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SAMPLING AND ANALYSIS PLAN
FOR
ILLEGAL MARIJUANA CULTIVATION SITES
ON THE YUROK RESERVATION

August 22, 2014

Prepared for:
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ACRONYMS AND ABBREVIATIONS

APN	Assessor's Parcel Number
AST	Above-Ground Storage Tank
ASTM	ASTM International (formerly American Society for Testing and Materials)
bgs	below ground surface
BTEX	Benzene Toluene Ethylbenzene Xylene
CERCLA	Comprehensive Environmental Response, Cleanup, and Liability Act
CFR	Code of Federal Regulations
CHHSL	California Human Health Screening Levels
CLP	Contract Laboratory Program
COCs	Chemicals of Concern
CWA	Clean Water Act
DQA	Data Quality Assessment
DQI	Data Quality Indicators
DQO	Data Quality Objectives
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
ESL	Environmental Screening Levels
FEMA	Federal Emergency Management Agency
FES	Freshwater Environmental Services
FSP	Field Sampling Plan
GPS	Global Positioning System
GIS	Geographic Information System
GC/MS	Gas Chromatography and Mass Spectrometry
IDW	Investigation-Derived Waste
IRIS	Integrated Risk Information System (USEPA)
LCS/LCSD	Laboratory Control Sample and Laboratory Control Sample Duplicates
MDL	Method Detection Limit
MPC	Measurement Performance Criteria
MQO	Measurement Quality Objective
MS/MSD	Matrix Spike and Matrix Spike Duplicate
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MTBE	methyl tertiary-butyl ether
µg/L	Micrograms per liter
NRCS	Natural Resource Conservation Service
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity
PDF	Portable Document Format
PE	Performance Evaluation
PPE	Personal Protective Equipment
PRG	Preliminary Remediation Goal
PRQL	Project-Required Quantitation Limit
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control

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QOA	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality Control
QL	Quantitation Limit
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
RSls	Residential Screening Levels
%R	Percent Recovery
SFRWQCB	San Francisco Regional Water Quality Control Board
SAP	Sampling and Analysis Plan (an integrated FSP and QAPP)
SOP	Standard Operating Procedures
SOW	Statement of Work
SVOC	Semi-Volatile Organic Compound
TPH	Total Petroleum Hydrocarbon
USA	Underground Service Alert
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
USGS	United States Geological Survey
VOC	Volatile Organic Compound
YTEP	Yurok Tribe Environmental Program

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1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared for Phase II Environmental Site Assessments (ESAs) at illegal marijuana cultivation locations within the boundaries of the Yurok Reservation. This SAP was prepared for the Yurok Tribe Environmental Program (YTEP) and will be used for all Phase II ESAs conducted by Freshwater Environmental Services (FES) at illegal marijuana cultivation locations on the Yurok Reservation. The Reservation boundaries are shown on Figures 1-3. Photos of illegal marijuana cultivation from various areas in northern California are shown on Photos 1-10. Photos taken by YTEP of illegal marijuana cultivation sites within the Yurok Reservation are shown on Photos 11-32. Each illegal marijuana cultivation location will be referred to as a Subject Property.

This SAP will focus on the following potential impacts to soil and surface water that may occur at a Subject Property including:

- Presence of petroleum compounds used for generators, construction equipment, pumps, and other uses;
- Use of insecticides for insect control;
- Use of herbicides for vegetation control;
- Use of anticoagulant rodenticides for rodent control; and
- Use of fertilizers and nutrients to enhance growth.

Sampling will be site specific based on chemicals that are suspected to have been used at the Subject Property based on field evidence including empty and partial chemical containers. Some of the Chemicals of Concern (COCs) will be evaluated by collecting soil samples (including growing medias such as potting soils) and surface water samples (if present) at each Subject Property. The photographs obtained at the Subject Properties by YTEP (Photos 11-32) along with FES field observations will be used to determine if additional COCs are likely to be present. The samples will be analyzed at a laboratory certified by the California Department of Public Health for the requested analyses. The analysis methods for rodenticides are currently not certifiable. There may also be some labeled containers with ingredients that do not have methods available for analysis.

If utilities are present at a Subject Property the site will be marked by YTEP personnel and Underground Service Alert (USA) notified prior to sampling. FES will assist YTEP with USA notification if requested. USA provides the following statements on their website about when it is safe to start digging:

> *You are safe to begin digging after the start time on your ticket or two working day notice (whichever is later) has passed, and all notified utility members have positively responded to your request.*

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> *If the start date and time for your ticket has passed, and one or more of our utility members has neglected to respond to your request, please refrain from digging and contact us as soon as possible by dialing 8-1-1 so that we may notify the utility member(s) in question regarding their no response.*

A Cultural Resources Management Permit will be obtained by YTEP (if required) for each Subject Property prior to conducting the activities described in this SAP.

The Phase II ESAs are projects being funded by a CERCLA Section 128(a), Tribal Response Program grant that includes hazardous substances and petroleum products.

1.1 Subject Property Name

The names assigned by YTEP for each Subject Property will be identified in the Phase II ESA Report.

1.2 Subject Property Location

The Phase II ESA Reports will include figures for each Subject Property identifying the Assessor's Parcel Numbers (APNs) and geographic location using topographic base maps and publically available aerial imagery.

1.3 Responsible Agency

The Phase II ESA sampling will be conducted by Freshwater Environmental Services of Arcata, California. Freshwater Environmental Services is an independently owned environmental consulting firm incorporated in California.

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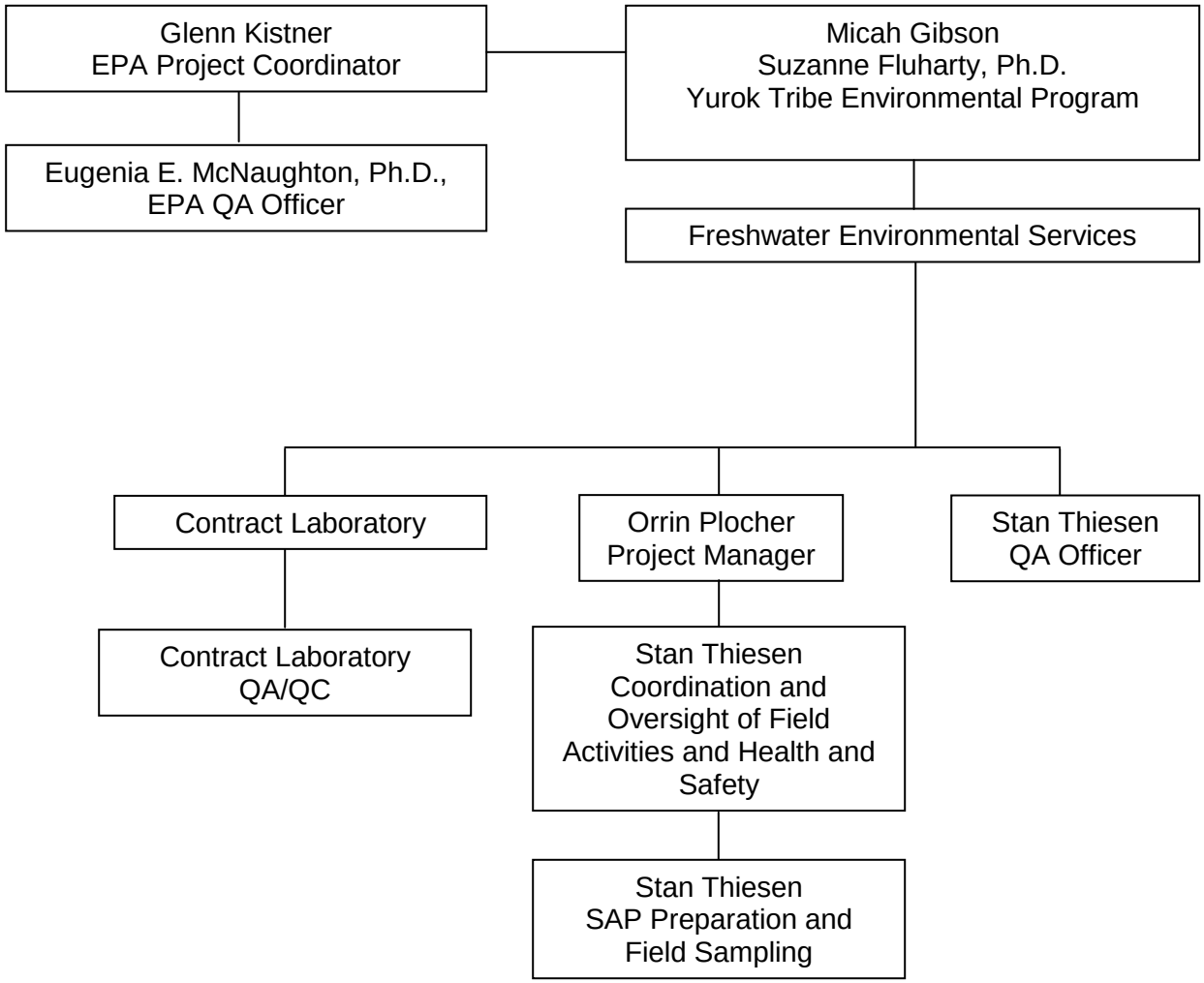
1.4 Project Organization

Table 1 provides the names, phone numbers and email addresses of the persons involved with this project. An organization chart is included below showing the lines of communication:



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2.0 BACKGROUND

The Yurok Tribe (the Tribe) has determined that there is significant impact from illegal marijuana cultivation to the land and water on the Yurok Reservation. This SAP will be used to evaluate the impacts to soil and surface water from chemicals that are used for illegal marijuana cultivation and related activities. Samples collected from growing media such as potting soil will be considered soil samples.

2.1 Sampling Area Description

Sampling areas may include the following:

- Stream channels if water is present;
- Springs and wetlands if they are potentially impacted and sufficient water is present;
- Areas where insecticides, herbicides, and rodenticides are expected to have been used or stored;
- Areas where nutrients were stockpiled and/or mixed with water;
- Areas where fuel tanks and/or generators were used; and
- Areas where there are indications of petroleum-impact including staining, odors, and sheens (if water is present).

The Phase II ESA Report for each Subject Property will have a description of the areas that were sampled.

2.2 Operational History

Each Subject Property is within the external boundaries of the Yurok Reservation and will have its own operational history. Publically available aerial imagery from Google Earth and the United States Department of Agriculture indicate that many of the visible illegal marijuana cultivation locations on the Yurok Reservation have been developed or expanded during the last approximately 10 years.

2.3 Previous Investigations/Regulatory Involvement

Law enforcement and YTEP personnel have visited each Subject Property and collected photographic and other information. There are no environmental samples known to have been collected at any Subject Property.

2.4 Scoping Meeting

The initial scoping meeting was held at the YTEP office on August 8, 2014. Suzanne Fluharty of YTEP and Orrin Plocher and Stan Thiesen of Freshwater Environmental Services were present. The meeting focused on the potential chemical impacts to soil and surface water at illegal marijuana cultivation locations.

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2.5 Geological/Meteorological Information

The Yurok Reservation ranges in elevation from approximately mean sea level at the mouth of the Klamath River to approximately 2,700 feet along the eastern boundary. The topography of the Yurok Reservation ranges from relatively flat areas along the Lower Klamath River to steeper slopes upriver and uphill from the Klamath River. Based on data obtained from the Natural Resource Conservation Service (NRCS), the average annual precipitation within the Yurok Reservation ranges from approximately 55 to 103 inches.

The upriver approximately 25% of the Yurok Reservation is shown on the "Geologic Map of the Weed Quadrangle, California" (Wagner and Saucedo, 1987) as being underlain by the South Fork Mountain Schist. Schist is a metamorphic rock type with sub-parallel orientation of micaceous minerals which typically dominate the composition. The downriver approximately 75% of the Yurok Reservation is shown as being underlain by sandstone and shale. These two rock types were formed approximately 66 to 201 million years ago. The lower 10 miles of the Klamath River within the Yurok Reservation contain large areas of recent (within the last approximately 11,000 years) unconsolidated alluvial deposits.

The nearest fault zoned as active (within the last 11,000 years) under the Alquist-Priolo Earthquake Fault Zoning Act, is approximately 20 miles to the southwest of the Yurok Reservation. The lower elevation areas from the mouth of the Klamath River upriver to approximately 1/4 mile upriver of the confluence with Turwar Creek are within the Tsunami Inundation Area as shown on the California Emergency Management Agency's March 30, 2009 Tsunami Inundation Map for Emergency Planning, Requa Quadrangle.

There are many soil types on the Yurok Reservation. Soil data from the Natural Resource Conservation Service (NRCS) will be provided in the Phase II ESA Report for each Subject Property if available.

The extent of the Yurok Reservation is approximately one mile on each side of the Klamath River from the confluence with the Trinity River near Weitchpec to the mouth of the Klamath River. There are numerous streams which contribute to the Klamath River as shown on Figure 3. The streams shown on Figure 3 are based on streams shown on USGS 7.5' Topographic Maps and were considered perennial at the time the maps were produced. There may be little or no flow in some of these streams during the dry season. Drought conditions may expand the time period where there is little or no flow.

2.6 Impact on Human Health and the Environment

There are no known actual chemical-impacts at any of the Subject Properties on human health and the environment. There is the potential for human health impact at Subject Properties from

dermal contact, inhalation of vapors, and unintentional ingestion of contaminated soils and surface water.

Wildlife may be impacted from the use of chemicals at the Subject Properties. Anticoagulant rodenticides may significantly impact wildlife that was not the intended target through direct ingestion and ingestion of animals possibly killed by the rodenticides. The following table lists potential receptors that are listed as endangered, threatened, or candidate species by the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (US FWS) on all eight of the USGS 7.5 minute quadrangle maps that contain portions of the Yurok Reservation.

Type	Common Name	Scientific Name	Category	Critical Habitat
Invertebrates				
NMFS	black abalone	Haliotis cracherodii	E	N
Fish				
NMFS	green sturgeon	Acipenser medirostris	T	Y
US FWS	tidewater goby	Eucyclogobius newberryi	E	Y
NMFS	S. OR/N. CA coho salmon	Oncorhynchus kisutch	T	Y
NMFS	CA coastal chinook salmon	Oncorhynchus tshawytscha	T	Y
NMFS	Southern eulachon DPS	Thaleichthys pacificus	T	Y
US FWS	Northern California steelhead	Oncorhynchus mykiss	T	Y
Reptiles				
NMFS	loggerhead turtle	Caretta caretta	T	N
NMFS	green turtle	Chelonia mydas (incl. agassizi)	T	N
NMFS	leatherback turtle	Dermochelys coriacea	E	Y
NMFS	olive (=Pacific) ridley sea turtle	Lepidochelys olivacea	T	N
Birds				
US FWS	marbled murrelet	Brachyramphus marmoratus	T	Y
US FWS	western snowy plover	Charadrius alexandrinus nivosus	T	Y
US FWS	Western yellow-billed cuckoo	Coccyzus americanus	PT	N
US FWS	short-tailed albatross	Phoebastris albatrus	E	N
US FWS	northern spotted owl	Strix occidentalis caurina	T	Y
US FWS	Xantus's murrelet	Synthliboramphus hypoleucus	C	N
Mammals				
NMFS	sei whale	Balaenoptera borealis	E	N
NMFS	blue whale	Balaenoptera musculus	E	N
NMFS	fin whale	Balaenoptera physalus	E	N
NMFS	Steller (=northern) sea-lion	Eumetopias jubatus	T	Y
US FWS	fisher, West Coast DPS	Martes pennanti	C	N
NMFS	humpback whale	Megaptera novaengliae	E	N
NMFS	killer whale, S. resident	Orcinus orca	E	Y
NMFS	sperm whale	Physeter macrocephalus	E	N

US FWS US Fish and Wildlife Service
NMFS National Marine Fisheries Service
C Candidate species
DPS Distinct Population Segment
E Endangered species
PE Proposed Threatened species
T Threatened species

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3.0 PROJECT AND DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) are qualitative and quantitative statements for establishing criteria for data quality and for developing data collection designs. This DQO discussion will describe the following:

- The problem to be investigated;
- The questions to be answered and decisions to be made;
- The information and measurements needed to answer the questions; and
- The type of areas within a Subject Property where data should be collected.

Statement of Problem, Planning Team Members, and Budget

The principal question is whether or not the Subject Property contains contaminated media resulting from the use of the Subject Property for the illegal cultivation of marijuana. The planning team members include Suzanne Fluharty, Ph.D., and Micah Gibson of the Yurok Tribe Environmental Program, Glenn Kistner and Eugenia E. McNaughton, Ph.D., of the Region 9 EPA Brownfields Program and Orrin Plocher and Stan Thiesen of Freshwater Environmental Services. Micah Gibson and Suzanne Fluharty are the decision makers regarding this project.

The Yurok Tribe Environmental Program has been awarded a CERCLA Section 128(a) Tribal Response Grant to fund the investigation. A total budget of $65,478 has been allocated to the investigation. All Phase II ESA activities are required to be completed by December 31, 2015.

Questions and Decision

The principal questions to be answered by the investigation are listed below.

- Does soil or surface water contamination exist at the Subject Property from the use of generators, construction equipment, and other uses;
- Does soil or surface water contamination exist at the Subject Property from the use of herbicides for vegetation control;
- Does soil or surface water contamination exist at the Subject Property from the use of insecticides for insect control;
- Does soil or surface water contamination exist at the Subject Property from the use of anticoagulant rodenticides for rodent control; and
- Does soil or surface water contamination exist at the Subject Property from the use of fertilizers and nutrients to enhance growth.

The alternative actions that could result from resolution of the principal study questions include:

- If contamination is not identified over allowable levels on the Subject Property the Yurok Tribe can consider that no further action is recommended to address chemical impacts to the Subject Property; and
- If contamination is identified over allowable levels and is not delineated during the initial sampling event, additional assessment and cleanup may be necessary

prior to recommending that no further action is necessary at the Subject Property.

Combining the principal study questions and the alternative actions results in the following decision statement:

Determine whether or not the Subject Property contains contaminated media resulting from the use of the Subject Property for the illegal cultivation of marijuana that would require additional assessment and/or cleanup prior to determining that no further action is recommended for the Subject Property.

Inputs to the Decision

The information input needed to resolve the decision statement is whether there are concentrations of contaminants in soil or surface water at the Subject Property that will require additional assessment and/or cleanup.

Environmental variables that will be measured may include:

- Concentrations of petroleum products in soil and surface water (if present);
- Concentrations of metals in soil and surface water (if present);
- Concentrations of pesticides in soil and surface water (if present);
- Concentrations of herbicides in soil and surface water (if present);
- Concentrations of rodenticides in soil and surface water (if present); and
- Concentrations of fertilizers and nutrients in soil and surface water (if present).

Tables 2a and 2b list potential analytes, screening levels, reporting limits, and method detection limits. Action levels for soils will be from:

- Environmental Screening Levels (ESLs), Table A, San Francisco Bay, Regional Water Quality Control Board, Interim Final – December 2013. http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/ESL/Lookup_Tables_Dec_2013_Detail.pdf;

Action levels for surface water will be from:

- Environmental Screening Levels (ESLs), Tables F2-a and F4-d, San Francisco Bay, Regional Water Quality Control Board, Interim Final – December 2013; http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/ESL/Lookup_Tables_Dec_2013_Detail.pdf; and
- Water quality objectives (WQOs) from the online database maintained by the State Water Resources Control Board if ESLs are not listed from the above website. http://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/search.shtml.

Appropriate measurement methods exist to provide the necessary soil and surface water data and include:

- EPA Method 8015B: Total Petroleum Hydrocarbons (TPH) as Diesel and Motor Oil range organics with silica gel cleanup;
- EPA Method 8260B: Gasoline, BTEX, MTBE, Fuel Oxygenates, Lead Scavengers, and naphthalene;
- EPA Method 6020 and 200.8: cadmium, chromium, nickel, lead, and zinc;
- EPA Method 8081B: organochlorine pesticides;
- EPA Method 8141A: organophosphorus pesticides;
- EPA Method 8151A: chlorinated herbicides;
- EPA Method 300.0: nitrate and nitrogen; and
- SM 4500: Total Phosphate Phosphorus.

Additional methods for chemicals that are not included in the above list may be used if labeled containers indicate that they may be present. These additional methods may include:

- EPA Method 619: Triazine pesticides;
- EPA Method 630: Dithiocarbamate pesticides;
- EPA Method 632: Carbamate and Urea pesticides;
- EPA Method 633: Organonitrogen pesticides; and
- Other tests for individual analytes not included in the above lists.

Study Boundaries

The spatial boundaries of the areas to be investigated includes the soil within the Subject Property area down to a maximum depth of approximately 10 feet below ground surface (bgs) or the practical limits of hand tools. The specific areas where samples will collected will be determined at the time of the sampling because the Subject Properties will not be accessible prior to sampling. The areas of investigation will be documented at the time of the sampling. The data generated will reflect current risk conditions for future land use of the Subject Property.

3.1 Project Task and Problem Definition

The purpose of the investigation is to determine if soil contamination exists on the Subject Property that exceeds applicable screening levels. The data will be used to determine if the Subject Property can be recommended for no further action for chemical-impacts, or if additional assessment and/or cleanup is necessary

The current and historical use of the Subject Properties for illegal marijuana cultivation could have contaminated soils with petroleum products, metals, pesticides, herbicides, rodenticides, nitrate, nitrite and phosphate. The investigations will include soil and surface water sampling at various areas within the Subject Properties as indicated in the table below.

Area of Subject Property	Potential Contaminants	Media
Areas potentially-impacted by petroleum releases	Gasoline, BTEX, MTBE, fuel oxygenates, lead scavengers, naphthalene, diesel, motor oil, cadmium, chromium, nickel, lead, and zinc.	Soil and surface water (if present)
Growing and disposal areas potentially-impacted by growing-related chemicals	Pesticides, herbicides, rodenticides, nitrate, nitrite, and phosphate.	Growing media, and surface water (if present)
Surface water	Gasoline, BTEX, MTBE, fuel oxygenates, lead scavengers, naphthalene, diesel, motor oil, cadmium, chromium, nickel, lead, zinc, pesticides, herbicides, rodenticides, nitrate, nitrite, and phosphate.	Surface water
Chemical storage area	Pesticides, herbicides, rodenticides, nitrate, nitrite, and phosphate.	Soil
Solid waste accumulations	Gasoline, BTEX, MTBE, fuel oxygenates, lead scavengers, naphthalene, diesel, motor oil, cadmium, chromium, nickel, lead, zinc, pesticides, herbicides, rodenticides, nitrate, nitrite, and phosphate.	Soil

3.2 Data Quality Objectives (DQOs)

The decision of whether or not to recommend that no further action is necessary for chemical-impacts at a Subject Property will be made based on the results of sample analysis for the lists of potential contaminants listed in the table above. Sample results will be compared to applicable screening levels from the Environmental Screening Levels (ESLs), Tables A, F2-a and F4-d, San Francisco Bay, Regional Water Quality Control Board (SFRWQCB), Interim Final – December 2013. Laboratory results for some contaminants that are not included in the SFRWQCBs tables will compared to Water Quality Objectives (WQOs) from the online database maintained by the State Water Resources Control Board.

If contamination is not identified over the screening levels and if contaminants with no screening levels are not detected, the Subject Property can be recommended for no further action for chemical-impacts. If one or more contaminant is identified over the screening levels, additional assessment and/or cleanup may be necessary.

3.3 Measurement Quality Objectives (MQOs)

Data assessment criteria will be used to evaluate the quality of the field sampling and laboratory performance for the sampling event, and are expressed in terms of analytical precision, accuracy, representativeness, completeness, and comparability, which are described in detail below.

Precision

Precision is the degree of mutual agreement between or among independent measurements of a similar property usually reported as relative percent difference (RPD). This indicator relates to the analysis of duplicate laboratory samples. An RPD of <20% for water and <35% for soil, depending upon the chemical being analyzed, is generally acceptable. Laboratory precision is assessed using laboratory control samples and laboratory control sample duplicates (LCS/LCSD) and matrix spikes and matrix spike duplicates (MS/MSD). Precision will be expressed in terms of RPD between the values resulting from duplicate analysis. RPD is calculated using the following formula:

RPD = Relative Percent Difference (as %)

$$RPD = \frac{|X_1 - X_2|}{(X_1 + X_2)/2} \times 100$$

$|X_1 - X_2|$ = Absolute value (always positive) of $X_1 - X_2$

X_1 = Original sample concentration

X_2 = Duplicate sample concentration

QC samples that will be used to measure the precision of the data collected include:

- At least one field duplicate sample will be collected and submitted "blind" to the laboratory for each Subject Property;
- Laboratory duplicates - To duplicate inorganic sample preparation/analysis methodology; and
- Matrix spike/matrix spike duplicates - To duplicate organic sample preparation/analysis methodology; to represent the actual sample matrix itself.

Acceptance criteria or Measurement Performance Criteria (MPC): Acceptable levels of precision will vary according to the sample matrix, the specific analytical method, and the analytical concentration relative to the method detection limit (MDL). For field duplicate samples, the target RPDs are 20 percent for water samples and 35 percent for soil.

Accuracy/Bias

Accuracy is the degree of agreement of a measurement with a known or true value. To determine accuracy, a laboratory value is compared to a known or true concentration. Accuracy for this project will be determined by laboratory control samples and laboratory control sample duplicates and matrix spikes and matrix spike duplicates. Accuracy is expressed as a bias (high or low) and is determined by calculating percent recovery (%R) from MSs/MSDs and LCSs/LCSDs. LCS %Rs indicates accuracy relevant to an analytical batch lot and is a measure of analytical accuracy conditions independent of samples and matrices. MS/MSD and surrogate spike %Rs indicate accuracy relevant to a unique sample matrix. The %R of an analyte, and the resulting degree of accuracy expected for the analysis of spiked samples, are dependent upon the sample matrix, method of analysis, and the compound or element being measured.

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The concentration of the analyte relative to the detection limit of the method also is a major factor in determining the accuracy of the measurement.

QC samples that will be used in the investigations to measure accuracy/bias include the following:

- Matrix spikes - To monitor sample preparation/analysis methodology, as well as, to represent the actual sample matrix itself; and
- Standard reference materials and/or laboratory control samples to monitor sample preparation/analysis methodology and often of a similar media (such as water, soil, sediment) as the field samples;

Acceptance criteria or MPC: MPC are typically expressed in terms of %Recovery of a known or accepted/true amount and defined by the following equation:

$$\%R = \frac{X}{K} \times 100$$

where,

%R = Recovery (as %)
X = Measured value or concentration
K = Known or accepted/true value or concentration

For matrix spikes, the %Recovery calculation typically takes into account correcting the matrix spike concentration for the naturally occurring amounts (as measured in the unspiked sample). The calculation may be represented by the following equation:

$$\%R = \frac{(A-B)}{K} \times 100$$

where,

%R = Recovery (as %)
A = Measured value or concentration in the matrix spike
B = Measured value or concentration in the unspiked sample
K = Known or accepted/true value or concentration in the matrix spike without native amounts present

Acceptable QC limits for %R are 80 percent to 120 percent for LCSs, method-defined for surrogates, and laboratory-defined for MS/MSDs. Chemical analytical data will be evaluated for accuracy using surrogates, MS/MSDs, and LCSs, as applicable.

Representativeness

Representativeness is the expression of the degree to which data accurately and precisely represent a characteristic of an environmental condition or a population. It relates both to the area of interest and to the method of taking the individual sample. The principal question is whether or not the Subject Property contains contaminated media resulting from the use of the Subject Property for the illegal cultivation of marijuana.

Factors that affect representativeness include:

- Use of appropriate sampling procedures, including equipment and equipment decontamination and sample holding temperatures;
- Use of appropriate analytical methods for the required parameters and project reporting limits; and
- Analysis of samples within the required holding times.

The portion of each collected sample that is chosen for analysis also affects sample representativeness. The laboratory will adequately and appropriately homogenize samples collected for non-volatile analyses prior to taking aliquots for analysis to ensure that the reported results are representative of the sample received. Samples collected for TPH-Gasoline and VOC analyses will not be homogenized.

This investigation will use sampling and analytical methods for ensuring the data collected reflects the environmental conditions in the areas sampled. To further ensure the representativeness of the data collected, chain-of-custody procedures, sample preservation, and maximum sample holding times will be followed.

Quality Control samples that will be used in this investigation to quantitatively measure representativeness will include temperature blanks (water samples that travel with samples from transport in the field to the laboratory) to serve as a QC check for temperature-related sample preservation.

Acceptance Criteria or Measurement Performance Criteria (MPC): For temperature blanks, MPC is expressed in relation to an acceptable temperature range. For field samples requiring preservation at 4°C, the MPC is 4°C +/- 2°C.

A qualitative measure of representativeness will include verification that documented sample collection and analytical methods (including sample handling & chain-of-custody procedures, sample preservation, and sample holding times protocols) were followed to ensure the data reflects the environmental conditions.

Comparability

Comparability expresses the confidence with which one dataset can be compared to another. The use of methods from EPA or “Standard Methods” or from some other recognized sources allows the data to be compared facilitating evaluation of trends or changes at a site. Comparability also refers to the reporting of data in comparable units so direct comparisons are simplified. Comparability during analysis is dependent upon analytical methods, detection limits, laboratories, units of measure, and sample preparation procedures. Comparability is determined on a qualitative rather than quantitative basis. For this project, comparability of all data collected will be ensured by adherence to standard sample collection procedures, standard field measurement procedures, and standard reporting methods, including consistent units.

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Completeness

Completeness is expressed as percent of valid usable data actually obtained compared to the amount that was expected. Due to a variety of circumstances, sometimes either not all samples scheduled to be collected can be collected or else the data from samples cannot be used (for example, samples lost, bottles broken, instrument failures, laboratory mistakes, etc.). The minimum percent of completed analyses defined in this section depends on how much information is needed for decision making. Generally, completeness goals rise the fewer the number of samples taken per event or the more critical the data are for decision making. The expected completeness percentage for this project is at least 95%.

Acceptance criteria or MPC: MPC is expressed in terms %Completeness between the amount of usable data collected versus the amount of data planned to be collected for the study. Completeness is defined by the following equation:

$$\%C = \frac{N}{T} \times 100$$

where,

%C = Completeness (as %)
N = Number of usable results
T = Targeted number of samples planned to be collected

Sensitivity

Laboratory methods need to be sensitive enough to be able to quantify the parameters of concern at or below the regulatory standards.

- QC samples used to test sensitivity include: Laboratory QC samples (such as laboratory control samples, method blanks, etc.)

Acceptance criteria or MPC: MPC is expressed in terms of the laboratory's acceptable performance criteria for their QC checks. Additionally the laboratory results will be reviewed by FES to evaluate their validity.

3.4 Data Review and Validation

All analytical data generated will be reviewed by the contractor laboratory supervisor and receive approval prior to being provided to the contractor. All data received from the laboratory contractor will receive a Tier 1 review by the contractor Quality Assurance Officer (QAO). The checklist for data quality review is attached as Appendix B. Analytical data that do not meet data quality objectives will be discussed with the contractor laboratory, and flagged. Possible corrective actions include the rejection of data, reanalysis or resampling.

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3.5 Data Management

Data management procedures will be used to ensure that data collected for this project will be transferred accurately from collection to the final report. The sample containers for this project will have labels affixed prior to sample collection. The labels will include the following information:

- Project name which will be provided by YTEP for each Subject Property;
- Type of analysis including method number; and

After the samples are collected the following information will be written on the labels:

- Date and time of sample collection;
- Initials of the person collecting the sample; and
- Sample ID which will include depths for soil samples.

The label information described above will also be recorded at the time of sample collection in a bound, waterproof field notebook. A chain-of-custody will be filled out at the time the samples are collected and will accompany the samples until they reach the laboratory. The sample containers will be photographed after sample collection at the location where they were collected.

The sample collection locations will be recorded on sketches in the field notebook and on the aerial imagery. The GPS coordinates of sample locations will be collected by YTEP personnel (if available) with an accuracy of approximately one foot. FES will collect GPS data if YTEP personnel are not available for GPS collection. GPS data collected by FES will have an estimated accuracy of approximately 20 feet.

The laboratory will provide the results of the analyses in Portable Document Format (PDF) format. The laboratory reports will be reviewed by FES using the laboratory review checklist (Appendix B). Data from the laboratory reports will be entered manually into a spreadsheet. The spreadsheet will be reviewed by FES personnel who did not enter the data. The final report will be a PDF that includes all of the text, tables, figures, and appendices. The report will be reviewed by FES personnel who did not enter the data and will include checking the presentation of the sample results in the text and tables.

3.6 Assessment Oversight

As a check on the quality of field sampling activities (sampling, containerization, shipment, and handling), field duplicates will be sent to the laboratory. Other QA/QC procedures include decontamination of measuring and sampling equipment, use of analyte-appropriate containers, and chain-of-custody procedures for sample handling and tracking.

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4.0 SAMPLING DESIGN AND RATIONALE

The sampling design for this project is based on photographs and other information provided by YTEP. Additional information has been acquired by FES through research into potential chemical-impacts at illegal marijuana sites. If no field indications of contamination are present the only samples collected will be a composite sample of growing media and a surface water sample (if present). A composite sample will be collected from growing media (if present) at each Subject Property. The composite sample will consist of up to 10 subsamples which will be homogenized (assuming no petroleum compounds are present in the growing media) and the final sample will be collected from the homogenized material. Samples will only be collected if there are indications of contamination. Indicators of contamination by petroleum compounds will include:

- Stained soil;
- Petroleum odors; and
- Sheens on water.

Indicators of contamination by pesticides, herbicides, and rodenticides will include:

- Presence of labeled containers;
- Pesticide odors;
- Presence of rodenticide bait;
- Dead animals; and
- Sheens on water.

FES used information provided by YTEP and information from FES research about chemicals used at illegal marijuana cultivation site. This information indicates that the following environmental conditions may exist at the Subject Properties:

- Potential contamination of soil, groundwater, and surface water with petroleum compounds;
- Potential contamination of soil, groundwater, and surface water with pesticides, herbicides, and anticoagulant rodenticides; and
- Elevated concentrations of fertilizer and nutrient related chemicals.

This plan lists depth intervals for soil sample collection of 0.0 to 0.5 feet and 0.5 to 1.0 feet below ground surface (bgs). Based on field conditions and field indications of contamination, the intervals may vary. If there are indications of contamination a shallow and a deeper sample will be collected at the location. The deeper sample will be collected below the depths where contamination appears to be present. Soil samples will be collected beyond the perimeter of any field indications of contamination to attempt to delineate the contamination to the extent possible during the initial sampling. Access to the Subject Properties may limit the extent of

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delineation possible. A list of potential analytes are included in Tables 2a and 2b. A list of field equipment expected to be used for this investigation is included in Table 6.

4.1 Soil Sampling

The locations of the borings and the depth of sample collection will depend on conditions encountered in the field and whether there are indications of contamination. Soil samples will be collected in the following locations if there are indications of contamination:

- Areas where petroleum indications are present;
- Growing areas where growing media such as potting soil is present including disposal areas;
- Chemical mixing areas;
- Chemical storage areas;
- Solid waste disposal areas; and
- Areas where there are indications of the presence of rodenticides.

At least one field duplicate soil sample will be collected for each Subject Property if no water samples are collected.

4.2 Sediment Sampling

Sediment samples will be collected if there are field indications of contamination of stream channel sediment. Sediment samples may be collected if there are chemical containers, solid waste, tanks, or generators located in stream channels. Sediment samples will be collected using the same techniques as for soil samples.

4.3 Surface Water Sampling

Surface water samples will be collected if water is present at locations upstream and downstream of areas where there is evidence of potential contamination. There may be limitations on access to surface water. FES will make reasonable efforts to safely access potential surface water samples.

4.4 Groundwater Sampling

It is unlikely that groundwater will be present at depths which can be reached by the equipment expected to be used. No groundwater samples are anticipated to be collected.

4.5 Other Sampling

Water samples may be collected from tanks and other containers if there are indications of chemical use or mixing.

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5.0 REQUEST FOR ANALYSES

Soil and water sample analyses for petroleum compounds, pesticides, herbicides and metals will be conducted by Calscience Environmental Laboratories, Inc. (Calscience) of Garden Grove, California. Calscience is certified by the California Department of Public Health for the requested analyses.

Sample analyses for pesticides, herbicides, nitrogen, phosphorous, and anticoagulant rodenticides (brodifacoum and diphacinone) will be conducted by North Coast Laboratories, Ltd. (North Coast) of Arcata, California. North Coast is certified by the California Department of Public Health for the requested analyses except for brodifacoum and diphacinone analyses which currently do not have certifiable methods.

5.1 Analyses Narrative

The samples collected for this project may include soil, growing media (will be considered as soil), and water as matrices. Information about the analytes, screening levels and reporting limits is presented in Tables 2aand 2b. Information about the sample analyses and methods is included in Tables 4a and 4b.

The soil samples to be analyzed for TPH-Gasoline and VOCs will be collected with Terra Core® kits which include pre-preserved vials. All other soil samples will be collected in 4 or 8-ounce glass jars with Teflon® lids with no preservative.

The water samples for pesticides, herbicides, and rodenticides will be collected in 1-Liter amber glass containers (3 containers for each sample). The water samples for nitrogen analysis will be preserved with sulfuric acid and collected in 250 milliliters plastic containers. The water samples for phosphorous analysis will be collected in 250 milliliter plastic containers.

The samples to be analyzed by Calscience will be shipped overnight by FedEx®. The samples to be analyzed by North Coast will be dropped off as soon as possible after collection. The turn-around time requested for all samples will be normal which is usually two to three weeks.

5.2 Analytical Laboratory

The laboratories have provided SOPs and quality control information that is included in Appendix E and Appendix F. Freshwater Environmental Services has discussed the requirements for this project with the laboratories.

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6.0 FIELD METHODS AND PROCEDURES

6.1 Field Equipment

This project involves the collection of soil samples and water samples. A minimum of one aqueous equipment blank will be collected per sampling event which will typically include multiple Subject Properties. Shovels and rock bars will be used initially. A stainless steel hand auger and a jackhammer may be used if necessary.

6.1.1 List of Equipment Needed

We anticipate that shovels, rock bars, stainless steel augers, and a jackhammer may be required for the collection of soil samples. The field equipment required for this project is listed in Table 6.

6.1.2 Calibration of Field Equipment

No instruments will be used for collection of the samples.

6.2 Field Screening

Field screening will be conducted at the time of the sampling. The screening will be based on the presence of staining and odor and sheen (if water is present).

6.3 Soil Sampling

Soil sampling may include the collection of soil, growing media, and sediments. These will all be considered to be soil samples. The soil samples collected for this project are anticipated to be shallow (less than 1.0' bgs) soil samples unless field indications of contamination are present. If there are field indications of contamination, soil samples from below the contamination will be attempted. Because of the potential for coarse gravel and cobbles to be present at or near the surface it may not be possible to collect samples from depths below one or two feet.

The shallow soil samples will be collected using a shovel to loosen and pry open the surface. The samples will be collected in laboratory-supplied containers from the loosened soil in a manner in which there will be no contact between the shovel and the sample. If deeper samples are needed they will be collected in the same manner unless breaker bars or a jackhammer if needed to loosen the soil around the sample location. Field personnel will wear disposable non-powdered nitrile gloves when collecting samples.

6.3.1 Surface Soil Sampling

Exact soil sampling locations will be determined in the field based on visible signs of potential contamination and the presence of growing media. Soil sample locations will be recorded in the field logbook as sampling is completed. A sketch of the sample location will be entered into the

logbook and any physical reference points will be labeled. If possible, distances to the reference points will be given. GPS coordinates will be collected by YTEP personnel (if available) with an accuracy of approximately one foot. FES will collect GPS data if YTEP personnel are not available for GPS collection. GPS data collected by FES will have an estimated accuracy of approximately 20 feet.

Surface soil samples will be collected as grab samples from a depth of approximately 0.0 to 0.5 feet bgs. Surface soil samples will be collected using a shovel to break loose the soil and only soil that has not been in contact with the shovel will be placed in a clean glass mixing bowl and homogenized prior to the filling of 4 or 8-ounce glass jars with a Teflon® lids using a new pair of non-powdered nitrile gloves. The sample identification number will be written on the label attached to the jar and on the lid of the jar. Surface samples to be analyzed for TPH-Gas and VOCs will be collected using a Terra Core® sampling kit and placed in 40 ml vials with lab-supplied preservative as described in Appendix H. Surface samples to be analyzed for TPH-Gas and VOCs will not be homogenized to prevent loss of volatile compounds. All sample containers will have labels applied with the following information:

- Sample identification number;
- Project name;
- Sampling date;
- Sampling time;
- Analysis to be performed;
- Preservatives added; and
- Sample collector's initials.

The shovel will be decontaminated between samples using a wet paper towel with Liquinox® solution applied to it. An additional paper towel will be wetted with distilled water and used for a final wipe of the shovel. Samples collected in the 4-ounce glass jars will be filled to the top, taking care to prevent soil from remaining in the lid threads prior to being closed to prevent potential contaminant migration to or from the sample.

6.3.2 Subsurface Soil Sampling

Soil sample locations will be recorded in the field logbook as sampling is completed. A sketch of the sample location will be entered into the logbook and any physical reference points will be labeled. If possible, distances to the reference points will be given. GPS coordinates will be collected by YTEP personnel (if available) with an accuracy of approximately one foot. FES will collect GPS data if YTEP personnel are not available for GPS collection. GPS data collected by FES will have an estimated accuracy of approximately 20 feet. Subsurface soil samples may be collected as grab samples from a depth of approximately 0.5 to 2.0 feet bgs. Subsurface soil samples will be collected using a shovel to break loose the soil and only soil that has not been in contact with the shovel will be placed in a clean glass mixing bowl and homogenized prior to

the filling of 4-ounce glass jars with Teflon® lids using a new pair of non-powdered nitrile gloves. The sample identification number will be written on the label attached to the jar and on the lid of the jar. Subsurface samples to be analyzed for TPH-Gas and VOCs will be collected using a Terra Core® sampling kit and placed in 40 ml vials with lab-supplied preservative as described in Appendix H. Subsurface samples to be analyzed for TPH-Gas and VOCs will not be homogenized to prevent loss of volatile compounds. All sample containers will have labels applied with the following information:

- Sample identification number;
- Project name;
- Sampling date;
- Sampling time;
- Analysis to be performed;
- Preservatives added; and
- Sample collector's initials.

6.4 Sediment Sampling

The protocol for sediment samples (if collected) will be the same as for soil samples.

6.5 Water Sampling

Surface water samples will be collected (if present) and may include sampling of streams, springs, and mixing containers with unknown contents.

6.5.1 Surface Water Sampling

Surface water samples will be collected using a peristaltic pump with dedicated tubing and pumped directly into the appropriate container. Samples collected for metals analysis will be field-filtered directly into the appropriate container using a disposable 0.45 micron filter attached to the outflow of the peristaltic pump. The samples will be chilled to 4°C immediately upon collection.

6.5.2 Groundwater Sampling

Section does not apply.

6.5.2.1 Water-Level Measurements

Section does not apply.

6.5.2.2 Purging

Section does not apply.

6.5.2.3 Well Sampling

Section does not apply.

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6.6 Other Sampling

Section does not apply.

6.7 Decontamination Procedures

Shovels and rock bars that are used for sampling will be decontaminated using the following steps:

- Wipe the shovels and/or rock bars with a wetted paper towel to which a Liquinox® solution has been applied; and
- Final wipe with a paper towel wetted with distilled water.

All equipment used for surface water sampling will be dedicated and disposable so there will be no decontamination necessary.

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7.0 SAMPLE CONTAINERS, PRESERVATION, PACKAGING AND SHIPPING

New, laboratory-supplied, unopened glass jars, glass vials, and plastic containers will be used to collect the samples. See Table 5 for sampling container details. No preservation will be necessary for the soil samples except for the TPH-Gas and VOC samples which will use laboratory-supplied preservatives including methanol and sodium bisulfate. No preservation will be necessary for the water samples except for the TPH-Gas and VOC samples which will use laboratory-supplied containers containing hydrochloric acid. The containers used for nitrogen analysis will use sulfuric acid as a preservative. All container lids will be tightly closed and will not be removed at any time prior to sample collection.

7.1 Soil Samples

Shovels and if necessary rock bars will be used to advance the soil borings. Soil samples will be collected and placed on plastic for soil classification. The soil samples will be collected in 4-ounce glass jars with Teflon® lids and 40 milliliter pre-preserved glass vials. The sample collector will use a new pair of non-powdered nitrile gloves to collect each sample directly from the soil. The samples will be chilled to 4° immediately upon collection.

7.2 Sediment Samples

The protocol for sediment samples (if collected) will be the same as for soil samples.

7.3 Water Samples

Surface water samples will be collected using a peristaltic pump with dedicated tubing and pumped directly into the appropriate container. Samples collected for metals analysis will be field-filtered directly into the appropriate container using a disposable 0.45 micron filter attached to the outflow of the peristaltic pump. The samples will be chilled to 4°C immediately upon collection.

7.4 Other Samples

Section does not apply.

7.5 Packaging and Shipping

The samples will be sealed and labeled in the field. The samples that will be shipped to Calscience will be packaged in the FES office for transport to Calscience. The samples that will be analyzed by North Coast will be dropped off as soon as possible after collection. Samples will be packed and shipped on ice to ensure they reach the laboratory at 2-6 degrees Celsius. Samples will be shipped for overnight delivery. A custody seal will be applied to each cooler prior to shipping. The following packaging and labeling procedures will be followed:

- The chain-of-custody will be placed inside a sealed plastic bag and placed inside the coolers;

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- The samples will be packed to ensure that they will not break, leak, spill, or evaporate from the containers;
- Glass containers will be placed in bubble wrap;
- Custody seals will be applied to each cooler; and
- Coolers containing samples that will be shipped will have labels that include: company name, address, and telephone number and the laboratory's name, address, and telephone number.

The packaged samples will be delivered to the laboratory as soon as possible after sample acquisition, and in accordance with analytical method-specific holding times.

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8.0 DISPOSAL OF RESIDUAL MATERIALS

The process of collecting soil samples will generate different types of potentially contaminated investigation-derived waste (IDW) that include the following:

- Used personal protective equipment (PPE);
- Disposable sampling equipment; and
- Soil cuttings from soil borings.

Used PPE and disposable equipment will be bagged and disposed of as household trash. This waste is not considered hazardous and can be sent to a municipal landfill. Any PPE and disposable equipment that is to be disposed of which can still be reused will be rendered inoperable before disposal.

Soil cuttings generated during the subsurface sampling will be placed back into the boring unless there is obvious contamination as indicated by soil staining, odor, or color. All soil cuttings generated from sampling with indicators of contamination will be placed in covered 5-gallon buckets pending characterization and disposal. Any buckets containing contaminated soils will be will be the responsibility of YTEP.

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9.0 SAMPLE DOCUMENTATION

9.1 Field Notes and Photographs

A bound waterproof field notebook will be used to record all information collected in the field. Additionally, photographs of sampling locations and any other features will be taken with the time and date of the photo imbedded in the image. The GPS coordinates of sample locations will be collected by YTEP personnel (if available) with an accuracy of approximately one foot. FES will collect GPS data if YTEP personnel are not available for GPS collection. GPS data collected by FES will have an estimated accuracy of approximately 20 feet. Data to be entered into the notebook include:

- Sample identification number;
- Sample location and description;
- Site or sampling area sketch showing sample location and measured distances;
- Sampler's names;
- Date and time of sample collection;
- Designation of sample as composite or grab;
- Soil description based on the Unified Soil Classification System (USCS);
- Type of sampling equipment used; and
- Field observations and details related to analysis or integrity of samples (e.g., weather conditions, noticeable odors, color).

In addition to the sampling information, the following specific information will also be recorded in the field logbook for each day of sampling:

- Time of arrival on site and time of site departure;
- Other personnel on site;
- Deviations from the QAPP or SOPs required in the field; and
- Summary of any meetings or discussions with tribal, contractor, or federal agency personnel.

9.2 Sample Labeling

The sample label will be firmly attached to the container and the following information will be legibly and indelibly written on the label:

- Sample identification number;
- Project name;
- Sampling date;
- Sampling time;
- Analysis to be performed;
- Preservatives added; and
- Sample collector's initials.

9.3 Chain of Custody Control

During and after sampling until the time of sample shipment, samples will be in the "custody" of the sampler or samplers. "Custody" refers to the samples being in the immediate care of the

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field personnel, either in physical possession, immediate view, locked up, or held in a secure area restricted to authorized personnel. Samples that are shipped will have a custody seal placed on the cooler or container that will indicate if the container has been opened. After the samples have been collected, chain-of-custody procedures will be followed to establish a written record of sample handling and movement between the sampling site and the laboratory. Each shipping container will have a chain-of-custody form completed in duplicate by the sampling personnel. The sampling team will keep one copy of this form and the other copy will be sent to the laboratory. The chain-of-custody will contain the following information:

- Sample identification numbers;
- Sample collector's printed name and signature;
- Date and time of collection;
- Sample matrix;
- Analyses requested;
- Signatures of individuals involved in the chain of custody;
- Inclusive dates of possession;
- Special instructions for the laboratory if needed; and
- If sample was preserved (Yes/No).

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10.0 QUALITY CONTROL

10.1 Field Quality Control Samples

Field quality control samples are described below and will include equipment blanks and duplicate samples.

10.1.1 Assessment of Field Contamination Blanks

Section does not apply.

10.1.1.1 Equipment Blanks

One equipment rinsate blank will be collected for each analyte for soil samples collected with non-disposable equipment. For this project the non-disposable equipment will be the shovel which will be used to dig the holes for subsurface access. After completing the normal decontamination procedures, distilled water will be poured on the shovel and the rinse water collected in the appropriate containers. The equipment blank will be submitted "blind" to the laboratory and analyzed for the same chemicals as the soil samples which were collected just prior to decontamination. The equipment blank will be collected from the first soil sample that has indications of contamination.

10.1.1.2 Field Blanks

Section does not apply.

10.1.1.3 Trip Blanks

Section does not apply.

10.1.1.4 Temperature Blanks

For each cooler that is shipped or transported to an analytical laboratory a water-filled container will be included that is marked "temperature blank." This blank will be used by the sample custodian to check the temperature of samples upon receipt.

10.1.2 Assessment of Field Variability (Field Duplicate Samples)

Soil

One field duplicate soil sample will be collected for each Subject Property. The field duplicate soil sample will be collected at the first location where there are field indications of contamination or where the highest potential for contamination is expected. The field duplicate soil sample will be collected in the same manner and as close as possible to the soil sample that is being duplicated. The analytes for the duplicate soil sample will be the same as the soil sample that is collected at the location.

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Water

One field duplicate water sample will be collected for each Subject Property. The field duplicate water sample will be collected at the first location where there are field indications of contamination or where the highest potential for contamination is expected. The field duplicate water sample will be collected in the same manner and as close as possible in location and time to the water sample that is being duplicated. The analytes for the duplicate water sample will be the same as the water sample that is collected at the location.

10.2 Background Samples

Section does not apply.

10.3 Field Screening, including Confirmation Samples, and Split Samples

Section does not apply.

10.3.1 Field Screening Samples

Section does not apply.

10.3.2 Confirmation Samples (Field Screening)

Section does not apply.

10.4 Laboratory Quality Control Samples

Soil

One soil sample for each Subject Property will be designated for a laboratory quality control sample which will consist of a matrix spike (MS) and a matrix spike duplicate (MSD). The sample to be designated will be the first sample collected that has obvious indications of contamination (staining and/or odor). Additional quantity of soil samples will be collected as required by the laboratory. The request for the MS/MSD analysis will be recorded on the chain-of-custody.

Water

One water sample (if collected) from each Subject Property will be designated for a laboratory quality control sample which will consist of a matrix spike (MS) and a matrix spike duplicate (MSD). The sample to be designated will be the first sample collected that has obvious indications of contamination (odor and/or sheen for water). Additional quantity of water samples will be collected if required by the laboratory. The request for the MS/MSD analysis will be recorded on the chain-of-custody.

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11.0 FIELD VARIANCES

There is expected to be variability among the Subject Properties. No Phase I ESAs conducted have been conducted for the Subject Properties so decisions about the actual sample collection locations will be made at the time of sampling. FES and YTEP personnel will need to make decisions based on the conditions encountered. When appropriate, the EPA Brownfields Coordinator or the EPA QA Officer and will be notified and a verbal approval will be obtained before implementing the changes. Modifications to the approved plan will be documented in the Phase II ESA Report for each Subject Property.

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12.0 FIELD HEALTH AND SAFETY PROCEDURES

A site-specific health and safety plan will created for each Subject Property. An example plan without location information is included as Appendix A.

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Table 1.
Key Project Personnel Contact Information and Responsibilities

Title	Name	Phone Number Email Address	Responsibilities
EPA Project Officer	Glenn Kistner	(415) 972-3004 kistner.glenn@epa.gov	Administration of EPA grant, review of SAP and assessment report.
EPA Quality Assurance Officer (QAO)	Eugenia E. McNaughton, Ph.D.	(415) 972-3411 mcnaughton.eugenia@epa.gov	Oversight of the technical aspects of the project related to Quality Control and Quality Assurance. Reviews SAP and provides comments on sampling design/rationale, analytical methods, and QC/QA issues.
YTEP Interim Director	Micah Gibson	(707) 482-1822 Extension 204 mgibson@yuroktribe.nsn.us	Department administration and YTEP Quality Assurance Officer. 128(a) Program Manager
Yurok Tribe Environmental Specialist	Suzanne Fluharty, Ph.D	(707) 482-1822 Extension 1013 sfluharty@yuroktribe.nsn.us	Evaluates the technical aspects of the project including quality control and provides input for the sampling and analysis plan and the final report.
Contractor Project Manager (Freshwater Environmental Services)	Orrin Plocher	(707) 839-0091 orrin@freshwaterenvironmental services.com	Responsible for the development of the SAP, implementation of the field activities, data review and report preparation.
Contractor QAO and Contractor Field Team Leader (Freshwater Environmental Services)	Stan Thiesen	(707) 839-0091 stan@freshwaterenvironmental services.com	Oversee the implementation of the SAP, including whether specified quality control (QC) procedures are being followed as described. This individual will discuss QA issues with the Project Manager. Oversees all field activities including sample collection, documentation and sample handling.
Calscience Quality Assurance Director	Jill Henes	(714) 895-5494 jhenes@calscience.com	Assures that internal laboratory QA/QC process is followed.
Calscience Quality Assurance Manager	Larry Lem	(714) 895-5494 llem@calscience.com	Assures that internal laboratory QA/QC process is followed.
North Coast Quality Assurance Manager	Cherie Thomas	(707) 822-4649	Assures that internal laboratory QA/QC process is followed.

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Table 2a.
Contaminants of Concern in Water - Screening Levels and Laboratory Method Detection Limits and Laboratory Reporting Limits

	San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (December 2013)						
	Table F-1a Groundwater Screening Levels Levels (groundwater is a current or potential drinking water resource)	Table F-2a Surface Water Fresh Water Habitats	Table F-4d Surface Water Quality Standards for Bioaccumulation and Human Consumption	WQOs Database	WQOs Database Description	Calscience Method Detection Limit	Calscience Reporting Limit
Analytes	**ug/l**	**ug/l**	**ug/l**	**ug/l**		**ug/l**	**ug/l**
Metals (EPA Method 6020)							
Cadmium	**0.25**	**0.25**	No Value			0.13	**1.00**
Chromium (III)	180	180	No Value			0.40	1.00
Lead	2.5	2.5	No Value			0.09	1.00
Nickel	8.2	52	4,600			0.13	1.00
Zinc	81	120	4,600			0.48	5.00
TPH-Motor Oil (EPA Method 8015B)							
TPH as Motor Oil	100	100	No Value			34.00	100.00
TPH as Diesel	100	100	No Value			11.00	50.00
VOCs (EPA Method 8260B)							
Gasoline Range Organics	100	100	No Value			31.00	50.00
Benzene	1.0	1.0	71			0.14	0.50
Diisopropyl Ether (DIPE)	No Value	No Value	No Value	No Value		0.33	2.00
Ethylbenzene	30	30	29,000			0.14	1.00
Ethyl-t-Butyl Ether (ETBE)	No Value	No Value	No Value	No Value		0.44	2.00
Methyl-t-Butyl Ether (MTBE)	No Value	5.0	No Value			0.31	1.00
Naphthalene	61	**6.1**	No Value			2.50	**10.00**
o-Xylene (combined screening level)	20	20	No Value			0.23	1.00
p/m-Xylene (combined screening level)	20	20	No Value			0.24	1.00
Tert-Amyl-Methyl Ether (TAME)	No Value	5.0	No Value			0.22	2.00
Tert-Butyl Alcohol (TBA)	12	No Value	No Value			4.60	10.00
Toluene	40	40	200,000			0.24	1.00
Fertilizers						**NCL**	**NCL**
Nitirite	No Value	No Value	No Value	No Value		20.00	10.00
Nitrate	No Value	No Value	No Value	10000.00	CA PHG	20.00	10.00
Phosphate	No Value	No Value	No Value	No Value		10.00	20.00
Organophosphorus Pesticides (EPA Method 8141B)						**NCL**	**NCL**
Asponb	No Value	No Value	No Value	No Value			
Azinphos-ethyla	No Value	No Value	No Value	No Value		0.75	2.50
Azinphos-methyl	No Value	No Value	No Value	**0.01**	Freshwater Aquatic Life Protection (Max)	0.75	**2.50**
Chlorpyrifos	No Value	No Value	No Value	**0.02**	Freshwater Aquatic Life Protection (Max)	0.21	**0.50**
Coumaphos	No Value	No Value	No Value	No Value		0.70	2.50
Demeton-Sc	No Value	No Value	No Value	**0.10**	Freshwater Aquatic Life Protection (Max)	0.74	**2.00**
Diazinon	No Value	No Value	No Value	**0.08**	Freshwater Aquatic Life Protection (Max)	0.34	**0.50**
Dichlorvos (DDVP)	No Value	No Value	No Value	**0.09**	Cal/EPA Cancer Potency Factor (drinking water)	0.78	**1.00**
Dimethoate	No Value	No Value	No Value	**1.00**	California Notification Levels	0.64	**2.50**
Disulfoton	No Value	No Value	No Value	**0.05**	Freshwater Aquatic Life Protection (Max)	0.31	**0.50**
Ethiona	No Value	No Value	No Value	No Value		0.21	0.50
Ethoprop	No Value	No Value	No Value	No Value		0.46	1.00
Fensulfothion	No Value	No Value	No Value	No Value		0.42	2.50
Fenthion	No Value	No Value	No Value	No Value		0.29	0.50

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Table 2a.

Contaminants of Concern in Water - Screening Levels and Laboratory Method Detection Limits and Laboratory Reporting Limits

Malathion	No Value	No Value	No Value	**0.10**	Freshwater Aquatic Life Protection (Max)	0.19	**0.50**
Mevinphose	No Value	No Value	No Value	No Value		0.29	1.00
Naled	No Value	No Value	No Value	14.00	USEPA IRIS Reference Dose (RfD)	0.56	1.00
Parathion, ethyl	No Value	No Value	No Value	No Value		0.22	0.50
Parathion, methyl	No Value	No Value	No Value	1.00	USEPA Health Advisory	0.36	0.50
Phorate	No Value	No Value	No Value	0.70	National Academy of Sciences Health Advisory	0.39	0.50
Ronnel	No Value	No Value	No Value	No Value		0.33	0.50
Stirophos (Tetrachlorvinphos, Gardona)	No Value	No Value	No Value	No Value		0.33	0.50

ORGANOCHLORINE PESTICIDESs (EPA Method 8081A)						**NCL**	**NCL**
Heptachlor	0.0036	0.00021	0.00021			0.02	0.10
Heptachlor epoxide	1.0	0.00011	0.00011			0.02	0.10
Methoxychlor	**0.003**	**0.01900**	No Value			0.03	**0.10**
Toxaphene	**0.0004**	**0.00020**	**0.00020**			0.50	**1.00**
Aldrin	**0.002**	**0.00014**	**0.00014**			0.05	**0.10**
alpha-BHC	No Value	No Value	No Value	0.01	USEPA IRIS	0.03	0.10
beta-BHC	No Value	No Value	No Value	0.02	USEPA IRIS	0.02	0.10
gamma-BHC (Lindane)	No Value	No Value	No Value	0.03	Cal/EPA Cancer Potency Factor as a drinking	0.02	0.10
delta-BHC	No Value	No Value	No Value	500.00	National Academy of Sciences Health Advisory	0.04	0.10
Chlordane -- not otherwise specified (n.o.s.)	**0.004**	**0.00059**	**0.00059**			0.50	**1.00**
4,4-DDD	**0.001**	**0.00084**	**0.00084**			0.03	**0.10**
4,4'-DDE	**0.001**	**0.00059**	**0.00059**			0.03	**0.10**
4,4'-DDT	**0.001**	**0.00059**	**0.00059**			0.03	**0.10**
Dieldrin	No Value	**0.00014**	**0.056**			0.03	**0.10**
Endosulfan I	**0.0087**	**0.05600**	0.24			0.03	**0.10**
Endosulfan II	0.0087	No Value	No Value			0.07	0.10
Endosulfan sulfate	No Value	No Value	No Value	0.07	Freshwater Aquatic Life Protection (24 hr ave)	0.03	0.10
Endrin	**0.0023**	**0.03600**	0.03600			0.03	**0.10**
Endrin aldehyde	No Value	No Value	No Value	0.29	Public Health Effects non-cancer	0.09	0.10

CHLORINATED HERBICIDES (EPA Method 8151A)						**NCL**	**NCL**
2,4-D (Dimethylamine salt of 2,4-Dichlorophenoxyaetic acid)	No Value	No Value	No Value	20.00	CA PHG	0.45	1.00
2,4-DB (2,4-dichlorophenoxy butyric acid)	No Value	No Value	No Value	56.00	USEPA IRIS	0.62	1.00
2,4,5-TP (Silvex)(Lauryl Alcohol, propylene glycol)	No Value	No Value	No Value	5.25	National Academy of Sciences Health Advisory	0.12	0.50
2,4,5-T (Trichlorophenoxy acetic acid)	No Value	No Value	No Value	70.00	USEPA IRIS	0.39	0.50
Dalapon (2,2-Dichloropropionic acid)	No Value	No Value	No Value	110.00	Freshwater Aquatic Life Protection (Max)	0.36	2.00
Dicamba (3,6-dichloro-2-methoxybenzoic acid)	No Value	No Value	No Value	8.75	National Academy of Sciences Health Advisory	0.12	0.50
Dichloroprop (2-ethylhexyl ester of carboxylic acid)	No Value	No Value	No Value	5700.00	Toxicity Information chronic LOEL	0.26	1.00
Dinoseb (2-sec-butyl-4,6-dinitrophenol)	No Value	No Value	No Value	7.00	MCL	0.11	0.50
Pentachlorophenol	1.0	1.00000	8.2			0.10	0.10
Bentazon	No Value	No Value	No Value	18.00	Primary MCL	0.23	1.00
Garlon	No Value	No Value	No Value	No Value		0.10	0.50
Picloram	No Value	No Value	No Value	140.00	USEPA Health Advisory	0.55	1.00

Glyphosate (EPA Method 547)						**NCL**	**NCL**
Glyphosate	**NA**	**NA**	**NA**	700.00	MCL	1.30	5.00

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Table 2b.

Contaminants of Concern in Water - Screening Levels and Laboratory Method Detection Limits and Laboratory Reporting Limits

	San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (December 2013)						
	Table F-1a Groundwater Screening Levels Levels (groundwater is a current or potential drinking water resource)	Table F-2a Surface Water Fresh Water Habitats	Table F-4d Surface Water Quality Standards for Bioaccumulation and Human Consumption	WQOs Database	WQOs Database Description	Calscience Method Detection Limit	Calscience Reporting Limit
Analytes	**ug/l**	**ug/l**	**ug/l**	**ug/l**		**ug/l**	**ug/l**
Metals (EPA Method 6020)							
Cadmium	**0.25**	**0.25**	No Value			0.13	**1.00**
Chromium (III)	180	180	No Value			0.40	1.00
Lead	2.5	2.5	No Value			0.09	1.00
Nickel	8.2	52	4,600			0.13	1.00
Zinc	81	120	4,600			0.48	5.00
TPH-Motor Oil (EPA Method 8015B)							
TPH as Motor Oil	100	100	No Value			210.00	100.00
TPH as Diesel	100	100	No Value			11.00	50.00
VOCs (EPA Method 8260B)							
Gasoline Range Organics	100	100	No Value			31.00	50.00
Benzene	1.0	1.0	71			0.14	0.50
Diisopropyl Ether (DIPE)	No Value	No Value	No Value	No Value		0.33	2.00
Ethylbenzene	30	30	29,000			0.14	1.00
Ethyl-t-Butyl Ether (ETBE)	No Value	No Value	No Value	No Value		0.44	2.00
Methyl-t-Butyl Ether (MTBE)	No Value	5.0	No Value			0.31	1.00
Naphthalene	61	**6.1**	No Value			2.50	**10.00**
o-Xylene (combined screening level)	20	20	No Value			0.23	1.00
p/m-Xylene (combined screening level)	20	20	No Value			0.24	1.00
Tert-Amyl-Methyl Ether (TAME)	No Value	5.0	No Value			0.22	2.00
Tert-Butyl Alcohol (TBA)	12	No Value	No Value			4.60	10.00
Toluene	40	40	200,000			0.24	1.00
Fertilizers						**NCL**	**NCL**
Nitirite	No Value	No Value	No Value	No Value		20.00	10.00
Nitrate	No Value	No Value	No Value	10000.00	CA PHG	20.00	10.00
Phosphate	No Value	No Value	No Value	No Value		10.00	20.00
Organophosphorus Pesticides (EPA Method 8141B)						**NCL**	**NCL**
Asponb	No Value	No Value	No Value	No Value			
Azinphos-ethyla	No Value	No Value	No Value	No Value		0.75	2.50
Azinphos-methyl	No Value	No Value	No Value	**0.01**	Freshwater Aquatic Life Protection (Max)	0.75	**2.50**
Chlorpyrifos	No Value	No Value	No Value	**0.02**	Freshwater Aquatic Life Protection (Max)	0.21	**0.50**
Coumaphos	No Value	No Value	No Value	No Value		0.70	2.50
Demeton-Sc	No Value	No Value	No Value	**0.10**	Freshwater Aquatic Life Protection (Max)	0.74	**2.00**
Diazinon	No Value	No Value	No Value	**0.08**	Freshwater Aquatic Life Protection (Max)	0.34	**0.50**
Dichlorvos (DDVP)	No Value	No Value	No Value	**0.09**	Cal/EPA Cancer Potency Factor (drinking water)	0.78	**1.00**
Dimethoate	No Value	No Value	No Value	**1.00**	California Notification Levels	0.64	**2.50**
Disulfoton	No Value	No Value	No Value	**0.05**	Freshwater Aquatic Life Protection (Max)	0.31	**0.50**
Ethiona	No Value	No Value	No Value	No Value		0.21	0.50
Ethoprop	No Value	No Value	No Value	No Value		0.46	1.00
Fensulfothion	No Value	No Value	No Value	No Value		0.42	2.50
Fenthion	No Value	No Value	No Value	No Value		0.29	0.50
Malathion	No Value	No Value	No Value	**0.10**	Freshwater Aquatic Life Protection (Max)	0.19	**0.50**
Mevinphose	No Value	No Value	No Value	No Value		0.29	1.00

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Table 2b.

Contaminants of Concern in Water - Screening Levels and Laboratory Method Detection Limits and Laboratory Reporting Limits

Naled	No Value	No Value	No Value	14.00	USEPA IRIS Reference Dose (RfD)	0.56	1.00
Parathion, ethyl	No Value	No Value	No Value	No Value		0.22	0.50
Parathion, methyl	No Value	No Value	No Value	1.00	USEPA Health Advisory	0.36	0.50
Phorate	No Value	No Value	No Value	0.70	National Academy of Sciences Health Advisory	0.39	0.50
Ronnel	No Value	No Value	No Value	No Value		0.33	0.50
Stirophos (Tetrachlorvinphos, Gardona)	No Value	No Value	No Value	No Value		0.33	0.50
ORGANOCHLORINE PESTICIDESs (EPA Method 8081A)						**NCL**	**NCL**
Heptachlor	0.0036	0.00021	0.00021			0.02	0.10
Heptachlor epoxide	1.0	0.00011	0.00011			0.02	0.10
Methoxychlor	**0.003**	**0.01900**	No Value			0.03	**0.10**
Toxaphene	**0.0004**	**0.00020**	**0.00020**			0.50	**1.00**
Aldrin	**0.002**	**0.00014**	**0.00014**			0.05	**0.10**
alpha-BHC	No Value	No Value	No Value	0.01	USEPA IRIS	0.03	0.10
beta-BHC	No Value	No Value	No Value	0.02	USEPA IRIS	0.02	0.10
gamma-BHC (Lindane)	No Value	No Value	No Value	0.03	Cal/EPA Cancer Potency Factor as a drinking	0.02	0.10
delta-BHC	No Value	No Value	No Value	500.00	National Academy of Sciences Health Advisory	0.04	0.10
Chlordane -- not otherwise specified (n.o.s.)	**0.004**	**0.00059**	**0.00059**			0.50	**1.00**
4,4-DDD	**0.001**	**0.00084**	**0.00084**			0.03	**0.10**
4,4'-DDE	**0.001**	**0.00059**	**0.00059**			0.03	**0.10**
4,4'-DDT	**0.001**	**0.00059**	**0.00059**			0.03	**0.10**
Dieldrin	No Value	**0.00014**	**0.056**			0.03	**0.10**
Endosulfan I	**0.0087**	**0.05600**	0.24			0.03	**0.10**
Endosulfan II	0.0087	No Value	No Value			0.07	0.10
Endosulfan sulfate	No Value	No Value	No Value	0.07	Freshwater Aquatic Life Protection (24 hr ave)	0.03	0.10
Endrin	**0.0023**	**0.03600**	0.03600			0.03	**0.10**
Endrin aldehyde	No Value	No Value	No Value	0.29	Public Health Effects non-cancer	0.09	0.10
CHLORINATED HERBICIDES (EPA Method 8151A)						**NCL**	**NCL**
2,4-D (Dimethylamine salt of 2,4-Dichlorophenoxyaetic acid)	No Value	No Value	No Value	20.00	CA PHG	0.45	1.00
2,4-DB (2,4-dichlorophenoxy butyric acid)	No Value	No Value	No Value	56.00	USEPA IRIS	0.62	1.00
2,4,5-TP (Silvex)(Lauryl Alcohol, propylene glycol)	No Value	No Value	No Value	5.25	National Academy of Sciences Health Advisory	0.12	0.50
2,4,5-T (Trichlorophenoxy acetic acid)	No Value	No Value	No Value	70.00	USEPA IRIS	0.39	0.50
Dalapon (2,2-Dichloropropionic acid)	No Value	No Value	No Value	110.00	Freshwater Aquatic Life Protection (Max)	0.36	2.00
Dicamba (3,6-dichloro-2-methoxybenzoic acid)	No Value	No Value	No Value	8.75	National Academy of Sciences Health Advisory	0.12	0.50
Dichloroprop (2-ethylhexyl ester of carboxylic acid)	No Value	No Value	No Value	5700.00	Toxicity Information chronic LOEL	0.26	1.00
Dinoseb (2-sec-butyl-4,6-dinitrophenol)	No Value	No Value	No Value	7.00	MCL	0.11	0.50
Pentachlorophenol	1.0	1.00000	8.2			0.10	0.10
Bentazon	No Value	No Value	No Value	18.00	Primary MCL	0.23	1.00
Garlon	No Value	No Value	No Value	No Value		0.10	0.50
Picloram	No Value	No Value	No Value	140.00	USEPA Health Advisory	0.55	1.00
Glyphosate (EPA Method 547)						**NCL**	**NCL**
Glyphosate	**NA**	**NA**	**NA**	700.00	MCL	1.30	5.00

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Table 3
Sampling Design and Rationale

Sampling Location/ID Number	Depth (feet)	Analytical Parameters	Rationale
[Subject Property]-1-(0.0'-0.5')	0.0' to 0.5'	Gasoline, BTEX, MTBE, fuel oxygenates, lead scavengers, naphthalene, diesel, motor oil, cadmium, chromium, nickel, lead, and zinc.	Assess possible contamination from petroleum compounds in soils.
[Subject Property]-1-(0.5'-1.0')	0.5' to 1.0'	Gasoline, BTEX, MTBE, fuel oxygenates, lead scavengers, naphthalene, diesel, motor oil, cadmium, chromium, nickel, lead, and zinc.	Assess possible contamination from petroleum compounds in soils.
[Subject Property]-1	Water	Gasoline, BTEX, MTBE, fuel oxygenates, lead scavengers, naphthalene, diesel, motor oil, cadmium, chromium, nickel, lead, and zinc.	Assess possible contamination from petroleum compounds in water.
[Subject Property]-2-(0.0'-0.5')	0.0' to 0.5'	Pesticides, herbicides, rodenticides, nitrate, nitrite, and phosphate.	Assess possible contamination of soils from chemicals used at grow sites.
[Subject Property]-2-(0.5'-1.0')	0.5' to 1.0'	Pesticides, herbicides, rodenticides, nitrate, nitrite, and phosphate.	Assess possible contamination of soils from chemicals used at grow sites.
[Subject Property]-2	Water	Pesticides, herbicides, rodenticides, nitrate, nitrite, and phosphate.	Assess possible contamination of water from chemicals used at grow sites.

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Table 4a.
Analytical Services (Soil)

Sampling Location/ID Number	Depth (feet)	Special Designation	EPA Method 8015B TPH-Gas	EPA Method 8015B TPH-Diesel	EPA Method 8015B TPH-Motor Oil	EPA Method 8260B BTEX, MTBE, oxygenates, lead scavengers, and naphthalene	EPA Method 6020 (cadmium, chromium, lead, nickel, and zinc)	EPA Method 8141B Organophosphorus Pesticides	EPA Method 8081B Organochlorine Pesticides	EPA Method 8151A Chlorinated Herbicides
[Subject Property]-1-(0.0'-0.5')	0.0' to 0.5'	MS/MSD	x	x	x	x	x			
[Subject Property]-1-(0.5'-1.0')	0.5' to 1.0'		x	x	x	x	x			
[Subject Property]-2-(0.0'-0.5')	0.0' to 0.5'							x	x	x
[Subject Property]-2-(0.0'-0.5')	0.0' to 0.5'							x	x	x
[Subject Property]-3-(0.0'-0.5') Duplicate of [Subject Property]-1-(0.0'-0.5')	0.0' to 0.5'		x	x	x	x	x			

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Table 4b.
Analytical Services (Water)

Sampling Location/ID Number	Special Designation	EPA Method 8015B TPH-Gas	EPA Method 8015B TPH-Diesel	EPA Method 8015B TPH-Motor Oil	EPA Method 8260B BTEX, MTBE, oxygenates, lead scavengers, and naphthalene	EPA Method 6020 (cadmium, chromium, lead, nickel, and zinc)	EPA Method 8141B Organophosphorus Pesticides	EPA Method 8081B Organochlorine Pesticides	EPA Method 8151A Chlorinated Herbicides	NCL Method 072 Glyphosate
[Subject Property]-1	MS/MSD	X	X	X	X	X				
[Subject Property]-2							X	X	X	X
[Subject Property]-3 Duplicate of [Subject Property]-1		X	X	X	X	X				
[Subject Property]-Equipment Blank		X	X	X	X	X				

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Table 5.
Analytical Method, Container, Preservation, and Holding Time Requirements

Analytical Parameter	Media	Analytical Method Number	Containers (number, type, size/volume)	Preservation Requirements (chemical, temperature, light protection)	Maximum Holding Times
TPH-D/MO	Soil	8015B (TPH-D/MO)	4 oz glass jar with Teflon® lid	Chill with ice to 4°C	14 days
TPH-Gas	Soil	8015B (TPH-Gas)	3 40 ml VOAs	5 grams of soil placed in each of two 40 ml VOAs with sodium bisulfate for low-level analysis 10 grams of soil placed in one 40 ml VOA preserved with methanol Chill with ice to 4°C	14 days
VOCs	Soil	8260B (VOCs)	3 40 ml VOAs	5 grams of soil placed in each of two 40 ml VOAs with sodium bisulfate for low-level analysis 10 grams of soil placed in one 40 ml VOA preserved with methanol Chill with ice to 4°C	14 days
Metals	Soil	6020 (Metals)	4 or 8 oz glass jar with Teflon® lid	Chill with ice to 4°C	180 days
Organophosphorus Pesticides	Soil	8141B	4 or 8 oz glass jar with Teflon® lid	Chill with ice to 4°C	14 days
Organochlorine Pesticides	Soil	8081B	4 or 8 oz glass jar with Teflon® lid	Chill with ice to 4°C	14 days
Chlorinated Herbicides	Soil	8151A	4 or 8oz glass jar with Teflon® lid	Chill with ice to 4°C	14 days
Glyphosate	Soil	NCL Method 072	4 or 8 oz glass jar with Teflon® lid	Chill with ice to 4°C	14 days
TPH-Diesel/Motor Oil	Water	8015B (TPH-D/MO)	500 ml amber glass	Chill with ice to 4°C	7 days
TPH-Gas/VOCs	Water	8260B (VOCs)	3 40 ml VOAs	Three 40 ml VOAs preserved with HCL Chill with ice to 4°C	7 days
Metals	Water	6020 (Metals)	250 ml poly	Field filtered and preserved with nitric acid Chill with ice to 4°C	7 days
Organophosphorus Pesticides	Water	8141B	1 liter amber glass	Chill with ice to 4°C	7 days
Organochlorine Pesticides	Water	8081B	1 liter amber glass	Chill with ice to 4°C	7 days
Chlorinated Herbicides	Water	8151A	1 liter amber glass	Chill with ice to 4°C	7 days
Glyphosate	Water	NCL Method 072	1 liter amber glass	Chill with ice to 4°C	7 days
Nitrite	Water	300.0 Rev 2.1 (1993)	250 ml poly	Preserved with sulfuric acid Chill with ice to 4°C	48 hours
Nitrate	Water	300.0 Rev 2.1 (1993)	250 ml poly	Preserved with sulfuric acid Chill with ice to 4°C	48 hours
Orthophosate	Water	300.0 Rev 2.1 (1993)	250 ml poly	Chill with ice to 4°C	48 hours

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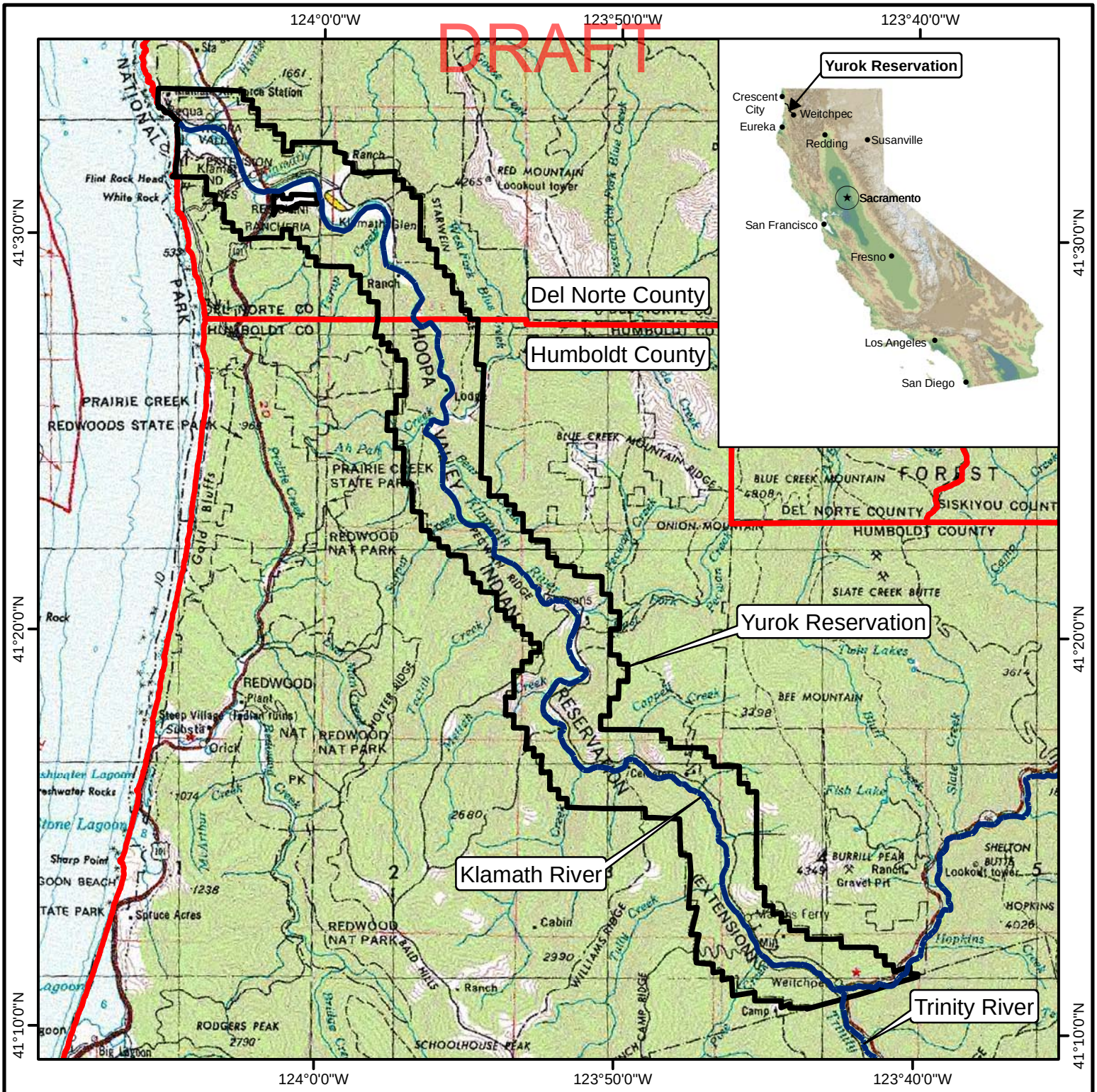
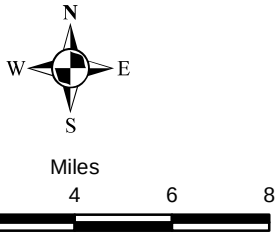
Table 6.
Field and Sampling Equipment

Description of Equipment	Material	Dedicated (Yes/No)
Shovel	Hardened Steel	No
Rock Bar	Hardened Steel	No
Hand Auger	Hardened Steel	No
Jack Hammer	Hardened Steel	No





LEGEND

- Yurok Reservation Boundary
- County Boundary

Base Image Data Source:
1:250,000 topographic map images.

ALL LOCATIONS APPROXIMATE

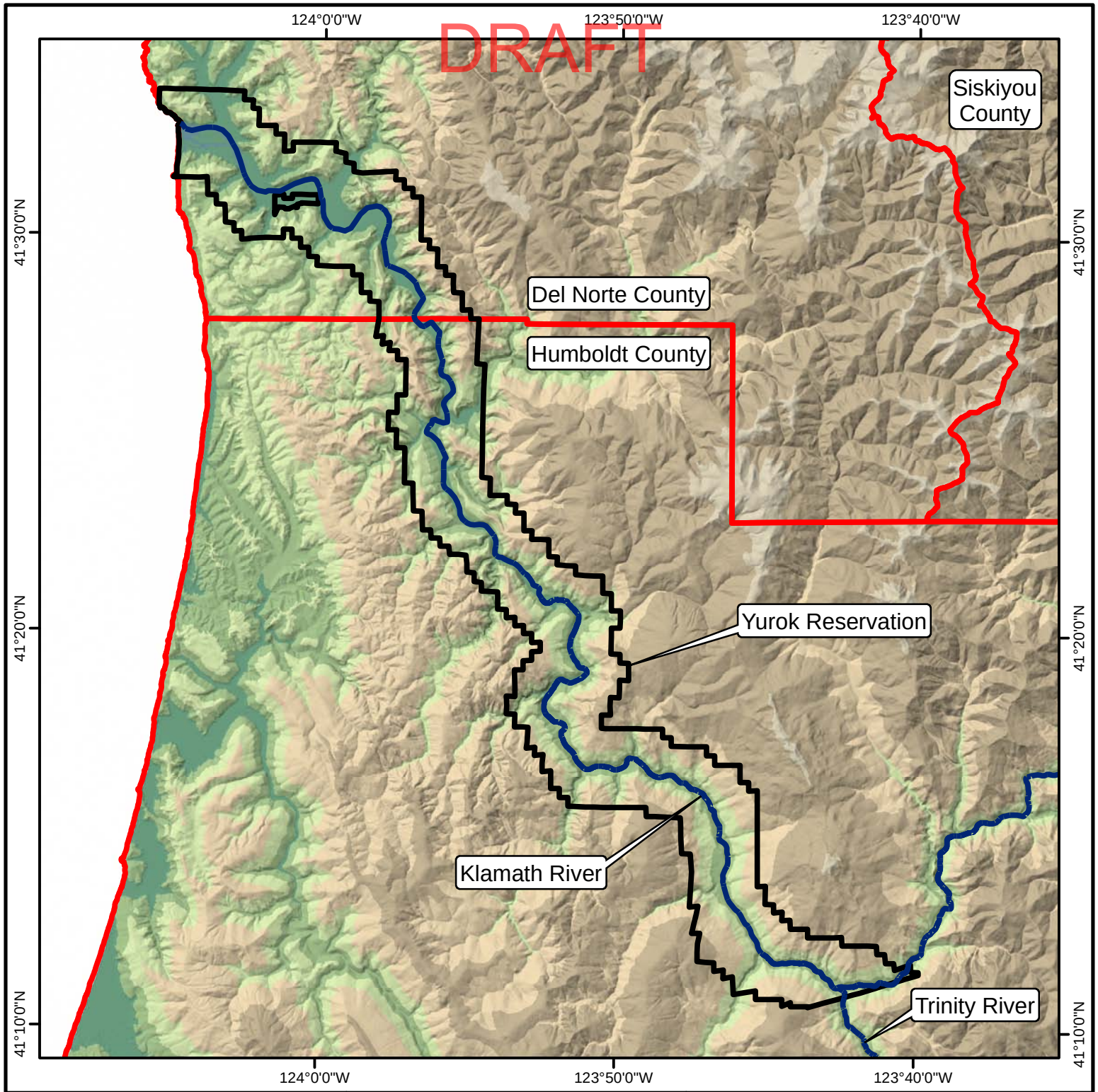
Yurok Tribe
Environmental Program

Figure 1
Yurok Reservation
Humboldt and Del Norte
Counties, California

Freshwater Environmental Services

Date: 8-13-14

By: SJT



N
W E
S

Miles
0 1 2 4 6 8

LEGEND

Yurok Reservation Boundary

County Boundary

Base Image Data Source:
USGS 30-Meter Digital
Elevation Model

ALL LOCATIONS APPROXIMATE

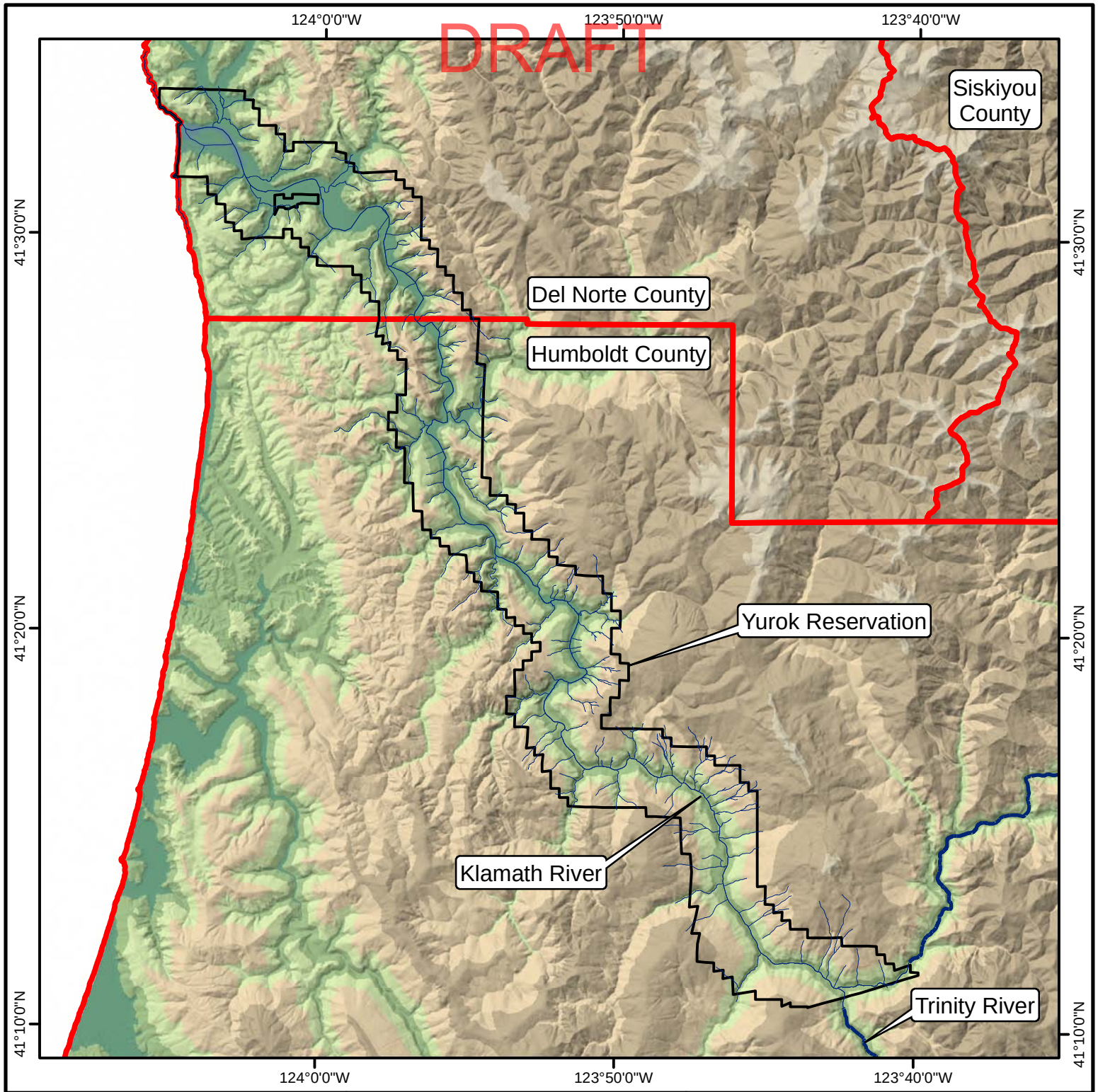
Yurok Tribe
Environmental Program

Figure 2
Yurok Reservation
Humboldt and Del Norte
Counties, California

Freshwater Environmental Services

Date: 8-16-14

By: SJT



N
W E
S

Miles
0 1 2 4 6 8

LEGEND

Yurok Reservation Boundary

"Blue-Line Stream"

Base Image Data Source:
USGS 30-Meter Digital
Elevation Model

ALL LOCATIONS APPROXIMATE

Yurok Tribe
Environmental Program

Figure 3
Stream Channels shown as
"Blue-Line Streams"
on USGS Topographic Maps

Freshwater Environmental Services

Date: 8-16-14

By: SJT

Photo 1. Site preparation.
Photo Source: Lost Coast Outpost website. Photo Date: Unknown

Photo 2. Greenhouses installed after site preparation.
Photo Source: Lost Coast Outpost website. Photo Date: Unknown

Photo 3. Outdoor cultivation.
Photo Source: Lost Coast Outpost website. Photo Date: Unknown

Photo 4. Outdoor cultivation using soil containment.
Photo Source: Lost Coast Outpost website. Photo Date: Unknown

Photo 5. Greenhouse with soil containment.
Photo Source: Lost Coast Outpost website. Photo Date: Unknown

Photo 6. Greenhouse with potted plants.
Photo Source: Lost Coast Outpost website. Photo Date: Unknown

Photo 7. Probable fuel tank with no secondary containment.
Photo Source: Lost Coast Outpost website. Photo Date: Unknown

Photo 8. Probable fuel tank with no secondary containment adjacent to stream channel.
Photo Source: Lost Coast Outpost website. Photo Date: Unknown

Photo 9. Anticoagulant rodenticide containers. The active ingredient in d-CON® is brodifacoum.
Photo Source: Lost Coast Outpost website. Photo Date: Unknown

Photo 10. Pesticide and anticoagulant rodenticide containers. Malathion is an organophosphate insecticide. The active ingredient in Bait Block® is diphacinone.
Photo Source: Lost Coast Outpost website. Photo Date: Unknown

DRAFT

Photo 11. Diesel generator on trailer inside building. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 12. Fuel storage tank on trailer. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 13. Tanker with flammable liquid (probably diesel) placard. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 14. Small gasoline generator. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 15. One-gallon motor oil container. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 16. Various petroleum containers. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

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Photo 17. Hydraulic fluid in 5-gallon container. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 18. Probably waste oil container. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

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Photo 19. Pesticide containers. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 20. Pesticide containers. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 21. Chemical containers. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 22. Fertilizer bag. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

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Photo 23. Sprayer with Roundup label. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 24. Sprayer with unknown contents. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

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Photo 25. Degreaser container. Photo Source: YTEP (modified by FES).
Photo Date: July/August 2014.

Photo 26. Potting soil disposal. Photo Source: YTEP (modified by FES).
Photo Date: July/August 2014.

Photo 27. Unknown liquid in container. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 28. Unknown liquid in container. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 29. Poly tank with nutrient containers. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 30. Water impoundment with small pump in background. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

DRAFT

Photo 31. Plants near seep. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.

Photo 32. Excavated spring. Photo Source: YTEP (modified by FES). Photo Date: July/August 2014.