A BAT

SURVEY WITHIN THE

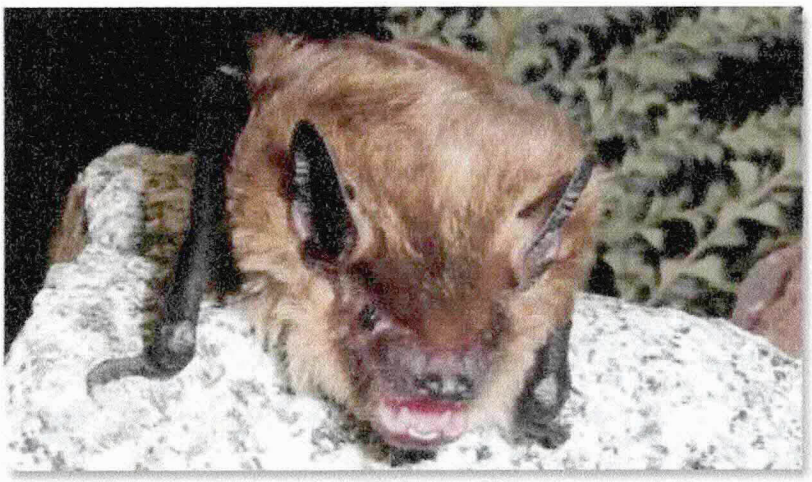
BOUNDARIES OF THE

SMITH AND BYBEE LAKES WILDLIFE AREA

OF THE

PORTLAND METROPOLITAN AREA

SUMMER, 2003



A Big Brown Bat

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Bats are an important component of most ecosystems as a consumer of nocturnal adult and juvenile forms of insect pests (Bruns 1960, Ross 1967, Constantine 1970, Hill and Smith 1984). Some recognized pests include, but are not limited to: cutworm moths, corn borer moths and larvae, pine bark beetles, crane flies, biting flies and mosquitoes (Ross 1967, Whitaker et al. 1977, Whitaker et al. 1981a, Whitaker, et al. 1981b, Whitaker 1988). An objective assessment of most species' populations and trends is not possible at this time because quantitative and qualitative data are lacking (Machmer and Steeger 1995). Oregon has 15 resident and migratory species, 10 of, which are likely study area residents or species that migrate through the survey area (Table 1). Six of these potential resident bat species were considered federal candidates for listing (*Corynorhinus townsendii, Myotis evotis, M. thysanodes, M. volans, M. yumanensis, Lasionycteris noctivagans),* and are also considered species at risk by the State of Oregon. All 15 Oregon bat species are listed in Table 1, with scientific names, common names and a four-letter designation used in other tables in this report.

At least two bat species *(Lasiurus cinereus, Lasionycteris noctivagans)* are dependent on trees or snags for roosts that have morphological characters primarily found among forest stands or riparian zones where tree age class exceeds 125 yr. (Perkins and Cross 1988). Such trees whether dead (snags) or "defective (a timber term relating to wood value) are the primary source for day roosting bats in forests and riparian zones. Availability of such potential roosts directly affects bat diversity and distribution (Perkins and Anderson 1996). Some bat species can utilize varying roost sites where such trees are absent (cliffs, caves, mines, buildings) (Perkins, 1984). Distribution of individual bats and bat species in natural habitat is non-random and the overlying factor appears to be a limitation in roost availability (Perkins 1992, 1995; Perkins and Peterson 1995). Most bat species which could occur within the Smith-Bybee Lakes area (SBL) and would utilize native riparian habitat for foraging are dependent upon dead, defective or mature trees with exfoliating bark, limb holes or other structures that would provide suitable day roosts

Prior sampling for bats within the UGB occurred in 1982 at three locations: the Audubon Sanctuary, McCleay Park, and at Crystal Springs Rhododendron Gardens. Although these sites were productive, the data are two decades old and only represent a very small portion of potential sampling sites within the UGB (Perkins field notes).

To effectively manage bat populations, roosts and foraging areas, the minimum data required is at least the species present, reproductive activity knowledge of roost sites, and roost preferences. Here, within the Portland Metro area, little is known about the presence, distribution and abundance of resident and migratory bats. This survey was contracted with Metro, to specifically provide a baseline survey of the Smith and Bybee Lakes Wildlife area.

OBJECTIVES- Mist net or sample with ANABAT detectors at least four (4) sites twice to provide distribution and diversity for the two principal habitat types of

interest within the SBLWA (Cottonwood riparian and Oregon Ash riparian). Provide a list of recommended habitat modifications, which will allow for enhancement of roosting and foraging habitat for resident and migratory bat species.

MATERIALS AND METHODS

Rationale for ANABAT Detectors: The SBL area does not provide sites for mist netting that would produce desired results. To accomplish the objectives, I chose to use ANABAT II detectors with laptops as the primary technique to sample for bats at selected sites. In conjunction with the detectors, we used visual observations to try and determine bat flights within the sampled area. Hayes (pers. comm.) noted that it was not possible to distinguish between *Myotis* species in riparian zones. Betts (*pers. comm.*) noted overlap when *L. noctivagans* and *E. fuscus* are simultaneously present. In addition, unless the bats fly extremely close (about 2 meters) within the bat microphone, it is virtually impossible to detect accurately *C. townsendii* and *M. thysanodes.* Thus, for most of these sites I could end up with two to three groups of species, and an occasionally clear call group that can be positively assigned to an individual species. Thus the longer the sample time and the more calls gathered, the greater the chance for collecting calls that represent positive identification as to species present.

Site Descriptions: The four sites selected (Figure 1) were called NE, NW, SE and SW. NE was a site just off the public trails about 0.3 mi south of the parking lot. It included a small, protected cove about 20 m across surrounded by mature and decadent cottonwoods. This area was protected from most breezes and winds.

NW was located near the NW corner of the SBL and was located about 30 m from a stringer of cottonwoods and initially about 10 m from standing water. By the second visit, evaporation of water had created a 100 m or more distance between the sample site and the edge of the wet ground.

SE was located along the slough and just west of the small dam engineered to hold water in the lakes during the driest summer months. To the east was a short portion of the dike and then open water. To the west was a corridor of consisting primarily of mature Oregon ash that bordered the slough.

SW was a vegetative opening along the same slough, about 150 m from the edge of the SBL. To the west and east were mature riparian zones dominated by Oregon ash with some scattered cottonwoods. At this site the brushy layer of the riparian zone was either intact or being rehabilitated.

Methodology: Sampling with detectors began approximately 15 minutes prior to civil sunset and continued for at least one and one-half (1.5) hours post sunset. We ceased sampling after 1.5 hr if computer batteries weakened or if no bats had been detected for the previous 15 min. Sampling was conducted during evenings when rain was absent and sunset temperatures were greater than 15^0

C. By limiting sampling to the best weather conditions, chances of success were considerably enhanced.

Sampling twice with approximately the same number of days between each sample for each site will provide a better and broader picture of bat diversity, seasonal site use and site loyalty. Using single point data to determine site suitability for wildlife, determine presence, or derive distribution patterns, particularly for mobile species such as bats, is fraught with potential errors.

I tabulated total calls collected and I compared the collected calls that were suitable for species identification, with those from my call library (records of Oregon bats that were hand released).

Data was tabulated, analyzed and mapped for reporting purposes. Data was also entered into the PNW Bat Research Team database. This database presently contains information on approximately 30,000 bats from museums, literature, and the work of Stephen Cross and myself. The file is presently being audited with years 1998-2001 being added and checked. Final disposition of the file will be to the Natural Heritage group in Oregon.

RESULTS

I sampled the 4 sites with ANABAT detectors. (Table 2). We likely detected a total of seven (7) species by ANABAT. The site where we noted the greatest number of calls was the SW site (August 6, 2003), and the site where we noted the least number of calls was the NE site (August 5, 2004)(Table 2). Numbers of total calls ranged from 0-361. Average calls per minute sampled ranged from 0-2.6.

We recorded more than twice as many calls during August than during late June. Species diversity (numbers of species noted) also increased in August. The sites where Oregon ash dominated averaged 181 calls/sample night as opposed to the one site where cottonwood dominated (154 calls/night sampled). I excluded the NW site since the lack of protection from elements and the "moving shoreline" appeared to be contributing factors to the low calls. Phototropic moths and mosquitoes seem to be equally dense at all four sites.

Two of the species we noted are listed as Sensitive by the Oregon Department of Fish and Wildlife (Table 3).

Foraging activity was most intense during the first 75 minutes post civil sunset and then rapidly diminished there after (Table 4).

DISCUSSION

The apparent wide variety of species noted was not expected. I was assuming because the diversity of habitat based on potential roost consisted of two tree species, bat species diversity would be lower than that found in a mixture of coniferous and broadleaf forests. If we "lump" for *E. fuscus* and *L. noctivagans,* and those of *M. lucifugus and M. yumanensis,* I still noted at least 5

species. I believe some of the calls recorded from the four Myotis species are clearly assignable to each species. The lack of vegetative clutter (low to medium height bushes and low hanging limbs) in the sample areas allowed the bats to use calls of the type recorded upon hand release of netted bats. Thus they were compatible with the library of calls.

The increase in calls and species recorded in the fall seems to indicate that the SBL area may be an important stop for migrating bats. Alternatively, the influx of recently volant (flying) young of the year may account for some of the increase in calls. Early spring and more frequent summer sampling and reproductive state of females could provide another explanation for the increase in abundance and species diversity. However the ideas provide my best rationale for the seasonal increase in calls and species.

The significantly higher numbers of calls collected at the sites where Oregon ash was the dominant overstory likely indicates this tree species is important as a day roost for resident bat species in lower valley wetlands such as these. Morphology of mature and older stands of Oregon ash may explain why this area was so productive. The mature trees each had numerous sites of visible crevices, exfoliating bark and limb holes that could be readily found and used by tree roosting bats for day roosts. *Lasiurus cinerus* tends to hang from near the ends of south facing tree branches about 3-10 meters above the ground or water. The Oregon ash trees that line the slough also provide numerous possibilities for this type of day roost. In addition, the trees provide a broader shade and overstory than the cottonwood trees and appear to protect areas of the slough flyways from heavy breezes. These factors provide cover for the insects that make up the bat species' prey base and shelter from the wind. Bats respond to insect concentrations by foraging in such areas and if possible, day roost as close to the insect sources as possible. Radio telemetry would provide data on roost selection within Oregon ash and/or cottonwood stands. Little is known about use of these trees.

The distribution of calls occurring primarily in the first 75 min post civil sunset corresponds with mist net data in non-urban habitat that indicates activity is intense for the first 90 minutes post civil sunset and then also rapidly diminishes with a smaller intense activity period just before civil sunrise. Bat activity, at least around foraging habitat appears to parallel prey activity periods (mostly crepuscular).

RECOMMENDATIONS

If Metro wishes to increase bat numbers within the SBL area, several options should be considered:

1. The preferable one is to maintain as many snags (dead and decadent trees) as possible. Particularly those snags that have excellent solar exposure and exfoliating bark and/or cracks in the boles. These trees will provide day roosts for most valley bat species and numerous primary and secondary bird cavity nesters. I realize that there is

potential for some liability if known snags are left where the public frequents. If the snag presents a hazard and does not have good solar exposure, then its use for bats is minimized, but may be maximized or suitable for some primary cavity nesters (Pileated and Downy woodpeckers). This type of habitat is infrequent in the Metro area except for Forest Park and surrounding habitat preserved for wildlife. In conjunction with need for suitable trees in which bats can find roosts, the Oregon ash appears an important component. The ash is a spectacular native tree, and is slowly disappearing as stands dwindle from increased urbanization and loss of wetlands suitable for this tree. I would encourage Metro to monitor and preserve this remnant stand of Oregon ash and perhaps (if feasible) increase the future size of the stand by plantings.

2. Consider the use of bat boxes. These should be deep (so the upper levels are dark) and mounted about 5-7 meters off the ground. Again solar exposure is critical and dark non-toxic paint will help them to absorb heat and retain heat through the critical early morning hours. Some placement ideas are on the exposed and south-facing sides of the cottonwood and Oregon ash boles. It is best if there are not limbs overhanging the box. Overhanging limbs seem to deter bat use. Recent speculations suggest bats avoid boxes under overhanging limbs because of a greater potential for predation and the shade may inhibit the box attaining and retaining proper heat values. The drawback to bat houses is that only 3 or four bat species that are present in the Willamette valley will make use of them. I feel 4 species present is a huge step up from no species present. The bat species that are know to use boxes include: *E. fuscus, M. evotis, M. lucifugus, M. volans, M. yumanensis.* Four of these species are now recorded from the SBL wildlife area.
3. Within the cottonwood "forests" or stands, Metro should encourage growth of native shrubs. Many moth species that bats feed upon (70% of all North American bat species include moths as a significant portion of their diet) are dependent on the lower shrubs for pupation sites. Bats are basically simple to manage. They require adequate day roosts, a substantial prey base and open water from which to drink. SBL appears to have all three, although the day roost and insect prey base could be increased through reasonable management actions over a number of years.
4. If Metro is interested in additional knowledge on the resident bat species I would recommend two actions: 1. a more comprehensive detector survey (perhaps biweekly beginning in may and ending in late September) and a radio telemetry project which would involve a handful of volunteers, a boat, and an experienced bat person to net the slough and radio tag captured bats, particularly females to determine maternity colony sites if any and then to count exiting bats to obtain a more complete understanding of the species present, the roost habitat

explicitly used and a population base which could then be monitored by trained volunteers in the future.

Table 1. Scientific, common names and four letter designations for Oregon bats.

SCIENTIFIC NAME	COMMON NAME	4-LETTER CODE
*Tadarida brasiliensis**	Mexican free-tail	TABR
*Antrozous pallidus**	Pallid Bat	ANPA
Eptesicus fuscus	Big Brown Bat	EPFU
*Euderma maculatum**	Spotted Bat	EUMA
Lasionycteris noctivagans	Silver-haired Bat	LANO
Lasiurus cinereus	Hoary Bat	LACI
Myotis californicus	California Myotis	MYCA
*M. ciliolabrum**	Western Small-footed Myotis	MYCI
M. evotis	Long-eared Myotis	MYEV
M. lucifugus	Little Brown Bat	MYLU
M. thysanodes	Fringed Myotis	MYTH
M. volans	Long-legged Myotis	MYVO
M. yumanensis	Yuma Myotis	MYYU
*Pipistrellus hesperus**	Western Pipistrelle	PIHE
Corynorhinus townsendii	Townsend's Big-eared Bat	COTO

*Not recorded from or expected in the study area.

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Lasiurus cinereus	Hoary Bat	LACI
Myotis californicus	California Myotis	MYCA
*M. ciliolabrum**	Western Small-footed Myotis	MYCI
M. evotis	Long-eared Myotis	MYEV
M. lucifugus	Little Brown Bat	MYLU
M. thysanodes	Fringed Myotis	MYTH
M. volans	Long-legged Myotis	MYVO
M. yumanensis	Yuma Myotis	MYYU
*Pipistrellus hesperus**	Western Pipistrelle	PIHE
Corynorhinus townsendii	Townsend's Big-eared Bat	COTO

*Not recorded from or expected in the study area.

Table 3. Summary of Bat species found at the SBL Wildlife Area and their status

SPECIES	FEDERAL STATUS	STATE STATUS
Eptesicus fuscus	None	None
Lasionycteris noctivagans	None	Sensitive
Lasiurus cinerus	None	None
Myotis califomicus	None	None
M. Lucifugus	None	None
M. volans	None	Sensitive
M. yumanensis	None	None

Table 4. Call density by time increments, summer 2003.

TIME *	SE 6/25	SE 8/06	NE 6/24	NE 8/05	SW 6/25	SW 8/06	NW6/24	NW 8/05	TOTALS
0-15	14	30	1	9	12	80	0	0	146
16-30	14	12	1	33	45	89	0	0	194
31-45	4	22	0	125	35	57	12	0	255
46-60	7	14	0	58	22	73	6	0	180
61-75	14	42	6	19	20	45	5	0	151
76-90	7	14	9	16	11	15	10	0	82
91-105	0	9	1	19	8	2	3	0	42
105-120	0	0	0	7	16	0	0	0	23
120+	0	11	0	0	0	0	0	0	11

- Time post civil sunset, numbers express minutes.

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