

State of California
Department of Fish and Wildlife
Memorandum

Date: 27 January 2023

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North Central Region Fisheries

From: Isaac Chellman, Environmental Scientist;
High Mountain Lakes;
North Central Region Fisheries

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Subject: Site Visit and Survey of Butte Creek House Ecological Reserve, Butte County



SUMMARY

Butte Creek House (BCH) meadow and the surrounding forest has been owned and managed by California Department of Fish and Wildlife (CDFW) since 1986. Prior to acquisition by CDFW, the meadow was highly degraded, likely due to historic overgrazing and incision from past roads and trails (Costello and Walker 2022). In the 1990's, some initial restoration work—including installation of log check dams and willow planting—was conducted in BCH meadow. However, the meadow currently exhibits several unfavorable characteristics that necessitate more comprehensive direct action to restore natural hydrology, geomorphology, and aquatic ecosystem function. Undesirable features include areas of deep channelization, headcuts, and forest encroachment. Butte County Resource Conservation District (BCRCD) is currently designing and permitting a meadow restoration project, the planning of which is funded via a Proposition 1 Streamflow Enhancement grant from the Wildlife Conservation Board. BCRCD and implementation collaborator Forest Creek Restoration, Inc., plan to begin project implementation in 2023. The restoration would help restore natural meadow function by management actions that include installation of grade control structures, filling incised channels, treating headcuts, and removing encroaching lodgepole pines.

On 2 September 2022, CDFW, BCRCD, and Point Blue Conservation Science (PBCS) biologists visited BCH meadow to observe the site and conduct an incidental visual encounter survey (VES) for amphibians. The primary focus of the visit was to determine potential suitability of the site for Cascades Frogs (*Rana cascadae*; RACA), which are currently a candidate for listing under the California Endangered Species Act (CESA). Additionally, staff were on site to learn more about the restoration project and potential benefits that restoration would provide for native aquatic species.

ENVIRONMENTAL SETTING

[Butte Creek House Ecological Reserve](#) includes the main BCH meadow and surrounding forest, totaling approximately 320 acres of land owned by CDFW in Butte County, CA (**Figure 1**). The site is located off Humbug Summit Rd, which can be accessed via State Route 32. BCH meadow is approximately 90 acres and contains numerous channels and ephemeral pools, in addition to the main stem of Butte Creek (**Figure 1**). Surrounding elevations range from 5,675 feet (ft) (1,730 meters [m]) at the CDFW property line along the outlet of Butte Creek, to 7,015 ft (2,138 m) at the summit of Snow Mountain, which is located approximately 1.9 kilometers (km) south of BCH meadow. Most of the forest surrounding BCH meadow was burned at high severity (**Figure 2**) during the [Dixie Fire](#), which burned nearly one million acres between July and October 2021 (**Figure 3**). There are no known records of endangered, threatened, or special concern amphibians in BCH Ecological Reserve (CNDDDB 2023). However, Southern Long-toed Salamanders (*Ambystoma macrodactylum sigillatum*) may be present, since there is suitable habitat available, and the species has been detected in Summit Lake (CNDDDB 2023), which is <1 km south of BCH meadow. The nearest known extant population of RACA is located approximately 6 km northwest of BCH meadow, in Willow and Colby Creeks (Butte and Tehama Counties; CNDDDB 2023).

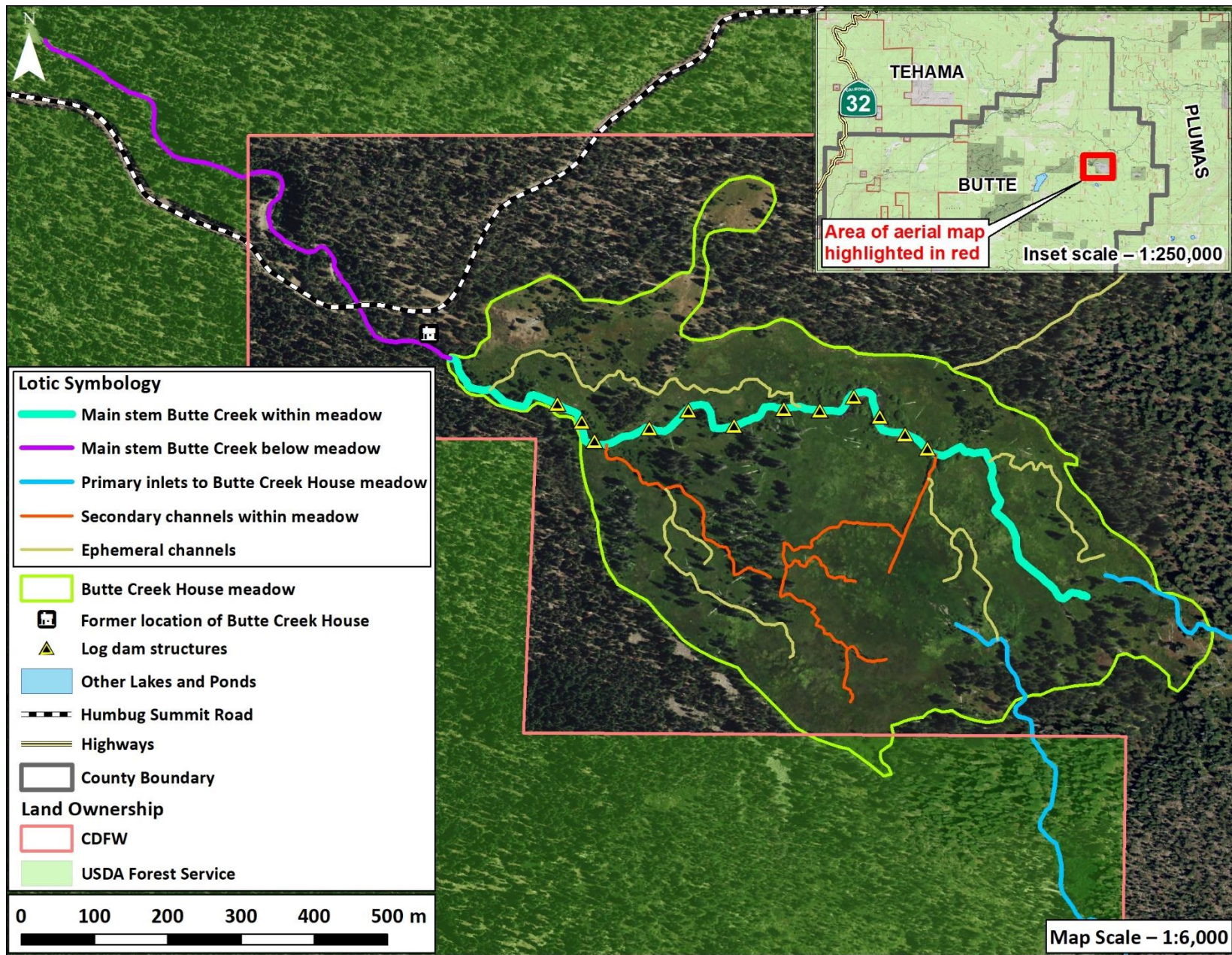


Figure 1. [See figure caption at the beginning of the next page.]

Figure 1 (continued). Butte Creek House (BCH) meadow and surrounding forest, Butte County, CA. On 2 September 2022, California Department of Fish and Wildlife, Butte County Resource Conservation District, and Point Blue Conservation Science staff visited BCH meadow to conduct visual encounter surveys for *Rana cascadae* (RACA) and other special status herpetofauna. Only lands owned by CDFW (areas without green shading and surrounded by pink property lines) are discussed in this memorandum. The enlarged aerial map showing site details is highlighted by the red box in the inset map.



Figure 2. Butte Creek, approximately 700 meters downstream of Butte Creek House meadow, showing an example of the aftermath from high intensity burning in the surrounding forest during the 2021 Dixie Fire. (CDFW, September 2022)

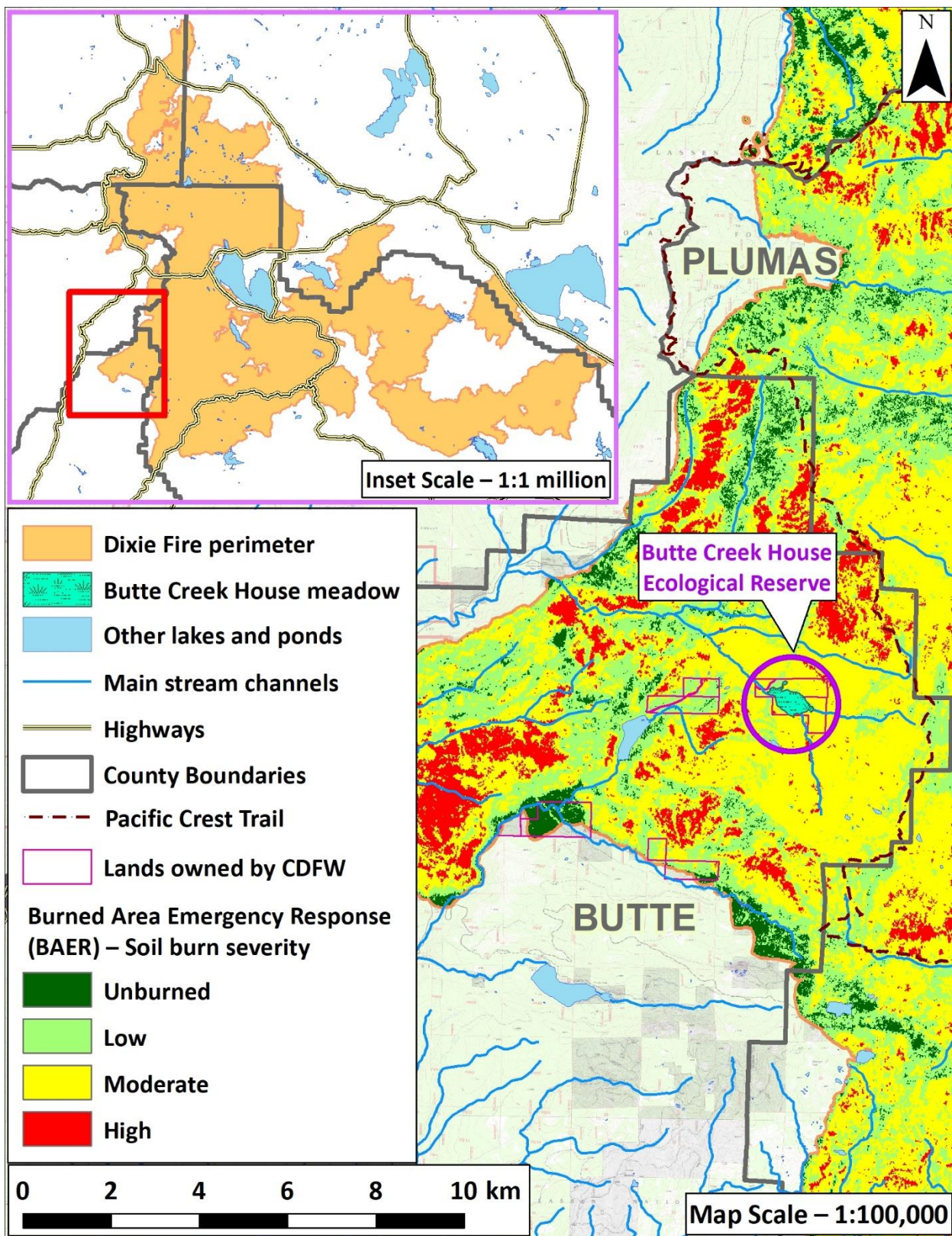


Figure 3. Map showing the [Burned Area Emergency Response \(BAER\)](#) soil burn severity classifications and perimeter of the Dixie Fire in relation to Butte Creek House Ecological Reserve (BCHER), northern Butte County, CA. Soil burn severity was moderate to high throughout most of BCHER.

METHODS and RESULTS

On 2 September 2022, CDFW, BCRC, and PBCS staff met at BCH meadow to conduct an incidental VES of aquatic habitat in BCH meadow and assess potential habitat suitability for RACA and other special status amphibians. Staff walked along most aquatic habitat with surface water still present during the time of surveying, including Butte Creek (bright cyan line; **Figure 1**) and side channels that still contained water (orange lines; **Figure 1**). Additionally, staff examined the downstream end of the main inlet channel to BCH meadow (blue line entering from the south; **Figure 1**) and approximately 700 m of Butte Creek downstream of the meadow, from the CDFW property line upstream to Humbug Summit Rd (purple line; **Figure 1**). Staff walked along shorelines and within near-shore shallow water to look for amphibians, and conducted dip net sweeps within shoreline vegetation and shallows to aid with amphibian detection. Much of the main channel of Butte Creek flowing through BCH meadow is wide, deep (≥ 2 m in places), and contained thick sediment and organic deposits that prevented wading into the main pools. Additionally, dense mats of algae were present in Butte Creek, which limited visibility into the water (**Figure 4**).



Figure 4. A large pool on the main stem of Butte Creek within Butte Creek House (BCH) meadow, which was created by one of numerous log dam structures installed in the 1990's. On 2 September 2022, the largest pools in BCH meadow contained abundant algae, which limited visibility into the water.

During VES of BCH meadow and Butte Creek, staff observed numerous trout in all perennial water sources, all of which appeared to be Brook Trout (*Salvelinus fontinalis*; BK). BK were especially abundant in the main stem Butte Creek within BCH meadow and throughout the creek downstream of the meadow. However, staff also observed BK within perennial side channels of BCH meadow, including within areas shown in orange in **Figure 1**. During the survey, water temperature was quite cold in BCH meadow, particularly within the smaller, shaded side channel

south of Butte Creek (the orange line farthest west; **Figure 1**). In that channel, which contained numerous trout, staff recorded a water temperature of 10.6° C.

Staff did not detect any special status amphibians during the incidental VES at BCH Ecological Reserve. However, staff did observe a subadult Western Toad (*Anaxyrus boreas*), Sierran Chorus Frog subadults (*Hyla sierra*), and at least one species of gartersnake, the Valley Gartersnake (*Thamnophis sirtalis fitchi*). Staff briefly glimpsed two other adult gartersnakes, which escaped into thick vegetation before staff could make a definitive species identification.

DISCUSSION

Given the lack of historic detections of listed amphibians and presence of introduced trout, CDFW expected the lack of RACA observations during the survey on 2 September 2022. Trout are known predators of amphibians, and trout presence often results in population declines and extirpations of RACA (Welsh et al. 2006, Garwood and Welsh 2007, Pope et al. 2007) and other native ranid frogs (Knapp and Matthews 2000, Pilliod and Peterson 2001, Dunham et al. 2004, Vredenburg 2004). Introduced trout also compete with RACA for native aquatic prey (Joseph et al. 2011). CDFW is not aware of any direct evidence of historic RACA presence in BCH meadow. However, given nearby historic RACA records (location and most recent year detected in parentheses; CNDDDB 2023)—located 4.5 km south (Coon Hollow; 1975), 4 km north (Sawmill Tom Creek; 1975) and 6 km west (Willow and Colby Creeks; 2015) of BCH meadow—it is reasonable to assume that RACA were likely present in aquatic habitats of BCH Ecological Reserve historically, prior to the introduction of BK. The well-established relationship between introduced trout and native amphibian declines and extirpations suggests that high densities of BK in BCH meadow and Butte Creek have likely contributed to the lack of modern RACA occupancy in BCH Ecological Reserve.

The planned BCH meadow restoration will likely provide many advantages for the ecosystem, including increased surface and groundwater storage capacity, and increased habitat diversity, with the potential to benefit numerous wetland flora and fauna. In particular, increasing aquatic habitat heterogeneity may be especially beneficial for extant native amphibians (Pope et al. 2019). These benefits may include additional ephemeral stream, pool, and flooded meadow habitat for native amphibians, particularly those species whose reproductive strategies may be less susceptible to non-native fish predation, such as Sierran Chorus Frogs and Western Toads (i.e., both species can reproduce in shallow, seasonally inundated areas, some of which may be inaccessible to fish, but maintain water through metamorphosis of early life stages). Additionally, native predators such as gartersnakes will likely benefit from additional native amphibian abundance (Jennings et al. 1992, Matthews et al. 2002) and the presence of BK, the smaller size classes upon which some gartersnake species are known to prey (Drummond 1983, Garwood and Welsh 2007). However, the planned restoration actions will be unlikely to provide any additional benefit to RACA, given the lack of known RACA occupancy and continued presence of a large self-sustaining BK population.

In early summer 2023, CDFW staff plan to return to BCH meadow for another VES during the amphibian breeding season. Although the main channels in BCH meadow contained abundant water on 2 September 2022, many locations were completely dry, given the time of year in tandem with a third year of drought (CDEC 2023a, b). Therefore, it will be beneficial to visit BCH meadow during wetter conditions to assess the potential for any additional native amphibian occupancy. In some ways, early season meadow surveys are more challenging, given the abundance of aquatic habitat available. However, surveys earlier in the amphibian active season can allow the potential to detect animals in ephemeral streams, pools, and side channels. Additionally, surveys soon after snowmelt may allow for better visibility due to aquatic habitat being less obscured by dense seasonal vegetative growth.

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