

**SAFE HARBOR AGREEMENT BETWEEN PACIFIC GAS AND ELECTRIC COMPANY,  
CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE, AND THE U.S. FISH AND WILDLIFE  
SERVICE FOR SHASTA CRAYFISH LOCATED ON ROCK CREEK, SHASTA COUNTY**

**1. INTRODUCTION**

This Safe Harbor Agreement (“Agreement”) is between Pacific Gas & Electric Company (“PG&E” or “Permittee”), the California Department of Fish and Wildlife (CDFW), and the U.S. Fish and Wildlife Service (“Service”), hereinafter referred to as the “Parties.” PG&E is the landowner and CDFW has a long-term lease agreement with PG&E for their Crystal Lake Fish Hatchery (Hatchery). This Agreement is effective and binding on the date of the last signature of any of the Parties below. This Agreement follows the Service’s Final Safe Harbor policy (64 Federal Register (“FR”) 32717) and final regulations (64 FR 32706), as revised (69 FR 24084), in accordance with procedural and substantive requirements of section 10(a)(1)(A) of the Endangered Species Act of 1983, as amended (16 U.S.C. § 1531 et seq.) (“Act”). This Agreement will facilitate translocation of Shasta crayfish (*Pacifastacus fortis*) from Crystal Lake Reservoir to protected waters on PG&E property, will provide a net conservation benefit for the species, and will provide assurances to PG&E and CDFW that habitat creation, habitat enhancement, and species reintroduction to the Upper Pool section of Rock Creek in Shasta County, California will not result in regulatory restrictions beyond those specifically defined within this Agreement. It is the intent of the Parties that the conservation actions implemented under this Agreement will result in a long-term sustainable population of Shasta crayfish within the Upper Pool section of Rock Creek that will assist in the recovery of the species.

**2. AUTHORITY AND PURPOSE**

Sections 2, 7, and 10 of the Act allow the Service to enter into this Agreement. Section 2 of the Act states that encouraging interested parties, through Federal financial assistance and a system of incentives, to develop and maintain conservation programs is key to safeguarding the Nation’s biological resources. Section 7 of the Act requires the Service to review programs that it administers and to utilize such programs in furtherance of the purposes of the Act. By entering into this Agreement, the Service is utilizing its Endangered Species and related programs to further the conservation of the Nation’s fish and wildlife resources.

Shasta crayfish (“Covered Species” or “Shasta crayfish”) is listed as endangered under the Act. This species is the “Covered Species” as defined in the Service’s final Safe Harbor Policy (Federal Register 64:32717). By definition, the Service limits “covered species” to federally listed endangered or threatened species that are the subject of a Safe Harbor Agreement. Section 10(a)(1)(A) of the Act authorizes the Service to issue enhancement of survival permits for listed species. It is the intent of the Parties to follow the procedural and substantive requirements of section 10(a)(1)(A) of the Act. Section 10(d) provides that the Service may grant permits authorizing the take of listed species under section 10(a)(1)(A) only if it finds that such permits “(1) were applied for in good faith, (2) if granted and exercised will not operate to the disadvantage of such endangered species, and (3) will be consistent with the purposes and policy set forth in section 2 of this Act.” This Agreement satisfies all three conditions set under section 10(d) of the Act. This permit has been applied for in good faith. If granted, it is expected to operate to the advantage of the Covered Species by reintroducing the species on PG&E’s lands.

This Agreement and permit are consistent with the purposes and policies of the Act, because they are expected to provide a net conservation benefit for the Covered Species in a manner consistent with the recommendations and strategies contained in the Recovery Plan for the Shasta crayfish (Service 1998).

The purpose of this Agreement is for the Parties to collaborate on conservation measures for the Covered Species and for the Service to provide PG&E and CDFW with assurances that additional land, water, and/or natural resource use restrictions, or financial compensation, beyond those defined in this Agreement, will not be imposed as a result of their voluntary conservation actions to benefit the Covered Species. This will be accomplished by PG&E allowing for the introduction of the Covered Species to suitable habitat and maintenance of habitat for the Covered Species on the Enrolled Property. As long as PG&E meets all of the terms of this Agreement, the Service will authorize incidental taking of the Covered Species at a level that enables PG&E to return the Enrolled Property back to the agreed upon baseline conditions.

### **3. DESCRIPTION OF COVERED SPECIES**

#### *Description*

Adult Shasta crayfish have a total carapace length typically in the range of 1.06–1.97 inches. The most common coloration pattern for Shasta crayfish is a dark mocha-brown on the dorsal surface and a bright orange-red on the ventral surface, especially on the pincer-like claws (chelae). Occasionally, individuals are blue-green to bright blue on their dorsal surface and a light salmon on their ventral surface. Key field identification characteristics that distinguish Shasta crayfish from other crayfish species include a toothed (denticulate) margin on the rostrum (the forward extension of the carapace beyond the eyes) and the inside margin of the Shasta crayfish chelae is smooth.

#### *Distribution and Habitat*

Shasta crayfish is one of only three crayfish species native to California and only one of five native species west of the continental divide (all in the genus *Pacifastacus*). The Shasta crayfish is both federally and state-listed as endangered. Within the small range of the Shasta crayfish, its distribution is very fragmented and limited to only a few areas (Service 1998, Ellis 1999). Most populations of Shasta crayfish occur in headwater spring pools and streams where there are abundant lava cobbles and boulders on clean gravel (Ellis 1999). Shasta crayfish prefer stable unembedded substrate in systems with minimal sediment transport. This type of habitat is found primarily in the Fall River and Hat Creek subdrainages and Sucker Springs Creek in the midreaches of the Pit River drainage, Shasta County, California. Because of the spring-fed nature of these waters, the habitat in the spring areas is generally of high quality with very stable temperature and flow conditions (i.e., minimal seasonal or annual change in water temperature, flow, or clarity).

#### *Population Dynamics*

At this time, there are believed to be between 785 to 2,250 Shasta crayfish in existence, with 735 to 1,910 Shasta crayfish in the Pit and Fall river watersheds, and 50 to 240 Shasta crayfish in the Hat Creek vicinity. Shasta crayfish populations continue to decline, and without intervention are likely to be extirpated within a decade. As non-native crayfish populations continue to expand and out-compete Shasta crayfish, the creation of Shasta crayfish habitat that is isolated and secure from non-native crayfish is believed to be the only remaining option to prevent the extinction of the species.

A Safe Harbor Agreement was finalized with a private landowner in 2012 for a duration of 30 years. The private property is within the historic range of the Shasta crayfish. To date, 28 Shasta crayfish have been relocated from the dwindling Big Lake population to an isolated spring-fed pond on the property. This population is expected to increase to approximately 100 individuals.

Crystal Lake is a spring-fed lake, with an approximate discharge of about 60 cfs (PG&E 2014 unpublished data), that flows into Baum Lake, an impounded reach of Hat Creek. The major spring areas are in the southwestern and middle coves of Crystal Lake. During 1993 surveys, Shasta crayfish were found in areas of lava boulder, cobble, and gravel substrate associated with the spring areas in the middle and southwestern coves of Crystal Lake, as well as at the outflow of Crystal Lake. The Crystal Lake Shasta crayfish population has declined significantly since the species was listed and as few as 50 individuals remain. During 2012 monitoring surveys, Shasta crayfish were found only in the Southwestern Cove of Crystal Lake. They have not been found in Crystal Lake Outflow since 2007 or in Crystal Lake Middle Cove since 2004 (Spring Rivers 2013). This population was found to be genetically distinct and has more genetic variation (both nuclear and mitochondrial DNA) than any other Shasta crayfish population.

### *Life History*

Shasta crayfish are nocturnal and rarely observed during the day. They venture out from hiding places only after dark to browse on the periphyton that adheres to rocks and small invertebrates, such as pebblesnails (*Fluminicola* species). Mating occurs in October or November when the male deposits spermatophores on the underside of the female. Shortly afterwards, the female lays 10 to 70 eggs, fertilizes them with sperm from the spermatophores and then attaches the fertilized eggs to the underside of her abdomen or tail. In the spring, the eggs hatch into immature larval forms (instars), which go through a series of three molts before they become free-living young-of-year. Shasta crayfish are long-lived, possibly 10 to 15 years, and slow-growing. It takes 5 years for a Shasta crayfish to reach sexual maturity.

### *Threats*

Historically, Shasta crayfish experienced significant population declines by the mid-1900s, likely due to introduction of non-native crayfish and due to anthropogenic modification and destruction of habitat. Prior to the installation of the current water diversion structure for the development of the CDFW Hatchery, Rock Creek provided habitat for Shasta crayfish and was part of the Hat Creek, Cassel population of Shasta crayfish.

The biggest known threat to the continued existence of Shasta crayfish is non-native crayfish, which are predators, competitors, and potential sources of new diseases and pathogens. The signal crayfish (*P. leniusculus*) was documented in the Hat Creek system in 1978. Signal crayfish are highly aggressive and possess a relatively large body size, characteristics that are common to invasive animal species. At the same age, signal crayfish quickly achieve a size advantage over Shasta crayfish, because they are faster growing. Signal crayfish reach reproductive size at about two years of age (three years earlier than Shasta crayfish), and females lay 100 to 300 eggs. By 1991, signal crayfish were the most abundant crayfish species in the system, outcompeting Shasta crayfish in the Fall and Pit rivers, as well as Hat Creek. In addition to superior fecundity and aggression, signal crayfish are habitat generalists, able to occupy a greater range of habitats than Shasta crayfish. There are no known, feasible means to eradicate signal crayfish, despite ongoing efforts within the range of Shasta crayfish.

The introduction of numerous exotic species of fish and other aquatic organisms that have the potential to be predators, competitors, and sources of new diseases and pathogens, has further threatened the continued existence of the Shasta crayfish. Largemouth bass (*Micropterus salmoides*) and green sunfish (*Lepomis cyanellus*), in particular, are known to be voracious predators on crayfish. In addition, the recent invasion of the non-native Asian clam (*Corbicula fluminea*) to the Pit River in the Pit 1 Bypass Reach has resulted in layers of clam shells lining the margins of the channel, thus altering the habitat (PG&E 2010). While the appearance is dramatic, the effects of the clam invasion on Shasta crayfish are unknown at this time.

#### **4. DESCRIPTION OF COVERED AREA**

The Enrolled Property is on PG&E lands along Rock Creek, approximately 1 mile northeast of the town of Cassel in Shasta County, California (Figure 1). The Enrolled Property is near the Crystal Lake Shasta crayfish population, which is found in Crystal Lake (Figure 2). The Enrolled Property includes the isolated Upper Pool (Figure 2). The Upper Pool is located approximately 400 feet upstream of the current water diversion point, consists of approximately 200 feet of channel, and is isolated from the water diversion pool/run area and Upper Rock Creek Meadow by a short reach of dry channel.

Currently, Shasta crayfish populations are not expected to occur downstream of the upper pool because most of the Rock Creek flow is diverted to the Crystal Lake hatchery and no suitable aquatic habitat exists downstream of the diversion, including within the Upper Meadow area. However, once Shasta crayfish are introduced into the Upper Pool, it is possible that some individuals may move or be washed to downstream to the existing diversion. Therefore the Enrolled Property also includes downstream portions of Rock Creek to the diversion. The Covered Area includes a 200-foot buffer from the ordinary high water mark of Rock Creek on PG&E lands, including parcels in Table 1 and in Figure 2.

**Table 1. PG&E parcels in the Covered Area.**

<b>Parcel ID</b>	<b>Assessor's Parcel Number</b>
483153711	023-370-018-000
483191277	031-520-010-000
483191311	031-520-006-000

## **5. PROJECT DESCRIPTION**

### *Description of Introduction Activities*

Rock Creek is fed by an isolated spring that flows from an extensive basalt lava flow. No fish predators or non-native crayfish species are known to occur within the Enrolled Property. Because there are barriers both upstream and downstream of the Enrolled Property, non-native crayfish and predatory fish species are prevented from entering the creek. Other native aquatic flora and fauna, which could be important for Shasta crayfish, are present and plentiful. These conditions make the Upper Pool an ideal location for introduction of Shasta crayfish. The Shasta Crayfish Technical Review Committee (TRC), or its designee, will relocate Shasta crayfish from Crystal Lake to the Upper Pool to preserve the Crystal Lake genome, which will likely be extirpated within a decade if action is not taken. Shasta crayfish can be introduced to the isolated Upper Pool, which is in the watered section of the channel, as soon as this Safe Harbor Agreement, as well as a 3<sup>rd</sup> Party License Agreement between PG&E and the Service, have been finalized. The actual relocation activity conducted by the TRC or its designee will be covered under a separate 10(a)(1)(A) Recovery Permit and not this safe harbor agreement.

### *Description of Monitoring Provisions*

PG&E will allow the TRC, or its designee, to conduct monitoring on the Enrolled Property. The TRC will provide funding to support monitoring. It is expected that monitoring will be conducted by Spring Rivers Ecological Sciences LLC (Spring Rivers), or by another qualified biologist, at no expense to the landowner.

Monitoring will be conducted, at a minimum, annually in the first five years after reintroduction, then once every 5 years. PG&E will allow access to the Enrolled Property for additional monitoring periods, at the Service's request.

Monitoring will consist of the following elements: An assessment of the amount of habitat available; Counts will be made of all Shasta crayfish encountered by sex, size, and location and; counts of all non-native crayfish (if any), which will be captured and removed.

The TRC will provide a report of monitoring results to the Parties of this agreement. Reported data will include habitat assessments, counts of all Shasta crayfish encountered by sex, size, and location, and all non-native crayfish (if any) captured and removed. In years following the first year of monitoring, comparisons to previous years' data will be made. Reporting may be included as part of annual TRC reports, which are provided to the TRC, Shasta Crayfish Recovery Team (Recovery Team), and PG&E by May 31<sup>st</sup> of each year.

## **6. PERMITTEE'S CURRENT LAND AND WATER USE AND MANAGEMENT PRACTICES THAT MAY AFFECT COVERED SPECIES AND THE HABITAT OF COVERED SPECIES**

On and in the vicinity of the Enrolled Property, PG&E's property includes a residential structure, residential garage, powerhouse, powerlines and associated support structures (poles or towers), water intake structure and pipe, access roads, and harvestable timber. All routine maintenance of

structures, utility infrastructure fencing, roads and drainages are performed on this property. Material storage and debris storage occurs on the property at various locations.

### *Crystal Lake Trout Hatchery*

PG&E leases part of the Enrolled Property to CDFW. CDFW's lease includes portions of the Hatchery, a diversion and intake structure, and a pipeline to the Hatchery. Water from Rock Creek is currently diverted through the metal pipe to the Hatchery.

CDFW operates the Hatchery, and provides public access and hatchery personnel housing on the property. The Hatchery, property, and housing require repairs, routine maintenance, and vegetation management. The access to the intake structure is maintained and vegetation is cleared to maintain operational activities..

Currently, Shasta crayfish do not occur within the Enrolled Property; therefore Shasta crayfish are not currently affected by these activities. After Shasta crayfish are translocated to the Enrolled Property, construction, maintenance and vegetation management activities may affect the species. A discussion of activities that may affect the covered species in the future is provided in the following section.

## **7. PERMITTEE'S FUTURE LAND AND WATER USE AND MANAGEMENT PRACTICES THAT MAY AFFECT COVERED SPECIES AND THE HABITAT OF COVERED SPECIES**

Activities fall into three general categories including:

- Routine construction and operations and maintenance (O&M) of utility infrastructure
- Land management including vegetation management and timber management
- Hatchery operations

Routine construction and O&M includes but is not limited to patrols, inspections, pole, tower and line maintenance, substation and power house maintenance, outage repair, equipment installation, maintenance, or replacement, water diversion/conveyance maintenance, communication line maintenance and access road maintenance. Examples of equipment include, but are not limited to, a flow meter and associated data logger, or a stream gauge. PG&E proposes to install an inline flow meter and an associated data logger in the diversion pipe downstream of the diversion, expected to be about 1 to 2 cubic feet in volume. In-line flow meters are primarily contained within the pipe with displays attached to the perimeter of the pipe. It is unlikely that a stream gauge would be needed, since all flow would be diverted through the pipe downstream of the diversion, however a gauge may be installed if a meter in the pipe were to fail for unforeseen reasons.

If any other proposed equipment installation were to result in substantial ground disturbance in or near the creek, the potential to affect Shasta crayfish or their habitat would be evaluated by a qualified biologist and the Service and CDFW will be notified prior to implementation of work.

Water diversion from Rock Creek includes: 1) water supply to the Hat Creek Powerhouse No. 2 (not generation) and PG&E residence; and 2) Crystal Lake Hatchery. If Shasta crayfish are reintroduced to the Upper Pool, entrainment at the diversion may potentially occur.

Land management includes performing vegetation management to manage invasive plants, to reduce fire-fuel loading, and to provide safe access to be able to perform the construction and O&M activities described above. If planned land management activities were to result in substantial ground disturbance in or near the creek, the potential to affect Shasta crayfish or their habitat would be evaluated by a qualified biologist and CDFW and the Service will be notified prior to implementation of work.

Land management also includes PG&E's timber management operations which includes, harvesting trees, wildfire protection, enhancing forest health and reducing forest insects and disease. The Service and CDFW will be notified prior to implementation of timber management actions within the Enrolled Property. Timber harvest operations and forest fuels management projects may include commercial logging operations where heavy equipment is utilized. In these instances, the operations would be confined to PG&E property and in locations that are not deemed "sensitive" by CalFire (lead agency) and CDFW. If "sensitive" areas need to be entered with timber harvesting equipment, it must first be approved by the aforementioned agencies. All timber harvest activities on PG&E property and in the State of California adhere to the Z'Berg Nagedly Forest Practice Act (Title 14 CCR).<sup>1</sup> The California Forest Practice Rules have specific safeguards and buffers from heavy equipment that are established to protect watercourses, wetlands, aquatic habitats and other sensitive areas from timber harvest operations.<sup>2</sup>

Some of the California Forest Practice Rules that are expected to provide protection to sensitive areas, such as waterways where Shasta crayfish are present and adjacent riparian areas are excerpted in Attachment A of this Agreement. For timber harvest operations and forest fuels management activities, protection measures identified for Class I and Class II waterways will be implemented (see Attachment A, Table I). Furthermore, AMM measures identified in this Agreement will be implemented.

Some of CDFW's hatchery operations may affect the covered species in the future. Take will be limited in scope to hatchery operations at the diversion and intake structure on Rock Creek and the pipeline to the Hatchery (including if a Shasta crayfish is accidentally washed down the intake pipe to the Hatchery). A more detailed description of these Hatchery operations covered under this Agreement follows:

- Cleaning of intake weir of leaves, debris, snow and other obstructions using brushes, nets, hand tools and hands

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<sup>1</sup> The official web site for any California law or rule is [www.leginfo.ca.gov/calaw.html](http://www.leginfo.ca.gov/calaw.html). In addition, the Office of Administrative Law maintains their web site of the California Code of Regulations at <http://ccr.oal.ca.gov>. The only official publication of the rules is by Barclays Official California Code of Regulations at <http://www.barclaysccr.com/index.htm>.

<sup>2</sup> CAL FIRE has a Web Site and Home Page on the Internet: [www.fire.ca.gov](http://www.fire.ca.gov). Copies of the 2014 Rules and associated forms can be accessed at: [http://www.fire.ca.gov/resource\\_mgt/resource\\_mgt\\_forestpractice.php](http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice.php).

- Intake screen removal to make repairs and conduct regular maintenance
- Repair of intake structure if needed
- Repair and maintenance of automatic intake screen debris wiper
- Cleaning of vegetation from Rock Creek within 100' of intake diversion
- Cleaning of nuisance vegetation from Rock Creek (if it occurs: watercress, celery weeds, etc.) that inhibit flow
- Cleaning , repair and maintenance of flow meter, if installed
- Cleaning and maintenance of flow staff gauge
- Access and maintenance of valve to pipe at intake structure (if one is installed)
- Maintenance and repair of pipe connection at intake diversion
- Maintenance and repair of pipeline from intake structure down to hatchery raceway diversion box
  - Leak repair
  - Maintenance of pipe valve, joints, couplings and vent tubes
  - Painting of pipe
  - Repair and replacement of pipe supports
- Vegetation management near, in, on and around intake structure, pipeline, and distribution boxes
  - Weed eating, mowing and vegetation removal within 10' of intakes and pipeline
  - Water runoff channeling (if needed) to divert away from pipeline supports, valves and diversion boxes
  - Clearing of down trees and shrubs near pipeline, intake structures and diversion boxes
- Maintenance of roadway and pathway near intake structure, pipeline and diversion boxes

The maintenance and operation activities described above are expected to continue throughout the duration of this Agreement on the Enrolled Property. At this time, PG&E and CDFW do not anticipate any changes in land use during the duration of this Agreement.

The maintenance and operation activities described above may affect Shasta crayfish within the Enrolled Property once the species is translocated to the Enrolled Property. Any potential adverse effects to the Covered Species are expected to be insignificant or discountable due to the nature of the activities or due to the implementation of avoidance and minimization measures that will be conducted by PG&E and CDFW. A list of these various activities and of avoidance and minimization measures follows.

Public access and recreation also occurs on the Enrolled Property but is not expected to cause take.

#### General Avoidance and Minimization Measures (AMM)

AMM 1. Minimize or avoid wading or heavy equipment use in aquatic habitat (i.e. in-water lava substrate) to which Shasta crayfish have been reintroduced in order to minimize in-water activities and disturbances. If PG&E or CDFW cannot avoid in-water disturbance, PG&E or CDFW will contact a Service representative listed in Section 16.6 to determine what, if any, site-specific protection measures will be implemented.

AMM 2. If land-disturbing or land-clearing activities are needed along Rock Creek, measures to control erosion and sedimentation will be implemented. When maintenance work is completed, appropriate control measures will be implemented to minimize erosion and sediment mobilization.

AMM 3. Invasive plant management practices will be consistent with PG&E's *Yellow Starthistle Control Plan, Addressing License Article 414, Hat Creek Project* FERC Project No. 2661 (PG&E 2003), as well as any subsequent modifications that may be made to the plan, in consultation with resource agencies, for the protection of Shasta crayfish. For the protection of Shasta crayfish, this plan specifies that "Adequate aquatic buffer zones will be maintained for maximum protection of aquatic habitats in the project area." Should PG&E use herbicides to control yellow star thistle, or other noxious weeds, at locations where residues of the herbicide may enter Hat Creek or Rock Creek, either directly or by runoff, PG&E will implement protection measures developed for the protection of Shasta crayfish in the Hat Creek Hydroelectric Project Herbicide Use Plan (Hat Creek Project, FERC Project No. 2661), which is currently being developed in consultation with the California State Water Resources Control Board, and other resource agency staff on the Shasta Crayfish TRC, and which was developed in fulfillment of Article 414 of the Hat Creek Project license, filed with FERC on May 1, 2003, and modified and approved by FERC order on February 19, 2004.

AMM 4. Measures to prevent the spill of deleterious materials into Rock Creek will be implemented. Hazardous materials will not be stored near Rock Creek in the Enrolled Property. No fueling or equipment service will be performed in the channel or within the active floodplain.

AMM 5. The Service will be notified if covered activities require any in-stream activities in Rock Creek within the enrolled property where Shasta crayfish are likely to be present.

Although not part of this safe harbor agreement, the TRC plans to implement restoration and reintroduction activities on the Rock Creek Meadow site at some time in the future. Avoidance and minimization measures will be developed during the permitting process for the restoration activities and may include:

- The new hatchery diversion structure, including an "active" debris screening structure and necessary cleaning and maintenance activities, will be designed to minimize the potential for entrainment and take of Shasta crayfish to the extent feasible.
- No wading in or near or walking on Shasta crayfish habitat (i.e., in-water lava substrate) in Rock Creek upstream of the hatchery diversion structure. However, if wading in or near or walking on Shasta crayfish habitat (i.e., in-water lava substrate) is expected to be necessary and unavoidable due to maintenance work or land management requirements, then the Service will be notified.
- Work will be planned to minimize in-water work in Rock Creek upstream of the hatchery diversion structure.
- No land-disturbing or land-clearing activities will be done along Rock Creek upstream of the hatchery diversion structure without an erosion and sedimentation control plan.
- Best management practices for erosion and sedimentation control will be implemented during all maintenance, repair, construction, vegetation management, and other activities.

**8. FUNDING ASSURANCES (TO CARRY OUT MANAGEMENT ACTIONS, DETERMINATION OF BASELINE CONDITIONS, AND MONITORING AND REPORTING FOR THE DURATION OF THE AGREEMENT).**

PG&E owns the Enrolled Property and is committed to implementing the provisions of the Agreement and permit. For this Agreement, PG&E is willing to allow the TRC to plan and implement restoration, enhancement, and monitoring activities within the Enrolled Property and is willing to allow Shasta crayfish to be translocated to the Enrolled Property at the Upper Pool from other existing populations. The TRC, and potentially other entities, will bear the expense for this work at the Upper Pool and, therefore, no funding is required by PG&E.

Articles 411 and 412 of both the Hat Creek and Pit 1 projects' FERC licenses require PG&E to establish Shasta crayfish management funds (Fund) to cover the cost of license-required monitoring and non-native crayfish removal. Any funds not used for license-required monitoring and nonnative crayfish removal have been used for other TRC-approved Shasta crayfish activities, which often have included Recovery Team actions. The TRC has agreed to allocate funds not needed for FERC license-required monitoring to fund monitoring and reporting for the Enrolled Property for this Safe Harbor Agreement (see Section 5, *Detailed Monitoring and Reporting Program*).<sup>3</sup> If at some future time Fund money is no longer available, the TRC and/or Service will seek funding from Service sources or from other parties.

**9. DESCRIPTION OF BASELINE CONDITIONS**

The Service's Final Safe Harbor Policy requires a complete description of baseline conditions for all covered species identified in this Agreement [*Federal Register* 64:32717 (June 17, 1999)]. Baseline levels can be described by population estimates, locations of individual animals, the amount of habitat available, or by site characteristics that contribute to occupancy. Often baseline levels are described in terms of the amount and condition of available habitat (and not in terms of population census) because the number of individuals present in a given area is expected to fluctuate over time. Baseline levels for this Agreement are based on both site characteristics and on population census measurements.

For the purposes of this Agreement, baseline for the Upper Pool site is approximately 2,300 square feet ( 0.053 acres) of unoccupied (zero) potential Shasta crayfish foraging, breeding, and resting habitat in the Upper Pool. Returning to baseline conditions allows for the removal of all Shasta crayfish from the Upper Pool site. The 2,300 square feet of existing suitable habitat will remain in place, but will no longer be occupied by the Shasta crayfish. The permit associated with this Agreement provides incidental take coverage to PG&E and the CDFW's Crystal Lake Hatchery for Shasta crayfish while conducting activities covered under the Agreement as long as the habitat baseline conditions are maintained.

PG&E's and CDFW's activities on the Enrolled Property are unlikely to cause a decrease in the amount of habitat. Should the amount of habitat decrease below the established Upper Pool baseline PG&E will re-evaluate its activities on the Enrolled Property and notify the Service to

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<sup>3</sup> Discussed and approved at the November 6, 2013 Shasta Crayfish TRC meeting. Meeting minutes are included in annual Shasta Crayfish TRC reports.

determine what actions can be taken. The Service will not impose any additional land, water, and/or natural resource use restrictions on PG&E or CDFW, beyond those defined in this Agreement, if habitat reduction within the Upper Pool is not caused by PG&E or CDFW due to factors outside PG&E's or CDFW's control.

#### **10. NET CONSERVATION BENEFIT**

PG&E will allow the Service under a third-party use agreement, or other properly permitted and qualified persons designated by the Service, to restore and enhance habitat on the Enrolled Property, and will allow for the introduction of Shasta crayfish to occur on these lands. This will likely result in high-quality habitat that is free from non-native crayfish species. This will result in a greater likelihood of increased population sizes of Shasta crayfish in the general area and minimize the potential for Shasta crayfish extirpation in the general area. It is the intent of the Parties that the habitat restoration and future introduction of Shasta crayfish to the Enrolled Property will result in a net conservation benefit and the establishment of a Shasta crayfish population that will exist for the long-term, and ideally in perpetuity.

The 1998 Recovery Plan for the Shasta Crayfish states that the Crystal Lake subpopulation must be protected and stable, by the elimination, reduction, or management of signal crayfish. To meet this criterion, task 2.1 in the Recovery Plan is to protect and enhance the Hat Creek, Cassel population of Shasta crayfish, for which Crystal Lake is the only extant subpopulation. Therefore, the completion of the proposed action will: (1) help to prevent the extinction of the Shasta crayfish; (2) protect and stabilize the Crystal Lake subpopulation, helping to meet a recovery criterion; (3) preclude the loss of the last remaining subpopulation of the Hat Creek, Cassel population; and (4) preserve a unique genetic lineage, at a location within the historic range of that lineage.

The Service has determined that PG&E's conservation measures, as described in this Agreement, will be reasonably expected to provide the net conservation benefits listed above for the Shasta crayfish. The Service has also determined that the duration of the Agreement and associated permit will be reasonably expected to be sufficient to achieve these net conservation benefits.

#### **11. OTHER LAND OWNERS WHO MAY SECURE INCIDENTAL TAKE AUTHORIZATION**

It is acknowledged that other neighboring landowners currently may be undertaking conservation management activities within the Rock Creek watershed in accordance with other permits or authorizations. Other landowners are not Parties to this Agreement or the permit associated with this Agreement. If PG&E's voluntary conservation measures result in new or expanded occupation of adjacent properties by the Covered Species, the Service will use the maximum flexibility allowed under the Act to address neighboring properties under the Agreement and the associated permit, or such other authorization that otherwise governs the neighboring landowners' activities. Moreover, the implications to neighboring landowners and the potential need to actively address these implications will be determined on a case-by-case basis. In general, the Service will endeavor to include neighboring landowners whose activities may affect listed species as a Party to this or to a separate Agreement and permit.

## **12. RESPONSIBILITIES OF THE PARTIES**

### *Permittee Responsibilities*

Subject to the express terms and conditions of this Agreement, PG&E agrees to implement the provisions of this Agreement, and to adhere to the terms and conditions of the permit during the term of this Agreement. With reasonable advance notice, PG&E shall allow Service and/or CDFW personnel, or other properly permitted and qualified persons designated by the Service, to enter the Enrolled Property at reasonable hours and times to inspect the Enrolled Property to insure compliance with this Agreement and to conduct monitoring activities pursuant to this Agreement and associated Right of Entry License Agreement. The Service will notify PG&E of its need to enter the Enrolled Property.

PG&E's normal property management and utility operation activities on the Enrolled Property are not expected to cause a decrease in Shasta crayfish populations. While expected to occur infrequently, it is possible that PG&E actions may result in mortality or injury to Shasta crayfish. To meet reporting requirements of CDFW and the Service, PG&E will notify the Service and CDFW 90 days prior to any planned activity that PG&E reasonably anticipates will result in harm or mortality of Shasta crayfish on the Enrolled Property. The purpose of this notification is to allow time for the Service (or an agreed upon designee) to collect Shasta crayfish from areas that may be impacted and relocate them to a safe location within the Enrolled Property or to another property, should the Service elect to do so. PG&E will make every effort to allow enough notification that the Service and CDFW will be able to relocate Shasta crayfish during the late spring to late fall, which is outside of their breeding season, and, therefore, will cause less of an impact to the species.

Notwithstanding anything contained in this Agreement, the Parties acknowledge and agree that any third-party use, outside the use of volunteer groups, of PG&E's property related to or otherwise arising out of the implementation of the terms and provisions of this Agreement shall be subject to (i) a separate written agreement between PG&E and such third party in form and substance satisfactory to PG&E in its sole and absolute discretion and (ii) prior receipt of final, unappealable and unconditional approval from the California Public Utilities Commission ("CPUC") if such approval is deemed necessary or desirable as determined by PG&E in its sole and absolute discretion. Without limiting the generality of the foregoing, the Service and PG&E further agree that the foregoing conditions are applicable to any third-party use, outside the use of volunteer groups, agreed to or permitted on the Enrolled Property under this Agreement. The TRC has agreed to allocate funds from the Fund that are not needed for FERC license-required monitoring to fund monitoring, restoration, enhancement and relocation activities on the Enrolled Property for this Safe Harbor Agreement.

### *Service Responsibilities*

The Service will provide technical assistance regarding restoration, enhancement and relocation activities to assist with implementation of the Agreement. The Service will ensure that the Permittee implements the Agreement properly. Upon execution of this Agreement, the Service

shall issue a permit to PG&E in accordance with Section 10(a)(1)(A) of the Act, authorizing incidental take of the Covered Species as a result of lawful activities on the Enrolled Property.

#### *CDFW responsibilities*

Subject to the express terms and conditions of this Agreement, CDFW agrees to implement the provisions of this Agreement, and to adhere to the terms and conditions of the permit during the term of this Agreement. CDFW's activities on the Enrolled Property are not expected to cause a decrease in Shasta crayfish populations. While expected to occur infrequently, it is possible that CDFW's future land and water use and management practices may result in mortality or injury to Shasta crayfish. CDFW will notify the Service 30 days prior to any planned activity that CDFW reasonably anticipates will result in harm or mortality of Shasta crayfish on the Enrolled Property. However, the Parties acknowledge that CDFW may need to perform urgent or unplanned maintenance at any time due to storm events, wildfire, equipment malfunction, or other similar emergency situations. Under these circumstances CDFW will adhere to section 16.7, Emergency Situations, of the Agreement.

The purpose of this notification is to allow time for the Service (or an agreed upon designee) to collect Shasta crayfish from areas that may be impacted and relocate them to a safe location within the Enrolled Property or to another property, should the Service elect to do so. If CDFW must perform urgent maintenance that would not allow ample time for the Service to relocate Shasta crayfish, CDFW will make every effort to relocate Shasta crayfish in consultation with the Service. CDFW will also make every effort to relocate Shasta crayfish during the late spring to late fall, which is outside of their breeding season, and, therefore, will cause less of an impact to the species.

#### *Shared Responsibilities of the Parties*

The Parties will ensure that the Agreement and the actions covered in the Agreement are consistent with applicable Federal, State, and Tribal laws and regulations. The Parties will ensure that the terms of the Agreement will not be in conflict with any ongoing conservation or recovery programs for the Covered Species. Nothing in this Agreement will be construed to limit or constrain any Party or any other entity from taking additional actions at its own expense to protect or conserve the Covered Species. Nothing in this Agreement will limit the ability of Federal and State conservation authorities to perform their lawful duties, and conduct investigations as authorized by statute and by court guidance and direction. Each party will have all remedies otherwise available to enforce the terms of the Agreement and the permit, except that no Party shall be liable in damages for any breach of this Agreement, any performance or failure to perform an obligation under this Agreement, or any other cause of action arising from this Agreement. The Parties agree to work together in good faith to resolve any disputes, using dispute resolution procedures agreed upon by all Parties.

### **13. PERMITTEE ASSURANCES**

Through this Agreement, the Service provides PG&E assurances that it may use, alter, or modify the Enrolled Property, even if such use, alteration, or modification results in the incidental take

of the covered species. The Service further provides PG&E assurance that PG&E is authorized to take the Covered Species incidental to the return of the Enrolled Property to baseline conditions, although PG&E does not seek to return the enrolled property to the baseline condition. Through this Agreement and associated 10(a)(1)(A) permit, PG&E has the incidental take that is required to cover the activities of PG&E and CDFW. Specifically, the Service provides PG&E and its lessee (i.e., CDFW) assurances that such use, alteration, or modification activities may include those activities identified in this Agreement. These assurances depend on PG&E and its lessee complying with the obligations in this Agreement and in the permit. Further, such assurances apply only to this Agreement, only if the Agreement is being properly implemented, and only with respect to species covered by the Agreement and permit. The Service has determined that the incidental take of Covered Species authorized by this Agreement and its accompanying permit will not appreciably reduce the likelihood of survival and recovery in the wild of the Covered Species.

#### **14. AGREEMENT/PERMIT MANAGEMENT**

##### **14.1 Agreement/Permit Duration**

This Safe Harbor Agreement will remain in effect until March 1, 2043, the time when the FERC license for the Pit 1 Project expires.

##### **14.2 Agreement Renewal and Permit Extension**

The Agreement can be renewed with or without modification with the approval of all Parties. If the Agreement is renewed, the corresponding permit duration will be extended beyond the duration of the Agreement. The duration of the renewed Agreement and permit will be agreed upon by the Parties.

##### **14.3 Transfer of Agreement/Permit Benefits**

By signature of this Agreement, PG&E agrees to notify the Service in writing and at least 60 days in advance if all or a portion of its interest in the Enrolled Property is to be transferred to another owner. If PG&E transfers its interest in all or part of the Enrolled Property, the Service will regard the transferee as having the same rights and obligations as PG&E under this Agreement, if the transferee agrees to become a party to the original Agreement. Actions taken by the transferee that result in the take of covered species would be authorized if the transferee maintains the terms and conditions of the original Agreement and the permit. If the transferee does not become a Party to the Agreement, it would neither incur responsibilities under the Agreement nor receive any assurances relative to the Act's section 9 prohibitions that might result from the transferee's actions. After any notification of a transfer of interest in the Enrolled Property, the Service will contact the proposed transferee to explain the original Agreement and to determine whether the transferee desires to become a Party to the original Agreement or enter into a new safe harbor agreement. Notwithstanding anything contained in this Agreement, this Agreement is not intended to run with the land and any transferee or successor owner of the Enrolled Property or an interest therein shall not be obligated to be a party to the original Agreement or any other agreement with the Service. In the event a transferee becomes a Party to

the original Agreement, the Service will honor the terms and conditions of the original Agreement and permit, provided that the Service determines that there would continue to be a net conservation benefit for the Covered Species.

## **15. MODIFICATIONS OR AMENDMENTS**

### **15.1 Modification or Amendment of the Agreement**

Any of the Parties may propose amendments to this Agreement, as provided in 50 CFR 13.23, by providing written notice to, and obtaining the written concurrence of, the other Party. Such notice shall include a statement of the proposed modification, the reason for it, and its expected results. The Parties will use their best efforts to respond to proposed modifications within 60 days of receipt of such notice. Proposed modifications or amendments will become effective upon the other Parties' written concurrence.

### **15.2 Termination of the Agreement**

As provided for in Part 12 of the Service's Safe Harbor Policy (FR 64:32717), PG&E can terminate this Agreement at any time, for any reason or no reason by providing 90-days written notice to the Service. If the Agreement is terminated, the Service (or an agreed upon designee) shall collect all Shasta crayfish from within the Enrolled Property and return the Enrolled Property to baseline condition. PG&E will make every effort to allow enough notification that the Service and CDFW will be able to relocate Shasta crayfish during the late spring to late fall, which is outside of their breeding season, and, therefore, will cause less of an impact to the species. PG&E acknowledges that early termination of the Agreement will result in a corresponding termination of the permit and PG&E's loss of the regulatory assurances provided by the permit for the Covered Species after the Enrolled Property is returned to baseline condition.

### **15.3 Permit Suspension or Revocation**

The Service may suspend or revoke the permit for a reasonable cause, in accordance with the laws and regulations in force at the time of such suspension or revocation. The Service will pursue all appropriate options to avoid permit revocation where required by applicable regulations. PG&E has the right to appeal any suspension or revocation to a mutually agreed upon arbitrator.

### **15.4 Baseline Adjustment**

The baseline conditions for the Enrolled Property may, by mutual agreement of the Parties, be adjusted if, during the term of the Agreement for reasons beyond the control of PG&E, the baseline conditions are decreased from what it was at the time the Agreement is signed.

## **15.5 Adaptive Management**

Adaptive management allows for mutually agreed-to changes to the management activities in response to changing conditions or new information. This approach will be utilized if needed to assure that the project will provide a net conservation benefit for the Covered Species for the duration of the Agreement. Decisions related to adaptive management will be based on the monitoring results and other information in monitoring reports.

## **16. OTHER MEASURES**

### **16.1 Remedies**

Each party shall have all remedies otherwise available to enforce the terms of the Agreement and the permit, except that no party shall be liable in damages for any breach of this Agreement, any performance or failure to perform an obligation under this Agreement or any other cause of action arising from this Agreement.

### **16.2 Dispute Resolution**

The Parties recognize that disputes concerning implementation of, compliance with, or termination of, this Agreement may arise from time to time. The Parties agree to work together in good faith to resolve any disputes, using dispute resolution procedures agreed upon by all Parties.

### **16.3 Availability of Funds**

Implementation of this Agreement by the Service is subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this Agreement will be construed by the Parties to require the obligation, appropriation, or expenditure of any funds from the U.S. Treasury. The Parties acknowledge that the Service will not be required under this Agreement to expend any Federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

### **16.4 No Third-Party Beneficiaries**

This Agreement does not create any new right or interest in any member of the public as a third-party beneficiary, nor shall it authorize anyone not a party to this Agreement to maintain a suit for personal injuries or damages pursuant to the provisions of this Agreement. The duties, obligations, and responsibilities of the Parties to this Agreement with respect to third parties shall remain as imposed under existing law.

### **16.5 Other Listed Species, Candidate Species, and Species of Concern**

The possibility exists that other listed, proposed, or candidate species, or species of concern may occur in the future on the Enrolled Property as a direct result of the management actions specified in this Agreement. If that occurs and PG&E or CDFW so requests, the Parties may

agree to amend the Agreement and associated permit to cover additional species and to establish appropriate baseline conditions for such other species.

### **16.6 Notice and Reports**

Any notices and reports, including monitoring reports, required by this Agreement shall be delivered to the persons listed below, as appropriate:

*U.S. Fish and Wildlife Service*

Safe Harbor Program Coordinator  
Sacramento Fish and Wildlife Office  
U.S. Fish and Wildlife Service  
2800 Cottage Way, Room W-2605  
Sacramento, CA 95825

Recovery Division Chief  
Sacramento Fish and Wildlife Office  
U.S. Fish and Wildlife Service  
2800 Cottage Way, Room W-2605  
Sacramento, CA 95825

*California Department of Fish and Wildlife*

Fisheries Program Manager, Region I  
601 Locust Street  
Redding, CA 96001

*Permittee*

Director of Hydro Licensing, Power Generation  
Pacific Gas and Electric Company  
P.O. Box 770000  
San Francisco, CA 94177

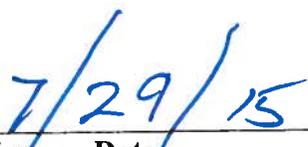
### **16.7 Emergency Situations**

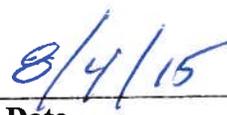
Emergency situations, such as wildfires, flooding, epidemic disease, or other factors, may require property management actions not specified in this Agreement. In these situations, the Parties acknowledge that it may be impossible for PG&E to provide the 90-day advance notice (30-day for CDFW) required by the Agreement prior to initiating activities that could result in the take of Covered Species. In emergency situations, PG&E or CDFW will notify the Service as soon as reasonably possible after discovering such a situation, and will make reasonable accommodations to the Service prior to the emergency management actions. The Parties acknowledge that relocation efforts of affected Covered Species may be precluded by certain

emergency situations. The Parties will work cooperatively to avoid impacts to Covered Species resulting from an emergency situation.

**17. SIGNATURES**

By our signatures below, each Party agrees to abide by and uphold the provisions of this Agreement and any conditions of the permit associated with this Agreement.

   
\_\_\_\_\_  
Alvin Thoma, Director of Hydro Licensing, Power Generation      **Date**  
Pacific Gas and Electric Company

   
\_\_\_\_\_  
Neil Manji, Regional Manager, Northern Region (1)      **Date**  
California Department of Fish and Wildlife

   
\_\_\_\_\_  
Jennifer M. Norris, Field Supervisor, Sacramento Field Office      **Date**  
U.S. Fish and Wildlife Service

## References

Ellis, M. J. 1999. Species invasions and replacements in a native crayfish community. Ph.D. Dissertation, Department of Biology, The University of Michigan, Ann Arbor, Michigan. 230 pp.

Meinzer, O.E. 1927. Large springs in the United States. Department of the Interior, United States Geological Survey Water-Supply Paper 557:1--63.

Pacific Gas and Electric (PG&E). 2003. Yellow Starthistle Control Plan Addressing License Article 414, Hat Creek Project, FERC Project No. 2661. April 2003.

PG&E. 2010. Pit 1 Project 2009 macroinvertebrate study report. Prepared by Spring Rivers Ecological Sciences LLC. Prepared for Pacific Gas and Electric Company Environmental Services, 3401 Crow Canyon Road, San Ramon, California 94583. June 2010.

Spring Rivers Ecological Sciences LLC. 2013. Shasta Crayfish Technical Review Committee 2012 Annual Report. Prepared for Pacific Gas and Electric Company, San Ramon, California. May 2013

U.S. Fish and Wildlife Service (Service). 1998. Recovery Plan for the Shasta Crayfish (*Pacifastacus fortis*). U.S. Fish and Wildlife Service, Portland, Oregon. 153 pp.

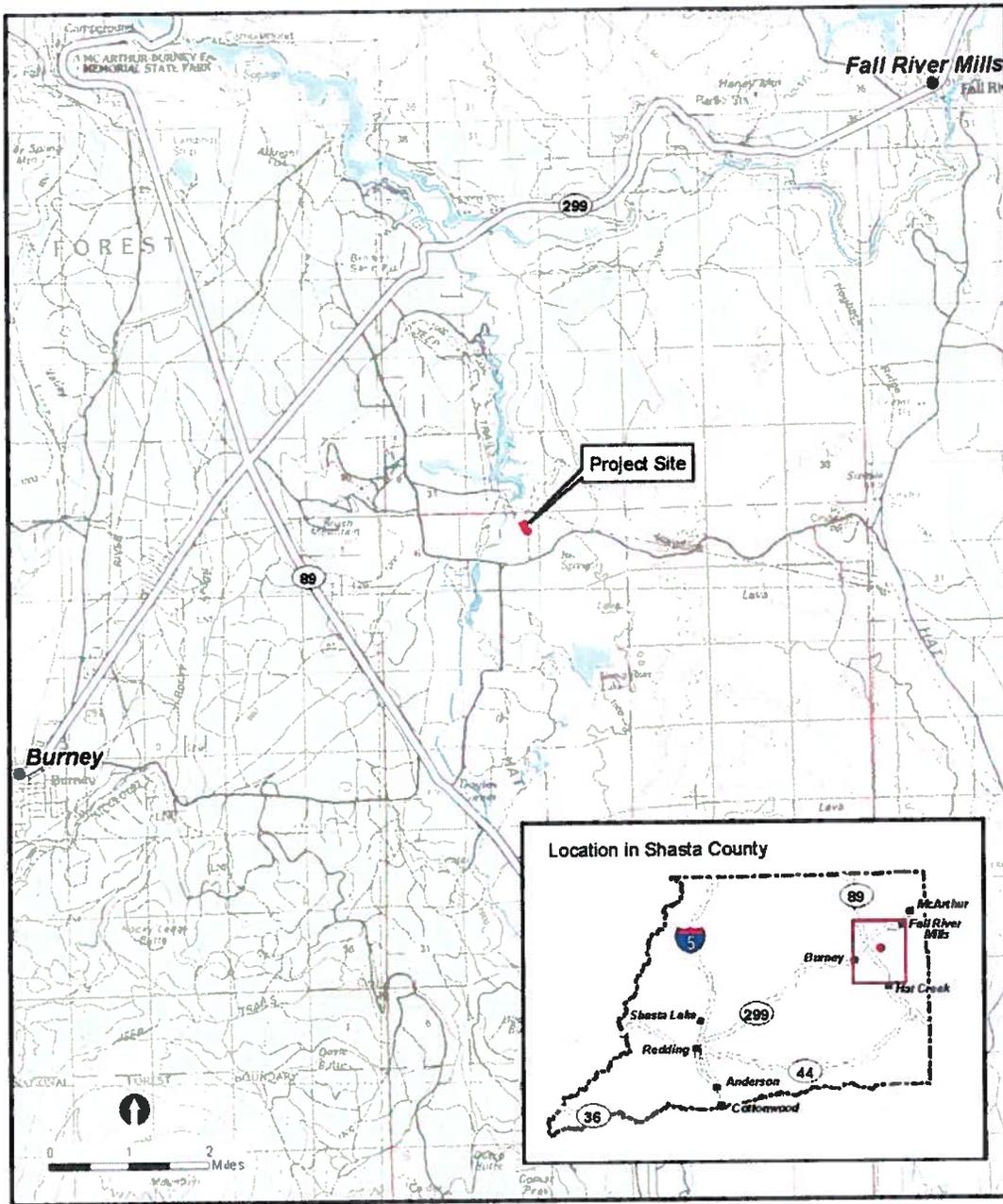


Figure 1 Enrolled Property Location.

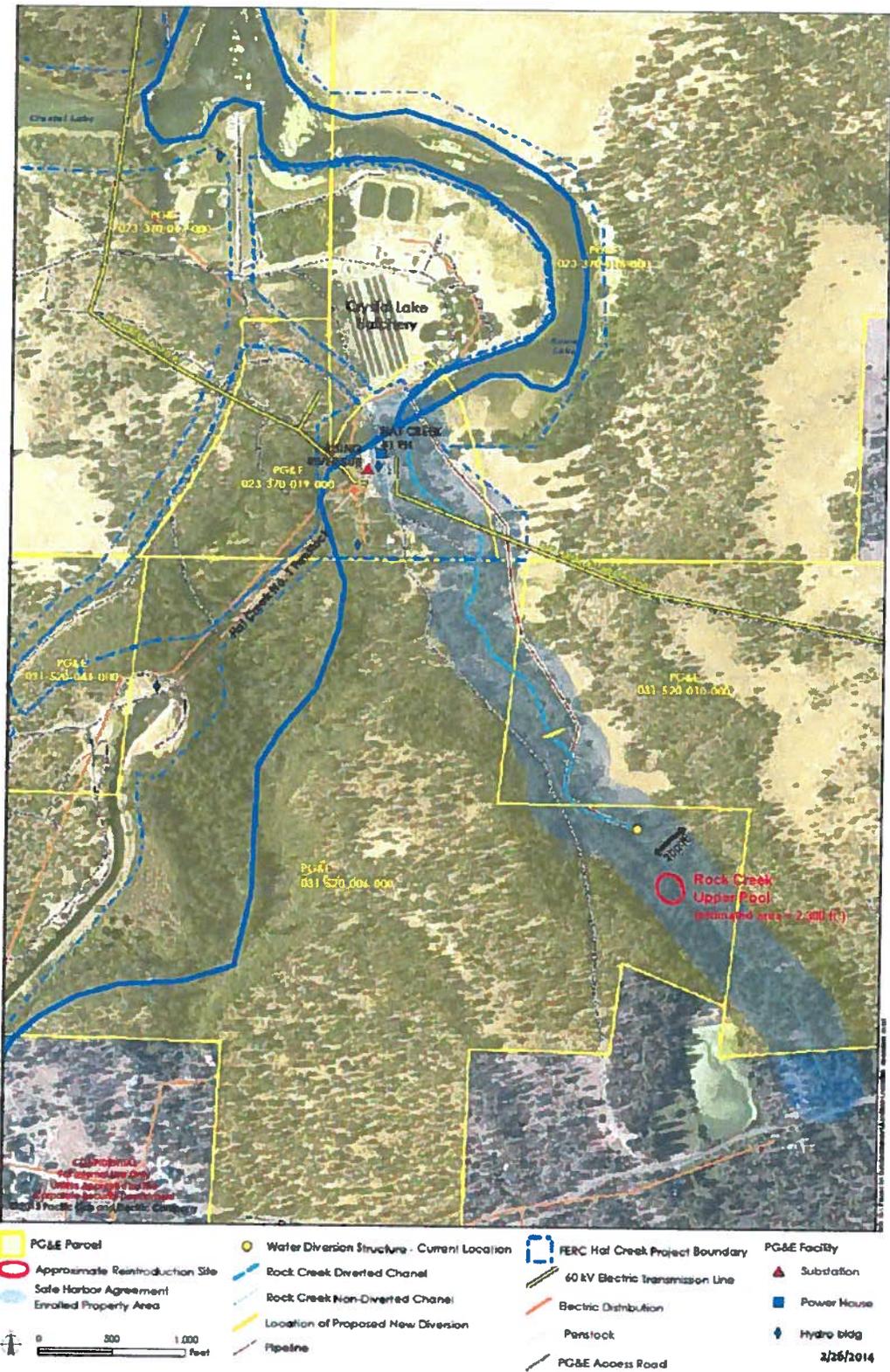


Figure 2 Covered Area and Surrounding PG&E Facilities.



## **Attachment A**

### **California Forest Practice Rules Excerpts with Watercourse Protection Measures**

**916.2, 936.2, 956.2 Protection of the Beneficial Uses of Water and Riparian Functions [All Districts]**

(a) The measures used to protect each watercourse and lake in a logging area shall be determined by the presence and condition of the following values:

- (1) The existing and restorable quality and beneficial uses of water as specified by the applicable water quality control plan and as further identified and refined during preparation and review of the plan.
- (2) The existing and restorable uses of water for fisheries as identified by the DFG or as further identified and refined during preparation and review of the plan.
- (3) The beneficial functions of the riparian zone that provides for the biological needs of native aquatic and riparian-associated species as specified in 14 CCR § 916.4 [936.4, 956.4] subsection (b) and 14 CCR § 916.9 [936.9, 956.9] when the plan is in a planning watershed with listed anadromous salmonids.
- (4) Sensitive conditions near watercourses and lakes as specified in 14 CCR § 916.4 [936.4, 956.4] subsection (a).

The maintenance, protection, and contribution towards restoration of these values shall be achieved through a combination of the rules and plan-specific mitigation. The RPF shall propose, and the Director may require, adequate protection of overflow and changeable channels which are not contained within the channel zone.

(b) The State's waters are grouped into four classes based on key beneficial uses. These classifications shall be used to determine the appropriate protection measures to be applied during the conduct of timber operations. The basis for classification (characteristics and key beneficial uses) are set forth in 14 CCR § 916.5 [936.5, 956.5], Table 1 and the range of appropriate protective measures applicable to each class are contained in 14 CCR §§ 916.3 [936.3, 956.3], 916.4 [936.4, 956.4], and 916.5 [936.5, 956.5] and 916.9 [936.9, 956.9] when the plan is in a planning watershed with listed anadromous salmonids.

(c) When the protective measures contained in 14 CCR §§ 916.5 [936.5, 956.5], and 916.9 [936.9, 956.9] when the plan is in a planning watershed with listed anadromous salmonids, are not adequate to provide for maintenance, protection or to contribute towards restoration of beneficial uses of water set forth in 14 CCR § 916.5 [936.5, 956.5] Table 1, additional measures to achieve these goals shall be developed by the RPF or proposed by the Director under the provisions of 14 CCR § 916.6 [936.6, 956.6], Alternative Watercourse and Lake Protection, and incorporated in the plan when approved by the Director.

**916.3, 936.3, 956.3 General Limitations Near Watercourses, Lakes, Marshes, Meadows and Other Wet Areas [All Districts]**

The quality and beneficial uses of water shall not be unreasonably degraded by timber operations. During timber operations, the timber operator shall not place, discharge, or dispose of or deposit in such a manner as to permit to pass into the water of this state, any substances or materials, including, but not limited to, soil, silt, bark, slash, sawdust, or petroleum, in quantities deleterious to fish, wildlife, or the quality and beneficial uses of water. All provisions of this article shall be applied in a manner which complies with this standard.

(a) When there is reasonable expectation that slash, debris, soil, or other material resulting from timber operations, falling or associated activities, will be deposited in Class I and Class II waters below the watercourse or lake transition line or in watercourses which contain or conduct Class IV water, those harvest activities shall be deferred until equipment is available for its removal, or another procedure and schedule for completion of corrective work is approved by the Director.

(b) Accidental depositions of soil or other debris in lakes or below the watercourse or lake transition line in waters classed I, II, and IV shall be removed immediately after the deposition or as approved by the Director.

(c) The timber operator shall not construct or reconstruct roads, construct or use tractor roads or landings in Class I, II, III or IV watercourses, in the WLPZ, marshes, wet meadows, and other wet areas unless when explained and justified in the THP by the RPF, and approved by the Director, except as follows:

- (1) At prepared tractor road crossings as described in 914.8(b) [934.8(b), 954.8(b)].
- (2) Crossings of Class III watercourses which are dry at the time of timber operations.
- (3) At existing road crossings.

(4) At new tractor and road crossings approved as part of the Fish and Game Code process (F&GC 1600 et seq.).

Use of existing roads is addressed in 916.4(a) [936.4(a), 956.4(a)].

(d) Vegetation, other than commercial species, bordering and covering meadows and wet areas shall be retained and protected during timber operations unless explained and justified in the THP and approved by the Director. Soil within the meadows and wet areas shall be protected to the maximum extent possible.

(e) Trees cut within the WLPZ shall be felled away from the watercourse by pulling or other mechanical methods if necessary, in order to protect the residual vegetation in the WLPZ. Exceptions may be proposed in the THP and used when approved by the Director.

(f) Where less than 50% canopy exists in the WLPZs of Class I and II waters before timber operations, only sanitation salvage which protects the values described in 14 CCR 916.4(b) [936.4(b), 956.4(b)] shall be allowed.

(g) Recruitment of large woody debris for instream habitat shall be provided by retaining at least two living conifers per acre at least 16 inches diameter breast high and 50 ft. tall within 50 ft. of all Class I and II watercourses.

#### **916.4, 936.4, 956.4 Watercourse and Lake Protection [All Districts]**

(a) The RPF or supervised designee shall conduct a field examination of all lakes and watercourses and shall map all lakes and watercourses which contain or conduct Class I, II, III or IV waters.

(1) As part of this field examination, the RPF or supervised designee shall evaluate areas near, and areas with the potential to directly impact, watercourses and lakes for sensitive conditions including, but not limited to, existing and proposed roads, skidtrails and landings, unstable and erodible watercourse banks, unstable upslope areas, debris, jam potential, inadequate flow capacity, changeable channels, overflow channels, flood prone areas, and riparian zones wherein the values set forth in 14 CCR §§ 916.4(b) [936.4(b), 956.4(b)] are impaired. The RPF shall consider these conditions, and those measures needed to maintain, and restore to the extent feasible, the functions set forth in 14 CCR §§ 916.4(b) [936.4(b), 956.4(b)], when proposing WLPZ widths and protection measures. The plan shall identify such conditions, including where they may interact with proposed timber operations, that individually or cumulatively significantly and adversely affect the beneficial uses of water, and shall describe measures to protect and restore to the extent feasible, the beneficial uses of water. In proposing, reviewing, and approving such measures, preference shall be given to measures that are on-site, or to offsite measures where sites are located to maximize the benefits to the impacted portion of a watercourse or lake.

(2) As part of this field examination, the RPF or supervised designee shall map the location of spawning and rearing habitat for anadromous salmonids, and the condition of the habitat shall be evaluated using habitat typing that at a minimum identifies the pool, flatwater, and riffle percentages. The opportunity for habitat restoration shall be described within the plan for each Class I watercourse, and for each Class II watercourse that can be feasibly restored to a Class I.

(3) The mapping of conditions identified in subsection (a)(1) and (a)(2) above, and their protective measures, shall be sufficiently clear and detailed to permit the Director and the other review team representatives to evaluate the potential environmental impacts of timber operations, the proposed mitigation measures and the proposed restoration measures.

(4) The mapping of conditions identified in subsection (a)(1) and (a)(2) above, and their protective measures, shall be sufficiently clear and detailed to provide direction and clear guidance to the timber operator.

(5) The mapping of conditions identified in 14 CCR § 916.4 [936.4, 956.4] subsections (a)(1) and (a)(2), and their protective and restoration measures, should be done at a scale of 1:2,400. In site-specific cases, the mapping of critical locations of corrective work and logging operation impacts shall be done at a scale of at least 1:240 when the Director determines it is necessary to evaluate the plan.

(6) One set of photocopies of recent stereo aerial photographs of the plan area may be required by the Director.

(b) The standard width of the WLPZ and/or the associated basic protection measures shall be determined from Table I (14 CCR 916.5 [936.5, 956.5]) or Section 916.4(c) [956.4(c), 956.4(c)], and shall be stated in the plan. A combination of the rules, the plan, and mitigation measures shall provide protection for the following:

- a. Water temperature control.
- b. Streambed and flow modification by large woody debris.
- c. Filtration of organic and inorganic material.
- d. Upslope stability.
- e. Bank and channel stabilization.
- f. Spawning and rearing habitat for salmonids
- g. Vegetation structure diversity for fish and wildlife habitat, possibly including but not limited to:
  - 1. Vertical diversity
  - 2. Migration corridor
  - 3. Nesting, roosting, and escape
  - 4. Food abundance
  - 5. Microclimate modification
  - 6. Snags
  - 7. Surface cover

(1) Measures and the appropriate zone widths for the protection of the State's waters which have been taken from Table I (14 CCR 916.5 [936.5, 956.5]) or developed under Section 916.4(c) [936.4(c), 956.4(c)] shall be stated in the THP.

(2) All timber operations shall conform to the marking, flagging and other identification of protective measures specified in CCR 916.4 [936.4, 956.4] and 916.5 [936.5, 956.5] and the THP. Conformance shall be determined based on the evaluation of no less than a 200 foot lineal segment of each watercourse or lake.

(3) The width of the WLPZ shall be measured along the surface of the ground from the watercourse or lake transition line or in the absence of riparian vegetation from the top edge of the watercourse bank.

(4) Slopes shall be measured in percent for the proposed WLPZ. If topography within the proposed WLPZ is variable, segments of the proposed WLPZ should be segregated by slope class as indicated in Table I, 14 CCR 916.5 [936.5, 956.5].

(5) If requested by either party, and after on-the-ground inspection, the RPF and the Director may increase or decrease the width of a proposed WLPZ. A decrease shall not exceed 25 percent of the width as determined by the procedure prescribed in Sections 14 CCR 916.4(c) [936.4(c), 956.4(c)], and 916.5 [936.5, 956.5]. Such changes in zone width shall be based on considerations of soil, slope, climatic factors, biologic, hydrologic, and geologic values listed in Section 14 CCR 916.4(b) [936.4(b), 956.4(b)], silvicultural methods, yarding systems, road location, and site preparation activities. In no case shall the width be adjusted to less than 50 feet for Class I and II waters. Where soil surfaced roads exist within the standard WLPZ, no in-lieu reduction of WLPZ width shall be approved.

(6) Within the WLPZ, at least 75% surface cover and undisturbed area shall be retained to act as a filter strip for raindrop energy dissipation, and for wildlife habitat. This percentage may be adjusted to meet site specific conditions when proposed by the RPF and approved by the Director or where broadcast burning is conducted under the terms of a project type burning permit and in compliance with 14 CCR 915.2(b) [935.2(b), 955.2(b)].

(c) The protection and WLPZ widths for Class III and Class IV waters shall prevent the degradation of the downstream beneficial use of water and shall be determined on a site-specific basis.

(1) Where operations occur adjacent to Class III watercourses, the RPF shall designate in the THP an equipment limitation zone (ELZ) of at least 25 feet where sideslope steepness is less than 30% and at least 50 feet where sideslope steepness is 30% or greater unless explained and justified otherwise in the THP and approved by the Director. Class III watercourses within logging areas where the EHR is Low and the slopes are less than 30% shall not require an ELZ unless proposed by the RPF or required by the Director. The RPF shall describe the limitations on the use of heavy equipment in the THP. Where appropriate to protect the beneficial uses of water, the RPF shall describe additional protection measures, which may include surface cover retention, vegetation protection and timber falling limitations. The location of the areas of heavy equipment use in any ELZ shall be clearly described in the plan, or flagged or marked on

the ground before the preharvest inspection. When necessary to protect the beneficial use of water, the RPF shall designate and the Director may require a WLPZ for Class III and Class IV waters or an ELZ for Class IV waters.

(2) The width of the WLPZ for Class III and IV waters shall be determined from on-site inspection. Minimum protective measures required when Class III and Class IV protection zones are necessary are contained in Table I 14 CCR 916.5 [936.5, 956.5].

(3) Soil deposited during timber operations in a Class III watercourse other than at a temporary crossing shall be removed and debris deposited during timber operations shall be removed or stabilized before the conclusion of timber operations, or before October 15. Temporary crossings shall be removed before the winter period, or as approved by the Director.

(4) When approved by the Director on an individual plan basis as provided in Section 14 CCR 916.4(c)(1) [936.4(c)(1), 956.4(c)(1)] Class IV waters shall be exempted from required protection when such protection is inconsistent with the management objectives of the owner of the manmade watercourse.

(d) Heavy equipment shall not be used in timber falling, yarding, or site preparation within the WLPZ unless such use is explained and justified in the THP and approved by the Director.

(e) Flagging for heavy equipment use within the WLPZ adjacent to Class I waters and for all tractor road watercourse crossings of all watercourses must be completed before the preharvest inspection if one is conducted or start of operations, whichever comes first. Flagging for heavy equipment use within the WLPZ adjacent to Class II, III and IV waters may be done at the option of the RPF or as required by the Director on a site-specific basis.

(f) Subsection (d) does not apply to (1)-(4) below. Subsection (e) does not apply to (2)-(4) below.

(1) At prepared tractor road crossings as described in 914.8(b) [934.6(b), 954.8(b)].

(2) Crossings of Class III watercourses which are dry at the time of timber operations.

(3) At existing road crossings.

(4) At new tractor and road crossings approved as part of the Fish and Game Code Process (F&GC 1600 et seq.).

#### **916.5, 936.5, 956.5 Procedure for Determining Watercourse and Lake Protection Zone (WLPZ) Widths and Protective Measures [All Districts]**

The following procedure for determining WLPZ widths and protective measures shall be followed:

(a) The following information shall be determined from field investigation:

(1) The location of all lakes and watercourses including man made watercourses.

(2) The existing and restorable beneficial uses of the waters to be protected as identified in subsection (1) above.

(3) The side slope classes for the individual class of waters to be protected (e.g. < 30%, 30-50%, >50%), where side slope is measured from the watercourse or lake transition line to a point 100 feet upslope from the watercourse or lake transition line, or, in the absence of riparian vegetation, from the top of the watercourse bank where slope configurations are variable, a weighted average method shall be used to determine sideslope percent.

(b) The beneficial uses noted from the field investigations in subsection (a) shall be compared to the characteristics or key beneficial uses listed in Row 1 of Table I (14 CCR 916.5 [936.5, 956.5]) to determine the water classes (e.g. I, II, III, IV, Row 2).

(c) The standard protection zone width differentiated by slope classes determined in Subsection (a) are shown in Rows 4-7, Table I (14 CCR 916.5 [936.5, 956.5]). These widths may be modified as stated in 14 CCR 916.4(b)(5) [936.4(b)(5), 956.4(b)(5)].

(d) The alphabetical letter designations A through I in Rows 4-7, Table I 14 CCR 916.5 [936.5, 956.5], and described in subsection (e) to Table I indicate the standard protective measures to be applied to the classes of water as determined in subsection (b) above.

(e) The letter designations shown in the "Protective Measures and Widths" column in Table I correspond to the following:

**"A"** WLPZ shall be clearly identified on the ground by the RPF who prepared the plan, or supervised designee, with paint, flagging, or other suitable means prior to the preharvest inspection. For nonindustrial timber management plans, sample identification of the WLPZ prior to the preharvest inspection may be allowed. The sample shall be based upon a field examination and be consistent with the applicable provisions of 14 CCR §§ 916.4 [936.4, 956.4] and 916.5 [936.5, 956.5], representing the range of conditions found within the WLPZ. The Director shall determine if the sample identification is adequate for plan evaluation during the preharvest inspection. If sample identification is allowed, the remaining WLPZ shall be identified by an RPF or supervised designee prior to the start of timber operations within or adjacent to the WLPZ. The RPF shall notify the Department when the WLPZ has been identified.

**"B"** WLPZ shall be clearly identified on the ground by an RPF or supervised designee, with paint, flagging, or other suitable means, prior to the start of timber operations. In watersheds with listed anadromous salmonids, on the ground identification of the WLPZ shall be completed prior to the preharvest inspection. For all nonindustrial timber management plans, sample identification of the WLPZ prior to the preharvest inspection may be allowed. The sample shall be based upon a field examination and be consistent with the applicable provisions of 14 CCR §§ 916.4 [936.4, 956.4] and 916.5 [936.5, 956.5], representing the range of conditions found within the WLPZ. The Director shall determine if the sample identification is adequate for plan evaluation during the preharvest inspection. If sample identification is allowed, the remaining WLPZ shall be identified by an RPF or supervised designee prior to the start of timber operations within or adjacent to the WLPZ. The RPF shall notify the Department when the WLPZ has been identified.

**"C"** In site-specific cases, the RPF may provide in the plan, or the Director may require, that the WLPZ be clearly identified on the ground with flagging or by other suitable means prior to the start of timber operations.

**"D"** To ensure retention of shade canopy filter strip properties of the WLPZ and the maintenance of a multi-storied stand for protection of values described in 14 CCR § 916.4(b) [936.4(b), 956.4(b)], residual or harvest trees shall be marked, including a base mark below the cut-line within the WLPZ by the RPF, or supervised designee. Outside of watersheds with listed anadromous salmonids, sample marking prior to the preharvest inspection is satisfactory in those cases where the Director determines it is adequate for plan evaluation. When sample marking has been used, the remaining WLPZ shall be marked in advance of falling operations by the RPF, or supervised designee. In watersheds with *[listed anadromous salmonids]*, trees shall be marked in advance of the preharvest inspection. For all nonindustrial timber management plans, sample marking of the WLPZ prior to the preharvest inspection may be allowed. The sample shall be based upon a field examination and shall be consistent with the applicable provisions of 14 CCR §§ 916.4 [936.4, 956.4] and 916.5 [936.5, 956.5], representing the range of conditions found within the WLPZ. The Director shall determine if the sample mark is adequate for plan evaluation during the preharvest inspection. If sample marking is allowed, the remaining WLPZ shall be marked by an RPF, or supervised designee, prior to the start of timber operations within or adjacent to the WLPZ. The RPF shall notify the Department when the WLPZ has been identified.

**"E"** To ensure retention of shade canopy filter strip properties of the WLPZ and the maintenance of a multi-storied stand for protection of values described in 14 CCR § 916.4(b) [936.4(b), 956.4(b)], residual or harvest trees shall be marked, including a base mark below the cut line, within the WLPZ by the RPF or supervised designee. Outside of watersheds with listed anadromous salmonids, tree marking shall be done prior to timber falling operations. In watersheds with listed anadromous salmonids, trees shall be marked in advance of the preharvest inspection. In watersheds with listed anadromous salmonids, trees shall be marked in advance of the preharvest inspection. For all nonindustrial timber management plans, sample marking of the WLPZ prior to the preharvest inspection may be allowed. The sample shall be based upon a field examination and shall be consistent with the applicable provisions of 14 CCR §§ 916.4 [936.4, 956.4] and 916.5 [936.5, 956.5], representing the range of conditions found within the WLPZ. The Director shall determine if the sample mark is adequate for plan evaluation during the preharvest inspection. If sample marking is allowed, the remaining WLPZ shall be marked by an RPF or supervised

designee prior to the start of timber operations within or adjacent to the WLPZ. The RPF shall notify the Department when the WLPZ has been identified.

"F" Residual or harvest tree marking within the WLPZ may be stipulated in the THP by the RPF or required by the Director in site-specific cases to ensure retention of filter strip properties or to maintain soil stability of the zone. The RPF shall state in the THP if marking was used in these zones.

"G" To protect water temperature, filter strip properties, upslope stability, and fish and wildlife values, at least 50% of the overstory and 50% of the understory canopy covering the ground and adjacent waters shall be left in a well distributed multi-storied stand composed of a diversity of species similar to that found before the start of operations. The residual overstory canopy shall be composed of at least 25% of the existing overstory conifers. Species composition may be adjusted consistent with the above standard to meet on-site conditions when agreed to in the THP by the RPF and the Director.

"H" At least 50% of the understory vegetation present before timber operations shall be left living and well distributed within the WLPZ to maintain soil stability. This percentage may be adjusted to meet on-site conditions when agreed to in the THP by the RPF and the Director. Unless required by the Director, this shall not be construed to prohibit broadcast burning with a project type burning permit for site preparation.

"I" To protect water temperature, filter strip properties, upslope stability, and fish and wildlife values, at least 50% of the total canopy covering the ground shall be left in a well distributed multi-storied stand configuration composed of a diversity of species similar to that found before the start of operations. The residual overstory canopy shall be composed of at least 25% of the existing overstory conifers. Due to variability in Class II watercourses these percentages and species composition may be adjusted to meet on-site conditions when agreed to by the RPF and the Director in the THP.

**916.5, 936.5, 956.5 Procedures for Determining Watercourse and Lake Protection Zone Widths and Protective Measures [All Districts]**

TABLE I

Procedures for Determining Watercourse and Lake Protection Zone Widths and Protective Measures <sup>1</sup>								
Water Class Characteristics or Key Indicator Beneficial Use	1) Domestic supplies, including springs, on site and/or within 100 feet downstream of the operations area and/or 2) Fish always or seasonally present onsite, includes habitat to sustain fish migration and spawning.		1) Fish always or seasonally present offsite within 1000 feet downstream and/or 2) Aquatic habitat for nonfish aquatic species. 3) Excludes Class III waters that are tributary to Class I waters.		No aquatic life present, watercourse showing evidence of being capable of sediment transport to Class I and II waters under normal high water flow conditions after completion of timber operations.		Man-made watercourses, usually downstream, established domestic, agricultural, hydroelectric supply or other beneficial use.	
Water Class	Class I		Class II		Class III		Class IV	
Slope Class (%)	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection Measure	Width Feet	Protection
					[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]		[see 916.4(c)] [see 936.4(c)] [see 956.4(c)]	
<30	75	BDG	50	BEI	See CFH		See CFI	
30-50	100	BDG	75	BEI	See CFH		See CFI	
>50	150 <sup>2</sup>	ADG	100 <sup>3</sup>	BEI	See CFH		See CFI	
1 - See Section 916.5(e) for letter designations application to this table. 2 - Subtract 50 feet width for cable yarding operations. 3 - Subtract 25 feet width for cable yarding operations.								

**916.6, 936.6, 956.6 Alternative Watercourse and Lake Protection [All Districts]**

(a) Alternative prescriptions for the protection of watercourses and lakes may be developed by the RPF or proposed by the Director on a site-specific basis provided the following conditions are complied with and the alternative prescriptions will achieve compliance with the standards set forth in 14 CCR 916.3 [936.3, 956.3] and 916.4(b) [936.4(b), 956.4(b)].

(1) The following information regarding an alternative prescription shall be included in the THP:

(A) An identification of each standard prescription which would be replaced by the alternative prescription.

(B) An identification of any beneficial uses of water or other features listed in 14 CCR 916.4(b) [936.4(b), 956.4(b)] which may be adversely affected by the replaced standard prescription and the alternative practice.

(C) An evaluation of any significant effects on such beneficial uses or features due to implementation of the alternative prescription.

(D) A clear and complete explanation and justification as to the reasons why, given site-specific technical, environmental, economic, or institutional considerations, an alternative prescription is needed. The reasons given must include at least one of the following:

(aa) Implementation of the specified standard prescriptions would not be feasible.

(bb) Implementation of the specified standard prescription(s) would not adequately prevent or reduce damage to the quality and beneficial uses of water.

(cc) Implementation of the proposed alternative prescription would provide equal or greater protection, including all proposed mitigations for the quality and beneficial uses of water and those features listed in 916.4(b) [936.4(b), 956.4(b)] than would implementation of the specified standard prescriptions.

(E) A plan for evaluating the results of the proposed alternative practice by either the plan submitter or the Director. The plan must include the criteria and procedures for evaluating and inspecting each approved alternative practice.

(2) The alternative measures stated in the plan shall be written so that they provide clear, enforceable standards for the guidance of the timber operator.

(3) Prior to beginning or continuing an operation in which alternative measures have been added to an approved THP in regard to watercourse and lake protection measures, the timber operator shall acknowledge the new specifications by signing and filing with the Director, a copy of the amended plan.

(b) The Director shall not accept for inclusion in a THP alternative watercourse and lake protection measures which do not meet the standard of subsection (a) of this section. In the event that written comments received from two or more agencies listed in 4582.6 PRC and 14 CCR 1037.3 and which participated in review of the plan, including on-the-ground inspection, lead to the conclusion that the proposed alternative does not meet the criteria of 14 CCR 916.5 [936.5, 956.5], and is therefore not consistent with rules of the Board, the Director shall reject the proposed alternative.

(c) Alternative practices stated in an approved THP shall have the same force and authority as those practices required by the standard rule.

**916.7, 936.7, 956.7 Reduction of Soil Loss [All Districts]**

Within the watercourse and lake protection zone adjacent to Class I and Class II waters, areas where mineral soil exceeding 800 continuous square feet in size, exposed by timber operations, shall be treated for reduction of soil loss. Treatment shall be done prior to October 15th except that such bare areas created after October 15th shall be so treated within 10 days, or as agreed to by the Director.

Stabilization measures shall be included and explained in the THP or other required notices.

Stabilization measures shall be selected that will prevent significant movement of soil into Class I and II waters and may include, but need not be limited to, mulching, rip-rapping, grass seeding, or chemical soil stabilizers.

**(a)** This section does not apply to the traveled surface of roads. Erosion control measures on road surfaces are specified in 14 CCR 923 [943, 963].

**(b)** Where mineral soil has been exposed by timber operations on approaches to watercourse crossings of Class I or II waters, or Class III waters if an ELZ or WLPZ is required, the disturbed area shall be stabilized to the extent necessary to prevent the discharge of soil into watercourses or lakes in amounts deleterious to the quality and beneficial uses of water.

**(c)** Where necessary to protect beneficial uses of water from timber operations, protection measures, such as seeding, mulching, or replanting, shall be specified to retain and improve the natural ability of the ground cover within the standard width of the WLPZ to filter sediment, minimize soil erosion, and stabilize banks of watercourses and lakes.

## Abbreviations and Definitions

CAL FIRE	California Department of Forestry and Fire Protection
CDF	California Department of Forestry and Fire Protection or CAL FIRE
DFG	California Department of Fish and Game (now California Department of Fish and Wildlife)
Director	Director of CAL FIRE
ELZ	Equipment limitation zone
FPA	Z'berg-Nejedly Forest Practice act of 1973 and amendments thereto (Public Resources Code Section 4551 et seq.)
RMP	Road Management Plan
RPF	Registered Professional Forester
RWQCB	Regional Water Quality Control Board
THP	Timber Harvesting Plan
USGS	United States Geological Survey
WLPZ	Watercourse and Lake Protection Zone
WTL	Watercourse Transition Line