



## *Native DNA Results Guide*

Hello and thank you for choosing Native DNA! We are pleased to present you with your Native DNA Ancestry Analysis<sup>®</sup> and hope that you enjoy discovering your ancestry as much as we've enjoyed performing the analysis. This tutorial was specially designed to help you get the most out of your results. As you read, we hope that your questions will be answered and that you'll be able to explain the results to family and friends. The sections provided within this document give details concerning your certificate of ancestry, world map, mixed and unmixed extended match result portions of your DNA analysis, Deep Dive Analysis, and more.

*\*You can download the latest version of this document anytime on our website at the following link: [FAQ | Native DNA \(native-dna.com\)](#). Also, you may find the FAQ (Frequently Asked Questions) page at this link very useful. Other information concerning our research and development, and company in general is available on our website, Facebook, and YouTube. Please feel free to contact us anytime.*

### **I. Certificate of Ancestry**

Your certificate is the most concise piece of information within your results package. It contains all the crucial information we were able to gather from the DNA sample you provided. This information was filtered for an extended period by our owner until confidence was reached that the best information could be provided to you. For instance, the percentage of ancestry estimates found on the lower left side of your Certificate of Ancestry are determined not only by what Pinnacle (our ancestry determining computer program) suggests your ancestry to be, but also by detailed inspection by the owner/operator to ensure you receive the most accurate results. Are these results perfect? Typically, they are the best on the DNA testing market, and this is something we're proud of. However, it is possible that the percentage estimates could be a bit off due to random assortment of autosomal genetic material within your DNA occasionally making it difficult for us to obtain perfect results.

Errors, if they occur, are typically twice the actual admixture present in a person. In other words, a tested individual could be only 10% Native American instead of 20% as indicated by the analysis, or 6% instead of 12% etc. etc. Unfortunately, there is simply no way to completely avoid errors such as these within DNA estimates of ancestry. According to our scientific research and feedback from customers, such errors are rare. Additionally, please consider that a greater number of STR markers used in your analysis provides results of increasing precision. Through years of

experience, we've noticed that 15 STR markers (two values per locus for a total of 30 unique numbers within your genetic profile) is often the minimum amount of STR data from which you can expect reasonable results. Native DNA offers STR tests of up to 28 STR markers (two values per locus for a total of 56 unique numbers within your genetic profile). Tests can be purchased at [DNA Tests | Native DNA \(native-dna.com\)](#)

You will find your final world population list on the right side of your certificate of ancestry. Much like your percentages of ancestry, this list of populations was filtered by someone who has thousands of hours of experience reading ancestry results, and not simply a computer doing all the work. These populations are the ones your DNA most closely matches within our population database, which currently contains over 1200 populations from around the world.

**Pooled** - Genetic frequencies from several populations of highly similar origins which have been combined through averaging into a single population listing (pool) for that population. For example, Ukrainian genetic data from Odesa, Kiev, and Dnipro may be averaged into a pooled Ukrainian population listing.

**Pooled<sub>n</sub>** - Indicates that frequency data has been grouped (pooled)/binned through averaging using the raw genome data from the population study(s). The n value indicates the pool or bin number based on genome data for that population.

**Simulated 1 (Sim 1)** - Population derived through modeling, via industry published population statistics within scientific journals. This is the most precise of the simulated population types. **All of our simulated STR population types have varying similarities to G25 global coordinate SNP data.**

**Simulated 2 (Sim 2)** - Population developed from knowledge concerning estimated genetic admixture and is based on information from preexisting studies or empirical observations. These are primarily composite populations (e.g., populations consisting of ancestry from three or more distinct world regions).

**Simulated 3A (Sim 3A)** - Population formed when a person of known ancestry provides a genetic profile, and a simulated (computer modeled) population is then constructed from that data. Prior knowledge of both STR statistics and genetic admixture for that population are not available.

**Simulated 3AT (Sim 3AT)** - Population developed from transposing SNP data to STR form via modeling, which is of value since orders of magnitude more people have taken SNP analyses when compared to STR.

**Simulated 3B (Sim 3B)** - A population which, after obtaining express permission from the sample provider, is assigned the sample provider's name and email address with the intent of improving customer results through the identification of global ancestral connections.

**Extracted** - Within a mixed population, genetic markers from specific world populations are isolated, extracted, modeled, and Simulated 3A populations developed using the data generated from computer modeling.

**Amplified (AMP)** – Statistically enhanced populations intended to reveal relatively small ancestral admixture that may be missed by standard analyses.

## II. World Map

This map simply illustrates where the world populations listed on the right side of your certificate of ancestry are located on Earth. Being able to visualize where these populations are located is advantageous by providing clues concerning relationships to nearby populations and migration routes. Filled yellow circles indicate where your strongest matches are located. Moreover, filled red circles indicate the location of your medium strength matches, and blue represents your lowest scores. This is an excellent visual guide to understanding your results...

All filled yellow markers combined make up 50-100% of your ancestry

All filled red markers combined make up 25-50% of your ancestry

All filled blue markers combined make up 25% or less of your ancestry

*-Markers which are outlined in orange indicate your strongest match for each continental region appearing in your results. The continental regions consist of America (both north and south are combined), Africa, Asia, Europe, and Australia. Markers outlined in purple and light grey indicate your second and third strongest matches from each region, respectively. Markers without an outline represent your lowest match for that particular color (yellow, red, or blue).*

\*Triangles indicate diaspora populations which contain a significant Native American admixture

\*Stars indicate diaspora populations which contain a significant Sub-Saharan admixture

\*Squares indicate diaspora populations from Europe

\*Non-filled circles indicate populations of strongly mixed ancestry (such as Roma, Polynesian, certain Caribbean peoples etc.)

*-The same convention applies for diaspora outlined colors as mentioned in the previous indented and italicized discussion concerning this topic above.*

## III. World Regional Map

This map includes the most important regional contributions to your genome. As with your world population map, yellow represents the region where your strongest matches originated, along

with red and blue in descending order. Note that it is possible that the population you would match the strongest is not yet in our database, and thus the regional map can help provide information concerning where the population you're most similar to is located. Lastly, highlighted regions outlined by colored dashes represent inferred regions where your ancestry may have been in more recent times and may represent the location of your more recent and known tribal/population affiliations. These dashed regions are often inferences made from associated populations within your results.

#### **IV a. Mixed and Unmixed Match Results**

Included with your results are files named "17 STR Mixed Results" and or "28 STR Mixed Results" or "28 STR Unmixed Results." However, if we performed your analysis using you previously obtained STR profile, the number of STR's used may vary. These valuable files contain your world population lists as they appeared verbatim from our computer program, Pinnacle. Since we have developed two separate versions of Pinnacle, one of which operates on up to 17 STR markers, and another uses up to 30 STRs. We find it important to provide you with mixed and unmixed results to help support your personal research. Your population lists are arranged in descending order from strongest population match at the top to your weakest match at the bottom.

The numerical values to the right of the world population listing indicate how likely your DNA profile is to be found within the specific population listed. For instance, if your match score for the Basque (France) population is  $1.36E+35$  it means that the probability of your specific 28 STR DNA profile existing within the Basque population of France is 1 in 136,000,000,000,000,000,000,000,000,000 (pronounced one hundred thirty-six quadrillion), which is impossible because there are only approximately eight billion (8,000,000,000) people on Earth. It's also important to recognize that the lower the value, the stronger the match to that population. For instance,  $3.13E+32$  is a much stronger match than  $2.18E+33$ . This shows how powerful STR markers can be in pinpointing both your forensic identity and ancestry. No one on Earth has your 28 STR profile, unless of course you have an identical twin. This information, although unfiltered by the owner/operator, can provide interesting background information to our customers, so we have continued to provide this data with every order.

#### **IV b. Difference Between Mixed and Unmixed Population Lists**

At the request of our customers, we have decided to develop a way of easily releasing both mixed and unmixed mode population lists with every STR DNA analysis we deliver. Both list types have pros and cons, and it is important to realize that extensive knowledge is often necessary to properly interpret them. The mixed population list includes hundreds of combinations of world populations such as "Yoruba (Nigeria) & Cherokee (North Carolina)" which are created for the

purpose of identifying specific genetic admixture in your data that unmixed mode may be unable to capture. Unpublished independent studies conducted by Native DNA have revealed that the mixed mode technique identifies ancestry with greater precision than unmixed mode population data. However, unmixed mode offers the advantage of being more inclusive of all populations in a shorter space with less clutter, which can reveal ancestry that mixed mode analysis may miss due to a lack of certain mixtures not existing in our database.

Please note that it is not uncommon for unmixed mode results to indicate populations which may not seem to line up with those in your mixed mode population list, or those found on your Certificate of Ancestry. This is because much interpretation is often required to produce the interpreted finished product, your Certificate of Ancestry. We now include your match scores for all populations in our STR database within your unmixed mode population list. Please note that you don't match all the populations in this list, and that we provide this information simply because many customers request it. Unmixed mode population matches are forced to express all your ancestry within one population at a time and all the information within each population must be unpacked through interpretation. Mixed mode populations can express a much wider range of world population data per population match listing, as the data within them comes already unpacked.

**In summary:** Unmixed population matches must express all your ancestry as one chunk, while mixed mode population matches allow your ancestry admixture to be expressed more precisely and with a more understandable consistency/smooth texture. Unmixed is kind of like trying to drink out of a high velocity firehose when you've been in the summer heat all day without water and it's your only hydration option. You've got to have it, but it's all coming at you at once whether you like it or not. Mixed mode is kinder and more piecemeal, with five different flavored waters to choose from. Moral: both have value in that unmixed population sharing can satisfy your thirst if you are careful and know how it's done (how to interpret the data), but mixed mode is often more palatable.

## **V. Deep Dive Analysis**

The Native DNA Deep Dive Analysis consists of arrays of your STR data processed iteratively in ensemble fashion using multiple statistical techniques to extract the most information possible from your STR profile. It's an analysis that we're experimenting with, and it seems promising. We plan on providing the Deep Dive arrays to STR customers in 2024 as we continue proof of concept verification.

## **VI. Other Helpful Information**

DNA testing for ancestry often produces results which take time, resources, and determination to understand. A few thought exercises which you may find helpful in shifting your mindset and bringing you closer to understanding your results are **1)**. Were you present when your relatives in question were walking the Earth? Do you truly feel that you have a deep understanding of who

they were? **2).** If you'd rather not take time to understand the depth of your results, why bother with DNA testing for ancestry? This is strongly related to question **1.**

## **VII. Ongoing Projects at Native DNA**

8-28-2024 – Continuing to use computer learning to develop simulated populations via Deep Dive array, mixed mode, unmixed mode, and composite data.

6-15-2024 – Experimenting with admixture percentages generated from Deep Dive Arrays

6-10-2024 – Began incorporating Deep Dive strategy into generation of all STR products

2-29-2024 – Native DNA Deep Dive Analysis STR product release

<http://www.native-dna.com> – Official Website

<https://www.facebook.com/NativeDna> – Facebook Business Page

<https://www.facebook.com/groups/nativednagroup> – Discussion Group

<https://www.youtube.com/nativedna> – YouTube Account

Do you have questions or comments? Let us know! We can be reached at [Nativednatesting@gmail.com](mailto:Nativednatesting@gmail.com) or through Facebook Messenger on our Facebook business page.

Sincerely,

Chris Lisackis (M.S.) – Owner/Operator