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Filing Date: Aug 4 2008 3:47PM MDT
Filing ID: 20922639
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DISTRICT COURT, WATER DIVISION NO. 3, COLORADO Alamosa County Courthouse 702 4th Street Alamosa, Colorado 81101	
IN THE MATTER OF THE APPLICATION FOR WATER RIGHTS OF THE UNITED STATES OF AMERICA **IN ALAMOSA AND SAGUACHE COUNTIES.**	**> COURT USE ONLY >**
	Case Number: **2004CW35** Division 3

FINDINGS OF FACT, CONCLUSIONS OF LAW, JUDGMENT AND DECREE

THIS MATTER has come before the Water Court on an Application for Approval of an In-Place Ground Water Right for the Great Sand Dunes National Park filed by the Applicant, United States of America, and the Court, having reviewed the Application, the Amended Application and the other pleadings and materials in this case, having considered the comments of the Division Engineer, and now being fully advised with respect to this matter, enters the following Findings of Fact, Conclusions of Law, Judgment and Decree:

FINDINGS OF FACT

1. A properly verified Application was filed in this matter by the United States of America on December 31, 2004. The Amended Application was filed pursuant to the Court's Order July 31, 2007.

2. The Applicant in this matter is the United States of America, c/o U.S. Department of the Interior, National Park Service, 1201 Oakridge Dr., #250, Ft. Collins, CO 80525, (970) 225-3500.

3. Timely and adequate notice of the filing and contents of the Application and Amended Application herein were given in the manner required by law. The time for filing Statements of Opposition and for seeking leave to intervene has expired. The Court has jurisdiction over the subject matter of this proceeding and over all persons and owners of

property affected hereby, irrespective of whether or not those persons and owners of property have appeared. *See* C.R.S. §§ 37-92-203, 302.

4. Timely statements of opposition were filed by Cotton Creek Circles, LLC, San Luis Valley Water Company, LLC, Partnership for the West, Farming Technology Corporation, Dr. James K. Beck, Baca Grande Water and Sanitation District, John C. Mattingly and Perry L. and Renee Hazard. Statements of Opposition in support of the application were filed by the Nature Conservancy, the Rio Grande Water Conservation District, Rio Grande Water Users Association, the State of Colorado on behalf of the State and Division Engineers and the Colorado Water Conservation Board, Conejos Water Conservancy District.

5. Farming Technology Corporation withdrew its Statement of Opposition by Motion filed November 4, 2005. Partnership for the West withdrew its Statement of Opposition by Motion filed January 9, 2007. San Luis Valley Water Company withdrew its Statement of Opposition by Motion filed April 19, 2007. The United States has entered into Stipulations with:

A. Baca Grande Water & Sanitation District dated June 2, 2008.
B. James K. Beck dated July 14, 2008.
C. The Nature Conservancy dated July 14, 2008.

6. The United States seeks confirmation of an In-Place Ground Water Right for the Great Sand Dunes National Park as follows:

Acting pursuant to the "Great Sand Dunes National Park and Preserve Act of 2000." Pub. L. No. 106-530, 114 Stat. 2527 (2000) ("Act"), the United States claims the right to use, in-place, all ground water in the unconfined aquifer underlying the Great Sand Dunes National Park so as to maintain, as nearly as possible, the water table elevations in the unconfined aquifer subject to natural hydrologic variations and 1) water rights in existence on November 22, 2000 for non-Federal purposes in the San Luis Valley or 2) operations of the Bureau of Reclamation's Closed Basin Division, San Luis Valley Project, or 3) by operation of Colorado law, all water rights decreed senior in priority to the water right decreed herein. Maintenance of a water table in the unconfined aquifer is necessary "in order to accomplish the purposes of the national park and the national preserve and to protect park resources and park uses." 16 U.S.C. § 410hhh-7(b)(2)(B). A map identifying the location of the Park and Preserve boundaries is attached as Exhibit 1 to this Decree.

7. Source: Ground water in the unconfined aquifer comprising the ground water system underlying the Great Sand Dunes National Park ("Park"), including surface flows that recharge the underlying aquifers and upward leakage from the confined aquifer, that are necessary to maintain ground water table elevations, surface water levels and stream flows on, across and under the Park.

8. Depth: The water right is for maintenance of the water table elevations in the unconfined aquifer underlying the Park, and encompasses all of the water within the unconfined aquifer underlying the Park from its base to the top of the water table. The total depth of the unconfined aquifer ground water system underlying the Park is estimated to range from approximately 60 feet thick to several hundred feet thick. The layer of unconsolidated material dominated by sand and gravel that composes the unconfined aquifer is thickest along the mountain front. The bottom of the aquifer is defined by the "blue clay layers" where they exist, and by the underlying strata of consolidated rock in areas where the blue clay layers do not exist. The blue clay layers are as described in Paragraph 14 herein.

9. Diversion: No physical well or diversion structure is necessary for this in-place use of water. Therefore, neither well permits nor production well locations are necessary.

10. A. Date of Appropriation: November 22, 2000.

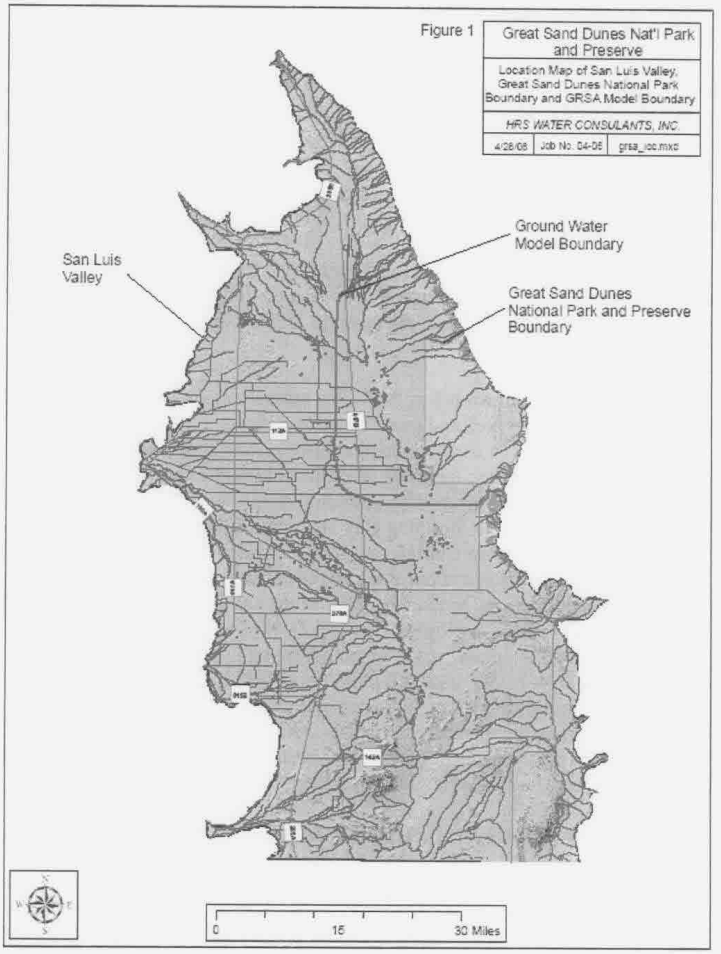
B. How Appropriation was initiated: Congressional enactment of the Great Sand Dunes National Park and Preserve Act of 2000, Pub. L. No. 106-530, 114 Stat. 2527, codified as 16 U.S.C. § 410hhh.

C. Date water was applied to beneficial use: September 24, 2004, date of Park designation, and publication in the Federal Register. *See* 69 Fed. Reg. 57,355 (Sept. 24, 2004).

11. Amount claimed: All ground water in the unconfined aquifer underlying the Great Sand Dunes National Park so as to maintain, as nearly as possible, the water table elevations in the unconfined aquifer, within the limits described herein, in order to accomplish the purposes of the National Park and Preserve and to protect Park resources and Park uses subject to 1) natural hydrologic variations, 2) water rights in existence on November 22, 2000 for non-Federal purposes in the San Luis Valley, 3) operations of the Bureau of Reclamation's Closed Basin Division, San Luis Valley Project, and 4) by operation of Colorado law, all water rights decreed senior in priority to the water right decreed herein.

Overview of the geographic, geologic and hydrologic features of the area of the Great Sand Dunes National Park.

12. The Great Sand Dunes National Park was created pursuant to the Great Sand Dunes National Park and Preserve Act of 2000, Pub. L. No. 106-530, 114 Stat. 2527, codified as 16 U.S.C. § 410hhh. The Park lies on the east side of the San Luis Valley. The San Luis Valley ("SLV") is located in south central Colorado, and includes portions of Alamosa, Conejos, Costilla, Rio Grande and Saguache Counties. The elevation of the Valley floor varies between approximately 7,500 feet and 8,500 feet above sea level, it is approximately 90 miles from north to south and 50 miles from east to west, and the average annual precipitation is approximately 7.5 inches. The Valley is bounded on the west by the San Juan Mountains and on the east by the Sangre de Cristo Mountains. These two ranges meet at Poncha Pass to form the northern terminus of the Valley. The two ranges function as both geographic and geologic boundaries for the Valley. The Rio Grande and its tributaries, including the Closed Basin, drain approximately 8,000 square miles in Colorado. The major perennial streams in the San Luis Valley are the Rio Grande and its largest tributary, the Conejos River. *See* Figure 1. The geologic boundaries of the SLV in Colorado are represented on Figure 1 as the edge of the mapped area. This geologic boundary shown on Figure 1 also defines the boundary of the Rio Grande Decision Support System ("RGDSS") model, which was built to encompass all of the SLV in Colorado. For purposes of the RGDSS model and the decree herein, the SLV boundary was chosen so that the unconsolidated valley-floor and alluvial deposits are inside the RGDSS model, and bedrock formations not characteristic of the valley sediments and alluvial deposits are outside the model.



[Figure 1]

13. The Closed Basin refers to that part of the Rio Grande basin that is separated from the Rio Grande by a hydrologic and a topographic divide. *See* Confined Aquifer New Use Rules for Water Div. 3, Water Div. 3 Case No. 04CW24, Nov. 9, 2007, as Amended by Order dated

December 29, 2006, Judge O. John Kuenhold. ("Confined Aquifer Rules Opinion"), aff'd *Simpson v. Cotton Creek Circles*, 181 P.3d 252 (Colo. 2008). The Closed Basin is defined as "that part of the Rio Grande basin in Colorado where the streams drain into the San Luis lakes and adjacent territory, and do not normally contribute to the flow of the Rio Grande." Rio Grande Compact, Art. I(d), codified in section C.R.S. § 37-66-101. For the purposes of this hydrogeologic description the "Park region" generally extends from the Sangre de Cristo Mountains on the east to State Highway 17 on the west, and from Saguache County Road T (Moffat – Crestone road) on the north to Lane 6 North (Mosca – Sand Dunes road) on the south. The Park region therefore is part of the Closed Basin of the SLV, and its hydrogeology is reflective of the geology of that area.

14. The geographic, geologic, and hydrologic features of the SLV have been generally described in previous water cases. *See Alamosa-La Jara v. Gould*, 674 P.2d 914, 918-20 (Colo. 1983) and *American Water Development, Inc. v. City of Alamosa*, 874 P.2d 352, 367 (Colo. 1994).

> The upper 6000 feet of fill below the valley surface consists of unconsolidated clay, silt, sand, and gravel, and interbedded lava flows . . . . Some of the underground water is in an unconfined aquifer system at shallow depths. Beneath the unconfined aquifer are relatively impermeable beds of clay and basalt and beneath these confining layers are substantial quantities of water which comprise the confined aquifer. The confining clay layer generally does not exist around the valley's perimeter, and the confined aquifer system is recharged from surface flow to the underground water system at the edges of the valley. Because the recharge areas are higher in elevation than the floor of the valley, the confined aquifer is under artesian pressure, resulting in the free flow of water from some artesian wells and springs at natural breaks in the confining layer. In some places, where the confining layer is less thick and more transmissive, water from the confined aquifer will leak upward through the confining clay layers into the unconfined aquifer. The unconfined aquifer is directly connected with the surface streams in some places. To varying degrees, the surface streams, the unconfined aquifer, and the confined aquifer are hydraulically connected.

Alamosa-La Jara Water Protective Ass'n., 674 P.2d at 917-918. More recently this Court has further described the geologic and hydrologic features in detail in the ruling entered November 9, 2007, in Case No. 2004CW24, *Concerning the Matter of the Rules Governing New Withdrawals of Ground Water in Water Division No. 3 Affecting the Rate or Direction of Movement of Water in the Confined Aquifer System* ("Confined Aquifer Rules case"); *Simpson v. Cotton Creek*, 181 P.3d at 255.

15. The upper 6000 feet below the SLV surface consists of unconsolidated clay, silt, sand, and gravel, and interbedded lava flows. The water in these formations is contained in two aquifers having different hydrologic properties and generally acting as separate hydrologic units.

Separating the aquifers is a group of relatively impermeable clay layers referred to as the blue clay or blue clay series. *Id.*; *American Water Development, Inc.*, 874 P.2d at 367.

16. The upper aquifer in the Park region, called the unconfined aquifer, generally is dominated by alluvium of Quaternary age (less than 2 million years ago). It is composed primarily of unconsolidated sand and gravel, and is situated above a complex series of confining clay layers interbedded with sands and gravels. The sequence commonly is called the "blue clay layers." Where recent stream alluvium is present in floodplains, the saturation tends to be continuous and in hydrologic connection with the broader unconfined aquifer that exists outside the streams' flood plains, particularly in the valley floor portion of the Park region.

17. The unconfined aquifer exists across the entirety of the Closed Basin and the Park region. The ground surface is at an elevation ranging from approximately 7500 feet near the southwest boundary, to over 8500 feet at the eastern boundary. The layer of unconsolidated material dominated by sand and gravel that composes the unconfined aquifer is thickest along the mountain front, where the alluvial fans are over 500 feet thick in places.

18. Beneath the unconfined aquifer are relatively low permeability blue clay layers. The confined aquifer is located between and below these blue clay layers and contains substantial quantities of water. *Alamosa-La Jara*, 674 P.2d at 917, and *American Water Development, Inc.*, 874 P.2d at 367. Although the confined and unconfined aquifers are hydrologically connected at various points, the extent of the hydrologic connection is limited by the low permeability blue clays and, because of this, water in the confined aquifer is maintained under artesian pressure. *Id.* The blue clay layer generally does not exist around the edges of the Valley, and both the unconfined and the confined aquifer systems are recharged from surface flow to the underground water system at the mountainous edges of the Valley. *Id.* The artesian condition results from a recharge of the confined aquifer by waters entering the aquifer at higher elevations at the edges of the Valley and the limited permeability of the blue clays separating the two aquifers. *Id.*

19. The confined aquifer system is composed of several water-saturated layers that can be identified by their different lithology and hydrologic characteristics. Although each of the confined aquifer layers is identifiable by its distinct lithology and aquifer characteristics, the available geologic and geophysical evidence shows that the layers are hydrologically connected to each other and to the overlying unconfined aquifer.

20. The water table in the unconfined aquifer is supported by the artesian pressure in the confined aquifer, and by ground water recharge derived from downward percolation of water from surface streams.

21. As previously recognized by the Colorado Supreme Court, "In some places, where the confining layer is less thick and more transmissive, water from the confined aquifer will leak upward through the confining layers into the unconfined aquifer. The unconfined aquifer is directly connected with the surface streams in some places. To varying degrees, the

surface streams, the unconfined aquifer, and the confined aquifer are hydraulically connected." *Alamosa-La Jara*, 674 P.2d at 917-918.

22. The potentiometric surface in the confined aquifer can also affect the water table elevation of the unconfined aquifer through recharge areas at the mountain front. The general direction of water flow in the area of the Park is from east to west. Along the mountain front (sometimes called the 'transition zone') there is clearly a hydrologic connection between the unconfined aquifer and the confined aquifer because no blue clay layer exists. If the confined aquifer potentiometric surface is drawn down, for example by pumping as shown schematically on Figure 2, then the downward gradient becomes steeper, and more of the available recharge water would move into the confined aquifer. If the streams along the mountain front are losing water at a constant rate, as the presence of an unsaturated zone in the upper alluvial fan areas suggests that they do, and more water moves into the confined aquifer due to a gradient steepened by confined-aquifer pumping, then there is less water available to recharge the unconfined aquifer in the same area, which will cause declines in the water table elevation in the unconfined aquifer.

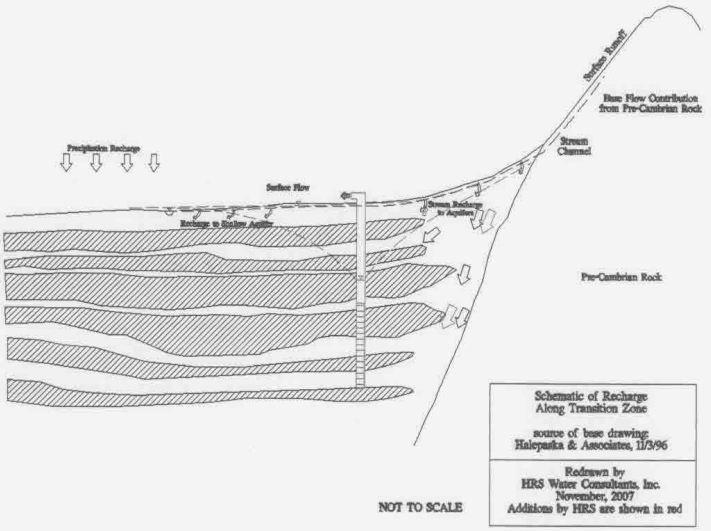


Figure 2: Schematic Cross-Sectional Illustration of Recharge along Transition Zone

The Great Sand Dunes National Park and Preserve.

23. Pursuant to the Great Sand Dunes National Park and Preserve Act of 2000, Congress recognized that the Great Sand Dunes, together with the associated sand sheet and the

adjacent wetland and upland, contain a variety of rare ecological, geological, paleontological, scenic, historical, and wildlife components that merit protection and preservation. These components, specifically including the unique pulse flow characteristics of Sand and Médano Creeks that are integral to the existence and maintenance of the dunes system, comprise a setting of irreplaceable national significance. *See* 16 U.S.C. § 410hhh. In the Act, Congress further acknowledged that certain public and private lands adjacent to the Great Sand Dunes National Monument contained additional unique geological, hydrological, paleontological, scenic, scientific, educational, wildlife and recreational resources that contribute to the protection of the sand sheet associated with the dune mass and of the surface and ground water systems that are necessary to the preservation of the dunes and adjacent wetland systems. *Id.*

24. The Act authorized the Secretary of the Interior to acquire certain specific public and private lands and established a framework for the future management of the lands so acquired, together with then-existing federal lands, in order to preserve the identified resources. *See* 16 U.S.C. § 410hhh-6.

25. Congress mandated the preservation of the existing diversity of resources in order to ensure the perpetuation of the entire ecosystem for the enjoyment of future generations, and authorized the designation of the Park,[1] which encompasses the previous Great Sand Dunes National Monument and additional lands with the purpose of providing greater long-term protection of the geological, hydrological, paleontological, scenic, scientific, educational, wildlife, and recreational resources of the area, specifically including the sand sheet associated with the dune mass and the surface and ground water system on which the sand dune and wetland systems depend. *See* 16 U.S.C. § 410hhh-2.

26. Congress specifically recognized that the surface and ground water systems on and underlying the Great Sand Dunes National Monument and public and private lands adjacent thereto are necessary to the preservation of the geological, hydrological, paleontological, scenic, scientific, educational, wildlife, and recreational resources of the area, specifically including the unique pulse flow characteristics of Sand and Médano Creeks that are integral to the existence of the dune system, and the sand sheet associated with the dunes. *See* 16 U.S.C. § 410hhh, 410-hhh-7.

27. Congress directed the Secretary to obtain and exercise water rights required to fulfill the purposes of the Park by maintaining ground water levels, surface water levels, and stream flows on, across, and under the Park, in order to accomplish the purposes of the Park and to protect Park resources and Park uses. *See* 16 U.S.C. § 410hhh-7(b)(2)(B).

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[1] In the same Act, Congress also established the Great Sand Dunes Preserve ("the Preserve"). Any ground water right for the Preserve, if necessary or appropriate, will be separately confirmed by the United States pursuant to Colorado procedural law and will not be addressed by this application, which concerns only the ground water right for the National Park.

28. Land for the Park was acquired by the United States. On September 24, 2004, the Great Sand Dunes National Park was designated, and the designation published in the Federal Register. *See* 69 Fed. Reg. 57,355 (Sept., 2004).

Water Table Elevation Dependent Resources and Uses at Great Sand Dunes National Park.

29. There are surface and ground water resources and water dependent resources within the Park that are subject to the protection mandates described above. Such resources are described in the Park's Final General Management Plan/Wilderness Study/Environmental Impact Statement and Summary document - April 2007. http//www.nps.gov/grsa/parkmgmt/index.htm.These resources include but are not limited to Médano and Sand Creeks, Deadman, Big and Little Spring Creeks, interdunal ponds, riparian and wetland systems, and associated wildlife, examples of which are further described in Paragraphs 30 through 40 hereof.

30. Numerous Park uses are dependent upon the maintenance of existing surface and ground water levels and streamflows. The recreational use of Médano Creek when it is flowing is a hugely popular activity in the spring, summer, and occasionally in the fall. The Park's visitor center receives frequent calls in the spring and summer to inquire if Médano Creek is running. In years when drought reduces Médano Creek's period of flow, a down turn in Park visitation is usually also experienced. Camping and hiking activities are concentrated along and near surface streams and other natural water features such as Médano and Sand Creeks and interdunal ponds. Many of the Park's interpretive activities and exhibits such as creek walks and visitor center exhibits are focused on surface water resources. Visitor enjoyment of the resource is heavily dependent upon maintaining healthy Park ecosystems and preserving the natural biological diversity which is, in turn, dependent upon preserving the existing surface and ground water levels.

31. Congress has recognized that Sand Creek and Médano Creek exhibit unique pulse flows that are of scientific interest and integral to the existence of the dunes sytem. 16 U.S.C. § 410hhh(2)(A). These pulse flows were also among the objects of scientific and educational interest originally to be protected by the creation of the Great Sand Dunes National Monument. See Proclamation No. 1994 of March 17, 1932, 47 Stat. 2506, amended by Proclamation No. 2681, 11 Fed. Reg. 2623, 60 Stat. 1339 (Mar. 12, 1946) and Proclamation No. 3138, 21 Fed. Reg. 4035, 70 Stat. C31 (June 7, 1956).

32. Streams, such as Sand Creek, that flow from the Sangre de Cristo Mountains into the SLV create a ground water mound under the stream channel, which causes surface stream flow. Frederic C. Wurster, David J. Cooper and William E. Sanford, *Stream/aquifer Interactions at Great Sand Dunes National Monument, Colorado: Influences on Interdunal Wetland Disappearance*, 271 Journal of Hydrology 77-100 (2003). If the water table elevations under streams like Sand Creek decline, more surface water will be required to build a ground water mound that would allow the streams to sustain a surface water flow. This would reduce the amount of water available to support surface water flows, and reduce the distance from the

mountain front that streams could flow for a given volume of water. This would reduce the amount of water and frequency of flow reaching wetlands west of the mountain front, and result in the loss of wetlands, riparian areas and interdunal ponds on the Park, Médano Ranch, San Luis Lakes area, and the former Baca Ranch area.

33. Decline in the water table elevation of the unconfined aquifer in the valley-floor reach of Sand Creek within the Park will also result in a lower length and duration of live flow in the creek. There is direct hydrologic interaction between the unconfined aquifer and Sand Creek, Big Spring Creek, and other streams on the valley floor area of the Park when these streams flow. The connection formed between the stream and the ground water mound helps to sustain the streamflow, while at the same time the percolating water from the stream helps to sustain the water table in the unconfined aquifer. This in turn helps sustain other features such as interdunal ponds (see Figure 3). Observations in the form of water levels, drilling data, and geophysical soundings show that Sand Creek, when it flows on the surface in the valley floor reach of the Park, is in hydrologic connection with the water table of the unconfined aquifer. When there is no flow in Sand Creek in this reach, the water table is lower because there is no surface water to recharge the aquifer in this location.

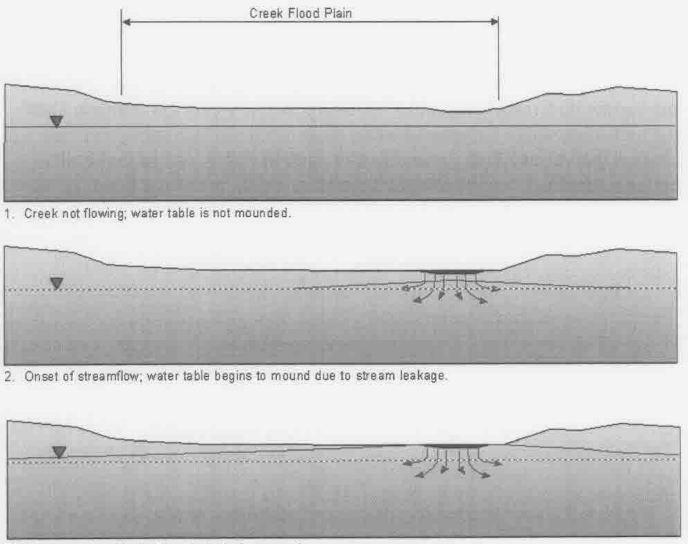

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Figure 3.

34. When the water table elevation declines due to natural or man-made causes so that a creek is no longer in direct hydrologic connection with the aquifer, the creek loses water to the aquifer at a higher rate than it would if the creek and the aquifer remained in connection. Therefore, if the water table in the unconfined aquifer declines regionally due to greater pumping, less recharge, or a combination of these, the creek will lose water more rapidly, and thus there will be less water to sustain the surface streamflow. Sand Creek then would not flow out as far on the valley floor, and the duration of live streamflow would be reduced. This has been observed in Sand Creek by observations of water levels in and adjacent to Sand Creek.

35. Other water features and water dependent components of the Great Sand Dunes system include Big and Little Spring Creeks, Médano Creek, Deadman Creek, interdunal ponds, wetlands and riparian areas, and cultural sites and artifacts whose occurrence and spatial distribution, and cultural, historical and biological significance for purposes of public education, recreation and research are dependent upon these surface and ground water relationships.

36. The distribution of wetlands is well documented in the SLV. This documentation spans more than 130 years and provides an excellent framework to evaluate where wetlands occur. The U.S. Fish and Wildlife Service's National Wetlands Inventory ("NWI") mapped wetlands in the SLV in the early 1990's. Figure 4 provides a simplified map that shows the wetland polygons identified by the NWI.[2] This map illustrates that wetlands are widespread in the eastern SLV and in the Park, particularly along its western side. They occur along streams that flow west from the Sangre de Cristo Mountains, including Médano Creek, Deadman Creek and Sand Creek, in wet meadows where the ground water table is at least seasonally near the soil surface, and in playa basins that receive both ground and/or surface water. Interdunal basins within sand dune complexes also may support wetland complexes (i.e. interdunal ponds). Most wetlands in the SLV are supported by ground water. Marshes, wet meadows, salt flats and some riparian wetlands depend largely or entirely on ground water.

[2] For purposes of Figure 4, a "Riverine" system includes all wetlands contained within a channel which is an open conduit, either naturally or artificially created which periodically or continuously contains moving water or forms a connecting link between two bodies of standing water. A "Lacustrine" system includes wetlands which are 1) situated in a topographic depression or dammed river channel; 2) lacking trees, shrubs, persistent emergents, with greater than 30% areal coverage; and 3) total area exceeds 20 acres. A "Palustrine" system includes all wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens. *See* National Wetland Inventory: Classification of Wetlands and Deepwater Habitats of the United States. Cowardin, et al. http://www.fws./nwi/Pubs_Reports/Class_Manual/Pages/contents.pdf

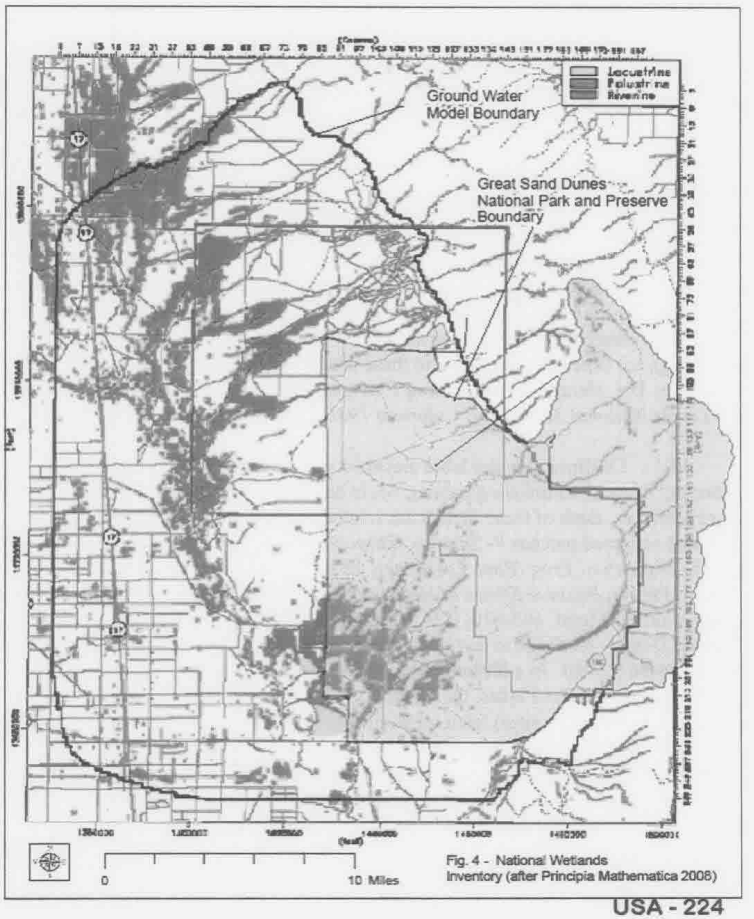

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Figure 4: National wetlands inventory map.

37. A number of ground water fed wetland (including marsh and wet meadow), riparian and salt flat plant community types occur in the SLV, each with distinctive hydrologic regime and soil salinity. The relationship of communities to each other on the landscape is relatively stable due to the consistent availability of ground water over decades to centuries, and the patterns of inundation and salt accumulation. The depth from ground surface to the water

table controls the frequency, depth and duration of flooding and the duration of anoxic (lacking oxygen) soil conditions and along with patterns of soil salinity, determines the natural distribution and abundance of all plant species in the SLV.

38. The wetlands found in the Park, particularly those along the Park's western edge, and along streams that flow west from the Sangre de Cristo Mountains, including Médano Creek, Deadman Creek and Sand Creek, are ground water fed wetlands. The existence, location and extent of these wetlands within the Park are dependant on the regional water table elevations underlying the Park.

39. Wetlands, marshes, and ponds within the Park that are supported by the water table elevation in the unconfined aquifer also support other Park resources. The greatest numbers of amphibians and their greatest reproductive success is associated with ponds and shallow lakes in the lower reaches of the Sand Creek, Big Spring Creek, and Little Spring Creek drainages, all concentrated within the southwest boundaries of the Park. Great Plains toads and chorus frogs are especially prevalent in these areas, which are characterized by a high ground water table. D.J. Hammond, *Measuring Changes in Areal Extent of Historic Wetlands at Great Sand Dunes National Monument, Colorado 1936-1995* (Colorado State University 1998).

40. Declines in water table elevation could lead to habitat loss resulting in smaller patches or "islands" of breeding habitat, while habitat fragmentation results in greater distances between patches. Both of these factors are related to predictable declines in population size and number of occupied patches P. Sjögren, *Extinction and Isolation Gradients in Metapopulations: the Case of the Pool Frog (Rana Lessonae),* 42 Biological J. of the Linnean Soc'y 135-147 (1991), L Fahrig, *Relative Effects of Habitat Loss and Fragmentation on Population Extinction,* 61 J. of Wildlife Mgmt. 603-610, C.C. Vos and J.P. Chardon, *Effects of Habitat Fragmentation and Road Density on the Distribution Patterns of the Moor Frog Rana Arvalis*, 35 J. Appl. Ecology 44-56 (1998). In addition, because the distance between habitat islands increases with loss of ponds and shallow lakes, the likelihood of dispersal (and associated potential recolonization of vacant sites) from remaining successful breeding sites becomes reduced.

41. The flows in Sand Creek, Médano Creek, Big Spring Creek and other streams within the Park as well as the wetland system in the Park are maintained and perpetuated by historical water table elevations in the underlying ground water system. Maintenance of a historical range, distribution and average of ground water elevations is necessary to protect and preserve the existing diversity of Park resources.

42. The water right decreed herein maintains the water table elevation under the Park and the interdependent surface flows in order to preserve and protect aquatic, riparian, wet meadow and marsh communities, including wildlife populations dependant thereon, from new man made declines in water table elevations that may alter environmental conditions and change the areal extent and species composition of wetland communities. The loss or reduction of wetland communities and ground water dependent systems will affect other Park resources, including, but not limited to, wildlife, educational activities, ecological research and recreation.

Maintaining the water table elevation under the Park therefore accomplishes the purposes of the Park to protect Park resources and Park uses.

In-Place Ground Water Right for the Great Sand Dunes National Park.

43. The water table elevation in the unconfined aquifer varies as a function of both natural hydrology and pumping of wells with water rights that are senior in priority to the water right decreed herein. The United States illustrated the historical range and variability of water table elevations between 1980 and 2007 at representative locations in Appendices to the Amended Application. Due to the location of the wells and available data, and the geology of the hydrologic system, these water table elevations may not precisely reflect water table elevations at the Park boundary, but serve to illustrate the approximate water level elevations at the Park. Congress instructed the Secretary to maintain ground water levels to protect Park resources and uses. The maximum water table elevations described in Paragraph 44 and Table 1 herein reflect historical maximum water table elevations at 331 wells located in the region in and around the Park xtrapolated to the Park boundary.

44. In order to accomplish the purposes of the Park and to protect Park resources and Park uses, the water right decreed herein is to all water within the unconfined aquifer underlying the Park sufficient to maintain water table elevations, subject to water rights in existence on November 22, 2000 for a non-Federal purpose in the San Luis Valley, the Closed Basin Division and, by operation of Colorado law, all water rights senior in priority to the appropriation and adjudication of the water right decreed herein. By its nature, the water right decreed herein is unique. For purposes of measurement to know whether the water right is being satisfied, and to know whether injury to the water right may be caused by depletions from new ground water withdrawals or changes in water rights, the water right decreed herein is further defined as the maximum historical water table elevation at the Park boundary between 1980 and the date of filing of the Application in this matter. The water table elevation and depth to ground water at which the water right is satisfied along the Park boundary necessarily varies with topography and location over a relatively large area, so a single elevation or data point is inappropriate for defining the water right. Therefore, it is necessary to define the upper limits of the water table elevations that are protected by this water right over a range of locations along or within the Park boundary. Based upon historically observed maximum water table elevations in or near the Park prior to June 11, 2007, extrapolated to the Park boundary, the water table elevations at which the water right decreed herein is fully satisfied, as located along the Park boundary, are described by a set of points and water table elevations as set forth in Table 1. The ten (10) points described in Table 1 have been chosen on the basis of site accessibility and future monitoring of water table elevations at representative locations (see Figure 5). Piezometers at these 10 points will be used as permanent monitoring wells and will assist the Division Engineer in the administration of this water right. If it is necessary to determine the required maximum water table elevation at the Park boundary between these points, it will be done by (linear) interpolation between points.

Table 1

Monitoring Well	UTM Location X_UTM_NAD83	UTM LOCATION Y_UTM_NAD83	DEM_NAVD88	Maximum Water Table Elevation
BP-1	440654	4168654	7559	7552
BP-2	437360	4171595	7541	7527
BP-3	435876	4175356	7537	7534
BP-4	435982	4179902	7578	7569
BP-5	436018	4183093	7621	7590
BP-6	435988	4186477	7614	7601
BP-7	435950	4189798	7616	7603
BP-8	435912	4193170	7615	7609
BP-9	437196	4196595	7648	7647
BP-10	440005	4196082	7726	7726

45. The general direction of ground water movement in the unconfined aquifer under the Park is from east to west and the maximum ground water levels at the proposed piezometers reflect the flow of ground water in the recharge areas along the mountain front as influenced by the confined aquifer as described in Paragraph 22.

46. The locations and elevations of the monitoring wells described in Table 1 do not necessarily correspond to existing monitoring wells located at the Park boundary, and are not intended to represent exact locations. These points for monitoring wells are approximate locations, and piezometers may be established within 1/8th mile of these locations. The intent is that the piezometer locations be located at or near the Park boundary at locations relevant to determining the water table elevations within the Park. If a piezometer cannot be located as described herein, the United States, in consultation with the Division Engineer, may substitute an appropriate location for a replacement piezometer. Nothing herein prohibits the United States from establishing additional piezometer sites at or near the Park boundaries at which the water right can be monitored or administered. A map showing the approximate locations of the piezometers is set forth in Figure 5.

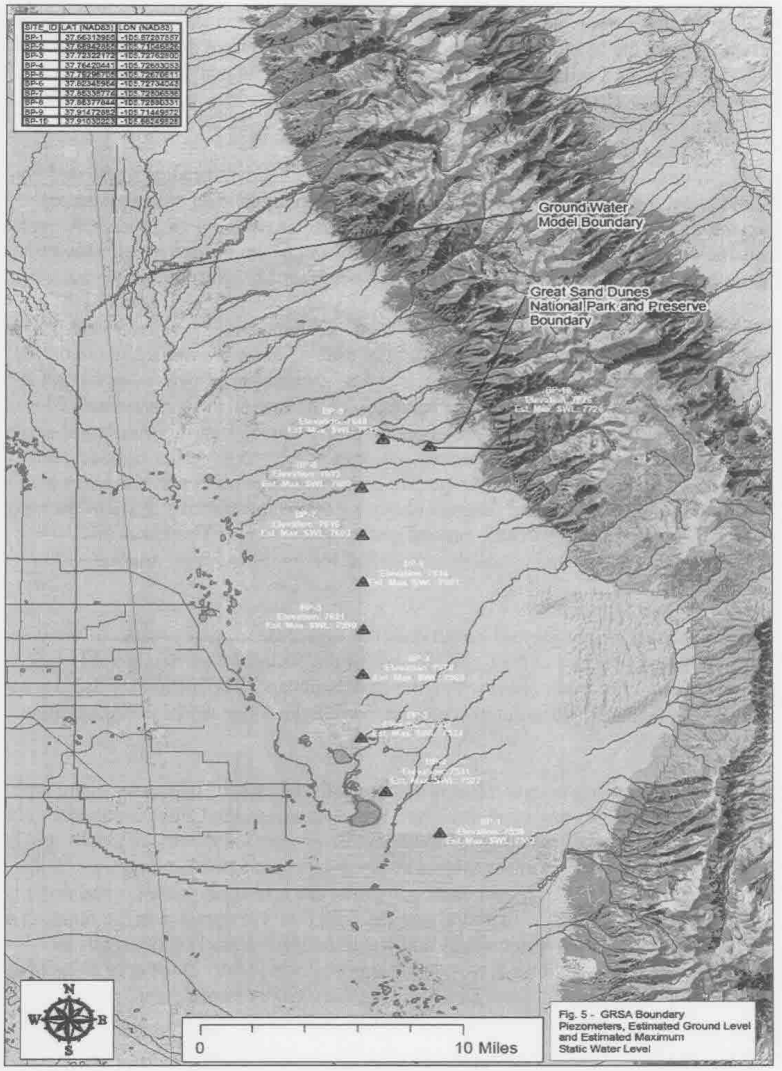
Ground Water Model Boundary
Great Sand Dunes National Park and Preserve Boundary
N
W
E
S
0
10 Miles
Fig. 5 - GRSA Boundary Piezometers, Estimated Ground Level and Estimated Maximum Static Water Level

Figure 5.

47. At times when the water table elevation at the Park boundary is at or above the elevation set forth for the locations described in Table 1, the water right described herein is satisfied at that location. Until the piezometers described herein are constructed at the approximate points described herein, the satisfaction of the water right decreed herein cannot be verified, and the water right cannot be administered.

48. Future hydrologic conditions may create less effective recharge to the underlying aquifers, and affect the lower end of the water table elevation range to an unknown degree. Therefore, the water right decreed herein is not extinguished or rendered unenforceable even if future climatic conditions cause water table elevations to fall below the bottom elevation of the historical range, subject to water uses existing as of November 22, 2000, and senior water rights.

49. This water right is decreed as ABSOLUTE. Pursuant to the Great Sand Dunes National Park and Preserve Act of 2000, this appropriation of water is specifically prohibited from interfering with 1) the exercise of any water rights in existence on November 22, 2000, for non-Federal purposes in the SLV, and 2) the operation of the Bureau of Reclamation's Closed Basin Division, San Luis Valley Project. By operation of Colorado law, the water right decreed herein is also subject to all water rights decreed senior in priority to the water right decreed herein. This appropriation is based on the specific authorization contained in the Act, which in turn is based upon Congress' explicit findings regarding the unique circumstances of the sand dunes and the associated sand sheet and wetland and upland systems. Therefore, this appropriation does not and cannot establish a precedent for any future appropriation within Colorado.

50. The water right decreed herein does not supercede, change or limit in any way the water rights previously decreed to the United States for the National Park Service or U.S.D.A. Forest Service for water resources now within the Park boundary. The previously decreed water rights operate independently from, but in conjunction with, the water right decreed herein to protect Park resources.

51. No volumetric measurement is necessary for this water right as the claim will encompass whatever water is present at any given time. However, the United States recognizes that what constitutes the appropriated ground water will vary naturally, both seasonally and from year to year. The practical effect of the subject in-place appropriation of ground water in the unconfined aquifer ground water system underlying the Park is to appropriate ground water table elevations in the ground water system underlying the Park that will fluctuate in the future as a function of climatic conditions, water supply and water demands from 1) water rights in existence on November 22, 2000 for non-Federal purposes in the SLV; 2) the operations of the Bureau of Reclamation's Closed Basin Division, San Luis Valley Project; and 3) by operation of Colorado law, all water rights decreed senior in priority to the water right decreed herein.

52. Fluctuations in the artesian pressure in the confined aquifer system have occurred and will continue to occur in response to climatic conditions, water supply, and water demands

from 1) water rights in existence on November 22, 2000 for non-Federal purposes in the SLV, 2) operations of the Bureau of Reclamation's Closed Basin Division, San Luis Valley Project or 3) by operation of Colorado law, all water rights decreed senior in priority to the water right decreed herein. The Court finds that the United States appropriation will be subject to such pressure fluctuations as artesian pressures increase during periods of greater water supply and decline during periods of lower water supply in much the same manner and within the same ranges of fluctuation as have historically occurred.

53. The water resources of the SLV are overappropriated. This Court's opinion in the Confined Aquifer Rules case reaffirmed the long-standing conclusion that "the surface streams and the aquifers in the SLV of Colorado are overappropriated." Opinion at 156, ¶ 453 (citing *Alamosa-La Jara Water Users Ass'n v. Gould*, 674 P.2d 914, 918 (Colo. 1983), *State Eng'r v. Bradley*, 53 P.3d 1165, 1167 (Colo. 2002), and *High Plains A&M, LLC, v. Southeastern Colorado Water Conservancy Dist.*, 120 P.3d 710, 722 (Colo. 2005)); see also Opinion at 176, ¶ 513. The determination that the surface water and ground water in the SLV are overappropriated creates a presumption that additional ground water depletions "result in injury to senior appropriators absent a showing to the contrary." Opinion at 176-77, ¶515 (quoting *City of Aurora v. Colo. State Eng'r.*, 105 P.3d 595, 607 (Colo. 2005)). In holding that Senate Bill 04-222 does not proscribe the right to appropriate water guaranteed by the Colorado Constitution, this Court noted that, "where withdrawals of ground water would cause material injury to other users, the ground water is not unappropriated and there is no constitutional right to appropriate such water." Opinion at 177-78, ¶ 521 (citations omitted). Thus, this Court has recognized that the availability of water for appropriation in an overappropriated system depends on the potential for injury to vested water rights.

54. Although the system is overappropriated, this fact alone does not prohibit in-place uses that do not injure other existing water rights. The fact that there may be no unappropriated water available for withdrawal from the aquifers does not defeat the United States' application as a matter of law. The United States' claim is for an in-place right to use ground water, similar to an in-stream flow water right, the in-priority maintenance of water table elevations under this water right cannot injure any vested water rights. See *Colorado Water Conservation Board v. City of Central*, 125 P.3d 424, 437-38 (Colo. 2005). The primary value of the water right claimed by the United States (apart from its role in protection of the Park resources described herein) is the right to in-priority administration of the water right and to be protected from injury from a changed or expanded use of existing appropriative rights, or new junior appropriative rights. In this respect the water right confers on the United States authority similar to the authority of the Colorado Water Conservation Board to protect from injury in-stream flow and minimum lake level water rights. *See Id.* at 439. Congress expressly authorized and directed the Secretary of the Interior to appropriate this particular in-place water right in the Great Sand Dunes National Park and Preserve Act of 2000. Because the in-place use of the water right decreed herein does not change aquifer conditions or water flow within the unconfined aquifer, it presents no potential for injury to vested senior water rights. Therefore, the United States has demonstrated that water is available for appropriation in the unconfined aquifer underlying the Park for the purpose of in-place use.

55. When decreed, the Division of Water Resources will administer this water right consistent with the terms of this decree and applicable state law.

CONCLUSIONS OF LAW

56. The application herein is one contemplated by law, and this Court has exclusive jurisdiction over the subject matter of this proceeding. C.R.S. § 37-92-203.

57. The Water Court for Water Division 3 has jurisdiction over the subject matter of these proceedings and over all persons and owners of property who may be affected thereby, whether or not they have chosen to appear. The application in this matter and the resume publication thereof was in all respects adequate to place such persons on inquiry notice of the relief granted herein. C.R.S. §§ 37-92-103 and 37-92-302.

58. Timely and adequate notice of the filing and of the contents of the application herein was given in the manner provided by law, and this Court has jurisdiction over all persons or entities affected hereby, whether or not they have appeared. C.R.S. § 37-92-302.

59. The United States has complied with all requirements and met all standards and burdens of proof and is therefore entitled to a decree confirming and approving the In-Place Ground Water Right for Great Sand Dunes National Park.

60. The United State does not claim the In-Place Ground Water Right for Great Sand Dunes National Park as a federal reserved water right, and as a matter of law the language of the Act does not support the creation of a new federal reserved water right for the Park beyond those already decreed. 16 U.S.C. § 410hhh-7(b)(2)(D).

61. This claim and Decree are within the legal authority delegated to the Secretary of the Interior by Congress in the Great Sand Dunes National Park and Preserve Act, 16, U.S.C. § 410hhh. The interpretation and administration of this Decree are bound by that Act.

JUDGMENT AND DECREE

62. The foregoing Findings of Fact and Conclusions of Law are incorporated herein by this reference as if fully set forth in this judgment and decree.

63. The United States In-Place Ground Water Right for Great Sand Dunes National Park is hereby confirmed and approved. The Great Sand Dunes National Park and Preserve Act was created to preserve and protect the ecosystem and resources of the area. Great Sand Dunes Act, § 2. Based upon the language in the Act, there is no question that the United States is entitled to make an appropriation of water in connection with the Park. The amount and nature of the right as set forth herein are consistent with maintaining ground water levels, surface water

levels, and stream flows on, across, and under the Park, in order to accomplish the purposes of the Park and to protect Park resources and Park uses. 16 U.S.C. § 410hhh-7(b)(2)(B).

64. The Court will retain jurisdiction for a period of 10 years after the piezometers described in paragraphs 44, and 45 are constructed for the limited purpose of correcting the locations and elevations of these monitoring wells, and refining the accuracy of the maximum ground water table elevation extrapolations set forth in Table 1 based upon new data obtained from the piezometers or other reliable information. The additional data from the piezometers should allow more accurate extrapolation of the historical maximum water table elevation at the Park boundary. Because the maximum water table elevation subject to this decree will be limited by historical maximums prior to June 11, 2007, adjustments to the maximum ground water table elevations set forth in Table 1 based upon new data obtained from the piezometers or other reliable information shall not be considered a change or amendment of the water right decreed herein. The United States may, upon request, extend the period of retained jurisdiction for up to an additional 10 years for the limited purpose of obtaining additional data with which to further refine the accuracy of the maximum ground water table elevation extrapolation at these locations. Any party hereto may seek to invoke the Court's retained jurisdiction by filing a Motion setting forth the new data or other reliable information justifying the exercise of the Court's retained jurisdiction. The Motion shall be served upon all parties or their successors.

65. The United States will provide water table elevation data from its piezometers described herein to the Division Engineer on a quarterly basis.

66. The water right decreed herein is subject to the Rio Grande Compact, § 37-66-101, C.R.S. (2007) and nothing in this decree affects the use, allocation, ownership, or control, in existence on November 22, 2000, of any water, water right, or any other valid existing right; any vested absolute or decreed conditional water right in existence on November 22, 2000, including any water right held by the United States; by operation of Colorado law, any water rights decreed senior in priority to the water right decreed herein; any interstate water compact in existence on November 22, 2000; or State jurisdiction over any water law.

67. Nothing in this decree shall be construed or interpreted to establish any standard to be used for the quantification of other water rights in any other judicial proceeding, or as precedent for the existence or quantification of water rights in any other proceeding.

68. The application in this case was filed in the Water Court in the year of 2004 and the water right herein confirmed and awarded shall be administered as having been filed in that year and shall be junior to all decreed water rights for which applications were filed in previous years. As between all decreed water rights, the applications for which were filed in 2004, priorities shall be determined by historical dates of appropriation and shall not be affected by the date of entry of this decree.

69. The application of the United States of America for a water right to all ground water in the unconfined aquifer underlying the Great Sand Dunes National Park is granted, subject to the terms of this decree.

Dated this 4th day of August, 2008.

BY THE COURT:

Hon. O. John Kuenhold
Water Judge
Water Division No. 3

Supporting Hydro Data

DOCUMENTATION OF BOUNDARY PIEZOMETER INSTALLATION

FOR GREAT SAND DUNES NATIONAL PARK AND PRESERVE, COLORADO

Prepared for

U.S. Department of Justice

National Park Service

Prepared by

HRS Water Consultants, Inc.

December, 2009 04-06.10

Certification

Documentation of Boundary Piezometer Installation for Great Sand Dunes National Park and Preserve, Colorado

Prepared for
U.S. Department of Justice
National Park Service

December 8, 2009

HRS Project No. 04-06.10

The evaluation and opinions expressed in this report were prepared by or under the direct supervision of the undersigned, whose seal as a registered Professional Engineer is affixed below.

COLORADO REGISTERED ERIC J. HARMON 20418 12/8/09 PROFESSIONAL ENGINEER

Eric J. Harmon, P.E.
Principal

Staff members of HRS Water Consultants, Inc. who contributed to the evaluation and documentation as presented in this report are:

G. Eric Saenger, CPG	Senior Hydrogeologist
Vance J. Campos	Hydrogeologist
Steven K. Barrett	Water Resources and GIS Specialist

Table of Contents

1. **INTRODUCTION** 1
2. **BACKGROUND** 3
   - 2.1. THE GREAT SAND DUNES IN-PLACE WATER RIGHT 3
   - 2.2. OBJECTIVES OF THE BOUNDARY PIEZOMETERS 4
3. **BOUNDARY PIEZOMETER DESIGN** 5
4. **BOUNDARY PIEZOMETER CONSTRUCTION** 7
5. **OBSERVED GEOLOGY AND HYDROLOGY OF THE UNCONFINED AQUIFER** 9
   - 5.1. GEOLOGY FROM OBSERVED LITHOLOGY 9
   - 5.2. HYDROGEOLOGY OF THE UNCONFINED AQUIFER AT THE BOUNDARY PIEZOMETERS 11
6. **SUMMARY AND CONCLUSIONS** 11

Figures

Figure 1: Location Map: GRSA Boundary Piezometers

Appendixes

A: Piezometer Specification
B: Piezometer Completions and Lithologic Sections
C: Field Chronology
D: Photographs of Field Activities
E: Lithologic Descriptions
F: Well Permits and Completion Reports
In pocket: Geophysical logs (on DVD)

1. INTRODUCTION

This report provides documentation of the construction of ten piezometers (monitoring wells) that were drilled at specified locations along the southern, western, and northern boundaries of the Great Sand Dunes National Park and Preserve ("GRSA") (see Figure 1 for locations). This set of piezometers was drilled in accordance with the decree entered in Case No. 2004CW35 by the Colorado Division 3 Water Court on August 4, 2008.[1]

HRS Water Consultants, Inc. (HRS) was retained by the National Park Service and the U.S. Department of Justice to provide engineering and hydrogeologic expertise for design, bidding-phase services, construction observation for specification compliance, and project documentation for the ten boundary piezometers ("BP's") at GRSA. This report, along with the figures and other documentary evidence attached hereto, fulfills Task 7.0 of HRS' authorized Scope of Work as specified in NPS Contract no. F2380083526.

The work done under our authorized Scope of Work was performed by the following professional staff members of HRS:

Steven K. Barrett	GIS and Water Resources Specialist
Vance J. Campos	Hydrogeologist
G. Eric Saenger, CPG	Senior Hydrogeologist
Eric J. Harmon, P.E.	Principal Hydrogeologist and Project Manager.

All of the engineering and hydrogeologic work documented in this report was completed by, or under the direct supervision of, Eric J. Harmon, P.E., whose certification is affixed to the front of this report.

We would like to acknowledge the aid of a number of persons involved with the successful completion of the Boundary Piezometer project:

[1] Decree in Case No. 2004CW34, ¶44.

National Park Service, Water Rights Branch:	Mr. James Harte, Mr. Bill Hansen
Great Sand Dunes National Park and Preserve:	Mr. Andrew Valdez, Mr. Fred Bunch
U.S. Geological Survey:	Dr. V.J.S. (Tien) Grauch, Dr. David Fitterman, and the U.S. Geological Survey Drilling Crew

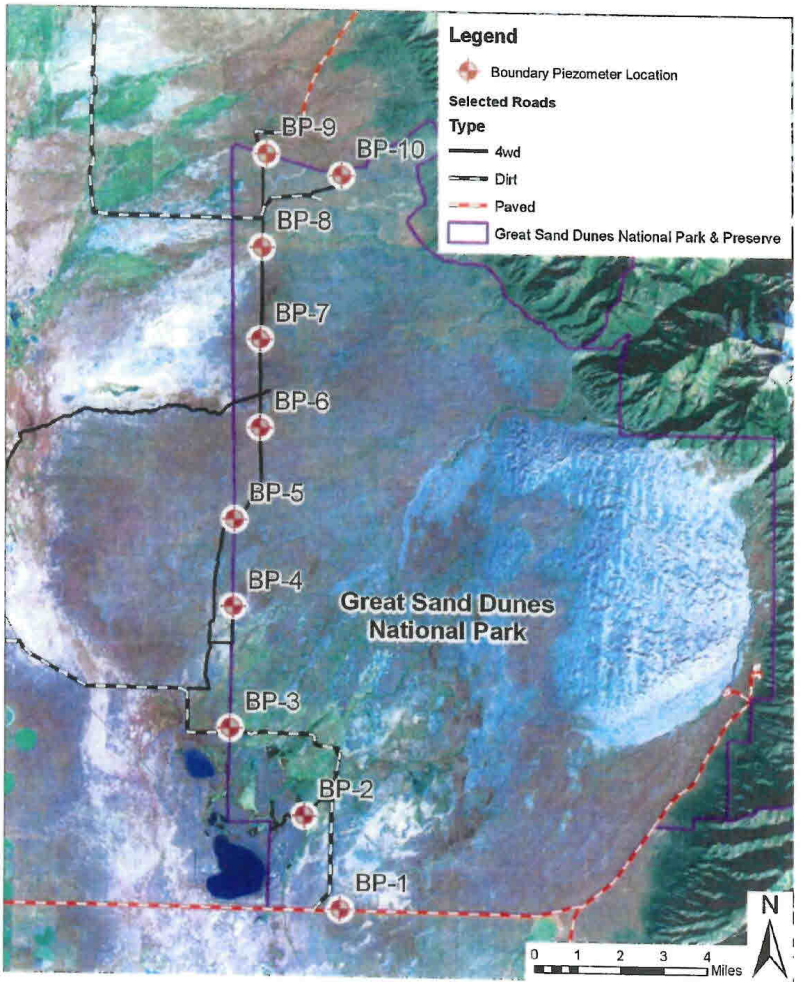

Figure 1: Boundary Piezometer Locations

06-05-2009: monitoring/observation water well permit application

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., RM 818, DENVER CO 80203
phone – info: (303) 866-3587 main: (303) 866-3581
Fax: (303) 866-3589 http://www.water.state.co.us

Office Use Only

Form GWS-46 (12/2007)

MONITORING/OBSERVATION Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be completed in black or blue ink or typed.

1. Well Owner Information

Name of well owner: Great Sand Dunes National Park & Preserve

Mailing address: 11500 Highway 150

City: Mosca | State: CO | Zip code: 81146

Telephone #: (719)378-6362 | E-Mail (Optional):

2. Type Of Application (check applicable boxes)

☐ Use existing well
☒ Construct new well
☐ Other:
☐ Replacement for existing monitoring well:
Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment: MH-
Well name or #: BP 1

4. Location Of Proposed Well

County: Alamosa
SW 1/4 of the SE 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
32	40	☒ ☐	12	☒ ☐	N

Distance of well from section lines (section lines are typically not property lines)
100 Ft. from ☐ N ☒ S 1575 Ft. from ☒ E ☐ W

For replacement wells only – distance and direction from old well to new well
feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same asItem 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ☒ YES

Easting 440062.32
Northing 4168681.27
Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: Colorado State Land Board

Mailing address: 1127 Sherman St., Ste. 300

City: Denver | State: CO | Zip Code: 80203-2206

Telephone #: (303) 866-3454

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total depth: 180 feet | Aquifer: unconfined

8. Consultant Information (if applicable)

Name of contact person: G. Eric Saenger, CPG

Company name: HRS WATER CONSULTANTS, INC.

Mailing address: 8885 W 14th Ave.

City: Lakewood | State: CO | Zip Code: 80215

Telephone #: (303) 462-1111

9. Proposed Well Driller License #(optional):

10. Signature Of Well Owner, Consultant Or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign here (Must be *original* signature): Wm. R. Olsen
Date: 6/5/09

Print name & title: for Chuck Pettee, Chief, Water Rights Branch

Office Use Only

USGS map name | DWR map no. | Surface elev.

Receipt area only

DIV ____ WD ____ BA ____ MD ____

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., RM 818, DENVER CO 80203
phone – info: (303) 866-3587 main: (303) 866-3581
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1. Well Owner Information

Name of well owner: Great Sand Dunes National Park & Preserve

Mailing address: 11500 Highway 150

City: Mosca | State: CO | Zip code: 81146

Telephone #: (719)378-6362 | E-Mail (Optional):

2. Type Of Application (check applicable boxes)

☐ Use existing well
☒ Construct new well
☐ Other:
☐ Replacement for existing monitoring well:
Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment: MH-
Well name or #: BP 2

4. Location Of Proposed Well

County: Alamosa
NW 1/4 of the NW 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
30	40	☒ ☐	12	☒ ☐	N

Distance of well from section lines (section lines are typically not property lines)
300 Ft. from ☒ N ☐ S 1200 Ft. from ☐ E ☒ W

For replacement wells only – distance and direction from old well to new well
feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ☒ YES

Easting 437719.225
Northing 4171827.5
Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: Colorado State Land Board

Mailing address: 1127 Sherman St, Ste. 300

City: Denver | State: CO | Zip Code: 80203-2206

Telephone #: (303) 866-3454

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total depth: 180 feet | Aquifer: unconfined

8. Consultant Information (if applicable)

Name of contact person: G. Eric Saenger, CPG

Company name: HRS WATER CONSULTANTS, INC.

Mailing address: 8885 W 14th Ave.

City: Lakewood | State: CO | Zip Code: 80215

Telephone #: (303) 462-1111

9. Proposed Well Driller License #(optional):

10. Signature Of Well Owner, Consultant Or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign here (Must be *original* signature): Wm. R. Dawson
Date: 6/5/09

Print name & title: for Chuck Pettee, Chief, Water Rights Branch

Office Use Only

USGS map name | DWR map no. | Surface elev.

Receipt area only

DIV ____ WD ____ BA ____ MD ____

COLORADO DIVISION OF WATER RESOURCES
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1313 SHERMAN ST., RM 818, DENVER CO 80203
phone – info: (303) 866-3587 main: (303) 866-3581
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Review instructions on reverse side prior to completing form.
The form must be completed in black or blue ink or typed.

1. Well Owner Information

Name of well owner: Great Sand Dunes National Park & Preserve

Mailing address: 11500 Highway 150

City: Mosca | State: CO | Zip code: 81146

Telephone #: (719)378-6361 | E-Mail (Optional):

2. Type Of Application (check applicable boxes)

☐ Use existing well
☒ Construct new well
☐ Other:
☐ Replacement for existing monitoring well:
Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment: MH-
Well name or #: BP 3

4. Location Of Proposed Well

County: Alamosa
SW 1/4 of the SW 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
12	40	☒ ☐	11	☒ ☐	N

Distance of well from section lines (section lines are typically not property lines)
10 Ft. from ☐ N ☒ S 10 Ft. from ☐ E ☒ W

For replacement wells only – distance and direction from old well to new well
feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ☒ YES

Easting 435877.585
Northing 4175188.75
Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: The Nature Conservancy, Attn. Paul B. Robertson

Mailing address: 5303 Highway 150

City: Mosca | State: CO | Zip Code: 81146

Telephone #: (719) 378-2356

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total depth: 140 feet | Aquifer: unconfined

8. Consultant Information (if applicable)

Name of contact person: G. Eric Saenger, CPG

Company name: HRS WATER CONSULTANTS, INC.

Mailing address: 8885 W 14th Ave.

City: Lakewood | State: CO | Zip Code: 80215

Telephone #: (303) 462-1111

9. Proposed Well Driller License #(optional):

10. Signature Of Well Owner, Consultant Or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign here (Must be ***original*** signature): Wm. R. Blanser
Date: 6/5/09

Print name & title: for Chuck Pettee, Chief, Water Rights Branch

Office Use Only

USGS map name | DWR map no. | Surface elev.

Receipt area only

DIV ____ WD ____ BA ____ MD ____

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., RM 818, DENVER CO 80203
phone – info: (303) 866-3587 main: (303) 866-3581
Fax: (303) 866-3589 http://www.water.state.co.us

Office Use Only

Form GWS-46 (12/2007)

MONITORING/OBSERVATION Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be completed in black or blue ink or typed.

1. Well Owner Information

Name of well owner: Great Sand Dunes National Park & Preserve

Mailing address: 11500 Highway 150

City: Mosca | State: CO | Zip code: 81146

Telephone #: (719)378-6362 | E-Mail (Optional):

2. Type Of Application (check applicable boxes)

☐ Use existing well
☒ Construct new well
☐ Other:

☐ Replacement for existing monitoring well:
Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment: MH-

Well name or #: BP 4

4. Location Of Proposed Well

County: Saguache

NW 1/4 of the NW 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
36	41	☒ ☐	11	☒ ☐	N

Distance of well from section lines (section lines are typically not property lines)
650 Ft. from ☒ N ☐ S 10 Ft. from ☐ E ☒ W

For replacement wells only – distance and direction from old well to new well
feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ☒ YES

Easting 435982.007
Northing 4179902.21
Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: Colorado State Land Board

Mailing address: 1127 Sherman St., Ste. 300

City: Denver | State: CO | Zip Code: 80203-2206

Telephone #: (303) 866-3454

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total depth: 150 feet | Aquifer: unconfined

8. Consultant Information (if applicable)

Name of contact person: G. Eric Saenger, CPG

Company name: HRS WATER CONSULTANTS, INC.

Mailing address: 8885 W 14th Ave.

City: Lakewood | State: CO | Zip Code: 80215

Telephone #: (303) 462-1111

9. Proposed Well Driller License #(optional):

10. Signature Of Well Owner, Consultant Or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign here (Must be *original* signature): Wm. R. Hansen | Date: 6/5/09

Print name & title: for Chuck Pettee, Chief, Water Rights Branch

Office Use Only

USGS map name | DWR map no. | Surface elev.

Receipt area only

DIV ____ WD ____ BA ____ MD ____

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., RM 818, DENVER CO 80203
phone – info: (303) 866-3587 main: (303) 866-3581
Fax: (303) 866-3589 http://www.water.state.co.us

Office Use Only

Form GWS-46 (12/2007)

MONITORING/OBSERVATION Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be completed in black or blue ink or typed.

1. Well Owner Information

Name of well owner: Great Sand Dunes National Park & Preserve

Mailing address: 11500 Highway 150

City: Mosca | State: CO | Zip code: 81146

Telephone #: (719)378-6362 | E-Mail (Optional):

2. Type Of Application (check applicable boxes)

☐ Use existing well
☒ Construct new well
☐ Other:
☐ Replacement for existing monitoring well:
Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment: MH-
Well name or #: BP 5

4. Location Of Proposed Well

County: Saguache
NW 1/4 of the NW 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
24	41	☒ ☐	11	☒ ☐	N

Distance of well from section lines (section lines are typically not property lines)
1150 Ft. from ☒ N ☐ S 100 Ft. from ☐ E ☒ W

For replacement wells only – distance and direction from old well to new well
feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ☒ YES

Easting 436036.248
Northing 4182948.92
Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: Colorado State Land Board

Mailing address: 1127 Sherman St., Ste. 300

City: Denver | State: CO | Zip Code: 80203-2206

Telephone #: (303) 866-3454

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total depth: 200 feet | Aquifer: unconfined

8. Consultant Information (if applicable)

Name of contact person: G. Eric Saenger, CPG

Company name: HRS WATER CONSULTANTS, INC.

Mailing address: 8885 W 14th Ave.

City: Lakewood | State: CO | Zip Code: 80215

Telephone #: (303) 462-1111

9. Proposed Well Driller License #(optional):

10. Signature Of Well Owner, Consultant Or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign here (Must be *original* signature): Wm. R. Hansen
Date: 6/5/09

Print name & title: for Chuck Pettee, Chief, Water Rights Branch

Office Use Only

USGS map name | DWR map no. | Surface elev.

Receipt area only

DIV ____ WD ____ BA ____ MD ____

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., RM 818, DENVER CO 80203
phone – info: (303) 866-3587 main: (303) 866-3581
Fax: (303) 866-3589 http://www.water.state.co.us

Office Use Only

Form GWS-46 (12/2007)

MONITORING/OBSERVATION Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be completed in black or blue ink or typed.

1. Well Owner Information

Name of well owner: Great Sand Dunes National Park & Preserve

Mailing address: 11500 Highway 150

City: Mosca | State: CO | Zip code: 81146

Telephone #: (719)378-6361 | E-Mail (Optional):

2. Type Of Application (check applicable boxes)

☐ Use existing well
☒ Construct new well
☐ Other:

☐ Replacement for existing monitoring well:
Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment: MH-

Well name or #: BP 6

4. Location Of Proposed Well

County: Saguache

_____ 1/4 of the _____ 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
		☐ ☐		☐ ☐	B

Distance of well from section lines (section lines are typically not property lines)
Ft. from ☐ N ☐ S Ft. from ☐ E ☐ W

For replacement wells only – distance and direction from old well to new well
feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ☒ YES

Easting 436956.739
Northing 4186440.67

Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: as above

Mailing address:

City | State | Zip Code

Telephone #: ( )

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total depth: 180 feet | Aquifer: unconfined

8. Consultant Information (if applicable)

Name of contact person: G. Eric Saenger, CPG

Company name: HRS WATER CONSULTANTS, INC.

Mailing address: 8885 W 14th Ave.

City: Lakewood | State: CO | Zip Code: 80215

Telephone #: (303) 462-1111

9. Proposed Well Driller License #(optional):

10. Signature Of Well Owner, Consultant Or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign here (Must be *original* signature): Wm. R. Hansen | Date: 6/5/09

Print name & title: for Chuck Pettee, Chief, Water Rights Branch

Office Use Only

USGS map name | DWR map no. | Surface elev.

Receipt area only

DIV ____ WD ____ BA ____ MD ____

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., RM 818, DENVER CO 80203
phone – info: (303) 866-3587 main: (303) 866-3581
Fax: (303) 866-3589 http://www.water.state.co.us

Office Use Only

Form GWS-46 (12/2007)

MONITORING/OBSERVATION Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be completed in black or blue ink or typed.

1. Well Owner Information

Name of well owner: Great Sand Dunes National Park & Preserve

Mailing address: 11500 Highway 150

City: Mosca | State: CO | Zip code: 81146

Telephone #: (719)378-6361 | E-Mail (Optional):

2. Type Of Application (check applicable boxes)

☐ Use existing well
☒ Construct new well
☐ Other:
☐ Replacement for existing monitoring well:
Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment: MH-
Well name or #: BP 7

4. Location Of Proposed Well

County: Saguache
_____ 1/4 of the _____ 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
		☐ ☐		☐ ☐	B

Distance of well from section lines (section lines are typically not property lines)
Ft. from ☐ N ☐ S Ft. from ☐ E ☐ W

For replacement wells only – distance and direction from old well to new well
feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ☒ YES

Easting 436965.071
Northing 4189821.11
Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: as above

Mailing address:

City | State | Zip Code

Telephone #: ( )

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total depth: 180 feet | Aquifer: unconfined

8. Consultant Information (if applicable)

Name of contact person: G. Eric Saenger, CPG

Company name: HRS WATER CONSULTANTS, INC.

Mailing address: 8885 W 14th Ave.

City: Lakewood | State: CO | Zip Code: 80215

Telephone #: (303) 462-1111

9. Proposed Well Driller License #(optional):

10. Signature Of Well Owner, Consultant Or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign here (Must be *original* signature): Wm. R. Hansen | Date: 6/5/09

Print name & title: for Chuck Pettee, Chief, Water Rights Branch

Office Use Only

USGS map name | DWR map no. | Surface elev.

Receipt area only

DIV ____ WD ____ BA ____ MD ____

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., RM 818, DENVER CO 80203
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Office Use Only

Form GWS-46 (12/2007)

MONITORING/OBSERVATION Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be completed in black or blue ink or typed.

1. Well Owner Information

Name of well owner: Great Sand Dunes National Park & Preserve

Mailing address: 11500 Highway 150

City: Mosca | State: CO | Zip code: 81146

Telephone #: (719)378-6361 | E-Mail (Optional):

2. Type Of Application (check applicable boxes)

☐ Use existing well
☒ Construct new well
☐ Other:

☐ Replacement for existing monitoring well:
Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment: MH-

Well name or #: BP 8

4. Location Of Proposed Well

County: Saguache

_____ 1/4 of the _____ 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
		☐ ☐		☐ ☐	B

Distance of well from section lines (section lines are typically not property lines)
Ft. from ☐ N ☐ S Ft. from ☐ E ☐ W

For replacement wells only – distance and direction from old well to new well
feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ☒ YES

Easting 437032.382
Northing 4193051.33
Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: as above

Mailing address:

City | State | Zip Code

Telephone #: ( )

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total depth: 210 feet | Aquifer: unconfined

8. Consultant Information (if applicable)

Name of contact person: G. Eric Saenger, CPG

Company name: HRS WATER CONSULTANTS, INC.

Mailing address: 8885 W 14th Ave.

City: Lakewood | State: CO | Zip Code: 80215

Telephone #: (303) 462-1111

9. Proposed Well Driller License #(optional):

10. Signature Of Well Owner, Consultant Or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign here (Must be *original* signature): Wm. R. Hansen | Date: 6/5/09

Print name & title: for Chuck Pettee, Chief, Water Rights Branch

Office Use Only

USGS map name | DWR map no. | Surface elev.

Receipt area only

DIV ____ WD ____ BA ____ MD ____

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., RM 818, DENVER CO 80203
phone – info: (303) 866-3587 main: (303) 866-3581
Fax: (303) 866-3589 http://www.water.state.co.us

Office Use Only

Form GWS-46 (12/2007)

MONITORING/OBSERVATION Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be completed in black or blue ink or typed.

1. Well Owner Information

Name of well owner: Great Sand Dunes National Park & Preserve

Mailing address: 11500 Highway 150

City: Mosca | State: CO | Zip code: 81146

Telephone #: (719)378-6361 | E-Mail (Optional):

2. Type Of Application (check applicable boxes)

☐ Use existing well
☒ Construct new well
☐ Other:
☐ Replacement for existing monitoring well:
Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment: MH-
Well name or #: BP 9

4. Location Of Proposed Well

County: Saguache
_____ 1/4 of the _____ 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
		☐ ☐		☐ ☐	B

Distance of well from section lines (section lines are typically not property lines)
Ft. from ☐ N ☐ S Ft. from ☐ E ☐ W

For replacement wells only – distance and direction from old well to new well
feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ☒ YES

Easting 437195.953
Northing 4196594.71

Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: as above

Mailing address:

City | State | Zip Code

Telephone #: ( )

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total depth: 220 feet | Aquifer: unconfined

8. Consultant Information (if applicable)

Name of contact person: G. Eric Saenger, CPG

Company name: HRS WATER CONSULTANTS, INC.

Mailing address: 8885 W 14th Ave.

City: Lakewood | State: CO | Zip Code: 80215

Telephone #: (303) 462-1111

9. Proposed Well Driller License #(optional):

10. Signature Of Well Owner, Consultant Or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign here (Must be *original* signature): Wm. R. Hansen
Date: 6/5/09

Print name & title: for Chuck Pettel, Chief, Water Rights Branch

Office Use Only

USGS map name | DWR map no. | Surface elev.

Receipt area only

DIV ____ WD ____ BA ____ MD ____

COLORADO DIVISION OF WATER RESOURCES
DEPARTMENT OF NATURAL RESOURCES
1313 SHERMAN ST., RM 818, DENVER CO 80203
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Office Use Only

Form GWS-46 (12/2007)

MONITORING/OBSERVATION Water Well Permit Application

Review instructions on reverse side prior to completing form.
The form must be completed in black or blue ink or typed.

1. Well Owner Information

Name of well owner: Great Sand Dunes National Park & Preserve

Mailing address: 11500 Highway 150

City: Mosca | State: CO | Zip code: 81146

Telephone #: (719)378-6361 | E-Mail (Optional):

2. Type Of Application (check applicable boxes)

☐ Use existing well
☒ Construct new well
☐ Other:
☐ Replacement for existing monitoring well:
Permit no.:

3. Refer To (if applicable)

Monitoring hole acknowledgment: MH-
Well name or #: BP 10

4. Location Of Proposed Well

County: Saguache
_____ 1/4 of the _____ 1/4

Section	Township	N or S	Range	E or W	Principal Meridian
		☐		☐	B

Distance of well from section lines (section lines are typically not property lines)
Ft. from ☐ N ☐ S Ft. from ☐ E ☐ W

For replacement wells only – distance and direction from old well to new well
feet direction

Well location address (Include City, State, Zip) ☐ Check if well address is same as Item 1.

Optional: GPS well location information in UTM format
You must check GPS unit for required settings as follows:

Format must be UTM
☐ Zone 12 or ☒ Zone 13
Units must be Meters
Datum must be NAD83
Unit must be set to true north
Was GPS unit checked for above? ☒ YES

Easting 439894.778
Northing 4195829.71
Remember to set Datum to NAD83

5. Property Owner Information

Name of property owner: as above

Mailing address:

City | State | Zip Code

Telephone #: ( )

6. Use Of Well

Use of this well is limited to monitoring water levels and/or water quality sampling

7. Well Data (proposed)

Total depth: 270 feet | Aquifer: unconfined

8. Consultant Information (if applicable)

Name of contact person: G. Eric Saenger, CPG

Company name: HRS WATER CONSULTANTS, INC.

Mailing address: 8885 W 14th Ave.

City: Lakewood | State: CO | Zip Code: 80215

Telephone #: (303) 462-1111

9. Proposed Well Driller License #(optional):

10. Signature Of Well Owner, Consultant Or Authorized Agent

The making of false statements herein constitutes perjury in the second degree, which is punishable as a class 1 misdemeanor pursuant to C.R.S. 24-4-104 (13)(a). I have read the statements herein, know the contents thereof and state that they are true to my knowledge.

Sign here (Must be *original* signature): Wm. R. Dickinson | Date: 6/5/09

Print name & title: for Chuck Pettee, Chief, Water Rights Branch

Office Use Only

USGS map name | DWR map no. | Surface elev.

Receipt area only

DIV ____ WD ____ BA ____ MD ____

Docket Information

Number of Documents in Docket 38

Documents Dated from 8/4/2008 to 12/8/2009

Docket Compiled: 7/10/2017