

Standardization of Genetic Markers and Databases for Brook Trout in Lake Superior

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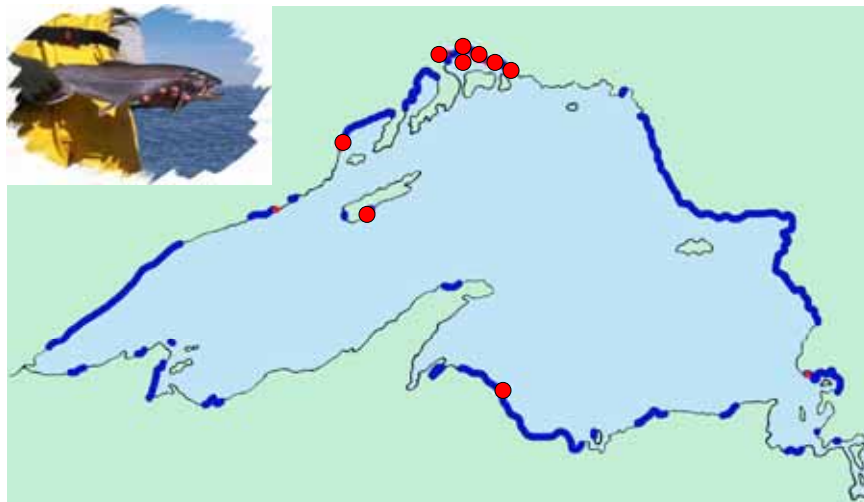


Talk Outline

- Brook trout restoration
 - Lake Superior
 - coaster brook trout
- Genetics
 - standardization project
- Data management
 - GLSC database



Distribution of coaster brook trout



Brook Trout Restoration Issues

- Taxonomic status of coasters (ESU / ecotype)
- Remnant populations
 - are there any?
 - stock structure
- Effects / effectiveness of stocking
- Source populations for restoration?

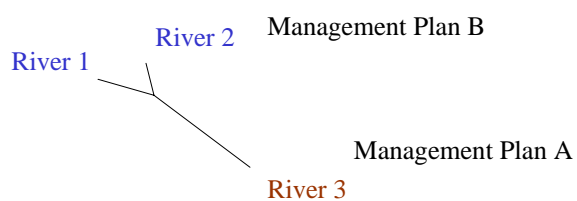
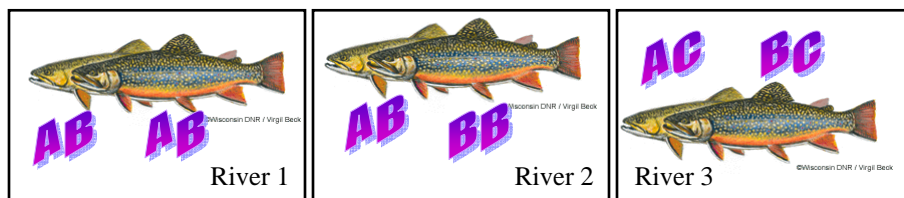


Genetics

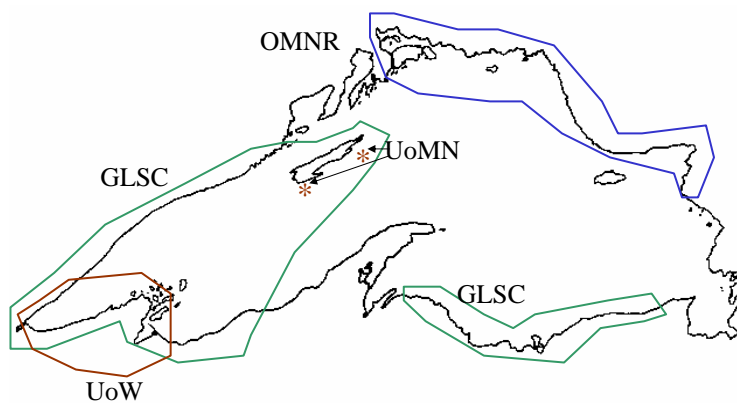
- Measure differences due to demographic processes
 - migration vs. isolation
 - population size, amount of inbreeding
 - glacial origins
- Look at how diversity is different among and within populations and species
 - species, subspecies or population
- Non-coding or neutral markers
 - microsatellite DNA loci



Genetics



Distribution of Collections



- Multiple jurisdictions, multiple research labs
⇒ need for data standardization

Standardization

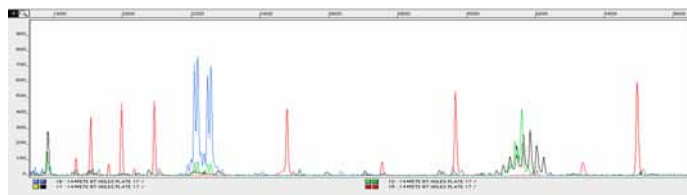


- Samples of Lake Nipigon hatchery brook trout
- Identify sources of variation and standardize scoring
- Stored in genetic database for future data sharing

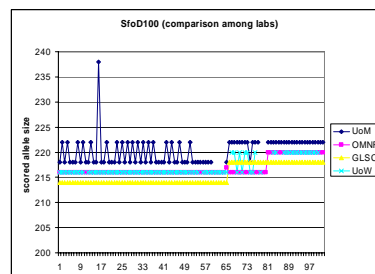
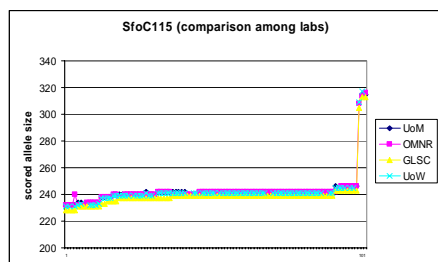
- Great Lakes Science Centre (GLSC)
- University of Minnesota (UoMN)
- Ontario Ministry of Natural Resources (OMNR)
- University of Wisconsin (UoW)

Project Variables

- Different labs
 - PCR equipment + conditions
 - sequencer platform
 - scoring (size, homo/het, binning)
- microsatellite loci
 - repeat size (di-, tri-, tetra-)
 - scoring (signal vs. noise, binning)

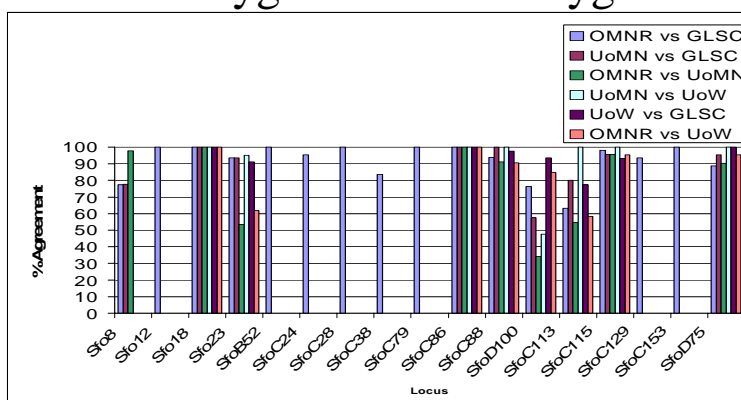


Comparison of offsets



- OMNR vs GLSC 1.4%
- UoMN vs GLSC 1.8%
- OMNR vs UoMN 1.3%
- GLSC vs UoW 1.9%
- UoMN vs UoW 0.77%
- OMNR vs UoW 1.2%

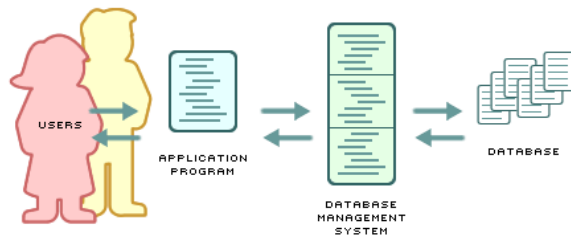
Heterozygotes vs. homozygotes



- OMNR vs GLSC 92%
- UoMN vs GLSC 89%
- UoMN vs OMNR 80%
- UoMN vs UoW 93%
- UoW vs GLSC 94%
- OMNR vs UoW 86%

Database System

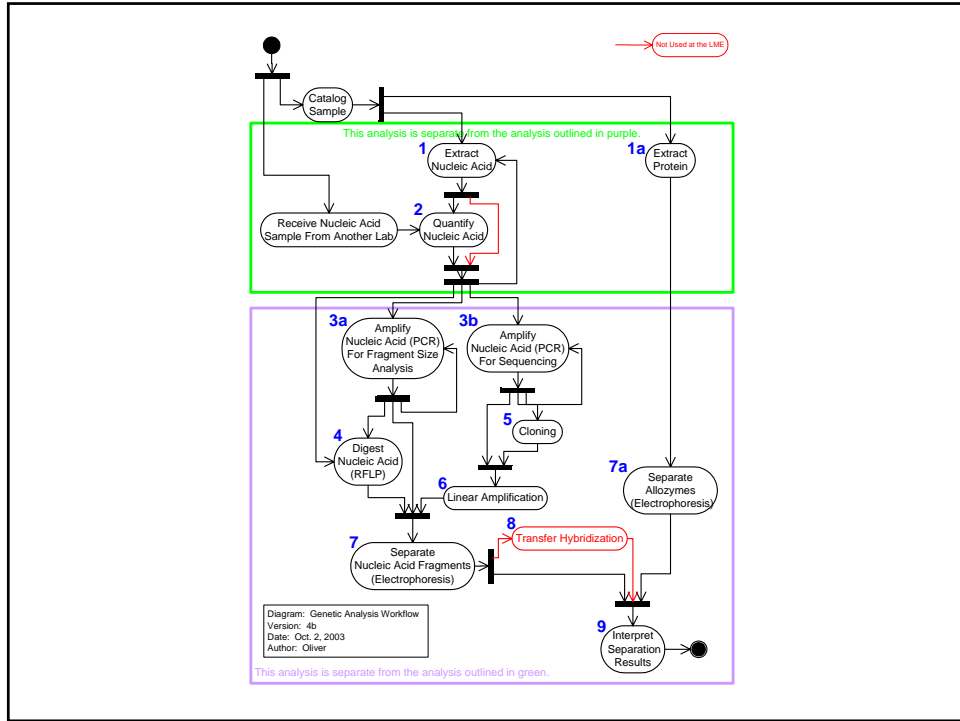
- Self-describing system of integrated records, bound in a cohesive unit
- Four parts

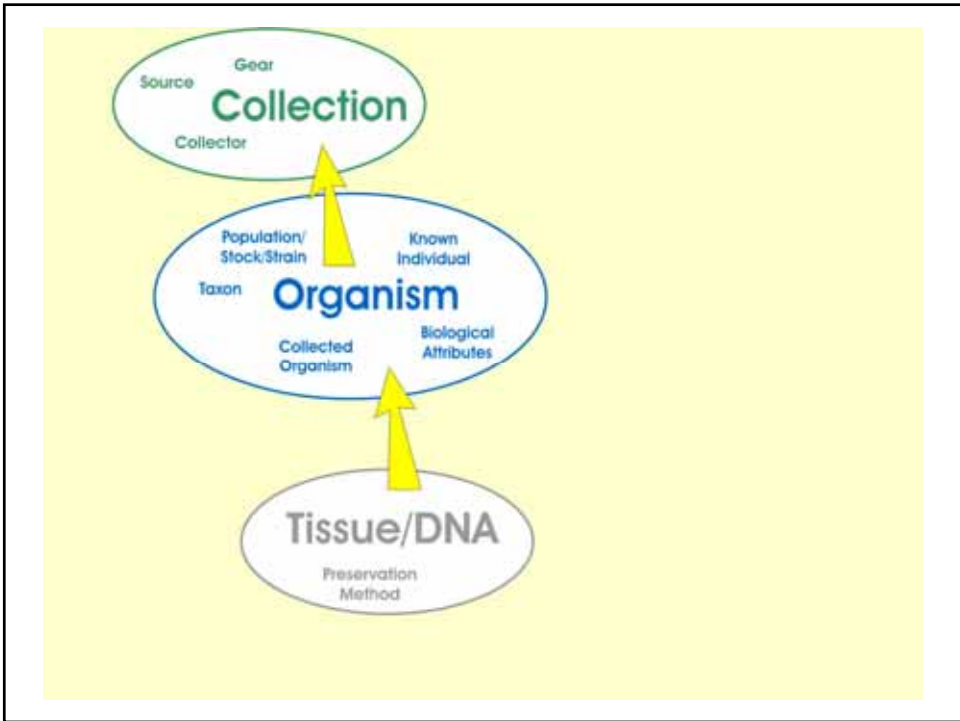
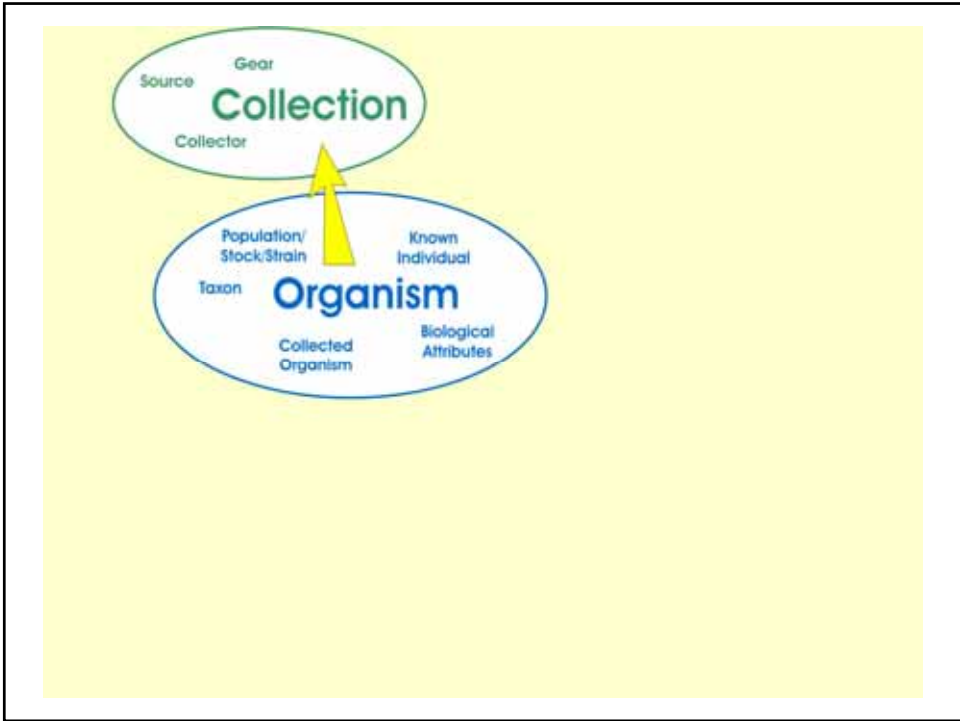


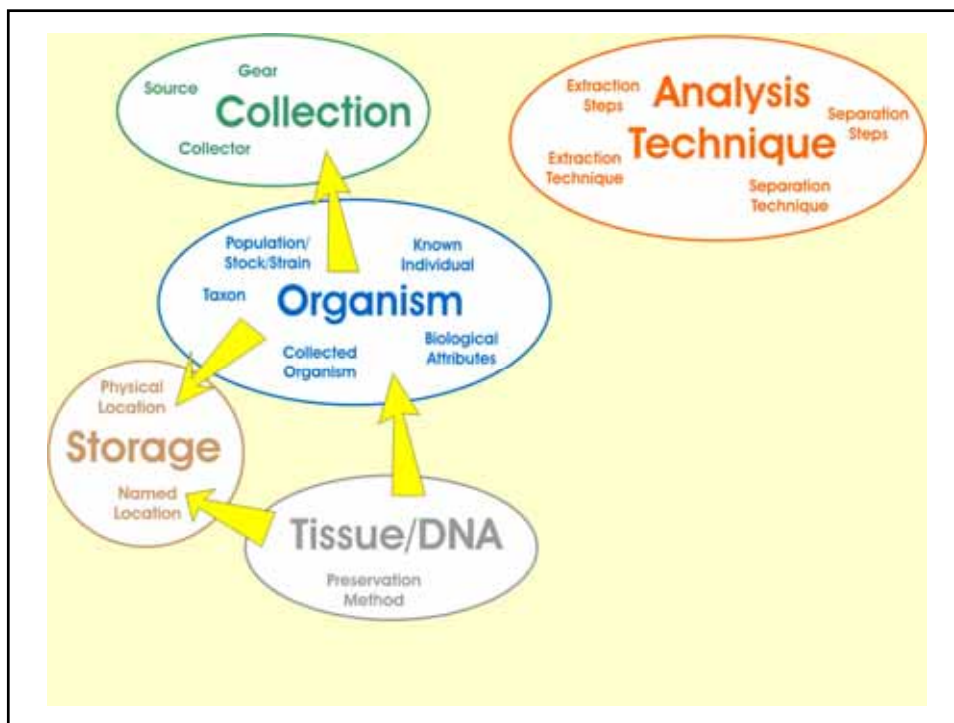
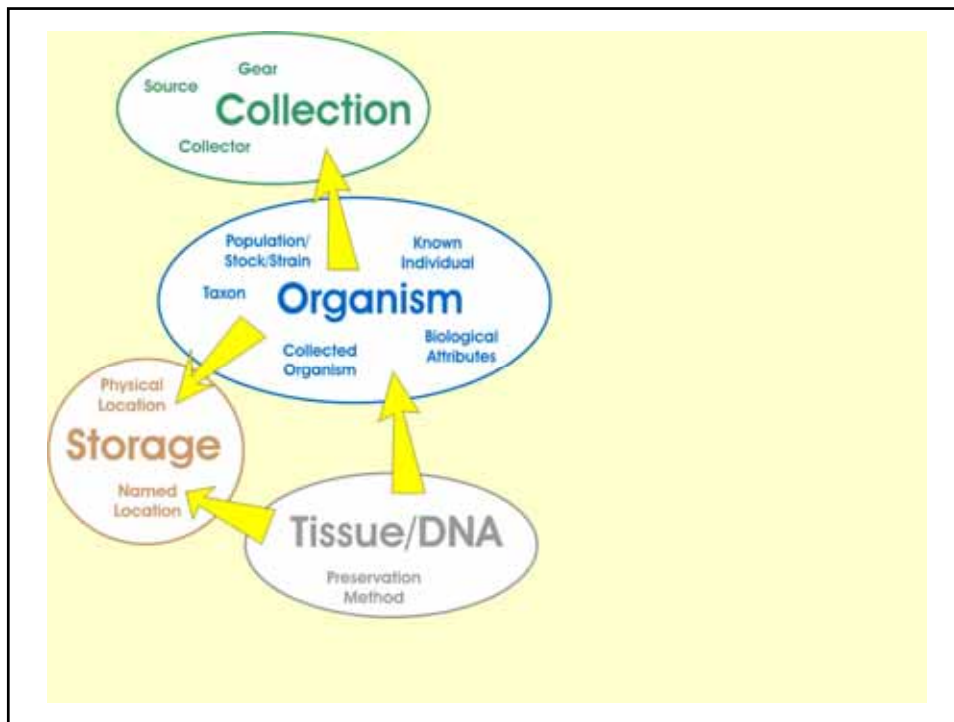
Great Lake Science Centre Genetic Database

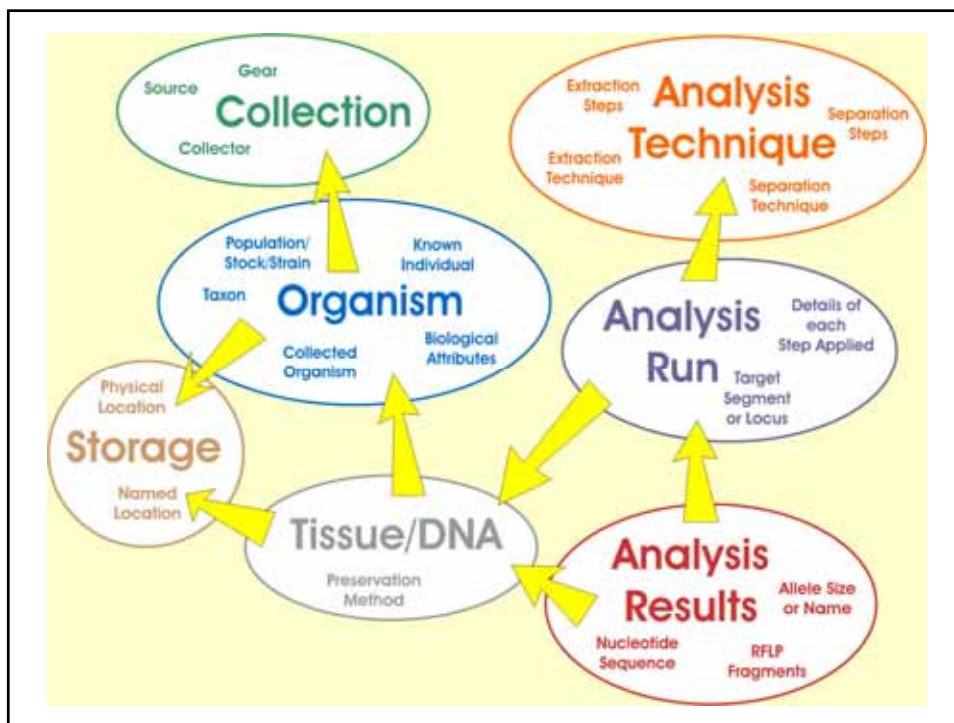
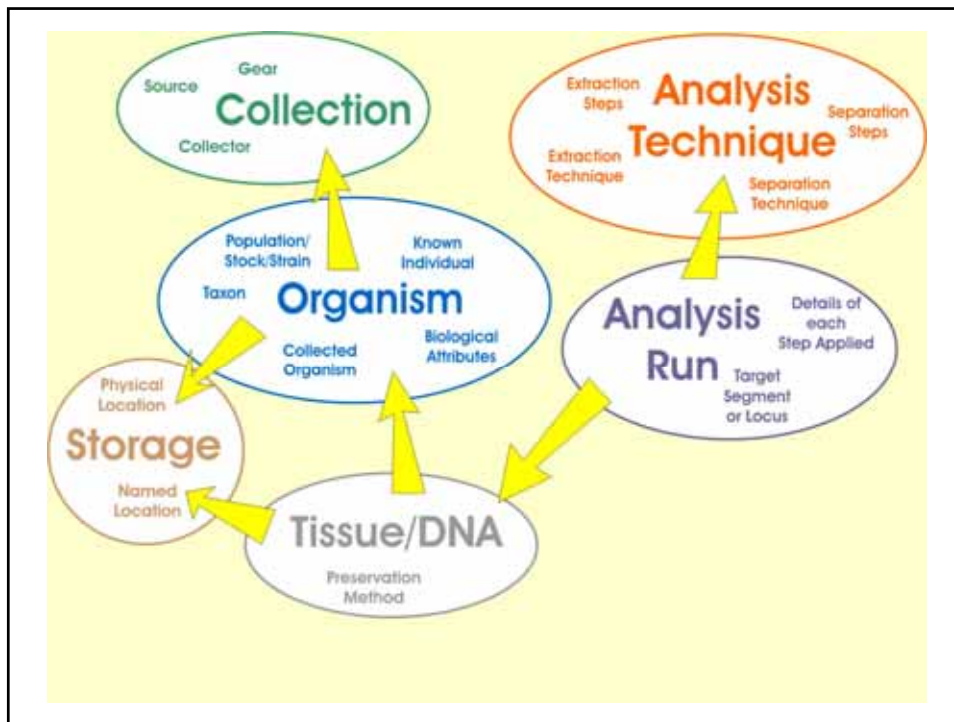
- Track samples
 - multiple species, projects, users, data sources
- Track specifics of laboratory protocols
- Accommodate changes in methodology
 - allow new methods to be added
- Modified for different labs with different needs
 - allozyme vs. DNA
 - forensics



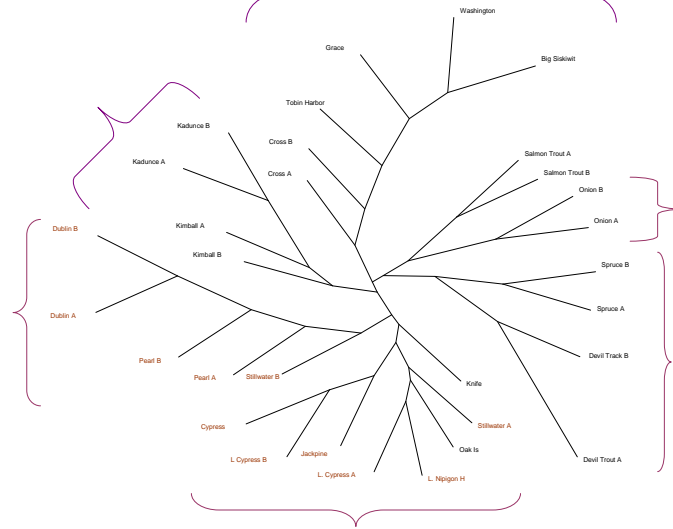








Use of Standardized Data



Next steps

- Develop standards or criteria for standardization process
 - what loci to use
 - what is acceptable level of error?
 - data sharing issues
- More geographically diverse sources for comparison
- Involve more labs



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