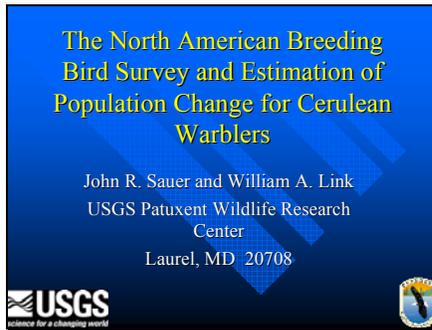
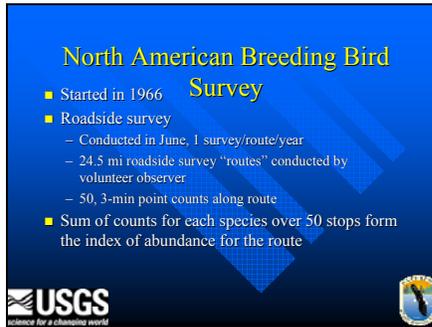


Appendix 5B – Sauer PowerPoint

Slide 1



Slide 2



Slide 3



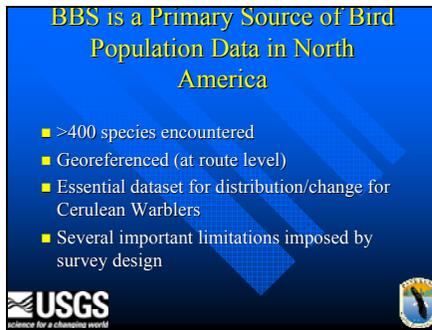
Slide 4



Slide 5



Slide 6



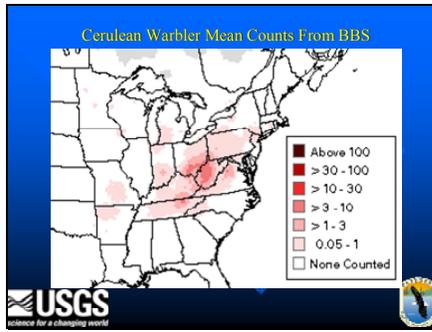
Slide 7

Today

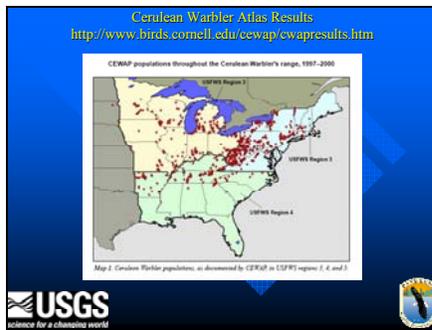
- Discuss available information from the survey
- Describe population change for Cerulean Warblers, as estimated from the BBS
- Discuss value of information



Slide 8



Slide 9



Slide 10

Statistical Analysis

- Estimate population change at different scales
 - State and Provincial
 - Bird Conservation Region (BCR) scale
 - Range-wide
- Statistical methods
 - Hierarchical models
 - Route-regression method
 - In transition to HM from RR




Slide 11

Estimation of Population Change

$$\log(\lambda_{i,t}) = S_i + \beta_j(t-t_j) + \omega_j + \eta I(j,t) + \gamma_{i,t} + \epsilon_{i,t}$$

Notation:

λ is expected value of Y

Stratum-specific intercept, slope, and year effects (S, β , and γ),

Observer/route effects (ω), and overdispersion effects (ϵ)

Observer/route effects, Year Effects, and Overdispersion effects are treated as mean zero normal random variables.



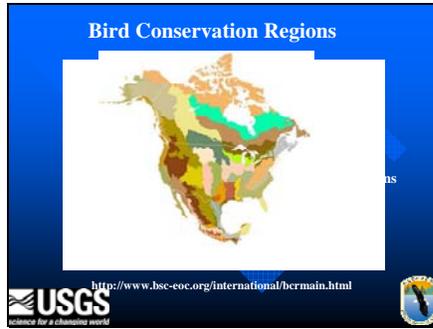

Slide 12

Presentation of Results

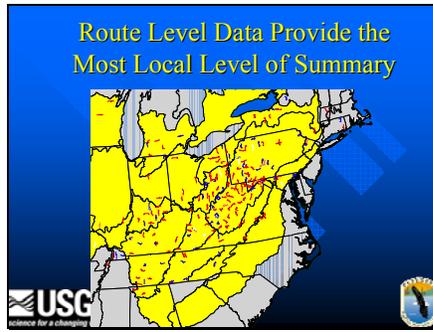
- Estimates of population change (%/yr) and credible intervals
 - Long-term (1966-2005)
 - Recent (1996-2005)
 - Selected states, BCRs, and survey-wide
- Graphs of population trajectories



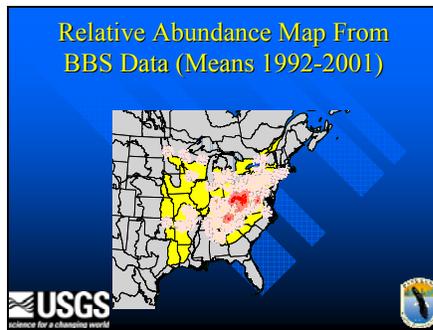

Slide 13



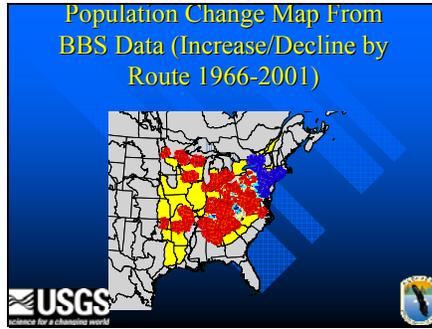
Slide 14



Slide 15



Slide 16



Slide 17

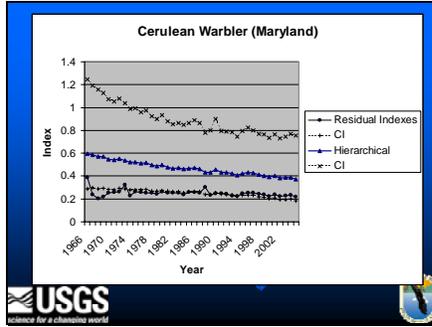
Region	N Routes	R.A.
Lower Great Lakes/ St. Lawrence Plain	19	0.08
Eastern Tallgrass Prairie	9	0.01
Prairie Hardwood Transition	15	0.05
Central Hardwoods	35	0.18
West Gulf Coastal Plain/ouachitas	5	0.03
Southeastern Coastal Plain	3	0.02
Appalachian Mountains	143	1.03
Piedmont	7	0.04
New England/mid-atlantic Coast	2	0.01

Slide 18

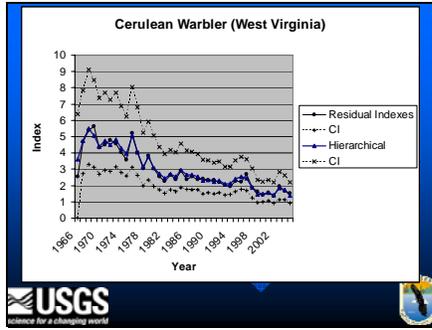
1966 – 2005 Trends for BCRs

Region	Trend	Credible Interval	
	%/yr	2.50%	97.50%
13Great Lakes/St. Lawrence Plain	-1.8	-4.8	1.5
22Eastern Tallgrass Prairie	-5.8	-10.5	-0.8
23Prairie Hardwood Transition	-4.1	-7.0	-1.0
24Central Hardwoods	-3.1	-4.8	-1.4
25West Gulf Coastal Plain/Ouachitas	-17.0	-26.0	-9.7
27Southeastern Coastal Plain	-1.1	-30.9	49.7
28Appalachian Mountains	-3.1	-4.4	-1.7
29Piedmont	-1.3	-6.4	3.4
30New England/mid-atlantic Coast	7.5	-3.2	20.9

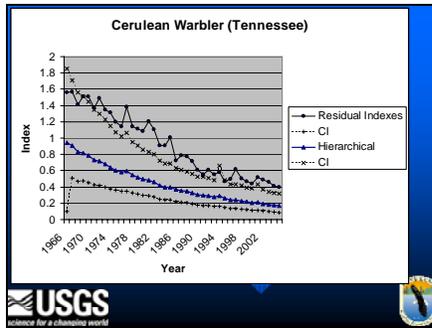
Slide 22



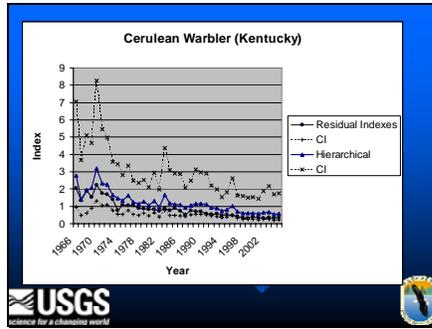
Slide 23



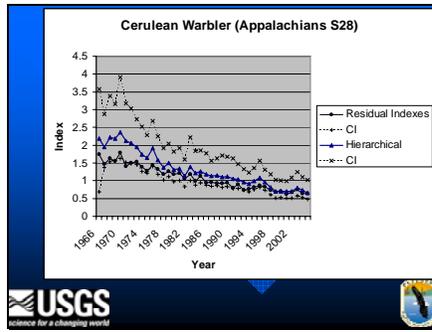
Slide 24



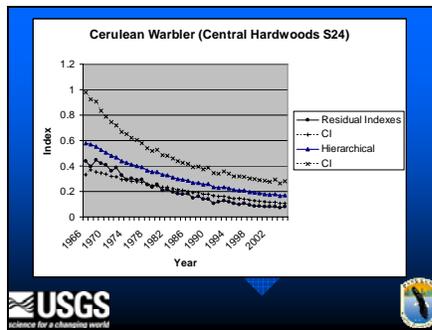
Slide 25



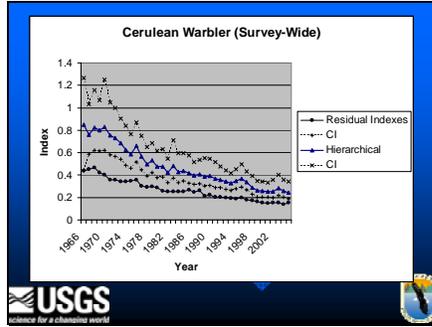
Slide 26



Slide 27



Slide 28



Slide 29

Critical Comments About the BBS

“We and our colleagues who oversee and analyze BBS data believe that BBS data are of questionable value for reliably determining trends for making listing determinations even for declining mature forest associated species, like the cerulean warbler (*A. Salveter*, Federal Register 67(205):65084).”

USGS science for a changing world

Slide 30

BBS has Several Important Limitations

- Point counts do not detect all birds
 - Observers count with varying efficiency
 - Observers have been getting better over time
 - Even the best observers vary in efficiency over time and space
- Roadsides do not reflect the entire landscape
 - Habitats tend to differ
 - Rate of change of habitats differs along roads

USGS science for a changing world

Slide 31

Analysis Accommodates Some (But Not All) Deficiencies

- Observer differences accommodated
- Relative abundance is arbitrary
 - Different methods can scale abundances to different levels
- On vs Off road issues cannot be addressed directly. Solutions include:
 - Models (evaluate differences in habitat)
 - Experimental studies (count off roads)



Slide 32

Future of the BBS

- Need to enhance the present design to address criticisms and directly estimate magnitude of bias associated with present estimates
 - No information exists in actual bias in BBS estimates
 - Speculation is useless!
- For many uses of BBS data, additional information can greatly enhance the value of the survey
 - Population size estimation
 - Models for predictions



Slide 33

Remaining Uncertainties Require Additional Information

- Field studies
 - Evaluate on-off road issues
 - Detectability investigations
- Using additional data
 - Remotely-sensed data for on-off road
- Modifying BBS design to routinely collect needed information



Slide 34

Does Adding More Routes Improve the Survey?

- Answer I: Of course it does!
- Answer II: Maybe not, unless the questions and analyses are carefully thought out beforehand
 - Add more routes in surveyed area
 - » Obtain better data on species already well-surveyed
 - Add routes in new/poorly sampled regions
 - » Survey larger portions of species ranges
- Adding routes does **not**
 - Efficiently obtain better information on rare/poorly-sampled species
 - "Improve" the survey