Atlas Handbook

March 2001 Edition

Project Coordinated by:
The New Mexico Breeding Bird Atlas Project, Inc.
947 Quartz Street
Los Alamos, NM 87544

The New Mexico Breeding Bird Atlas Project is a non-profit 501(c)3 organization.
For a copy of the IRS determination letter, send a written request to the address above.

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Logo by Garth Tietjen; Text compiled by Stephen Fettig

Corporation Directors:
Jeanne M. Fair
Stephen M. Fettig
Gail Garber
Jim Place
Christopher Rustay
Roberta Salazar
Jim Travis
Rebecca Wechsler

Acknowledgments

A breeding birds atlas project is a monumental task in magnitude and duration. Such a project could not be accomplished without the commitment of many people. People who have been especially helpful in sharing advice and experiences are Laurie Averill-Murray, Arizona Breeding Bird Atlas; Ted Floyd, Coordinator Nevada Breeding Bird Atlas; Bettie Harriman, Director Wisconsin Breeding Bird Atlas; Dan Hough, GIS specialist for the Oklahoma Breeding Bird Atlas; Bill Howe, US Fish and Wildlife Service; Hugh Kingery, Editor Colorado Breeding Bird Atlas; Patricia Mehlhop, New Mexico Natural Heritage Program, University of New Mexico; Richard Peterson, Editor South Dakota Breeding Bird Atlas; Dan Reinking, Coordinator Oklahoma Breeding Bird Atlas; Chandler Robbins, Patuxent Wildlife Research Center; John Sauer, Patuxent Wildlife Research Center; and Sandy Williams, New Mexico Department of Game and Fish.

This atlas project relies especially heavily on the work of previous and continuing atlas projects from other states, provinces, and countries. The atlasing methods described in the published atlases of Colorado, Kentucky, Michigan, Missouri, Pennsylvania, and South Dakota have been helpful in developing New Mexico's atlas methods. The atlas handbooks from Arizona, Colorado, Missouri, Nevada, Oklahoma, and Wisconsin have been especially helpful in developing this handbook.

The New Mexico Breeding Birds Atlas project is indebted to Los Alamos National Bank; Real Estate Associates, Inc., of Los Alamos; and at least two-dozen citizens. Their financial support was critical for starting the project and establishing the project's non-profit status with the Internal Revenue Service.

Most importantly, this atlas would not be possible without the encouragement, support, and interest of the state's birders, bird enthusiasts and professionals who are contributing their skills, knowledge and time to make the project successful. Special in this regard is Jim Travis whose encouragement and support for a New Mexico Breeding Bird Atlas have been unwavering.

Lastly, special thanks go to Miriam Oudejans and Tom and Kathy Stephens for suggesting improvements to an earlier version of this handbook.

Introduction to the History of Breeding Bird Atlases

The history of mapping of breeding bird distributions can be traced back at least to 1922 with the publication of Phillips's A Natural History of the Ducks, a text that provided maps of the known breeding and wintering distributions of ducks throughout the world. Within ten years, two books with state maps of bird distributions were published. Birds of New Mexico by Florence Merriam Bailey was published in 1928 followed by Howell's Florida Bird Life in 1932. In the 1950s, mapping the distribution of breeding birds at a national level began. The 6-volume Birds of the Soviet Union by Dement'ev and Gladkov was published over the period 1951 to 1954. In 1966, the first national maps for North America were published by Godfrey in The Birds of Canada.

The above named atlases were basically a compilation of known information on the distribution of birds. These atlases did not rely on a systematic grid-based method for gathering of information. Such grid-based mapping had been conducted as early as 1860 by Hermann Hoffman in Germany for plant distributions. It was not until the 1960s, however, that a systematic effort to map birds was started in England's West Midlands. This effort produced the Atlas of Breeding Birds of the West Midlands by Lord and Munns in 1970 and covered three counties. The West Midlands project was so popular and successful that an enormous 5-year effort began to map the distributions of breeding birds within Great Britain and Ireland using a 10-kilometer grid. Interest in atlasing birds continued to build as the British and Irish atlas work progressed. In 1971, the European Ornithological Atlas Committee was formed and took on the task of atlasing the birds of Europe in 5 years using a 50-kilometer grid. In 1976 the atlases for Britain and Ireland, France, and Denmark were published, followed by atlases for West Germany in 1977, the Netherlands in 1979, and Switzerland in 1980. Since 1980, work has been conducted on breeding bird atlases in Spain, New Zealand, and many countries in Africa including Sudan, Ethiopia, Somalia, and Zambia.

In the United States, Skaar's Montana Bird Distribution -- Preliminary Mapping by Latilong was published in 1975 and used 47 one-degree blocks of latitude and longitude to show categories of breeding evidence. Also in 1975 Stewart published his one-man atlas project for North Dakota that spanned 1950-1972 and used a grid based on townships.

In 1981, the first conference on North American breeding bird atlasing was held in Vermont and began to lay the foundations for atlas methods and standards to be used by many state atlas projects. Topics addressed were mapping scales, grid size, sampling design, standards for coverage, evaluation of survey data, data tabulation, habitat analysis, recruitment and motivation of volunteers, verification of records, blockbusting, financing an atlas project, and publishing the atlas. During the conference reports on the status of breeding bird atlases for Connecticut, Maine, the Maritime Provinces, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ontario, Rhode Island, and Vermont were presented. At a second breeding bird atlasing conference in April 1986, Alberta, Delaware, Florida, Illinois, Indiana, Iowa, Missouri, Nebraska, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia were added to the list of States and Provinces working on atlas projects.

By 2000, over 40 atlases have been completed or are underway in North America. Colorado published its breeding bird atlas in 1998. Oklahoma completed its third year of fieldwork in

1999. Nevada will complete fieldwork for its atlas in 2000. Arizona will conduct its eighth and final year of fieldwork in 2000. Breeding bird atlas work is so valuable that several northeastern states are planning the second round of atlas work to draw comparisons and conclusions about changes in bird distributions. New York will start its second atlas in the spring of 2000.

The New Mexico Breeding Bird Atlas: History and Planning

In early 1999, several birders and ornithologists began talking informally about starting a breeding bird atlas project for the state of New Mexico. There was great interest expressed. Such a project would be clearly a valuable undertaking in conservation and education based on the experiences of other state atlas projects. Several big questions, however, remained unanswered, namely questions about leadership and funding. The first tentative steps to answer these questions and to plan a New Mexico breeding bird atlas were taken at a small meeting at the home of Jim Travis in November 1999. Jim Travis edited the Atlas of the Breeding Birds of Los Alamos County, New Mexico, published in 1992, and has been a strong advocate for a statewide atlas for years. With Jim's support and encouragement, planning has continued with the establishment of a non-profit corporation with bylaws, articles of incorporation, and a board of directors approved by the State of New Mexico. The 2000 breeding season will be a trial year for atlasing methods. The directors of the atlas project will collectively be acting as the Atlas Manager until a full time manager can be hired for the job.

Purposes, Objectives, and Benefits

The purpose of the New Mexico Breeding Bird Atlas Project is to identify the distributions of all species of birds breeding and produce an atlas of breeding birds in the state and thereby contribute to a better understanding of the state's avifauna. The atlas objectives include:

- Survey the state of New Mexico for evidence of breeding during the appropriate seasons for all bird species using survey techniques that can be duplicated 20 to 50 years in the future and that will provide a baseline against which future changes can be measured.

- Classify and map the breeding evidence for each species using a set of codes based upon observable criteria for territorial, breeding, nesting, and rearing behaviors.

- Gather up-to-date information on the relative abundance, timing of breeding, and habitat selection of New Mexico breeding birds.

- Organize data from breeding observations into a series of maps (an atlas) that show the breeding occurrence, distribution, and abundance of each species within a grid of uniform blocks covering the state.

Additional benefits to be derived from the atlas project

- Provide accurate and up-to-date information on the breeding occurrences, so that conservation planning and land-use decisions can adequately address any needs of special breeding bird species.

- Provide a major scientific reference for applications in public policy, education, recreation, and research.

- Introduce New Mexico birders to a new and exciting way of birding, which at the same time contributes valuable information to a large statewide ornithological effort.

- Provide a coordinated and cooperative project that will bring bird enthusiasts together so they will become more involved in conservation issues and activities and will become better educated about birds as a natural resource.

Examples of Some Specific Questions the Atlas Aims to Address

Questions answerable with the first atlas project

- What areas or habitats of the state have the highest and lowest number of breeding species?

- How does the avifauna differ between southern and northern ponderosa pine forests? Are the same birds breeding in piñon-juniper habitat throughout the state or are there local differences?

- What are the habitat associations or requirements for all breeding species? What species have relatively specific habitat requirements?

- What are the ranges of dates that breeding occurs for common birds within New Mexico?

Questions answerable with a second atlas project in 20 to 50 years

- How have the relative abundance and distributions of breeding birds changed? Specifically, have densities and distributions for riparian breeding birds and neotropical migrant birds changed or remained the same?

- Which species have declined or increased the most in distribution or relative abundance?

- What changes in abundance and distribution have occurred for birds breeding within protected lands such as wildlife refuges, wilderness areas, and national parks? Do these changes differ from changes to the state's avifauna overall?

- Are non-native birds increasing as a component of the state's avifauna?

Field Work

Mapping Squares and Blocks

The state of New Mexico has been divided into 156 atlas **squares** that are 50 kilometers on a side. Each of these squares contains 100 5-km x 5-km **blocks**. The 5-km x 5-km block is the basic unit of the atlas project. Each block is further divided into 1-km squares called **kilos** for determining relative abundance (page 9).

Statistical Priority Blocks

Because it is impossible to survey the entire state of New Mexico for nesting birds, some blocks are assigned based on a random sampling design. Such blocks are called statistical priority blocks and are essential for making the result of the atlas valid for the state as a whole. Each mapping square contains at least one statistical priority block. Additional statistical priority blocks will be assigned if enough people volunteer over the life of the atlas project.

Habitat Priority Blocks

In addition to the statistical priority blocks, habitat priority blocks are assigned to gain information on specific habitats. For example, riparian vegetation (creek- and stream-side habitats) is a relatively rare and valuable habitat for birds in New Mexico, so the atlas project will sample them more heavily than some other habitats. Habitat priority blocks will also include areas of particular ornithological interest, or areas managed to serve as baselines against which to measure avian change or differences in the surrounding, less-protected landscapes. Examples of other habitat priority blocks are national park areas, wilderness areas, and wildlife refuges. Your regional organizer will be aware of the location of these blocks in your area.

Supplementary Blocks

Blocks not given statistical or habitat priority are called supplementary. While the importance of getting statistical priority and habitat priority blocks completed cannot be overemphasized, there is no restriction from working in supplementary blocks. In the early years of the atlas project statistical and habitat priority blocks will be emphasized. Volunteers are welcome to survey supplementary blocks, but not at the expense of statistical priority or habitat priority blocks. For example, if your residence is not in a priority block, you could survey in the nearest priority block as well as in the supplementary block in which you live.

Topographic Maps

A regional organizer will provide to each volunteer a photocopied or electronically reproduced topographic map of the block to be surveyed. The topo map shows roads, streams, ponds, buildings, and contour lines. Shaded gray or green-colored areas depict the location of forests. Especially note roads, trails, and major landmarks such as mountains, ridges, streams, forested versus open areas and man-made structures that will help you locate the boundaries of your block on the map and help you find your way around the block. Geographic features also signal different types of habitats that you need to visit. Forested and open areas are obvious habitat differences, but you may also find habitat changes with elevation, on different steepnesses of slope, on north- versus south-facing slopes, and in areas adjacent to streams, lakes, and marshes. Consider making additional copies of your map in case it gets wet or damaged by use in the field. Additional photocopies will also be helpful if you wish to sketch or make notes on the

location of habitat types, individual birds, trails, names of landowners, etc.

In some instances, topographic maps are several years old, and some features may have changed. Thus, there may be other maps you may find useful for getting information about your block. On public lands, National Forest and Bureau of Land Management maps often cover a larger area and may have more current road information. Your regional organizer can direct you to additional maps to supplement the map provided. A county map is useful in planning access to the different parts of the block. A county plat book that shows ownership and parcel size may be useful in obtaining permission to enter private land. If you find access too difficult or the terrain too rough, talk to your regional organizer about getting assigned a new block.

Access to Private Land

You must ask permission for access before beginning your survey on any private land. The big problem isn't access, it's asking. Rarely are atlasers denied access to land, and if they are, it is usually for a good reason. Some landowners have legitimate concerns about livestock, newly planted fields, or earlier encounters with trespassers. These concerns should be respected, and remember, never trespass. Finding out who owns the land and asking permission is usually easy to do. If your block is close to Bureau of Land Management or US Forest Service lands, agency landownership maps will indicate private land adjacent to public lands and the County Assessor of Fees will have maps of current land ownership.

When you first approach the landowner, your words and actions will make a big difference in how you are received and whether you get permission. Be sure to contact the landowner well before the day on which you intend to begin atlasing. Identify yourself as a volunteer with the New Mexico Breeding Bird Atlas before making the request. Once the atlas project is explained, most people are interested enough to ask you questions and share information about birds on their property. Arrive at a reasonable hour and don't bring a big group of people. If talking in person to a landowner, offer to write down your name and address as well as giving them a copy of the atlas fact sheet. Let them know why and when you want access, how many will be in your party, and give a description of your vehicle. Assure them that you will close gates, will not disturb livestock or crops, and will avoid driving on muddy roads. A thank-you note to show our appreciation after your visit will help ensure continued access. If they do refuse access, respect their rights. If the land contains an important habitat or large portion of the block, talk to your regional organizer; a different block may be assigned.

Important Private Land Reminders

- No private land will be visited without the permission of the landowner.
- In contacting private landowners, carefully explain the purpose of the proposed visits and share an atlas fact sheet.
- If permission is granted, understand that the visits are a privilege that obligates us to treat their property with respect.
- Volunteers will share a copy of all data gathered on private property with the landowner either during a visit or shortly thereafter.
- We appreciate landowner cooperation with the project. We understand if landowners choose not to participate.

Surveying Your Block

Timing

Visits to atlas blocks for breeding birds can begin as soon as the Great Horned Owls begin courtship in January and can continue until September or October when the last young fledge from the last nest of late nesting species such as the American Goldfinch. Fortunately, only a very few species nest very early or late in the year (Appendix A, page 36). The peak of the breeding season for most species includes late May, June, July, and early August.

June is the primary month for building a species list for a block because most birds are on territory and are very vocal. In piñon-juniper habitats (cover type group code GCCW, page 15), however, the last half of May can be very important for hearing Gray Vireos and Black-throated Gray Warblers. July and August are the optimal months for recording birds in the probable and confirmed breeding categories. Although most singing activity has greatly decreased by July, it is a time when noisy fledglings accompany parents or beg for food in a nest, and parent birds are more likely to be seen carrying food for young. Also, species with multiple broods are re-nesting in July and early August.

Caution is urged in recording the "FL" code (page 13) since young birds able to fly well could have been raised outside the block you are covering. The "FL" code should be used with caution especially for species such as starlings and swallows that may move relatively great distances soon after fledging. This code should be used only for recently fledged passerines in the natal areas that are still dependent on parents. Remember that young birds begin to disperse once the parents have discontinued feeding them. This can be two or three weeks after fledging.

Migrants create a particularly difficult threat to atlas accuracy. Remember that some migrants will sing during migration. For many species, there is a period of overlap where residents have

initiated breeding activities while other individuals of the same species are still migrating farther north.

The best time of the day for your visits is early morning from about daylight (5:00 - 5:30 a.m.) to mid-morning (9:00-10:00 a.m.). The majority of birds are most active and relatively easier to confirm during this period. Don't, however, refrain from making visits at other times of the day. Crepuscular (active at twilight or just before dawn) and nocturnal (active at night) species will require visits in the early evening, after dark, or at dawn. Common Snipe, Common Nighthawk, Common Poorwill, and owls are most easily recorded at such times.

Number of Visits

How much effort should be expended to ensure adequate coverage and consider a block to be complete? This is a difficult question that other atlases have struggled with. There is no simple or straightforward answer. The following is from the Wisconsin Breeding Bird Atlas handbook and is offered as a guideline, goal, or target:

> Visit or cover all habitats within the block, and survey every habitat at different times within the breeding season. Every acre of the block does not need to be examined, but thorough coverage of all available habitats is necessary. Obviously, a block with uniform habitat will take considerably less time to cover adequately than one with a diversity of habitats.

A list from the Missouri atlas project suggests the following potential visits. Conducting all of the following visits is not required: March to check for early nesters and get familiar with the terrain and ownerships; late April or early May for early nesters; early June to build a species list and note where males are singing; mid-June to re-check on the singing males and add more species; early July and early August to get more species into the confirmed category; and include some night-time hours in either early morning or late evening in both spring and summer. At least 1 trip should be taken after sunset.

Thus, spend 10-40 hours (20-30 hours as an ideal average) actually in the block actively surveying, spread over 4-8 occasions. Be sure to record the actual dates and number of hours spent in your block on your field observation card. For safety, a minimum of two people should conduct nighttime visits.

Most species in a block will be encountered in the first few hours. Atlas work in other states has shown that over 85% of the breeding species present in a block can be found in 20-30 hours by checking all the major habitat types in the block. Additional time spent beyond this period usually results in rapidly diminishing returns, and 100% of the species present may not be found even if hundreds of hours are spent in a block. After about 25 hours your time will probably be more productive if you turn your attention to another block. Blocks with high habitat diversity, however, may require more than 25 survey hours.

Don't miss an opportunity to spend an hour or two in any block just because you feel you cannot record enough species in the confirmed breeding category. In an hour or two, as many as half the species in a block can be recorded by an experienced birder as "possible breeding." It is

recommended, if possible, that you keep making trips until the number of new species added drops to zero for at least 2 trips or for at least 4 hours.

The number of species found in a block will vary depending on the diversity of habitats present and its location in the state. As few as 20 species may occur in an urban block; other blocks may contain as many as 100 species. You may find it helpful to make an estimate of the number of species that are known to occur in your region. Your regional organizer can help you determine the species to be expected in your region. This number is a best guess, but at least provides a target number for which you should strive.

Target 50% of the species recorded in the block to be in the confirmed category, with about 25% listed in each of the probable and possible categories. Some states have combined this "percent confirmed" method of estimating coverage with a target percent of the potential species list as the primary measure of adequacy of coverage. Reaching a 50% confirmation level is probably a better measure of completeness. In the process of attaining half of the species in the confirmed category, you will probably be near or above the 75% of species expected target used by several other atlas projects.

Fieldwork for a block can be done in one year or spread out over two or more years, but once you attain an acceptable level of coverage in your block, please ask for another block. Contact your regional organizer to find out which Statistical or Habitat Priority Blocks are without coverage or in need of help.

Remember that your goal is to confirm nesting for as many species as possible; absences on your field observation card should reflect real absences, not species missed. On the other hand, we need to cover many blocks in New Mexico, so make the most of your time. Use your time as you see fit, after all, you're the one donating it. If you wish, discuss any concerns about ceasing or continuing to atlas a block with your regional organizer.

Estimating Relative Abundance

Accurately estimating the abundance of birds in each block would be extremely time consuming and is not a goal of the New Mexico Breeding Bird Atlas Project. Knowing something about the relative abundance of each species across the state, however, is useful for land managers.

To estimate relative abundance, visit a minimum of eight kilos (page 5) of your choice within your block. During these visits keep a two-hour timed record of the birds observed in each of the selected kilos. Try to visit kilos that are spread throughout the block and cover all available habitats. Sometimes this is not possible or practical, but do the best you can. Atlas observations during the relative abundance counts should also be conducted in the same manor as at other times, namely try to document breeding behaviors for each observed species. Visits for relative abundance should be conducted when birds are actively singing and thus most detectable. These visits may be in late May for some piñon or juniper habitats, or late July for some high elevation habitats. The timed record for each kilo may be divided in any way that is convenient. For example, a one-hour visit may be made in early June with the second hour in early July. You will report your results using the relative abundance card (page 27).

Night Surveys

Eleven species of owls and four species of nightjars are currently documented to breed in New Mexico. The best way to confirm their presence is by nocturnal surveys in the very early morning (pre-dawn) or early evening hours, preferably with no wind. Depending on the species, elevation, and time of year, response to tape recorded calls is variable. Many of these species breed early and can be difficult to locate after young have hatched. For best results, all owls should be surveyed before the end of May. The peak calling activity for many species is during April and May. Great Horned, Long-eared, Western Screech, and Northern Saw-whet owls, however, respond best between January and March. Similar to daytime surveys, night surveys need to be done in as many of the block's habitats as possible.

If enough time is spent after dark during peak calling periods, you can often hear different species of owls and nightjars calling on their own. If time is limited, however, a tape recorder will be needed to broadcast their call to get a response (especially for smaller owls). Tapes should be used sparingly and not too loudly, just enough to get a response. (You do not need to see owls and nightjars to identify them—most have distinct calls.) We do not want to disturb their normal nesting activities. Playing tapes will not lead you to a nest, but may help you decide if a single owl or a pair of owls is in your block. When playing tapes, play smaller species first, since smaller species will probably not respond once you've played a Great Horned Owl call. Also, remember that playing tape-recorded calls is prohibited in most National Park Service areas unless special permission is obtained first.

Unless you know of a nest site or find recently fledged young, confirming breeding of nocturnal species is very difficult. However, just the presence of a bird or pair of birds in proper habitat during its breeding season is valuable information.

Record Keeping and Reporting

Everyone has a different way of keeping track of observations. Some use small notebooks or index cards. The field observation card was designed for use in the field and we seriously urge you to have it with you on every block visit. The field observation card will prompt you for important information that you may otherwise not record in a notebook. At the very least, all breeding codes and visit information should be transcribed onto the card soon after each survey is conducted on your block. Do not wait until the end of the season to transfer all your notes to the observation card. You may find this to be a greater chore than you realize when the end of the season due date comes around. Small notebooks can also be quite useful for keeping notes on special things (e.g. nest locations, unusual species or behavior).

Check and recheck your field observation card before sending it to your regional organizer. Double-checking your card is very important to avoid errors. We recommend, also, that you return the original field observation card rather than transferring the information to another card. This will eliminate the chance of making mistakes while transferring codes. Be sure to keep a clear photocopy of your card for reference if additional visits to the same block are needed the next year, or in case your regional organizer has any questions.

Average Block Survey Summary -- A "To Do" list
Here is a list that may be helpful in surveying your block. Each point is a reminder of an important part of the atlas methods:

1. When your atlas maps and materials arrive, review everything to insure that you have everything. This is the time to decide if you want to get additional maps (Forest Service maps, or Bureau of Land Management maps) of your block.

2. Contact any landowners before you visit your block. February and March would be the time to start making contacts.

3. Make your first visit sometime during March, April, or May. During this visit start considering which kilos you will visit for relative abundance estimates.

4. Travel time to a block or getting to a particular kilo within your block should be counted as travel time, not as observation time. Be sure to record both your travel time and your observation time.

5. During May - August, thoroughly survey at last some part of each habitat in your block. Also during May - August, visit a minimum eight kilos to conduct relative abundance counts. During relative abundance counts, observations of breeding behaviors are done in the same manner as at other time. The only difference is keeping a two-hour timed record of the species observed. The two-hour timed counts may be divided into smaller time periods to fit your schedule.

6. Confirm breeding of at least half of the species that you find in your block. If this is not completed in one year, fieldwork can be extended into a second or third year.

7. Spend at least 20-25 hours (over 4-8 occasions) of quality bird surveying in your block.

8. Take at least one trip to survey for species active at dusk, dawn, or night.

9. Record observations onto the field observation card during or soon after each survey.

10. Completion of the field observation card and the relative abundance is important. These data are the core of the atlas project, so these cards must be completed.

11. Completion of the out-of-block observation and nest observation forms are valuable but optional. Reporting out-of-block observations is a way to contribute atlas data from near your yard or neighborhood.

Breeding Codes and Interpretations

Observed	
O	A non-breeder or migrant (male or female) ***observed*** or heard between June 1 and July 31 does not suggest breeding, regardless of habitat. Use this code for species observed in unlikely breeding habitat, out of their normal breeding range, flying over, or with no indication of breeding. This code applies to vultures or raptors flying over, to ducks summering on an urban pond with no breeding habitat, or a heron foraging when no heronry exists in the block. This code records the presence of the species but does not suggest breeding.
Possible	
X	A male or female observed in possible suitable nesting habitat within safe dates suggests possible breeding. Note that many species do not have safe dates. Thus, this code can only be used for some species.
S	***Singing*** male detected once in possible suitable nesting habitat indicates possible breeding. If you hear a male of the same species in the same location on another visit determine if code T applies.
Probable	
M	***Multiple*** singing or territorial birds of a species detected within a block on one day indicates probable breeding. This code is the lowest level of evidence that a species is probably breeding in the block. Observation of a minimum of seven singing individuals is needed. Use this code only for remote blocks were only one visit can reasonably be made during any given year. If more than one visit to the block can be made, code T should be evaluated for use.
P	***Pair*** (male and female) observed in suitable nesting habitat when apparently holding a territory suggests probable breeding. This code is used when it is fairly certain that a mated pair of birds has been observed. Note that two birds of the same species observed together are not always a pair, especially when males and females look alike. In sexually monomorphic species, behavior may indicate a pair.
T	***Territory*** establishment can be based on a singing male observed on at least two different days a week or more apart in the same location. Such repeated observations are a good indication that a bird has taken up residence. Chasing of other birds of the same species often marks a territory and should be recorded using code T. One male American Robin chasing another falls under this code, as would two male owls hooting at each other from opposite sides of a canyon. Caution should be used for some species such as raptors and hummingbirds since they exhibit territorial behaviors in defense of feeding areas and favorite perches while wintering and migrating.
C	***Courtship*** behavior or copulation indicates probable breeding. This code includes courtship displays and food exchanges. Prairie-chickens seen dancing on a lek, hummingbird courtship flights, and the bill tilt or topple-over display of cowbirds would fit this code. Use this code cautiously for ducks and grebes since they often court during migration. For bird banders, this code should be used for females with a brood patch or males with a cloacal protuberance.
N	Visiting a probable ***nest-site*** indicates probable breeding when no further breeding evidence is obtained. This code is especially useful for cavity nesters and shrub-nesting species that fly into the same locations and disappear repeatedly. Repeated use of the same probable nest-site must be observed.
A	***Agitated*** behavior or anxiety calls heard from an adult suggests probable breeding. This behavior suggests the probable presence of a nest or young nearby. Do not include agitation that you induce by "pishing" or using taped calls. A goshawk that calls in a distressed fashion falls into this category. If the goshawk swoops at you, you upgrade to the confirmed breeding code DD.
B	Nest ***building*** by wrens (Cactus, Bewick's, House, and Marsh), Verdins, or excavation of holes by woodpeckers indicates probable breeding. In Verdins and some species of wrens, unmated males will build nests to attract females. Thus, nests built by these species do not confirm breeding. Also, woodpeckers usually excavate one nest hole and other holes for roosting. Thus, excavation does not confirm breeding in woodpeckers.

Confirmed	
NM	Birds observed carrying ***nesting material*** (e.g. sticks, hair, grass, mud, cobwebs) confirms breeding. This applies for all species except for some species of wrens (Cactus, Bewick's, House, March) and Verdins.
NB	***Nest building*** at the actual nest site by all except woodpeckers, Verdins, and wrens, confirms breeding.
PE	***Physiological evidence*** of breeding (i.e., highly vascularized incubation (brood) patch or egg in oviduct) based on a bird in hand confirms breeding for bird banders only.
DD	***Distraction display*** or injury feigning for defense of an unknown nest or young confirms breeding. This code is used if an adult bird is seen trying to lead people away from a nest or young. A Killdeer giving a "broken wing" act fits this code. The difference between this code and agitated behavior is that the adult bird puts its own life in danger with a distraction display.
UN	A ***used nest*** confirms breeding. Caution: This must be carefully identified if it is to be used, and requires a written verification form. Some nests such as those of orioles are persistent and characteristic, but others are more difficult to identify. Be sure that the nest was used during the atlas period. Do not use this code for species that build multiple nests in a breeding season, such as Verdins and Cactus Wrens. Do not collect nests because some species roost in them all year and it is also illegal to collect nests or eggs without a permit.
FL	Recently ***fledged young*** (of altricial species) or downy young (of precocial species such as galliformes, shorebirds or waterfowl) confirm breeding. Fledged young should be incapable of sustained flight. This code does not apply to mobile immatures. This code should be used with caution for species such as starlings and swallows that may move relatively great distances soon after fledging. Use of this code should be used only for recently fledged passerines in the natal areas that are still dependent on parents. A young cowbird begging for food confirms both the cowbird and the host species. If feeding of young by adults is observed use code FY.
ON	Adults entering or leaving a nest site in circumstances indicating an ***occupied nest*** confirms breeding. This code is not generally used for open-cup nesting birds, unless the nests are high above the ground and the contents cannot be seen. This code should be used mainly for cavity nesting birds that enter a hole and remain inside, leave a hole after having been inside for some time, or for adults that exchange occupancy of a cavity.
FS	An adult observed carrying a ***fecal sac*** confirms breeding. Many passerine adults keep their nests clean by carrying away membranous, white fecal sacs.
FY	***Feeding young***, carrying food for young, or feeding recently fledged young confirms breeding. Be especially careful on the edge of a block. Some birds, such as birds of prey, continue to feed their young long after they've fledged and may move considerable distances. Some birds, such as Common Ravens, may carry food long distances to young in a neighboring block. Also, care should be taken to avoid confusion with courtship feeding, code C.
NE	A ***nest*** with ***egg(s)***, undisturbed nest with a bird in incubation posture, or eggshells found below the nest confirms breeding. Finding a cowbird egg in a nest is coded NE for both the cowbird and the host. Be careful not to disturb the vicinity of any nests.
NY	A ***nest*** with ***young*** seen or heard confirms breeding. The presence of a cowbird young is coded NY for both cowbird and host species. Caution must be used in approaching nest sites to minimize disturbance. Most confirmations can be accomplished without locating actual nests (Robbins 1981).

Cover Type Group Codes (formerly habitat codes)

Habitat is essential to breeding birds, and each species has a unique set of habitat requirements. Effective bird conservation relies on knowledge of these habitat requirements, so that suitable habitat can be provided for all species. The New Mexico Breeding Birds Atlas project provides a great opportunity to gather some of this critical information, while encouraging participants to cultivate a knowledge of bird-habitat associations—another valuable dimension to birding. Thus, atlas participants are requested to record on the field observation card a cover type group code for each species recorded within a block.

These data will be very useful for several reasons. It will add to our knowledge of the natural history of each of these species in New Mexico and will help planners and land managers assess the impacts of changing land management for each species. You don't need to be a botanist to record cover type information. Though the list is long, only a few of these cover types will probably occur on your block. Start with the most general category and narrow it down. Choose the cover type code that contains the majority of the plants listed.

For a given species, the code should refer to the habitat in which the highest evidence of breeding was attained. If you confirm a bird species, indicate the nesting cover type in the appropriate place on the field observation card. For species that you do not confirm, enter the cover type group(s) in which you observe the most activity. If you find a species in more than one cover type, squeeze onto the card all the codes that apply.

Below are cover type groups identified by the New Mexico Gap Analysis Project and the New Mexico Natural Heritage Program at the Biology Department of the University of New Mexico. The following table lists the groups and abbreviations for major vegetation types to be used while doing atlas work. The table below also lists the physiognomic type (Tundra, Forest, Woodland, Grassland, etc.) subdivided into cover type groups. Following each cover type group is a list of characteristic plant species that can help distinguish between similar cover types. When choosing the code for a given cover type, the characteristic plants list should be the dominant or most common species with in the physiognomic type. Additional vegetation information is available from your regional organizer.

On the same line as each physiognomic and cover type is the four-letter atlas code (abbreviation) to be used on the field observation card and other atlas observation forms. Use the code for the cover type when possible. Codes for the more general physiognomic type have been provided, but try to avoid using them.

Tundra **TUND**

Rocky Mountain Alpine Graminoid Tundra RMGT
- Sedge (*Carex rupestris*)
- Alpine sedge (*Kobresia myosuroides*)

Rocky Mountain Alpine Forb Tundra RMFT
- Alpine avens (*Geum rossii*)
- Sierra Blanca Cinquefoil (*Potentilla Sierrae-blancae*)
- Nailwort (*Paronychia pulvinata*)

Forest	**FORE**
Subalpine Conifer Forest	SACF
Engelmann Spruce (*Picea engelmannii*)	
Subalpine Fir (*Abies lasiocarpa*)	
Subalpine Broadleaf Forest	SABF
Aspen (*Populus tremuloides*)	
Rocky Mountain Upper Montane Conifer Forest	UMCF
Douglas fir (*Pseudotsuga menziesii*)	
White Fir (*Abies concolor*)	
Blue Spruce (*Picea pungens*)	
Rocky Mountain Lower Montane Conifer Forest	LMCF
Ponderosa Pine (*Pinus ponderosa*)	
Madrean Lower Montane Conifer Forest	MMCF
Chihuahua Pine (*Pinus leiophylla*)	
Apache Pine (*Pinus engelmannii*)	
Woodland	**WOOD**
Upper Montane Open Conifer Woodland	MOCW
Bristlecone Pine (*Pinus aristata*)	
Limber Pine (*Pinus flexilis*)	
Rocky Mountain/Great Basin Closed Conifer Woodland	GCCW
Pinyon Pine (*Pinus edulis*)	
Rocky Mountain/Great Basin Open Conifer Woodland (Savanna)	GOCW
One-seed Juniper (*Juniperus monosperma*)	
Madrean Closed Conifer Woodland	MCCW
Border Pinyon (*Pinus discolor*)	
Alligator-bark Juniper (*Juniperus deppeana*)	
Madrean Open Conifer Woodland	MOCW
Redberry Juniper (*Juniperus erythrocarpa*)	
Madrean Closed Oak Woodland	MCOW
Silverleaf Oak (*Quercus hypoleucoides*)	
Netleaf Oak (*Quercus rugosa*)	
Madrean Open Oak Woodland (Encinal)	MOOW
Gray Oak (*Quercus grisea*)	
Arizona White Oak (*Quercus arizonica*)	
Emory Oak (*Quercus emoryi*)	

Shrubland **SHRU**

Rocky Mountain Montane Deciduous Scrub RMDS
- Mountain Mahogany (*Cercocarpus montanus*)
- Gambel Oak (*Quercus gambelii*)
- Wavyleaf Oak (*Quercus undulata*)

Broadleaf Evergreen Interior Chaparral BEIS
- Scrub Live Oak (*Quercus turbinella*)
- Toumey Oak (*Quercus toumeyi*)
- Point-leaf Manzanita (*Arctostaphylos pungens*)

Plains-Mesa Broadleaf Sand-Scrub BLSS
- Shinoak (*Quercus havardii*)

Plains-Mesa Microphyllous Sand-Scrub MPSS
- Sand Sagebrush (*Artemisia filifolia*)
- Indigobush (*Psorthamnus scoparius*)

Great Basin Microphyllous Desert Scrub MPDS
- Big Sage (*Artemisia tridentata*)
- Black Sage (*Artemisia nova*)
- Bigelow Sage (*Artemisia begelovii*)

Great Basin Broadleaf Deciduous Desert Scrub BDDS
- Fourwing Saltbush (*Atriplex canescens*)
- Shadscale (*Atriplex confertifolia*)
- Rubber Rabbitbrush (*Chrysothamnus nauseosus*)
- Winterfat (*Eurotia lanata*)

Chihuahuan Broadleaf Evergreen Desert Scrub CBES
- Creosotebush (*Larrea tridentata*)

Chihuahuan Broadleaf Deciduous Desert Scrub CBDS
- Tarbush (*Flourensia cernua*)
- Honey Mesquite (*Prosopis glandulosa*)
- Whitethorn (*Acacia constricta, A. neovernicosa*)
- Ocotillo (*Fouquieria splendens*)

Grassland	**GRAS**
Rocky Mountain Subalpine Grassland	RMSG
Thurber Fescue (*Festuca thurberi*)	
Mixed Sedge (*Carex* Spp.)	
Rocky Mountain Montane Grassland	RMMG
Arizona Fescue (*Festuca arizonica*)	
Mountain Muhly (*Muhlenbergia montana*)	
Short Grass Steppe	SGSG
Blue Grama (*Bouteloua gracilis*)	
Hairy Grama (*Bouteloua hirsuta*)	
Mid-Grass Prairie	MGPG
Sideoats Grama (*Bouteloua curtipendula*)	
New Mexico Needlegrass (*Stipa neomexicana*)	
Western Wheatgrass (*Pascopyrum smithii*)	
Little Bluestem (*Schizachyrium scoparium*)	
Sand Dropseed (*Sporobolus cryptandrus*)	
Tall Grass Prairie	TGPG
Big Bluestem (*Andropogon gerardii*)	
Sand Bluestem (*Andropogon hallii*)	
Great Basin Foothill-Piedmont Grassland	GBFG
Galleta (*Hilaria jamesii*)	
Indian Ricegrass (*Oryzopsis hymenoides*)	
Great Basin Lowland/Swale Grassland	GBLG
Alkali Sacaton (*Sporobolus airoides*)	
Chihuahuan Foothill-Piedmont Desert Grassland	CDFG
Black Grama (*Bouteloua eriopoda*)	
Dropseed (*Sporobolus flexuosus*)	
Chihuahuan Lowland/Swale Desert Grassland	CDLG
Tobosa (*Hilaria mutica*)	
Giant Sacaton (*Sporobolus wrightii*)	
Saltgrass (*Distichlis spicata*)	
Vine Mesquite Grass (*Panicum obtusum*)	

Palustrine Forested, Shrub & Emergent Wetlands		**WETL**
Rocky Mountain Forested Wetlands		RMFW
	Narrowleaf Cottonwood (*Populus angustifolia*)	
	Boxelder (*Acer negundo*)	
	Alder (*Alnus oblongifolia, A. tenuifolia*)	
Rocky Mountain Montane Broadleaf Shrub Wetlands		RMSW
	Peachleaf Willow (*Salix amygdaloides*)	
	Bebb Willow (*Salix bebbiana*)	
	Bluestem Willow (*Salix irrorata*)	
Southwest & Plains Forested Wetland		WPFW
	Fremont Cottonwood (*Populus fremontii*)	
	Plains Cottonwood (*Populus sargentii*)	
	Arizona Walnut (*Juglans major*)	
	Netleaf Hackberry (*Celtis reticulata*)	
	Arizona Sycamore (*Platanus wrightii*)	
Southwest & Plains Shrub Wetland		WPSW
	Coyote Willow (*Salix exigua*)	
	Seepwillow (*Baccharis glutinosa*)	
	Russian Olive (*Elaeagnus angustifolia*)	
Southwestern Deciduous Shrub Arroyo Riparian		DSAR
	Apache Plume (*Fallugia paradoxa*)	
	Brickelbush (*Brickelia lacinata*)	
	Black Greasewood (*Sarcobatus vermiculatus*)	
	Desert Willow (*Chilopsis linearifolia*)	
	Screwbean Mesquite (*Prosopis pubescens*)	
Graminoid Wetlands		PEGW
	Baltic Rush (*Juncus balticus*)	
	American Bulrush (*Scirpus americana*)	
	Water Sedge (*Carex aquatilis*)	
	Cattail (*Typha latafolia*)	

Other Land Types		**OTHE**
Agriculture	Dryland Agriculture	DRAG
	Irrigated Agriculture	IRAG
Barren	Mine/ Quarries	MINE
	Rock Outcrop	ROCK
Urban	Urban Barren	URBA
	Urban Vegetated	URVE
	Urban Park	URPA
Water	Riverine/Lacustrine	RIVE
	Basin/Playa	PLAY

Safe Dates

Safe dates are used to place a species in the possible breeding category—the lowest breeding category—based only on a visual observation of the species between specific dates. Outside of the safe dates (or any time of the year if no safe dates are given) it is unsafe to presume from a visual observation that an observed species is breeding. Use of safe dates, however, increases the number of species that can be easily added to the "possible" category. Based on the comments from managers of other breeding bird atlases, completely omitting the use of safe dates has the potential of increasing the amount of field time required to otherwise record the same number of possible breeding species.

Below is a list of safe dates to be used in the New Mexico Breeding Bird Atlas Project. This list was compiled based on summary data from New Mexico Department of Game and Fish's breeding bird observation cards and by comparison with the safe dates used by the Colorado and Oklahoma Breeding Bird Atlases. Given that the New Mexico breeding card records are clearly incomplete, judging the dates requires some knowledge of the migratory nature of each species and has a speculative nature. In most cases, the safe dates given below are conservative. Safe dates are omitted for species poorly documented by breeding bird cards and for many species that are year-round resident in the state. Some safe dates may be modified in future years as new information becomes available from the atlas fieldwork.

Species Name	**NM Proposed Safe Dates**	**NM Earliest**	**NM Latest**
Pied-billed Grebe	May 1 - July 31	5/15	9/2
Eared Grebe	June 1 - July 31	6/5	9/21
Western Grebe	June 1 - July 31	5/16	11/7
Clark's Grebe	none	4/13	9/28
American Bittern	none	5/23	7/15
Least Bittern	none	6/18	7/17
Great Blue Heron	none	2/25	7/22
Great Egret	none	5/11	7/19
Snowy Egret	none	4/27	7/9
Little Blue Heron	none	6/2	7/27
Cattle Egret	none	4/28	7/19
Green Heron	none	6/12	7/6
Black-crowned Night-Heron	May 1 - June 30	4/27	7/9
White-faced Ibis	none	-	-
Turkey Vulture	none	5/14	8/13
Canada Goose	May 1 - June 1	4/22	6/10
Wood Duck	none	5/15	7/11
Gadwall	none	6/1	9/1
Mallard	May 1 - July 31	4/21	8/12
Mexican Duck	none	5/1	7/20
Blue-winged Teal	none	5/8	7/27
Cinnamon Teal	none	5/11	8/3

Species Name	NM Proposed Safe Dates	NM Earliest	NM Latest
Northern Pintail	none	-	-
Green-winged Teal	none	5/26	7/26
Canvasback	none	-	-
Redhead	none	6/25	8/3
Common Merganser	none	5/26	7/28
Ruddy Duck	none	6/10	9/21
Osprey	none	4/30	8/2
Mississippi Kite	none	6/8	8/13
Northern Harrier	none	5/18	6/28
Sharp-shinned Hawk	none	6/30	7/31
Cooper's Hawk	May 1 - June 30	3/20	7/19
Northern Goshawk	May 15 - July 15	5/12	7/30
Common Blackhawk	none	3/23	7/16
Harris' Hawk	none	3/12	6/19
Swainson's Hawk	June 1 - June 30	4/16	8/11
Zone-tailed Hawk	May 15 - June 30	4/10	8/16
Red-tailed Hawk	none	3/23	7/11
Ferruginous Hawk	May 1 - June 15	3/5	7/25
Golden Eagle	May 1 - June 30	5/13	7/4
American Kestrel	May 15 - July 15	5/1	7/31
Prairie Falcon	May 1 - June 15	4/16	7/22
Chukar	none	7/30	-
Ring-necked Pheasant	May 15 - July 15	5/4	7/16
Blue Grouse	none	6/1	8/6
Wild Turkey	none	5/31	8/23
Montezuma Quail	none	7/10	9/11
Northern Bobwhite	none	6/7	7/12
Scaled Quail	May 15 - July 31	5/4	9/15
Gambel's Quail	May 15 - July 31	5/24	8/29
Virginia Rail	none	5/26	8/27
Sora	none	5/19	7/24
Common Moorhen	none	4/13	8/5
American Coot	May 1 - July 31	4/16	9/21
Snowy Plover	none	5/25	7/29
Killdeer	May 1 - July 15	4/21	7/20
Mountain Plover	none	4/9	7/29
Black-necked Stilt	none	5/25	8/27
American Avocet	none	5/20	8/17
Spotted Sandpiper	none	6/22	8/22
Long-billed Curlew	none	5/27	6/28

Species Name	NM Proposed Safe Dates	NM Earliest	NM Latest
Rock Dove	March 1 - July 31	1/26	7/27
Band-tailed Pigeon	none	2/24	9/12
White-winged Dove	none	2/21	12/29
Mourning Dove	May 15 - July 31	5/7	9/2
Inca Dove	none	3/24	9/24
Yellow-billed Cuckoo	none	6/29	7/30
Greater Roadrunner	May 1 - June 30	4/14	8/27
Barn Owl	May 1 - June 30	3/15	7/17
Flammulated Owl	none	6/5	7/20
Western Screech Owl	none	5/18	7/18
Great Horned Owl	March 1 - July 15	1/16	7/5
Northern Pygmy-Owl	none	5/10	6/25
Elf Owl	none	5/27	6/29
Burrowing Owl	June 1 - July 15	6/2	7/27
Spotted Owl	none	6/13	7/6
Long-eared Owl	May 1 - June 30	5/2	7/23
Northern Saw-whet Owl	none	-	-
Lesser Nighthawk	none	7/18	7/21
Common Nighthawk	none	5/31	8/25
Common Poorwill	none	5/16	7/21
Whip-poor-will	none	6/24	-
Black Swift	none	7/12	8/21
White-throated Swift	May 15 - July 15	4/17	7/26
Magnificent Hummingbird	none	6/13	-
Black-chinned Hummingbird	June 1 - June 30	4/26	8/19
Broad-tailed Hummingbird	June 1 - June 30	5/1	8/20
Elegant Trogon	none	7/7	-
Belted Kingfisher	none	5/8	6/28
Lewis's Woodpecker	June 1 - June 30	4/16	8/13
Red-headed Woodpecker	none	5/16	9/12
Acorn Woodpecker	May 15 - July 15	5/14	7/25
Red-naped Sapsucker	May 15 - July 15	5/10	8/25
Williamson's Sapsucker	May 15 - July 15	5/15	7/25
Ladder-backed Woodpecker	May 1 - June 30	4/17	7/11
Downy Woodpecker	none	4/25	7/4
Hairy Woodpecker	May 15 - July 15	5/3	9/2
Three-toed Woodpecker	none	6/20	8/11
Northern Flicker	May 1 - July 15	4/30	8/2
Greater Pewee	none	6/25	7/14
Western Wood-Pewee	June 1 - June 30	5/16	8/7

Species Name	NM Proposed Safe Dates	NM Earliest	NM Latest
Willow Flycatcher	none	6/22	7/6
Hammond's Flycatcher	none	6/1	6/26
Dusky Flycatcher	none	6/23	7/22
Gray Flycatcher	none	4/26	8/20
Cordilleran Flycatcher	June 15 - July 15	5/28	8/21
Buff-breasted Flycatcher	none	7/24	-
Black Phoebe	May 1 - June 30	4/1	7/25
Eastern Phoebe	none	6/4	7/3
Say's Phoebe	May 1 - June 30	3/25	8/7
Vermillion Flycatcher	May 15 - June 15	4/5	7/23
Dusky-capped Flycatcher	none	6/2	6/18
Ash-throated Flycatcher	May 15 - July 15	5/3	7/20
Brown-crested Flycatcher	none	5/22	7/24
Cassin's Kingbird	May 15 - July 15	5/12	8/7
Western Kingbird	May 15 - July 15	5/4	8/10
Eastern Kingbird	none	6/1	8/18
Scissor-tailed Flycatcher	none	4/29	7/18
Loggerhead Shrike	none	2/27	7/18
Plumbeous Vireo	June 1 - June 30	5/18	7/28
Hutton's Vireo	none	6/26	7/13
Warbling Vireo	June 1 - June 30	5/25	8/4
Gray Jay	none	6/9	-
Steller's Jay	May 15 - July 15	5/1	8/20
Blue Jay	none	6/2	8/31
Western Scrub-Jay	May 15 - June 15	4/20	7/28
Mexican Jay	none	4/24	6/10
Pinyon Jay	none	3/2	8/19
Clark's Nutcracker	none	4/14	6/12
Black-billed Magpie	May 1 - June 15	3/29	7/5
American Crow	none	4/14	7/9
Chihuahuan Raven	May 15 - June 30	3/30	7/12
Common Raven	May 15 - June 30	3/15	7/12
Horned Lark	May 1 - June 15	4/8	7/5
Purple Martin	May 15 - June 15	5/14	7/21
Tree Swallow	none	5/14	7/27
Violet-green Swallow	June 1 - June 30	5/19	7/22
Northern Rough-winged Swallow	none	5/6	6/28
Bank Swallow	none	5/30	7/10
Barn Swallow	May 15 - July 15	5/10	8/29
Cliff Swallow	none	4/18	8/6

Species Name	NM Proposed Safe Dates	NM Earliest	NM Latest
Cave Swallow	none	6/20	7/7
Black-capped Chickadee	none	5/26	7/15
Mountain Chickadee	June 1 - July 15	5/25	7/29
Bridled Titmouse	none	4/23	6/1
Juniper Titmouse	May 15 - June 15	4/29	7/4
Verdin	June 1 - June 30	5/19	8/3
Bushtit	none	4/2	7/19
Red-breasted Nuthatch	none	4/2	6/23
White-Breasted Nuthatch	May 15 - June 15	5/1	7/13
Pygmy Nuthatch	May 15 - June 15	5/19	8/10
Brown Creeper	none	4/14	7/15
Cactus Wren	May 1 - June 30	4/1	7/23
Rock Wren	May 15 - June 30	4/20	7/28
Canyon Wren	June 1 - June 30	5/18	7/29
Carolina Wren	none	9/1	-
Bewick's Wren	May 15 - July 15	5/5	8/9
House Wren	June 1 - July 15	6/2	7/21
Marsh Wren	none	6/6	6/25
American Dipper	May 1 July 15	4/9	7/26
Golden-crowned Kinglet	none	6/20	7/6
Ruby-crowned Kinglet	none	6/20	7/30
Blue-gray Gnatcatcher	May 15 - June 30	5/10	7/23
Black-tailed Gnatcatcher	none	5/26	8/21
Eastern Bluebird	none	4/10	5/25
Western Bluebird	May 15 - July 15	5/1	8/7
Mountain Bluebird	May 1 - June 15	4/30	8/7
Townsend's Solitaire	none	5/24	7/30
Swainson's Thrush	none	7/4	7/15
Hermit Thrush	June 1 - July 15	6/20	7/19
American Robin	May 15 - July 15	4/30	7/27
Catbird	none	5/31	8/10
Northern Mockingbird	May 15 - July 15	4/6	8/15
Sage Thrasher	none	5/26	7/14
Brown Thrasher	none	6/8	7/8
Bendire's Thrasher	none	5/1	7/16
Curve-billed Thrasher	May 1 - June 30	2/18	8/31
Crissal Thrasher	none	3/6	7/21
European Starling	May 1 - June 15	2/22	10/18
American Pipit	none	6/18	7/27
Cedar Waxwing	none	7/1	-

Species Name	NM Proposed Safe Dates	NM Earliest	NM Latest
Phainopepla	none	3/23	8/3
Olive Warbler	none	5/11	7/29
Orange-crowned Warbler	none	6/18	7/29
Virginia's Warbler	June 1 - June 30	6/3	7/13
Lucy's Warbler	none	4/19	7/18
Northern Parula	none	5/31	-
Yellow Warbler	June 1 - June 30	5/5	8/5
Yellow-rumped Warbler (Audubon's)	none	5/28	7/24
Back-throated Gray Warbler	none	5/29	7/4
Grace's Warbler	none	5/25	7/21
MacGillivray's Warbler	none	6/7	7/1
Common Yellowthroat	none	6/6	8/3
Wilsons Warbler	none	6/5	7/23
Red-faced Warbler	none	5/1	7/18
Painted Redstart	none	4/25	9/14
Yellow-breasted Chat	June 1 - July 15	5/10	8/21
Hepatic Tanager	none	5/8	7/27
Summer Tanager	none	5/17	9/6
Western Tanager	June 1 - July 15	5/25	8/9
Green-tailed Towhee	June 15 - July 15	6/7	8/10
Spotted Towhee	June 1 - July 15	5/2	8/4
Canyon Towhee	June 1 - June 30	4/17	9/18
Cassin's Sparrow	none	6/3	9/8
Rufous-crowned Sparrow	none	5/20	9/6
Chipping Sparrow	June 1 - June 30	5/9	7/20
Brewer's Sparrow	none	6/9	7/2
Black-chinned Sparrow	none	5/19	7/15
Vesper Sparrow	none	5/29	6/16
Lark Sparrow	May 15 - June 30	5/11	7/16
Black-throated Sparrow	May 1 - July 15	4/24	8/24
Sage Sparrow	none	6/4	6/21
Lark Bunting	none	6/2	8/7
Savannah Sparrow	none	5/27	6/27
Grasshopper Sparrow	none	6/9	8/2
Song Sparrow	none	6/3	7/20
Lincoln's Sparrow	none	6/14	7/12
White-crowned Sparrow	none	7/7	7/26
Dark-eyed Junco (Gray-headed)	May 15 - July 15	5/12	7/31
Northern Cardinal	none	5/25	8/24
Pyrrhuloxia	none	5/7	8/15

Species Name	NM Proposed Safe Dates	NM Earliest	NM Latest
Black-headed Grosbeak	June 1 - July 15	5/9	8/28
Blue Grosbeak	June 1 - July 15	5/25	9/22
Lazuli Bunting	none	7/27	-
Dickcissel	none	7/7	-
Red-winged Blackbird	May 15 - June 30	4/29	8/3
Eastern Meadowlark	none	5/28	8/10
Western Meadowlark	none	4/16	7/23
Yellow-headed Blackbird	May 15 - June 15	5/10	7/11
Brewer's Blackbird	May 15 - June 15	5/20	7/17
Common Grackle	May 15 - June 30	5/14	7/5
Great-tailed Grackle	May 15 - June 30	5/10	7/24
Bronzed Cowbird	none	6/21	-
Brown-headed Cowbird	June 1 - June 30	5/22	8/12
Orchard Oriole	none	6/8	6/8
Hooded Oriole	none	4/21	8/5
Baltimore Oriole	none	6/24	-
Bullock's Oriole	June 1 - July 15	5/11	7/31
Scott's Oriole	June 1 - July 15	4/29	8/1
Pine Grosbeak	none	-	8/17
Cassin's Finch	none	6/3	8/24
House Finch	May 15 - June 15	2/28	8/20
Red Crossbill	none	5/19	8/15
Pine Siskin	June 15 - July 15	5/19	8/21
Lesser Goldfinch	June 15 - July 15	6/2	11/3
American Goldfinch	none	6/24	8/12
Evening Grosbeak	June 15 - July 15	5/30	10/11
House Sparrow	April 1 - July 15	3/11	7/26

Field Observation Card

Below is part of one panel from the field observation card. The complete card lists only species that occur regularly in either high or low numbers within the state according to the 1997 New Mexico Bird Record Committee checklist, and have some known possibility of breeding within the state. Thus, species that are believed to be casual or irregular breeders have been omitted. Any species not listed on the card and found to be breeding within an atlas block should be documented using the rare breeding bird report form (page 31).

For each species observed within a block, the habitat (page 14) should be recorded to the left and the date of observation to the right of the species name. The breeding code (page 12) for the observed behavior should be marked in the appropriate column. When a species is up-graded, change the cover type group code if needed, the date, and record a new breeding code.

Figure 1: Example of information to be written onto the field observation card:

Species Name	Habitat	Date	Obs	Pos	Pro	Con
Pied-billed Grebe						
Double-cr. Cormorant						
American Bittern						
Great Blue Heron						
Green Heron						
Black-cr. Night-Heron						
Turkey Vulture						
Canada Goose						
Wood Duck						
Gadwall						
Mallard						
Blue-winged Teal						
Cinnamon Teal						
Northern Shoveler						
Northern Pintail						
Green-winged Teal						
Redhead						
Common Merganser						
Ruddy Duck						
Sharp-shinned Hawk						
Cooper's Hawk						
Northern Goshawk						
Swainson's Hawk						
Red-tailed Hawk						
Ferruginous Hawk						
Golden Eagle						
American Kestrel						
Prairie Falcon						
Ring-necked Pheasant						
Blue Grouse						
Wild Turkey						
Scaled Quail						
Gambel's Quail						
Virginia Rail						

Relative Abundance Card

Measuring the relative abundance of each species may be important for detecting difference in bird populations between various areas of the state and changes in bird populations over time. These differences and changes may not be as quickly or easily visible from presence / absence breeding information, as from timed counts of birds during atlas work. Follow the methods on page 9 to record relative abundance. Select which kilos you plan to survey for relative abundance (Figure 2). You may choose any eight kilos (or more if access is easy) and conduct the relative abundance counts in any order. The two-hour counts may be divided between visits to a particular kilo, as long as birds are actively singing. For each kilo, record the number of species (Figure 3) with individual species checked off (Figure 4) on the relative abundance card included in your packet of materials. Note that visits 1-4 are on one side of the card while visits 5-8 are on the other side. For more than eight kilos, request an additional relative abundance card from you regional organizer.

Figure 2: Kilo numbering system.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Figure 3: Relative abundance summary information

	Kilo number	Dates visited			Total species
1st Kilo					
2nd Kilo					
3rd Kilo					
4th Kilo					

Figure 4: Example of information to be written onto the relative abundance card.

Species Name	1st	2nd	3rd	4th	5th	6th	7th	8th
	Kilo	Kilo	Kilo	Kilo	Kilo	Kilo	Kilo	Kilo
Juniper Titmouse								
Bushtit								
Red-breasted Nuthatch								
White-breasted Nuthatch								
Pygmy Nuthatch								
Brown Creeper								
Cactus Wren								
Rock Wren								
Canyon Wren								
Bewick's Wren								
House Wren								
American Dipper								
Golden-crowned Kinglet								
Ruby-crowned Kinglet								
Blue-gray Gnatcatcher								
Western Bluebird								

Document number (for office use)_____

Nest Observation Form

Most species breeding can be confirmed without finding nests. When nests are found specific information can be collected. This is an optional but useful part of the atlas project. Nest records can provide detailed information for all species, but are especially useful for rare species or special concern species in New Mexico, as well as important for describing unique New Mexico nest characteristics for species with wider geographic ranges. When you find a nest please fill out the card and return it your regional organizer. Please ask your regional organizer for more cards, as you need them. Please remember that disturbing an active nest is a violation of the Migratory Bird Treaty Act, so keep your distance!

Species (standard common name) _____
Year _____
Observer (full name) _____
Locality _____
County _____
Basis of identification _____
Habitat (give atlas cover type group code) _____
Nest Site (circle where appropriate)
Bare ground, on ground in vegetation, floating, low vegetation, shrub, deciduous tree branch, deciduous tree cavity, conifer branch, conifer cavity, nest box, cliff or bank, other (specify)

_____
Principal plant or structure supporting the nest _____
Height of eggs above the ground or water in feet (feet and tenths if under five feet) or meters (meters and decimeter if under two meters). _____

Month (mm)	Day (dd)	Number Eggs	Number Young	Nest Building	Adult Incubating	Comments (Stage of nest building: eggs present, young present, or age of young, etc.)

Outcome (circle where appropriate)

Unknown because not revisited	Failure due to competition with other species
Young seen leaving nest	Failure due to weather
Parent(s) excited near nest	Failure due to predation
Parent(s) with young near nest	Failure due to invertebrate parasites
Nest empty, intact	Failure due to cowbirds
Nest empty, damaged	Failure due to human activities
Nest Deserted	Failure due to pesticides (give details)
Other (Please describe)	

Document number (for office use) _____

Out of Block Observation Form

(Page 1 of 2)

The atlas project can use all records of breeding birds that you observe, even outside your block. If you confirm breeding outside your block, please report it on an out of block observation form, not on a field observation card. The office staff must be able to map the exact location of an out of block observation to within a square mile so that the record can be assigned to the proper location for mapping. Start with a landmark that signifies a point (intersections of roads, river crossings, and political boundaries are good), and then provide an exact distance (to the tenth of a mile if possible) and direction (compass bearings are best) from your landmark.

Use this form if you have a few records of breeding birds gathered incidentally from blocks outside your assigned block, such as while traveling to and from your assigned block, or in your back yard. If you have 10 or more records in one block, please use the regular field observation card. Send out of block observation forms to your regional organizer at the end of each breeding season. Remember the deadline is September 15 of each year!

Observer's Name _____

Address _____

Telephone _____ Time spent observing _____

E-mail address _____

Site Number	Date mm/dd	Species	Breeding Code	Habitat Code	Block Name	Block Number
					(For Office Use)	

See the atlas handbook for breeding and cover type group codes.

Example of an exact location description: Two miles south of the intersection of County Road J and State Route K, or the southeastern quarter of the northwestern quarter of T17N, R14E, Section 13, Town of Frijoles, Eddy County. (Use road numbers when available.)

Give exact location descriptions on page 2. **A photocopy of a map covering about 3 miles on a side is most helpful.**

Site #1, Location Description _____

_____

_____

Nearest Town, County _____

Site #2, Location Description _____

_____

_____

Nearest Town, County _____

Site #3, Location Description _____

_____

_____

Nearest Town, County _____

Site #4, Location Description _____

_____

_____

Nearest Town, County _____

Site #5, Location Description _____

_____

_____

Nearest Town, County _____

Site #6, Location Description _____

_____

_____

Nearest Town, County _____

Site #7, Location Description _____

_____

_____

Nearest Town, County _____

Site #8, Location Description _____

_____

_____

Nearest Town, County _____

Site #9, Location Description _____

_____

_____

Nearest Town, County _____

Document number (for office use) _____

Rare Breeding Birds Report Form

(Page 1 of 2)

To be useful for the breeding bird atlas project, all sightings of rare breeding birds must be documented with a written description. This form will allow quick confirmation as well as provide a permanent record of one's sighting. Fill the form out thoroughly and get it to your regional organizer as soon as possible, or send the form to the New Mexico Breeding Bird Atlas Project, 947 Quartz Street, Los Alamos, New Mexico 87544. It is important to complete this form at the time of the sighting or from your field notes. Avoid completing the form from memory.

Species_____ Atlas breeding code_____

Number_____Age (adult-juvenile)_____Sex_____

Date observed_____Time observed: From_____To_____

Quad name (optional)_____If in a block, give block #_____

County_____Elevation_____

Description of location (Lat/Long, UTM, or land marks.)_____

_____

Nearest town _____

Habitat_____

_____

Other observers_____

_____

Light conditions_____Distance from bird_____

Optical equipment used_____

Notes taken: at time of sighting_____from memory after sighting_____

How well was the bird seen?_____

_____

On the back side of this sheet, describe the bird in detail including size, shape, color of bill, throat, breast, belly, flanks, wings, back, rump, tail, feet and so on. Include any features unique to this bird.

Describe all behaviors observed:

Describe songs or calls heard:

Field marks seen:

Variations in expected field marks:

Describe your process of elimination for similar species.

What is your experience with this or related species?

What references did you consult for identification?

What additional materials are included with this report? Drawings, photos, or tape recordings are very helpful.

Name Signature

Street address

City Zip code

Telephone number (___) E-mail

Field Safety

Remember, the backcountry in New Mexico can be a dangerous and unpredictable place. Do not go into the field alone unless you have told someone where you are going and when you will be back. Other suggested precautions are:

1. Take a companion when surveying at night. Watch where you are walking. Remember when conducting nocturnal surveys, rattlesnakes are much more prevalent at night in hot weather, especially in the desert. If you would like help with nocturnal surveys, your regional organizer may be able to suggest other birders in the area.

2. Insects are not often a problem in New Mexico most of the year, but after the summer rains have started, plant growth and rain pools can create good habitat for mosquitoes, black flies, and chiggers in some places. Also beware of swarms or hives of honeybees.

3. Prepare for changes in weather. Sudden heavy rains can leave roads muddy and impassible, and cause flash-flooding. This is especially important in steep canyon country.

4. Don't go alone into wilderness areas, roadless places, or dangerous terrain.

5. Be prepared for rapid changes in weather and vehicle breakdowns! Always carry plenty of water, food, a first aid kit, and camping gear in the event that you will need to spend the day or night near your vehicle.

Income Tax Deduction

The Internal Revenue Service (IRS) allows a deduction on income taxes for expenses incurred while conducting work for a non-profit organization. Since the New Mexico Breeding Bird Atlas Project is a non-profit organization, expenses such as motels, food, telephone calls, postage, copying, entrance fees, and mileage are deductible as contributions. Be sure to keep accurate and detailed records with receipts in the event of an IRS audit.

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Appendix A: Some Early Nesting Species

The following species are among the earliest nesting species in New Mexico. Some of the species below start nesting early but also continue nesting later in the season as well. Other species only nest early. Catching the first nesting attempts of these species (March or April of most) will ensure that their presence as breeders in a block will be recorded.

Red-tailed hawk
Ferruginous Hawk
Prairie Falcon
Lesser Prairie Chicken
Scaled Quail
Barn Owl
Great Horned Owl
Western Screech-Owl
Black-billed Magpie
American Crow
Horned Lark
Juniper Titmouse
White-breasted Nuthatch
Bewick's Wren
European Startling
Rufous-crowned Sparrow
Northern Cardinal
House Finch
House Sparrow

Appendix B: Population Trends for New Mexico
(Data from North American Breeding Bird Survey, 1966-1994)

Terms for Trends

Declining: Population declines are statistically significant
Negative: Population appear to be decreasing, but we don't know for sure
Stable: Populations apparently not changing much
Positive: Populations appear to be increasing, but we don't know for sure
Increasing: Population increases are statistically significant
?: We do not know if it is increasing, decreasing, or stable (sample size too small to tell)

Spruce-fir/aspen Birds	**National Trend**	**New Mexico Trend**
Red-naped Sapsucker	?	?
Olive-sided Flycatcher	Declining	?
Hammond's Flycatcher	Stable	?
Cordilleran Flycatcher	?	?
Clark's Nutcracker	Positive	?
Red-Breasted Nuthatch	Increasing	?
Hermit Thrush	Increasing	?
Golden-crowned Kinglet	Declining	?
Ruby-crowned Kinglet	Positive	?
Yellow-rumped Warbler Audubon's form	Positive	?
Red Crossbill	Stable	?
Dark-eyed Junco Gray-headed form	Positive	?
Pine-oak Birds	**National Trend**	**New Mexico Trend**
Northern Goshawk	Negative	?
Band-tailed Pigeon	Declining	?
Flammulated Owl	?	?
Northern Pygmy-Owl	Increasing	?
Broad-tailed Hummingbird	Positive	?
Violet-green Swallow	Declining	Declining
Steller's Jay	Positive	?
Pygmy Nuthatch	Increasing	?
Plumbeous Vireo	?	?
Grace's Warbler	Decreasing	?
Chipping Sparrow	Stable	Declining

Riparian Birds	**National Trend**	**New Mexico Trend**
Cooper's Hawk	Increasing	?
Yellow-billed Cuckoo	Declining	?
Black-chinned Hummingbird	Positive	?
Black Phoebe	Increasing	?
Black-capped Chickadee	Increasing	?
Gray Catbird	Stable	?
Bell's Vireo	Declining	?
Yellow Warbler	Increasing	?
Yellow-breasted Chat	Declining	?
Bullock's Oriole	Declining	Positive
Summer Tanager	Stable	?
Indigo Bunting	Declining	?
Song Sparrow	Stable	?
Birds of Multiple Habitats	**National Trend**	**New Mexico Trend**
Red-tailed Hawk	Increasing	Increasing
Mourning Dove	Stable	Declining
Northern Flicker	Negative	Stable
Downy Woodpecker	Stable	?
Western Kingbird	Declining	Positive
Ash-throated Flycatcher	Increasing	Positive
Western Wood-Pewee	Declining	Declining
Barn Swallow	Increasing	Increasing
Common Raven	Increasing	Increasing
Mountain Chickadee	Declining	?
White-breasted Nuthatch	Increasing	?
Northern Mockingbird	Declining	Negative
American Robin	Increasing	Positive
European Starling	Declining	Stable
Western Tanager	Stable	Positive
Black-headed Grosbeak	Stable	Negative
Red-winged Blackbird	Declining	Declining
Brown-headed Cowbird	Declining	Increasing
House Finch	Positive	Declining

Ethical Atlasing

(Adapted from the New Jersey, Colorado, and Arizona Breeding Bird Atlas Handbooks)

Ethic 1: Thoughtfulness Towards Bird

1. Be quiet and unobtrusive. Try to observe the birds so they are unaware of your presence, thus providing an opportunity to observe their normal behaviors. Avoid quick movements, discordant noises, running, continuous chasing of game birds, excessive "pishing", throwing things, and thrashing about. A quiet observer often sees and hears more.

2. Approaching a nest too closely or repeated flushing may cause abandonment of the eggs (especially early in incubation) or young, as well as exposing the nest to an increased chance of predation. Human odor and tracks may lead predators to the nest. Do not handle the young or eggs.

3. Avoid "tree-whacking" to arouse cavity dwellers. Undue disturbance may lead to abandonment of nest cavities.

4. Use tape recorders with restraint. Excessive use of tape recorders will disturb breeding birds.

2: Thoughtfulness Towards Habitat

1. Avoid trampling fragile habitats, especially marshes, grasslands, wild flowers, and tangles. Damage to the habitat affects all species in the ecosystem.

2. Carry out your litter, including cigarette butts.

3. Keep motor vehicles on established roads and parking areas. One set of tracks invites others. In fragile ecosystems, tracks may last for decades and severely degrade the habitat value.

4. Be extremely careful with fire. Avoid smoking while walking, press out cigarettes on rocks or mineral soil. Carry butts with you, or best, do not smoke.

5. Use discretion in divulging information on nests of rare or endangered birds, especially in fragile habitats.

3. Thoughtfulness Towards People

1. Obtain permission to enter private and state lands and where necessary, federal government lands. Respect an owner's privacy and property. Do not block right-of-ways; leave gates as you find them, or as the landowner has asked you to leave them. Do not carry firearms.

2. When birding at a private home, be considerate of your host's time, property, and privacy.

3. Behave in ways that reflect favorably on the organizations and colleagues that you represent.

4. Answer questions about your activities and volunteer the information courteously and respectfully.