

**North American Ornithological Atlas Committee (NORAC)
2010 Workshop Minutes**

Sunday, 6 February 2010, 09:00-17:00
Town & Country Resort and Convention Center
San Diego, California, USA

Organizers:

Charles M. Francis, NORAC Chair, charles.francis@ec.gc.ca
Andrew Couturier, NORAC Co-Chair, acouturier@bsc-eoc.org

Additional Participants:

Peter Blancher, Mike Cadman, Jean-Sébastien Guénette, Pamela Hunt, Matthew Kamm, Benoit Laliberté, Holly Middleton, Bob Mulvihill, Dan Reinking, Michel Robert, Bonnie Sample, Allison Sussman, Rick West, Mark Wimer, Jean Woods

ACTION ITEMS

- **Andrew** – create wiki for NORAC that will be used to manage the Handbook writing and review process (update: already done, but needs to be organized and prepared for others to start using it)
- **Charles and Andrew** – post revised Handbook outline to the wiki, along with instructions for authors
- **Denis** – post database of “invalid codes” to the NORAC website and/or wiki
- **Chapter Leads** – begin pulling together the outline and content of your chapter

INTRODUCTION (Charles Francis)

- Review of agenda and desired outcomes of this meeting
- Conclusions from Portland meeting and review of progress:
 - Many states/provinces currently developing second round atlases
 - Value and purposes of atlases have evolved considerably since first round
 - Internet is an essential part of modern atlases, and accepted by most atlasers
 - Many new technologies now in use
 - Atlases should aim to collect more, rather than less information
 - All of these advances point to the need for an updated Atlas handbook to provide guidance to new atlasers
 - Monograph of atlas-related papers is on hold in lieu of working on the Atlas Handbook. Too much work to organize a monograph, too little time available, etc. More immediate value to NORAC in working on the Atlas Handbook. However, potential authors should be encouraged to publish their papers on their own.
 - A brief review of the NORAC website
 - Purpose and function of NORAC
 - Overview of existing content and resources
 - Listserv has been very useful; we should continue to exchange information there, especially updated information for posting to the NORAC website
- Atlas Handbook – revisions to the Handbook are a major topic of discussion today and flow naturally from the evolution of atlas methods and needs. NORAC can provide valuable guidance to fledgling atlas projects.

SHORT UPDATES ON CURRENT ATLASES (Discussion lead – Andrew Couturier)

- Short updates from atlas coordinators or delegates on currently active or recent atlases (5-10 minutes each) – should emphasize features that are new or distinctive in each atlas and that might be of particular interest to others developing atlases

- Québec (Michel Robert)

- In final planning stages to launch project in spring 2010
 - Obtaining road layers, developing habitat classification scheme, point count sampling plan for abundance data, recruiting regional coordinators
 - Challenge – province is huge – S Quebec that was covered in first atlas 5,500 10x10 km squares; North – adds an extra 11,000 squares
 - Most ornithologists in Quebec are in S of province
 - Selected ~ 1000 priority squares in S Quebec based on roads and birders
 - Challenge of translating all materials
 - Cannot afford to repeat book publication in this 2nd atlas
 - Plan is to obtain both distribution and abundance data
 - Northern Québec:
 - May try to stretch beyond the 5 years
 - Likely can get a lot of volunteers, including from the U.S.
 - Need to get logistical things sorted out; very expensive
 - Could be many new breeding species for Quebec up there
 - Many rivers, but possibly challenging to use for navigation
 - May start by mapping existing older records (unpublished data, etc.) to help with planning coverage
- Minnesota (Bonnie Sample)
 - First data collection season last year (2009)
 - Cornell is managing data base
 - Volunteers are not being asked to collect abundance data
 - University of Minnesota is sampling 3,000 priority blocks in a parallel project for quantitative sampling
 - 3 times that for non-priority blocks
 - About 400 people registered for first atlas
 - Over 1000 blocks with some data. Goal is 500 completed blocks by this year
 - Blocks are 3 x 3 miles, based on the Public Land Survey System used in the USA.
 - Two websites: the project website, for overall coordination, and the site that manages the data
 - Delaware (Jean Woods)
 - State has <300 blocks (each 3 x 3 miles); whole state can be crossed in a two hour drive
 - A few blocks have no roads (e.g., marshes)
 - Some new things that were developed this round include new technology and better ways to collect data
 - Challenge – how to determine when a block is “complete.” Some are time-based (number of hours), some are target-based (number of species)
 - Trying to use a species accumulation curve; allows data to indicate when the block is complete
 - Allows (potentially) for variation in volunteer skills, challenges in accessibility
 - Getting better data on phenology
 - Reviewing “safe” dates for atlas. First atlas had borrowed safe dates from Maryland
 - Realised didn’t have any good data sources to look at safe dates
 - Using atlas to get better phenology data via a separate field card for each day’s visit
 - Using Patuxent on-line data entry system
 - New code “e” for species encountered outside of safe dates
 - A migratory species should be seen more widely outside of breeding season
 - By having people record every species they encounter each day, get better information on first nesting, second nesting, etc. (Also allows for better species accumulation curves)

- Encouraging more incidental observations
 - Greater emphasis on data from people who don't "own" a block
 - Blocks can have multiple owners, or can record data for blocks where people live
- Alabama (Rick West)
 - Complete and published and now available online
 - Maps and other info available
 - Web site links to species account and so on from the Cornell site ("all about birds – photos and life history information") so does not need to be repeated
 - New Birds of Alabama being developed; will incorporate data from atlas, but extend beyond it.
- Puerto Rico (Rick West)
 - See notes regarding atlas development in Latin America
- Florida (Rick West)
 - Trying to get a second atlas going, funding has not yet been secured
- Maryland (Mark Wimer)
 - Maryland finished 2nd atlas, now in press
 - All of the maps are available on line
 - Raw data are available on request
- Vermont (Mark Wimer)
 - In process of writing up their atlas
 - Doing an online presentation
 - Found out that a lot of their sponsors and contributors wanted a book. Trying to do enough fund raising to cover costs
- Loudoun County, Virginia (Mark Wimer)
 - Small county-scale atlas just starting - 76 blocks (1/6 topo map)
 - Daily cards, but only recording new sightings and upgrades, rather than all species on each day
- Oklahoma (Dan Reinking)
 - First winter bird atlas
 - Similar to breeding bird atlas
 - Record order of magnitude abundance (1-10; 11-100; etc.) of what you actually observed, as opposed to what you think is in the block
 - Completed 5 years of field data
 - Intention is to publish a book, but funding remains a concern; looking at a combination of funds from private sources and state wildlife grant money.
- South Dakota (Nancy Drilling)
 - 435 randomly selected blocks
 - Not many birders – only 38 volunteer atlasers available; might top out around 50
 - Therefore, quite a few paid staff needed
 - No point counts – just regular atlasing
 - Volunteers contributing ~1/4 to 1/3 of data
 - Showed interesting graph comparing species accumulation across blocks, and comparing volunteers to paid staff.
 - Volunteers get on average 5 fewer species, although the avg species/hour is not significantly different.
 - Question of whether higher species richness was because of paid people covering more remote/diverse blocks – not really.
 - Special owl surveys (in Black Hills – only heavily forested areas)

- Conducted in March and April
 - Collecting data to estimate detection probabilities – see separate item later in agenda
 - First atlas was all volunteer, but concern was there were a lot of gaps in information collected – not just numbers, but also quality
 - Some of most important blocks were quite far away
- Ontario (Mike Cadman)
 - Published in 2007, but not quite over yet!
 - Put out a book in English, but then needed to translate into French – may be able to get French version published this summer
 - Noted that a Canadian Breeding Bird Atlas committee has just been formed to coordinate and standardize methods, and to plan the rollout of atlases across the country on 20 year cycles
 - Need to ensure adequate support from government funding sources and reduce the number of atlases running concurrently
- Pennsylvania (Bob Mulvihill)
 - Completed field work for 2nd atlas in 2009 (2004 start)
 - Now preparing final maps, doing data analyses, etc.
 - Preparing for a book publication
 - Somebody else will be dealing with Internet presentation results
 - ~3000 to 4000 volunteers surveying 4,900 blocks (5 x 5 km)
 - 900,000 breeding bird records from volunteers and paid crews (includes multiple records of same species)
 - Particularly asked for multiple records for species of conservation concern
 - Volunteers did a lot of extra work collecting additional data that are likely to be useful
 - Well beyond what was needed for first atlas
 - Ignored advice to expect less from volunteers, and it paid off in a big way
 - New features in 2nd atlas:
 - Dates for all records
 - Cannot enter a record without a date
 - Not expected to report birds every time seen, but cannot report a record without a date
 - Precise location data requested for 50 species of interest (required for 25 state rarities; encouraged for 25 others)
 - 125,000 pin-pointed breeding bird records in relation to hemlock distribution (because this tree species is suffering from woolly adelgid disease)
 - Point Counts
 - ~36,000 completed by paid staff, 10 staff per season
 - Covered all blocks
 - Priority blocks – 1 out of every 6 – included special protocols for nocturnal and marsh birds -- limited success. Some were well covered, some less well
 - Not as much extra effort as would have been liked
 - Playback and GIS layers on modelled habitat data
 - Given maps with wetlands to target wetland birds
 - Penn state university gave data to allow a block owner to toggle habitat to find appropriate areas
 - Low success on nocturnal and marsh birds probably because:
 - Volunteers reluctant to go out at night
 - Limited success in many areas, so low positive feedback
 - In retrospect, should have used paid crews for special surveys
 - Playback and CD and published
 - Block completion

- Original atlas goal had been ~75% of 100 species per block, and that was roughly what was achieved
 - 2nd atlas, looked more at spatial heterogeneity (land cover and species data) and used GAP models to get predicted numbers for each species
 - Goal – 75% of predicted number and/or 25 hours of active atlasing
 - Some blocks probably had well over 100 species, while others may have had quite a bit less
 - Using data from 2nd atlas to refine and improve GAP models for future. (people are associated with Penn State)
 - Also have abundance data
 - Used professional point counters
 - Very rigorous point count protocol
 - ~10 field people per season, many replicates ~ 36,000 point counts. Each point was 6 minutes 15 seconds (5 75-second intervals for removal model analysis)
 - Andy Wilson (from U.K. originally – just got PhD from Penn State) is lead analyst for the project
 - Looking at how we analyse occupancy changes between atlases
 - Challenge is to deal with effort differences – see notes from afternoon session
 - Writing book
 - ~30 authors developing book chapters / species accounts. Mostly people who've been invited based on expertise.
 - Two websites:
 - Home site with protocols, etc.
 - Cornell site for data entry
- Massachusetts (Matt Kamm)
 - Run by Mass Audubon Society
 - 2007-2012 for 2nd atlas
 - 1055 blocks (~3 x 3 miles); about 740 are complete near the mid-point of the project
 - After about 20-30 hours tend not to get a lot of new species
 - Major species changes:
 - Declines in open space species (EAME, Kestrel) as forest regenerates
 - Loss of GWWA
 - Big increase in RBWO, CORA, COHA, WITU
 - Maintain a blog to keep atlasers in loop (full-time blogger)
 - Interim reports for all breeding species in Massachusetts – examples shown
 - Trying to encourage more effort on priority species, but not yet sure if this will be successful
 - Led to a nest box program for AMKE (associated with Mass atlas)
 - Results will be published online – no book planned
 - British Columbia (Andrew Couturier)
 - Two years of field work completed
 - Showed a map of current coverage; making progress, but a lot of areas with big gaps
 - Large, inaccessible areas to cover
 - need to review what is appropriate coverage
 - Maritimes (Andrew Couturier)
 - Four years of field work completed; fifth and final year in 2010
 - assessing coverage, how to fill gaps, what gaps need to be filled in, etc.
 - appears that a lot of the “harder to find” species may not be showing up as much this time

- Are people spending too much time doing atlasing by ear, or else atlasing from the roadside?
- Could age of atlasers be an issue? (e.g., GCKI no longer audible, etc.)
- Manitoba (Andrew Couturier)
 - Starting up in the spring; same stage as Quebec, i.e., in final planning stages to launch project in spring 2010
 - Obtaining road layers, developing habitat classification scheme, point count sampling plan for abundance data, recruiting regional coordinators
 - Funding challenges; coverage challenges
 - Very few birders (and people in general) in the province
 - Large, remote area to cover

TRAINING RESOURCES FOR ATLASES - NATUREINSTRUCT WEBSITE

Charles gave a demonstration of the NatureInstruct website that he and others have been working on for some time. The website contains a new and improved online version of *Dendroica* (for Canada) and *Doricha* (for Mexico), both interactive training tools which were previously available on CD. This training tool, complete with bird photos, songs, maps, and quiz functions, will be of great use to BBS and Atlas participants.

- Latest version, with modules for Canada, USA and Mexico was released in May 2010
- It is available in French and English
- Spanish capability to be added soon
- Further upgrades and improvements are either planned or underway
- Use of site requires self-registration in order to access the full suite of features
- <http://www.natureinstruct.org/>

Atlas coordinators may want to provide links on their websites. Also, if they would like to review the species lists for their regions, or help to improve contact, they should contact Charles.

REVIEW OF ATLAS HANDBOOK OUTLINE

We went through the draft outline of the Handbook and discussed content, organization, authorship, etc. We edited the outline on-screen during the discussion, so that content is not repeated here. In the afternoon, we discussed the content of certain chapters in more detail, with presentations from chapter leads, and these notes are captured in the minutes. Some additional points of interest that arose during the morning discussion are shown below.

- Question about published list / bibliography of uses of atlas data
 - Nobody appears to have a comprehensive list, although there have been a couple of recent papers that review atlases and their uses which might be a good starting point.
 - Once NORAC wiki is operational, we will post such papers there
 - Data sharing agreements should require notification of publication, but hard to enforce this
- Chapter – Recording Breeding Evidence and Effort
 - Safe date discussion revisited repeatedly
 - Recording things every time helps some, but recommended coverage dates in place of safe dates is another approach to remove the bias of safe dates.
 - Invalid codes
 - Is there a master list of invalid combinations of species and breeding codes that can be shared with the group?
 - Patuxent and Bird Studies Canada have been compiling these, but not yet a centrally available database
 - Ask Denis Lepage to share this via the listserv and/or wiki
 - Sampling design, selection of priority squares/blocks

- What methods have atlases been using?
 - Would be good to compile and include in this chapter
- Chapter – Tools and Tips for Managing Volunteers
 - Key comment: NORAC can archive atlas manuals, forms, etc. Patuxent has a bunch of those already and BSC has access to the suite of atlas materials from Canada. Should post them all on the NORAC website.
- Paid crews as part of atlas projects
 - How do you incorporate paid crews into an atlas that is or has been largely volunteer to date?
 - Paid crews were incorporated from the beginning in the first (and second) Ontario atlas
 - Work hard on getting most difficult areas done early – don't leave it to the end

---Lunch Break---

NORAC Business Session

- Officers
 - Charles and Andrew are having some difficulty keeping up with NORAC coordination
 - Asked for volunteers to step forward to help out – maybe 1 or 2 additional people would be good
 - Meeting participants polled, but no volunteers willing or able at this point; Charles and Andrew will continue
 - Will need some additional help with leading the compilation of the handbook chapters, nudging authors, etc.
 - Will send email to the atlas listserv as the process of writing the handbook ramps up
- Next meeting
 - Will take place 14-18 August 2012 at the NAOC, Vancouver, British Columbia
 - Could hold smaller, focussed meetings in the interim, if opportunities arise (e.g., in conjunction with a conference/meeting where many of us will be)
- Web page, listserv
 - Need to keep web page up-to-date, especially information on current atlases
 - People should send updates to the listserv

SPECIAL TOPIC: OCCUPANCY MODELLING AND SPECIES DETECTION

- Presentation by Nancy Drilling, Rocky Mountain Bird Observatory, *Estimating Species Detection Probabilities in the South Dakota Breeding Bird Atlas*
- Detectability study run during second summer of SDBBA
 - David Pavlacky – statistician who designed the survey and analysis methods
 - An add-on to the main atlas project
 - Importance of addressing detectability and variation in detectability in analysis of atlas data
- Set clear goals
 - Project does not want to take away from main atlas project, supplement only
- Detectability is affected by habitat, season, time of day, survey, observer, species
- Issue of 'false absences' where bird is in the block but was not detected
 - Was it under-reported or is it really not there?
- Data must be collected properly for analysis purposes, so project design is very important
- Presence data (observed/not observed) only
- Occupancy modeling where P is the probability of detection when a species is present over repeated visits
 - $P = \text{sum of detections} / \text{sum of visits}$ (simplified)
 - Species must be detected 10-90% of the time, otherwise does not work

- Assumes
 - Closed population
 - Birds are properly identified
 - Compromise between missed records and detected
 - Detection probabilities are equal across all species
- Field methods must be consistent and the same over each repeated visit
 - Asked some professional atlasers to do structured visits
 - 3 four-hour visits, using exact same route (first visit, atlaser picked its own route, 2nd and 3rd visits follow same route)
- Analyses
 - Used Program PRESENCE for analyses
- Conclusions
 - Data used in atlas project
 - Little change in data collection
 - Helps understand bird distributions
 - Does NOT detract from atlas objectives
- How do you account for rare species that you cannot run modeling on?
 - One possible suggestion is to collect more data. But what about species that are detected too much (>90% of the time)?

HANDBOOK CHAPTER: ANALYZING CHANGE BETWEEN ATLASES

- Presentation by Peter Blancher, Environment Canada, *Measuring change between atlases - Ontario and elsewhere*
- **Key point:** when planning first atlas, always think ahead to second atlas
 - Measuring change requires robust information and careful planning is required
- Why measure change? What type of change do you want to detect?
 - Landscape, population, bird distribution
 - Need to consider unexpected changes and patterns (range shifts, climate change impacts)
 - Fill geographic gaps in trends
- Point counts will help monitor change for the next atlas, but still need to look at occupancy data
- Measuring change – can range from simplified mapping to extensive modelling
- Challenges with Ontario Atlas data:
 - Very poor correlation in number of hours of effort within squares between atlases
 - Could not separate casual effort from focused effort, and not all effort properly recorded
 - Differing methods in different parts of the province (e.g., in second atlas, added point counts, special research project in boreal, targeted selected species)
 - Possible changes in skill levels since first atlas – impossible to tease out
 - Not enough “redundant” data, e.g., did not allow for exclusion of individual records (e.g., particular times of year). Would have helped to record all species on every visit
 - Approach employed:
 - Compared same squares with adequate effort (20 hours or more) in both atlases
 - Richness increases beyond 20 hours, richness is related to effort and region
 - Matched effort within squares
 - Few matched squares in north
 - Changed methods; included all squares even unmatched with 10hrs effort and included land cover covariates to balance out unmatched squares
 - Boreal forest bird program (paid birders doing point counts, and atlasing)
 - Data removed from change analysis to avoid skewed results (although results were similar even if this was included)

- Measuring change elsewhere briefly discussed (Alberta, NY, PA)
- Consider...
 - Atlases are rarely one time only
 - Designing data collection methods – what kinds of change will you want to measure??
 - How will these data be collected to maximize their use?
 - Data management
 - Analysis of data
- Suggestions for Handbook:
 - Section describing the different types of effort – how do you define and track them?
 - Along with different ways to categorize the effort; assign an effort value to a sighting or multiple sightings – need standardized effort measurements
 - Essential that it be tied with complete species lists on each visit
 - Separate out primary and secondary effort
 - More statistical development is needed!
 - Flag special survey types as such so that during analyses, data can be pulled out (marshbird, owls, nightjars, etc.)
 - What are the best practices for pulling in outside data (BBS, marshbird surveys, owl surveys, nightjar surveys, etc.)?
 - Recommendation: Include the data! But record where they came from... regardless of effort associated with it.

HANDBOOK CHAPTER: HABITAT DATA (Discussion lead – Nancy Drilling)

- Have a purpose for collecting habitat data besides just wanting to do it
 - Habitat data being gathered by participants in Canadian atlases, but so far have not been used for any analyses.
 - Tried in Puerto Rico – but failed
 - Many places tried to include habitat data
 - In Colorado tried to do it
 - In S Dakota – was flagged as an objective, but not clear what to do
 - Just for special species in some regions:
 - In Ontario – only for point counts (and nest records)
 - In Penn collected hemlock data – helped to supplement remote sensing
 - Also some data that focussed on information that could not be picked up with remote sensing data (or that needed calibration)
 - Species of concern – listed or PIF, etc.
- Why collect habitat data?
 - Rare or peripheral species -- improve understanding of their habitat use
 - Measuring changes between atlases
 - Identifying nesting habitat for particular species
 - Important for conservation, because habitat is what we can manage
 - Statistical adjustments when calculating abundance
- Habitat associations – do we really need to know more?
 - Predictions based on “expert best opinion” often work very badly
 - Habitat associations may be very specific
 - Penn provided data to show that we do not know enough information about current habitat distributions
 - Including bird use of different habitats
- Is there another way to get habitat data since atlasers may be reluctant to collect the information?
 - GIS, remote sensing
- What categories of habitat should we use, especially if they are volunteers?
 - Codes and categories that are mutually exclusive and well defined
 - Can we use schemes from elsewhere – TNC (Nature Conservancy) or Natural Heritage program?

- May have merit for combining data with elsewhere
- Relationship to GIS landcover and/or vegetation layers
 - If they don't match at all, may be a challenge
- General issues
 - too complicated
 - too much to ask
 - bird not in breeding habitat
 - Do we record habitat where observer was standing?
 - Do we record habitat where bird was observed?
 - Can we simply record lat-long where bird was found and relate to GIS
 - Are habitat locations specific enough?
- Latitude/longitude location where bird was seen, can be related to a GIS layer
 - Challenges with precision and accuracy – will locations be accurate?
 - Is the GIS layer accurate/good enough?
 - GIS/GPS phobia

HANDBOOK CHAPTER: DATA MANAGEMENT (Presentation and discussion by Mark Wimer)

- Incorporate into planning process – project goals, management needs
 - Evaluate options broad and specific and then prioritize them
 - Data management system can be more than just a database, but rather a project management tool
- Science value is (and should be) the driving factor; do not let technological limitations drive your decisions; design the technology to collect the data you want; don't let current tools limit the data you collect
- How much should be managed online?
 - Data managers want to be less involved so more online is better, but can all atlasers handle online data entry?
 - Learning curve is key; older participants don't always want to learn new technology
 - Recommend providing multiple options for ways to capture data: email, online, in-office, scanning
- Contribute through collaboration... or else what's the point? You're helping data managers and other atlasers by using an existing system
 - Better for merging datasets among states / provinces in the long run for larger scale analyses
 - Functions developed for one atlas can be passed on to the next at greatly reduced cost
- Do's and Don'ts (other ideas from Mark's list) – pass along any ideas from atlasers for handbook
- Avian Knowledge Network can help with data sharing, by storing atlas data in one consistent format, even when source data is stored differently
 - Therefore, doesn't matter if individual source databases have different fields, as long as they can map to a common suite of fields
- Suggestion to ask atlas coordinators about their experiences with different data management systems

HANDBOOK CHAPTER: SPATIAL ANALYSIS AND MAPPING (Presentation and discussion by Andrew Couturier)

- Purpose of mapping
 - Project planning
 - Rapid feedback to participants (motivation)
 - Fundraising
- Project planning, set up – how can maps help?

- Area coverage, regions, blocks assigned, priority blocks, large maps for coordinators to assign blocks
- Mapping atlas results
 - Breeding evidence/distribution
 - Abundance
 - Change
 - Kriging
 - Combinations of species
- Formats
 - Web
 - Book publishing
 - Dynamic mapping portals
- Software
 - Desktop, Server/web, Google Earth, etc.
- Spatial Analysis
 - Kriging, clustering, gap analysis
- Design considerations
 - Colour-blindness
 - Ask a birder with colour-blindness to review your maps!
 - Designing for black and white and/or colour-only printing
 - Need to pay attention to colour and hue
 - Need to run many test plots and get feedback from reviewers
- Suggestion to host a page on the NORAC wiki where people can upload maps and others can comment on them and/or derive some design ideas from them

NEOTROPICAL ATLASES (group discussion)

- How do we decide if atlases are good tools to be promoting in Latin America?
- Need to scope this out further
- Volunteers to look into this:
 - Nancy Drilling, Mike Cadman, Rick West, Charles Francis, Andrew Couturier
- Perhaps need to develop some promotional material to try to explain and market atlasing
- Potential Promotion in Mexico
 - Involvement of >100 people in Mexico as part of the PIF species assessment
 - Worth contacting to see what they think?
 - BBS, e-Bird Mexico, meso-American corridor monitoring strategy
 - Emphasize winter atlasing in Mexico
 - Winter is when both Northern and resident species are present
 - Who is making decisions about land conservation actions in Mexico?
 - What data do they require for these decisions?
 - Mexican website: AvesMex
 - Getting Spanish speakers involved – cultural aspect is important
 - Working together – pairing locals with other birders
- Other ideas for tapping into existing programs and/or funding pots
 - RED – reforestation for carbon capture (Mike Cadman)
 - Is it possible to tie this into better biodiversity conservation practices?
 - Money can potentially be better directed with good bird information
 - Collaborate with MoSI stations, etc.
- Dominican Republic has been considering an atlas
- Puerto Rico example (Rick West)
 - Hexagons as base units = slight problem (versus traditional squares/blocks)
 - In final year, 334 volunteers
 - Use Julian dates to collect breeding evidence for getting breeding periods and phenology data
 - Year round breeding = problematic
 - Need knowledge of tropical birds

CONCLUSION

- Wrap up and review
- Next steps for completing the Handbook
 - Andrew to create a wiki site for NORAC and set up facility for chapter authors to upload content
 - Once this is ready, we can start uploading / editing chapter outlines
 - Will need a champion / committee to encourage authors to complete their chapters and to move the project along
 - Potential recruits could include coordinators from just-completed atlases who are now under-employed? ☺
 - Need guidance for authors as to content and format
 - Maybe pick a few chapters and develop a model
 - Suggestions:
 - One page summary for each chapter
 - Most important information up front
 - Save details for later
- Adjourned at 1700