
A Review of Prairie Canada Bander Training Workshops – Tools, Techniques and Exercises

Brenda C. Dale*

Environment Canada/ CWS
200 – 4999 98th Ave. NW
Edmonton, AB
Canada T6B 2X3

*Corresponding Author
email:Brenda.Dale@ec.gc.ca

Kenneth Burton

2231 E Street
Eureka, CA 95501
email:shrikethree@gmail.com

Katie Calon

111 First St.
New Westminster, BC
Canada V3L 2G3
email:Katie.Calon@gmail.com

ABSTRACT

Data such as the species, age and sex of the bird banded have many conservation uses and it is important that these data be as accurate as possible. Most banders acquire skills in an informal manner and are rarely reassessed once they receive the testimonial letters needed to acquire a permit. Previous research showed assessment of age and sex and even species differed between experienced songbird banders. In prairie Canada we have conducted more than 20 annual workshops since 1994. Here we describe the basic elements of these workshops, including three teaching exercises developed to assist participants to interpret reference materials efficiently and consistently and to apply these skills to identify, age, and sex birds. The exercises facilitated the sharing of knowledge and experience among participants and could also be used within local groups of banders or by individuals. We encouraged frequent interaction among banders within prairie Canada to improve and maintain the standard of data accuracy necessary for effective conservation.

INTRODUCTION - Bander Skills/The Need

Bird banding yields data critical for conservation and requires a unique skill set typically acquired through extensive hours in the field under the mentorship of an experienced bander. Experience is gained primarily through informal training until the trainer is satisfied with the consistency and correctness of bird handling, banding, and data collection techniques and procedures (Dale 2004). Having achieved recommendations from several trainers, a permit may be issued. Once trained and in possession of a permit,

individuals often function in near isolation, with little guidance or information exchange, and their skills are rarely re-tested to ensure accuracy and consistency with other banders. Even banders or trainers at the same station may get few opportunities to work together, share information, and/or compare results.

In the Prairie and Northern Region (PNR) of Environment Canada, which includes Alberta, Saskatchewan, Manitoba, the Northwest Territories and Nunavut, there are currently five Canadian Migration Monitoring Network banding stations banding passerines and near-passerines. These stations are spread throughout the southern portion of the PNR and, as a result, collect data on birds in effective isolation from one another. The result of the current informal training system is that the experience of virtually every bander in Canada is unique with respect to extent, duration, species variety, and locale. Preliminary research has shown that banders received very different scores for their ability to age and sex birds depending on who trained and tested them (Dale 2004). This has implications for data quality and resultant conservation actions.

To address the heterogeneity of knowledge and experience of bird banders within the region Environment Canada/Canadian Wildlife Service opted to provide free advanced bander training workshop opportunities. These workshops were developed to transfer information in a consistent way and, on a larger scale than the typical informal method, with the goal of improving and

maintaining data quality and uniformity. The workshops were intended to augment traditional training methods, not replace them, and were designed for participants with prior experience. They focused mainly on age and sex determination, but the exchange of knowledge on all aspect of banding, including capture and handling techniques occurred.

In this paper, we provide a brief history of bander training workshops in the PNR, describe the format of our workshops, and present details on three training exercises that were developed by the authors. The exercises we describe are now used by our leaders in workshops elsewhere, and we feel that they may be useful to other workshop leaders, individuals, and observatories who wish to improve uniformity of data collection.

Workshop History

From 1994 to 2013 more than 20 workshops have been conducted in the PNR. The initial participants included the principal banders and trainers from each of the five banding stations. The first workshop was a combination of processing and banding birds captured at the station and presentations by the participants on how they would teach assigned skills. The exchange of information among the participants was clearly useful, but revealed a need for measures to determine if participants' skills in assessing age and sex of birds in the hand were enhanced by the workshop. General discussion among the participants also indicated some were having difficulty interpreting age/sex literature, such as Pyle et al. (1987). As a result, in 1996 at the second workshop time was spent on teaching banders/trainers how to use Pyle et al. (1987) effectively. We introduced the bar chart and specimen exercises described below. In the specimen exercise participants individually assessed the age and sex of frozen birds, revealing a variance in their assessments (Dale unpub. data). The variation reduced as the workshop progressed.

Since then, workshops with up to 18 individuals have been held at least annually with priority given to principal trainers of landbird banders, then experienced non-trainers, with novice banders invited only if space was available. We assumed that the knowledge gained would be passed on by

trainers and other participants and gradually would reach the entire banding community. Since the publication of the *Identification Guide to North American Birds, Part I* (Pyle 1997a) a part of each workshop has been devoted to teaching participants how to use and interpret the detailed species accounts. From 1996 through 2002 all workshops were taught by Ken Burton, but since 2003, Peter Pyle and Burton have alternated in the leadership role.

Personnel, Facilities, Timing and Workshop Format

Leaders in our workshops had a combination of skills and experience. It was important that leaders were knowledgeable about molts and plumages and a wide variety of species. They possessed prior experience and excellent teaching skills that allowed them to convey knowledge, make corrections, and encourage discussion and the free exchange of knowledge among a variety of personality types. At most workshops they had an assistant who could take care of logistics and supervise the first phase of an individual specimen exercise while the leader was in a banding session.

Workshop facilities required specific characteristics to ensure a successful learning experience for the attendees. Proximity to a banding station was an asset, as the morning sessions were planned for small groups to work with the workshop leader to identify and determine the age and sex of captured birds. Ideally, the banding station captured enough birds to make the exercise worthwhile and provided all participants the opportunity to engage in one-on-one discussion with the workshop leader, on one or more captured birds. While banding provided important opportunities for sharing knowledge, we have held successful workshops at which few birds were captured due to weather. In those cases, we relied on the variety of classroom exercises and the presence of specimens and photographs. Lecture and classroom facilities with electricity, a projection screen, and good lighting were required for the afternoon and evening sessions of the workshops. Large tables were ideal for displaying specimens and utilizing the variety of reference books. An on-site freezer was needed when frozen specimens were used.

PNR banding workshops have been held mainly in the spring, late summer or fall. Spring workshops allowed participants to examine captured birds in alternate plumage and to study molt limits as related to aging in second-year and older birds. Late summer workshops provided the greatest range of plumages, skull classes, feather wear, molt, and age classes. Fall workshops allowed the leader to confirm or correct each participant's assessment of ossification and feather shape and other useful characters, and helped familiarize participants with more obscure basic plumages which could present challenges.

Our workshops were held on weekends to allow volunteers with non-banding jobs to attend. Typically, we began with a Friday evening lecture on the topic of plumage, molts, and molt limits and their relation to age determination and coding for banding sheets. After the publication of Howell et al. (2003), a segment was added to explain how the modified molt terminology related to the terminology of Pyle (1997a). These lectures were similar to those the same leaders gave at training workshops elsewhere (e.g., MAPS training workshops). Where facilities with enough space were available, we made this lecture open to any interested individual, not just those registered in the workshop. Saturday and Sunday mornings consisted of banding and the afternoon/evening sessions were made up of various learning exercises. When possible, the workshops included additional elements such as a "Bandit" workshop to familiarize participants with that program or a field trip to a nearby museum to look at additional specimens.

The banding on Saturday and Sunday mornings allowed participants to handle and evaluate the same birds in the hand. We generally restricted handling of each bird to the leader and up to two workshop participants. Birds were released immediately if they exhibited stress. All participants were able to discuss quietly aspects of data collection during this time. Digital images of selected birds were often taken to allow everyone to view and discuss the birds later in a classroom setting. Formats varied with the situation, but normally we restricted banding sessions to a third or a half of the participants so that all viewed the birds and had a chance to ask questions. The remaining

participants worked with specimens, made net runs, or exchanged information on extraction, net management, and transportation techniques. The groups switched roles which allowed everyone to handle birds within a four-to-six-hour banding session.

The Saturday and Sunday afternoon or evening sessions took place indoors in a classroom setting. The following is a description of three exercises developed by the authors that we conducted during most workshops.

Exercises

Pyle (1997a) and its predecessor (Pyle et al. 1987) have been around for more than two decades. Without assistance in learning how to use the guides, it can be rather overwhelming to interpret a page or more of fine print when you have a bird in hand.

Much of the information in Pyle (1997a) is highly detailed, and descriptions often required interpretation based on experience (e.g., molt limits are a relatively new tool in North America). Pyle (1997b) and Sakai and Ralph (2002) made the wealth of information in Pyle (1997a) more understandable to some by organizing species accounts into a tabular format. Froehlich (2003) published a photographic guide to demonstrate the most common patterns of feather replacement with selected images of North American birds. These excellent publications have the same common goal as our workshop exercises—to make the material in Pyle (1997a) more transparent. The exercises we carried out as part of our workshops included building an age chart, 'coloring 101', and a specimen exercise.

Building a Species Age Chart

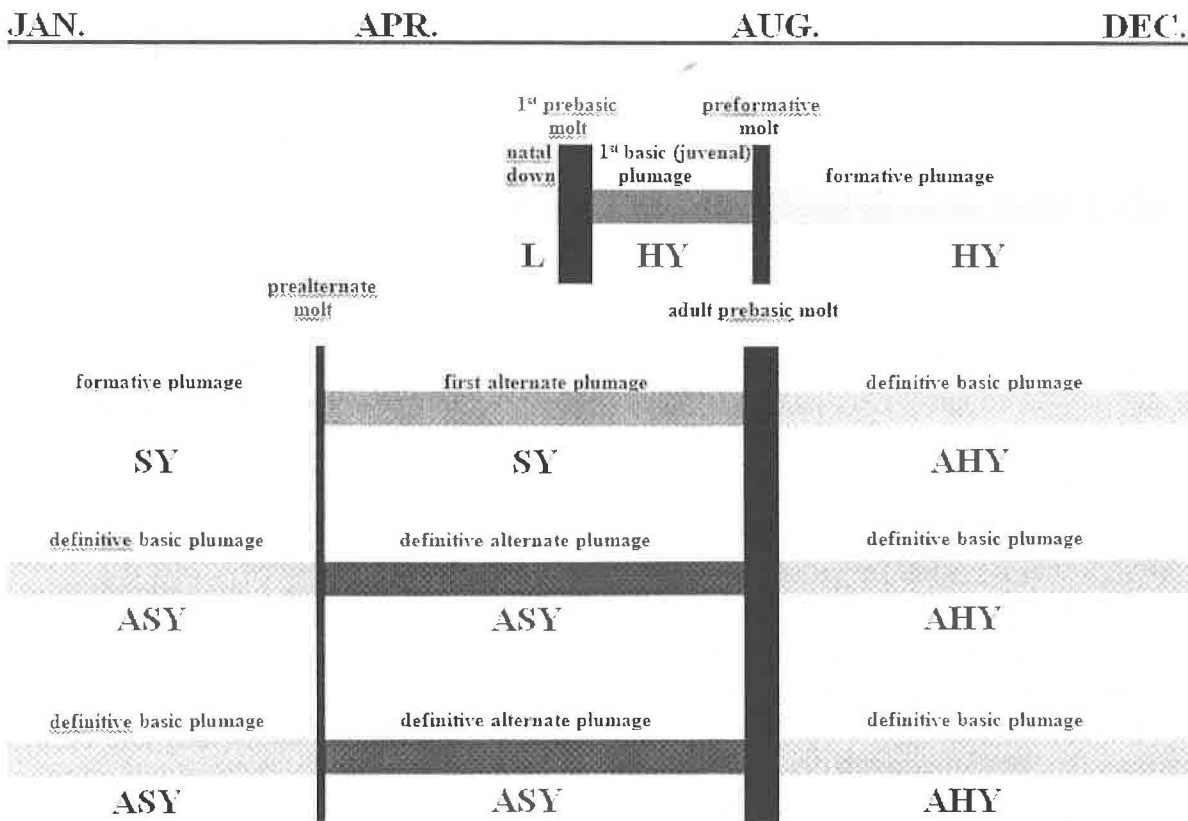
The initial age charts were developed at the 1996 workshop. The charts themselves were described thoroughly in Burton (2006), and readers should refer to this paper for a more detailed explanation. This workshop exercise essentially produced schematic diagrams of the molts, plumages and age classes of selected species that collectively illustrated the range of molt strategies.

Carrying out the age chart exercise helped participants make the connection among molts, resultant plumages, and the appropriate banding age codes throughout a calendar year and throughout the life of a bird. This enhanced understanding of the modified molt terminology (Howell et al. 2003) and developed the ability to find the key information in a Pyle (1997a) more quickly.

The first age chart at a workshop was often created as a group on a blackboard, whiteboard, or flip chart and mediated by the leader who asked questions that encouraged the participants to find the necessary information (timing and extent of molt) in Pyle (1997a). To build the chart, participants were essentially being asked "When the bird has a particular feather coat and undergoes a molt, what happens next and what effects, if any, does the molt have on the age class?" To answer this question and populate the age chart, participants examined the appropriate account in Pyle (1997a) for the sample

species selected. Horizontal plumage bars were drawn, with the first one beginning on the average hatch date of the species (e.g., May or June) and continuing through December, with subsequent plumage bars representing each subsequent year of the birds life (Fig. 1). In consulting the species account, participants identified the approximate month when the species underwent its various molts (e.g., first prebasic or prejuvenal [PJ], preformative [PF], and prealternate molt [PA], and prebasic [PB] molts) throughout its life cycle. A vertical molt bar was drawn during the appropriate time period for the molt and its relative thickness was an indication of the extent of the molt. As participants identified the timing and extend of the species' molts, the plumage bars were segmented and labelled with the name or abbreviation of the appropriate plumage (e.g., natal down [ND], or juvenile [Juv], formative [F1], first alternate [A1], definitive basic [DB], and definitive alternate[DA] plumages) above the bar and the appropriate banding age code (e.g., L, HY, SY, TY, AHY, ASY, ATY) below.

Fig. 1. Example age chart for a species displaying Complex Alternate Molt Strategy.



This exercise helped to emphasize that the change in age class due to the calendar-year basis of the North American Banding Program was not related to the plumage of the bird. Individuals conducting the exercise saw the plumage remained the same from 31 Dec to 1 Jan, but the age code changed (e.g. HY to SY, AHY to ASY). This chart also helped individuals to visualize the plumage of a bird at any time of the year. An understanding of the different molt strategies (Simple Basic, Complex Basic, Simple Alternate, and Complex Alternate strategies) gained from the initial evening's lecture helped to prepare workshop participants for this exercise. By working through age charts for multiple species, participants found there were a limited number of molt strategies but many variations within them. It was helpful to create age charts for some species caught during the morning banding session or commonly caught in the region. Once the group developed one or more age charts, each workshop participant or smaller group of participants could be assigned a species for which to create an age chart. These charts were checked by the workshop leader to ensure they were correct.

Age Chart Discussion

For individuals attempting this exercise without the assistance of a trainer or leader, one approach is to create charts for the six species depicted in Burton (2006), allowing their efforts to be checked against the article for accuracy. The appendix of that paper also detailed molt strategies and extents of molt for all 397 species described by Pyle (1997a), so essentially all age charts could be checked against this reference. This highly visual exercise of building age charts simplifies utilization of the wealth of information available in the Pyle (1997a) species accounts.

Coloring 101

When first introduced to Pyle (1997a), many begin by reading through an entire account to see what best matches the bird in hand. The presence or absence of molt limits between the different generations of feathers for a given plumage is the basis for age determination. Jenni and Winkler

(1994) provided simple diagrams of selected European birds with colored feather tracts depicting the effects of molt on a bird's appearance. The "coloring 101" exercise, developed in 2005, helps participants determine where locations of molt limits should occur by consulting species accounts in Pyle (1997a). It provides a simplified visual component that demonstrates the sequence of molts and plumages, allowing participants to see the effect different feather generations has on the appearance of a bird at different times of year. This exercise, like the age chart, provides an understanding that the date of banding controls the precision with which a bird may be aged.

The coloring 101 exercise was used with any species account in Pyle (1997a) to provide a simple, visual representation of the molt limits present on a bird for any given age class similar to those depicted in Jenni and Winkler (1994). Each participant was given a sheet with six outlines of extended wings (Fig. 2). At the top of the sheet was a blank line for the species name, and by each bird outline were three blank lines for noting the bird's true age, its age code, and the date the molt occurred. One color of pencil or felt pen was needed for each feather generation.

First, a species was selected and the appropriate account in Pyle (1997a) consulted for the timing of each molt along with the location of the molt limits. The 'Molt' section in Pyle (1997a) was used exclusively for this exercise to clarify information contained there. Banders were taught to first consider the date of banding, thus narrowing down which parts of the molt account needed to be read, and where molt limits should be visible during that time period. This information was used to color the wing outlines. Each outline on the sheet was used to depict the resultant plumage from each molt of the species. Species with pre-alternate molts had more outlines colored in than those without them.

As participants worked through the description and stages of the bird's life, they colored outlines to show what a wing it would look like sequentially until all plumages were depicted. The wing outlines were filled out as follows: Juvenal feathers

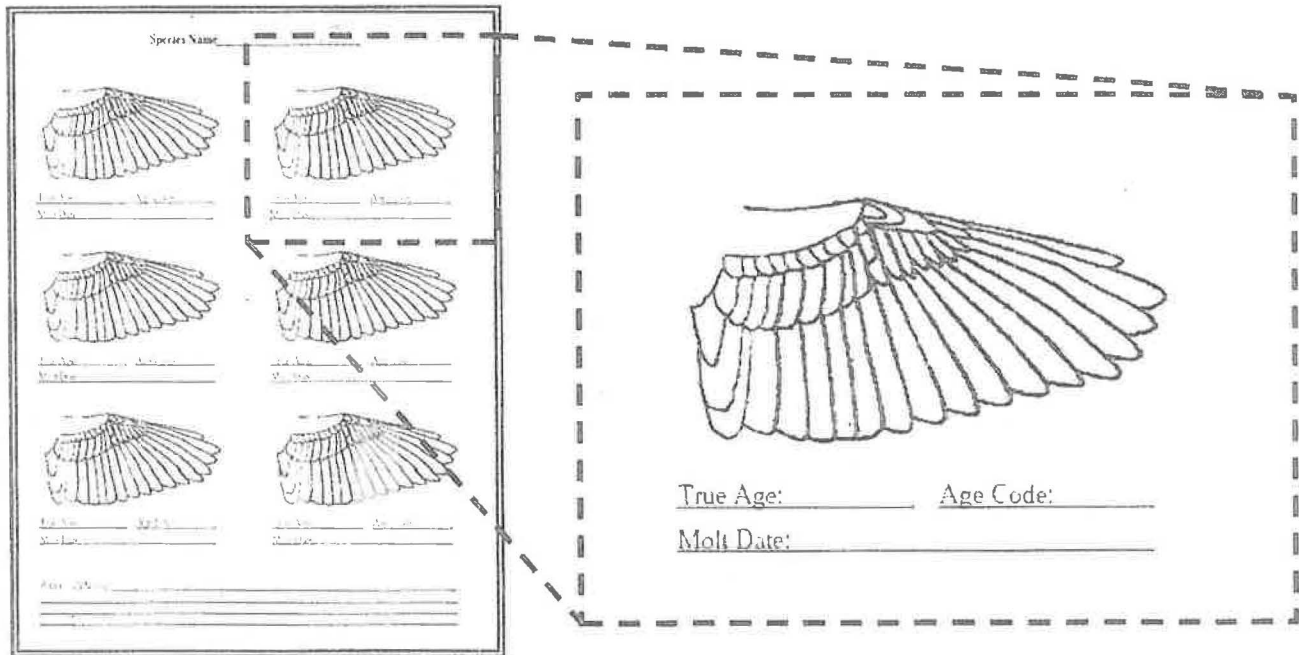


Fig. 2. Worksheet for coloring 101 exercise. This worksheet consists of six bird wing outlines, with a space to identify the species at the top of the sheet. Below each outline is a space to note the true age of the bird, the appropriate banding age code, and the average or earliest (either) known date of molt occurrence.

appeared as white, so the juvenal wing was not colored, and a different color was assigned to represent each plumage resulting from every molt in the bird's first through definitive cycles. Participants read through the molt section of the species account, identified the tract being described for each molt, and colored the minimum number of feathers that were replaced "often", "usually", or "always" (implied in the absence of one of the other descriptors). If specified feathers are replaced "rarely", "occasionally", or "sometimes" they were ignored or, alternatively indicated with dots or hatching. The alula covert, lesser alula, carpal covert, and lesser coverts were assumed to be replaced with the median coverts unless stated otherwise. As with the age chart exercise, the first example was done in a group setting, followed by individual work.

Coloring 101 Discussion

While the focus of this exercise is on the wing of the bird, the outlines may also include the body and tail and be colored appropriately. Outside of a

workshop, any group or individual can perform this exercise. By conducting these coloring exercises, it becomes obvious that there are a limited number of molt strategies and patterns repeat themselves. Some participants choose to create these diagrams for the most frequently captured species at their banding station. It is possible to just read Pyle (1997b) and examine the tables for familiar species, but we feel that the information is better learned and retained when individuals create their own colored outlines, at least until participants can use the Molt sections of Pyle (1997a) accurately and efficiently.

Specimen exercise

The specimen exercise was developed initially at the 1996 workshop to provide a measure of banders' ability to collect key data and to gain insight into the heterogeneity of the assessments that experienced banders would provide. However, the discussion that followed the initial exercise was of such value that learning has been its primary use ever since. This particular exercise assists participants in putting their new or refined

knowledge of age and sex determination techniques to work on birds-in-hand and is used at all PNR workshops.

The primary advantage of using specimens rather than live birds for this exercise is that all participants are able to handle the same bird, making comparisons and lengthy discussion possible while avoiding the risk of stress to a live bird due to long handling. It allows birds from all seasons of the year (and the varying plumages) to be examined in a single setting. Some characteristics (e.g., soft-part colors, skull, cloacal protuberance, brood patch) are not available to help determine age and sex on dead birds forcing the participants to focus on plumage characteristics.

Acquiring specimens for this exercise has been an ongoing process. We initially used frozen birds. Once thawed they were as flexible as live birds, but often damp and sometimes messy if the specimen bled. Unless they were later dissected, the gonadal and pneumatization status to confirm sex and age remained unknown. Next we tried museum specimens. While often of known sex and crude age they did not typically have an open wing, so their usefulness for this exercise was limited. Because of the extensive handling of specimens and difficulty in measuring and fully examining a closed wing, we were concerned that potential damage to specimens might affect our ability to borrow specimens for future workshops. To address this, the Provincial Museum of Alberta (now the Royal Alberta Museum [RAM]) prepared a small number of specimens with one wing disarticulated and prepared as a spread wing, then attached to the whole specimen with a thread. RAM also had specimens for which the body was in too poor a condition to be suitable for preparation. The wings of these birds were salvaged and contributed spread wings for use in our workshops.

As our program grew and the utility of spread-wing specimens became more obvious, the Bird Banding Office in Ottawa created a specimen collection with the assistance of the Royal Ontario Museum. This collection consists of over 200 spread-wing specimens and can be borrowed within Canada for

learning events. It is accompanied by image files for most specimens and a database with specimen number, species, age, sex, and notes from the person who made or, in some cases, corrected designations. The images and notes have been extremely helpful in the discussion and verification stages of this exercise.

In addition to the specimen collection, museums made available frozen birds not suitable for preparation as specimens from station salvage or window strikes. A bonus of using specimens outside the museum collection was that taxonomic variety increased, though in this exercise we found that even common birds yielded useful discussion. For frozen birds, we found it was important to thaw them slightly before use (surrounded with paper towel during thawing) so that the wings were flexible enough to be extended for assessment and measuring.

Regardless of whether the specimen was prepared with a closed or open wing or was a thawed bird, the species, age, and sex was usually predetermined by the leader for this exercise. Where possible, a collection that included different ages/sexes of the same species was useful for comparison. We provided the specimen number, month of death, and wing chord (if available) and covered any existing labels if they contained information we were asking participants to devise.

Participants assessed the bird and recorded the species, age, sex, and notes on the left side of the form provided. We recommended that they identify which characters they used in their assessments and record the generation(s) present in each feather tract in the notes section. Occasionally we asked them to take a physical measurement (i.e., wing chord, tail, tarsus, or culmen length) and note it on the sheet. For this exercise, participants were permitted to use all of the reference material and tools normally available to them if they were banding. Each participant was given the opportunity to evaluate all specimens.

Following the assessment of specimens, we had an open discussion about each specimen. When there

was a digital image of the specimen, it was projected on the screen for evaluation by all workshop participants under the guidance of the leader. This was a huge benefit as the salient features, such as wear, feather shape, or molt limit, were pointed out on screen. The discussion led to considerable exchange of information and clarification of many terms used in Pyle (1997a), such as the contrast between coverts and flight feathers. At this point of the workshop, participants became aware of relevant supplementary literature and the occasional inapplicability of Pyle (1997a) for some species or regions. They received reinforcement or adjusted their understanding of the reference materials. For the leader, the discussion made clear what messages about the use of molts and plumages needed to be repeated to the participants and these points were then illustrated with specific specimens or slides. We encouraged participants who initially made errors to fill in the appropriate final determinations and to make additional notes on what they learned. It was important to allow participants access to the specimens again after the discussion.

The main variation of this exercise was in doing it in small groups. For the first few years we did it individually but then tried it as a group exercise and thereafter we employed both methods over the course of each workshop. Starting the exercise in a group was helpful, if participants had limited or a mix of experience. Groups of three to four individuals including at least one experienced individual seemed to work well. The individual exercise should not be avoided as it is the closest approximation to banding in isolation.

Workshop leaders needed to be mindful of personalities and experience levels. Novice or passive individuals sometimes acquiesced to the group assessment without truly comprehending what they saw in the plumage and were less likely to ask questions. Also, experienced or confident individuals often dominated the discussion and assessment even if they were making errors. The risk of group misdirection by a dominant individual was mitigated by prompt verification by the workshop leader, after each bird or small group of birds was assessed. During verification, the group

presented its assessment and pointed out the features or characters that led it to that conclusion. Leaders examined the specimen, consulted their notes, confirmed or corrected as necessary, and pointed out additional cues that the group may not have noticed. If there were conflicting cues, a discussion to identify which are the most reliable one(s) followed. The leader asked each person in the group to present the assessment for at least one specimen to help to involve the less experienced or less confident participants.

As an individual exercise, well-spaced workshop participants were left to work at their own pace or given a time limit of four to six minutes per specimen. The advantage of applying a time limit was that it simulated actual banding, in which birds need to be processed promptly. We found that participant shyness and discomfort with being wrong was sometimes a challenge to discussion participation, addressed by keeping the discussion as informal as possible. It was important to use a variety of approaches to engage all workshop participants regardless of the level of experience, knowledge, or background. The post-assessment discussion proved to be a valuable forum for all to learn from one another. Often there was a workshop participant with long experience with one of the species examined, and he/she had some insights from which all, including the leader, learned.

Finally, utilizing this exercise multiple times throughout the workshop weekend provided us with a measure of workshop effectiveness, as we compared individual performance early in the workshop and near the end. We asked participants to indicate whether they would change their assessment of a specimen's species, age, or sex based on the discussion. Comparison of the uniformity of answers among all participants before and after the discussion provided another measure of workshop effectiveness. We found that the proportion of correct answers increased and variation in workshop participant assessments of age and sex was reduced following discussion (Dale, unpub. data).

Specimen Exercise Discussion

The specimen exercise can be further modified depending on the knowledge and experience of the workshop participants. For example, a group of inexperienced participants may benefit from initially limiting the specimens to birds from only one season so that they do not have to consider season on top of sex and plumage characteristics. Later in the workshop or for more advanced participants, a combination of male and female birds from spring and fall could be used. Although a workshop setting is ideal because more participants almost always means more experiences to draw on, this exercise can be done by small groups, such as at an observatory and this will increase uniformity of data collection. If specimen material is not available, the exercise can even be done with high quality spread wing photographs.

Conclusion

Bringing workshop participants together allows both structured and unstructured information exchange and results in an increase in knowledge and uniformity in the application of age and sex determination techniques. The exercises we have outlined here focus that exchange and ensure target topics are covered. A leader with extensive knowledge, wide experience and a confident but open and non-threatening demeanor maintains order but allows for the transfer of new information through open discussion.

We recommend that banding trainers attend annual regional or national workshops to maintain consistency (Dale 2004). We hope that the above presentation of our workshop format and principal exercises will help to motivate other jurisdictions or individual banding stations to perform similar training exercises to pass along the benefits of consistency and confidence generated by these workshops.

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News, Notes, Comments

ERRATA-Omission: NABB Jan-Mar 2014 Vol. 39 No. 1, page 27, 2nd column last line of ACKNOWLEDGMENTS should be as follows: Dan Anderson, and Walter Sakai for helpful reviews of earlier drafts of this manuscript. This is Point Blue Conservation Science contribution #1964.

Guidelines for Prioritizing Bird Safety during High Capture Events.

As responsible bird banders, we must anticipate, mitigate and minimize any potential danger to the birds we capture and process. The purpose of most banding operations is to sample a population, which does not necessarily include capturing every possible bird. There is always the potential to catch large numbers of birds and contingency plans should be in place to ensure that bird safety is never compromised. Certainly large numbers of birds can be caught and banded safely, but there is a fine line between a safe operation and a potentially harmful one. Ensuring bird safety requires training, constant vigilance and assessment of our actions.

The purpose of this article is to provide a synopsis of strategies and methods used to help banders manage potentially busy situations that may be outside an operation's normal comfort zone. Our most important recommendation is that banders use the information within to help prepare and develop their own strategies for handling potentially high volume events.

BE PREPARED

Know the limits of an operation and work within them - Being prepared to handle large numbers of
Apr. - Jun 2014

birds can drastically improve efficiency and overall safety of birds on both the busy and not so busy days. It is important that banders know their own limits and strive to work within them. Every banding site is different, but the size and skill level of the team will always be two of the greatest limiting factors to an operation. Knowing the limits of a team is essential to maintaining a safe operation. Having lots of help is not necessarily an invitation to band more birds, as a lot of inexperienced help is far worse than few experienced assistants. Short-handed situations may require modifications to protocols, such as opening *fewer* nets and banding *fewer* birds.

The greatest Bander-In-Charge (BIC) is not measured by how fast they can band or extract a bird, but by the quality of their team and the level of explicit focus on bird safety and data quality in every aspect of the operation. Banders should never be placed in a situation that they cannot handle, and they should not be afraid to tell the BIC that this is so. BICs may wish to reassure less experienced team members that, although they are extremely busy, the situation is under control and offer advice on how to improve efficiency. Depending on the site, it may be important for protocols to address specifically preferred methods or deviations in busy situations to maintain data integrity while prioritizing bird safety.

Importance of Protocols - General practices and guidelines of bird banding on a busy day are no different from a normal day. However, the potential consequences of not following them are amplified significantly on busy days. Guidelines