HRS WATER CONSULTANTS, INC.
8885 West 14th Avenue
Lakewood, Colorado 80215
(303) 462-1111
Fax: (303) 462-3030

CONSULTANTS IN
HYDROGEOLOGY AND
WATER RESOURCES

June 11, 2009

State Engineer's Office
Division of Water Resources
1313 Sherman Street, Room 818
Denver, CO 80203

04-06.10

**RE: National Park Service Monitoring/Observation Water Well Permit Application Forms**

To Whom It May Concern:

Enclosed please find completed and signed Monitoring/Observation Water Well Permit Application forms for ten monitoring wells to be drilled for the National Park Service at the Great Sand Dunes National Park & Preserve. Enclosed is a check for $1,000.00 to cover the filing fees.

Please call me if you have any questions regarding the foregoing.

Very truly yours,

HRS WATER CONSULTANTS, INC.

G. Eric Saenger

G. Eric Saenger, CPG
Senior Hydrogeologist

Cc: Jim Harte

HRS WATER CONSULTANTS, INC.
8885 West 14th Avenue
Lakewood, Colorado 80215
(303) 462-1111
Fax: (303) 462-3030

CONSULTANTS IN
HYDROGEOLOGY AND
WATER RESOURCES

June 2, 2009

04-06.10

Mr. James Harte
Hydrologist
National Park Service
Water Resources Division
1201 Oakridge Drive, suite 250
Fort Collins, CO 80525

Re: Monitoring/Observation Water Well Permit Application Forms
for the Ten Boundary Piezometers

Dear Mr. Harte:

As we discussed this morning, enclosed please find filled out the Monitoring/Observation Water Well Permit Application forms for the ten Boundary Piezometers. Please review these forms. If any corrections need to be made, please initial the changes. Have each form signed under Item 10. If you want to submit the forms to the State Engineers Office please enclose a check for $1,000 for the filling fee ($100/well). In the alternative, HRS would be happy to submit the applications under our cover letter so that the State will contact us if any questions arise.

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HRS WATER CONSULTANTS, INC.

G. Eric Saenger

G. Eric Saenger, CPG
Senior Hydrogeologist

Enclosures: Permit Applications

COLORADO DIVISION OF WATER R  URCES
DEPARTMENT OF NATURAL RESOURCES

GWS-46 MONINST (12/2007)

# MONITORING/OBSERVATION WELL PERMIT APPLICATION INSTRUCTIONS

**Applications must be typewritten or printed in BLACK or BLUE INK. ALL ITEMS in the application must be completed. Incomplete applications may be returned to the applicant for more information. Applications are evaluated in chronological order. Please allow approximately six weeks for processing.**

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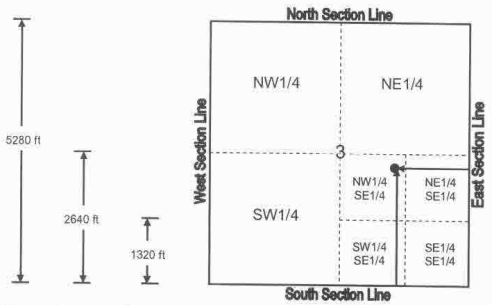
**USES:** This form (GWS-46) is to be used when applying for a permit where the only uses are monitoring of water levels and/or water quality sampling. For well construction criteria refer to the Colorado Water Well Construction Rules, 2CCR 402-2. A copy of the Rules may be obtained from any Division of Water Resources Office for a fee of $5, or you may refer to our web site at **http://water.state.co.us**.

**ITEM INSTRUCTIONS: (numbers correspond with those on the front of this form)**

1. Provide the name of the well owner and the mailing address where all correspondence will be sent.
2. Check and complete all boxes that apply.
3. Provide the MH number assigned by the Division of Water Resources in response to the notice of intent to construct a monitoring/observation well. Complete the well name if the structure has a name or identifying number.
4. The county, ¼ of the ¼ section designation, section #, township, range, principal meridian, and distances from section lines for the proposed well must be provided. This information is critical in the evaluation, and error or omission may cause a delay. In a typical case, a township is comprised of 36 square section miles, with each section ideally one mile square, or 5,280 feet on each side. Sections are further divided into quarter sections. Each ¼ Section is 2,640 feet square and comprises 160 acres. Each ¼ section can be further divided into additional quarters. Each ¼ of the ¼ Section is 1,320 feet square and comprises 40 acres. The distances are measured from the section lines. In the following example, the well is located 2,500 feet from the South Section line and 1,400 feet from the East Section line:




Well Location Example: NW1/4 of the SE1/4 of Section 3, 2500 feet from the South and 1400 feet from the East Section Lines respectively.

(An option to providing distances from section lines and the ¼ of the ¼ section designation is to provide an accurate GPS location in UTM format. The required GPS unit settings must be as indicated on this form.) Colorado contains two (2) UTM zones. Zone 13 covers most of Colorado. The boundary between Zone 12 and Zone 13 is the 108th Meridian (longitude). West of the 108th Meridian is UTM Zone 12 and east of the 108th Meridian is UTM Zone 13. The 108th Meridian is approximately 57 miles east of the Colorado-Utah state line. On most GPS units, the UTM zone is given as part of the Easting measurement, e.g. 12T0123456. Check the appropriate box for the zone. Provide the property address of the well location if one exists. If it is the same as the mailing address, check the box next to the well location address.

5. Provide property owner information.
6. Use of this well is limited to monitoring water levels and/or water quality sampling only.
7. The actual or anticipated total depth must be provided. Provide the name of the aquifer in which the well will be completed.
8. Provide consultant information (if applicable).
9. Monitoring/observation wells must be constructed by a Colorado licensed well construction contractor or authorized individual, as defined in the Well Construction Rules, 2CCR 402-2. Only a licensed contractor may construct any monitoring/observation well that penetrates a confining layer, or, is to be converted into a future production well. The well must be constructed in compliance with the Well Construction Rules, unless a variance has been approved allowing an alternative construction design.
10. An ORIGINAL signature of either the well owner, consultant, or their authorized agent must be on the application.

**IF YOU HAVE ANY QUESTIONS** regarding any item on the application form, please call the Division of Water Resources Ground Water Information Desk (303-866-3587), or the nearest Division of Water Resources Field Office located in Greeley (970-352-8712), Pueblo (719-542-3368), Alamosa (719-589-6683), Montrose (970-249-6622), Glenwood Springs (970-945-5665), Steamboat Springs (970-879-0272), or Durango (970-247-1845), or refer to our web site at http://water.state.co.us.

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 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 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 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 ____

**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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   - 2.1. THE GREAT SAND DUNES IN-PLACE WATER RIGHT ..... 3
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4. **BOUNDARY PIEZOMETER CONSTRUCTION** ..... 7
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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 |

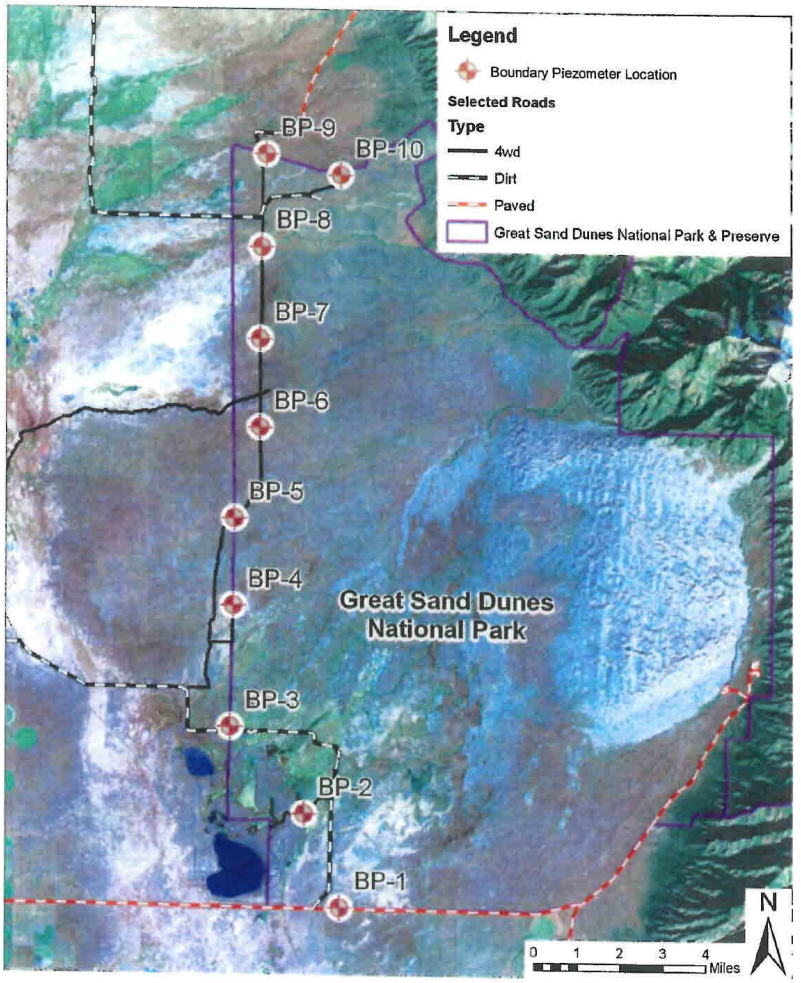


**Figure 1: Boundary Piezometer Locations**



Docket Information

Number of Documents in Docket 10

Documents Dated from 6/2/2009 to 12/8/2009

Docket Compiled: 12/14/2017

HRS WATER CONSULTANTS, INC.
8885 West 14th Avenue
Lakewood, Colorado 80215
(303) 462-1111
Fax: (303) 462-3030

CONSULTANTS IN
HYDROGEOLOGY AND
WATER RESOURCES

June 11, 2009

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04-06.10

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CONSULTANTS IN
HYDROGEOLOGY AND
WATER RESOURCES

June 2, 2009

04-06.10

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Hydrologist
National Park Service
Water Resources Division
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Fort Collins, CO 80525

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Enclosures: Permit Applications

COLORADO DIVISION OF WATER R  URCES
DEPARTMENT OF NATURAL RESOURCES

GWS-46 MONINST (12/2007)

# MONITORING/OBSERVATION WELL PERMIT APPLICATION INSTRUCTIONS

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1. Provide the name of the well owner and the mailing address where all correspondence will be sent.
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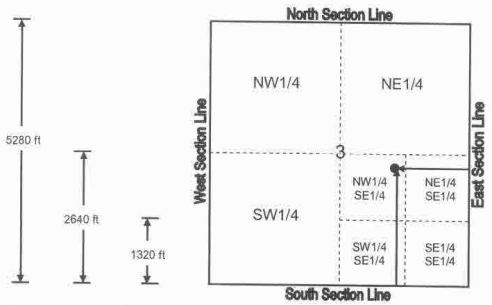


Well Location Example: NW1/4 of the SE1/4 of Section 3, 2500 feet from the South and 1400 feet from the East Section Lines respectively.

(An option to providing distances from section lines and the ¼ of the ¼ section designation is to provide an accurate GPS location in UTM format. The required GPS unit settings must be as indicated on this form.) Colorado contains two (2) UTM zones. Zone 13 covers most of Colorado. The boundary between Zone 12 and Zone 13 is the 108th Meridian (longitude). West of the 108th Meridian is UTM Zone 12 and east of the 108th Meridian is UTM Zone 13. The 108th Meridian is approximately 57 miles east of the Colorado-Utah state line. On most GPS units, the UTM zone is given as part of the Easting measurement, e.g. 12T0123456. Check the appropriate box for the zone. Provide the property address of the well location if one exists. If it is the same as the mailing address, check the box next to the well location address.

5. Provide property owner information.
6. Use of this well is limited to monitoring water levels and/or water quality sampling only.
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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 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 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):

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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 ____

**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:

| | |
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## 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
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Figure 1: Location Map: GRSA Boundary Piezometers


## Appendixes


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

| | |
|---|---|
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| Vance J. Campos | Hydrogeologist |
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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.

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[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 |

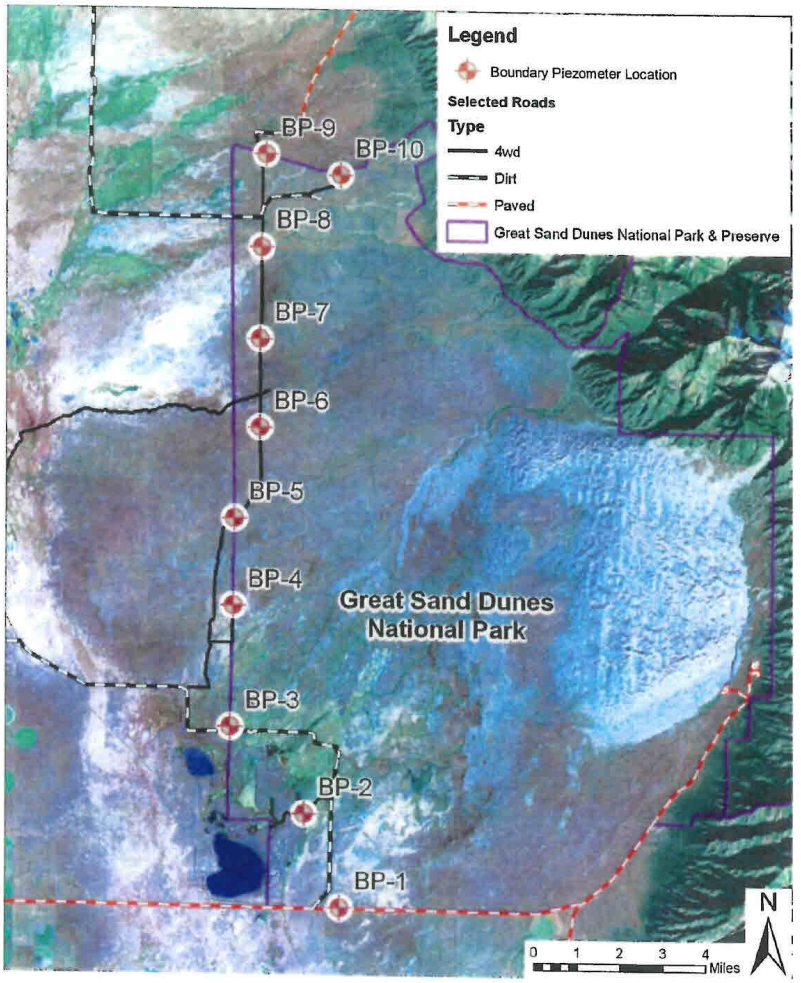


**Figure 1: Boundary Piezometer Locations**



Docket Information

Number of Documents in Docket 10

Documents Dated from 6/2/2009 to 12/8/2009

Docket Compiled: 12/14/2017