



Newsletter

Fall 02 / Winter 03 Issue 23



Club Information

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Calendar submissions:

Calendar items should be sent to Jeff Rogers at least 2 months before the event.
president@norcalrover.org or Club PO Box

Our web page is www.norcalrover.org

Members are strongly encourage to submit articles, notes or letters for publication.

Club Decals

Additional club decals are currently available for \$4 each. The decals are approximately 2 inches by 4 inches and bear the club logo as it appears on the newsletter cover. To obtain additional decals please forward a letter with a mailing address, number of decals desired and a check for the appropriate sum to the club address.

Newsletter Back Issues

Newsletter back issues may be obtained from the website in PDF format.

Membership Application

A membership application can be downloaded from our website at <http://www.norcalrover.org>

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Cover Photo: Joe's 109 positioned for changing a flat, and Bruce without the snow plow attachment.

Offroading and Archaeology

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By Jason Pipes

Many NCRC trips are held in mountain and desert areas and the chances of coming across historically and culturally significant artifacts and sites are very high. What do you do if you stumble upon an archaeological site while exploring or offroading? As there are many ethical, moral and legal issues at play around archaeological sites, knowing what to do when you find one is very important.

An archaeological site is defined as a distinct spatial clustering of artifacts, features, structures, and/or organic and environmental remains that are the residue of human activity. The most common form of site one is likely to encounter while on an offroad trip is known as surface scatter. Surface scatter are sites that, at the offset, consist of single or multiple human-altered historical objects found directly on the earth's surface. You can generally think of these object as pottery sherds, stone tools, projectile points, and the refuse left behind from their creation. Surface scatter literally means that objects are found laying upon the ground. Scientifically speaking surface scatter sites are found via unsystematic or systematic methods. Finding a surface scatter site while exploring during lunch is an example of an unsystematic method of finding a surface scatter site.

The first thing to do when you discover a site regardless of its type is to be careful not to disturb the location, especially if it is in an area where people or vehicles don't travel. The physical placement of objects is often a very critical to researchers trying to understand their importance. Although placement is less of an issue with surface scatter it's always a good rule of thumb to avoid moving or disturbing finds if possible. Take photos of the site but don't take anything more than that. In most cases it is illegal to remove objects from a site, especially if they are on land managed by the government. Projectile points (often referred to as arrow heads) collected from the surface are excluded from the Archaeological Resources Protection Act (one of the most significant laws affecting archaeological resources to have been



enacted in recent years) and therefore collecting them is less controlled. Even so, projectile points or any artifact found on government land is considered government property and it is therefore theft if you remove them.

I spoke at length with the regional archaeologist for the Nevada BLM Black Rock Conservation Area about this matter. I suggested to him that because of the chances of artifacts being lost or stolen when found on offroad trails that their removal (and later sending them to the proper agency) would be ideal to help protect them. I mentioned that most federal archaeology groups don't have the time or resources to do so themselves and that many people take artifacts without concern for reporting their find. He responded as follows:

"You are correct in that land managing agencies are waging an uphill battle in trying to prevent people from taking artifacts that they find, and that it is often difficult to find time to recover artifacts that are in danger. I've had two instances where I went out to retrieve an artifact, only to find that someone else had beat me to it. Part of the problem is that cultural resources on federally administered lands are a public resource. If left behind, that arrowhead can conceivably give someone else the pleasure of discovery. Agencies also try to recover more than artifacts - ideally a research design should

Offroading and Archaeology, Cont.

be in place when artifacts are collected to optimize data recovery. Also, this is where funding rears its ugly head - curation costs are soaring and agencies are forced to keep artifact collections to a minimum for purely economic reasons. As imperfect as it is, leaving an artifact behind is still the best policy. If you notice that an artifact is in extreme danger of destruction it would be okay to move it. If I find a projectile point in a road rut I often move it to the side of the road and record its new location. Most surface artifacts get moved around anyway from natural and cultural forces, and a few meter relocation is usually acceptable. If I'm worried about theft, I might also make an effort to conceal it, such as slipping it under a bush or a cowpie.

With this in mind, when you encounter an artifact while offroad carefully record the location, altitude, time of day, and any other relevant information using GPS coordinates if they are available. You should then be prepared to provide that information to local or regional archaeological organizations once you're back home. Often times you will be mentioned in any archaeological fieldwork reports that evolve from your find. Making contact should be a simple matter of searching online for the closest group to the location where you made your discovery. Nevada in particular has the Nevada Archaeological Association (NAA), which has a membership of both professional and avocationalists (their web site is at www.webpanda.com/NAA). On occasion members work with agency or academic archaeologists on a volunteer basis during excavation and recording projects. There is also a group called Am-Archs in Reno that is a sub-group of the of the NAA that is very active. Specific to the Nevada Conservation Area there is a group called Friends of the Black Rock/High Rock Canyon that is often called upon to assist with archaeological projects. After providing your recorded information they will pursue it as needed. Archaeologists are always on the look out for more information about sites. A single surface find might not warrant sending out researchers but by knowing that there are X number of surface sites in a given region patterns can emerge that point to larger and more important sites.

Many important archaeological sites have been found by people exploring, had they neglected to inform appropriate researchers about their discovery the information they contained would have been lost. Archaeology isn't just about objects; it's about uncovering culturally and historically significant information that ultimately belongs to us all. Representing our club as responsible members of the scientific and outdoor community when it comes

to items of archaeological significance should always be a high priority for everyone.

Lastly, don't forget to take some time to enjoy the site you've found. Absorbing its historical significance is part of our human connection!

Where's Regent

The answers to the "Where's Regent" game from the summer newsletter are as follows:

Picture 1. Yosemite National Park. On the right you can barely make out Bridal Veil Falls, while the rock cliff on the left is El Capitan, and I think that's Three Brothers in the clouds, but not exactly sure. I'm sure Yosemite Experts can name more.

Picture 2. Yosemite National Park, Yosemite Falls.

Picture 3. Craters of the Moon National Monument, No special place.

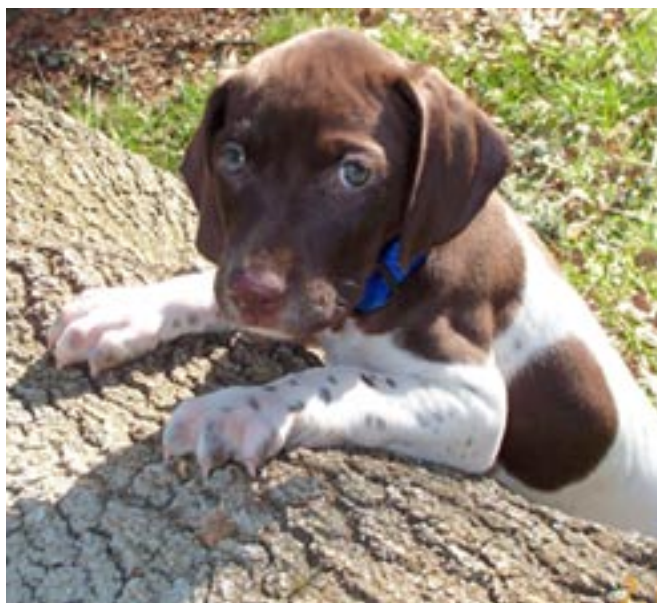
Picture 4. Lassen Volcanic National Park, Chaos Crags.

Picture 5. Sequoia National Park, No special place.

Picture 6. Yellowstone National Park, Mammoth Hot Springs

The winner is no one. I did not receive any entry's. Not even one guess.

NCRC newest member



Von der Feld Bonsai Gustine Cope

Series Land Rover Steering Relay Replacement

By Jeremy Bartlett

Chances are that the older your Series vehicle is (what do you mean you don't own one?) the more play you have in your steering. One source of this play is the steering relay. Now before you jump to conclusions, just because you have play in the steering doesn't automatically mean that you need to replace your relay. There are many things that can cause loose steering in a Series Land Rover. In my experience more than with a coil sprung Land Rover. Finding out if the steering relay is the source, or one of the sources, is best accomplished with the aid of an assistant. While you poke around looking at and feeling the components along the length of the steering linkage have your assistant work the steering wheel back and forth between the limits of "slop" (before the wheels start to respond). You should be able to locate the part(s) that don't move when the rest of the linkage initially does or that wiggle suggestively.

If you've never heard of the Series Land Rover's steering relay before, it is the device located in the front cross member just behind the breakfast. It's on the same side as the steering wheel. It passes through the front cross member with an input arm attached to the top of its shaft and an output arm attached to the shaft at the base below the cross member. Basically it translates the turning motion of the steering column down through to the linkage to the wheels. The output arm is attached via a ball joint to the drag link which in turn runs across the vehicle to the swivel on the right side. If the steering relay is the location of your steering play you will probably see some wobble in the input, or more likely, output arms as the steering is initially turned.

Having determined the steering relay to be the cause of your woes the next job is to replace it. In theory it is possible to rebuild a relay, although I've not checked if the bushes (and other bits less prone to wear) are still available. In practice this is not commonly done since a replacement relay can be had at a reasonable price, all things considered.

Fortunately replacing the steering relay is not a very mechanically complex job. There are very few bolts to undo and no fluid bleeding procedures or fine measurements to be made. Unfortunately, steering relay replacement does have one important prerequisite. The prerequisite for steering relay removal is to be lucky. Owning a vehicle that has spent most of its life in a dry, salt free climate will help you to be lucky. Penetrating oil will only get you so far if you lack the requisite luck. The reason that it helps so much to be lucky is that the steering relay is held in at the top by two bolts and at the base by a friction fit with the cross member. It is removed by pushing

it up through the cross member. So you can imagine that a relatively rusty and dirty relay is not going to progress smoothly up through its exit from the cross member. I have been told of relay removals that took a couple of days with the vehicle jacked up so that the weight of the entire front end was on the relay which was propped below on a suitable rest. In such cases time lapse photography is perhaps the best way to check movement of the extracting relay. I have even heard rumors from the east coast of desperados cutting the cross member and replacing it along with the relay. Out here on the west coast we are fortunately more lucky.

The photos of this operation show a Series IIA. A Series III will be similar. The first thing you will need to do is remove the front grill to get access to the relay. To proceed with the relay replacement apply a liberal soaking of penetrating oil to the top of the relay so that the oil soaks down the inside of the cross member and begins (hopefully) to drip out the base. Do this regardless of how lucky you are. If nothing drips out the base go and buy a rabbit's foot. Now remove the lower arm from the relay by removing the retaining bolt. The bolt keeps the arm in place by sitting in a groove through the splines of the relay output shaft. You may need a steering arm puller to get the arm off, especially if you're unlucky. Levering with a pry bar between the arm and a suitable brace point on the cross member may also get the part off as may light tapping with hammer or the like. I suppose you don't have to worry too much about the integrity of the old relay since it's being replaced. Repeat this process for the upper arm. Now that you have the arms removed, the next step is to remove the mud shield at the base of the relay. There are four screws holding the shield in place. These are the outer four; the inner four hold the relay together; don't touch them. Pop the mud shield off; it's a friction fit around the base of the relay. Now things get a little tricky. There are two bolts at the top of the relay that hold it in place in the cross member. Loosen these bolts. You'll find that they cannot be withdrawn without either removing the radiator or the breakfast, depending on which way in they've been put in. Most seem to be put in requiring removal or shifting of the radiator, which in my books is preferable to shifting the breakfast. If you are careful you can unbolt the radiator from the top and sides and leave it attached to the hoses. Just shift it back being careful not to damage it against the fan or tear older radiator hoses (remember to be lucky). There should then be just enough space to work the steering relay bolts out. This saves you the trouble of draining and refilling the cooling system.

With the upper and lower arms off and the retaining

Series Land Rover Steering Relay Replacement



bolts removed you can now try to remove the steering relay from the vehicle. It has to be pushed up from the bottom to come out the top of the cross member. I found the best way to do this was with a jack pushing up on the base via a block of wood and a piece of metal tubing larger than the relay shaft but small enough to fit through the cross member hole without fear of getting stuck. A jack stand extension worked perfectly. The first photograph shows this arrangement at work. Use what you have or can come up with. Remember jacking safety. I was lucky and my relay was rather loose and came out as soon as the jack lifted the vehicle sufficiently to transfer weight onto the relay. The second photograph shows the relay emerging from the cross member. This occurred despite lifting the relay at a slight angle. I did this because in addition to sometimes being lucky I am also lazy and did not want to go through the hassle of removing the tie rod to get a straight shot at the relay. Whoever said necessity was the mother of invention didn't have it quite right; laziness is. It's amazing what gets invented to save time and effort. If you find it necessary to get a straight push on the relay you will have to remove the tie rod which is the rod with a ball joint at each end linking the front wheels. If this is necessary only undo one side sufficient to move the rod out of the way. The third photograph shows the breakast and cross member with the relay removed. The fourth photograph shows a comparison of the new next to the old relay. You can see the nice clean shiny friction fit area at the base of the new relay.



If you have been lucky and successfully removed the relay without much fuss, then the only real "special tool" that you will require for this job is a cheap small syringe acquired from your local pharmacy. The use of this tool is to fill the new steering relay with oil (they aren't shipped full). As shown in the fifth photograph, the technique for filling the relay is to remove two of the screws retaining the top plate of the relay (don't remove all four). These removals create one hole for filling and one hole for venting; without the vent hole air already in the relay would be trapped and the consequent bubbling would make it very hard to fill. When you've finished filling the relay with 90w oil replace the two screws. I filled mine before I installed it since access is a lot easier this way. While you've got the tools out for these screws make sure the four on the base of the relay are aligned so that their flats are flush with the side of the relay. If the corners of the screw heads stick out (as they did on the one I received), the piece won't clear the hole in the cross member and the mud shield at the bottom won't fit on. And you thought Series vehicles weren't precision machines.



Clean out the hole in the cross member before you install the new relay. Depending on its condition you may want to put rust preventive and/or paint on. Some people like to use anti-seize lubricants in such locations. These are a mixed blessing since they can trap more dirt and some (especially the copper/lead ones) do in fact end up corroding. I think the best bet is grease, but choose your own poison. The goal is to prevent rust and make the next removal easier for your grandchildren (you're not going to do this again are you?).

Series Land Rover Steering Relay Replacement



Insert the new steering relay into the cross member and tap it home until the retaining bolts can be fitted. When they've been replaced reattach the mud shield at the bottom with its four screws. It will have to be tapped onto the base of the relay. Don't be surprised if regardless of the orientation in which you reattach it the screw holes now don't line up with those in the cross member. I don't know why they don't but they don't. Be prepared to remove and refit it a couple of times perhaps even enlarging the screw holes a bit to allow the screws to line up properly with the threads in the cross member (don't cross thread them).

Attached the upper arm first and secure it with the retaining bolt. Use a new lock washer, and ideally some thread locking compound ("Loctite") as well. When the

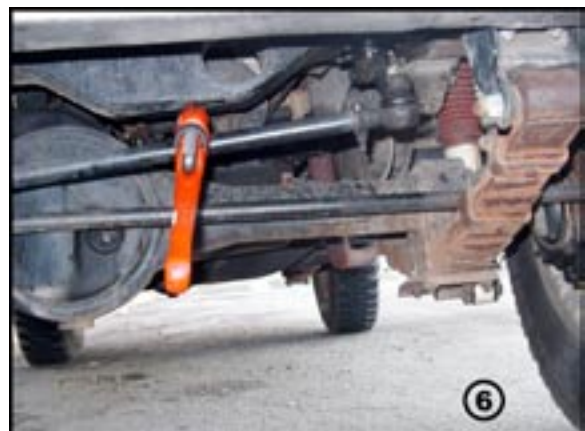


upper arm is secured turn the steering from one extreme to the other making note of how many times you turned it total. Divide by two and turn the steering wheel this many times. The steering relay will now be approximately centered between the limits of the steering wheel motion. Failure to center the steering wheel in this manner could leave you with a Land Rover only capable of turning to one side. Once you've done this you can now attach the lower arm (remember the lock washer and thread locker). You may find it helpful to jack up the right side wheel while fitting the lower arm. This will allow you to move the whole arm and drag link assembly just a bit, perhaps enough to make the job easier. To get full play in the arm and drag link for remounting the arm you will have to jack up both front wheels (remember jacking safety). I got away with only the right side but err on the side of minimizing the risk of damage to the new relay splines. Make sure the lower arm retaining bolt is on tight. Having the lower arm drop off would be rather unpleasant.

When all is reattached you now need to loosen the retaining clamps on the drag link. These are at the ends near the ball joints. With these loose the drag link can be rotated to be lengthened or shortened. Lengthening or shortening the drag link allows you to fine tune the centering of the steering wheel. To turn the drag link I find the best

tool is a pipe wrench set around the center of the link. This is shown in the sixth photo. If you are unlucky it may take a few hard blows to get it moving. Adjust the link to center the wheel but double check at the ends to make sure you're not exposing too much of the ball joint thread on either end. If there's a large difference on either end you may even run out of adjustment room and have to either remount the steering wheel or relay arm on a different orientation on their respective splined shafts.

Your steering should now be centered and the play due to the steering relay gone. Congratulations.



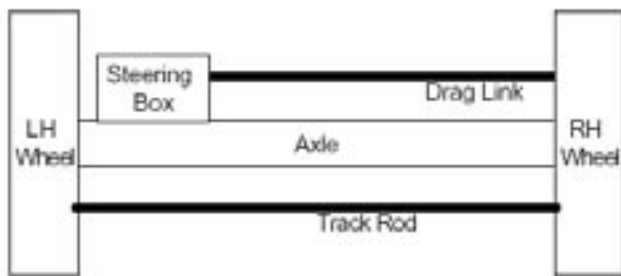
Track Rod Replacement and Alignment

By: Chris Dow

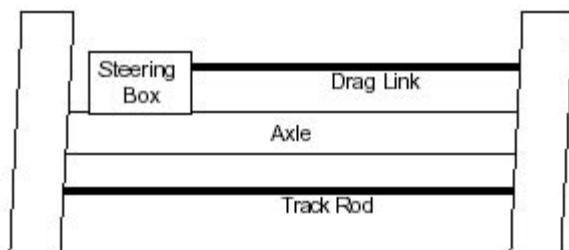
As some of you may know, I've had ample opportunity to perform alignments after installing track rods on Defenders, of late. I thought I'd save everyone the hassle I encountered when trying to get a reputable chain to do that, and list my procedure here.

Background

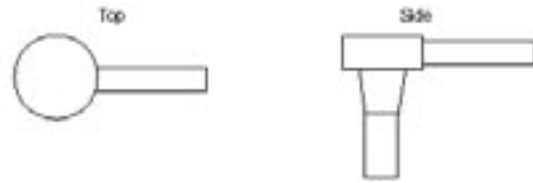
First, it helps to understand how steering works on Land Rovers. As the figure below illustrates, the basic principle is that the steering wheel turns a mechanism in the steering box, which causes the drag link to move left or right. Both the drag link and track rod are attached to the right-hand wheel. The track rod is also attached to the left-hand wheel.



Thus, when the right hand wheel pivots about the end of the axle, it causes the track rod to move in the opposite direction from the drag link. Since the track rod is moving the back of the left wheel, it "tracks" the movement of the right wheel, as illustrated below.



So, in effect, the left-hand wheel is doing what the right-hand wheel is telling it to do. The right-hand wheel is doing what the steering box tells it to do, and the steering box is doing what the steering wheel tells it to do. Note that aligning the steering wheel to be straight when the vehicle's wheels are straight is done through the drag link.



Necessary Items

- New track rod
- New track rod ends
- New clamps for track rod ends
- Wrenches (18mm, 16mm, 11mm, 10mm for my 110)
- Two meter sticks--as stiff as you can find, as flex will affect alignment measurement
- Jack
- Jack stands
- Pickle fork
- Duck-bill pliers

Removing Old Track Rod

First, remove the bracket attached to the differential through which the track rod runs (90 and 110 only). Be careful, as if the track rod is really bugged, it can launch that bit at high velocity once the bolts are removed.

Now, remove the rod from the vehicle. This job can be difficult--especially if the track rod has been in place for some time. First, lay under the vehicle and note where the track rod is attached to the wheels. There is either an aero nut or a castle nut holding the track rod end in a hole through an arm attached to the wheel. The stud on which this nut is threaded is able to pivot and rotate inside the round part of the end (see figure below). This makes the task a bit difficult sometimes.

Get out the appropriate wrenches. Remove the cotter pin if you have a castle nut on the end. Attempt to turn the nut. If it's a castle nut, it's likely to come off pretty easily. If it's an aero (lock) nut, then it's likely to be a little more difficult. The problem that you are likely to encounter at this stage is that the section of the end which goes through the eye on the arm that is attached to the wheel will spin as you attempt to remove the nut. The best solution to this problem is to start the vehicle and turn the steering wheel. This causes pressure to be exerted by the eye against the conical section of the track rod end, and prevents it from spinning in the eye. If you do

Track Rod Replacement and Alignment

not encounter this problem, do not get too pleased with yourself, as you are likely to encounter another problem when removing the track rod assembly from the eyes.

Once both nuts have been removed from the ends, it's time to remove the track rod. If it was difficult to get the nuts off the ends, this task is likely to simply involve pushing up on the rod and having it pop out. If it was easy to get the nuts off, then the conical part of the end is seized in the eye. In this case, turn on the vehicle and move the steering wheel back and forth several times. This may result in the track rod popping out of the eyes. If not, measure the diameter of the part of the track rod end that goes through the eye, then go to your local parts store and purchase a pickle fork of suitable size. A pickle fork looks much like a tuning fork, but the "U" shaped portion is a wedge in cross-section. Place the pickle fork on the top of the eye through which the end is inserted, and pound on the end of it with a hammer. As the two sides of the "U" go under the top of the track rod end, it will lift it up and pop it out. There is likely to be much grunting and cursing in this stage of the operation.

At each end of the rod, there is a clamp which prevents the rod from turning on the ends once the alignment is correct. Unless you remembered to purchase these when you purchased your new rod and ends, these must be removed for installation on the new rod assembly. Loosen the bolt which closes the clamps, then remove the ends. Note that the ends and rod have two thread directions, so righty-tighty-lefty-loosey only applies to one of them. Removing the clamps may involve placing an adjustable spanner on the rod and banging on it with a hammer (it always does for me, anyway).

Setting Up The New Track Rod

You should have purchased new ends (since you likely buggered the old ones in one of the steps above) and a new track rod. Place the clamps on the ends of the rod. Note that this may involve increasing their diameter. I have found that the best way to do that is to place the nose of a pair of duck bill pliers and force them open. I then place the clamp on the end (where it either almost or just barely fits), placing the aforementioned adjustable spanner on the clamp, and banging with a hammer. Once the clamps are on the rod (remember not to tighten them), install the ends—remember that each end is threaded opposite the other. Run the ends into the rod until they are in as far as they will go and both ends are lined up axially about the rod. Remember to check for a grease nipple in the box for the ends and install it

if it's there. If there's a hole in the top of the end and no grease nipple in the box, you may need to send the part back and get another.

Installing New Track Rod

When the assembly is completed, place the "down" part of the ends back in the eyes on the wheels. You may have to jiggle the steering a bit to get them to fall into place. Next, run the nuts up the down part of the ends to secure them to the eyes. You may encounter the same problem as in the removal step: the stud spins as you try to run the nut up. Again, fiddling with the steering to create pressure inside the conical eye will help prevent this from happening. I have also done it by placing my shoulder against one tyre while my feet exerted pressure on the other.

Once the rod is in place, replace the bracket which is bolted onto the diff (90 and 110 only).

Alignment

Once the track rod is installed, adjust the steering until the right-hand tyre is as straight as you can make it. Put the vehicle up on jack stands so that the wheels are just off the ground and the axle is level. Get the two meter sticks, and pick a place as high as you can just inside the lip of the leading and trailing edges of the wheel. Place the meter sticks together and slide them against each other until they are touching the points you picked on the wheels. Use one meter stick as a marker for reading the other (always use the same side of the same stick for taking the measurements). Perform the same measurement on both the leading and trailing points on the wheels. Spin the track rod to increase or decrease the distance between the leading and trailing edges of the wheels until the measurements are in spec. For a 90 or 110 it should be 0-1mm toe-out. Thus, if there is any slop in the measurement (i.e. you can only measure to 1mm and you're not getting it dead on), give the larger accurate measurement to the leading edge. Once you've got it, tighten the clamps and measure again to make sure you didn't affect the alignment in that process.

Testing

To test the alignment, I take the vehicle out on the stretch of 101 from Embarcadero to San Antonio Ave. and run it up to the maximum speed with which I feel comfortable (80MPH). If the steering and handling behave, then I know I've got it. The requirements are fast speed and a less-than-perfect road, so that stretch of freeway meets my needs.

T r i p R e p o r t

The Lake Lahontan Expedition: *Land Rovers Meet the Ice Age*

By: John Brabyn PhD

At 9:30 am on September 14, 2002, a group of Land Rovers met at the Churchill County Museum, Fallon, Nevada. Their purpose was to explore and film the remains of the vast lake that covered much of Nevada during the last Ice Age. The people who lived around the shores also left evidence that begged to be explored. As befitted a Land Rover expedition, an emphasis was planned on the more remote and difficult-to-reach aspects of the geological and archaeological evidence, inaccessible to the general public. The trip would cover 300 miles of desert dirt in 5 days, with 4 nights camping out on the trail.

Such was the official expedition mission. However, nobody present was in any doubt that the hidden agenda -- the secret mission and the underlying purpose -- was to have a good time.

Furnishing the necessary Land Rover horsepower were Lynn Helm's Series IIA 88, Marvin Mattson's Chevrolet 350 with a Series II 109 body conversion, Jay Finklestein's Series I Discovery, and the author's Series II Range Rover 108 4.0SE. Equally important was the intellectual horsepower required for the trip's geological and archaeological theme. Unfortunately our official NCRC Geologist, Jeremy Bartlett, was unable to make it. However, the hand-picked team that assembled in Fallon at the start of the trip included my 83-year old Uncle Joe and cousin Sally -- both amateur geologists (and desert rats) of considerable experience. Joe's lifelong geological interest included studies at UC Berkeley. The scientific team was completed by Jay Finklestein's nephew David, a cultural anthropology major, also from UC Berkeley.

Participation of Joe and Sally was made possible by a slight dilution of Land Rover purity -- they drove Joe's GMC Jimmy. This was felt to be permissible since the expedition's 109 was GM-propelled, and the engines of the Discovery and Range Rover both derived originally from the same manufacturer. Thus, the only genuine Land Rover power source present was in Lynn's 88. In any case, before the trip, Sally diligently did her "homework" by reading a Land Rover book on off-road driving techniques. Also making up for the slight deviations from official Land Rover purity was the custom-made expedition apparel kindly provided by Land Rover Marin, and Land Rover pins supplied by

Land Rover of North America. All members also wore Geological Society of America badges to remind them of the serious nature of the task at hand.

Departing from Fallon, we started with an official BLM tour of nearby Hidden Cave -- the premier archaeological site of the Great Basin. In the dank interior of this cavern, open to visitors for only half an hour twice a month, we were able to observe layered strata spanning over 10,000 years, including ancient buried cache baskets and atlatl arrows. A layer of ash from the Mt Mazama (Crater Lake, Oregon) eruption 6,700 years ago helped confirm the time scale.

After the official tour, we began our own, less civilized, agenda. After a brief stop at Grimes Point to view the petroglyphs (too near the main road -- and with its own parking lot -- to be considered serious exploration), our first destination was a nondescript-looking site off Highway 50 where ash from the Mono Craters eruption was buried in a sand barrier, providing evidence of an old beach dating from as recently as 600 years ago. This was a graphic illustration of how the lake basin has periodically filled and emptied over the years since the peak 12,700 years ago, known to geologists as the "Sehoo Highstand". Then, the waters covered some 8,500 square miles in central Nevada, centered on the Carson Sink.

From here, in order to reach the blessed shade of our lunch stop at Fish Cave, we had to cross the Lahontan Mts and descend a very rocky 4WD trail. To avoid damage, the GMC bypassed the rocky section on a longer but easier road. In the cave itself, formed by the wave action of the lake, spectacular tufa deposits lined the roof (evidence of underground springs bubbling up and precipitating their mineral load). After lunch, we traversed many miles of undulating primitive dirt tracks to inspect a 3,800-year-old habitation site in the Stillwater Marsh area. On the surface here we were able to film a number of arrowheads and other remnants. As evening approached, we climbed a steep 4WD trail up the face of the Stillwater Range to reach a spectacular ancient spit, now 500 feet above the dry floor of the Carson Sink. Camping here, we could see the old beaches, cut into the sides of the Range, stretching for miles north and south.

On Day 2, after visiting more ancient beaches in the Stillwater Range, we tackled the sand dune barrier separating us from the vast Carson Sink playa. The GMC got stuck in the sand, but eventually we all made it to the dry lakebed. It was eerie to think of this ground



John Crossing Wash



Approaching Fish Cave



Checking Marvin's Engine



Fishing Boat Far from Water



Carson Sink Playa



3800 yr old shell middens



Hidden Cave Petroglyph

T r i p R e p o r t

being under 500 feet of water not so very long ago!

To skirt the naval bombing range in the middle of the playa, we had to cross many miles of rough and uncertain terrain before reaching terra firma at the foot of the West Humboldt Range. I managed to find the 4WD “road” marked on the map, but it kept disappearing, so we resorted instead to Marvin’s instincts, developed during years of training in the Black Rock, to find us a path where we might not sink in. Those of us who had viewed videos of his reckless solo assaults on the Black Rock Point in the snow were not reassured that we would again see terra firma, but we stuck together and finally reached the “shore”.

Greeting us at the remote West Humboldt Range was a spectacular view of the steps cut into the hill face by wave action as the ancient lake stabilized at successively lower levels. An extremely steep, faint 4WD mining road climbed this “staircase” to the top of the range. Several of the vehicles needed a tug to surmount a particularly gnarly “step”. Concern arose about potential damage to the GMC that could result from continuing, so camp was made for the night at an intermediate plateau about halfway up the staircase.

By now the daily camping routine was becoming established, with each participant utilizing his own idiosyncratic solution. Jay and David slept in collapsible “tent cots”, which kept out the elements as well as the mosquitoes. Marvin had his classic “Oregon Trail” rooftop tent, while Lynn slept in his permanent bunk in his vehicle. Joe and Sally alternated between a tent and the open air, depending on the weather, while I luxuriated inside my vehicle with one of the back seats folded down. Providing amusement for the gathered throngs was the rest of my Range Rover routine including the evening shower and dressing for dinner before the obligatory round of margaritas and finger snacks.

That night a storm fortunately held off long enough for dinner. When the sky cleared the next morning, the fresh air and a hike to the ancient high beach barrier at the top of the mountain (now covered with smooth black “desert pavement”) afforded a breathtaking view of the Carson Sink. The vast extent of the ancient body of water began to “sink in”.

Day 3 was devoted to exploration of the West Humboldt Range, including the Lovelock and Ocala Indian Caves. At the former site we had one of the few meetings with other human beings on the trip – a pair of dirt bikers looking for refinements to their

annual “border to border” off road route from Mexico to Canada. Not interested in the history and archaeology of the cave itself, they were nonetheless interested in our views on the existence of 4WD roads to the south in the direction we were heading. We caught up with them again near Ocala after a great many miles of questionable trail.

Along this rough and obviously unfrequented 4WD road fringing the north side of the range, we discovered eerie old beaches with the pebbles still piled up undisturbed along the shore. Sitting there, we could really imagine the waves splashing in, and the ancients sitting at the water’s edge, having a barbeque and watching the children swim.

Relaxing on the beach, we realized that our time was passing rapidly -- each day packed with geological and archaeological interest. Scientific commentary and debate on the CB was interspersed with Land Rover talk as the route was punctuated by some kind of 4WD challenge (rocks, sand dunes, steep hillclimbs, washouts) -- that sufficed to give pause even to the veteran drivers.

Our camp that night was on another bluff with a beautiful view of the Carson Sink. Leaving next morning, the 88 stuck briefly in a steep sandy spot, but soon the convoy continued south through the Hot Springs Mountains, forming the western shore of the ancient lake. On the sandy dirt roads forming this leg of the journey, Lynn and John (as was their custom at least once on every expedition) swapped vehicles. This enabled John to get grounded again in “real” Land Rover driving while Lynn glided through the rough and dusty bits in air-suspended, pollen-filtered comfort listening to Mozart on the 11-speaker stereo.

On this leg, we visited an archaeological site where stone tools and weapons have been found dating from the Clovis period 10 to 12,000 years ago – corresponding to the earliest human migrations to North America. In those days, this spot was right on the lakeshore; an ancient beach appears at this level all along the foot of the Hot Springs Range. The arrival of humans coincided with the extinction of the large mammals that formerly lived here -- including woolly mammoths. Among the remains that cannot be explained today are dozens of mysterious pebble mounds – arranged in geometrical patterns. One theory is that the pebbles were removed from the surrounding terrain to improve water runoff, stimulating the growth of useful plants downhill.

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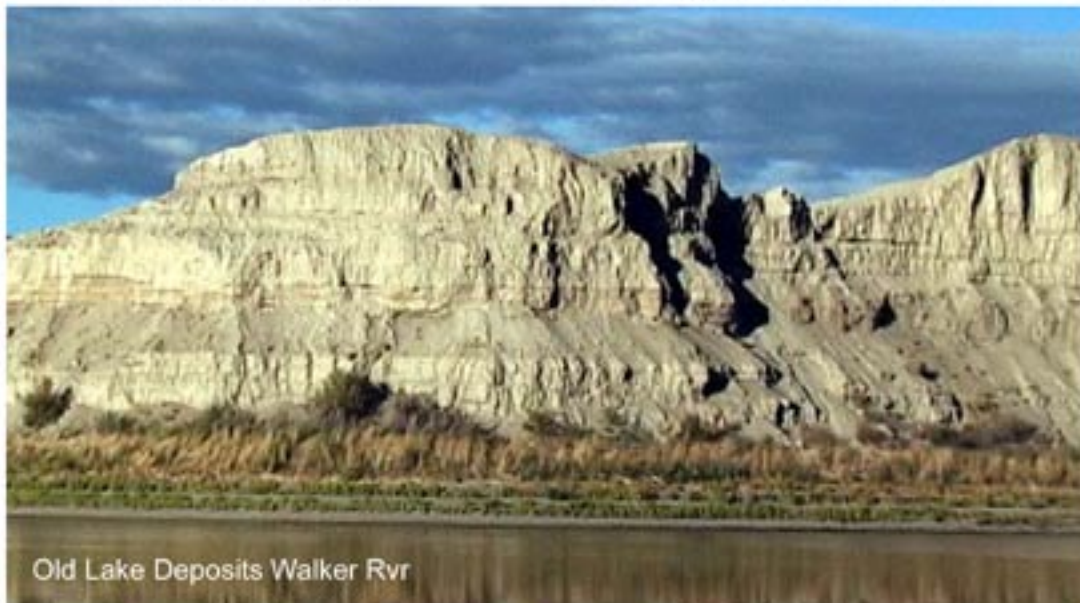
Descending West Humboldt Beaches



Hidden Cave Interior



Lynn Inspects Fish Cave Tufa



Old Lake Deposits Walker Rvr

Trip Report



Old Shells Stillwater Marsh



Old Shorelines Humboldt Range



Sally Explains Lake Deposits



Sandblasted Rock



Marvin's Hat



Joe's Hat



West Humboldt Stairsteps



Continuing south, we lunched in the narrow Adrian Valley, the only low-altitude connection between the Carson and Walker Rivers. In ice age times, this valley joined the Carson and Walker Lake basins to form one vast uninterrupted body of water. At other times (and as recently as 2,000 years ago), the Adrian Valley channeled the Walker River north into the Carson drainage, completely drying up Walker Lake. Today, the Adrian is dry, but evidence abounds of its past vital role in the Lake Lahontan system.

We now followed the remote north bank of the Walker River, where evidence was seen of ancient beach barriers some 200 feet higher than the previously assumed peak of Lake Lahontan. Such evidence occurs in several places in the Walker basin, indicating that sometime since the Bishop eruption of 700,000 years ago, Lake Lahontan reached a staggering size – flooding as far south as Rhodes Salt Marsh, and extending from Reno to Battle Mountain. We located and sampled for analysis a layer of volcanic ash that, with luck, might provide further clues to the lake's uncertain chronology.

Day 5 began with a drive up the sandy bottom of McGee Wash, a prominent drainage channel where strata from the last million years can be studied in the steep, contorted banks on either side. A deep washout half way up prompted us to send Marvin ahead to find a way around. He led us on a detour over a sandy hill whose descent back into the Wash would be too steep to attempt on the return journey, but our reward was some truly unique geological evidence, including a long beach barrier at 4,600 feet – far above the 4,390 ft “Sehoo highstand” level.

Returning to the washout, we had to dig our way out with picks and shovels, getting two Land Rovers stuck in the process. We then skirted the east shore of Walker Lake, where a particularly rocky stretch of trail took us up to an outcropping of tufa-cemented beach gravel far above the Sehoo highstand lake level. Some of the rocks on this road had to be rearranged to allow the passage of the GMC, but all made it to the outcropping, where lunch was served at the ancient shore level with present-day Walker Lake shimmering in the distance – over 600 feet below us.

All that afternoon, we saw stark evidence of the recent, manmade shrinking of Walker Lake during the past 100 years, due to diversions from the Walker River for irrigation. The water level during that time

has dropped by over 120 feet -- so far that ruins of old fishing boats and docks we explored are now almost mile from the shore. From Thorne Bar, a curious high sandy spit formation protruding into the lake, we gained a truly panoramic view of the lake and its surroundings. Climbing the sandy road to the top of the Bar, we observed again the characteristic staircase formation on the hillside documenting the successive levels of the lake.

On the final stretch, the GMC developed slow leaks in two tires. Considering the very street-oriented nature of the GMC's rubber and all the rocks we had been over, it was amazing that more trouble had not arisen. Fortunately, air from the 4.0's suspension kept the situation under control until we reached the tire shop in Hawthorne. Finally emerging there from the desert dirt, the participants were sorry to see the trip end, but secretly relished the real showers, real beds and the restaurant food of the awards dinner.

Reflecting on the experience, members of the group were well satisfied. Enough evidence had been documented in video footage for the future production of a modest documentary about the former lake, and the vehicles had all performed well with no breakdowns. The customary rude barbs that Range Rover drivers experience from owners of “Real Land Rovers” were made bearable by the fact that (due to some quirk of fate) the convoy's 4.0 was the only vehicle not to get stuck along the route, and was pressed into service as the primary tow truck. This expected rivalry between the different Land Rover models was augmented and enriched by the presence of an “other brand” vehicle. All agreed that the GMC had turned in a creditable performance considering its low clearance and other car-like features. It got its undercarriage scraped, bashed and dented frequently, but had only been actually stuck twice – the same number of times as the Discovery and the 109. However, the experience did turn Joe and Sally into Land Rover admirers!

We all gained a new way of looking at the desert, and a wider perspective of geologic time and history. In the clamor of today's news commentary about alleged global warming, it is easy to lose sight of the fact that the earth is overdue for another ice age. Who knows, Lake Lahontan may rise again sooner than we think!!

Trip Report

My First Time! (off road with my Land-Rover)

By Rob Kerner

We were living in Southern California at the time, and had purchased Regent from a Grad Student at Santa Barbara. I was looking for places to try it out, when I was at the Anaheim Convention center Outdoor Recreation show and spotted a whole bunch of Side Kick maps. I purchased a couple, including Coyote Canyon in Anza Borrego. It was rated medium, so I figured I would go down and run it, and turn around if need be. The trail travels up Coyote



Canyon as it narrows, and then climbs out. The beginning section can be done by any 2 wheel drive vehicle. I was meandering along when an FJ40 came up behind me and started tail-gating. After a creek crossing I pulled over and he followed. It turns out he was traveling with a D-90. Keep in mind this is in early 1995, so the D-90 is brand new! We chat a while, and they have run this before, so I lucked out and now am I am traveling in a group. Lucky (stupid) me for starting out alone. We head out from there and hit the break off point for the non 4X4 crowd. A rocky hill climb. This being my first real trip, I put it in low range and go entirely too fast up the hill while trying to follow spotting instructions. I managed to shave some metal off my Warn hubs, but other than that no real damage. The trail then meanders through the valley and crosses/follows the stream. We saw a wild horse in the canyon. Eventually we pass a historic marker for the first



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born child in California from De Anza's exploration. A little further up is a cabin with a sign in sheet. At the cabin a disabled Jeep was being pulled out in the opposite direction. We head off the trail here and find a nice spot to camp next to a year round stream. That night the frogs kept me up, and I swear I heard a Mt. lion, but the guys I was with thought I was hearing things.

The next morning we had a little further to go up the canyon, and then a rather difficult climb out of the canyon, called Turkey Track. Again the guys helped spot me up the turkey track, and the only damage incurred was a bent transmission brake backing plate from too little clearance on an obstacle. Once to the top, we topped up our tires and said our goodbyes. I can't for the life of me remember their names, but they helped make my first time off road trip memorable, and exciting. Sadly Coyote Canyon is closed to motor vehicles because it is a breeding ground for the Big Horn sheep, but then I can't hold that against the sheep. It is one trail I am glad I got to run. FYI, I am sure it would be a much easier drive now that I possess some off-road driving skill and experience.





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