

NOTES MONDAY 12 JUNE 7:00 EVENING DISCUSSION

Wind Power...

What is the risk in particular to CERW? During migration, breeding season residency as well. On ridgetops in the Appalachians, potential threat to Ceruleans.

Buehler study in the heart of Cerulean country. At one particular site, along passerine migration corridor, miniscule number of birds picked up at the base of towers. Includes correction factor for predator and disappearance rate. Peak power generation is in August... when bats are passing through. The only way it could be a significant impact on CERWs is if they have a particular concentration habit somewhere in the migration route. What about long Gulf crossings? An offshore wind project in the Gulf, for example, could significantly impact Ceruleans.

Same lighting restrictions on the lighting on wind towers? Lighting a more significant impact on Ceruleans than the turbines themselves. Recommendations to industry has been receptive to changing FAA red lighting to something less attractive to birds. Wooded ridgetops have tended to have high mortality rates for bats, but not birds. Recommendations for study pre- and post- tower placement.

Is there a threshold... cumulative effect... of wind towers? At what point are there just too many towers to safely migrate down a mountain ridge corridor?

Building Collisions

Lots of presumed mortality for birds. Any reason to suspect disproportionate mortality for Ceruleans.

Cell towers may have impact... but any more so for CERW?

When does the cumulative impact of all these collision obstacles become significant? E.g., what about the Tehuantepec project?

What about the rare, but still possible, catastrophic event... e.g., when a large migration meets a cell tower or big wind project in a storm.

1960's Long Point storm collision event... mortality in the 10's of thousands.

If numbers are low enough for a species, these collision impacts may become significant. Buehler's models are an example. Event could be THE 1% factor that precipitates the ultimate decline.

Could look at Paul's summary on mortality in the BNA... compare to same for a species like Bachman's Warbler.

Fatal Light Attraction Program in Toronto picked up Ceruleans on a regular basis (Jason Jones). Chicago program has had a demonstrated impact (Jones).

Contaminants

Folks doing work on mercury contamination at UMESC, to Wayne's knowledge, have no info on effects on songbirds. Mercury contamination tends to be

In Vermont, methyl mercury pathway in anaerobic conditions at high altitude. The Vermont work, as far as we know, is the first such study. Mercury is a global problem with no defined safe level in humans. Nothing known specifically about Ceruleans.

Blackburnians and Redstarts co-occur with Ceruleans on wintering grounds but do not show similar declines. But their wintering range is also more extensive and more inclusive of other habitats. Most of the birds that are restricted in winter to the slopes of the Andes are in fairly significant decline, however.

Any particular pesticides or defoliants in the wintering range? Defoliants for illicit drugs tends to be lower or higher in elevations. Folks in Quito did not seem to think coca or opium spraying was an issue for Ceruleans.

Last five or ten years, no significant Gypsy spraying in the Ridge and Valley (Pat Keyser).

BT spraying and its effects... see papers by Bob Cooper (Buehler).

Emetic study in 2002 at Queens... off the charts diversity in adult crops. Adults appear to eat just about anything opportunistically while carrying Lepidopteran larvae (green caterpillars) to feed nestlings.

Acid rain -> lack of calcium. Looked at in Great Smokies, but no evidence yet of an effect on birds. Connection between calcium and mercury cycles. Low buffering capacity -> increased methylation. (Ceruleans are not in the Smokies... never were, at least in the 30's (Buehler)).

Oil pits

Inactive now in Daniel Boone, but may become more of an issue as oil prices go up. Known effect on bats out west. (Birds go for insect prey on/near oil pits and become trapped.) Not likely to have a big effect on landbirds.

Climate Change

Oak-hickory (Louis Iberson, Maladanof lab) (Iberson and Persod, Ecological Monographs)... general migration northward. Significant for Ceruleans.

Oak regeneration?

Not that forests will march northward, but that they will change.

Climate change more likely to be manifest in greater variability (droughts and deluge), catastrophic events. High variability affects prey base, results in unusually poor reproduction. If this variability increases, could have major impacts on birds. Can we see this in increased variability in BBS? (Maybe better to look for this in a long-term study site like Hubbard Brook.) We have entered the age of extremes.

Loss of fallout habitat on Gulf Coast may differentially effect Ceruleans as a trans-Gulf migrant. This habitat being lost to development, hurricanes.

Will we see same disconnect between Lepidopteran emergence and long-distance migration? Warm springs create disconnect. Insect flush tracks leafout. If leafout is early, arriving birds miss the energy input of these first flushes.

Long-distance migrants have less ability to track these climate events on the breeding ground... they arrive at the same time.

Anything else?

Invasive or exotics... what will be the effect of these? Sudden oak death, ash leaf borer... Dutch Elm disease. These likely to have far greater effect than climate change.

Deer... differential effect on Ceruleans? Severe effect on oak-hickory regeneration, which is important to Ceruleans. Severe effect on forest diversity and hence structure. If forest is not regenerating, where will Ceruleans go?

Avian flu... no evidence yet of differential effect on Ceruleans.

Tree of Heaven. Replaces oak-hickory in Indiana, replaces canopy. (Some disagreement on how much of a problem, although Paul H agrees with Vicky that it can potentially become a problem.) Chinese Fallow (Pop-corn Tree).

Deer eat understory shrub layer... and all the insect prey items they support. Yet another direct effect on forest birds?

What is the legacy of past changes?

What we see today may be a relic of some past chain of events (Rosenberg). Current refugia may not even represent original optimal habitat.

If what we see is not the way it was, would that cause us to do anything different? No. (Jason)

Loss of soil quality... lower site productivity... Every bird will have a different threshold. Ceruleans may have a lower threshold for site productivity loss. Ceruleans seem to have a preference for the most productive sites.. trees significantly taller than their DBH would predict. These sites have also been the most desirable for agriculture.

Supplemental feeding studies (Buehler's point) suggest that increased food abundance -> greater bird productivity.

VICKY'S NOTES

Evening discussion of threats

Randy - windtowers. growing and continuing to grow. trying to evaluate what real risk might be for this kind of species. where are they likely to go up that they would pose a threat, probably particularly migration, but maybe during residence period.

Wayne - aren't they thinking of putting them on Appalachian ridgetops? that would be a problem.

Charlie - Appalachians maybe a big target due to steady winds - a conglomerate/company is interested.

Sue - paper on Mt. Storm - fairly neutral on that site

Dave - study on Cumberlands in heart of cerulean country - TVA has a site. monitored for a couple of years, bird and bat. At that site - good migration corridor for passerines. But miniscule # of birds picked up. Lots of bats.

Wayne - critics suggest scavengers pick up carcasses

Dave - there's a correction factor for how long they've been out there ... Peak power generation is often in August and that's also when most bats are being killed. You'd think birds passing through would be vulnerable but seems not.

Wayne - in my area, are extending blades which is supposed to make them slower ...

Dave - argument is longer blade, slower they go

Ken - it looks like they go slower. but this is an issue for all migrants. if cerw concentrate on particular flyways, maybe could get things sited in other places, but we aren't there yet.

Steve - anything about life history or migratory routes that would make them particularly susceptible?

Ken - yes, if they do long-distance overwater migration and stage in Belize, then offshore windtowers could be an issue.

?? - how high do they migrate

Ken - usually high, but could get all your mortality on an occasional night, or even on an occasional night on an occasional year when ceiling is low and birds ...

What about lights

Yes, lights can be more dangerous than blades

In WV have provided recommendations re both lighting and siting. Currently we have 1 active site with approximately 40 turbines on a wooded ridgetop. One under construction - 150 turbines sprinkled thruout wooded ridgetops and old mines. Then 3 other projects iwth betw 50-125 turbines proposed all on wooded ridgetops.

Lighting issue has been looked at fairly closely, recommendations made, industry willing to change FAA red light to one that is not deemed to attract birds. Concerned not only with birds but also bats, particularly on wooded ridegtops, altho mortality of birds has been fairly small. Still recommend postmortality studies. All sites currently in WV industry has been agreeable - ? 1 year pre construction ? and 3 years post-construction

Steve - any studies on surrogate species for cerw or any bird - any studies quantifying risks of these kinds of installations?

Ken - lots of studies. highly variable. no signs of high risks disproportionately for different kinds of birds. we just don't know. What about Kennesaw Mt (GA) - might

be another Belize kind of place. Want to keep an eye out for concentration points. Don't know if there are other species - lots of warblers are killed by these things. Lots probably hit buildings.

Steve - other kinds of aerial collisions?

Randy - buildings

Ken - along coastlines

Randy - any reason to suspect cerw to be more susceptible?

Dave - coming back to wind turbines. Given we know these birds migrate along ridges - you put in a few turbines and get no effect - is there some threshold where you put enough in and there's no safe path down the Appalachians and you start to get elevated mortality.

Ken - definitely an issue, not disproportionate for cerw

Steve - other collisions - powerlines, cell towers?

Randy - powerlines not an issue for songbirds. Cell towers could be. Doubt they're more susceptible to it than typical neotrop migrant. Do we have any sense that cumulatively, these towers and turbines and buildings add up to where we'd be concerned about cumulative impacts across migratory pathways.

Ken - internationally - Mexico is planning huge projects across Isthmus of Tehuantepec on ridges where all the migratory birds go ...

Randy - catastrophic events don't happen often, but if the timing is just right, pulse of birds, bad weather, 150 wind turbines - what's the impact of that? How often does that happen?

Brett - are you talking about 10s of birds? 1000s of birds

Randy - highest incidents are 10s of thousands of birds

Jason - Long Pt lighthouse - 46000 birds killed in one night in 1960s, almost all warblers

Wayne - is cerw differentially more susceptible, but if you think of Heath Hen - it wasn't that it was more susceptible to stuff it was a cumulation of small things that drove it extinct. At low numbers, everything is additive.

Ken - one tower killed a Kirtland's warbler - it's only one bird, but ...

Dave - a new 1% factor or 3 new 1% factors can be the difference betw stability and decline

Steve - ton of studies on this kind of thing - any individual pub studies ever provided insights to really turn on the light bulb more than just average study at one site?

Ken - 24 Bachman's warbler killed on a TV tower in one night in FL I suspect Paul summarized that in the BNA account

Jason - lighting - switching from FAA red light to strobe birds aren't attracted by strobes at all - constancy, rather than color matters most. Fact that FAA is willing to consider strobes as warning lights may obviate a lot of concern. I think buildings are going to be the big problem. Chicago had a lights out night in 2002. The result was staggering in terms of reducing mortality. Fatal light attraction program in Toronto picks up ceruleans ?every night?

Ken - if that's true that's the first thing I know of that showed an impact on cerw

Jason - daily may be an exaggeration - but regularly

Ken - Paul's account has nothing on towers for ceruleans

Donna - I heard recently about a window that they've recently built an entire bldg out of - has very fine wires in the window - invisible to folks valuing view, but birds can detect - is this viable

Vicky - not at night, probably

Ken - they're working on all kinds of ways to minimize impact - as Dave was saying it's a growing cumulative impact on all kinds of birds

Donna - I thought I heard them say it was one of the more serious sources of mortality

Jason - I think it's the lights more than the building - the exhaustion of fluttering at the lights.

Steve - contaminants - cumulation of icky stuff in food chains and in birds - also effects on prey base. never had privilege to talk to group of warbler experts - does this topic come up very much? is there anything about range variation in performance? pesticides, Hg, other things that can build in food chains

Wayne - some of what I was doing in Appal with acid rain and soils - was talking with folks who work with Hg contamination - it seems like an unexplored area. Don't know anyone whos thought about cewa and Hg but seems to be a correlation betw acid rain and Hg - could be hard to to tease out, don't know if it's even an issue.

Ken - high elevation, anaerobic conditions, fog shrouded ridges, saltmarshes, too. Bicknell's thrush shows it.

?? - Is it a fitness issue.

Vicky - no safe level in humans?

Jason - but whether cerw are particularly susceptible - obviously all this stuff affects cerw - hard to pinpoint things for which cerw are the species that's affected by these things

Steve - other warblers aren't experiencing declines for many of these things ...

Wayne - mixed species flocks with Am redstarts and Blackburnian warblers - I don't know what there current trends are?

Ken - both pretty stable

Wayne - do they co-occur - do cerw occurring in a confined area relative to these other species

Ken - yes, they're more widespread there and on breeding grounds

Wayne - trying to see if similarity helps explain things

Ken - there is a set of birds that overwinters at midelev in Andes that are all declining, but in my mind pretty strong connection, not published on, but I think it makes them a group - co-occur on breeding ground, too. Most of the birds that overwinter of slopes of Andes are in steep decline

TJ - from fragmentation

? - Yes

TJ - wanted to ask about ag in Andes - are there pest species - pesticide applications assoc with coffee at that elev?

Maria Isabel - they are applying pesticides, I think

Jason - less in shade coffee, but still applications, and we don't know what they are

Maria Isabel - fumigation for coca crops - interdiction spraying - no overlap with cerw

Ken - I'll have to stop saying that, then

TJ - would want to know about organophosphates in pesticides

Charlie - what about pests in the US?

Steve - what about silviculture - spraying for that?

Brett - when establishing, not in mature - Roundup, Arsenal, to release from competition

Pat - No spraying in range of cerw - some in pine plantations, but little of that in range

Brett - what about ferns

Pat - only in PA - gypsy moth spraying

TJ - not spraying as much as they used to?

Pat - in Virginia, MD very little spraying for last 5 years

Steve - herbicides and insecticides?

TJ - gypsy moths - insecticides

missing a couple of comments

Charlie - other insects affected by bt and other gypsy moth counters

Wayne - unk green caterpillars? is there anybody doing indices of green caterpillars?

Vicky - Shuey communicated stuff on caterpillars in oak hickory vs beech maple

Ken - but every bird eats them - if anything was hurting them, we'd see all species declining

Jason - got a few stomach contents - very high diversity - nonreliance on green caterpillars was amazing - never find anything but green caterpillars fed to young, but adults feed on anything - makes sense given broad diet on overwintering sites

Wayne - acid rain - reduces CA - broken egg shells - does that make sense with this species

Ken - happening in Europe with some species, long ways from seeing it in N Am, first evidence is at highest elevation where acid rain is worst - are seeing some prey reduction in soils in that areas but doesn't seem like cerw is good candidate for that

Dave - looking at it in the Smokies, pretty good evidence in the spruce fir - good evidence that Ca is being disrupted but not shown yet that birds expressing it - not to say it's not there

Ken - there is a connection between Ca cycles and Hg - some of the prey concentrate Hg - spiders and isopods -

TJ - could map that pretty easily - when calcium carbonate in single digits get problems

Dave - places with biggest problems with acid deposition are not really core cerw habitats

Wayne - is that cause and effect?

Dave - no - cerw weren't abundant in acid rain areas in 1930s

Ken - will become a big issue for birds at some point

TJ - in loons its a big deal

Vicky - estrogen mimics

nothing in response

Tony - oil pits - surveys in the Daniel Boone - pits are inactive but we fill with the rising prices of petroleum might see them increasing in activity - have been a problem for bats in w KY but in e KY could see some strandings and acute effects

Steve - describe oil pits

Tony - resemble pool of water - if dip down or are wading, might see insect if there's more than an eighth of an inch that's crude oil and they'll be taken down immediately

Steve - any sense of overlap

Ken - no known effect on songbirds

? - law enforcements did work on oil pits - can probably get records - ducks

Ken - don't think it would affect forest birds

? - not a lot of them, but some in D. Boone - were there before feds bought the land -
We've pulled lots of small birds and bats out. we can find out what they were

Steve - want to make time for climate change - connections are many - I realize in
groups as yourselves, climate change doesn't mean the same thing to everyone -
since probably be talking about this - express how you mean it - want to spend a
little time on it - both forest experts and cerw experts - open it up

Pat - important what it does to particular forest cover - Iverson

Vicky - Mladenoff

Steve - what does it do

Brett - general shift north, but some issues on how species are going to move

Dave - iverson and prasad a few years ago oak hickory is shifting probably 300 mi n in
theory, many types shifting out of US

Steve - what kinds of rates of change can these hardwood forest in a noticeable way in
20-40 years? - what do we know about rates of change - something that can give us
some sideboard on oak-hickory - are we talking 100 years? 40 years? we could go
out and be in a fundamentally different forest

Pat - more likely 100 yrs than 40 yrs

Wayne - but no regen

Ken - but not going to have a new forest

Wayne - if no regen, then no forest

Dave - if disturbance removes overstory then can get change, otherwise 80-100 yrs

Wayne - along Miss have maples reaching senescence and are going to have
grasslands ?because maples aren't regen

Ken - if oak hickory goes north, that's good for cerw - get out of coal

Pat - and into acid rain

Brett - trees may not march north - light seeded trees might make it easier than heavy-
seeded

Dave - if you look at modeling relative to bird distributions - good correlations with temp
gradients and if warming pushes gradients further north, climate producing habitat
goes north, and birds will have to go north - decades for htis

Ken - and maybe it's happening already

Dave - but in my mind the climate change that is most relevant is variability in drought
and moisture in both ends and catastrophe events - I think it's right here right now
affecting us - affecting the birds - more likely to have immediate impacts than
marching northwards

Steve - general increase in risk from wider oscillations?

Dave - affects prey base , especialloy on wintering ground, migration, on repro side, had
a cold, wet season had cerw with nestlings 7-9 days in the nest starving. doesn't
happen every year, but

Steve - could short-term cycles change in their own right

Dave - El Nino and La Nina and Atlantic Oscillation could be linked to cerw and have been linked to warming effects

Ken - and hurricanes - if birds are doing long overwater passages, hurricanes could disproportionately nail cerw

Steve - since they have long migration in both directions, would "march" going to lengthen the trip?

Ken - it could

Jason - they're not going much further north than Toronto?

Ken - no, that wouldn't change - gulf doesn't get bigger

Steve - if forest type is moving north

Ken - on migration they're using other habitat for stopover - that won't be affected by oak-hickory moving north

Charlie - what about oak mottes on Gulf Coast - have to move further in to rest

Ken - that's well known - I thought they were doing something ...

Charlie - they're trying to save it, but they're still losing it

Brett - *missed it*

Charlie - BBS data maybe can tell if climate variability has increased and is there a similar variability in birds?

Ken - all seems to be smoothing

Dave - wouldn't you think CV would be getting greater if variability is increasing?

Ken - wouldn't look in BBS but in long-term studies where aren't expecting a trend per se

Jason - sites in White Mtns - effects on winter climate (not getting all this) - some negative effect on overwintering larvae and egg masses. also, any parallels in terms of marching of habitat and alteration of phenology of interest to cerw as in pied flycatcher - are we going to see that same disconnect? Do see in northern locations higher seasonality - higher fluctuation in Ontario vs TN.

Dave - this year in TN - earliest leaf development ever. This year 2 wks earlier. and insect flush peaks after leaf emergence, so this year was a 2 wk disconnect.

Jason - if not just following bug clutches north (i think), might see effects

Dave - it's all leafed out, ought to be in Gulf and ought to be able to figure it out and be up here

Vicky - studies seem to show longer migrants can't do it, altho shorter distance migrants can

Jason - why they're not flexible is interesting conjecture

Steve - last thoughts on climate? this is the time to get things out ... different species that never used to live in range of cerw ... and the forest - new things that might be changing for good or bad

Mark - whole issue of invasives and exotics is big, bigger than climate change in next 15-20 years - Dutch elm, Asian longhorn, EAB ... Damage from invasives will probably exceed wildfire damage some people predict. very rapidly could have not change in distribution of tree species, but change in (missed it)

Steve - winter and breeding range?

Ken - artificially high deer densities

Wayne - why disproportionate on cerw

Ken - if it eliminates oak hickory and they wink out and cerw are restricted to oak hickory - they're basically tied to it. if that starts disappearing we're in trouble

Brett - could change structural diversity, too

Brett - what about intro of pathogen that would affect the bird?

rehash of parasite stuff from earlier - not at levels that seems on average to be troublesome

Randy - what about avian diseases that make the news

Ken - haven't screened well, no indication they affect small passerines, and certainly not disproportionately

Steve - other species

Vicky - tree of heaven

Paul - confirms tree of heaven, deer (I'm missing this) and in Gulf - chinese tallow can take over potential stopover sites - easy to keep adding these up - not sure if it's useful. winds - when Hurricane Katrina came across Keys, winds were ideal for taking off from Gulf coast and birds would have been dead, sucked into gyre. spring and phenological advance and insect flushes missed ... - what if wind conditions in gulf are affected that are opposite to way that phenology - could have more trouble getting north and find less to eat when they arrive. but that's just what if what if stuff - all live topics

Sue - lot of these things that you've been talking about, but that list of abstract addresses a lot of these things ...

Dave - thing that strikes me about climate issues - when I look at news, warmest hottest weather ever, wettest weather ever, most hurricanes ever - we don't have the data to clearly understand what those implications are, but if I had to bet, I'd bet that there are some. We are on the extreme for a lot of these parameters and they're likely to have effects on a lot of these species we're interested in

Steve - re time line - Ken's and Wayne's talks and Dave's - all this stuff has happened - massive clearing in the past, regrowth, another wave of habitat loss - there forests, the kinds of trees they like are pretty old - are there legacy signals? are the population levels now responsive not to ongoing logging and stuff, but past logging - when it got better, probably got better differently than it was before - are legacies of past changes to forests on your minds?

Ken - can turn it around - we've done everything we can to screw up the continent and lots of things are doing pretty well - may be more flexible than we think. reason they're in the places they are today is because they've been there for thousands of year, not because of management. A lot of what we see today is a relict of past events.

Steve - sometimes when we get involved in species that have declined lots worse than cerw - things we thought were habitat for a species really weren't a good representation of what they used when there were more of them - they were in last refuges and we found out those refuges weren't really where they wanted to live. is our perception of primetime what it would have been if we were here 200 years ago?

Paul - should I start with the yes part and go to the no part? 200 yrs ago lots of burning everywhere and anywhere. horse was main mode of transportation, lots more chestnut, lots more elm, esp in the western part - lower Ohio and into midwest. early studies talk about finding nests in s IN - all the nests were in the open - loss of "elm"

might be problem - see how the birds use the trees - I couldn't detect any diff between use and avail of elm - is that because elm has been reduced - maybe. And when Jay says after one growing season, elm produced all these little sprouts and boom nests were in there - we have nests in elm in the Lower Miss and smart foresters try to reduce elm in the forest because it's not a good timber tree unless you ask them to leave it. In our area, elm and box elder are not so good. So yes, there could be legacy effect.

Jason - if we say there have been changes, does that change what we would do?

Ken - has come up with ivory-billed - used to be pine species - doesn't help us very much, have to work with what we have

Dave - when look at Appal clearing and soil loss - basic forest productivity has undoubtedly gone down significantly. if that has affected bird populations because of less high-quality sites than we once had, equation might be harder to solve because of basic changes in core of the range.

Ken - every species will have different threshold and maybe for cerw have hit a combination of factors that affects it earlier

Brett - when did decline start?

Dave - before 1960s

Jason - not in Ontario

Ken - know it used to be abundant in Miss drainage - early 1800s

Paul - 1907 - that's where that statement came from. Wilson maybe said it was the most abundant bird when settlers came in across the Ohio valley.

Brett - so 1910 to 1960s

Ken - can infer from loss of forest that bird has been declining for 200 yrs just from habitat loss

Paul - don't think Lewis and Clark said anything - bird not named until 1811. Business about site productivity - think you're on to something. When we look at nest trees and roost trees - always too tall for their diameters - has to be some kind of site conditions or management conditions for trees at 99%ile of height for diameter.

When I look at spots birds like in LAV - in low abundance, so can pick their spots - they're the high productivity sites which are most likely to be cleared for ag. Look at trees that they're using, maybe use FIA - are these run-of-the-mill trees or special trees? how tall should these trees be?

Dave - recent studies with other warblers, people have supplemented food during breeding season and showed significant impacts on productivity. So whatever may limit prey avlbty does link to repro output, at least for other warblers

Jason - laura's work on black-throated blue - argument was - was she actually incr food avlbty or decreasing energetic costs of gathering it since it's right there by nest.

Most birds are not producing at physiol capability

Mark - Paul, in the Ohio plot - densities lowest in 1940s and highest in 1960s - can we learn something from that?

Paul - that was BBS data - I don't know - would need to go back to data, just reminded me of something - data exist as published field notes - some veg data, and some of those plots may still exist