BIOLOGICAL ASSESSMENT

Mattley Meadow Restoration (47053).

Calaveras Ranger District, Stanislaus National Forest

PROJECT LOCATION

Calaveras County, California.

T7N, R17E, Section 8, 9,16-18, 20

Prepared by: _____ Date: 10/09/2018

Lucas Wilkinson, Aquatic Biologist

Species	Status	Determination
Sierra Nevada yellow-legged frog	Endangered	Likely to adversely affect
Yosemite toad	Threatened	May affect, not likely to adversely affect
Delta smelt	Threatened	No effect
Steelhead, Northern California DPS	Threatened	No effect

Contact Person: Lucas Wilkinson 209-288-6322 lwilkinson@fs.fed.us

1. Introduction

The purpose of this Biological Evaluation (BA) is to determine and document the potential effects of the Mattley Meadow Restoration project on proposed, threatened, or endangered species, and/or critical habitat and to determine the appropriate level of consultation required with USFWS. This document was prepared in accordance to the standards established in Forest Service Manual direction (FSM 2672.43). Every attempt is made in this document to utilize current research and the best available science.

The Mattley Meadow Restoration project is located on the Calaveras Ranger District of the Stanislaus National Forest in Calaveras County, California. Elevation of the project area is approximately 7000 to 7960 ft. The main goal of the project is meadow restoration which would be accomplished by filling existing gullies with plug and pond methods. The project would also include range improvements, conifer removal in meadows and aspen stands, and reroute of an existing trail to a location outside of meadows.

An official list of Federal Endangered, Threatened, Proposed, and Candidate species for the project area was obtained from the U.S. Fish and Wildlife Service IPAC website on May 12, 2016 (Consultation Code: 08ESMF00-2016-SLI-1461) and updated on September 13, 2018 (Event Code 08EsMf00-2018-E-09623).

Effects to the following species from that list are analyzed in this document:

Sierra Nevada-yellow legged frog (*Rana sierrae*, SNYLF): has suitable habitat and has been detected within the action area.

Yosemite toad (Anaxyrus canorus, YOTO): has suitable habitat within the action area.

The following species from that list would not be affected by the project and are **not considered** further in this document:

Delta smelt (*Hypomesus transpacificus*) Threatened. This species occurs only in the Sacramento-San Joaquin River Delta at least 60 miles downstream of the action area (Moyle 2002).

Steelhead (*Oncorhynchus mykiss*) Threatened (NMFS). The project is in the watershed of the North Fork Mokelumne River. However, steelhead are now completely restricted from the upper Mokelumne at Camanche Dam(completed 1963) over 50 miles downstream from the action area.

The final rule designating critical habitat for the Central Valley steelhead was issued on September 2, 2005 (Federal Register 2005). The final rule designating critical habitat for the delta smelt was issued on December 19, 2004 (Federal Register 2004). The proposed rule designating critical habitat for the Sierra Nevada yellow-legged frog and Yosemite toad was issued on April 25, 2013 (Federal Register 2013). The area affected by the proposed action addressed in this BA does not fall within proposed or designated critical habitat for any listed species. Thus, effects to critical habitat would not occur and are not considered further in this document.

2. Consultation to Date

On May 5, 2016 Crispin Holland, wildlife program manager at Stanislaus NF, briefed Chris Nagano regarding the project. Mr. Nagano directed the Forest Service to initiate consultation outside of the programmatic biological opinion for Sierra Nevada amphibians. It was agreed that a USFWS staff would make a field visit to the project site.

On July 21, 2016 Lucas Wilkinson of the Stanislaus National Forest briefed Felipe Carrillo the project. Mr. Carillo expressed early concerns regarding implementation of a restoration project in a SNYLF occupied site. He also indicated that there could be complications with captive care due to recent mortality of captive SNYLF tadpoles. He suggested that pursuing a 10A1A permit may be necessary in addition to section 7 consultation in order to complete the project.

On Dec 20, 2016 Lucas Wilkinson emailed Chad Mellison at the Reno, NV USFWS office to brief him on the project and request further informal consultation.

On March 20, 2017 Lucas Wilkinson spoke with Richard Kuyper of USFWS Sacramento field office via telephone to brief him on the project.

On July 21, 2017 a field trip was held at Mattley meadow that included Rick Kuyper, Jill-Marie Seymour, and Ian Vogel from USFWS as well as representatives from CDFW, Plumas Corp, Stanislaus NF, and the landowner.

On Thursday September 21, 2017 an interagency conference call was held that included Rick Kuyper, Jill-Marie Seymour, Ian Vogel, Jared McKee, and Damion Ciotti from USFWS as well as representatives from CDFW and the USFS. Staff from all agencies expressed major concerns about proceeding with a pond and plug design in the western stream channel.

On October 4, 2017 a field trip was held at Mattley Meadow that included Rick Kuyper, Jill-Marie Seymour, Ian Vogel, Jared McKee, and Damion Ciotti from USFWS. Jared and Damion evaluated the site and presented alternative options for restoration; primarily the use of beaver dam analogues.

3. Current Management Direction

Forest Service Manual (FSM) 2670.32 directs that a biological evaluation (BE) be prepared to evaluate project effects upon threatened, endangered, proposed, and sensitive species to ensure that project decisions do not result in loss of species viability or create a trend towards Federal listing.

The Stanislaus National Forest Plan Direction (USDA 2017) presents current management direction as derived from the Stanislaus National Forest Land and Resource Management Plan (LRMP; USDA 1991) and amendments and the Sierra Nevada Forest Plan Amendment (USDA 2001, 2004). The following summarizes direction relevant to aquatic species and the proposed project:

Forest Goals set forth in the LRMP include:

Manage riparian area to protect or improve riparian area –dependent resources while allowing for management of other compatible uses

Maintain or improve water quality and watershed condition to meet applicable state and federal requirements

Provide habitat for viable populations of all native and desired non-native wildlife, fish and plants. Maintain and improve habitat for Threatened and Endangered species and give special attention to sensitive species to see that they do not become federally listed as Threatened or Endangered.

USDA (2001 and 2004) established an Aquatic Management Strategy (AMS) that included the following goals relevant to the Mattley Meadow Restoration project:

Maintain and restore habitat to support viable populations of native and desired non-native plant, invertebrate and vertebrate riparian-dependent species.

Maintain and restore the species composition and structural diversity of plant and animal communities in riparian area, wetlands, and meadows to provide desired habitats and ecological functions.

Maintain and restore the distribution and health of biotic communities in special aquatic habitats to perpetuate their unique functions and biological diversity.

Maintain and restore soils with favorable infiltration characteristics and diverse vegetative cover to absorb and filter precipitation and to sustain favorable conditions of stream flows.

Maintain and restore the connections of floodplains, channels, and water tables to distribute flood flows and sustain diverse habitats.

Maintain and restore the physical structure and condition of stream banks and shorelines to minimize erosion and sustain desired habitat diversity.

Maintain and restore in-stream flows sufficient to sustain desired conditions of riparian, aquatic, wetland, and meadow habitats and keep sediment regimes as close as possible to those with which aquatic and riparian biota evolved.

The AMS also set aside riparian conservation areas (RCAs) and critical aquatic refuges (CARs) as specific land allocations which are to be managed according to a set of riparian conservation objectives (RCOs) and associated standards and guidelines.

The AMS has six Riparian Conservation Objectives (RCO):

• RCO 1: Ensure that identified beneficial uses for the water body are adequately protected. Identify the specific beneficial uses for the project area, water quality goals from the Regional Basin Plan, and the manner in which the standards and guidelines will protect the beneficial uses.

• RCO 2: Maintain or restore: (1) the geomorphic and biological characteristics of special aquatic features, including lakes, meadows, bogs, fens, wetlands, vernal pools, springs; (2) streams, including in stream flows; and (3) hydrologic connectivity both within and between watersheds to provide for the habitat needs of aquatic-dependent species.

• RCO 3: Ensure a renewable supply of large down logs that: (1) can reach the stream channel and (2) provide suitable habitat within and adjacent to the RCA.

• RCO 4: Ensure that management activities, including fuels reduction actions, within RCAs and CARs enhance or maintain physical and biological characteristics associated with aquatic- and riparian-dependent species.

• RCO 5: Preserve, restore, or enhance special aquatic features, such as meadows, lakes, ponds, bogs, fens, and wetlands, to provide the ecological conditions and processes needed to recover or enhance the viability of species that rely on these areas.

• RCO 6: Identify and implement restoration actions to maintain, restore or enhance water quality and maintain, restore, or enhance habitat for riparian and aquatic species.

4. Description of Proposed Project

4.1. PURPOSE OF THE PROJECT

The purpose of the project is to restore natural ecosystem function in Mattley and Mattley Creek meadows. The project would be guided by current management direction contained in the Stanislaus National Forest Plan Direction, which is based on the 1991 Forest Plan as modified through the Forest Plan appeals and amendment process (USDA 2010). A successful restoration would meet the following objectives based on Aquatic Management Strategy (AMS) goals and Riparian Conservation Objectives (RCO) for Aquatic, Riparian, and Meadow Ecosystems:

- Restore meadow hydrologic function (i.e., channel/floodplain connectivity; increased ground water elevation and recharge; increased dry season stream flows).
- Improve water quality by reducing fine sediment input through restoration of eroding channels and other unstable areas within the Mattley meadow complex.
- Improve the extent and vigor of meadow vegetation and aspen stands within the Mattley meadow complex.
- Improve meadow habitat for aquatic and terrestrial wildlife within the Mattley meadow complex.

4.2. PROPOSED ACTION

The Calaveras Ranger District, in partnership with the private landowner, proposes to restore riparian and meadow habitat within Mattley Meadow and Mattley Creek Meadow to a functioning condition. This would be accomplished by re-connecting the existing gullied channel to its floodplain using the pond and plug technique. The pond and plug technique is proposed because it is an economically feasible technique to restore the channel to the meadow floodplain elevation. Fencing and an off-channel water source for livestock management are also proposed to accomplish restoration within the project area, so that animals can be controlled to promote stabilizing riparian vegetation. Ancillary activities to enhance the channel/floodplain restoration in the meadow include removing encroaching conifers and rerouting an existing motorized trail out of the meadow. Specifically, the Proposed Action entails the following components and activities (Figure 4-1& Figure 4-2):

4.2.1. Meadow Restoration

- Meadow restoration would be accomplished by the pond and plug technique. consists of obliterating the existing gullies by replacing them with a series of ponds and earthen plugs. In Mattley Meadow, work would be confined to the middle and east channel and would not occur in the SNYLF occupied west channel.
- Approximately 15,918 cubic yards of material would be excavated in the creation of 9 ponds (6.0 acres of pond) and moved short distances to build 6 gully plugs (4.5 acres of plug; Figure 4-2).
- Project construction would occur during periods of minimal and/or subsurface stream flow and dry weather, beginning no earlier than July 1 and no later than October 1.
- Any existing streamflow would be re-directed from the gullies into existing remnant channels on the meadow.
- Equipment used would include a tracked excavator, wheeled loader, and tracked loader. To minimize the footprint of project activities, all heavy equipment stays within the confines of the work area, and material transport generally does not exceed 300 feet. Access routes into the meadows will utilize an existing OHV trail (Figure 4-2).
- Plugs would be compacted with a wheel loader. The compaction levels are intended to match the porosity/transmissivity of the native meadow soils. This allows moisture to move freely within the plug soil profile and support erosion resistant meadow vegetation for long term durability, as well as preventing preferential pathways for subsurface flows either in the plug or the native material.
- Topsoil and existing vegetation would be removed and stockpiled adjacent to the plug fill zones to top dress the completed plugs. Vegetation that would be buried or continually submersed as a result of the Proposed Action would be removed and re-planted at key points on the plugs, pond sides, or along the remnant channel where additional vegetation is needed. Plugs would be seeded with native seed. Pond margins would be planted with available sedge plugs, willow cuttings, and native riparian grasses. Re-vegetation efforts would focus primarily in areas that need

vegetative armoring or where implementation of the project has resulted in bare surfaces. Because of the slow response of native vegetation, it is expected that adequate re-vegetation in disturbed areas would take three years.

- Large woody debris would be placed on a steepened slope facet in Mattley Meadow to reduce flow velocities and meter channel scour through this reach.
- Habitat features and diversity would be incorporated into the pond design. To the extent possible, ponds are constructed to look like a natural part of the landscape. Shallow areas within the ponds are particularly beneficial to wildlife, and are constructed to provide habitat. Other constructed features may include islands, peninsulas, basking logs, etc., which are determined as fill needs are met. Selected ponds will be designed to take into account the primary constituent elements of suitable aquatic breeding and rearing habitats for SNYLF. The depth of ponds will be maximized to avoid freezing and hypoxic conditions. Pond margins would be constructed with gradual banks to provide extensive shallow water habitats. Boulders and woody debris would be incorporated into banks and island to provide basking areas and refugia. Native plantings would stabilize banks and provide additional escape cover
- All plugs and borrow ponds are sited and designed to accommodate surface and subsurface through flow, as well as adjacent hillslope-generated surface and groundwater inflows. The fill material would be excavated from borrow ponds along the margins of the meadow or other elevated features. This design significantly reduces risk associated with frequent overland flow over plugs and into ponds.
- Plug and pond construction would be performed by Plumas Corporation staff who have completed implementation and effectiveness monitoring of over 45 restoration projects in the Feather River as well as other Sierra Nevada and Cascade watersheds encompassing more than 51 miles of stream channel and 4,500+ acres of associated riparian areas in a wide variety of channel types and settings.

4.2.2. Grazing Management

- One off-channel water trough and solar pump on Forest Service land at the southern end of Mattley Meadow would be installed to increase cattle dispersal.
- Temporary fencing (either electric or barbed) would be constructed around the restoration area in Mattley meadow and Mattley Creek Meadow to exclude cattle until the site has sufficiently revegetated and stabilized, generally a minimum of 2-3 years.

4.2.3. Conifer Removal

- Encroaching conifers less than 30 inches dbh within 1.5 tree lengths of meadows and aspen stands may be removed (approximately 193 acres). In areas where standing dead trees would not threaten forest resources or improvements or pose an undue hazard to human safety (i.e. areas away from roads, trails, dispersed campsites, fence lines or other improvements), conifers may be girdled and left in place.
- Conifers would be removed using hand tools or mechanized equipment. Tree boles may be removed for use as sawlogs or left on site; smaller diameter material would be piled and burned, chipped, or used for other restoration needs (i.e. OHV trail barriers, fencing, erosion control, etc.).

4.2.4. Motorized Trail Reroute

- Reconstruct approximately 0.9 miles of trail 17EV16 to improve surface drainage to reduce erosion and sediment delivery to streams as well as to improve travel. Reconstruction actions include: maintaining/improving existing drainage features and constructing new ones (e.g.,

waterbars, rolling dips, outsloping); placement of rock or other armoring at stream crossing approaches; placement of barriers along trail to discourage off-trail travel; brushing; grading; hazard tree falling. Reconstruction activities may be implemented using both hand tools and mechanized equipment.

- Construct approximately 1.9 miles of new trail to re-route sections of the existing 17EV16 trail out of sensitive meadow/riparian areas. Trail construction actions would include: trail construction using a small tractor (e.g., SWECO trail dozer) and/or hand tools; installing rock or other armoring at forded stream crossings; installing culverts or bridges at stream crossings; tree removal; placement of barriers along to trail to discourage off-trail travel.
- Block and restore approximately 1.5 miles of existing trail 17EV16 passing through meadows/riparian areas; this section of trail would be removed from the NFTS (Tables 1, 2). Block and restore actions would include: installing barriers (e.g., rock, log, soil berm, slash) to block motorized vehicle access; constructing drainage features (e.g., waterbars, rolling dips, slope recontouring, outsloping); subsoiling compacted areas; tree and brush removal; scattering of vegetation; planting and/or seeding of native vegetation; placement of signs (e.g., vehicle closure, restoration area). Block and restore activities may be implemented using both hand tools and mechanized equipment.

4.2.5. Monitoring/Adaptive Management

The meadow restoration area would be monitored for several years after implementation to ensure restoration actions are functioning as intended and meeting project objectives. To correct any problems that may arise (e.g., erosion of plugs due to unusual flood event, slower than expected vegetation recovery, noxious weeds, etc.) the following activities may be employed: channel reshaping/rock placement using mechanized equipment; seeding and planting of native species; removal of noxious weeds using hand tools; realignment of exclusion fences; or other activities as needed.

A monitoring plan would be developed to track abundance and habitat use by SNYLF in Mattley meadow. At minimum, annual VES surveys that document all individuals encountered and their locations in the meadow would be performed along with photo point monitoring of habitats. Other techniques could include capture -mark – recapture studies and additional habitat monitoring techniques (as separately authorized by permit with USFWS and CDFW). The goals would be to monitor trends in relative abundance by life stage, determine if frogs utilize the created ponds for breeding or non breeding habitat, and determine if existing habitats are negatively modified. Monitoring should continue for a period of at least 5 years after implementation

Management requirements / Conservation measures

The following measures would be incorporated into the project design to minimize resource impacts:

- Follow all applicable Standards and Guidelines and Best Management Practices from Forest Plan Direction as listed in Appendix B (attached).
- All persons involved with project activities will be informed about the presence of the Sierra Nevada yellow-legged frog and potential for Yosemite toads within the work areas, and be provided a training session about life history and habitat elements. This should reduce the potential for unintended injury or mortality during project activities.
- During restoration work within Mattley Meadow, a qualified biologist must be on site during all activities. Survey the immediate work area for listed amphibians before commencement of daily work and following work stoppages exceeding one hour.

- Maintain a 75-foot limited operating area around the SNYLF occupied western channel in Mattley meadow where mechanical operation for conifer removal is prohibited. Trees may be girdled or hand-felled within this zone.
- If Sierra Nevada yellow-legged frogs are detected within the work area, the following procedures will be followed:

  Each Sierra Nevada yellow-legged frog or Yosemite toad encounter shall be treated on a case-by-case, but the general procedure is as follows: (1) leave the non-injured animal alone if it is not in danger; or (2) move the animal to a nearby safe location if it is in danger. These two actions are further described below:

  (a) When a Sierra Nevada yellow-legged frog or Yosemite toad is encountered within the project site, the first priority is to stop all activities in the surrounding area that may have the potential to result in the harassment, injury, or death of the individual. Then, the situation shall be assessed by a Forest Service biologist or Service approved biologist in order to select a course of action that will minimize adverse effects to the individual.

  (b) Avoidance is the preferred option if an individual of the Sierra Nevada yellow-legged frog or Yosemite toad is not moving or using a burrow or other refugia. A Forest Service biologist or Service-approved biologist shall inspect the animal and the area to evaluate the necessity of fencing, signage, or other measures to protect the animal.

  (c) If appropriate, the listed amphibians shall be allowed to move out of the hazardous situation on their own volition to a safe location. An animal shall not be picked up and moved based on it not moving fast enough or it is an inconvenience for activities associated with rehabilitation or operation. This only applies to situations where individuals are encountered when they are moving during conditions that make their upland travel feasible. It does not apply to individuals that are uncovered, exposed, or in areas where there is not sufficient adjacent habitat to support the species should the animal move outside the immediate area.

  (d) Individuals of the three listed species shall be captured and moved by hand only when it is necessary to prevent harassment, injury, or death. If suitable habitat is located immediately adjacent to the capture location, then the preferred option is relocation to that site. An individual shall not be moved outside of the radius it would have traveled on its own. Under no circumstances shall they be relocated to a non-Forest Service property without the landowner's written permission.

  (e) Only Forest Service biologists or Service-approved biologists may capture the three listed amphibians. Nets or bare hands may be used to capture the animals. Soaps, oils, creams, lotions, repellents, or solvents of any sort cannot be used on hands within two hours before and during periods when the biologist is capturing and relocating individuals. If the animal is held for any length of time in captivity, they shall be kept in a cool, dark, moist environment with proper airflow, such as a clean and disinfected bucket or plastic container with a damp sponge. Containers used for holding or transporting shall not contain any standing water, or objects or chemicals.

4.2.6. Action Area

The action area is defined in 50 CFR 402.02 to mean "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For purposes of this analysis the action area comprises 514 acres including the project footprint, an additional 200 foot buffer around the project footprint where noise or visual disturbance could occur, and 1.2 miles of Mattley Creek downstream of the project where indirect effects could occur (Figure 4-1).

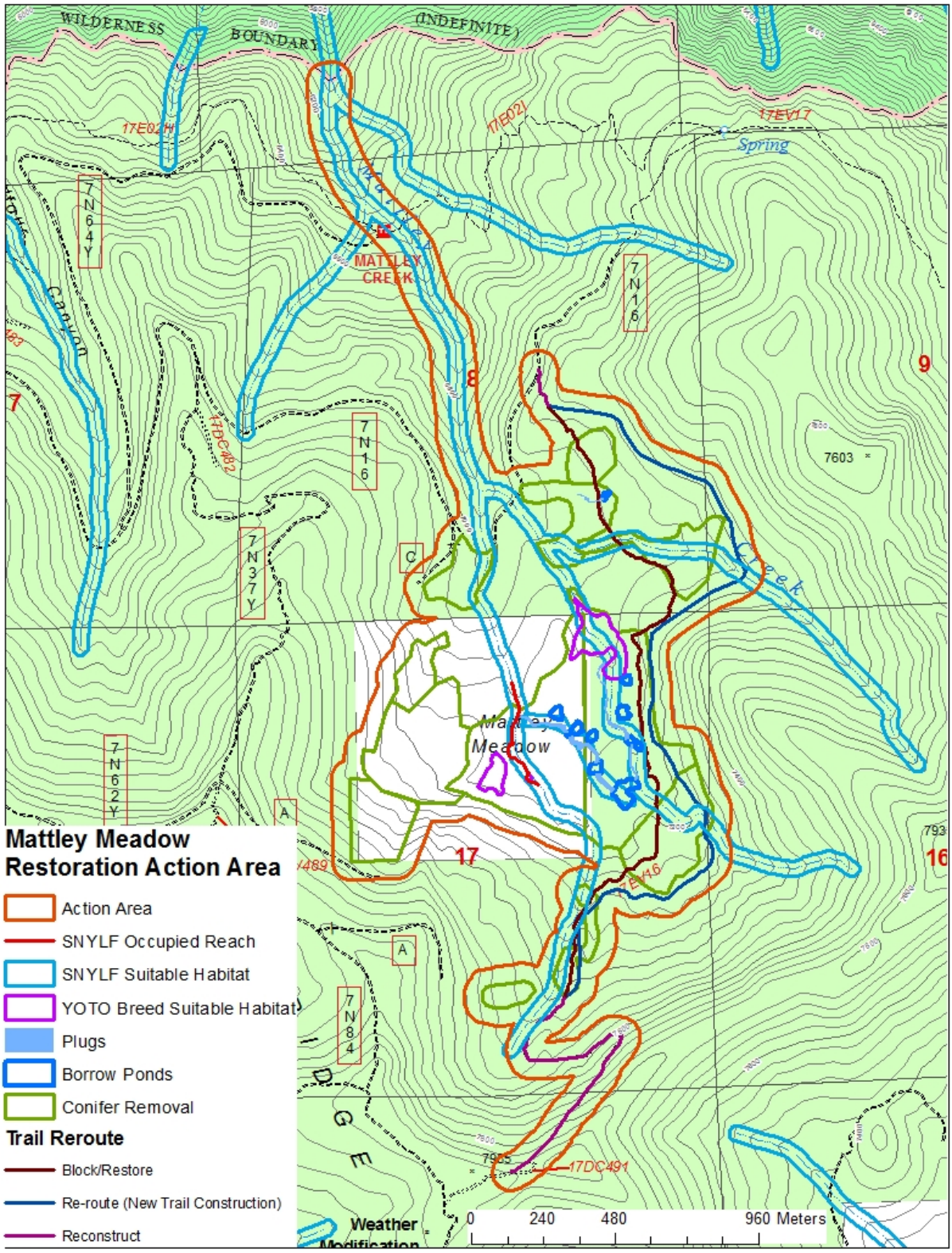


Figure 4-1. Action Area, Proposed Actions, and habitat status for Mattley Meadow restoration project.

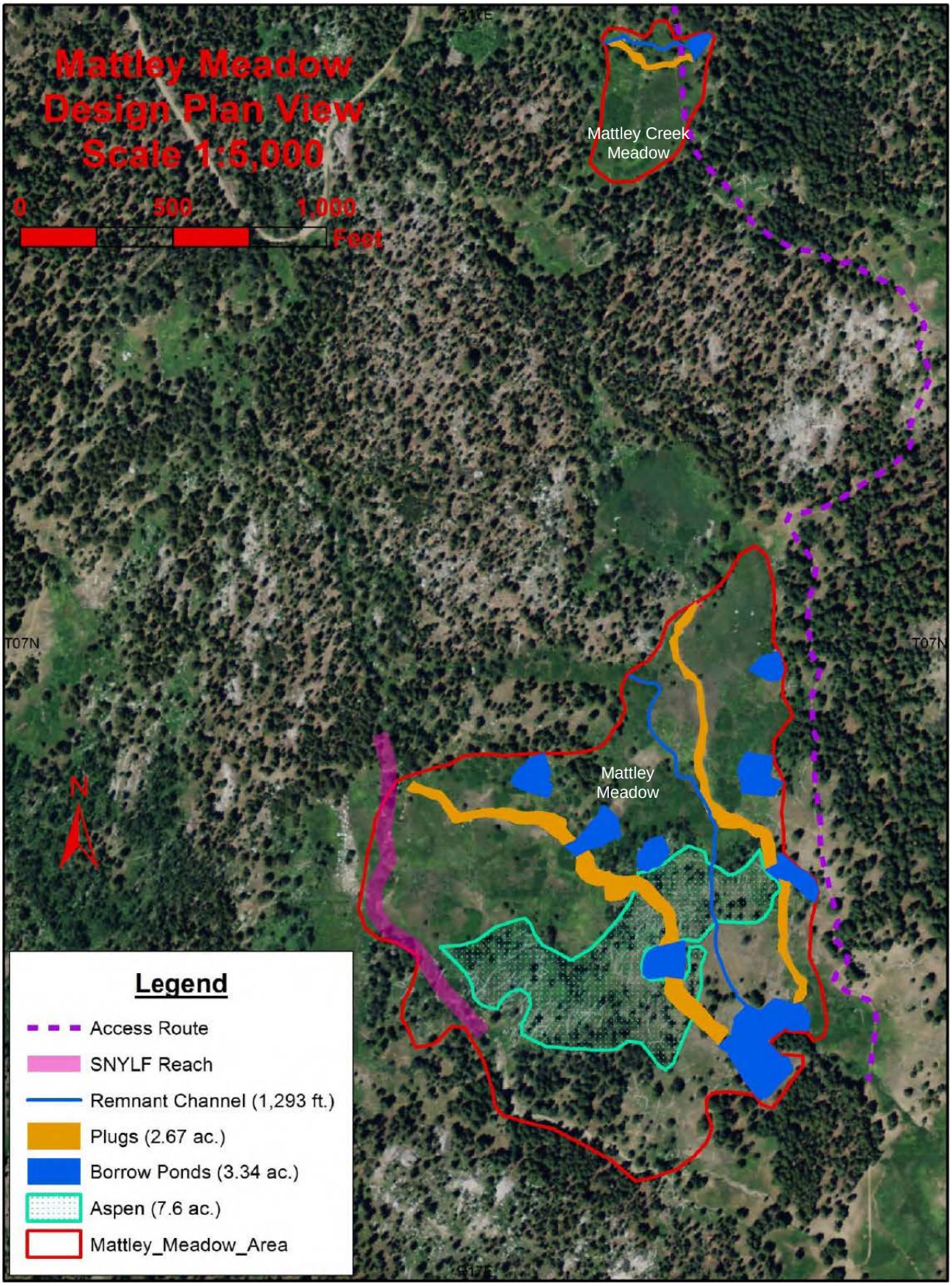


Figure 4-2 Overview of proposed restoration design in Mattley and Mattley Creek meadows.

5. Environmental Baseline

5.1. GENERAL ACTION AREA

Conditions in the project area are described in the Mattley Meadow Restoration Project Basis of Design Report (Wilcox 2018). In summary: historically, the Mattley meadow complex lacked large channels and water travelled as sheet flow and through shallow swales on the surface of the meadows. However, natural and human caused disturbances over the last 100 years, including road construction, channel modifications, livestock use, and floods, have resulted in degradation of the meadows. These disturbances allowed sheet flows from the adjacent hillslopes to concentrate and form three large gully channels in Mattley Meadow and one gully in Mattley Creek Meadow. Instead of spreading across the meadows, stream flows are now confined to channels that are incised from 2-10 feet below the meadow surface. It is unlikely that any but the most extreme flood events would allow the gullied channels to overflow onto the meadow. Instead of being deposited in the floodplain where they can build soil and streambanks, sediments are being rapidly transported through the degraded channels and negatively impacting water quality in downstream areas. The gullies also effectively drain the meadow which has led to lowered ground water elevations, diminished stream flows, and reduced groundwater recharge.

The hydrologic alterations in turn have impacted the plant community and wildlife habitat. Based on existing remnant vegetation, Mattley Meadow once supported a large aspen stand and a vigorous wet meadow plant community. The aspen stand has suffered mass die-offs and has been encroached by conifers as the meadow has dried. The incised channels have little remaining riparian vegetation. The altered meadow hydrology has resulted in conversion of mesic (moist) plant communities to xeric (dry) plant communities, and deterioration of aquatic and terrestrial habitats.

5.2. YOSEMITE TOAD

General descriptions of the biology, ecology, habitat use, and threats to Yosemite toad are summarized in the Yosemite Toad Conservation Assessment (Brown et al. 2015).

5.2.1. Recent Survey Information and Occurrences in Project Vicinity

Visual encounter surveys (VES, Fellers and Freel 2005) have been conducted in aquatic habitats within the action area. Table 5-1 and Figure 5-1 summarize these survey efforts.

Table 5-1 Visual encounter surveys performed in the project area

Location	Date	Detections
Mattley Meadow (FS portion)	8/3/2009	None
Mattley Meadow (all outside channels)	6/19/2018	PSSI
Mattley Meadow- West Channel	9/17/14, 9/18/14, 8/3/15, 6/20/16, 7/17/17, 7/18/17, 7/25/2018	RASI, PSSI, ONMY
Mattley Meadow- Middle Channel	6/10/16, 7/17/17, 7/18/17, 7/25/18	NONE

Mattley Meadow – East Channel	9/17/2014, 6/10/16, 7/18/17, 7/25/18	PSRE
Mattley Creek Meadow	8/4/2009	NONE
Meadow A	8/3/2009	NONE
Meadow B	8/3/2009	NONE
Meadow C	8/3/2009	NONE
Meadow D	8/3/2009	NONE
Meadow E	8/4/2009	NONE
Meadow F	8/4/2009	NONE
Meadow G	8/4/2009	NONE
Meadow H	8/4/2009	NONE
Mattley Creek (Lower)	9/16/2014, 7/29/15	PSRE, ONMY
Mattley Creek (Upper)	8/4/2009, 9/17/2014, 8/3/15	ONMY

No YOTO were found during these surveys and no historical records for YOTO exist in the action area (CNDDB, ARCTOS, Aquasurv).

There are three known YOTO occurrences within 10 miles of the action area:

1. Meadow on Underwood Valley tributary 6.5 miles NE of action area. 1 subadult reported in 2008.
2. Duck Lake 7 miles east of the action area. 2 subadults detected in 2002, 150 subadults detected in 2008
3. Wheeler Lake 8 miles NE of the action area. 6 adults and 2 egg masses detected in 1995.

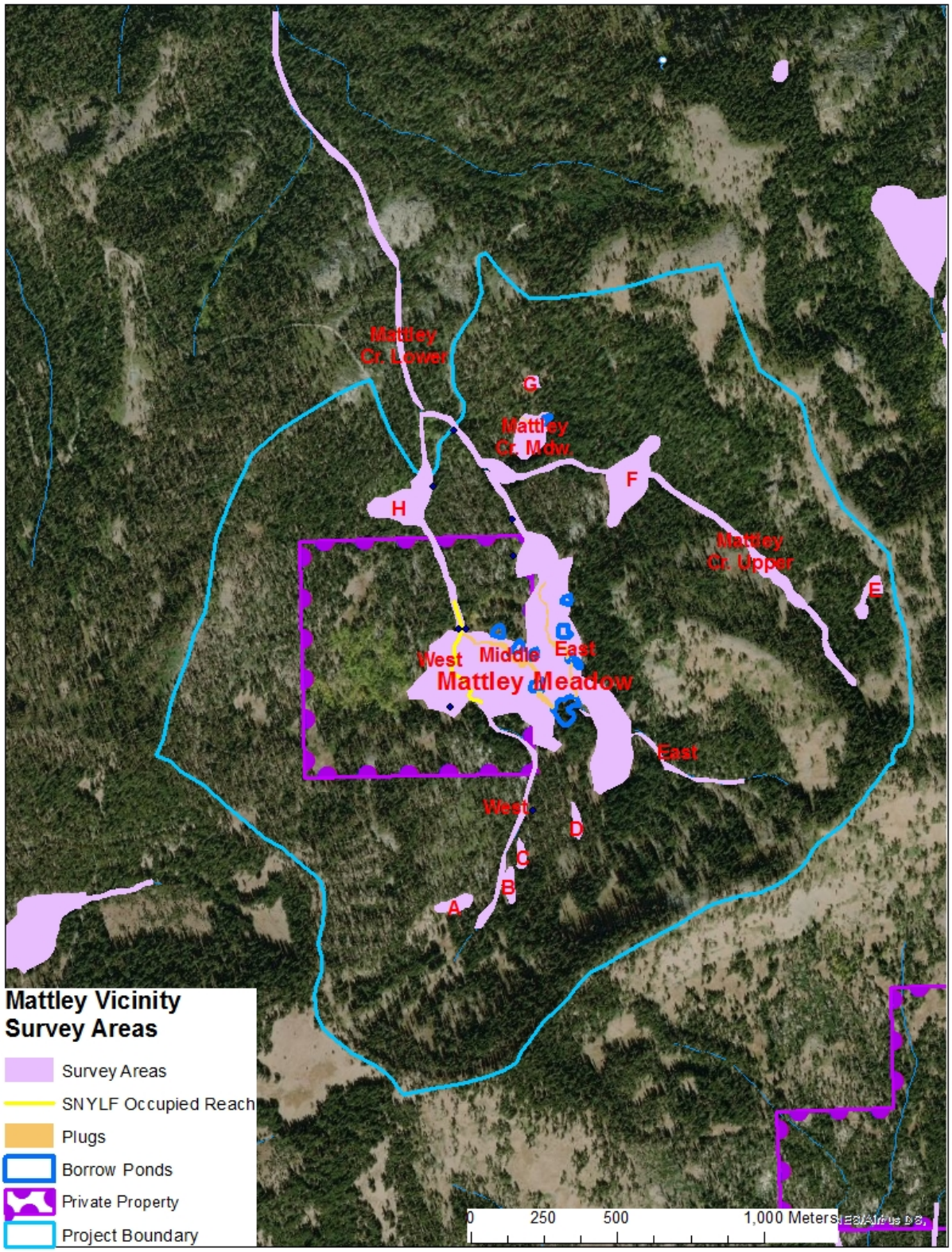


Figure 5-1. Areas where visual encounter surveys have been conducted in the vicinity of Mattley Meadow.

5.2.2. Habitat status in the action area

Mattley meadow is approximately 80 acres and occupies the confluence of multiple small drainages and hillslope flows. It has high and middle gradient riparian meadow types as well as discharge slope hydrogeomorphic types. The tributaries to Mattley creek that flow through the meadow are incised in gullies from 3.8 to 7.3 feet deep. A large mature aspen stand within the meadow has died off and significant conifer encroachment has resulted from meadow dewatering.

Approximately 6 acres of Mattley Meadow have marginally suitable breeding habitat for Yosemite toad (Figure 5-2). These portions of the meadow have shallow surface water in spring with obligate meadow vegetation. However, observations of the habitat made in 2016, 2017, and 2018 indicate that potential breeding areas may not hold water long enough to allow tadpole development in most years. The remaining portions of Mattley meadow do not retain surface water for a sufficient period to support tadpole development, but provide suitable non-breeding habitat. The meadow likely had larger areas of suitable YOTO breeding habitat before formation of gullies lowered the water table elevation.

Upland habitat surrounding Mattley meadow is predominantly red fir forest, with smaller components of sierra mixed conifer, lodgepole pine, and montane chaparral.

Meadows A,B,C,D,E,F,G, and Mattley Creek Meadow lack sufficient surface water to support Yosemite toad breeding.

5.3. SIERRA NEVADA YELLOW-LEGGED FROG

General descriptions of the biology, ecology, habitat use, and threats to Sierra Nevada yellow legged frog are summarized in the Mountain Yellow-legged Frog Conservation Assessment (Brown et al. 2014).

5.3.1. Recent Survey Information and Occurrences in Project Vicinity

Visual encounter surveys (VES, Fellers and Freel 2005) conducted in aquatic habitats within the project area are summarized in Table 5-1.

Mattley Meadow contains three main channels (Figure 4-2). Sierra Nevada yellow legged frogs have only been detected in and adjacent to the western channel (Figure 5-2). Within the west channel, detections were as follows: 212 Larvae on 9/17/14; 2 adults, 18 metamorphs, and 22 tadpoles in 2015; 2 adults and 4 tadpoles on 6/16/2016; 2 adults and 1 subadult on 7/17/17; 2 adults and 7 tadpoles on 06/29/2018. Negative surveys were made in the middle and east channel in 2014, 2016, 2017, and 2018 (Table 5-1). On August 19, 2017 eDNA samples were made in all three channels. The eDNA samples corroborated previous VES results with positive detections on the lower and central parts of the west channel, but negative results on the upper western channel and on the middle and east Channels (Appendix). The existing survey data indicated that the population in Mattley meadow is small. Inconsistent tadpole detections and sparse detections of subadults may indicate that recruitment is irregular.

Other known SNYLF occurrences in the vicinity of the action area are as follows:

1: Moore Creek approximately 1 mile west of the action area. Detections as follows: 10 adults in 1993; 15 adults, 5 tadpoles, 3 egg masses in 1996; 4 adults and 1 subadult in 1997; 2 adults, 2 subadults, and 9 larvae in 2008.

2: Pond near Moore Creek approximately 1.6 miles west of the action area. One adult detected in 2009.

3: Big Meadow approximately 2.5 mi south of the action area. Collections made in 1928 and 1952. No detection were made in surveys in 2009 and 2015.

The populations at Moore Creek and Mattley Meadow are somewhat disjunct from other known populations in the vicinity. The nearest known extant populations are over 8.5 miles to the northeast at Wheeler Lake.

Occurrences in the action area are within general forest management areas and do not fall within proposed critical habitat.

5.3.1. Habitat status in action area

The action area includes the following habitats:

Mattley meadow is approximately 80 acres and occupies the confluence of multiple small drainages and hillslope flows. It has high and middle gradient riparian meadow types as well as discharge slope hydrogeomorphic types. The tributaries to Mattley creek that flow through the meadow are incised in gullies from 3.8 to 7.3 feet deep. A large mature aspen stand within the meadow has died off and significant conifer encroachment has resulted from meadow dewatering. Except for immediately following snowmelt, there is little surface water in the meadow outside of the channels.

In Mattley meadow SNYLF have been detected only in the northern portion of the west channel (Figure 5-2). Although this channel is also deeply incised, a lowered floodplain has formed at the bottom of the gully. Within the meadow, tadpoles have been found in two general areas, one is a slow moving pool around 0.5 meters deep near the outlet of the meadow (Figure 5-3-A). The second is an off channel, groundwater fed, willow shrouded pool within the lowered floodplain that is approximately 0.3 meters in depth (Figure 5-3-B). Tadpoles have also been detected approximately 100 meters downstream of the meadow. Here the channel is not incised and has a bedrock, boulder, gravel substrate. These breeding sites are atypical and perhaps lower quality in that they are relatively shallow and may not be permanent in drier years. This is consistent with the irregular observations of tadpoles and young of year in the meadow.

The middle channel in Mattley meadow is deeply incised (3-10 ft.), has deep silty substrate, and extensive emergent vegetation. The east channel is also deeply incised (2.5 -9 ft.), has minimal sinuosity, and has primarily sand/gravel substrate. Both of these channels have been observed to dry nearly completely in late fall of low water years. Neither channel provides suitable breeding habitat for SNYLF. Suitability for non-breeding use by post metamorphic individuals is low-moderate, but none have been detected here.

Because the channels are detached from the floodplain, the majority of the surrounding terrestrial habitat is xeric and does not provide suitable dispersal habitat for SNYLF.

Meadows A, B, C, D, E, F, G, H, and Mattley Creek Meadow lack sufficient surface water to support SNYLF.

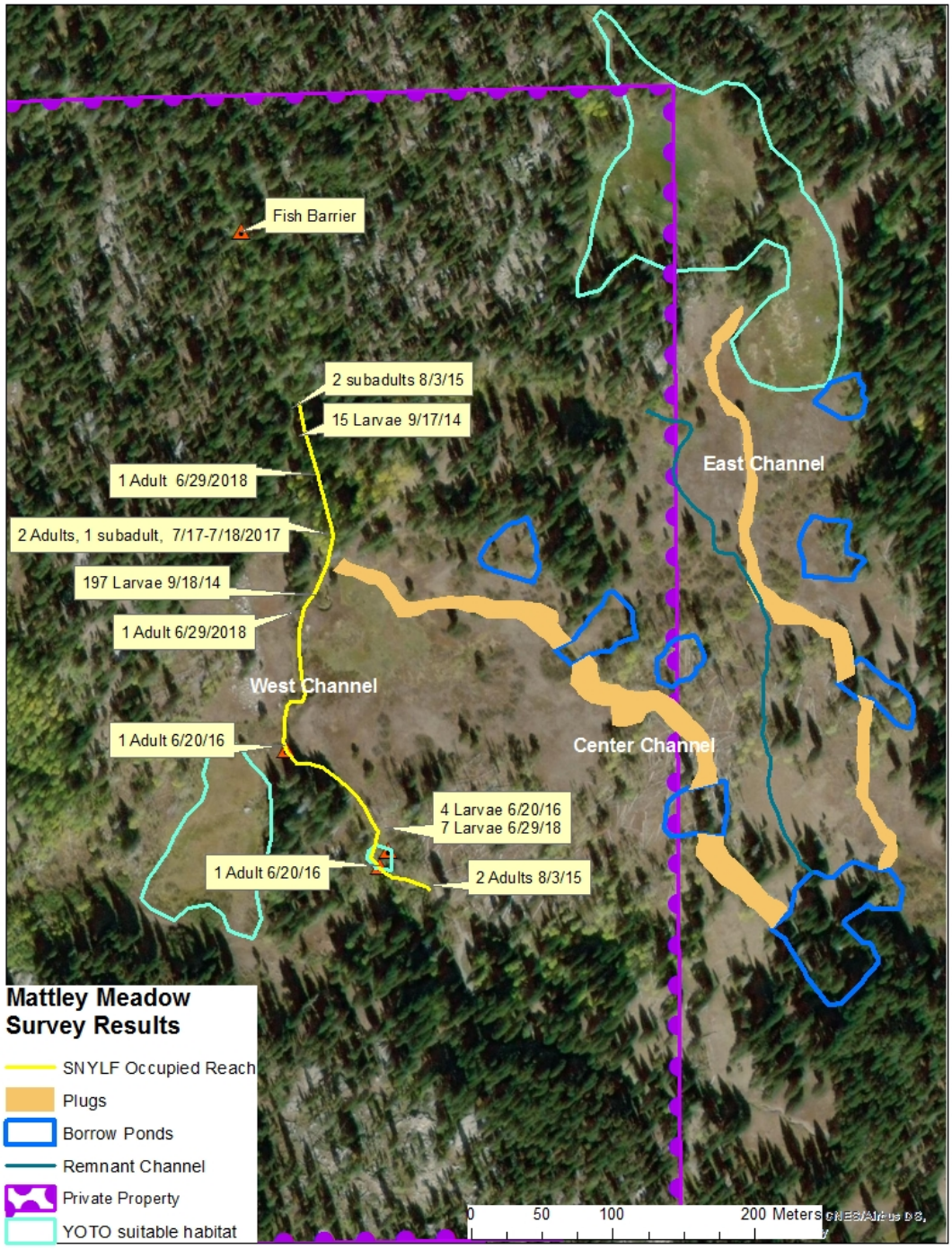


Figure 5-2. Rana sierrae detections within Mattley meadow from 2014 to 2018.

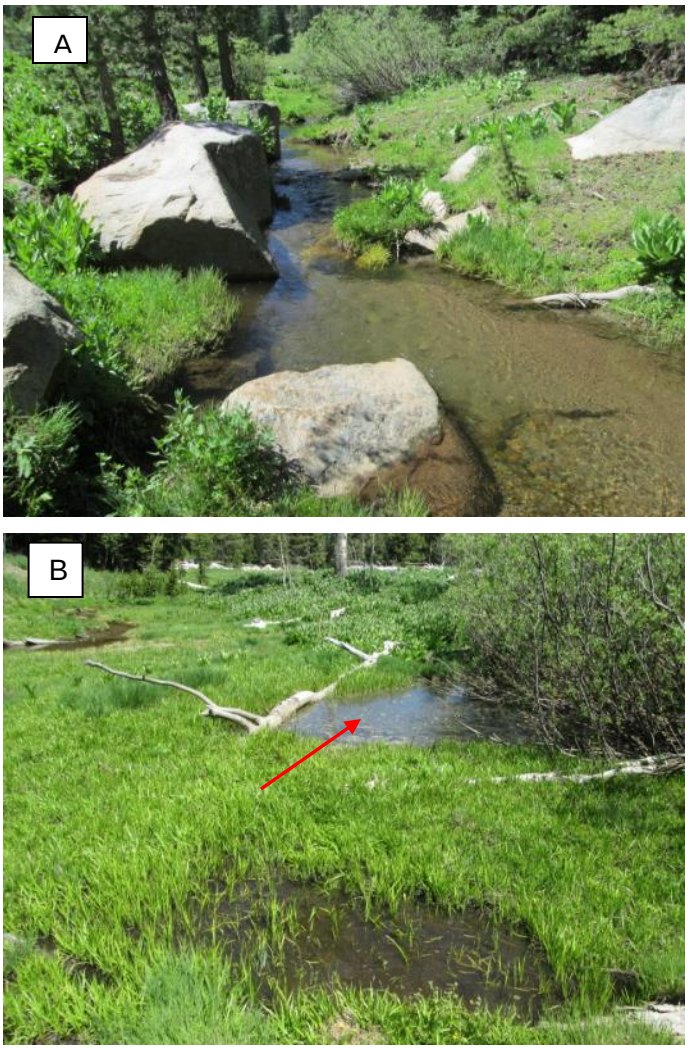


Figure 5-3. Rana sierrae breeding locations in Mattley Meadow.

6. Effects of the Proposed Project

Effects to both species from management activities are discussed generally in the programmatic biological opinion which is hereby incorporated by reference (USFWS 2014, USFWS 2017).

6.1. YOSEMITE TOAD

Table 6-1. Yosemite Toad Direct and Indirect Effects Indicators

Indicator	Acres
Suitable Breeding Habitat Acres in Action Area	7.5
Suitable Non-Breeding Habitat Acres in Project Area	450
Suitable Breeding Habitat Acres in Action Area Affected	5.5
Suitable Non-Breeding Habitat Acres in Project Area Affected	450

Acres of Habitat Occupancy in Utilized	0
Acres of Habitat Occupancy in Utilized Unknown	457.5
Acres of Habitat Occupancy in Unutilized Potential	0
Acres in RCA	384
Acres of Designated CH in Action Area	0

Meadow restoration

There is a possibility that individual Yosemite toads could be killed or injured during implementation of meadow restoration actions. The proposed locations of ponds and plugs do not overlap suitable YOTO breeding habitats, so no effects to eggs or larvae would occur. Restoration activities would impact approximately 5 acres of suitable non-breeding habitat. Heavy equipment will be moved over the meadow surface and could crush individuals or trap them in burrows. However, the risk of this occurring is negligible. No individuals have been detected in the project area despite thorough surveys. The quality of available breeding habitat is marginal and restoration actions would take place in late summer/early fall when meadows are very dry and individuals are unlikely to be present in the meadow.

There would be limited direct impacts to toad breeding habitat. Borrow pond sites are generally located in areas without sufficient surface water to support toad breeding and the channels that would be filled are unsuitable for toad breeding. After project implementation, it is likely that the extent and duration of surface water in the meadows will be increased. This may provide additional suitable breeding habitats for Yosemite toad, but it is not possible to predict with any certainty how much or what quality of habitat would be created. It is highly likely that existing depressions will have increased hydroperiod, increasing their suitability for toad breeding.

Terrestrial habitat within the meadows is expected to be improved after project implementation. The project is expected to raise the stream base level to the historic floodplain elevation and restore the ground water table. This should result in re-establishment of meadow and riparian vegetation in areas of the meadow that have converted to more mesic and xeric species. This would be a beneficial effect for YOTO, as occupancy is strongly driven by meadow wetness (Allen-Diaz et al. 2010). The moister habitat should decrease risk of desiccation during overland movements and increase the likelihood of dispersal between habitat patches.

Conifer removal

Conifer removal near aspens and meadows would overlap approximately 193 acres of suitable YOTO upland habitat and 7.5 acres of suitable breeding habitat.

There is a risk that harassment, injury, and mortality of YOTO could occur during these operations. Individuals could be crushed, harassed, injured, or killed by equipment, falling or piling of trees. Individuals could be disturbed by noise, dust, or vibration that causes them to modify their behaviors. However, the risk of this occurring is negligible. No individuals have been detected in the project area despite thorough surveys and the quality of available breeding habitat is low.

Yosemite toad habitats could be adversely affected in the short term by ground disturbing activities that include end-lining, skidding, dozer piling, mechanical equipment use such as road maintenance, skid trail construction, timber cutting, log prep, skidding, loading, and landing creation and general ground related access to cutting trees with mechanical equipment or conventional logging. Potential effects from activities associated with vegetation management include disturbance and destruction of refuge and overwintering sites including rodent burrows. Potential habitat alterations include changes to canopy and other vegetative and non-vegetative cover, air and water microclimates including temperature, water quantity and quality, hydro periods, increased nutrients, sedimentation, woody debris, and channel scour.

Currently, it is not known if a reduction in forest canopy cover in upland habitat is beneficial or detrimental to YOTO. The burrows, logs, tree roots, and stumps used for cover and refuge by the toad may be adversely affected by project activities. Adults have been found to have site fidelity to burrows (Liang 2010). The duration of effects to upland habitats would be on the order of one year for rodent activity to replace crushed burrows. Changes to vegetation composition would last on the order of 10-30 years.

In the long term, conifer removal treatments are intended to reduce transpiration by trees and promote meadow wetness and herbaceous vegetation (Sanford 2016). These changes would benefit habitat conditions in Mattley meadow which are currently limited by abbreviated hydroperiod and sparse surface water. Combined with hydrological effect from the pond and plug treatment, conifer removal should help lead toward increased extent and duration of surface water that will create additional and more suitable breeding habitat for YOTO.

Trail re-route

Reconstruction and re-routing of trail 17EV16 would overlap approximately 20 acres of suitable upland habitat for Yosemite toad. There is no overlap with suitable breeding habitats so effects to eggs and tadpoles would not occur. Subadult and adult toads could be killed or injured during trail construction and blocking activities. A small tractor would likely be employed and large boulders will be placed that could crush or trap toads if present. As above, however, this risk is considered to be negligible due to the low-likelihood of toad occurrence in the action area.

Direct mortality of Yosemite toads on roads and trails has been documented (Brown et al. 2015, S. Barnes pers. comm.). The existing route runs very close to the most suitable breeding habitat and may pose a risk to toads from vehicles traveling the trail. Relocation of the existing trail further from the meadow should slightly reduce the risk that toads would be injured or killed.

Effects to suitable habitats would be minimal. Approximately 6.8 acres where new construction would occur would have decreased suitability because of soil compaction, loss of burrows, and addition of vehicle traffic. On the other hand the 5.6 acres of existing route that would be blocked would have increased suitability due to prohibition of vehicle traffic, soil decompaction where necessary, and return of native vegetation. These small effects would have negligible impact on the overall suitability of the habitat at large.

6.2. SIERRA NEVADA YELLOW-LEGGED FROG

Table 6-2. Sierra Nevada Yellow-legged Frog Direct and Indirect Effects Indicators

Indicator	Acres
Suitable Habitat Acres in Action Area	82
Suitable Habitat Acres in Project Area Affected	82
Acres of Habitat Occupancy in Utilized	6
Acres of Habitat Occupancy in Utilized Unknown	0
Acres of Habitat Occupancy in Unutilized Potential	76
Acres in RCA	384
Acres of Designated CH in Action Area	0

6.2.1. Direct and Indirect effects

Meadow restoration

Direct Effects

There is a possibility that individual Sierra Nevada yellow-legged frogs could be killed or injured during implementation of meadow restoration actions. Suitable stream habitats would be excavated with heavy equipment or completely filled with borrow material. The affected area would include 0.31 miles of the middle channel (1.9 acres ponds, 1.5 acres plugs) and 0.34 miles of the East Channel (0.28 acres ponds, 1 acre plugs). No plug and pond actions are proposed for the occupied west channel. There is a very low likelihood that individuals would be crushed or buried by this process for the following reasons 1) SNYLF have not been detected in the work areas by VES or eDNA sampling, 2) a qualified biologist would conduct surveys before and during operations to ensure to ensure no individuals are present, 3) if individuals are detected they will be avoided or relocated as described in the management requirements section. The duration of risk is limited to around one month while heavy equipment work is ongoing in the meadows. Because population size at Mattley Meadow is assumed to be small, the death of even a single adult individual may reduce the viability of the population. On the other hand, because tadpole recruitment to adulthood is relatively low, loss of a small number of tadpoles would have a limited effect on population size and persistence.

Indirect Effects

Effects on meadow/stream habitats derived from monitoring of completed pond and plug restoration treatments in the Sierra Nevada are well summarized by Hoffman et al. (2010) and Hoffman et al. (2013). In summary, completed projects have restored channel/floodplain connectivity and returned meadow water tables to historic condition. This, in general, has led to reduced peak flood flows in winter and early spring, increased base flow in late spring into summer, and reduced base flow in late summer to fall. However flow timing effects were highly variable. Treatment has resulted in conversion of dryland vegetation to riparian species and increased soil moisture more similar to historic condition. Improved vegetation along with reduced flood peaks has led to reduced stream bank erosion.

The proposed meadow restoration will primarily alter non-utilized stream and meadow habitats. The proposed project would completely eliminated channel habitat in the central and east channels replace it with pond habitat. This habitat modification is designed to be permanent. Because these channels are not currently utilized, the potential for negative indirect effects to SNYLF is extremely low. Instead, it is expected that the resulting ponds would be more suitable for SNYLF than the existing incised channels. Ponds are expected to hold water year-round and would lack the scouring flows present in the channels (Wilcox 2018). To ensure the greatest likelihood that created ponds will support breeding and rearing, selected ponds will be designed to take into account the primary constituent elements of suitable aquatic breeding and rearing habitats (USFWS 2016). The depth of ponds will be maximized to avoid freezing and hypoxic conditions. Pond depth may be constrained by substrate in some locations, but should be able to meet or exceed the depth of the existing habitats. Pond margins would be constructed with gradual banks to provide extensive shallow water habitats. Boulders and woody debris would be incorporated into banks and island to provide basking areas and refugia. Native plantings would stabilize banks and provide additional escape cover. However, it is not known if stream adapted individuals will readily breed in lake habitats when they are made available. On the Stanislaus National Forest, the vast majority of known breeding sites are in lakes and ponds. There is at least one location on the Stanislaus where tadpoles have been detected in stream habitats and nearby lake habitats (C. Brown unpubl. data). There is also a possibility than in the absence of dynamic stream processes, dense vegetation may restrict open areas suitable for basking and maintaining warm shallow water areas. This will be mitigated by incorporating boulders, rocks, and logs into the banks to maintain open areas.

There is some possibility that actions in the middle and east channel will have indirect effects on the occupied west channel. The nature of hydrologic connection between these zones through the water table is unknown, so the exact nature of the effect is somewhat uncertain. There are two scenarios that are most likely. The first is that there is little connection between the channels. In this scenario, the portion of the west channel above the confluence with the middle channel would be virtually unaffected as this watershed would operate independently of the others. Below the confluence, the flow contribution from the center channel would be modified as described above with decreased flood peaks, increased early season base flows, and reduced late season flows. In a scenario where there is strong groundwater connectivity between the channels, the entire west channel could see some similar changes in flow timing. For SNYLF, reduced flood flows could improve habitat quality by reducing scour risk that could prevent successful overwintering or breeding. On the other hand, reduced late season flows could increase the risk of tadpole desiccation if breeding pools are more likely to dry up. This is likely a minor risk for the upstream breeding location which is an off channel pool that is dependent on groundwater elevation, not stream flow to remain semi-permanent (Figure 5-3). The downstream pool where tadpoles were located in 2014 is already subject to period drying and scour and may provide only irregular suitability in its current state.

Terrestrial habitat within the meadows is expected to be improved after project implementation. The project is expected to raise the stream base level to the historic floodplain elevation and restore the ground water table. This should result in re-establishment of meadow and riparian vegetation in areas of the meadow that have converted to more mesic and xeric species (Hoffman et al. 2018). The moister habitat should decrease risk of desiccation during overland movements and increase the likelihood of dispersal between habitat patches.

Meadow restoration activities are also likely to temporarily modify downstream stream habitats. The risk of effects to SNYLF is considered low as frogs have not been detected downstream of the east channel and both the center and east channels are typical dry or have extremely low flow at the time of implementation (late summer/early fall). The majority of the flow downstream of the west/ center channel confluence derives from the west channel, so modifications of flow in the center channel should be of insignificant impact. In the short term, it is likely that the project would temporarily reduce or completely stop flow in the channel downstream of the east channel. Plugs placed into the existing channel would interrupt flow in the channel and instead divert some of this water towards filling ponds and subsurface storage. Flows would likely return once ponds and subsurface storage was filled after the first winter. If tadpoles are present but undetected in these reaches, they could be killed because of desiccation or hypoxia. Adult frogs are also dependent on aquatic habitats and could be forced to move from preferred habitats if the channel becomes too dry. This could reduce growth and reproduction as it may reduce opportunities for feeding and basking. Frogs moving downstream would also be at increased risk of predation from resident trout. To mitigate these effects, the channels downstream of the restoration sites would be thoroughly surveyed and tadpoles at risk of desiccation or exhibiting signs of distress would be translocated to nearby suitable sites that retained water.

Increased risk of colonization by invasive species is a concern following a pond and plug project. In particular, the created ponds would potentially create high quality breeding habitat for bullfrogs. Dramatic increase in bullfrog populations have been observed post-project in plug and pond projects in the Feather River drainage, however these sites had existing populations within or nearby the project area (Hoffman 2010). Although studies of the effects of bullfrogs on SNYLF have not occurred, colonization by bullfrogs would likely present a negative effects to SNYLF at Mattley meadow. Introduced bullfrogs are voracious opportunistic predators and have been implicated in the decline or displacement of many amphibians including foothill yellow-legged frogs and northern red-legged frogs (Brown et al. 2014). Nevertheless, the risk of colonization at Mattley meadow is quite low at the current time. In the vicinity of the project, bullfrogs are documented from the Middle Fork Mokelumne River about 16 miles west at about 3000 ft. elevation and from San Antonio Creek and White Pines Lake 18 miles southwest at 3700-

4000 ft. Given the large distance and elevation gradient between these sites and the project (7000-7500 ft. elev.) it is unlikely that bullfrog colonization by natural means is likely. Human introduced colonization remains a possibility, but given the remote nature of the site and infrequent public visitation this remains unlikely.

Installation of fencing and water troughs would reduce the impacts of cattle on frogs and their habitats. The temporary fencing would prevent cattle from disturbing the restored area until vegetation had recovered enough to sufficiently stabilize the area (likely 2-3 years). Placement of water troughs would help to permanently increase the dispersal of cattle in the project area and reduce concentrations in the meadows. Reduced cattle use of the meadows would reduce the risk of frogs being injured or killed by trampling or entrapment in hoof prints. These range improvements would also limit negative effects of cattle on frog habitat. Grazing can remove vegetation cover from frog habitat leading to increased predation, desiccation, and siltation of pond habitat.

Conifer removal

Conifer removal in meadows and aspen stands would overlap with 35 acres of suitable SNYLF habitat. There is a risk that harassment, injury, and mortality of SNYLF could occur during these operations. Individuals could be crushed, harassed, injured, or killed by equipment, falling or piling of trees. Individuals could be disturbed by noise, dust, or vibration that causes them to modify their behaviors. This risk, however, is very low. A mechanical exclusion zone within 25 meters of occupied habitats would virtually eliminate the risk where frogs are known to occur. Other areas are presumed unoccupied because of negative VES and eDNA results, so direct effects are extremely unlikely.

Increased sedimentation is the primary potential pathway for negative effects to aquatic habitats. The use of mechanized equipment, such as feller bunchers, skidders, and harvesters, in near stream environments has the potential to increase erosion and stream sedimentation because the operation of this type of equipment results in localized areas of soil compaction and disturbance which are prone to erosion. Increased sedimentation risk might last 3-5 years while vegetation reestablishes and surface roughness and infiltration capacity increase.

SNYLF are highly aquatic and are rarely found away from water (>1 m) when adjacent aquatic habitat is not present; therefore effects to the immediate riparian area and instream habitats are of primary concern. Mechanical equipment would not be allowed to operate within 15 feet of streams, and no skidding would be allowed within 50 feet of perennial and intermittent streams. These exclusions would limit direct effects on suitable habitats because they would limit effects to aquatic features or obligate riparian vegetation that the frog may use for refuge.

Sedimentation from increased erosion is potentially damaging to SNYLF breeding habitat (Federal Register 2013). An increase in sediment to the stream could increase turbidity, reduce depth of breeding sites, and fill interstitial spaces in stream substrates that can be used as refuge. On the other hand, in lake habitats, SNYLF presence has been positively associated with increased littoral zone silt (Knapp et al. 2003) and fine sediments can provide cover for all life stages. Because of the small area treated and the project design features and BMPs, there is an extremely low risk of the project resulting in increases in sediment great enough to modify habitat suitability.

Removal of conifers near meadows and aspen stands could lead to some habitat modification by reducing overhead canopy cover. This may benefit SNYLF habitat by increasing the availability of preferred warm water and basking sites.

Trail re-route

Reconstruction and re-routing of trail 17EV16 has a limited potential to impact SNYLF and their habitats. These activities would occur ~0.2 miles from the occupied stream reach so have negligible risk for direct effects. These activities overlap approximately 6 acres of suitable, but unoccupied habitat. There is a

minor risk that trail building and closure activities could lead to short-term increases in sedimentation as soil may be disturbed and compacted. This trail reroute would move an existing route that traverses Mattley meadow out of the meadow into the adjacent forest. As a result, the potential for negative effects such as sedimentation, fuel/fluid contamination, and direct mortality would be reduced.

6.3. CUMULATIVE EFFECTS

Under the Endangered Species Act (50 CFR 402.02) cumulative effects are "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Within the action area, the only identified State or private action is livestock grazing of the 160 acre private parcel in Mattley Meadow. This parcel is grazed as part of a larger allotment administered by the Stanislaus National Forest. The permit authorizes 171 Cow/Calf pairs with a typical season of use of 6/16 – 09/15. Mattley meadow is typically used as a late season gathering pasture, so the majority of use occurs 8/15 through 9/15. Grazing overlaps suitable habitat for YOTO and suitable and occupied habitat for SNYLF. Limited cattle activity or disturbance has been noted in close proximity to known SNYLF occurrences, perhaps because the incised gully is relatively inaccessible to the cows.

The existing literature on effects of cattle grazing on Yosemite toads and Sierra-Nevada yellow-legged frogs is equivocal and incomplete. Some studies have found no significant effects from grazing on YOTO (McIlroy et. al. 2013; Roche et al. 2012); while Lind et al. (2011) found negative correlations between livestock utilization and tadpole density. No studies have directly examined effects to SNYLF.

Nevertheless, there is some potential for negative effects. Livestock in aquatic habitats present a low risk of trampling individuals, particularly tadpoles who have lower mobility and tend to escape into fine sediments. Excessive livestock grazing can impact terrestrial habitats directly from browsing on obligate riparian vegetation that provides cover and feeding habitats for the frog. Excessive livestock grazing can affect aquatic habitats indirectly primarily through erosion and sedimentation processes if the activity occurs in near-stream environments. Secondarily, the livestock's metabolic waste products may cause minor nutrient enrichment (nitrogen and phosphorus) of aquatic habitats.

Effects on newly restored habitats would be mitigated by excluding cattle from the restoration area until bare soils are sufficiently vegetated – approximately 2-3 years. Effects would be further minimized by application of Forest Plan standards to the allotment at large. These include limitations on allowable utilization on herbaceous vegetation and shrubs, limits on allowable streambank disturbance, and defined season of use. The Forest Service portion of Mattley Meadow is a monitoring site for forage use and is representative of the entire meadow.

Completion of the Mattley Meadow Restoration project is likely to improve forage conditions across the meadow surface and reduce the tendency of cows to congregate in limited areas of superior forage. This should help reduce impacts such as trampling and chiseling as impacts should be spread more evenly across the meadow.

7. Determination of Effects

The project area contains suitable and occupied habitat for the Sierra Nevada yellow-legged frog. Because there are known occurrences in the action area, individuals would be at risk of harm, harassment, injury, and mortality as a result of project activities within occupied habitats. Project design features should mitigate this risk to a minor level. The project would eliminate existing unoccupied stream habitat and create pond habitat with potentially increased suitability for breeding and rearing, while effects to occupied habitat should be minor and positive. Therefore, it is my determination that the Mattley Meadow Restoration Project may affect and is likely to adversely affect the Sierra Nevada yellow-legged frog.

The project area contains suitable habitat for the Yosemite toad. The risk of harm to individuals as a result of mechanical operations in suitable aquatic and upland habitats is insignificant because of the extremely low likelihood that toads occur in the action area given negative survey results and poor habitat conditions. Meadow restoration activities should increase the amount and quality of wet meadow habitat suitable for the toad breeding. Therefore it is my determination that the Mattley Meadow Restoration Project may affect but is not likely to adversely affect the Yosemite toad.

References

Allen-Diaz, B., S.K. McIlroy, L.M. Roche, K.W. Tate, and A.J. Lind. 2010. Determining the effects of livestock grazing on Yosemite toads (*Bufo canorus*) and their habitat: final report to Forest Service Region 5. U.S. Forest Service, Vallejo, California.

Brown, C., M. P. Hayes, G. A. Green, and D.C. Macfarlane. 2014. Mountain Yellow-legged Frog Conservation Assessment for the Sierra Nevada Mountains of California, USA. R5-TP-038. USDA Forest Service, Pacific Southwest Region, Vallejo, CA, USA. 128 pp.

Brown, C., M. P. Hayes, G. A. Green, D.C. Macfarlane, and A. J. Lind. 2015. Yosemite Toad Conservation Assessment. R5-TP-040. USDA Forest Service, Pacific Southwest Region, Vallejo, CA, USA. 134 pp.

Federal Register. 2004. Endangered and threatened wildlife and plants; critical habitat determination for the delta smelt. Federal register, volume 59, number 242, pages 65256- 65279.

Federal Register. 2005. Endangered and threatened species; Designation of critical habitat for seven evolutionarily significant units of Pacific salmon and steelhead in California. Federal Register, volume 70, number 170, pages 52488 - 52627.

Federal Register. 2010. Endangered and threatened wildlife and plants: revised designation of critical habitat for the California red-legged frog; final rule. Federal Register, volume 75, number 51, pages 12815 – 12959.

Federal Register. 2013. Endangered and threatened wildlife and plants; designation of critical habitat for the Sierra Nevada yellow-legged frog, the northern distinct population segment of the mountain yellow-legged frog, and the Yosemite toad; proposed rule. Federal Register, volume 78, number 80, pages 24516 - 24574.

Fellers, G.M. and K.L. Freel. 1995. A standardized protocol for surveying aquatic amphibians. Technical Report NPS/WRUC/NRTR-95-01. National Biological Service, Cooperative Park Studies Unit, University of California, Davis.

Hoffman, J. K. Roby, B. Bohm. 2013. Effects of Meadow Restoration on Stream Flow in the Feather River Watershed. Version 5.5, June 12, 2013.

Knapp, R.A., K.R. Matthews, H.K. Preisler, and R. Jellison. 2003. Developing probabilistic models to predict amphibian site occupancy in a patchy landscape. Ecological Applications 13:1069–1082.

Lind, A., R. Grasso, J. Nelson, K. Vincent, C. Liang, K. Tate, L. Roche, B. Allen-Diaz, and S. Mcilroy. 2011. Determining the Effects of Livestock Grazing on Yosemite Toads (Anaxyrus [Bufo] canorus) and Their Habitat: An Adaptive Management Study. Pacific Southwest Research Station, Sierra Nevada Research Center, Davis, California.

McIlroy, Susan K., A. Lind, B. Allen-Diaz, L. Roche, W. Frost, R. Grasso, and K. Tate. 2013. Determining the effects of cattle grazing treatments on Yosemite toads (Anaxyrus [=Bufo] canorus) in montane meadows. PLoS ONE 8(11):79263.

Moyle, P. B. 2002. Inland Fishes of California. University of California Press, Berkeley, CA. xv + 502pp.

Roche, L.M., B. Allen-Diaz, D.J. Eastburn, and K.W. Tate. 2012. Cattle grazing and Yosemite toad (Bufo canorus Camp) breeding habitat in Sierra Nevada meadows. Rangeland Ecology and Management 65:56–65.

Sanford, T. W. 2016. The water table and soil moisture following the removal of conifers from an encroached meadow. Masters Thesis. California Polytechnic State University. San Luis Obispo, CA. 92 pp.

USFWS. 2014. Programmatic Biological Opinion on nine forest programs on nine national forests in the Sierra Nevada of California for the endangered Sierra Nevada yellow-legged frog, endangered northern distinct population segment of the mountain yellow-legged frog, and threatened Yosemite toad. U. S. Fish and Wildlife Service, Sacramento, California. 194 pp.

USFWS. 2017. Amendment of the Programmatic Biological Opinion on nine forest programs on nine national forests in the Sierra Nevada of California for the endangered Sierra Nevada yellow-legged frog, endangered northern distinct population segment of the mountain yellow-legged frog, and threatened Yosemite toad. U. S. Fish and Wildlife Service, Sacramento, California. 76 pp.

USDA. 1991. Stanislaus National Forest - Resource and Land Management Plan. Stanislaus National Forest, 19777 Greenley Road, Sonora, CA 95370.

USDA 2001. Sierra Nevada Forest Plan Amendment Environmental Impact Statement. Pacific Southwest Region, USDA Forest Service, San Francisco, CA.

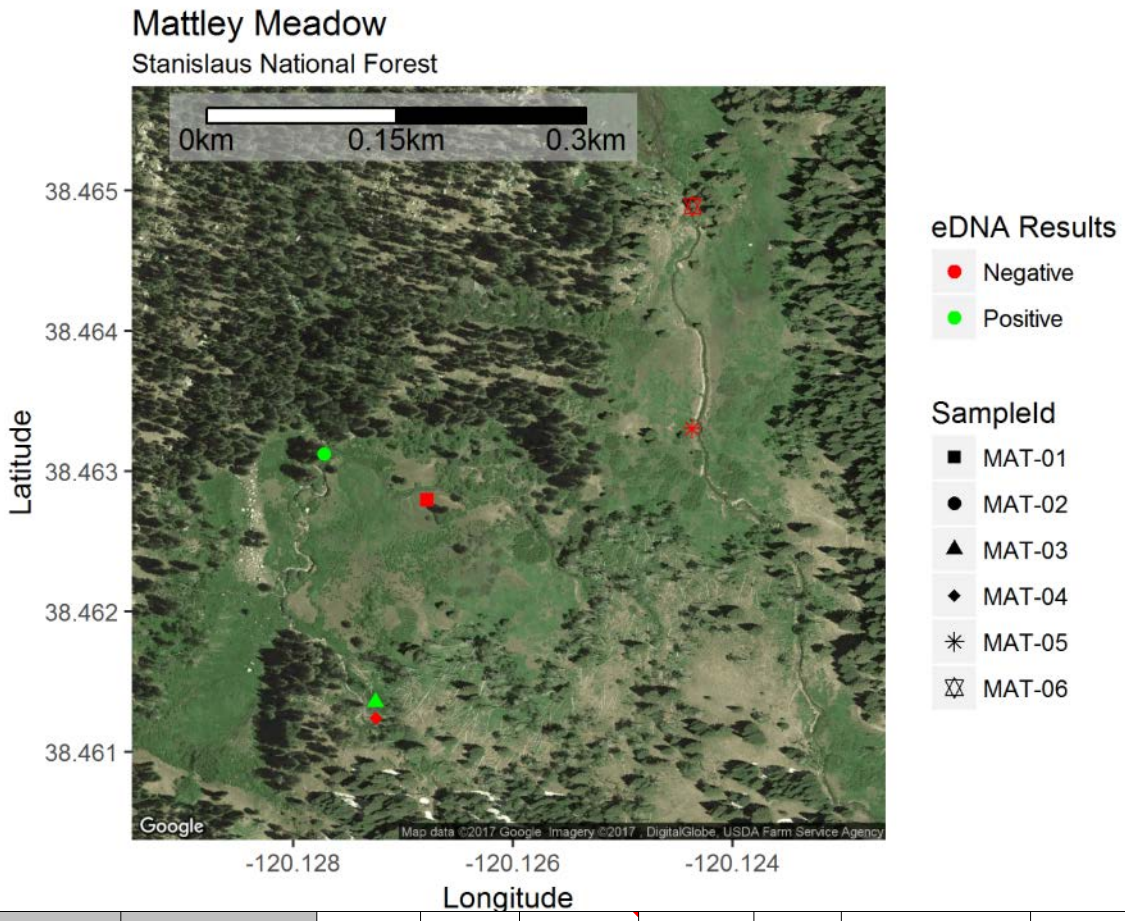
USDA 2004. Sierra Nevada Forest Plan Amendment Record of Decision. PSW Region, Vallejo, CA. 71 pp.

USDA. 2017. Stanislaus National Forest, Forest Plan Direction. Sonora, California.

Wilcox 2018. Mattley Meadow Restoration Project Basis of Design Report. May 25, 2018. Plumas Corporation, Quincy CA. 55 pp.

8. Appendix A

On August 19, 2017 Karen Pope of Forest Service PSW Research Station collected eDNA samples from 6 locations in Mattley meadow. The samples were processed by Caren Goldberg's lab at Washington State University. The eDNA results were consistent with previous VES results indicating that the northern portions of the west channel were occupied by Rana sierra, but the center and east channels were unoccupied.



Meadow	Region	MeadowTyp	SampleDa	eDNASample	TotalVolume	Sample	Sample1LabResults	Sample2	Sample2LabResul
Mattley Meadow	Stanislaus National Forest	S	19-Aug-17	MAT-01	3.94	MAT-01 A	0	MAT-01 B	0
Mattley Meadow	Stanislaus National Forest	S	19-Aug-17	MAT-02	4.13	MAT-02 A	<10	MAT-02 B	<10
Mattley Meadow	Stanislaus National Forest	S	19-Aug-17	MAT-03	0.82	MAT-03 A	20.24876723	MAT-03 B	38.15248952
Mattley Meadow	Stanislaus National Forest	S	19-Aug-17	MAT-04	3.93	MAT-04 A	0	MAT-04 B	0
Mattley Meadow	Stanislaus National Forest	S	19-Aug-17	MAT-05	0.00	MAT-05 A	0	MAT-05 B	0
Mattley Meadow	Stanislaus National Forest	S	19-Aug-17	MAT-06	4.09	MAT-06 A	0	MAT-06 B	0
Mattley Meadow	Stanislaus National Forest	S	19-Aug-17	MAT-CT	2	MAT-CT	0		0