Some recent Safford AZ area discoveries have now located many dozens of Mt. Graham mountain stream fed prehistoric CE 1350 "hanging" canals that represent utterly mind boggling world class stone age engineering.

An apparently unique hallmark of the entire complex system is that the canals are often literally "hung" on the extremely difficult terrain of steep mesa edges. In a clear attempt to make their routings and carefully controlled slopes fully independent of local typography!

Ownership is primarily Bureau of Land Management, AZ State Lands, Coronado National Forest, and some private inholdings. A few canals are severely endangered, but the vast majority simply remain woefully unappreciated.

Nearly 100 canal study areas have already gotten identified, with a projected total length likely well in excess of 150 miles or 250 kilometers.

Preservation is often exceptional. It seems an attempt was made to exploit literally every drop of mountain stream water. Along with some related artesian sources.

Amazingly, the system appears "complete" and free of any apparent mistakes or failures. Other involved examples of stunning engineering include a significant aqueduct, watershed crossings (!), routings along the highest of available terrain, and "counterflowing" where canal slopes drop into rising terrain.

While the vast majority of canals favor the wetter northeast slopes, examples also literally surround Mount Graham. Which has the highest elevation differential of any Arizona range. Combined with an unusually high number of perennial streams.

Other instances of area ag development include Hohokam style riverine canals, extensive grided fields, mulch rings, field houses, rock alignments and aproned check dams.
Here is the general study area...

And here is an older and click expandable map of some of the northeastern canals...

Yes, we are working on a much better and a more complete "flyable" KML map. Which is turning into a major project.

In general, KML is preferable to GIS in that it can be "flown" and has all the resources of Google Earth behind it.

Both Acme Mapper and Google Earth have proven enormously useful in our canal work.

Sadly, satellite imagery presently can only hint at the presence of a small fraction of the canals.
### Third Party Pubs

Always start [here](#).

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<tr>
<th>Archaeology Southwest I</th>
<th>Glyphs Paper</th>
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<td>Archaeology Southwest II</td>
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<td>Lair Mt. Graham Survey</td>
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<td>AZ Central Story</td>
<td>Safford Valley Grids</td>
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<td>AZ Republic Story</td>
<td>USA Today Story</td>
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<td>Gila Watershed paper I</td>
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<td>Gila Watershed paper II</td>
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### Our Own Pubs

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<table>
<thead>
<tr>
<th>Gila Watershed Paper</th>
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<tr>
<td>Prehistoric Hanging Canal Engineering</td>
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**More Dr. Neely papers** [here](#), [here](#), and [here](#).

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<td>Tramway History</td>
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**Gonzo Utilities (needed for above sourcecodes)**

Support [here](#). Tutorial [here](#). Reference [here](#).
The prehistoric Bajada "hanging" canal study areas are listed here in roughly east to west order. A few "losers" do remain in this listing in order to divert any future duplication. Many of the names were somewhat arbitrarily assigned.

1. Veech
2. Goat Tank
3. Ledford Tank
4. Low Jacobson
5. Upper Marijilda
6. Main Marijilda
7. South Feeder
8. The Aqueduct
9. Lebanon Hang
10. Sixpack
11. Henry's
12. Roper Lake
13. Rincon
14. Tranquility
15. Discovery Prk
16. Twin East
17. Twin West
18. TB Ponding
19. Bear Flat
20. Goat Hydro?
21. Deadman West
22. Water Spread
23. Bigler Canal
24. Mulch Rings
25. Aproned Check
26. Alberto's Sign
27. Longview
28. Upper Frye
29. Mid Frye Delv
30. Low Frye Pond
31. HS Canal
32. Early Freeman
33. Blue Ponds
34. Riggs Mesa
35 Golf Course
36. Twin Artesian
37. Robinson
38. Allen canal
39. Allen D Failure
40. Culebra Cut
41. Ash Creek Fed
42. Mud Springs
43. Troll House
44. MudJern Bch
45. Mud Tank
46. Jernigan
47. Lower Mud
48. Smith Tank
49. Cluff Southwest
50. Cluff Northwest
51. Minor Webster
52. Tugood
53. Main Left hand
54. Left hand West
55. South Left hand
56. Lamb Tank
57. Mystery Rech
58. Sand Wash
59. Nuttall Divers
60. Bear Springs
61. The Grids
62. Bandelier
63. UFO Fish Filt
64. P Ranch
65. Spear Ranch
66. Sand West
67. Sand Center
68. Deadman East
69. Taylor
70. Lower Frye
71. Bandelier Ext
72. Canal nr UFO
73. Hog Canyon
74. Grant Creek
75. Low Frye Ext
76. Tailwater
77. Artesian #1
78. Artesian #2
79. Lopez
80. Reay Canal
81. Thunderbird
82. Lower Rincon
83. Deep Vee Mys
84. Henry's Fields
85. Thunbird Rwk
86. Int Supercanal
87. Cottontail Arts
88. Frye Pipeline
89. In Process
90. San Jose Rivn
91. Jernigan Ext.
92. Freeman Filds
93. Tripp Canyon
94. Jawava
95. Sunny Flat
96. Aravaipa
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Intended for priority major upgrade are...

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<td>Riggs Mesa</td>
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This list is currently only preliminary and incomplete. Availability of new field notes are often announced here.

**Proof the Canals are Real:**

While no single factor by itself can unambiguously prove that the canals are both in fact real and prehistoric, evidence from multiple independent sources collectively overwhels other possibilities...

Factors that the canals are man made...

1. Unvaringly optimal constant slope.
2. Often along the highest available terrain.
3. Significant hanging portions present.
4. Credible water oriented sources and destinations.
5. Slopes often nearly independent of local terrain.
6. Spoil banks typically present.
7. Obvious extreme purposefulness.
8. Consistent width and depths over long distances.
9. Lack of braiding or sudden channel changes.
11. Absence of sinuous or dendritic natural features.
12. Obviously human placed cobbles and boulders.
13. Some evidence of clay linings.
14. Instances of counterflowing into rising terrain.

Factors that the canals are prehistoric...

1. Extreme construction energy awareness.
2. Overrun by roads, dams, and even cemeteries.
3. Lack of historic records by an aware community.
4. Consistent patina, lichens, and desert varnish.
5. Mature trees and cacti mid channel.
6. Prehistorically oriented original purposes.
7. Significant lack of "non-human liftable" constructs.
8. No obvious long distant construct transport.
10. Lack of ongoing modern or initial historic use.
11. Termination in verified prehistoric sites.
12. Refurb typically only to an original fraction.
13. Presence of sherds, artifacts, and digging tools.

We can now turn to a few of the...
Key Spectacularousities: deeplink top bot respond

- **High Lebanon Hanging Canal** at 32.73351 -109.75685
- **The High Lebanon in 3D** at 32.73418 -109.75654
- **A "Water Flows Uphill" Illusion** at 32.77371 -109.79646
- **The "HS" Counterflowing Canal** at 32.75907 -109.81376
- **The Allen Cuelbra Cut** at 32.83568 -109.79803
- **The Lower Frye Complex** at 32.76794 -109.79193
- **The UFO Fish Fillets** at 32.81511 -109.97060
- **Troll House / Adena Embassy** at 32.82538 -109.82281
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<td>Northern Grids</td>
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The master bajada hanging canal image directory is shown below. You can click through to view any image.

More details in the field notes or the spectacularocities. Or click here to open an image name cross reference.

Or you can contact us for access details, tours, or lectures.

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Evidence is strong and compelling that most, if not all, historic canal rework were adaptations of prehistoric originals. First, because it is infinitely easier to "dig out an old ditch" or "steal the plans" or "borrow the blueprints" than to engineer a new canal from scratch.

And second, because nearly all of the decent canal locations were already and nearly exclusively prehistorically taken. And third, because historic rework often only applied to a smaller portion of the entire canal reach.

Finally, Ockham's Razor can be used to add credibility to any missing canal portions. In which the simplest explanation will often likely be found to be the correct one.
Ancient Hanging Canals
Archaic Paleo Wells
Calcified Microbial Mat
Drop-tower Gristmills
Debating Oaxaca Prehistory
Deh Luran Early husbandry
Friable Iran Pigments
Gila Canals Paper *
Hohokam Canal Irrigation
Intrusive anurian Pithouses
Iran Settlement Patterns *
Lefthand Canyon Paper *
Mesoamerican Irrigation
Monte Alban Survey
Preservation Archaeology *
Purron Dam Paper *
Radiocarbon Sediment Age
Safford Agricultural fields
Safford Bajada Canals *
Safford Basin Canals *
Safford Dry Farming
Safford Valley Grids
Tehuacan Canals
Tecoatles Paper
Tracking Safford Basin
Xosocotlan Piedmont Survey

* Papers are available at www.tinaja.com Other Dr. Neely publications appear at Academia, at ResearchGate and the Arizona State Museum, and elsewhere.

A James Neely bio here. And a Don Lancaster bio here.

Don Lancaster publications can be found here, here, here, and here. With free ebooks here. And classic reprints here. With email assistance here.

Our blogs found below often give a timeline and details on initial hanging canal discoveries and speculations. We have excerpted these here, retaining only the entries of possible hanging canal interest...

2018 Blog Excerpts
2017 Blog Excerpts
2016 Blog Excerpts
2015 Blog Excerpts
2014 Blog Excerpts

Blog excerpts are usually compiled yearly. Be sure to check here and later for current emerging developments.

The following bajada hikes could greatly assist the world class research on our hanging canals. Typical total and return lengths are one to three miles, often in very difficult or brushy terrain.

Needed are field verification, drone work, photos, and GPS...
Please send results to don@tinaja.com or (928) 428-4073.
More details on some of these here or via email.

USB Collected Works

DON LANCASTER CLASSICS USB
An "all we have" archive of our website. Includes all ebooks and reprints. Well over 2 Gigabytes of content and often updated. Easily searched.

Click on the image to access.

BAJADA "HANGING" CANALS USB
Definitive summary of most of our Gila Valley prehistoric bajada hanging canal research. Both our own and from third parties. Internally sourced where possible.

Click on the image to access.

Build Time Estimates:

Given some useful stone age tools and an "average" canal run, it would seem feasible to build one foot of canal per person hour. Which might translate to fifteen feet of canal per person day or one mile per person year.

More difficult areas might involve half a mile per person year, and "management" and "diet energy" might need included.

Thus, a possible WAG of 250 man years for 150 miles of canal.

Which, while clearly a major undertaking, this does not seem remotely near a "pyraminds" class project.
From time to time, we have papers in prepress with traditional publishers who may have very restrictive IP rights.

If you wish to know the status or possibly access these docs, email us with your bonafides as a potential peer reviewer.

The use of a NDA non disclosure agreement may be involved.
No survey instruments as such are known to exist, so what follows remains as rank speculation.

It would appear possible that static water level techniques could be used. In which a small pilot ditch could be extended and then filled with just enough water to measure its start-to-end differential. This could be compared to an optimal slope and corrected before completing the full size ditch.

For instance, something like "one fist per five paces" might be deemed a "correct" two percent slope.

As to "best" overall canal routes, there are many hillocks or prominences common to Mount Graham that oversee potential routes. This conceivably could have given the equivalent of an "aerial photo" suitable for determination of useful earlier canal orientations.

As an example, there are several locations where nearly the entire length of the Mud Springs Canal can be simultaneously viewed.

This might seem to raise the possibility of the Mud Springs Canal being an earlier prototype.

Your Involvement:

You are invited to participate in this world class bajada hanging canal research. Specific needs are for GPS literate gonzo hikers and ATV enthusiasts, live video drone operators, and a KML specialist. And perhaps a sedimentologist or climatologist or nearly any other utterly arcane specialist. Plus, of course, cash in small bills.

You are welcome to support us by picking up our USB research summary as detailed above. Or participate in our eBay offerings.

Ongoing current goals are to improve and complete the field notes, produce one or more YouTube videos, dramatically update and upgrade "flyable" mapping, and convince "them" to set up significant ongoing field schools. Or simply to pick up new hiking partners. Or individuals we can mentor.

Please send results to don@tinaja.com or (928) 428-4073. More details on some of these here or via email.

Discovery emails

Intended here is a compilation of early discovery emails. It remains very much a work in process.
A copy of a proposed interdisciplinary Safford Basic research program can be found here. And is authored here.

The original tinsamp1.shtml can still be found here. The original tinaja01.shtml can still be found here. Or you can return to our home page. Or use your back arrow. Or...

You can click here to...

- Ask a Technical Question.
- Download our Free eBooks.
- Explore Magic Sinewaves
- Find out what a Tinaja is.
- Get a Lancaster Classics USB.
- Hang with Marcia Swampfelder.
- Look into Energy Efficiency.
- Master Bezier Cubic Splines.
- View our Classic Reprints.
- Pick up Surplus Bargains.
- Request a Lecture.
- Schedule a Canal Tour.
- Send an email to Don.
- Solve a Research Problem.
- Study our Recommended Books.
- Take a Gila Valley Dayhike.
- Visit the Marbelous Pancakes.
- Watch a PostScript Video.
- Get a Hanging Canals USB.

Note that right clicking can give you several tab or window options.

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