

# Examining Land-use Intensification in the Portland Basin through Cooking and Processing Features

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Willamette Cultural Resources Associates, Ltd.,  
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Examining Land-use  
Intensification in the Portland  
Basin through *the Structure and  
Content* of Cooking and  
Processing Features

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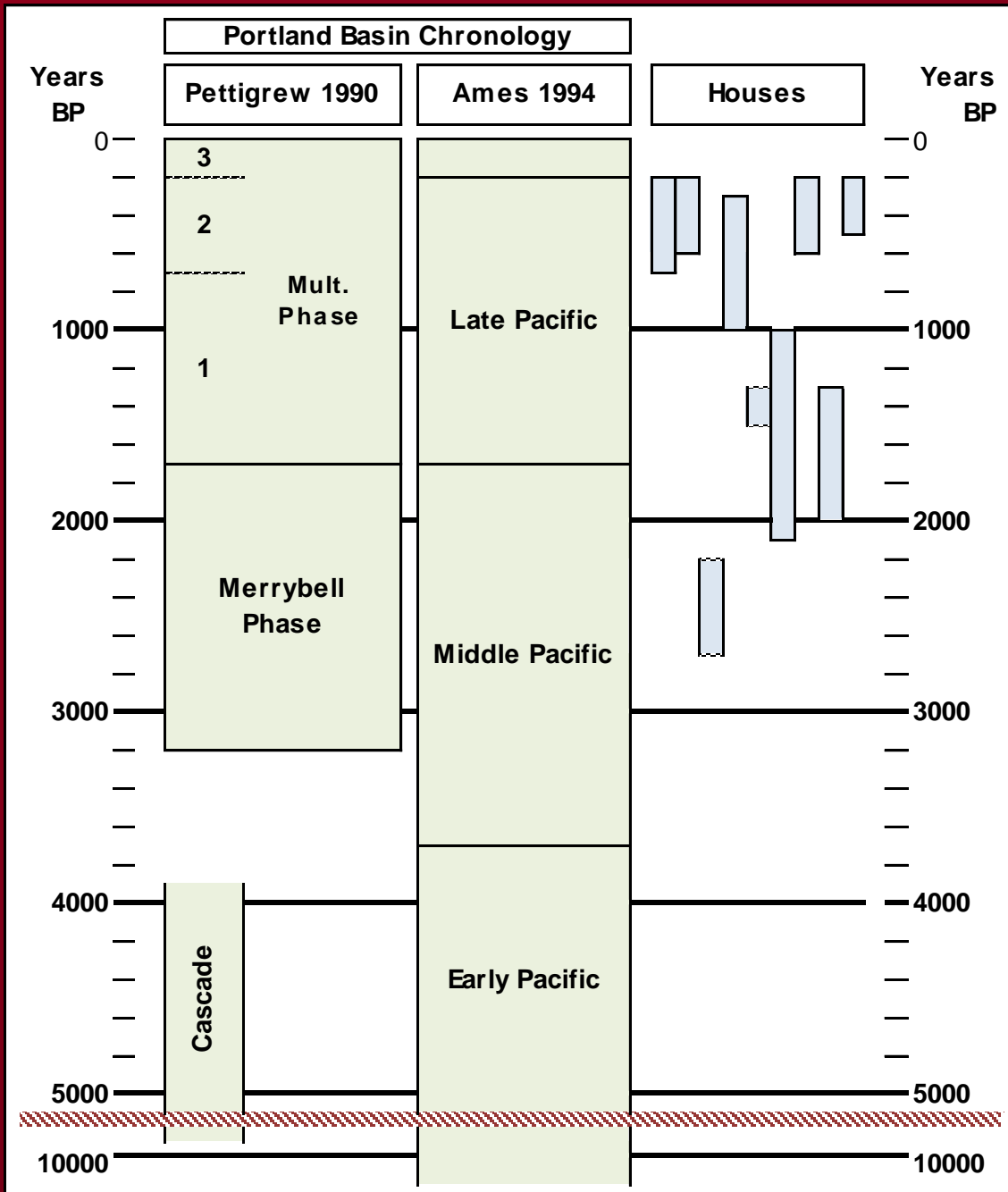
# Outline

- **Land-use Intensification in the Portland Basin.**
- **Expectations.**
- **Data Used.**
- **Results:**
  - **Feature Structure (2015).**
  - **Feature Content (2016).**
- **Conclusions.**
- **Biases.**



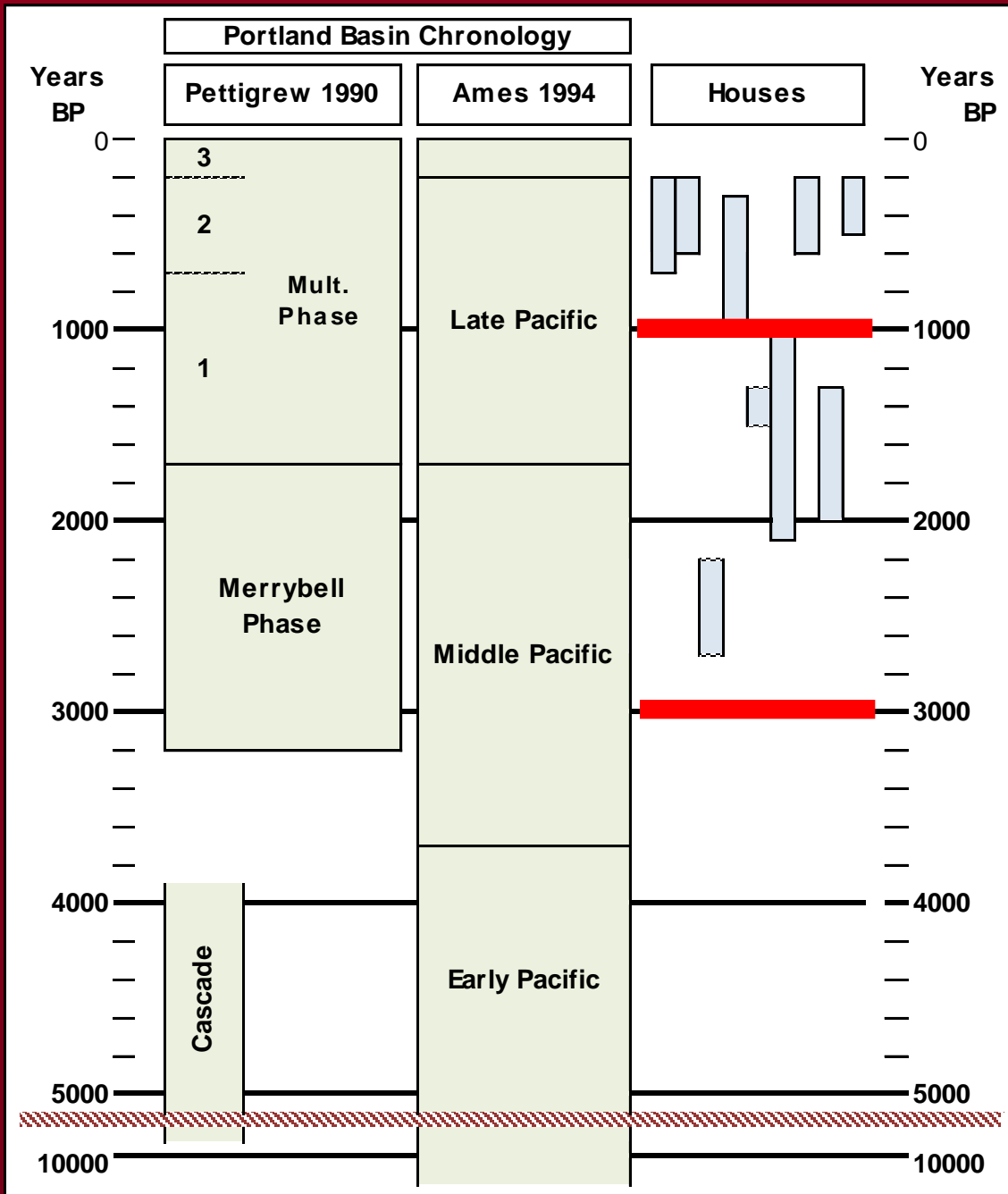
# The Portland Basin





**Late Holocene**

**Early Holocene**



# Late Holocene

Population Density

Increasing  
Functional  
Diversity  
Among Sites

Increasing  
Assemblage  
Diversity

Increasing  
Site Density

# Early Holocene



# Land-use Intensification in the Portland Basin

Producing more food from the same landscape to feed more people.

- Targeted resources.
- Technological change.
- Scheduling.
- Altering social organization.



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# Thoms' Model

Trend through time to expending more energy per area to recover more food from the same landscape to feed more people (Thoms 2009:575).

# Thoms' Model

Cooking Costs /  
Generalized Food Unit  
(Cooking Technology)

Less  
Complex

More  
Complex

Early  
Holocene

Middle  
Holocene

Late  
Holocene

Time



Direct Cooking  
on/in/above Coals



Rockless Earth  
Oven



Cook-stone Grill



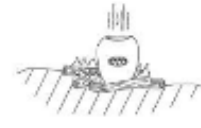
Earth Oven with Rock  
Heating Element



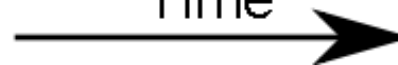
Steaming Pit with Rock  
Heating Element



Stone Boiling (non-  
ceramic container)



Direct Boiling  
(ceramic container)



# Expectations

As land-use intensifies in the Portland Basin:

**Structure**

1. Increase in complex features.
  2. Increase in feature diversity.
- 

**Content**

3. Increase in difficult to cook foods (plants) and decrease in easier to cook foods (animals).
4. Decrease in the mean number of species found in features (increase in special-use features).

# Methods and Data

## Sources:

- Features only from sites without houses.
- Completely excavated features.
- Seven Sites.
- 39 Features
  - Only 25 with absolute dates.

# Methods and Data

## Compiled Data Includes:

- **Age.**
- **Classification:**
  - **Type (hearth, oven, etc. as reported).**
  - **Class (paradigmatic Campbell 1981).**
- **Content as Reported.**
  - **Sampling Strategy.**
  - **Food Plants, Medicinal Plants, Fuel Woods, Mammals (species/size), Fish.**

# Results-Feature Structure

As land-use intensifies in the Portland Basin:

Structure

1. Increase in complex features.
2. Increase in feature diversity.
3. Increase in difficult to cook foods (plants) and decrease in easier to cook foods (animals).
4. Decrease in the mean number of species found in features (increase in special-use features).

# Feature Types (as reported)

Type	Period (Ames 1994)					Total
	Archaic	Early Pacific	Middle Pacific	Middle-Late Pacific	Late Pacific	
Oven	1	2	1		2	6
Hearth	1	2	4	4	9	20
Cleanout or Hearth					4	4
Cleanout			1	2	2	5
Pit					1	1
Unk				1	1	2
Total	2	4	6	7	19	39

**Types as reported by original researcher**



# Feature Classes (Paradigmatic)

Class	Period (Ames 1994)					Total
	Archaic	Early Pacific	Middle Pacific	Middle-Late Pacific	Late Pacific	
221	2	2	1	1	3	9
220		1			1	2
211					1	1
210			1	1	2	4
201				1		1
200				1	1	2
121				1	1	2
120			1			1
110				1		1
101				1		1
100			1		2	3
021		1				1
010					2	2
001			1			1
000			1		6	7
Total	2	4	6	7	19	39

# Feature Classes (Paradigmatic)

	Period (Ames 1994)					

## Key

Surface Relation	Surface	0
	Excavated into surface-Shallow (<10cm)	1
	Excavated into surface-Deep (>10cm)	2
Overall Structure	Unstructured	0
	Diffuse	1
	Tightly structured	2
Evidence of Burning	No in situ burning	0
	In situ burning	1

Total	2	4	6	7	19	39
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121				1	1	2
120			1			1
110				1		1
101				1		1
100			1		2	3
021		1				1
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Total	2	4	6	7	19	39

# Feature Classes (Paradigmatic)

Class	Period (Ames 1994)					Total	
	Archaic	Early Pacific	Middle Pacific	Middle-Late Pacific	Late Pacific		
Deep ( $\geq 20$ cm)	221	2	2	1	1	3	9
	220		1			1	2
	211					1	1
	210			1	1	2	4
	201				1		1
	200				1	1	2
Shallow ( $\leq 20$ cm)	121				1	1	2
	120			1			1
	110				1		1
	101				1		1
	100			1		2	3
Surface	021		1				1
	010					2	2
	001			1			1
	000			1		6	7
Total	2	4	6	7	19	39	

**42 %**

**62 %**

**90 %**

# Results-Feature Structure

**As land-use intensifies in the Portland Basin:**

**1. Increase in complex features.**


**2. Increase in feature diversity.**

**3. Increase in difficult to cook foods (plants) and decrease in easier to cook foods (animals).**

**4. Decrease in the mean number of species found in features (increase in special-use features).**

# Results-Feature Structure

As land-use intensifies in the Portland Basin:

- 
- ~~X~~ 1. Increase in complex features.
  - ~~X~~ 2. Increase in feature diversity.

- 
- 3. Increase in difficult to cook foods (plants) and decrease in easier to cook foods (animals).
  - 4. Decrease in the mean number of species found in features (increase in special-use features).

# Results-Feature Content

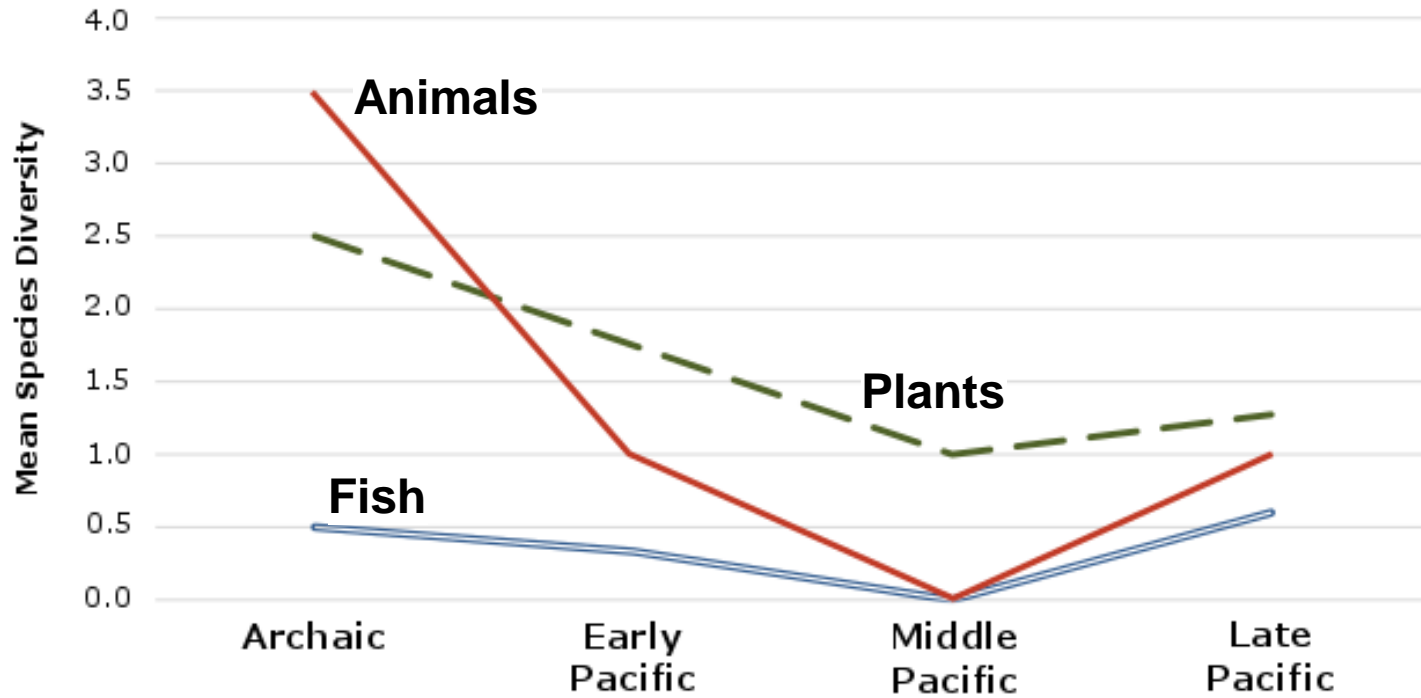
As land-use intensifies in the Portland Basin:

1. Increase in complex features.
2. Increase in feature diversity.

**Content**

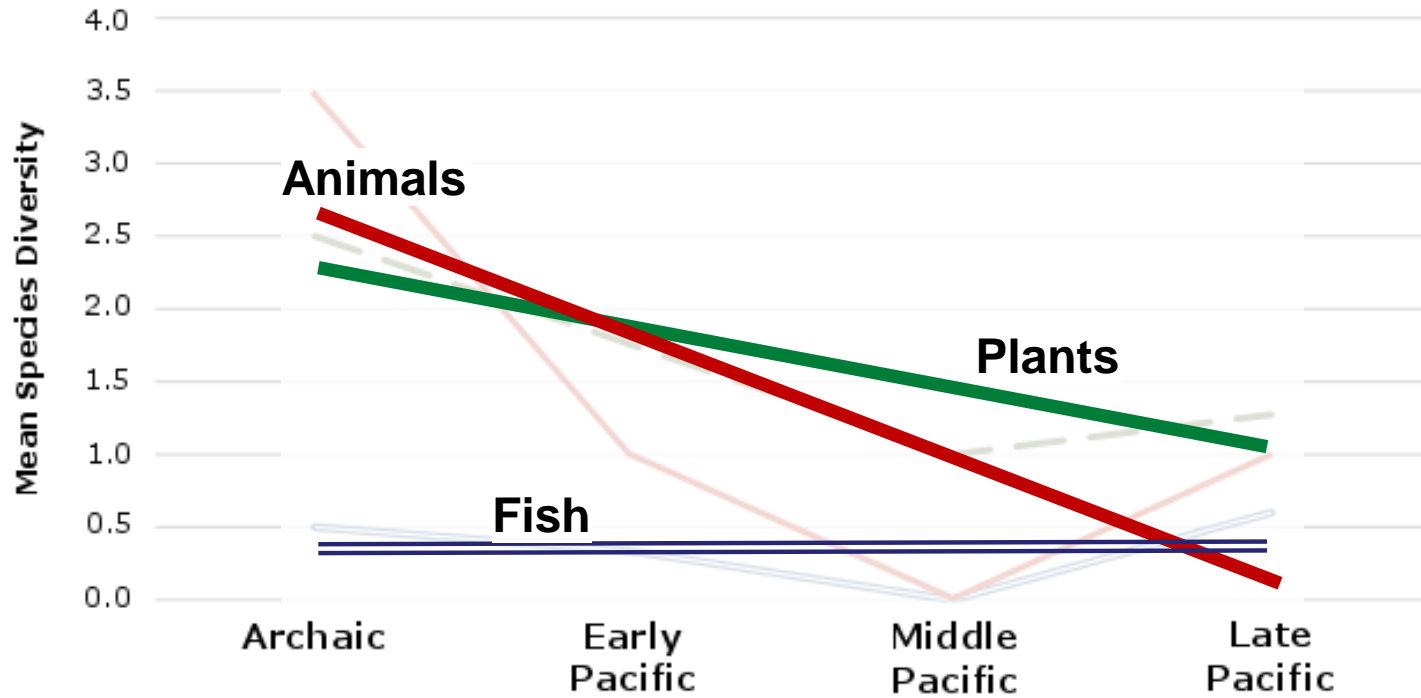
- 
3. Increase in difficult to cook foods (plants) and decrease in easier to cook foods (animals).
  4. Decrease in the mean number of species found in features (increase in special-use features).

# Mean Species Diversity All Features

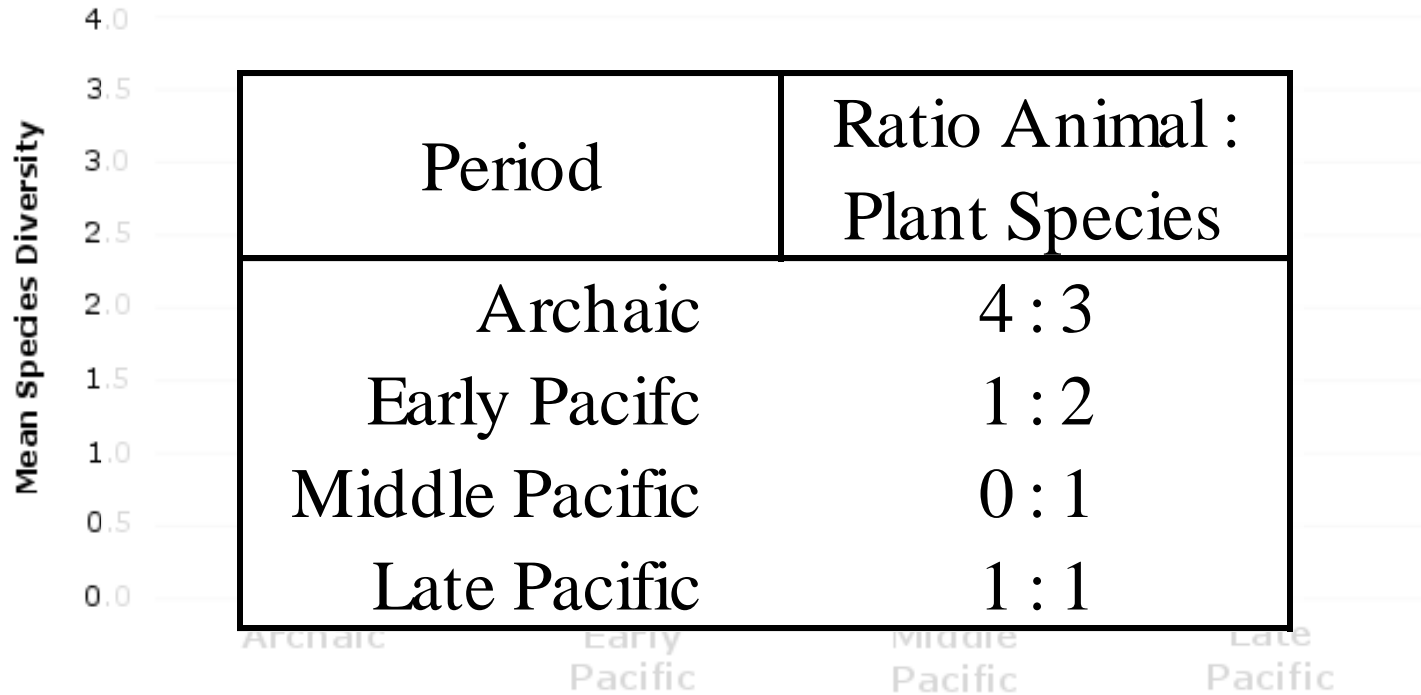




# Mean Species Diversity All Features *Trends*



# Mean Species Diversity All Features *Ratios*

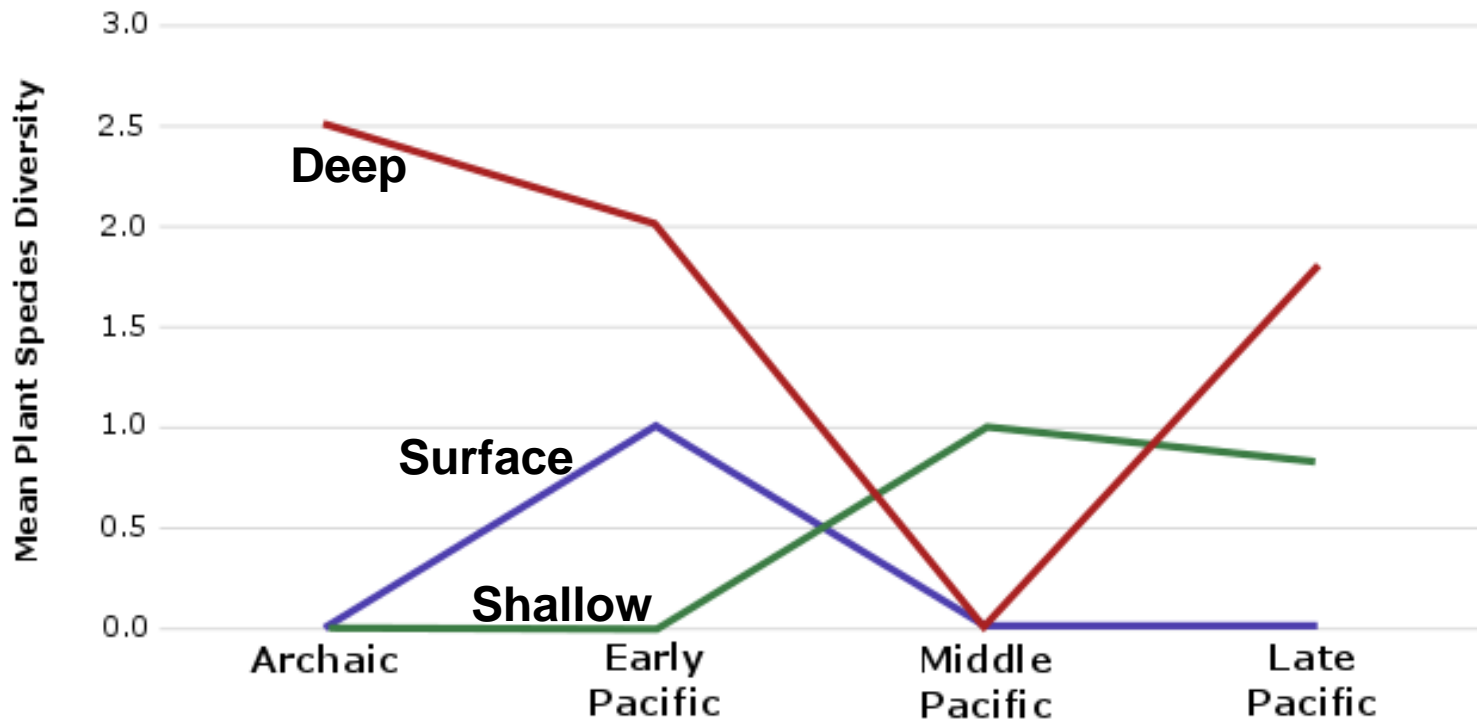


# Feature Classes (Paradigmatic)

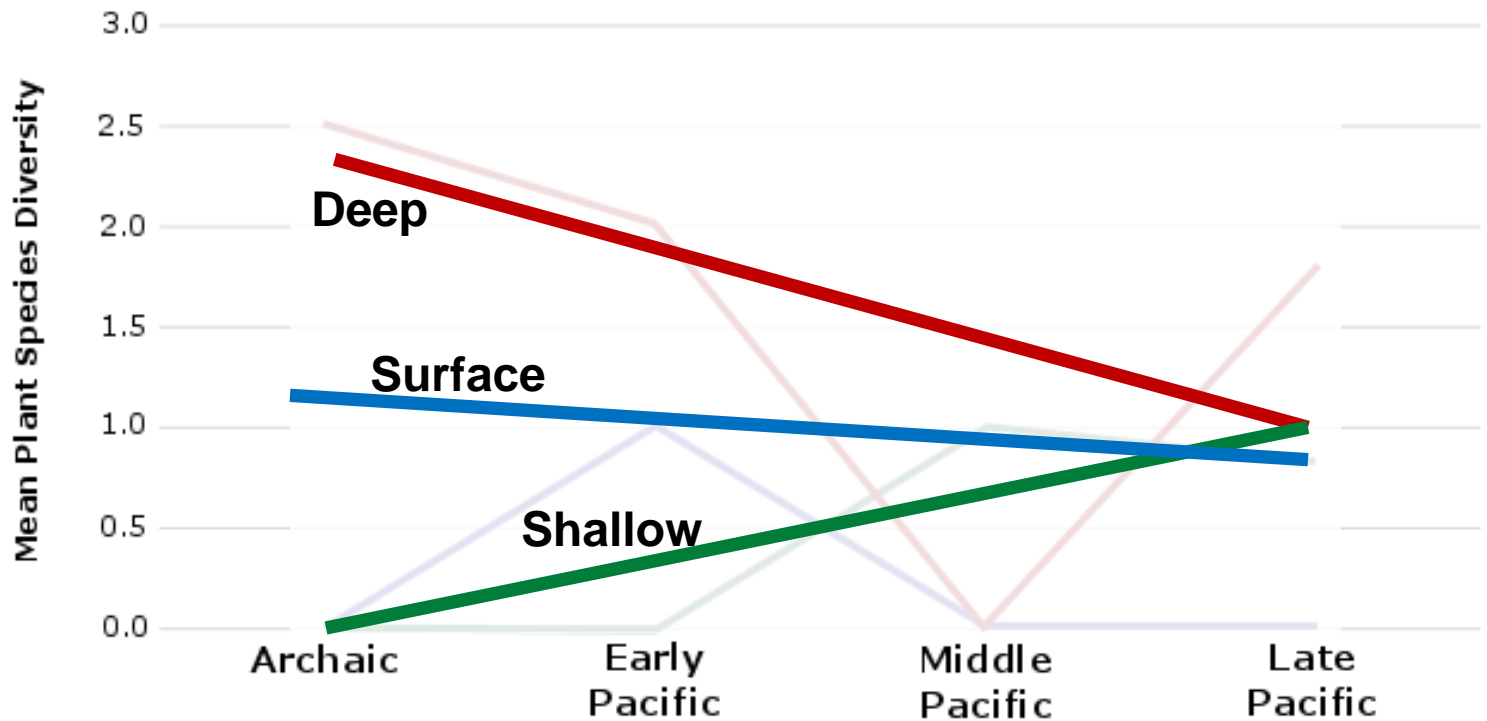
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Shallow ( $\leq 20$ cm)	121				1	1	2
	120			1			1
	110				1		1
	101				1		1
	100			1		2	3
Surface	021		1				1
	010					2	2
	001			1			1
	000			1		6	7
Total	2	4	6	7	19	39	

**Class  
Group**

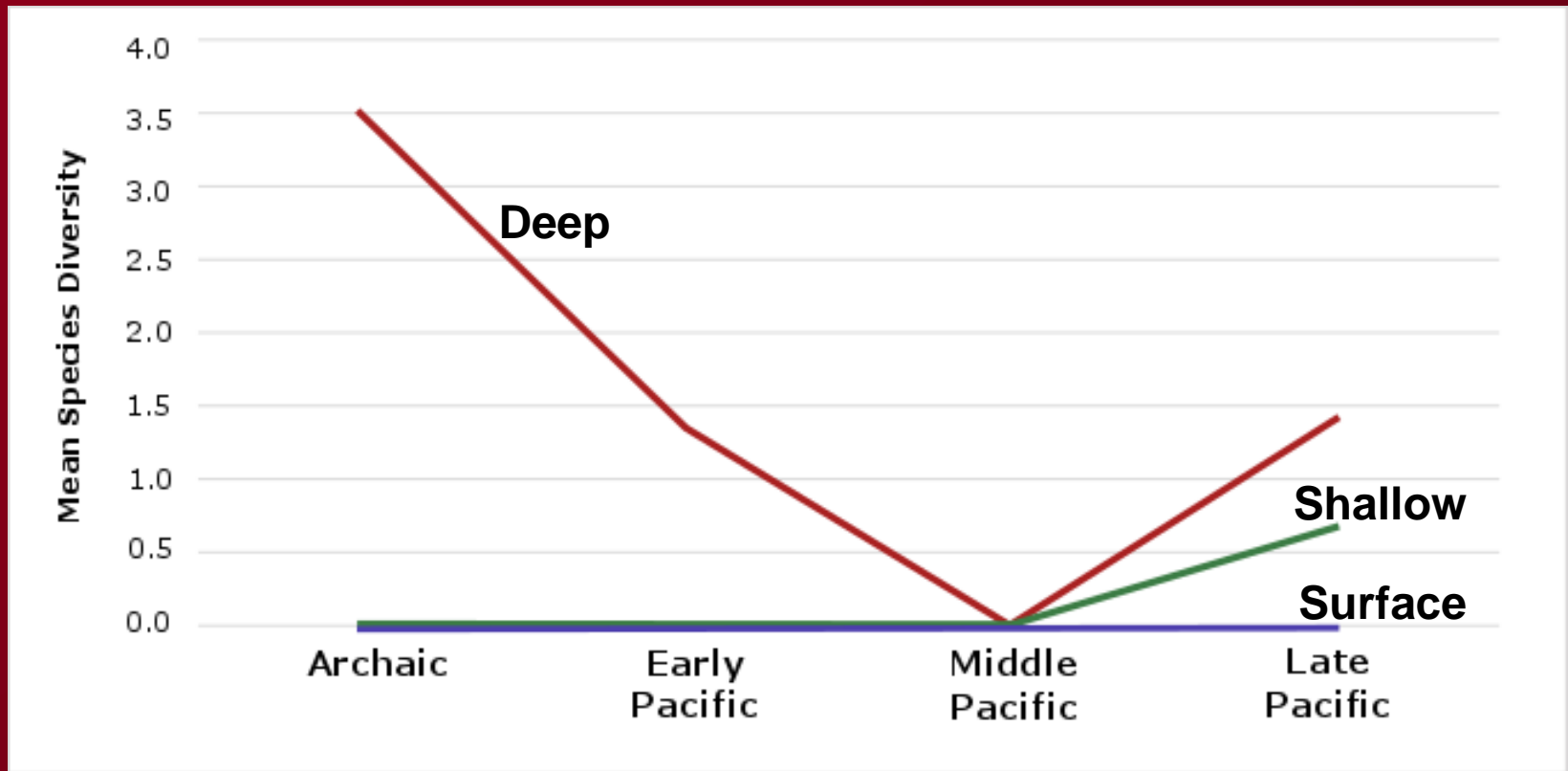
# Mean Plant Diversity by Feature Class Group



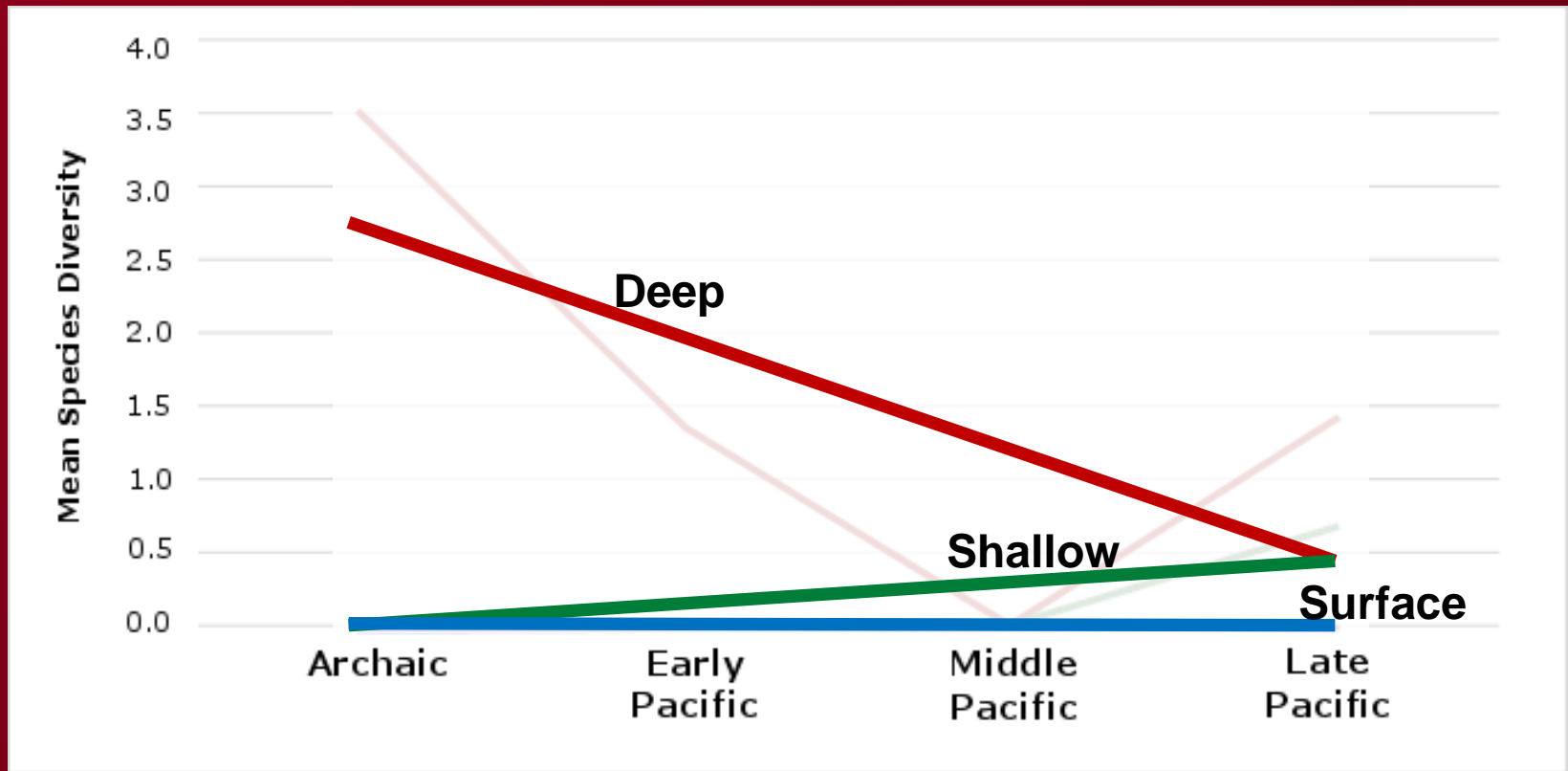
# Mean Plant Diversity by Feature Class Group *Trends*



# Mean Animal Diversity by Feature Class Group



# Mean Animal Diversity by Feature Class Group Trends



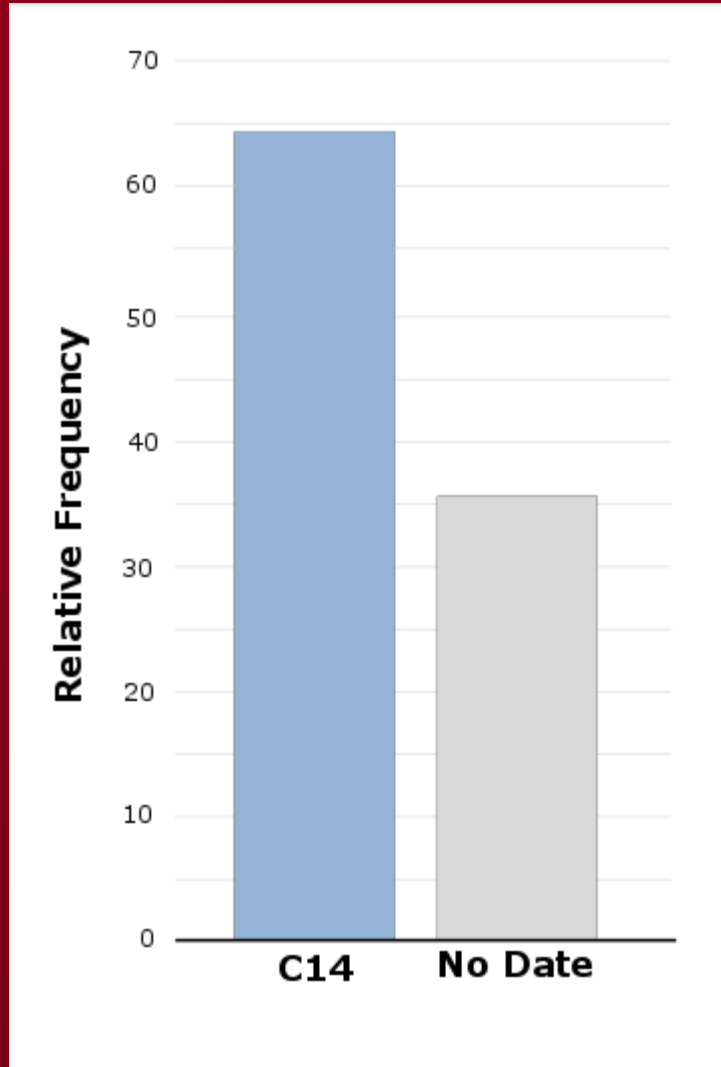
# Conclusions

## In the Portland Basin through the Holocene:

1. We are not seeing a clear change in how cooking and processing facilities are constructed.
2. Ovens/Deep facilities consistently in use from Early to Late Holocene.
3. Feature reuse increases through time.
4. Use of animals and plants may be roughly even.
5. Some increase in specialized feature use.



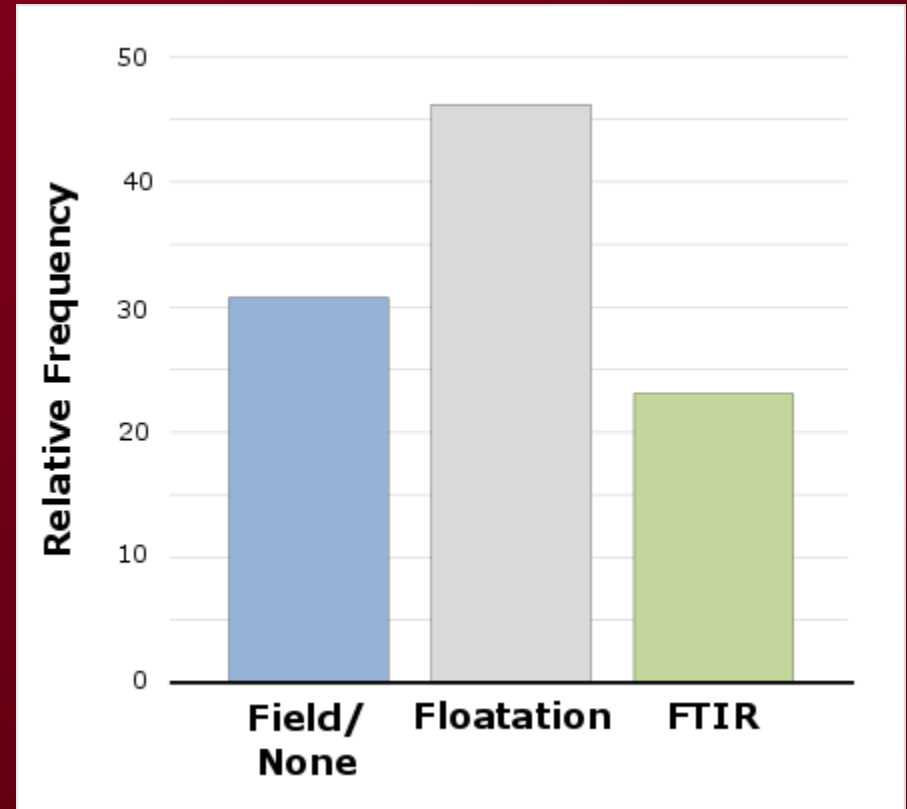
# Biases I



1. **Need absolute dates.**
2. **If not dated absolutely, then need to be specific on age.**

# Biases II

1. Field sample = no sample
2. First option is floatation.
3. Residue analysis after floatation.





**35-MU-234  
Trenching**



35MU234  
EU 4  
LEVEL 2  
13 FEB 2014

**35-MU-234  
Feature 3**



the end