Recommendations for Defining Biologically Important Bat Roosts in Colorado Related to Local Population Persistence

Prepared for:

Colorado Multiagency White-nose Syndrome Committee

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Background

The Colorado Bat Working Group White-nose Committee (CBWG WNC) was asked by the Colorado Multiagency White-nose Syndrome (WNS) Committee to provide guidance in determining significant, or biologically important, roosts used by bats in Colorado. Determination of such roosts may be integral to assisting with management decisions such as cave closures (USDA-FS 2013). The term *biologically important*, as used in this document, refers to roosts that play a critical role in maintaining local populations of bats in Colorado and should not be confused with the term "significant" as used in the Federal Cave Resource Protection Act (1988). We initially drew from the Bureau of Land Management's Final WNS Interagency Response Plan for New Mexico (2010), specifically Appendix B, while formulating our recommendations. The New Mexico response plan provided a rational approach to defining what should be considered *significant* (or biologically important as used in this document) bat roosts as it was based on sound biological information and local expert opinion. Appendix B of the New Mexico Plan frames its response around WNS arriving in New Mexico. We emphasize criteria for roosts here that are biologically important to bats and have the greatest potential of being affected by any threat in Colorado, not just WNS. Consequently, we provide recommendations for roosts based on what is biologically important to bat populations at local scales. The intent of this document is to provide field managers, biologists, and other users with a tool that aids in the decision process for determining which roosts are important or worth the investment of time and limited resources.

In an effort to create consistency across bat species, roost types, and potential threats, the domain values used to define "Scope of Threat" in the Colorado Bat Matrix (Colorado Bat Working Group 2010, http://www.cnhp.colostate.edu/teams/zoology/cbwg/splash.asp) were referenced to create tangible units of measure related to local bat populations rather than setting abrupt, and often arbitrary, numeric cut-offs. The Colorado Bat Matrix is based on the NatureServe methodology for ranking threats to species and has become a defensible way to prioritize management actions using a species-by-species approach (Master et al. 2009). The values defined in the Colorado Bat Matrix for Scope of Threat vary slightly from those used by NatureServe (Table 1). As used here, scope is defined as the proportion of a bat species' local population that is observed, inferred, or suspected to be present at a particular roost during some point of the bat's roosting cycle. In determining what is biologically important at appropriate scales to metapopulations of bats, a local population may be defined as a group of individuals within an investigator-delimited area smaller than the geographic range of the species and often within a population (Wells and Richmond 1995). Data using rigorous approaches to estimating populations such as mark-recapture, while ideal, are rarely available or even possible to collect due to the difficulty in meeting assumptions for these techniques as well as the time and funding needed to collect such data (Kunz 2003, Weller 2007). The scale of threat acting upon the roost type or managerial boundaries may dictate the extent of a local population, and thus scope, depending on how the tool is to be applied. Consequently, a local population could be defined by the species of interest's habitat such as any suitable coniferous forest or by a political boundary such as a specific forest district. The local population could also be disjunct from the core of the overall population.

Table 1. Scope as defined by the Colorado Bat Matrix (2010) and adapted here for use in determining biological importance of roosts to local bat populations.

Domain	Value (estimated % of local population)
High	> 60%
Moderate	20-60%
Low	5-19%
Insignificant	< 5%

Defining a biologically important roost for bat species occurring in Colorado

To be considered a biologically important bat roost in Colorado in relation to that species' local population, a roost must meet the primary criterion detailed below. Additional significance is given to roosts if they meet either of the additive criteria in the following section.

Primary Criterion: A biologically important bat roost includes any hibernaculum, maternity roost, transient roost, colonial bachelor roost, or fall swarming site used by bat species that are one or more of the following: gregarious roosters, hibernators, or are known to swarm in Colorado. ***In addition***, loss of or impacts to the roost from disturbance must have at least a Low Scope with potential of extending to 5% or greater of the local population.

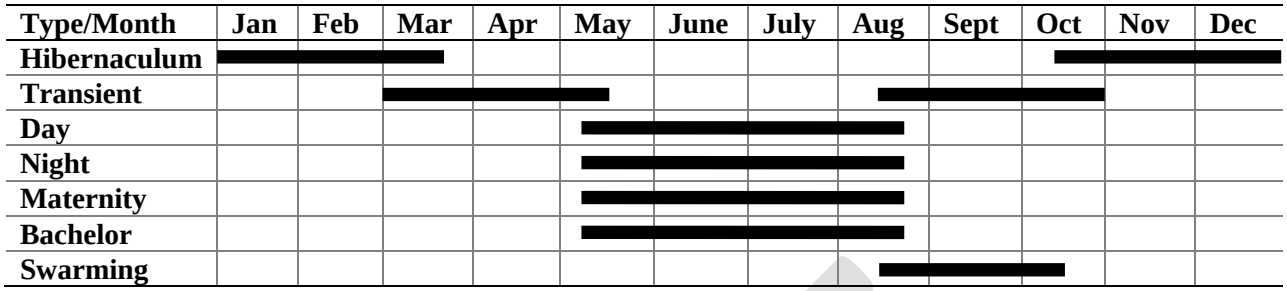
Roosts are differentiated from each other based on the specific role they fill in terms of seasonal requirements for a given bat species. Hibernacula are winter roosts, generally used by non-migratory bats or those species that use local migrations. These roosts maintain constant microclimates that do not experience freezing temperatures but stay cold enough for a bat to utilize prolonged bouts of torpor during the time of year when foraging resources are not available (Ransome 1990). Maternity roosts provide warm microclimates for raising young during the early summer and may be composed of large groupings of adult, female bats depending on the species (Neubaum et al. 2007). Transient roosts are those sites used during the spring after leaving hibernacula and before arriving at maternity colonies and again in the autumn when moving between the two sites. These roosts may be used for shorter periods of time and tend to have microclimates that are warmer than hibernacula but cooler than maternity roosts thus allowing daily bouts of torpor (Ransome 1990, Speakman and Thomas 2003, Neubaum et al. 2006). Numbers of bats at transient roosts range widely and such roosts may be used erratically making use more difficult to confirm. Male bats for most species in Colorado tend to roost alone but for some species, such as the Mexican free-tailed bat (*Tadarida brasiliensis*), they may form predominantly male bachelor colonies. The best example of such a roost in Colorado is the Orient Mine which houses an estimated 100,000 mostly male free-tailed bats throughout the summer (Svoboda and Choate 1987). Swarming in bats is thought to occur when individuals congregate, typically at a cave, and interact through repeated circling, diving, chasing, and landing events (Veith 2004). The behavior could serve multiple social purposes including mating and orientation of young bats for migration or with potential hibernacula. For the purposes of this document we refer to sites where swarming is observed as a "roost" despite the multiple behaviors observed during such events. Roosts are considered to support gregarious bats if any number of bats equal to or greater than a pair are clustered in tight groups or close proximity to each

other. It should be noted that while a roost with a pair of bats can be considered gregarious, it may not have enough individuals to justify a Low Scope. For justification and an example see the rationale below.

Rationale: The types of bat roosts noted in the primary criterion are thought to be critical to the survival of local bat populations (Altenbach and Pierson 1995, Pierson 1998, O'Shea et al. 2003), providing significant locations used by bat species on a consistent seasonal and sometimes year-round basis free from direct or indirect disturbances (Siemers 2002, Ellison et al. 2003, Ingersoll et al. 2010, Hayes et al. 2011). A good example of how a disturbance to a roost could be direct, indirect, or both is the potential introduction of WNS. Since its first confirmation in early 2007, WNS has been an emerging disease of gregarious, hibernating bat species. As of July 2012, 7 species of hibernating bats in the eastern United States have been affected (USDI-FWS 2012) and of these 5 (the same species or a close counterpart) occur in Colorado. Cave and mine roosts tend to be given most of the consideration here as the fungus (*Pseudogymnoascus destructans*) associated with WNS thrives in the darkness, low temperatures, and high humidity (Hayes 2012), traits that are characteristic of many caves and mines. However, this criterion also applies to roosts, occupied by gregarious species, other than caves or mines (e.g. buildings) since one individual could pick up WNS spores while using a cave during one season and potentially transmit it to a colony during a separate season. To date, knowledge regarding WNS's ability to persist and spread in rock crevices that are used by some winter roosting bats in Colorado (Neubaum et al. 2006) which may harbor suitable microclimates for *Pseudogymnoascus destructans* to persist, remains unexamined. Roosts listed under the primary criterion that are used by bats not known to be gregarious should pose little to no risk of acting as a reservoir where WNS can be spread either to or from individuals. For example, a maternity roost used by a lone female bat is not biologically important in relation to the persistence of that species' local population. However, a roost used by gregarious bats, even if the number of individuals is as low as 2, immediately has the potential for one infected individual to spread WNS to the other. Consequently, the direct impact of WNS killing bats in a hibernacula or indirect effects of *Pseudogymnoascus destructans* spores being transferred from a maternity colony to other roosts could both occur.
Whether or not that roost meets the primary criterion for being biologically important would still need to be determined on a case-by-case basis. Roost types not considered as biologically important for most bat species under the primary criterion, or that lack enough data to suggest otherwise, include night and transient fall roosts that are thought to be used only once or for short periods of time, roosts that are more exposed to the elements, and roosts that are used by lone individuals. The seasonality of how these roosts are used varies year to year and overlap may be expected (Figure 1). If a roost is used for more than one of these roost types it should be considered to have a higher biological significance.

Qualifying Species: Eighteen bat species have been documented using some type of roost during one or more seasons in Colorado (Table 2; Armstrong et al. 2011). Information on roost use by bats in Colorado has improved greatly over the last two decades, due in part to the invention of miniature radiotransmitters. Data supporting gregarious roost use, mainly in the summer, has been collected by a number of studies in the state (Svoboda and Choate 1987, Navo and Gore 2001, Neubaum et al. 2007, Adams 2010, O'Shea et al. 2010, Schorr and Siemers 2010, O'Shea et al. 2011) and additional work can be drawn upon from states adjacent to Colorado.

Figure 1. Seasonality of roost use and gathering activity as generally accepted for bat species in Colorado.



Knowledge of winter roost use and hibernacula are limited in Colorado, with documentation of bats using rock crevices, mines, and caves (Potter 2005, Neubaum et al. 2006, Ingersoll et al. 2010, and Hayes et al. 2011). Data tied to swarming are also somewhat limited as the behavior has not been well studied across these species range. Efforts by Navo et al. (2002), Englert (2008), Mosch (2009), Siemers et al. (2012) and Siemers and Neubaum (2013) focused on the White River National Forest and account for the majority of work during which species have been documented swarming in Colorado.

Table 2. Bat species known to use roosts in Colorado on at least a seasonal basis and their gregarious roosting, hibernating, and swarming tendencies as noted in the Western United States.

Scientific name	Common name	Gregarious Roosting	Obligatory Hibernator	Swarming
Antrozous pallidus	Pallid bat	Yes (maternity)	Yes	Yes
Corynorhinus townsendii	Townsend's big-eared bat	Yes	Yes	Yes
Eptesicus fuscus	Big brown bat	Yes	Yes	Yes
Euderma maculatum	Spotted bat	Yes (maternity)	Probably	Unknown
Lasiurus borealis	Eastern red bat	No	No	No
Lasiurus cinereus	Hoary bat	No	No	No
Lasionycteris noctivagans	Silver-haired bat	No	No	No
Myotis californicus	California myotis	Yes (maternity, hibernacula)	Yes	Yes?
Myotis ciliolabrum	Western small-footed myotis	Yes (maternity, hibernacula)	Yes	Yes
Myotis evotis	Western long-eared myotis	Yes (maternity)	Yes	Yes
Myotis lucifugus	Little brown myotis	Yes (maternity)	Yes	Yes
Myotis thysanodes	Fringed myotis	Yes (maternity)	Yes	Yes
Myotis volans	Long-legged myotis	Yes	Yes	Yes
Myotis yumanensis	Yuma myotis	Yes (maternity)	Yes	Yes
Nyctinomops macrotis	Big free-tailed bat	Yes (maternity)	No	No
Parastrellus hesperus	Canyon bat	Yes (maternity)	Yes	Yes
Perimyotis subflavus	Tricolored bat	Yes (maternity)	Yes	Unknown
Tadarida brasiliensis	Mexican free-tailed bat	Yes	No	No

Special Status Species & Large Congregations

Due to the special status assigned to some species and the magnified importance of roosts with large numbers of individuals, two additive measures have been included to emphasize an increased level of biological importance for applicable roosts. Consequently, for each additive criterion that is met, an additional level of biological importance should be considered warranted for the roost. It should be noted that the presence of a special status species (Additive Measure A) does not guarantee that a site will be considered biologically important as the scope of the population affected by the roost must extend to 5% or greater of the local population as noted in the Primary Criterion. A good example of this scenario would be finding a solitary Townsend's big-eared bat roosting in a cave. While this bat is a state species of concern and federal sensitive species, only one individual would not meet the gregarious or Low Scope requirements. Conversely, all roosts that meet Additive Measure B will be biologically important roosts as they have a Moderate Scope of Threat.

Additive Measure A: Species Status – Bat species occurring in Colorado that are ESA-listed, agency-sensitive, state-listed, or ranked High on Western Bat Working Group's (WBWG) Regional Bat Species Priority Matrix.

Rationale: Listed species and "species of concern" are included because these bat species are considered by various entities as vulnerable or threatened, or are in need of specific conservation actions separate from roost disturbance alone. If an important roost is compromised, populations of these species may be at additional risk of decline.

Qualifying Species: Five of the 18 bat species known to roost in Colorado (Table 2) are agency sensitive (5), state-listed (1), or ranked 'High' on WBWG's matrix (3) (Table 3). Townsend's big-eared bats (*Corynorhinus townsendii*) and fringed myotis (*Myotis thysanodes*) are known to roost gregariously and hibernate. Spotted bats (*Euderma maculatum*) are known to roost gregariously but winter behavior is unknown. Big free-tailed bats (*Nyctinomops macrotis*) roost gregariously but are thought to be migratory. Hoary bats (*Lasiurus cinereus*) are not thought to be gregarious and are migratory.

Table 3. Status of roosting bat species occurring in Colorado for the Endangered Species Act (ESA), U.S. Forest Service (USFS), Bureau Land Management (BLM), Western Bat Working Group (WBWG), and Colorado Parks and Wildlife (CPW).

Scientific name	ESA	USFS	BLM	CPW	WBWG
Corynorhinus townsendii	--	X	X	X	X
Euderma maculatum	--	X	X	--	X
Lasiurus cinereus	--	X	--	--	--
Myotis thysanodes	--	X	X	--	X
Nyctinomops macrotis	--	--	X	--	--

Additive Measure B: Roosts in Colorado where 20% or more of the local population (CO Bat Matrix, Moderate Scope) is roosting or swarming. These colonies and swarming groups are consistently larger than at most roosts that will meet the primary criterion of a biologically important roost (Low Scope).

Rationale: Medium to large roosts are important because higher percentages of the local population are vulnerable to human disturbance and persecution (Hayes and Loeb 2007, Neubaum et al. 2007, Potter 2011). Many caves that were once known to house large concentrations of bats, no longer are used by bats due to disturbance (Tuttle and Moreno 2005). Bats are especially vulnerable to decline because they have a low potential for population growth, generally giving birth to only one offspring per year. In addition, roosts where swarming activity occurs may provide unique situations where large numbers of bats composed of multiple species can interact during a short period of time. In Colorado, swarming has been documented at a number of roosts for multiple species (Navo et al. 2002, Englert 2008, Mosch 2009, Siemers et al. 2012).

Qualifying Species: Nine of the 18 bat species occurring in Colorado (Table 2) are known, or thought to have the ability, to form roosts meeting a Medium scope (≥20% of the local population) and 5 have been documented swarming (Table 4).

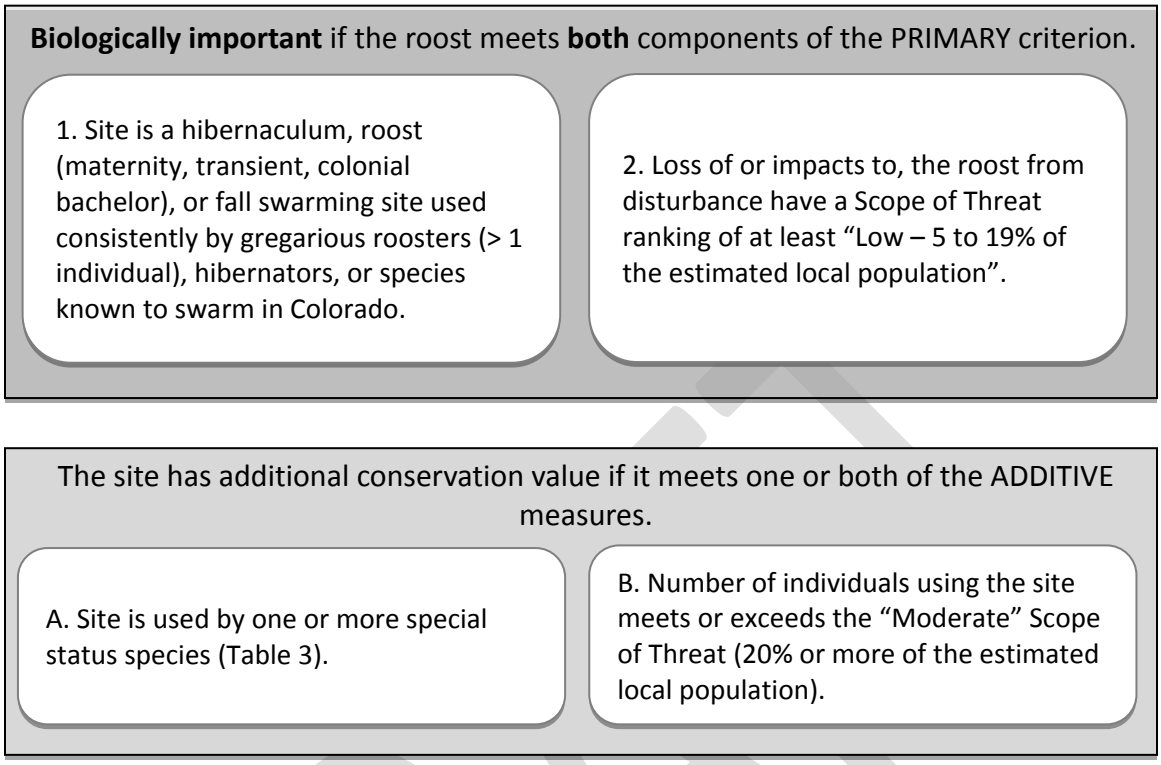
Table 4. Bat species occurring in Colorado that congregate in colonies or gatherings that have the potential to support moderate proportions of the local population (20-60%).

Scientific Name	Biological Activity
Antrozous pallidus	Maternity[1]
Corynorhinus townsendii	Maternity[2], hibernation[3,4], swarming[4]
Eptesicus fuscus	Maternity[5]
Euderma maculatum	Maternity[6]
Myotis evotis	Swarming[7]
Myotis lucifugus	Maternity[6, 8], swarming[7]
Myotis thysanodes	Maternity[9]
Myotis volans	Maternity[6], swarming[7]
Myotis yumanensis	Maternity[8], swarming[7]
Nyctinomops macrotis	Maternity[10]
Tadarida brasiliensis	Bachelor colony[11], maternity[8]

Ellinwood 1978[1], Armstrong 1972[2], Hayes et al. 2011[3], Ingersoll et al. 2010[4], Neubaum et al. 2007[5], O'Shea et al. 2011[6], Navo et al. 2002[7], Armstrong et al. 2011[8],Adams and Hayes 2008[9], Navo and Gore 2001[10], Svoboda and Choate 1987[11]

A summary of this tool is captured in a simple flow chart that steps the user through an easy series of questions regarding the primary criteria and additive measures (Figure 2). In addition, a worksheet has been included to assist the user in working through the steps of determining if a roost is biologically significant (Appendix II). We recommend the worksheet be filed with additional information pertaining to the roost under consideration and local population of the species that help justify a final decision.

Figure 2. Summary of primary criteria and additive measures that define biologically important roosts for bat species in Colorado.



Conclusions

Field level staff, managers, and workers with city, state, and federal agencies, as well as the private sector are regularly required to make management decisions that affect use and persistence of bat roosts. While saving every roost would be preferred, in practice such actions are not feasible or practical. Consequently, decisions regarding which roosts warrant protection must be made and may carry significant impacts to a bat population based on how these choices are made. Making decisions regarding protection of bat roosts can be complicated particularly if the manager is not well versed with bats or their ecology. Use of these roosts can vary by season, geographic location, sex of the individuals, and plasticity of the species. We provide standards to assist managers in making such decisions by incorporating a number of biological metrics and providing examples of how these metrics are used.

Managing bat populations and their habitats is inherently difficult as we generally are lacking good biological data regarding bats, their distribution, and status. These knowledge gaps for many species of bats can make the choice of appropriate scale at which to operate a difficult but important factor for the user. This tool was designed to offer flexibility to the user and depends heavily on how the population under consideration is defined. Judgment calls regarding bat populations can be informed by some basic information like habitat and roost type, and range of the species. We caution that while the tool includes flexibility for the user those same judgments can alter the management decision outcome widely. We urge users to consider using a meaningful and reasonable scale of "local population" that best addresses the conservation of bats at an appropriate level to the threat under consideration. However, the smaller

the geographic area considered being the "local population", the less meaningful the application of this process will be to the species and its larger population. Thus, users can apply this tool to many different scales depending on the project. This flexibility also heightens the need for users to document in detail the context of each situation, specific assumptions about populations, and why various choices are made.

Numbers of gregarious bats being considered under a given scenario are generally given more attention for roosts inhabited by large numbers of individuals for most threats. However, WNS provides an example of where relatively small numbers of individuals can be very important in terms of the threat for some scenarios despite not meeting the required Scope for a roost to be considered biologically important. Decisions regarding roost management have become even more difficult over the last several years with the onset of WNS which is particularly problematic due to the high degree of roost-to-roost mobility for this disease (Ihlo 2013). The user needs to be aware of this caveat when dealing with WNS scenarios and incorporate such cautions into the final decision.

In addition, this document is not intended to be utilized for all resource planning applications in regards to bat conservation. For example, tree bats are not considered to be gregarious roosters, and would not meet the primary criteria under this process. However, this does not mean that resource planning for forest management activities should not give consideration of potential impacts from such a threat to these species. Rather, these situations should be considered in the aggregate, and from both cumulative and landscape level perspectives.

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Appendix I: Example Scenarios

Example 1.

Known information: A mine in central Colorado is used as a maternity roost for Townsend's big-eared bats (*Corynorhinus townsendii*). The size of the colony at its peak is estimated to be approximately 500 individuals and it has been used consistently over the past 5 years.

Biologically important to the local population: YES. The site is a maternity roost with gregarious bats. Loss of the roost would impact greater than 5% of the local population for this species. Although the size of the local population is unknown, 500 individuals is presumed to be greater than 5% of the local population based on current knowledge for densities of bats on the landscape.
Additive Criteria A met? YES. Townsend's big-eared bat (See Table 4).
Additive Criteria B met? YES. This species is known to congregate in large colonies in Colorado (See Table 5). The manager believes 500 individuals constitutes 20% or greater of the local population for this species based on current knowledge for densities of bats on the landscape.

Comments: Given the unusually large size of this maternity colony and the percentage of the local population it likely supports, this roost represents one of the most important for this species in the state.

Example 2.

Known information: A cave in western Colorado is used as a hibernaculum for an unknown *Myotis* species. The greatest number of individuals observed during the winter season is 8 and data have been collected over 2 winters within the last 10 years. Swarming has been observed at other caves in the area (within 3 km), but swarming has not been documented during surveys at the cave in question.

Biologically important to the local population: NO. While the bats at this roost are gregarious and hibernators, numbers individuals do not meet the Scope threshold. Eight individuals would not meet or exceed 5% of the local population based on current knowledge for densities of bats on the landscape.
Additive Criteria A met? NO. Species identity has not been confirmed, future identification could result in this criteria being met as some *Myotis* species are special status (Table 4).
Additive Criteria B met? NO. Eight individuals would not meet or exceed 20% of the local population based on current knowledge for densities of bats on the landscape.

Comments: While the roost did not meet the primary criterion for biological importance the roost should still be considered important to the group of individuals using despite the fact that the local population would not be affected if it was lost. Cumulative impacts of losing multiple roosts of this type in the same area for the same species could be detrimental for the local population.

Example 3.

Known information: A stand of cottonwoods in eastern Colorado is known to consistently support hoary bats (*Lasiurus cinereus*) during the migration season. We have 2 years of acoustic data to support increased use of the area during migration, but only one roost tree has been documented supporting one individual at a time. The stand occurs along a major river and the closest similar stand is >20km away.

Biologically important to the local population: NO. No evidence is available to suggest gregarious roosting and numbers of individuals would not meet or exceed 5% of the local population based on current knowledge for densities of bats on the landscape.
Additive Criteria A met? YES. See Table 4.
Additive Criteria B met? NO

Comments: While the roost was not found to be biologically important based on current data the cottonwood stand may prove important ecologically to these bats in terms of migration but more data will be needed to show this. Similar cottonwood stands or individual tree roosts within them should be addressed on a case-by-case basis as would a cave, building, or any other individual roost.

Example 4.

Known information: A mine in western Colorado is part of an AML closure project that consists of 30 mines in total spread out over 25 km^2. The mine in question is used as a hibernaculum by 6-8 long-legged myotis (*Myotis volans*) based on 2 winters of data. All 30 of the mines in the project have been evaluated and no other hibernacula for this species have been documented in the area.

Biologically important to the local population: YES. The investigator has defined the population of interest as those individuals within the boundaries of the AML project (see discussion on populations and scales under Background). Given that knowledge of use by bats for all of the AML roosts is known the investigator feels that the 6-8 bats meets the 5% threshold for this metapopulation at this scale.
Additive Criteria A met? NO.
Additive Criteria B met? NO.

Comments: The investigator should be prepared to justify the scale at which they are considering the metapopulation in terms for which the biological importance is being assigned. The scale being set to the AML project size is critical to the determination of this example.

Example 5.

Known information: A timber sale in a national forest in Colorado is being evaluated in an EA, and impacts to bats are under consideration. Snag management and timber harvest designs are part of the project considerations, and consist of 150 acres spread out over 25 km^2. Previous acoustic survey work has documented some summer activity by silver-haired bats (*Lasionycteris noctivagans*) and hoary bats within the project area. No additional survey work has been conducted.

Biologically important to the local population: NO. A distinct roost has not been identified for criteria to be considered.
Additive Criteria A met? YES. See Table 4.
Additive Criteria B met? NO

Comments: Although a specific roost has not been identified under this scenario, a manager may assume that tree roosts are likely to be present based on current understanding of bat ecology related to forest management. Consequently, retention of snags should be considered despite the lack of data to support such roosts as biologically important.

Example 6.

Known information: A cave in western Colorado is used as a hibernaculum for little brown myotis (*Myotis lucifugus*). The greatest number of individuals observed is 8 and data have been collected over 2 winters within the last 10 years. Swarming has been observed at other caves in the area (within 3 km), but swarming ***has not*** been documented during surveys at the cave in question. The cave is within an area that has a high volume of caves on the landscape, and numerous species of bats documented roosting during swarming season.

Biologically important to the local population: YES. The roost contains gregarious, hibernating individuals **and the Scope threshold is met when considered as potential threat of WNS**.

Additive Criteria A met? NO
Additive Criteria B met? NO

Comments:

While the number of hibernating bats does not meet the threshold of Scope for impacts to the local population, the threat of WNS provides justification that meets the 5% threshold making this roost biologically important when considering transmittable diseases such as WNS.

Appendix II: Worksheet for Defining a Biologically Important Bat Roost

Site Name_____ Biologically Important? ☐ Yes ☐ No

Is this site biologically important to local populations of bats in Colorado?

Biologically important if the roost meets **both** components of the PRIMARY criterion.

1. Site is a hibernaculum, roost (maternity, transient, colonial bachelor, day), or fall swarming site used consistently by gregarious roosters (> 1 individual), hibernators, or species known to swarm in CO.

2. Loss of or impacts to, the roost from disturbance has a Scope of Threat ranking of at least "Low."*
☐ Yes ☐ No

Additional conservation value if the site meets one or both of the **ADDITIVE** measures.

A. Site is used by special status species.*
☐ Yes ☐ No
Species: _____

B. At least a "Moderate" Scope of Threat.**
☐ Yes ☐ No

Local population defined as: _____
_____

Estimated Scope: _____% of local bat population affected.

* Special status species

Scientific name	Common name
Corynorhinus townsendii	Townsend's big-eared bat
Euderma maculatum	Spotted bat
Lasiurus cinereus	Hoary bat
Myotis thysanodes	Fringed bat
Nyctinomops macrotis	Big free-tailed bat

** Scope of Threat

Scope of Threat	% of local bat population affected
High	> 60%
Moderate	20-60%
Low	5-20%
Insignificant	< 5%

No criteria met?

Continue to consider:
- Cumulative impacts
- Design criteria or mitigations, especially those that overlap with other wildlife concerns
- Current and future information needs