**Minutes of the 2015 Northeast Loon Study Working Group Meeting**

March 16-17, 2015: Loon Preservation Committee, Moultonborough, NH

1. State Monitoring and Populations
   1. State comparisons—Harry Vogel, Loon Preservation Committee, LPC
   2. Other state reports/highlights
   3. Late-season monitoring of loons—Lee Attix, Biodiversity Research Institute (BRI)
   4. Volunteers in loon monitoring—Dana Fox, LPC volunteer
   5. Discussion of state monitoring efforts: gaps, collaborations—All
2. Loon Health and Mortality I
   1. COLO eggshell porosity and thickness in North America—Mary-Lee Barboza, Courtney McGinness, Lusan DellaGrotte, Danielle Karcher, Worcester Polytechnic Institute
   2. Malarial parasites of the COLO—Ellen Martinsen, Smithsonian Conservation Biology Institute
   3. Botulism losses in COLOs—Carrie Gray, BRI
   4. Predicting biomagnification in loons from plankton—Jim Haney, UNH
   5. The ZAPPR Kit: a new SOP—Nancy Leland, UNH
3. Lead
   1. Population-level effects of lead on loons—Tiffany Grade, LPC
   2. Community-based social marketing to promote lead-free fishing—Melissa Leszek, Plymouth State University
   3. Fish Lead-Free Initiative—Susan Gallo, Maine Audubon
   4. Policy initiatives on lead ammunition—Lena Spadacene, Humane Society of the US
4. Other
   1. Transmitters on RTLOs—Carrie Gray, BRI
   2. B-120 oil spill update—Ken Munney, US Fish and Wildlife Service
5. Loon Health and Mortality 2
   1. Squam Lake Loon Initiative—Tiffany Grade, LPC
   2. National loon health assessment—Nina Schoch, BRI
   3. Eagles and loons—David Harris and Chris Martin, NH Audubon
   4. Factors influencing COLO breeding success—Harry Vogel, LPC
6. Other Worthy Efforts
   1. Loon vocalizations and acoustic networks—Jay Mager, Ohio Northern University
   2. Winter site fidelity in COLOs across North America—Jim Paruk, BRI
   3. MN chick translocation—Jim Paruk, BRI
   4. Social media outreach—Susie Burbidge, LPC
7. Rescues and rehabilitation
   1. Winter and other rescues of loons—John Cooley, LPC; Eric Hanson, Vermont Center for Ecostudies
   2. Loon rehabilitation—Mark Pokras, Tufts
8. The future
   1. Managing large-scale, long term datasets—Mark Pokras, Tufts
   2. WI Research Committee report—Susan Gallo, ME Audubon
   3. NELSWG future directions—role and feasibility—All
   4. Other business/next NELSWG meeting—All

**I. State monitoring and populations**

*1. State comparisons—Harry Vogel (LPC)*

* State populations
  + Slight increase in numbers in all states in 2014, except in NY where estimated population subset remained the same
* Rafts floated
  + Number of nesting rafts floated is one measure of management effort
  + Substantive increase in number of rafts floated in NH and MA
    - NH: reflects increased management effort as part of Loon Recovery Plan
  + Large drop in number of rafts floated by BRI in 2014
* Raft use
  + % of territorial pairs using rafts is indicator of intensity of management of population
  + VT: Declined but still twice the rate of NH
* Chicks hatched from rafts
  + ME: Very high, special case of reservoirs
  + MA: Consistently high
  + VT: Fell in 2014
    - Eric: New pairs turning up in VT but not putting out many new rafts and have removed some rafts; also, a lot of competition in VT
* Ropes/signs
  + Signs/rope lines another measure of management activity
  + Mainly VT and NH using ropes and signs
  + VT: generally, over half of chicks hatched come from roped nests, although efficacy fell for VT in 2014
  + NH: Number of chicks hatched climb as put out more ropes
  + Lee: Just met with lake association in ME with heavy recreational use; residents wanted to put out ropes/signs; Lee emphasized to association need for three years of trying/failing due to disturbance factors before consider it; danger of signs drawing people in to nest area; need to see productivity dropping before put them out
  + Harry: LPC’s 40 year dataset could provide information on situations where signs are a good option and where they are not
  + Eric: Uses nest vulnerability index rather than lake-scale index; high risk sites are 80% successful with signs compared to 55% successful without signs; only 5-10% difference on low-risk sites
  + Eric: Learning curve associated with signs to educate people and get them to buy in to what signs do
  + Harry: Need to do sign paper comparable to JWM raft paper
* Person-days
  + Person-days/TP is another measure of intensity of conservation effort
  + NH, VT: reliance on volunteers proportionately higher
  + NY, ME: devote a lot of time to intensive monitoring
    - Banding: better information on return rates and pair switches in NY and ME
    - NH: Exception is Squam where keep good track of banded loons
* Nesting pairs/TP
  + Always tempted to look at west to east trend but nesting propensity higher in NY’s banded population and ME has reservoir effect
    - West-East trend less evident this year
  + 2014 generally good year for NP/TP
  + MA: Good nesting year on DCR-managed sites
    - Rest of state: loons didn’t nest
* Chicks hatched per nesting pair
  + Most variable of reproductive success parameters
  + VT: high, probably attributable to rafts/signs
  + NH: climbing but possible temperature effects?
  + MA: large number of pairs on reservoirs, possible temperature effects?
  + ME: low (reservoirs)
* Chicks surviving per chicks hatched
  + Very stable over time in most states
  + VT: decline in CS in 2014
* Chicks surviving per territorial pair
  + Heavily dependent on adult survival
    - If adult survival increases to 0.93, may lower needed CS/TP for a stable population
    - More research needed on this point
  + VT: Drop below 0.6 CS/TP
  + ME: Low due to reservoirs
  + NH: Just above 0.48 but it took intensive management to get there
  + NY: Above 0.48, but rate based on banded loons
  + MA: Below 0.48 but the population continues to grow
    - Know that some NH loons are crossing the border, partial re-sight of NY or VT bird in MA, so immigration there too
    - What proportion of population growth is due to natural growth vs. immigration?
* Discussion on effects of climate change on loons
  + Jim: Question of southern distribution of loons and effect of climate change
  + Harry: Loons northern species at southern edge of breeding range that nests at water’s edge, therefore vulnerable to increases in temperature and precipitation
    - Is climate effect in MA confounded by management on reservoirs?
  + Intensity and timing of storm events may be key
  + Is McIntyre’s observation of 70% of first nests with two chicks valid?
    - Mark: Really early literature like Audubon report most loon nests with three chicks

*2. Late-season monitoring of loons—Lee Attix (BRI)*

* Launched in 2013 to investigate questions associated with captive-rearing of chicks
  + When do adults leave chicks?
  + How old are the chicks when the adults leave them?
* Objectives:
  + Determine timing of adult departures by individual and gender, based on banded individuals or molt patterns
  + Determine number of days chick remains after the last adult has departed
  + Calculate age of chick when both adults depart
* 2013
  + Loon families absent from four lakes already at end of September
  + Quabbin and problem with multi-territory lakes
    - Move around all over the place, could be anywhere on the waterbody
* Methods: focus on lakes with banded adults, survey each territory twice/week, begin surveys in September and conclude when two consecutive surveys find no loons present
* Results
  + Confirm that adults depart separately
  + Average departure date for first adult: October 10th (range: 9/3-11/20)
  + Average departure date for second adult: October 27th (range: 9/16-11/20)
  + Average departure date for last chick: October 30th (range: 9/19-11/20)
  + Average age of chicks when last adult departs: 17 weeks
  + Youngest chick when first adult departs: 8 weeks
* Notable observations:
  + 62% of time females depart first (consistent with both years)
  + Migration not necessarily migration—individuals or whole families move to neighboring ponds
    - Hard on multi-territory lakes to confirm loons departed
    - Define departed as left the territory or left the lake—doesn’t think they have gone to the coast, just staging somewhere
  + 2-chick clutches: one chick may leave before second adult leave
  + On average, last chick leave 3 days after last adult
    - But had 3 chicks in 2014 that stayed 22-37 days after last adult departed
  + Ability to identify individuals based on molt pattern or stage of molt
* Next steps
  + Continue banding birds in study area
  + Prioritize lakes surveyed in previous years
  + Increase sample size
* Discussion
  + Can this be expanded with volunteers?
    - Lee: Takes experience and dedication, challenge of needing to get bands, sex birds, look at molt patterns. Takes a special type of volunteer.
  + Is there a difference between larger and smaller lakes?
    - Not enough data; Quabbin not included in dataset because data not good enough
    - Have data from Massabesic, Squam, one other large lake (plus Quabbin)
  + Question about whether or not 2 consecutive surveys without sighting loons is enough
    - Lee is confident that, after two surveys without seeing them, they are gone

*3. Volunteers in loon monitoring—Dana Fox (LPC volunteer)*

* Things a volunteer can contribute
  + History of loons on pond
  + Detailed/timely observations
  + Alert to a problem
  + Use of boat/car park
  + Water level changes
  + Knowledge of other key people on pond
  + Names of volunteers/lake association contact
  + Contributions
* Ways to attract volunteers
  + Appeal to people that the loons need their help
  + Improve recruitment by targeting audience
    - Lake associations
    - Birding community
      * Ask them to report data to you, not put it on listserve (photographers not very respectful)
  + Need to ask volunteers for commitment, sign a pledge
    - They’re far more likely to follow through, find replacement when can’t do it
    - Need to work within parameters volunteers give you
* Cultivating volunteers
  + Define what information needed and how often needed
  + Train volunteer and ask for commitment
  + Maintain regular contact with volunteer
  + Find effective ways to motivate them to report
  + Supervise and cultivate volunteers
    - Potlucks
  + Get one of volunteers to talk to others about their work
    - Let them be inspiration/role model
  + Give volunteers prompts to do the right thing
    - Refrigerator magnet or key chain with reporting information
* Remember: Key volunteers love their loons and are protective of them
* Discussion:
  + Jim: Use water monitoring people to help with loons?
    - Susan: ME Audubon investigated this and not as productive as hoped for
  + Eric: Use existing volunteer network to spread word and let people know what to look for
  + Harry: Volunteers run the gamut as far as ability and knowledge of loons; if volunteer says loon nesting, believe; if say loon not nesting, don’t believe it

*4. Discussion of state monitoring efforts—All*

* Lack of data on fish composition—could be important for loons
* Mark: Parasites turning up in loons, could be coming from invertebrates
* Invasive plants? LPC’s preliminary investigation showed increase in productivity and no short-term effects of 2,4-D; possible improvement in habitat quality

*5. COLO eggshell porosity and thickness in North America—Mary-Lee Barboza, Courtney McGinness, Lusan DellaGrotte, Danielle Karcher (Worcester Polytechnic Institute)*

* Hypothesis: differences in eggshell porosity, as measured by water vapor conductance, eggshell thickness, and pore density will vary throughout regions studied
* Genetic diversity in loons: will eggshell porosity be different in different populations?
* 150+ samples across North America
* Count pores in known area, variability in size of pores and eggshell thickness
  + Some eggs are a lot thinner than others
* Based on porosity, will embryo be able to cope in era of climate change?
* Thickness: how close are eggs to limit of what parents can sit on?
* Will try to correlate thickness, porosity, number of pores

*6. Malarial parasites of the COLO—Ellen Martinsen (Smithsonian Conservation Biology Institute)*

* Malaria can impact both adult survival and reproductive success, leading to population declines
* Climate change leading to distribution changes in parasites
* Goals: better understand distribution and diversity of parasites including malaria in COLO
* Study in 2005: morphological examination of blood smears and PCR-based screening of blood samples
  + Morphological exam from NY over 12 year period—no plasmodium parasites found
* Examined 128 loons 2010-2011 ME, NY, NH, MA
  + 15/128 COLO infected--12% prevalence, high for bird species
  + Infection for all 4 states
  + 6 plasmodium species found in loons in study
    - 2 previously not documented from birds
    - Many of these parasites have more southerly distributions
      * Are parasites moving north or are loons sicker?
* Harry: were the parasites present in the earlier study and not detected or is this a new development?
  + Ellen: They could have been missed but, had it been at the 12% level, they probably would have seen something
    - One bird sampled that didn’t have it in 2010 but did in 2011
    - Not clear where picking it up
* Battling infection—take energy away from something else
  + Flood of health data coming in, better understanding of health effects
* New England loons winter up north, is this evidence of global warming?
  + Possibly, but we’ve introduced new vectors as well

*7. Botulism losses in COLOs—Carrie Gray (BRI)*

* Larger botulism die-offs tend to occur during periods of very low or rapidly decreasing water levels
* Major outbreaks in early 1960’s in Lake Michigan
* Smaller outbreaks in 1980’s
  + Other outbreaks in 2000’s
* Changes in fisheries in Great Lakes
  + Initial outbreaks in Lake Michigan may have been caused by introduction of alewives, not adapted to thermal structure of Great Lakes
  + More recently introduction of zebra mussels
* Transect surveys in NY to determine species involved, mortality estimates, location of outbreaks, feather samples for genetic analyses to determine source population
  + All years: estimate 25,000 loons lost
    - Grear paper: importance of adult survival
* What breeding population is most affected?
  + Genetic analysis suggested from Ontario
    - 97,000 TP of loons in ON, 1/3 of North American breeding population
    - Breeding Bird Surveys of loon population in Ontario was stable and increase 0.68% per year
    - Short term 0.92% increase
  + Area just north of Lake Erie seems to be declining based on BBS
  + Canadian Lakes Loon Survey hasn’t seen any changes in population
  + 20% floater population, so wouldn’t see in TP
  + Overall productivity decreased between 1992-2012 but still >0.48
    - Buffer population of less-experienced breeders moving in
  + Fall 2014: Erie had greatest loon die-off of any previous year
    - Small subset of birds analyzed indicates source population is southern ON

*8. Predicting biomagnification in loons from plankton—Jim Haney (UNH)*

* Avian vaculor mylopathy associated with biomagnification of cyanotoxin
  + Associated with deaths of 70 bald eagles in southeastern US in 2001
* Cyano-loon bioaccumulation model
  + Greater the transfer of cyanotoxins at first trophic level, the greater the potential to get it into loons
  + Used loon feathers and loon blood to examine presence of cyanotoxins in loons
* Preliminary results
  + High rates of transfer from phyto- to zooplankton, suggesting ease of transferring to higher trophic levels
  + Detectable concentrations of toxins in loon feathers
* Re-examination of MC and BMAA cyanotoxins in Squam loon eggs
  + Higher sensitivity equipment than when ran samples previously
  + Detected MC and BMAA in Squam eggs
    - BMAA problems for development in embryos, could contribute to eggs not hatching
    - Cyanobacteria linked to liver problems and parasite burdens
    - BMAA and MC not correlated, metabolized in different ways

*9. The ZAPPR kit: a new SOP—Nancy Leland (UNH)*

* Nancy discussed and demonstrated the new device she developed for separating phyto- and zooplankton
* Portable for use in canoe/kayak

*10. Population-level effects on lead on loons—Tiffany Grade (LPC)*

* Developments on research into population-level effects of lead since last year
  + Inclusion of only May-September lead mortalities unless banded and known to be from NH population
  + Matrices vs. population model
  + Statistics for significance of population-level effect
* Paper submitted to Journal of Wildlife Management, we cannot post results on the web due to JWM embargo policy. Please contact Tiffany for results.

*11. Community-based social marketing to promote lead-free fishing—Melissa Leszek (Plymouth State University)*

* Objective: Investigate perceived barriers and benefits of using and purchasing non-lead fishing tackle
* Education alone unlikely to change behavior, too reliant on information-based messages
  + Identify perceived barriers and benefits to engaging in behavior
* Conducted interviews with anglers, leaders of fishing clubs, representatives of NH Fish and Game, representatives of non-profits, tackle shop owners
* Sent questionnaire to random sample of holders of NH fishing licenses
  + 14% response rate
* Results of questionnaire:
  + 65% aware of current law
  + 57% not aware of new law
  + 435 (of 790) respondents fished 16 or more days/year
  + Importance of protecting loons ranked fairly high in questionnaire, as did angler’s willingness to replace old tackle for protection of NH wildlife
  + Tungsten ranked highest for level of performance
  + Price ranked highest in concerns with purchasing/using non-lead tackle
  + Most spent $50-$99 per year on tackle
    - $1-$50 spent on jigs per year
  + Most trusted source of information about impacts of lead tackle: NH Fish and Game
* Discussion:
  + Ralph: Bias in survey for more-educated people?
    - Self-selecting group if answered survey in the first place
    - Readability level of survey
  + Carrie: Issue for so many people about loss of freedom/individual rights
    - Is this addressed in survey?

*12. Fish Lead Free Initiative—Susan Gallo (Maine Audubon)*

* Develop materials to appeal to anglers and hope they will be adopted regionally, along with the logo and slogan
  + Rack cards, posters, stickers, etc.
    - ME Audubon has printed 8,000 rack cards—use volunteers and tourism board to get them out
  + Kit to send out to people who want to host events
  + Make a website that can work for multiple states
* Interest in adopting this in the Midwest as well
* NH Fish and Game agreed to adopt logo and rack cards
* Maine Bass Federation, Sportsman’s Alliance, etc., all on board
  + Get variety of groups working on this, which was goal from the start
* Ask other states to get involved as well and help develop materials
* NH: Goal to distribute 5,000 packets of non-lead tackle each year, rack card should go with each

*13. Policy Initiatives on Lead Ammunition—Lena Spadacene (Humane Society of the US)*

* Humane Society working to reduce or eliminate use of lead ammunition in hunting
  + State efforts, Dept. of Defense lands, Native American lands
  + Work with manufacturers and network of hunters to assist with outreach
* 10-20 million birds still dying annually from ingesting lead ammunition
* Petitioned Dept. of Interior to require lead-free ammunition on all lands owned by National Park Service or Fish & Wildlife Service
  + No movement on this yet
* CA phase-out of lead ammunition statewide—will not take effect until 2019
  + Bill introduced in past month to repeal this
* Bills also in legislature in RI and VT for phasing out lead ammunition
  + Want to introduce bill in MA as well
* Right now focus of Humane Society is on ammunition
* Nearly impossible to pass anything on federal level, but still part of strategy moving forward
* Humane Society would support any efforts on fishing tackle

*14. Transmitters on RTLOs—Carrie Gray (BRI)*

* BRI is collecting data on occurrence and movement of diving birds to inform plans for siting wind farms
  + Proposed wind farm sites in Delaware Bay, Chesapeake Bay, and off North Carolina overlap with core wintering area for RTLOs
  + Study what habitat covariates overlap with areas used by RTLOs, hope to use that in siting wind farms
    - Look at: water temperature, distance to shore, depth, slope, sediment grain size, sea surface temperature, North Atlantic Oscillation, tidal currents, primary productivity
    - RTLOs shallow water species, generally occur within 4 miles of shore in water <20 m deep
* 2012-2014: mortality rates drop from 41% in 2012 within 2 weeks of implant to 13% in 2014
* Identified key spring staging areas off coast
  + Leave wintering grounds mid-March, arrive breeding grounds mid-June
* Fall migration more through Great Lakes, spend 6-8 weeks in Hudson Bay
  + Leave breeding grounds mid-August, arrive wintering grounds mid-December
* Catch twice as many females as males
  + Is there habitat niche differentiation?
* RTLOs captured have high feather Hg (2-30 ppm), blood Hg low due to feeding on low trophic level in winter
  + Feather levels approaching levels of concern
* Next steps:
  + 4 years of data collected, begin habitat analysis of core wintering/staging areas
  + Comparison of genetics with Alaska RTLOs
  + Analysis of Hg in feathers and molt paper
  + Determine Hg exposure in molt areas

*15. B-120 oil spill update—Ken Munney (US FWS)*

* 12 years on from spill, still no COLO settlement
* Trustees of state and federal government sent final position paper out to responsible parties in October
  + Updated life history information resulted in higher multiplier for birds killed and F1 generation
    - Try to project dead bird years needed to recover losses (500 birds) and come up with dollar value, based on recovery projects
  + Settlement dollar value higher than what originally put in
* Recovery projects
  + Rafts
  + Habitat management (e.g., look at raft success with or without management)
  + Purchase land for territorial protection
    - Most expensive piece—probably not get funded
    - More palatable to responsible party if can recover bird years from rafts (cheaper)
* Waiting for response on proposal by responsible party
  + Molly thinks they’re interested in trying to settle soon
  + Expect to hear back April-May
* Once get settlement, money will be distributed through an RFP process, essentially like vying for grant money
  + Not sure what time frame will be on that
  + 2016 would probably be RFP year, grants would go out in 2017
  + Grants may be distributed over 10-15 years
  + Thinks a lot of the money may go to MA, rest of it distributed around New England
* Harry asked if NELSWG can put in a proposal so the various organizations aren’t vying against one another
  + Ken thinks the RFP process can play out however anyone wants it to
  + FWS can provide guidance on what projects would work well with the RFP
    - Right now, big things would be rafts and management
      * Have to make bird years

*16. Squam Lake Loon Initiative—Tiffany Grade (LPC)*

* Squam productivity continues to be very low, and worse than years of critical decline in 2005-2007
* Two aspects of Squam research:
  + Social chaos
  + Contaminant sources
* Social chaos
  + Caused by very high levels of adult mortality on Squam due to 2004/5 decline and ongoing high rates of lead mortality
  + “Snowball effect” of evicted females across lake in 2013
  + Continued high levels of fighting/evictions in 2014
* Contaminant sources
  + Testing of tributaries in northeast sector of Squam
    - 1 tributary flowing into Squaw Cove came up high for PBDEs
    - 1 tributary flowing into Sandwich Bay came up high for E1 pesticides and PCBs
  + Sumer 2015: sediment sampling in key tributaries to narrow potential point sources; sediment sampling in more tributaries in northeast part of Squam and other key tributaries

*17. National loon health assessment—Nina Schoch (BRI)*

* Goals:
  + Collect baseline data on COLO health
  + Build on previous studies
  + Advance knowledge with innovative methods of loon health research
  + Identify emerging threats to loons and ecosystem health
  + Compare findings across regions in North America
* Collect data on:
  + Baseline hematology
    - Anemia, infection, plasma biochemistry, liver & kidney function, overall metabolic status
  + Parasitology
  + Toxicology
    - Heavy metals, cyanotoxins, pesticides, PCB’s, flame retardants, PAH’s
  + Avian diseases
  + Fungal diseases
  + Immunology
    - Effects of stress, disease, parasites, and contaminants on immune function
    - Have found that high Hg chicks have compromised immune function, high Hg adults don’t
  + Necropsy exams
* Outcomes
  + Build scientific and public understanding of health of loon populations
    - Establish baseline health parameters
    - Quantify exposure to environmental contaminants and biotoxins
    - Determine exposure to avian diseases and parasites, including those affecting population health
    - Physiological responses to climate change
  + Train wildlife researchers and veterinary students
  + Help guide North American loon conservation efforts
  + Publish loon health parameters so they are available for vets and rehabilitators

*18. Eagles and loons—David Harris and Chris Martin (NH Audubon)*

* Effect of eagles on individual loons vs. effect on loon population
* Increasing eagle population=increasing number of eagle nests within 5 km of loon nests
* 16 years of data, 391 site year observations of loon nests with nearby eagle nest
  + 296 loon nest unsuccessful, 95 successful
* Hypothesis: presence of BAEA nest would decrease loon occupancy and productivity
  + Methods: built model to do counterfactual analysis, put in parameters from Kuhn’s habitat nest site selection model
  + Counterfactuals to look at site years where nearby BAEA nest and no nest success
    - What happen if change eagle features to zero, would the model predict an increase in loon nest success?
    - 13.8% site years successful in absence of eagles; 86% cases, no change
    - Nest site characteristics if removal of eagles predicts success
      * Island nest sites, good water clarity, water depth (either very shallow or very deep), farther distance from human populations (slight effect)
    - Nest site characteristics if no difference in nest success with eagles removed
      * Not on island, medium water depth, nearby human population, poor water clarity
  + Conclusions
    - Habitat differs in sites that model predicts would be successful in absence of eagles
    - Future analysis: build predictive abilities of model—given habitat and eagle nest presence, predict loon nest success
    - Develop management guidance—identify prime areas for intervention
    - Long term vs. immediate effects
      * If one case of eagle predation occurs, does it hijack loon nest success (example on Winnipesaukee)?
    - Independence of data points, i.e., is eagle making selection?
    - Proximity: redo with eagle nest within 2.5 km
    - Do eagles get loons compromised in other ways, e.g., from mercury or lead?

*19. Factors influencing COLO breeding success—Harry Vogel (LPC)*

* Each year LPC sets new records for management and outreach
* Still have a ways to go to reach carrying capacity
* CS/TP hit 0.48 only 3 times in the last 9 years
* Bottleneck is when loons are on nest but also when we can protect them most effectively
  + Each year, nearly half of nests fail, and half of those failures are for an unknown cause
  + Second largest driver of loon population after lead tackle mortality is human disturbance of nests, and this is probably underestimated
* Impact of precipitation on CH/NP, and temperature a driver in nest failures/nest attempt in SW and SE population but not in North Country
  + Confounding factors:
    - Are management activities masking or compensating for weather effects?
    - Other anthropogenic effects?
    - Biological factors?
* Combine LPC’s 40 year dataset with environmental or social data—need to mine dataset
  + Complicating factors: natural variation in loon reproductive success, data gaps, mitigating effects of LPC’s management, experience of loon pairs
  + Want to assess the efficacy of LPC’s management

*20. Loon vocalizations and acoustic networks--Jay Mager (Ohio Northern University)*

* Individuals have own yodel
* Interaction with territorial holder and intruder and to all other loons within earshot
* May re-establish pair bond with mate on nest as well as re-establish relationships with other nearby neighbors
  + Functional benefit to all territory holders in earshot of yodeler—network of territories
  + Interactive network—information gathered by eavesdroppers and benefits of broadcasting to larger audience
  + Reinforcement of condition/stamina of territory holder to current and future intruders and mate
  + Functional benefits associated with “dear enemy” phenomenon
* Acoustic environmental factors
  + Will signal be sent effectively in networks?
* Acoustic neighborhoods
  + Individual loon yodel distinct but not too different
* Most of work on single territory lakes
  + Unique characteristics of large multi-territory lakes plus nearby satellite lakes
* How does body condition relate to vocal production of signal?
* Interested in:
  + Monitoring behavior in uniform way as group
  + Signal attenuation and degradation over distance
  + Maximizing signal to noise ratio in anthropogenically noisier world
    - Are pieces of information being lost?
  + Consider functional advantage/disadvantage of communication networks among different systems and contexts
  + Consider if/how function of acoustic signals are shaped by the network of receivers
* Lot to learn:
  + Signal production
    - What is physiological mechanism of yodeling?
    - How does learning influence yodel production?
    - How does health/fitness influence yodel production?
  + Signal transmission
    - Impact of ambient/human noise
  + Enhance diversity of systems
    - Systems with long-term knowledge of territories
    - Partial-lake territories vs. large lakes
    - Clusters of single-lake territories
  + Collaborative studies with current efforts
    - Factors that affect health/fitness
    - Effects on human activities on network dynamics
    - Long-term assessment of local population dynamics
* Discussion
  + Documented that loons evicting other loons come in from 2.5 km away
    - Have prior knowledge of acoustic environment
      * Change yodel to fit in but still be distinct
    - Situation on Squam: once one domino falls…how does the acoustic environment change?

*21. Winter site fidelity in COLOs across North America—Jim Paruk (BRI)*

* In CA and LA, adults exhibiting winter site fidelity, ~81%
* Immatures don’t seem to exhibit winter site fidelity
  + But they likely experience greater mortality than adults
  + Possibly go elsewhere in subsequent years
* Put out transmitters on loons from Rangeley
  + Female spent two winters in Chincoteague Bay, MD
  + Females wintered farther south than males
    - Males off coast of ME, females in Cape Cod and MD
    - Importance for males to get back on territory sooner than females??
    - Pairs reducing competition??
* Loons also seem to be using same migratory stopover sites

*22. MN chick translocation—Jim Paruk (BRI)*

* Source lake: highly productive lake in northern MN, state-managed, few homes
* Translocate to cluster of lakes in southeast MN—high quality, heavily forested, not highly developed, good water clarity
* Translocation done at night to help loon remain calm, 7-8 week old chicks able to forage independently
* Hyperstock pen with fish
* Monitor behavior, health; compare behaviors in pen and after release to wild chicks
  + In pen 6-15 days
* Release: geolocator, blood work
* Short-term success: 5 fledged chicks, healthy appearance, similar behavior in and out of pen
  + Did not put on transmitters
* Consistent that none of chicks stayed on release lake
  + Checked natal lakes: didn’t find them there
  + Found one on another lake near release lake for a couple days
  + Cue time to go: no adults around?
    - Most chicks leave 3-5 days after adults leave
* Future directions
  + Continue translocations: in MN and MA
  + 2016/17: expand to WY

*23. Social media outreach—Susie Burbidge (LPC)*

* LPC’s Facebook page had 55% increase over this time last year
  + Big increase last summer in July—loon cam probably contributed to increase
* E-newsletter: Constant Contact All-Star Award, given to 10% customers with low bounce rates, above average open rates, and click rates on links
  + Try not to ask for money, people just like hearing about loon news
* Web cam on nesting loon
* Fish Lead Free campaign
  + Use ME model for new rack card
  + Lead exchange kits
  + Uniform regional message
  + Want to follow up with lake associations that signed up for Lead Free Lakes Initiative
* LPC purchased $2,000 of non-lead jigs
  + Painted/unpainted round-head jigs
  + Skirted football jigs
  + Tube-head jigs
  + Trying to find out what fishermen want to use
  + Sell jigs at LPC and distribute in field
* Converting website to mobile-compatible site
* NELSWG web page
  + Separate stand-alone website or part of BRI or LPC website?
  + LPC could take on administering the page

*24.* *Winter and other rescues of loons—Eric Hanson (VCE) and John Cooley (LPC)*

* Seem like random events but some predictability over time
* Live rescue attempts, n=180
* Success rates
  + NH adults 11/yr, 36% (ice=89%)
  + NH juvenile, 52% (ice=100%)
  + VT adults 5/yr, 75% (ice=100%)
  + VT juvenile, 69% (ice=100%)
* VT=lot of road crashes
  + VT lakes really spread out, so likely end up putting down in storms on roads
* Conservation benefit of rescues
  + VT: 3 releases/year=1% change in λ
  + NH: much less but comparable to benefit from rafts/signs
* Are we confident loons are surviving and coming back?
  + VT: 100% monofilament entanglement survival (as opposed to monofilament ingestion)
* Benefits of rescues:
  + Successful rescues may make a real difference to the population
  + Getting useful information from loon
  + Humane response
    - Make sure you decide when it’s worth it to take loon to rehabber
  + Public relations
  + Cultivating a network of people concerned about loons
* Discussion:
  + Harry: more learn about importance of adult survival, really can save loons one at a time

*25. Loon Rehabilitation—Mark Pokras (Tufts) and Marge Gibson (Raptor Education Group)*

* Mark: difficulty of keeping loons in captivity, can’t keep long enough to heal a fracture
* Marge: have kept them for a number of weeks, but can’t go beyond that with asper, even with anti-fungals
* Potential of keel sores if not kept in a soft environment
* Marge: involvement of public in rescues
  + give public more of an investment, public wants to be part of solution
  + WI DNR: doesn’t have the $$ to do a rescue, up to the public to get loons to rehabber
  + Important to allow public to be involved as part of rescue or transport team
* Blood work essential
  + Loons can’t submerge when they’re anemic, will die of emaciation
* Listening to airsacs
  + Might be useful to have stethoscope at LPC
  + So many things that can cause crackling in airsacs, asper to fluids
* Decision tree:
  + When to triage, when to take to rehab, when to euthanize
  + When to euthanize:
    - Eye injury
    - Lead levels
      * Difference in treating loons in different parts of country with lead
* Improve practices
  + How get vets with more knowledge of avian physiology?
    - Benefit of one day or weekend wet lab for regional vets
    - Harry: Happy to host this at LPC
  + Need for basic protocol
    - Few rehabbers set up to care for loons adequately
    - Need to encourage rehabbers to get more involved in aquatic wildlife
  + Expensive to rehab loons
    - Live food, pools, filtration, water quality
    - Death spiral for loons if not adequate facilities
* Data from Tufts necropsies 2014
  + ME: 45% trauma, 20% Pb toxicosis (n=40)
  + MA: 25% Pb toxicosis, 25% trauma, 37.5% open (n=8)
  + NH: 20% Pb toxicosis, 46.6% trauma (various types), 6.7% monofilament entanglement (n=15)
    - As populations get denser, may see trauma picking up
    - Any potential behavioral connection between pathological trauma and contaminants?
  + VT: 2 Pb toxicosis, 1 trauma (n=3)

*26. Managing large-scale, long-term datasets—Mark Pokras (Tufts)*

* Want to begin discussion on managing long-term mortality database
* Two key questions:
  + How to continue doing loon necropsies after Mark’s retirement?
  + How to maintain mortality database?
* Google Drives: unstable platform
  + What can do longer term to keep data available?
* Possible option: [www.dataone.org](http://www.dataone.org)
* Look for collaborative way to work together
* Need for quality control/quality assurance
* Harry: 1) this data is incredibly important for loons, given that population hinges on adult survival; 2) we need to do things as uniformly as possible, share data, and NELSWG is uniquely poised to bring this together

*27. WI Research Committee report—Susan Gallo (ME Audubon)*

* Working group on research directions and conservation strategies
  + Smaller groups: made list of important topics to work on
    - Behavioral research
    - Toxicology/lead
    - Disease/health

*28. NELSWG future directions—Harry Vogel (LPC) and all*

* Submit joint proposal for B-120
* Fish Lead Free Initiative—ME Audubon and LPC working together on it, invite rest of group to participate

***Next Meeting: March 17-18, 2016***