INTERAGENCY SPECIAL STATUS/SENSITIVE SPECIES PROGRAM (ISSSSP) REPORT

- FY2005 OLYMPIC NF BAT SURVEYS -

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SUMMARY

Bat surveys were conducted on the Olympic National Forest (ONF) in 2005 to determine the presence or potential use by bats, particularly Townsend's Big-eared Bat (*Corynorhinus townsendii* [COTO]). Objectives of the survey were to determine the location and use of sites (including structures, road bridges, mines, or caves) that provide suitable hibernacula or roost habitat for COTO on the ONF. In all, 83 bridges and 6 building structures were surveyed forest-wide during daylight hours. Over 23% of the bridges surveyed had bats day-roosting and the majority of bridges with bats had at least one COTO present. A minimum of 15 COTO were observed using bridges as day-roosts on the ONF and one was documented using a building structure. An hourly night-survey was conducted at two bridges in the Skokomish watershed to determine night-roosting activity by bats. Incidental observations led to the discovery of a colony comprised of at least two species of bats roosting in a facilities building at the Quilcene Ranger Station. Based on follow-up exit-surveys, this structure may contain a maternal colony of Big Brown Bats (*Eptesicus fuscus*) and possibly Yuma myotis (*Myotis yumanensis*). Limited internal surveys of other structures were also conducted. Previous cave and mine studies were reviewed in lieu of conducting mine surveys in 2005. All bat observations were entered into the NRIS Fauna database. Surveys were completed between 02 June and 07 September 2005.

INTRODUCTION

The Townsend's Big-eared Bat is on the Regional Forester's Sensitive Animal Species List for the Pacific Northwest Region. It was given a Natural Heritage rank of "Critically Imperiled" (S-1) in Washington. Little was previously known of bat occurrence overall on the Olympic National Forest, especially with respect to COTO. A survey of mines on the ONF occurred in 1988 with no bat activity observed (Perkins 1988). Another mine assessment incurred similar results (Fleckenstein 1998). A 1993 acoustical survey documented COTO on the ONF but not associated with any structures. This species was known to use building structures, bridges, caves, and mines for hibernation, roosting, and maternal colonies. Use of these structures places bats at risk to disturbance and habitat loss when management actions such as bridge replacement or facilities maintenance or destruction take place.

METHODS

Bridges

Day Survey
A bridge data base and associated Geographic Information Systems (GIS) layers generated by the ONF engineers were used in locating bridges to survey. A total of 121 road bridges of nine different construction designs and materials were listed for the Olympic National Forest (Figure 1 and Appendix 1). Bats are known to prefer some construction styles and materials to others (Adam and Hayes, 2000; Bat Conservation International (BCI) 1999; Ormsbee et al. 2005, unpublished report). However, due to uncertainties about the features or micro-climates that might exist at each bridge, personnel attempted to survey all of the bridges regardless of construction type.

Day-time surveys typically took 20 minutes to complete, depending on access and the presence of bats. Aspect, vegetative cover, elevation, and other environmental variables were recorded to determine solar exposure and thermal potential of the bridge (Appendix 2). The undersides of the bridges were quietly inspected with flashlights. Surveyors searched all crevices, expansion joints, chambers and boulder openings, using red-filtered light if a bat was located (Ormsbee et al. 2005, unpublished report). Bat locations were noted on the datasheet along with a description of the bat itself. Surveyors also noted presence and location of guano, insect parts, body or urine staining, other wildlife use and evidence of human disturbance.

Due to timing and budget constraints, no trail-bridges were surveyed in 2005.

Night Survey
A night-time survey was conducted at four bridges in the Skokomish River watershed. Two of the bridges were in a high recreational-use area with easy access (paved roads) at 600 ft elevation. Originally three bridges were selected as candidates in this area because of indications of bat use (LeBar and Browns Creek) or bats present in the day (South Fork Skokomish). The Browns Creek site was not surveyed due to the presence of overnight recreationists next to it. The Pine and Church Creek bridges were approximately five miles from the LeBar/Browns Creek area. Those bridges were accessed by a secondary dirt road and are at 1000 ft elevation.

Night-time bridge surveys started at sunset and counts were taken roughly every hour until 30 minutes past sunrise. The survey began by positioning an observer underside each end of the bridge. Observers sat quietly with lights off for 5 minutes to allow disturbance from their travel in to the site to dissipate. After that period, red-filtered lights were turned on and counts were quickly made of roosting and flying bats (Adams and Hayes 2000; Ormsbee et al. 2005, unpublished report).

Building Structures

Day Survey
Building structures on the ONF include hiking shelters, an abandoned warehouse, actively-used facilities buildings, employee quarters, and recreational cabins (Figure 1). Where access

permitted, structures were surveyed externally and internally. External surveys were conducted by walking around the building searching for entrances to potential roost sites (shingled roofs, shutters, etc.) while recording general impressions of the solar exposure. All accessible areas inside the buildings were surveyed for bats and evidence of bats (guano, insect remains, staining). Second-story and attic portions were thoroughly examined where not precluded by confined-space safety issues.

Exit survey
Exit surveys were conducted at the USFS auto shop building located at the Quilcene Ranger Station. The shop is a 1930's-era wooden, shingle-roofed building. The main attic of the building was filled with insulation and sealed about 15 years ago (Takamoto 2005, pers comm.) but there is an adjacent portion that remains accessible to humans.

The general exit path of the bats from the building was determined based on preliminary observation of exit flight, building structure and presence of guano. Observers were situated on the ground, in the exit path and approximately 30 feet from the building. Previous observations had indicated two distinct size classes of bats, likely indicating the presence of two or more species. Therefore, exiting bats were initially classified and counted as either "large" or "small". The surveys started at sunset and lasted until it was too dark to see clearly with the unaided eye, which occurred roughly 40 minutes past sunset. Surveys were conducted on clear nights that allowed for good visibility against the western sky.

Additionally, vocalizations of the exiting bats were recorded on the first night of surveys using a Petterson Ultrasonic Detector D240 and an i-River iFP-700 digital recorder (iRiver America). Calls were analyzed using SonoBat 2 vocalization-analysis software and were compared to reference calls to determine species.

Mines and Caves

A literature search was conducted and previous mine surveys were reviewed. Based on review of previous mine survey efforts and safety concerns, no mine or caves were surveyed in 2005. Hibernacula surveys on the ONF were cancelled after consultation with Regional Office personnel, due to the low likelihood of the presence of winter hibernacula on the ONF.

Data Entry

Data collected on bridges, other structures, and bat locations were entered into an Access database. A GIS layer was also created for bat locations. Location and observation information for all bats and the accompanying structures where bats were found on the ONF were entered in to the corporate NRIS Fauna database.

RESULTS

Bridges

Day Surveys
Eighty-three of the 121 listed bridges were surveyed between 02 June and 24 August, 2005. Only 11 additional bridges were determined to be both potentially suitable (Concrete or steel with frame or girder design) and logistically feasible for survey in 2005, had timing and funding permitted additional surveys. In all, 95 of the 121 listed bridges were actually suitable and logistically feasible to include in survey efforts. Of the remaining 27 bridges, 11 could not be located, 12 were not surveyed due to lack of access (closed roads, washouts), one was not surveyed due to safety concerns, one bridge was listed on a road that does not exist, and two have not been constructed.

Over 23% of the bridges surveyed had at least one bat day-roosting. Of those bridges with bats present, 68% had at least one COTO day-roosting (Figure 2). Cabin Creek and Sixteen Creek bridges not only had 2 COTO roosting under each bridge (in different areas) but also had at least one other unknown species of bat using the bridge. A minimum of 15 COTO were observed day-roosting on the ONF in 2005. Furthermore, the Cabin Creek bridge had at least 10 bats (unknown spp.) roosting on June 6 and July 21 and a minimum of 20 were found on 09 August, 2005. Guano samples were taken from the site for species identification. The results were not available at the time of this writing.

Across ONF, the concrete-continuous with frame construction-type represents 32% of all bridges, concrete pre-stressed with stringer or beam/girder construction-type represents 29%, steel stringer or multi-beam represents 16%, and the remainder are of timber-type construction (n=121). Of those bridges with COTO present, 38% were concrete-continuous, 46% were concrete pre-stressed, and 15% were steel (n=13). Of those with other or unknown species present, 13% were concrete-continuous, 62% were concrete pre-stressed, and 25% were steel (n=13). No bats were observed at bridges with a timber-type construction design.

At bridges surveyed across the ONF in 2005, the elevation ranged from 30 to 2500 feet, with an average elevation of 898 feet. The elevation of bridges with COTO observations ranged from 600 to 1600 feet in elevation, with an average elevation of 900 feet. The elevation for bridges with other or unknown bat species ranged from 600 to 1700 feet, with and average elevation of 1088 feet. There was no consistent relationship between aspect of bridge sites and bat presence.

Night Surveys
The South Fork Skokomish and the LeBar Creek bridges were surveyed seven times through the night, starting at 2055 hrs on the night of 08 August and ending at 0549 hrs on the morning of 09 August, 2005.

The count for the LeBar Creek Bridge was highest (22 bats) at 0400 hrs. The observed peak followed what Adams and Hayes (2000) had described. All but one of the bats was using the chamber on the north end of the bridge. A peak count of 11 bats occurred earlier (0120 hrs) at the South Fork Skokomish bridge. The Pine Creek and Church Creek bridges were surveyed only

twice in the night, due to distance from the other sites. They were surveyed once just after sunset (1947 hrs) and then again at approximately 0200 hrs. Four bats were observed using the Pine Creek bridge only during the 0220 hrs survey. No bats were observed night-roosting under the Church Creek Bridge.

Technical issues prevented us from obtaining acoustical samples during the night surveys. Therefore, the species of bats observed during the night survey were undetermined. All but one was of a small (i.e., *Myotis* spp.) size-class.

Due to an employee injury incurred during a second night of surveys (09 August), further night-time bridge surveys were discontinued until safety and emergency-response procedures could be re-evaluated and modified.

Building Structures

Day Surveys
Internal surveys of buildings were completed for four of the five building complexes between 26 June and 03 August, 2005. One COTO was found roosting upstairs in the storage warehouse at the USFS Satsop Work Center. It is a wooden building with a wood-shingle roof. Guano and insect parts were found scattered in the same area. No bats and very little evidence were seen inside and outside of the USFS Snider Work Center buildings. No bats were found day-roosting at the Fir Creek Work Center. None of the recreational rental cabins were surveyed due to occupancy. Two of the 13 hiking shelters were surveyed with no bats or field sign found in either. The shelters rated low for day-roost and hibernacula potential due to high human visitation and open construction style.

Two dead bats were found in the accessible attic portion of the Quilcene Ranger District auto shop; one *E. fuscus* and one *Myotis* spp. No live bats were observed. Guano was scattered over most surfaces and on the walls. Outside the building, piles of guano were noted under the eaves of the dormers. A rarely used storage room on the ground level also had guano scattered on surfaces as well as the walls, though it was not as concentrated as in the attic portion of the building. One bat (*Myotis* spp.) was observed flying in the day while the external survey was being completed. The bat exited from the shingles and quickly disappeared in to another area of roofing shingles.

Night Surveys
Nighttime exit surveys were conducted at the Quilcene auto shop on 31 August and 07 September, 2005. The surveys confirmed at least two species day-roosting in the Quilcene auto shop. The first survey resulted in counts of 54 large bats and 234 small bats. The second survey recorded 50 large bats and 258 small bats. Ninety-seven of the smaller size-class of bats were observed exiting from one location on the peak of the roof. Other small bats were using the shingles and other small openings. The larger bats exited from five locations on the dormers.

Seventy-four calls were collected on the first night of surveys. Acoustical analysis confirmed *E. fuscus* as the larger size-class of bats that were observed. The majority of the calls captured that

night were *E. fuscus* calls. Of the few recorded calls that were not from *E. fuscus*, analysis of one call was more indicative of *M. yumanensis* as the smaller of the two bat species observed.

It was determined that there was no immigration to the building by observing the north side of the building when the mass exodus of bats was occurring.

Mines

The literature search revealed two previous cave/mine surveys on the ONF. A study conducted by Perkins (1988), surveyed only three mines on the ONF with no bat activity observed. A second survey, conducted by Fleckenstein (1998) for the DNR Natural Heritage Program, assessed the potential of mines on the Olympic Peninsula to house a COTO maternal colony. Of the ten mines found on the ONF, two were considered a potential site for a COTO maternal colony. The Bear Creek mine was surveyed once at night using night vision devices and a Petterson bat detector. No bats (COTO or other species) were seen or heard.

DISCUSSION

The results of this survey confirmed that COTO are readily using the bridges and, to a more limited extent, buildings on the Olympic National Forest for day-roosting. All of the COTO located were single bats and, as such, are assumed to be males (Ormsbee et al. 2005, unpublished report; Sherwin and Piaggio 2005). The COTO observations were concentrated in the southern end of the forest. The majority were located in the Wynoochee (6 COTO) and Hamma Hamma (5 COTO) watersheds. No COTO were observed in the northern portion of the forest.

A recent study conducted for the Olympic National Park found evidence of a COTO maternal colony (West et al. 2004) in the Quinault watershed, within one mile of the ONF and five miles from the nearest COTO found in the 2005 ONF survey. Nightly movements by COTO range between <1.0 to 6.5 miles while foraging and moving between roost sites (Fellers and Pierson 2001). Therefore, females from the maternal colony could potentially be foraging on the ONF. The distribution of COTO found in that area could suggest a relationship to the maternal colony.

The other bat species observed on the ONF followed roughly the same distribution as the COTO. The exceptions are one bat found in the northwest portion of the forest and the colonies at the Quilcene Ranger Station on the northeast side of the forest. The aggregation of 10 bats at the Cabin Creek bridge was believed to be a maternal colony due to a doubling of the number of observed bats two months after the discovery of the roost site (Ormsbee 2005, pers. comm.). The species of these bats remains undetermined.

This skewed distribution may be influenced by factors such as forest type, precipitation, elevation, temperature, prey abundance and other factors influencing roost microclimate or overall habitat quality. Survey effort may play a roll in this as well.

The percentage of bridge-use increased slightly when the limited night survey information was included. While the LeBar Creek bridge had relatively high bat use at its peak during the night survey, none were found using the bridge during the day. The species of bats using the LeBar Creek Bridge was not determined.

Observed field-sign of bats (guano, insect parts, staining) indicate that more bridges may be being used as night-roosts then were shown by the limited night-time results from this survey effort. While COTO are less likely to use bridges for night-roosts than other species (Adam and Hayes, 2000; Bat Conservation International [BCI] 1999) they have been documented using them (Adam and Hayes, 2000; Ormsbee et al. 2005, unpublished report; Perkins 1988.) One "larger" bat was noted roosting at the LeBar bridge during the night bridge survey. Also that night, a COTO was observed flying in to roost at the South Fork Skokomish bridge after sunrise. That species had not been detected throughout the night.

There appeared to be at least 50 *E. fuscus* using the Quilcene auto shop facility. We remain unsure of the other species present because of the difficulty of analyzing the various *Myotis* spp. by vocalization (Ormsbee et al. 2005, unpublished report) and the relative low number of non-*E. fuscus* calls collected. There appear to be several hundred of this other species present. Still, remote recording proved to be a relatively easy way to determine use and presence of bats in an area and can, in many cases, be used to positively identify bats in the area without capture. Acoustical detection equipment was loaned to the ONF by Regional Office personnel. This system will allow the ONF to further inventory the forest in areas not yet surveyed and will aid in determining area of high use and which need further investigation.

The 2005 survey effort showed that a surprising proportion of all bridges surveyed on the Olympic National Forest had bats day-roosting under them. Bats were also found in several building structures. This demonstrates the potentially valuable contribution to bat habitat provided by these artificial structures.

Enlisting the help of other internal departments and external agencies is an important and often overlooked factor in locating bats. For example, anecdotal information led to the discovery of the Quilcene maternal colonies and the COTO at the Satsop Work Center. Additionally, bridge inspections occur on a semi-regular basis across the ONF. Therefore, wildlife personnel created a document for the bridge engineers to briefly explain how to interpret bat field-sign and who to contact if they encounter bats during their inspections.

RECOMMENDATIONS

A number of day surveys are yet to be complete for structures, road bridges and trail bridges as well as night surveys that are needed to assess night-time roosting activities under bridges. The remaining 11 bridges deemed suitable and logistically feasible would be the first priority. A combination of guano catches (Ormsbee et al. 2005, unpublished report) and/or capture could lead to positive identification of other species that were observed using the bridges for day and night-roosting.

The ONF has, on loan, all the equipment necessary to capture bats (mist nets, poles, a "cluster buster", etc.) as well as all the materials needed to collect genetic information (wing punches, sterilization equipment, etc.). This equipment was intended for use pertaining to the Bat Grid Study (Ormsbee 2005, unpublished report) but could be beneficial to both the ONF and the Bat Grid Study. One Bat Grid study area falls on ONF and is in an area that would benefit from further survey efforts, the northeast corner of the forest where only one bat was located in the 2005 summer survey. The survey cell is in close proximity to the coast, close to the Olympic National Park boundary and in an old growth area making the area a good survey candidate for locating Keen's Myotis (*Myotis keenii*) (Dewey 2005; Wenger 1998 Unpublished document), a species for which very little is known. Participating in the Bat Grid Project will not only be aiding the ONF in gathering important bat information but could aid in collecting data absent for a species and the region as a whole. Three PFT wildlife biologists received rabies vaccine boosters and one seasonal wildlife technician received the full initial vaccination regime in 2005. Therefore, only minimal investment in training in safe bat-handling techniques would be necessary to be fully prepared for capture opportunities.

Exit surveys should be repeated at the Quilcene auto shop, starting at the beginning of next summer, to determine if the roosting bats comprise maternal colonies of one or more species and to identify the unknown bat species. Species identification could be determined either through more acoustical analysis or possibly through in-hand identification via capture.

Although no bats were found at the Snider Work Center, an exit survey is recommended due to the site conditions (i.e. older buildings with wooden shingle roofs, open exposure and the presence of some guano) conducive to suitable bat habitat. An exit survey is also recommended at the Satsop Work Center (one Townsend's found in the attic) to further determine the bat use occurring in the building.

The species of bats inhabiting the Cabin Creek bridge needs to be determined. It could also be monitored for an increase in size via exit surveys. A doubling in size over a short period could indicate a maternal colony.

The Fir Creek warehouse building was burned to the ground in a training exercise two days after the wildlife biologist was informed that the event was to occur. The building was quickly surveyed prior to its destruction. The building did not appear to house any bats at the time of the survey. However, the building had the potential to house bats due to open to solar exposure and a wooden shingle roof with crevices conducive to roosting. This indicates the importance of (1) timely surveys of structures prior to disturbance or deconstruction activities and (2) the importance of inter-departmental communication.

Temperature readings from the under-bridge roost areas would be valuable information to gather to examine more closely the specific need and ranges of the bats using bridges for roosting on the ONF. We attempted to gather temperature information during our limited night surveys in 2005 but our equipment proved to be too slow in recording temperature differences. Temperature data loggers should be set to gather temperatures underneath as well as outside of bridges (ambient temperature).

Further study will aid us in understanding how bats including COTO are utilizing a variety of habitats on the Olympic National Forest and how to protect habitat important for roosting and reproduction.

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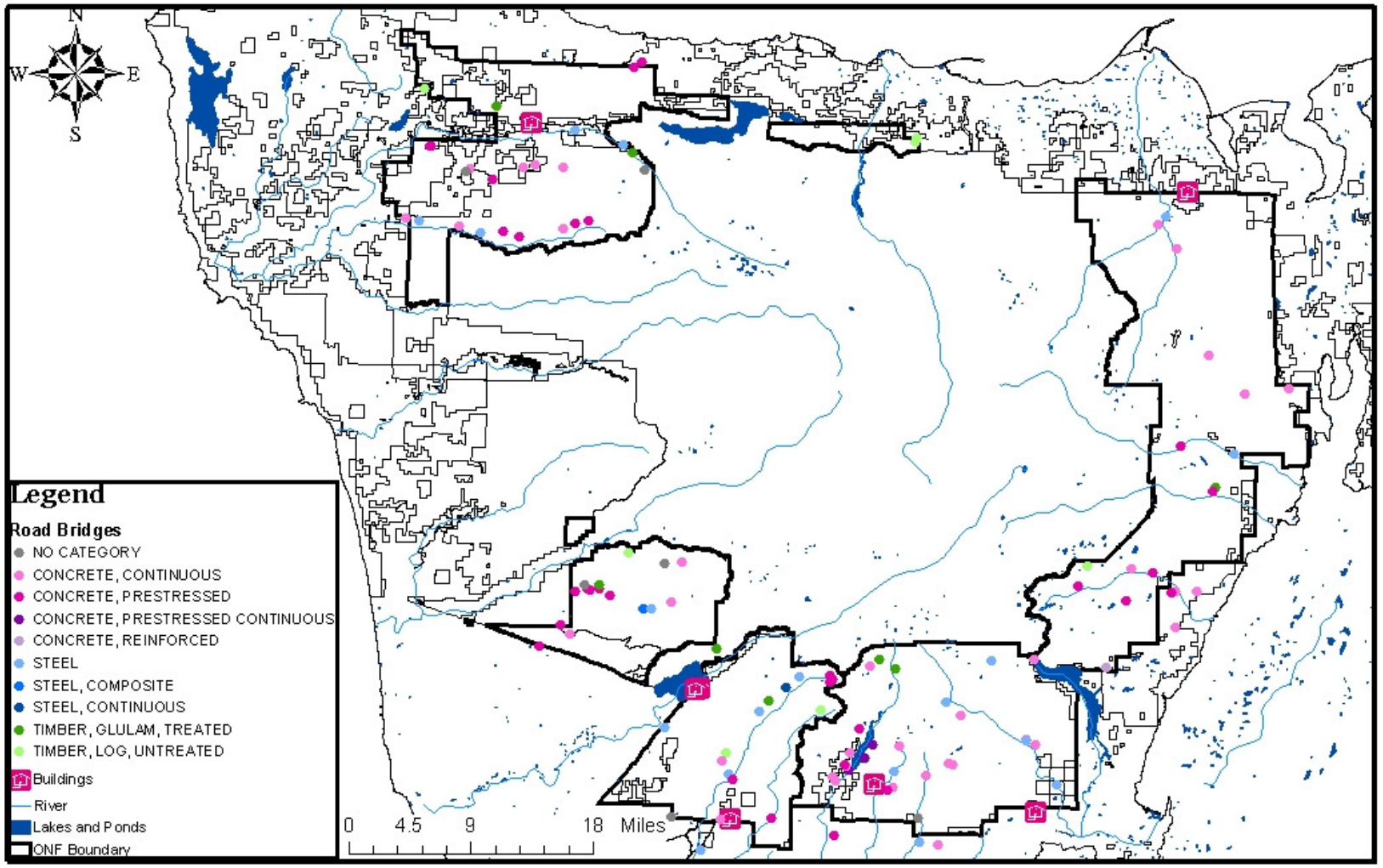

Figure 1. Bridge and Building Distribution on the Olympic National Forest, 2005

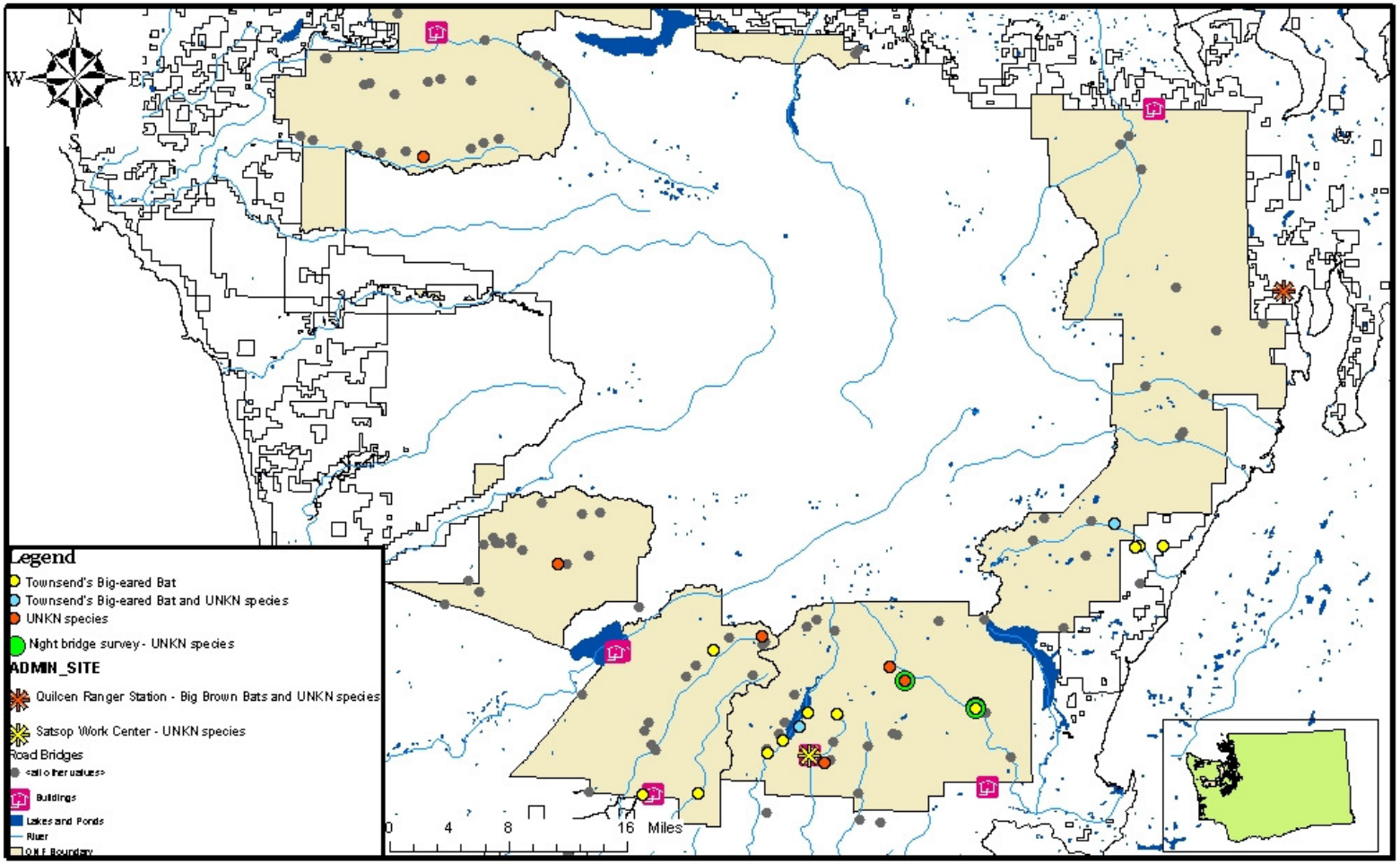

Figure 2. Bat Occurrence at Bridge and Building Sites on the Olympic National Forest, 2005