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Jim Neely & Don Lancaster: **Prehistoric Bajada "Hanging" Canals**



🌵 A YEAR'S WORTH OF 🌵
GILA VALLEY DAYHIKES

the very worst of
marcia swampfelder

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.

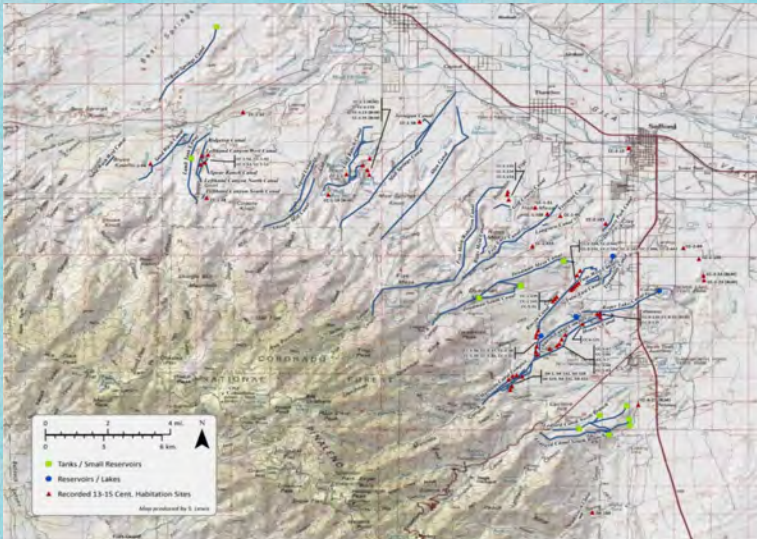
While the vast majority of canals favor the wetter northeast slopes, examples also literally surround **Mount Graham**. Which has the highest elevation differential of any Arizona range. Combined with an unusually high number of perennial streams.

Other instances of area ag development include **Hohokam** style riverine canals, extensive **gridded 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

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Always start [here](#).

Archaeology Southwest I
Archaeology Southwest II
AZ Archaeological Society
AZ Central Story
AZ Republic Story
Gila Watershed paper I
Gila Watershed paper II

Glyphs Paper
Lafayette Magazine Story
Lair Mt. Graham Survey
Safford Valley Grids
USA Today Story
Wikipedia Coverage

Our Own Pubs

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Always start [here](#).

Gila Watershed Paper
Prehistoric Hanging Canal Engineering
Prehistoric Hanging Canal Engineering (sourcecode)
Prehistoric Bajada Hanging Canals
Prehistoric Bajada Hanging Canals (sourcecode)
Prehistoric Hanging Canal Image Tour
Prehistoric Hanging Canal Image Tour (sourcecode)
Prehistoric Hanging Canal Summary
Prehistoric Hanging Canal Summary (sourcecode)
Prehistoric Hanging Canal Paper III
Prehistoric Hanging Canal Paper III (Sourcecode)
Prehistoric Hanging Canal Lecture III
Prehistoric Hanging Canal Lecture III (Sourcecode)
Wikipedia Coverage

More Dr. Neely papers [here](#), [here](#), and [here](#).

Gila Valley Dayhikes
Little Known Dayhikes
Allen Dam Failure
Tramway History
Tramway Show
Tramway Specs

Gonzo Utilities ([needed for above sourcecodes](#))
[Support here](#). [Tutorial here](#). [Reference here](#).

Index & Directory:

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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	26. Alberto's Sign	51. Minor Webster	76. Tailwater
2. Goat Tank	27. Longview	52. Tugood	77. Artesian #1
3. Ledford Tank	28. Upper Frye	53. Main Lefthand	78. Artesian #2
4. Low Jacobson	29. Mid Frye Delv	54. Lefthand West	79. Lopez
5. Upper Marijild	30. Low Frye Pond	55. South Lefthnd	80. Reay Canal
6. Main Marijilda	31. HS Canal	56. Lamb Tank	81. Thunderbird
7. South Feeder	32. Early Freeman	57. Mystery Rech	82. Lower Rincon
8. The Aqueduct	33. Blue Ponds	58. Sand Wash	83. Deep Vee Mys
9. Lebanon Hang	34. Riggs Mesa	59. Nuttall Divers	84. Henry's Fields
10. Sixpack	35 Golf Course	60. Bear Springs	85. Thunbird Rwk
11. Henry's	36. Twin Artesian	61. The Grids	86. Int Supercanal
12. Roper Lake	37. Robinson	62. Bandelier	87. Cottontail Arts
13. Rincon	38. Allen canal	63. UFO Fish Filts	88. Frye Pipeline
14. Tranquility	39. Allen D Failure	64. P Ranch	89. In Process
15. Discovery Prk	40. Culebra Cut	65. Spear Ranch	90. San Jose Rivn
16. Twin East	41. Ash Creek Fed	66. Sand West	91. Jernigan Ext.
17. Twin West	42. Mud Springs	67. Sand Center	92. Freeman Filds
18. TB Ponding	43. Troll House	68. Deadman East	93. Tripp Canyon
19. Bear Flat	44. MudJern Bch	69. Taylor	93. Levada
20. Goat Hydro?	45. Mud Tank	70. Lower Frye	95. Sunny Flat
21. Deadman West	46. Jernigan	71. Bandelier Ext	96. Aravaipa
22. Water Spread	47. Lower Mud	72. Canal nr UFO	97. ----
23. Bigler Canal	48. Smith Tank	73. Hog Canyon	98. ----
24. Mulch Rings	49. Cluff Southwest	74. Grant Creek	99. ----
25. Aproned Check	50. Cluff Northwst	75. Low Frye Extn	100. ----

Preliminary Field Notes:

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Our present bajada hanging canal docs on Researchgate, on our website, and elsewhere do include...

Allen Canal	Lower Frye Construct
Bear Springs Canal	Mud Springs
Cluffnw Canal	Reay Canal
Deadman Canal	Robinson Canal
Frye Complex	Tranquility Canal
Henry Canal	Tugood Canal
Jernigan Canal	Veech Canal
Longview Area	

Intended for priority major upgrade are...

Freeman Canal
Lefthand Canal
Minor Webster
Riggs Mesa

Sand Canal
Smith Canal
TB Ponding Area

This list is currently only preliminary and incomplete.
Availability of new field notes are often announced [here](#).

Proof the Canals are Real:

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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 overwhelms other possibilities...

Factors that the canals are man made...

1. Unvaryingly 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.
10. Nearly straight alignments.
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.
9. Lack of any obvious modern tool use.
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.
14. Non-cardinal alignments.

We can now turn to a few of the...

Key Spectacularousities:

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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](#)



Mud Springs Watershed Cross
at N 32.79159 W 109.85379



Deadman East Canal
at N 32.75510 W 109.78052



Northern Grids
at N 32.93213 W 109.80717



Mud Springs Mid Route
at N 32.82681 W 109.81953



Aproned Check Dams
at N 32.81406 W 109.91849



Lefthand Canal
at N 32.81405 W 109.91849



The Aqueduct
at 32.72398 -109.76241



The Sand Canal Takein
at 32.81259 -109.946989



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 spectacularosities.
Or click [here](#) to open an image name cross reference.

Or you can [contact us](#) for access details, tours, or lectures.

hc000	hc030	hc060	hc090	hc120	hc150	hc180	hc210	hc240	hc270
hc001	hc031	hc061	hc091	hc121	hc151	hc181	hc211	hc241	hc271
hc002	hc032	hc062	hc092	hc122	hc152	hc182	hc212	hc242	hc272
hc003	hc033	hc063	hc093	hc123	hc153	hc183	hc213	hc243	hc273
hc004	hc034	hc064	hc094	hc124	hc154	hc184	hc214	hc244	hc274
hc005	hc035	hc065	hc095	hc125	hc155	hc185	hc215	hc245	hc275
hc006	hc036	hc066	hc096	hc126	hc156	hc186	hc216	hc246	hc276
hc007	hc037	hc067	hc097	hc127	hc157	hc187	hc217	hc247	hc277
hc008	hc038	hc068	hc098	hc128	hc158	hc188	hc218	hc248	hc278
hc009	hc039	hc069	hc099	hc129	hc159	hc189	hc219	hc249	hc279
hc010	hc040	hc070	hc100	hc130	hc160	hc190	hc220	hc250	hc280
hc011	hc041	hc071	hc101	hc131	hc161	hc191	hc221	hc251	hc281
hc012	hc042	hc072	hc102	hc132	hc162	hc192	hc222	hc252	hc282
hc013	hc043	hc073	hc103	hc133	hc163	hc193	hc223	hc253	hc283
hc014	hc044	hc074	hc104	hc134	hc164	hc194	hc224	hc254	hc284
hc015	hc045	hc075	hc105	hc135	hc165	hc195	hc225	hc255	hc285
hc016	hc046	hc076	hc106	hc136	hc166	hc196	hc226	hc256	hc286
hc017	hc047	hc077	hc107	hc137	hc167	hc197	hc227	hc257	hc287
hc018	hc048	hc078	hc108	hc138	hc168	hc198	hc228	hc258	hc288
hc019	hc049	hc079	hc109	hc139	hc169	hc199	hc229	hc259	hc289
hc020	hc050	hc080	hc110	hc140	hc170	hc200	hc230	hc260	hc290
hc021	hc051	hc081	hc111	hc141	hc171	hc201	hc231	hc261	hc291
hc022	hc052	hc082	hc112	hc142	hc172	hc202	hc232	hc262	hc292
hc023	hc053	hc083	hc113	hc143	hc173	hc203	hc233	hc263	hc293
hc024	hc054	hc084	hc114	hc144	hc174	hc204	hc234	hc264	hc294
hc025	hc055	hc085	hc115	hc145	hc175	hc205	hc235	hc265	hc295
hc026	hc056	hc086	hc116	hc146	hc176	hc206	hc236	hc266	hc296
hc027	hc057	hc087	hc117	hc147	hc177	hc207	hc237	hc267	hc297
hc028	hc058	hc088	hc118	hc148	hc178	hc208	hc238	hc268	hc298
hc029	hc059	hc089	hc119	hc149	hc179	hc209	hc239	hc269	hc299

Evidence is strong and compelling that **most, if not all, historic canal rework were adaptions 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.

Other Dr. Neely Pubs:

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Ancient Hanging Canals	Monte Alban Survey
Archaic Paleo Wells	Preservation Archaeology *
Calcified Microbial Mat	Purron Dam Paper *
Drop-tower Gristmills	Radiocarbon Sediment Age
Debating Oaxaca Prehistory	Safford Agricultural fields
Deh Luran Early husbandry	Safford Bajada Canals *
Friable Iran Pigments	Safford Basin Canals *
Gila Canals Paper *	Safford Dry Farming
Hohokam Canal Irrigation	Safford Valley Grids
Intrusive anurian Pithouses	Tehuacan Canals
Iran Settlement Patterns *	Tecoatl Paper
Lefthand Canyon Paper *	Tracking Safford Basin
Mesoamerican Irrigation	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](#).

Blog Excerpts:

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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	2013 Blog Excerpts
2017 Blog Excerpts	2012 Blog Excerpts
2016 Blog Excerpts	2011 Blog Excerpts
2015 Blog Excerpts	2010 Blog Excerpts
2014 Blog Excerpts	2009 Blog Excerpts

Blog excerpts are usually compiled yearly. Be sure to check [here](#) and later for current emerging developments.

Possible Projects:

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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...

Allen Off Mesa -32.82088 -109.80470
Allen Destination -32.83309 -109.80482
Ash Creek Source - 32.78602 -109.85499
Deadman East -32.75574 -109.77915
Discovery Park -32.79453 -109.72779
Frye Middle -32.75075 -109.83780
Frye Pipeline-32.76889 -109.79317
Frye Watershed -32.74526 -109.83888
Golf Course Mid -32.78502 -109.78708
Grant Creek -32.59249 -109.96686
Henry's Source -32.73713 -109.74231
Hog Canyon -32.55380 -109.76431
Jernigan Gaps- 32.84140 -109.81260

Lamb Tank Canal - 32.81368 -109.92292
Middle Freeman - 32.76971 -109.79022
Minor Webster - 32.80758 -109.86857
Mud Springs Gap - 32.79170 -109.85312
Mud Springs Dest - 32.84785 -109.81104
Spear Ranch Area - 32.83613 -109.91437
Stockton Wash - 32.61429 -109.72799
Taylor Canyon - 32.81620 -109.97316
Tripp Canyon - 32.81133 -110.04680
Tugood North -32.82087 -109.86675
Tugood South - 32.80923 -109.87116
Veech Canyon -32.64279 -109.74278

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

USB Collected Works

[deeplink](#) [top](#) [bot](#) [respond](#)



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

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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:

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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 "pyramids" class project.

Some Useful Resources:

[deeplink](#) [top](#) [bot](#) [respond](#)

Academia	Hanging Canal Slide Show
Acme Mapper Topos	Hanging Canal Summary
Allen Dam Failure Docs	Hanging Canal AZ Rep Vid
Arizona GIS Land Owners	Highway Milepost Markers
Arizona Place Names	Hiking Clubs
Arizona State Museum	Hinton's Arizona Handbook
Arizona Stream Gauges	Hot Springs Directory
Arizona Water Atlas III	Little Known Dayhikes
Bird Watching	Magic Sinewaves
Bureau Land Management	Map of Allen Canal
Coronado National Forest	Map of Mud Springs Canal
Discovery Park	Mine and Mineral Data
Fewkes 1897 Arch Report	More Website Links
Gila Valley Dayhikes	More Fossil Stuff
Gila Valley Hiking Club	Multipurpose Trail Map
Gila Watershed Partnership	Natural Arch & Bridge Soc
Google Maps	Neely Prehistoric Ag Paper
GPS Format Conversions	One Each of my Everythings
Guru's Lair	Our eBay Sales
Graham County Birds	Research Gate
Graham County Dams	Reay Lane Wetland Birds
Graham County Lakes	Safford Basin Canals
Graham County Hist Society	Safford Basin Water Atlas
Graham County Minerals	Safford BLM Paleontology
Graham County Peaks	Safford Prehistory
Graham Cty Plc Names	San Carlos Minerals
Historic USGS Maps	San Simon Valley Fossils
Hodge's Arizona as it is	Stream Gauges
Heliograph Maps	USFS Fire Lookouts
Hanging Canal Projects	Walnut Grove Dam Disaster
Hanging Canal Directory	Wesrch
Hanging Canal Image Tour	Wikipedia Hanging Canals
Hanging Canal Library	Wilderness Net
Hanging Canal Resources	Zeolite Paper

Attention Reviewers:

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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.

Survey Instruments:

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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:

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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

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Intended here is a compilation of early discovery emails. It remains very much a work in process.

Study Proposals:

[deeplink](#) [top](#) [bot](#) [respond](#)

A copy of a proposed interdisciplinary Safford Basic research program can be found [here](#). And is authored [here](#).

For More Help:

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

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