Western Riverside County MSHCP
Biological Monitoring Program
Clinton Keith Overcrossing and Undercrossing Monitoring 2022 Protocol

INTRODUCTION

Passive infra-red motion-triggered cameras will be utilized to document wildlife use of the Clinton Keith overcrossing structure (overcrossing), and adjacent Warm Springs Creek (undercrossing; Figure 1). Monitoring of both locations occurs throughout the year and began in the summer of 2019. Additional cameras were added to the overcrossing in Spring of 2021 to monitor for Quino Checkerspot Butterfly (*Euphydryas editha quino*; "Quino") presence (Figure 1). Quino cameras are monitored during Quino's larval and flight season (January - June) and repositioned to be wildlife use cameras when the flight season ends. Cameras are ideal for confirming the occurrence of large- and medium- bodied mammals and human activity, however birds, invertebrates, herpetofauna, and small mammals may also trigger the camera.

Figure 1. Clinton Keith Overcrossing and Undercrossing camera locations in 2022.

The Quino is a federally endangered species and one of two insect species covered by the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP; Dudek & Associates 2003). Quino is sparsely distributed within the southeastern section of the Western Riverside County MSHCP Plan Area. In 2022, detection surveys for Quino will be conducted over three repeat visits to the Clinton Keith overcrossing structure during the Quino flight season.

Goals and Objectives

1. Document use of Clinton Keith overcrossing and undercrossing by wildlife
    a. Utilize infra-red motion triggered cameras to monitor wildlife use
2. Document use of Clinton Keith overcrossing by Quino
    a. Utilize infra-red motion triggered cameras to monitor Quino presence
    b. Conduct presence/absence surveys within 250 m × 250 m sampling stations (Figure 2)

Figure 2. Clinton Keith 250 m x 250 m sampling stations for Quino surveys. Each square represents a sampling station and is assigned a unique identification number.

METHODS

Survey Design

Camera Surveys: Infra-red motion triggered cameras will be deployed as wildlife cameras at the overcrossing (Browning Spec Ops Advantage HD Trail Camera; n = 2) and at the undercrossing (Bushnell Trophy Cam HD; n = 2) and are installed permanently on their fixed locations (Figure 1). Two additional infra-red motion triggered cameras (Stealth Cam STC-DS4K) will serve as Quino cameras or wildlife use cameras at the overcrossing, depending on time of year and survey goal (Figure 1). These cameras will be programmed to monitor Quino (January-June) following the emergence of Quino larvae or adults at a nearby Sentinel Site located at a similar elevation (such as the Southwestern Riverside County Multi-Species Reserve) and will be repositioned and reprogramed, with the specifications described below, to monitor wildlife use at the end of the Quino flight season. During Quino monitoring, the cameras will be positioned to face patches of flowering plants likely to be visited by Quino, paying special attention to minimize solar glare (facing North or South), and capturing the maximum view. For security, we will chain cameras to nearby structures (i.e., pylons, fencing) and affix informational signs about the nature of the use of the cameras to each camera post. These notes will inform the public that the cameras are used to monitor the use of the area by wildlife and human activity is not monitored. We have found this type of signage to be useful in decreasing chances of vandalism in the past. The wildlife use cameras are programed to operate 24 hours a day and when triggered, will take a burst of three photos followed by a five-minute delay. The Quino cameras will be programed to operate during peak insect activity (between 0800-1800 PST), and when triggered, will take a burst of three photos followed by a one-minute delay.

Quino Surveys: We used ArcGIS (ESRI 2009) to overlay a grid with adjacent 250 m × 250 m grid squares across the Plan Area (Figure 2). We will use these grid squares to delineate the five sampling stations where we will conduct focused area searches. Our survey strategy relies on conducting three surveys for adult Quino only after the emergence of Quino larvae or adults have been observed at a nearby Sentinel Site located at a similar elevation; such as the Southwestern Riverside County Multi-Species Reserve (the nearest location to the overcrossing with a reliable Quino population). The three Quino surveys are scheduled to be distributed throughout the duration of the flight season, conducted between the hours of 0930 and 1600. To commence a survey in a chosen sampling station, temperatures in the shade at ground level shall be >12.0 ºC on a clear, sunny day or > 16 ºC on an overcast or cloudy day, and with average wind speeds ≤ 24 km/hr as measured 1.2–1.8 m above ground level. Average wind speed is defined as the wind speed determined by averaging observed values over a one-minute period at the beginning of the survey. We do not conduct surveys when there is fog or precipitation.

Field Methods

Camera Surveys: All deployed cameras will be serviced (i.e., batteries checked, SD card replaced, lens cleaned, etc) every other week.

Quino Surveys: Surveyors should spend approximately 45 minutes in each sampling station, but no less than 20 minutes, less if it is decided that the habitat is not suitable for Quino. On the other hand, if a station has an abundance of Quino sightings, more time may be needed to cover it thoroughly.

During surveys, biologists should walk slowly and attentively, stopping occasionally to search for any flying or stationary butterflies and pay special attention to areas with high potential for Quino use. We will use binoculars to scan surrounding areas and aid in identification of distant butterflies. When Quino larvae or adults are observed, the surveyor will approach carefully, take a waypoint, record the number and lengths of larvae (to determine instar stage) or adults, and record any observed behavior. Lastly, if it won't cause any disturbance to the butterfly, we may approach slowly to take a photograph. Any number of Quino observed within a 10 m radius shall be counted together using one waypoint, providing they display the same behavior. Surveyors should take care to avoid disturbing the delicate cryptogamic soil crusts (Preston et al. 2012). Quino is a federally-listed endangered species so surveyors should be extremely careful to minimize their impacts on both the species and their habitat.

Field Procedure

Wildlife Use Camera Installation

1. (*Steps 1 thru 3 can be done at the office*). Cut a 4' piece of 4"x 4" and place a mark 1.5' from one end by running a handsaw across the length of the beam (this will mark the depth to bury beam).

2. Drill a hole approximately 1/4" deep and about 3" above the mark you just made using a 3/8" drill bit.

3. Attach a 1-1/4" spade bit and bore through the wood post, using the 3/8" hole you just made as a starting guide (you will later pull chain through this hole).

4. Locate a fairly flat area near a rooted object (e.g. tree) and dig a hole about 1.5' deep.

5. Place 4"x 4" into hole so that the saw mark at 1.5' is flush with the surface (or, as close as you can get it). Be sure that the side with the bore hole is pointed in the direction that you want the camera to face, and that the beam is vertical. Replace dirt and tamp until secure in the ground.

6. Place camera in security box and hold against wood post. Have your partner help you position the box so that the camera's motion/heat sensor sits at 1.5' (45 cm) from the surface of the ground. Mark this position on the post with a pencil. (Attach camera directly to post with a wood screw at the above specified height if steel box is not to be used. Move on to step 9).

7. Select 2 holes (1 upper and 1 lower) that you will use to eventually bolt the steel box to the post (position of holes will vary depending on who constructed the box). Drill a guide hole about 1/4" deep with a 3/8" bit, using the box as a guide. Remove the box and finish drilling through the post.

8. Attach box to post using 3/8" x 4-1/4" carriage bolts.

9. Pass end of a 3/8" or 1/4" chain through the 1-1/4" hole you drilled earlier, making sure that it is long enough to reach the camera box. Measure out the remaining length of chain required to secure that camera station to a fixed object, cut chain with bolt cutters, and lock chain around the fixed object.

10. Insert batteries; install memory card, and program camera according the model specific instructions. *Be sure that you have the camera instructions before you go into the field, or are with someone who knows what they are doing*.

11. Close camera shell and place into security box (if applicable). Lock camera or security box to chain.

12. Test camera by moving in front of the infrared beam at the typical height of a fox or coyote. You should be able to see the beam being activated on the camera.

13. Camouflage the station, if possible, by placing vegetation or downed debris around and behind the station. Be sure not to obstruct front of camera.

14. Finally, take GPS waypoint and photograph station

Quino Camera Installation:

1. The Quino camera will be mounted to one of the post used to hold up the chain link fence bordering the overcrossing. Attach the metal camera case to the post using a 6ft x 3/16in adjustable locking cable. While one person holds the camera case, the other wraps the locking cable around the case and fence several times.
2. To angle the camera case towards the ground, once the cable has been wrapped around the fence enough times and the camera case feels securely attached to the post, use wooden stakes to wedge in between the fence and camera case.
3. Insert AA batteries, install the memory card, and program the camera. Note, programming sequence differs according to camera make and model. *Be sure that you have read the camera instructions before you go into the field*. File path for camera programming is below.
4. Place the camera in the camera case and close camera shell.
5. Once the angle of the camera seems to aim at a patch of Quino host plants and/or nectaring sources, it is time to test the camera.
6. Test camera by moving in front of the infrared beam at the typical height of the QCB host plants and nectaring sources.
7. Determine if the camera is located at its optimal position by looking at the test photos. If the camera needs to be adjusted again, repeat steps five through seven.
8. Once the camera seems to be in an optimal angle, tightened the adjustable locking cable and slip the end through the attached locking system.
9. When locking the adjustable cable, the camera station might shift and readjustment might be needed.
10. Lock the camera security box.
11. Finally, take a GPS waypoint and photograph the camera station.

Camera Programming and Checking

Manuals for programming and checking cameras on Clinton Keith are located here; S:\Projects\Mammals\Monitoring Camera Instructions_Manuals_Analysis\Camera Unit Manuals - Instructions for Use\Clinton Keith

Quino Surveys:

During Quino surveys, surveyors collect the following information via a paper datasheet:

1. Date and surveyor's initials.
2. Sampling Station. The unique center-point identification number for the sampling station being surveyed.
3. Upon arriving and departing the survey location, the following information is recorded:
    a. *Arrival / Departure time*.
    b. *Temperature (°C).*
    c. *Average sustained wind speed (km/h).* As measured over a 1-minute interval.
    d. *Weather.* Circle one of the following options: clear, partly cloudy, mostly cloudy, or rain.
4. Habitat type. Check the box next to the two most dominant habitat types encountered within the sampling station.
    a. Chaparral
    b. Coastal Sage Scrub
    c. Desert Scrub
    d. Grassland
    e. Montane Coniferous Forest
    f. Playas and Vernal Pools
    g. Riversidean Alluvial Fan Sage scrub
    h. Woodland and Forest
5. Attributes. Check the box next to each habitat attribute encountered within the grid.
6. List up to three of the most dominantly occurring shrub species within the sampling station.
7. Record Quino host plant presence, including the condition observed for each species, leaf length (cm) of *Plantago* spp., and record coverage of each host plant by choosing the number of host plants seen: 1-100, 101-1000, or > 1000.
8. Nectar plants in bloom. Check the box next to each species observed flowering.
9. Take notes of any habitat changes or disturbance, other MSHCP covered species observed during the survey, and any photos taken of the habitat.
10. When Quino larvae or adults are observed, record the following information on the datasheet:
    a. *Waypoint coordinates*. Any number of Quino observed within a 10 m radius shall be counted together using one waypoint, providing they display the same behavior.
    b. *Count*. The number of individuals observed at any recorded waypoint.
    c. *Age class* (larva or adult).
    d. *Length* (mm) of larvae.

e. *Behavior*. Record the activity or behavior observed: feeding (larvae), crawling (larvae), flying, perching, basking, nectaring, agonistic, ovipositing, mating.
f. *Substrate*. The name or 6-letter plant code the individual/s was observed upon.
g. *Photo*. JPEG numbers of any photographs taken.

11. Tallies of Quino larvae and adults encountered during the survey.

Equipment
Camera installation:

- Install Equipment4-foot 4”x 4” wood beam
- Rip saw
- Spool of 3/8” or 1/4" chain
- Bolt cutters
- Drill
- 3/8” drill bit
- 1-1/4” spade bit
- 2 3/8” x 4-1/4” carriage bolts
- Torque-head screw driver
- AA batteries
- shovel
- 1 – 2 large padlocks
- Camera unit(s)
- Security box(es)
- SD cards (1 per camera)
- GPS unit

Camera checking:

- Instructions for programing each manufacture of camera
- SD Cards (1 per camera)
- Keys for locks on cameras
- Cloth to clean cameras

Quino Surveys:

- Handheld GPS unit with waypoints
- Timepiece
- Map of survey area
- Clipboard with survey datasheets
- Digital camera with zoom lens
- Binoculars
- 2 Extra AA batteries
- Centimeter ruler
- Kestrel
- Butterfly field guide
- Plant field guide

TRAINING

Cameras: Field personnel must successfully read and comprehend this protocol for camera checking and data entry. Prior to checking the cameras solo, field biologists will shadow the Mammal Taxa lead or another trained field biologist. The Mammal Taxa will review work and make changes as needed, updating staff and communicating any issues or changes to the survey protocol.

Quino Surveys: The Monitoring Program requires biologists to pass the USFWS's Quino identification exam before conducting surveys. We provide biologists with a variety of materials to prepare for Quino surveys. Surveyors must also be able to identify the six plant species currently recognized as host plants: *Plantago erecta, P. patagonica, Castilleja exserta, Antirrhinum coulterianum, Collinsia concolor,* and *Cordylanthus rigidus* (USFWS 2003; Pratt et al. 2001). A guide to host plants, prepared by Monitoring Program staff, is available for study as well as a variety of published plant guides.

Training Results

Cameras: Field biologists will show ability to follow the protocol with regard to downloading photos to the correct folders, deleting blank photos, naming data photos, entering and checking data onto the appropriate spreadsheet.

Quino Surveys: Upon completion of training and passing the USFWS Quino identification exam, Quino surveyors are capable of distinguishing Quino larvae from all other co-occurring butterfly larvae, distinguishing adult Quino from all other co-occurring butterflies, identifying Quino host plant species, identifying nectar plants in bloom (either in the field or in the office, with assistance if needed from the Quino Survey Lead and other staff), and filing and entering the data from completed datasheets.

DATA MANAGEMENT

Cameras: Upon returning from the field, we will transfer the images from the SD cards to our server, and a biologist will begin analyzing the photos. We will use Program PIE (Picture Information Extractor) to name the photos. If there is an animal in the photo we will keep the photo that best represents the species identity and/or number of species in the photos. For each positive image, species identification (taxonomic group and species name), date, and time will be recorded. A second biologist will check the entered photos and compare the images to the data that has been entered in the database for quality assurance.

Quino Surveys: Surveyors must complete a number of office tasks after conducting a survey. Paper datasheets must be photographed or scanned and stored to the shared drive (S:\Projects\Invertebrates\Quino\Datasheets\2022) and the completed paper datasheets must be placed in the file trays located in the office. Digital photos should be uploaded to the shared drive as soon as possible. Photos taken as data (e.g., species or habitat photos) are stored to one folder (Common\Projects\Data_Photos\Quino\2022) and photos that are not strictly data photos, but which may have other uses (e.g., general survey area photos, surveyors in the field), are uploaded to another (Common\Projects\Invertebrates\Quino\Photos). All photos should be uploaded as JPEG files and labeled according to our established convention [i.e., date photo was taken (yyyymmdd), observer initials, and JPEG number; for example, "20220324_ESP_043.JPG"]. Note that it is critical that the exact number of each photo also appears on the appropriate datasheet.

Data entry follows the standard protocol established by the Monitoring Program. Data are entered into the database using a form created for each project. One person enters data and a second person verifies the entries independently (i.e., quality control). Once completed, the Lead and Data Manager review the entries and correct errors. The Data Manager verifies/validates the data once all errors have been corrected.

DATA ANALYSIS

Cameras: We will determine the rate of species occurrence by dividing the number of detections of a species by the number of days the camera was active. In the event of multiple occurrences of the same species, only one occurrence will be recorded per half hour for wildlife and three minutes for invertebrates. If a distinction cannot be made between individuals of the same species based on pelage or other characteristics, then each individual will be recorded once. Because individuals cannot be identified in most photographs, these data will document occurrence rather than abundance of the species present.

Quino Surveys: These data will be used to map surveyed and occupied sampling stations to demonstrate distribution of occupied areas within the Conservation Area.

TIMELINE

- January - December 2022: Monitor wildlife use on the Clinton Keith overcrossing and undercrossing on a biweekly basis.
- Spring 2022: Monitor QCB use on Clinton Keith overcrossing on biweekly basis
- Mid-February –March: Begin surveys for adult Quino on and adjacent to the Clinton Keith overcrossing and undercrossing.
- April 2023: Submit a summary report to the RCA on the years' worth of monitoring data.

LITERATURE CITED

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