

**INLAND EPHEMERAL DATA COLLECTION PLAN
FEATHER RIVER CANYON**

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**California Department of Fish and Wildlife,
Office of Spill Prevention and Response
Resource Restoration Program**

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LIST OF ABBREVIATIONS AND ACRONYMS

BIOS	Biogeographic Information and Observation System
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
COC	Chain-of-custody
CDFW-OSPR	California Department of Fish and Wildlife, Office of Spill Prevention and Response
EDCC	Ephemeral Data Collection Coordinator
EPA	U.S. Environmental Protection Agency
ERMA	Environmental Response Management Application
GPS	Global Positioning System
Ephemeral Data	Information that can only be collected within the narrow time-frame of after a spill occurs and before the river is impacted.
HAZWOPER	Hazardous Waste Operations & Emergency Response
ID	Identification
mL	Milliliter
NOAA	National Oceanic and Atmospheric Administration
NRDA	Natural Resource Damage Assessment
PAHs	Polycyclic Aromatic Hydrocarbons
PFD	Personal Floation Devices
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/ Quality Control
RP	Responsible Party
SAP	Sampling and Analysis Plan
TPH	Total Petroleum Hydrocarbons
USFWS	United States Fish and Wildlife Service
VOA	Volatile Organic Analysis

EXECUTIVE SUMMARY

This Ephemeral Data Collection Plan (plan) describes and prioritizes ephemeral data collection by the Natural Resources Damage Assessment (NRDA) team in the event of an accidental release of oil within the Feather River Canyon. The NRDA team may consist of representatives of the responsible party (RP) and the natural resource trustees (hereafter referred to as the 'Trustees'), including the California Department of Fish and Wildlife, Office of Spill Prevention and Response (CDFW-OSPR), the Department of the Interior (U.S. Fish and Wildlife Service [USFWS], and the U.S. Department of Agriculture (U.S. Forest Service). By developing and implementing this plan before an accidental release, it ensures that the baseline (pre-spill) condition data will be available and helps establish agreed upon sample locations and collection procedures to be implemented following a release. CDFW-OSPR prepared this plan.

Ephemeral data refer to information that may not be available if it is not collected within a narrow time frame. The primary goal of the plan is to collect ephemeral data that (1) documents existing conditions, and (2) documents petroleum hydrocarbon concentrations in water, sediment, and selected freshwater organisms prior to and following an incident.

The key to successfully collecting ephemeral data (i.e., petroleum hydrocarbon concentrations in environmental media) during an accidental release is a well-designed and implementable ephemeral data collection plan. Therefore, the primary purpose of this plan is to describe notification procedures, sampling locations, sampling media, sampling procedures and chemical analysis objectives in the event of an accidental release within the Feather River Canyon. Collection of ephemeral data aids in the understanding of environmental conditions prior to a release and is critical in identifying the need for, and scope of, subsequent environmental sampling and injury assessment. Having this plan in place prior to a release will facilitate the collection of critical environmental information during the early stages of the response effort.

A secondary purpose of this plan is to detail sampling locations, procedures, and chemical analysis objectives for monitoring of surface water, sediment, and tissues that may be performed by CDFW-OSPR to evaluate pre-incident ambient conditions. There are many anthropogenic and natural sources of hydrocarbons in the environment. Baseline or ambient conditions (i.e., petroleum hydrocarbon concentrations in various media not associated with an accidental release) should be assessed to gain an understanding of the existing conditions to allow a more accurate evaluation of impacts should an incident occur in the future. The Trustees recognize that implementing an ephemeral data collection plan within hours of an incident may be problematic given the potential magnitude of released product (i.e., thousands of gallons of crude oil or refined fuels) and the limited resources and manpower available for this effort on a short 2-3 hour timeframe. Therefore, in order to provide some initial information on potential baseline chemical conditions in the Feather River Canyon, CDFW-OSPR determined it was appropriate to perform monitoring of ambient petroleum hydrocarbon concentrations in surface water, sediment, and tissues within this area beginning in the fall of 2017.

Before implementing this plan, representatives of the NRDA team will determine if incident circumstances warrant implementation of the plan, and, if so, any modifications to the plan that may be required. Also, during an incident, the ephemeral data collection procedures and locations detailed in this plan may be modified following lessons learned from future oil spill response drills or real-time responses to accidental releases within the Feather River Canyon.

Finally, the CDFW-OSPR recognizes that other (non-petroleum) spills may occur in the Feather River Canyon and may benefit from the sampling design and procedures described in this plan. In the event of a release, the Trustees may choose to implement this plan to assist them during NRDA pre-assessment and assessment activities.

1.0 INTRODUCTION

1.1 PURPOSE, GOALS, OBJECTIVES, FOCUS, AND SCOPE OF THE PLAN

- **Purpose:** (1) To expedite and detail procedures for collection of ephemeral source oil, surface water, sediment, and tissue samples in the event of an accidental release of petroleum into the Feather River Canyon. This plan describes notification procedures, sampling locations, sample media, sampling procedures and chemical analysis objectives in the event of a large accidental release of oil. (2) To detail procedures for collecting and analyzing petroleum hydrocarbon concentrations in surface water, sediment, and tissues for understanding baseline or ambient conditions present because of anthropogenic or natural releases of petroleum hydrocarbons into the Feather River Canyon.
- **Goals:** To obtain data that will assist in determining the source of oil(s); document petroleum hydrocarbon concentrations in water, sediment, and selected freshwater organisms prior to and following an accidental release of oil in the Feather River Canyon.
- **Objectives:** (1) To collect source oil, water, sediment, and tissue samples within the first hours, days, and weeks after an accidental release of oil for petroleum hydrocarbon analysis; and (2) collect water, sediment, and tissue samples for understanding baseline petroleum hydrocarbon concentrations in the Feather River Canyon. During an incident, there is a narrow window of opportunity for collection of these data, and, accordingly, they are referred to as “ephemeral” data (i.e., if the samples are not collected, the opportunity to collect them will be lost permanently). Ephemeral and baseline data can be critical in identifying the need for, and scope of, subsequent environmental sampling and injury assessment.
- **Focus of Sample Collection and Chemical Analysis:** The following types of samples will have the highest priority: (1) source oil(s) to confirm petroleum fingerprint and for possible toxicological testing; (2) water, sediment, and tissues in areas not yet impacted but likely to be impacted (baseline conditions); and (3) water, sediment, and tissues within the impacted river reach to obtain information on the concentration of selected petroleum constituents in those media. Petroleum hydrocarbon analyses will be consistent with the U.S. Environmental Protection Agency (EPA) standard methods.
- **Scope:** To have a scalable sampling plan to adjust to the size of the incident, with sample locations pre-identified in the plan.
- **Study Area:** Feather River Canyon including the North and Middle Forks of the Feather River. Specific sampling locations within the study area are identified in Section 1.3.

Ephemeral data collection plan overview, ambient monitoring, communication among agency representatives and the unified command and field teams are described in Section 1. Procedures for collecting, storing, transporting, and documenting samples are detailed in Section 2. Chemical analyses and chain-of-custody are described in Sections 3 and 4. The key natural resource trustee representatives, technical support and chemical analysis contacts, and other state and local agency contacts are listed in Sections 5, 6, and 7. FedEx shipping locations are provided in Section 8 and directions to the listed sampling locations are provided in Section 9. Referenced material can be found in Section 10.

1.2 FACTORS AFFECTING EPHEMERAL DATA COLLECTION PLAN IMPLEMENTATION

1.2.1 Study Area and Special Considerations

The Feather River is located in the Sierra Nevada mountain range. As the mountain range's largest river, it flows from its headwaters to the Sacramento River. It consists of five branches, East Branch, West Branch, South Fork, Middle Fork, and North Fork.

- The East Branch originates at the confluence of Indian Creek and Spanish Creek and joins the North Fork near Belden, CA.
- The West Branch originates in Butte County and is joined by various creeks prior to emptying into the northwest arm of Lake Oroville.
- The South Fork originates from Little Grass Valley Reservoir and eventually becomes the south arm of Lake Oroville.
- The Middle Fork, listed as a National Wild and Scenic River, is formed by a number of tributaries from the Sierra Valley and other merging creeks. It continues to flow west into Lake Oroville.
- The North Fork originates in Feather River Meadows, which flows into Lake Almanor and eventually meets the East Branch. It continues to flow west into Lake Oroville.

The North Fork contains dams and diversions used for hydroelectric power generation by Pacific Gas & Electric Company. The Upper North Fork consists of three dams and reservoirs, river powerhouses, tunnels and penstocks. The dams include the Rock Creek Dam (southwest of Belden, CA), the Cresta Dam (southwest of Merlin, CA) and the Poe Dam (Northeast of Pulga, CA). Prior to entering the Sacramento River, the Feather River crosses Oroville Dam and Thermalito Diversion.

Railroad tracks parallel the road and often the river, along the North and Middle Forks. These tracks are used to transport crude and petroleum products that may potentially impact the river by an accidental derailment.

1.2.2 Physical and Temporal Factors

Implementation of the ephemeral data collection, as detailed in this plan, including sampling site priorities (Appendix 1) will depend on three primary factors: (1) volume released, (2) time-period between the release and when field teams can be mobilized to collect samples, and (3) river flow rate and depth at the time of the release. Wind and storm water runoff are secondary forces, affected by seasonality and weather conditions. For purposes of implementing this plan, as discussed in Section 1.4, the NRDA Agency Lead(s) will confer to decide whether the magnitude of the release warrants the deployment of field teams to implement the plan. In deciding how to implement this plan and deciding on sampling location priorities, the NRDA Agency Lead(s) will consider the following:

- *Volume released:* If the volume of released product appears to have harmed or is likely to harm birds, fish, or other organisms, or appears to have compromised the usefulness of habitat for wildlife, it may be assumed that NRDA is a possibility and that trust wildlife resources may be affected. Field teams should be mobilized to begin gathering information and collecting time-critical data.
- *Time-period between the release and when field teams can be mobilized to collect samples:* If field teams are unable to collect samples after 6 to 12 hours following the release, depending on the magnitude, duration, weather conditions, and river flows, it may not be possible to sample the riverbank before it is impacted. Therefore, as a contingency, this plan also includes an optional baseline or ambient data collection plan as described in Section 1.3.
- *River flow rate and depth:* Depending on the river's flow and depth, areas downstream of the release may become impacted, and petroleum product may become entrained in the subsurface flow or in the bed sediments. If the river's flow rate and depth present dangerous conditions, field teams may not be able to collect samples from within the river following the release; sampling priorities should be matched to flow rate and depth conditions.

1.2.3 Safety

Safety is the most important consideration in plan implementation. Field teams may encounter oil during collection of water, sediment or tissue samples. Personnel collecting data in the field should be at least 24-hour Hazardous Waste Operations & Emergency Response (HAZWOPER) certified if oil is present and have received permission from the Unified Command Incident Site Safety Officer to enter impacted areas.

Before sampling in impacted areas, all field team members must read and be familiar with and follow the procedures specified in the site safety plan prepared by the Unified Command. Before going into the field, all field team members will receive a daily safety briefing from the Ephemeral Data Collection Coordinator (EDCC; discussed in detail in Section 1.4). Field team members collecting samples by boat,

if applicable, will receive a boat safety briefing by the boat operator prior to leaving. When on or near water, field team members will wear personal floatation devices (PFDs). Good judgment must be used at all times, particularly when considering fieldwork during inclement weather and collecting samples near cliffs and in high flow situations. If sampling is to be conducted where high flows create dangerous swift water conditions, field team members must survey the river for features (e.g., access points, eddies) and hazard risks (i.e., strainers, rocks) and wear appropriate river safety gear (e.g., PFD, helmet, whistle, and knife) prior to entering the river. Shore-based field team members also should be equipped with the same safety gear, including a throw bag, should a rescue scenario arise. No sampling will be conducted in the dark. While working near the river, field team members should be mindful of slippery surfaces (e.g., rocks) and sharp objects. Field team members should wear sunglasses, sunscreen, appropriate footwear, and other personal protective equipment (PPE) as might be required by the safety officer.

PPE will depend on the specific hazardous petroleum materials and their concentrations. Under no circumstances should the field team enter uncharacterized, freshly impacted riverbanks without proper training (i.e., 40-hour HAZWOPER certification) and combustible gas/hydrogen sulfide meters. Likewise, sampling in the impacted area will not be done if respirators are required or the safety officer deems the area unsafe. When collecting water samples in the impacted area, field sampling team members will wear appropriate protective equipment (e.g., gloves, Tyvek, personal flotation device). Nitrile gloves and/or cut-resistant gloves will be worn when sampling any medium of interest and will be changed between each sampling site. See Appendix 5 for further discussion of sampling procedures and health and safety requirements.

1.3 AMBIENT MONITORING

As part of the preparation of this plan, samples were collected by CDFW-OSPR in October 2017 to begin documenting ambient or baseline conditions in the study area. Doing so was based on concerns about conditions (e.g., time of day when a spill might happen, traffic, availability of trained field team members) that may preclude or impede implementation of ephemeral data collection in the event of an actual accidental release.

The following locations (shown in Appendix 1 and 2) and sample-types were collected:

Surface Water Grab Samples (1-liter sample per location)

- Pulga (N 39.80740° / W -121.43658°)
- Paxton (N 40.03873° / W -120.99349°)
- Indian Creek (N 40.07167° / W -120.94733°)
- O'Feather (N 39.78486° / W -120.51328°)

Sediment Samples (composite sample; same general area as water samples)

- Pulga (N 39.80750° / W -121.43650°)
- Paxton (N 40.03841° / W -120.99309°)
- Indian Creek (N 40.07143° / W -120.94747°)
- Spanish Creek Campground (N 40.02505° / W -120.96695°)
- O'Feather (N 39.78477° / W -120.51328°)

Tissue Samples [each sample is a composite of 3+ individuals (e.g., crayfish)]

- Pulga
 - Trap #1 – (N 39.80740° / W -121.43658°)
 - Trap #2 – (N 39.80669° / W -121.43769°)
- Paxton
 - Trap #1 – (N 40.03848° / W -120.99315°)
 - Trap #2 – (N 40.03873° / W -120.99349°)
- Indian Creek
 - Trap #1 – (N 40.07167° / W -120.94733°)
- Spanish Creek Campground
 - Trap #1 – (N 40.02505° / W -120.96695°)
- O'Feather
 - Trap #1 – (N 39.78486° / W -120.51328°)
 - Trap #2 – (N 39.78477° / W -120.51363°)

Interpretation of statistical comparisons of these data to spill data (in the event one occurs) must take into consideration the sample size and geographic coverage of the sampling effort. Data, including site-specific information (GPS coordinates), sample specific information (date and time collected, matrix etc.), and analytical chemistry results are available on CDFW's Biographic Information and Observation System (BIOS; <https://www.wildlife.ca.gov/Data/BIOS>) and on NOAA's Southwest Environmental Response Management Application (ERMA; <https://response.restoration.noaa.gov/maps-and-spatial-data/environmental-response-management-application-erma/southwest-erma.html>).

1.4 COMMUNICATION AMONG AGENCY REPRESENTATIVES

After receiving notification of a release of greater than de minimis quantities, CDFW-OSPR will notify, to the extent feasible, the key RP and Natural Resource Trustee Agency Lead(s) or their alternates (Section 5). RP and Trustee Agency representatives may coordinate to assess the circumstances and determine sampling priorities including what, if any, elements of the plan should be implemented, modified, or if additional monitoring elements should be considered. In the event of a large release that could potentially harm or threaten to harm birds, fish, or other organisms, or appears to have compromised or has the potential to compromise the usefulness of habitat for fish or wildlife, the RP and the Trustee agencies can identify and mobilize the appropriate staff to initiate implementation of the plan. Key contacts for mobilizing field teams are identified in Section 5.0. If the RP and Trustee Agency Lead(s) are unreachable in the early hours/days of the spill,

CDFW-OSPR Agency Lead(s) will begin coordinating initial sampling priorities and efforts, including implementation of this plan.

The RP, Trustee Agency Lead(s), or their alternates (Section 5.0), may participate in an initial conference call to determine the specific plan elements to be implemented, to share needed contact and location information, and then to assign their respective staffs to participate in sample collection activities as appropriate. A Trustee EDCC, appointed by the NRDA Agency Lead(s), will be assigned to provide project oversight and management. The EDCC will manage implementation of this plan and coordinate with the Unified Command for the response (see Section 1.5), via the NRDA Representative, for increased efficiencies in all aspects of data collection for the response and the damage assessment.

1.5 RELATIONSHIP AND COMMUNICATION WITH THE UNIFIED COMMAND

The NRDA for an incident is done in parallel with the incident response, but is separate from it. The goals of response and NRDA are different. The goals of spill response are to stop and stabilize the source of the spill, remove oil from the environment, protect the safety and health of the responders and the public, and avoid or minimize harm to the environment. Whereas, the goal of NRDA is to identify the type and amount of restoration needed to restore injured natural resources.

Figure 1 details the response Incident Command Structure organization for a spill and the coordination points with NRDA. Since NRDA field assessment activities may overlap those of the response, close coordination and cooperation between the two efforts is necessary. The NRDA Agency Lead(s) are responsible for establishing the communication link with the Incident Command (i.e., Unified Command if the incident is federalized) via the NRDA Representative or Liaison as described in the West Coast Joint Assessment Team (WCJAT) guidance document (WCJAT, 2017) and the CDFW-OSPR Policy 603-1, Communication and Coordination between Natural Resource Damage Assessment (NRDA) and Incident Command Structure During Spill Response (2009). All communications with the Unified Command will be coordinated through the NRDA Representative.

The EDCC will prepare a General Message (*ICS 213*) to establish and document communications and resource requests between NRDA and the Planning Section (Environmental Unit) and the Operations Section (Wildlife Branch) of the Unified Command. This will allow for the coordination of environmental sampling and field data collection activities between NRDA and the response. For example, when NRDA ephemeral data collection field teams are directed to sample in impacted areas, health and safety must be addressed and permission to enter impacted areas must be coordinated through the NRDA Representative and the EDCC. A General Message (*ICS 213*) will be provided to the Unified Command daily throughout the duration of the field activities or as appropriate based on the incident.

1.6 FIELD TEAMS

The EDCC makes field assignments, reviews and disseminates health and safety procedures, monitors all field activities, and provides the field team leaders with information containing specific guidelines (e.g., health and safety, sampling locations and sites, sample collection procedures, etc.) for implementing the plan. All personnel involved in implementation of the ephemeral data collection plan are responsible for reporting progress and results to the EDCC. The EDCC also will verify that all field sampling team members have read and signed a copy of the incident health and safety plan.

NRDA field teams, including representatives of the RP and/or the Trustees, may collect samples both offshore and onshore. To expedite the collection of samples, separate offshore (i.e., in wadable or non-wadable river reaches) and onshore field teams may be mobilized. Offshore sampling teams may sample from a boat in deeper waters and include an experienced boat operator and two other qualified people (i.e., people with experience or training for on-water sample collection): one to collect samples and the other to record notes and take photographs. Onshore sampling teams may consist of up to four people each: one to collect water and sediment samples, one to collect tissue, one to record notes, and one to photo-document the riverbank. A person designated by the Unified Command or Investigations Unit will collect the source oil sample, if present. All communications with the Unified Command will be coordinated through the NRDA Representative (Section 1.5). Key contacts for mobilizing field teams are identified in Section 5.0.

2.0 SAMPLING PROCEDURES

2.1 OVERVIEW

This section describes methods for collecting source oil or fuel (i.e. product), weathered product (i.e., tar balls), sheen, water, sediment, and tissue. The protocol described below is to be followed unless the NRDA Agency Lead(s) decide otherwise and provide an alternative. This section provides a general overview of sample collection procedures. Appendix 1 provides maps of proposed pre-oiling sampling locations and baseline or ambient monitoring locations. Appendix 2 provides photographs of sampling locations and brief site descriptions. Appendix 3 provides a checklist for field sampling teams to consider before, during, and after planned field activities. Appendix 4 provides a list of equipment and supplies necessary for collecting and documenting samples. Appendix 5 is CDFW-OSPR's 'Template' Sampling and Analysis Plan (SAP) used during the ephemeral data collection phase of an NRDA.

This plan refers to sample "locations" and sample "sites". A sample "location" is the general vicinity where the sample is to be collected (e.g., Spanish Creek Campground). A sample "site" is the point referenced in decimal degrees by WGS84

datum where the sample is collected (e.g., points on a transect at Spanish Creek Campground).

At a minimum, the following information should be recorded in field notes by each field team: names of field team members, name of person collecting the sample, type of sample collected and time of sample collection, global positioning system (GPS) location of sampling site, photographic log, standard observations such as weather and presence of wildlife and recreational users, and any unusual sample conditions. After collected, all samples should immediately be chilled in an ice cooler with frozen blue, crushed, or block ice. Chain-of-custody must be maintained for all samples collected (see Section 4.0 and Appendix 5).

One NRDA team member each day or each shift will be responsible for a quality assurance review of the data sheets to verify that they are completely and correctly documented.

2.2 SAMPLING FREQUENCY

2.2.1 Ephemeral Data Collection Following a Spill Event

A source sample and baseline (pre-oiling) water, sediment, and tissue samples should be collected as soon as possible after the release. To achieve these objectives, the NRDA team must have notification procedures in effect for the immediate mobilization of field teams (see Sections 1.4 and 5). If pre-oiling samples cannot be collected in time, then ambient monitoring samples collected per this plan, in addition to upstream unoiled samples, may be used to help understand baseline conditions.

The frequency of sampling following the incident in impacted areas (i.e., daily, weekly, monthly) will depend on the magnitude of the incident, the type of product released, and the affected resource or habitat (e.g., riverbank, water column, stream). The NRDA Agency Lead(s) will evaluate conditions and determine a suitable frequency for subsequent sampling in areas impacted by the incident.

2.2.2 Ambient Monitoring

Samples may be collected to document and understand the potential magnitude of ambient petroleum hydrocarbon concentrations at the sites identified herein (Section 1.3). During the development of this plan, water, sediment and tissue (crayfish) samples were collected by CDFW-OSPR in October 2017 from five sites within the Feather River Canyon (Pulga, Paxton, Indian Creek, Spanish Creek Campground and O'Feather). The frequency of future ambient monitoring will be at CDFW-OSPR's discretion.

2.3 SAMPLING PRIORITY

Under ideal conditions (i.e., favorable weather and plenty of resources), collection of source oil samples and environmental samples identified below should occur in parallel and have first priority. Circumstances, and timing of the mobilization of field teams, may prevent the collection of samples in the priority indicated below. Therefore, it is critical that the NRDA Agency Lead(s) quickly evaluate circumstances and available resources to determine the appropriate priority of sample collection.

- **First Priorities:**

- I. Collection of source oil(s) from the point of release. CDFW-OSPR Oil Spill Prevention Specialists and RP representatives (with the approval of CDFW-OSPR) are the appropriate personnel to collect source oil samples.
- II. Collection of water, sediment, and tissue in areas that are not yet impacted but are likely to be impacted based on river flows, trajectory analysis if close to a river mouth and the professional judgment of the Unified Command Scientific Support Coordinator. See Section 1.2.2 and Appendix 1 for information and maps that detail sampling location priorities within various segments of the river.
- III. Collection of water, product (i.e., tar balls, floating fuel) or sheen samples in impacted areas, provided it is safe (i.e., respirators not required and other proper PPE is applied), and site access is coordinated with the Unified Command. Within impacted areas, the first priority is to sample water in oiled areas (e.g., areas with high, medium, low oiling levels), including sampling at the leading margin where the oil has begun to break up. Sheen and product samples for petroleum hydrocarbon fingerprinting also should be collected on water, on structures, and on riverbanks to document the extent of the release.

- **Second and Ongoing Priorities:** After first priority samples are collected in the days following the incident, additional sheen, product, water, sediment, and tissues samples may be collected for chemical analysis on a weekly, monthly, or annual basis as required for injury assessment purposes (Section 2.2.1).

2.4 SAMPLE DOCUMENTATION AND HANDLING PROCEDURES

2.4.1 Sample Labeling

All samples must be labeled for proper sample tracking, transport, chain-of-custody, and chemical analysis. Fill out a label for each jar, vial, bottle or foil/plastic bag with the following information: name of the incident/case; sample ID number; date, time, and location of sample collection; sample type and amount; and collector's name. Use a pen or permanent marker for labeling and cover label with clear plastic tape if

the label is not printed on waterproof paper. Appendix 5 includes sample label templates and provides more detailed sample labeling procedures, including unique codes used to identify each type of sample collected. For purposes of identifying the technical or resource NRDA field team involved with sampling, sample codes should include “ED” for “Ephemeral Data Collection” and a one number code identifying the field team that collected the sample.

2.4.2 Contamination Precautions

A sample will be contaminated if the gloves you are wearing contacts oil. If a glove comes into contact with oil, do not sample, change gloves, and take another sample if necessary. Avoid sampling downwind of engine exhaust. Use certified pre-cleaned glassware. If glassware comes in contact with oil, discard and resample with a clean bottle. If oil is present, clean or cover boots between sampling locations as needed to avoid cross-contamination.

2.4.3 GPS

Record all sampling locations by location name and provide GPS coordinates (WGS84 datum in decimal degrees) in field notes for each sampling site.

2.4.4 Sample Storage

Store samples in a cooler with enough ice to chill and preserve the samples at approximately 4°C with ice. Sample holding times will vary, depending primarily on the matrix and type of sample collected (see Appendix 5), so if questions arise regarding holding times, contact the analytical laboratory (see Section 5.0). Transport as soon as practical (and within 12 hours) to the laboratory or a secure refrigerator where the samples can be stored at 4°C until a decision about subsequent analyses can be made. Use packing material to avoid breakage. Keep source oil sample(s) separate from other samples and from each other.

2.4.5 Decontamination

If samples are collected from multiple sources, clean non-disposable sampling equipment with Alconox followed by a distilled water rinse between each sample collection. Methanol may also be used to clean sampling equipment. Change gloves between sample collections. Collect rinse water in a container and dispose of appropriately following waste handling procedures described below. Further information on decontamination is provided in Appendix 5.

2.4.6 Waste Handling

When decontaminating sampling equipment, wash and rinse over a plastic bucket with a lid. Store all oily rags, paper towels, gloves, and other contaminated material in a plastic bag. Dispose of rinse water and contaminated material in accordance

with the waste management plan prepared by the Unified Command Environmental Unit.

2.4.7 Recordkeeping

Record the date, time, and location of sample collection, sample collection GPS waypoint(s) and coordinates, and name(s) of collector(s). Take a photograph of the area where the samples were collected.

2.4.8 Photo Documentation

Photograph or video the sampling site. Take video and/or the photos in both directions along the river (upstream and downstream) as well as from the waterline toward the bank, and from the bank to the waterline. Try to get permanent and distinctive landmarks in some photos and/or videos for future reference. The date, time, and GPS location of the photographs/video should be documented. Photographs should be processed so that sample locations are GPS-referenced on a map. See Appendix 5 for more detailed information.

2.5 SOURCE OIL SAMPLING

It is critical that all sources of released oil be identified and sampled at the point of release. This is typically, and most appropriately, done as part of the response activities directed by the Unified Command or by state and federal incident investigators, not NRDA personnel. The NRDA Representative will coordinate with the U.C. and incident investigators to confirm that sampling of the released material (e.g., oil) from its source will be conducted. The NRDA Representative also will brief the incident investigators and Unified Command regarding NRDA sampling activities and any special NRDA concerns. Source sample collection at the point of release is overseen by the State incident investigator (i.e., warden) and collections are normally done by CDFW-OSPR Oil Spill Prevention Specialists. Source sampling by NRDA personnel is usually not recommended because of the hazards and expertise needed to sample fuel tanks, pipelines, or vessels following a release.

Sampling of released oil, dispersed in the environment, is recommended for documenting the spatial extent of impacts and confirming the source of the oil. Provided safety considerations are met (Section 1.2.3), NRDA field teams may collect these types of samples.

Samples may be analyzed for petroleum fingerprinting purposes (Section 3).

2.5.1 General Procedure for Collecting Source Oil from Point of Release

- **Timing:** First priority; collect as soon as possible.

- **Sample Location:** To be coordinated by CDFW-OSPR Oil Spill Prevention Specialists and the Unified Command Incident Site Safety Officer.
- **Sampling Equipment and Supplies:** Certified pre-cleaned, 1-liter wide-mouth glass jar with an airtight Teflon[®]-lined lid. Paper, metal, or plastic funnel may be used to transfer oil. Under emergency conditions, a new metal or plastic bucket (least preferred) may be used after cleaning with soap and water.
- **Sample Volume:** 1-liter, minimum.
- **Number of Samples:** Sample quantity may be scaled for petroleum fingerprinting and toxicity assessment depending on the size of the release. The volume to collect should be determined by the NRDA Agency Lead(s) and the EDCC.
- **Sampling Procedure:** Per CDFW-OSPR Oil Spill Prevention Specialists. Label, preserve, store and ship samples as previously discussed (Section 2.4)

2.5.2 General Procedures for Collecting Sheen or Oil on Riverbanks or on Water

Rainbow sheen on water or structures

In cases where the released material is visible as a rainbow sheen either floating on water or coating structures, samples may be collected for petroleum fingerprinting purposes to define the extent of the release.

- **Timing:** Second priority; collect as directed by the NRDA Agency Lead(s).
- **Sample Location:** The locations and numbers of samples to collect are spill-specific and should be coordinated through the NRDA Agency Lead(s) and the EDCC.
- **Sampling Equipment and Supplies:** Four 12" fiberglass sheets. Certified pre-cleaned, 250-mL wide-mouth glass jar with an airtight Teflon[®]-lined lid.
- **Number of Samples:** At least one sample (four fiberglass sheets) should be collected that represents each location visited.
- **Sampling Procedure:** Sheen samples are collected by passing fiberglass sheets through the sheen floating on water or coating substrate, at approximately a 90-degree angle. Place the fiberglass into the glass jar and cap. See Appendix 5 for more detailed information. Label, preserve, store, and ship samples as previously discussed (Section 2.4).

Oil on water, riverbanks, or structures

In cases where the released material is highly viscous, concentrated, or weathered (e.g., fuel oil, crude oil), either floating on water, submerged, stranded on the riverbanks, or coating structures; samples of product may be collected for petroleum fingerprinting purposes and to document the extent of the release.

- **Timing:** Second priority; collect as directed by the NRDA Agency Lead(s).
- **Sample Location:** The locations and numbers of samples to collect are spill-specific and should be coordinated through the NRDA Agency Lead(s) and the EDCC.
- **Sampling Equipment and Supplies:** Certified pre-cleaned, 250-mL wide-mouth glass jar with an airtight Teflon[®]-lined lid. Wooden tongue depressors.
- **Sample Volume:** At least one (25+ gram) sample should be collected that represents each location visited.
- **Number of Samples:** A 250-mL jar for each sample.
- **Sampling Procedure:** Product (i.e., tar balls) is collected by using a disposable wooden tongue depressor. Submerged product may need to be collected by oil adsorbing pom-poms or by other means. Label, preserve, store, and ship samples as previously discussed (Section 2.4).

2.6 WATER SAMPLING

Water samples will be collected for analyses of benzene, toluene, ethyl benzene, and xylenes (BTEX), total petroleum hydrocarbons (TPH), and polycyclic aromatic hydrocarbons (PAH's; see Section 3 for analytical methods).

2.6.1 General Procedures and Sampling Locations

- **Timing:** First priority: areas that are not yet impacted. Second priority: areas under the floating oil, near or offshore. Collect as directed by NRDA Agency Lead(s).
- **Sample Location:** After evaluating circumstances and as health and safety conditions dictate, the NRDA Agency Lead(s) may discuss the need to select sampling locations in addition to or different from those identified below, including locations only accessible by watercraft. However, for purposes of implementing this plan, the following riverine locations (Appendix 1) should be sampled (see Section 6 for driving directions, and Appendix 2 for photographs of identified sampling areas):

Pre-impact Surface Water Sampling Priority Areas

- Pulga (N 39.80740° / W -121.43658°)
- Paxton (N 40.03873° / W -120.99349°)
- Indian Creek (N 40.07167° / W -120.94733°)
- O'Feather (N 39.78486° / W -120.51328°)

Immediate Post-impact Priorities

- Along impacted riverbanks, including beaches or rocky areas. Include sheen or surface floating oil sample for chemical fingerprinting.
- Water under floating oil slicks by watercraft, if applicable. Include sheen or surface floating oil sample for chemical fingerprinting.

Alternate Sampling Areas

Depending on river flows and spill trajectory models, additional areas may require sampling.

- **Sampling Equipment and Supplies:** For offshore samples, a subsurface grab water sampler (e.g., Ben Meadows Sub-Surface Grab Sampler) with certified pre-cleaned, 1-liter, wide-mouth amber glass bottles may be used. Onshore samples may be collected by hand with certified pre-cleaned, 1-liter, wide-mouth amber glass bottles. In environments with high flow, use the subsurface grab sampler with certified pre-cleaned 1-liter, wide-mouth amber glass bottles to reach into the water. See Appendix 5 for more detailed information.
- **Sample Volume:** 1-liter, to be used for analyses of TPH, and/or PAHs. 40-mL vials to be used for VOAs. See allocation procedures per Sections 2.6.2 and 2.6.3 below.
- **Number of Samples:**
 - Offshore Field Teams - Collect one 1-liter sample from each identified offshore sampling location by either boat (if too deep) or wading into the river. At each location, collect the sample from just below the impacted surface area (~ 0.5 ft). Depending on the type of material released, other depth intervals may be targeted for sampling per the direction of the NRDA Agency Lead(s).
 - Onshore Field Teams - Collect one 1-liter sample adjacent to each identified riverbank location identified above.
 - Quality Assurance/Quality Control (QA/QC) Samples – Collect as directed by the NRDA Agency Lead(s). See Section 2.9 and Appendix 5 for further details.

- **Sampling Procedure:** Visible oil on the water surface should be moved aside with a water hose, compressed air, or paddle. Care should be taken not to disperse oil into the water column. The sub-surface sampler should be opened at a depth of approximately 0.5 ft below the surface (or at specified depths determined by the NRDA Agency Lead). Label, preserve, store, and ship samples as previously discussed (Section 2.4).

2.6.2 VOA Samples

Volatile organic analysis (VOA) water samples are collected in glass vials and analyzed for BTEX (Section 3).

- **Timing:** Same as Section 2.6.1.
- **Sample Location:** Sheen in water or riverbank.
- **Sampling Equipment and Supplies:** 40-mL screw-cap glass vials with Teflon[®]-faced silicone septum (hereafter referred to as 'VOA vials').
- **Sample Volume:** Three 40-mL vials.
- **Number of Samples:** Three per location or as directed by NRDA Agency Lead(s).
- **Sampling Procedure:** After collecting a 1-liter sample, gently pour water into a VOA vial to avoid bubble formation. Fill the vial until a meniscus forms over vial's lip. Alternatively, the VOA sample may be collected directly, by hand, in the same manner as the 1-liter sample. Cover with the screw-cap lid, tighten the lid and invert the vial and tap the end to check for air bubbles. If bubbles are present, pour out the sample and resample with a new VOA vial. Label, preserve, store, and ship samples as previously discussed (Section 2.4).

2.6.3 TPH and PAH Samples

Water samples are collected and analyzed for TPH, PAH and alkylated PAH content (Section 3).

- **Timing:** Same as Section 2.6.1.
- **Sample Location:** Same as Section 2.6.1 and 2.6.2.
- **Sampling Equipment and Supplies:** Certified pre-cleaned 1-liter, wide-mouth amber glass bottles.
- **Sample Volume:** 1-liter.

- **Number of Samples:** One each per location or as directed by NRDA Agency Lead(s).
- **Sampling Procedure:** Collect a 1-liter sample, and after decanting water for the VOA sample, cover with screw-cap lid and tighten. See Appendix 5 for additional details. Label, preserve, store, and ship samples as previously discussed (Section 2.4).

2.7 SEDIMENT SAMPLING

2.7.1 General Procedures and Sampling Locations

- **Timing:** First priority: areas that are not yet impacted. Second priority: areas where oil has stranded onshore. Collect as directed by NRDA Agency Lead(s).
- **Sample Location:** After evaluating circumstances and as health and safety conditions dictate, the NRDA Agency Lead(s) may discuss the need to select sampling locations in addition to or different from those identified below. However, for purposes of implementing this plan, the following wadable riverine locations should be sampled (see Appendix 1 for maps and Appendix 2 for photographs of identified sampling areas):

Pre-impact Sediment Sampling Priority Areas

- Pulga (N 39.80750° / W -121.43650°)
- Paxton (N 40.03841° / W -120.99309°)
- Indian Creek (N 40.07143° / W -120.94747°)
- Spanish Creek Campground (N 40.02505° / W -120.96695°)
- O'Feather (N 39.78477° / W -120.51328°)
- **Sampling Equipment and Supplies:** Pre-cleaned or disposable stainless-steel or wooden spoon, certified pre-cleaned 250-mL screw-cap jar with Teflon[®]-lined lid, or certified pre-cleaned 1-liter wide-mouth amber glass bottles with Teflon[®]-lined lid. Plastic one-gallon re-sealable bags.
- **Sample Volume:** Fill the jars or bottles completely with sediment.

Composite samples – 1-liter bottle, to be used for analyses of TPH, and/or PAHs. The laboratory will split the sample for the appropriate analyses.

Non-composite (discrete) samples – individual 250-mL jars, one for each analysis (i.e., TPH and PAH).

A plastic one-gallon re-sealable bag, approximately one-third the way full, with sediment that is representative of the composite or discrete sample collected for grain size and TOC analyses.

- **Number of Samples:** *Composite samples* - One 1-liter composite sample per site. *Non-composite (discrete) samples* – one 250-mL jar per site. One-gallon sized re-sealable bag (one-third the way full) per sampled site.
- **Sampling Procedure:** At each location, locate wadeable depositional zones. These zones are often where there is low energy, shallow waters, in the inside of stream bends or along the riverbanks. Starting from a downstream point, approach the selected sediment deposits by moving upstream. Using a pre-cleaned hand-held stainless-steel scoop or wooden spoon, scoop the sample from the bottom of the waterbody in the upstream direction. Collect sediment from 5 to 10 depositional zones that represent the left bank, right bank, center channel and different depths (if practical). If sediment is only available along the riverbank or if flow conditions make it too difficult to wade into, collect from various locations along the riverbank, moving upstream.

For various petroleum releases, collect sediment at the following depths:

- Gasoline or diesel fuel releases: ~1-foot-deep sediment core (see Appendix 5 for sediment coring methods);
- Crude or heavy fuel oil spills: ~2 centimeters deep surface grab sample.

Label, preserve, store, and ship samples as previously discussed (Section 2.4).

2.8 TISSUE SAMPLING

Tissue samples should be collected to document the potential exposure to petroleum hydrocarbons. Species suitable for collection include crayfish or bivalves [e.g., Asian clam (*Corbicula fluminea*)]. For comparative purposes, one or both species should be collected, as available. Collection details are provided below. Collection of bivalves that are considered special status species or species at risk [e.g. Western pearlshell (*Unionidae*), California floater (*Unionidae*), Oregon floater (*Unionidae*), Western ridged mussel (*Unionidae*), and the Montane peaclam (*Sphaeriidae*)] should not be collected. To differentiate between these species and obtain additional information, use the NatureServe Explorer website (<http://explorer.natureserve.org>) If crayfish or bivalves are unavailable, collection of streambed benthic macroinvertebrates (e.g., New Zealand mud snail, caddisflies) may be considered. Field teams without a CDFW representative during sampling events must have a valid scientific collection permit and must coordinate sample collection with CDFW. Preferably, samples can be collected by a CDFW employee to avoid the necessity of obtaining a scientific collection permit. If a CDFW employee is not present to sample, then non-CDFW NRDA field team members may be provided written authorization to collect tissue samples during the initial phase of the ephemeral data collection period.

2.8.1 General Procedures and Sampling Locations - Crayfish

- **Timing:** First priority: areas that are not yet impacted. Second priority: areas where oil has stranded onshore. Collect as directed by NRDA Agency Lead(s).

- **Sample Location:** Wadable riverine locations.
 - Pulga
 - Trap #1 – (N 39.80740° / W -121.43658°)
 - Trap #2 – (N 39.80669° / W -121.43769°)
 - Paxton
 - Trap #1 – (N 40.03848° / W -120.99315°)
 - Trap #2 – (N 40.03873° / W -120.99349°)
 - Indian Creek
 - Trap #1 – (N 40.07167° / W -120.94733°)
 - Spanish Creek Campground
 - Trap #1 – (N 40.02505° / W -120.96695°)
 - O'Feather
 - Trap #1 – (N 39.78486° / W -120.51328°)
 - Trap #2 – (N 39.78477° / W -120.51363°)

- **Sampling Equipment and Supplies:** Crayfish traps (i.e., mesh wired, tornado shaped crawfish traps; commercially available), aluminum foil and plastic one-gallon re-sealable bags for holding samples.

- **Sample Size:** From three or more crayfish, depending on size. Collect enough for at least a 10-20 gram composite of soft tissue.

- **Sampling Procedure:** To collect crayfish, place 2 or more traps into the river, stream or creek where flow energy is low and/or water is pooled. Traps must be placed in different locations, include bait (e.g., cat food) and be retrieved 24-hours after setting them. After retrieving the traps, remove collected crayfish, observe them for missing limbs or cracked shells. If missing limbs or cracked shells are visible, the crayfish are not useable and can be returned back to the water. Measure and record the carapace length of each crayfish (to the nearest millimeter). To do so, measure from the tip of the rostrum (point between the eyes) to the end of the carapace (end of main shell); do not include the tail segments in this measurement. If necessary, rinse debris and sediment from them using (in order of preference) distilled water, clean tap water, or clean surface water. Place rinsed animals on heavy-duty aluminum foil (dull side to the tissue) and wrap them in several layers. Place foil-wrapped animals in a re-sealable bag with adhered label. Place a second zip-lock bag around the first bag to protect the label between the two bags. Preserve, store, and ship samples as previously discussed (Section 2.4).

2.8.2 General Procedures and Sampling Locations - Bivalves

- **Timing:** First priority: areas that are not yet impacted. Second priority: areas where oil has stranded onshore. Collect as directed by NRDA Agency Lead(s).
- **Sample Location:** Wadable riverine locations.
- **Sampling Equipment and Supplies:** Pre-cleaned or disposable stainless-steel trowel or shovel for exposing subsurface bivalves, stainless steel trowel, large knife or similar tools for removing surface bivalves. Aluminum foil and plastic one-gallon re-sealable bags for holding samples.
- **Sample Size:** From 15 to 25 individual bivalves of the same species. Collect enough for at least a 10-20 gram composite of soft tissue.
- **Sampling Procedure:** Remove bivalves from the rocky surface or river bottom sediment, and, if necessary, rinse the debris and sediment from them using (in order of preference) distilled water, or clean tap water. Exterior rinses of shelled organisms (i.e., bivalves) are not usually necessary since only the tissue is extracted and analyzed. However, loosely adhered debris and sediment may be removed before wrapping samples. Place rinsed bivalves on heavy-duty aluminum foil (dull side to the animals) and wrap them in several layers. Wrap, bag, preserve, store, and ship samples as previously discussed in Sections 2.4 and 2.8.1.

2.8.3 General Procedures and Sampling Locations – Benthic macroinvertebrates

- **Timing:** First priority: areas that are not yet impacted. Second priority: areas where oil has stranded onshore. Collect as directed by NRDA Agency Lead(s).
- **Sample Location:** Wadable riverine locations.
- **Sampling Equipment and Supplies:** D-frame net (i.e., 500- μ mesh), tray and 1-liter, wide mouth amber glass bottles for benthic macroinvertebrates.
- **Sample Size:** Collect enough for at least a 10-20 gram composite of soft tissue.
- **Sampling Procedure:** Collect benthic macroinvertebrates using the reach wide benthos method from the SWAMP bioassessment protocol. In wadable sections of the river, measure a reach length (e.g., 150 m reach) along the bank. If there are upstream or downstream barriers, the length of the reach may be shortened. Within the reach place eleven evenly spaced transects. Along each transect samples are collected at either 25, 50 and 75% across the width of the stream. Alternate sampling locations systematically while working downstream to upstream. Collect samples by placing a D-frame net (i.e., 500- μ mesh), with the opening facing upstream, on the substrate. Within one square foot in front of the net collect any large organisms (e.g., caddisfly casings) by cleaning large rock surfaces by hand. Disturb the substrate, directly in front of the net, for roughly 30 seconds.

Allow flow to push disturbed material into the net. Quickly bring the net out of the water and place the sample into a 1-L wide mouth HDPE bottle filled with approximately 300ml of 90% ethanol. To do so, place the bottle onto a tray, to avoid losing the sample, and invert the net into the bottle. Repeat collection for all transects within the reach and composite the subsamples into one bottle per site. The final concentration of ethanol in the samples should be at or above 70%. Refer to the California State Water Board (2016) or U.S.EPA (2003) references for additional methods. Label, preserve, store, and ship samples as previously discussed (Section 2.4).

2.9 QA/QC SAMPLES

The types of samples collected for QA/QC purposes will be at the discretion of NRDA Agency Lead(s). More information can be found in the NRDA Sampling and Analysis Plan template (Appendix 5). The samples can be taken in VOA vial(s) for BTEX and 1-liter bottle(s) for TPH and PAH analyses, as directed by the NRDA Agency Lead(s) and EDCC.

- **Timing:** As required by NRDA Agency Lead(s).
- **Sample Location:** As determined by NRDA Agency Lead(s).
- **Sampling Equipment and Supplies:** Certified pre-cleaned, 1-liter, wide-mouth amber glass bottles with Teflon[®]-lined lid and 40-mL screw-cap glass vials with Teflon[®]-faced silicone septum lid. Uncontaminated, clean bottled water.
- **Sample Volume:** 40-mL and/or 1-liter depending on chemical analysis.
- **Number of Samples:** As determined by NRDA Agency Lead(s). Minimum: one VOA vial and/or one 1-liter bottle.
- **Sampling Procedure:** Fill the vial or bottle with uncontaminated clean bottled water and place into the ice chest with the samples. Field blanks, trip blanks, and field duplicate samples are collected as described in Appendix 5. Label, preserve, store, and ship samples as previously discussed (Section 2.4).

3.0 CHEMICAL ANALYSES

3.1 LABORATORIES

Send samples to either the TDI Brooks Lab, the CDFW-OSPR Petroleum Chemistry Laboratory, or other designated laboratory based on the decision of the NRDA Agency Lead(s).

3.2 METHODS

The NRDA Agency Lead(s) and the EDCC shall coordinate which chemical analyses are suitable for the collected samples. The following analyses and methods may be requested:

- **Water Samples:** PAHs and alkylated PAHs (EPA Method 8270-modified-GC/MS/SIM), TPH (EPA Method 8015, GC/FID, extended range), BTEX (EPA Method 8260 modified GC/MS/SIM).
- **Sediment Samples:** PAHs and alkylated PAHs (EPA Method 8270-modified-GC/MS/SIM), TPH (EPA Method 8015 modified, GC/FID, extended range). Request results on a dry weight basis.
- **Tissue Samples:** PAHs and alkylated PAHs (EPA Method 8270-modified-GC/MS/SIM), percent lipid content, and percent moisture. Request results as dry weight.
- **Source Oil, Sheen, and Product Samples:** Complete fingerprinting characterization, including PAHs, alkylated PAHs and petroleum biomarkers (EPA Method 8270-modified-GC/MS/SIM); total petroleum hydrocarbons (TPH or THE; EPA Method 8015-modified-GC/FID).

Additional methods that may be requested include: BTEX (EPA Method 8260 modified GC/MS/SIM), SARA (saturates, aromatics, resins and asphaltenes), PIANO (paraffins, iso-paraffins, aromatics, naphthenics and olefins; may include BTEX), density, boiling curve (simulated distillation), metals and sulfur content.

Fingerprinting analysis may vary between laboratories. Contact the laboratory that will be analyzing these samples to determine which analysis to request.

4.0 CHAIN-OF-CUSTODY

Chain-of-custody must be maintained at all times. Chain-of-custody means that the sample or data are under the possession and control of the person identified on the chain-of-custody form for the period specified on the form. Possession and control mean in the possession of, within sight of, or in secure storage with access limited only to the person in possession. The person relinquishing the samples and the person taking control of the samples need to sign the chain-of-custody form.

Before shipping samples, make sure that each chain-of-custody form is filled out completely and properly. Check that the sample identifications on sample bottles match the sample identifications on the chain-of-custody. Verify that the date, time, type, matrix and container types, and analyses requested are clearly indicated.

After the chain-of custody has been checked and verified, sign where indicated in the “Relinquished By” box at the bottom of the form. Make sure that the date and time that you relinquished the samples are recorded on the chain-of-custody. Put the chain-of-custody forms in a re-sealable bag and tape the bag to the lid inside the ice chest. Remember to put ice in the ice chest and tape the lid shut with duct tape. Take the ice chest to an over-night mail service and ship the samples to the lab as directed by the EDCC. Shipped material must comply with all applicable hazardous shipping regulations. When the lab receives the ice chest, the person accepting the samples will sign his or her name in the “Received By” box on the bottom of the chain-of-custody form. The EDCC should receive a copy of each completed chain-of-custody form. See Appendix 5 for further information.

5.0 KEY NATURAL RESOURCE TRUSTEE REPRESENTATIVES CONTACT INFORMATION

For more information on the Contact Information, please contact CDFW-OSPR’s NRDA Unit.

5.1 CA DEPARTMENT OF FISH AND WILDLIFE – OFFICE OF SPILL PREVENTION AND RESPONSE AGENCY LEAD(S)

5.2 U.S. FISH AND WILDLIFE SERVICE AGENCY LEAD(S)

5.3 U.S. DEPARTMENT OF AGRICULTURE

6.0 TECHNICAL SUPPORT AND CHEMICAL ANALYSIS CONTACT INFORMATION

6.1 NOAA ASSESSMENT AND RESTORATION DIVISION

6.2 U.S. ENVIRONMENTAL PROTECTION AGENCY

6.3 CA DEPARTMENT OF FISH AND WILDLIFE – OFFICE OF SPILL PREVENTION AND RESPONSE BIOASSESSMENT TEAM

6.4 CHEMICAL ANALYSIS/TECHNICAL SUPPORT

Department of Fish and Wildlife Petroleum Chemistry Laboratory

TDI Brooks

7.0 OTHER STATE AND LOCAL AGENCY CONTACTS

7.1 CA DEPARTMENT OF FISH AND WILDLIFE – REGIONAL OFFICE

North Central Region (Plumas County)

7.2 CA DEPARTMENT OF PARKS AND RECREATION

Office of Historic Preservation

Lake Oroville Recreation Area

7.3 CA REGIONAL WATER QUALITY CONTROL BOARD

Central Valley (Regional Board: 5R)

7.4 OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT

7.5 PUBLIC UTILITIES

Pacific Gas & Electric

Department of Conservation, Division of Oil Gas and Geothermal Resources
(DOGGR)

7.6 RAILROADS

Union Pacific Railroad (UPRR)

Burlington Northern Santa Fe (BNSF)

7.7 TRIBAL CONTACTS

Butte County

Plumas County

Yuba County

8.0 FEDEX SHIPPING LOCATIONS

FedEx Ship Center

1330 Fortress St.

Chico, CA 95973

Hours of Operation: M-F 09:00 – 17:30

FedEx Ship Center

109 Spring Hill Dr.

Grass Valley, CA 95945

Hours of Operation: M-F 09:00 – 17:30

FedEx Ship Center

1500 Nichols Dr.

Rocklin, CA 95765

Hours of Operation: M-F 09:00 – 19:45

FedEx Ship Center at Sac International Airport

6733 Lindbergh Dr. f.

Sacramento, CA 95837

Hours of Operation: M-F 12:00 – 20:15

FedEx Ship Center

3950 Development Dr.

Sacramento, CA 95838

Hours of Operation: M-F 08:45 – 19:45

9.0 DIRECTIONS TO SAMPLING LOCATIONS - FROM Sacramento

- Pulga
Take I-5 N toward Redding, merge onto CA-99 N toward Yuba City. Continue onto CA-70 N, follow signs for Marysville/Oroville. Continue onto CA-70 N toward Paradise/Quincy. Refer to Appendix 1 and Appendix 2 for photographs 1-3.
- Paxton
From Pulga, continue east on CA-70 E approximately 40 miles. Refer to Appendix 1 and Appendix 2 for photographs 4-6.
- Indian Creek
From Paxton, continue east on CA-70 E approximately 3 miles. Turn left onto CA-89 N, travel approximately 4 miles. Refer to Appendix 1 and Appendix 2 for photographs 7-9.
- Spanish Creek Campground
From Indian Creek, head back towards south CA-89 S towards CA-70 E. Turn left onto CA-70 E. The campground is approximately 2.5 miles from this point. Turn right into the campground. Refer to Appendix 1 and Appendix 2 for photographs 10-12.
- O'Feather
From Spanish Creek Campground turn right onto CA-70 E from the campground, continue approximately 31 miles. Turn right onto CA-89 S, and left onto Portola McLears Rd, continue 5.5 miles. Turn left onto O'Feather Rd. Follow the dirt road until it opens up, keep right. Refer to Appendix 1 and Appendix 2 for photographs 13-15.

Alternate route:

From Spanish Creek Campground turn right onto CA-70 E from the campground, continue approximately 40 miles. Turn right onto S Gulling St., right onto Commercial St., right onto 3rd Ave (turns into Portola McLears Rd). Right onto O'Feather. Follow remaining directions above.

10.0 REFERENCES

CDFW-OSPR 2009. OSPR POLICY AND GUIDELINES MANUAL Subject: Communication and Coordination between Natural Resource Damage Assessment and Incident Command Structure During Spill Response Issued: September 21, 2009, Manual Section: Scientific\Damage Assessment Reference: 603-1.

California Water Boards. 2007. Standard Operating Procedures for Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California.
https://www.waterboards.ca.gov/water_issues/programs/swamp/bioassessment/docs/swamp_bioassess_sop_2007.pdf

NatureServe Explorer. 2018. <http://explorer.natureserve.org/>

U.S.EPA. 2003. Benthic Macroinvertebrate Sampling & Processing. SOP #EH-04.
https://www.epa.gov/sites/production/files/documents/r8-src_eh-04.pdf

West Coast Joint Assessment Team (WCJAT). 2017. Recommendations for Conducting Cooperative Natural Resource Damage Assessment.
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=200743&inline>

FIGURES

Figure 1 Spill Response Unified Command Structure, Including Communication and Coordination Points with NRDA

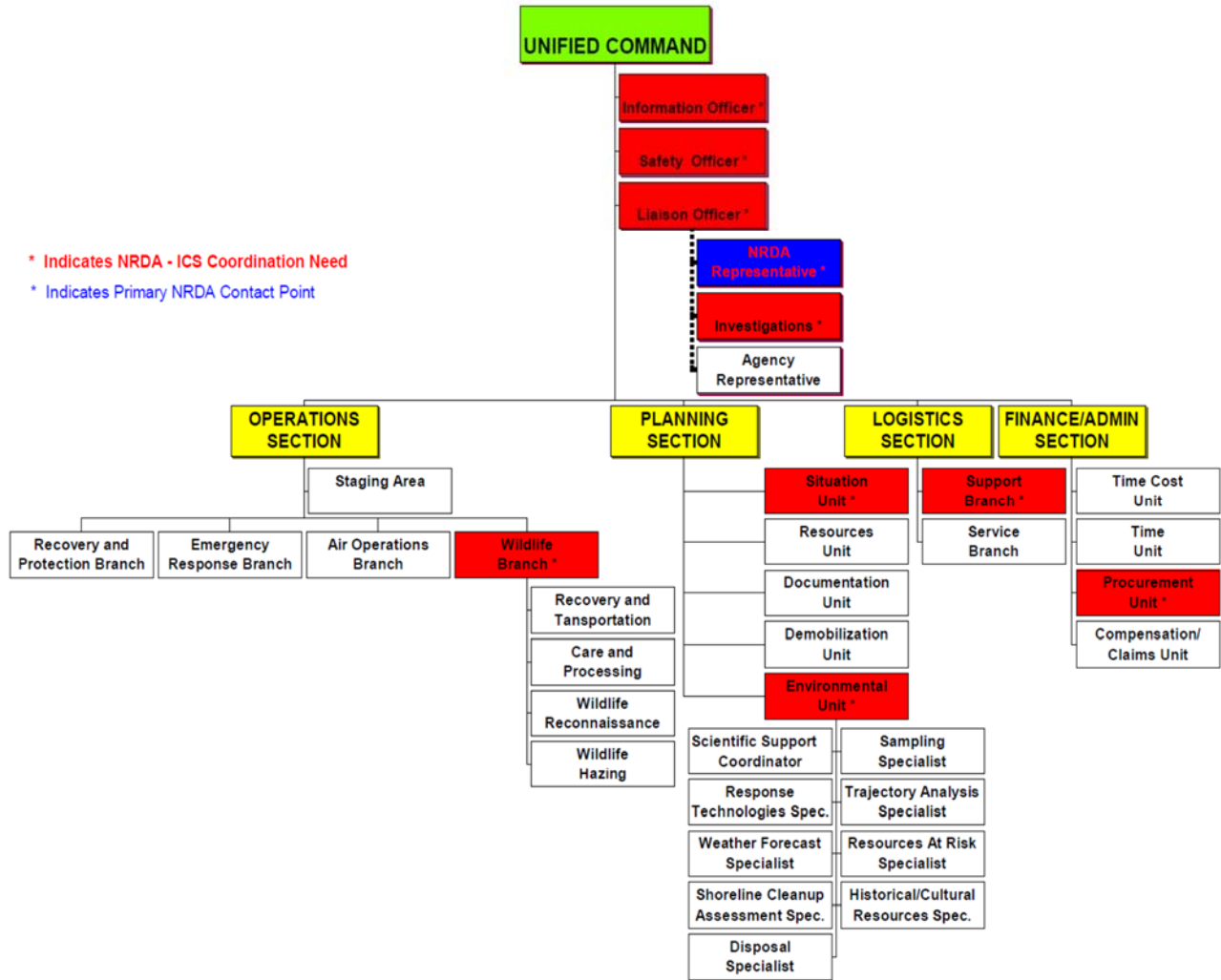
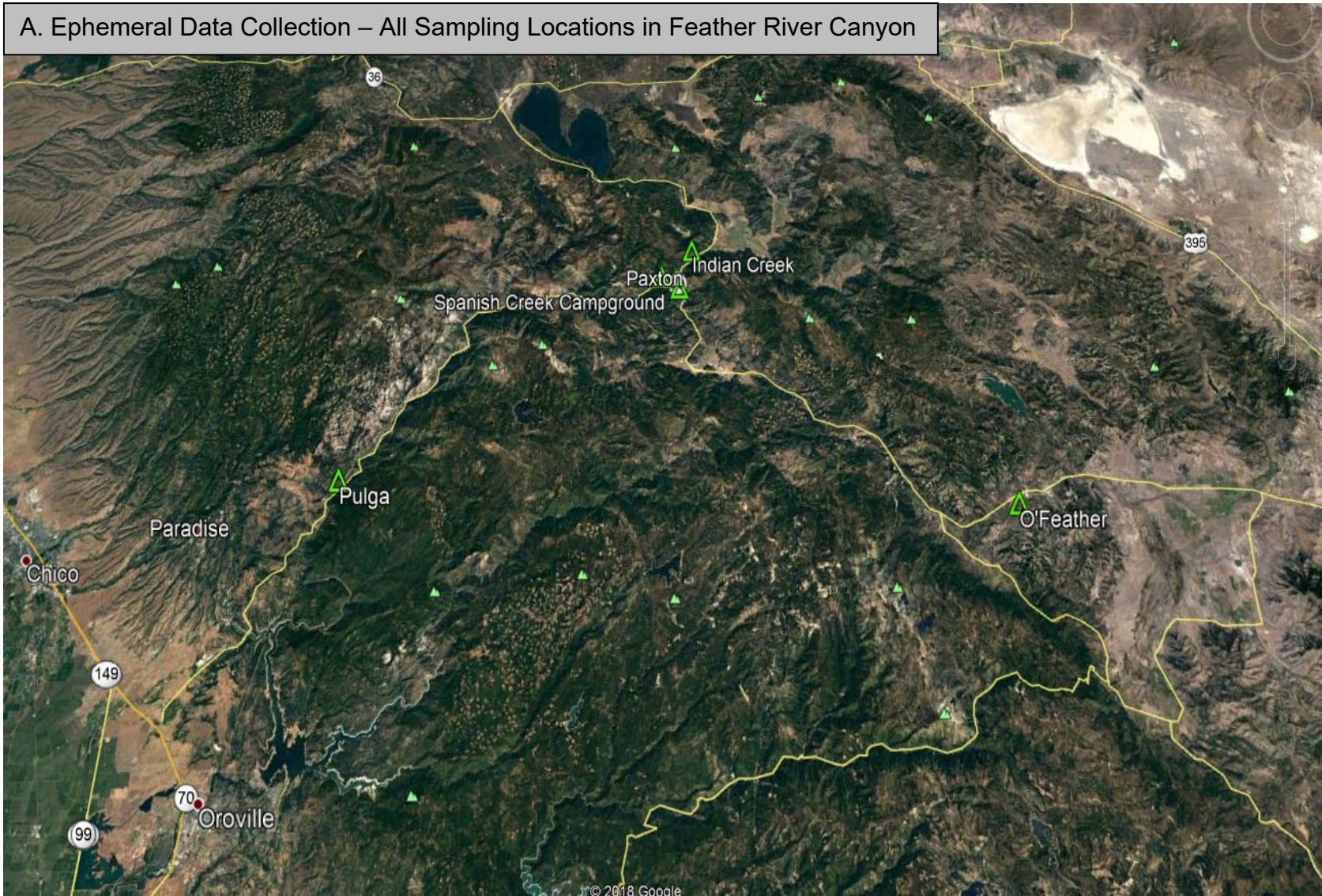


Figure 1. Spill Response Incident Command Structure Organization, Including Communication and Coordination Points with NRDA

**APPENDIX 1 MAPS OF SAMPLING LOCATIONS: Feather River
Canyon**

A. Ephemeral Data Collection – All Sampling Locations in Feather River Canyon



B. Ephemeral Data Collection – Pulga



C. Ephemeral Data Collection – Paxton



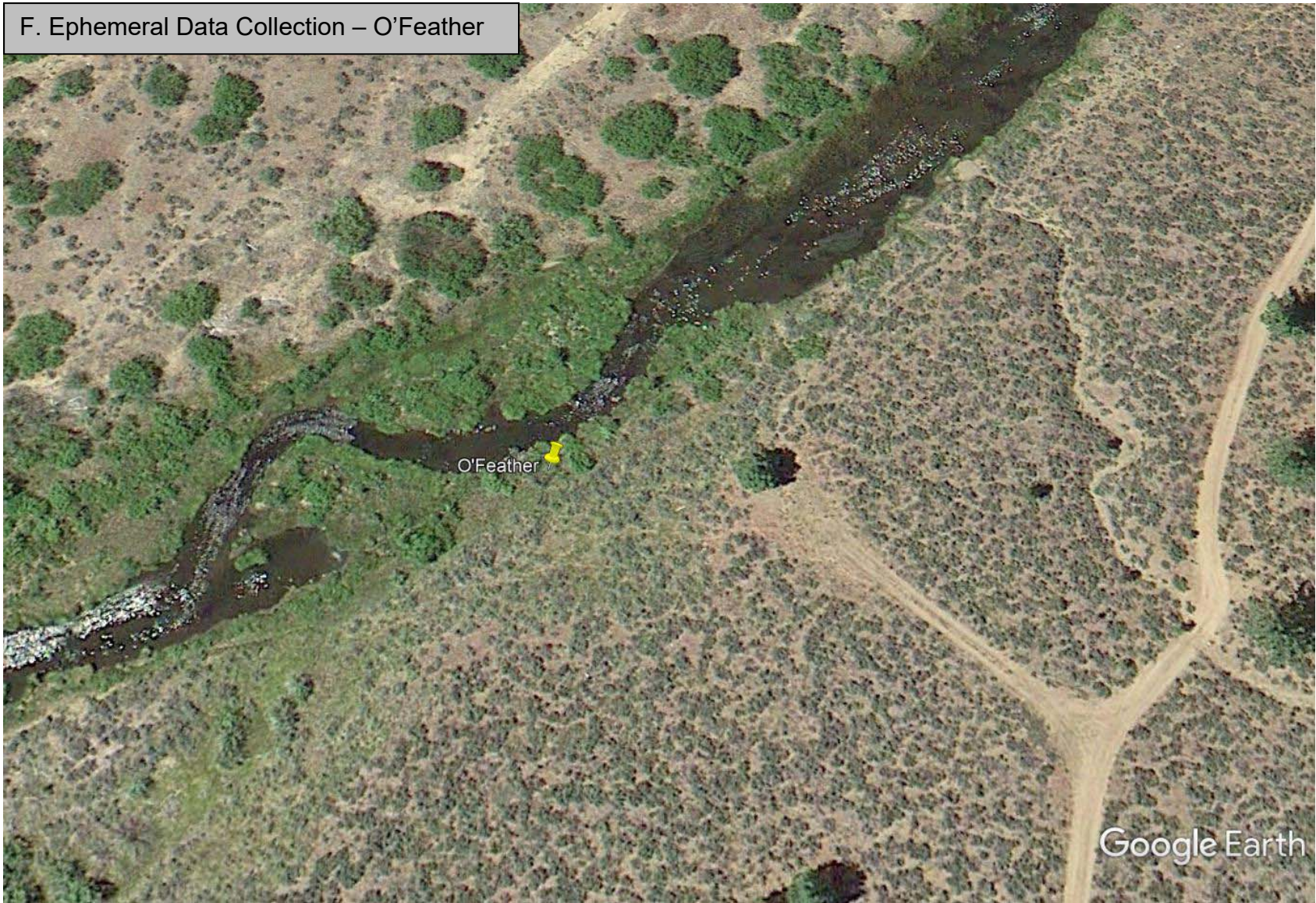
D. Ephemeral Data Collection – Indian Creek



E. Ephemeral Data Collection – Spanish Creek Campground



F. Ephemeral Data Collection – O'Feather



**APPENDIX 2 PHOTOGRAPHS OF EPHEMERAL AND AMBIENT DATA
COLLECTION SAMPLING LOCATIONS**



Photograph 1
Overview of Pulga shoulder parking,
access trail and sampling location.



Photograph 2
Upstream (east) of Pulga sampling
location.



Photograph 3
Pulga sampling location.



Photograph 4
Overview of Paxton shoulder parking
and sampling location.



Photograph 5
Upstream (east) of Paxton sampling
location.



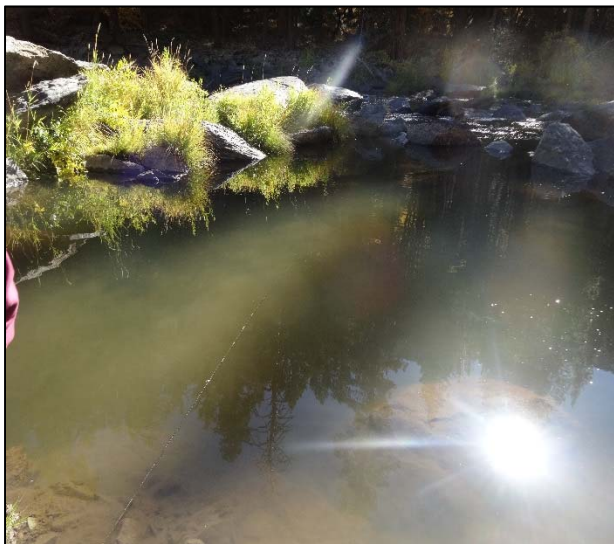
Photograph 6
Paxton sampling location.



Photograph 7
Overview of Indian Creek shoulder parking and sampling location.



Photograph 8
Upstream (northeast) of Indian Creek sampling location.

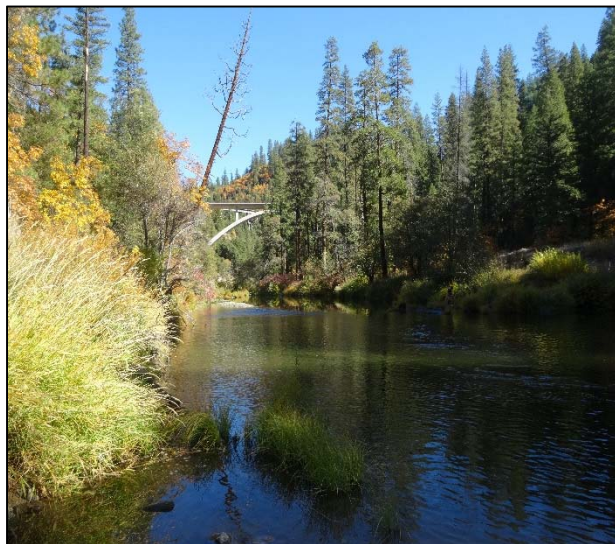


Photograph 9
Indian Creek crayfish trap sampling location.



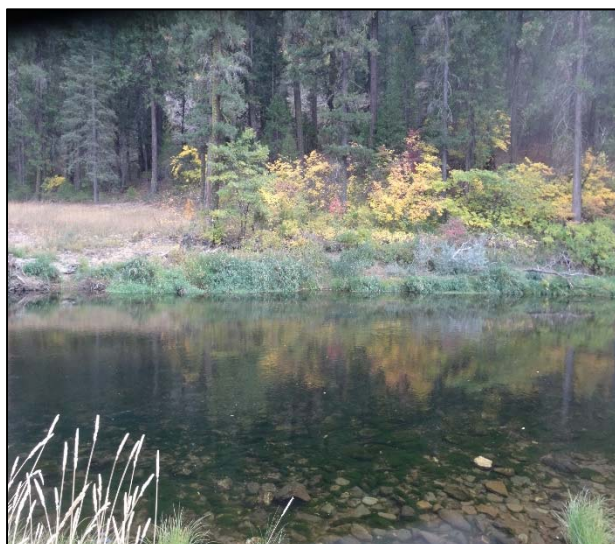
Photograph 10

Overview of Spanish Creek Campground sampling location. When the campground is closed, park at entrance and hike approximately ½ mile down paved road. A key is required to open the gates when campground is closed for the season.



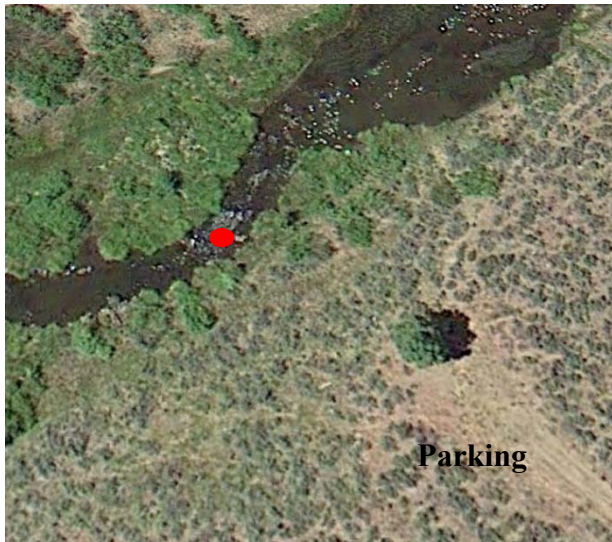
Photograph 11

Upstream (east) of Spanish Creek Campground sampling location.



Photograph 12

Spanish Creek Campground sampling location.



Photograph 13
Overview of O'Feather parking and
sampling location.



Photograph 14
Upstream (east) of O'Feather sampling
location.



Photograph 15
O'Feather sampling location.

APPENDIX 3 CDFW-OSPR CHECKLIST FOR FIELD SAMPLING

NRDA FIELD CHECKLIST

Incident/Case: _____ Field Team Name and #: _____

Date (MMDDYY): _____

BEFORE FIELD

EQUIPMENT & SUPPLIES	
Forms/COCs: see Table 1 for types and # of forms; clipboard (1 per team); sharpies, rite in the rain pen	
GPS & camera: 1 each per team; batteries (6 AA plus backup; check charge); photo scale	
Sampling Equipment and Supplies: see Table 3 Error! Reference source not found. for containers; freezer and trash bags; tongue depressors; spoons; may need sediment corer or pole water sampler	
Ice & coolers: 1+ large cooler for samples; get bagged ice prior to first sampling (3-4, 7-lb bags per cooler)	
Create trip blank for VOA: obtain DI water (from store), fill and label 2, 40 mL VOA vials (see Table 3), and store in sample cooler; record on COC	
Clothing: Wear clothes/hat with NRDA and/or agency logos	
PPE & monitors: outer & inner gloves; chemical resistant boots/covers; safety glasses; PFD; H ₂ S monitor; GPS Spot Tracker	
FIELD TEAM ASSIGNMENT	
Contacts & Training: Give phone numbers and HAZWOPER training info for all team members to NRDA Field Ops; confirm if 1+ person has 40-hr HAZWOPER	
Daily Field Team Form: complete Field Team Assignment and Objectives section; attach to ICS 213 General Message Form for Field Team Assignments and give to NRDA Representative	
SAMPLE PLANNING	
NRDA IDs: see Table 2 ; assign field team names and #s	
Access/Sites: Determine access points and directions; bring map/aerial image of the site; identify any site restrictions, access issues, sensitive species, and contacts	
Consider sub-surface sampling, depending on type of oil and substrate	
Contact lab: Make initial contact with selected analytical lab(s); arrange sample storage and transport	

IN THE FIELD

HEALTH & SAFETY	
GPS SPOT tracker: Turn on, press and hold the footprint (track progress button) until it flashes green	
Call NRDA Field Lead/Ops: at start and end of field activities, and if any health and safety incidents occur	
Health & Safety Plan: All team members review and sign Complete a "tailgate" Health & Safety Meeting at initial site setup; as necessary, assign tasks appropriate for level of HAZWOPER training	
PPE: sampler must wear eye protection and 2 pairs nitrile gloves - for water sampling by hand, wear smaller glove inside elbow-length; otherwise wear 2 pairs of smaller gloves (change outer pair between samples); secondary sample handler wear 1 pair of smaller gloves (change between sites)	
CAMERA/GPS	
Camera setup: record make, model, ID# and time zone on the Photo Log ; clear previous photos; use continuous sequential numbering and daily folder; use max resolution; check battery charge; set camera time to match GPS time; take legible photo of current time on GPS and record on Photo Log ; do NOT delete photos	
GPS setup: record make, model, ID# and time zone on the Photo Log ; clear previous track/waypoints; turn on track log; set track log to 15 sec time interval & wrap when full; set WGS84 in decimal degrees; enable WAAS; check battery charge; take waypoint at setup and record on Sample Collection Summary Form ; do NOT turn off	
PHOTO LOG and SAMPLING	
Sites: Take a waypoint at each site (with unique GPS lat/long) where sampling, observations, or other activities occur; record location and descriptions with sketch and observations on the Sample Collection Summary Form	

NRDA FIELD CHECKLIST

Incident/Case: _____ **Field Team Name and #:** _____

Date (MMDDYY): _____

Photo: Take photos of sampling location (up-coast, offshore, down-coast, close up) and collected samples (incl. sample label and scale); record waypoint, camera photo #, description/keywords and sample ID on the Photo Log	
Sample containers and amount: See Table 3 for sample types, containers, and amounts	
Sample ID: FieldTeamName FieldTeam # Date SampleType Sample # (e.g., <i>RI1 022611 MU01</i>) See Table 2 ; use a unique sample ID for every sample; number samples in sequential order beginning with 01	
Sample labels: Fill out sample labels completely; include sample type and amount; Place label on glass jars or between 2 resealable bags (VOA & tissue samples) Sample Summary Collection Form: Fill out completely with field specific information including location name, waypoint, camera photo #, sample type, sampling method, sample ID, etc. Photo Log: include waypoint, camera photo #, description/keywords, and sample ID	
Sample storage: wrap jars in bubble wrap or foam sleeves; store on bagged ice between sampling locations	

AFTER FIELD / AT COMMAND POST

HEALTH & SAFETY	
Notify NRDA Field Lead/Ops and turn off spot tracker when leaving last field site	
Waste & Decon: check with NRDA Field Ops; dispose of used gloves and sampling wastes properly	
SAMPLES	
Storage: keep at 4°C in dark (in cooler on wet ice or in the fridge); maintain secure custody	
COC: fill out form; see Error! Reference source not found. 3 for analysis types; clearly identify instructions to lab (e.g., hold, extract and hold, OR analyze); at sample transfer, both parties sign COC, original COC with samples, and copy to sampler	
Transport: Confirm transportation to and receipt by the analytical lab; use bagged ice and close drain for shipping; if shipping, follow air/ground shipping regulations	
EQUIPMENT/SUPPLIES	
Make sure all equipment is cleaned, stored; replace supplies and forms; recharge/replace batteries	
DATA INTAKE	
Coordinate location/time of data download with NRDA Field Lead/Ops	
Field Team: make sure all forms are complete; review and initial all forms	
File management: Scan/download forms/notes, GPS, and photos, save original and working copies in 2 locations; complete Data Intake section; organize files as shown below: - Daily folder (by field team and day): FieldTeamNameFieldTeam#_Date (e.g. <i>RI1_022611</i>) - Sub-folders by file type (GPS, photos, field forms) and status (original, working): FieldTeamNameFieldTeam#_Date_FileType.Status (e.g., <i>RI1_022611_Photo.Original</i>)	
GPS: save as .gpx, .gdb, and .txt files using Garmin MapSource™; clear waypoints and track from GPS	
Photos: Copy photos directly from memory card to “original” folder; copy to a “working” folder; do NOT change file names; clear photos from camera	
DATA MANAGEMENT	
Geotag: Match GPS and photos using GeoJot+ Core™; save output as .kml, tagged photos, & PDF	
Upload data: post GeoJot+ Core™ output (.kml & PDF) and scanned forms to CDFW Document Library	
Database: add sample info to Sample Tracking Sheet	
complete Data Management section of DFTF	

Table 1. FORMS

Form Name (Abbrev)	Use	#
Daily Field Team Form (DFTF)	Info on field team members, logistics, assignments and objectives; daily summary; data intake and management	1 - 2 per team
Sample Collection Summary Form	Record site and sample information	1 - 6 sites /sheet

NRDA FIELD CHECKLIST

Incident/Case: _____ **Field Team Name and #:** _____

Date (MMDDYY): _____

Photo Log	Record photo descriptions and corresponding samples	> 1 site /sheet
Sample labels	Identify sample ID, date, location and collector	10 samples /sheet
Chain of custody (COC)	Record of sample custody; original stays with samples	10 samples /sheet

Table 2. SAMPLE ID: ⁽¹⁾FieldTeamName ⁽²⁾FieldTeam # ⁽³⁾Date ⁽⁴⁾SampleType ⁽⁵⁾Sample #

⁽¹⁾ Field Team Name (2 letters)		⁽²⁾ Field Team # (1 number; by field team and day)			
Agricultural Land	AG	⁽³⁾ Date (date collected; MMDDYY)			
Aquatic Vegetation	AV				
Barren Land	BL	⁽⁴⁾ Sample Type (2 letters)			
Birds	BD				
Desert Land	DL	Amphibian	AM	Other Tissue	OT
Dry Creek	DC	Aquatic Invertebrate	AI	Pore Water	PW
Ephemeral Data	ED	Aquatic Vegetation	AV	Reptile	RE
Fish	FI	Beach Wrack	WR	Riparian Vegetation	RV
Forest	FT	Clam	CL	Sediment	SD
Marine Mammals	MM	Crab	CR	Sheen	SH
Riparian Vegetation	RV	Dead Wildlife	DW	Surf Water	SW
Rocky Intertidal/Rip-rap	RI	Emerita/Sand Crab	EM	Terrestrial Invertebrate	TI
Salt Marsh/Mudflats/Lagoon	SM	Fish	FI	Terrestrial Mammal	TM
Sandy Beach	SB	Insect	IN	VOA	VO
Subtidal	ST	Mussel	MU	Water	WT
Terrestrial Mammals	TM	Oil/Tarball	TB	Other:	
Water Column	WC	⁽⁵⁾ Sample # (2 numbers; sequential numbering beginning with 01; resets for each field team and day)			
Other	OT				

Table 3. ANALYTICAL CHEMISTRY SAMPLE INFORMATION (by sample type and analysis)

Sample Type	Type & Size of Container	Amount	Analysis	Holding condition & time (days)	Ok to freeze?
Water (WT)	1 L wide-mouthed amber glass bottle	Full; 1+ ¹	PAH ¹	4°C, dark: 7 to extract	No
VOA (VO)	40 mL VOA vial	Full; 3 (1 backup)	BTEX	4°C, dark: 7 to extract	No
Sheen (SH)	12" fiberglass sheets; 250 mL glass jar	4 sheets	Petroleum Fingerprint	Long-term	Yes
Tarball / Oil (TB)	250 mL glass jar	>1 tsp	Petroleum Fingerprint	Long-term	Yes
Sediment (SD)	Grab: 250 mL glass jar OR Composite - 1 L wide mouth bottle	Full; >30 g ¹	PAH ¹ Grain size ² ; TOC ²	4°C, dark: 7 to extract frozen: long-term	Yes
Tissue (varies)	Aluminum foil ³	>10 g ¹	PAH; % lipid ²	4°C, dark: 7 to extract frozen: long-term	Yes

¹ A single sample can be used to confirm petroleum hydrocarbons and for subsequent PAH analysis, but COC must clearly request both; otherwise 1 L for each analysis; TPH analysis not recommended unless petroleum product visible.

² Additional analytes by sample type. Sediment grain size analysis requires additional quart-sized bag if 250 mL sample.

³ Double wrap tissue in aluminum foil with dull side to sample; place inside 2 plastic freezer bags with label in between.

APPENDIX 4 CDFW-OSPR EQUIPMENT & SUPPLY LIST FOR FIELD SAMPLING

Supplies in general “sampling kits” (October 2017)

Notes:

- *Most supplies are in 1 large grey bin, multiple boxes for jars, and 1 clear bin for with bubble wrap, bags, packing tape, etc.*
- *Glass bottle mouth size may vary*

Aluminum Foil (50' roll)	1
Bubble Wrap Sleeves	56
Clear Packing Tape Roll	1
Measuring Tape (30m or 50m length)	1
Paper Towel Roll	1
Tongue Depressors (set of 20 in foil)	1
Wet-Ones Wipes Container	1
Wooden Spoons	12
Clipboard (the following items inside)	1
Chain of Custody Forms (triplicates)	5
NRDA Field Team Check Lists	2
Sample Collection Summary Form	12
Photo Log	4
Daily Field Team Forms	56
Sample Labels (1 per sample container)	1
Rite in the Rain Field Notebook	1
Rite in the Rain Pen	1
Ball Point Pen	2
Sharpies (or permanent markers)	2
Photo Scales	2
Bags	
Gallon Size Ziplocs	14
Quart Size Ziplocs	10
Kitchen Size Trash Bags	3
Large Black Trash Bag	1
Gloves	
Nitrile Inner Gloves (wrist length) S/M	2 boxes (50 pairs)
Nitrile Inner Gloves (wrist length) L/XL	2 boxes (50 pairs)
Outer Gloves (elbow length, green) S/M	4 pairs
Outer Gloves (elbow length, green) L/XL	8 pairs
Outer Gloves (shoulder length, blue) S/M	2 Pairs
Outer Gloves (shoulder length, blue) L/XL	2 Pairs
Sample Containers	
4 oz. VOA Vials (with septum lid)	12
250 mL Clear or Amber Containers	12
250 mL Sheen Containers	8
12" Fiberglass Sheets (4/container)	32
1 L Amber Bottles (wide mouth)	12
1 L Amber Bottles (narrow mouth)	12

Additional sampling and safety supplies

Traps (per site)	
Crawfish traps (mesh wire, tornado shaped)	2+
Bait (e.g., catfood)	2+
D-frame net	1
Tray	1
1 L plastic bottles (per site)	1
Safety Gear (per team)	
First aid kit	1
Personal flotation device (Type 5)	2+
Helmet (Whitewater safety specific)	2+
Pocket knife	2+
Whistle	2+
Throw bag	1

APPENDIX 5 CDFW-OSPR NRDA SAMPLING AND ANALYSIS PLAN 'TEMPLATE'

For a copy of the Sampling and Analysis Plan, please contact CDFW-OSPR's NRDA Unit.