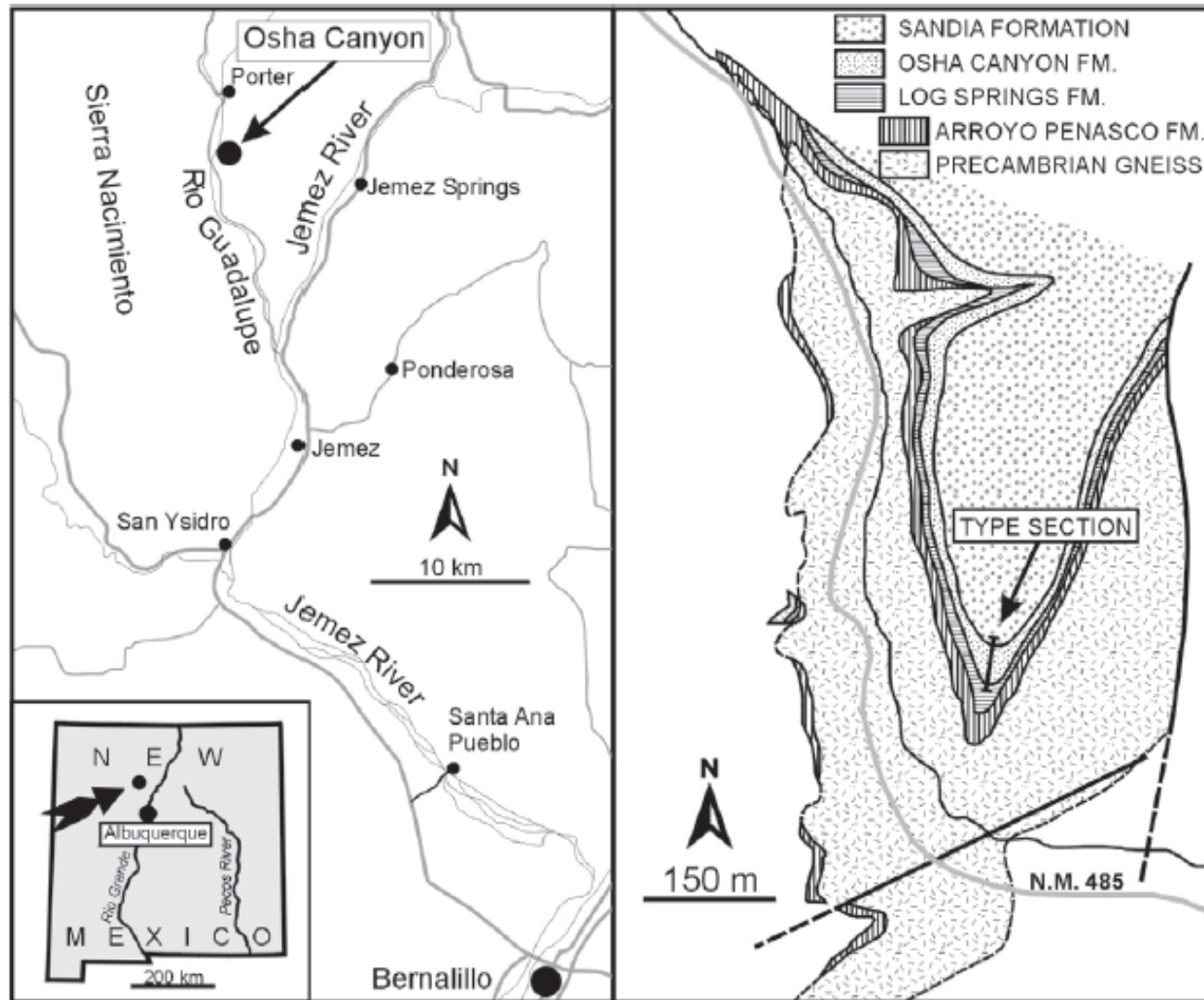


**Biostratigraphy / Ecostratigraphy
of the Early Pennsylvanian
Osha Canyon Formation
at Guadalupe Box,
Jemez Mountains, New Mexico**

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Spencer G. Lucas
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LOCATION



Krainer, K. and Lucas, S.G.,
2005, *Lithofacies of the
Pennsylvanian Osha
Canyon Formation at
the type section,
Jemez Mountains,
New Mexico*,
New Mexico Geological
Society 56th Annual
Fall Field Conference
Guidebook, pp. 139-144.

FIGURE 1. Location map of Osha Canyon Formation type section.

Revision to the geologic map



North of Gilman Tunnels Exposures

The formation is exposed for about one-half kilometer extending north from the type section at Guadalupe Box.

These exposures, north of Gilman Tunnels, produce rich assemblages.

- Upper Part, beds 15 and 14 *
- Middle Part, beds 10 - 13 *
- Lower Part, beds 6 - 9 *

* beds defined by Krainer & Lucas, 2005

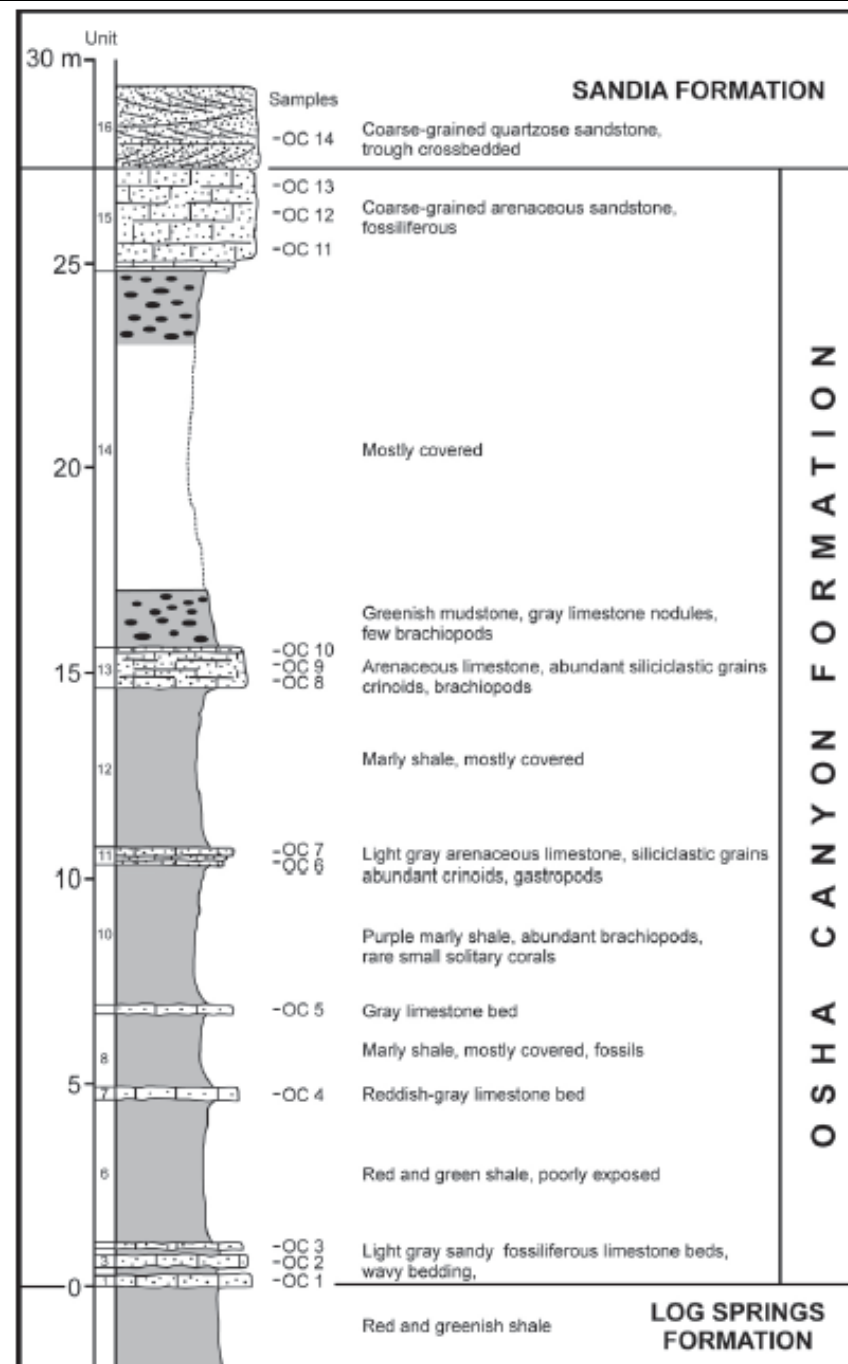
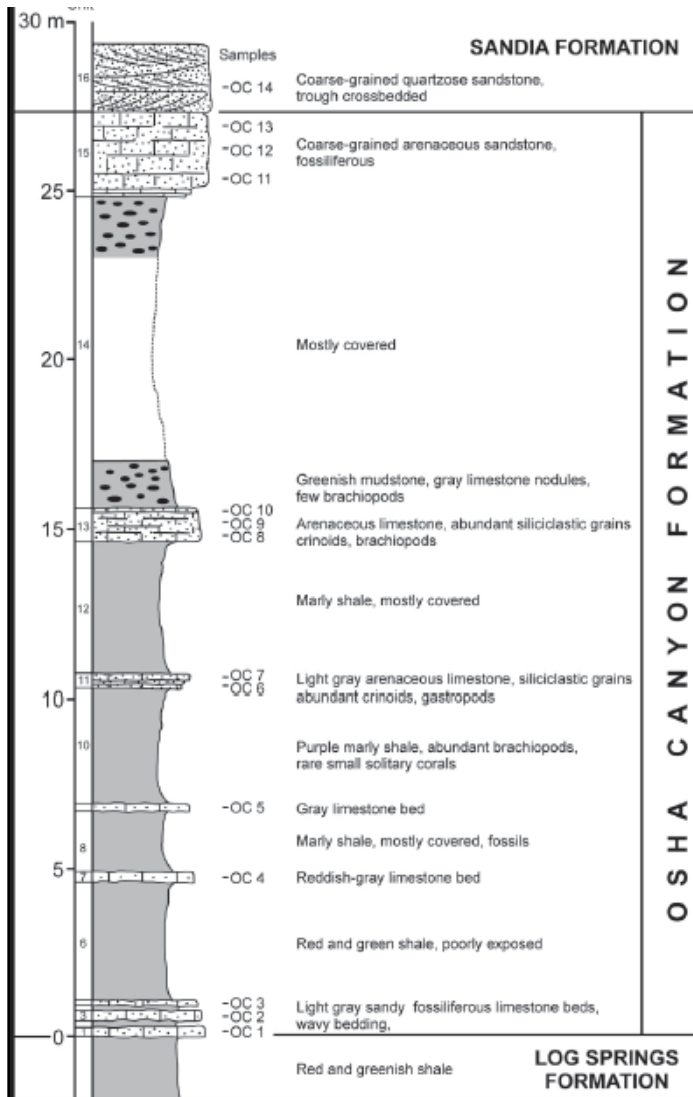


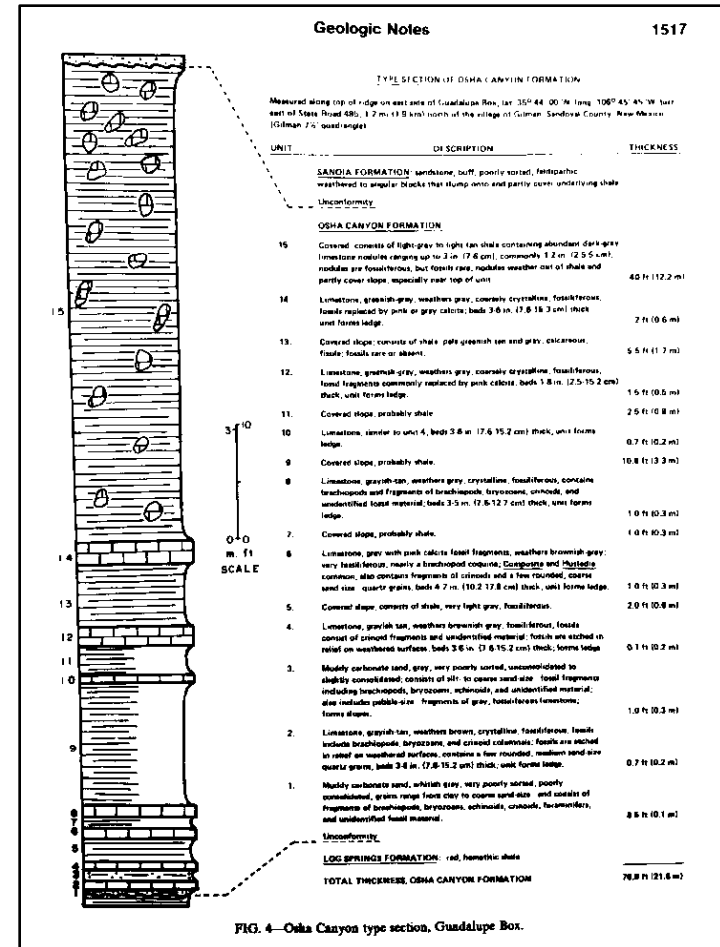
FIGURE 2. Type section of the Osha Canyon Formation.

Two lithostratigraphies compared

Krainer & Lucas, 2005



Duchene, et al., 1977



Upper unit: contact with the Sandia Formation basal sandstone



Upper unit: close-up of contact



Upper unit: *Zoophycus*



Upper unit fossils

Beds 15 and 14 (Krainer & Lucas, 2005)

- uppermost limestone bed (3 m thick)
- and the shale below it (10 m thick)

Parajuresania? is less than 1%

Anthracospirifer is common, 15-30%

Rhipidomella and *Derbia* are together about 10%

Linoproductus is about 15%

Composita is 9-18%

Zoophycus trace fossil and *Echinaria* impressions are prominent in the limestone talus.

Hustedia and *Sandia* are very minor, <1%

Neochonetes and *Punctospirifer* are also less than 1%

Distribution of Brachiopods in the Osha Canyon Formation (comparison)

Upper Unit

type section (1977)

1. *Schizophoria altirostris*
2. *Neochonetes whitei*
3. *Neochonetes platynotus*
4. *Kozlowskia?* sp.
5. *Sandia welleri*
6. *Antiquatonia* sp. indet.
7. *Linoproductu nodosus*
8. *Linoproductus devargasi*
9. *Juresania* sp.
10. *Hustedia miseri*
11. *Composita gibbosa*
12. *Cleiothyridina milleri*
13. *Spirifer goreii*
14. *Anthracospirifer curvilateralis tanoensis*
15. *Anthracospirifer newberryi*
16. *Punctospirifer morrowensis*

whole formation (2020)

- Rhipidomela trapezoidea*
- Derbyia bonita*
- Mesolobus striatus*
- Kozlowskia?* sp.
- Desmoinesia nambeensis*
- Parajuresania pustulosa*
- Antiquatonia* sp.
- Linoproductus nodosus*
- Composita deflecta*
- Spirifer goreii*
- Anthracospirifer curvilateralis*
- Anthracospirifer newberryi*
- Punctospirifer morrowensis*

Middle unit: northern road cut exposure (east side)



Photo credit: zynpigo, June 30, 2009

<http://www.thefossilforum.com/index.php?/topic/7378-fossils-north-of-guadalupe-box-jemez-mountains/>

Middle unit fossils

Beds 10 through 13 (Krainer & Lucas, 2005)

Mostly in the area near the first utility pole NE of Gilman Tunnels, total thickness 8 meters

Parajuresania? is less than 1%

Anthracospirifer is about 5%

Rhipidomella and *Derbia* are less than 1%

Linoproductus is about 2%

Composita is 50-67% and averages smaller in size than is usual in the lower and upper strata

Zoophycus is not found in these limestones, but *Echinaria* is present at 1%.

Neochonetes is about 2%

Hustedia is about 10%

Punctospirifer is about 5%

Sandia is also about 5%

Distribution of Brachiopods in the Osha Canyon Formation (comparison)

Middle Unit

type section (1977)

1. *Schizophoria oklahomae*
2. *Derbyia* sp. nov.
3. *Pliochonetes?* arkansanus
4. *Neochonetes platynotus*
5. *Desmoinesia nambeensis*
6. *Sandia welleri*
7. *Pulchratia?* picuris
8. *Antiquatonia* sp. indet.
9. *Hustedia miseri*
10. *Composita gibbosa*
11. *Anthacospirifer curvilateralis tanoensis*
12. *Anthacospirifer newberryi*
13. *Punctospirifer morrowensis*

whole formation (2020)

- Schizophoria oklahomae*
Derbyia bonita
Neochonetes platynotus
Desmoinesia nambeensis
Sandia welleri
Antiquatonia coloradoensis
Linoproductus nodosus
Hustedia gibbosa
Composita deflecta
Spirifer goreii
Anthacospirifer newberryi
Phricodothyris perplexa
Punctospirifer morrowensis
Beecheria gerberi

Lower unit:

***Parajuresania* in micritic limestone**



Lower unit fossils

Beds 6 through 9 (Krainer & Lucas, 2005)

- There are 6 meters of strata in these units

Parajuresania? is dominant at 40%

Anthracospirifer is about 3%

Rhipidomella is about 2%

Linoproductus is about 6%

Composita is about 28%

Zoophycus is absent from the limestones,
and *Echinaria* is rare.

Neochonetes and *Punctospirifer* are both less than 1%

Hustedia and *Sandia* seem to be absent

Distribution of Brachiopods in the Osha Canyon Formation (comparison)

Lower Unit

type section (1977)

1. *Schizophoria oklahomae*
2. *Rhipdomela* sp. nov.
3. *Derbyia bonita*
4. *Neochonetes platynotus*
5. *Sandia welleri*
6. *Buxtonia grandis*
7. *Antiquatonia* sp. indet.
8. *Linoproductus nodosus*
9. *Hustedia gibbosa*.
10. *Composita gibosa*
11. *Cleiothyridina milleri*
12. *Anthracospirifer curvilateralis tanoensis*
13. *Punctospirifer morrowensis*
14. *Spiriferellina campestris*

whole formation (2020)

- Schizophoria oklahomae*
Rhipdomela trapezoidea
Derbyia bonita
Desmoinesia nambeensis
Sandia welleri
Parajuresania pustulosa
Antiquatonia coloradensis
Linoproductus nodosus
Composita deflecta
Spirifer goreii
Anthracospirifer curvilateralis
Anthracospirifer newberryi
Punctospirifer morrowensis
Phricodothyris perplexa
Beecheria gerberi

Environments of Deposition

- Depositional environments were changing due to eustatic sea level changes and intermittent uplift of source-area rocks.
- Eustatic changes were likely due to glacial-interglacial climate fluctuations in Gondwana.
(New Mexico was in the tropic zone.)
- The source area for terrestrial sediment was the Peñasco uplift, which was elevated at about the location of the present Nacimiento range during the Pennsylvanian Ancestral Rocky Mountain Orogeny.
- Silicification of the shells occurred soon after deposition, possibly due to an influx of silica-rich terrestrial runoff during marine low stand.

Silicification in three formations at Guadalupe Box

Upper Guadalupe Box Fm. at Guadalupe Box (late Missourian)

mostly no

very uncommon silicification

Lower Guadalupe Box Fm. at Guadalupe Box (early Missourian)

yes

uncommon, but the red spiriferid layer is distinctive

Sandia Fm. at Guadalupe Box (Atokan)

yes

fairly common silicification

Osha Canyon Formation, upper member at Guadalupe Box (Morrowan)

yes

fairly common silicification (Note the spiral brachidia.)

Osha Canyon Formation, upper member at West Hill (Morrowan)

yes

uncommon silicification

Osha Canyon Formation, middle member at Guadalupe Box (Morrowan)

yes

fairly common silicification, abundant beekite rings (due to intermittent silicification)

Osha Canyon Formation, middle member at 3.7 miles north of Gilman Tunnels (Morrowan)

yes

extensive silicification (90% of the shells)

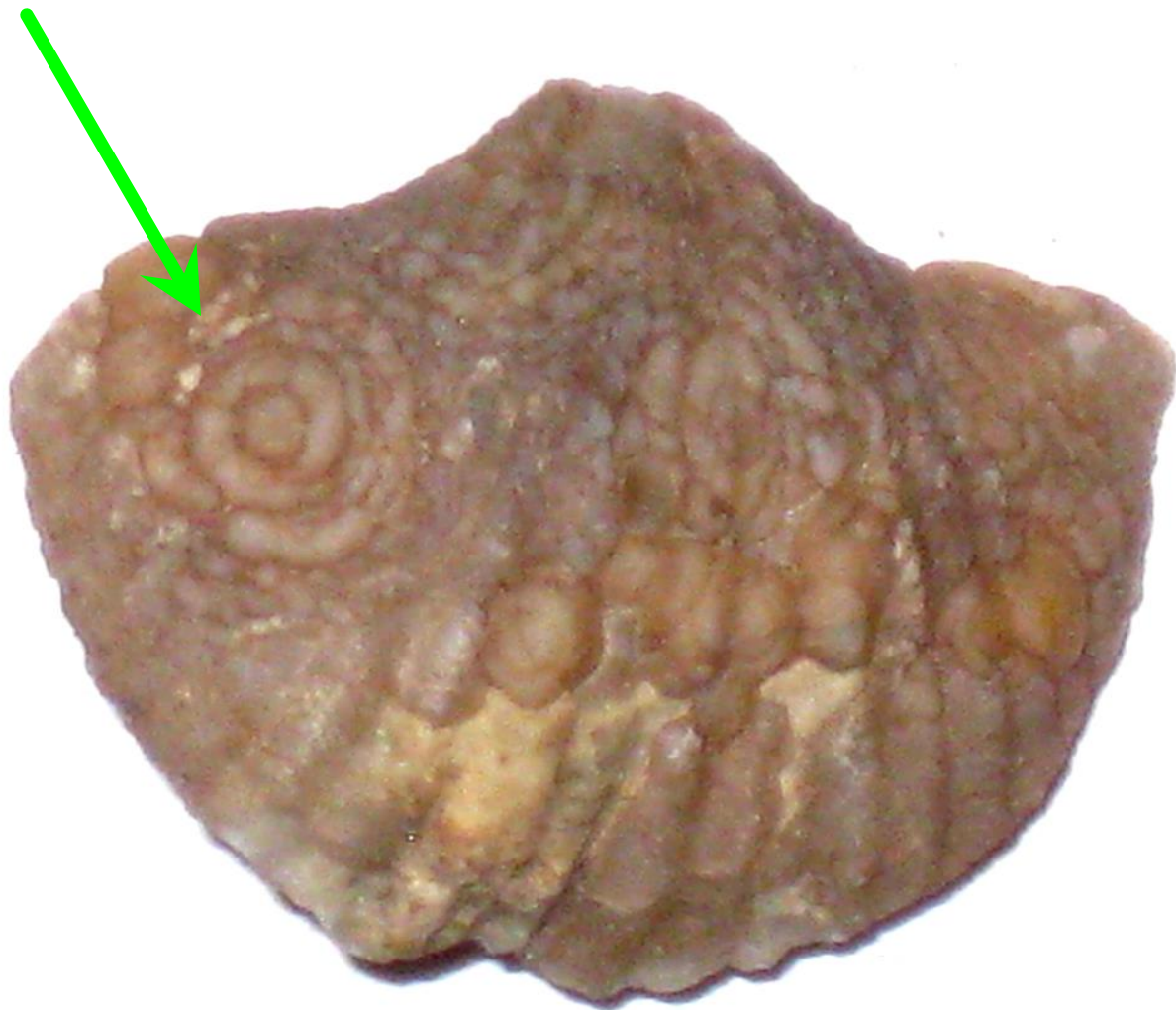
Osha Canyon Formation, lower member at Guadalupe Box (Morrowan)

yes

minor red spotting, and beekite rings on *Schizophoria oklahomae*



Silicification: beekite rings



Future Work

- Continued investigation of silicification compared to environment of deposition
- Bed-by-bed biostratigraphy of the Osha Canyon Formation
- Biostratigraphies for the other Guadalupe Box Formations:
 - Sandia Formation (Atokan)
 - Gray Mesa Formation (Desmoinesian)
 - Guadalupe Box Formation (Missourian)

Thank you!
Questions?

