Assumption	Research/Data Needs	Possible Response
Current delineation of ABB active season for surveys is appropriate	Research to determine when the majority of ABBs emerge and when they return underground for overwintering. Data collected consistently at the same location (or preferably, multiple locations) throughout the year can be used to determine when ABBs are most frequently captured.	If the majority of ABBs are found to be active earlier or later than currently expected, the season for ABB surveys could be extended. Conversely, if majority of ABBs are difficult to capture at specific time periods (beginning, middle, or end of ABB active season), the season for presence/absence ABB surveys may be reduced.
Ability to capture ABBs is equal throughout the active season	Similar to the above research, continue ABB surveys at the same location(s) throughout the active season to determine if there are time periods where ABBs are less likely to be captured.	If the majority of ABBs are able to be captured equally throughout the season, survey timing will stay the same. If research indicates that there are time periods when ABBs are less likely to be captured during the ABB season, surveys may be restricted during that time period.
ABBs can be effectively captured in all temperatures higher than 60 degrees F	Similar to the above research, continue ABB surveys at the same location(s) throughout the active season to determine if there are maximum temperatures where ABBs are less likely to be captured.	If there is a high temperature at which ABBs are no longer effectively captured, additional restrictions on temperature conditions during surveys may be implemented (i.e., no surveys when minimum temperature is above X degrees).
Surveys using bait to attract ABBs are most effective	Compare presence/absence survey results to those of other options, potentially including: ABB searches by trained dogs, using light to attract, etc.	If new survey technique is found to be more effective than current survey methodology (baited bucket traps), the new survey technique may replace the previous one.
Effective area of surveys is correctly estimated	Attempt to more accurately determine ABB movement through more intensive mark/recapture studies, or preferably, develop a method to track ABBs using GPS or other method. Determine the distance ABBs typically travel over a 5 night period.	If movement data indicate that ABBs move farther over a 5 night trapping period, fewer traps may be required to effectively survey an area for ABBs. If movement data indidates that ABBs move less over a 5 night trapping period, additional traps may be required to effectively survey an area.
ABB presence can adequately be determined within 5 trap nights	Conduct presence/absence surveys over a longer period of time to determine if and when the majority of ABBs are captured. Especially important in areas on the outskirts of the range where ABB numbers may be lower and therefore ABB surveys may result in more false negatives.	Base the number of required trapnights for presence/absence surveys on the results of the survey. If ABB presence/absence can be determined in a shorter timeframe than 5 nights, the number of required for presence/absence surveys can be shortened. If additional nights are proven to increase effectiveness, additional nights may be added.

ABB presence/absence surveys adequately determine if ABBs are present for an extended time period (7 weeks if conducted at the beginning of the season, until the next active season if conducted at the end of the active season).	Multiple studies would help to determine how long a presence/absence survey should be considered valid. First, ABB surveys should be conducted at the same location(s) throughout the active season to determine if there is a difference in presence/absence determinations (if ABBs are present once, they should be present through the next 7 weeks according to our current surveys and if they are not found, they should not be found within the next 7 weeks). Second, information about ABB movement could be used to determine if ABBs move into areas where previous presence/absence surveys indicated they were absent in a shorter timeframe than current survey results are valid.	If it is determined that ABBs move into areas previously found to be absent of ABBs within a shorter timeframe than surveys are valid for, the timeframe between surveys and project impacts may be shortened. If it is determined that ABB surveys adequately indicate ABB presence/absence for longer periods of time after the surveys, survey validity timeframes may increase (timeframe between surveys and project impacts may be lengthened).
ABB presence/absence surveys adequately determine if ABBs are present even in drought years.	Analyze previous survey data to determine drought impacts on ABB presence/absence surveys. Potentially conduct lab studies to determine if ABBs are active in very dry, extended conditions and are captured at the same rate as wetter conditions.	If it is determined that extended droughts or wet seasons impact the results of ABB catchability, use of survey results during these years may be limited, requiring assumption of ABB presence.
ABB CPAs are the areas of higher ABB presence	Conduct ABB surveys throughout the ABB range in Oklahoma in a coordinated/grid system at the same time to determine what areas have the highest capture rates/number of ABBs identified.	CPAs, and methods to select them, may be re-evaluated if it was determined that current non-CPA have high ABB captures or if current CPAs have low ABB captures. CPAs could change based on new methods.
ABBs do not use areas described in the "Areas unfavorable for ABB use"	May be completed in several ways, including: 1) if the ability to track ABBs is developed, determine what types of habitat ABBs frequent and what areas they do not occur in. 2) lab study using ABBs and different simulated habitat types.	If ABBs are found to use areas currently considered "unfavorable" for ABB use, those habitat types would be removed from the list and need to be considered potential ABB habitat.
ABBs can potentially use all areas not described in the "Areas unfavorable for ABB use"	Similar to above description	If ABBs are found to avoid areas not currently described as "unfavorable", these habitat types would be added to the list and no longer need to be considered potential ABB habitat.

Areas with "temporary impacts" as described become suitable for ABB use within 5 years of disturbance, given appropriate restoration measures.	Research project on a large construction area (preferably covering a wide and long area, not a long, narrow project like a pipeline) to determine if and when ABBs begin to use restored project areas. Additionally, if ABBs are able to be tracked, it could be beneficial to see if ABBs had been identified in any previously disturbed areas.	If ABBs do not use restored construction areas 5 years after project impacts, project proponents may need to adjust restoration methods or the Service's definition of "temporary" may need to be re-evaluated.
Seismic charges/vibroseis for oil and gas exploration do not cause take of the ABB	Conduct a lab study to determine injury or death of ABBs from similar vibrations and actions. Determine if brood chambers could collapse from vibrations.	If take of ABB from seismic is identified, this take (based on the area of impacts) would need to be estimated, minimized, and mitigated according to standards set forth in the GCP.
Typical emissions of byproducts from flaring, such as H2S gas, does not cause take of the ABB	Collect data at multiple but consistent distances from well pads, including pH levels in soils, ambient concentrations of H2S, and annual surveys of ABB habitat within the designated area. Conduct laboratory experiments to determine toxicity of these levels to ABBs.	If take of ABB from flaring is identified, this take (based on the area of impacts) would need to be estimated, minimized, and mitigated according to standards set forth in the GCP.
Removing carrion from project areas prior to and during impacts minimizes the impact of the taking of ABBs	Conduct a study to determine ABB behavior and movement to and within areas with carrion compared to those that have surveyed and removed carrion from the site.	If fewer ABBs occur at the site with carrion removal, carrion removal would not change. If carrion removal if found not to be a factor in ABB movement, the minimization measure could be adjusted to be more strenuous (depending on results), or removed all together if found to be uneffective.
Trained carrion detecting dogs most effectively identify carrion within project areas	Conduct a study to compare a variety of carrion removal trials using humans and dogs. Determine search effeciency of searcher type.	If dogs are found to have higher search effeciency, carrion removal would be by dogs would be required. If humans can as effectively find carrion, either method could be used.
Tractor equipment and implements used to maintain vegetation compacts soil to a level that reaches take.	Determine the amount of soil compaction caused by driving tractor equipment at speed typical of vegetation maintenance for a variety of soil types with a variety of moisture levels. Study the amount of soil compaction necessary to cause take of overwintering ABBs.	If soil compaction occurs at levels causing ABB take due to tractor use in all soil types and soil moisture, this take must be minimized and mitigated appropriately. If soil compaction causes take only at specific soil types or soil moistures, actions occurring in the specified areas must be minimized and mitigated. If soil compaction does not cause ABB take for any soil type or soil condition, minimization and mitigation would not be required for tractor during the ABB inactive season.