Audio Commentary for
Rock Creek Augmentation Project Video

Audio 01
The Rock Creek Augmentation Project (which during this video will be referred to as the Project) is located near the Southwest corner of Nebraska, a little less than 20 miles from the intersection of the three states of Colorado, Kansas, and Nebraska.

Audio 02
The Project is within the Republican River Basin, a watershed that drains almost 25,000 square miles to its confluence with the Smoky Hill River in northeastern Kansas, forming the Kansas River. These flows eventually drain into the Missouri River.

Audio 03
The Project is owned by and located within the boundaries of the Upper Republican Natural Resources District. The District is one of four Natural Resource Districts located within the Republican River basin in Nebraska.

Audio 04
Rock Creek itself is a small, baseflow-dominated stream, roughly 10 miles in length, which drains into the Republican River near Parks, Nebraska. The major components of the Rock Creek Augmentation Project are in the upper portion of the Rock Creek sub-basin.

Audio 05
In this video we'll take a virtual tour of the project, along with a portion of the Rock Creek and Republican River basins. We'll start at the upper end of the project and work our way downstream. This virtual tour uses imagery from a variety of sources, including Google Earth, video from aerial flyovers, and photos and video taken from the ground level. We'll begin this short flyover starting at project headquarters. Here equipment and materials, used to maintain the project infrastructure, are stored.

Audio 06
The Rock Creek Augmentation Project is designed to add wet water to the Republican River Basin by reducing the consumptive use of water used to irrigate crops, and pumping water directly into Rock Creek. As part of the Project, about 3,260 certified irrigated acres within the Upper Republican Natural Resources District were retired, along with 23 irrigation wells that used to deliver water to those acres. Now, 10 augmentation wells pump groundwater into a pipeline and deliver that water directly to the upper portions of Rock Creek. The pipeline spans approximately 7 miles, and is up to 24-inches in diameter.

Audio 07
1,920 acres of additional lands adjacent to the Project were purchased by the District in April of 2013, to assist with management efforts. These additional lands are not part of the Augmentation Plan as submitted to the RRCA.

Audio 08
Starting at the upper end of the pipeline, the 10 augmentation wells pump groundwater into the pipe system, which moves the water downstream towards the headwaters of Rock Creek. Careful monitoring of pumping rates is maintained by District staff using a real-time Supervisory Control and Data Acquisition, or SCADA, system. The buried pipeline stretches approximately 7-miles in Dundy County connecting the augmentation wells and appurtenances. The pipeline terminates near a small embankment in the Rock Creek channel. The main discharge point is just downstream of this embankment.

Audio 09
Here, water flows out of the pipe, and then through an energy dissipater – a structure designed to reduce erosion as the water enters the creek channel. The Project has a pumping capacity of approximately 20,000 acre-feet per year, or about 27 cubic feet per second at a constant rate of pumping. Within the augmentation plan proposed by Nebraska, pumping rates would vary depending on the type of operations needed for a given year. In years in which augmentation pumping is needed to ensure compliance with the Republican River Compact, referred to as Compact Operation Years, pumping could range from zero to just over 20,000 acre-feet per year, as needed for Compact compliance. In other years, known as Maintenance Operation Years, smaller pumping rates of about 300 acre-feet per year would be sufficient to ensure that no new net depletions exist.

Audio 10
In this video footage, we move downstream from the pipe outlet into a valley shaped over time by the flows of Rock Creek. This is part of about a 1-mile stretch between the discharge point and the entrance to the Rock Creek Fish Hatchery to the south. As the footage shows, the new water in the creek follows the same stream channels that carry flows during runoff events on Rock Creek, such as heavy rainfall from thunderstorms or snowmelt.

Audio 11
The top of a bluff along the valley's Eastern edge provides an excellent vantage point from which to see the clear impact from the augmentation pumping on the flows in the creek, as well as highlighting the unique landscape of this part of western Nebraska.

Audio 12
From this spot, it's just a short distance to the entrance to the Rock Creek Fish Hatchery. In this last stretch before the hatchery, the creek passes through minor road crossings and into a small pond on the north side of the hatchery. Before moving downstream, however, we can take a last look at this upper portion of the basin, and the augmentation water as it works its way down the valley southward. As the camera pans from south to north, the augmentation pipe outlet is obscured by the bluff to the north, but would be a little less than a mile north from the location of this video.

Audio 13
Next, we'll move to the hatchery. Managed by the Nebraska Game and Parks Commission, the Rock Creek Fish Hatchery is made up of a series of ponds, artesian supply wells, and other structures that stretch from the north, or the left side of the screen, to the south, or the right side. The Rock Creek channel and the augmentation water bypass the hatchery facilities, with the channel primarily on its east side. Now with the construction of the augmentation pipeline, a portion of augmentation water could also go downstream through the hatchery joining back with the main Rock Creek channel at the lower end of the hatchery. This is accomplished via a mile-long pipeline – highlighted in green – that stretches from the end of the larger, 24-inch mainline, through a smaller pipe.

Audio 14
Just a mile downstream from the hatchery is Rock Creek Lake, a small spring-fed reservoir which is about a mile long from north to south, and covers a surface area of a little less than 50 acres.

Audio 15
Augmentation flows pass through the small reservoir, and are discharged through an outlet structure on the south side of the lake at the dam embankment.

Audio 16
After leaving Rock Creek Lake, the creek continues southwards, flowing about 4 miles before reaching the edge of Parks, Nebraska. This reach, like much of the basin, is sparsely populated, save for a small ranch operation.

Audio 17
Now as we near the outlet of the Rock Creek sub-basin, the creek enters the boundaries of the small community of Parks, Nebraska, where flow is gaged at a station maintained by the U.S. Geological Survey. On the date of this video, May 31, 2013, the average daily flow at the gage was 32 cubic feet per second. This compares with an augmentation pipe discharge of about 26 cubic feet per second on the same day, and suggests minimal if any losses of augmentation water.

The addition of the augmentation water is easily visible in the hydrologic record from the Parks stream gage, as shown in this USGS graph. The augmentation pumping, which ramped up in February of 2013, quickly resulted in higher flows downstream at the Parks gage, and indicates little if any loss of augmentation flow.

Audio 18
While just a small, unincorporated community, Parks represents an important geographic location in the Republican River Basin. Not only is the Parks gage found here, where measurements are made for Rock Creek sub-basin contributions towards Compact compliance, but just a short half-mile to the south of Parks is the actual confluence between the Rock Creek and the Republican River itself.

Audio 19
This confluence marks where Rock Creek, meandering from the north to the south, meets with the Republican River, flowing up from the south and west. The combined flows move eastward from here, with the total contributions from the Rock Creek sub-basin and any flow from the upstream drainage area.

Audio 20
The confluence is located about 8 miles south of the discharge point for the augmentation pipeline. It's also roughly halfway between where upstream the Republican River begins, at the confluence of the North Fork and Arikaree Rivers, near Haigler, Nebraska, and downstream at Benkelman, Nebraska, where the South Fork empties into the Republican River.

Audio 21
Before moving downstream on the Republican River, we'll examine the river just upstream of the confluence with Rock Creek, about one and one-half miles west-southwest of Parks. Photos were taken from the bridge just north of Highway 34, on the same day that the videos were taken at the augmentation pipe outlet and at the USGS gage for Rock Creek at Parks – May 31, 2013. While the flow at this particular location on the Republican River is not gaged, the photos do show a flowing channel.

Audio 22
Now moving back to the confluence with Rock Creek, we can take a look at the combined flow just downstream of the confluence, viewing the Republican River from the bridge just southeast of Parks.

Audio 23
This location provides a view of the Republican River with the supplemental flows provided by the Rock Creek augmentation project. The confluence is just within view near the central part of the horizon from this vantage point. Even though streamflow at this location is also not gaged, the increase in flow resulting from the augmented Rock Creek supplies is clearly evident in the video. This footage was also taken on the same day as the earlier videos that were taken at the augmentation pipe outlet and at Parks gage.
Turning downstream at the same bridge location, the Republican River continues eastward, flowing towards the next recording gage on the Republican River located at Stratton, Nebraska some 30 miles downstream.

Audio 24
Before moving to Stratton, the next reach of the Republican River stretches from the confluence with Rock Creek to near Benkelman, Nebraska—a reach of approximately 12 river miles.
At the end of this reach is another importance confluence, with the main Republican River flowing from the west, represented here in green, and the South Fork channel stretching from the southwest to northeast, shown here in red.
First we can take a look at the South Fork gage, to see the conditions as this tributary of the Republican River enters from Kansas, with the state line represented here in yellow.

Audio 25
At this location, from the bridge at Highway 61, we are a little less than a mile downstream from the Kansas-Nebraska state line. Here no flow enters from Kansas, as the stream has been entirely depleted. As one would expect this downstream view shows a similar desolate channel. These photos were taken on May 31, 2013, but unfortunately this condition on the South Fork has become a common sight in recent years. For reference we look to the USGS gage information at this location. The record speaks for itself showing regular periods with zero flows entering from Kansas.

Audio 26
Turning from the dry South Fork , the Republican River passes under the same Highway 61 a little over a mile and a half straight north. From this spot just southwest of the community of Benkelman the flows in Nebraska course eastward towards the confluence with the South Fork, which is a little over two and a half miles downstream. From here, the Republican River turns more north, and deeper into the State of Nebraska.

Audio 27
The following aerial footage was taken on June 17 of 2013, just a couple of weeks later from the previous few videos and photographs, and shows the last segment of the Republican River before its confluence with the South Fork. This ungauged segment again shows significant water flows moving downstream. While the confluence itself is just outside the view of this video, the flows from Kansas on the South Fork remained at zero throughout this time period.

Audio 28
Finally, the last reach of the Republican River before the Stratton gage stretches over about 18 river miles from Benkelman, flowing from the southwest to the northeast. A few minor tributaries and the community of Max, Nebraska, are found within this reach.
Downstream at the Stratton gage, the Republican River flow is measured for a final time before flowing into Swanson Lake. On the date of these photos, May 31, 2013, the river flow was gaged at 83 cubic feet per second.

Audio 29
After the Stratton gage, it's only about a 5 mile stretch to Swanson Lake, the final destination of this virtual river tour. Swanson Lake, formed by the impoundment of river water at Trenton Dam, is owned and operated by the U.S. Bureau of Reclamation, and also serves as a water source for portions of the Frenchman-Cambridge Irrigation District in Nebraska.

Audio 30
This last segment of the Republican River after the Stratton gage starts in a fairly narrow and defined channel, but becomes wider and more braided as the backwater affects from the reservoir begin to come into play.

From the headwaters of Rock Creek to the broad waters of Swanson Lake, this portion of the Republican River Basin represents a crucial part of southwest Nebraska, and has important implications to Compact compliance, the regional economy, fish and wildlife habitat, and many other important features. Now,

with the addition of the Rock Creek Augmentation project, the tools afforded by this wet water venture offer new opportunities for wise and careful management of water.