

I, Stuart Siegel, declare as follows:

1. I am President of Siegel Environmental, LLC, Coastal Resilience Specialist for the San Francisco Bay National Estuarine Research Reserve, and Adjunct Professor of Earth and Climate Sciences at San Francisco State University. I have been so employed in these and prior positions for over 30 years. I am a Professional Wetland Scientist, certified since 1994 by the Society of Wetland Scientists. My experience and expertise are outlined in Attachment 1.

2. The facts stated in this Affidavit are true and correct of my own personal knowledge, except for those matters expressly stated on information and belief, which matters I believe to be true. If called as a witness, I could and would competently testify thereto.

3. **Wetlands are present within the Dogwood timber harvest area (“Study Area”) and would be impacted by THP implementation.** Review of the National Wetlands Inventory¹ (“NWI”) for this Study Area reveals six types of wetlands were mapped using 2002 aerial imagery and field reconnaissance between 2003 and 2006. Though the scale and methods of mapping may not yield exact and thorough mapping of all wetlands and it is not current, the NWI maps provide an approximation of wetland distributions and a minimum assessment of wetland types found within the Study Area. The NWI maps are provided in Attachment 2. These maps show wetlands distributed intermittently along the entire length of the Gualala River and its lower tributaries within the Study Area. Wetland types include herbaceous, scrub-shrub, and forested wetlands with temporary, seasonal, and saturated hydrologic conditions:

NWI Code	NWI Definition
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¹ www.fws.gov/wetlands/

NWI Code	NWI Definition
Freshwater Forested/Shrub Wetlands	
PSS1A	Temporarily flooded scrub-shrub wetland usually located in drainages
PFO1A	Temporarily flooded depressions and floodplains dominated by forested vegetation
PSS1B	Saturated scrub-shrub wetland usually associated with springs
PSS1C	Seasonally flooded scrub-shrub wetland usually located in drainages
Freshwater Emergent Wetland	
PEM1A	Temporarily flooded wetlands dominated by herbaceous vegetation
PEM1C	Seasonally flooded wetlands dominated by herbaceous vegetation
Riverine	
R3USA	Temporarily flooded unconsolidated substrate associated with upper perennial riverine systems
R3UBH	Permanently flooded upper perennial rivers
R1UBV	Permanently flooded, tidally influenced riverine deepwater habitat

4. These NWI mapping data establish the general presence of multiple wetlands types in the Study Area. These data establish that wetland types include “seasonal wetlands” and “perennial wetlands” found predictably within the Study Area and generally

associated with riparian floodplain conditions. These wetlands fall almost entirely within the Flood Prone Area as mapped for the lower reach of the Gualala River (see Attachment 3). Similar conditions apply to many of the North Coast California river floodplains and flood prone areas.

5. The definition of wetlands under the federal Clean Water Act is provided in 33 CFR 328.3(b), which states, “The term *wetlands* means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”
6. The Porter-Cologne Water Quality Control Act, as amended through January 2016, defines “waters of the State” to be “any surface water or groundwater, including saline waters, within the boundaries of the State” (California Water Code Section 13050(e)). Examples include, but are not limited to, rivers, streams, lakes, bays, marshes, mudflats, unvegetated seasonally ponded areas, drainage swales, sloughs, wet meadows, natural ponds, vernal pools, diked baylands, seasonal wetlands, and riparian woodlands².
7. The definition of “adjacent” which refers to wetlands adjacent to Waters of the United States is provided in 33 CFR 328.3(c), which states, “The term *adjacent* means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are ‘adjacent wetlands’”.
8. The guidance from the U.S. Army Corps of Engineers and U.S. Environmental Protection Agency in regards to jurisdiction in light of U.S. Supreme Court rulings on

² http://www.waterboards.ca.gov/northcoast/water_issues/programs/water_quality_certification.shtml,

<http://www.waterboards.ca.gov/sanfranciscobay/certs.shtml>

Rapanos and Carabell regarding isolated wetland, issued in a December 2, 2008 Guidance Letter, is clear that jurisdiction continues to apply “traditional navigable waters, wetlands adjacent to traditional navigable waters, non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically follow year-round or have continuous flow at least seasonally (e.g., typically three months), and wetlands that directly abut such tributaries”.

9. All wetlands that occur within the Dogwood THP are adjacent to the Gualala River and its tributaries. These floodplain wetlands are not “isolated” and continue to be treated jurisdictionally under the Clean Water Act. The claim in the Recirculated Section 5 of the THP (page 44.163) that any confusion regarding federal jurisdiction supports the conclusion that it is “reasonable to rely on the established FPR definition of wet areas (wetlands)” is therefore without relevance to the Dogwood THP.
10. The Forest Practice Rules define wetlands (wet areas) for the Northern District as follows: “Meadows and Wet Areas (For the Northern Forest District:) means those areas which are **moist on the surface throughout most of the year** and/or support aquatic vegetation, grasses and forbs as their principal vegetative cover (Ref. Sec. 4562.7, PRC).” In contrast, the wetland hydrology characteristic necessary to establish presence of wetlands is defined in the Wetland Delineation Manual (USACE 1987, page 10): “The area is inundated either permanently or periodically at mean water depths ≤ 6.6 ft, or the soil is **saturated to the surface at some time during the growing season** of the prevalent vegetation. The period of inundation or soil saturation varies according to the hydrologic/soil moisture regime and occurs in both tidal and nontidal situations.” Under the Clean Water Act, this definition of wetland hydrology must be met for an area to be considered a wetland. This definition is the enforceable standard, contrary to the THP statement (CALFIRE 2016, page 441.66). There is not equivalency between “moist on the surface throughout most of the year” and “saturated at the surface at some time during the growing season” in these two

wetland hydrology definitions. The conclusory statement of the Recirculated Section 5 of the THP (CALFIRE 2016, page 441.63) that there is “no significant difference between the two” is not valid. Thus, deferring to the Forest Practice Rules of wet area definitions excludes considerable areas that meet the federal wetland definition.

11. The Forest Practice Rules (CALFIRE 2013, pages 11-12) define Flood Prone Areas as **“an area contiguous to a watercourse channel zone that is periodically flooded by overbank flow**. Indicators of flood prone areas may include diverse fluvial landforms, such as overflow side channels or oxbow lakes, hydric vegetation, and deposits of fine-grained sediment between duff layers or on the bark of hardwoods and conifers. The outer boundary of the flood prone area may be determined by field indicators such as the location where valley slope begins (i.e., where there is a substantial percent change in slope, including terraces, the toes of the alluvial fan, etc.), a distinct change in soil/plant characteristics, and the absence of silt lines on trees and residual evidence of floatable debris caught in brush or trees. Along laterally stable watercourses lacking a channel migration zone where the outer boundary of the flood prone area cannot be clearly determined using the field indicators above, it shall be determined based on the area inundated by a 20-year recurrence interval flood flow event, or the elevation equivalent to twice the distance between a thalweg riffle crest and the depth of the channel at bankfull stage. When both a channel migration zone and flood prone area are present, the boundaries established by the channel migration zone supersede the establishment of a flood prone area.”
12. This FPR definition of Flood Prone Area aligns far more closely with the Clean Water Act definition of Wetlands than does the FPR Wet Area definition. Specifically, it establishes “periodically flooded” hydrology, “hydric vegetation”, and “deposits of fine-grained sediment” directly consistent with the Clean Water Act.
13. The “Dogwood THP Wet Area – Wetland Designation Review” (CALFIRE 2016, pages 441.68 to 441.70” do not provide complete information for wetland mapping,

identification, or delineation and thus are incomplete for wetland impact assessment. Wetland delineation follows federal protocols established in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual and include field data on vegetation, soils, and hydrology. Mapped wetlands are a subset of Waters of the United States under the Clean Water Act. Waters of the State of California fully encompass and are more expansive than Waters of the U.S., including wetlands. This review does not provide data or data sheets, does not describe sampling areas, does not describe sampling intensity, does not describe soils or hydrology, and does not map wetlands.

14. The absence of data to establish presence of wetlands subject to Clean Water Act and Porter-Cologne Water Quality Control Act jurisdiction, the close alignment of the FPR definition of Flood Prone Area with the Clean Water Act definition of Wetlands, and the mapping of nearly the entire Dogwood THP area as within Flood Prone Areas (Attachment 3) translates to most of the proposed harvest occurring within wetlands. Impacts of timber harvest within wetlands causes significant damage that is irreversible or, at a minimum, takes many years to reverse.

15. **Flood prone areas provide a range of hydrologic, geomorphic, and biological processes, functions that are not protected adequately in the THP.** Table 1 in the CALFIRE Report, “Flood Prone Area Considerations in the Coast Redwood Zone” (CALFIRE 2005), lists a suite of these processes and functions:

Hydrologic Processes/Functions/Properties and Role of Vegetation

- Accommodation of floods above bankfull or channel-full flow
- Modification of the flood hydrograph
- Storage of runoff to allow for infiltration and recharge alluvial groundwater
- Roughness to a floodplain that expends the energy of flood waters (e.g., slowing flood water velocity)

- Temporary storage of water to moderate downstream flood flows
- Hyporheic zone function

Geomorphic and Geologic Processes/Functions/Properties and Role of Vegetation

- Area of deposition for suspended sediment in flood waters
- Source of sediment through erosion of stored material by flood flows
- Storage and metering of sediment transported from hillslope and upstream portions of the watershed (sediment filtration)
- Roughness of floodplain vegetation slows flood waters and permits the deposition of fine-grained sediment adjacent to high-energy channels
- Vegetation provides both surface and subsurface resistance to soil erosion
- Vegetation provides cohesion that aids in bank stabilization

Biological Processes/Functions/Properties and Role of Vegetation

- Potential site of overflow channels that serve as refugia for fish during floods
- Large wood for recruitment to watercourses, enhancing aquatic habitat structure and complexity
- Direct shading of watercourses and reduced heating from solar radiation
- Wetland area that provides habitat such as ponds and vernal pools for a variety of mesic-(moisture) zone associated and dependant plants and animals
- Riparian woodland that provides habitat for terrestrial organisms
- Acceptable riparian microclimate conditions (air temperature, relative humidity, soil temperature, soil moisture, etc.)
- Migratory corridors for wildlife species

- Overhanging bank cover
- Meters naturally occurring nutrients transported from hillslopes
- Input of fine organic matter, leaf litter, and insects directly into watercourses that may be used for food for aquatic organisms
- Moderation of air temperature above and immediately adjacent to stream channels
- Alluvial aquifers that moderate surface water temperatures
- Possible support of species of concern
- Deposition and storage of large wood (both in and on the floodplain for potential delivery downstream), while providing habitat (e.g., nests, dens, food caches, and water/moisture sources) for wildlife species. Also, colonization sites for some coniferous species
- Filtration of agricultural nutrients (nitrogen and phosphorus) and pesticides
- Hyporheic zone function

16. The Flood Prone Area Considerations report (CALFIRE 2005) focuses extensively on riparian wetland habitats and their processes and functions, and links these processes and functions to seasonal wetland functions as an important biological component. Studies of salmonid rearing habitat in the Sacramento Delta and the Cosumnes River, which support seasonal floodplain habitats with both similarities and differences to coastal river seasonal floodplains, have demonstrated the important role of seasonally inundated riparian and herbaceous vegetation communities (e.g., Opperman 2012, Sommer et al. 2005).
17. **Heavy equipment operations and skid trails and other temporary roads disturb and can compact fine-grained floodplain sediments and cause irreversible**

changes in soil bulk density and permeability, thereby affecting rates of floodwater infiltration and groundwater recharge. Operations are proposed to take place in areas including fine-grained floodplain sediments. As documented in the table above from the 2005 CALFIRE Report, fine-grained floodplain sediments are important contributors to floodwater infiltration and groundwater recharge. Research has identified that the forestry equipment and skid trails compact soils and can impact infiltration processes as well as tree growth (e.g., Greacon and Sands 1980, Rollerson 1995, Trombulak and Frissell 2000). Once compacted, there are no natural processes to reverse this compaction to the level at which these fine-grained sediments were naturally deposited.

18. **Estuary and upstream coastal transition zone floodplains are especially sensitive part of riparian ecosystem.** The Gualala River lies within the California Coastal Chinook Salmon Evolutionarily Significant Unit (NMFS 2015, Figure 1), is designated Critical Habitat under the federal Endangered Species Act for the Northern California Steelhead Distinct Population Unit (NMFS 2015, Figure 2) and it lies within the North-Central California Coast Recovery Domain (NMFS 2015, Figure 4) for multiple salmonids. Steelhead exhibit a variety of life history strategies, including some that utilize estuarine or lagoon habitats for extended periods of time. Coastal estuaries have been documented to be highly productive rearing habitats, allowing salmonids to grow faster compared to upstream rearing. Salmonids that rear in coastal estuaries contribute disproportionately to adult returns from the ocean (NMFS 2015, pages 62-63). Inundated riparian floodplains, such as found just above the coastal estuaries, provide low velocity refuge habitats for juvenile salmonids that they depend on for survival. Lack of availability of such floodplain habitats is often cited as a contributing limiting factor for many populations. In addition, floodplains have been shown to contribute to substantially higher rates of growth of juvenile salmonids (NMFS 2015, page 62).

19. Crushing or removing ground layer vegetation and trees will substantially reduce roughness that is significant for trapping and stabilizing sediment during flood events. ADD TEXT.

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I declare under penalty of perjury under the laws of the state of California that the foregoing is true and correct.

Dated: August 17, 2016

Stuart Siegel, Ph.D., P.W.S.
Expert for Plaintiff's Attorney