Biology/DNA Scientific Area Committee

Robyn Ragsdale, Ph.D., Chair

Biology/DNA SAC Leadership

Robyn Ragsdale, Ph.D., Chair; Florida Department of Law Enforcement

Carl Sobieralski, Vice Chair; Indiana State Police Laboratory

Deedra Hawk, Executive Secretary; Wyoming Game and Fish Department

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Kimberly Frazier, Wildlife, Chair; Wyoming Game and Fish Department Wildlife Forensic and Fish Health Laboratory

Kimberly Murga, Biological Methods, Chair, Las Vegas Metropolitan Police Department

Beth Ordeman, Biological Data Interpretation and Reporting, Chair; Pinellas County Forensic Laboratory

Biology/DNA SAC Membership and Liaisons

Jason Byrd, **Ph.D.**, University of Florida

Thomas Callaghan, **Ph.D.**, Federal Bureau of Investigation

Robin Cotton, **Ph.D.**, Boston University

Phillip Danielson, **Ph.D.**, University of Denver

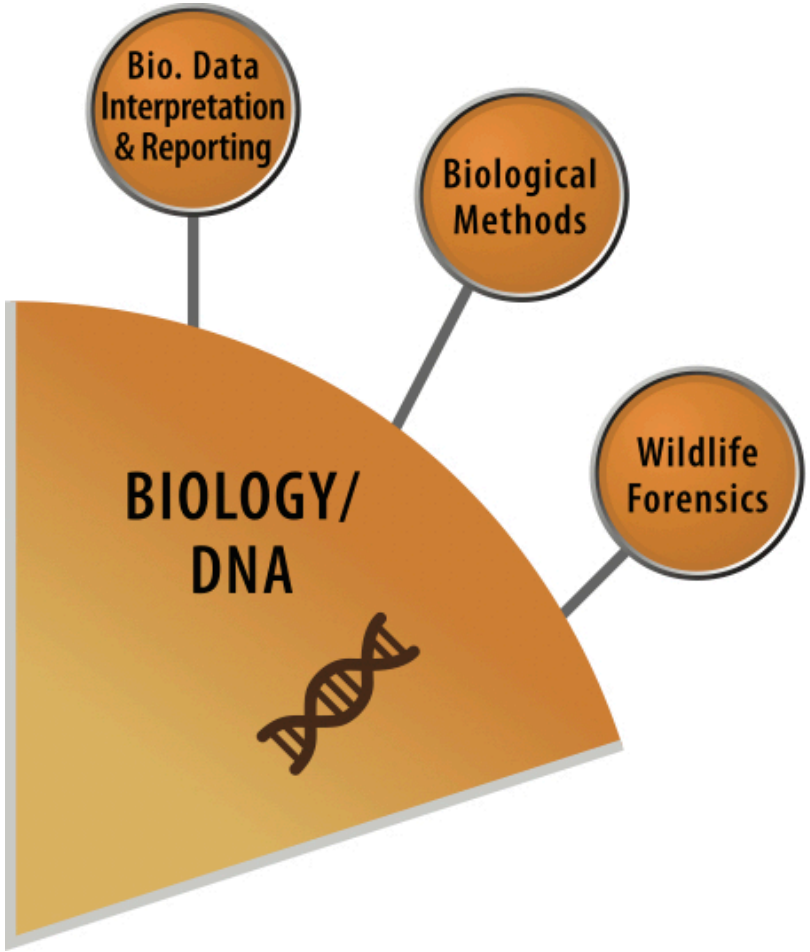
Simone Gittelson, **Ph.D.**, University of Technology – Sydney

Bruce Weir, Ph.D., University of Washington

Ex-Officios - Erin Morris, Ph.D., Behavioral Sciences Research Analyst, Los Angeles County Public Defender (HFC)

Jennifer Friedman, Deputy Public Defender, Los Angeles County, California (LRC)

Timothy Kupferschmid, Chief of Laboratories, New York City Office of Chief Medical Examiner (QIC)



The Biology Scientific Area Committee provides strategic direction within the Biology Discipline, serves as a platform to integrate similar standards activities across multiple forensic science disciplines, and manages the activities of the following subcommittees:

Biological Methods

Biological Data Interpretation and Reporting

Wildlife Forensics

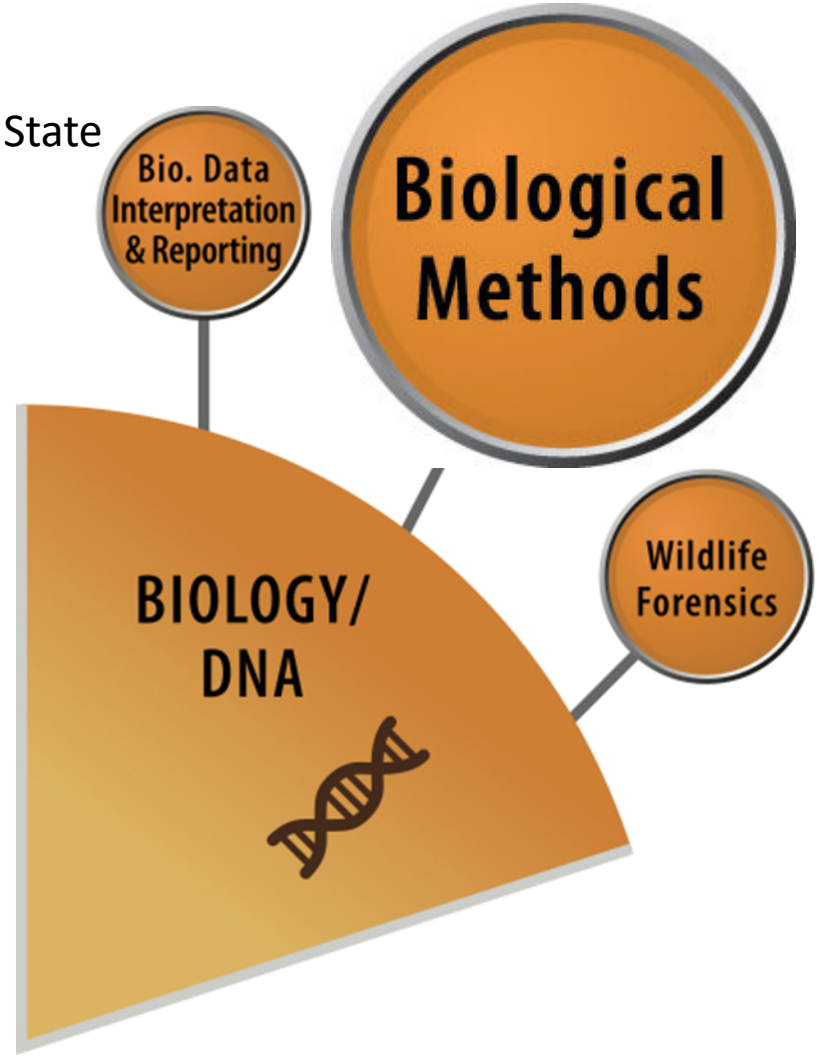
SAC Activities

Biology SAC members work closely with the SC and TGs in identifying needed standards, development of new standards, as well as identifying research needs for the forensic biology community. Additionally, they are available to help with implementation of OSAC Registry Standards in your laboratory.

The Biology SAC works closely with SWGDAM to ensure our efforts are complemented.

Kimberly Murga, Subcommittee Chair, Las Vegas Metropolitan Police Department
Margaret Sanger, Ph.D., Subcommittee Vice Chair, Retired
Jason Befus, Subcommittee Executive Secretary, Maryland State Police Forensic Sciences Division

Roadmaps



Biological Methods Subcommittee

- DNA Training Task Group
- Validation Task Group
- Contamination Task Group
- Serology and Y-STR Task Group
- Sequencing: Massively Parallel Sequencing/Next Generation Sequencing Task Group
- Familial Searching Task Group

Biological Methods Subcommittee

DNA Training Task Group

Standard for Forensic DNA Analysis Training Programs

- Standards for Training of Forensic DNA Isolation and Purification Methods
- Standards for Training of Forensic DNA Quantification Methods
- Standards for Training of Forensic STR Typing Methods using PCR Amplification, DNA Separation, and Allele Detection
- Standard for Training in Forensic DNA Amplification Methods for Capillary Electrophoresis Sequencing
- Standard for Training in Forensic DNA Sequencing using Capillary Electrophoresis
- Standard for Training in Forensic Human Mitochondrial DNA Interpretation
- Technical Report for a Sample Training Plan for Forensic DNA Laboratories

Validation Task Group

Standard for Internal Validation of Forensic DNA Analysis Methods

Standard for Internal Validation of Human STR Profiling on CE Platforms	→ Best Practice Recommendations for Internal Validation of Human Short Tandem Repeat Profiling on Capillary Electrophoresis Platforms
Standards for the Internal Validation of Human DNA Quantification	→ Best Practice Recommendations for Internal Validation of Human DNA Quantitation
Standards for Internal Validation of DNA Extraction Methods	→ Best Practice Recommendations for Internal Validation of DNA Extraction Methods
Standards for Internal Validation of Automated Platforms	→ Best Practice Recommendations for Internal Validation of Automated Platforms

Biological Methods Subcommittee

Serology and Y-STR Task Group

- Standards for the Developmental and Internal Validation of Forensic Serological Methods
- Standards for the Analytical Procedures and Report Writing of Serological Methods
- Standard for Training in Serological Methods
- Document for Report Wording for Male Screening Results
- Best Practice Recommendations for Reporting and Results of Serological Examinations
- Best Practice Recommendations for Efficient Sex Assault Kit Processing

Contamination Task Group

- Forensic Laboratory Standards for Prevention, Monitoring, and Mitigation of DNA Contamination

Biological Methods Subcommittee

Sequencing: Massively Parallel Sequencing/Next Generation Sequencing Task Group

Training Standards for Sequencing: Massively Parallel Sequencing/Next Generation Sequencing

Internal Validation Standards for Sequencing: Massively Parallel Sequencing/Next Generation Sequencing

Familial Searching Task Group

Standard for Familial DNA Searching

Standards in Process – Under Development

TRAINING

- **Standard for Training in Forensic Human Mitochondrial DNA Interpretation**
- **Technical Report for a Sample Training Plan for Forensic DNA Laboratories**

SEROLOGY AND Y-STRs

- **Document for Report Wording for Male Screening Results**
- **Best Practice Recommendations for Reporting and Results of Serological Examinations**
- **Best Practice Recommendations for Efficient Sex Assault Kit Processing**

Standards in Process – Under Development

VALIDATION

- **Standards for the Internal Validation of Human DNA Quantification**
- **Best Practice Recommendations for Internal Validation of Human DNA Quantitation**
- **Standards for Internal Validation of DNA Extraction Methods**
- **Best Practice Recommendations for Internal Validation of DNA Extraction Methods**
- **Standards for Internal Validation of Automated Platforms**
- **Best Practice Recommendations for Internal Validation of Automated Platforms**

Standards in Process – Under Development

SEQUENCING: MASSIVELY PARALLEL SEQUENCING/NEXT GENERATION SEQUENCING

- **Training Standards for Sequencing: Massively Parallel Sequencing/Next Generation Sequencing**
- **Internal Validation Standards for Sequencing: Massively Parallel Sequencing/Next Generation Sequencing**

FAMILIAL SEARCHING

- **Standard for Familial DNA Searching**

Standards in Process – at ASB

TRAINING

- **Standard for Forensic DNA Analysis Training Programs**
- **Standards for Training of Forensic DNA Isolation and Purification Methods**
- **Standards for Training of Forensic DNA Quantification Methods**
- **Standards for Training of Forensic STR Typing Methods using PCR Amplification, DNA Separation, and Allele Detection**
- **Standard for Training in Forensic DNA Amplification Methods for Capillary Electrophoresis Sequencing**
- **Standard for Training in Forensic DNA Sequencing using Capillary Electrophoresis**

Standards in Process – at ASB

VALIDATION

- **Standard for Internal Validation of Forensic DNA Analysis Methods**
- **Standard for Internal Validation of Human STR Profiling on CE Platforms**
- **Best Practice Recommendations for Internal Validation of Human Short Tandem Repeat Profiling on Capillary Electrophoresis Platforms**

CONTAMINATION PREVENTION

- **Forensic Laboratory Standards for Prevention, Monitoring, and Mitigation of DNA Contamination**

Standards in Process – at ASB

SEROLOGY

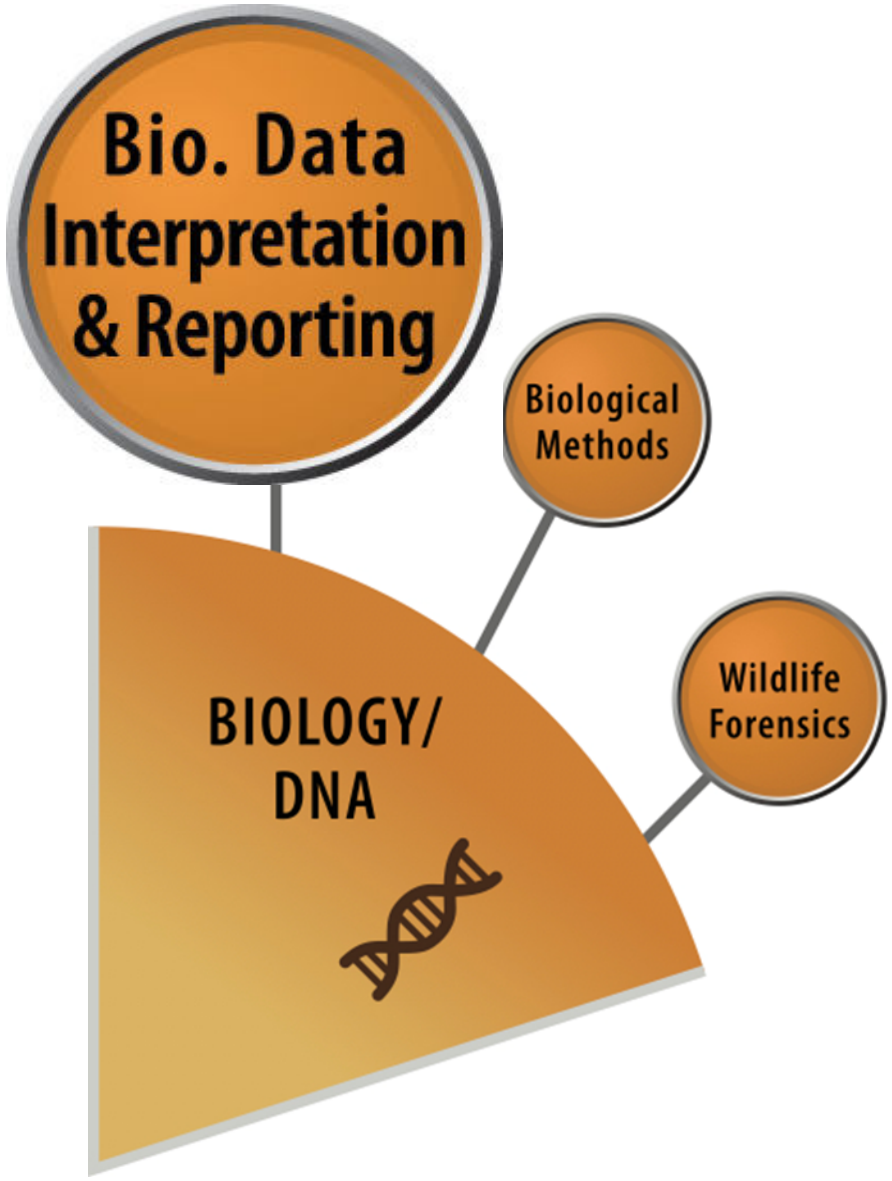
- **Standards for the Developmental and Internal Validation of Forensic Serological Methods**
- **Standards for the Analytical Procedures and Report Writing of Serological Methods**
- **Standard for Training in Serological Methods**

Standards on the Registry

<u>Coming in 2019:</u> Standard for Forensic DNA Analysis Training Programs

Beth Ordeman, Subcommittee Chair, Pinellas County Forensic Laboratory
Mechthild Prinz, Ph.D., Subcommittee Vice Chair, John Jay College of Criminal Justice, City University of New York
Catherine Grgicak, Ph.D., Executive Secretary, Rutgers University

Roadmaps



Biological Data Interpretation and Reporting

- Data Analysis
- Interpretation
- Statistical Analysis
- Report Writing/Review
- CODIS
- Testimony

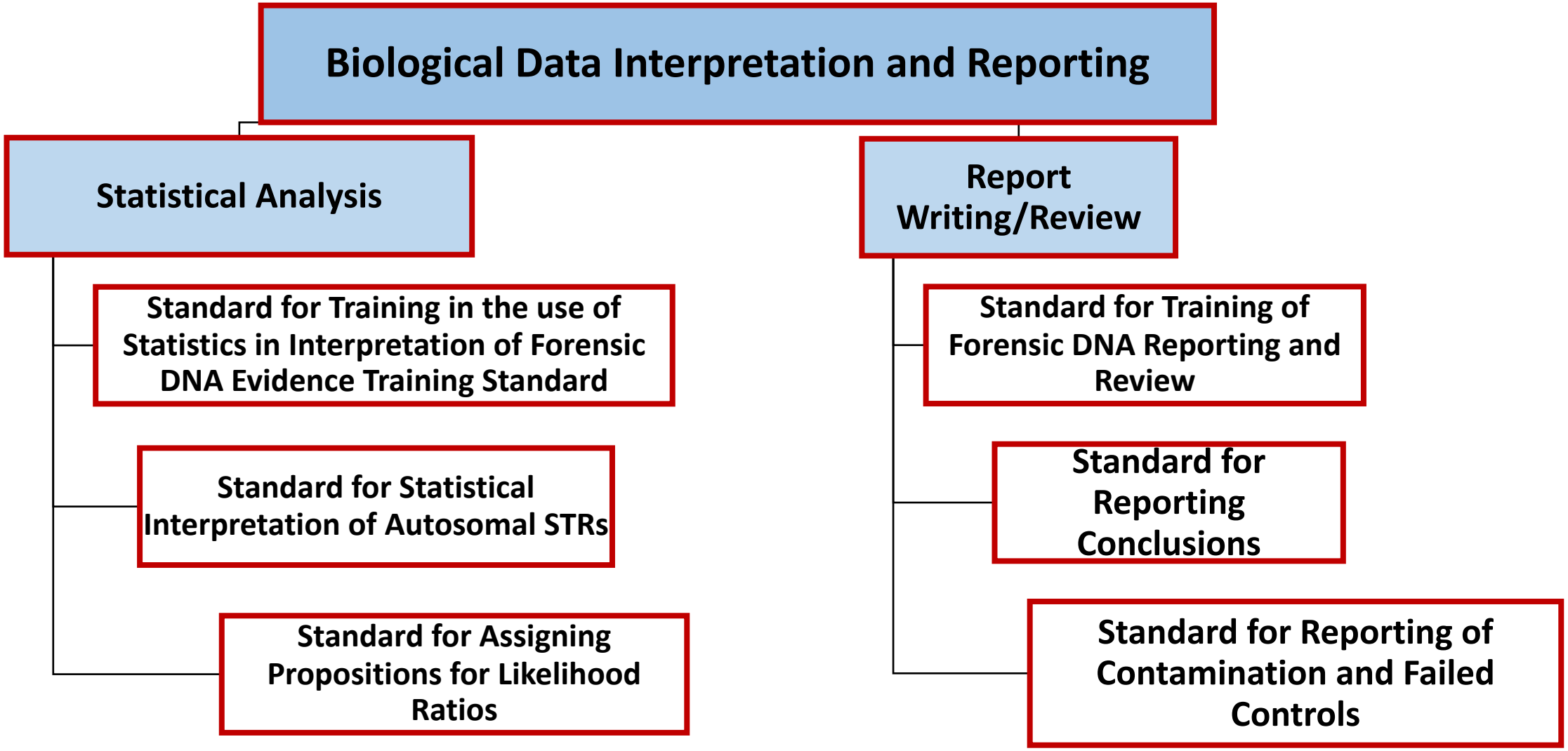
Biological Data Interpretation and Reporting

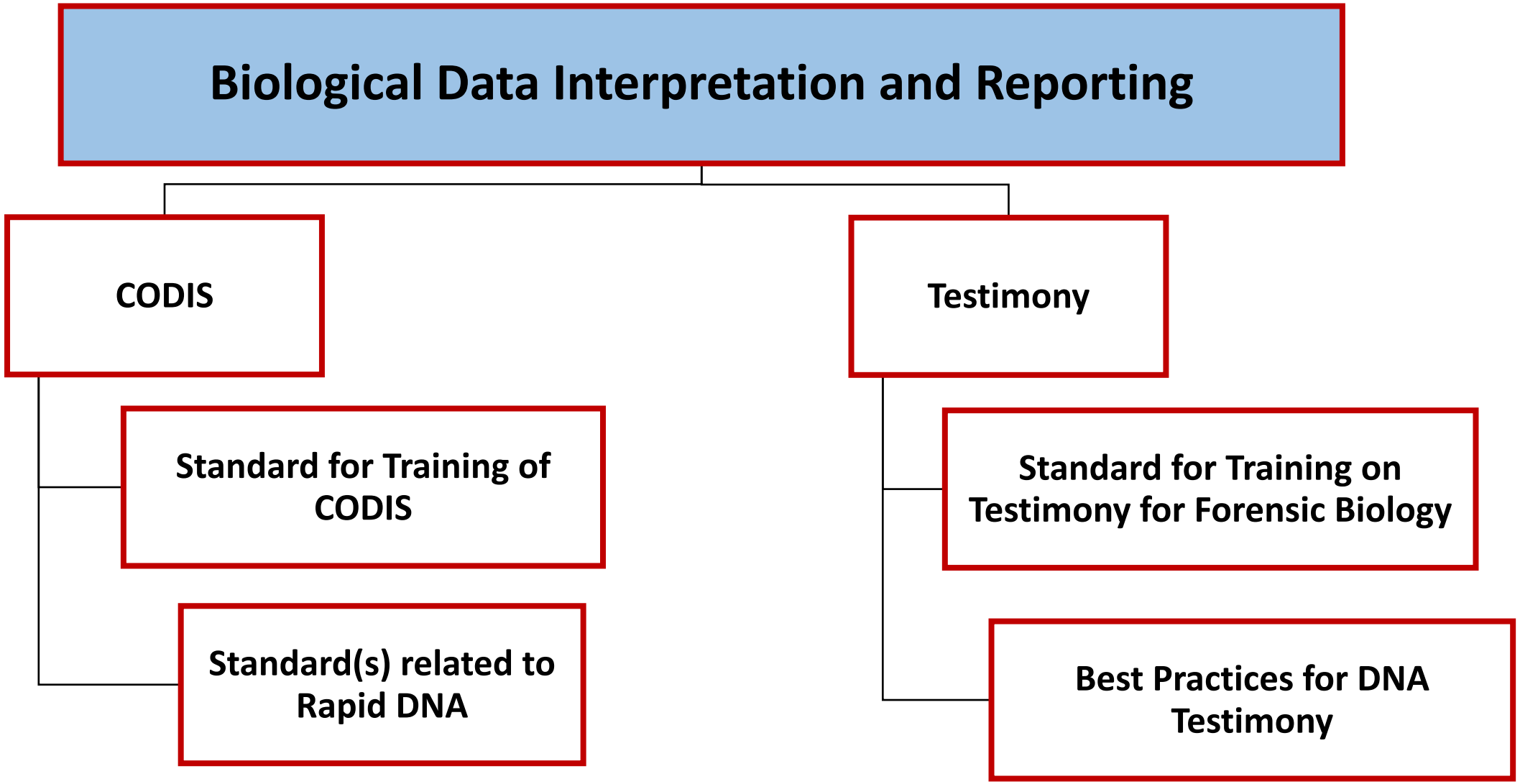
Data Analysis

- Standard for Training on Analysis of Forensic STR Data
- Validation Standards for Probabilistic Genotyping
- Best Practice Recommendations for Validation of Forensic DNA Software
- Standard for Setting Analytical and Stochastic Thresholds
- Standards for NGS/MPS
- Standards for the Use of Rapid DNA

Interpretation

- Standard for Training of Forensic Autosomal and Y-STR Data Interpretation
- Standards for Forensic DNA Interpretation and Comparison Protocols
- Standards for Internal Self-Evaluation of Mixture Protocols
- Standards for Validation Studies of DNA Mixtures, and Development and Verification of a Laboratory's Mixture Interpretation Protocol ASB 20
- Standard for the use of Elimination Databases
- Standards for NGS/MPS
- Standards for the Interpretation of Rapid DNA


Biological Data Interpretation and Reporting
Statistical Analysis
Standard for Training in the use of Statistics in Interpretation of Forensic DNA Evidence Training Standard
Standard for Statistical Interpretation of Autosomal STRs
Standard for Assigning Propositions for Likelihood Ratios
Report Writing/Review
Standard for Training of Forensic DNA Reporting and Review
Standard for Reporting Conclusions
Standard for Reporting of Contamination and Failed Controls


Biological Data Interpretation and Reporting
CODIS
Standard for Training of CODIS
Standard(s) related to Rapid DNA
Testimony
Standard for Training on Testimony for Forensic Biology
Best Practices for DNA Testimony

Standards in Process – Under Development

DATA ANALYSIS

- **Standard for Training on Analysis of Forensic STR Data**
- **Standard for Setting Analytical and Stochastic Thresholds**
- **Standards for NGS/MPS and Rapid DNA**

INTERPRETATION

- **Standard for Training of Forensic Autosomal and Y-STR Data Interpretation**
- **Standard for the Use of Elimination Databases**
- **Standards for NGS/MPS and Rapid DNA**

Standards in Process – Under Development

STATISTICAL ANALYSIS

- **Standard for Training in the Use of Statistics in Interpretation of Forensic DNA Evidence**
- **Standard for Statistical Interpretation of Autosomal STRs**
- **Standards for NGS/MPS and Rapid DNA**

REPORT WRITING/REVIEW

- **Standard for Training of Forensic DNA Reporting and Review**
- **Standard for Reporting Conclusions**
- **Standard for the Reporting of Contamination and Failed Controls**
- **Standards for NGS/MPS and Rapid DNA**

Standards in Process – Under Development

CODIS

- **Standard for Training of CODIS**
- **Standards for NGS/MPS and Rapid DNA**

Testimony

- **Standard for Training on Testimony for Forensic Biology**
- **Best Practices for DNA Testimony**
- **Standards for NGS/MPS and Rapid DNA**

Standards in Process – at ASB

- **Assigning Propositions for Likelihood Ratios**
- **Best Practice Recommendations for Validation of Forensic DNA Software**
- **Standards for Forensic DNA Interpretation and Comparison Protocols**
- **Validation Standards for Probabilistic Genotyping Systems**
- **Standards for Internal Self-Evaluation of Mixture Protocols**

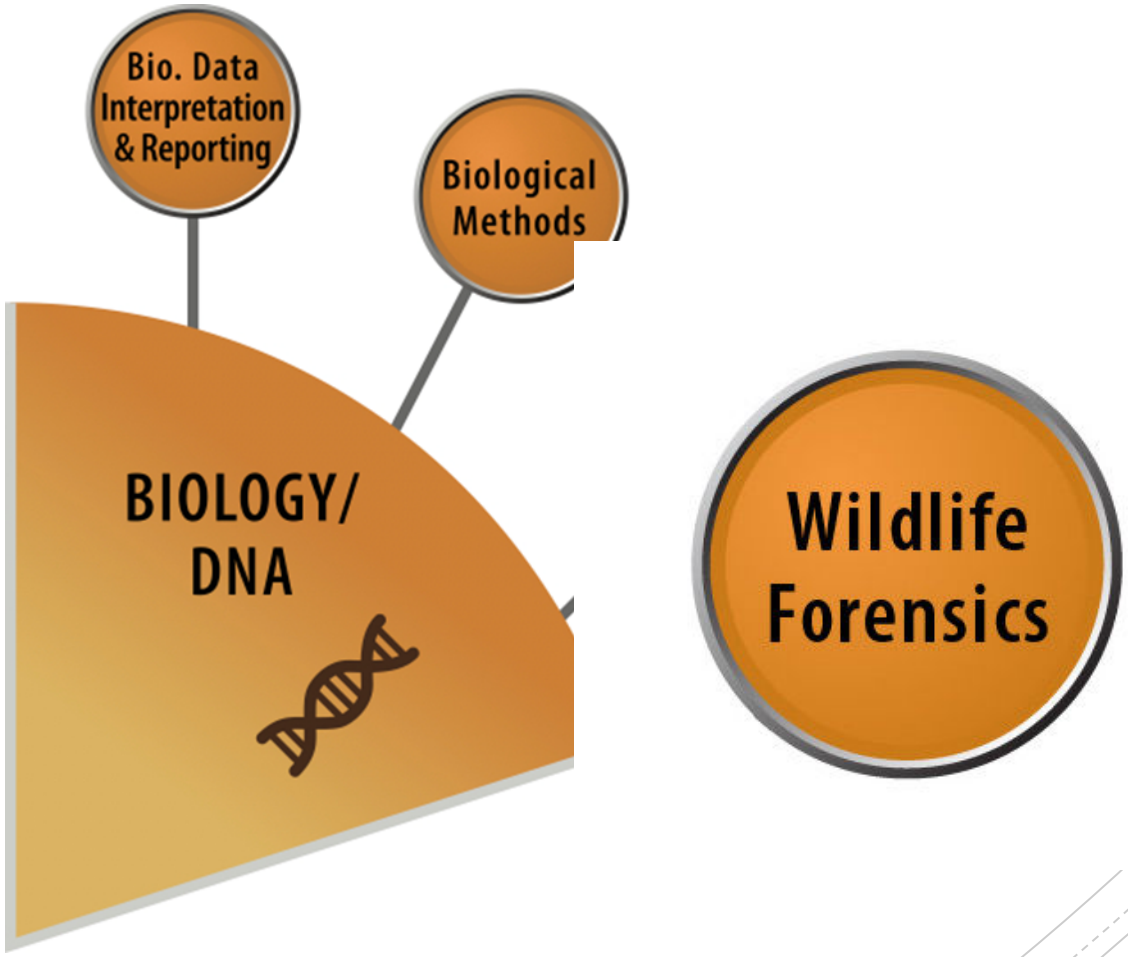
ASB Published Standards Going Through the OSAC Registry Process

ANSI/ASB Standard 020, *Standard for Validation Studies of DNA Mixtures, and Development and Verification of a Laboratory's Mixture Interpretation Protocol*, First Edition, 2018

This standard sets forth the requirements for the design and evaluation of internal validation studies for mixed DNA samples and the development of appropriate interpretation protocols for mixtures based on the validation studies performed. This standard includes a requirement that the laboratory verify and document that the mixture interpretation protocols developed from the completed validation studies generate reliable and consistent interpretations and conclusions for the types of mixed DNA samples typically encountered by the laboratory. This standard applies to any type of DNA testing technology and methodology used, including but not limited to, STR testing, DNA sequencing, SNP testing, haplotype testing, traditional and rapid protocols, etc., where mixtures of DNA may be encountered, analyzed and interpreted.

Kimberly Frazier, Subcommittee Chair, Wyoming Game and Fish Department Wildlife Forensic and Fish Health Laboratory
R. Christopher O'Brien, Ph.D., Subcommittee Vice Chair, University of New Haven
Mary Burnham-Curtis, Ph.D., Subcommittee Executive Secretary, U.S. Fish and Wildlife Service, Office of Law Enforcement

Roadmaps



Wildlife Forensic Genetics and Morphology

Training

General Standards

Validation

Report Writing

Methods – Taxonomic Identification

Maintenance of Reference Collections

DNA

Methods

Wildlife Forensics Genetics

Training

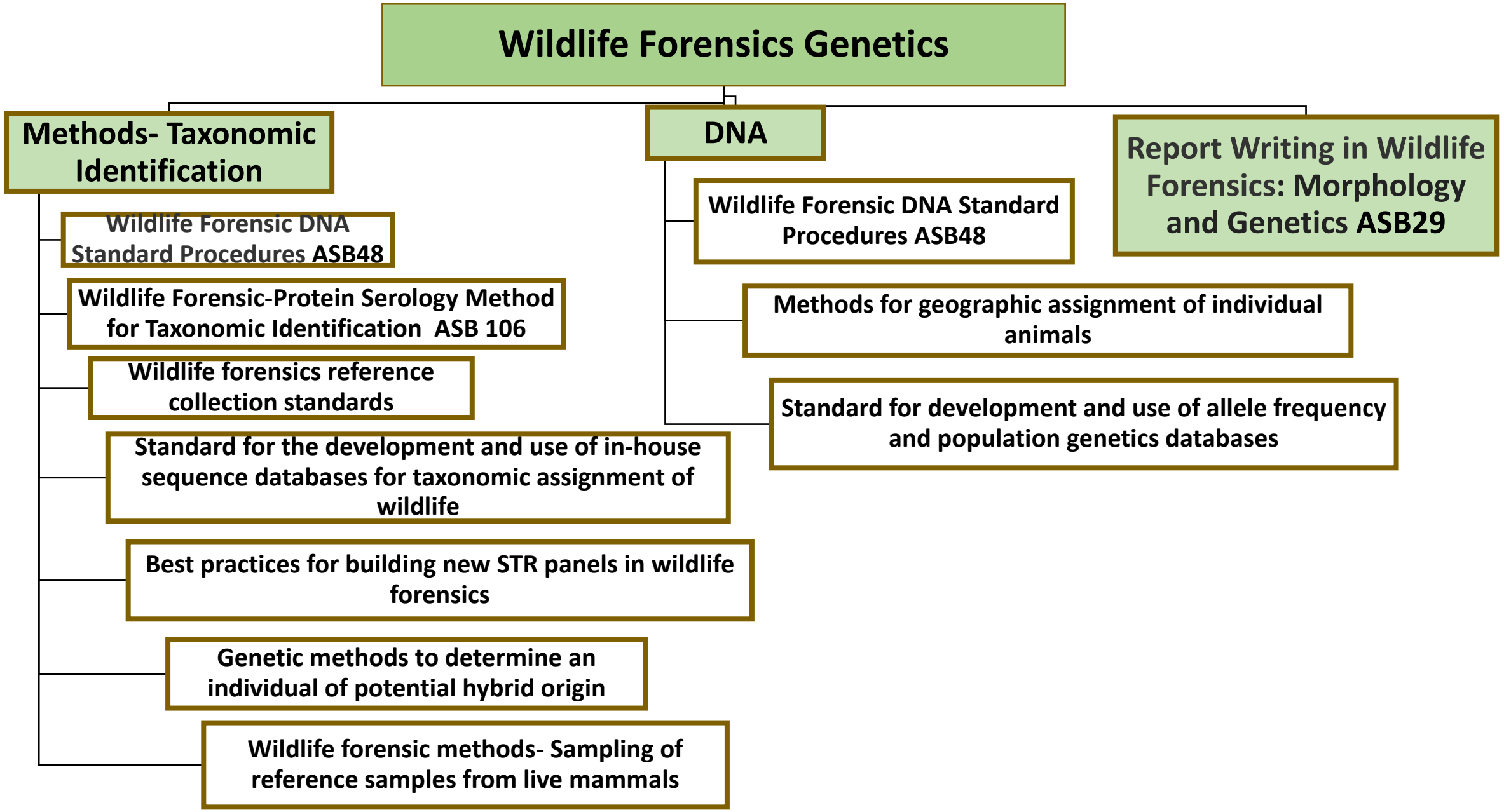
- Forensic DNA Analysis Training Programs*ASB22
- Standard for Training in mtDNA Analysis for Taxonomic Identification ASB111
- Forensic DNA Sequencing using Capillary Electrophoresis*
- mtDNA Amplification Methods*
- Forensic DNA Isolation and Purification Methods*
- Forensic DNA Quantification Methods*

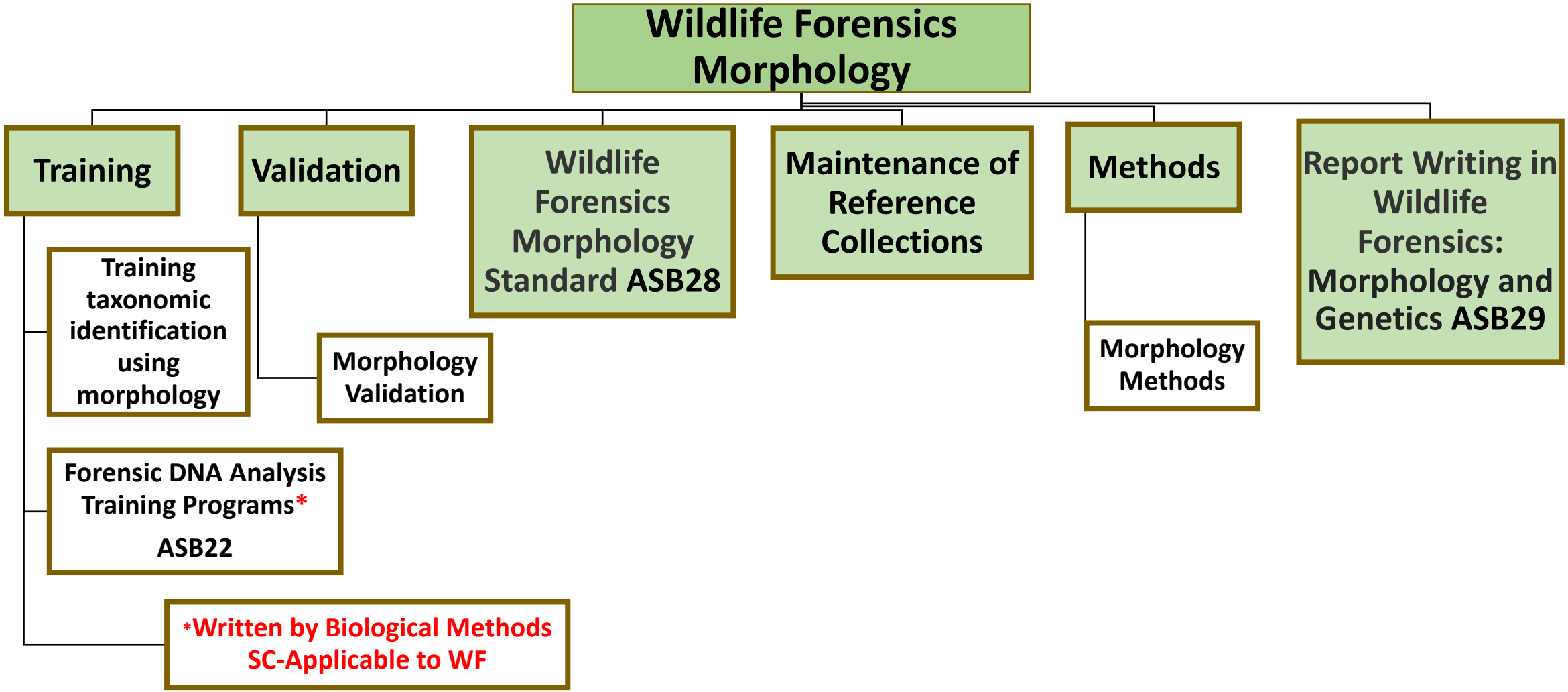
*Written by Biological Methods SC-Applicable to WF

Validation

- Wildlife Forensics Validation Standards – New Tests for Validating Short Tandem Repeat (STR) Primers ASB46
- Wildlife Forensics Validation Standard - Validating New Primers for Sequencing ASB47
- Standard for use of public databases for wildlife forensic protocol

Wildlife Forensics General Standards ASB19


Wildlife Forensics Genetics
Methods- Taxonomic Identification
Wildlife Forensic DNA Standard Procedures ASB48
Wildlife Forensic-Protein Serology Method for Taxonomic Identification ASB 106
Wildlife forensics reference collection standards
Standard for the development and use of in-house sequence databases for taxonomic assignment of wildlife
Best practices for building new STR panels in wildlife forensics
Genetic methods to determine an individual of potential hybrid origin
Wildlife forensic methods- Sampling of reference samples from live mammals
DNA
Wildlife Forensic DNA Standard Procedures ASB48
Methods for geographic assignment of individual animals
Standard for development and use of allele frequency and population genetics databases
Report Writing in Wildlife Forensics: Morphology and Genetics ASB29


Wildlife Forensics Morphology
Training
Validation
Wildlife Forensics Morphology Standard ASB28
Maintenance of Reference Collections
Methods
Report Writing in Wildlife Forensics: Morphology and Genetics ASB29
Training taxonomic identification using morphology
Morphology Validation
Morphology Methods
Forensic DNA Analysis Training Programs*
ASB22
*Written by Biological Methods SC-Applicable to WF

ASB Published Standards Going Through the OSAC Registry Process

ANSI/ASB Standard 019, *Wildlife Forensics General Standards*, First Edition, 2019

This document provides minimum standards and recommendations for practicing wildlife forensic analysts. This document covers good laboratory practices, evidence handling, and training as well as considerations of taxonomy and reference collections that are specific to wildlife forensic science.

ANSI/ASB Standard 028, *Wildlife Forensics Morphology Standards*, First Edition, 2019

This document provides minimum standards for wildlife forensic analysts in the sub discipline of morphology.

ANSI/ASB Standard 029, *Report Writing in Wildlife Forensics: Morphology and Genetics*, First Edition, 2019

This document describes the information to be provided in formal written reports of wildlife forensic examinations for use in legal proceedings. Requirements for both genetic and morphological examination reports are covered. Forensic reports serve a variety of audiences, and must provide a clear and concise summary of methods, results, and limitations.

ASB Published Standards Going Through the OSAC Registry Process

ANSI/ASB Standard 046, *Wildlife Forensics Validation Standards—STR Analysis*, First Edition, 2019

This document provides minimum standards and recommendations for validating new nuclear STR (short tandem repeat) markers for use in wildlife forensic DNA laboratories where the STR genotyping method has already been validated.

ANSI/ASB Standard 047, *Wildlife Forensics Validation Standard—Validating New Primers for Sequencing*, First Edition, 2019

This document provides minimum requirements and recommendations for validating new primers for mitochondrial haplotyping and/or taxonomic identification via sequencing in wildlife forensic DNA laboratories where the sequencing (Sanger) method has already been validated.

ANSI/ASB Standard 048, *Wildlife Forensic DNA Standard Procedures*, First Edition, 2019

This document provides minimum requirements for forensic DNA analysis of wildlife evidence including general laboratory practice, DNA extraction and amplification, analysis and interpretation, statistical support, sequencing, mitochondrial DNA haplotyping, taxonomic identification, STRs and data analysis.

Research Needs

Biological Methods:

- **To Improve the Analysis of Serological Evidence: ID of Body Fluid**

Research Needs

Biological Data Interpretation & Reporting:

- **Assessment of Specific Classes of Evidence Types to Determine the Necessity to Quantify DNA Before Amplification of Human Autosomal STR Loci**
- **Characterizing, Designing and Constructing Integrated DNA Mixture Interpretation Solutions**
- **Proficiency Testing for Complex Data Interpretation and Biostatistical Evaluations**

Research Needs

Wildlife Forensics:

- **Development of New Technologies for Discovery and Characterization of Forensically Useful Markers of Relevant Species' Biogeography**
- **Validate STR/SNP Panels for Species of Forensic Interest Using the OSAC DNA Validation Standards**
- **Develop STR/SNP Panels (Including Any Necessary Allelic Ladders and Databases) for Current Species of Forensic Interest**

Kimberly Murga, Biological Methods Subcommittee Chair, Las Vegas Metropolitan Police Department K10140M@LVMPD.com

Beth Ordeman, Biological Data Interpretation and Reporting Subcommittee Chair, Pinellas County Forensic Laboratory bordeman@co.pinellas.fl.us

Kimberly Frazier, Wildlife Subcommittee Chair, Wyoming Game and Fish Department kim.frazier@wyo.gov

Robyn Ragsdale, Ph.D., Biology Chair; Florida Department of Law Enforcement robynragsdale@fdle.state.fl.us

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Thank you

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