

Projects (continued).....

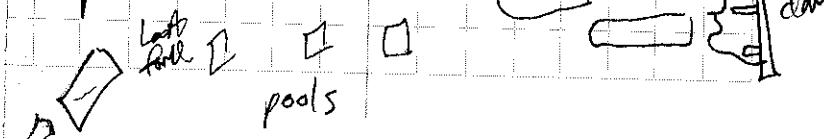
13-May-2008

- BDS, PAS, KJL, Erica Becker,
& Whittney L. Johnson arrived in camp. Saw 8¹
gopher-snake on 838. Split into 2 groups. BDS & KJL
set 3 nets (2S:1L) in Horse Pasture tank. H₂O levels are 1
(1.5m below dam) ~~lower~~
considerably lower than in October 2007. Caught 6
frogs by hand. It appears that cattle grazing
has increased in the area. Set 2 nets (2L) in Cloverdale
Spring. Water levels are also lower in cloverdale & much
of the aquatic vegetation is absent. ^{BDS & KJL} SAW ~~a~~ saw a
gopher snake on Battalion. Hiked to Suahili tank and
it was dry. Saw 7 Gould's turkeys along GTR & road
that led to Suahili tank.

PAS/WLS/ECS

Hiked to BW Hole - BW Hole completely
dry, small hole (penny size) in
rock plate on dam, H₂O leaking
out like a strong piss stream.
H₂O running from under the mud
bank completely dry

H₂O from pool below BW Hole
to last fork - several large
pools, cold water, bigger than ever August
(levels)



rest of canyon practically dry
only pools from last fork to -
Canyon is 1 m^2 (ca. 20 cm deep - pool)
and 1 m^2 (20 cm deep) pool around
bend above would be rapids

Big Gravelly dry, would be rapids dry
without Tree Pool, dead things etc
all day

very few birds, lizards, flowers
etc very dry
windy, cool then cold by dusk

Saw turkeys by turnoff to
Black CC

Saw several deer and pheasants
on 338, several deer in BW Canyon

No Zone-tailed hawks

14 May 2008

PAS/KJR hiked to Mud Hole - dry
hiked over the saddle to Cloverdale
Canyon then on to Maverick Spring
over tiny pool (1 m^2) in Cloverdale Canyon

Maverick Spring trough was full and
there were several good pools above
Maverick Spring

Hiked to South Hole - no H2O
is that $\frac{1}{2}$ of Miller Canyon

Hiked back up Saurap's - all day

found 4 dead turtles
that brings it to 7 (all told) that trip
(Counting Trevor Horne's collection)

Zone-tailed Hawks are there

BDS, WES, & ECB reset nets in Horse Pasture
Tank. 6 white-tail were observed leaving the tank.
Reset nets in Cloverdale spring. Observed 25
mule deer on Battellion. Drove to Buckhorn tank.
Buckhorn tank is also considerably lower &
all aquatic vegetation is absent. Again, it seems
that there has been increased cattle grazing
in the area. We set 4 nets (2L:2S) in Buckhorn.

The large pools below Buckhorn were completely
dry. Hiked 600 m above Buckhorn, most of

the canyon was dry, except 3 small pools.
None of which had turtles. Checked out
Hunt tank/3-way dam area, all of which
was dry. ~~at~~ Fake Black CCC was dry.

Observed a Sonoran whipsnake, a gopher snake,
2 urosaurus ornatus, & 2 Cnemidophorus around the
Buckhorn/Hunt tank area. Found a
disarticulated turtle shell 50 m below the dam
@ Buckhorn tank.

Receipts for Travel Card

41.49	Gas	12 May
41.64	"	"
42.38	"	13 May
51.74	"	12 May
39.40	Breakfast	13 May
40.92	Lunch	12 May
49.45	Hotel	12 May
<hr/>		
308.02		

60.90	Gas	20 May
65.36	"	21 May
<hr/>		
434.28		
41.59		
475.87		

304.51
41.59
396.10

17 May: 08 - out of order

- depth @ middle of BW dam - 1.8m
- first bank of silt - 3.4m
@ middle of dam
- 55 cm deep
- 17m to second tier @ middle of dam
- 1.3m deep @ 2nd tier
- 42 1/2 m from 2nd tier of silt to back
of mosquito pool.

3 August 2008

Arrived at camp

PAS, BDS, RCH, Erica Becker,
Kelly Smith, Curtis Biernau

water levels high!

iked up BW Canyon
noodled and mapped the
from just below fine pool to
lost forle

iked to BW Hole - full (a. 4cm
below top of dam) pouring out
of hole in place

15 May 2003

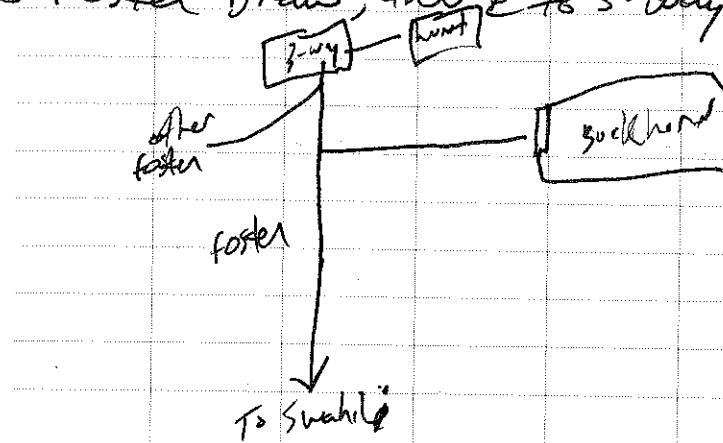
PAS/KJL set 1 med, 1 small
in Clinton Tank - seems nearly full

set 1 med, 1 small in StateLine Tank
~~seems~~ quite low but plenty of H2O
heard 1 plop of maybe small lizard
flog

checked out ~~generous~~
steep tank - seems full

Saw 2 roadrunners, several deer
4 turkeys running along GTR

all 5 of us went this far to Buckhorn
KJL/PAS hiked from Buckhorn down
to Foster Draw, then E to 3-way draw



no H2O anywhere but Buckhorn, but
lots of pools will be there eventually

caught ca. 40 turtles at Buckhorn

BOS/WLS/ECS hiked to horse pasture tank.
One net (medium) had collapsed, 4 turtles
were in the net and all 4 were o.k. Another
net had been pulled ashore & was
empty. Reset (1m:2s) at Horse Pasture Tank.
Checked & reset nets @ Cloverdale
spring = 0 turtles. Met up w/ PAS/KJL
@ camp and went to Buckhorn.

While measuring turtles, a cowboy
rode up. Talked to him awhile he
revealed that they will dig out the 3-way-
draw area sometime soon. He also
expressed his concern about BW Hale.

Reset nets @ Buckhorn (2s:1m:4s)

Saw 25 mule deer @ clover spring.

Set 3 nets (1 large, 2 small)
in GST near draw

if H2O levels are high

16 May 2008

730 am checked and spotted
pulled GST - ca. 15 sunfish
no turtles

cold, overcast, raining on Animas

wave line
checked and pulled State Line,
Cloverdale, Horse Pasture - 6 turtles
all from HPT

checked and reset Clanton Tank

Rain on Animas Mountains most of day
Rain in the Valley too
just a bit blew into Felawilles
a trace, wouldn't have filled anything

Caught a frog in State Line tank
probably had another little one
fall through the net

No fish in Clanton, ~~Cloverdale~~
small, deep, cold pool
just above silted in dam on GTR

hung out w/ Larry from NMDF
plan to hike to BW Hole w/ him
and Turkey fed. Volunteers tomorrow
he put us on to a path to Bow and
Big Tanks

Collected a mummified Oreosaurus
at State Line Tank WLS/PAS

up to 7 turtle shells this trip

BDS/KJL/ECB drove to Buckhorn. Caught
ca. 15 turtles, most recaps from previous days.
Pulled nets all nets. Explored canyon south
of Buckhorn in an attempt to find a small
tank. Found the tank but it was nothing
more than a plastic tub. However, it does
appear that you could continue down that
canyon and you could reach Blackmountain tank.
We also explored west on Foster Draw in an
effort to reach Swahili tank. ~~Swahili~~ We
found 2 really nice pools, and caught 2 turtles
in each. We had no luck in finding Swahili
tank from Foster Draw b/c BDS forgot
the map. It looked like Foster Draw
would hold several pools when water is present.

Saw a *S. clarkii* in Foster Draw.
H₂O temp in Buckhorn was 16°

17 May 2008

frost on ground this AM
Scott says his thermometer said 29°F
laid around camp until almost 11 AM
pulled nets from Clinton - no fish or turtles

Killed up to Blackwater Hole w/
Larry Kamees, Scott Lerich ^{Turkey fed.} _{Biology},
Jim Bates (Turkey fed. chap. President)
~~SS~~ David, Nancy, Carol (all volunteers ^{& Turkey})

leak has slowed down, spilled H₂O is
evaporating fast, mapped the silt
talked about the situation, Scott Lerich
asked if he could take over as leader
of silt removal project, I said you bet

stock some sticks in the hole to slow
down the H₂O, all agreed that next
summer would be time to remove silt
turtles will have to hang on

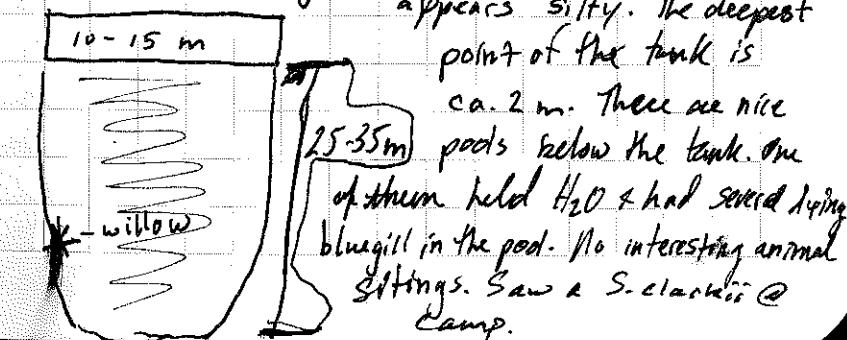
those silver tags on trees mark turkey roosts
in PM went to Douglas, saw Masticophis flagellum
on road to Douglas

hung out w/ Matt Goode, Roger, and his
crew a bit the last 2 nights, they
are working on 11 roads and fire over
by Bow Tie - we think we know the
way over there via all National Forest land
~~Someone must have killed Clinton here~~

18 May 2008

heard turkeys from camp this AM
(camped at big caysbes just inside the forest)

ADS/WLT/ECB hiked to Black Mountain Tank
via Cloverdale spring. A pretty tuff hike over
to Black Mountain Tank. Probably should hike
via Buckhorn in the future, especially if
planning on setting nets. Black Mountain
Tank was dry. It was a stone dam about
10-15 m ~~m~~ bisecting a canyon. The tank sediment
appears silty. The deepest



W

Starting at 9 AM
PAS/KJL hiked to Pine Canyon Tank
from GTR - hiked from GTR to
Whitnive to Salt Canyon - easy hike
w/ well-marked trail and actual
signs - salt Canyon to Dutchman was
easy but we lost the trail, at Dutchman
we went up a ridge, walked along
a ridge then another, but eventually
the ridge became crumbly and
heavily vegetated, so we went
down into a narrow canyon, hiked
up the narrow canyon, ^{winding}
around but going generally N, shooting
for a grove of trees we'd seen
from the mountain, we reached the
grove of trees - ball busting hike, it
was Skeleton Canyon, ate lunch,
walked west to Pine Canyon, picking
up a road after a while - Pine
Canyon was dry, caught 2 turtles
in pools below dam - many
pools will form above and below
dam and also in skeleton
canyon, hiked back starting at 4 PM
hiked up Pine Canyon - no sign of a
trail, eventually we broke up a side

Canyon - the Canyon from Hell - roughly
3 times longer than Sauris and Steger -
including a 15 ft. wall that required rock-
climbing skill, eventually we got on a ridge
and snaked around it, also heavily
vegetated, and eventually fell into Dutchman
Canyon, staggered home from there -
it got dark around Whitnive - last
hour of hike w/ Danie, hiked the
trail by GPS - reached the truck at
9:30 PM

19 May 2008 heard turkeys this AM

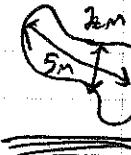
PAS, WLJ, ECB tried to find Bow Tank
hiked ~~WAN~~ to avoid whaling,
crossed Whitnive, up a ridge, hit a
fence - reluctant to cross fence
we walked W along it across an
entire ridge - it may have been a
lease dividing fence, and our foray W
may have taken us past the whaling
fence, but we abandoned hope.

In the PM we hiked SW Canyon to
GTR along the GTR - found 4 pools

2 small, 1 med, 1 large

↓
~ 1.5 m²
Cir. 1.0 m²

we associated
w/ temp. down
(just now red)
(first named)



|
old small
down

BDS/KSL drove to BioResearch Ranch near Rodeo, NM. We met up w/ Carroll D. Littlefield (C.D.). The ~~dry~~ ranch is way back in the canyons and is owned by Robert & Kathryn Schales. C.D. was our guide to Miner Creek. It started w/a very long hike @ a relatively steep incline. ~~After~~ You could see the world from the top of this mountain. We followed Lee Creek to Miner Creek. In miner creek we caught one turtle in Lee spring. We followed Miner Creek (unknown direction, check GPS) until we reached "Willow Pond". There was a string of several pools below Willow Pond ^{for} Ea. 300m. we caught 4 turtles. Willow Pond was dry but it looks like a carbon copy

of Javalina tank. C.D. mentioned he had seen several turtles basking on logs in Willow Pond during previous explorations down Miner Creek. After noodling all the pools in that stretch, we hiked to the Maverick Spring of Miner Creek. (Maverick Spring North). We caught 2 turtles in that small tank. Both Maverick & Lee spring ~~had~~ all natural rock pools that may have been aided in permanence by human construction but these were in no way stock tanks. Both Maverick & Lee spring held considerable H₂O (knee deep) in a small area.

There were several more pool complexes below Maverick spring North. We noodled these and caught several turtles. We hiked to Shorty Miller's burned down house that was near Miner Creek. All that stood was the chimney.

The ~~second~~ pool complexes below Willow Pond appear to be great habitat. There was still plenty of H₂O & numerous willow trees. C.D. identified them as Gooding's willows.

Miner creek has several dams along its stretch but every one is filled w/ silt. However, pools do develop at the base of the dams.

After several hours of exploring we hiked back and drove back to camp. We arrived in camp ca. 9 PM.

20-May-2008

① Packed up & left camp

②

3-August-2008

On the way to camp...

on (338) found one Diamond Back DOR.

3.9 mi later found another Diamond Back DOR, ~~---~~

Second atrox 3.8 mi from turnoff to Geronimo trail.

③ PAS pickled both specimens in camp

Arrive in Camp: PAS, BDS, Erica C. Becker
RR Hites, KA Smith, & CJ Behenna

(see 10 pages back for 1/2 page
& Aug 17 2008)

Noodled Mosquito Pool and 50 m above
noodled shallows of SW Hole
did not map yet

4-August-2008

Split into groups.

BDS & KA Smith went to SBNWR
but gate was locked.

Drove to Hunter's access road & hiked
through all types of thorns, shrubs, &
weeds to get to what we believe
is Astin Spring. Plenty of fish (small), frogs,
cattails & tadpoles.

Interlude

PAS, ECL, RML, CB

Hiked to BW Hole

Set 2 med, 1 small net

Noodled back down canyon
(we'd noodled Big Gravelly and Parker)
Noodled to Big Gravelly
then noodled Big Gravelly to Lost Fork
so, everything noodled to below Piney Pad

Saw 2 sanden snakes, 1 bull snake

Lots of tadpoles, aquatic insects
but very little else - no zone-tails

few lizards, few birds ~~with N~~
no turkeys or quail

Lots of H₂O

Later in day - BDS, CB, KAS, SB PAS
hiked to Swahili Table
BDS says it is 2X bigger than
last year

Set 2L, 2S shore

Saw Horned Lizard (Regal Horned Lizard)
2 deer, several jackrabbits

Lots of H₂O in canyon along
trail to Swahili

Kelly Smith made no ride in the
back of BDS truck

PAS fell on his face yesterday

Refined both nights, briefly
border last night - strong convective
for 15-60 min

Continue from SBNWR

found several springs along Black Draw

also found an access road that led to GTR. Hiked up access road to truck & drove back.

All the springs are aided by pumps recaling water into them

Found 4 springs; all really close to each other

Set 3 nets in 4 springs (32L:1M:2S)

Saw Bullfrogs, Ranids, tons of tadpoles, a water snake, tons of small fish, an atrox, a avalina, & 100's of Whiptails.

5-August-2006]

Spring 1 -

called this Astin Spring, but I don't think it is now: 2 small nets = ♂ turtles, 2 Bullfrogs

cattails, aquatic grass, algal, & scirpus all present.

Willows & cottonwoods surround pond

Two Springs

This is an area w/ 2 spring separated by a road. both have emergent aquatic vegetation. But the east spring has filamentous grass covering the ~~entire~~ surface of the spring

1M = ♂ turtles, 1BF

1L = ♂ turtles, 1 Bullfrog

again, willows & cottonwoods surround these springs

Deep Spring - I think this may be the real astin spring. large spring surrounded by scirpus, willows, & cottonwoods.

Saw 3 mallards (2 had black head w/grey body, 1 had reddish head) - could not ID

1L = ♂ turtles

heard Bullfrogs croaking

Noodled approx 250-300m of Black Draw = ♂

Completely Skunked @ SBNWR

Checked 4 nets @ Swahili tank

1L = 2 turtles

2L + 1S = 8 turtles

2S = 2 turtles

Reset all nets, set an additional 2 nets

1M + 1S ; 6 nets in total

- saw gopher snake @ entrance to SBNWR

- several dead tadpoles in tanks @ SBNWR

- Red-tail hawk @ along GTR

PAS, RCH, KAS hiked to BW Hole
caught 25 adults - reset nets

then hiked to Javalina Tank
it was fuller than I've seen it
mapped

Noodled Sawson's caught 16 (15 hatchlings)
lots of H2O in canyon, but more
up near the tank and less down
below Devil's Rock mapped H2O in areas

saw whip snake
tree lizard
S. virgatus
a few desert
montezuma; Garter

almost heard
cooper's hawk
by Pine pool

bath out hills (2 camps) - alive and kicking
mapped a few out hills near new camps

no rain last night - amazingly
no turkeys or quail for H2O

16-August-2008

BDS went to Diamond A to find
out whether we were allowed
access to Miner Creek or not. We
were not allowed access.

~~4. T. ornata~~ 4. *T. ornata* on 338

Met up w/ the rest of the crew and
took ECB, KAS, & RCH & to deck
nets @ Swahili tank.

6 nets = 8 turtles.

~~Reset~~ Reset nets & added
another large net.

7 nets (3S, 3L, 1M)

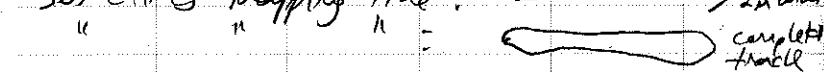
Noodled approx 800-900 m below
Swahili tank, 8 turtles (3H, 2S, 3adults)
Saw a *S. virgatus* @ the dam
Saw an regal horned lizard & black-necked
garter snake

PAS, RAK, ECB, CJB, KAS Noodled
from below pine pool to Clayton Draw
then down Clayton Draw past the
fence line, and up Clayton Draw
to the first switch
caught 3, including 2 that were missed
by the first person

I would say the noodling hasn't been
near 100% efficient, there are
problems

Mapped the area from SW Canyon/Clayton
to past the fence where we stopped
noodling - nearly continuous H₂O

also mapped H₂O from Dam to beyond Big Gravelly
sometimes mapping like:



nearly continuous H₂O

PAS/CJB hiked to BW Hole - checked nets
ca. 12 w/ 5 throwbacks - reset but
I forgot bait, so we used old sausages
w/ 2 and sunny sausage in the small
set TL and 25 net 5

Hiked to Javalina Tank - set 2 med nets
baited w/ sausage and beef jerky
hiked back noodled Mosquito Pool to
Hello Hill - caught 1
mapped Mosquito Pool and BW Hole
mapped a bunch of cut hills
mapped an Alligator (rand)
- heard Zone-tail hawk / saw it too
at usual spot
- saw a night hawk fly both days
we came to Javalina tank - it may
be nesting on the slope N of tank

7 August 2008

PAS/ECB hiked to BW Hole
caught 8 w/ 4 throwbacks
pulled nets

H₂O is now ca. 25 cm down at BW Hole
H₂O is also down in canyon on S side

Hiked up to mud hole - checked nets
caught 6 - released most w/ sausages

Hiked back out
wooded Turtle Canyon for ca. 300 m
until rain turned us back
There were nearly continuous pools
but none of them were very deep
mapped our noddling trail

Mapped bed here and a bunch of
ant hills

Back in camp Scott Leriche joined
us for the night - talked into
the night - he brought H2O, ice, ~~beer~~,
~~beer~~

232.2 and
Brian and ECB - noddled up 2 turtles
and set them in orange buckets
w/ ca. 10 cm of H2O and
5 or ~~4~~ Hyloscirtus color tadpoles
just around ankle - in bed by truck
ca. 9 PM
but then it rained/sprinkled
most of the night

next morning ca. 7 AM / 4 or 3
1 tadpole in each bucket / eaten
by each turtle

BDS, CJSB, KAS, PRH checked
nets @ Swahili. 7 nets = 0
pulled nets. Nodded nearly
1.2 km of Foster Draw. Caught
5 turtles (2 M; 3 adults)

-Saw a S. virgatus

8 August 2008

Rained hard
last night

BW Hole 25 cm below Draw

	Depth
B15 Gravelly	67 cm
Deep Pool	96 cm
Midbat Tree Pool	48 cm
Would Be 10/12	88 cm
Snag Pool	—
Pine Pool	38 cm

rainy couldnt fall
down slopes off

entire crew hiked to Javelina
pulled nets - caught six

then hiked over the saddle into
Clover Dale Canyon - but Savory's ad
Miller was plenty of H2O so we
didn't nodle

hiked to Maverick Spring
Wooded extensive pools above
and below Maverick
caught 23

hiked back, most of party taking
some version of saddle!
~~PAS~~ PAS and KAS ended up in
Sawmill, woodled 5 more
hatchlings, 3 unmarked

measured H₂O depths (see above)
on the way back, PAS/BDS
got caught in pouring rain
around would-be rapids
fallied around old camp
and never really hit the
other people who were waiting
at truck on top of hill

the in the wee hours, a bit
more rain at camp

both zone-tailed hawks
there in A.M.
usual spot

9 August 2008

Partly broke camp in early morning

drove to Buckhorn
set two large nets from 9-11
caught nothing

woodled from dam to fence
netted too

caught a
bunch

Buckhorn was huge - netted

Broke camp the rest of the way

drove out - running on fumes
2 creeks ran out
flowing across on Diamond A trail

138

17 May 2009

arrived in Deming, NM

Saw ≈ 20 pronghorn on drive
from ORC.

[18-May-2009]

(tail cutoff)

- DOR Western Diamondback on 338

@ entrance to Diamond A property

Arrived in camp around noon. (BDS, MES, Leah, Bates)

Drove to Buckhorn Tank. ~~straight away~~ Mapped Buckhorn
~~abandoned~~ + ~~empty~~, ~~buckhorn~~ ^{but still has water}

Water levels are extremely low. Approx 3m from top of dam to water's surface. Still

@ least 1.6 m from water surface to the bottom.
~~3 m~~ ^(at deepest point) + 1.6m = 4.6m = Buckhorn @ deepest point.

~~above~~ above Buckhorn proper has been dredged. It does not appear to be dredged along the shores of the tank. No H₂O above buckhorn. Noodled for 1 hr & caught 13 turtles, all recaps. Set 4 (2m:2s) nets. Fish still present.

Met Joseph Harris, Glenn Klingler, & Rueben

@ Buckhorn. They were scouting a project planned to plant cottonwoods near the area. Talked for a bit.

All silt removed from Buckhorn was placed downstream. BAD! →

Flight response (almost) - will conduct flight response experiments tomorrow.
- a few turtles started to make their way out of H₂O forest service guys pulled up in truck & said

recent

A burn (non-prescribed) ~~to happen~~ has taken place from the 1st gate to take Black CCC. An electric fence now borders the edge of much of the fire's path. There is now a makeshift electric gate along the drive to Buckhorn. (separate burns)

Forest Service (Ruben) said they had just got done burning near Horse Pasture Tank.

Drove to GST. H₂O levels low but not terribly low. Mapped GST. Set no nets. Saw a few fish, and two mallards flew overhead.

Saw one Cheri @ Buckhorn.

Became overcast around 3:45. almost looked like rain. HALA.

Silt has been placed North of the dam and some of the silt pile is in the canyon.

Heard turkeys most of the day.

19-May-2009

arrived @ Swahili ~ 0930

Swahili tank is dry

arrived @ Buckhorn ~ 1130h

checked nets, measured turtles, ate
lunch, then released turtles @ 1415h.

≈ 30 (but check data)

Flight Response Experiment: 1415-1445h

(1) Turtle left water at 1425h, walked
on shore ca. 5 min, then back into
water before able to check #.

(2) Turtle left water @ 1435h, smooth
shore then into vegetation, then near
boulders. # 2052 ~~released~~ released
released back into Buckhorn, released
musk upon handling. (LMB)

Reset nets (21:2s)

Sampled for invertebrates (6 core samples)

Met w/ Meira Gualt & her son Adam.

The fire that extends along the drive to Buckhorn
was an accident by her husband Stephen.

The electric fence was set up to keep the
cattle off the burned grass. They de-electrified

the fence today. She also was wanting to

make sure they had not harmed the turtle population.

Walked from Buckhorn to Foster Draw, No posts!

IT STARTED TO RAIN!!

It rained off and on during ~~the~~ the
rest of the day and night.

Rain was not hard, just a spitting.
Probably will fill some small rock
pools.)

Checked out the hunt tank & 3-way
dam area. Everything is dry. It looks
like they may have done some dredging
around 3-way dam.

Saw red-spotted toad at 3-Way
dam. Heard turkeys all around.
Saw red-tailed hawk at Swahili
tank.

20 May 2009

Checked & pulled nets at Buckhorn. Remapped tank w/ GPS. Saw Red-tailed hawk when we drove up. Saw a ^{Gooid's} turkey and White-tailed deer. Intercepted rabbit copulation ("sexy time") several times. Rained off and on most of morning.

Hiked Foster Draw from road after Buckhorn Tank. Hiked down draw to Hunt Tank, which was dry. Hiked back up Foster Draw, across road, to Overhang Pool. Canyon was dry except for occasional puddles.

Saw 2 white-tailed deer.

Buckhorn Mtn. area

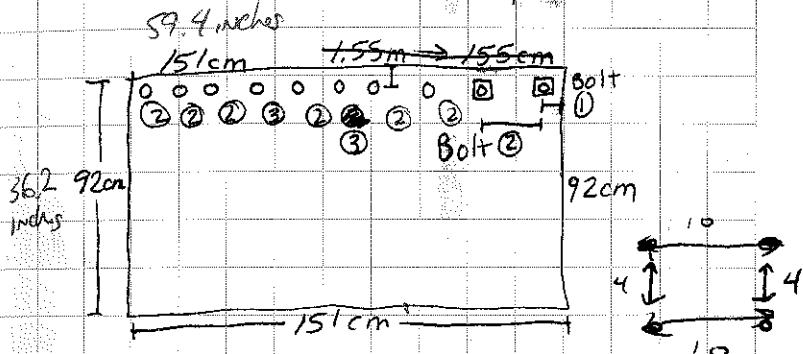
Drove to Cloverdale Spring. Water was high. Cattle were around tank. Hiked to Horse Pasture Tank; water was low. Water was mapped w/ GPS. Water had large amount

of algae. Saw several turtle heads. Lots of cattle around tank and approached us as we packed up to leave.

PAS, EEB in canyon car 11 PM

21 May 2009

Measurements of plate at BWTH:



Nut - square; 41.6 mm (1.61")

Bolt ①: 4 cm 28 bolts

Bolt ②: 16 cm

Bolt ③: 15.9 cm

Looks like 2 pieces of metal.
Head of bolt is on inside (up) dam,
nut is on outside (down) dam

rod is ca. .8 m above the hole in plate

21 May 2009

Rained hard last night ca. 1 inch
filled up pools in SW Canyon.

Pine pool noodled half-heavily
Mossy Pool to Hellhole - noodled
Noodled and tramped area below and
above S. Gravelly - caught 4
noodled would be Rapids - caught 5

Hiked to Tavelva Falls - dry
SW Hole also dry -

no zonotailed ~~hopper~~

noodled much of day - overcast all day

State Line tank has water -
seen from top of - near 10

Leah, Brian, Eric hiked
to top of world

22 May 2009

Saw 5 deer here (and
heard turkeys from camp)

Drove to Miller Canyon AZ

Saw coati mundi on GTR near
Mormon Mountain

saw 3 deer on drive

saw ² zone tails ⁽⁵⁾ in Miller AZ

Hiked to Prospect tank - it has been
cleared out - they piled dirt up on
either end, creating 2 tanks
(one upstream from each side p16)

Both dry - Brian mapped area
The 47 footers at entrance to
canyon all held ca. 4 inches of H₂O

Drove back to camp and MES, BDS, Bats
left - ECB and PGS left in camp

we went to Clanton tank - set 2 nood nets
Clanton pretty full

Then noodled from camp to base of
would-be rapids - caught 1, mapped
area - many pools from gravel all fit w/
small

Saw 2-3 zonotails at usual spot
in SW ~~Wet~~ Canyon - only 2 were yellow
at us (maybe three)

~ Then 5-6 other adult from trees
and a big group start circling
above us, noisy flurries until
they were pretty high then coming
like vultures over a carcass

could have been Zone-tails mixed
w/ vultures, can't say

Later when we walked back
we only saw 2 zone-tails

almost forgot - before the first path
off we collected core/wet
samples from GST

23 May 2009

Things we need to do Sunday/Monday

1. Noodle WSL to BG gravelly w/
noodle BG gravelly to BW Hole GPS tracks
2. Pic from Canyon by camp
3. pool depths
4. repair hole w/ plate
5. pull nets at Clanton / core samples ✓

ECB caught 5 out of 7 turtles

23 May 2009

SUNNY Day

Hiked to Clanton - checked nets
no fish or turtles

Hiked to BW Hole, then Mud Hole, then
Maverick Springs - noodled all around
Maverick, water low but there
caught 2, one in trough
plenty of pools in Maverick Canyon - no time to noodle
Zone-tailed hawk at Maverick Spring
2 at Pine pool

got turned around leaving Maverick,
ended up in Lion Creek

caught 3 turtles in 3 small pools
either in Lion Creek or Clarendale
(we were lost) Another

Heard turkeys in Camp and by Clanton

Finally found our way to Saunders
Canyon - plenty of small/med pools
mapped and noodled - caught 2

saw 6 whiptails and a few other lizards
saw several Gaudia Ovalis by parking area
saw pair of Montezuma Ovalis (one had to BW)

24 May 2009

sunny day

Hiked to Clanton - pulled empty nets
collected 6 core samples and
1 net sample

In AM

Saw 4 Deer and 1 Gambel's Quail
on GTR 5th Camp and Clanton
heard turkeys from camp

Saw black-tail rattlesnake back up
in front of a rock 1 m from
edge of water at Clanton

welded WBR (top) to Big Gravelly
mapped it too

welded Big Gravelly to BW Hole
mapped it too

half assed the pool at base of
wall, slipped pool 20 m below
that - very nearly

Pool Depths

24 May 2009

Pine Pool	25 cm ca. 7m ²
Swag Pool	53 cm ca. 10m ²
would be rapids	72 cm mapped
Swag Po	
Welded Tree Pool	36 cm ca. 8 m ²
Deaf Pool	39 cm ca. 2 m ²
Big Gravelly	40 cm ca. 10 m ²

Tried to patch the Dam plate w/ JB Ad
had to dig out the other side of dam
to get H2O away from hole in plate
fairly easy digging - there is no mud
in the part of wall where plate
is / just a gap that was half
filled by water and by mud
after clearing H2O out, we welded
a saddle over it to the plate

In PM - saw a squirrel and 3 Gambel's
Quails on GTR

saw 2 S. Janner Copepods on tree
at camp

24 May 2009

Fails of woe:

Erica left net in truck
and had to hike Clanton Hill twice

Erica's bucket handle broke

Erica lost her watch

Paul locked keys in truck
Seth managed to break in
seconds before he was throwing
a rock through the window

Hiked Clanton Draw from
camp to fence at National forest boundary
all day

ECB collected a large black
beetle from on an ant mound
walking around by active ants

25 May 2009

Licked⁺ BW hole - charred patch in place
and filled in hole above dam

ECB collected bugs from Big Gravelly

many small pools have already
evaporated - many medium pools
are now ~~large~~ //

10 August 2009

Snag pool Tadpole cleanup
great mixture of small toad
and big ones, many w/ both front
and hind limbs - none are black
but the size offs are large
all Hyla?

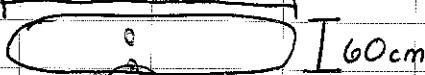
Sampled 45 minutes
1 sampler swept 10 trees w/ a tab.
Others were setting out here and there

$$161 + 20 + 20 + 2 = 203 \text{ tadpoles}$$

10 Aug 2009 cont.

cm: 25, 27, 18, 8, 18, 21, 17, 11, 7, 5

3.28



* Pool for
Tadpole experiment

water temp: 20.1 °C

search time: 45 min.

5 people sweeping w/dip nets

set up 2 tanks w/ 99 mud turtles
in back of my truck

near tank, set up a 3rd tank
as a control, each w/ 10 tadpoles

- used turtles 394, 118

- Started trials 1917h

- rained in canyon most of day, cool
and cloudy back at camp

PAS, MESS, BDS, KJL, ECB, Leah Bates,
Josiah Gillepsie, Brad Relyea, Summer Meier,
Chris Butter are on trip

3 trucks

BDS went to Bio Research ranch to
pick up KJL

rest of us hiked up to BW Hole
major pools have H₂O, BW Hole is dry

wooded Pine pool, Snag pool

wooded all around BW Hole, but not
any distance above or below

stopped at Mosquit pool, and pool 25 m below
BW Hole

caught about 12 - held 2 for tadpole
and to rays

Sunflowers growing in BW Hole

Zone-tailed hawks are there

saw a *S. armatus* jump into H₂O as
an escape behavior 2X in pools at
base of BW Hole

Few lizards in canyon

BDS: Picked up Ken @ Bio Res Ranch
Saw a Texas Horned Lizard and
a *S. virgatus* along the road up to
Ranch.

Exchanged pleasantnes w/ Schales & C.O.

Drove to Buckhorn & set 3 nets (1L:1M:1S) ~~the~~ Buckhorn has more H₂O than in May. Noodled 3 turtles from pools below Buckhorn.

Lots of vegetation around the perimeter.

Hiked to Swahili Tank. Tank is completely dry. Hiked from tank to Foster Draw, entire ~~the~~ area behind Swahili is dry. No H₂O in sight.

11 Aug 2009

MCBS

Tadpole Experiment Results 0645h

Control - 10 tadpoles

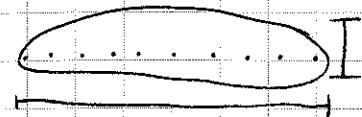
394 - 10 tadpoles

118 - 8 tadpoles

394, 118 held for x-ray; tadpoles released back into Snag Pool.

Would-Be Rapids: Sampling

Pool 1 - sampled 45 min tads, 30 min inverts & samplers: MEBS, LMBA, ECB, SPM



Trans sect line, multiple depths

2

5

9

6

4

1

5

6

4

1

5

4

4

4

4

4

4

4

4

4

4

4

4

4

4

4

19.5 ° shade

22.5 sun

n = 101

Length

28.5

width

40, 30, 55

* saw 3 beetles eating a tadpole

* saw hatchling *K. sonoriense* bite tail off tadpole

11 August 2009
pool 1/2

Sampled 60 min
3 samplers, MEBS,
ECB, CMBA
trans ect line, multiple depth meas:
15, 25, 30, 38, 37, 37, 30, 21, 17, 11



$$\text{Length} = 532$$

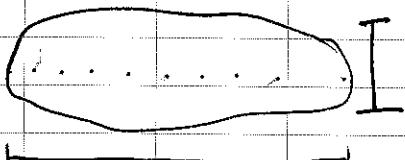
$$\text{Width} = 210$$

$$25^\circ$$

$$\begin{aligned}n &= 15 + 10 + 10 + 12 + 9 + 12 \\&+ 9 + 7 + 9 + 10 + 7 \\&+ 7 + 7 \\&= 124\end{aligned}$$

Pool 3 - sampled 45min MEBS, ECB, CMBA

depths: 2, 8, 11, 11, 12, 12, 3, 3, 2, 1



$$\text{Length} = 270$$

$$29.5^\circ\text{C}$$

$$\text{Width} = 120$$

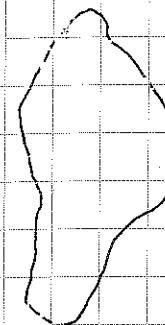
$$\text{length} = 270$$

$$n = 97 \text{ tadpoles}$$

11 August 2009

pool 4

Sampled 45 minutes
4 samplers MEBS, ECB, CMBA
trans ect line
depths:
2, 5, 6, 10, 5, 11, 14, 7, 4, 12



$$\text{length} = 330$$

$$\text{Width} = 120$$

$$n = 196$$

$$28.0^\circ\text{C}$$

Tadpole Experiments

$$19:51$$

Tank 1 - 10 Hyla

Tank 2 - 10 Hyla

Tank 3 - 10 Bufo

Tank 4 - 10 Bufo

Tank 5 - 10 Bufo

Tank 6 - 4 Bufo - 6 Hyla
(Control)

PAS, KJL, Chris Butler, Tashiah & Brad all went to Buckhorn Tank. 3 nets = ~20 turtles. KJL mapped from Buckhorn dam to Hunt Tank. Small pools existed along the draw. He captured 2 ^{large} ~~big~~ ^{large} woodlizards ~~from~~ above Buckhorn.

Brought PAS ♀ to Justin Congdon & Dick Van Loven sets. X-Rayed 9 ♂ notes & data from x-ray is on field sheets.

CB found a juvenile travelling away from Buckhorn Tank in the dry streambed.

(5) Captured several in the pools @ 3-way dam. Saw a blue-yellow Urosaurus next to gate near Buckhorn.

Found 1 dead juvenile on the bank @ Buckhorn (entire shell) #2206

The stars were great!

PAS & crew (^{summer} PAS, MES, LON, ECS, BR, JG)
all hiked up to would be Rapid's woodlizard WBN to switchback above Deep Pool

I drove back to find Justin/Dick w/o ♀ for X-Ray

Saw them ~ ♀ we had held from yesterday at BW Hole

(9) PAS also brought a bunch for X-ray

Dropped KJL off at BW Canyon house and summer hiked to Mud Hole which is above Dry

MES and ECS, Leah Summer saw Dry canyon tadpoles and snails in WBN

PAS, Brad, Tashiah set 2L, 2S nets in GST, checked 2X after ca. 2-3 hr sit - nothing but sandfish

we then woodled our way down 3 ~~steps~~ new trail in Cedar Draw to the switchback beyond BW Canyon caught 4 turtles ~~1~~ saw many Sander Waller in pool far enough of H₂O in pool

Eventually, PAS brought one ♀
and BDS brought two ♀♀ back
for x-ray - ca 14 in total

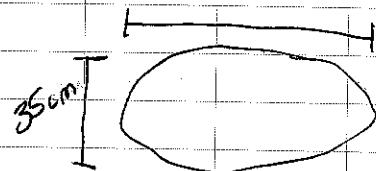
tadpole cap sets up w/ hatchlings

11 August 2009

(11 August 09 results)

Tank 1	10	tadpoles
Tank 2	16	tadpoles
Tank 3	10	tadpoles
Tank 4	6	tadpoles
Tank 5	6	tadpoles
Tank 6	10	tadpoles

Sampled Big Gravelly for inverts
and tadpoles
- SDM & ECB sampled 20 min.

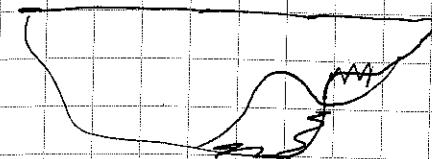


length = 80
width = 2 m
depth = 35 cm
depths: 4, 14, 17, 14,
5, 11, 3, 2, 3, 2

~~tadpoles~~
tadpoles were Hyla sp. n = 8 + 6 + 6
 $\frac{8+6+6}{2} = 36$

Sampled Pool 2

- LMBA, ECB, SDM sampled 20 min



length = 270 cm
width = 90 cm
temp = 20°C

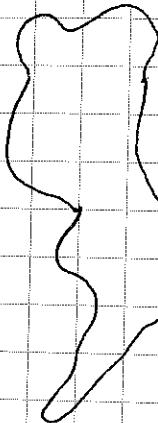
depths: 12, 15, 20, 19, 18, 21, 25, 29, 25, 10

n = 8

Sampled Pine pool

- LMBA, ECB, SDM, MEBS

Sampled 20 min

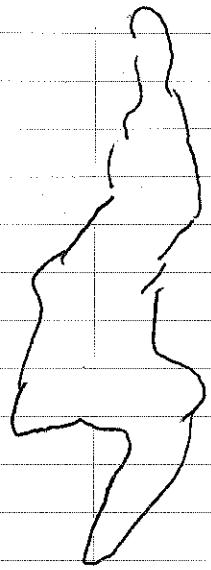


length = 315
width = 56
temp = 26.5

depths: 1, 12, 15, 14,
17, 12, 7, 4, 2, 8

n = 8

Sampled medium pine pool 2
LMBA, S DM, E CB, NE BS,
sampled 15 minutes



depths: 3, 2, 3, 12,
10, 12, 12, 13, 11,
12

temp = 29

width = 65

length = 466
n = 2

Pine pool small one

width = 25

length = 140

temp = 28.5

depths = 3, 3, 4, 10,
12, 9, 9, 12, 14, 9

Scooped
10 times
and found
no tadpoles
by LMBA



12 August 2009

caught 1 green sunfish

PAS KJL JMG went to Buckhorn/Hunt
pulled nets - caught ca 12
brought 6 obapple for X-ray
- saw adult Phrynosoma douglasii
BDS, BDIL, Chris Bitter
pulled nets from GST
caught 4 + 4 sunfish (red ear?)

PAS helped Justin/Dick w/ X-rays
while KJL dropped Josiah off
at Pine pool - he tried to
meet the girls at Big Gravelly,
but got lost for 2-3 hours -
eventually found his way out

PAS/KJL returned to the
Buckhorn/Hunt

there were pretty much done
except hilly from GRN to GNB we can
BW Canyon has been mapped and
roadbed

Scared up Montezuma Quail, ran and
broken wing display for ca 50m from
where they started

lots of black-necked garter snakes
and tadpoles, mostly Hyla

Saw several adult Hyla around
BW Hole in Pine (10 August) the after-
noon

lots of deer
coyotes every night
no turkeys

~~BDS~~ BDS, BDR, +CJB hiked up to
Jewell's tank. Caught 6 hatchlings
in ~~for~~ the pools of Sawon's Canyon. There
were approx. 10-15 small pools in Sawon's.

Top $\frac{1}{2}$ of the canyon held the hatchlings.
Bottom $\frac{1}{2}$ of the canyon had pools but no hatchlings.

BDS found an arrowhead/spearhead in
~~recent~~ ~~ancient~~ Sawon's.

Caught 3 H @ pools above BWH.

CJB noted that there was not much
bird action going on.

Saw several ~~o~~ Cnemis along the
trail

Saw 2 S. clarkii (BW H, Sawons)
Was very hot during our hikes
but cooled off considerably in
the afternoon

Saw a Thamnophis @ Pine Pool

NEBS, LMBA, ECB, SAM hiked to
BW hole and walked canyon. Very
few puddles in canyon. Big
Gravelly was $< 1\text{ m}^2$. ~~Sampled~~
several pools in canyon.

Saw 4 black-necked garter snakes
~~stuck~~ in Pine Pool. One snake
appeared dead, and we placed
it in a baggy. 15 min later
it was coiled in the baggy
and was released.

Saw zone-tailed hawks

Lots of tadpoles in pools, mostly
Hyla sp.

13 August 2009

13
13
13
13
13/10

All except Butler hiked to Tavares
in a light rain that persisted
most of early morning

PAS, BDS, Surver, Brad hiked
to Maverick Spring

wooded Cloverdale caught
8 wooded Maverick area
caught 5 (so far)

below Maverick is a series of
160 ~~more~~ small pools, all filled
from rainfall, all in bedrock

Cloverdale had several pools
including the normal Harvey hole,
which was ca. 30 cm deep

heard zone-tailed hawk by Maverick
haven't seen tadpoles, suggesting
these pools are mostly brand new
water in Maverick spring is 1.5-2 ft below
top, pools ~~at~~ above Maverick are mostly
dry

Noodled from Maverick to Petercock
by Cloverdale/Miller caught a bunch
all but 3 pools were small (3 med)

met the other crew right at
the Petercock area - they noodled all the
way from Beloncillo Tank

we all then hiked up Cloverdale
then up Surver's, etc.

caught 6 more in Surver's
2 recaps

Cloudy all day, rained in AM and
a bit at the end

we didn't see much wildlife today
or on the trip - few lizards,
few rabbits, no turkeys, several deer

only found tadpoles in one pool,
which was obviously not a freshly
filled rain pool

so we've noodled the entire Miller Canyon complex
Beloncillo to Maverick (200 m below or so)
Surver's to Miller

13 August 2009 (conts)

MEBS, KJL, LMBA, ECB, and JMG hiked with the rest of the group to Javalina Tank then ~~the~~ MEBS group hiked to Peloncillo Tank.

ECB almost stepped on a Black Tail Rattlesnake on the way to the tank.

We drove up ridge after lunch at Peloncillo Tank around 11:30h, then we hiked to the ridge past Peloncillo. The view was great!

Then we hiked down Miller Canyon and caught ~~about~~ ~20 turtles, mostly juveniles and hatchlings. We saw another young (1A) black tail next to a pool that had a juvenile. Erica almost touched the snake when ~~going~~ reaching for the turtle.

~~Peloncillo~~ Peloncillo Tail - Day

Later we met the other group in Cloverdale.

14 August 2009

PAS, BOS, ECB, KJL, Butten went on the Death March to Pine Canyon 3094 D. A terrestrial flight response from MGD Pool near Pine tail occurred w/s 1 min of release

really too tired to remember much
(except saw 2 so-far that way open)

MEBS, LMBA, ~~ECB~~, JMG, SDM, and BDR hiked to BW Hole and back for water depths.

Silt below BW dam: 201 cm
Pools at base: 21 cm, 19 cm
Big Gravelly: 17 cm
Mutant Tree Pool: 14 cm
Deep Pool: 14 cm
WBR: 39 cm
Snag pool: 31 cm
Pine pool: 16 cm

When obtaining water depths, we found several hatchlings in the pools in the open.

Most of the hatchlings were new captures, which is worth noting because the same pools had been noodled previously in the week.

Special note: When we approached Big Gravelly, we saw two hatchlings ^{K. longirostris} interacting. One hatchling was on top of the other hatchling's carapace. The top turtle (T1) was holding the bottom turtle (T2) underwater while biting at T2's head.

The interaction lasted approx. 2 min, which was video recorded by Jim Gillespie. The pool was shallow ca. 3.5 cm deep, 65 cm diameter, 25.5°C water temp, in full sun. After the turtles separated, T1 moved to all areas of the pool and

attempted to bite inverts ^{beetles} in the pool.

17 May 2010

arrived at camp ca. NOON

PAS, SDS, KJL, & SHINE, (C Belcher, D Baxter, S Pano, N Wood), Craig Koenig

hiked up BW Canyon

there is H₂O but not much - a wet May noodled pine pool to ^{switchback} above deep pool caught a few set 2 nets - med/fwd

Pine Pool - 2 med pools

at Pine & Snag - ca. 2 med pools

Snag - med

would-be} - ca. 8 med pools

at would-be - ~~lost~~ for CX - ca 2 med pools
pool below MT, MT, Deep - all med

BW Hole is holding H₂O

Mosquito pool is full

pools below BW Hole - ca. 3 med

noodled caught a couple
and 2 shells of JOKS

not much activity otherwise
a few (izard, heard 20+ tally ho's
far away (pro) didn't have tree)
lots of flowers
but we walked up in heat of day
camp and Carla's notes are fine

18 May 2010

walked from camp to Five Pool
then from Deep pool to Big Gravelly
then above BW hole - to Hello Hill
A little H₂O everywhere
major pools filled, rest dry

met Joe Harry and Reuben
at SW hole, me and BDS discussed
w/ them the repair of the dam
and removal of silt

conclusions -

i. Plate needs replacing - Joe Harry
agreed to do it - perhaps by
moving the plate for as long as
one year - I may have some say here

2. Bobcat from GTR to BWTF
appears feasible - Joe Harry agreed
to make the trail happen - he
thinks a few manzanita may need
removal, but USFS hates manzanita
anyway - plan is to build a trail
then destroy it - they think Five Pool
and one other area (I couldn't tell
where) will be problem

3. Moving frog silt is on me.
They ~~needed~~ 5 days / 10 hrs per day
to clear the silt and all agreed
to remove old and new silt
we hiked to Tavarina - as full
as I've seen it, or close
set 2 med nets
checked after ~ 2 hours - nothing
walked around - perhaps 10 pools
caught 2 turtles

saw a bullsnake \rightarrow both denuded
lesser earless lizard \rightarrow
zone-tailed hawk (lower today), saw one

checked nets in BW Hole - caught ca. 5

we've walked from camp to
base of Savon's Canyon

2 nets (1m, 1.5) in BW Hole
2 nets (2m) Javalina

Saw duck in Javalina Tank

Lordsburg Border Patrol Station
(575) 542 3221

19 May 2010

Hiked up to BW Hole - checked nets
ca 10 caught

Hiked to Javalina Tank caught ca. 5
found dead re capture - GPS / data sheet

PAS, SSP, ENS, CJK, BDS, ~~AB~~

Notation

↓
Peloncillo Tank
over north Damm

↓
Maverick
Springs

Peloncillo Tank full

Maverick Spring Drinker empty,
water in Maverick Spring pools

all scalped 200m below Maverick Spring
all of Miller and Cloverdale Canyons
except for the nice rock pools by

Peloncillo Tank

Farm mulled area turtle
by in Cloverdale by
GPS

Peloncillo Tank was ca. 25 m³
and 1 m deep (measured to my waistline)

Not much water in Miller
or Cloverdale ~~is~~ (above or below Y)
all GPS

Western
Saw ~~ANNA~~ rattlesnake juv. on
BW Canyon Trail just below Pine Pool

Zone-tailed hawks at Maverick Spring

rebaited nets in BW Hole / Javalina

still 2 m for Javalina
1 m 1.5 m in BW Hole

Saw duck @ Javalina

CJK + BDS set 4 nets @
Buckhorn (1L, 1M, 2S)

Tank is very full / GPS track

Saw two mule deer + 4 turkeys
(3 hens + 1 male)

Saw 2 deer on Mount Doom

Saw DOR (Rattle Valley) (western Danforth)
on 338 just before pavement
Looked dead shot, rattle cut off

20 May 2010

heard turkey in camp

saw scrub jay in camp

saw 2 deer by corral

saw owl in BW Hole

heard zone-tailed hawk in Pine Rd area

Moved up to BW Hole w/ Justin Capron
he thinks he can get a bobcat
up to BW Hole

he thinks the old silt is unstable
because of the magnitude

the new silt he says is stable
agrees the plate stove be replaced
wants to bring a tractor and load up
pulled nets from BW Hole and Javalina
3 nights in BW Hole
2 nights in Javalina

BDS, SSP, NSW, EMS headed
to Buckhorn tank

saw 1 turkey + 2 mule deer
along the way

checked and reset 4 nets,
~ 22 turtles ; ~ 30 fish (green sunfish)

- removed
notable pools below Buckhorn
noodled around 3-way dam

set 3 nets in swale tank
(2S, 1M)

noodled pools below swale

21 May 2010

whole crew went to Buckhorn
checked and reset nets caught ca. 12

BDS, GJK, NJW, SSP

Wooded from Buckhorn stop pt.
yesterday to 3-way Dam
Caught a gopher snake

PAS/BDS set a Gordon trap net
in 3-way Dam - set for ca 2 hours
caught nothing

PAS, EMS measured at Buckhorn then
checked net in 3-way then hiked
to Hunt Trail - walked over marshy
puddle at base of Hunt - nothing
Hunt Dry

3-wayunch and watched.
several turtles bobbing their
heads - PAS leapt on one
at least one other adult and one juv
3-way is huge - GPS track

Lake Black CCR is dry

~~bottom mudline 3 ft~~

Drove over to Swahili and hiked up
caught 2, including one ♀ w/ 157 MCL
Swahili is tiny - GPS track

PAS woodded for ca. 20 min around
dam at Swahili - nothing though
the organic matter is deep
Swahili is ca. 1 m deep

rest of crew is walking below
Swahili - they have caught 3 ~~so far~~
walked to Foster Draw

Saw 3 groups of deer in the
Buckhorn area
pod of at least 14 near 3-way
pod of 2 going to
pod of 7 Swahili.

saw several kill-dean
cows running around 3-way
4 turkey hens at Black CCR
from off areas

lizards more scarce than usual; but did see some *Crotaphytus*, *S. virgatus*, & *urosaurus*

22 May 2010

PAS, NJW left camp early and headed for home.
*masterful packing job!

BDS, EMS, CJK, SSP checked & pulled nets @ swahili tank. NO turtles!

Saw Javalina near the road that leads to swahili.

Saw 2 white tail near lakeblack ccc.

Checked & pulled nets @ buckhorn. Green sunfish in nets.

4 ducks @ Buckhorn

Saw 3 more Javalinas near switchback to Foster draw/ GPS.

Saw 3 ~~♂~~[♀] or ♂ turkeys/GPS
@ ~~switchback~~ switchback after Foster Draw.

⑧ Packed up & left camp

Checked cave on 338. tons of owl pellets & an unidentified bird's nest w/ eggs.

Met w/ KJL, CJB, David & Deming.

13 August 2010

saw/GPS 2 ~~Athena~~
on 338

arrived at 8 AM to camp BDS/KJL already there

biked up BW Canyon water everywhere - continuous in many places, trickling fiber in some places - no way we'll wade everything

nets already set by BDS/KJL
all gan-latch style

- 1 in Deep pool - no turtles
- 1 in pool below BW Hole - 2 turtles
- 1 in mosquito pool - no turtles
- \$ in BW Hole - ca. 5 turtles

collected blood from all adults

collected shit for parasite analysis

reset nets in BW Hole

pulled other nets and reset in Mud Hole

BW Hole is full - trickling over dam
Mud Hole is not full but is holding
plenty of H₂O

rodded 50 m below last fork
to Hello Hill (much of that way
done yesterday by BDS/KJL)
caught a bunch

bugs are awful - lots of biting flies,
mosquitoes, gnats

14 August 2011

at least 2 Zonotrichia hawks at coral spot
ants at camp and Carlos camp

checked and reset nets in BW Hole
caught 3

checked and reset nets in Javalina Tank
caught 2

Noodled Saurian caught several
hatchlings

1/2 assed mapped CANYON
water level high but not
as high as they were recently

rodded 50 m above pt. 50
to ca. 50 m below Big Gravelly
(waypoint for latter)
caught several

bath in camp ca. 7 PM - violent rainstorm
by very high winds - blew things around
very hard rain for ca. 20 min. Notes
that another burst in the night - some duration
less wind

15 August 2010

lots of just transformed Bufo

lots of Hyla tadpoles

Bufo tadpoles are rare

haven't seen a garter snake

very few hatching mud turtles

checked/pulled BW Hole nets

" Java lime tank nets

hiked over mount Doom's E end
into Miller ~~at~~ 54 Y and South Hill

roadbed from there to Y

ca. 300 m (ca. 100 m above

the one turtle we captured)

needle style = Sniffing

hiked to Maverick Spring

dry river bed nearly continuous
water in the canyon, as in
Miller

needled a 50' stretch
waypoint at each end

1/2 real needling, 1/2 sniffing
several turtles, no hatchlings

got caught in rain on way back
in Cloverdale, which was off needle
caught a turtle in Cloverdale by
accident

zonetailed hawk at Maverick Spring
at least 3 zonetailed hawks
at Pine Pool area

rainy, cloudy, windy in afternoon,
PM, and next morning

16 August 2010

PM

Buckhorn - #0130 m below River
set 13 nets 9 on/odd 2 L 2 S
all along Buckhorn

→ tool stops
waypoint

needled for ca. 300 m down below Buckhorn
caught a bunch of adults, few hatchlings

Buckhorn is huge - canyon pools are
extreme - contours
tool picture for 75 m (waypoint)

saw roadrunners and raven
→ several Sps pools
after that

Noodled from the big pool above WSR (around the corner) to base of WSR - took waypoints at each end - caught a bunch

would be rapid and nearly continuous

Saw Sander Snakes in snag pool
took several pictures of pools w/ WSR

tadpoles in every pool - all Hyda in all stages of development

Saw several near transformed Bufo
one ca. 50m from lake.

17 August 2010

checked nets at Buckhorn
collected blood/shot - brought 12 ♀♀
back to camp for Justin to x-ray
caught few turtles in Buckhorn
ca. 20, caught 1 sunfish (Hg)
8 left nets beside shore

attacked by bears at the turn off
back in camp / go camp - PAS ear

1 KJL eyes swollen shut
2 blackbirds having sex in tree
1 m behind our cooler

noodled Clinton Draw Settler Camp
spent several hours in it - found a spring ^{down} ~~here~~ ^{near} ~~no~~ sequoia
one pool full of Saline tadpole from
not nearly Hyda

caught 8 adults, 0 hatchlings
1 marked ~~here~~ before (2008?)
marked in Tonto Canyon

rest unmarked GFS begins end of Noodle
lots of nice pools

fence off Natural Food and AA
blow down in last flood, so no
fence across canyon, so we
occidentally went a Tonto farther
to huge pool w/ willow that

looks permanent ~~but is~~ - here all X-rayed 3 ♀♀
likely spring fed - ~~but is~~ ^{but is} ~~but is~~ ^{but is}
we think there is a potential

population here - lower Clinton

saw 3 adult Canyon tree frogs
in Clinton Draw, all at Hg edge

set nets in Buckhorn
2 L, 2 S, 8 gen-lock

set nets in 3-way dam
2 gen-lock

set late in afternoon

pulled nets in Buckhorn
Caught 12
brought back 6 for x-ray

pulled nets in 3-way Dam

18 August 2010

checked and pulled nets from
Buckhorn - caught some
and 3-way - nothing

took 6 ♀♂ back to camp for x-ray

21 total x-rays

rained almost every day/night
heard coyotes one morning

No turkeys. . saw 4/15 snake on 338 GPS

16 May 2011

Arrived in camp after much adventure
with BDS truck ca. 1245
walked up to SW Hole - walked entire canyon
from road to Mosquito Pool
only water was 1 small pool ca. 70m below
SW Hole, large (trashed) pool 25m below
" " , large (ca. 16m²) " base of SW Hole

caught 22 turtles in these pools
+ one dead - pickled (very fresh)

turkey in camp - camping by Clanton Draw
midway b/t new camp and old camp

did not hear zone-tails
ants at Clark's Camp are fine
" " old " were inactive 2X

summer tanager - yellow morph
Sclateriana clarkii

plate at SW Hole has broken - broke just
below patch - leaking like we all piss streams
SW Hole dry / mosquito pool dry
cattle running ab new camp - 8 hit everywhere
saw bull snake on 338 (tode way past)

17 May 2011

PAS, BDS, KJL,

RB Key AD Dinger
by tip

Maverick Spring - GPS broken

5 small, 2 med, 1 large (co. 20 m long)
less than 1 m wide)
w/n 100 m above Maverick Spring
no H₂O below Maverick Spring

No turtles

Some juvenile red-spotted toad
300 m below Maverick Spring

Trough at Maverick Spring had 2" H₂O

one small pool 70 m below Y in Cloverdale canyon

Red Spotted toad.

Acorn woodpeckers

10 Whiptails total

April Dinger thinks she saw a bear

All hiked to Javelina - dry

PAS RBK KJL - hiked to Maverick
Spring

PDS, AD Dinger hiked to Petencillo
walked all off Miller Canyon, Cloverdale
from Maverick to Sawtooth, Sawtooth

only water mentioned earlier
nothing else

Petencillo dry

Javelina "
BW Hole "

0 turtles today

several deer non-caps

skunk walking in creek by camp
white on head and maybe underneath
black and white warbler in camp
not strong much

KJL and RB Key hiked to 400 m
below Maverick - no H₂O down here

(18 May 2011)

Drove to Swahili, whole party walked

up
Swahili DM - dead cow at edge of normal
basin

BDS/PAS hiked to Foster - all dry
then down Foster to Butchhorn

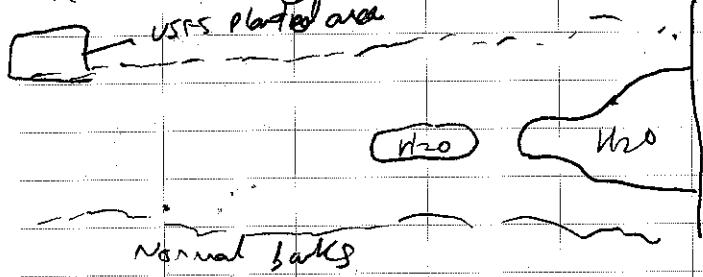
3 small pools - no turtles

1 pool (waypoint) had five JCV
green spotted sunfish
looks like plenty of good pools
when H₂O is present

KJL, RBR, ADD hiked
from Buckhorn to Hot - all dry

Buckhorn greatly reduced
set 2 small, mesh, 1 large
and basically filled pond

half-heartedly waded the shallow
half - nothing



✓ aside from a few deer
really saw nothing

found weather device (radiosonde)
on path to Snashill

19 May 2011

All to Buckhorn - measuring 31 turtles
in the wind - reset nets

KJL RBN to Douglas - ice, beer,
contact Heather Swanson about
access to San Pedro - Granted

PAS, BDS, ADD to Prospect Tank
both dry - look long dry lots of cattle activity
4 troughs at entrance were full, as was Miller Spring well
Appeared to be water pumping from well into troughs - caught 1 turtle

then to StateLine - held H₂O
ca. 2 m x 8 m, 5 inches deep
drying fast - waded for 10 minutes
with feet - nothing lots of cattle activity

Saw Western Tanager at State Line
Swainson's Hawk at Prospect tank
not much else

then to GST - H₂O very low
several feet down from max
tooll pics

saw a bunch of deer in various places today

dry tanks

Black CCC - saw 2*
prospect 1 & 2

BW Hole

Java Linen tank

Peloncillo "

Swahili "

Hunt "

3-Way Dam

South Hole

20 May 2011

PDS/KJL to Diamond A - rejected

Then hiked Clanton Draw from

SW Canyon to GST

water solved settled at dam
on GST

large pool

what's it for H2O

tracked whole thing / took waypoints
at Switchbacks and 3 new dams and down

shallow tanks

GST

Buckhorn

State Line

Clanton (pretty full)

Dinger Hole

Cloverdale Spring (Pretty full)

active springs

Maverick

Miller AZ

saw 4 deer on Diamond A turn
blt Nat'l forest and turn off to
Cascade

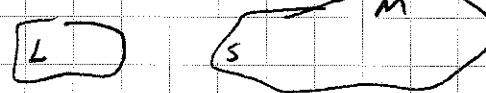
Border patrol says illegal are getting
more trash in wastewater by gringos
also said they were carrying their trash out

saw thrush (maybe Swainson's) in camp

saw a squirrel (2x)

2 pm - drove back to Diamond A
we got permission for Cloverdale Spring,
Horse Pasture Tank, Clanton Draw

PAS/KJL blazed to Cloverdale Spring
set 1 m, 1 L, 1 S - w/ L in small pond
to west



saw several more deer - found a shell of
reap at Cloverdale Spring

KJL found Killdeer chick in H2O w/
another nearby - put it back on shore

Saw Lazuli Buntings in Clanton Draw

Blotted back - BDS, RBR, ADD

were in Clanton Draw roosting

caught 17 turtles in pool (Dinger Hole)

ca. 700 m below SIS pool we parked in August

GPSed the pool - 1 migrant from SW Canyon

The entire area looks great for turtles

In AM BDS, RBR, ADD went to Buckhorn

saw 5-7 turkeys (Gould's Turkeys)

vultures on dead cow

Saw loggerhead shrike - on way to

scrub Jay - GST

Caught a bunch at Buckhorn -

reset nets (med, large, 2 small)

H2O 1.65m below top of tank

Mexican mallards

2 at Cloverdale

3 at GST

2 @ Clanton tank

Set 1 gaslock net, 1 small at GST

Set 1 " " at Clanton Tank

10 nets in H2O

Canyon treefrog to Clanton Draw

Saw deer everywhere

light rain last night

saw numerous turtle trails apparently moving into Buckhorn

3 deer by turnoff to Black CCC

1 deer had a drink @ Buckhorn
while BDS, ADD, & RBR measured turtles

Clanton Tracked, but not GST

No leopard in State Line

Saw a grey-like object in ~~the~~
Dinger hole

121 May 2011

BDS & KJL drove to Buckhorn to check
& pull nets

- saw 3 deer & 6 turkeys along the way

- vultures still camped on dead cow

- 2 mallards @ Buckhorn

Caught several but most were recaps

BDS + KSL hiked to Clanton to check a pull net
-nothing ~~empty~~

Saw S. virgatus on rock next to trail going up to Clanton tank

21 May 2011 cont.

PAS, RBR, ADD went to Cloverdale Spring
caught 1 in big pond, 2 in small pond
caught perhaps 10 big Green eared sunfish in little pond - photographed a couple

11 mallards in Cloverdale Spring
♂ red-winged blackbird " "

saw deer and perhaps 15 pronghorn
on Battalion Road

Not turtles from GST - tracked it

1 rabbit on GTR - only 1 I saw this trip

broke camp and drove to Sierra Vista
set 6 nets (2 med, 4 small) in Green Kingfisher
set 4 nets (2 med garlock, 2 large) in Black Phoebe

Caught big Coachwhip on road to Douglas - way point
Spent night at Motel 6

22 May 2011

checked nets at 11 AM
Caught 1 slider, 1 bullseye, 1 carp, 1 bass
1 sunfish, a bunch of catfish
no GST

Relasted w/ beef ribs and sandwiches
sitting on them in 2 hour set mode

~~After many hours~~ 1 PM - checked nets
in Green Kingfisher Pond
nothing but a few catfish

Left - not sorry 2nd catch
of Black Phoebe

23 May 2011

checked nets at 8 AM
one small softshell
Catfish in several nets
Bullseye too

parked and left

Cassin's Kingbird

Belted Woodpecker

Slender Phoebe

Vermilion Flycatcher

Mallard

Blue Heron

Bullfrogs everywhere

went to Justin's - he owned 3
2 rectangular
nets and 1 small
and two funnel traps

(24 nets cont)

Arrived in Arizona at 2 pm

Set nets in 3 boggy areas

3

Small long

3 med

2 small

rectangular

med

gardock

3

rectangular

small long

gardock

staying in Nature Conservancy
Researchers Cabins

Saw a roadrunner

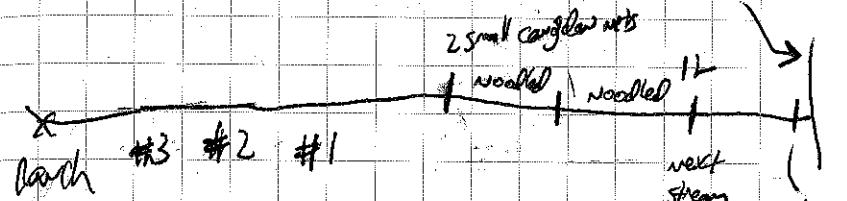
" " Jackrabbit

25 May 2011

Checked all the nets - reset all

Boggy area # 3	- 1 worn juv
" " # 2	- 1 worn ♂ - blood
" " # 1	- 1 worn juv, 1 marked ♂ 1 worn ♂ - blood

Drove all the way to Nature Conservancy
border up 32M - at Turkey Creek



Set 1L and 2 small conglem nets
in stream near end of Nature Conservancy

Noodled ca. 800 m - snatching it
bit 3 stream crossings (2 chunks of stream)

Caught / marked ♂

lots of little fish (2 species of
conglem suckers)
on stream
lots of watercress (an invasive)

26 May 2011

checked and pulled nets
nothing in stream
some success in soggy areas
Saw 2 turtles in road
some other stuff
padded and left for home

Tadpole design depth 15 cm
 - caught/
 had difficulty getting a rock

4 trails involving 99 - all w/ canyon tree frogs
5 " " hatchlings - 2 trails w/ canyon tree frogs
3 " " red spotted toads

3 August 2011 PAS & KJL

Drove to Flagstaff, then on to
Cottonwood AZ

4 August 2011 located Enslie's creek

Spring Creek - long stretch of
creek covered by Sycamore trees
creek 1-3 m wide, shrubs to water deep
water pretty clean, creek mostly shaded

waded upstream for 5 1/2 hours (9-230 pm)
caught 2 turtles - collected 5600

Enslie's method: walking upstream slowly
looking for turtles, worked for one turtle,
which was walking around on the bottom
in the open - knee deep water

other turtle was under a pile of twigs
in middle of pool

both females, one tried to bite

100's of reaches into the water yielded
0 turtles

deep, wooded banks, lots of tree
roots, not many rocks - bottom of silt
lots of grass and other veg. at edge
missed a lot of wading opportunity

started at P 20 went to
a GPS stepping pt.

difficult to see pool Enslie talked
about

set 2 gaskets near other end
of the Noodled area

Different to imagine Catching many turtles
woodlily or w/ net

Crayfish in creek

we saw over 10 crayfish
mostly juveniles (1 ad off molt)
mostly downstream end of noodled area

several types of small fish

5 August 2011 rained a lot last night

good pouring rain several times over
3-4 hours

creek flooded in night but receded
a lot before we arrived

no turtles

creek now up a lot, flow a little
stronger, water murkier and visibility
zero, w/ woodlily more difficult than
yesterday

explored/smoothed for 50m downstream
of pt 20 - no turtles

drove to cottonwood
washed nets at car wash
drove to Douglas
via Phoenix, Tucson, Benson
Sierra Vista BISSELL

6 August 2011

Drove to Camp - camped left SW Canyon
and toward - same camp as many
River Camp

hiked up to NW hole
lots of trees
noodled Pine Pool area - GPS
nothing

noodled from SW Hole down to last
caught 5 adults

found 1 med, 1 small in SW Hole
leaving dam
tail is near normal, soft well
below dam

Zone-tail hawks - 2 near Pine Root
Camp Art - fine
Cona Camp Art - fine
lots of whiptails

really not much else but we
walked in the heat of the day

tadpoles - lots in Pine Root area
byla & near SW Hole

saw garter snake near Pine Root - GPS
no hatchlings seen

found a dead toad - a few camouflaged
GPS elements

PAS JN Crocker JL Massengill
(in Reliance) w/ Ford Fusion

RJL, SSP in Pinaleno & thule

7 August 2011

Hiked to SW Hole - caught 13
reset nets

Saw young Red-spotted Toad in camp
collected a numbered Red-spotted
Toad near camp on GSN - need waypoint

Hiked to Javeline trail

good water level, though nothing big
needed a trawl

set 1 small, 1 med net near willow

Noodled Sawtooth Canyon - caught
15 hatchlings - mapped lower half

Saw 2 garter snakes
Zone-tail hawks
lots of tadpoles
no rabbits

8 August 2011

Hiked to SW Hole - checked nets on ^{caught}
water levels down from yesterday
small net was empty but would
have required walking on funnel
in air - moved nets to deeper

~~July 26~~ 1 ~~duck~~ in BW Hole

Hiked to Javalina Tank
checked nets caught 4 - released

Hiked over the saddle to Cleaveland
Canyon, caught 2 random turtles
in isolated pools, 1 coming down
the mountain is a tiny feeder stream

Hiked to Maverick Spring
walked back to the Miller Y
car 1 km, not shooting

Mapped upper half of Savron's
some pools from yesterday were
gone, including some pools up further
yesterday

Hiked home - caught in 5th rain
ca. 2 hours at least 1 inch, ^{some} hail
no hatchlings around Maverick
not even a juvenile

Mountain lion tracks in Cleaveland Canyon
big snake shed ca. 6 ft, keeled scales
at Maverick

Border patrol - on horseback at BW Hole
said big party of illegal at
Maverick Spring the day before

adult saw Canyon frog in Maverick puddle
Lots of tadpoles, esp. Canyon frog "

Saw several garter snakes - way north for each

Maverick Spring H2O not mapped
It was high but not unrealistically high
cattails in many places

9 August 2011

Tracked

Hiked to BW Hole - caught a bunch
~~then~~ pulled the nets

Tracked

Hiked to Javalina Tank - caught a bunch
reset the nets - collected turtle shell
GPS

Wooded Hell Hill to Margarita Pool
caught 5 GPS both ds

Wooded car som alone ft SD to
SD n 3 clear b's Grizzly - caught 2
cos start and end

mosquitos out all day
again - no rabbits, very few birds
some kind of ground squirrel in camp
not many birds, mammals, herps, anything

Lots of tadpoles of both species

10 August 2011

Hiked to WMR - noodled from
base of WMR to below Big Gravelly,
where we stopped yesterday
Caught 3 + 1 Dead area -
area - GFS
hatching
noodled base of WMR to Pine Pool

So, we have noodled from below Pine Pool
to above Big Gravelly

BDS and CJB arrived around 10 AM
BDS just hiked to Javalina

Gila Whiptail near Hello Hill
western "hutting up" "

pulled nets, caught 5

Collected a near intact
skeleton in Sawtooth Canyon
maybe a PECCARY

Drove out to Buckhorn
Buckhorn is very low - flooded
lower than May, or barely equal

Set 6 nets - 2L, 2M, 2L^{long}, small

JKM - has ~~collected~~ H₂O samples
from BW Hole (2x) and ~~Buckhorn (2x)~~
and Bodiehorn (1x)
Javalina

W 1X tomorrow

Still very little wildlife

H₂O not mapped yet mostly
continuous everywhere

11 August 2011

saw 3 Gould's Turkeys

Collected dead horned lizards in Clinton Draw
on Diamond A property - GPS

[Collected 200 bullsnakes on GTR 12 August
at Diamond A property - GPS
picked 5; 30S]

Collected snake skeletons up a head
on GTR - GPS

checked nets at Buckhorn / reset
caught a bunch - held female for x-ray
wooded / mapped ca. 100 m below
Buckhorn - caught a bunch

[Wooded again Buckhorn posts all way
to fence - 1/20 stopped at 380 m
from Draw - 12 August 2011]

Brought turtle back for x-ray
walked down Clinton Draw to
Forest Boundary - no water

went to Diamond A for permit,
then west onto Diamond A ~~post~~ land
in Clinton Draw - several small pools
in 3 places + Ginger Hole - woodled

Collected a partial Mammal skeleton in Clinton
Draw
caught a few - took 2 ♀ ball for
x-ray

Later returned and set Box trap
and 1 Garlock in Ginger Hole

Set 1m, 15, 1L in GST at draw

Rained hard right around bed times
but only for 30-60 minutes

~~12 August 2011~~

around 130 AM - woke up to hearing
Clinton Draw flowing flood.

Crack of dawn I hopped to Dryer Hole
NETS underwater - caught maybe 4, a
couple lethargic - pulled net 5

Hopped to Buckhorn - took up wet 1st
half of road, 2nd half dry
Buckhorn was same as yesterday
no rain there

Turtles fine - OK not bring 4 ♀
back for fear of further damage to road

pulled nets at Buckhorn
and decided we couldn't go back again

Planned to GTR caught 3 w/ 1 net
Bunch of ~~fish~~ ^{minnows} in all 3 nets
Started all near road
Nets 1.5 ft underwater

Sneaked back to camp - eventually revived
X-Rayed 2 ♀♀

Clayton Draw down some by trucks
Set still flowing

Drove up to pass - stream trickles up there
We've concluded that somewhere
up there it rained like hell

We've also determined that the
study area is unworkable,
and we should go home.

Saw 6-8 ♂♂ turkeys on
way to Buckhorn

Saw one Bullmoose on ~~GTR~~ GTR
on Diamond Mtn

Finally saw a rabbit on GTR on
National Forest land

Saw a deer on GTR by normal camp
the forest camp alone

Saw night hawk at least 2 pairs
flying fantastically on GTR
Diamond Mtn

113 May 2012 BDS & KJL arrive
in study area ~ 1200 hrs

- temp is in 90's, clear skies
- unload truck and set out for BW Hole
- BDS + KJL hike to BW Hole. BW Hole is dry.
- Sprayed liquid wrench on nuts @ on plate @ base of BW Dam
- Saw several Nemi's, and a few S. virgatus on trail to BW Hole
- Water is present @ base of dam
- Did not nosalle

Drove to Buckhorn Tank
Tank is full. Did not GPS.

Set 3 nets: 2L
Baited w/sardines 3M

- nets difficult to set 3S

b/c of depth

- Water below dam, did not GPS

- many diff wildflower's present, ~~atmosphere~~
drove to 3-way dam. Dry except for 1 M pool
 $(2m \times 2m)$

Hiked to Hunt tank = dry

Fake Black Cee = dry

* found old small net buried in the silt @ BW Hole

- Skies clear, stars great

14 May 2012

heard
*Turkey in the air

- BDS + KSL hiked to Swahili Tank = dry
hiked below Swahili Tank to fence = dry

- Drove to Buckhorn, checked nets ~ 40
Several green sunfish in nets

- collected dookie from 5 turtles for Kristen

- Reset nets

- GPS'd Buckhorn Tank - walked
around the edges - track

- Explored road past 3-way dam, leads to gauntlet homestead

- set nets 2(2m) in GST, Ken fracked GST

- saw Javelina & Gould Turkey on GTR.

met Game Warden, Camping @ camp near us. He's here for turkey survey's.
Supposed to meet w/ Scott Lehrich from Wild Turkey Federation

15 May 2012 / Clear skies
-windy
Heard Turkeys in the AM.

Checked and pulled nets from GST
2 M nets = 8 turtles

A few red eared sunfish were also present in nets

Went back to Camp to await the arrival of Paul & Company

Paul & Company arrive 10:00 am

Company = Marie Stone, Sosiah Gillispie,
Kristen Bliss, Jeremy Masengil, Peter
Chelsea Smith

Dropped off Ken, Peter & Jeremy @ trail to Suahsi tank

Checked & ~~pulled~~ nets @ Buckhorn
8 nets = 15 turtles
10 throwbacks

Wooded ^{and} mapped all of canyon below Buckhorn. - Caught one turtle

Wooded road to 3-Way - Foster Draw found a dead turtle @ the intersection of Foster Draw & Buckhorn Canyon

5-6 medium pools, 1 large pool mostly below Buckhorn

XJL and gacky wooded from Suahsi, to the road at Foster caught 5-6 - more water on that side

reset nets in Buckhorn

turkey boys are camped up road
and doing turkey surveys
~~three~~ ^{several} NM GFD conservation officers
lying out w/ US in camp

16 May 2012

heard coyotes and turkeys in
camp

BB, Jeremy & Kristen ~~BB~~ pulled net 50
Buckhorn

Caught approx. 20 turkeys, 12 throwbacks

Jeremy sampled Buckhorn & pools below
Buckhorn for invents.

Great Blue Heron @ Buckhorn

- saw 2 turkeys before the 1st switchback
to Swahili/Buckhorn

BDS & Party hiked to BW Hole to meet Stone
^{9 crew}

WBZontal's new fine foot area

BDS, KEB, PDD hiked to Javelina Tank
Javelina Tank is full
Set 2 nets (25)
- baited w/ sardines
Did not GPS/track Javelina

Mexican Market @ Javelina

BDS/KJL/NEBS/JKM hiked down
BW Canyon, 3 pools the entire
stretch:

Small pool 170m above BW Hole

Jeremy sampled 2 pools along
the BW Canyon hole.

2 S. Virginias about to have sety time
by BW Hole

Paul & Company dug all day @ BW Hole

17 May 2012

MEBS/JKM/KJL/BDS hiked to Javalina
Tank

Checked 2 nets = 16 turtles

Reset 2 nets and added 2 more
total at 4 nets = 25 + 2 m

Baited w/ sardines

2 mexican mallards @ Javalina

Ken trashed Javalina

Jeremy collected invertz

Collected poop for Kristen Bross

Greg hiked over saddle into Cloverdale
Canyon.

-only one pool in Clov. Canyon prior to Y

hiked to Mar. Spring. Mar spring drinker
is dry

Several small pools & 1 large pool in Mar.
Spring area

Ken mapped pools by Mar.

Noodled from 75^m south of Mar. Spring
to Y, up Cloverdale canyon

& up Saurans Canyon

* Deloncillo Tank to Y still needs
to be noodled.

found one dead turtle in Clov. Canyon
GPS point taken

Jeremy sampled pools in Mar. Spring

Saw 2 A-10's that flew ~~over~~^{low}
in the canyon

heard Zone tail near Mar. Spring

caught 3 turtle(s) in Clinton Draw
Dam

none got started w/ help by yucca

Saw turkey near camp on GTR

18 May 2012

Trash

Douglas List

~~REMOVED~~
Jeremy - 2 packets Camel Crush (menthol)

\ ICE

Peter - none

Dinner party - 16 people

Ken - 12 pack hippy juice

cold drinks for volunteers

Paul - recent Red Sox Scores

Tuesday - Thursday

i-phone - Scoreboard app

KJL, PDD, JKM hiked to Javalina
pulled nets - caught a few

Saw a black-tailed - swam across
Peter filmed it - fault

gopher snake bit coral and
Hello Hill

KJL, CLS, KEB hiked to
Clanton Tank set 1L and 1M

Clanton deeper than usual

PAS, MBS, JC saw Coati
and 3 M. Swallow on GTR

BDS, JKM, PDD, JMB pulled off
plate and hauled it back
to camp

19 May 2012

BDS & JKM hiked to Clanton Tank

Checked & pulled nets = 2 turtles

JKM sampled for invertebrates

BDS mapped Clanton w/ GPS,
he fell in.

19 MAY 2012 CONT'D

1630 - KSL, PDD, JKM, SUZI-Q

HIKED SWITCHBACKS BETWEEN
BLACKWATER AND GERONIMO STEP TANK.

JKM SAMPLED 1 MEDIUM POOL ALONG
CLANTON DRAW (GPS'D). TWO SMALL POOLS
ENCOUNTERED NEAR THREE LITTLE DAMS.
NO TURTLES ENCOUNTERED. JKM TOOK WATER
CHEMISTRY AND INVERTEBRATE SAMPLES AT
GST. WATER AT GST WAS LOW IN pH AND
RUDDY. PDD SAW ONE TURTLE AND ONE
NONDESCRIPT FROG. DID NOT SET NETS.
SAW NO RAPTORS, LIZARDS, SNAKES, OR
NOTABLE MAMMALS OTHER THAN COTTONTAILS

20 MAY 2012 - KSL, JKM, PDD
ca. 0800 - DROPPED CREW OFF AT BWH.
ENCOUNTERED SONORAN MOUNTAIN KING SNAKE
BETWEEN BWH + TURN OFF TO CLANTON TANK.

(CHECK BOX WHEN GPS'D). SET TWO NETS
IN STATELINE TANK (SLT). SLT HAD NO AQUATIC
VEGETATION, WAS MUDDY AND TURBID AS USUAL.
JKM DID CHEMICAL AND INVERTEBRATE SAMPLING.
KSL MAPPED SLT. WALKED MILLER CANTON TO
PROSPECT TANK. PROSPECT TANK HELD WATER
AND HAD LITTLE AQUATIC VEGETATION; KSL MAPPED IT.

20 MAY 2012 CONT'D

DROVE TO DOUGLAS AND STOCKED UP ON GAS
AND BEVERAGES. RETURNED TO CAMP CA. 1630.
DROVE TO PROSPECT TANK AND SET TWO NETS IL, IM.
SAW ONE ZONETAIL HAWK AT THE TANK AND ONE
COATI AT THE MOUTH OF MILLER. PDD SAW
2 COTTONTAILS ON THE GTR.

21 May 2012

PAS CLS hiked to prospect tank (Tracked)
caught nothing - pulled nets
zonetailed hawk (GPS)
PAS falls and hunts in karee

CLS hiked to StateLine Tank, solo
w/o GPS waypoint
caught nothing - pulled net

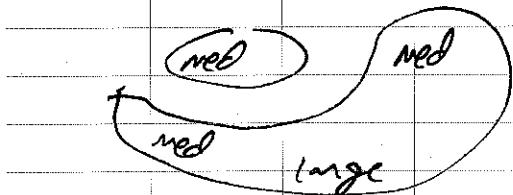
21 MAY 2012 - KSL, PDD, JKM, ELS
0800 HIKE TO BWH, THEN MUD HOLE.
HIKE TO PECONCILLO TANK; CAUGHT AND
MARKED ONE 2011 HATCHLING ABOUT 220M
DOWNSTREAM FROM PECONCILLO TANK. JKM
SAMPLED PECONCILLO TANK FOR INVERTEBRATES
AND WATER CHEMISTRY. HIKE TO SOUTH HOLE.

21 MAY 2012 CONT'D KSL, JKM, PDD

SOUTH HOLE WAS DRY. SAW NO WATER BETWEEN SOUTH HOLE AND THE MILLER CANYON INTERSECTION THAT LEADS TO PEGONCILLO TANK. HIKED THE SADDLE FROM SOUTH HOLE AND OVER THE SADDLE TO MUD HOLE AND ARRIVED AT MUD HOLE W/IN 30 MIN. HIKED BACK TO CAMP. JKM + PDD ARE AWESOME.

22 May 2012

PAS running around w/ Diamond A all day finally went to Cloverdale Spring along and set 4 nets



Saw 2 porophorus or 838
in Arrow Valley

Saw 2 suckers in Cloverdale Spring

KJL and party saw a white breasted arthach in camp also zonetail in Whitmire Canyon

22 MAY 2012

1030 - KSL, JKM, PDD, CLS HIKED FROM GERONIMO TRAIL TO WHITMIRE CANYON; SAW NO WATER ALONG SMALL CREEKS AND AT WHITMIRE CANYON ENTRANCE. HIKED WHITMIRE CANYON EAST TO CASLABEL. SAW CA. 3 POOLS. JKM SAMPLED AT LEAST ONE POOL. ENTERED CASLABEL RANCH LAND BY WALKING WHITMIRE. THIS WAS NOT EXPECTED. PDD COLLECTED MULTIPLE SKELETAL REMAINS. SAW ONE ZONETAIL HAWK.

23 MAY 2012 - KSL, JKM, PDD SAMPLED CHECKED FOUR NETS IN CLOVERDALE; GOT SIX TURTLES. ONE ATTEMPTED TO BITE KSL MULTIPLE TIMES. RESET TWO NETS. HIKED TO HORSE PASTURE TANK AND SET TWO NETS. HORSE PASTURE TANK WAS ABOUT 3.5' DEEP SAW AT LEAST 10 TURTLE HEADS ABOVE THE WATER. JKA SURVEYED THE BOGGY AREA BELOW CLOVERDALE. DROVE TO CLINTON DAM; JKM SAMPLED AND KSL MAPPED THE TANK. DROVE BACK TO CAMP AND HOODED ALONG CLINTON DRAW TO DIAMOND A POOL. ENCOUNTERED 3 LARGE POOLS AND FOUND 4 TURTLES.

24 MAY 2012 KSL, PDD, JKM

~0900 DROVE TO CLOVERDALE AND CHECKED THE TWO NETS; NO TURTLES. HIKE TO HORSE PASTURE TANK AND FOUND ONE NET HAD EITHER COLLARED, BEEN MESSED WITH BY A BEAR (FRESH TRACK WAS FOUND AND PHOTOGRAPHED), OR BEEN MESSED WITH BY ILLEGALS. NEITHER NET HAD TURTLES. KSL FOUND ONE TERRESTRIAL FLIGHT RESPONDER (PREVIOUSLY UNMARKED). ONCE MARKED, THE TURTLE UNDERWENT ANOTHER TFR. WAITED FOR ~1 hour ON THE BANKS OF HORSE PASTURE TANK FOR OTHER TFR'S. OBSERVED NO TFR'S BUT KSL AND PDD CAUGHT, WITH THE SKIN OF 'THE K', ONE TURTLE EACH THAT SWAM NEAR THE SHORE.

DROVE TO BW H TURN OFF AND HIKED THE CANYON, LOOKING FOR PLACES TO SET DATA LOGGERS FOR JKM.

18 July 2012

11

List for Plate:

Plate - kevin
Nuts/washers - kevin
pond liner ✓
Tape ✓
Silicon ✓
Silicon gun ✓
Wrench/breaker bar ✓
2 C clamps ✓
2 straps ✓
Knife ✓
files/drill attachments - Drill Kevin
Belts for gasket - kevin
Brushes ✓
Gloves ✓
Towel ✓
Punch - kevin
Put Permits up ✓
Fix-a-flat ✓

✓ GPS units
✓ measuring kit
✓ stuff for data loggers
✓ Camera
seeds ✓
water ✓
lunch ✓
measuring tape
batteries

18 July 2012

Clinton Draw Dam
has a pool less than 1 m^2
1 JUV seen in it

Pool behind restored impoundment
has less than 1 m^2 .
found a turtle in it

Prior to arrival of Valen and Kevin,
we hiked Clinton Draw from
switchback above Clinton Draw
Dam to ~~Trees~~ Blackwater Canyon
junction. - 1 medium pool (GSS)
plus 2 small pools ass. w/
Clinton Draw Dam

Blackwater Canyon held a little
water - Big Pool and would be
like to had rained some, but
not enough to fill pools

Rain all around as we drove
out

3 August 2012

MES, R JL, JKM, CLS, KEB, D B,
BRF arrived at camp around
1200 and set up ~~Rocky~~ Dry
all over. Made it to Buckhorn
around 1315h, and Ken caught
a turtle (2129) by hand.
Started to rain & rained
hard. Before rain started,
Buckhorn Tank was smaller
than in May (ca. 10m from
dam to edge). Noodled pools
below Buckhorn and caught
6 hatchlings & a juvenile. Set
4 nets in Buckhorn.

Set 2 nets in GST. Water levels
are down. Walked ~~down~~ Clinton
Draw to ~~down~~ Clinton Dam from GST
and noodled 6 hatchlings & 1
adult female. Rained off and
on.

Saw beetles at Buckhorn that were
black w/red markings, 3 small elytra,
and large abdomen.

Pool behind Clanton Dam was $< 1 \text{ m}^2$, smaller than in July according to CLS.

Saw bats in camp. Uneventful evening.

14 Aug 2012

Arrived at GST ca. 0830h, pulled nets. Caught two turtles. Jeremy sampled. Then went to Clanton Tank and set one large and one small net. Water levels were down from May levels.

1030h Drove to Buckhorn after dropping Ken, Kriste, & Jeremy off at the road to Swahili. Checked & pulled nets at Buckhorn, caught 20 turtles, all marked. Didn't reset nets because of concern over running out of gas (down to $\frac{1}{2}$ tank). All turtles were pulled out of nets & combined, so it's unclear which turtles came out

of particular nets. In data recorded as caught in medium net,

Walked canyon below Buckhorn all the way to fork that turns to 3-Way Dam & Hunt Tank, then went part of the way down fork then stopped because of time & storms. Walked back up to fork then to road to Buckhorn. Several puddles throughout canyons and MBS, CLS, DWB, & BRF found several turtles, mostly hatchlings. Saw a few tadpoles and lizards on the walk.

Arrived at camp around 1800h to find everything flooded. Chelsea & Kristen's tent had an inch of standing water. The creek behind camp was flowing, and there was 6-8" of hail on the bank. The creek appeared to have flooded into camp. Lots of bats & tree frogs. Paul & Laura Kimmel arrived in camp ca. 2130h. The moon was ^{stone}.

awesome! It was large and bright, and came up from the horizon very quickly.

5 Aug 2012

Hiked up to Blackwater Hole and noodled down to the Would-Be-Rapids. Lots of seedlings sprouting from when Chelsea planted the Cloverdale seed mix from Trevor Hare. There's a large pool at the base of the dam. Noodled lots of turtles throughout the day, mostly hatchlings. Lots of water in pools. BW Hole was dry ~~and the plate is~~. Saw a couple of garter snakes.

Set up 6 tadpole experiments

Three set up with adult males, and three set up with hatchlings. All experiments have 10 *Hyla arenicola* tadpoles. Set up at 1930h and placed in back of the foreunner.

Kevin, ranch hand for the Austin's, came to camp in the evening. He brought the Kubota & plate for the dam, and he cooked for us.

Benton also arrived. We now have eleven people in camp. Ended the evening around the fire.

6 Aug 2012

Results of tadpole experiments:

- ① hatchling¹ 0 eaten
- ② #266 (♂) 0 eaten
- ③ #1048 (♂) 4 eaten
- ④ #374 (♂) 6 eaten
- ⑤ hatchling² 0 eaten
- ⑥ hatchling³ 0 eaten

Hatching experiments set up
at 1920h:

- ① hatchling⁴ w/ 5 Bufo, 5 Hyla
- ② 2228 w/ 5 Bufo, 5 Hyla
- ③ adult + 305 w/ " " "
- ④ " " "
- ⑤ control w/ 3 Hyla, 12 Bufo

Ryan & Kevin took the plate up to BW Hole in the Kubota. Marie, Paul, Chelsea, Kristen, & Laura hiked up to meet them. Around 1030h Marie, Kristen, & Laura hopped canyon above BW Hole up to the confluence of ~~Kubota~~ Hill & Top of the World canyons. Very few pools were found, and we found no turtles. MEB, KEB, & LBK hopped canyon b/t Hello Hill and BW Hole, and found several pools and 3 turtles. The group except Kevin ate lunch ca. 1200h.

After lunch, the group hopped up Last Fork (up to "Stop Last Fork in GPS). Found several pools and 1 turtle. Then the

group waded Canyon from WBR to Geronimo Trail.

We collected an adult ♀, hatching Bufo and Hyla tadpoles for experiments.

Returned to camp ca. 1700h, then Marie, Chelsea, Kristen, & Laura went swimming in GST. After returning, waded Clanton Draw across camp down to Diamond A fence. We found two turtles and kept them for experiments.

17 Aug 2012

Results of tadpole experiments

- ① Control: 12 Bufo, 3 Hyla
- ② 2298: 2 Bufo & 2 Hyla eaten
- ③ 365: 2 Bufo & 1 Hyla eaten
- ④ Hatchling⁴: 2 Bufo & 1 Hyla eaten
- ⑤ 2330: 0 Bufo & 2 Hyla eaten

Group of 10 hiked to Javelina (Dry)

RJL BRF hiked to Peloncillo Tank
It was dry - they waded below Peloncillo Tank and caught ca. 10 GPS god's - hiked above Peloncillo gods out

Rest hiked to Maverick over the Saddle - waded ca. 20 ft

ca. 200 m below Maverick to Miller Y
mapped the pools not much water
waded 200 m below last pool below maverick

→ partly transformed tadpoles near Peloncillo

lots of trash

not many tadpoles around maverick

saw Red-tailed Hawk

• Brief rain in the night
after much advertising
didn't do much actual rain

8 August 2012

KJL and Laura Kinnel I went to the Gallores (Deer Creek) in the AM.

rest of crew headed Clinton Draw Dam to BW Canyon - caught ca. 4 mapped this stretch - H2O on every switchback, much murky and new, perhaps last night?

The big pool at the BW Canyon Switchback is about $\frac{1}{3}$ what it was 2 days ago.

MBS, Ryan Faught, and David Baxter left for home after lunch

Five of us (PAS, JKM, CLS, XEP, Gendarinna) explored, looking for new canyon, the next canyon down from BW Canyon

found it easily - connected up Clinton Draw at the turnout to Bullhorn, just stay to the right.

hiked ca. 2 km up that creek, finally found a few pools, then a huge pool, then a few more perhaps 3 pools JKM can sample

caught 2 turtles

turned back at a fence (barbed-wire) tracked and waypoints both ends

the huge pool is the largest pool I know of in Clinton Draw

we prepare to return in a day or two and set net in this pool, sample bugs, and explore further up

rained hard on us on the return by a little rain - may have filled up some pools

threatened to rain all evening and night - a few scattered showers & little consequence is all we got

9 August 2012

KYL and LSK in AZ
had good success at Deer Creek Tank
returned in PM

USFS Law Enforcement

Devin Lindle [Call him before]
520 471-3196 [Coming out]
dlindle@fs.fed.us

KYL and LSK were in handcuffs
Devin Lindle had cruised our camp
saw JLRM's truck and assumed
we were a meth lab

After much consternation
we were scolded for not having
a permit for the STCII

~~In the AM~~ we head to the nets
in the front of camp
and a USFS & NMGR permits
on CLS dashboard

so we concluded Devin's investigation
skills were poorly developed

In the AM -

rest of us went to Statewide Tank
set 1 med / 1 small

then to Horseshoe Tank
set 2 small nets

next to Roadsides Tank
Any

Finally to Prospect Tank
set 1 small net

all the tanks w/ water were:
Sampled for inverts

Tracked
very small and shallow
med nets wouldn't have worked
in Prospect or Horseshoe Tanks

In the PM -

hiked back up New Canyon again
to fence - set 2 med gill nets
in Huge Pool - Now dubbed "The Grotto"

much additional H2O accumulated
overnight in pools just below the Grotto

These new pools were mapped
as was the Grotto

so we have two pool maps of
the area, and they will be different
many more pools today

Hoary ~~of~~ Doves w/ white C collars
~~at back~~ back of the Nettle w/ reddish
(reddy) heads needed
big, hairy bellied doves
seen twice, once in camp, once
at Black CCC turnout

Cooper's hawk at Prospect Tank
and at Pine Pool

Benton Shriver left in PM
he made a large terrestrial
insect collection

also found several vining gourds
around camp

Things Left to Do

- ✓ Cloverdale Spring
- ✓ Horse Pasture Tank
- ✓ Buckhorn Tank
- ✓ Three-way Dam
- ✓ Diamond A pool
- ✓ Whitmine Canyon
- ✓ Turtle Canyon
- ✓ Last stretch of Blackwater
- ✓ Data loggers

	Team 1 (Toyota)	Team 2 (Fiat)
Saturday	JKM	Cloverdale, Horse Pasture
Sunday	"	Diamond A pool
Monday	"	KEB
Tuesday	"	JKM
wednesday	Buckhorn	Whitmine
Thursday	Data loggers/last stretch	PAS in Camp

10 August 2012

the Ponce de Leon's have taken good field notes on their New Canyon exploits -

PAS KEB checked nets in Prospect caught a Bufo alvarius pulled nets

checked nets in Horseshoe - empty pulled

checked nets in Stateline caught 4 - pulled

Then hiked Clanton Draw from camp to BW Canyon - tracked and mapped pools - not much H₂O

saw a few turkeys this trip
a few deer
a few cottontails

11 August 2012

Toyota crew set 32 1m w cloverdale Spring and 2 m garlock in Horse Pasture Tank - KEL will write field notes

Hiked Clanton on Diamond A (Wallowa) lots of H₂O mapped, no killed in nets all the way to Fish pool caught 7

need to set garlock from NPT and set them in massive rock pool

big pool on N side of canyon was not reoccupied b/c it was much smaller

Saw bullvalley by camp saw Canyon tree-frog in Clanton

KEL/CLS intent to lordburg for gas/ice

12 August 2012

PAS, JKM
LK

Transformed Bufo punctatus
1♂ pool in Turtle Canyon
in area where we caught 5♂ and 2>JUV

Turtle Canyon caught 10

Tracked up west washly-trace

tracking way back

Mapped all slugs and turtles
few tadpoles in pools, mostly Bottos

Hiked Clawton Draw b/w TC
and GJL caught one and
mapped a few pools
- 3 switchbacks I think

PAS, LK, KEB, ~~JKM~~ JKM

went to Buckhorn

set 3L nets, worts from Buckhorn
and 2 big pools below

Checked out 3-way and Hurd
small pool below 3-way again
caught a few - no more Huds

Black CCC had H2O!

13 August 2012

CJS and PAS checked and pulled
Buckhorn - caught ca. 28 w/ N. thorectes

Tried to set nets in Black CCC both
need garlocks

Set 2 red garlocks in Fink Pool
this fallen noticeably since ~~my~~ last visit

KJL and rest went to Salt Canyon
and caught ca. 12 turtles
and collected ca. 11 invert samples

Seems like heavy rain the day we
discovered New Canyon (on 8 August)
may have filled New Canyon,
Black CCC, and Diamond A pools

Nothing lately in rest of normal
study area

Salt Canyon very wet, many
unlooded pools, much siltting

14 August 2012

KJZ and the others went on a failed attempt to nozzle Salt Canyon - they got lost (see KJZ notes for further details)

PAS and JHM shucked and pulled snappers from Fink Pool caught 4 - also did inventr

PAS went to Animas and spiced up camp

big storm brewed all afternoon rained to the South, West, North, East, but almost nothing in camp

Storm cleared over night

Saw 5⁺ Atrox near camp

CLS took pics

15 August 2012

KJZ and the others could not find away eastern entrance to Whalers

So, they were dropped off late at GST - KJZ & JHM went to Salt Canyon and White Sage Canyon caught 7 turtles and collected several inverte samples

PAS Nozzled below Fink Pool caught 9+ - spent almost the whole time in a pool car, 300 m long - caught 8 in there GPS beginning and ending of the great pool (half mile pool) and Fink pool - lots of Hyla tadpoles

CLS and KEB - set 2 snappers in Black CCC, hiked BW Canyon from mouth to road - one pool left there for Jeremy mapped out near camp

Saw Hyla overcolor do a variable flight response across 2 m wide Fink pool

16 August 2012

hiked BW Canyon to deal w/ data loggers

checked nets in black CCC (empty)

pulled

also did insect sampling

rain has filled much of BW Canyon
overnight

Snag pool went from med to large
overnight

caught one throwball near Big Gravelly

Saw a coati in BW Canyon

17-May-2012

Spec

Vert

#1

Vert/Rib Saw/leg w/ fur
- deminated

GPS'd w/ stone

- near "Bush Cave"

Vert

#2

Pelvis/Vert/ribs

GPS'd w/ stone

- near Kettle

Vert

#3

Saw bones

GPS'd w/ stone

Vert #4

~~Skull~~ Backbone

~~Pelvis~~ Vert 7cm from "bulge"

5m apart

Vert #5 Pelvis

- likely w #1

7cm from "Bush Cave"

Vert #6 Sawbones - small deer like

Vert #7

Skull w/ disconcentric sawtooths

- likely Pig

GPS'd - 35m from bush cave

" " gps Name

Vert 8 18-May-2012

- Bones/pelvis/vert/ribs gps

Vert 9 18-May-2012

Back portion of skull gps

Vert 10 22 May 2012

Bone fragment - Blackwater Tank

Vert 11 22 May 2012

Bone fragment Peloncillo tank

Vert 12 "Mammal skull" 22 May 2012

small carnivore, full skull gps

Vert 13 "Mammal skull 2" gps'd 22 May 2012

Skull fragment, likely deer

Vert 14 "Ribs and Verts" GPS point 22 May 2012

Ribs & vert

Vert 15 "Mam skull 3" GPS pt 22 May 2012

Partial skull + pelvis?

2m apart

Vert 16 "J pool" GPS point 22 May 2012

Deer Saw

Vert 17 "deer parts 522" 22 May 2012

hind legs + pelvis?

Vert 18 "deer parts 2 522"

Vert + rib

Vert 19 "deer parts 3 522"

deer jaw bones

- Vert 20 "Skunk S24" yes 24 May 2012
 Skunk found near cloverdale hole, 2023
 Vert 21 24 May 2012
 Knob & bone, New horse tank 24
 Vert 22 "deer leg S24" 24 May 2012
 3 bones & hoey, pasture near horse
 Vert 23 "deer skull S24" 24 May 2012 Grid
 - Found by C. Smith
 Vert 24 "deer legs S24" 24 May 2012
 C. Smith & P. Drivers
 Vert 25 "2. Bones S24" 24 May 2012
 Salvinea shoulder? hoof length & phalanges
 Vert 26 "Mammal skull S24" 24 May 2012
 Cow skull? C. Smith & P. Drivers
 Vert 27 "Mammal parts S24" 24 May 2012
 Likely deer Vert & shoulder? C. Smith & P. D.

CURVE TABLES

HOW TO USE CURVE TABLES

Table I. contains Tangents and Externals to a 1° curve. Tan. and Ext. to any other radius may be found nearly enough, by dividing the Tan. or Ext. opposite the given Central Angle by the given degree of curve.

To find Deg's of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and External: Divide Ext. opposite the given Central Angle by the given External.

To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table I.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

EXAMPLE

Wanted a Curve with an Ext. of about 12 ft. Angle of Intersection or I. P. = $23^\circ 20'$ to the R. at Station 542+72.

Ext. in Tab. I opposite $23^\circ 20' = 120.87$
 $120.87 \div 12 = 10.07$. Say a 10° Curve.

Tan. in Tab. I opp. $23^\circ 20' = 1183.1$
 $1183.1 \div 10 = 118.31$.

Correction for A. $23^\circ 20'$ for a 10° Cur. = 0.16
 $118.31 + 0.16 = 118.47$ = corrected Tangent.

(If corrected Ext. is required find in same way)
 Ang. $23^\circ 20' = 23.33^\circ \div 10 = 2.3333$ = L. C.

	I. P. = sta.	542+72
$2^\circ 19\frac{1}{4}'$ = def. for sta.	542	
$4^\circ 49\frac{1}{4}'$ = " "	+50	Tan. = 1 . 18.47
$7^\circ 19\frac{1}{4}'$ = " "	543	B. C. = sta. 541+53.53
$9^\circ 49\frac{1}{4}'$ = " "	+50	L. C. = 2 . 33.33
$11^\circ 40'$ = " "	543+	
	86.86	E. C. = Sta. 543+86.86
$100 - 53.53 = 46.47 \times 3'$ (def. for 1 ft. of 10° Cur.) = 139.41'		
$2^\circ 19\frac{1}{4}'$ = def. for sta. 542.		

Def. for 50 ft. = $2^\circ 30'$ for a 10° Curve.
 Def. for 36.86 ft. = $1^\circ 50\frac{1}{4}'$ for a 10° Curve.

