# Skin cutting patterns

- Easy to do
- Variety of cuts
- Creates area for tagging

When used with a tagging system provides a “belt and braces” marking protocol.

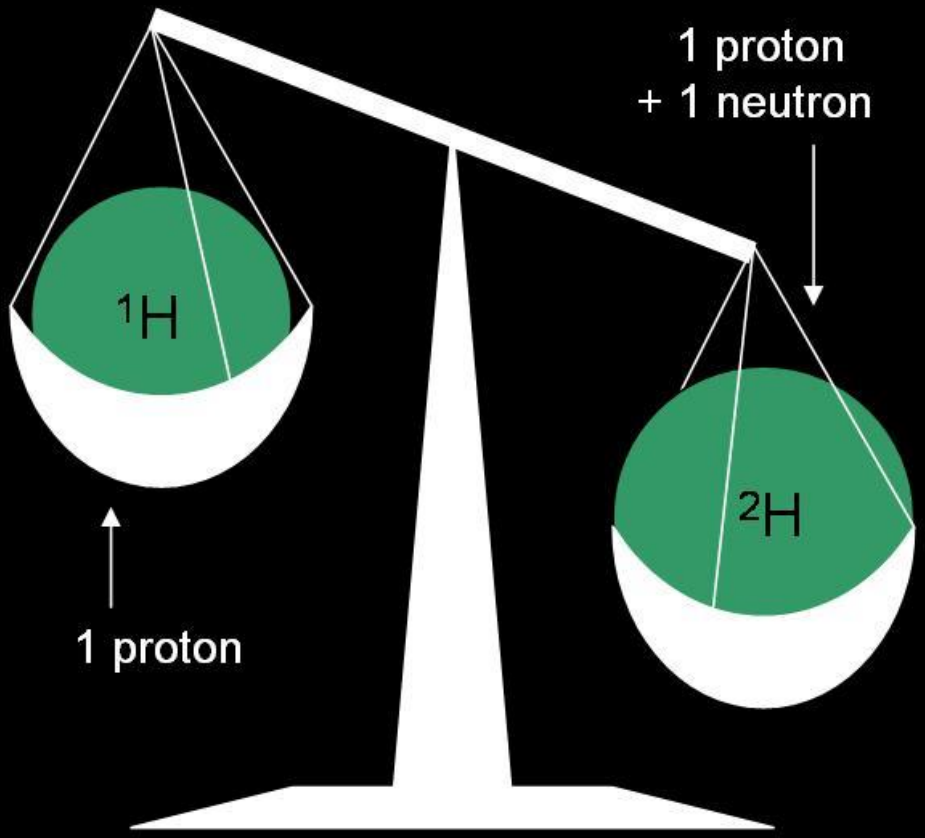
# But…the major issue is…

How do you tell the difference, between:

- Captive-bred and wild-caught?
- Capture location?

# What are isotopes?

Isotopes are atoms whose nuclei contain the same number of protons, but a different number of neutrons




Two isotopes of hydrogen

# Two types of isotopes

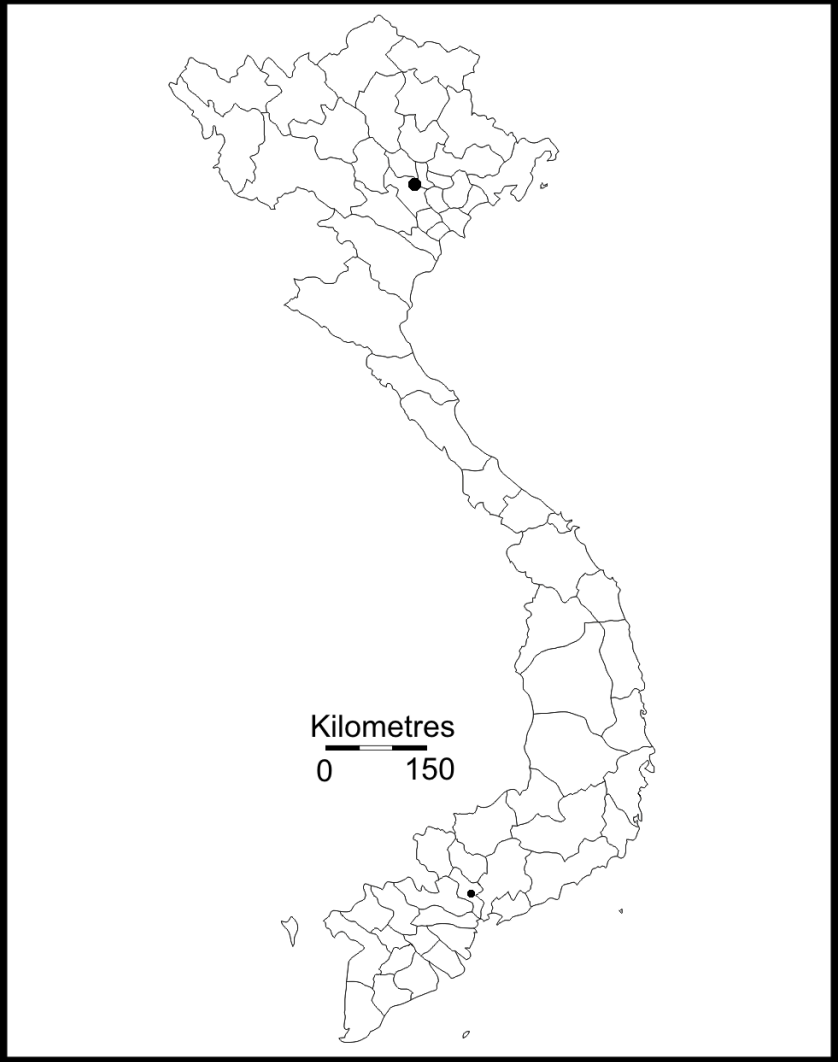
- Unstable (radioactive) – commonly used for ageing ($^{14}C$ dating)

- Stable isotopes - maintain constant concentrations on the earth over time

# Applicability to the python skin trade

- Oxygen and Hydrogen
  - Geographic origin

- Carbon and Nitrogen
  - CITES Source Codes



# How do they work?

- You are what you eat!

- Carbon and Nitrogen are propagated from one organism to another through food assimilation,

- Farmed specimens can be distinguished from wild conspecifics because commercial diets and natural food resources have different stable isotope ratios.

- Oxygen can also be used to distinguish geographic origin because oxygen isotopes differ depending on the latitude and longitude that the animal is from

# The specifics?

- Analyze isotope ratios from tissues of study species from known sources
- Build a database of known ratios to which individuals of unknown origin can be compared

# Examples

- Origin of chicken eggs (cage vs free range)
- Differentiation between captive-bred and wild-caught fish from different farms
- Differentiation between wild and escaped farm-bred mink