Department of Defense
Legacy Resource Management Program

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Support for Department of Defense – Avian Knowledge Network Program

Department of Defense Bird Banding Training Report

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Department of Defense (DoD) / Klamath Bird Observatory (KBO) Bird Banding Workshop Summary Report

KBO Upper Klamath Field Station -- September 11-15, 2023

Overview

DoD Mission-based Objective. This project was funded by the Department of Defense (DoD) Legacy Resource Management Program (Legacy Program). In September 2023, Klamath Bird Observatory (KBO) collaborated with US Army Engineer Research and Development Center and the Legacy Program, along with several other partners, to offer a five-day fundamentals of bird banding workshop hosted at KBO's Upper Klamath Field Station in Rocky Point, Oregon. This workshop was designed to support proactive habitat-based conservation and management strategies that maintain healthy landscapes and training lands by increasing internal capacities within DoD through an in-person field-based bird banding training. Our focus was on adaptive improvement and application of continued long-term demographic monitoring. Demographic monitoring using standard mist-netting and banding techniques provides essential information for monitoring trends in population-level vital signs at multiple scales (e.g., abundances, age ratios, productivity, survival, condition) at multiple scales. With attention on standardizing data collection and increasing data precision and accuracy, expected outcomes of this workshop included better data sharing and integration, and the application of advanced analysis for more technically and scientifically sound Integrated Natural Resource Management Plans (INRMPs), National Environmental Protection Act (NEPA) environmental reviews, and Endangered Species Act (ESA) Section 7 consultations.

Workshop instructors and participants band birds on KBO's Upper Klamath Lake Field Station. In-field training involved hands-on instruction and interaction (Photo credit: Ryan Terrill)

Full annual cycle vital signs monitoring is an essential component of science-driven proactive conservation, monitoring, and management of priority bird species. Building on DoD's new Avian Knowledge Network (AKN) Program, this workshop offered advanced field-based monitoring techniques training, a need identified during recent AKN data-focused classroom and on-line workshops.

This workshop combined in-field learning at two KBO fall migration monitoring sites with classroom study to train participants in all aspects of running a constant-effort mist-netting and bird banding program. Safety, data quality, and modern scientific practices were core foci of this workshop. This workshop took participants through a series of training materials, practical exercises, and scientific case studies. Skills and knowledge learned during the workshop will help participants establish and/or improve bird monitoring efforts and apply results at their installations in support of the DoD mission.

Participants. Seven individuals from different installations within DoD participated in this workshop. In addition, four KBO bird banding interns participated in a hybrid manner, assisting in training as student-assistants during morning banding sessions, while actively learning alongside DoD participants during afternoon classroom sessions. Intern participation offered additional one-on-one support for DoD participants, especially with regards to the specific protocols used at KBO's active migration monitoring sites.

Pedagogy. This workshop focused on building experience in the field during morning banding sessions, integrated with focused topics for learning, reinforced by afternoon classroom sessions. During morning banding sessions, DoD participants were assigned to a group and group leader to guide their learning. Groups rotated through focus areas with topics addressed at the mist nets and at two different banding tables. Each morning, rotations between topic-focused learning stations ensured groups had access to individualized instruction on all topics during daily banding sessions. During afternoon sessions, instruction included expert lectures and interactive exercises.

Workshop instructors. Three staff members and a senior intern from KBO designed and led the course based on North American Banding Council (NABC) curriculum. With over 50+ years combined experience banding birds around the world, these individuals have trained hundreds of bird banders. Two of these instructors are NABC certified trainers. Joined by two additional members of the DoD AKN team, one from DoD and KBO each, five instructors led afternoon exercises and facilitated discussions.

Preparation

Workshop participants were provided with preparation details before the workshop (see Appendix 1). These details included logistical planning, as well as detailed literature to inform the participants on field methods, bird banding, aging and sexing of birds, banding safety, and KBO's published standard operating procedures. Participants were expected to familiarize themselves with these materials before the beginning of the workshop.

Workshop Program

Structure. Methods for operation of banding sites and instruction followed guidelines established and recommended by KBO, the North American Bird Banding Laboratory, and NABC. A detailed syllabus compiled from teachings and guidelines from these organizations provided the structure for the workshop.

Materials. At the beginning of the workshop each participant received a copy of the *Identification Guide to North American Birds, Part I (2nd Edition)* by Peter Pyle (2022) and a binder with course materials. The course materials were compiled from those routinely provided as part of KBO's annual Bird Banding Internship Program and other regularly offered workshops. Materials included bird banding guides produced by the NABC; protocols, data sheets and other helpful materials produced by KBO and KBO's collaborators; literature related to bird banding methodology; case studies utilizing bird banding data authored by staff at KBO and KBO collaborators; and checklists and worksheets for participants to track their progress. See Appendix 2 for the table of contents of course materials included in the binder, and Appendix 3 for the list of course material citations.

Field. Morning banding sessions began at sunrise with experiential instruction at two constant-effort mist-netting cites located in the Upper Klamath region – (1) United States Forest Service Sevenmile Guard Station, and (2) United States Fish and Wildlife Service Rocky Point Cabin. Morning sessions were held at Sevenmile on September 12 and 14, and at the Cabin on September 13 and 15.

Ten nets were opened for four hours daily. During banding efforts, participants received instruction in key topics, including: banding site management; operation of mist-nets; net extraction; proper bird handling; application of bird bands; interpretation and use of the Pyle (2022) guide; aging and sexing techniques; the plumage-based aging system; collection of biometric and molt data used to evaluate breeding condition, physical condition, age, and sex of birds; appropriate data entry; and species checklist tallies.

KBO intern and instructor, Ché Ragoonanan, demonstrates proper handling and measurement of a Yellow-rumped Warbler (Setophaga coronata) at KBO's Sevenmile Creek banding site (Photo credit: Ryan Terrill)

Banding instruction was divided across three learning stations – (1) nets, (2) banding table #1, and (3) banding table #2. Each station was assigned a designated group instructor, and participants were divided into groups of two to three individuals. Groups rotated between stations in 80-minute intervals each morning to ensure that each group had access to individualized instruction at all stations, and from all instructors, during each banding session.

Specific topics were covered at each learning station (*i.e.,* topics covered at the nets and at the two banding tables were unique). Station topics were reviewed at each learning station daily, and topics were expanded upon during each subsequent banding sessions to further understanding of key techniques and concepts being covered during the week. See Appendix 4 for the workshop agenda, which includes the banding schedule, assigned groups, and topics covered at each station.

Participants were expected to remain with their designated group during each 80-minute interval, and participate in experiential learning as guided by each station instructor. Participants were introduced to key concepts, and quizzed throughout the morning to ensure application of concepts was understood. Participants were encouraged to ask questions, to assist as data scribes, and to engage in the banding process where appropriate. Participants were also given the opportunity to handle birds, band birds, and fully process at least one bird at the station. On the final day of the workshop, participants were able to move freely between learning stations, to receive extra instruction or clarification on topics as needed or desired.

The four primary banding instructors served as the group leaders during banding sessions. Four KBO bird banding interns served as student-assistants at morning banding sessions. Operation of the banding stations followed protocols and standards established in Ralph *et al.* (1993), NABC (2001a, 2001b), and Stephens *et al.* (2010).

Classroom. Afternoon classroom sessions took place at the Rocky Point Resort following each morning banding session. During afternoon sessions, instructors provided a series of lectures and interactive exercises to participants. Lectures and presentations built upon concepts covered in morning banding sessions and course materials in a more traditional learning environment. The DoD instructor helped ensure all aspects of the workshop applied to DoD-specific monitoring and natural resource management needs. Both DoD AKN team members also helped to relate workshop topics to the DoD AKN Program.

KBO intern and instructor Giselle Ragoonanan teaches proper use of banding pliers for band application at KBO's Sevenmile creek field station (Photo credit: Ryan Terrill)

During afternoon sessions, participants received instruction in key topics, including the importance of bird banding as a scientific practice; ethical and safe bird banding practices, including the Banders' Code of Ethics (NABC 2001a); bird topography and terminology; interpretation and use of the Pyle (2022) guide; molt strategies and plumage-based aging; bander safety, bird safety, and first aid; and permitting guidelines. Participants also practiced important concepts and techniques in interactive exercises with instructors, including identification of molt limits and creation of plumage maps using wing specimens, banding first aid and band removal, interpretation of bar charts in Pyle (2022), creation of tabular field reference sheets for species from Pyle (2022), and practice setting up and taking down mist-nets. See Appendix 4 for the workshop agenda, which includes the schedule of lectures and exercises provided during afternoon sessions.

Participants also heard from guest speakers during the workshop, who presented on KBO's collaborative outreach efforts at constant-effort mist-netting stations, ongoing partner-driven KBO projects, and scientific case studies that highlighted ways in which bird banding data can be used to inform scientific research. These talks aimed to provide participants with additional context on why collection of data through bird banding is important. They illustrated different examples on how participants can use bird banding data collected on DoD installations. Additional talks focused on a variety of value-added standard bird monitoring techniques (e.g., point counting, Motus) to demonstrate how the multiple bird monitoring methods employed by DoD serve as an integrated framework for informing natural resource management at installations as related to the DoD mission. Guest speakers also presented on best practices in outreach and education at banding stations, highlighting the importance of bird banding as

an effective education tool for varying audiences including DoD leadership, installation communities, and the public. To close the workshop the DoD instructor facilitated a discussion with the DoD participants about bird banding on DoD lands, brainstorming ideas about communications within a DoD banding network, data integration and analysis needs and opportunities, training needs, and the DoD AKN priorities focused on management and use of constant-effort mist-netting data.

Accomplishments

This workshop was implemented as part of an agreement between DoD and KBO to support the DoD AKN Program. This course provided seven DoD participants with intensive hands-on training experience, providing them with a foundation of knowledge and skills in bird banding that will help them establish bird banding stations at DoD installations and/or to improve existing bird banding and research practices currently being carried out. This workshop also facilitated the streamlining of DoD data collection techniques. A follow-up advanced workshop is being planned for the Spring of 2024 to build upon the foundation provided through this workshop, to introduce more hands-on experience with birds in the field, and expand upon plumage-based aging and molt limit identification. Additionally, another foundational class is being planned for the Fall of 2024 to train more DoD participants in bird banding techniques, and provide opportunities for further growth and development of a demographic monitoring network including bird banding at DoD installations.

KBO Banding Program Manager, Lucinda Zawadzki, provides classroom instruction to workshop participants at the Rocky Point Resort on Upper Klamath Lake, OR (Photo credit: Ryan Terrill)

Partners

KBO, DoD Legacy Program, DoD Defense Natural Resources, USFWS Klamath Refuge Complex, USFS Fremont-Winema National Forest, Crater Lake National Park, Avian Knowledge Network, NABC, Partners In Flight, Rocky Point Resort.

People

Instructors and DoD AKN team facilitators:

John D. Alexander, PhD (Director, KBO)
Ryan S. Terrill. PhD (Science Director, KBO)
Lucinda C. Zawadzki, PhD (Banding Program Manager, KBO)
Martín López Aguilar (Lead Bander, KBO)
Elizabeth Neipert (Army Corps of Engineers, Engineer Research and Development Center)
Caitlyn Gillespie, MS (Research Biologist, KBO)

Participants:

Chris Frauenhofer (National Guard, Utah Army National Guard Camp Williams)
Kaylee Draughon (Air Force, Hill Air Force Base)
Joelle Mangelinckx (Army, Joint-Base Lewis-McChord Yakima Training Center)
Lindsey Goldsby (Navy, Naval Base Kitsap-Bangor)
Emma Hoskins (Army, Joint-Base Lewis-McChord Yakima Training Center)
Andrew Sharp (Army Corps of Engineers, Engineer Research and Development Center)
Kevin Warner (National Guard, Idaho Army National Guard Orchard Combat Training Center)

Student-Assistants:

Eli Hersh (2023 Bird Banding Intern, KBO)
Ché Ragoonanan (2023 Bird Banding Intern, KBO)
Giselle Ragoonanan (2023 Bird Banding Intern, KBO)
Otávio Rocha (2023 Bird Banding Intern, KBO)

Guest Speakers:

Elva Manquera-DeShields, MS (Science Communication, Outreach & DEIJ Manager, KBO)
Thomas McLaren, MS (Point Count Program Biologist, KBO)
Linda Powell (NPS Seasonal Ranger, Crater Lake National Park)
Sarah Rockwell, PhD (Research Biologist, KBO)
Samantha Webb (Field Technician, KBO)

DoD and KBO staff and participants join for a group photo outside of the USFS Sevenmile Guard Station in the Upper Klamath (Photo credit: Elva Manquera-DeShields)

Participant Workshop Evaluations

Participants were asked to contribute to daily evaluations through plus/delta sessions, derived from a plus delta "positive change" evaluation methodology. The plus/delta system is an adaptive facilitation method that involves consistent check-ins with individuals that highlights both positive aspects, and suggested improvements, for existing practices. During each plus/delta session, all participants and instructors were encouraged to briefly share a positive aspect about the day (the +, or positive), and a topic for improvement (the Δ, or change). This positive framework aimed to provide consistent feedback from participants and instructors to help make this workshop be as successful as possible. Comments shared during plus/delta sessions were recorded, and adaptations were introduced on the following days to address any deltas.

Overall, participants expressed that the workshop was a positive learning experience as represented by very positive responses throughout. Most often mentioned was how supportive and patient the instructors and student-assistants were throughout the workshop in answering questions and guiding participants in their learning.

In response to how the workshop could be improved, participants suggested increasing the length of interactive exercises during afternoon classroom sessions, providing more opportunities for bird handling and banding in the morning sessions, better reference binder materials, more time in the field to connect banding and classroom sessions, and providing more hands-on practice with the plumage-based aging system and molt limit identification.

An Audubon's Warbler (Setophaga coronata auduboni) captured during the workshop, with a versus molt limit (difference in generations between the older, juvenal primary coverts and the newer, formative greater coverts), indicating this is a hatching year bird (Photo credit: Ryan Terrill)

Participants agreed that the instructors presented the material in an effective and thorough manner. They appreciated the inviting learning environment that the workshop provided to participants, which actively encouraged questions and discussion, and provided opportunities for participants to lead their learning throughout. Participants also responded positively to having interns present to act as student-assistants during the workshop, and noted that the banding crew worked well together to keep a good pace for learning throughout morning banding sessions.

Birds Captured

A total of 169 birds of 27 species were captured during this five-day workshop. Seventy-two birds were captured at USFS Sevenmile Guard Station, and 97 birds were captured at USFWS Rocky Point Cabin. The most abundant species captured was the Audubon's Warbler (*Setophaga coronata auduboni*), with a total of 45 individuals captured across both constant-effort mist-netting stations. The next most abundant species was the Dark-eyed (Oregon) Junco (*Junco hyemalis*), with a total of 29 individuals captured across both constant-effort mist-netting stations.

See Appendices 5 through 8 for more details on birds captured during the course of the workshop.

References Cited

NABC. (2001a). The North American banders' study guide. The North American Banding Council. Point Reyes Station, California, USA. 66 pp.

NABC. (2001b). The North American banders' manual for banding passerines and near passerines (excluding hummingbirds and owls). The North American Banding Council. Point Reyes Station, California, USA. 15 pp.

Pyle, P. (2022). Identification guide to North American birds, part I: Second Edition. Slate Creek Press. Forest Knolls, California, USA. 698 pp.

Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin, and D. F. DeSante. (1993). Handbook of field methods for monitoring landbirds. USDA Forest Service, General Technical Report, PSW-GTR-144, Albany, California. 41 pp.

Stephens, J. L., Mohren, S. R., Alexander, J. D., Sarr, D. A., and Irvine, K. M. (2010). Standard Operating Procedure (SOP) #6: Mist Netting. Version 1.05 (2022 DRAFT REVISION). Klamath Network landbird monitoring protocol. U.S. Department of Interior, National Park Service, Natural Resource Report NPS/KLMN/NRR-2010/187, Fort Collins, CO.

Appendix 1. Preparation details provided to participants before workshop.

Klamath Bird Observatory

Advancing bird and habitat conservation through science, education, and partnerships

Preparation Details -- DoD Bird Banding Workshop

KBO Upper Klamath Field Station -- September 11-15, 2023

To help participants make the most of this training opportunity, the following materials are being provided for review prior to the workshop. Specific attention and study should focus on the resources that are so noted (and listed in red font).

If you have any questions about these materials or the workshop specifically please call Ryan Terrill (KBO Science Director) by email at rst@KlamathBird.org or by phone at 408-406-1231.

Workshop Locations

Classroom and Lodging

KBO and DoD are hosting this training workshop in collaboration with the Rocky Point Resort. The Resort is generously providing discounted lodging and classroom space.

- Afternoon and evening classroom sessions will be held at the Rocky Point Resort. Limited lodging options are also available at the Resort.
  - Address -- 28121 Rocky Point Rd, Klamath Falls, OR 97601
  - Google Maps link -- https://goo.gl/maps/kJ3TJ1mBkifB68fY7
- Additional lodging is available at the Resort's brand-new Crater Lake Gateway.
  - Address -- 29200 OR-140, Klamath Falls, OR 97601
  - Google Maps link -- https://goo.gl/maps/nzT7CMrpp9Z3gKhb6
  - Crater Lake Gateway is a 10-minute drive from the Rocky Point Resort.

Call Esther Ong at 650-270-3068 to reserve a room. Cancellations due to changes in federal travel authorization allowed up to 48 in advance of check in.

Field Sites

KBO's experiential learning approach involves banding instruction and practice at long-term constant-effort monitoring stations. We will be running two of KBO's banding stations that have been in operation at our Upper Klamath Field Station facilities since 1997. These facilities are made available to KBO though special use permits with the US Fish and Wildlife Service (USFWS) Klamath National Refuge Complex and the US Forest Service (USFS Fremont-Winema National Forest.

- USFWS Rocky Point Cabin (CABN)
  - Google Link -- https://maps.app.goo.gl/e6nffVYr5CH74hFu7
  - The Cabin site is a 5-minute drive from the Rocky Point Resort and a 10-minute drive from Crater Lake Gateway.
- USFWS Rocky Point Cabin (CABN)
  - Google Link -- https://goo.gl/maps/cx9ccowSvHk6VD777
  - The Seven Mile site is a 30-minute drive from the Rocky Point Resort and a 35-minute drive from Crater Lake Gateway.

Meals

Please be prepared to pack your own breakfasts for the Tuesday through Friday field days. The 140 Country Store located at the Crater Lake Gateway Hotel has limited shopping options. More extensive shopping options are available in Medford, where most workshop participants will be flying in to, and in Klamath Falls, which is a 35-minute drive from Rocky Point Resort. Dinners are available for purchase at the Rocky Point Resort where afternoon classroom session will be held. The restaurant at Harriman Springs Resort and Marina (Google link --

P.O. Box 758, Ashland, OR 97520 Ph (541) 201-0866 Fax (541) 201-1009 www.KlamathBird.org

Klamath Bird Observatory

https://goo.gl/maps/T9WRuhMti3KWoCwxS), located within 5 minutes of the Rocky Point also offers a full lunch and dinner menu. KBO will provide basic coffee each morning.

Reading Materials

Field Methodology

Banding instruction and practice will be offers at long-term constant-effort monitoring stations that are being operated as a part of our fall migration mist-netting and banding efforts. These monitoring efforts follow methodologiesoutlined in *Standard Operating Procedure (SOP) #6: Mist Netting.* This workshop version of the KBO field methodology is based on *the Klamath Network Landbird Monitoring Protocol* (Stephens et al. 2010), originally published as a National Park Service natural resource report. Workshop participants should familiarize themselves with the field methods outlined in this document.

- File Name -- Stephens et al 20210 SOP 6 Mist-netting vl.05.DoD (WORKSHOP VERSION) 20230901Ajda.pdf
- Citation -- Stephens JL, Mohren SR, Alexander JD, Sarr DA, Irvine KM. 2010. *Standard operating procedure (SOP) #6: Mist netting Version 1.05.DoD* ***(2022*** *DRAFT REVISION). Klamath Network landbird monitoring protocol.* U.S. Department of Interior, National Park Service, Natural Resource Report NPS/KLMN/NRR-2010/187, Fort Collins, CO. (SOP version available from Klamath Bird Observatory, Ashland, OR)

  Specific attention and study should focus on the following *SOP* sections.
  - Wolfe-Ryder-Pyle (WRP) Molt and Plumage Based Ageing System (Page 12)
  - Recognizing and Treating Capture-related Stress and other Common Injuries (page 13)
  - Priority of Data (page 15)
  - Recording How Aged and How Sexed (Page 16)
  - Field Forms (Page 18)
  - Banding Data Form (Page 31)
  - Appendix C. The Codes for Characters Used in Ageing and Sexing Birds (Page 41)
  - Appendix D. Reference of the Best-fitting Size Band for Commonly Captured Species (Page 42)
  - APPENDIX F. Example of a Correctly Completed Banding Data Form (Page 44)
- Specific attention and study should also focus on the following SOPsupplement materials:
  - 2-page reference sheet with abbreviated definitions of the codes used on KBO's banding sheets

    File Name - KBO 2020 Band code reference sheet.pdf
  - *Plumage Mopping Standard Operating Procedure (SOP) Supplement*

    File Name - KBO (In Review) Plumage Map Draft SOP 20230904Ajda (clean)- Copy.pdf

Additional Literature

In addition to the above noted parts of KBO's field methods, before the workshop specific attention and study should also focus the following papers

Searching for consensus in molt terminology 11 years after Howell et o/.'s "first basic problem"

- File Name -- Wolfe et al 2014 Searching for consensus in molt terminology - Copy.pdf
- Citation --Wolfe JD, Johnson El, Terrill RS. 2014. *Searching for consensus in molt terminology 11 years ofter Howell et ol.'s "first basic* problem."The Auk: Ornithological Advances 131:371-377. Oxford University Press.

Application of o globo/ oge-coding system ("WRP"), bo.,ed on molts ond plumages, for use in *demographic and other studies of birds*

- File Name -- Pyle et al 2021 Application of a global age-coding system - Copy.pdf
- Citation -- Pyle P, Gahbauer M, Johnson El, Ryder TB, Wolfe JD. 2022. *Application of a globol age-coding system ("WRP"}, bosed on molts ond plumages, for use in demographic ond other studies of birds.* The Auk 139:ukab063. Oxford University Press US.

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The Body Grosp Technique: A Ropid Method of Removing Birds from Mist Nets

- File Name -- Ralph 2005 Body grasp technique (NABB) - Copy.pdf
- Citation -- Ralph CJ. (2005). The body grasp technique: a rapid method of removing birds from mist nets. North American Bird Bander 30:65-70.

Additional materials that workshop participants should review and be familiar with Include the following:

Identification Guide to North American Birds, Port I (Second Edition)

- All workshop participants will receive a copy of this second edition of the Pyle Guide
- Citation -- Pyle P. 2022. *Identification guide to North American birds, Port* I *(Second Edition).* Slate Creek Press, Point Re es Station, CA, USA. 689 pages. ISBN 9780961894054.
  Specific attention and stud should focus on the following essential sections of the P le Guide Pyle 2022 or earlier versions):
  - Introduction (Pages 1-401
  - Ageing and sexing *Setophogo* Wartbler (Page 605)
  - Also, review two examples of common species in the Pyle Guide
    Yellow-rumped Warbler (Page 633; Figures 299,307,398; Table 75)
    Swainson's Thrush (Page 422; Figures 237, 238)

This workshop will follow the North American Banding Council Bird (NABC) *Banding (Passerine) Curriculum, Version 1.2,* available onllne at (https:://klamathblrd org/educatlon/professional-educatlon/nabc-banding-currlculyml). Central to this curriculum are the following NABC manuals and materials that workshop participants should be familiar with:

The North American Bander's Study Guide

- Available at httpd/nabandlng net/wp-content/uploads/2021/07/Banders-Study-Guide-2001pdf
- Citation - NABC 2001. *The North American bonder's study guide.* Point Reyes Station, CA

The North American Bander's Manual for Banding Posserlnes and Near Passerlnes (Excluding Hummingbirds and Owls)

- Available at https://nabanding.net/wp-content/uploads/2021/07/Passerine-Manual-2001.pdf
- Citation - NABC 2001. *The North American Bonder's manual far banding posserines and near posserines (excluding hummingbirds and owls).* Point Reyes Station, CA

Mist-netting With the Public: A Guide for Communicating Science Through Bird Banding

- Available at http://pointblue.orn/wp-content/uploads/2018/06/MPitkinMNWithThePublic.pd/
- Citation -- Pitkin MJ. 2005. *Mist-netting with* the *public: A guide for communicating science through bird bonding.* PRBO Conservation Science and Klamath Bird Observatory (In cooperation with the North American Banding Council. Petaluma, CA

Local Birds

The following tools will help participants become familiar with the birds that may be encountered following during the workshop.

Species Report - KBO Upper Klamath Field Station Area

- File Name: AKN 2023 Species Report - KBO Upper Klamath Field Station Area 20230831.pdf
- Graphs show when birds are most likely ta be enrnuntered in an area rnvering KBO's banding stations at the US Fish and Wildlife Service Rocky Point Cabin, US Forest Service Seven Mile Guard Station, and Crater Lake National Park. Bar charts include information about presence, abundance, and effort and include estimates for mid-September.
- This Species Report was generated using the AKN Phenology Tool. Learn more about this tool at www AyiankNow)edgeNorthwest net(PhenologyTool.

Klamath Bird Observatory

eBird Northwest "Explore" Tools

- To further explore birds that occur in the KBO Upper Klamath Field Station area visit the eBird Explore tools on the eBird Nortwest portal (https-//ebird.org/onw/exglore).
- Bar Charts accessed from the Explore page show when species are frequently reported from an area lhttps://ebird.org/pnw/hotspots). Here are Bard Charts from eBird "Hot Spots" near or at the two KBO Upper Klamath Field Station banding sites we will be visiting during the work.shop:
- Upper Klamath Lake- Rocky Point (near the US Fish and Wildlife Service Rocky Point Cabin site and the Rocky Point Resort) -- https://ebird.org/pnw/barchart?r=L572639&vr-=all&m
- Seven Mile Guard Station -- http.'{/ebird_prg/pnw/barchart?r-L1Q03218&yr-all&m

DRAFT Schedule

We hope to start all sessions on time; please arrive and be settled in prior to starting times.

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Monday Sept 11 1700-1830	Introductory classroom session Roeky Point Resort	• Introductions (20 minutes) • Housekeeping {10 minutes) • Agenda review 110 minutes) • Why band birds? (20 minutes) • Molt strategies defined in an evolutionary context (20 minutes) • Wrap-up (10 minutes)
Tuesday Sept 12 0600-1130	Experiential instruction: • Three Groups • Six 40-minute group rotations USFS Seven Mile Guard Station	• Orientation to banding station operation and in-field workshop structure • Demonstrations (40 minutes each) o Topic 1: Banding Station Management (At Nets) o Topic 2: "Body grasp" method of removing birds from mist nets and other approaches (At Nets) o Topic 3: Efficient banding and processing and review of **aging** and sexing techniques (Table 1) o Topic 4: Introduction to the plumage map (Table 1) o Topic 5: Using Pyle and Tabular Pyle (Table 2) o Topic 6: Introduction to Wolfe, Ryder, Pyle (WRP) age-coding system (Table 2) • Opportunistic demonstrations and practice - age and sex comparisons, Empidonax and hummingbird ID, other • Questions and discussion, banding Plus-Delta, wrap up

Klamath Bird Observatory

Date!!ime	Activit:i:lLoc,ation	Topic
Tuesday Sept 12 1300-1700	Classroom instruction and discussion: ● Seven 30-minute sessions Roeky Point Resort	● NABC Bander's Code of Ethics and NABC checklist of practical skills ● How to use Pyle 12022) and Tab Pyle Ibased on Pyle 1997) in practice and as a le,arning tool ● Complex molt strategies and a full lifecycle approach to aging passerines ● Guest speakers and case studies ● More on the WRP age-coding system ● Questions and discussion from the morning ● Questions and discussion, classroom Plus-Delta, wrap up
Wednesda V Sept 13 0600-1130	Experiential instruction ● Three Groups ● Six 40-minute group rotations USFWS Rocky Point Cabin	● Orientation to banding station operation and In-fieId workshop structure ● Demonstrations (40 minutes each) 0 Topic 1: Banding Station Management (At Nets) 0 Topic 2: "Body grasp" method of removing birds from mist nets and other approaches (At Nets) 0 Topic 3: Efficient banding and processing and review of aging and sexing techniques (Table 1) 0 Topic 4: Introduction to the plumage map (Table 1) 0 Topic S: Using Pyle and Tabular Pyle (Table 2) 0 Topic 6: Introduction to Wolfe, Ryder, Pyle (WRP) age-coding system (Table 2) ● Opportunistic demonstrations and practice - age and sex comparisons, Empidonax and hummingbird ID, other ● Questions and discussion, banding Plus-Delta, wrap up
Wednesda y Sept 13 1300-1700	Classroom instruction and discussion: ● Seven 30-minute sessions Roeky Point Resort	● Why Band Birds ● Bird Topography and Plumage map ● Complex molt strategies and molt limits ● More on the WRP age-coding system and discussion ● Guest speakers and case studies ● Exercises 0 Tab Pyle from Pyle 12022) 0 Mist Nets 0 Plumage Map ● Questions and discussion, classroom Plus-Delta, wrap up

Klamath Bird Observatory

Date!!ime	Activit:i:lLoc,ation	Topic
Thursday Sept 14 0600-1130	Experiential Instruction: ● Three Groups ● Six 40-minute group rotations USFS Seven Mile Guard Station	● Orientation to banding station operation and in-field workshop structure ● Demonstrations (40 minutes each) 0 Topic 1: Banding Station Management (At Nets) 0 Topic 2: "Body grasp" method of removing birds from mist nets and other approaches (At Nets) 0 Topic 3: Efficient banding and processing and review of aging and sexing techniques (Table 1) 0 Topic 4: Introduction to the plum,age map (Table 1) 0 Topic S: Using Pyle and Tabular Pyle (Table 2) 0 Topic 6: Introduction to Wolfe, Ryder, Pyle (WRP) age-coding system (Table 2) ● Opportunistic demonstrations and practice - age and sex comparisons, Empidonax and hummingbird ID, other ● Questions and discussion, banding Plus-Delta, wrap up
Thursday Sept 14 1300-1700	Classroom instruction and discussion Rocky Point Resort	● Piecing it all together: concepts reviewed, concepts applied ● Bird safety and 1" aid ● Permitting ● Guest speakers and case studies ● Discussion: DoD banding objectives ● Discussion: DoD banding opportunities ● Questions and discussion, banding Plus-Delta, wrap up
Friday Sept 15 0600-1130	Experiential instruction ● Three Groups ● Six 40-minute group rotations USFWS Rocky Point Cabin	● Orientation to banding station operation and in-field workshop structure ● Demonstrations (40 minutes each) 0 Topic 1: Banding Station Management (At Nets) 0 Topic 2: "Body grasp" method of removing birds from mist nets and other approaches (At Nets) 0 Topic 3: Efficient banding and processing and review of aging and sexing techniques (Table 1) 0 Topic 4: Introduction to the plumage map (Table 1) 0 Topic 5: Using Pyle and Tabular Pyle (Table 2) 0 Topic 6: Introduction to Wolfe, Ryder, Pyle (WRP) age-coding system (Table 2) ● Opportunistic demonstrations and practice - age and sex comparisons, Empidonax and hummingbird ID, other ● Questions and discussion, banding Plus-Delta, wrap up

Klamath Bird Observatory

Date!!ime	Activit:i:lLoc,ation	Topic
Friday 15 Sept 1200-1300	Workshop wrap up and evaluation	• Questions and discussion • DoD next steps • Workshop Plus-Delta • Wrap up

Theory and Practice

During this workshop we will strive to integrate the following theoretical and practical topics into classroom and in-field session.

Theory	Practical
Why Band Birds & Uses of Banding Data Bird Topography Skulling theory Molt Strategies Molt and plumage systems and patterns of passerines Feather growth & structure Distinguishing juvinal and adult fe.athers Molt limits Using the Pyle Guide and Tab Pyle Measurements Agelng/sesing technique,, approach to ageing/sexing, assessing age & sex classifications WRP Inte ratinJI: imall:es of birds banded Specimens review St..:ition mc'.lnagement Managing high capture *rates* Extraction Training	• Station management • Banding table layout • Net set up and handling • Net extraction • Managing high capture rate, • Bird handling • Efficient process.ing • Uslnc the Pyle Guide and Tab Pyle • Ageing/sexing technique:s., approach to ageing/sexing, assessing age & sex classificatfons • Wolfe, Ryder Pyle Skullin • Measurement:s and accuracy Bird safety • Preventing banding-related injuries • Bird first aid • Band adjustment & removal • Positive interactions with the public at banding stations

Prerequisites

This workshop requires previous passerine banding experience. Participants attending this workshop should have prior experience with: basic bird identification; setting up mist-nets; extracting birds from mist-nets; banding passerines; ageing and sexing birds using molt, plumage, breeding status, and measurements; and familiarity with Pyle guide.

Photographs

Please DO NOT take photographs of/with birds at banding stations. KBO will photograph birds and participants, and we will distribute photographs to participants after the workshop.

Air Travel and Carpooling

For attendees that need to travel by plane, Rogue Valley International Medford (MFR) Is the closest airport, 60 miles west of lodging location. Eugene Airport (EUG)) is another option, 180 miles to the north. We recommend a rental car for transportation from the airport to lodging and to and from the field station. After the Monday evening introductory session we ask that you work with you fellow workshop participants to coordinate rnrpooling to and from the field sites and the classroom. After you have arranged your travel please eMail Caitlyn Gillespie (KBO Research Biologist) at crg@KlamathBird.org and provide your mobile phone number our arriving flight information.

Appendix 2. Table of contents from course material binder.

Klamath Bird Observatory

Advancing bird and habitat conservation through science, education, and partnerships

DoD Bird Banding Workshop -- Table of Contents

KBO Upper Klamath Field Station -- September 11-15, 2023

P.O. Box 758, Ashland, OR 97520 Ph (541) 201-0866 Fax (541) 201-1009 www.KlamathBird.org

Workshop Table of Contents

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Appendix 3. List of course material citations.

Figueira, L., Martins, P., Ralph, C. J., Stephens, J. L., Alexander, J. D., and Wolfe, J. D. (2020). Effects of breeding and molt activity on songbird site fidelity. *The Auk*, *137*, 1-15.

Geldart, E. A., Howes, L-A., Wheeler, H., and Mackenzie, S. A. (2022). A review of impacts of tracking devices on birds. *North American Bird Bander*, *47*(4), 201-212.

Howell, S. N. G. (2003a). All you ever wanted to know about molt but were afraid to ask. Part I: The variety of molt strategies. *Birding*, *2003*(Oct), 490-496.

Howell, S. N. G. (2003b). All you ever wanted to know about molt but were afraid to ask. Part II: Finding order amid the chaos. *Birding*, *2003*(Dec), 640-650.

Long, L. L, Lake, F. L, Stephens, J. L., Alexander, J. D., Ralph, C. J., and Wolfe, J. D. (2021). Using culturally significant birds to guide the timing of prescribed fires in the Klamath Siskiyou Bioregion. *Ecosphere*, *14*(6), e4541. https://doi.org/10.1002/ecs2.4541

Mulvihill, R. S. (1993). Using wing molt to age passerines. *North American Bird Bander*, *18*(1), 1-10.

NABC. (2001a). The North American banders' study guide. The North American Banding Council. Point Reyes Station, California, USA. 66 pp.

NABC. (2001b). The North American banders' manual for banding passerines and near passerines (excluding hummingbirds and owls). The North American Banding Council. Point Reyes Station, California, USA. 15 pp.

NABC. (2001c). The instructor's guide to training passerine bird banders in North America. The North American Banding Council. Point Reyes Station, California. 25 pp.

NABC. (2021, March). *Banders' code of ethics*. North American Banding Council. https://nabanding.net/banders-code-of-ethics/

Patterson, A., Howes, L., and Hill, A. (2020). *North American Banding Council photographic guidelines*. North American Banding Council. https://nabanding.net/waterfowl/photographic-guidelines/

Pitkin, M. (2006). Mist-netting with the public: a guide for communicating science through bird banding. PRBO Conservation Science. Petaluma, CA.

Pyle, P. (2022). Identification guide to North American birds, part I: Second Edition. Slate Creek Press. Forest Knolls, California, USA. 698 pp.

Ralph, C. J. (2005). The body grasp technique: a rapid method of removing birds from mist nets. *North American Bird Bander*, *30*(2), 65-70.

Ralph, C. J., G. R. Geupel, P. Pyle, T. E. Martin, and D. F. DeSante. (1993). Handbook of field methods for monitoring landbirds. USDA Forest Service, General Technical Report, PSW-GTR-144, Albany, California. 41 pp.

Rockwell, S. M., Alexander, J. D., Stephens, J. L., Frey, R. I., and Ralph, C. J. (2017). Spatial variation in songbird demographic trends from a regional network of banding stations in the Pacific Northwest. *The Condor*, *119*, 732-744.

Rousseau, J. S., Alexander, J. D., and Betts, M. G. (2020). Using continental-scale bird banding data to estimate demographic migratory patterns for Rufous Hummbingbird (*Selasphorus rufus*). *Avian Conservation & Ecology*, *15*(2):2.

Sakai, W. H. (2016). Using outer iris color to age wrentits: an evaluation. *North American Bird Bander*, *41*(2), 45-51.

Smith, C. M. (2022). Does my station need a bird handling protocol? *North American Bird Bander*, *47*(3), 136-139.

Spotswood, E. N., Goodman, K. R., Carlisle, J., Cormier, R. L., Humple, D. L., Rousseau, J., Guers, S. L., and Barton, G. G. (2012). How safe is mist netting? evaluating the risk of injury and mortality to birds. *Methods in Ecology and Evolution*, *3*, 29-38. doi: 10.1111/j.2041-210X.2011.00123.x

Stephens, J. L., Mohren, S. R., Alexander, J. D., Sarr, D. A., and Irvine, K. M. (2010). Klamath Network landbird monitoring protocol. U.S. Department of Interior, National Park Service, Natural Resource Report NPS/KLMN/NRR-2010/187, Fort Collins, CO.

Stewart, R. M. (1972). The reliability of aging some fall migrants by skull pneumatization. *Bird Banding*, *1972*(Jan), 9-14.

Stuyck, C. (2023). MAPS operator profile: Klamath Bird Observatory. *The Institute for Bird Populations MAPS Chat*, *2023*(23), 10-12. https://www.birdpop.org/docs/misc/MAPS_Chat_2023.pdf

Terrill, R. S., Seeholzer, G. F., and Wolfe, J. D. (2020). Evolution of breeding plumages in birds: a multiple-step pathway to seasonal dichromatism in New World warblers (Aves: Parulidae). *Ecology and Evolution*, *10*(17), 9223-9239.

Wolfe, J. D. (n.d.) *WRP Primer*. https://www.wolfecology.com/_files/ugd/03ac7f_61fa7f74f118480783289b03645a4632.pdf

Wolfe, J. D., and Rowe, L. M. (2010). Using alulas and the carpal covert to assess age in some formative and first alternative plumaged western passerines. *North American Bird Bander*, *35*(1), 23-27.

Wolfe, J. D., Ralph, C. J., and Elizondo, P. (2015). Changes in the apparent survival of a tropical bird in response to the El Niño southern oscillation in mature and young forest in Costa Rica. *Oecologia*, *178*, 715-721.

Wolfe, J. D., Alexander, J. D., Stephens, J. L., and Ralph, C. J. (2018). A novel approach to understanding bird communities using informed diversity estimates at local and regional scales in northern California and southern Oregon. *Ecology and Evolution*, *9*(8), 4431-4442.

Yangega, G. M., Pyle, P., and Geupel, G. R. (1997). The timing and reliability of bill corrugations for ageing hummingbirds. *Western Birds*, *28*, 13-18.

Yunik, R. P. (1979). Variation in skull pneumatization patterns of certain passerines. *North American Bird Bander*, *4*(4), 145-147.

Yunik, R. P. (1981). Further observations on skull pneumatization. *North American Bird Bander*, *6*(2), 40-43.

Appendix 4. Workshop agenda and schedule for banding sessions and classroom sessions.

Klamath Bird Observatory

Advancing bird and habitat conservation through science, education, and partnerships

SYLLABUS

DoD Bird Banding Workshop

KBO Upper Klamath Field Station – September 11-15, 2023

The purpose of this five-day workshop is to combine active learning in the field at active fall migration monitoring stations with classroom study to train participants in all aspects of running a constant-effort mist-netting and bird banding program. Safety, data quality, and modern scientific practices are core foci of this workshop. This workshop will take participants through a series of training materials, practical exercises, and scientific case studies focused on monitoring avian demographics and populations using banding methodologies.

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G

Klamath Bird Observatory

Monday, September 11

Evening session | 1700-1830 | Rocky Point Resort

1. Introductions and learning objectives *John Alexander* *1700-1720*
2. Housekeeping *John Alexander* 1720-1730
3. KBO professional education objectives and agenda review *John Alexander* *1730-1740*
4. Why band birds? Lucinda Zawadzki 1740-1800
5. Molt strategies defined in an evolutionary context Ryan Terrill. 1800-1820
6. Wrap-up *John Alexander* *1820-1830*

iTuesday, September 12

Morning session | 0600-1100 | USFS Seven Mile Guard Station

Morning Schedule | USFS Seven Mile Guard Station		
Time	**Participants**	**KBO Crew**
0615	Arrival, organize into groups	Banding station set-up
0630	First rotation **Team Flycatchers** - nets (open 1-4) **Team Warblers** - table 1 **Team Woodpeckers** - table 2	Open nets **5** through 12 Instruction
0750	Second rotation **Team Flycatchers** - table 2 **Team Warblers** - nets **Team Woodpeckers** -table 1	Run nets and station Instruction
0910	Third rotation **Team Flycatchers** - table 1 Team **Warblers** - table 2 Team **Woodpeckers** - nets	Run nets and station Instruction
1030	Wrap-up	Continue running station
1115	n/a	Close nets and wrap-up

iTuesday, September 12

Morning Instruction Topics IUSFSSeven Mile Guard Station

Nets

- *Running nets*
  - Prep (personal kits, count nets)
  - Set-up and monitoring net conditions
  - Net runs; checking nets
  - Intro to "body grasp" extraction
  - Priority birds; communicating with banders; organizing birds
- *Species checklist*
  - Local bird identification by sight and sound
- *General discussion*

Table 1

- *Efficient bonding and processing*
  - Priority birds; organizing birds, communic.iting
  - Applying bands
  - Basic processing and data forms; don't speak in code
  - Monitoring bird condition; process then discuss
  - Codes and general process for recording plumage maps
- *Ageing and sexing techniques*
  - Interpreting your data; approach to aging and sexing
  - Cloacal protuberance (CP) and brood patch (BP), or not
  - Intro to skulling
  - Recognizing juvenal plumage and feather condition
  - Molt and plumage
- *Opportunistic demonstration, practice, and photos* (make inset)
  - Difficult species ID; birder vs. bander approach
  - Exemplary ageing and sexing features
  - Comparative study
  - Organizing birds, sharing and photos

Table 2

- *Bonding* Station *Monog,om,ont*
  - Count nets
  - Equipment and banding table layout
  - Conditions assessment (birds, weather, hazards, personnel)
  - Code sheets, don't speak in code
  - Delegating crew (which nets, why)
- *Using Pyle and Tobu/or Pyle*
  - Family accounts
  - Finding species accounts
  - Understanding codes and bar chans
- *Plumage-based ageing system*
  - Topography; life cycles applied; approach to aging and sexing
  - Feather condition; fault and growth bars
  - WRPcodes
  - Plumage-based vs. annual-based ageing

Experiential active learning pedagogy

This workshop will focus on building experience in the field during morning sessions integrated with focused topics for learning, reinforced by afternoon classroom sessions. During morning banding sessions, you will be assigned a group and group leader who will guide your learning, focused one on topic at the nets, and a separate topic at your banding table. It **is important to stay with your group in the field** and at tables so that all participants are adequately exposed to all learning topics

G Klamath Bird Observatory

iTuesday, September 12

Afternoon session I 1300-1700 I Rocky Point Resort

Classroom instruction and discussion

1. Banding outreach and Crater Lake National Park..... 1300-1310
2. NABC Bander's Code of Ethics and checklist of practical skills *Martin Agui/ar* 1310-1320
3. How to use Pyle (2022) and tabular Pyle (based on Pyle 1997) in practice and as a learning tool *Lucinda Zawadzki*..... 1320-1340
4. Case studies.....1340-1410
   a. *Sarah Rockwell* ----Spatial variation in songbird demographic trends from 12 years of mist netting in the Klamath-Siskiyou Bioregion
   b. *Sarah Rockwell* -- Tracking migration routes and overwintering locations of the Western Purple Martin
5. Complex molt strategies and a full life cycle approach to aging passerines *John Alexander*.....1410-1430
6. Break..... 1430-1500
7. Case studies 1500-1530
   a. *Ryan Terrill* -- A novel approach to understanding bird communities using informed diversity estimates at local and regional scales in northern California and southern Oregon
   b. *John Alexander-* A Tri-National Partnership: migratory connectivity and western forest bird conservation
8. The plumage-based aging system for aging birds *Ryan Terrill*.....1530-1550
9. Exercises *John Alexander*.....1550-1650
   a. Plumage Map with specimens *Ryan Terrill*
   b. Interpreting bar charts *John Alexander*
   c. 1'' aid and band removal *Martin Aguilar*
10. Questions, discussion, +/11, wrap-up.....1650-1730

The +/// system

Plus delta, or the +/11 system, is a adaptive facilitation method based on consistent check-ins with participants. We will regularly conduct +/11 sessions where each participant is encouraged to briefly share a positive aspect about the day (the+) and a topic for improvement (the 11). This positive framework encourages consistent feedback from participants to help make this workshop be as successful as possible.

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Wednesday, September 13

Morning session | 0600-1100 | USFWS Rocky Point Cabin

Morning Schedule | USFWS Rocky Point Cabin		
Time	**Participants**	**KBOCrew**
0615	Arrival, organize into groups	Banding station set-up
0630	First rotation **Team Flycatchers** - table 2 **Team Warblers** - nets 3-6 **Team Woodpeckers** - table 1	Open nets 1-2, 7-10
0750	Second rotation **Team Flycatchers** - table 1 Team **Warblers** - table 2 Team **Woodpeckers** - nets 3-6	Run nets and station
0910	Third rotation Team **Flycatchers** - nets 3-6 Team **Warblers** - table 1 Team **Woodpeckers** - table 2	Run nets and station
1030	Wrap-up	Continue netting
1115	n/a	Close nets and wrap-up

Wednesday, September 13

Morning Instruction Topics | USFWSRocky Point Cabin

Nets

- *Running nets*
  - Prep (personal kits, count nets)
  - Set-up and monitoring net conditions; busy day protocols (high capture rates)
  - Net runs; checking nets; preventing injury at nets
  - Intro to "body grasp" extraction
- *Species checklist*
  - Local bird identification by sight and sound
- *General discussion*

Table 1

- *Efficient banding and processing*
  - Applying bands; adjusting bands
  - Basic processing and data forms; minimal/priority dat.i (busy day)
  - Monitoring bird condition
  - Codes and general process for recording plumage maps
- *Ageing and sexing techniques*
  - Interpreting your data; basic measurement techniques
  - Cloacal protuberance (CP) and brood p.itch (BP), or not
  - Intro to skulling
  - Recognizingjuvenal plumage; feather condition; fault and growth bars
  - Molt and plumage: in-hand photography
- *Opportunistic demonstration, practice, and photos* (make inset)
  - Difficult species ID
  - Exemplary ageing and sexing features
  - Comparative study
  - Sharing and photos

Table **2**

- *Banding Station Management*
  - Count nets
  - Equipment and banding table layout; organizing birds
  - Conditions assessment (birds, weather, hazards, personnel); protocols for priority birds
  - Delegating crew (which nets, why)
- *Using Pyle and Tabular Pyle*
  - Family accounts
  - Finding species accounts
  - Understanding codes and bar charts
- *Plumage-based ageing system*
  - Life cycles applied; recording data in the plumage map
  - WRPcodes
  - Plumage-based vs. annual-based ageing

G

Klamath Bird Observatory

Wednesday, September 13

Afternoon session | 1300-1700 | Rocky Point Resort

Classroom instruction and discussion

1. Bird topography and plumage map *Ryan Terrill and Lucinda Zawadzki*..... 1300-1320
2. Case studies 1320-1340
   a. *John Alexander* -- Using culturally significant birds to guide the timing *of* prescribed fires in the Klamath Siskiyou Bioregion
   b. *Ryan Terrill* -- Effects of breeding and molt activity on songbird site fidelity
3. Monitoring objectives *John Alexander*..... 1340-1400
4. Complex molt strategies and molt limits *Ot6vio* Rocha..... 1400-1430
5. Break..... 1430-1500
6. Advanced application of plumage-based aging *Martin Aguilar*....._....., ... *1500-1520*
7. Case studies 1520-1540
   a. *Samantha Webb* -- Breeding biology of the Oregon Vesper Sparrow *(Pooecetes gramineus ajfinis)*
   b. *Elva Manquero* -- Banding with the public
8. Exercises*John Alexander*.....1540-1640
   a. Tab Pyle from Pyle (2022)
   b. Mist Nets
9. Questions, discussion,+/!',., wrap-up.....1640-1700

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iThursday, September 14

Morning session | 0600-1100 | USFS Seven Mile Guard Station

Morning Schedule | USFS Seven Mile Guard Station		
Time	**Participants**	**KBOCrew**
0615	Arrival, organize into groups	Banding station set-up
0630	First rotation **Team Flycatchers** - table 1 **Team Warblers** - table 2 **Team Woodpeckers** - nets 1-4	Open nets 5 through 12
0750	Second rotation **Team Flycatchers** - nets 1-4 Team **Warblers** - table 1 Team **Woodpeckers** - table 2	Run nets and station
0910	Third rotation Team **Flycatchers** - table 2 Team **Warblers** - nets 1-4 Team **Woodpeckers** - table 1	Run nets and station
1030	Wrap-up	Continue netting
1115	n/a	Close nets and wrap-up

iThursday, September 14

Morning Instruction Topics | USFS Seven Mile Guard Station

Nets

- *Running nets*
  - Count nets
  - Set-up and monitoring net conditions; recognizing and marking priority birds
  - Net runs; checking nets; organizing birds
  - "Body grasp" in practice; advanced extraction techniques; bird handling
- *Species checklist*
  - Local bird identification by sight and sound
- *General discussion*

Table 1

- *Efficient banding and processing*
  - Applying bands
  - Basic processing and data forms
  - Monitoring bird condition; bird handling
  - Codes and general process for recording plumage maps
- *Ageing ond sexing techniques*
  - Interpreting your data
  - Cloacal protuberance (CP) and brood patch [BP), or not
  - Intro to skulling
  - Recognizing juvenal plumage and feather condition
  - Molt and plumage
- *Opportunistic demonstration, practice, and photos* (make inset)
  - Difficult species ID; what could it be?
  - Exemplary ageing and sexing features: advanced measurement techniques
  - Comparative study
  - Sharing and photos; photographic techniques (for identification, teaching, and research)

Table **2**

- *Bonding Station Management*
  - Count nets
  - Equipment and banding table layout
  - Conditions assessment (birds, weather, hazards, personnel); protocols for high capture rates
  - Delegating crew (which nets, why)
- *Using Pyle and Tabular Pyle*
  - Family accounts
  - Finding species accounts
  - Understanding codes and bar charts
- *Plumage-based ageing system*
  - Life cycles applied; molt limits
  - WRP codes
  - Plumage-based vs. annual-based ageing; feather condition

iThursday, September 14

Afternoon session | 1300-1700 | Rocky Point Resort

Classroom instruction and discussion

1. Piecing it all together: concepts reviewed, concepts applied *John Alexander*...1300-1320
2. Bander safety, bird safety, and first aid *Martin Aguilar*..... 1320-1340
3. Permitting *Lucinda Zawadzki*.....1340-1400
4. Case studies 1400-1430
   a. *Thomas McLaren-·* Monitoring objectives applied through KBO's point count program
5. Break..... 1430-1500
6. Case studies 1500-1530
   a. *Lucinda Zawadzki* -- Vagrancy in passerines
   b. *Ryan Terrill* -- Evolution of breeding plumage on birds: a multiple -step pathway to seasonal dichromatism in New World Warblers (Aves: Pa rulidae)
7. Discussion: DoD banding objectives *Elizabeth Neipert and John* Alexander 1530-1550
8. Discussion: DoD banding opportunities
   Elizabeth Neipert and John Alexander.....1550-1610
9. Questions, discussion, *+/t:.,* wrap-up John Alexander.....,,.....1610-1700

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Friday, September 15

Morning session | 0600-1100 | USFWS Rocky Point Cabin

Morning Schedule | USFWS Rocky Point Cabin		
Time	**Participants**	**KBOCrew**
0615	Arrival, organize into groups	Banding station set-up
0630	First rotation **All teams** - select station	Open nets 1-2, 7-10
0750	Second rotation **All teams** - select station	Run nets and station
0910	Third rotation **All teams** - select station	Run nets and station
1030	Wrap-up	Continue netting
1115	n/a	Close nets and wrap-up

Friday, September 15

Morning Instruction Topics | USFWSRocky Point Cabin

Nets

- *Running nets*
  - Prep (personal kits, count nets)
  - Set-up and monitoring net conditions
  - Net runs, checking nets
  - Intro to "body grasp" extraction
- *Species checklist*
  - Local bird identification by sight and sound

General discussion

Table 1

- *Efficient banding and processing*
  - Applying bands
  - Basic processing and data forms
  - Monitoring bird condition
  - Codes and general process for recording plumage maps
- *Ageing and sexing techniques*
  - Interpreting your data
  - Cloacal protuberance (CP) and brood patch (BP), or not
  - Intro to skulling
  - Recognizing juvenal plumage and feather condition
  - Molt and plumage
- *Opportunistic demonstration, practice, and photos* (make inset)
  - Difficult species ID
  - Exemplary ageing and sexing features
  - Comparative study
  - Sharing and photos

Table 2

- *Bonding Station Management*
  - Count nets
  - Equipment and banding table layout
  - Conditions assessment (birds, weather, hazards, personnel)
  - Delegating crew (which nets, why)
- *Using Pyle and Tabular Pyle*
  - Family accounts
  - Finding species accounts
  - Understanding codes and bar charts
- *Plumage-based ageing system*
  - Life cycles applied
  - WRPcodes
  - Plumage-based vs. annual-based ageing

Friday teams

By Friday, each participant should have received instruction in each field-based topic. Friday will be a review day. This is the only day where participants can move freely between teams to receive extra instruction or clarification on topics as needed or desired.

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Friday, September 15

Afternoon session | 1200-1300 | Rocky Point Resort

Classroom instruction and discussion

1. Questions and discussion
2. DoD next steps
3. Workshop +/t:,.
4. Wrap up

Appendix 5. Total number of birds captured (*n*) per day during the workshop.

Date	Mist-Netting Station	Total birds captured (*n*)
9/12/2023	USFS Sevenmile Guard Station	50
9/13/2023	USFWS Rocky Point Cabin	38
9/14/2023	USFS Sevenmile Guard Station	47
9/15/2023	USFWS Rocky Point Cabin	34
	Total	**169**

Appendix 6. Total number of birds captured as new (N), recaptured (R), and unbanded (U) at each mist-netting station during the workshop.

Band code	Alpha band code	Site	
		USFS Sevenmile Guard Station	USFWS Rocky Point Cabin
New	N	87	68
Recaptured	R	6	3
Unbanded	U	4	1
	Total	**97**	**72**

Appendix 7. Total number of each species captured (*n*) during the workshop.

Common Name	Scientific Name	4-letter Code	Total Captured (*n*)
Black-capped Chickadee	*Poecile atricapillus*	BCCH	1
Black-throated Gray Warbler	*Setophaga nigrescens*	BTYW	1
Brown Creeper	*Certhia americana*	BRCR	1
Chipping Sparrow	*Spizella passerine*	CHSP	4
Common Yellowthroat	*Geothlypis trichas*	COYE	1
Dark-eyed Junco (Oregon)	*Junco hyemalis*	ORJU	29
Fox Sparrow	*Passerella iliaca*	FOSP	1
Golden-crowned Kinglet	*Regulus satrapa*	GCKI	2
Golden-crowned Sparrow	*Zonotrichia atricapilla*	GCSP	6
Hammond's Flycatcher	*Empidonax hammondii*	HAFL	4
Hermit Thrush	*Catharus guttatus*	HETH	5
Hermit Warbler	*Setophaga occidentalis*	HEWA	3
Lincoln's Sparrow	*Melospiza lincolnii*	LISP	4
MacGillivray's Warbler	*Geothlypis tolmiei*	MGWA	1
Mountain Chickadee	*Poecile sclateri*	MOCH	6
Orange-crowned Warbler	*Leiothlypis celata*	OCWA	4
Sharp-shinned Hawk	*Accipiter striatus*	SSHA	2
Song Sparrow	*Melospiza melodia*	SOSP	4
Spotted Towhee	*Pipilo maculatus*	SPTO	2
Steller's Jay	*Cyanocitta stelleri*	STJA	1
Swainson's Thrush	*Catharus ustulatus*	SWTH	2
Townsend's Warbler	*Setophaga townsendi*	TOWA	4
Warbling Vireo	*Vireo gilvus*	WAVI	1
White-crowned Sparrow	*Zonotrichia leucophrys*	WCSP	25
Wilson's Warbler	*Cardellina pusilla*	WIWA	4
Yellow Warbler	*Setophaga petechia*	YEWA	6
Yellow-rumped (Audubon's) Warbler	*Setophaga coronata auduboni*	AUWA	45
		Total	**169**

Appendix 8. Age and sex of individuals captured by species. For age codes, HY = hatching-year, AHY = after hatching-year, U = unknown, and -9 = not attempted. For sex codes, M = male, F = female, U = unknown, and -9 = not attempted.

Common Name	Scientific Name	4-letter Code	Age	Sex	Total Captured (*n*)
Black-capped Chickadee	*Poecile atricapillus*	BCCH	HY	U	1
Brown Creeper	*Certhia americana*	BRCR	HY	U	1
Black-throated Gray Warbler	*Setophaga nigrescens*	BTYW	HY	M	1
Chipping Sparrow	*Spizella passerine*	CHSP	HY	U	4
Common Yellowthroat	*Geothlypis trichas*	COYE	HY	M	1
Dark-eyed Junco (Oregon)	*Junco hyemalis*	ORJU	HY	M	8
			HY	F	14
			HY	U	5
			AHY	M	1
			AHY	F	1
Fox Sparrow	*Passerella iliaca*	FOSP	HY	U	1
Golden-crowned Kinglet	*Regulus satrapa*	GCKI	HY	M	1
			HY	F	1
Golden-crowned Sparrow	*Zonotrichia atricapilla*	GCSP	HY	U	5
			U	U	1
Hammond's Flycatcher	*Empidonax hammondii*	HAFL	HY	U	4
Hermit Thrush	*Catharus guttatus*	HETH	HY	U	3
			AHY	U	2
Hermit Warbler	*Setophaga occidentalis*	HEWA	HY	F	1
			HY	U	1
			U	U	1
Lincoln's Sparrow	*Melospiza lincolnii*	LISP	HY	U	4
MacGillivray's Warbler	*Geothlypis tolmiei*	MGWA	HY	M	1
Mountain Chickadee	*Poecile sclateri*	MOCH	HY	U	5
			U	U	1

Appendix 8 (cont.). Age and sex of individuals captured by species. For age codes, HY = hatching-year, AHY = after hatching-year, U = unknown, and -9 = not attempted. For sex codes, M = male, F = female, U = unknown, and -9 = not attempted.

Common Name	Scientific Name	4-letter Code	Age	Sex	Total Captured (*n*)
Orange-crowned Warbler	*Leiothlypis celata*	OCWA	HY	M	2
			HY	F	1
			HY	U	1
Sharp-shinned Hawk	*Accipiter striatus*	SSHA	HY	M	1
			HY	F	1
Song Sparrow	*Melospiza melodia*	SOSP	HY	U	4
Spotted Towhee	*Pipilo maculatus*	SPTO	HY	M	1
			HY	F	1
Steller's Jay	*Cyanocitta stelleri*	STJA	AHY	U	1
Swainson's Thrush	*Catharus ustulatus*	SWTH	HY	U	2
Townsend's Warbler	*Setophaga townsendi*	TOWA	HY	F	4
Warbling Vireo	*Vireo gilvus*	WAVI	HY	U	1
White-crowned Sparrow	*Zonotrichia leucophrys*	WCSP	HY	U	18
			AHY	U	6
			-9	-9	1
Wilson's Warbler	*Cardellina pusilla*	WIWA	HY	M	3
			HY	F	1
Yellow Warbler	*Setophaga petechia*	YEWA	HY	M	1
			HY	F	5
Yellow-rumped (Audubon's) Warbler	*Setophaga coronata auduboni*	AUWA	HY	M	16
			HY	F	2
			HY	U	26
			-9	-9	1