Gravel Extraction Sites and Extraction Terminology

Table 1 describes the geographic breakdown of Humboldt County mining reaches used in this report. CHERT classifies extraction techniques into the 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 rest of project. 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.

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. Also referred to as a 'horseshoe' skim.
Overflow Channel Skim	Same as above, but one that is located within a high flow overflow channel
Dry Trench	A relatively long, linear shallow skim that remains above the water table at the time of excavation.
Wet Trench	A trench deep enough to intersect the water table at the time of excavation designed for high water to flow through the excavation.
Deep Alcove	A relatively deep excavation designed to simulate naturally occurring shoreline pools that can provide deep cool water during summer months and/or winter high velocity refuge.
Shallow 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 (see Figs. 1 and 2); sometimes provided with a small outlet channel.
Terrace Pit	A pit excavated on a low terrace to a depth above groundwater level with an outlet provided to allow water to freely enter and exit the pit with changes in river stage.

Habitat Enhancement Activities

The primary purpose of gravel mining in Humboldt County is to supply local markets with construction aggregate, and most extractions are designed to do this as efficiently as possible within the constraints of the rules and regulations aimed at minimizing effects on riverine habitat. In addition to habitat protection, habitat improvement has become a fairly common consideration in mining plan development. Some years ago, we began recommending, and the operators began excavating, what we termed "alcoves", mimicking what we observed the river creating on its own. Alcoves are trenches that typically connect with the main low flow channel at the downstream end of a point bar. Juvenile and adult salmon and steelhead use these features for holding to escape high velocities in the main channel. Juvenile salmonids in particular benefit from cooler summer water temperatures typically found in alcoves. And each year, a fish access channel is excavated by Leland Rock on the Van Duzen River delta as part of mining activities. The channel is designed to provide fall upstream spawning migration access for adult chinook salmon that would otherwise be impeded by shallow water.

More active restoration projects have also become a part of gravel mining activities. Figure 1 shows a portion of the Leggit Creek restoration project implemented in 2012 by Eureka Ready Mix. Leggit Creek flows into the Mad River from the south across from Christie Bar in Blue Lake. A The restoration project consisted of excavating gravel from the mouth of the creek and constructing habitat structures at intervals to assist upstream salmonid migration and juvenile rearing and holding habitat. The project was funded by the Fish America Foundation with assistance from NOAA Fisheries and was designed and implemented jointly by Eureka Ready Mix and the Humboldt Fish Action Council (HFAC).

Figure 1. Habitat structures placed in lower Leggit Creek in 2012. This photo was taken in January, 2013, after high flows that occurred in December, 2012 (photo by Paul Kraus).

Beginning in about 1993 (the second year of CHERT, known then as the Mad River Scientific Design and Review Committee), CHERT recommended extraction features termed "wetland pits" with design elements that optimized habitat for plants and animals that typically occupy off-channel oxbow ponds formed by the river's lateral migration. Gently sloping shorelines that readily allow wetland plants to colonize, and perimeters conforming to existing riparian vegetation are the two main design elements for wetland pits. Large wood may also be placed in these features to add habitat complexity. Over time the wetland pits became lush with wetland plants and aquatic animals such as Western Pond turtles, salamanders, etc. Most eventually disappeared through channel migration or

gravel replenishment during floods as expected (and as desired). Figure 2 shows a ground-level photo from 2011 of a persistent wetland pit excavated in 2001 on Emmerson Bar, Mad River. Because bullfrogs invading these pits may feed on other native species that are threatened or endangered (such as red legged frogs), use of wetland pits as a mining technique is on hold for the time being. The overall effect of wetland pits on sensitive species is unknown: the pits create new habitat for sensitive species, possibly increasing their numbers, but bullfrogs take some unknown percentage. Consequently, the net benefit to sensitive species is unknown. Lacking a full understanding of the impacts of wetland pits on amphibian ecology, the CDFW has barred creation of any new wetland pits, and the Emmerson Bar wetland pit was eliminated in 2012 by filling with gravel (Fig. 3).

Figure 2. 2011 photo of off channel wetland pit extraction on Emmerson Bar, Mad River, excavated in 2001. Riparian and aquatic plants were thriving and providing much-needed habitat for native aquatic species and migratory birds. However, bullfrogs had invaded the area and may have harmed red-legged frogs by predation. Use of wetland pits such as this is on hold until the effect of bullfrogs is better understood.

Figure 3. Emmerson Bar wetland pit after filling with gravel in 2012. The pit will now only pond water during the wet seasons, drying during the late summer and fall periods. This will prevent reproduction of bullfrogs.

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2012 EXTRACTION SUMMARIES

River Reach Extraction Volumes

In 2012, CHERT reviewed 34 extraction areas (some multiple times) distributed among 18 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 and isolated sites added). As shown in Table 3, the total volume of gravel approved for extraction in 2012 was 534,665 cubic yards (cy). The total volume actually extracted was 384,514 cy, or about 72% of that approved for extraction.

Table 3. Humboldt County 2012 gravel extraction summary by river reach.

River Reach	No. of mined areas	No. of mined sites	Approved Volume (cubic yards)	Extracted Volume (cubic yards)	Percent of Approved Volume	Extracted Area (acres)
Lower Mad River	15	9	111,317	100,329	90%	27.5
Lower Eel River	9	2	226,520	188,994	83%	24.0
Middle Eel River	1	1	29,569	25,880	88%	2.2
Van Duzen River	7	3	142,191	47,760	34%	12.5
South Fork Eel River	0	0	0	0	n/a	0.0
Trinity River	2	3	25,068	21,551	86%	4.9
Isolated Sites	0	0	0	0	n/a	n/a
Humboldt County Total =	**34**	**18**	**534,665**	**384,514**	**72%**	**71.1**

Tables 4-10 list site-specific 2012 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 isolated sites in 2012. Over-extraction is a primary concern for CHERT and regulatory agencies. The following criteria were used to designate sites that were over-extracted: 1) extracted volume exceeded approved volume by 10% or more (110% of approved volume), and 2) the volume of over-extraction exceeded 1,000 cy (for small volume extractions, a relatively small amount of over-extraction may meet the 110% criterion without causing any real damage to river resources, thus the additional 1,000 cy criterion). Areas that had over-extraction are shown in red font in Tables 4-10. The characteristics of each over-extraction are discussed in the next section (performance issues).

Table 4. Mad River gravel extractions, 2012. The maximum annual volume determined by the NMFS for the Mad River was 111,000 cy and nearly all of this was extracted. The in this table volumes do not include that 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	7,190	7,378	103%	2.4
Miller Family Trust	Miller Bar	1	wide shoreline skim	6,280	3,281	52%	2.0
Eureka Ready Mix	Johnson-Spini Bar	1	wide shoreline skim	23,985	24,303	101%	6.3
Eureka Ready Mix	Johnson-Spini Bar	2	wet alcove	4,639	5,882	127%	0.3
Mercer Fraser Co.	Essex Bar	1	wide shoreline skim	3,248	2,189	67%	0.7
Eureka Ready Mix	Leta-Johnson Bar	1B	narrow shoreline skim	4,098	4,189	102%	1.7
Eureka Ready Mix	Christie Bar	3B	narrow shoreline skim	9,358	8,645	92%	2.9
Eureka Ready Mix	Christie Bar	3C	narrow shoreline skim	3,939	4,168	106%	1.5
GLJ Construction	Blue Lake Bar	1	dry alcove	9,636	9,951	103%	2.7
GLJ Construction	Blue Lake Bar	2	narrow shoreline skim	8,031	7,103	88%	1.5
Eureka Ready Mix	Emmerson Bar	1	terrace pit	10,057	7,616	76%	3.1
Mad River Sand and Gravel	Guynup Bar	1	narrow shoreline skim	2,571	2,305	90%	1.0
Mad River Sand and Gravel	Guynup Bar	2	wet alcove	7,461	5,117	69%	0.6
Mad River Sand and Gravel	Guynup Bar	3A	narrow shoreline skim	1,046	968	93%	0.2
Mad River Sand and Gravel	Guynup Bar	3B	wet alcove	9,778	7,234	74%	0.6
River Reach Totals =	---	---	---	**111,317**	**100,329**	**90%**	**27.5**

Table 5. Lower Eel River gravel extractions, 2012.

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	n/a	no extraction proposed	n/a	n/a	n/a	n/a
Mallard Pond	Drake Bar	n/a	no extraction proposed	n/a	n/a	n/a	n/a
Mercer Fraser Co.	Sandy Prairie: Plant B	B1	wet trench	46,918	44,479	95%	3.0
Mercer Fraser Co.	Sandy Prairie: Plant B	B2	offset skim	12,067	9,860	82%	3.2
Mercer Fraser Co.	Sandy Prairie: Plant B	B3	narrow offset skim	12,740	9,718	76%	5.1
Mercer Fraser Co.	Sandy Prairie: Plant B	B4	wet trench	29,323	29,420	100%	2.5
Mercer Fraser Co.	Sandy Prairie: Plant B	B5	wet trench	36,996	8,929	24%	1.1
Mercer Fraser Co.	Sandy Prairie: Plant A	A1	wet trench	49,668	45,278	91%	4.3
Mercer Fraser Co.	Sandy Prairie: Plant A	A2	wet trench	19,970	20,462	102%	1.7
Hansen Truck Shop	Hansen Bar	1	no extraction done	0	0	n/a	n/a
Eureka Ready Mix	Hauck Bar	1	narrow offset skim	8,766	9,276	106%	2.1
Eureka Ready Mix	Hauck Bar	2	wet trench	10,072	11,572	115%	1.0
River Reach Totals =	---	---	---	**226,520**	**188,994**	**83%**	**24.0**

Table 6. Van Duzen River gravel extractions, 2012.

Operator	Site	Area No.	Method	Approved Volume (cu. yds.)	Extracted Volume (cu. yds.)	Percent of Approved Volume	Extracted Area (acres)
Leland Rock	below 101 bridge	A	wet trench	18,808	10,069	54%	1.6
Leland Rock	below 101 bridge	B	wet trench	16,117	0	0%	0.0
Leland Rock	below 101 bridge	C	wide offset skim	14,293	11,431	80%	2.9
Van Duzen River Ranch	Bar # 10	1	wide offset skim	47,205	0	0%	0
Van Duzen River Ranch	Bar # 8	2	narrow overflow skim	18,570	6,804	37%	3.4
Van Duzen River Ranch	Bar # 6	3	wide offset skim	14,889	8,475	57%	2.4
Tom Bess	East Site A	1	narrow shoreline skim	1,671	1,671	100%	0.32
Tom Bess	East Site B	2	narrow shoreline skim	8,775	7,908	90%	1.48
Tom Bess	East Site C	3	narrow shoreline skim	1,415	1,402	99%	0.41
Tom Bess	East Site D	4	alcove	448	0	0%	0
River Reach Totals =	---	---	---	**142,191**	**47,760**	**34%**	**12.5**

Table 7. Middle Reach Eel River gravel extractions, 2012.

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	1	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	2	wet trench	29,569	25,880	88%	2.2
Humboldt Redwoods Co.	Three Mile Bridge Bar	3	no extraction proposed	n/a	n/a	n/a	n/a
Humboldt Redwoods Co.	Dinner Creek Bar	n/a	no extraction proposed	n/a	n/a	n/a	n/a
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 =	---	---	---	**29,569**	**25,880**	**88%**	**2.2**

Table 8. South Fork Eel River gravel extractions, 2012.

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	17,348	0	0%	0.0
Randall Sand and Gravel	Home Bar	2	narrow offset skim	1,691	0	0%	0.0
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 =	---	---	---	**19,039**	**0**	**0%**	**0.0**

Table 9. Trinity River gravel extractions, 2012.

Operator	Site	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	1,443	398	28%	0.7
Mercer Fraser Co.	Willow Creek Site	2	wide shoreline skim	13,640	11,346	83%	2.5
Mercer Fraser Co.	McKnight Bar	1	wide shoreline skim	9,985	9,807	98%	1.7
Klamath Trinity Aggregates	Rowland Bar	n/a	no extraction proposed	n/a	n/a	n/a	n/a
River Reach Totals =	---	---	---	**25,068**	**21,551**	**86%**	**4.9**

Table 10. Gravel extraction from isolated sites, 2012.

Operator	Site	Area	Method	Approved Volume (cu. yds.)	Extracted Volume (cu. yds.)	Percent of Approved Volume	Extracted Area (acres)
County of Humboldt	North Fork Mattole	Cook Bar	n/a	n/a	n/a	n/a	n/a
County of Humboldt	Larabee Creek	Charles Bar	n/a	n/a	n/a	n/a	n/a
County of Humboldt	Bear River	Branstetter Bar	n/a	n/a	n/a	n/a	n/a
County of Humboldt	Mid-Van Duzen River	PL Bar	n/a	n/a	n/a	n/a	n/a
County of Humboldt	Middle Eel River	Dyerville Bar	n/a	n/a	n/a	n/a	n/a
Fort Seward Ranch	Eel River	Satterlee Bar	n/a	n/a	n/a	n/a	n/a
Isolated Sites Totals =	---	---	---	**0**	**0**	**0**	**0.0**

Humboldt County extraction volumes by method for 2012 are shown in Table 11. In recent years there has been increasing reliance on wet trenching in the active channel to depths below groundwater (wet trench category, below), which in 2012 accounted for nearly one-half of the total extraction volume. Concurrently, the formerly common method of wide shoreline extraction has diminished to only about 15%. Trenching can often be the least damaging method of gravel extraction, but it is not a panacea. When it is done in an inappropriate location, negative consequences can result, such as riffle shallowing and channel braiding. We believe a more conservative use of wet trenching than has been employed lately will better protect river habitat.

Table 11. Humboldt County gravel extraction volumes and areas by mining method, 2012.

Extraction Method	No. of Areas	Extracted Volume (cy)	Percent of total volume	Area (acres)
dry alcove	1	9,951	3%	2.7
wet alcove	3	18,233	5%	2
narrow offset skim	2	18,994	5%	7.2
narrow shoreline skim	7	27,776	7%	10
terrace pit	1	7,616	2%	3.1
wet trench	7	186,020	48%	16
wide offset skim	1	9,860	3%	3.2
wide shoreline skim	6	58,304	15%	16

Performance Issues: 2012

To evaluate operator performance and compliance, CHERT conducts field reviews in the fall after completion of operations and reviews post-extraction documentation (cross sections, air photos, and other materials) to ensure

approved mining plan design specifications were met. By and large, operator performance in conducting their 2012 operations consistent with approved mining plans was very successful. The most common deviation of actual extraction from approved plans was mining a greater volume than that approved. Although the majority of extractions were below their approved volumes, several sites exceeded approved volumes, as indicated below.

At several mined areas, the actual extraction volume was much less than that approved. This does not present a problem as long as the area is left in a condition that meets design objectives (the area will drain effectively after inundation by river flows and so does not have depressions that may trap fish). Other instances may occur where the approved volume is met, but the extraction boundaries deviated from approved designs. We note below where deviations in the form of excessive volume and/or substantive deviation from approved plans occurred in 2012.

Johnson-Spini Bar, Mad River (Eureka Ready Mix, operator): The alcove was over-extracted by 27% (see Table 4), a result of a wider than approved extraction at several cross sections. We note that controlling extraction boundaries within wet trenches is difficult because the sidewalls tend to collapse into the trench. This relatively was a minor deviation from approved plans and, based on prior alcove trenching at this location, the extraction will be completely obliterated by wither high flows. CHERT considers the over-extraction to be of no consequence to river habitat.

Hauck Bar, Lower Eel River (Eureka Ready Mix, operator): This fish access channel (wet trench) was over-extracted by 15% (see Table 5), a result of a wider than approved extraction at several cross sections. As with the Johnson-Spini Bar (above), this was a relatively minor deviation from approved plans and, based on prior fish channel excavations at this site, the extraction will be completely obliterated by wither high flows. CHERT considers the over-extraction to be of no consequence to river habitat.

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%
Totals	**9,590,001**	**6,855,988**	**71%**
Averages	**815,886**	**572,424**	**70%**

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%
Totals	**3,037,319**	**2,751,126**	**91%**
Averages	**165,724**	**149,335**	**90%**

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%
Totals	**3,923,757**	**2,489,719**	**63%**
Averages	**311,531**	**198,923**	**64%**

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%
Totals	**1,013,087**	**744,292**	**73%**
Averages	**72,363**	**53,164**	**73%**

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%
Totals	**894,018**	**641,371**	**72%**
Averages	**69,789**	**49,578**	**71%**

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%
Totals	**1,968,094**	**1,362,964**	**69%**
Averages	**165,162**	**107,580**	**65%**

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%
Totals	**570,437**	**397,368**	**70%**
Averages	**42,936**	**28,504**	**66%**

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
Totals	**166,650**	**91,904**	**55%**
Averages	**13,552**	**7,571**	**56%**