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Dear Mr. King and Spring Valley Stipulation Executive Committee:

SUBJECT: SPRING VALLEY BIOLOGICAL MONITORING PLAN 2014 STATUS AND DATA SUMMARY

Southern Nevada Water Authority hereby submits a summary of 2014 biological data collection efforts and the status of the *Biological Monitoring Plan for the Spring Valley Stipulation* (Plan) (BWG 2009). This summary satisfies the biological data reporting requirements of Nevada State Engineer (NSE) Ruling 6164, which granted SNWA groundwater rights in the Spring Valley Hydrographic Area 184 (Spring Valley) upon compliance with the Plan and any amendments to the Plan that the NSE requires pursuant to his authority under Nevada water law (NSE 2012). This summary also satisfies the biological data reporting requirements of the 2006 Spring Valley Stipulation for Withdrawal of Protests between SNWA and the U.S. Department of the Interior regarding SNWA groundwater applications 54003-54021 in Spring Valley (Stipulation) (Stipulation 2006 at Exhibit B).

The Plan identifies that at least seven years of baseline biological data will be collected prior to SNWA groundwater withdrawal from Spring Valley (BWG 2009 at page 2-2). Two years of baseline biological data collection were completed in 2009 and 2010 in accordance with the Plan (SNWA 2010 and 2011), and additional surveys, studies and data analyses were conducted in 2011-2013 to support the Plan (SNWA 2013 and 2014a). To meet Plan objectives, SNWA will resume full biological monitoring at least five years prior to projected SNWA groundwater withdrawal from Spring Valley. The Stipulation Biological Work Group (BWG) and Executive Committee (EC) identified the time until five years prior to groundwater withdrawal from Spring

Valley as an "interim period", which if feasible can be used to examine data, test field protocols, make Plan adjustments, and conduct targeted monitoring and studies in support of the Plan and Stipulation goals.

In 2014 SNWA conducted interim period activities, including surveys, studies and data analyses associated with the Plan. A detailed description of the activities completed by SNWA in 2014 is provided in the Attachment to this letter, and includes:

- Northern leopard frog (*Lithobates pipiens*; formerly *Rana pipiens*; henceforth leopard frog) egg mass surveys.

- Assistance with Nevada Department of Wildlife Shoshone Ponds Pahrump poolfish (*Empetrichthys latos*) surveys.

- Data analyses to evaluate sampling designs and methods, explore species distributions within monitoring sites, and better clarify relationships between species and habitat indicators. Springsnail, macroinvertebrate, leopard frog, physical habitat mapping, water quality, water quantity, and other habitat data were analyzed.

- Completion of three reports on data collection efforts: 2011-2012 springsnail and water quality study report (SNWA 2014b); 2014 springsnail distribution site field report (SNWA 2014c); and 2011-2013 leopard frog survey report with 2014 addendum (SNWA 2014d).

- Creation of ArcGIS geodatabases for viewing 2009-2014 data.

- Maintenance of the SNWA data-exchange web site.

The BWG continued to conduct the Plan evaluation. A detailed description of the activities completed by BWG in 2014 is provided in the Attachment to this letter, and includes:

- Evaluation of fish, springsnail, macroinvertebrate, frog, and associated habitat sampling designs.

- Completion of a final report evaluating fish monitoring efforts (BWG 2014a).

- Submittal of a draft report to the EC evaluating springsnail and macroinvertebrate monitoring efforts (BWG 2014b) (completed in early 2015). The BWG also developed a working draft report evaluating leopard frog monitoring efforts (BWG 2014c).

- Completion of consultant efforts supporting the Plan evaluation. The US Fish and Wildlife Service contracted with a consultant to evaluate assessing spatial and temporal trends in spring environments and aquatic macroinvertebrates, and a final report was

produced (Sada 2014). SNWA contracted with a consultant to evaluate physical habitat data collection in relation to fish and springsnail monitoring, and three technical memorandums were produced (BIO-WEST 2014a-c).

- Development of a working draft memorandum to the EC recommending additional local hydrologic monitoring at biological monitoring sites (BWG and TRP 2014) (completed in early 2015). The memo was prepared in collaboration with the hydrology Technical Review Panel (TRP).

SNWA anticipates the following activities for 2015:

- SNWA leopard frog egg mass surveys.

- Completion of the BWG Plan evaluation. Remaining efforts include finalizing the leopard frog evaluation report, and evaluating vegetation, site assessment, and fixed station photography sampling designs in a separate report.

If you have any questions regarding this summary, please contact Nancy Beecher at (702) 822-3351.

Sincerely,

Zane L. Marshall
Director, Resources & Facilities

ZLM:NB:dg

Attachment

cc: Rick Felling, Nevada Division of Water Resources
Adam Sullivan, Nevada Division of Water Resources

References

BIO-WEST. 2014a. Evaluation of physical habitat monitoring efforts in relation to fish data collections at Keegan Spring, Spring Valley, Nevada. Technical Memorandum. 35 p. Prepared for SNWA by BIO-WEST, Inc., Logan, Utah. January.

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BWG. 2014c. Evaluation of northern leopard frog sampling designs for the Spring Valley Stipulation. Draft in progress.

BWG and TRP [Technical Review Panel]. 2014. Consensus recommendations regarding additional local hydrologic monitoring at biological monitoring sites. Memorandum. 9 p. February 4.

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SNWA. 2014a. Spring Valley biological monitoring plan 2013 status and data report. Southern Nevada Water Authority, Las Vegas, Nevada. March.

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Stipulation. 2006. Stipulation for Withdrawal of Protests: U.S. Bureau of Indian Affairs, U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, Southern Nevada Water Authority, 2006. Regarding SNWA groundwater applications (#54003-54021) in Spring Valley hydrographic area (#184). September 8.

Spring Valley Biological Monitoring Plan - 2014 Status

The following discussion provides a detailed summary of SNWA's biological data collected in 2014, and the current status of the *Biological Monitoring Plan for the Spring Valley Stipulation* (Plan) (BWG 2009). Previous efforts conducted under the Plan in support of Nevada State Engineer (NSE) Ruling 6164 (NSE 2012) and the Spring Valley Stipulation (Stipulation 2006) are available in SNWA (2010, 2011, 2013, and 2014a).

Biological Data Collection

The Spring Valley Stipulation Biological Work Group (BWG) and Executive Committee (EC) have identified the time until baseline monitoring resumes (at least five years prior to groundwater withdrawal from Spring Valley) as an "interim period", which if feasible can be used to examine data, test field protocols, make Plan adjustments, and conduct targeted monitoring and studies in support of the Plan and Stipulation goals. The data collection efforts listed below for 2014 are considered part of this interim period.

The Plan integrates Nevada Department of Wildlife's (NDOW) regular and on-going monitoring of Shoshone Ponds fish populations, a program activity of the Nevada State's Native Aquatic Species Program (BWG 2009 at page 5-12). NDOW conducted their annual Shoshone Ponds fish survey in August 2014. To support Plan activities, and as a participant of the Pahrump Poolfish Recovery Implementation Team, SNWA assisted with the survey effort. Pahrump poolfish mark-recapture data were collected at the North, Middle and South refuge ponds, the Stock Pond, and the Well #2 outflow. Since NDOW transplanted relict dace out of the South refuge pond (and added Pahrump poolfish in their place), relict dace are no longer monitored at the site. Standard water quality data were collected as part of the fish survey. The forthcoming 2014 field trip report is being prepared by NDOW.

SNWA tested Hester-Dendy multi-plate samplers in May 2014 as an alternative to surber samplers for monitoring springsnails in desert spring systems. The Hester-Dendy samplers were tested at Minerva Spring Complex for 48 hours to examine springsnail counts, and were tested in a variety of habitats to examine functionality. The samplers enabled the collection of springsnail abundance and extent data, and resulted in significantly less habitat degradation, variation in sampling technique, and effort than surber samplers. As a result, BWG recommended that modified Hester-Dendy samplers be adopted to monitor springsnail populations. Details are presented in the BWG report evaluating springsnail and macroinvertebrate sampling designs (BWG 2014b).

SNWA conducted a site visit in July 2014 to determine springsnail distribution at Unnamed 5 Spring, and presented the results in a field trip report (SNWA 2014c). The objective of the effort was to map the precise distribution of *P. kolobensis* within the springhead to inform the sampling design at the site. The field trip report presented details of the effort (SNWA 2014c), and informed the BWG evaluation of springsnail sampling designs (BWG 2014b).

SNWA conducted leopard frog egg mass surveys in spring (March-May) 2014, and presented the results in a final 2011-2013 survey report with 2014 addendum (SNWA 2014d). The report

included detailed methods, results and discussion pertaining to leopard frog egg mass and habitat sampling at six leopard frog monitoring sites (Keegan Spring Complex, Minerva Spring Complex, Shoshone Ponds, South Millick Spring, Unnamed 5 Spring, and West Spring Valley Complex). The report also analyzed the breeding period and trend in egg mass count from 2009-2014 (SNWA 2014d), and informed the BWG evaluation of leopard frog sampling designs (BWG 2014c).

Plan Evaluation

In Ruling 6164, the NSE found that the adaptive approach incorporated in the Plan is an accepted scientific approach that is appropriate and advisable for managing a long-term project, and that adaptive management is a critical component in ensuring water development occurs in a manner that is environmentally sound (NSE 2012 at page 182). As part of this adaptive approach, the BWG plans to routinely evaluate biological and hydrologic data and groundwater flow modeling results, as well as consider any future NSE decisions, changes in permitted points of diversion, and specific production well locations to inform biological monitoring, management, and mitigation needs. Currently, in accordance with the Plan, BWG is conducting a Plan evaluation with the goal of revising components, methods and approaches as needed to continue to meet the needs of the Stipulation (Stipulation 2006). The NSE would review and determine approval of any proposed Plan modifications submitted by SNWA under Ruling 6164, and may require additional amendments pursuant to his authority under Nevada water law (NSE 2012 at page 217).

In 2014, the BWG evaluated fish, springsnail, macroinvertebrate, frog, and associated habitat monitoring efforts. The evaluation involved members of all Stipulation Parties [SNWA, Bureau of Indian Affairs, Bureau of Land Management, National Park Service, and U.S. Fish and Wildlife Service] and invited participants [Office of the NSE, NDOW, Utah Division of Wildlife Resources, and U.S. Forest Service (USFS)]. In accordance with the Stipulation, the BWG consulted with the Technical Review Panel (TRP) regarding hydrologic data and monitoring relevant to BWG monitoring efforts.

The Plan evaluation focused on monitoring indicators (i.e., measurable attributes that reflect the condition of the species and their habitats), sample designs, and sampling methods for the populations and communities of interest as well as associated water quality, water quantity, and other habitat variables. The evaluation was informed by biological and hydrologic data collected in 2009-2014, scientific literature, and studies and data analyses regarding sampling designs, methods, and relationships between species and habitat indicators. The evaluations and Plan modification recommendations were designed to be consistent with the goals and requirements of the Stipulation.

A report evaluating and recommending changes to fish and associated habitat monitoring efforts was approved by the EC and finalized in 2014 (BWG 2014a). Two technical memorandums evaluating physical habitat monitoring efforts in relation to fish monitoring (BIO-WEST 2014a-b) were produced as part of the evaluation process. The report provided recommendations (BWG 2014a at Section 8) for the following surveys:

- Pahrump poolfish (*Empetrichthys latos*) at Shoshone Ponds (Spring Valley, Nevada);

- Relict dace (*Relictus solitarius*) in Keegan Spring Complex and Stonehouse Spring Complex (Spring Valley); and

- Big Springs/Lake Creek native fish assemblage [Snake Valley (Hydrographic Area 195), NV and Utah]. The native fish species include redside shiner (*Richardsonius balteatus*), speckled dace (*Rhinichthys osculus*), Utah chub (*Gila atraria*), Utah sucker (*Catostomus ardens*), and mottled sculpin (*Cottus bairdi*).

A draft report evaluating and recommending changes to springsnail, macroinvertebrate, and associated habitat monitoring efforts was submitted to the EC (BWG 2014b), and a final report was completed and approved by the EC in early 2015. A consultant report evaluating the assessment of spatial and temporal trends in spring environments and aquatic macroinvertebrates (Sada 2014), and a consultant technical memorandum evaluating physical habitat monitoring efforts in relation to springsnail monitoring (BIO-WEST 2014c) were produced as part of the evaluation process. SNWA also finalized a 2011-2012 springsnail and water quality study report (SNWA 2014b) and a 2014 springsnail distribution site field report (SNWA 2014c) that informed the evaluation. The report provided recommendations (BWG 2014b at Section 8) for the following surveys:

- Springsnails (*Pyrgulopsis kolobensis* [Toquerville pyrg], *P. anguina* [longitudinal pyrg], and *P. peculiaris* [bifid duct pyrg]) inhabiting 10 spring systems in Spring and Snake valleys.

- Macroinvertebrate communities in 13 springs in Spring and Snake valleys and one stream in Snake Valley.

- Potential springsnail and macroinvertebrate surveys in one spring on USFS-managed land under the 2011 SNWA-USFS Spring Valley Stipulation (Stipulation 2011). The 2011 SNWA-USFS Stipulation, which also is in regards to SNWA groundwater applications 54003-54021, requires biological monitoring to be conducted at one site in Spring Valley on USFS-managed land according to the principles contained in the Plan (BWG 2009; Stipulation 2011 at page 8).

An evaluation of leopard frog and associated habitat monitoring efforts began in 2014 (BWG 2014c). SNWA also finalized a 2011-2013 leopard frog egg mass survey report with 2014 addendum (SNWA 2014d) that has informed the evaluation. The evaluation addresses leopard frog egg mass surveys in seven spring systems in Spring Valley, and is expected to be finished in 2015.

A joint BWG/TRP evaluation of local hydrologic monitoring at biological monitoring sites was conducted in 2014 (BWG and TRP 2014), and a final BWG/TRP memorandum was completed and approved by the EC in early 2015. The recommendations were designed to facilitate developing relationships and interpreting changes between spring hydrologic conditions and monitored aquatic biological resources (springsnails, frogs, fishes, and their habitats).

Data Management and Reporting

The data management workflow process conducted by SNWA included use of standardized data sheets, archival storage of original data, creation of geographic information system files, completion of rigorous multistep Quality Assurance/Quality Control of digital data, storage of final data in a secure network location, back-up of files on a regularly scheduled basis, and upload of data into a secure Relational Database Management System. Final data were provided to the NSE, EC, BWG, and TRP via a data-exchange web site, and are available to the public.

SNWA continued to maintain a secure data-exchange web site accessible by the NSE, EC, BWG, and TRP to distribute monitoring data within 90 days of required data collection. SNWA also used the data-exchange web site to distribute the reports described above, and additional biological data and documents of interest to the BWG.

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