

Mission

To create a resource that makes publicly available as much information as possible concerning the nonmarine arthropods of Alaska.

Using specimens + literature + 'grey' literature

Which species occur in Alaska?

Where do these species occur?

What do they do? / Are they changing?

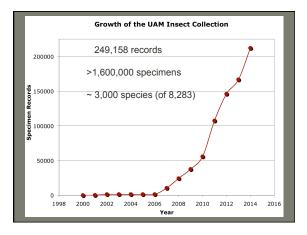
Mission

Which species occur in Alaska?

~8,300 nonmarine arthropod species

USFWS Alaska Region NWRS Inventory and Monitoring Initiative

- hope to use DNA Barcode methods for monitoring
- must first build a DNA Barcode library for Alaska's arthropod species



Methods

Plan: Contribute to iBoL, DNA Barcodes of

2-3 specimens per authoritatively identified species < 10yrs old

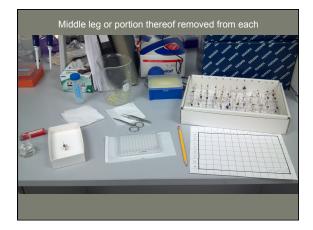
~2,000 species, >4,000 specimens

Test the library by using it to identify unknowns



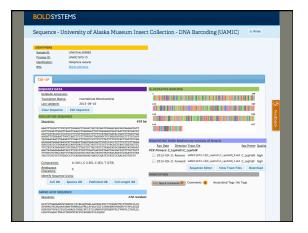




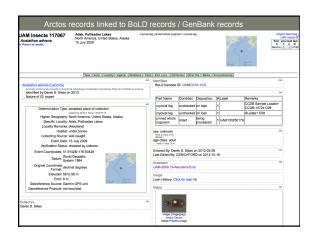


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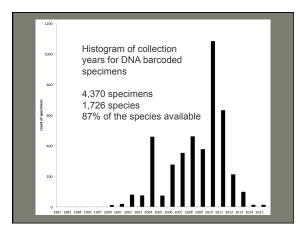


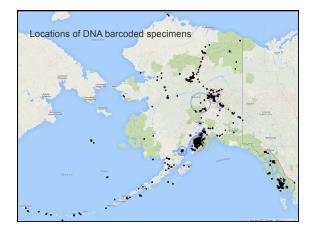


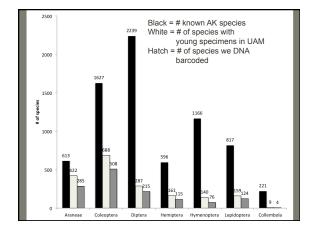


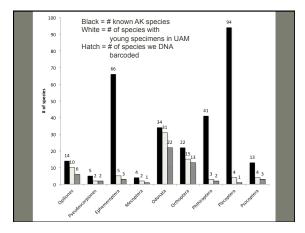


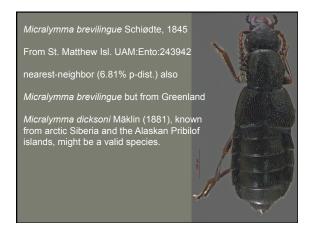












DNA Barcoullig – lest		ary			
10 plates of legs sent of unidentified specimen Coleoptera, Hymenoptera, Diptera					
specimens sent	950				
Barcodes	601 (241	BINs)			
ID improvement	562				
Confident species IDs	161 (27%	of 601)			
number of confide	nt spp IDs / N	o. succ barcode			
Coleoptera	13 / 8	82 15%			
Hymenoptera	85/3	338 25%			
Diptera	62 /	181 34%			

IA Barcoding – test of the library	
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BIN Discordance (Barcode Index Numbers(BIN): cluster barcode sequences to create OTUs that closely reflect species groupings)							
UAMIC409-13	Carterocephalus palaemon	Carterocephalus palaemon	Species	BOLD:AAA6267	101	Carterocephalus palaemon(93), Carterocephalus silvicola[15]	
UAMIC1668-13	Centromerus nr. longibulbus	Centromerus nr. Iongibulbus	Species	BOLD:AAU6230	4	Centromerus longibulbus[3], Centromerus nr. longibulbus[1]	
UAMIC176-13	Cephaloon bicolor	Cephaloon bicolor	Facalas	BOLD:0400032	13	Cephaloon bicolor[3], Cephaloon lepturides[1]	
UAMIC271-13	Cephaloon bicolor	Cephaloon bicolor	species	80CD.304Q0032	15	Cephaloon bicolor(3), Cephaloon leptundes(1	
UAMIC1234-13	Cephalops furnaceus	Cephalops furnaceus	Species	BOLD:AAG1658	22	Cephalops pallidivittipes(8), Cephalops furnaceus(6)	
UAMIC1329-13	Ceraticelus fissiceps	Ceraticelus fissiceps	Species	BOLD:AAC1590	82	Ceraticelus silus[73], Ceraticelus atriceps[4], Ceraticelus fissiceps[1]	
UAMIC1683-13	Ceratinella acerea	Ceratinella acerea	Species	BOLD:AAM0568	16	Ceratinella acerea[15], Ceratinella tigana[1]	
UAMIC992-13	Cheilosia borealis	Cheilosia borealis		cies BOLD:ACF0974	49	Cheilosia fraterna[11], Cheilosia vernalis[10], Cheilosia melanura[6], Cheilosia chlorus[6], Cheilosia sootryeni[6],	
UAMIC993-13	Chellosia borealis	Cheilosia borealis	Species			Cheilosia reniformis[3], Cheilosia vernalis-agg.[2], Cheilo borealis[2], Cheilosia fraternus[1], Cheilosia chloris Cheilosia aff. melanura[1], Cheilosia ruficollis	
UAMIC597-13	Chlorochroa rossiana	Chlorochroa rossiana	Species	ROLD: AAF9082	18	Chlorochroa ligata[11], Chlorochroa rossiana[2], Chlorochro granulosa[2	
UAMIC598-13	Chlorochroa rossiana	Chlorochroa rossiana	species	010.001.0001	10		
UAMIC191-13	Chrysobothris trinervia	Chrysobothris trinervia	Species	ROLD: AAF2098	9	Chrysobothris trinervia[7], Chrysobothris pseudotsugae[1],	
UAMIC391-13	Chrysobothris trinervia	Chrysobothris trinervia	species	010.04110.00		Chrysobothris cariniperinis[1]	
UAMIC955-13	Chrysops carbonarius	Chrysops carbonarius	Species	BOLD:AA84140	42	Chrysops ater[22], Chrysops carbonarius[1]	
UAMIC959-13	Chrysops dawsoni	Chrysops dawsoni	Species	BOLD: AAD 8563		Chrysops dawsoni/81. Chrysops cuclux/1	
UAMIC981-13	Chrysops dawsoni	Chrysops dawsoni	species	peces BULD:AAD8563		Cinysopa dansonijuj, cinysopa cociazja,	
UAMIC956-13	Chrysops excitans	Chrysops excitans	Species	BOLD:AAA8870	773	Chrysops excitans[54], Chrysops mitis[10	
UAMIC958-13	Chrysops excitans	Chrysops excitans	species	1010.0000000			
UAMIC986-13	Chrysops frigidus	Chrysops frigidus	Species	BOLD:AAD4375	97	Chrysops frigidus[29], Chrysops venus[5]	

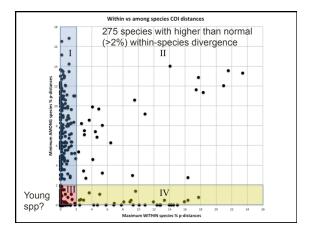
BIN Discordance Report

UAMIC project

611 of the 1,360 BINs – discordant (BIN shared by > 1 spp) different taxa (identifications) with low divergence

660 concordant

89 singleton BINs



Conclusions & Future Directions

Combined with other data in BOLD

4,020 AK species have DNA barcodes

48.5% of the fauna of AK (most well-barcoded state?)

- Continue to build the DNA barcode library esp. aquatics
- Discordance improvements contamination, misids, classification, taxonomy

Pursue & refine NGS methods for bulk sample ID & monitoring (USFWS)

