# Appendix B.
# Compatibility Determinations

# Appendix B. Compatibility Determinations

This appendix includes Compatibility Determinations for the following uses on Service-owned lands.

*Llano Seco Unit, North Central Valley WMA*
- Environmental Education
- Wildlife Observation, Wildlife Photography, and Interpretation

*Butte Sink Unit, Butte Sink WMA and*
*Llano Seco Unit, North Central Valley WMA*
- Grazing
- Mosquito Monitoring and Management
- Plant Material Gathering
- Research

## COMPATIBILITY DETERMINATION

**Use:** Environmental Education

**Wildlife Management Area Name:** Llano Seco Unit, North Central Valley Wildlife Management Area (WMA) located in Butte County, California. This compatibility determination applies only to Service-owned (fee-title) lands within the WMA.

**Establishing and Acquisition Authority(ies):** The North Central Valley WMA was established in 1991 to preserve existing and restored wetlands for waterfowl and other wetland dependent plants and wildlife. The North Central Valley WMA is seen as an integral component in achieving the habitat protection and restoration goals of the Central Valley Joint Venture and ultimately the waterfowl population objectives of the North American Waterfowl Management Plan. Legal authorities include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715), Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j), Emergency Wetlands Resources Act of 1986 -- Public Law 99-645 (100 Stat. 3582), and North American Wetland Conservation Act of 1989 (103 Stat. 1968; 16 U.S.C. 4401-4412) -- Public Law 101-233.

**WMA Purposes:** Llano Seco Unit, North Central Valley Wildlife Management Area

*North Central Valley WMA Purposes*

"...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).

"...for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) and "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

"...the conservation of wetlands...in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." Public Law 99-645 (100 Stat. 3582), approved November 10, 1986 (Emergency Wetlands Resources Act of 1986).

"...protection, restoration, and management of wetland ecosystems..." and "…acquisition of wetlands to implement the North American Waterfowl Management Plan 16 U.S.C. 4401-4412 (North American Wetland Conservation Act of 1989).

**National Wildlife Refuge System Mission:** "To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-ee]).

**Description of Use:** Currently, the environmental education program at the Llano Seco Unit, of the North Central Valley WMA (WMA) serves approximately 300 students a year. The environmental education program is designed to provide effective resources, tools, and training which facilitates the teaching of accurate scientific and environmental information about the

Sacramento River watershed and surrounding areas. The WMA encourages environmental education as a process of building knowledge in students. The Refuge staff will work with schools (K-12) to integrate environmental concepts and concerns into structured educational activities. Refuge staff will promote environmental education that is: aligned to the current Federal, State and local standards; curriculum based that meets the goals of the school districts adopted instructional standards; and provides interdisciplinary opportunities, linking the natural world with all subject areas. The environmental education program will be managed in accordance with Service Manual 605 FW 6. The proposed environmental education program is discussed in detail as part of the Proposed Action in the CCP and associated EA (CCP Chapter 5 and Appendix A), which are incorporated by reference (USFWS 2019).

Environmental education is identified in the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) as one of the Big Six wildlife-dependent priority public uses of the National Wildlife Refuge System. Environmental education is not considered a Refuge management economic use.

The WMA proposes to develop an environmental education program in the next 5 years to serve about 500 students. Primary visitation will occur during the traditional school year of August through May. Educators may attend a teacher orientation and may design, schedule, and facilitate their own field trips on the WMA. Refuge staff will provide teacher training, site-specific curricula, materials, and activities, and field trip assistance to enhance learning in an outdoor setting. Local school district guidelines for supervision during a field trip recommend one adult for up to ten students and require at least one credentialed teacher.

Llano Seco Unit could be promoted as one primary Unit for school groups to visit. The area meets the basic health and safety needs for students (i.e., rest rooms, trail, bus parking). Students will utilize the hiking trail to complete their activities.

Students participating in restoration and monitoring activities will work as described in the environmental education program and as permitted in their reservation form. The reservation form allows the teacher to request specific activities or materials. Students will be trained by Refuge staff before they start restoration and monitoring projects to ensure their safety while out in the field, to minimize wildlife and habitat disturbance and to maximize project success.

This compatibility determination will be re-evaluated if new activities in the expansion area are anticipated to significantly change the level of use or impacts.

**Availability of Resources:** The following funding/annual costs (based on FY 2017 costs) would be required to administer and manage environmental education activities as described above:

| Resource Description | One-time Costs | Annual Costs |
|---|---|---|
| Staffing (teacher training, student support curriculum development, field trip assistance, teaching students, and administration) | | $5,000 |
| Equipment, materials, and supplies | | $600 |
| TOTAL | | $5,600 |

Funds are anticipated to be available through the Service budget process for establishment of study site, and potentially some operational costs. Additional funding for staffing and operational costs would be needed. Other sources will be sought through strengthened partnerships, grants, and additional Refuge operations funding to support a safe, quality environmental education program as described above.

**Anticipated Impacts of Use:** Opening the Llano Seco Unit to environmental education activities will be compatible with the WMA's purposes, goals, and objectives and the Refuge System mission.

Maintenance of a packed gravel or dirt trail and wildlife viewing platforms will have minor impacts on soils and vegetation around the trails. This could include an increased potential for erosion, soil compaction (Liddle 1975), reduced seed emergence (Cole and Landres 1995), alteration of vegetative structure and composition, and sediment loading (Cole and Marion 1988).

Human activities on trails can result in direct effects on wildlife through harassment, a form of disturbance that can cause physiological effects, behavioral modifications, or death (Smith and Hunt 1995). Birds can be impacted from human activities on trails when they are disturbed and flushed from feeding, resting, or nesting areas. Flushing, especially repetitive flushing, can strongly impact habitat use patterns of many bird species. Flushing from an area can cause birds to expend more energy, be deterred from using desirable habitat, affect resting or feeding patterns, and increase exposure to predation or cause birds to abandon sites with repeated disturbance (Smith and Hunt 1995). Migratory birds are observed to be more sensitive than resident species to disturbance (Klein 1989). Herons and shorebirds were observed to be the most easily disturbed (when compared to gulls, terns and ducks) by human activity and flush to distant areas away from people (Burger 1981). A reduced number of shorebirds were found near people who were walking or jogging, and about 50 percent of flushed birds flew elsewhere (Burger 1981). In addition, the foraging time of sanderlings decreased and avoidance (e.g., running, flushing) increased as the number of humans within 100 meters increased at a coastal bay refuge on the Atlantic coast (Burger and Gochfeld 1991). Nest predation for songbirds (Miller et al. 1998), raptors (Glinski 1976), colonial nesting species (Buckley and Buckley 1976), and waterfowl (Boyle and Samson 1985) tends to increase in areas more frequently visited by people. In addition, for many passerine species, primary song occurrence and consistency can be impacted by a single visitor (Gutzwiller et al. 1994). This could potentially limit the number of breeding pairs of certain passerine species, thus limiting production within refuge riparian habitats (Reijnen and Foppen 1994).

The disturbance by environmental education activities is considered to be of minimal impact because: (1) the total number of students permitted through the reservation system is limited to 100 per day; (2) students and teachers will be instructed in trail etiquette and the best ways to view wildlife with minimal disturbance; (3) education groups will be required to have a sufficient number of adults to supervise the group; (4) trail maintenance will provide adequate cover for wildlife; (5) observation areas and scopes are provided to view wildlife at a distance which reduces disturbance; and (6) the majority of the Llano Seco Unit will remain as inviolate sanctuary with no disturbance from public use.

Disturbance by students is considered minimal as study sites will be placed in areas already impacted by trail users and Refuge staff, and all off-trail activity will be focused in these small areas. Educators will be instructed on use of the study areas during teacher orientation workshops. Collection of samples for study (i.e., mud, water, plants) will be restricted to study areas, and samples must be used on site. Collection will be of materials needed to enhance hands-

on learning and investigation and will be designed as part of structured activities and lessons, guided by teachers, and monitored by Refuge staff. These activities are an integral part of the education program design and philosophy and their impacts are considered minimal.

Education staff will coordinate with Biology staff regarding activities associated with restoration or monitoring projects to ensure that impacts to both wildlife and habitat are minimal. As with any restoration and monitoring activities conducted by Refuge personnel, these activities conducted by students would be at a time and place where the least amount of disturbance would occur.

Endangered Species Act (ESA), section 7 consultations were conducted with USFWS and NOAA-Fisheries on the implementation of CCP activities on the WMAs. In the 2017 Biological Evaluation and Biological Assessment, the Service determined that with implementation of conservation measures and Best Management Practices (Appendix 1 to Appendix A, USFWS 2019), WMAs CCP actions may effect, but are not likely to adversely affect multiple fish and wildlife species and their critical habitats. The Service also concluded that WMAs CCP actions may effect, but are not likely to jeopardize the continued existence of 11 plants (Appendix M, USFWS 2019). Section 7 compliance documentation is in Appendix M (USFWS 2019).

**Public Review and Comment:** Public review and comments were solicited in conjunction with distribution of the Draft CCP/EA for the Butte Sink, Willow Creek–Lurline, and North Central Valley Wildlife Management Areas. Comments received and the Service's responses are provided in Appendix Q to the Final CCP/EA (USFWS 2019).

**Determination:**

_____ Use is Not Compatible

__X__ Use is Compatible with the Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

1. Participants in the Llano Seco Unit's environmental education program will be restricted to the established trail, study sites, and other facilities including the wildlife viewing platforms.

2. All groups using the Llano Seco Unit for environmental education will be required to make reservations in advance through the Sacramento Refuge office. This process, which takes the place of a Special Use Permit, allows refuge staff to manage the number and location of visitors for each unit. There is a current refuge policy that educational groups are not charged a fee or required to have a Special Use Permit (SUP). A daily limit of 100 students participating in the education program will be maintained through this reservation system. Efforts will be made to spread out use by large groups while reservations are made, reducing disturbance to wildlife and over-crowding of WMA facilities during times of peak demand.

3. Trail etiquette including ways to reduce wildlife disturbance will be discussed with teachers during orientation workshops and with students upon arrival during their welcome session. On the Llano Seco Unit, the teacher(s) is responsible for ensuring that students follow required trail etiquette.

4. Environmental education study sites will be located where minimal impact to WMA resources will occur. Refuge biologists and visitor services specialists will conduct regular surveys of public activities on the WMA. The data will be analyzed and used by the Refuge Manager to develop future modifications if necessary to ensure compatibility of environmental education programs.

**Justification:** Environmental education is a priority public use of the National Wildlife Refuge System. It is the intent of the Refuge staff to provide a quality environmental education program. To achieve this goal, the WMA environmental education program would provide a diversity of environmental education opportunities to students and teachers. These include: (1) facilities, materials, and training; (2) access to a variety of WMA habitats on Service-owned lands; and (3) the ability to observe wildlife and conduct hands-on exploration. The program is intended to foster a better understanding of WMA ecosystems and wildlife resources, and in turn foster a public that is knowledgeable about and involved in natural resource stewardship. Although there is some impact to WMA lands and wildlife in having an environmental education program, efforts will be made to ensure that they are kept within acceptable levels. Based upon impacts described in the Comprehensive Conservation Plan and Environmental Assessment (USFWS 2019), it is determined that environmental education within the Llano Seco Unit, as described herein, will not materially interfere with or detract from the purposes for which the WMA was established or the mission of the Refuge System. The Service has concluded that environmental education will not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the WMAs.

**Mandatory Re-Evaluation Date:** Provide month and year for allowed uses only.

__X__ Mandatory 15-year Re-Evaluation (for priority public uses)

_____ Mandatory 10-year Re-Evaluation (for all uses other than priority public uses)

**NEPA Compliance for Refuge Use Decision: (check one below)**

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

**References Cited:**

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**Refuge Determination:**

Prepared by: Sandy Osborn (Signature) 6/27/19 (Date)

Acting Refuge Manager/ Project Leader Approval: (Signature) 7/2/19 (Date)

**Concurrence:**

Refuge Supervisor: (Signature) 9/7/19 (Date)

Assistant Regional Director, Refuges: (Signature) 8.7.19 (Date)

## COMPATIBILITY DETERMINATION

**Use:** Grazing

**Wildlife Management Area Name:** Llano Seco Unit of the North Central Valley Wildlife Management Area (WMA), and Butte Sink Unit of the Butte Sink WMA, located in Butte and Sutter Counties, California. This compatibility determination applies only to Service-owned (fee-title) lands within the WMA.

**Establishing and Acquisition Authority(ies):** The North Central Valley Wildlife Management Area (NCVWMA) was established in 1991 to preserve existing and restored wetlands for waterfowl and other wetland dependent plants and wildlife. The NCVWMA (or WMA) is seen as an integral component in achieving the habitat protection and restoration goals of the Central Valley Joint Venture and ultimately the waterfowl population objectives of the North American Waterfowl Management Plan. Legal authorities for NCVWMA and Butte Sink WMA include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715) and Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j). For NCVWMA, additional legal authorities are: Emergency Wetlands Resources Act of 1986 -- Public Law 99-645 (100 Stat. 3582) and North American Wetland Conservation Act of 1989 (103 Stat. 1968; 16 U.S.C. 4401-4412) -- Public Law 101-233.

**WMA Purposes:** Llano Seco Unit, North Central Valley Wildlife Management Area and Butte Sink Unit, Butte Sink Wildlife Management Area

*Butte Sink WMA Purposes*

"...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).

"...for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) and "...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

*North Central Valley WMA Purposes*

"...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).

"...for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) and "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

"...the conservation of wetlands...in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." Public Law 99-645 (100 Stat. 3582), approved November 10, 1986 (Emergency Wetlands Resources Act of 1986).

"...protection, restoration, and management of wetland ecosystems..." and "…acquisition of wetlands to implement the North American Waterfowl Management Plan 16 U.S.C. 4401-4412 (North American Wetland Conservation Act of 1989).

**National Wildlife Refuge System Mission:** "To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-ee]).

**Description of Use:** The natural and managed vegetation at the WMAs provide habitat in the form of water, food, cover, breeding areas, rearing areas, and sanctuary for a variety of wildlife including endangered and threatened species, rare and endemic species, migratory birds, anadromous fish, and mammals, including game animals, such as waterfowl and deer. Prescribed grazing, utilizing primarily cattle and sheep, will be used at specified units of the WMA to manage vegetation to meet wildlife habitat and vegetation objectives. Improving wildlife habitat and native vegetation through changing grassland and woodland understory structure and composition and also the reduction of annual grass residual dry matter, including standing dead grass and thatch, are the primary goals for this program. Grazing will be done in accordance with site specific grazing plans. Livestock grazing would be conducted annually for a specified period (i.e., seasonally) to manage for specified vegetation and wildlife habitat. Grazing is typically administered with a livestock cooperator under a U.S. Fish and Wildlife Service Cooperative Agricultural Agreement (CAA) or a U.S. Fish and Wildlife Service Special Use Permit (SUP). The CAA states provisions for habitat objectives, expected wildlife benefits, shared staffing, facility maintenance, pest control damages, remedies, operating rules and laws and reporting requirements. A SUP indicates the location, purpose of activity, duration of use and the reimbursement to the Service for those activities. An annual grazing plan is developed for a specific WMA unit and identifies tracts (and subdivisions of tracts) to be grazed and specifies: vegetation and habitat type, grazing objective (e.g., hazardous fuels reduction, wildlife habitat enhancement, invasive plant species control), prescribed expected tract conditions (residual grass height), period by which expected conditions are to be met, livestock turn-in/turn-out dates and livestock use measured by the Animal Unit Month (AUM). The specific dates are determined by the refuge manager through consultation with the refuge biologist and cooperator to develop a strategy that meets target tract objectives. Each year the needs for vegetation management, including grazing, are evaluated during the annual review of the habitat management plan. The grazing plan has built-in flexibility due to the uncertainties of annual and seasonal precipitation, flooding, and temperatures, and their consequent effect on vegetation growth. This is to insure that expected conditions are met and that WMA vegetation is neither over-grazed nor under-grazed—both conditions result in degraded habitat. Included in the annual grazing plan is a project plan, which also specifies by WMA tract: identified facilities and maintenance projects, materials, shared responsibilities, and special management problems and considerations. This is a refuge system management economic activity and its utilization helps the WMA achieve the purposes for which it was created and the mission of the Refuge System. The proposed grazing program is discussed in detail as part of the Proposed Action in the CCP and associated EA (CCP Chapter 4 and Appendix A), which are incorporated by reference (USFWS 2019).

Vegetation and wildlife habitat management occurs in grasslands, Valley oak and elderberry savanna, Valley oak woodlands, mixed-riparian forest, and freshwater marshes. Grazing is

conducted periodically (seasonal) each year. The specified time is determined by the refuge and cooperator to meet target tract conditions.

**Availability of Resources:** The following funding/annual costs (based on FY 2017 costs) would be required to administer and manage grazing activities as described above:

| Resource Description | Annual Costs |
|---|---|
| Administration | $1,000 |
| Facilities maintenance | $5,000 |
| TOTAL | $6,000 |

Monitoring is addressed in the annual grazing plan, which fits into the overall scheme of natural resources management at Sacramento NWR Complex (Silveira 2007). The Refuge does not charge a user fee and in-kind services are determined annually during the annual grazing plan meeting. Refuge operational funds are currently available through the Service budget process to administer this program.

**Anticipated Impacts of Use:** Prehistoric and historical grazers/browsers were an important part of the Californian landscape influencing its botanical and zoological resources Edwards 2007). Domestic livestock can be an appropriate tool for habitat management in grasslands (Barry 2003; Briske et al. 2011; Germano et al. 2012; Griggs 2000; Thomsen et al. 1993), and livestock grazing remains a tool for ecosystem restoration (Huntsinger et al. 2007, Papanastasis 2009). Grazing is very poorly characterized in many studies, making results difficult to accurately interpret (Huntsinger et al. 2007). Stocking rates and density, seasonality, duration, varying rainfall amounts, soils, length of rest, species/age of grazer, and grazing history are just a few of the variables impacting results. The objects being manipulated often vary greatly, and defy any broad attempt to group them into simple categories. Habitat manipulation often positively impacts one species (or group), while negatively impacting other species. In a meta-analysis of grazing studies in California's Mediterranean-type grasslands, Stahlheber and D'Antonio (2013) reported that grazing often increased native grasses, but also non-native forbs, and sometimes increased native forbs. The results all appeared to be highly site-specific and dependent on weather patterns. Thus, characterizing the effects of grazing depends on a narrow frame of reference and is likely to be very site-specific (Jackson and Bartolome 2007).

Grazing influences vegetation composition and the abundance of native plants, although results can be highly site-specific and temporally variable (Stahlheber and D'Antonio 2013). Research evaluating the use of grazing as a conservation tool for native vegetation restoration and management report mixed results (Noy-Meir and Oron 2001; Kimball and Schiffman 2003). Published research shows both negative impacts to wildlife, such as waterfowl nesting habitat (Kirsch 1969) and riparian habitat conditions (Krueper 1993), and positive benefits to wildlife habitat, such as improved forage nutritional quality and habitat structure (Buchsbaum et al. 1986; Colwell and Dodd 1995; Germano et al. 2001; Germano et al. 2012; Knopf and Rupert 1995). Grazing is reported to be a successful conservation management tool for specific plant taxa in some herbaceous wetland communities such as salt marshes (Bakker 1985) and vernal pools (Marty 2005; Pyke and Marty 2005), probably through the reduction of competing non-native species and thatch accumulation. Such is the case reported for a Californian coastal grassland rare plant (Coppoletta and Moritsch 2001; Davis and Sherman 1992). Plant life history stages (phenology) are affected differently by grazing (Hayes and Holl 2003; Carvell 2002; Muir and

Moseley 1994; George et al. 1992), and grazing period and intensity effects plant species composition (Bakker 1985; Bullock et al. 2001; Hayes and Holl 2003; George et al. 1992). This effect is also seen with other vegetation management tools such as prescribed fire (Meyer and Schiffman 1999).

Periodic grazing in grasslands removes dead plant material referred to as residual dry matter (RDM) and prevents dense thatch layers from accumulating, thus providing space and sunlight for germination of grasses and wildflowers (also referred to as forbs and legumes). Cattle are the livestock of choice for managing grasslands at Llano Seco because of historic use, availability, and the way cattle graze. Cattle are generalist herbivores that prefer grasses like those dominating the California annual-type grassland (Van Dyne and Heady 1965), including several dominant species at the WMA. Due to forage preferences, sheep tend to over utilize wildflowers, which affects both native plants and their pollinators (Carvell 2002). As a result of cattle preference for annual grasses, some wildflowers may benefit from the reduction of non-native annual grass biomass, including active growing plants and standing dead plant material and thatch (Huenneke et al. 1990).

Beneficial effects to refuge habitat, wildlife and native plants would occur as a result of a targeted or prescribed livestock grazing program. Primary, benefits associated with the grazing program include: the reduction and accumulation of RDM; reduction in non-native invasive weeds (Thomsen et al. 1993); maintenance of native perennial grasslands impacted by non-native annual grasses (George et al. 2013); increases in native plants, including special status species, from reduced competition for sunlight, water and nutrients with non-native annual grasses (Coppoletta and Moritsch 2001; Davis and Sherman 1992; Muir and Moseley 1994; Marty 2005); maintenance of native perennial grasslands impacted by non-native annual grasses (George et al. 2013); increases primary production and resultant increases in plant biomass (McNaughton 1985); increases in native vernal pool flora and hydroperiod, which is beneficial to vernal pool macro-invertebrates (Marty 2005; Pyke and Marty 2005). Grazing would provide optimal shorebird foraging habitat (Colwell and Dodd 1995; Knopf and Rupert 1995) and also would provide short, nutritious grasses for grazing migratory waterfowl (Buchsbaum et al. 1986), and the resident deer herd. Removal of dry protein-poor thatch and germination and growth of protein-rich grasses provides greater nutrition for grazing animals which benefits herbivores such as black-tailed deer (*Odocoileus hemionus ssp. Columbianus*). This is especially important when deer select grasses in late winter during pregnancy. Primary burrowing mammals such as California ground squirrel would increase with grazing and this would result in increases of secondary burrowing animals such as burrowing owls and various snake taxa.

Ferris milk-vetch (*Astragalus tener var. ferrisae*) is a special status plant known to occur at Llano Seco Unit (USFWS 2013). This milk-vetch is included in the vernal pool ecosystem recovery plan, for which the Llano Seco Unit is a Priority 1 Core Area (USFWS 2005). Other vernal pool ecosystem recovery taxa occurring at Llano Seco Unit vernal pools include vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), and recently introduced Green's tuctoria (*Tuctoria greenei*). These species are likely to benefit from prescribed seasonal grazing through the reduction of RDM (Marty 2005; Pyke and Marty 2005) and negative impacts can be addressed in the annual grazing plan through fencing out vernal pools and adjusting the grazing period (USFWS 2013). Cattle grazing will also benefit summer active native wildflowers at Llano Seco, including several tarweeds (*Hemizonia congesta ssp. luzulifolia*, *Centormadia fitchii*, and *Calycadenia* sp.) and vinegarweed (*Trichostema lanceolatum*), which provide vital summer nectar sources for native pollinators, including bumble bees and blister beetles. These particular

summer wildflowers are known to thrive in northern California's cattle-grazed annual grasslands. Grazed grasslands and prairies can benefit insect habitats (Panzer 1988).

Cattle grazing will also benefit the restored perennial grasslands at the Llano Seco Unit, which occurs in Upper Butte Basin soils where non-native annual Italian rye grass (*Lolium multiflorum*) flourishes. Cattle actually select annual grasses over native perennials and the rye grass is particularly palatable to cattle. The Llano Seco ecotype of purple needlegrass (*Nassella pulchra*) is used extensively at restored grasslands at the Llano Seco Unit. Purple needlegrass stands occurring with annual grasses are enhanced by cattle grazing by removing the non-native annuals while green and after the native needlegrass flowers to remove RDM/thatch (George et al. 2013).

The grazing program would also impact WMA wildlife and habitat. Impacts to some nesting waterfowl, songbirds, would occur (Kirsch 1969; Krueper 1993), as well as Northern Harrier and American Bittern. Mammals, which burrow through thatch such as California meadow vole would likely decrease or be temporarily displaced with livestock grazing. Songbirds, raptors and some mammals, including black-tailed jackrabbit could also be temporarily displaced by grazing and activities associated with livestock management. Other impacts could include disturbance to soils resulting in erosion and the potential introduction of invasive plant species (seeds) from livestock. However, these impacts would be short-term because the prescribed grazing program uses adaptive management to make adjustments to allow recovery of impacted sites. Songbirds, harriers and larger mammals, such as black-tailed jackrabbit, would seek cover in areas of the WMA that are not grazed. Prescribed grazing would improve plant species composition and structure so that short-term impacts to wildlife and habitat would be mitigated by long-term benefits to WMA vegetation, native plants, and overall wildlife habitat quality. Therefore, the long-term benefits to habitat to migratory birds, resident deer herds, native plants, and nesting habitat condition would mitigate the short-term, localized impacts to local ground-nesting birds and some small mammals.

Primary, long-term benefits include continued annual native plant production, non-native invasive plant species control, and annual, seasonal use of refuge habitat by migratory birds and resident deer herds. The condition of nesting cover would be maintained through increases in new plant biomass and removal of dense thatch layers.

Secondary benefits of the program are the habitat and water system maintenance work done by the cooperator as specified in the CAA. Periodic grazing can also be used to reduce thatch and mulch accumulation, lessening the threat of wildfire near rural structures and agricultural industrial facilities.

Endangered Species Act (ESA), section 7 consultations were conducted with USFWS and NOAA-Fisheries on the implementation of CCP activities on the WMAs. In the 2017 Biological Evaluation and Biological Assessment, the Service determined that with implementation of conservation measures and Best Management Practices (Appendix 1 to Appendix A, USFWS 2019), WMAs CCP actions may effect, but are not likely to adversely affect multiple fish and wildlife species and their critical habitats. The Service also concluded that WMAs CCP actions may effect, but are not likely to jeopardize the continued existence of 11 plants (Appendix M, USFWS 2019). Section 7 compliance documentation is in Appendix M (USFWS 2019).

**Public Review and Comment:** Public review and comments were solicited in conjunction with distribution of the Draft CCP/EA for the Butte Sink, Willow Creek–Lurline, and North Central Valley Wildlife Management Areas. Comments received and the Service's responses are provided in Appendix Q to the Final CCP/EA (USFWS 2019).

**Determination:** This program as described is determined to be compatible. Potential impacts of grazing activities on Refuge resources will be minimized because sufficient restrictions would be included as part of the annual grazing plan and grazing activities will be monitored by the refuge manager and biologist. The refuge/WMA manager and biologist would ensure the grazing plan and associated projects contribute to the enhancement, protection, conservation, and management of native WMA wildlife populations and their habitats thereby helping the Refuge fulfill the purposes for which it was established, the mission of the National Wildlife Refuge System, and the need to maintain ecological integrity, diversity, and environmental health.

_____ Use is Not Compatible

__X__ Use is Compatible with the Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

1. The criteria for evaluating need for vegetation management, including grazing, are determined during the annual review of the refuge habitat management plan.
2. Grazing is conducted in accordance with the CAA or SUP. Any potential problems and impacts to WMA natural and cultural resources are identified during the annual review of the habitat management plan. These problems and impacts are also recorded in the annual grazing plan under associated projects. Measures to eliminate or reduce adverse effects of grazing to WMA resources would be identified in both the CAA or SUP and the annual grazing plan and the refuge manager and biologist would monitor their outcome. If grazing effects cannot be eliminated or reduced to sufficiently protect natural and cultural resources, then other techniques for vegetation management would be considered. In addition to stipulations outlined above, in both the CAA or SUP, and annual grazing plan, all refuge rules and regulations must be followed by the livestock grazing cooperator unless otherwise accepted in writing by the refuge manager.
3. Grazing would not be allowed in sensitive natural or cultural resource sites.

**Justification:** This program as described is determined to be compatible. Based upon impacts described in the Comprehensive Conservation Plan and Environmental Assessment (USFWS 2019), it is determined that grazing within the Llano Seco Unit of the NCVWMA and the Butte Sink WMA, as described herein, will not materially interfere with or detract from the purposes for which the WMAs were established or the mission of the Refuge System. WMA livestock grazing will directly benefit and support refuge/WMA goals, objectives and management plans and activities. Fish, wildlife, plants and their habitat will improve through vegetation management, which will result in short-term and long-term reductions of non-native invasive plant species, increases in native plants, increases in biomass, improved foraging conditions for migratory birds and local deer herds, and long-term improved nesting conditions. Consequently, the livestock grazing program would increase or maintain biological integrity, diversity and environmental health. The wildlife-dependent, priority public uses (wildlife viewing and photography, environmental education and interpretation, fishing and hunting) would also benefit as a result of increased biodiversity and wildlife and native plant populations from improved habitat conditions associated with the grazing

program. The Service has concluded that grazing will not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the WMAs.

**Mandatory Re-Evaluation Date:** Provide month and year for allowed uses only.

_____ Mandatory 15-year Re-Evaluation (for priority public uses)

__X__ Mandatory 10-year Re-Evaluation Date (for all uses other than priority public uses)

**NEPA Compliance for Refuge Use Decision:** (check one below)

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

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**Refuge Determination:**

| | | |
|---|---|---|
| Prepared by: | Sandy Osborn (Signature) | 6/27/19 (Date) |
| Acting Refuge Manager/ Project Leader Approval: | (Signature) | 7/2/19 (Date) |

**Concurrence:**

| | | |
|---|---|---|
| Refuge Supervisor: | (Signature) | 8/7/19 (Date) |
| Assistant Regional Director, Refuges: | (Signature) | 8.7.19 (Date) |

## COMPATIBILITY DETERMINATION

**Use:** Mosquito Monitoring and Management

**Wildlife Management Area Name:** Llano Seco Unit of the North Central Valley Wildlife Management Area (WMA) in Butte County, California; and Butte Sink Unit of the Butte Sink Wildlife WMA, located in Sutter County, California. This compatibility determination applies only to Service-owned (fee-title) lands within the WMAs.

**Establishing and Acquisition Authorities:** The Butte Sink WMA was established in 1979 with the primary purpose of preserving wetland habitat to perpetuate the migratory waterfowl resource in the Central Valley and the Pacific Flyway. Other objectives of the WMA include assuring adequate water conditions for wintering waterfowl, preserving wetland habitat for a broad spectrum of migratory wildlife, and establishing and maintaining a wildlife sanctuary on the Butte Sink Unit. In accordance with deed restrictions, there is no public use allowed on the Butte Sink Unit. Legal authorities include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715-715r), Fish and Wildlife Act of 1956 [16 U.S.C. 742f(a)(4) and (b)(1)].

The North Central Valley WMA was established in 1991 to preserve existing and restored wetlands for waterfowl and other wetland dependent plants and wildlife. The North Central Valley WMA is seen as an integral component in achieving the habitat protection and restoration goals of the Central Valley Joint Venture and ultimately the waterfowl population objectives of the North American Waterfowl Management Plan. Legal authorities include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715), Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j), Emergency Wetland Resources Act of 1986 (16 U.S.C. 3921), and North American Wetlands Conservation Act of 1989 (16 U.S.C. 4401-4412).

**WMA Purposes:** Llano Seco Unit, North Central Valley Wildlife Management Area and Butte Sink Unit, Butte Sink Wildlife Management Area

*Butte Sink WMA Purposes*

> "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).
>
> "...for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

*North Central Valley WMA Purposes*

> "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).
>
> "...for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) and "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to

the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

"...the conservation of wetlands...in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." Public Law 99-645 (100 Stat. 3582), approved November 10, 1986 (Emergency Wetlands Resources Act of 1986).

"...protection, restoration, and management of wetland ecosystems..." and "…acquisition of wetlands to implement the North American Waterfowl Management Plan 16 U.S.C. 4401-4412 (North American Wetland Conservation Act of 1989).

**National Wildlife Refuge System Mission:** "To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1996, as amended [16 U.S.C. 668dd-ee]).

**Description of Use:** The proposed use is the implementation of mosquito monitoring and management (control) activities requested and conducted by local mosquito control districts (Districts) within the Llano Seco Unit and Butte Sink Unit of the North Central Valley WMA and Butte Sink WMA, respectively. These Districts include Colusa Mosquito Abatement District and Butte County Mosquito and Vector Control District (MVCD). This is not a wildlife-dependent public use. This represents an update of a compatibility determination approved in August 1994.

The Districts have verbally informed the wildlife refuge manager of their desire to conduct mosquito monitoring and, if necessary, management activities to protect the public from mosquito borne diseases. While mosquitoes are considered a nuisance because of their biting, some species are known vectors of serious diseases in California. There are primarily five mosquito species of concern potentially produced or harbored on the Refuges: *Aedes melanimon* (=*A. meliolineata*), *Aedes nigromaculatus, Aedes vexans, Culex tarsalis,* and *Anopheles freeborni.*

The main diseases of concern for mosquito control programs in northern California are western equine encephalitis virus (WEEV), St. Louis encephalitis virus (SLEV), California encephalitis, West Nile virus (WNV), and malaria (USFWS 2005a). *Culex tarsalis* is the main vector identified in the transmission of these diseases, with the exception of malaria. *Cx. tarsalis* can be found throughout California in a wide variety of aquatic sources. Most such water is associated with irrigation of agricultural crops or urban wastewater. Other mosquito species, such as *Cx. pipiens, Cx. quinquefasciatus,* and *Cx. stigmatosoma*, play an important role in the transmission cycles of WNV, and potentially SLEV, in urban and suburban areas. Additional mosquitoes such as *Aedes vexans* and *Cx. erythrothorax* also could be important bridge (i.e., bird to mammal) vectors in transmission. Lastly, *Ae. albopictus* and *Ae. aegypti* mosquitoes, important vectors of other viruses in other parts of the world, have been detected in several locations in California in recent years and may serve as bridge vectors of WNV (CA Department of Health Services 2017). Public concern over human health issues related to mosquito-borne disease has intensified on the west coast with the advance of WNV across the United States, and its detection in California in 2003.

Guidelines to address mosquito management have been developed for implementation on refuges in the Pacific Region (USFWS 2003), as well as similar guidance developed at the national level for

the National Wildlife Refuge System (USFWS 2018). At the local level, the Sacramento Refuge Complex (Complex) has an approved Integrated Pest Management Plan for Mosquito Control (IPM Plan) that incorporates the above current regional and national policies. The proposed use would apply the principles in the IPM Plan incorporated herein by reference (USFWS 2009b).

The purposes of this IPM plan are to: 1) describe habitats that occur on Refuges and WMAs, and their role in the production or harborage of mosquitoes; 2) describe the use of approved mosquito control methods and materials in an IPM program that is consistent with the goals of the Complex, Department of Interior (DOI) and Service policy, and minimizes public health risk from Refuge-produced or harbored mosquitoes; 3) provide long-term planning to meet the Service's goal of using IPM to minimize effects of mosquito control on trust resources to the greatest extent possible; and 4) provide long-term planning to meet the Service's goals of reducing overall pesticide use on DOI trust resources to the greatest extent possible and using the least toxic options when pesticide use is deemed necessary. The IPM Plan includes a risk-based, phased response approach to mosquito management adapted from national guidance (Table 1). This approach uses an understanding of mosquito biology and ecology whereby intervention measures depend on continuous monitoring of mosquito populations (Table 2).

The IPM approach ensures legitimate human, fish, and wildlife health concerns are addressed. It incorporates a combination of best management practices (BMPs) in managed wetlands (Kwasny et al. 2004), biological controls, and a select group of pesticides if warranted. Treatment thresholds (i.e., adult and larval mosquito population levels, and disease activity) and appropriate corresponding responses are identified (USFWS 2009b). Under this program, if mosquito population monitoring and disease surveillance indicate that human health thresholds are exceeded, the use of larvicides, pupicides, and/or adulticides may become necessary. In some cases, emergency actions may be required that are not addressed by this compatibility determination.

Mosquito monitoring and control is currently authorized on the Complex through Special Use Permits (SUP) and approved Pesticide Use Proposals (PUP), both of which are issued to the Districts on an annual basis. In addition, the Districts have received a copy of the most current IPM Plan. The SUP identifies permitted dates, access points and conditions, monitoring and data reporting requirements, treatment thresholds, approved PUPs, treatment notification requirements, and sensitive areas to be avoided. The SUP makes specific reference to the IPM Plan for many of these items. The PUPs identify specific mosquito control products approved for use on the Refuges, and include details on target pests, products applied, application dates, rates, methods, number of applications, site description, sensitive habitats and best management practices to avoid them. Because the U.S. Fish and Wildlife Service (Service) uses insecticides, herbicides and fungicides on national wildlife refuges a formal pesticide use review process is employed to ensure that all chemical pesticides approved for use have been reviewed for their potential impacts to groundwater, surface water and terrestrial and aquatic non-target vegetation and wildlife, including threatened and endangered species. Pesticides approved for use must be shown to pose the lowest toxicity-related threat to non-target terrestrial and aquatic ecosystems, while addressing the specific pest control objectives. Depending on the product, PUPs are reviewed and approved at the Project Leader, Regional Office, or Washington Office level.

Refuge and District staff meet annually to evaluate past and proposed mosquito management activities and to coordinate all necessary permitting and implementation planning required to conduct mosquito monitoring and control on the Complex for the upcoming year. During these meetings, Refuge and District staffs discuss ways to further minimize pesticide use on the

Refuges, use the least toxic materials practicable, and identify research needs. As part of this coordination process, Refuge staff provides District personnel with habitat management data and maps for the Refuges that identify planned habitat types, water management schedules, and locations of sensitive areas and species. District personnel are responsible for monitoring mosquitoes and are required to provide Refuge staff with timely data collected on mosquito population trends and disease activity on the Refuge.

Mosquito monitoring and management is discussed in the Comprehensive Conservation Plan (CCP) and Environmental Assessment (EA) (USFWS 2019), incorporated by reference.

**Availability of Resources:** The following funding/annual costs (based on FY 2017 costs) would be required to administer and manage activities as described above:

| Resource Description | Annual Costs |
|---|---|
| Administration (evaluation of applications, permit compliance, and monitoring) | $5,000 |
| TOTAL | $5,000 |

Refuge operational funds are currently available through the Service budget process to administer this program.

**Anticipated Impacts of Use:** One of the major objectives of the Refuges is to provide high quality feeding areas for migratory birds and other wildlife; there is concern that mosquito control treatments may be interfering with that objective by reducing the existing food base. Effects on non-target organisms (i.e., those other than mosquitoes) can be loss of biomass, loss of diversity, interference with normal ecological relationships, bioaccumulation, or other unknown effects. There is particular concern about aquatic species, including anadromous fish that occur in the Butte Sink WMA. Another concern is that rare insects and/or insects that may function as important pollinators for rare plants may be adversely affected by mosquito control treatments. Use of non-native biological controls such as mosquito fish may alter ecological relationships of native species.

Significant bioaccumulation has not been associated with any of the chemical treatments identified in the IPM Plan. In a study conducted on Colusa and Sutter Refuges, researchers found no reductions in total abundance or biomass of aquatic macro-invertebrates in the treated (i.e., application of pyrethrin, permethrin, or Malathion) or control fields (Lawler et al. 1997). Adult midges and some other flying insects experienced apparent short-term decreases, rebounding to pre-application levels within 24 hours. While this study provided encouraging information about adulticide use there are still some questions about their effects on refuge resources. This study focused on the effects of a single adulticide treatment. During most years, Colusa and Sutter Refuges, and the Butte Sink Wildlife Management Area receive multiple adulticide treatments, often weekly during the fall flood-up season. Effects of multiple applications may have cumulative effects not detected in the 1997 study. In addition, effects on smaller common invertebrates (i.e., cladocera, copepods) were not studied, but should be included in future research efforts, given their lower acute toxicity tolerances (Johnson and Finley 1980). Lawler et al. (2008) studied the effects of weekly pyrethrin adulticide applications on susceptible sentinel aquatic invertebrates at Colusa NWR. Results indicated that although some elevated concentrations of pyrethrin and the synergist piperonyl butoxide were detected in sediments, application rates used for mosquito

control did not produce any detectable effects on Daphnia magna or *Callibaetis californicus*. Although these results are encouraging, sub-lethal effects on non-target species have not been studied in detail, which is a remaining concern.

Mosquito monitoring includes regular visits by District personnel to sample mosquito larvae (dip counts) and adults (landing counts) in wetlands and adjacent areas. Mosquito monitoring will cause direct and indirect disturbance effects. Disturbance would include altering wildlife behavior and habitat use, and entering a number of wetland areas to collect mosquito samples. However, most of these effects would be short-term. The sampling interval would typically be once a week during May through October. Long-term effects would be eliminated/reduced because sufficient restrictions would be included as part of the SUP, and District activities would be monitored by refuge staff. Refuge staff would ensure that mosquito monitoring does not detract from the purposes of the Refuges, the mission of the National Wildlife Refuge System, and the need to maintain ecological integrity. Additionally, SUP conditions would include conditions to further ensure that impacts to wildlife and habitats are avoided and minimized.

Mosquito control will have minimal impact to public use activities on the Refuges. Using the approach identified in this determination and the IPM Plan, mosquito control will utilize the least toxic and the least amount of insecticide required to achieve mosquito control and public health protection objectives. Adulticide treatments will occur in evenings or early mornings when adult mosquitoes are active and refuge personnel and visitors are not present.

Endangered Species Act (ESA), section 7 consultations were conducted with USFWS and NOAA-Fisheries on the implementation of CCP activities on the WMAs. In the 2017 Biological Evaluation and Biological Assessment, the Service determined that with implementation of conservation measures and Best Management Practices (Appendix 1 to Appendix A, USFWS 2019), WMAs CCP actions may effect, but are not likely to adversely affect multiple fish and wildlife species and their critical habitats. The Service also concluded that WMAs CCP actions may effect, but are not likely to jeopardize the continued existence of 11 plants (Appendix M, USFWS 2019). Section 7 compliance documentation is in Appendix M (USFWS 2019).

Following the IPM approach, including the implementation of adequate monitoring and best management practices will lessen potential short-term, long-term, and cumulative impacts of mosquito control activities to acceptable levels. The annual PUP and SUP processes would continue to be used by the Complex staff.

**Public Review and Comment:** Public review and comments were solicited in conjunction with distribution of the Draft CCP/EA for the Butte Sink, Willow Creek–Lurline, and North Central Valley Wildlife Management Areas. Comments received and the Service's responses are provided in Appendix Q to the Final CCP/EA (USFWS 2019).

**Determination:**

_____ Use is Not Compatible

__X__ Use is Compatible with the Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

1. All mosquito control activities proposed by the Districts are evaluated and authorized through an annual SUP, supported by the risk-based, hierarchical approach outlined in Table 1 (below).
2. The application of any mosquito control products are conducted in accordance with approved PUPs, which is referenced in the SUP.
3. The implementation of mosquito monitoring and control are conducted in accordance with Section 7 of the Endangered Species Act. The Refuges provide the Districts a map of sensitive areas and identifies measures to avoid them.
4. Districts are required to notify the Project Leader prior to any treatments or expected series of treatments, which can only occur after mosquito populations and virus activity levels exceed treatment thresholds as documented by monitoring data.
5. An annual report summarizing the mosquito control activities is provided to the Project Leader each year.
6. The Refuges will monitor District activities on the Refuges to ensure compliance with the Stipulations presented here and any additional conditions specified in the SUP, to ensure any impacts remain at an acceptable level.

**Justification:** Mosquito-borne disease issues are a threat in the northern Central Valley. Mosquito management activities are controlled by a process that involves incorporating USFWS National and Regional Mosquito Guidance, the local IPM Plan, annual PUPs and SUPs, which would contribute towards a compatible program consistent with purposes of the Refuges and Refuge System mission. Appropriate safeguards are incorporated into the planning efforts to ensure that the level of mosquito control is commensurate with the associated public health risk. In particular, the above stipulations and those within the PUPs and SUPs will help to avoid or minimize any impacts to fish, wildlife, plants and their habitats along with the Refuges' ability to maintain the biological integrity, diversity, and environmental health of the Service-owned lands. Any additional terms and conditions included in the SUP will be based, at least in part, on the results of monitoring efforts. If monitoring demonstrates an unacceptable impact to the Refuges' resources, this use will be reevaluated. Based upon impacts described in the Final Comprehensive Conservation Plan and Environmental Assessment and IPM Plan, (USFWS 2013, 2009a, b), it is determined that mosquito management activities within the Llano Seco Unit and Butte Sink Unit of the North Central Valley WMA and Butte Sink WMA, respectively, as described herein, will not materially interfere with or detract from the purposes for which the Refuges were established or the mission of the Refuge System. The Service has concluded that these mosquito management activities will not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the WMAs.

Refuge staff has also worked with local Districts on mosquito control at other Refuges within the Complex, in a manner consistent with this compatibility determination (USFWS 2005b).

**Mandatory Re-Evaluation Date:** Provide month and year for allowed uses only.

_____ Mandatory 15-year Re-Evaluation Date (for priority public uses)

__X__ Mandatory 10-year Re-Evaluation (for all uses other than priority public uses)

**NEPA Compliance for Refuge Use Decision:** (check one below)

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

**Table 1. Mosquito-Borne Disease Health Threat and Response Matrix (USFWS 2009b).**

| Current Conditions | | Threat Level | Refuge Response |
|---|---|---|---|
| Health Threat Category[1] | Refuge Mosquito Populations[2] | | |
| No documented existing or historical health threat/ emergency | No action threshold | 1 | Remove/manage artificial mosquito breeding sites such as tires, tanks, or similar debris/containers. Allow compatible monitoring by MVCDs. |
| Documented historical health threat/emergency | Below action threshold | 2 | Response as in threat level 1, plus: employ compatible non-pesticide management options (BMPs) to reduce mosquito production. |
| | Above action threshold | 3 | Response as in threat level 2, plus: allow compatible site-specific larviciding, pupaciding, or adulticiding of infested areas by MVCDs as determined by monitoring. |
| Documented existing health threat | Below action threshold | 4 | Response as in threat level 2, plus: allow increased monitoring and disease surveillance by MVCDs. |
| | Above action threshold | 5 | Response as in threat levels 3 and 4, plus: more readily allow compatible site-specific larviciding, pupaciding, or adulticiding of infested areas by MVCDs as determined by monitoring data. |
| Officially determined existing health emergency | Below action threshold | 6 | Maximize monitoring and disease surveillance by MVCDs. |
| | Above action threshold | 7 | Response as in threat levels 5 and 6, plus: allow site-specific larviciding, pupaciding, and adulticiding of infested areas by MVCDs as determined by monitoring. |

Source: Integrated Pest Management Plan, Sacramento National Wildlife Refuge Complex (USFWS 2009b).

[1] **Health threat** - For the purposes of allowing mosquito control on a particular refuge, the threshold of a "documented existing health threat" will be met when a positive virus (WNV, Western Equine Encephalitis, St. Louis Encephalitis, etc.) detection is made in humans, dead birds, mosquito pools, sentinel chickens, or horses in the vicinity of the Refuge and within the same county and within the same annual mosquito season.

**Health emergency** - Indicates an imminent risk of serious human disease or death. A health emergency represents the highest level of mosquito-associated health threats. An "officially determined existing health emergency" will be determined by the appropriate Federal, State, or local public health authorities and documented with local and current mosquito population and disease monitoring data. Changes to these definitions may occur as a result of changes in national policies.

[2] Action thresholds represent mosquito population levels that may require intervention measures and are identified in Table 2.

**Table 2. Action thresholds for larvicide, pupacide, and adulticide applications on Refuges within the Complex**

| Refuge | Distance from Nearest Urban Area | Treatment Thresholds[1] | | | |
|---|---|---|---|---|---|
| | | Larvicide | Pupacide[2] | Adulticide | |
| | | Dipper[3] | Dipper | *Aedes* sp. Landing Count[4] | NJLT Index for *C. tarsalis*[5] |
| Sacramento | 6 miles south of Willows | nt[6] | nt | nt | 607[7] |
| Delevan | 4 miles east of Maxwell | nt | nt | nt | 407[7] |
| Colusa | 1 mile west of Colusa | 2/2 | 10/10 | 5 | 5/20 |
| Sutter | 3 miles south of Sutter | 2/2 | 10/10 | 10 | 5/20 |
| Butte Sink Unit | 3.5 miles northeast of Colusa | 2/2 | 10/10 | 10 | no trap present |
| Llano Seco Unit | 1.5 miles southwest of Dayton | 2/2 | 10/10 | 5 | 5/20 |

Source: Integrated Pest Management Plan, Sacramento National Wildlife Refuge Complex (USFWS 2009b).

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[1] First number is during a documented public health threat; second number is outside of a documented public health threat.

[2] Refers specifically to GB-1111; used under rare circumstances where pupae have accumulated in abundance in discrete areas (i.e., windrows); would be conducted in consultation with Refuge staff to avoid areas with significant numbers of young duck broods (Miles et al. 2002).

[3] Average number per dip.

[4] Average number landing per pant leg per minute.

[5] Per trap night, based on weekly index of adult females.

[6] No threshold established; not applicable at this time.

[7] Only during an existing human health threat or emergency. A health emergency indicates an imminent risk of serious human disease or death. An "officially declared existing health emergency" will be determined by the appropriate Federal, State, or local public health authorities and documented with local and current mosquito population and disease monitoring data. Changes to this definition may occur as a result of changes in national policies.

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**Refuge Determination:**

Prepared by: Sandy Osborn (Signature) 6/27/19 (Date)

Acting Refuge Manager/ Project Leader Approval: (Signature) 7/2/19 (Date)

**Concurrence:**

Refuge Supervisor: (Signature) 8/7/19 (Date)

Assistant Regional Director, Refuges: (Signature) 8.7.19 (Date)

## COMPATIBILITY DETERMINATION

**Use:** Plant Material Gathering

**Wildlife Management Area Name:** Llano Seco Unit of the North Central Valley Wildlife Management Area (WMA) and the Butte Sink Unit of the Butte Sink WMA. This compatibility determination applies only to Service-owned (fee-title) lands within the WMAs.

**Establishing and Acquisition Authority(ies):** The Butte Sink WMA was established in 1979 with the primary purpose of preserving wetland habitat to perpetuate the migratory waterfowl resource in the Central Valley and the Pacific Flyway. Other objectives of the WMA include assuring adequate water conditions for wintering waterfowl, preserving wetland habitat for a broad spectrum of migratory wildlife, and establishing and maintaining a wildlife sanctuary on the Butte Sink Unit. In accordance with deed restrictions, there is no public use allowed on the Butte Sink Unit. Legal authorities include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715-715r), Fish and Wildlife Act of 1956 [16 U.S.C. 742f(a)(4) and (b)(1)].

The North Central Valley WMA (or NCVWMA) was established in 1991 to preserve existing and restored wetlands for waterfowl and other wetland dependent plants and wildlife. The North Central Valley WMA is seen as an integral component in achieving the habitat protection and restoration goals of the Central Valley Joint Venture and ultimately the waterfowl population objectives of the North American Waterfowl Management Plan. Legal authorities for NCVWMA and Butte Sink WMA include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715), and Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j). For NCVWMA, additional legal authorities are: Emergency Wetlands Resources Act of 1986 -- Public Law 99-645 (100 Stat. 3582) and North American Wetland Conservation Act of 1989 (103 Stat. 1968; 16 U.S.C. 4401-4412) – Public Law 101-233.

**Refuge Purpose(s):** Llano Seco Unit, North Central Valley Wildlife Management Area and Butte Sink Unit, Butte Sink Wildlife Management Area

*Butte Sink WMA Purposes*

> "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).
>
> "...for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) and "...for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

*North Central Valley WMA Purposes*

> "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).
>
> "...for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) and "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to

the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

"...the conservation of wetlands...in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." Public Law 99-645 (100 Stat. 3582), approved November 10, 1986 (Emergency Wetlands Resources Act of 1986).

"...protection, restoration, and management of wetland ecosystems..." and "…acquisition of wetlands to implement the North American Waterfowl Management Plan 16 U.S.C. 4401-4412 (North American Wetland Conservation Act of 1989).

**National Wildlife Refuge System Mission:** "To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-ee]).

**Description of Use:** Gathering of plants in and around the Llano Seco Unit of the NCVWMA and the Butte Sink Unit of the Butte Sink WMA by Native Americans has occurred historically and continues to be a periodic use today. Plants are gathered for a variety of uses; for food, medicinal uses, ceremonial uses, and for artistic purposes such as basket weaving. Plants gathered for traditional uses may include: tule (*Schoenoplectus acutus*), cattail (*Typha* spp.), elderberry (*Sambucus* sp.) and other common species. The amount of plant material being harvested is traditionally small and is not expected to increase. The use of WMA lands for plant gathering is important to Native American cultural groups.

In addition, native plant seeds may also be collected and propagated for use in habitat restoration activities on the Complex. Species may include salt grass (*Distichlis spicata*), gumweed (*Grindelia camporum*) and other common species.

A Special Use Permit (SUP) will be issued for all plant gathering/collection activities. SUPs will contain specific terms and conditions that the gatherer(s) must follow relative to activity, location, duration, seasonality, etc. to ensure continued compatibility. All Refuge rules and regulations must be followed unless otherwise provided in writing by Refuge management.

The proposed program is described in the Comprehensive Conservation Plan (CCP) and associated Environmental Assessment (EA), which are incorporated by reference (USFWS 2019).

**Availability of Resources:** The following funding/annual costs (based on FY 2017 costs) would be required to administer and manage plant gathering activities as described above:

| Resource Description | Annual Costs |
|---|---|
| Administration | $1,000 |
| TOTAL | $1,000 |

**Anticipated Impacts of Use:** Anticipated impacts to habitat and wildlife associated with plant gathering on the WMAs are expected to be minimal. The amount of plant material being harvested is very small (<1 percent of any WMA unit) and will have an insignificant impact on habitat. Cuttings from perennial plant species are typically requested, which result in no plant mortality. In addition, cuttings are usually harvested from areas that are identified for thinning. No rare or special status species will be gathered.

The level of disturbance to wildlife is also minor and long-term effects would be negligible because conditions of SUPs would ensure that impacts, such as disturbance to wildlife and habitats, are avoided or minimized. Areas used will be monitored to evaluate the impacts on the resource; if adverse impacts appear, the activity may be moved to secondary locations or eliminated entirely.

Plant gathering on Service-owned lands has been designed to avoid or minimize impacts anticipated to the Refuges' resources and visitors. While the activity of gathering may have short-term impacts on individual plants and wildlife, no adverse long-term impacts on wildlife or plant populations are anticipated. This activity should not result in short- or long-term impacts that adversely affect the purposes of the WMAs or the mission of the National Wildlife Refuge System.

Endangered Species Act (ESA), section 7 consultations were conducted with USFWS and NOAA-Fisheries on the implementation of CCP activities on the WMAs. In the 2017 Biological Evaluation and Biological Assessment, the Service determined that with implementation of conservation measures and Best Management Practices (Appendix 1 to Appendix A, USFWS 2019), WMAs CCP actions may effect, but are not likely to adversely affect multiple fish and wildlife species and their critical habitats. The Service also concluded that WMAs CCP actions may effect, but are not likely to jeopardize the continued existence of 11 plants (Appendix M, USFWS 2019). Section 7 compliance documentation is in Appendix M (USFWS 2019).

**Public Review and Comment:** Public review and comments were solicited in conjunction with distribution of the Draft CCP/EA for the Butte Sink, Willow Creek–Lurline, and North Central Valley Wildlife Management Areas. Comments received and the Service's responses are provided in Appendix Q to the Final CCP/EA (USFWS 2019).

**Determination:**

_____ Use is Not Compatible

__X__ Use is Compatible with the Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

1. Access to the Refuges is allowed from one hour before sunrise to one hour after sunset.
2. A SUP will be issued for all plant gathering activities. SUPs will contain specific terms and conditions that the gatherer(s) must follow relative to activity, location, duration, seasonality, etc. to ensure continued compatibility. All Refuge rules and regulations must be followed unless otherwise excepted in writing by Refuge management.
3. Areas used will be monitored to evaluate the impacts on the resource; if adverse impacts appear, the activity may be moved to secondary locations or eliminated.

**Justification:** Though plant gathering is not a wildlife-dependent recreational use, it is an activity that contributes to environmental education and awareness. The stipulations outlined above should minimize potential impacts relative to wildlife/human interactions. Based upon impacts described in the Comprehensive Conservation Plan and Environmental Assessment (USFWS 2019), it is determined that plant gathering within the Llano Seco Unit of the North Central Valley WMA and the Butte Sink Unit of the Butte Sink WMA as described herein, will not materially interfere with or detract from the purposes for which the WMAs were established or the mission of the Refuge System. The Service has concluded that implementing the plant gathering and associated stipulations will not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the WMAs.

**Mandatory Re-Evaluation Date:** Provide month and year for allowed uses only.

_____ Mandatory 15-year Re-Evaluation (for priority public uses)

__X__ Mandatory 10-year Re-Evaluation (for all uses other than priority public uses)

**NEPA Compliance for Refuge Use Decision:** (check one below)

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

**References Cited:**

U.S. Fish and Wildlife Service. 2009. Sacramento, Delevan, Colusa, and Sutter National Wildlife Refuges Final Comprehensive Conservation Plan and Environmental Assessment. Region 8. Sacramento, CA.

U.S. Fish and Wildlife Service. 2019. Butte Sink, Willow Creek-Lurline, and North Central Valley Wildlife Management Areas Final Comprehensive Conservation Plan and Environmental Assessment. Region 8. Sacramento, CA.

**Refuge Determination:**

Prepared by: Sandy Osborn (Signature) 6/27/19 (Date)

Acting Refuge Manager/ Project Leader Approval: (Signature) 7/2/19 (Date)

**Concurrence:**

Refuge Supervisor: (Signature) 8/7/19 (Date)

Assistant Regional Director, Refuges: (Signature) 8.7.19

## COMPATIBILITY DETERMINATION

**Use:** Research

**Wildlife Management Areas Name:** Llano Seco Unit of the North Central Valley Wildlife Management Area (WMA) and Butte Sink Unit of the Butte Sink WMA, located in Butte and Sutter Counties, California. This compatibility determination applies only to Service-owned (fee-title) lands within the WMAs.

**Establishing and Acquisition Authority(ies):** The Butte Sink WMA was established in 1979 with the primary purpose of preserving wetland habitat to perpetuate the migratory waterfowl resource in the Central Valley and the Pacific Flyway. Other objectives of the WMA include assuring adequate water conditions for wintering waterfowl, preserving wetland habitat for a broad spectrum of migratory wildlife, and establishing and maintaining a wildlife sanctuary on the Butte Sink Unit. In accordance with deed restrictions, there is no public use allowed on the Butte Sink Unit. Legal authorities include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715-715r), Fish and Wildlife Act of 1956 [16 U.S.C. 742f(a)(4) and (b)(1).

The North Central Valley WMA was established in 1991 to preserve existing and restored wetlands for waterfowl and other wetland dependent plants and wildlife. The North Central Valley WMA is seen as an integral component in achieving the habitat protection and restoration goals of the Central Valley Joint Venture and ultimately the waterfowl population objectives of the North American Waterfowl Management Plan. Legal authorities for North Central Valley WMA (or NCVWMA) and Butte Sink WMA include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715), and Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j). For NCVWMA, additional legal authorities are: Emergency Wetlands Resources Act of 1986 -- Public Law 99-645 (100 Stat. 3582) and North American Wetland Conservation Act of 1989 (103 Stat. 1968; 16 U.S.C. 4401-4412) -- Public Law 101-233.

**WMA Purposes:** Llano Seco Unit, North Central Valley Wildlife Management Area and Butte Sink Unit, Butte Sink Wildlife Management Area

*Butte Sink WMA Purposes*

> "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).
>
> "...for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) and "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

*North Central Valley WMA Purposes*

> "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).
>
> "...for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) and "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to

the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

"...the conservation of wetlands...in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." Public Law 99-645 (100 Stat. 3582), approved November 10, 1986 (Emergency Wetlands Resources Act of 1986).

"...protection, restoration, and management of wetland ecosystems..." and "…acquisition of wetlands to implement the North American Waterfowl Management Plan 16 U.S.C. 4401-4412 (North American Wetland Conservation Act of 1989).

**National Wildlife Refuge System Mission:** "To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-ee]).

**Description of Use:** Two provisions of the National Wildlife Refuge System Improvement Act of 1997 are to "maintain biological integrity, diversity and environmental health" and to conduct "inventory and monitoring." Monitoring and research are an integral part of National Wildlife Refuge management. Plans and actions based on research and monitoring provide an informed approach, which analyzes the management effects on refuge wildlife (Silveira 2005). The proposed research program is discussed in detail as part of the Proposed Action in the CCP and associated EA, which are incorporated by reference (USFWS 2019).

Special Use Permits for the Butte Sink Unit and Llano Seco Unit would only be issued for monitoring surveys and research investigations that contribute to the protection, preservation, enhancement, restoration, and management of native plant and wildlife populations and their habitats on Service-owned lands. Special Use Permits would only be issued for monitoring and investigations which contribute to the enhancement, protection, preservation, and management of native Refuge plant and wildlife populations and their habitats.

Research applicants are required to submit a proposal that outlines: (1) objectives of the study; (2) justification for the study; (3) detailed methodology and schedule; (4) potential impacts on Refuge wildlife or habitat, including disturbance (short and long term), injury, or mortality (this includes a description of measures the researcher will take to reduce disturbance or impacts); (5) research personnel required; (6) costs to Refuge, if any; and (7) progress reports and end products (i.e., reports, thesis, dissertations, publications). Research proposals are reviewed by Refuge staff and conservation partners, as appropriate. Special Use Permits are issued by the refuge manager, if the proposal is approved.

Evaluation criteria will include, but not be limited to, the following:

1. Research that will contribute to specific Refuge management issues will be given higher priority over other research requests.

2. Research that will conflict with other ongoing research, monitoring, or management programs will not be granted.

3. Research projects that can be accomplished off-Refuge are less likely to be approved.

4. Research which causes undue disturbance or is intrusive will likely not be granted. Level and type of disturbance will be carefully evaluated when considering a request.

5. Refuge evaluation will determine if any effort has been made to minimize disturbance through study design, including considering adjusting location, timing, scope, number of permittees, study methods, number of study sites, etc.

6. If staffing or logistics make it impossible for the Refuge to monitor researcher activity in a sensitive area, the research request may be denied, depending on the specific circumstances.

7. The length of the project will be considered and agreed upon before approval. Projects will be reviewed annually.

8. If proposed research methods are evaluated and determined to have potential adverse impacts on refuge wildlife or habitat, then the refuge would determine the utility and need of such research to conservation and management of refuge wildlife and habitat. If the need was demonstrated by the research permittee and accepted by the refuge, then measures to minimize potential impacts (e.g., reduce the numbers of researchers entering an area, restrict research in specified areas) would be developed and included as part of the study design and on the SUP. SUPs will contain specific terms and conditions that the researcher(s) must follow relative to activity, location, duration, seasonality, etc. to ensure continued compatibility.

9. All Refuge rules and regulations must be followed unless otherwise accepted in writing by Refuge management.

10. Extremely sensitive wildlife habitat areas will be avoided unless sufficient protection from research activities (i.e., disturbance, collection, capture and handling) is implemented to limit the area and/or wildlife potentially impacted by the proposed research, as approved by the refuge manager. Where appropriate, some areas may be temporarily/seasonally closed so that research would be permitted when impacts to wildlife and habitat are no longer a concern.

11. Research activities will be modified to avoid harm to sensitive wildlife and habitat when unforeseen impacts arise.

12. Refuge staff will monitor researcher activities for potential impacts to the refuge resources and for compliance with conditions on the SUP. The refuge manager may determine that previously approved research and SUPs be terminated due to observed impacts. The refuge manager will also have the ability to cancel a SUP if the researcher is out of compliance with the conditions of the SUP.

These criteria will also apply to any properties acquired in the future within the approved boundary of the Refuge.

**Availability of Resources:** The following funding/annual costs (based on FY 2017 costs) would be required to administer and manage research activities as described above:

| Resource Description | Annual Costs |
|---|---|
| Administration (evaluation of applications, management of permits, and monitoring of research projects) | $18,000 |
| TOTAL | $18,000 |

Refuge operational funds are currently available through the Service budget process to administer this program.

**Anticipated Impacts of Use:** Use of the Refuge to conduct research will benefit Refuge fish, wildlife, plant populations, and their habitat. Monitoring and research investigations are an important component of adaptive management. Research investigations would be used to evaluate habitat restoration projects and ecosystem health (CVJV 2009a.; CVJV 2009b.; CVJV2009c.; CVJV 2010; Gardali et al. 2006; Golet et al. 2003; Golet et al. 2008; Golet et al. 2013; RHJV 2004; Silveira 2007, Stillwater Sciences 2003). Specific restoration and habitat management questions would be addressed in most research investigations to improve habitat and benefit wildlife populations. Monitoring would be standardized to help managers identify less productive areas that may be suitable for habitat enhancement and restoration (Elzinga et al. 1998; Ralph et al. 1993).

An expected short-term effect of monitoring and research investigations is that Refuge management activities would be modified to improve habitat and wildlife populations, as a result of new information. Expected long-term and cumulative effects include a growing body of science-based data and knowledge as new continued monitoring and new research compliments and expands upon previous investigations; and, an expanded science-based body of data and information from which to draw upon to implement the best Refuge management possible. Natural resources inventory, monitoring and research are not only provisions of the Refuge Improvement Act, but they are necessary tools to maintain biological integrity and diversity and environmental health, which are also key provisions of the act. Inventory, monitoring and research are intended to improve habitat and wildlife populations. This would improve wildlife-dependent recreation by increasing encounters with native wildlife and plants.

Some direct and indirect effects would occur through disturbance, which is expected with some research activities, especially where researchers are entering sanctuaries. Researcher disturbance would include altering wildlife behavior, going off designated trails, collecting soil and plant samples or trapping and handling wildlife. However, most of these effects would be short-term because only the minimum of samples (e.g., water, soils, vegetative litter, plants, macroinvertebrates) required for identification and/or experimentation and statistical analysis would be permitted and captured and marked wildlife would be released. Long-term effects would be avoided or minimized because refuge evaluation of research proposals would insure only proposals with adequate safeguards to avoid/minimize impacts would be accepted.

Potentially adverse effects associated with research activities would be mitigated because sufficient restrictions would be included as part of the study design and researcher activities would be monitored by Refuge staff. Refuge staff would ensure research projects contribute to the enhancement, protection, preservation, and management of native Refuge wildlife populations and their habitats thereby helping the Refuge fulfill the purposes for which it was established, the

mission of the National Wildlife Refuge System, and the need to maintain ecological integrity. Additionally, Special Use Permit conditions would include conditions to further ensure that impacts to wildlife and habitats are avoided and minimized.

Endangered Species Act (ESA), section 7 consultations were conducted with USFWS and NOAA-Fisheries on the implementation of CCP activities on the WMAs. In the 2017 Biological Evaluation and Biological Assessment, the Service determined that with implementation of conservation measures and Best Management Practices (Appendix 1 to Appendix A, USFWS 2019), WMAs CCP actions may effect, but are not likely to adversely affect multiple fish and wildlife species and their critical habitats. The Service also concluded that WMAs CCP actions may effect, but are not likely to jeopardize the continued existence of 11 plants (Appendix M, USFWS 2019). Section 7 compliance documentation is in Appendix M (USFWS 2019).

**Public Review and Comment:** Public review and comments were solicited in conjunction with distribution of the Draft CCP/EA for the Butte Sink, Willow Creek–Lurline, and North Central Valley Wildlife Management Areas. Comments received and the Service's responses are provided in Appendix Q to the Final CCP/EA (USFWS 2019).

**Determination:** This program as described is determined to be compatible. Potential impacts of research activities on Refuge resources will be minimized because sufficient restrictions and safeguards would be included in the Special Use Permit and research activities will be monitored by the refuge manager and biologist. The refuge manager and biologist would ensure that proposed monitoring and research investigations would contribute to the enhancement, protection, conservation, and management of native Refuge wildlife populations and their habitats thereby helping the Refuge fulfill the purposes for which it was established, the mission of the National Wildlife Refuge System, and the need to maintain ecological integrity, diversity, and environmental health.

_____ Use is Not Compatible

_X_ Use is Compatible with the Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

1. The criteria for evaluating a research proposal, outlined in the Description of Use section above, will be used when determining whether a proposed study will be approved on the Refuge.

2. If proposed research methods are evaluated and determined to have potential adverse impacts on refuge wildlife or habitat, then the refuge would determine the utility and need of such research to conservation and management of refuge wildlife and habitat. If the need was demonstrated by the research permittee and accepted by the refuge, then measures to minimize potential impacts (e.g., reduce the numbers of researchers entering an area, restrict research in specified areas) would be developed and included as part of the study design and on the Special Use Permit (SUP). SUPs will contain specific terms and conditions that the researcher(s) must follow relative to activity, location, duration, seasonality, etc. to ensure continued compatibility.

3. All Refuge rules and regulations must be followed unless otherwise accepted in writing by Refuge management.

4. All information, reports, data, collections, or documented sightings and observations, that are obtained as a result of this permit are the property of the Service and can be accessed by the Service at any time from the permittee at no cost, unless specific written arrangements are made to the contrary.

5. The Refuge also requires the submission of annual or final reports and any/all publications associated with the work done on the Refuge.

6. Each SUP may have additional criteria. Each SUP will also be evaluated individually to determine if a fee will be charged and for the length of the permit.

7. Extremely sensitive wildlife habitat areas will be avoided unless sufficient protection from research activities (i.e., disturbance, collection, capture and handling) is implemented to limit the area and/or wildlife potentially impacted by the proposed research, as approved by the refuge manager. Where appropriate, some areas may be temporarily/seasonally closed so that research would be permitted when impacts to wildlife and habitat are no longer a concern.

8. Research activities will be modified to avoid harm to sensitive wildlife and habitat when unforeseen impacts arise.

9. Refuge staff will monitor researcher activities for potential impacts to the refuge and for compliance with conditions on the SUP. The refuge manager may determine that previously approved research and SUPs be terminated due to observed impacts. The refuge manager will also have the ability to cancel a SUP if the researcher is out of compliance with the conditions of the SUP.

**Justification:** This program as described is determined to be compatible. Based upon impacts described in the Comprehensive Conservation Plan and Environmental Assessment (USFWS 2019), it is determined that research within the Service-owned lands of the WMAs, as described herein, will not materially interfere with or detract from the purposes for which the WMAs were established or the mission of the Refuge System. WMA monitoring and research will directly benefit and support refuge goals, objectives and management plans and activities. Fish, wildlife, plants and their habitat will improve through the application of knowledge gained from monitoring and research. Biological integrity, diversity and environmental health would benefit from scientific research conducted on natural resources at the refuge. The wildlife-dependent, priority public uses (wildlife viewing and photography, environmental education and interpretation, fishing and hunting) would also benefit as a result of increased biodiversity and wildlife and native plant populations from improved restoration and management plans and activities associated with monitoring and research investigations that address specific restoration and management questions.

**Mandatory Re-Evaluation Date:** Provide month and year for allowed uses only.

_____ Mandatory 15-year Re-Evaluation (for priority public uses)

__X__ Mandatory 10-year Re-Evaluation (for all uses other than priority public uses)

**NEPA Compliance for Refuge Use Decision:** (check one below)

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

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**Refuge Determination:**

Prepared by: Sandy Osborn (Signature) 6/27/19 (Date)

Acting Refuge Manager/ Project Leader Approval: _____ (Signature) 7/2/19 (Date)

**Concurrence:**

Refuge Supervisor: _____ (Signature) 8/7/19 (Date)

Assistant Regional Director, Refuges: _____ (Signature) 8.7.19 (Date)

## COMPATIBILITY DETERMINATION

**Use:** Wildlife Observation, Wildlife Photography, and Interpretation

**Wildlife Management Area Name:** Llano Seco Unit, North Central Valley Wildlife Management Area (WMA) located in Butte County, California. This compatibility determination applies only to Service-owned (fee-title) lands within the WMA.

**Establishing and Acquisition Authority(ies):** The North Central Valley WMA (or NCVWMA) was established in 1991 to preserve existing and restored wetlands for waterfowl and other wetland dependent plants and wildlife. The North Central Valley WMA is seen as an integral component in achieving the habitat protection and restoration goals of the Central Valley Joint Venture and ultimately the waterfowl population objectives of the North American Waterfowl Management Plan. Legal authorities include: Migratory Bird Conservation Act of 1929 (16 U.S.C. 715), Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j), Emergency Wetlands Resources Act of 1986 -- Public Law 99-645 (100 Stat. 3582), and North American Wetland Conservation Act of 1989 (103 Stat. 1968; 16 U.S.C. 4401-4412) -- Public Law 101-233.

**WMA Purposes:** Llano Seco Unit, North Central Valley Wildlife Management Area

*North Central Valley WMA Purposes*

"...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act of 1929).

"...for the development, advancement, management, conservation, and protection of fish and wildlife resources ..." 16 U.S.C. 742f(a)(4) and "... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ..." 16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956).

"...the conservation of wetlands...in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." Public Law 99-645 (100 Stat. 3582), approved November 10, 1986 (Emergency Wetlands Resources Act of 1986).

"...protection, restoration, and management of wetland ecosystems..." and "…acquisition of wetlands to implement the North American Waterfowl Management Plan 16 U.S.C. 4401-4412 (North American Wetland Conservation Act of 1989).

**National Wildlife Refuge System Mission:** "To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans." (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-ee]).

**Description of Use:** Wildlife observation, photography, and interpretation are considered together in this Compatibility Determination because all are considered to be wildlife-dependent, non-consumptive uses and many elements of these programs are similar. All three of these public uses are dependent upon establishing a trail and a vehicle parking area on the Llano Seco Unit.

An estimated 25,000 annual opportunities for high quality wildlife observation will be provided for wildlife observation and photography on the Llano Seco Unit. These uses are identified and discussed in detail in the CCP (USFWS 2019) and are incorporated by reference.

Some highlights are as follows:

a.) Develop and maintain a hiking trail to provide wildlife viewing and photographic opportunities and to promote awareness about the value of managed wetlands and upland habitat, management efforts, and plant/wildlife identification tips.

b.) Place and maintain public use signs (for example, at parking area, hiking trail, etc.) to effectively manage use and minimize wildlife disturbance.

c.) The Service-owned lands would be open to the public from 1 hour before sunrise to 1 hour after sunset.

d.) Maintain the wildlife viewing platforms, kiosk, restroom, and walking trail to provide a high-quality visit.

e.) Continue to improve visitor service facilities and interpretive activities to provide and enhance a quality wildlife observation program.

f.) Install a fixed-in-place spotting scope at the interior viewing platform to improve wildlife viewing opportunities.

g.) Construct additional loafing islands in Tract 12 adjacent the wildlife viewing platform and hiking trail.

**Availability of Resources:** The following funding/annual costs (based on FY 2017 costs) would be required to administer and manage the activities as described above:

| Resource Description | One-time Costs | Annual Costs |
|---|---|---|
| Administration | | $46,390 |
| Law enforcement | | $7,395 |
| Maintain interpretive walking trail | | $2,500 |
| Repair interpretive panels and kiosk | $12,000 | |
| Maintain signs, restroom and vehicle parking area | | $6,288 |
| Repair viewing platforms | $18,000 | |
| Spotting scope for 2nd platform | $5,000 | |
| TOTAL | $35,000 | $62,573 |

Refuge operational funds are currently available through the Service budget process to administer these uses.

**Anticipated Impacts of Use:** Maintenance of the trail and parking area will have minor impacts on soils and vegetation around the trail. This could include an increased potential for erosion, soil compaction (Liddle 1975), reduced seed emergence (Cole and Landres 1995), alteration of vegetative structure and composition, and sediment loading (Cole and Marion 1988).

The Llano Seco Unit provides habitat for resident and migratory wildlife. As a result of these activities, individual animals may be disturbed by human contact to varying degrees. Human activities on the trail can result in direct effects on wildlife through harassment, a form of disturbance that can cause physiological effects, behavioral modifications, or death (Smith and Hunt 1995). Many studies have shown that birds can be impacted from human activities on trails when they are disturbed and flushed from feeding, resting, or nesting areas. Flushing, especially repetitive flushing, can strongly impact habitat use patterns of many bird species. Flushing from an area can cause birds to expend more energy, be deterred from using desirable habitat, affect resting or feeding patterns, and increase exposure to predation or cause birds to abandon sites with repeated disturbance (Smith and Hunt 1995). Migratory birds are observed to be more sensitive than resident species to disturbance (Klein 1989). Herons and shorebirds were observed to be the most easily disturbed (when compared to gulls, terns and ducks) by human activity and flushed to distant areas away from people (Burger 1981). A reduced number of shorebirds were found near people who were walking or jogging, and about 50 percent of flushed birds flew elsewhere (Burger 1981). In addition, the foraging time of sanderlings decreased and avoidance (e.g., running, flushing) increased as the number of humans within 100 meters increased at a coastal bay refuge on the Atlantic (Burger and Gochfeld 1991). Nest predation for songbirds (Miller et al. 1998), raptors (Glinski 1976), colonial nesting species (Buckley and USFW), and waterfowl (Boyle and Samson 1985) tends to increase in areas more frequently visited by people. In addition, for many passerine species, primary song occurrence and consistency can be impacted by a single visitor (Gutzwiller et al. 1994). This could potentially limit the number of breeding pairs of certain passerine species, thus limiting production within refuge riparian habitats (Reijnen and Foppen 1994). In our opinion, due to the habitat requirements and life cycles of Valley elderberry longhorn beetle and Chinook salmon these species will not be impacted by these activities.

Of the wildlife observation techniques, wildlife photographers tend to have the largest disturbance impacts (Klein 1993, Morton 1995, Dobb 1998). While wildlife observers frequently stop to view species, wildlife photographers are more likely to approach wildlife (Klein 1993). Even slow approach by wildlife photographers tends to have behavioral consequences to wildlife species (Klein 1993). Other impacts include the potential for photographers to remain close to wildlife for extended periods of time, in an attempt to habituate the wildlife subject to their presence (Dobb 1998) and the tendency of casual photographers, with low-power lenses, to get much closer to their subjects than other activities would require (Morton 1995), including wandering off trails. This usually results in increased disturbance to wildlife and habitat, including trampling of plants.

The Wildlife Observation, Photography, and Interpretation programs have been designed to avoid or minimize impacts anticipated to WMA resources and visitors. Accordingly, the Service has concluded that these uses will not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the WMA.

Endangered Species Act (ESA), section 7 consultations were conducted with USFWS and NOAA-Fisheries on the implementation of CCP activities on the WMAs. In the 2017 Biological Evaluation and Biological Assessment, the Service determined that with implementation of conservation measures and Best Management Practices (Appendix 1 to Appendix A, USFWS 2019), WMAs CCP actions may effect, but are not likely to adversely affect multiple fish and wildlife species and their critical habitats. The Service also concluded that WMAs CCP actions may effect, but are not likely to jeopardize the continued existence of 11 plants (Appendix M, USFWS 2019). Section 7 compliance documentation is in Appendix M (USFWS 2019).

**Public Review and Comment:** Public review and comments were solicited in conjunction with distribution of the Draft CCP/EA for the Butte Sink, Willow Creek–Lurline, and North Central Valley Wildlife Management Areas. Comments received and the Service's responses are provided in Appendix Q to the Final CCP/EA (USFWS 2019).

**Determination:**

_____ Use is Not Compatible

__X__ Use is Compatible with the Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

1. Adequate areas will be designated as wildlife sanctuary with no or limited public use activities to provide high quality habitat for feeding, resting, and nesting. Where site conditions permit, native trees and shrubs will be planted to create screening along the trail to reduce disturbance. These measures will also enhance viewing opportunities and provide quality wildlife observation, photography and interpretation experiences.

2. Regulations and wildlife friendly behavior (e.g., requirements to stay on designated trails, dogs must be kept on a leash, etc.) will be described in brochures, website and posted at the Visitor Contact Station(s).

3. Refuge biologists and visitor services specialists will conduct regular surveys of public activities on the Llano Seco Unit. The data will be analyzed and used by the visitor services manager to develop future modifications if necessary to ensure compatibility of the wildlife observation, photography, and interpretation programs.

**Justification:** These wildlife-dependent uses are priority public uses of the National Wildlife Refuge System. Providing opportunities for wildlife observation, photography, and environmental interpretation would contribute toward fulfilling provisions of the National Wildlife Refuge System Administration Act, as amended in 1997, and one of the goals of the WMA. Wildlife observation, photography, and interpretation would provide an excellent forum for allowing public access and increasing understanding of Refuge resources. The stipulations outlined above should minimize potential impacts relative to wildlife/human interactions. Based upon impacts described in the Comprehensive Conservation Plan and Environmental Assessment (USFWS 2019), it is determined that wildlife observation, photography and interpretation within the Llano Seco Unit, NCVWMA as described herein, will not materially interfere with or detract from the purposes for which the WMA was established or the mission of the Refuge System. The Service has concluded that these wildlife dependent uses will not conflict with the national policy to maintain the biological diversity, integrity, and environmental health of the WMAs.

**Mandatory Re-Evaluation Date:** Provide month and year for allowed uses only.

__X__ Mandatory 15-year Re-Evaluation (for priority public uses)

_____ Mandatory 10-year Re-Evaluation (for all uses other than priority public uses)

**NEPA Compliance for Refuge Use Decision:** (check one below)

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

__X__ Environmental Assessment and Finding of No Significant Impact

_____ Environmental Impact Statement and Record of Decision

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