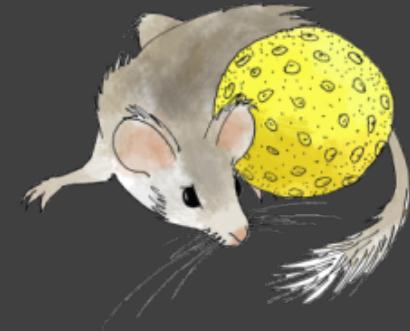


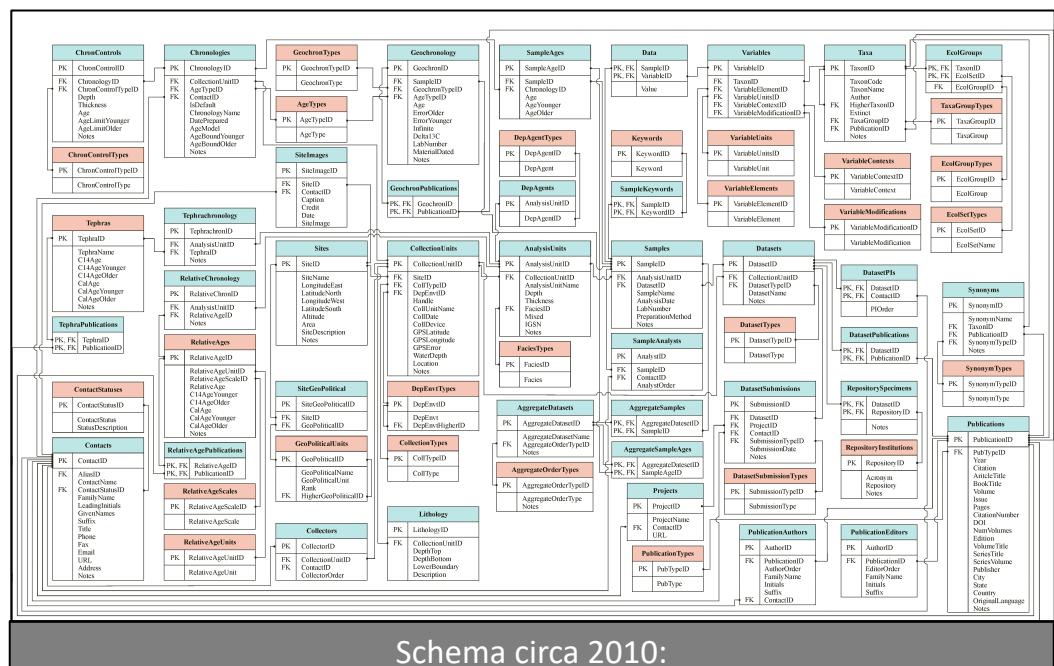
Navigating Neotoma: Key concepts and data model



Introductory Virtual Workshop

July 2020

www.neotomadb.org



- More complicated now with additional functionality!
 - Best viewed at:
<http://neotomadb.github.io/dbschema/index.html>

Sites



Sites Table

SiteID
SiteName
LongitudeEast
LatitudeNorth
LongitudeWest
LatitudeSouth
Altitude
Area
SiteDescription
Notes

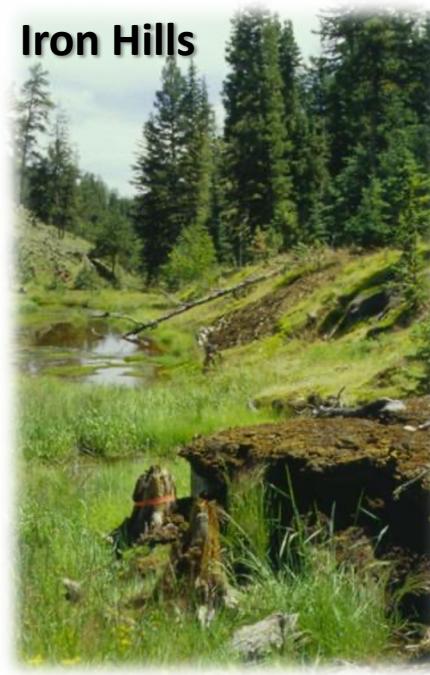
Kanarado



Kettle Lake



Iron Hills



Parkers Pit



Collection Units



CollectionUnits

CollectionUnitID
SiteID
CollTypeID
DepEnvtID
Handle
CollUnitName
CollDate
CollDevice
GPSLatitude
GPSLongitude
GPSError
WaterDepth
Location
Notes

CollectionTypes

CollTypeID
CollType

Animal midden
Composite
Core
Excavation
Modern
Section
Surface float
Isolated specimen



Collection Units



CollectionUnits

CollectionUnitID
SiteID
CollTypeID
DepEnvID
Handle
CollUnitName
CollDate
CollDevice
GPSLatitude
GPSLongitude
GPSError
WaterDepth
Location
Notes

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CollTypeID
CollType

Animal midden
Composite
Core
Excavation
Modern
Section
Surface float
Isolated specimen



Collection Units



CollectionUnits

CollectionUnitID
SiteID
CollTypeID
DepEnvID
Handle
CollUnitName
CollDate
CollDevice
GPSLatitude
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GPSError
WaterDepth
Location
Notes

CollectionTypes

CollTypeID
CollType

Animal midden
Composite
Core
Excavation
Modern
Section
Surface float
Isolated specimen



Parker's Pit



Collection Units



CollectionUnits

CollectionUnitID
SitID
CollTypeID
DepEnvID
Handle
CollUnitName
CollDate
CollDevice
GPSLatitude
GPSLongitude
GPSError
WaterDepth
Location
Notes

CollectionTypes

CollTypeID
CollType

Animal midden
Composite
Core
Excavation
Modern
Section
Surface float
Isolated specimen



Collection Units



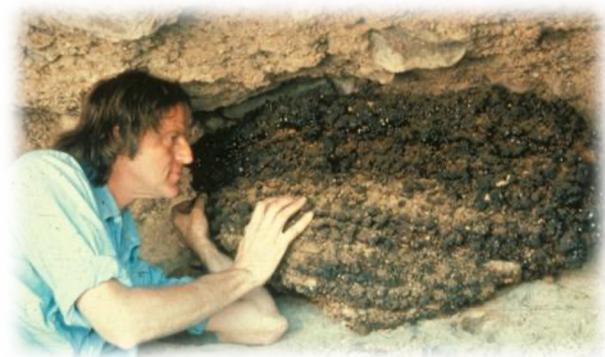
CollectionUnits

CollectionUnitID
SiteID
CollTypeID
DepEnvID
Handle
CollUnitName
CollDate
CollDevice
GPSLatitude
GPSLongitude
GPSError
WaterDepth
Location
Notes

CollectionTypes

CollTypeID
CollType

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Composite
Core
Excavation
Modern
Section
Surface float
Isolated specimen



Collection Units



CollectionUnits

CollectionUnitID
SiteID
CollTypeID
DepEnvID
Handle
CollUnitName
CollDate
CollDevice
GPSLatitude
GPSLongitude
GPSError
WaterDepth
Location
Notes

CollectionTypes

CollTypeID
CollType

Animal midden
Composite
Core
Excavation
Modern
Section
Surface float
Isolated specimen



Mammuthus primigenius right maxilla and molar

Collection Units



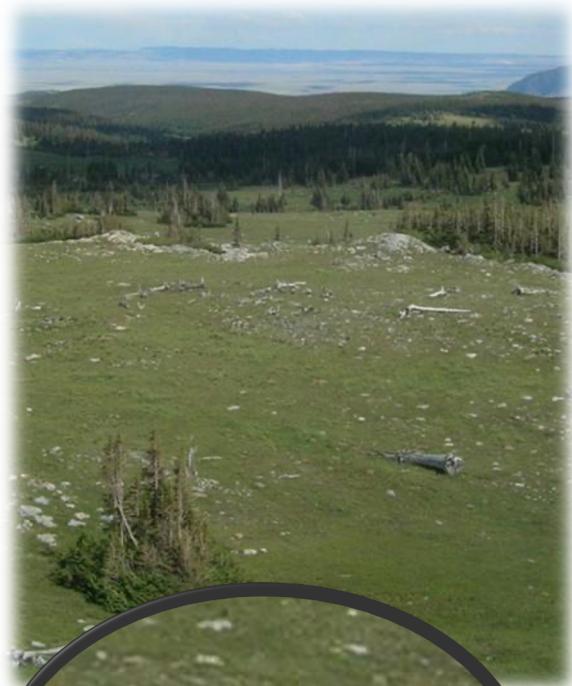
CollectionUnits

CollectionUnitID
SiteID
CollTypeID
DepEnvtID
Handle
CollUnitName
CollDate
CollDevice
GPSLatitude
GPSLongitude
GPSError
WaterDepth
Location
Notes

CollectionTypes

CollTypeID
CollType

Animal midden
Composite
Core
Excavation
Modern
Section
Surface float
Isolated specimen



Collection Units



CollectionUnits

CollectionUnitID
SiteID
CollTypeID
DepEnvID
Handle
CollUnitName
CollDate
CollDevice
GPSLatitude
GPSLongitude
GPSError
WaterDepth
Location
Notes

CollectionTypes

CollTypeID
CollType

Animal midden
Composite
Core
Excavation
Modern
Section
Surface float
Isolated specimen



Depositional Environments



CollectionUnits

CollectionUnitID

SitID

CollTypeID

DepEnvID

Handle

CollUnitName

CollDate

CollDevice

GPSLatitude

GPSLongitude

GPSError

WaterDepth

Location

Notes

DepEnvTypes

DepEnvID

DepEnv

DepEnvHigherID

Archaeological

Biological

Estuarine

Lacustrine

P **Natural Lake**

R **Glacial Origin Lake**

S **Kettle Lake**

Spring

Terrestrial

Analysis Units

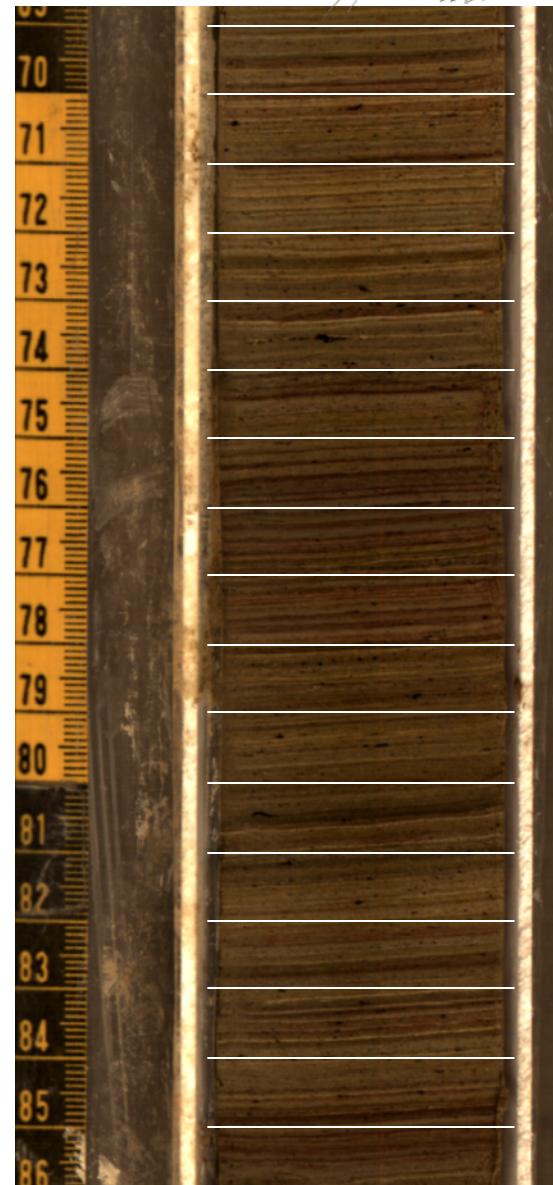


CollectionUnits

CollectionUnitID
SiteID
CollTypeID
DepEnvID
Handle
CollUnitName
CollDate
CollDevice
GPSLatitude
GPSLongitude
GPSError
WaterDepth
Location
Notes

AnalysisUnits

AnalysisUnitID
CollectionUnitID
AnalysisUnitName
Depth
Thickness
FaciesID
Mixed
IGSN
Notes



Analysis Units



CollectionUnits

CollectionUnitID
SiteID
CollTypeID
DepEnvID
Handle
CollUnitName
CollDate
CollDevice
GPSLatitude
GPSLongitude
GPSError
WaterDepth
Location
Notes

AnalysisUnits

AnalysisUnitID
CollectionUnitID
AnalysisUnitName
Depth
Thickness
FaciesID
Mixed
IGSN
Notes



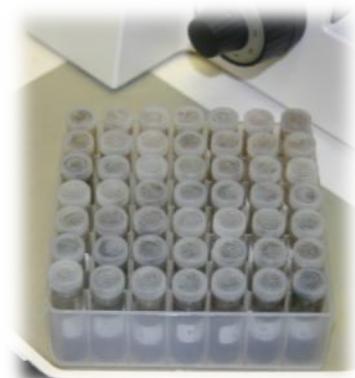
Samples



Dataset

AnalysisUnits

AnalysisUnitID
CollectionUnitID
AnalysisUnitName
Depth
Thickness
FaciesID
Mixed
IGSN
Notes



Samples

SampleID
AnalysisUnitID
DatasetID
SampleName
AnalysisDate
LabNumber
PreparationMethod
Notes

Pollen

Charcoal

Diatoms

Loss-on-ignition

Datasets



Samples

SampleID
AnalysisUnitID
DatasetID
SampleName
AnalysisDate
LabNumber
PreparationMethod
Notes

Datasets

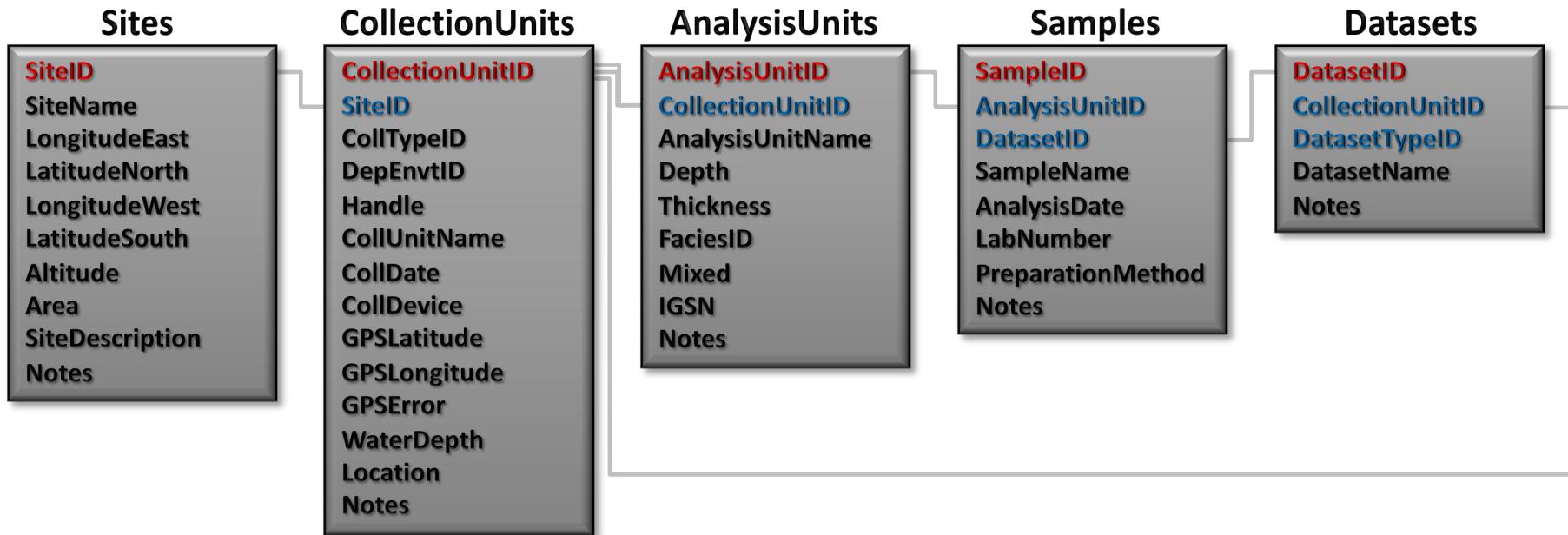
DatasetID
CollectionUnitID
DatasetTypeID
DatasetName
Notes

DatasetTypes

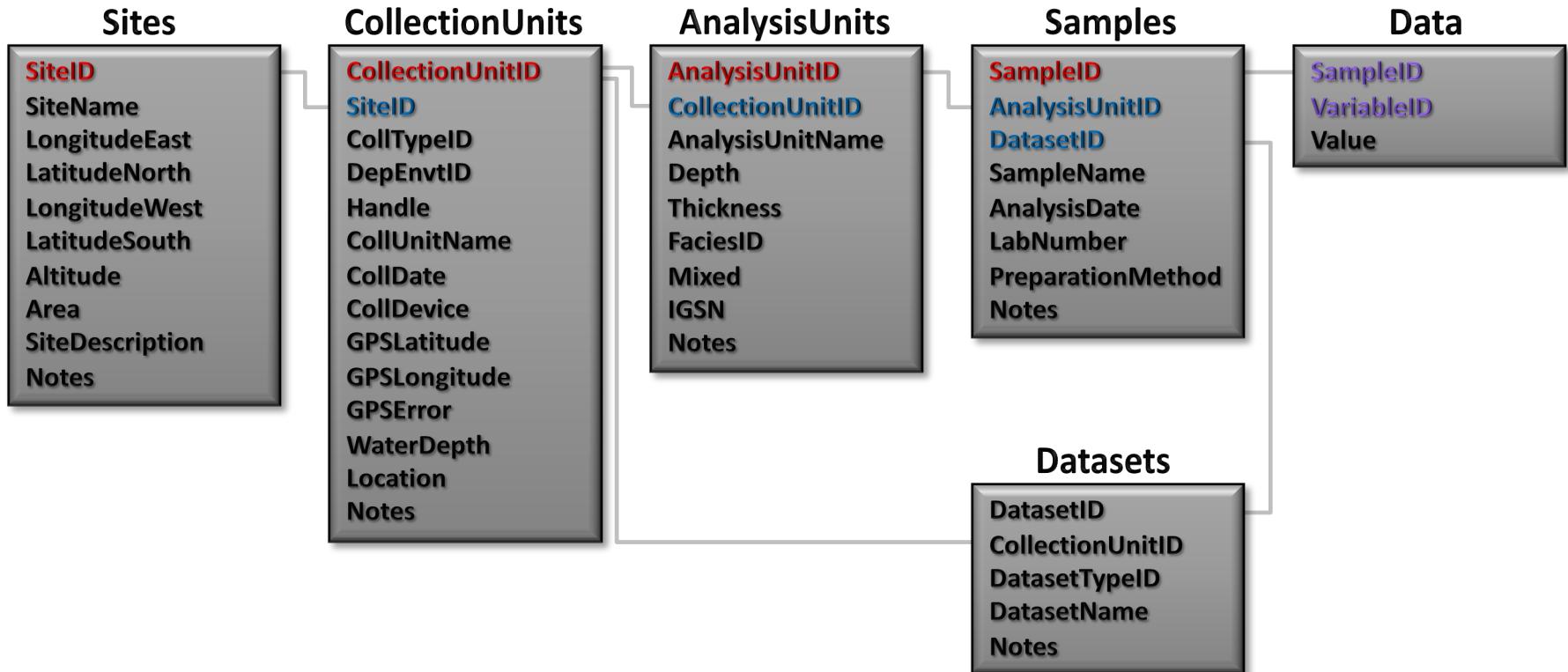
DatasetTypeID
DatasetType

geochronologic
loss-on-ignition
pollen
plant macrofossils
vertebrate fauna
mollusks
pollen surface sample

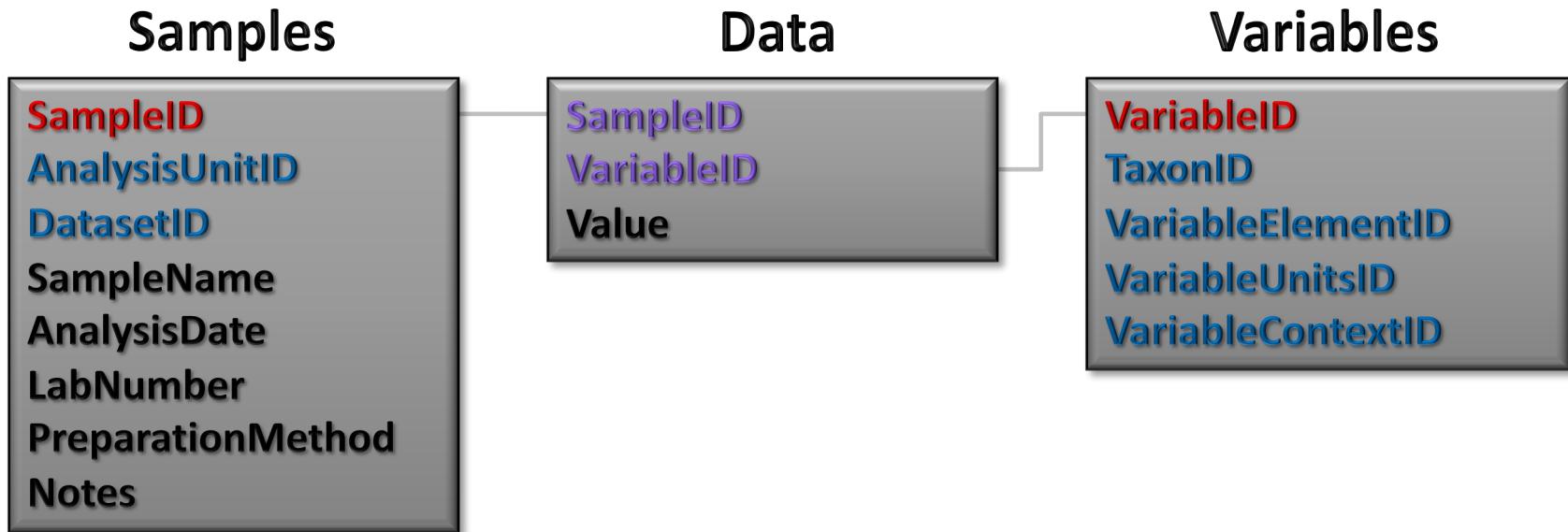
Neotoma Database Structure



Neotoma Database Structure



Variables



Variables



Variables

VariableID
TaxonID
VariableElementID
VariableUnitsID
VariableContextID

Taxa

TaxonID
TaxonCode
TaxonName
Author
HigherTaxonID
Extinct
TaxaGroupID
PublicationID
Notes

Variables



Variables

VariableID
TaxonID
VariableElementID
VariableUnitsID
VariableContextID

VariableElements

VariableElementID
VariableElement

achene
acorn
acorn cup
ament bract
anther
bark
bract
bud
bud scale
bulbil
calyx
capsule
pollen
spore
stomate

Variables



Variables

VariableID
TaxonID
VariableElementID
VariableUnitsID
VariableContextID

VariableUnits

VariableUnitsID
VariableUnit

MNI
NISP
number
number/ml
particles/ml
percent
percent after LOI
percent dry mass
present/absent

Variables



Variables

VariableID
TaxonID
VariableElementID
VariableUnitsID
VariableContextID

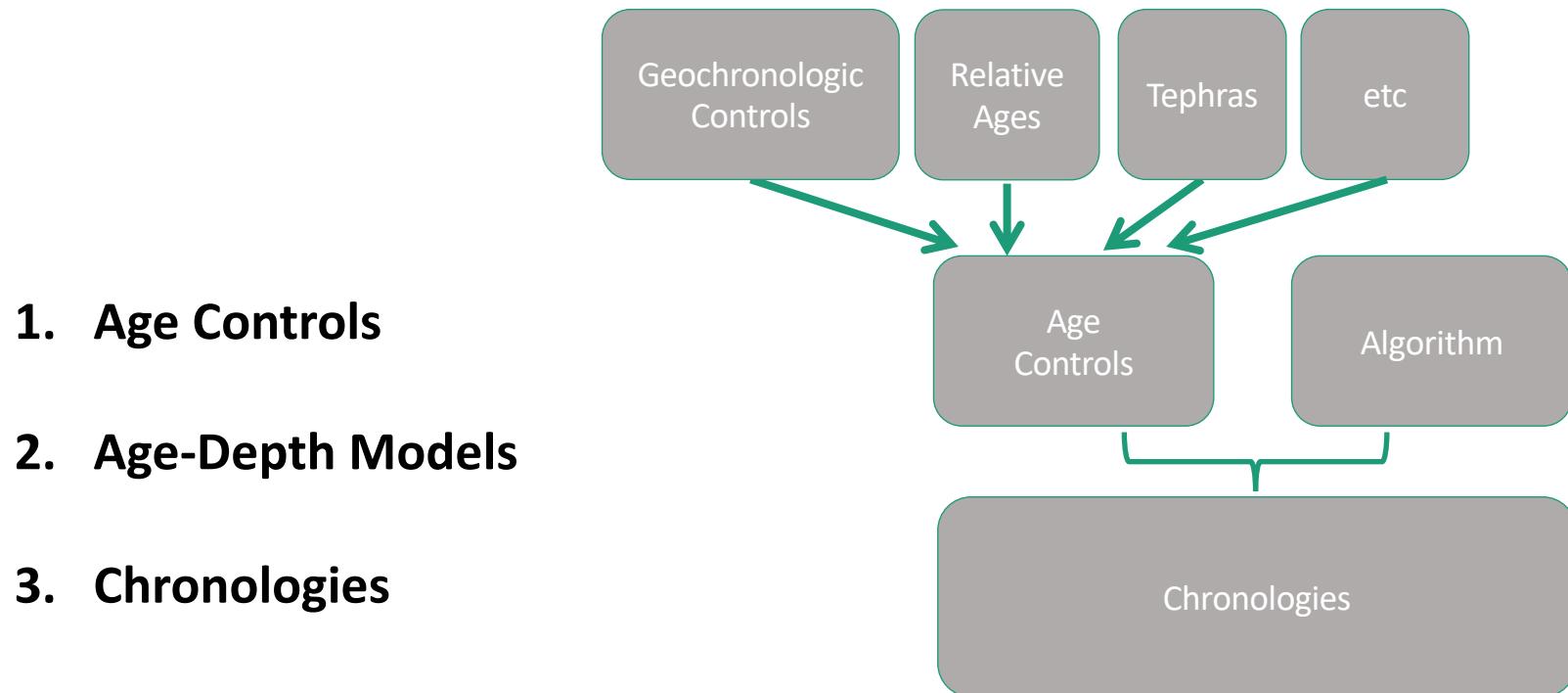
VariableContexts

VariableContextID
VariableContext

anachronic
articulated
derived
intrusive
redeposited
clump

Time in Neotoma: Key Concepts

The Neotoma data model for time is based on three related concepts



Chronologies and Age Models



An Age Model has two components:

- Set of age-depth values (or analysis unit ages)
- An algorithm for interpolating ages to analysis units between the ones with independent ages.

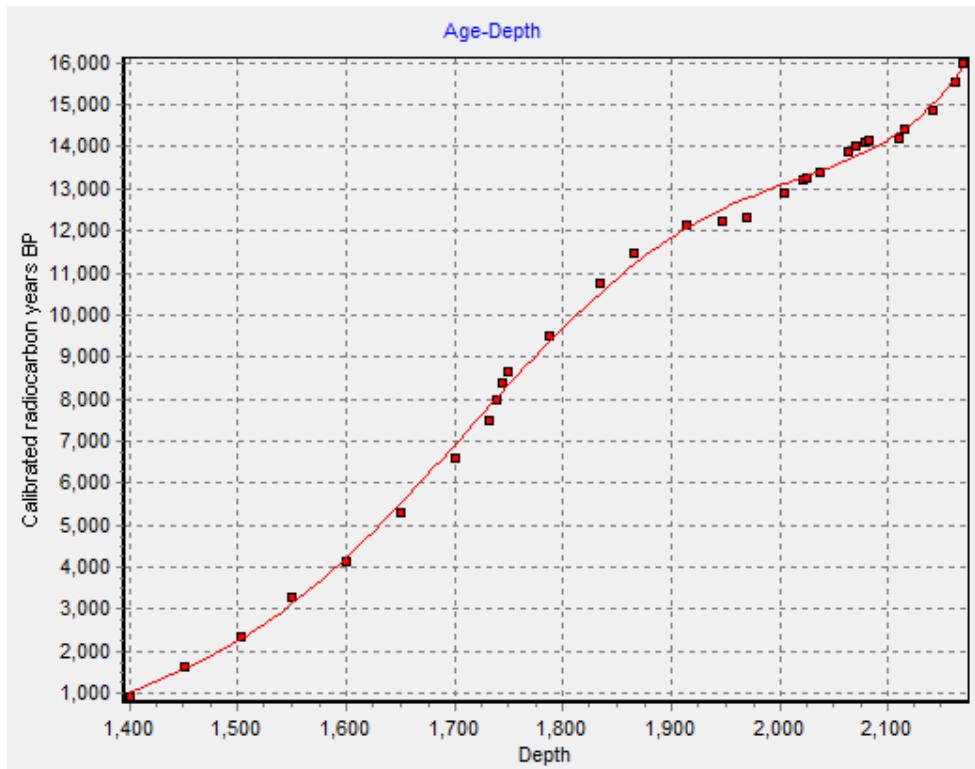
Chronologies and Age Models



An Age Model has two components:

- Set of age-depth values (or analysis unit ages)
- An algorithm for interpolating ages to analysis units between the ones with independent ages.

5th degree polynomial



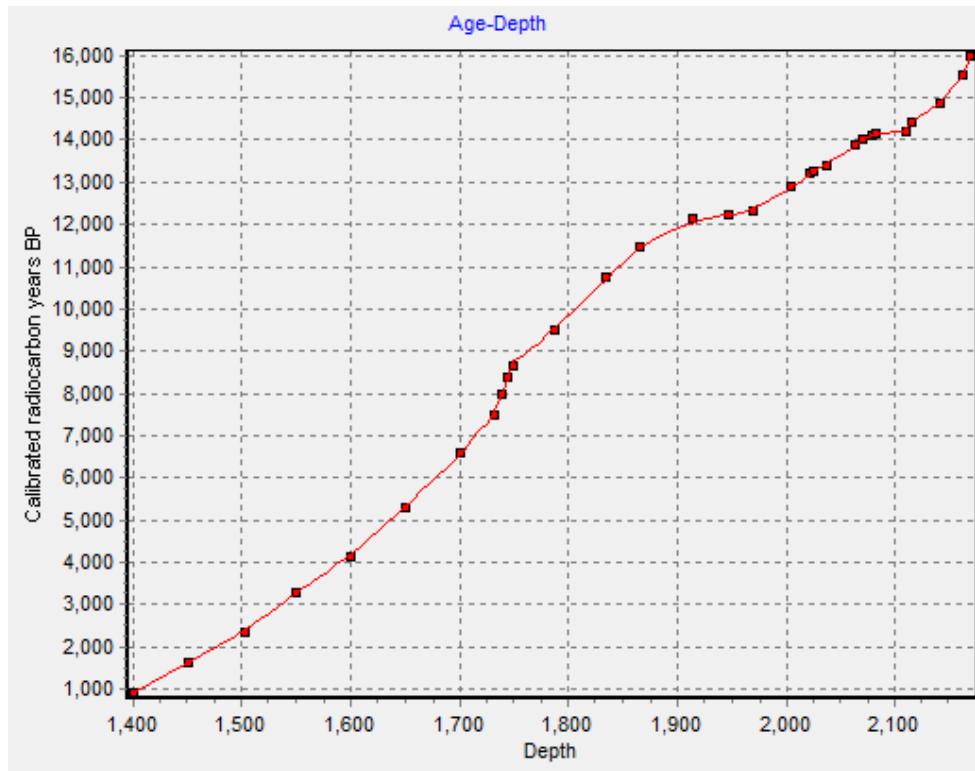
Chronologies and Age Models



An Age Model has two components:

- Set of age-depth values (or analysis unit ages)
- An algorithm for interpolating ages to analysis units between the ones with independent ages.

Cubic B-spline

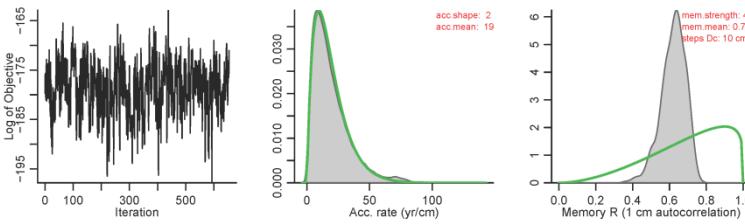


Chronologies and Age Models

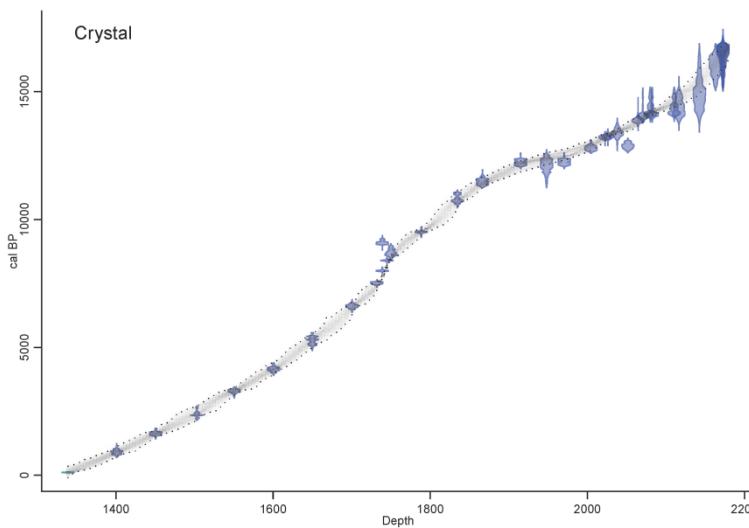


An Age Model has two components:

- Set of age-depth values (or analysis unit ages)
- An algorithm for interpolating ages to analysis units between the ones with independent ages.



Bacon



Chronologies and Age Models



An Age Model has two components:

- Set of age-depth values (or analysis unit ages)
- An algorithm for interpolating ages to analysis units between the ones with independent ages.

A Chronology is a set of ages assigned to analysis units.

- A chronology is based on an age model.

Geochronology



Geochronology

GechronD
SampleID
GechronTypeID
AgeTypeID
Age
ErrorOlder
ErrorYounger
Infinite
Delta13C
LabNumber
MaterialDated
Notes

GeochronTypes

GechronTypeID
GechronType

Amino acid racemization
Carbon-14
Cosmogenic
Electron spin resonance
Fission track
Potassium-argon
Optically stimulated luminescence
Lead-210
Silicon-32
Thermoluminescence
Uranium series
Carbon-14: accelerator mass spectrometry
Carbon-14: proportional gas counting
Carbon-14: liquid scintillation
Carbon-14: conventional radiometric
Argon-argon
Protactinium-231
Archaeomagnetic
Obsidian hydration
Paleomagnetic
Dendrochronological

Chronologies



CollectionUnits

CollectionUnitID
SiteID
CollTypeID
DepEnvtID
Handle
CollUnitName
CollDate
CollDevice
GPSLatitude
GPSLongitude
GPSError
WaterDepth
Location
Notes

Chronologies

ChronologyID
CollectionUnitID
AgeTypeID
ContactID
IsDefault
ChronologyName
DatePrepared
AgeModel
AgeBoundYounger
AgeBoundOlder
Notes

ChronControls

ChronControlID
ChronologyID
ChronControlTypeID
Depth
Thickness
Age
AgeLimitYounger
AgeLimitOlder
Notes

Chronology Controls



ChronControls

ChronControlID
ChronologyID
ChronControlTypeID
Depth
Thickness
Age
AgeLimitYounger
AgeLimitOlder
Notes

ChronControlTypes

ChronControlTypeID
ChronControlType
HigherChronControlTypeID

➤ Geochronologic

Radiocarbon
Lead-210
Thermoluminescence
Uranium-series
Argon-argon
Potassium-argon
Obsidian hydration
Amino acid racemization
Electron spin resonance

Chronology Controls



ChronControls

ChronControlID
ChronologyID
ChronControlTypeID
Depth
Thickness
Age
AgeLimitYounger
AgeLimitOlder
Notes

ChronControlTypes

ChronControlTypeID
ChronControlType
HigherChronControlTypeID

Geochronologic

➤ Relative time scale

Geologic time scale

Geomagnetic polarity time scale

➤ Marine isotope stages

MIS 1

MIS 2

MIS 3

MIS 4

MIS 5

MIS 5a

MIS 5b

logical time scale

mammal ages

ication

mammal ages

Chronology Controls



ChronControls

ChronControlID
ChronologyID
ChronControlTypeID
Depth
Thickness
Age
AgeLimitYounger
AgeLimitOlder
Notes

ChronControlTypes

ChronControlTypeID
ChronControlType
HigherChronControlTypeID

- Geomagnetic polarity reversal
 - C1n/C1r (Brunhes/Matuyama)
 - C1r.1r/C1r.1n (Jaramillo top)
 - C1r.1n/C1r.2r (Jaramillo bottom)
 - B
 - C1r.2r/C1r.2n (Cobb Mountain top)
 - C1r.2n/C1r.3r (Cobb Mountain bottom)
 - C1r.3r/C2n (Olduvai top)
 - C2n/C2r.1r (Olduvai bottom)
- Geomagnetic polarity reversal
- Tephra

Chronology Controls



ChronControls

ChronControlID
ChronologyID
ChronControlTypeID
Depth
Thickness
Age
AgeLimitYounger
AgeLimitOlder
Notes

China Hat	67000 – 55500
Eldgjá	1016 – 1012
Glen Garry	2210 – 1966
Hekla 1	846
Hekla 1104	846
Hekla 1693	257
Hekla 4	4300 – 4220
Katla 1721	229
Katla 1918	32
➤ Katla ~1500	465 – 435
➤ Laacher See	13058 – 12914
➤ Landnám	1079 – 1073
Lava Creek	635000 – 643000
Mazama	7777 – 7477
Saksunarvatn	10300 – 10060
➤ Tephra	

Tilia Data Entry: Pollen



Software interface showing a spreadsheet titled "Tilia Data Entry: Pollen". The window has tabs for "Data" and "Metadata". The "Data" tab is active, displaying a table with 26 rows of pollen data.

	A	B	C	D	G	H	I	J	K	L	M	N
1	pollen					1	5	10	23	35	40	78
2	Code	Name	Element	Units	Group							
3	#Chron1	APD 1		14C yr BP		2615	2675	2749	2934	3097	3163	3627
4	#Chron2	APD 2		cal yr BP		2915	2957	3010	3138	3270	3337	3989
5	#Chron2...	APD 2 Older Bound		cal yr BP		3179	3199	3231	3298	3358	3498	4212
6	#Chron2...	APD 2 Younger Bound		cal yr BP		2567	2629	2701	2918	3157	3198	3706
7	#Anal.Th...	Analysis Unit Thickness				2	1	1	1	1	1	1
8	#Samp....	Sample Analyst				Elenga, H.	Elenga, H.	Elenga, H.	Elenga, H.	Elenga, H.	Elenga, H.	Elenga, H.
9	#Samp....	Date Analyzed				2/4/1994	2/4/1994	2/5/1994	2/5/1994	2/11/1994	2/22/1994	3/7/1994
10	#Samp....	Sample Notes				Pollen w...	Good pr...					
11	Cypeae	Cyperaceae	pollen	NISP	UPHE	68	59	65	19	30	82	10
12	Pipeae	Polypodiaceae	spore	NISP	VACR	16			2			6
13	Rhz	Rhizophora	pollen	NISP	MANG	6	1	1	3	1	16	172
14	ind	Indeterminable	pollen/s...	NISP	UNID	26	16	17	14	6	1	1
15	unk	Unknown	pollen/s...	NISP	UNID	11	6	10	41	7	4	9
16	Amaeae	Amaranthaceae	pollen	NISP	UPHE	2	1					
17	Asteae	Asteraceae	pollen	NISP	UPHE	5	2	4	2			
18	Poaeae	Poaceae	pollen	NISP	UPHE	26	22	20	20	2		
19	Urteae	Urticaceae	pollen	NISP	UPHE	3	5	1				
20	Typ	Typha	pollen	NISP	AQVP	4	8	22	2			
21	Zan	Zanthoxylum	pollen	NISP	TRSH							
22	Dio	Diospyros	pollen	NISP	TRSH					1		
23	Moreae...	Moraceae undiff.	pollen	NISP	TRSH		1	2	1		1	
24	Pod	Podocarpus	pollen	NISP	TRSH						1	1
25	Clseae	Celastraceae	pollen	NISP	TRSH							
26	Alg	Alchornea	pollen	NISP	TRSH	6	2		1			

Taxonomy: Vascular Plants



New Taxon

Select Taxa Group
Vascular plants

New Taxon Name

As Child
 As Sibling

Insert 

Search: 

Fagales
Malpighiales
Oxalidales
Rosales
Elaeagnaceae
Rhamnaceae
Rhamnaceae/Rosaceae
Rosaceae
Urticalean Rosids
Cannabaceae
Aphananthe
Cannabaceae cf. Cannabis sativa
Cannabaceae cf. Humulus
Cannabaceae cf. Humulus lupulus
Cannabaceae sensu stricto
Cannabaceae undiff.
Cannabis
Cannabis-type
Celtis

Unlocked Undo Close Validate

ID	Code	Name	Author	HigherID	Extinct	GroupID	PubID	Notes	EcolGroup	Validator	ValidDate
> + 49	Cel	Celtis	Linnaeus, 1753	9115		VPL	613		1:TRSH		44 2014-02...

Taxonomy: Vascular Plants

