



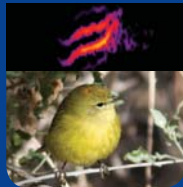
Blue-winged Warbler  
(*Vermivora cyanoptera*)



Golden-winged Warbler  
(*Vermivora chrysoptera*)



Tennessee Warbler  
(*Oreothlypis peregrina*)



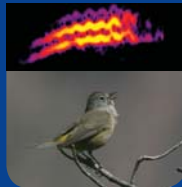
Orange-crowned Warbler  
(*Oreothlypis celata*)



Nashville Warbler  
(*Oreothlypis ruficapilla*)



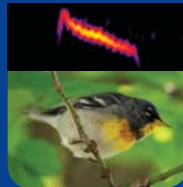
Virginia's Warbler  
(*Oreothlypis virginiae*)



Colima Warbler  
(*Oreothlypis crissalis*)



Lucy's Warbler  
(*Oreothlypis luciae*)



Northern Parula  
(*Parula americana*)



Yellow Warbler  
(*Dendroica petechia*)



Chestnut-sided Warbler  
(*Dendroica pensylvanica*)



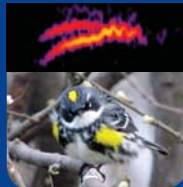
Magnolia Warbler  
(*Dendroica magnolia*)



Cape May Warbler  
(*Dendroica tigrina*)



Black-throated  
Blue Warbler  
(*Dendroica caerulescens*)



Yellow-rumped Warbler  
(*Dendroica coronata*)



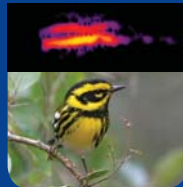
Black-throated  
Gray Warbler  
(*Dendroica nigrescens*)



Golden-cheeked Warbler  
(*Dendroica chrysoparia*)



Black-throated  
Green Warbler  
(*Dendroica virens*)



Townsend's Warbler  
(*Dendroica townsendi*)



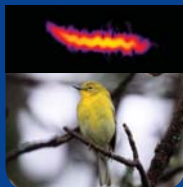
Hermit Warbler  
(*Dendroica occidentalis*)



Blackburnian Warbler  
(*Dendroica fusca*)



Yellow-throated Warbler  
(*Dendroica dominica*)



Pine Warbler  
(*Dendroica pinus*)

## Rosetta Stone for Warblers

These spectrograms are a visual representation of the very brief flight calls made by North American warblers during their nocturnal migrations. Some of these call notes sound almost identical to our ears, but spectrograms show minute differences between them. Scientists can compare spectrograms of night recordings to spectrograms of known species to identify nocturnal migrants in total darkness. Andrew Farnsworth, a scientist in the Cornell Lab's Conservation Science program, developed this "Rosetta Stone" in 2006 in collaboration with Michael Lanzone, Cellular Tracking Technologies, William R. Evans, and Michael O'Brien. It covers all 48 warbler species of the U.S. and Canada (including Grace's and Red-faced warblers, not shown), and is a major tool in our Terrestrial Acoustic Monitoring Initiative, sponsored in part by the Leon Levy Foundation.

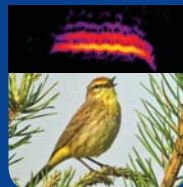
Learn more about the Cornell Lab's technology at <http://tinyurl.com/CLO-technology>.



Kirtland's Warbler  
(*Dendroica kirtlandii*)



Prairie Warbler  
(*Dendroica discolor*)



Palm Warbler  
(*Dendroica palmarum*)



Bay-breasted Warbler  
(*Dendroica castanea*)



Blackpoll Warbler  
(*Dendroica striata*)



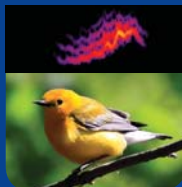
Cerulean Warbler  
(*Dendroica cerulea*)



Black-and-white Warbler  
(*Mniotilta varia*)



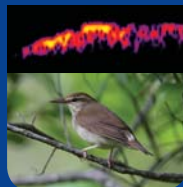
American Redstart  
(*Setophaga ruticilla*)



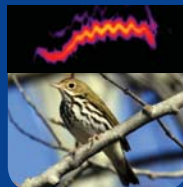
Prothonotary Warbler  
(*Protonotaria citrea*)



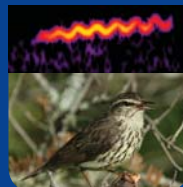
Worm-eating Warbler  
(*Helminthos vermivorum*)



Swainson's Warbler  
(*Limnithlypis swainsonii*)



Ovenbird  
(*Seiurus aurocapilla*)



Northern Waterthrush  
(*Parkesia noveboracensis*)



Louisiana Waterthrush  
(*Parkesia motacilla*)



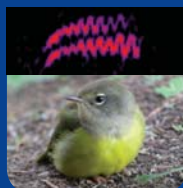
Kentucky Warbler  
(*Oporornis formosus*)



Connecticut Warbler  
(*Oporornis agilis*)



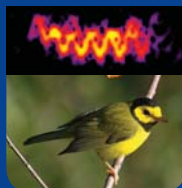
Mourning Warbler  
(*Oporornis philadelphia*)



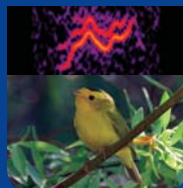
MacGillivray's Warbler  
(*Oporornis tolmiei*)



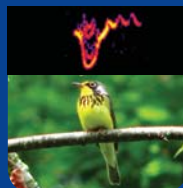
Common Yellowthroat  
(*Geothlypis trichas*)



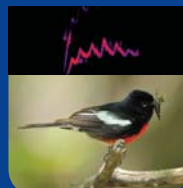
Hooded Warbler  
(*Wilsonia citrina*)



Wilson's Warbler  
(*Wilsonia pusilla*)



Canada Warbler  
(*Wilsonia canadensis*)



Painted Redstart  
(*Myioborus pictus*)

SOME SPECTROGRAMS IN THIS FIGURE WERE GENERATED FROM AUDIO FILES RECORDED BY WILLIAM R. EVANS AND MICHAEL O'BRIEN, EVANS W. R., AND O'BRIEN, M. 2002. FLIGHT CALLS OF MIGRATORY BIRDS: EASTERN NORTH AMERICAN LANDBIRDS. CD-ROM. OLDBRIDG, INC., ITHACA, NY. PHOTOS COURTESY OF DANNY BALES, SARAH BEGENTH NPK, ROY BROWN, HERRBY CLARK, DAVID CAKE, GERRY DWAGHE, BILL DYER, LAURA ECKERSON, JOAN GELATLY, MICHAEL J. HOPJAC, CRAIG KEEN, MIKE MCDOWELL, DAVID MCNICHOLES, SHARON RICHARDS, CAMERON ROGNAN, ED SCHMEIDER, VAN TIEHAN.