BLM_NV_NVSO_GWProjects

From: Rovianne Leigh <RLeigh@abwwlaw.com>
Sent: Tuesday, October 11, 2011 11:05 PM
To: BLM_NV_NVSO_GWProjects
Cc: Gloria Coronado
Subject: FW: DEIS Comment
Attachments: SNWA Grassetti 10-3-11 Final.pdf

From: Gloria Coronado
Sent: Tuesday, October 11, 2011 6:27 PM
To: nvgwprojects@blm.gov
Cc: Rovianne Leigh
Subject: DEIS Comment

Ms. Woods, good evening. On behalf of the Confederate Tribes of the Goshute Reservation, we submit our comments to the *Clark, Lincoln, and White Pine Counties Groundwater Development Project Draft Environmental Impact Statement (DEIS)*, in two parts.

Thank you. Have a wonderful evening.

Gloria Coronado
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REC'D - BLM - NSO
9:00 A.M. OCT 14 2011

October 11, 2011

VIA EMAIL TRANSMISSION: nvgwprojects@blm.gov

Penny Woods, Project Manager
Bureau of Land Management
Groundwater Projects Office
P. O. Box 12000
Reno, NV 89520-0006

Re: **Comments**: *Clark, Lincoln, and White Pine Counties Groundwater Development Project Draft Environment Impact Statement (DEIS)*
On behalf of: Confederated Tribes of the Goshute Reservation

Dear Ms. Woods:

This office represents the Confederated Tribes of the Goshute Reservation ("Tribe"). On behalf of the Tribes, we hereby submit the attached comments to:

1) Tribal Comment Letter;
2) Review of DEIS performed by Richard Grassetti of Grassetti Environmental Consulting;
3) Review of DEIS with emphasis on Groundwater Depths, Desert Plant Community Response to Groundwater Pumping, Phreatophyte Root Depths and Use by Wildlife and Cattle performed by Duncan Patten; and
4) Review of DEIS's Air Quality and Climate Change Issues, performed by Geoffrey Hornek of Environmental Air Quality & Acoustical Consulting.

Please do not hesitate to contact the undersigned if there are any questions or concerns.

Sincerely,

ALEXANDER, BERKEY, WILLIAMS & WEATHERS LLP

Rovianne A. Leigh
Attorney at Law

Attachments

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October 11, 2011

Penny Woods, Project Manager
Bureau of Land Management
Nevada Groundwater Projects Office
Nevada State Office (NV-910-2)
P.O. Box 12000
Reno, Nevada 89520-0006

Re: Comments of the Confederated Tribes of the Goshute Indian Reservation on the Clark, Lincoln, and White Pine Counties Groundwater Development Project Draft Environmental Impact Statement (DEIS)

Dear Ms. Woods:

On behalf of the Confederated Tribes of the Goshute Indian Reservation (Tribe), we submit these comments on the Southern Nevada Water Authority's (SNWA's) Clark, Lincoln, and White Pine Counties Groundwater Development Project Draft Environmental Impact Statement (DEIS). On the Tribe's behalf, we have also attached the Review of the DEIS provided by Grassetti Environmental Consulting.[1] For the reasons more fully set forth below, we request that the Bureau of Land Management (BLM): 1) Suspend this environmental review process until SNWA's water rights applications conclude; 2) Engage in formal Tribal consultation with the Goshute Tribe on a government-to-government basis regarding the Tribe's cultural and water resources, including its federally reserved water rights; 3) Revise the Draft Programmatic Agreement to ensure that the Tribe's cultural resources, including human remains and sacred sites, are adequately protected in accordance with both the letter and spirit of federal and Tribal laws; and, 4) Supplement and recirculate the DEIS once further information is available regarding the amounts of water SNWA will be authorized to pump, including locations of wells and associated infrastructure.

The Tribe has owned and occupied the lands encompassed by the proposed project since time immemorial. From the perspective of the Tribe, the benefits of the proposed Project do not

[1]We incorporate by reference those comments here.

outweigh the destruction of the cultural resources and traditional ways of life of Indian people.[2] There are also fatal flaws with the timing of this requested review. It is absolute folly to review Right-of-Way (ROW) applications for a pipeline without knowing the approximate locations of the wells that it will be supplying. The pipelines will follow the water, not the other way around. This makes it impossible to perform any informed, reasoned decision-making at this time, as required by law. Because of the unlawful segmentation of this DEIS, the BLM cannot carry out its duty to carefully evaluate and mitigate impacts to cultural and water resources, among others. Without further formal Tribal consultation and supplementation of the DEIS, Tribal cultural and water resources, including federally reserved water rights, will remain unlawfully ignored. We provide a more thorough overview of the Tribe's significant concerns, and the reasons this DEIS fails to comport with federal law, below.

1. The Bureau of Land Management Has Violated its Trust Duty to the Tribe

As a federal governmental agency, BLM has a heightened duty to consult with federally recognized Indian tribes and protect Tribal resources. *See Seminole Nation,* 316 U.S. 286, 297 ("We have described the Federal Government's fiduciary duties toward Indian tribes as consisting of 'moral obligations of the highest responsibility and trust,' to be fulfilled through conduct 'judged by the most exacting fiduciary standards'"); *See Pit River Tribe v. U.S. Forest Service*, 469 F.3d 768, 788 (9th Cir. 2006) (Because the federal government violated both NEPA and NHPA, it follows that it violated its minimum fiduciary duty to the Tribe). The Treaty of Peace and Friendship entered into by the United States federal government and the Goshute Shoshone Indians in 1863 predates NEPA and other environmental laws. The enactment of federal environmental laws certainly "does not diminish the Department's original trust responsibility to Indian tribes or cause it to disappear." *See Island Mountain Protectors,* 144 I.B.L.A. 168, 185 (1998) (Holding that BLM was required to consult with the Tribes to identify, protect and conserve trust resources, trust assets, and Tribal health and safety). The BLM's failure to adequately evaluate and mitigate impacts to Tribal cultural resources, including impacts to water resources, reserved water rights, culturally significant plants and animals, traditional and cultural practices, and religion, is therefore unlawful. Simply put, the BLM has not acted in accordance with its fiduciary relationship to the Tribe as required by federal law. This failure has grave consequences for the future of the Tribe and requires, at minimum, supplementation and recirculation of the DEIS in conjunction with formal Tribal consultation.

[2]For the purposes of this Comment Letter, the term "cultural resources" includes without limitation the following: any place, object, burial, plant, animal, fish, water source, natural resource, or landscape determined by the Tribe to be culturally, traditionally, historically or religiously significant in accordance with Tribal law, custom and tradition.

2. The Bureau of Land Management Has Failed to Engage in Meaningful Tribal Consultation As Required by Law

The obligation to provide meaningful and timely participation for the public is heightened with regard to sovereign Indian tribes, who enjoy a special status under federal law. *See Worcester v. Georgia*, 31 U.S. (6 Pet) 515, 559 (1832)(Indian tribes have inherent powers of self-government protected by federal law"); *Confederated Tribes & Bands of Yakima Indian Nation v. FERC,* 746 F.2d 466 (9th Cir.1984)(Holding that FERC violated its duty of Tribal consultation because the "consultation obligation is an affirmative duty"); *Te-Moak Tribe of Western Shoshone of Nevada v. U.S. Dept. of Interior*, 608 F.3d 592, 609-610 (9th Cir. 2010) *citing* 16 U.S.C. § 470a(d)(1)(A)(Holding that early consultation with tribes is encouraged by the National Historic Preservation Act's regulations "to ensure that all types of historic properties and all public interests in such properties are given due consideration...."). The BLM failed to fulfill its enhanced legal obligation to consult with, and take into consideration the views of, the Goshute Tribe and other Indian tribes that would be affected by this Project.

Contrary to the DEIS's assertions, meaningful Tribal consultation has not properly occurred. Informal meetings and informational conferences simply do not constitute formal government-to-government consultation. In one instance, Tribes were informed that a meeting in Ely with the BLM specifically would not be considered consultation, yet the DEIS counts it as such. Formal government-to government consultation must occur with the Goshute Tribal government during a formal Tribal Council session that includes, at the Tribe's discretion, its Tribal attorneys and appropriate Tribal staff. In order for "government-to-government" consultation to occur, consultation must be held with a quorum of the Tribal Council as the Tribe's governing body (or its duly authorized delegate). Furthermore, the Tribe must have advance notice that a proposed meeting is considered government-to-government consultation. *See* 36 C.F.R. § 800.2(c)(2)(ii)(C) (Consultation with Indian tribes pursuant to the NHPA "must recognize the government-to-government relationship between the Federal Government and Indian tribes").

The consultation requirement is an ongoing duty. This makes sense, because meaningful consultation cannot occur in an information vacuum. For example, should SNWA obtain the right to extract groundwater, BLM must immediately consult with the Tribe once it receives information regarding the proposed location of wells and associated infrastructure. BLM must be required, as Trustee and in furtherance of both the letter and spirit of the law, to consult with the Tribe on a government-to-government basis as new information arises that may have significant impacts on Tribal cultural resources. Only the Goshute Tribe can inform the BLM whether a proposed well site, or associated infrastructure, may infringe on its cultural resources or

traditional, ceremonial and religious practices. Without formal, ongoing Tribal consultation, significant, adverse impacts to Tribal cultural and water resources cannot be avoided or mitigated as required by law. *See South Fork Band Council Of Western Shoshone Of Nevada v. U.S. Dept. of Interior*, 588 F.3d 718, 727 (9th Cir. 2009) *citing Methow Valley*, 490 U.S. at 351-352 ("The Supreme Court has required a mitigation discussion precisely for the purpose of evaluating whether anticipated environmental impacts can be avoided").

In order to adequately supplement the DEIS so that it comports with federal law, BLM must engage in ongoing, meaningful government-to-government consultation with the Tribal government regarding Tribal cultural and water resources, including its federally reserved water rights. The BLM's failure to consult with the Tribe in a manner that is respectful of Tribal sovereignty resulted in the unlawful absence of any reasonable consideration, evaluation, and mitigation of impacts to Tribal resources and Tribal culture, including religious and ceremonial practices, in the DEIS. Should the Project move forward, BLM must consult with the Tribe on an ongoing, formal basis in order to fulfill its enhanced legal obligations under federal law.

3. <u>The Bureau of Land Management Has Failed to Comply with Federal laws Protecting Tribal Cultural Resources</u>

Goshute culture is shaped by the Tribe's relationships with the mountains, streams, rivers, animals, fish and other places and living things in the Project area. Collectively, this can be referred to as the "cultural landscape." Goshute people have inhabited these lands since time immemorial. They have protected the cultural landscape through ceremonial and religious practices since time began. This means that from the Tribe's perspective, the DEIS's failure to adequately identify, assess and mitigate impacts to the Tribe's cultural resources is a serious, and offensive, shortcoming.

A. *This DEIS Fails to Adequately Address and Mitigate Significant, Adverse Impacts to Tribal Cultural Resources*

The magnitude of this proposed undertaking virtually ensures that potential impacts to cultural resources, including human remains and associated and unassociated funerary objects, will occur. The SNWA's full Right-of-Way request encompasses 306 miles of pipeline (including underground trenching and blasting); 323 miles of electric power lines; 7 electrical substations; 5 pumping stations; 6 regulation tanks; 3 pressure reducing stations; 1 water treatment facility/buried storage reservoir; 431 miles of access roads; 12,303 acres of estimated construction surface disturbance; 11,289 acres of temporary disturbances area to be revegetated; and 1,014 acres of permanent disturbance. Additional subsurface and surface disturbance will

occur once wellfield development begins. (For example, this DEIS accounts for a range of 144 to 174 underground groundwater production wells). This massive intrusion into the Goshute's aboriginal lands is unprecedented in scope and presents enormous challenges to appropriately considering and mitigating impacts to cultural resources. It is therefore critical that the BLM responsibly execute its obligations under federal law. It has yet to do so.

The DEIS's "Cultural Resources" Section reports that a files search was completed to identify known cultural resources within one mile of the proposed pipeline and power line ROW's. *DEIS* at 3.16-8. No files search has been conducted for the locations of future facilities, such as associated well development. *DEIS* at 3.16-8. Presumably, the pipeline infrastructure will follow the water, and not the other way around, making it impossible to evaluate whether the location of the pipeline will remain within the one mile corridor surveyed via file inventory here. Moreover, only 11 percent of the study area has been previously surveyed for cultural resources, making the results of this file survey extremely limited. *DEIS* at 3.16-8. Nonetheless, within this 11 percent of an uncertain one mile corridor, the search results reflected an enormous number of cultural resources: 657 previously recorded cultural resources. *DEIS* at 3.16-8. Of those 657 resources, 488 are prehistoric, comprising 310 sites and 178 isolated finds; 117 are historic, comprised of 82 sites and 35 isolated finds, and 22 resources are multi-component sites that contain both prehistoric and historic components. *DEIS* at 3.16-8. Of these almost 700 cultural resources located within one mile of a proposed pipeline to transport water from wholly undetermined well locations, *184 sites are located within 300 feet of the proposed ROW's or facilities*. *DEIS* at 3.16-8. Moreover, 22 of the sites are eligible for listing on the NRHP. *DEIS* at 3.16-8. These 22 sites include lithic scatters, artifact scatters, rock shelters, habitation sites, and camps, among others.

In sum, a files search was performed in a one mile corridor around a pipeline that will be transporting water from wells. We have no information about where those wells will be located. Only 11 percent of the one mile study area has been previously surveyed. Despite this, almost 700 resources have been recorded, with 22 eligible for listing on the National Register. These numbers indicate the vast number of cultural resources present in the Project area, and the critical need for the BLM to appropriately address cultural resources in both the DEIS and the Draft Programmatic Agreement (PA). As they currently stand, the DEIS and PA do not sufficiently comply with either the letter or the spirit of the law. BLM should require that Tribally approved Tribal representatives and Native American monitors participate in future Class III surveys and be present during all ground disturbance activities in both the DEIS and the PA. Furthermore, BLM should require that the Goshute Tribe be formally consulted as the locations of pipelines, powerlines, wells, and associated infrastructure are further defined to determine whether cultural resources will likely be affected.

The large number of cultural resources identified in such a small area of the proposed project demonstrates the absolute folly of analyzing environmental impacts to a pipeline without knowing even the approximate location of its water sources. This makes it next to impossible to appropriately evaluate potential impacts to cultural resources or, of course, culturally appropriate mitigation measures. It also makes clear that performing an environmental review at this stage is premature. Without the benefit of knowing where wellfield development may be proposed, we cannot know the location of the pipeline or its associated infrastructure. Without knowing the location of the pipeline, the Tribe cannot know whether, and to what extent, cultural resources will be impacted.

There is a solution to these quandaries, however. This review should be suspended until SNWA's water rights applications are approved. At that time, SNWA should formally supplement this DEIS with information regarding proposed wellfield locations. Of course, some uncertainty will remain, and some exploratory wells will be drilled. But without the benefit of a final water rights adjudication and the best available scientific information about where wellfield development should occur, it is inappropriate to move forward with this environmental review now. The vague, uncertain placement of various components of this project on the Tribe's aboriginal lands is a recipe for disaster. No real informed decision-making, or mitigation of potentially significant impacts to cultural resources, can occur at this time. Once water rights are adjudicated, and scientifically based locations of pipelines and associated infrastructure, including wells, are further defined, the BLM should formally consult with the Goshute Tribe, and other Indian tribes, to determine whether or not cultural resources would be affected. This consultation would be *in addition* to any archeological survey that would be required, as archeologists are not qualified to address traditional Goshute values. Only the Goshute Tribe can do this. The Goshute Tribe must also be allowed to participate in the Class III survey; archaeological survey; and evaluation of cultural resources, including archaeological resources and culturally or religiously significant locations, on their own terms. If SNWA obtains the right to extract groundwater, BLM must develop a culturally appropriate mechanism for reaching these decisions with the Tribe. For example, a Memorandum of Understanding (MOU) between the Goshute Tribe and BLM regarding the identification, evaluation, and mitigation of cultural resources should be executed.

The Tribe is pleased that a Class III inventory will be performed. Again, however, the Tribe *must* participate in the inventory, including the identification and evaluation of archaeological and other cultural resources. Once the locations of wells and their associated pipelines are further defined, the Tribe must be consulted to determine whether the Tribe should participate in all of the Class III survey, or only those portions of the survey where the Tribe

determines cultural resources are most likely to occur. This determination must be made by the Tribe.

As the DEIS and PA are currently drafted, the Goshute Tribe is not afforded sufficient consultation, identification and mitigation rights and responsibilities with regard to cultural resources. The Tribe must be allowed to: 1) participate in the Class III inventory to the extent that the Tribe determines is appropriate; 2) participate in the identification and evaluation of cultural resources, including archaeological resources, to the extent the Tribe determines would be appropriate (this may include onsite monitoring); 3) determine whether cultural resources, including archaeological resources, are culturally or historically significant to the Tribe; 4) determine, in collaboration with BLM, NRHP eligibility; 5) assess potentially significant effects to cultural resources to determine what type of mitigation measures would be culturally appropriate; and, 6) be empowered in the PA to provide its expertise in the identification, evaluation, and mitigation of cultural resources in a meaningful way.

As the aboriginal inhabitants of these lands, only the Tribe can truly identify, evaluate, and suggest appropriate mitigation measures for its Tribal cultural resources. BLM must defer to the Tribe's expertise, not simply state that it will include Indian Tribes while reserving all inventory and decision making power. To that end, BLM must substantially revise the Ethnographic Assessment to reflect Tribal concerns and comments. BLM must also commit to sharing all information regarding Tribal natural or cultural resources immediately with the Tribe so that the Tribe can evaluate potentially significant impacts. BLM should also ensure that funding is provided to the Tribe so that it may provide its expertise if this Project moves forward. (For example, funding for Tribal cultural monitors should be required as a mitigation measure). A dispute resolution mechanism must also be included in the PA that places any disputes between the BLM and Tribe before a neutral, third-party for resolution. In sum, substantial revisions must be made to the Ethnographic Assessment, PA and DEIS in order to adequately consider and protect Tribal cultural resources in a manner that is respectful of Tribal sovereignty.

B. This DEIS Fails to Adequately Address and Mitigate Significant, Adverse Impacts to Tribal Religious and Ceremonial Practices, Including Sacred Sites and Properties of Religious and Cultural Importance to the Tribe

From the Tribe's perspective, it is impossible to separate the cultural landscape from its Tribal culture and traditions. Many areas within the proposed project area are of particular cultural importance to the Tribe and its members. These areas were used for ceremonies and other religious activities by the Tribe since time began. Tribal religious traditions are inextricably tied to these cultural areas and the environment for many reasons. Tribal members

actively and regularly participate in Tribal ceremonies, festivals and other traditional activities within the proposed project area. Tribal members visit the area to pass traditional and religious information to the next generation, and to perform ceremonies and bless the spirits of their ancestors.

There is no justification for the complete absence of any reasonable consideration, evaluation, or mitigation of impacts to Tribal religious and ceremonial practices, including sacred sites, in the DEIS. BLM must engage in meaningful consultation with the Tribe once the locations of wellfields and associated infrastructure are further defined to appropriately consider this project's impacts to Tribal religious and ceremonial practices in accordance with federal law. *See Cholla Ready Mix, Inc. v. Civish*, 382 F.3d 969, 976 (9th Cir. 2004) ("Native American sacred sites of historical value are entitled to the same protection as the many Judeo-Christian religious sites that are protected on the NRHP..."); *Lyng v. Northwest Indian Cemetery Protective Ass'n*, 485 U.S. 439, 471 (1988)(In enacting the American Indian Religious Freedom Act (AIRFA), "Congress expressly recognized the adverse impact land-use decisions and other governmental actions frequently have on the site-specific religious practices of Native Americans, and the Act accordingly directs agencies to consult with Native American religious leaders before taking actions that might impair those practices"). Additionally, BLM must execute a confidentiality agreement with the Tribe regarding Goshute religious, ceremonial, and traditional practice to ensure that the locations of sacred sites are not inappropriately disclosed to the public.

4. <u>The Bureau of Land Management Has Failed to Adequately Address and Mitigate Significant, Adverse Impacts to Tribal Water Resources, Including Reserved Water Rights</u>

The proposed Project would be devastating to the Goshute people and culture. Water has always been the Tribe's most vital resource. Tribal cultural and religious practices depend on water. Tribal subsistence methods are inextricably linked to the water. The Tribe has thrived in a cultural landscape with extremely limited water resources since time immemorial because of its traditional subsistence, ceremonial, and religious practices. Hundreds of geographic place names throughout the Tribe's aboriginal lands are based on sources of water. Water resources are used for religious ceremonies and retain their traditional Goshute names today. Every spring, creek, and stream has a historical and present-day use for the Tribe. The Tribe's water resources are already threatened by extinction due to non-Indian over extraction. This Project would exacerbate existing issues by extracting immense amounts of water from the Tribe's aboriginal land base, threatening the Tribe's water resources and very survival. Because the DEIS fails to

adequately consider and mitigate impacts to the Tribe's water resources, it must be supplemented in order to comply with the law.[1]

Most relevant to these comments, the DEIS completely fails to consider impacts to the Tribe's reserved water rights. In *Winters v. United States*, the United States Supreme Court held that the establishment of a Reservation for Indian purposes implied the creation of a federal reserved water right sufficient to fulfill the Government's purposes in establishing the Reservation. *See Winters v. United States*, 207 U.S. 564, 576-77 (1908). The right to water has a priority date which is based upon the date of creation of the Tribe's Reservation. Here, the Goshute Tribe has a priority date of time immemorial, or, no later than 1863 (when the Treaty of 1863 was executed between the United States and the Goshute Shoshone Indians). *See 1863 Treaty of Peace and Friendship*. At the very latest, the Tribe has a priority water date of 1912 or 1914 pursuant to subsequent Executive Orders creating the Tribe's Reservation. *See also* Exec. Order No. 1539 (1912); Exec. Order No. 1903 (1914).

Under the *Winters* doctrine, the Goshute Tribe is entitled to flows of the quantity, force, quality, and timing necessary to satisfy the Tribe's subsistence and ceremonial water needs. *See United States v. Adair*, 723 F.2d 1394, 1411 (9th Cir. 1983). The reserved water right is not limited to waters located on the Reservation. Rather, it extends off-reservation to whatever waters and sources of water are necessary to satisfy the Tribe's needs. *See Arizona v. California*, 373 U.S. 546, 595 n. 97 (1963) (awarding rights in an off-reservation river); *Winters v. United States*, 207 U.S. 564 (upholding the right of the United States to obtain an injunction restraining upstream, off-reservation diversions in the Milk River and its tributaries); *United States v Ahtanum Irrigation District*, 236 F.2d 321, 325 (9th Cir. 1956)(holding that the Yakima Tribe's reserved water rights in Ahtanum creek included waters which originated off reservation, regardless of whether upstream users held riparian or appropriative rights). The fact that the Goshute Tribe's reserved water rights have yet to be judicially determined in no ways affects the legality or enforecability of the right. Reserved water rights are vested, presently existing rights, regardless of whether they have or have not been adjudicated. SNWA therefore has a duty to refrain from diverting water or taking other actions which may interfere with the exercise of the Tribe's reserved water rights. *See Winters v. United States*, 207 U.S. 564; *United States v. Winans*, 198 U.S. 391.

[1]The attached Review generated by Grassetti Environmental Consulting extensively discusses adverse impacts to Tribal water resources, while these comments focus on the Tribe's reserved water rights under federal law.

Because the Tribe's reserved water rights derive from lands and waters used by the Tribe before the arrival of Europeans, the priority of the Tribe's reserved water right is arguably time immemorial. *United States v. Adair*, 723 F.2d at 4142-14. Therefore, the Tribe's reserved right is "paramount" or "senior" to all other water rights. Based on this priority, the Tribe, or the United States acting on behalf of the Tribe, may enjoin or limit any junior appropriator from depleting the waters of the valleys which provide groundwater resources to the Tribe, even if this action would result in economic hardship to non-Indian interests. *Arizona v. California*, 373 U.S. at 597. Other users must refrain from interfering with the right, regardless of the fact that it has not been judicially quantified. For these reasons, the DEIS's failure to evaluate potentially significant impacts to tribally reserved water rights is unlawful. *Compare Okanogan Highlands Alliance v. Williams* 236 F.3d 468, 480 (9th Cir. 2000)(The EIS "extensively" analyzed the issues that would affect the Tribe's reserved rights and concluded that the impacts would not be significant).

The DEIS's failure to consider the Tribe's reserved water rights renders it inadequate under the law. As trustee, BLM has a duty to protect the Tribe's reserved water rights, including both water quantity and quality.[2] According to the Tribe, the loss of water is the loss of life. The very existence of the Tribe and Tribal culture depends on water. Without an unpolluted water source capable of supporting not only the Tribe but all the plants and animals that survive within the Goshute cultural landscape, the Tribe and its traditions may cease to exist. For these reasons, the DEIS must be supplemented to more adequately address water resources, including adverse impacts to the Tribe's reserved water rights.

5. <u>The Bureau of Land Management Must Suspend this Environmental Review Until Further Information Regarding Wellfield Development and Groundwater Pumping Rates are Available</u>

BLM cannot appropriately consider significant, adverse and cumulative impacts to Tribal cultural and water resources without further information about the locations of wellfield development and pipeline construction, including the rate at which groundwater will be pumped in accordance with SNWA's pending water rights application. This DEIS completely fails to consider the interdependent relationship between a right of way application for pipelines and the development of wells and associated infrastructures. It further fails to consider the

[2] As noted in the Review provided by Grassetti Environmental Consulting, the DEIS utilizes an inappropriate water model which vastly underestimates the drawdown effects this Project would have on groundwater resources, leading to a vastly underestimated analysis of potential effects on other critical natural resources.

interdependent relationship between the amount of water that SNWA will be authorized to pump from this ROW application. Such inappropriate segmentation makes it currently impossible to adequately evaluate and mitigate potentially significant and cumulative impacts to cultural and water resources, among others. The BLM must defer its consideration and decision until the DEIS can be appropriately supplemented and recirculated for additional public review and comment. *See Thomas v. Peterson*, 753 F.2d 754, 761 (9th Cir. 1985)(Holding that the Forest Service must prepare and consider an environmental impact statement that analyzes the *combined impacts* of the road and the timber sales that the road is designed to facilitate) (emphasis added); 40 C.F.R. § 1508.25(a)(1) (CEQ regulations require "connected actions" to be considered together in a single EIS); 40 C.F.R. § 1508.25(a)(2) (CEQ regulations require that "cumulative actions" be considered together in a single EIS).

The Tribe readily acknowledges that its traditions and cultural resources are inextricably connected to a robust, uncontaminated groundwater supply. Yet the BLM unlawfully ignores the fact that SNWA is approaching this project from the back end. Logically, SNWA should first secure the necessary water rights. (SNWA's water rights applications are currently pending). Once the amount of groundwater that SNWA is authorized to extract has been finally determined, SNWA would evaluate where it is most likely to begin wellfield development (including wellfield exploration). Only once SNWA has obtained the right to extract groundwater and evaluated where wellfield development will likely occur should this environmental review process be reinstated. At that point, BLM and SNWA must consult with the Tribe regarding SNWA's proposed wellfield locations and the likelihood that cultural resources and water resources will be impacted, including which mitigation measures would be culturally appropriate. *See Native Ecosystems Council v. Dombeck*, 304 F.3d 886, 894 (9th Cir. 2002)(Connected, cumulative, and similar actions must be considered together to prevent an agency from dividing a project into multiple actions which collectively have a substantial cumulative impact); *Neighbors of Cuddy Mountain v. United States Forest Serv.*, 137 F.3d 1372, 1380 (9th Cir.1998) (Agency must take requisite "hard look" at the possible mitigating measures).

The goal of NEPA is to provide a "full and fair discussion of significant environmental impacts" so that decision makers and the public are informed of reasonable alternatives which would minimize adverse impact to the environment. *See High Sierra Hikers Assn v. Weingardt*, 521 F.Supp.2d 1065, 1072-1073 (N.D. Cal. 2007). With the limited information currently available regarding SNWA's pending water rights applications, and the intended location of wells to supply this pipeline, it is simply not possible to take the required "hard look" at this

time. This vast oversight makes it impossible to provide a "reasonably thorough" discussion of environmental impacts or an analysis of proposed mitigation measures. *City of Carmel By-The-Sea v. United States Dep't of Transp.*, 123 F.3d 1142, 1151 (9th Cir. 1997). With the very future of the Tribe at stake, this is simply unacceptable.

Sincerely,
ALEXANDER, BERKEY, WILLIAMS & WEATHERS LLP

Rovianne A. Leigh
Curtis Berkey

GECO
Grassetti Environmental Consulting

Mr. Ed Naranjo, Tribe Administrator
Confederated Tribes of the Goshute Indian Reservation
P.O. Box 6104
195 Tribal Center Road
Ibapah, Utah 84034

October 3, 2011

SUBJECT: PEER REVIEW OF SOUTHERN NEVADA WATER AGENCY, CLARK, LINCOLN, AND WHITE PINE COUNTIES GROUNDWATER DEVELOPMENT PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT

Dear Mr. Naranjo;

Grassetti Environmental Consulting (GECo) was retained by the Confederated Goshute Tribes to conduct a peer review of the national Environmental Policy Act (NEPA) Draft Environmental Impact Statement (DEIS) prepared by the US Bureau of Land Management (BLM) on the proposed Southern Nevada Water Agency (SNWA), Clark, Lincoln, and White Pine Counties Groundwater Development Project (Project). This letter summarizes the results of our peer review.

The peer review was conducted by Richard Grassetti, GECo's Principal with assistance from Owen Schmidt, NEPA consultant. The GECo peer review team's qualifications are attached to this letter. Our review also incorporates expert comments on the DEIS presented under separate cover by Tom Myers, hydrologist, Duncan Patten, biologist, and Geoffrey Hornek, air quality specialist, as they apply to issues identified in our analysis. In conducting our assessment, we reviewed relevant portions of the DEIS for NEPA compliance and also generally evaluated the Project's compliance with the Federal Land Policy and Management Act of 1976 (FLPMA).

Summary of Findings

As detailed below, our review has identified a number of structural and technical major flaws in both the DEIS and the Project's compliance with FLPMA. These flaws include:

- The DEIS fails to consider the Coyote Springs Valley withdrawals and facilities, resulting in potential segmentation of the project
- The EIS range of alternatives is inadequate
    - The DEIS should consider additional alternative that complies with its Resource Management Plans
    - The No Action alternative assumes that too many existing rights will be developed in the future
- The DEIS Impact Assessment includes a number of structural flaws:
    - Failure to consider project impacts as additive to the existing baseline
    - Failure to conduct a "hard look" evaluation of Project impacts

- The DEIS's Use of arbitrary analytical models and methods that result in a failure to accurately and meaningfully evaluate Project impacts
    - The DEIS groundwater model is inappropriate and understates impacts
        - Arbitrary and inappropriate use of a 10-foot drawdown criteria for impact analyses
        - DEIS groundwater model considers impacts for only 200 years, when they will actually continue to worsen indefinitely (over 10,000 years)
        - DEIS groundwater model underestimates the project's likely groundwater drawdown
        - The DEIS fails to address loss of aquifer capacity due to compaction
    - The DEIS uses an inappropriate database for the biological resource assessment
- The DEIS omits meaningful analysis of potentially significant issues:
    - It omits detailed assessment of the project's effects on groundwater quality
    - It omits assessment of the health risk effects of project construction or operation
    - It fails to adequately address fisheries impacts
    - The air quality assessment is substantively flawed
    - It omits analysis of combined effects of the project and climate change
- The DEIS fails to investigate and correctly address mitigation
    - The DEIS inappropriately defers mitigation to future studies and tiered documents
    - The DEIS fails to identify reduced groundwater pumping as an effective mitigation for certain project effects
- The DEIS fails to adequately address growth inducement
    - The Project would remove a major obstacle to long-term growth in Las Vegas area, thereby inducing growth
    - Approval of the Project pipeline would induce development of the wellfields and groundwater pumping infrastructure
- The DEIS fails to adequately address Project's conformance with applicable BLM Resource Management Plans
    - The DEIS impermissibly defers any assessment of conformance of the effects of groundwater withdrawal with applicable RMPs to future NEPA analyses
    - The DEIS analyses show that the Project cannot comply with many of the Ely RMP's goals, policies, and actions, yet this is not acknowledged in the EIS
- The DEIS discussion as to why the underlying water supply Project is needed is out of date and no longer valid
- The BLM's consideration of the pipleline ROW approval prior to adjudication of water rights and separately from wellfield approval is "backwards" planning.

These multiple deficiencies result in a DEIS that fails to meet NEPA analytical and disclosure requirements. In addition, even as analyzed in the DEIS, the Project as currently construed (including all of the DEIS alternatives) cannot be approved because there is no evidence or finding that it would conform with the BLM's Resources Management Plans. In fact, the DEIS presents substantial evidence to the contrary.

Background

The BLM has been requested by SNWA to grant a right of way for a pipeline to transport water from northeastern Nevada and western Utah to the Las Vegas area. SNWA currently holds approximately 70,000 acre-feet of water per year (AFY) in the affected valleys, and has applications pending with the Nevada State Engineer (NSE) for another approximately 110,000 AFY in these valleys. The Project DEIS addresses the impacts of main pipeline construction at a "project" level while addressing well-field development and groundwater pumping at a "programmatic" level. The BLM proposed to consider SNWA's right of way application based on this EIS, and "tier" NEPA evaluations of applications for specific well-field developments (including roadways and wellheads) off of this EIS as those project elements become better defined.

The DEIS considers impacts of the proposed Project at completion of the pipeline (initiation of groundwater pumping), and at 75 and 200 years after initiation of pumping. It also considers cumulative impacts of pumping (future baseline and with the Project). It does not, however, consider the impacts of the Project pumping superimposed on existing groundwater pumping.

Project Segmentation Issues

Groundwater development in the Coyote Spring Valley may be a connected, cumulative, or similar action. (Coyote Spring Valley is Basin Number 210 in the White River flow system, page 3.3-8). The relationship of this project to the GWD project has not been adequately explained in this DEIS (p. 1-8).

The Coyote Spring Valley action may be connected, and thus it and its environmental consequences must be included within the scope of this EIS, if it depends on the GWD project for its justification. 40 CFR 1508.25(a)(1)(iii). There is no information in this DEIS as to the justification for the Coyote Spring Valley project, and thus the reader cannot know whether it depends on the GWD project for its justification and whether these are connected actions.

The Coyote Spring Valley action may be cumulative, and thus it and its environmental consequences must be included within the scope of this EIS, if its environmental consequences may be cumulative with those of the GWD project. 40 CFR 1508.25(a)(2). There is no information in this DEIS for the location or the environmental consequences of the Coyote Spring Valley project. The reader cannot know whether its consequences are incremental with those of the GWD project and thus whether these are cumulative actions.

The Coyote Spring Valley action may be similar to the GWD Project, and thus it and its environmental consequences must be included within the scope of this EIS, if it has common timing or geography with the GWD project. 40 CFR 1508.25(a)(2). There is no information in this DEIS for the location or timing of the Coyote Spring Valley project, and thus the reader cannot know whether "the best way to assess adequately the combined impacts of similar actions … is to treat them in a single impact statement."

At a minimum, in response to this comment, the BLM must make findings as to whether Coyote Spring Valley actions are connected, cumulative, or similar. If they are, the DEIS may have to be revised so the readers have a reasonable opportunity to comment on this information. The BLM should revise the DEIS to correct the project piecemealing deficiencies.

Alternatives Issues

Need for Additional Alternative to Address Compliance with BLM's Resource Management Plans

NEPA requires that agencies "shall identify any methodologies used" (40 CFR 1502.24). BLM did not identify their method for deriving alternatives in this DEIS, which is an error of non-compliance. All of the alternatives identified in the DEIS would result in very large-scale damage to the environment. As summarized in DEIS Tables 2.10-1, 2, and 3, the project would permanently and significantly adversely affect the water resources, biota, air quality, land use, socioeconomics, and tribal use of hundreds of square miles of northeastern Nevada and western Utah. In addition, as discussed later in this analysis, the DEIS's estimates of many of the project's impacts are likely substantially underestimated, and its consideration of the effectiveness of mitigation measures substantially overestimated.

As can be seen in Table 2.10-3, the Project has numerous widespread, significant impacts associated with pumping (the project also has major impacts associated with construction, but those are dwarfed by the pumping effects and therefore are not detailed herein). As described later in this letter, these impacts would not conform to many of the policies, goals, and actions contained in the BLM's Resource Management Plans for the affected areas. Therefore the selection of alternatives is of utmost importance to assure that the BLM's decision-makers are presented with at least one alternative that complies with the RMPs. All of the pumping alternatives would result in serious and ongoing (well over 200 years) adverse impacts to the environment. The only pumping option that would not result in those effects would be an alternative that reduces groundwater pumping so that long-term groundwater drawdown does not occur. This DEIS fails to either identify or assess such an alternative. Instead, the EIS presents a range of alternatives that, for the most part, amount to rearranging the deck chairs on the Titanic. All of the alternatives rely on groundwater mining, that is, withdrawal in excess of recharge. It is that mining of groundwater that causes all of the effects listed above. Under the EIS' alternatives, there would be some variation in the impacts associated with different levels, rates, and distribution of withdrawal points of groundwater mining, however the widespread impacts of that mining would continue to worsen into the endless future. (Tom Meyers' comments on this EIS indicate that, under the proposed Project, groundwater equilibrium does not occur for over 10,000 years. [1]) Therefore the EIS alternatives should be expanded to include at least one alternative that reflects a perennial sustained yield, and does not result in long-term aquifer drawdown.

Inadequate No Action Alternative

As described in the Myers report, the BLM presented impacts of its various alternatives and the No Action alternative as a series of drawdown maps and hydrographs of water levels and fluxes. The impacts of the project alternatives are the difference in the drawdown caused by the sum of the No Action and project alternatives and the No Action alternative. Although not stated in the DEIS, this assumes that drawdowns for No Action and the projects is additive.

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[1] Technical Memorandum, September 15, 2011, to Confederated Tribes of the Goshute Reservation, From Tom Myers, Ph.D, Hydrologic Consultant, Subject: Review of the SNWA Pipeline Draft Environmental Impact Statement.

The No Action alternative assumes that too many existing rights will be developed in the future. For example, No Action includes the future development of water for a power plant in Steptoe Valley, SNWA developing the 8000 af/y it has on the ranches it owns in Spring Valley, and the water rights to be transferred from Lake Valley to Coyote Springs (DEIS, chapter 2, Figure 2.2-1). The impacts caused by these projects may not occur; if SNWA is not granted water rights in Spring Valley, it may not develop the other rights it has purchased. The BLM should develop a No Action alternative that includes only existing pumping. The other options should be considered reasonably foreseeable future actions.

The impacts of the action alternatives should be determined without pumping the No Action alternatives simultaneously. This would remove the potential nonlinearities that could skew the estimates of the with-project impacts. Predicted impact would be estimated with certainty that they are not potentially due to existing pumping.

The DEIS ignores too many applications that should be considered a reasonably foreseeable future action. Applications listed as APP, RFA, or RFP in 11 basins total almost 488,000 af/y (see Table below). BLM did not adequately justify its decision regarding which to consider as reasonably foreseeable. The BLM should include more of the potential future uses, especially since some are owned by credible entities including SNWA, Vidler, and Lincoln County.

Pending Applications in Eleven Basins Within The Study Area.

Basin	Basin	Duty	Comment
210	Coyote Spring	202268	The duty was determined by converting the proposed diversion
205	L Meadow V	14632	
204	Clover	14479	
203	Panaca	3552	
202	Patterson	54364	Includes Vidler/Lincoln Cty from 1989 and various irrigation
195	Snake V	61598	Does not include NPS instream flow application or 1977
184	Spring V	100645	Includes many irrigation applications, including many by SNWA
183	Lake V	0	Valley has many change apps for moving water to Coyote
182	Cave V	0	The database includes SNWA's applications as RFP, not as PER
181	Dry Lake V	2388	The database includes SNWA's applications as RFP, not as PER
180	Delamar V	33018	The database includes SNWA's applications as RFP, not as PER
	TOTAL	486944	
The duty includes applications listed as APP, RFA, or RFP; application, ready for action, or ready for action protested.			

The DEIS ignores the effects that developing existing surface water rights may have on groundwater. Surface water rights affect groundwater rights in two ways. First, groundwater pumping lowers the water table that may induce recharge from perennial streams; if those streams have been diverted there will be no induced recharge. Second, surface water rights to runoff may divert water that naturally would become recharge further downstream, at the intersection with alluvial fans for example, and reduce the perennial yield of a basin.

Structural Flaws in DEIS Impact Assessments

Failure to Consider Project Impacts as Additive to the Existing Baseline

A fundamental flaw in this DEIS, which requires that it be revised and circulated for comment before proceeding to a final EIS, is that it apparently never adds one increment of environmental impact to other relevant increments. The "cumulative impacts analysis" in this DEIS is flawed and must be revised. The method used for analysis to support this comment is shown on the table below. For each adverse environmental consequence revealed in the DEIS, the DEIS was analyzed to see whether it showed the increment caused by the proposed action (box 1), the increment already present in the "affected environment" (box 2), and whether any reasonably foreseeable future actions would add an increment (box 3). Box 4 shows whether the DEIS investigated the possibility that the adverse consequence can be avoided. Box 4 shows one kind of alternative, mitigation not included in the proposed action. 40 CFR 1508.25(b)(3). The second box from the top shows whether the DEIS disclosed the grand sum total of all potential cumulative sources of all increments – the so-called cumulative impact. The top box shows a regulatory cap, if applicable, so the reader can readily grasp whether the cumulative impact of the proposed action meets whatever standards may apply.

Regulatory cap, if applicable		50
Grand sum total of all increments		45
4. Mitigation not included in action to avoid the consequence		-5
3. Caused by reasonably foreseeable future action		0
2. In affected environment		40
1. Increment caused by proposed action		10
	Adverse cones-quence	**Sample**

A proper "cumulative impacts analysis" would add the increment caused by the proposed action to what is already present in the existing environment (which includes the consequences of past and other present actions), to the increment caused by reasonably foreseeable future actions, as may be modified by mitigation not included in the proposed action – all of which will produce a grand sum cumulative total of some intensity. If there is any constraint or cap or regulation the analysis should include a comparison where the reader learns whether the so-called "cumulative impact" complies with the constraint or cap. To illustrate, the "Sample" shows the proposed action would cause 10, which would be incremental with 40 in the affected environment. In the example above, there are no reasonably foreseeable future actions that add any increment, but mitigation not included in the action could lower the total by 5. This yields a sum total of 50 without optional mitigation, or 45 with mitigation. Because the regulatory threshold is 50 in this illustration, the reader can readily see that mitigation is not necessary to achieve compliance, but some of the adverse effects can be avoided if optional mitigation were adopted.

Following are a representative series of analyses on whether this DEIS adequately informs the reader – and thus eventually the decisionmaker – of the cumulative impacts of the proposed action, and whether those impacts can be avoided. This is not a comprehensive list; many other examples of this problem exist in the DEIS.

Air quality, pages 3.1-13 through 3.1-17

Regulatory cap, if applicable	??
Grand sum total	??
4. Mitigation not included in action	"None," p. 3.1-16
3. Caused by reasonably foreseeable future action	??
2. In affected environment	??
1. Caused by action	CO, VOC, NOx, SO2, PM10 and PM2.5, CDE – Table 3.1-8
Increment	**Emissions of right-of-way construction equipment**

According to Table 3.1-8, right-of-way construction will put 8 kinds of pollutants into the air. Quantities are given in terms of rate per day and rate per year. No total quantities are given. The affected environment section does not give current values in the atmosphere for any of these 8 pollutants. While there will be air pollution, added to whatever is already in the air, whether or not there will be contributions by future actions, the DEIS dismisses the possibility of mitigation with the single word "None". No explanation is given for why these adverse consequences cannot be avoided, which is inadequate.

Without the missing information identified above, the reader cannot possibly understand the cumulative effect on air quality. The regulatory cap for air pollutants is given in Appendix F3.1 in terms of concentration (micrograms per cubic meter), while the adverse consequence is given in terms of rate per day and per year – apples and oranges – and thus the reader cannot see for themselves whether air pollution standards will be met. Over 29 pages of text and tables (5 pages in the air quality section, 13 pages in the introductory section, 6 pages in Appendix F3.1, and 5 pages in Section 3.1.4), all the reader really learns is that the proposed action will throw 8 kinds of air pollutants into the atmosphere. "Current air quality conditions, as presented in Section 3.1.1.1, are not expected to change appreciably due to ROW … construction and maintenance activities." Page 3.1-60. The BLM cannot possibly know that air quality would not change "appreciably" when the DEIS does not disclose how much it will change.

Air quality, pages 3.1-18 through 3.1-22

Regulatory cap, if applicable	Table F3.1-1, PM10 is 50 and PM2.5 is 15 micrograms per cubic meter annual average
Grand sum total	??
4. Mitigation not included in action	"None," p. 3.1-20
3. Caused by reasonably foreseeable future action	??
2. In affected environment	??
1. Caused by action	it is estimated that 1,172 pounds per day of PM10 (176 tons per year) and 117 pounds per day of PM2.5 (18 tons per year) will be emitted in the project area due to fugitive dust during construction activities. P. 3.1-18; Table 3.1-10. It is estimated the short-term PM10 windblown dust would be 1,750 tons per year and the PM2.5 windblown dust would be 175 tons per year over the whole project area. P. 3.1-20; Table 3.1-10.
Increment	**Fugitive Dust from Construction and Facility Maintenance Activities**

The EIS states that the project would emit considerable tons per year of particulate matter (Box 1), but the reader does not learn what this means in terms of the size of the "cumulative impacts." Inexplicably, the DEIS then concludes these emissions are "negligible": "The cumulative impacts to air quality due to ROW and groundwater development construction and maintenance and known past and present actions and RFFAs are anticipated to be negligible. Current air quality conditions, as presented in Section 3.1.1.1, are not expected to change appreciably." Page 3.1-60. "Negligible" is not the standard, where the Federal standards are written in terms of micrograms per cubic meter annual average but the project emissions are expressed in terms of tons per year. The reader does not learn whether the project will meet Federal standards. The DEIS makes no apparent effort to investigate the possibility of further mitigation not already included in the proposed action.

Air quality, pages 3.1-22 through 3.1-24

The EIS states that there will be tailpipe emissions into the atmosphere, in terms of metric tons per year, but the reader does not learn whether there are other sources of these same emissions, whether these emissions can be avoided, or whether these emissions will, in fact, conform to applicable air quality standards.

Regulatory cap, if applicable	??
Grand sum total	??
4. Mitigation not included in action	??
3. Caused by reasonably foreseeable future action	??
2. In affected environment	??
1. Caused by action	estimated annual emissions from construction and maintenance activities varying between less than 1 ton per year of SO2 to approximately 24,000 metric tons of CDE. Page 3.1-22; Table 3.1-9. Long-term impacts to air quality from maintenance vehicles are minimal and range from close to 0 tons per year of SO2 up to approximately 8 metric tons per year of CDE. ; Table 3.1-9.
Increment	**Tailpipe Emissions from Construction Equipment and Facility Maintenance**

Air quality, pages 3.1-32 through 3.1-35

The EIS states that here will be air pollution from groundwater development and facility maintenance (Box 1). How much this might accumulate with air pollution from other aspects of the project and from other projects is not disclosed (Boxes 2 and 3). How much this might be avoided with mitigation not included in the proposed action (Box 4) is not disclosed. Whether this will conform to applicable air pollution standards (top 2 boxes) is not disclosed.

Air quality, page 3.1-36

Regulatory cap, if applicable	It is possible that windblown dust emissions from groundwater drawdown could impair visibility conditions at the GBNP. The extent of possible visibility impairment is highly uncertain. Page 3.1-60 The GBNP is a Class II area, based on the Congressional legislation that brought the park into existence. Page 3.1-5
Grand sum total	??
4. Mitigation not included in action	??
3. Caused by reasonably foreseeable future action	??
2. In affected environment	The visibility at the GBNP is one of the best in the nation. Page 3.1-5
1. Caused by action	The increase in PM2.5 emissions are estimated to be 2,400 tons per year and 3,470 tons per year after full build out plus 75 years and full build out plus 200 years, respectively. At these levels, it is possible that windblown dust emissions from groundwater drawdown could impair visibility conditions at the GBNP. Page 3.1-36
Increment	**Visibility conditions at the GBNP**

The DEIS states that visibility in the GBNP is "one of the best in the Nation" but that there will be enough particulate matter from the project over time to possibly impair visibility in a Class II area, the GBNP (Box 1). What the reader should be able to learn readily is whether these emissions from the project (Box 1) plus all other foreseeable emissions of like kind will constitute a sum total that will still meet the Class II air quality standards for the GBNP. All the reader leans in the "cumulative impacts" section, page 3.1-60, is that visibility could be impaired. This is inadequate. The question was whether the Clean Air Act standards would foreseeably be met, and the question is not answered in this DEIS.

Air quality, pages 3.1-49 through 3.1-54

Regulatory cap, if applicable	??
Grand sum total	??
4. Mitigation not included in action	??
3. Caused by reasonably foreseeable future action	??
2. In affected environment	??
1. Caused by action	Tonnes of CDE per year from ROW construction and maintenance (23,896), ROW maintenance long term (8), and indirectly from groundwater pumping (327,000). Page 3.1-49. Table 3.1-24
Increment	**Climate Change Effects**

The reader learns that the GWD project will introduce hundreds of thousands of metric tons of greenhouse gases into the atmosphere, "cumulatively." What this incremental addition to the atmosphere means in terms of climate change – the very title of this section – is not stated. The DEIS spends several pages of encyclopedic narrative on what a warming climate may mean to the desert Southwest (pages 3.1-50-55), but the DEIS does not inform the reader as to the consequences of this increment on climate change in the desert Southwest. The reader may have independent knowledge that there

are no regulatory caps on greenhouse gases in Nevada, but the DEIS does not state that fact. Thus, the relevance of these pages of information to the decision maker is not transparent. One way this information could have been put to use would be to conduct an investigation into mitigation not included in the proposed action. But there is no indication that this investigation was done, and thus there is no evidence on this issue of climate change for compliance with NEPA 102(2)(C)(ii). This DEIS should be revised to provide the missing information.

Paleontological Resources

The DEIS fails similarly to adequately identify impacts of paleontological resources. While paleontological resources are present in the impact area, and may in fact be impacted, this DEIS

Paleontological Resources, pages 3.2-14; 3.2-16 et seq.

Regulatory cap, if applicable	??
Grand sum total	??
4. Mitigation not included in action	"None," page 3.2-17.
3. Caused by reasonably foreseeable future action	?? "The RFFAs have the potential to cause loss of fossil resources," page 3.2-49. See also page 3.2-52. No size of impact given.
2. In affected environment	Portions of proposed ROWs may contain areas of medium to high potential for scientifically important fossil resources. Page 3.2-17
1. Caused by action	Even if construction monitoring is implemented, some scientifically valuable fossils may be disturbed and lost during excavation and ROW grading over thousands of acres. As a consequence, there would be a small incremental loss of fossil material …… Page 3.2-17
Increment	**Paleontological resources**

does not inform the reader as to whether as to the size of the potential for cumulative impacts (Box 3) or whether these adverse impacts can be avoided. There are BMPs in the Ely RMP (page 3.2-16, "protection measures … would be implemented"), and these BMPs are baked into the proposed action, but this DEIS does not inform the reader of the size or magnitude of the fossil resources that are not protected and in fact may be lost. Moreover, the loss of paleontological resources is divided into sections, with no grand total: (1) from construction and maintenance (pages 3.2-14 through 3.2-17(; (2) from groundwater development and pumping (pages 3.2-21 through 3.2-40); and (3) from groundwater pumping (pages 3.2-40 through 3.2-42, though "not expected to have effects").

Water Resources

The DEIS fails similarly to adequately identify impacts of water resources. This portion of the DEIS is concerned with impacts to "water resources" from the right-of-way portion of the project. Effects include ground disturbance and stream crossings. Stream crossings could result in sedimentation, among other unspecified effects. What the reader does not see is the increment of these impacts added to other past and present impacts or an investigation into whether there might

Water resources effects from rights-of-way, page 3.3-69 through 3.3-79

Regulatory cap, if applicable	??
Grand sum total	??
4. Mitigation not included in action	??
3. Caused by reasonably foreseeable future action	??
2. In affected environment	??
1. Caused by action	The proposed pipeline ROW would cross one perennial stream reach (Snake Creek) and two intermittent stream reaches (Big Wash and Lexington Creek) all located in Snake Valley. Page 3.3-71 Ground disturbance associated with the pipeline ROW also would impact an estimated 720 ephemeral streams …. Page 3.3-71 Surface disturbance from construction activities could affect water quality from sediment input on a short- and long-term basis. Page 3.3-72
Increment	**Impacts to water resources from rights-of-way**

be an increment added by future actions.

If the proposed action will add sediment to streams, the DEIS does not say how much or whether this complies with whatever water standards may be in place, or whether any of this sedimentation can be avoided. The analysis of right-of-way effects on surface water is inadequate.

Water resources effects, pages 3.3-80 through 3.3-205.

Regulatory cap, if applicable	
Grand sum total	
4. Mitigation not included in action	
3. Caused by reasonably foreseeable future action	Box 3 accounts for reasonably foreseeable future actions Box 2 accounts for past and other present actions, in other words, what is in the environment right now Box 1 accounts for the proposed action Together, all 3 boxes account for the increment caused by the proposed action, added to the impacts of past, other present, and reasonably foreseeable future actions
2. In affected environment	
1. Caused by action	
Increment	**Resource or issue**

The third bullet on page 3.3-87 defines the "cumulative pumping scenarios" as no-action, plus reasonably foreseeable future actions, plus the proposed action. This definition of "cumulative impacts" equates "no action" with the affected environment. This method of cumulative impacts analysis does not account for optional mitigation and thus does not create an administrative record of compliance with NEPA §102(2)(C)(ii). A second problem with this method is that it does not inform the reader of the "increment" caused by the proposed action, and the increments caused by other contributing sources. By lumping together most sources of cumulative impact into one section, the reader cannot readily discern in this DEIS one contributing cause from another, which deprives the reader of valuable information when trying to understand the comparative consequences of taking action and not taking action.

Cultural Resources

t_3.16_Cultural_Resources.

Regulatory cap, if applicable	??
Grand sum total	??
4. Mitigation not included in action	?? Other mitigation determined by the BLM through consultation with the SHPO, interested Tribes, and other consulting parties. Page 3.16-11
3. Caused by reasonably foreseeable future action	?? Potential indirect effects, such as unauthorized artifact collection and vandalism, could occur. Page 3.16-9.
2. In affected environment	?? No data is available on the numbers and types of historic properties that could be affected by groundwater pumping. Page 3.16-20 Currently, no information is available on the numbers and types of sites or structures that have been or could be adversely affected by subsidence in the cumulative effects study area. Page 3.16-20
1. Caused by action	Construction of the GWD Project and its associated facilities could affect historic properties if they cannot be avoided. Previously undiscovered archaeological deposits, including burials and associated funerary objects, could be discovered and directly affected during ground-disturbing activities that are associated with project construction. Page 3.16-9. At this time, the number of historic properties that could be affected by the proposed Project is unknown. Page 3.16-12
Increment	**Cultural Resources**

The reader cannot fill in this table on the basis of the contents of this DEIS. Even though cultural resources are traditionally treated differently from other resources because they are often underground and cannot be easily tested for, cultural resources often can be completely avoided upon discovery, or recovered for their cultural value. Of course, avoidance techniques should be used if at all possible. In either case, adverse effects on cultural resources can only be avoided if they are appropriately identified far enough in advance such that avoidance or other appropriate mitigation measures can be fully implemented. Thus the full investigation into their presence should not be delayed until a project is underway. By that time, many of the available mitigation measures may no longer be available to a project applicant. This DEIS simply does not inform the reader how and when an appropriate investigation into cultural resources will take place such that adverse impacts, and appropriate mitigation measures, can be sufficiently analyzed. The DEIS fails to identify the expected incidence of encountering a cultural resource, based on past projects in this area, or the likelihood of an adverse impact on cultural resources, if they are

discovered. The DEIS additionally inappropriately defers evaluation and mitigation of cultural resources to a Draft Programmatic Agreement to which the Tribe objects.

Native American Traditional Values

u_3.17_Native American Traditional Values.

Regulatory cap, if applicable	??
Grand sum total	??
4. Mitigation not included in action	??
3. Caused by reasonably foreseeable future action	RFFAs have the potential to cause damage to or loss of sites of tribal importance. Page 3.17-24
2. In affected environment	How many properties of cultural and religious importance, including TCPs, would be adversely affected by the proposed Project is currently unknown. Page 3.17-15 Potential impacts to sites of cultural, traditional, or religious importance to the tribes may have already occurred from past and present actions. Page 3.17-24
1. Caused by action	a total of 76 locations were identified as possible places of cultural and religious importance to Native Americans. Page 3.17-12 Evaluation of each site as a TCP will be conducted by the BLM in consultation with those tribal groups that attach cultural and religious significance to the site. Page 3.17-12 Maps of the 48 known locations show that one known location would be crossed by the proposed pipeline ROW and two known locations could be visually affected by the proposed transmission lines. The remaining known locations are outside of proposed disturbance areas or not within view of the proposed transmission lines. Page 3.17-13 and 14
Increment	**Native American traditional values**

The DEIS does not disclose, because the BLM does not know, how many sites important to Native Americans will be adversely affected by the proposed action or by alternative actions. This analysis is inappropriately deferred to an indefinite time in the future. This DEIS discloses that future actions "have the potential" to cause damage or loss of these sites (Box 3) but there is no assessment of the extent or magnitude of these effects. It isn't just a numbers exercise of how many places or locations. It is a question of the cumulative impact of the proposed action, along with other present, past, and future actions, on the "cultural practices or beliefs of a living community" (page 3.17-3). This DEIS has no assessment of this question at all. Additionally, there is no discussion of why the 76 identified locations of cultural and religious importance to Native Americans were limited to only 8 sites recommended for listing on the National Register, nor is there any discussion about how disputes between Tribes and BLM regarding significance will be resolved. Simply put, there is not enough information here to satisfy NEPA's or the NHPA's requirements.

Use of Arbitrary Analytical Models and Methods that Result in a Failure to Accurately and Meaningfully Evaluate Project Impacts

Arbitrary and Inappropriate use of a 10-Foot Drawdown Criteria for Impact Analyses

The DEIS consistently uses an arbitrary 10-foot groundwater drawdown as the minimum drawdown considered in its impact assessments. As described below, this has led to the EIS analyses missing or understating important potential impacts. This constitutes an impermissible gap in the analysis (per 40 CFR 1502.22 "incomplete or unavailable information")
This applies to direct impacts to hydrologic features such as springs and streams, as well as indirect impacts to air quality, aquatic biota, terrestrial biota, vegetation, grazing, land use, special designations/wilderness areas, and socioeconomics. As detailed later in this discussion, the assumptions sections of each of these chapters specifically identify the 10-foot drawdown as the minimum drawdown considered.

The DEIS acknowledges that,

> "Drawdowns of less than 10 feet could reduce flows in perennial springs or streams that are controlled by discharge from the regional groundwater flow system, which in turn could potentially cause declines in the diversity and abundance of associated riparian flora and fauna that may only be able to tolerate water declines on the order of a few feet."
>
> But goes on to state,
> "However, considering the regional scale of the model and unavoidable uncertainty associated with the model predictions…the BLM does not believe it is reasonable or appropriate to use the regional model to quantify changes in groundwater levels of less than 10 feet. In addition, in many areas within the study area, changes of groundwater levels of less than 10 feet can be difficult to distinguish from natural seasonal and annual fluctuations in groundwater levels. The BLM has used the 10-foot drawdown contour to define the drawdown area for quantification of impacts associated with groundwater pumping in many other EISs in Nevada over the past 10-15 years." (DEIS, p .3.3-87)

In short, the EIS acknowledges that impacts may occur with less than 10 feet of drawdown, but this EIS will not analyze those impacts because, 1) the model's not accurate enough, 2) there's 10 feet of natural fluctuation in many areas, and 3) this is they way they have done it in the past. Hydrologist Tom Myers has prepared an extensive critique of these arguments, which has been submitted under separate cover. In summary, Myers concludes:

> "BLM makes several excuses for limiting the analysis to the 10-foot drawdown. First, the "BLM does not believe that it is reasonable or appropriate to use the regional model to quantify changes in groundwater elevation" (Id.) because of the model's regional scale and "unavoidable uncertainty associated with the model predictions" (Id.). They could have developed a more detailed model for the targeted valleys, such as Myers (2011a and 2011b). Even so, understanding that predictions are uncertain is much better than just ignoring the impacts. Considering the uncertainty, the drawdown in Tippet or Deep Creek Valley could easily be double that predicted.
>
> The point about uncertainty in the predictions is overstated. If the model has been objectively constructed, each contour line represents an expected value for that contour

value. In the absence of obvious model bias, model error should be normally distributed (Hill et al 1998). There is just as much chance that the contour is underestimated as overestimated. All predictions should be treated as though there is a confidence band around them. If the BLM has concerns about the uncertainty, they should require the modeler to put confidence bands around the contour estimates.

Second, the BLM is concerned that 10 feet is similar to the magnitude of natural variation. Seasonal variation in water levels at any point may exceed the predicted drawdown, but a constant drawdown would cause a new median level around which the natural changes would fluctuate. Where seasonal variability causes springs or wetlands to dry, the additional drawdown may cause them to be dry longer. There are many springs in Tippet or Deep Creek Valley, which could be affected by a few feet of drawdown. The DEIS fails to disclose the impacts to those resources that have a significant natural variability.

Third, the BLM justifies its use of 10-foot drawdown by mentioning other DEISs in which it used similar reasoning. The fact that the BLM did it wrong in the past is not a justification for doing it wrong in this project. This is particularly important because the area between the predicted 10-foot and 1-foot drawdown may be hundreds of square miles, including most of Tippet and Deep Creek Valley.

The following are reasons to include lesser drawdowns.

- Springs can be dried even if the water table is lowered less than 10 feet. Not identifying the springs between 10-ft and 1-ft of drawdown is a failure to present potential impacts of the proposed project.
- Lowered water tables can dry or significantly change the wetland ecosystem types. The same argument as for springs can be made for wetlands. A wetland that is naturally stressed could be killed with just a few feet of drawdown.
- Less than 10 feet of drawdown can affect wells with a productive zone near the top of the screens.

Halford and Plume (2011) presented drawdown contours as low as 0.3 ft, without making a detailed uncertainty analysis. They did mention the uncertainty in the placement of a contour as being equal in magnitude as the length of a side of a cell."

Curiously, although the DEIS relies upon its own model (with the 10-foot drawdown criteria) for most of the potentially affected area, at the request of the National Park Service (NPS), it uses a different, finer grained model with one-foot drawdown contours in its analysis of resources and impacts within Great Basin National Park (GBNP). (DEIS, p. 3.3-90) Apparently the NPS also did not find the BLM's model to be adequate for assessing impacts. The fact that a finer model was used for GBNP indicated that the use of such a model for the remaining areas potentially affected by the Project was both desirable and feasible. Further, Myers also used a model with a 1-foot drawdown in his study of hydrologic impacts of the Project in the northern and eastern parts of the study area. Again this indicates that the use of a finer-grained model is essential to undertaking a "hard look" at the project impacts, as required under NEPA.

As described above, the DEIS's use of the 10-foot minimum groundwater drawdown as its limit for assessment is both unsupported and arbitrary (per 5 U.S.C. § 706(2)(A))[2]. Agencies have wide discretion when choosing which scientific method to use in order to assess environmental impacts. This discretion must be informed, however, by knowledge of alternative methods. An alternate groundwater assessment method was presented in Myers' comments; the BLM was well aware of this method because it has been presented to them in the past and was used extensively in past water rights adjudication proceedings, to which the BLM was a party. There is no information in the DEIS that BLM was aware of alternative methods to assess groundwater drawdown, considered using alternative methods, or gave reasons for the choice of methods actually used. These facts alone – failure to consider alternative methods and failure to give reasons for their choice of methods – provide reason enough to revise the DEIS and circulate for another round of comment before proceeding to the final EIS. The reader of a draft EIS should be able to comment on the methods not selected, and their reasons for not being selected just the same as the reader should be able to comment on the methods used, and the results of the methods used.

Environmental Implications of Use of the 10-foot Drawdown Impact Standard

Effects on Vegetation

The importance of using a model that predicts drawdowns of less than 10 feet to take a "hard look" at impacts to vegetation and correctly identify potential impacts to vegetation comprising wetland and upland habitat is discussed by Patten (2011)[3], in comments submitted separately. Patten responds to the following DEIS impact assumptions:

- Based on an evaluation of plant rooting depth, physiological responses to drought, available information on groundwater levels, and seasonal soil moisture, an index drawdown contour of 10 feet is assumed to be a reasonable estimate of the point at which long-term changes in plant community vigor and composition would begin to appear. (DEIS, Section 3.5, p. 39)

  and

- An index drawdown contour of 10 feet is assumed to be a reasonable estimate of the point at which long-term changes to vegetation community vigor and composition would begin to appear." (DEIS, Section 3.12, p.38)

Patten's research indicates that the DEIS's use of the arbitrary 10-foot drawdown as its minimum for considering impacts may have resulted in the EIS substantially underestimated the project's impacts on vegetation. In fact, his studies at several sites in Spring Valley show that most wetland and upland species studied show the potential for substantial changes in cover at drawdowns of one to two meters, or less. Patten provides evidence that most of the changes suggested in DEIS

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[2] A decision is arbitrary and capricious if the BLM relied on factors Congress did not intend it to consider, entirely failed to consider an important aspect of the problem, or offered an explanation that runs counter to the evidence before the agency or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.

[3] Duncan T. Patten, Comments Relevant to BLM's "Draft EIS on Southern Nevada Water Authority Groundwater Development Project Right-of-Way" with emphasis on Groundwater Depths, Desert Plant Community Response to Groundwater Pumping, Phreatophyte Root Depths and Use by Wildlife and Cattle

Table 3.5-14 would occur when drawdown levels from pumping are considerably less than the stated 10 feet, and thus changes that are suggested to occur "after" a 10-foot drawdown will occur during the drawdown when the water table is dropping and is shallower than 10 feet. Patten's comments and previous research conducted, in part, for the BLM, shows that, even with a few feet of drawdown, the following are likely to occur to a greater extent than identified in the DEIS:

- Truncation of the lateral and longitudinal extent of the wetland and wetland/upland transition areas
- Declines in areal cover of hydrophytic vegetation
- Composition shifts toward drought-tolerant species for wetland and riparian ecosystems affected by dewatering
- In the phreatophytic-upland zone, reductions in soil salinity, a response to reduced capillary rise of salts from the declining shallow water table, may drive shifts toward nonhalophytes.
- In the wetland and wetland/upland transition zones along the outflow stream, halophyte cover might increase where less water is available to dilute saline soils.

Patten identifies an additional error in the EISs vegetation impact assumptions that results in the document further understating the potential impacts of the proposed Action and alternatives. The DEIS mischaracterizes of the drawdown depths at which phreatophytes may be affected. The DEIS states:

> "It is assumed that a groundwater depth of 50 feet or deeper in relation to the ground surface elevation is not accessible to the roots of most phreatophytic shrubs and this groundwater depth represents a reasonable boundary for: 1) estimating the deepest root zone extent of plant communities that are at least partially dependent on underlying groundwater"
>
> "…2) defining a groundwater drawdown boundary that assumes that the roots of overlying plant communities no longer have access to groundwater as a moisture source at depths greater than 50 feet. For example, the phreatophytic shrubland ET that occupies Cave Valley are underlain by existing groundwater depths greater than 50 feet. Therefore, it is assumed that these communities would not be affected by groundwater drawdown in this hydrologic basin." (DEIS. Section 3.5, p. 38)
>
> On page 3.5-13, the following statement (which is based on reports about greasewood) is meant to "support" the assumption that groundwater below 50 ft is not accessible to phreatophytes:
>
> "The phreatophyte shrub greasewood (Sarcobatus vermiculatus) is a key indicator of relatively shallow groundwater depths in the Great Basin. Studies of root depths of this shrub species in relation to groundwater depth indicate that rooting depths range from the soil surface to as much as 50 feet. Recent studies in the Snake, Spring, and White River valleys (Moreo et al. 2007; Devitt 2008) indicate that depth to groundwater ranged between 10 and 45 feet on sites dominated by greasewood."

Patten's analysis found that the first statement above on rooting depths of greasewood to 50 ft is not supported by any references, whereas the references cited in the second statement concern groundwater depths between 10 and 45 ft. Many estimates of rooting depths of desert phreatophytes are based on a combination of known groundwater depths and plant moisture stress. On the other hand, in an extensive USGS study, Robinson (1958) estimated rooting depths of many phreatophytes (see Table 1 of Patten's letter) including about 20 m (ca. 65 ft) for greasewood, which supports the statement above. However, most other phreatophytes that occur in the Great Basin area have rooting depths considerably shallower (are there refs we could cite here?). The latter suggests that the "50 ft. assumption" does not relate to most of the phreatophytes in the areas of concern, other than to suggest that at that depth, all, not "most", phreatophytes would no longer be supported by groundwater.

Also, in Patten's 1996 studies of spring areas in Spring Valley, he determined woody plant cover relative to groundwater (more accurately "water table") depth. Although Patten's monitoring wells seldom went deeper than 4 meters, many woody species did not occur (based on cover measurements) at locations with the water table much deeper than 2 to 3 meters.

The implications of the DEISs mischaracterization of this impact on other resources are summarized below.

Indirect Effects of Underestimation of Vegetation Loss/Change on Other Impacts

Because the drawdown effects on vegetation are explicitly identified in the DEIS as the basis for the calculation of the Project's impacts to dust generation, land use, grazing, agriculture, terrestrial habitat, and endangered species, it is likely that the use of the arbitrary 10-foot standard has resulted in substantial underestimations of those impacts as well. Further, the underestimation of project impacts on springs and streamflow resulting from the arbitrary use of the 10-foot standard also results in an underestimation of impacts to aquatic species and habitats. References to this are presented below:

- **Air Quality:** Dust generation factors are addressed on p. 3.1-34 of the DEIS, which sates, "The change in area for each ET unit is calculated relative to the No Action Alternative for a 10-foot groundwater drawdown….similar to the calculations shown…in Section 3.5 Vegetation Resources."
- **Terrestrial Wildlife:** Use of the 10-foot criteria to identify pumping effects on wildlife is discussed on p. 3.6-71 of the DEIS, which states, "Based on evaluations of the model-predicted 10-foot drawdown contour for the Proposed Action pumping and geology and groundwater characteristics, there is potential risk to terrestrial wildlife species…". This assessment fails to look at the risk to these species under lesser drawdowns, which, given vegetative changes predicted by Patten, may substantially increase the impacts.
- **Aquatic Biological Resources:** Use of the 10-foot criteria to identify pumping effects on aquatic biological resources is discussed on p. 3.7-40 of the DEIS, which states, "Based on evaluations of the model-predicted 10-foot drawdown contour for the Proposed Action pumping and geology and groundwater characteristics, aquatic biological resources could be affected in portions of six basins…". This assessment fails to look at the risk to these species under lesser drawdowns, which, given potential hydrologic changes predicted by Patten, may substantially increase the impacts.

- **Land Use:** Use of the 10-foot criteria to identify pumping effects on land use is discussed on p. 3.8-24 of the DEIS, which states, "Public lands that are available for disposal might be less desirable for other land uses if they were within the 10-foot drawdown areas, as water and vegetation resources in some areas could be altered over time as discussed in Section 3.3, Water resources, and Section 3.5, Vegetation." This assessment fails to look at potential land use effects in areas subject to lesser drawdowns, which, given vegetative changes predicted by Patten and hydrologic changes identified by Myers, may be substantial.
- **Recreation:** Use of the 10-foot criteria to identify pumping effects on recreation is discussed on p. 3.9-28 of the DEIS, which states, "Drawdown effects may reduce water levels in ponds, springs, and perennial springs and alter vegetation, which could change the recreation setting and wildlife use patterns and subsequently affect wildlife-based recreation..." The DEIS then states "recreation areas with perennial streams at moderate to high risk of being affected by a 10-foot or greater drawdown under the proposed Action include…" The sections also addresses springs in terms of the 10-foot drawdown criteria. This assessment fails to look at potential recreation effects in areas subject to lesser drawdowns, which, given vegetative changes predicted by Patten and hydrologic changes identified by Myers, may be substantial.
- **Rangelands and Grazing:** Use of the 10-foot criteria to identify pumping effects on rangeland and grazing is discussed on p. 3.12-41 of the DEIS, which states, "For the purposes of this EIS, the index for delineation of drawdown with potential effects to water sources was determined by the 10-foot or greater drawdown contour, as predicted by the groundwater model." Given vegetative changes predicted by Patten and hydrologic changes identified by Myers, the DEIS's identified 200,000-acre potential impact area may understate the actual Project effects.
- **Wild Horse and Burro Herd Management Areas:** Use of the 10-foot criteria to identify pumping effects on land use is discussed on p. 3.13-19 of the DEIS, which states, "estimates of effects to areas containing wetland vegetation and phreatophytes were determined based on the areas that occur where the 10-foot or greater drawdown contour overlaps with areas where depth to groundwater is less than 50 feet, respectively, as predicted by the groundwater model. For more detailed information on the model analysis see Vegetation Resources, Section 3.5.2.8." Similarly, this section states, "Estimates of the effects to water supplies (streams and springs) within HMAs were based on their location within the areas of low, medium, or high risk (as predicted by the area geology and the groundwater model predictions of drawdown of 10-foot or greater (sic))". This assessment fails to look at potential wild horse and burro management area effects in areas subject to lesser drawdowns, which, given vegetative changes predicted by Patten and hydrologic changes identified by Myers, may be substantial.
- **Special Designations and Wilderness Lands:** Use of the 10-foot criteria to identify pumping effects on lands with special designations and wilderness areas is discussed on p. 3.14-20 of the DEIS, which states, "Gradual changes in wetland meadow and phreatophyte (i.e. basin shrubland) vegetation communities from groundwater drawdown could adversely affect water- and wildlife- related values in special management areas. The analysis was conducted on areas where the 10-foot drawdown overlapped with areas of groundwater shallower than 50 feet (as detailed in Section 3.5.2.8, Vegetation Resources)." This assessment fails to look at potential effects in special designation and

wilderness areas subject to lesser drawdowns, which, given vegetative changes predicted by Patten and hydrologic changes identified by Myers, may be substantial.

- **Socioeconomics:** Use of the 10-foot criteria to identify pumping effects on socioeconomic factors is discussed on p. 3.18-68 of the DEIS, which states, "The combined area of private agricultural land affected by drawdown of 10 feet or more increases to 17,192 acres when the groundwater pumping simulation is extended to full build out plus 200 years. Furthermore, the severity of the drawdown effects increases such that the areal extent of agricultural lands affected by drawdown of 50 feet or more increases to 13,439 acres, nearly 54 percent of all private agricultural lands in the Spring and Snake valleys." Given vegetative changes predicted by Patten and hydrologic changes identified by Myers, the DEIS's identified potential impact acreages may understate the actual Project effects.

Other Flaws in the DEIS Groundwater Model

Myers identifies and describes the following additional critical flaws on the BLM model. This also constitutes an impermissible gap in the analysis (per 40 CFR 1502.22 "incomplete or unavailable information.")

- **The DEIS considers the alternatives for only 200 years, which is a failure to disclose all the potential impacts of granting this right-of-way and allowing the concomitant pumping.**

  This is an insufficient time period because the groundwater systems do not even approach equilibrium within 200 years. Equilibrium would occur at the time that the pumping essentially ceases to remove groundwater from storage. It is the time at which the pumping has captured an equivalent amount of natural discharge, meaning wetlands evapotranspiration (ET) and spring discharge. At this point the drawdown will have reached its maximum extent and the impacts caused by the project will be at a maximum. The maximum extent as described below in the simulations completed for this review reach Tippet and Deep Creek Valley, areas which the DEIS primarily ignores.

  Predicted water levels for various wells, for example, well 184 N11E6713B1 USBLM (DEIS, Figure 3.3.2-7), begin to decrease by the time of full build-out, but in the long-term trend almost linearly downward. Two hundred years after full build-out, the water levels are decreasing almost as rapidly as just a few years after full build-out. This demonstrates clearly that the impact will continue to worsen far beyond the time period as presented in the DEIS.
  The 200-year time frame is arbitrary. As documented in the Myers report, the BLM in Nevada commonly analyzes the effects of open pit mines that will take more than 200 years to fill with groundwater, thereby forming a pit lake. Longer analyses are necessary even though the predictions become more uncertain. The choice the BLM leaves the reader is between uncertain predictions and no predictions at all. The issues regarding uncertainty beyond 200 years are similar to those discussed and rejected above regarding the use of a 10-foot drawdown cone. The uncertainty could be considered with a stochastic analysis wherein they present the drawdown contours and hydrographs with a confidence band.

  Unless the Project proposes to cease groundwater pumping after 200 years, the analysis should consider a much longer pumping period.

- **SNWA's analysis underestimates the drawdown.**

As detailed in Myers, (September 2011) predicted drawdown reaches the model boundary at Pine Valley (DEIS, p. 3.3-110). This demonstrates the BLM made an error in establishing the boundaries for the numerical groundwater model.

One model simplification likely causes an underestimate in the extent of drawdown. That is the assumption that groundwater flow is Darcian and that the aquifers are a homogeneous porous media. If the pumping affects a fracture or other preferential flow zone, it could draw water from much further away than the porous media simulation allows.

Finally, although the model has many errors and great uncertainty, if it has been calibrated objectively, the estimates may be considered an expected value (Hill et al 1998). This is similar to determining the mean where the observations around the mean are the variability but the mean may be an expected value. In general, the estimates should not be considered conservative, as claimed in the DEIS. Drawdown and springflow reductions are as likely to have been underestimated as overestimated.

Other Issues in the Hydrology Assessment

The DEIS geology section identifies major land subsidence. This indicates that the Project would result in a significant permanent loss of aquifer capacity. The DEIS does not mention this issue. It should be addressed in the EIS, along with any long-term effects on groundwater recharge potential.

Other Major Errors in Impact Assessment

Use of Inappropriate Database for Biological Resources Assessment

As detailed below, the methodology use in identifying existing habitat composition is inappropriate and likely results in an inaccurate baseline with respect to the most sensitive vegetation/habitat types that would be affected by the project.
Section 3.5.1.2 of the DEIS states that "The regional SWReGAP Land Cover types were grouped into broader cover classes to provide a description of the major wildlife habitat types". DEIS Table 3.5-1 describes this analysis. According to the Southwest ReGap report, the ReGAP data was not created at an appropriate scale to support this type of fine scale analysis of the ROW areas. Specifically, identifying and quantifying the occurrence and extent of vegetation communities that naturally exist in small patches on the landscape (e.g., spring/wetland and riparian vegetation communities and species) is not an appropriate use of the SW ReGAP land cover data.

The following excerpts from the Southwest ReGap report[4] clearly identify the appropriate and inappropriate use of the data. The ReGAP report explicitly states on page 190: (http://fwsnmcfwru.nmsu.edu/swregap/report/SWReGAP%20Final%20Report%20Chapter%207%20Product%20Use%20and%20Availability.pdf.

[4] Prior-Magee, J.S. 2007. Product use and availability. Chapter 7 in J.S. Prior-Magee, et al., eds. Southwest Regional Gap Analysis Final Report. U.S. Geological Survey, Gap Analysis Program, Moscow, ID.

> "Scale: First we must address the issue of appropriate scale to which these data may be applied. The data were produced with an intended application at the ecoregion level, that is, geographic areas from several hundred thousand to millions of hectares in size. The data provide a coarse-filter approach to analysis, meaning that not every occurrence of every plant community or animal species habitat is mapped, only larger, more generalized distributions. The data are also based on the USGS 1:100,000 scale of mapping in both detail and precision...

The wetland ecosystems of interest in this region naturally occur in patches far smaller than "larger, more generalized distributions", and many would likely be missed at the 1:100,000 scale.

A comparison of the EIS's use of the ReGap data and the specific **prohibitions against inappropriate use of that data** is indicated in bold, below.

> **"Inappropriate Uses:** It is far easier to identify appropriate uses than inappropriate ones, however, there is a "fuzzy line" that is eventually crossed when the differences in resolution of the data, size of geographic area being analyzed, and precision of the answer required for the question are no longer compatible. Examples include:
>
> • Using the data to map small areas (less than thousands of hectares), typically requiring mapping resolution at 1:24,000 scale and using aerial photographs or ground surveys."
>
> *The DEIS did this*
>
> "• Combining GAP data with other data finer than 1:100,000 scale to produce new hybrid maps or answer queries."
>
> *The DEIS did this when it combined ReGAP with ROW data*
>
> "• Generating specific areal measurements from the data finer than the nearest thousand hectares (minimum mapping unit size and accuracy affect this precision)."
>
> *The DEIS did this*
>
> "• Establishing definite occurrence or non-occurrence of any feature for an exact geographic area (for land cover, the percent accuracy will provide a measure of probability)."
>
> *DEIS essentially did this. By quantifying the amount of features that cover "less than 1%" of the ROW, the EIS implies that it knows the feature exists there, based on the ReGAP.*
>
> "• Determining abundance, health, or condition of any feature."
>
> **DEIS did this**
>
> "• Using the data without acquiring and reviewing the metadata and this report.
>
> *It appears the authors of the DEIS also failed to review the ReGAP report prior to doing their analysis.*

Because of this misuse of the ReGap database, the DEIS may have omitted entirely many of the smaller wetland/riparian plant communities in the project area and/or understated the size of many of the most sensitive habitats in the study area. In addition, the combined acreage of wetland lost or otherwise affected is likely substantially understated in the EIS. Given the above

described flaws in the DEIS assessment of project impacts on native vegetation communities; it is likely that their assessment of impacts on native wildlife species (many of which depend strongly on the wetland/spring/riparian communities that are rare in the Great Basin), is also flawed. In the Great Basin (more so than in many similar desert biomes), these spring/wetland/riparian areas provide keystone resources for many wildlife populations and thus in many respects drive the biodiversity of the region. Therefore this analysis must be revisited using an appropriate data set. For example, the LANDFIRE database could be used, and does not have the limitations on use and accuracy found in the ReGap database.

Omission of Ground Water Quality Analysis

Although the DEIS acknowledges that groundwater quality degradation is an issue that should be assessed (p. 3.3-80), it fails to assess the Project's effects on that topic. The DEIS includes a single paragraph addressing water quality impacts (p. 3.3-113), and that paragraph provides no information on the potential impact. Instead, it provides generic statements that it is not possible to predict water quality impacts. The project may change salinity and mineral composition in well water used by residents, farms, ranches, wildlife, and businesses in the affected area as groundwater is drawn down. Therefore the EIS should evaluate, at least at a programmatic level, the potential impacts of those changes. The current approach does not meet NEPA's "hard look" standard for analysis.

Omission of Health Risk Assessment

The DEIS identifies (and likely understates) large-scale and widespread dust generation as a result of both Project construction and Project groundwater withdrawals. This dust may adversely affect health or residents and workers in the affected areas, as well as in areas where the dust might blow. The DEIS includes no discussion of the health risks of this dust.

Failure to Adequately Address Fisheries Impacts

Section 3.7, Aquatic Biological Resources correctly identifies effects to aquatic invertebrates, however fails to do so for the fish. Instead, it just says that the various affected species "could be adversely affected" and identifies the basins and springs in which the effects could occur (pp. 3.7-50, 51). The reader is given no information of the potential severity of the impact or the need for, or availability of, mitigation (beyond monitoring, which by itself does not constitute mitigation). Similarly, Figure 3.7-21 identifies numbers of streams, stream miles, waterbodies, and springs that would be affected, but neither the figure nor the accompanying text provides any context for the reader to understand what this means in terms of the affected resource (*i.e.* fish). Substituting impacts to water features for impacts fish does not help the reader understand the impacts to the fish.

Flaws in Air Quality Assessment

The Air and Atmospheric Values chapter of the DEIS was reviewed for technical adequacy by Geoffrey Hornek, atmospheric scientist. Mr. Hornek's detailed comments are attached to this

letter[5] . Mr. Hornek found that the DEIS air quality assessment contains numerous errors of fact and omissions of methodology and analysis related to important air quality and climate change issues, among the most important of which are summarized in the bulleted items below:

- DEIS recognizes the primary importance of the ambient effects of air pollutants, but does not include methodology or quantitative modeling to determine project-induced ambient pollutant concentrations at sensitive receptors in the project area, nor does it assess the severity of such concentrations in conjunction with existing or future ambient pollutant background levels and visibility conditions.

- The DEIS only considers pollutant emissions from project construction equipment/activity, project operation and soil dehydration in the ground water basins. But the project would have a major indirect effect on residential, commercial, industrial and transportation pollutant emissions in Clark County urban areas by providing a completely new source of water to support and promote continued population and economic growth there. Such emissions would not exist without the expanded water supply and their effects must be estimated and included with direct project effects in the comparison to regional air quality attainment plan goals or federal conformity thresholds.

- The DEIS does not perform a complete cumulative analysis. Only direct project sources related to the proposed facility's construction and operation are included, not the complete ambient impacts of other non-project pollutant sources in the areas affected by the project emissions, specifically the fine particulate matter background concentrations in the desert areas, and carbon monoxide, ozone and fine particulate matter concentrations produced by existing and future cumulative sources in the Las Vegas and Salt Lake City areas.

Climate Change

The DEIS includes a generic discussion of climate change (Air Quality, Section 3.1.3), but, in each of the relevant subsequent impact analyses states only, "These effects could be in combination with GWD pumping. As a result of the current knowledge of climate change, it is not possible to relate potential effects with respect to specific pumping alternatives that are analyzed in the EIS" (see, for example, p. 3.6-60 – Terrestrial Wildlife). As discussed in Section 3.3.3, a number of studies exist indicating generally warmer conditions, earlier snowmelt, impacts to springs and stream hydrology and temperature, and climate-induced changes in vegetation and wildlife favoring drought-tolerant and heat-tolerant species. More recently, the US Forest Service's issued Humboldt-Toiyabe National Forest Vulnerability Report 2011 [USFS 2011], which addresses potential effects of climate change to natural resources in much of the Project area.

With respect to riparian ecosystems, the USFS study states,

> Warmer temperatures, decreased snowpack and earlier run-off have resulted in a longer period of hot season gazing by livestock. During the hot season, cattle and horses tend to stay in riparian areas for shelter and forage. The resulting effect is a loss of vegetative cover, increased soil exposure, increased soil compaction and

[5] Geoffrey H. Hornek, Environmental Air Quality and Acoustical Consulting, letter to Ed Naranjo, Confederated Tribes of the Goshute Indian Reservation, October 3, 2011.

> streambank alteration, and lowering of the water table. Climate change with increasing temperature will extend the hot season, and could result in increased loss of riparian ecosystems, unless livestock are managed.

With respect to invasive species, the USFS study states,

> "Invasibility of cheatgrass (Bromus tectorum) varies across elevation gradients on the Forest and appears to be closely related to temperature at higher elevations and to soil water availability at lower elevations. Cold soil temperatures at higher elevations limit the growth and reproduction of cheatgrass. High variability in soil water and lower average perennial herbaceous cover appear to increase invasion potential at low to mid elevations explaining the high susceptibility of more mesic Salt desert shrub and Wyoming sagebrush ecosystems to invasion by cheatgrass. Fire and removal of perennial herbaceous species increases the susceptibility to invasion due to elevated soil water and the lack of competition."

With respect to effects of climate change on riparian habitats, the USFS study states,

> "Riparian areas also serve as the foundation of much of the region's biological diversity. Declining conditions in riparian areas are likely to have cascading effects not only on aquatic species, but on the many upland species that use these ecosystems as their sole source of water (Chambers 2011)."

Similarly, the USFS report assesses the effects of climate change on sagebrush habitat,

> "Big sagebrush habitats throughout the western U.S. could decrease in area by 59% before the end of the 21st century, with devastating consequences for sage grouse, mule deer, pronghorn and other species that depend on these habitats (Glick 2006)."

The DEIS makes no attempt to add, at a program level, these anticipated effects of climate changes to project effects. This violates NEPA's "hard look" requirements. The DEIS impact discussions should be expanded to address, at a minimum, the following potential additive or synergistic effects of the long-term Project groundwater pumping with anticipated effects resulting from climate change:

1) Potential effects on modeled groundwater drawdown and resulting combined (project plus cumulative plus climate change) impacts to springs and streams.
2) Potential long-term combined (project plus cumulative plus climate change) effects on fish and other aquatic resources.
3) Potential long-term combined (project plus cumulative plus climate change) effects on plants and terrestrial biological resources.
4) Potential long-term combined (project plus cumulative plus climate change) effects on grazing resources, land use, and socioeconomic effects.

Failure to Investigate and Correctly Address Mitigation

Regulatory Background

One fundamental flaw in this DEIS is that the agency has not investigated the adverse consequences for the possibility of avoidance for many of the identified Project impacts. This DEIS reads as though an EIS is supposed to show the adverse consequences of each alternative and compare them to one another, and then the job is done. This is false. Of course an EIS is

supposed to show the adverse consequences of each alternative. Of course an EIS is supposed to compare the alternatives to each other. But an EIS is supposed to go one step further:

NEPA states, "The discussion will include … any adverse environmental effects which cannot be avoided should the proposal be implemented …. This section … shall include discussions of … Means to mitigate adverse environmental impact (if not fully covered [elsewhere])." 40 CFR §1502.16(h). Therefore the EIS must disclose the adverse effects "which cannot be avoided." NEPA 102(2)(C)(ii). The only way to know whether an adverse effect can or cannot be avoided is to investigate and report on its avoidance. This DEIS has not done that. The duty to investigate whether adverse consequences can be avoided has been enforced in the Supreme Court and in the Ninth Circuit.[6]

It is of no help to the reader that the proposed action and alternative actions have built-in mitigation. This is explained, for example, on pages ES-20 and 21. Best Management Practices (BMPs) and Applicant-Committed Measures (ACMs) have been incorporated into the alternatives. These are important because they may be necessary to meet agency policies and in some cases environmental standards. But there are still left-over adverse consequences, even considering all the BMPs and ACMs. The EIS must identify whether these adverse consequences can be avoided. NEPA §102(2)(C)(ii) requires that they be disclosed, if they exist. This DEIS does not tell the reader whether they exist.

There is no "significance" threshold for revealing these effects, so it is of no help to the reader that the BMPs and ACMs may "reduce, avoid, or offset some of the adverse environmental consequences," as it says on page ES-21 (emphasis added). The point remains that there are adverse environmental consequences, even after mitigation, and this DEIS does not inform the reader whether these adverse consequences can be avoided.

Inappropriate Deferral of Mitigation to Future Studies or Tiered NEPA Documents

The DEIS includes a project-level analysis of construction of the main pipeline and ancillary facilities, and a program-level assessment of the groundwater development and groundwater pumping, which will be further defined after the water rights adjudications are complete and SNWA's pumping plans are more fully developed. This approach is logical, however it must be carefully implemented to avoid inappropriate deferral of impact analysis and mitigation. A well-constructed program-level EIS will identify the program impacts and then identify feasible

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[6] South Fork Band Council Of Western Shoshone Of Nevada v. U.S. Dept. of Interior, 588 F.3d 718, 727 (9th Cir. 2009) (EIS is not adequate for BLM approval of a major gold mining project on the side of Mt. Tenabo in Nevada where BLM did not evaluate possibility of avoiding environmental consequence of springs drying up, and did not evaluate effectiveness of mitigation) ("The Supreme Court has required a mitigation discussion precisely for the purpose of evaluating whether anticipated environmental impacts can be avoided. Methow Valley, 490 U.S. at 351-52, 109 S.Ct. 1835 (citing 42 U.S.C. § 4332(C)(ii)). Nothing whatsoever is said about whether the anticipated harms could be avoided by any of the listed mitigation measures. This discussion is inadequate.") (emphasis original); Carmel-By-The-Sea v. U.S. Dept. of Transp., 123 F.3d 1142, 1153-54 (9th Cir. 1997) (EIS/R on 3-mile stretch of improvement for California Hwy. 1) ("An Environmental Impact Statement must include a detailed statement regarding adverse environmental effects that cannot be avoided. 42 U.S.C. §4332(2)(C)(ii). This requirement entails a duty to discuss measures to mitigate adverse environmental requirements. 40 C.F.R. §1502.16(h); see Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 351-52, 109 S.Ct. 1835, 1846-47, 104 L.Ed.2d 351 (1989).

general mitigation measures for those impacts. Those mitigation measures may then be refined during the project-level NEPA analysis for specific application to the detailed proposal. A program-level EIS may not defer the entire mitigation to the project-level NEPA review. In a number of cases, this EIS improperly defers both analysis and mitigation of significant program impacts.

Similarly, a project-level EIS also may not substitute additional studies for actual mitigation. NEPA permits and encourages monitoring, but there is a major difference between monitoring and actual mitigation. In short, monitoring absent prescriptive actions triggered by the results of the monitoring does nothing to mitigate the identified impact. As described above, the EIS must identify feasible mitigation for all impacts and then identify which, if any, effects cannot be avoided. Yet this EIS fails to diligently pursue mitigation and, in turn, fails to inform the reader which impacts are unavoidable. Further, in numerous instances the EIS relies upon these vague, toothless, and deferred mitigation measures to make conclusions that an impact would be substantially mitigated. A non-comprehensive list of examples of this problem (focusing on groundwater withdrawal impacts and mitigation) is presented in the table, below. There are many other similar examples throughout the impact/mitigation sections of the EIS.

Examples of Impacts with No Actual Mitigation or Monitoring Substituted for Mitigation

Impact	Mitigation	Problems
Windblown dust from groundwater drawdown	GW-AQ-3: Develop Air Quality Monitoring plan	1) Monitoring plan should have already been developed and then reviewed for adequacy in this EIS. 2) The "mitigation" has no post- monitoring action requirements, so there's no mitigation.
Widespread ground subsidence	GW-G-3: Subsidence monitoring	1) Monitoring plan should have already been developed and then reviewed for adequacy in this EIS. 2) The "mitigation" has no post- monitoring action requirements, there's no mitigation.
Major groundwater drawdown over hundreds of square miles	GW-WR-3: Monitoring and modeling	1) The "mitigation" has no post- monitoring action requirements, so there's no actual mitigation. 2) EIS claim that this measure "likely would reduce impacts" is completely unsupported. 3) There are no provisions for water quality monitoring in this measure.
Groundwater withdrawal impacts to Snake Valley	GW-WR-4: Snake Valley groundwater monitoring, mitigation, and management plan	1) The EIS includes no commitment to implement the SNWA "adaptive management measures" (p. 3.3-122), therefore they can be considered no more than vague, generalized mitigation concepts - no actual mitigation is

		specified in the measure, therefore the EIS's conclusions regarding effectiveness are unsupported. 2) By the time monitoring detected a groundwater problem, the impact would already have occurred and would continue to occur for some time into the future regardless of any future actions to reduce it.
Wildlife impacts in Snake Valley	GW-WL-8: Snake Valley monitoring, mitigation, and management plan	Mitigation notes that the plan "could be used to address impacts…relevant to terrestrial wildlife species…". There is no commitment in the measure to actually address those impacts, therefore this "mitigation" fails to mitigate anything.
Impacts to aquatic biota associated with streamflow and spring dimunition	GW-MN-AB-1: Streamflow and aquatic biology monitoring	1) The "mitigation" has no post- monitoring action requirements, so there's no actual mitigation. 2) EIS claim that this measure "would be highly effective in providing baseline and post-project stream flows" misses the point, which is would the mitigation mitigate anything? The answer is no. 3) There are no provisions for water quality monitoring in this measure.
Impacts to aquatic biota associated with streamflow and spring diminution	GW-MN-AB-2: Spring and aquatic biology monitoring	1) The "mitigation" has no post- monitoring action requirements, so there's no actual mitigation 2) EIS claim that this measure "would be moderate (sic) to highly effective in reducing or possibly eliminating pumping effects on those springs" is entirely unsupported and contradicted by the groundwater analysis in the EIS, which concludes that ***regional groundwater drawdown*** would diminish or dry up springs. 3) The mitigation's statement that if problems are detected "alternate diversion points would be considered" is entirely toothless and therefore does not actually mitigate anything. Consideration of mitigation is not a commitment to mitigate.
Impacts to aquatic biota associated with streamflow and spring diminution	GW-MN-AB-3: Flow/habitat determination	1) The "mitigation" has no post- monitoring action requirements, so there's no actual mitigation

		2) The EIS itself states "Without defining the actions to be implemented under this measure, it is not possible to describe effects of any actions on environmental resources." (p. 3.7-49) Therefore the EIS has failed to adequately analyze whether this impact is avoidable.
Impacts to aquatic biota associated with streamflow and spring diminution	GW-MN-AB-4: Snake Valley monitoring plan actions	See comments on mitigations GW-WR 4 and 8, above. This measure has no commitment to mitigate impacts to aquatic biological resources. In addition, the DEIS acknowledges (p. 3.7-49) that, "The effectiveness and environmental effects of this measure will be determined during subsequent NEPA analyses when specific details are defined." Because this is a regional impact associated with overall project pumping, deferral of this analysis to some future project-specific analyses is improper and fails to provide the decision-makers with essential information on impact significance and the feasibility of avoidance.
Land use impacts of groundwater pumping	None	EIS found that over 17,000 acres of agricultural land would be affected by the project, yet it proposes no mitigation measures or nor does it discuss the feasibility of mitigation.
Rangeland and grazing impacts of groundwater pumping	None	EIS found that over 200,000 acres of rangeland/grazing land would be affected by the project, yet proposes no mitigation measures nor does it discuss the feasibility of mitigation. The EIS makes the entirely unsupported claim that "there are opportunities over the long term to conduct upland rangeland improvement projects to offset losses elsewhere, and to improve the distribution and reliability of surface water sources to improve the overall forage utilization rate." The EIS seems oblivious to the fact that the project would reduce or eliminate water supplies throughout hundreds of thousands of acres in the project area therefore it is unclear how this rangeland improvement could possibly occur in the project area.
Snake Valley hydrologic effects with respect to GBNP	GW-SD-2: Additional hydrologic studies	The "mitigation" has no post- data collection action requirements, so there's no actual mitigation
Socioeconomic effects of groundwater pumping	SE-6, 7: Financial assistance and equitable treatment of ranchers and public water systems that rely on groundwater (SE-6) and for individual	The mitigation states, "SNWA should create and fund a mitigation/protection program for holders of water rights…" There's no explanation of: 1) the size of the fund

	businesses affected by drawdown (SE-7)	2) how the funding will be allocated 3) how the fund will offset the loss of ranches and the project's rendering of areas uninhabitable Therefore there's no actual mitigation.

Failure to Identify Reduced Groundwater Pumping as Mitigation

In its impact analyses, the EIS repeatedly claims that the BLM has no authority over groundwater withdrawal rates. This is not the case. The EIS confirms this (DEIS p. 2-5), stating, "Under FLPMA, the BLM has the authority to 'protect the quality of scientific, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values.'" As a signatory to the stipulation agreements for Spring, Cave, Dry Lake, and Delmar Valleys, the BLM may negotiate monitoring programs that would identify changes in the quantity and quality of natural resources on the BLM-administered public lands. Through these same authorities and agreements, the BLM may request and enforce changes in groundwater pumping rates to protect water-dependent natural resources on the BLM-administered public lands." The EIS does impose limitations on groundwater withdrawal in Great Basin National Park and near some of the federal Wildlife refuges. It is unclear why the BLM considers those limitations to be feasible but refuses to consider similar limitations on other sensitive lands. In addition, overall groundwater withdrawal rates can be controlled by limiting the number and location of wellheads, which the BLM has full authority over. Finally, as discussed below, the Project is required to conform with BLM's Resource Management Plans for the Project area. Imposing limitations on location of groundwater withdrawal is one of the BLM's primary tools for assuring compliance with its Plans. Therefore, the EIS should and can include both alternatives and mitigation measures that limit groundwater withdrawal from public lands under its jurisdiction.

Failure to Adequately Evaluate Growth Inducement

NEPA requires the consideration of growth-inducing impacts[7]. However, NEPA offers no specific guidance with respect to defining what is or is not "growth-inducing". We respectfully request that the BLM consider the more extensive guidance on this topic provided by the California Environmental Quality Act (CEQA) Guidelines. (CEQA, adopted in 1970, was patterned after NEPA). Section 15126(d) of the CEQA guidelines specifically defines growth inducement as potentially caused by removal of an obstacle to growth[8]. It is clear that, absent

[7] Ocean Advocates v. U.S. Army Corps of Engineers, 402 F.3d 846, 870 (9th Cir. 2005) (Corps' EA/FONSI is not adequate for issuance and extension of a permit allowing BP to build an addition to its existing oil refinery dock in Cherry Point, Washington) ("Here ... even if we found that the pier expansion was necessitated by existing development, the foreseeable growth in tanker traffic has not been accounted for in any other planning documents."); Sierra Club v. U.S. Department of Transportation, 310 F.Supp.2d 1168, 1186 (D. Nev. 2004) (FHWA EIS is adequate for proposal to widen US-95 to ten lanes) ("The Court finds that the FEIS's discussion of induced and accelerated growth impacts was reasonably thorough").

[8] CEQA Guidelines, Section 15126(d) states, "Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in

adequate water supplies, the Las Vegas area cannot continue to grow indefinitely. It is also clear that the only reason that the project has been proposed is to facilitate growth of that area by removing a critical obstacle to future growth. The DEIS claims that the Project "would enable but not drive growth" (p. 3.18-72). There is no functional difference between enabling growth and driving growth. In either case, growth that would otherwise not occur, would be led, moved, or caused to occur (see definition of "induce at: http://dictionary.reference.com/browse/induce). The DEIS should be revised to acknowledge that the project, in removing this obstacle, would be growth inducing. The DEIS should also generally address the potential effects of this growth. See also our comments on the air quality assessment, above.

A second aspect of the project's growth inducement is even more straightforward: the BLM's approval of the pipeline would induce development of the wellfields and associated facilities. Although the DEIS assesses, at a program level, potential effects of the wellfields, it fails to identify the pipeline as inducing the their development.

Failure to Adequately Consider the Project's Conformance with BLMs Resource Management Plans

Under NEPA, an EIS is required to inform the reader as to whether the project would conform with the applicable BLM Resource Management Plans (RMPs).

As stated in the DEIS (p. 2-9):

> All actions approved or authorized by the BLM must conform to the existing land use plan where one exists (43 CFR 1610.5-3, 43 CFR 2920.2-5). The BLM's planning regulations state that the term "conformity" or "conformance" means that "...a resource management action shall be specifically provided for in the plan, or if not specifically mentioned, shall be clearly consistent with the terms, conditions, and decisions of the approved plan or amendment" (43 CFR 1601.0-5[b]). According to the BLM Handbook (BLM 2008a), if the proposed action does not conform to the existing land use plan, either the proposal should be modified to conform, or a land use plan amendment that allows the action should be considered. Additionally, if the existing land use plan is silent about an activity, the plan direction, including the broad and programmatic goals and objectives, should be reviewed.

This EIS fails to make the required conformity determinations. First, although the DEIS includes a cursory discussion of the RMP on pp. 2-9-2-13, it fails to make any "finding" that this project will conform to the RMPs. Is summarizes BMPs and the additional mitigations identified in the EIS, but does not make any conclusion or finding of conformity with the RMPs. The DEIS states only that, "These additional measures conform to the resource management direction contained in the RMPs." Page 2-9. That statement is not a finding on conformance with the RMP. The DEIS needs to clearly answer the questions: Does the project conform? Will this be multiple use, sustained yield?

Second, this DEIS fails to identify the conformity of the Project's proposed groundwater withdrawal with the Ely RMP. Instead, the DEIS impermissibly kicks the can down the road:

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service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects."

> "For groundwater development facilities, the BLM would make determinations on RMP conformance in future NEPA analyses (subsequent tiers). The following are examples of potential future effects on resources that may not conform to management actions contained in the Ely District RMP:
>
> Aquatic resources in Shoshone Ponds and vegetation resources in the Swamp Cedars and Baking Powder Flat ACECs may be affected by construction of groundwater development facilities, and aquifer drawdowns from pumping in the future. These areas are classified as avoidance areas, on which facilities may be located on a case-by-case basis. Management direction for the effects of aquifer drawdown from groundwater pumping on these ACECs is not included in the Ely District ROD management prescriptions for the ACECs (BLM 2008b), and groundwater pumping may not comply with the management prescriptions to protect the identified sensitive vegetation and other biotic communities.
>
> Potential riparian vegetation changes related to aquifer drawdown may occur within some wilderness areas (e.g., Fortification Range, Highland Ridge, and Mount Grafton) based on estimated aquifer drawdown contours. Groundwater pumping and the related impacts may not comply with the Wilderness Act and its requirements to protect the vegetation and other biotic communities found within the wilderness areas.
>
> The visual impacts of the future project construction may not comply with Visual Resource Management (VRM) guidelines in the RMP; a final determination of compliance would be made when site-specific facility locations are proposed and evaluated.

The NEPA question is compliance with the Resource Management Plans (40 CFR 1502.16(c) ..... "Possible conflicts between the proposed action and the objectives of Federal ... land use plans ...." An EIS must disclose possible conflicts; if this information is not in the DEIS, the DEIS must be revised so this disclosure can be subject to public notice and comment. This draft EIS fails to disclose whether or not the proposed actions and alternative actions have possible conflicts with the RMPs. The DEIS includes a lengthy programmatic assessment of the proposed groundwater pumping's effects on the environment (flawed as it may be). Thus it is clearly feasible to assess the Project's conformity with the applicable RMPs. Instead of providing the required information, the EIS's takes a "head-in-the-sand" approach, which does not meet NEPA's requirements for full and reasonable disclosure of the Project RMP conformity. Given that the pipeline project has no utility absent the groundwater pumping, the conformance of both project components with the RMPs must be analyzed in this program EIS.

BLM May Not Approve Projects not in Conformance with RMP

If the Project does not comply with the RMP, then the BLM is not permitted to approve the Project (unless, prior to Project approval, it amends the RMP to eliminate the conflict– such an amendment also would be subject to NEPA review). The FLPMA question is compliance with the RMPs, as well, except that **compliance is mandatory**, as indicated in the Shasta Resources Council v. U.S. Dept. of Interior, 629 F.Supp.2d 1045, 1054 (E.D. Cal. 2009) case:

> "Furthermore, given the dictates of the 1993 RMP, it is eminently probable that the local easement alternative was precluded by statute. See 43 U.S.C. 1732(a) ("The Secretary shall manage the public lands ... in accordance with the land use plans

> developed by him under section 1712 ...."); Utah Shared Access Alliance v. Carpenter, 463 F.3d 1125, 1129 (10th Cir.2006) ("FLPMA prohibits the BLM from taking actions inconsistent with the provisions of RMPs." (citing Norton v. S. Utah Wilderness Alliance, 542 U.S. 55, 69, 124 S.Ct. 2373, 159 L.Ed.2d 137 (2004); 43 U.S.C. § 1732(a); 43 C.F.R. § 1610.5-3)); Klamath Siskiyou Wildlands Ctr. v. Boody, 468 F.3d 549, 557 (9th Cir.2006) (providing that "provisions of FLPMA ... require BLM to manage public lands in accordance with resource management plans once they have been established"). Plaintiffs did not formally challenge the 1993 RMP when it was issued fifteen years ago (AR 43, 933, 1583-84), and any new challenge to its provisions would be untimely under the APA's six-year statute of limitations. See 5 U.S.C. § 704; 28 U.S.C. § 2401(a)."

Although the facts of that case are not the facts for this project, the central notion of an RMP and then compliance with the RMPs is in there, with citations. The DEIS must therefore answer the question, "does the project comply with the RMPs?" If not, the BLM may not approve the project under the current RMPs. The DEIS is impermissibly mute on this critical issue. Therefore it must be revised to include the required conformity analysis and recirculated for public review and comment.

A review of the Project impacts as identified in the DEIS with respect to the RMP's policies indicates that the Project would not conform with the Ely RMP, which applies to much of the Project area. (The Project may also conflict with policies of the Las Vegas RMP, however, due to review-period time constraints, we did not conduct that assessment). Specifically:

Water Resources (Ely RMP p. 23)

RMP Goals

The quality of water resource on public lands administered by the Ely District Office will be suitable for the appropriate beneficial uses and will meet approved federal, state, tribal, and local requirements, guidelines, and objectives. The quantity of water on public lands administered by the Ely District Office will be suitable to meet public land management purposes.

Applicable RMP Management Actions:

WR-1: Ensure authorized activities on public lands do not degrade water quality by complying with the Clean Water Act and Nevada Water Pollution Control Regulations (Nevada Revised Statute 445A). Cooperate with the Nevada Division of Environmental Protection to reduce non-point source water pollution as per the Memorandum of Understanding between the BLM and Nevada Division of Environmental Protection dated September 2004.

WR-2: Integrate land health standards, best management practices, and appropriate mitigation measures into authorized activities to ensure water quality meets state requirements and BLM resource management objectives (BLM Manual 7240 Nevada Supplement).

WR-3: Recognize community wellhead protection areas approved by the State of Nevada and only authorize activities within such areas that do not have potential for degrading groundwater quality.

Project Conformity: The DEIS fails to assess the Project's groundwater pumping for conformity with the applicable regulations, however, given the massive impacts on the groundwater table, it is likely that water quality also will be affected. This issue should be reviewed in the EIS.

WR-4: Maintain or improve watershed conditions by controlling or restricting land uses and utilizing tools, where appropriate, to promote desired vegetation conditions.

Project Conformity: The DEIS found that the project groundwater pumping would result in hundreds of thousands of acres where vegetation would change due to lowering of groundwater and associated impacts to wetlands, springs, and streams. Therefore the Project fails to conform to this Goal and Action.

Soil Resources *(Ely RMP, pp 24-25)*

RMP Goals

Maintain or improve long-term soil quality.
Northeastern Great Basin Resource Advisory Council Standard. Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, and landform.

Mojave/Southern Great Basin Resource Advisory Council Standard. Watershed soils and stream banks should have adequate stability to resist accelerated erosion, maintain soil productivity, and sustain the hydrologic cycle.

Applicable RMP Management Actions

SR-1: Restore and maintain desired range of conditions to increase infiltration, conserve soil moisture, promote groundwater recharge, and ground cover composition (including litter and biotic crusts) to increase or maintain surface soil stability and nutrient cycling.

Project Conformity: The DEIS found that the project groundwater pumping would result in hundreds of thousands of acres of subsided land due to lowering of groundwater. This would reduce the potential for groundwater recharge substantially throughout the region. Therefore the Project fails to conform to this Goal and Action.

Vegetation Resources *(Ely RMP, pp. 25-33)*

RMP Goals

Manage vegetation resources to achieve or maintain resistant and resilient ecological conditions while providing for sustainable multiple uses and options for the future across the landscape.

Northeastern Great Basin Resource Advisory Council Standard. Habitats – Exhibit a healthy, productive and diverse population of native and/or desirable plant species, appropriate to the site characteristics, to provide suitable feed, water, cover, and living space for animal species and maintain ecological processes; habitat conditions meet the life cycle requirements of threatened and endangered species.

Mojave/Southern Great Basin Resource Advisory Council Standard. Habitats and watersheds should sustain a level of biodiversity appropriate for the area and conducive to appropriate uses. Habitats of special status species should be able to sustain viable populations of those species.

Applicable RMP Management Actions

VEG-1: Emphasize treatment areas that have the best potential to maintain desired conditions or respond and return to the desired range of conditions and mosaic upon the landscape, using all available current or future tools and techniques.

VEG-2: Develop specific management objectives through the watershed analysis process, incorporating direction from activity plans (see Management Actions WL-8 and WL-15).

VEG-4: Design management strategies to achieve plant composition within the desired range of conditions for vegetation communities, and emphasize plant and animal community health at the mid scale (watershed level).

VEG-6: Emphasize the conservation and maintenance of healthy, resilient, and functional vegetation communities before restoration of other sites.

VEG-14: (salt desert shrub) Implement actions to attain the desired vegetation states shown in Table 6.

VEG-15: Intensively manage areas currently in the herbaceous state to facilitate conversion to the shrub state.

VEG-16: Sagebrush (basin big sagebrush, Wyoming big sagebrush, mountain big sagebrush, and black sagebrush). Implement actions to attain the desired vegetation states shown in Table 7.

VEG-17: Integrate treatments to:
1. Establish and maintain the desired herbaceous state or early shrub state where sagebrush is present along with a robust understory of perennial species.

2. Prioritize treatments toward restoration of sagebrush communities on areas with deeper soils and higher precipitation.

VEG-18: Manage native range to meet the requirements of wildlife species. Management will focus on maintaining or establishing diversity, mosaics, and connectivity of sagebrush between geographic areas at the mid and fine scales.

> *Project Conformity:* Although the DEIS failed to assess the project's conformity with any of these policies, it is clear that the project groundwater pumping would result in massive changes in vegetation composition, likely resulting in non-compliance with all of these policies. We have attempted to conduct a more detailed conformity assessment of vegetation impacts, however this is made difficult because of the DEIS's inappropriate use of the ReGap database instead of the BLM RMP's Landfire database. The DEIS bases its impact assessment on vegetation types and uses the Southwest ReGAP model to do so (the problems with that are described above), while the RMP objectives are articulated based on individual (indicator) plant species and uses the more sophisticated (and appropriate) LANDFIRE model for its analysis. The choice to use an different (and

problematic) land cover model for the DEIS precludes a full comparison of the DEIS with the Ely (and likely other districts') RMPs. The DEIS must conduct this assessment for full disclosure under NEPA.

Riparian/Wetlands
Desired Range of Conditions. The Ely District Office is directed to follow the appropriate rangeland health standards. The Northeastern Great Basin Resource Advisory Council states "Riparian and wetland areas exhibit a properly functioning condition and achieve state water quality criteria." The Mojave/Southern Great Basin Resource Advisory Council specifies "Riparian and watershed vegetation should have structural and species diversity characteristic of the stage of stream channel succession in order to provide forage and cover, capture sediment, and capture, retain, and safely release water (watershed function)." In addition to achieving riparian proper functioning condition, composition, structure, and cover of riparian vegetation will occur within capabilities of the site. Ground cover and species composition will be appropriate to the site.

Riparian areas with free-flowing water (i.e., undeveloped springs) that are non-functional or functioning at risk will show improving trends toward proper functioning condition.

VEG-23: Promote vegetation structure and diversity that is appropriate and effective in controlling erosion, stabilizing stream banks, healing channel incisions, shading water, filtering sediment, and dissipating energy, in order to provide for stable water flow and bank stability.

VEG-24: Focus management actions on uses and activities that allow for the protection, maintenance, and restoration of riparian habitat.

Project Conformity: Although the DEIS failed to assess the project's conformity with any of these policies, the DEIS shows that the project groundwater pumping would result in massive changes in riparian and wetlands vegetation, likely resulting in non-compliance with policies Veg 23 and 24.

Fish and Wildlife

RMP Goals

Provide habitat for wildlife (i.e., forage, water, cover, and space) and fisheries that is of sufficient quality and quantity to support productive and diverse wildlife and fish populations, in a manner consistent with the principles of multi-use management, and to sustain the ecological, economic, and social values necessary for all species.

Northeastern Great Basin Resource Advisory Council Standard. Habitats exhibit a healthy, productive and diverse population of native and/or desirable plant species, appropriate to the site characteristics, to provide suitable feed, water, cover and living space for animal species and maintain ecological processes. Habitat conditions meet the life cycle requirements of threatened and endangered species.

Mojave/Southern Great Basin Resource Advisory Council Standard. Habitats and watersheds should sustain a level of biodiversity appropriate for the area and conducive to appropriate uses. Habitats of special status species should be able to sustain viable populations of those species.

Applicable RMP Management Actions

The RMP includes 20 specific management actions, none of which have been addressed in the DEIS.

> *Project Conformity:* Although the DEIS failed to assess the project's conformity with any of these policies, it shows that the project groundwater pumping would result in massive changes in habitat, likely resulting in non-compliance with some or all of the Wildlife policies. Of specific concern is compliance with management action WL-18: Restore natural water sources (i.e., springs and seeps) to increase water availability through restoration of riparian habitats and proper livestock and wild horse management. The project would destroy many of the natural water sources in the region, making it impossible to restore them.

Special Status Species

RMP Goals

Manage public lands to conserve, maintain, and restore special status species populations and their habitats; support the recovery of federally listed threatened and endangered species; and preclude the need to list additional species.

Northeastern Great Basin Resource Advisory Council Standard
• Habitats exhibit a healthy, productive, and diverse population of native and/or desirable plant species, appropriate to the site characteristics, to provide suitable feed, water, cover, and living space for animal species and maintain ecological processes. Habitat conditions meet the life cycle requirements of threatened and endangered species.

• Riparian and wetland areas exhibit a properly functioning condition and achieve state water quality criteria.

Mojave/Southern Great Basin Resource Advisory Council Standard

• Habitats and watersheds should sustain a level of biodiversity appropriate for the area and conducive to appropriate uses. Habitats of special status species should be able to sustain viable populations of those species.

• Watersheds should possess the necessary ecological components to achieve state water quality criteria, maintain ecological processes, and sustain appropriate uses. Riparian and wetlands vegetation should have structural and species diversity characteristic of the stage of stream channel succession to provide forage and cover, capture sediment, and capture, retain, and safely release water (watershed function).

Applicable RMP Management Actions

The RMP includes 43 specific management actions, none of which have been addressed in the DEIS.

> *Project Conformity:* Although the DEIS failed to assess the project's conformity with any of these policies, it shows that the project groundwater pumping would result in massive changes in habitat, likely resulting in non-compliance with some or all of the Wildlife

policies. Of specific concern is compliance with management actions addressing wetlands and riparian areas. The project would destroy or dewater many of the natural water sources in the region, making it impossible to meet those management actions, goals, and objectives. This issue should be reviewed in detail in the DEIS.

Other Resources

The RMP specifies policies for other resources including cultural resources and visual resources. The Project's conformance with these goals and policies should be assessed in the DEIS.

Project Need Issues

Combining information in Section 1.6 with data included in Section 3.18, Socioeconomics and Environmental Justice, indicates that the proposed project may not be needed at all. Section 1.6.1 identifies a need for the project water based on outdated and incorrect 2008 population and water demand forecasts. The projected water demand in this section is erroneous and outdated; it has not been updated with current demographic information, despite the fact that this information is included in the EIS Section 3.18, Socioeconomics. SNWA's determination that the project was needed seems to be supported based on outdated growth projections from 2008, at the peak of Las Vegas' housing boom. As stated on p. 3.18-9 of the DEIS, "Pre-recession economic and demographic projections for Clark County, prepared by UNLV-CBER in 2008, underlie SNWA's 2009 Water Resource Plan. Those projections portrayed unabated, but slowing long-term growth, yielding a population of 3.45 million residents by 2030." The DEIS reports that, one year later UNLV-CBER's 2009 projections reflect a more conservative perspective, calling for a population of 3,126,000 in 2030, which is 10 percent lower than the previous projections." (DEIS p. 3.8-19) One year later, the Nevada State Demographer issued a report showing even lower projections, rising from a 2010 total of about 1.9 million to between 1.98 and 3.06 million people by 2030. (DEIS p. 3.8-19) The lower number reflects a slow recovery from the current economic conditions. The DEIS (p. 1-13) states that SNWA proposed to reduce per capita water demand by 20% by 2035. That conservation reduction would allow for a 20 percent increase in population by 2035 (up to nearly 2.4 million) with **no additional water demand**. Given that SNWA had previously projected adequate (non-drought) supplies through 2020, it is likely that there will be no need for the project by 2035.

"Cart Before The Horse" Project Planning

As described in Section 1.2 of the DEIS, the BLM's is to consider the applicant's request for use of federal land managed by the BLM for construction and operation of the groundwater conveyance system. However, a pipeline connected to no water supply is the equivalent of a freeway with no onramps. The EIS acknowledges that BLM will be requested by SNWA to grant permission for wellfield development on BLM lands after adjudication of water rights has been completed by the Nevada State Engineer. Those wells will be the sole reason that the pipeline is proposed – as described in the EIS, they will provide most, if not all, of the water to the pipeline. SNWA would have no reason to propose a pipeline if it could not develop the wellfields. Therefore the wells and the pipeline are two parts of a single project. Yet the BLM is not considering any approval of a "program" including the pipeline and associated wells and groundwater mining. Instead, it is considering approval only a portion of the program – one with no independent utility. In addition, the Program itself is not anticipated or included in the BLM's applicable Resource Management Plans.

From a planning perspective, the BLM should not consider the pipeline absent knowledge of the pending application for associated groundwater pumping. As shown in the EIS, most of the long-term, severe impacts of the Project would result from the groundwater pumping, not from construction of the pipeline. Therefore the BLM should be considering the applications for the pipeline and wells at the same time. Approval of the pipeline at this time could inappropriately predispose the BLM to approval of the wellfields.

Conclusion

As detailed above, the subject DEIS fails to meet even the most basic NEPA requirements of full disclosure of potential environmental impacts and investigation of the feasibility of mitigation of those impacts. Many of the mitigation measures that are identified for groundwater pumping fail to mitigate anything at all. The range of alternatives included in the EIS fails to include any alternatives that would be sustainable and the no-action alternative is improperly construed. The Project's growth inducement effects are not adequately assessed.

As detailed above, the impact assessment is fatally flawed in relying on an arbitrary minimum 10-foot groundwater drawdown before it even starts to consider impacts, despite substantial evidence that substantive impacts would occur at lesser drawdown levels. Similarly, the DEIS uses a

biological resources database the documentation for which expressly states that it is not appropriate for this sort of use. The EIS contains other substantial errors and omissions, including major errors in the groundwater model, use of inappropriate databases for biological impact assessments, omission of a substantive water quality analysis, omission of a health risk analysis, failure to adequately address fisheries impacts, and failure to appropriately assess air quality impacts. Decisions based on this information would be arbitrary or capricious.[9]

Finally, the DEIS fails to analyze the Project's conformance with the BLM's own RMPs, and appears to be impermissible in light of its conflicts with the BLM's RMPs. Finally, as discussed later in this letter, the BLM is required to comply with, and fully implement, its Resource Management Plans for the Project area. 43 USC §1732 ("The Secretary shall manage the public

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[9] "We review the BLM's compliance with NEPA under the deferential 'arbitrary and capricious' standard of the Administrative Procedure Act. 5 U.S.C. §706(2)(A); see The Lands Council v. McNair, 537 F.3d 981, 987 (9th Cir.2008) (en banc). We also review the BLM's compliance with FLPMA under the deferential 'arbitrary and capricious' standard. See Webb v. Lujan, 960 F.2d 89, 91 (9th Cir.1992)." Center for Biological Diversity v. U.S. Dept. of Interior, 623 F.3d 633, 641 (9th Cir. 2010) (EIS on land exchange for mining project near Ray, Arizona, is not adequate where "the BLM did not compare the environmental effects of exchanging the land with the effects of not exchanging the land"). "The arbitrary and capricious standard 'requires us to ensure that an agency has taken the requisite hard look at the environmental consequences of its proposed action, carefully reviewing the record to ascertain whether the agency decision is founded on a reasoned evaluation of the relevant factors.'" Te-Moak Tribe of Western Shoshone of Nevada v. U.S. Dept. of Interior, 608 F.3d 592, 598-99 (9th Cir. 2010) (NEPA document is not adequate in part for BLM approval of Cortez's amendment to a plan of operations for the Horse Canyon/Cortez Unified Exploration Project (HC/ CUEP), located in Lander and Eureka Counties in northeastern Nevada). "We ... remand for the entry of an injunction pending preparation of an EIS that adequately considers the environmental impact of the extraction of millions of tons of refractory ore, mitigation of the adverse impact on local springs and streams, and the extent of fine particulate emissions." South Fork Band Council Of Western Shoshone Of Nevada v. U.S. Dept. of Interior, 588 F.3d 718, 721-22 (9th Cir. 2009) (EIS is not adequate for BLM approval of a major gold mining project on the side of Mt. Tenabo in Nevada).

lands under principles of multiple use and sustained yield, in accordance with the land use plans developed by him under section 1712 of this title"). The DEIS does not inform the reader as to whether BLM considers the project with all of its connected actions and future build-outs to be consistent with the multiple use and sustained yield mandate of BLM's organic legislation, in other words, not only whether this project is consistent with the relevant RMPs but also whether any RMP could allow such a devastating project on our nation's public lands.

Please feel free to contact me at (510) 849-2354 if you have questions regarding this letter.

Sincerely;

Richard Grassetti
Principal
Grassetti Environmental Consulting

Attachments: Grassetti Qualifications, Patten Letter, Hornek Letter and Qualifications

Richard Grassetti

PRINCIPAL

Expertise

- CEQA/NEPA Environmental Assessment
- Project Management
- Geologic and Hydrologic Analysis

Principal Professional Responsibilities

Mr. Grassetti is an environmental planner with 30 years of experience in environmental impact analysis, hydrologic and geologic assessment, project management, and regulatory compliance. He is a recognized expert on California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) processes, and has served as an expert witness on CEQA and planning issues. Mr. Grassetti regularly conducts peer review and QC/QA for all types of environmental impact analyses, and works frequently with public agencies, citizens groups, and applicants. He has managed the preparation of over 50 CEQA and NEPA documents, as well as numerous local agency planning and permitting documents. Mr. Grassetti has prepared over 200 hydrologic, geologic, and other technical analyses for CEQA and NEPA documents. He has analyzed the environmental impacts of a wide range of projects including ecological restoration projects, waste management projects, mixed-use developments, infrastructure improvements, energy development, military base reuse projects, and recreational facilities throughout the western U.S. In addition to his consulting practice, Mr. Grassetti regularly conducts professional training workshops on CEQA and NEPA compliance, and is a lecturer at California State University, East Bay, where he teaches courses on environmental impact assessment, among others.

Professional Services

- Management and preparation of all types of environmental impact assessment and documentation for public agencies, applicants, citizens groups, and attorneys
- Peer review of environmental documents for technical adequacy and regulatory compliance
- Expert witness services
- Assisting clients in CEQA and NEPA process compliance

- Preparation of hydrologic and geologic analyses for EIRs and EISs
- Preparation of project feasibility, opportunities, and constraints analyses, and mitigation monitoring and reporting plans

Education

University of Oregon, Eugene, Department of Geography, M.A., Geography (Emphasis on Fluvial Geomorphology and Water Resources Planning), 1981.

University of California, Berkeley, Department of Geography, B.A., Physical Geography, 1978.

Professional Experience

1992-Present	Principal, GECo Environmental Consulting, Berkeley, CA
1994-Present	Adjunct Professor, Department of Geography and Environmental Studies, California State University, Hayward, CA
1988-1992	Environmental Group Co-Manager/ Senior Project Manager, LSA Associates, Inc. Richmond, CA
1987-1988	Independent Environmental Consultant, Berkeley, CA
1986-1987	Environmental/Urban Planner, City of Richmond, CA
1982-1986	Senior Technical Associate - Hydrology and Geology - Environmental Science Associates, Inc. San Francisco, CA
1979-1981	Graduate Teaching Fellow, Department of Geography, University of Oregon, Eugene, OR
1978	Intern, California Division of Mines and Geology, San Francisco, CA

Professional Affiliations and Certifications

Member and Past Chapter Director, Association of Environmental Professionals, San Francisco Bay Chapter

Member, International Association for Impact Assessment

Publications and Presentations

Grassetti, R. *Round Up The Usual Suspects: Common Deficiencies in US and California Environmental Impact assessments.* Paper Presented at International Association for Impact Assessment Conference, Vancouver, Canada. May 2004.

Grassetti, R. *Understanding Environmental Impact Assessment – A Layperson's Guide to Environmental Impact Documents and Processes.* (in press).

Grassetti, R. *Developing a Citizens Handbook for Impact Assessment.* Paper Presented at International Association for Impact Assessment Conference, Marrakech, Morocco. June 2003

Grassetti, R. *CEQA and Sustainability.* Paper Presented at Association of Environmental Professionals Conference, Palm Springs, California. April 2002.

Grassetti, R. and M. Kent. *Certifying Green Development, an Incentive-Based Application of Environmental Impact Assessment*. Paper Presented at International Association for Impact Assessment Conference, Cartagena, Colombia. May 2001

Grassetti, Richard. *Report from the Headwaters: Promises and Failures of Strategic Environmental Assessment in Preserving California's Ancient Redwoods.* Paper Presented at International Association for Impact Assessment Conference, Glasgow, Scotland. June 1999.

Grassetti, R. A., N. Dennis, and R. Odland. *An Analytical Framework for Sustainable Development in EIA in the USA*. Paper Presented at International Association for Impact Assessment Conference, Christchurch, New Zealand. April 1998.

Grassetti, R. A. *Ethics, Public Policy, and the Environmental Professional.* Presentation at the Association of Environmental Professionals Annual Conference, San Diego. May 1992.

Grassetti, R. A. *Regulation and Development of Urban Area Wetlands in the United States: The San Francisco Bay Area Case Study*. Water Quality Bulletin, United Nations/World Health Organization Collaborating Centre on Surface and Ground Water Quality. April 1989.

Grassetti, R. A. *Cumulative Impacts Analysis, An Overview*. Journal of Pesticide Reform. Fall 1986.

1986, 1987. Guest Lecturer, Environmental Studies Program, University of California, Berkeley.

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September 27, 2011

Confederated Tribes of the Goshute Reservation

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Dear Tribal Members:

I am attaching a document titled: ***Comments Relevant to BLM's "Draft EIS on Southern Nevada Water Authority Groundwater Development Project Right-of-Way" with emphasis on Groundwater Depths, Desert Plant Community Response to Groundwater Pumping, Phreatophyte Root Depths and Use by Wildlife and Cattle*** which I prepared at your request. I hope the information in this document is useful to your efforts to address concerns about groundwater withdrawal in Nevada by SNWA.

I am also attaching my resume to allow you to understand my background that qualifies me to make the comments in the attached document.

Sincerely,

Duncan T. Patten, PhD

Attachments:

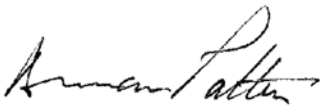
Attachment A: Document on Groundwater Development

Attachment B. Patten Resume

Attachment A.

Comments Relevant to BLM's "Draft EIS on Southern Nevada Water Authority Groundwater Development Project Right-of-Way" with emphasis on Groundwater Depths, Desert Plant Community Response to Groundwater Pumping, Phreatophyte Root Depths and Use by Wildlife and Cattle

Submitted by Duncan Patten



Introduction

This discussion relates primarily to sections in the EIS, under Proposed Action Section 3.5.2.8 Groundwater Development and Groundwater Pumping.

This section considers issues, assumptions, and methods related to field development and eventual pumping from up to five hydrologic basins.

Under Issues relevant to *Groundwater Pumping* it states that an issue of concern is:

• "Short-term, long-term, and permanent loss of vegetation communities (including spring-fed wetlands and riparian areas) and special status plant species populations due to groundwater drawdown." (FDEIS Section 3.5, p. 38)

Relative to this Issue, the EIS discusses consequences for possible changes and loss of desert plant communities. The EIS adopts several assumptions that are critical to estimating the project impacts. (DEIS Section 3.5, pp. 38 - 39) The validity and appropriateness of the assumptions are discussed below.

Assumption 1

"It is assumed that a groundwater depth of 50 feet or deeper in relation to the ground surface elevation is not accessible to the roots of most phreatophytic shrubs and this groundwater depth represents a reasonable boundary for: 1) estimating the deepest root zone extent of plant communities that are at least partially dependent on underlying groundwater, and 2) defining a groundwater drawdown boundary that assumes that the roots of overlying plant communities no longer have access to groundwater as a moisture source at depths greater than 50 feet. For example, the phreatophytic shrubland ET that occupies Cave Valley are underlain by existing groundwater depths greater than 50 feet. Therefore, it is assumed that these communities would not be affected by groundwater drawdown in this hydrologic basin." (DEIS. Section 3.5, p. 38)

On page 3.5-13, the following statement (which is based on reports about greasewood) is meant to "support" the assumption that groundwater below 50 ft is not accessible to phreatophytes:

"The phreatophyte shrub greasewood (*Sarcobatus vermiculatus*) is a key indicator of relatively shallow groundwater depths in the Great Basin. Studies of root depths of this shrub species in relation to groundwater depth indicate that rooting depths range from the soil surface to as much as 50 feet. Recent studies in the Snake, Spring, and White River valleys (Moreo et al. 2007; Devitt 2008) indicate that depth to groundwater ranged between 10 and 45 feet on sites dominated by greasewood."

Response to Assumption 1

The first statement above on rooting depths of greasewood to 50 ft is not supported by any references, whereas the references cited in the second statement concern groundwater depths between 10 and 45 ft. Many estimates of rooting depths of desert phreatophytes are based on a combination of known groundwater depths and plant moisture stress. On the other hand, in an extensive USGS study, Robinson (1958) estimated rooting depths of many phreatophytes (see Table 1) including about 20 m (ca. 65 ft) for greasewood, which supports the statement above. However, many other phreatophytes that occur in the Great Basin area have rooting depths considerably shallower (see Table 1). This suggests that the "50 ft. assumption" does not relate to most of the phreatophytes in the areas of concern, other than to suggest that at that depth, all, not "most", phreatophytes would no longer be supported by groundwater.

Also, in Patten et al. (2008), which included studies of spring areas in Spring Valley, woody plant cover was measured relative to groundwater (more accurately "water table") depth. Although their monitoring wells seldom went deeper than 4 meters, many woody species did not occur (based on cover measurements) at locations with the water table much deeper than 2 to 3 meters (see Figures 1 and 2).

Assumption 2

“Based on an evaluation of plant rooting depth, physiological responses to drought, available information on groundwater levels, and seasonal soil moisture, an index drawdown contour of 10 feet is assumed to be a reasonable estimate of the point at which long-term changes in plant community vigor and composition would begin to appear. The model drawdown estimates include a wide range of uncertainty (see Water Resources, Section 3.3). Soil texture, soil chemistry, seasonal soil moisture, and rooting depths in these plant communities are highly variable. As a consequence of this variability, the depth index may encompass plant stress levels that would be initiated at shallower drawdown depths or stress that would be initiated at greater depths. Key references that were consulted on wetland and phreatophytic shrub rooting depths, physiological mechanisms to withstand drought, and seasonal water use from underlying soils include: Branson et al. (1976); Busch et al. (1992); Castelli et al. (2000); Hacke et al. (2000);

Moreo et al. (2007); Pataki (2008); Sperry and Hacke (2002); Steinwald et al. (2006); Trent et al. (1997); Toft (1995); and Toft and Fraizer (2003).” (DEIS, Section 3.5, p. 39)

This assumption is repeated in Section 3.12 Rangeland and Grazing:

"An index drawdown contour of 10 feet is assumed to be a reasonable estimate of the point at which long-term changes to vegetation community vigor and composition would begin to appear." (DEIS, Section 3.12, p.38)

Response to Assumption 2

The data for woody plants from the study by Patten et al. (2008) in Spring Valley (e.g., Figures 1 and 2) refute the assumption that "an index drawdown contour of 10 feet (i.e., 3 m) is assumed to be a reasonable estimate of the point at which long-term changes in plant community vigor and composition would begin to appear" (3.5, p. 39). The woody plant data are supported by data for cover of herbaceous plants from the same study which show that few herbaceous plants, including those from most wetland categories (wetland to upland) occur on sites where the water table (groundwater levels on the graphs) is below 2 meters. If these herbaceous plants grow primarily on sites where the water table is less than 2 meters below the surface, what might happen if the water table dropped well below this? Patten et al. (2008) also developed linear models describing how plant communities in the spring areas of Spring Valley would change with declining water tables. They state:

"Using a linear model on relationships between herbaceous community wetland indicator scores (WIS) and water table levels at Spring Valley (Model 1), we can project how the herbaceous plant communities might change in composition.
Model 1: Herb WIS (Spring Valley: May - June) = 0.786 x 1:085 Water Table Depth (August)
[n=17; R2= 0:427; p 0:01].

Using the above model, we find that the WIS will increase by about 1 unit with each meter of decline in the water table. For example, a wetland/upland transition zone herbaceous community with a WIS of 2 at the Spring Valley study springs includes species of *Carex, Juncus, Puccinella, Sporobulus*, and *Distichlis*. Following a 2-m water level decline, this community might shift to one with a WIS of 4, equivalent to a phreatophytic-upland community vegetated by species such as those of *Descurainia, Distichlis*, and *Puccinellia" (Patten et al. 2008:405).*

The EIS also suggests changes in the vegetation in areas where groundwater pumping will occur. Table 3.5-14 (p. 47) below summarizes these changes.
Table 3.5-14 Summary of Vegetation Resource Impacts, Applicant-committed Protection Measures, and Monitoring and Mitigation Recommendations for Proposed Action Effects/Conclusions

• Groundwater drawdowns from pumping (index of 10 feet or greater) would likely result a long-term changes in plant species composition in the Wetland/Meadow ET area from wetland species such as rushes, sedges, and grasses, to upland species of grasses and shrubs.

• Groundwater drawdowns from pumping (index of 10 feet or greater) would likely result in lower densities of phreatophytic shrubs such as greasewood and an increase in upland species of grasses and shrubs that are not completely, or partially dependent on reliable sources of groundwater.

• Groundwater drawdowns from pumping (index of 10 feet or greater) and changes in spring flows would likely increase stress on spring-fed aquatic vegetation and riparian shrubs. If these water sources dried up over a long period of time (5 years or more), it is likely these communities would not recover and vegetation community composition would change to upland species.

• Successional changes in spring-dependent wetlands and meadows could reduce the availability of Tribal traditional use wetland and riparian plants in Spring, Snake, and Lake valleys. The Ute ladies'-tresses orchid has not been identified in any of the hydrologic basins potentially affected by drawdown. If populations of this species are found in the future, evaluations of groundwater drawdown risk to this species would be conducted.

In general, I cannot disagree with most of these statements on changing plant communities with water table drawdown. However, since the conclusions are based on the "index of 10 feet (3m) or greater," I would suggest that *most of the changes suggested in Table 3.5-14 would occur when drawdown levels from pumping are considerably less than the stated 10 ft*, and thus changes that are suggested to occur "after" a 10 ft drawdown will occur during the drawdown when the water table is dropping and is shallower than 10ft. How this would affect the overall cover of herbaceous and woody plants, as well as species composition is only conjecture. In all likelihood, herbaceous species dependent on a shallow water table would drop out and be replaced by species tolerant of drought and dependent on ambient precipitation conditions. There would be a likely shift in woody species composition from phreatophytic species to non-phreatophytes.

Quoting again from Patten et al. (2008:409) in their conclusions: "As regional groundwater pumping drives reductions in spring discharge and local water tables, it will modify vegetation in the spring area (Perkins and others 1984; Sorenson and others 1991). Our projections of truncation of the lateral and longitudinal extent of the wetland and wetland/upland transition areas, declines in areal cover of hydrophytic vegetation, and composition shifts toward drought-tolerant species have been documented globally for other wetland and riparian ecosystems affected by dewatering (Stromberg and others 1996; Fairfax and Fensham 2003; Cooper and others 2006; Earmus and others 2006;

Elmore and others 2006; MacKay 2006). Spatial patterns of soil water quality (salinity, in particular) also may change in response to reduced spring discharge and shallow water table decline resulting from groundwater withdrawal. In the wetland and wetland/upland transition zones along the outflow stream, halophyte cover might increase where less water is available to dilute saline soils. In the phreatophytic-upland zone, reductions in soil salinity, a response to reduced capillary rise of salts from the declining shallow water table, may drive shifts toward nonhalophytes. Increased salinity at the ground surface is a common consequence of elevated water tables created by agricultural irrigation in semi-arid and Mediterranean climate regions; western and southeastern Australia are examples (Cramer and Hobbs 2002; Dogramaci 2004)... Thus, reduced surface salinity may be an expected response of regional groundwater withdrawal for urban expansion in the Great Basin and Mojave deserts. One caveat to this projection is that many of the saline soils in these deserts have existed for millennia, thus changes resulting from percolation of salts into the soil following rain events will be long-term...To increase our predictive capacity, increased understanding is needed on hydrologic thresholds for vegetation change. Although vegetation change will occur along a continuum from wetland to upland, it will occur as tolerance levels with respect to soil moisture reduction, and water table depth or seasonal fluctuation of the water table are exceeded for the dominant plant taxa that occupy different zones at or near the spring. Community-wide spatial gradient studies have clarified some relationships, but knowledge of water depth tolerance ranges for dominant taxa of the different zones of the springs should be refined through experimental manipulation of water levels (Naumburg and others 2005), population-focused studies along spatial hydrologic gradients (Groeneveld and Or 1994), and monitoring studies."

Impacts on Wildlife and Cattle Use of the Springs and Desert Vegetation

The anticipated changes in vegetation cover of the Great Basin Desert where groundwater withdrawal will lower the water table reducing cover of plant species dependent on shallow water and increasing cover of species that utilize ambient precipitation may also change the value of natural forage found in these desert areas. A shift from herbaceous species to upland non-phreatophytic shrubs would greatly reduce the quality of rangeland forage used both by wildlife and cattle. A reduction and/or loss of wetland vegetation and its water source, both extensively used by wildlife and cattle would make the rangeland less useable for domestic animals and may greatly reduce the abundance of wildlife at the spring areas and surrounding desert.

Literature Cited[1]:

Patten, D.T., L. Rouse, J.C. Stromberg. 1997. Analysis of the effects of groundwater withdrawal on vegetation associated with springs in the Great Basin: Phases two and three – Vegetation and ecosystem dynamics. Final Report for Phase Three under UNLV

1 *Excludes those references cited in quotations from the EIS and Patten et al. (2008).*

Agreement NPS/ASU 8007.72(9209). Submitted to the National Park Service, Western Region. December 1997.

Patten, D.T., L. Rouse, and J.C. Stromberg. 2008. Isolated spring wetlands in the Great Basin and Mojave Deserts, U.S.A.: Potential response of vegetation to groundwater withdrawal. Environmental Management 41(3): 398-413.

Robinson, T.W. 1958. Phreatophytes. USGS Water Supply Paper 1423.

Table 1. Estimates of rooting depth to water table and quality of water tolerated by phreatophytes forund in Great Basin spring areas (adapted from Robinson 1958). Related species are presented when actual species from study springs were not listed. Water quality scale is 1, excellent to good; 2, good to poor; and 3, poor to unsatisfactory. (Table 9 from Patten et al. 1997)

Species	Depth to Water Table (m)	Quality of Water
Allenrolfea occidentalis	0.3 to 7	3
Anemopsis californica	shallow	3
Atriplex canescens	2.5 to 20	1 - 2
Atriplex lentiformis	2 to 5	3
Baccharis emoryi	---	2
Baccharis glutinosa	0.6 to 5	2
Baccharis sarothroides	---	2
Chrysothamnus nauseosus	---	2 - 3
Distichlis spicata	0.6 to 4.5	1 - 3
Fraxinus velutina	---	1
Hymenoclea sp.	shallow	2 - 3
Juncus cooperi	---	1 - 2
Juniperus scopulorum	3 +/-	1 - 2
Phragmites communis	0 to 2.5+	1 - 2
Pluchea sericea	0 to 3+	1 - 2
Prosopis juliflora	---	1 - 2
Prosopis pubescens	---	---
Prosopis velutina	3+	1 - 2
Sarcobatus vermiculatus	20 +/-	1 - 3
Sporobolus airoides	2 to 8	1 - 3
Suaeda torreyana	1.2 to 4.5	3
Tamarix ramosissima	---	1 - 3

Figure 1. Cover of woody vegetation by wetland category in relation to maximum depth to water table (groundwater) at Spring Valley spring sites. (Figure 55 from Patten et al. 1997).

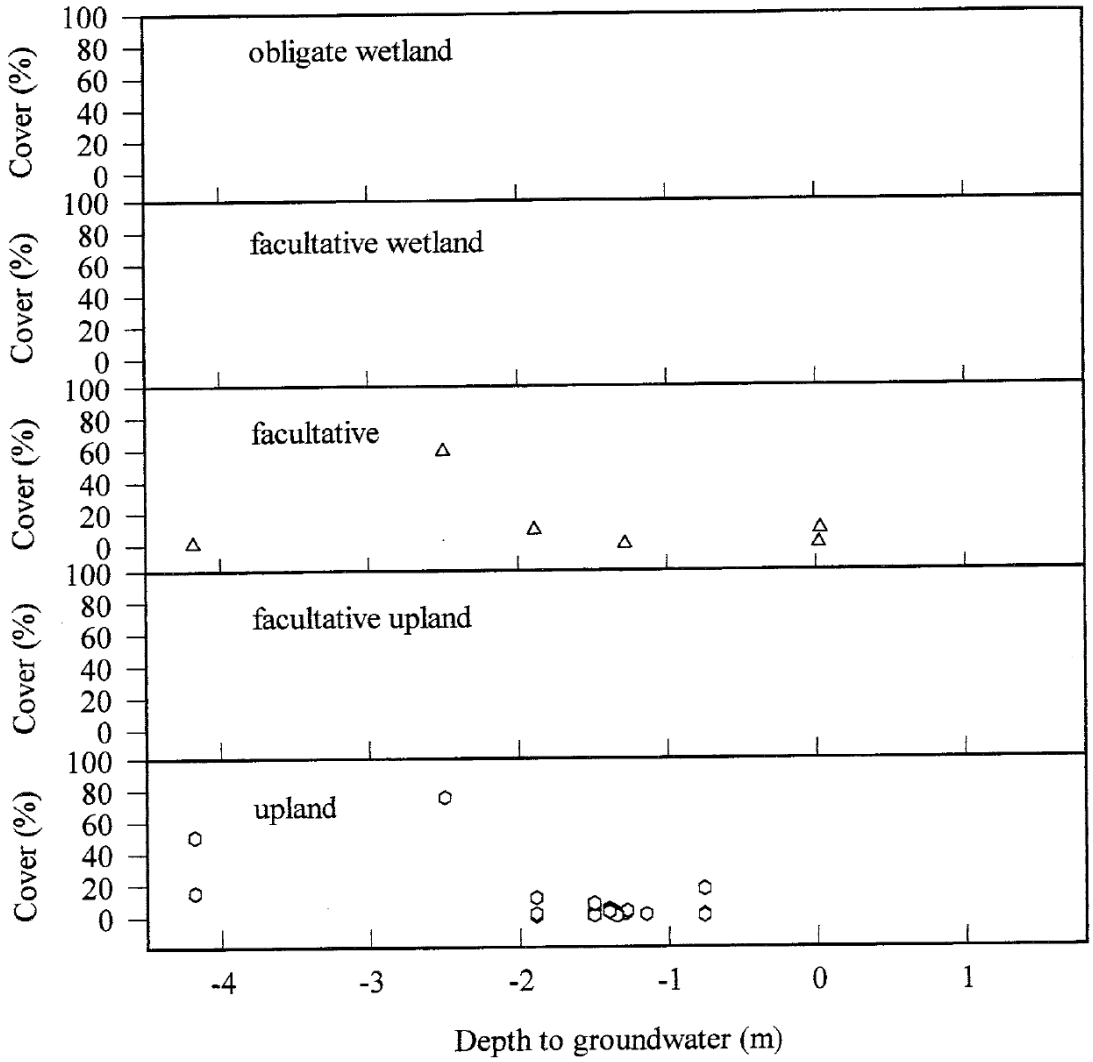


Figure 2. Cover of six upland woody species in relation to maximum depth to water table (groundwater). (Figure 56e from Patten et al. 1997).

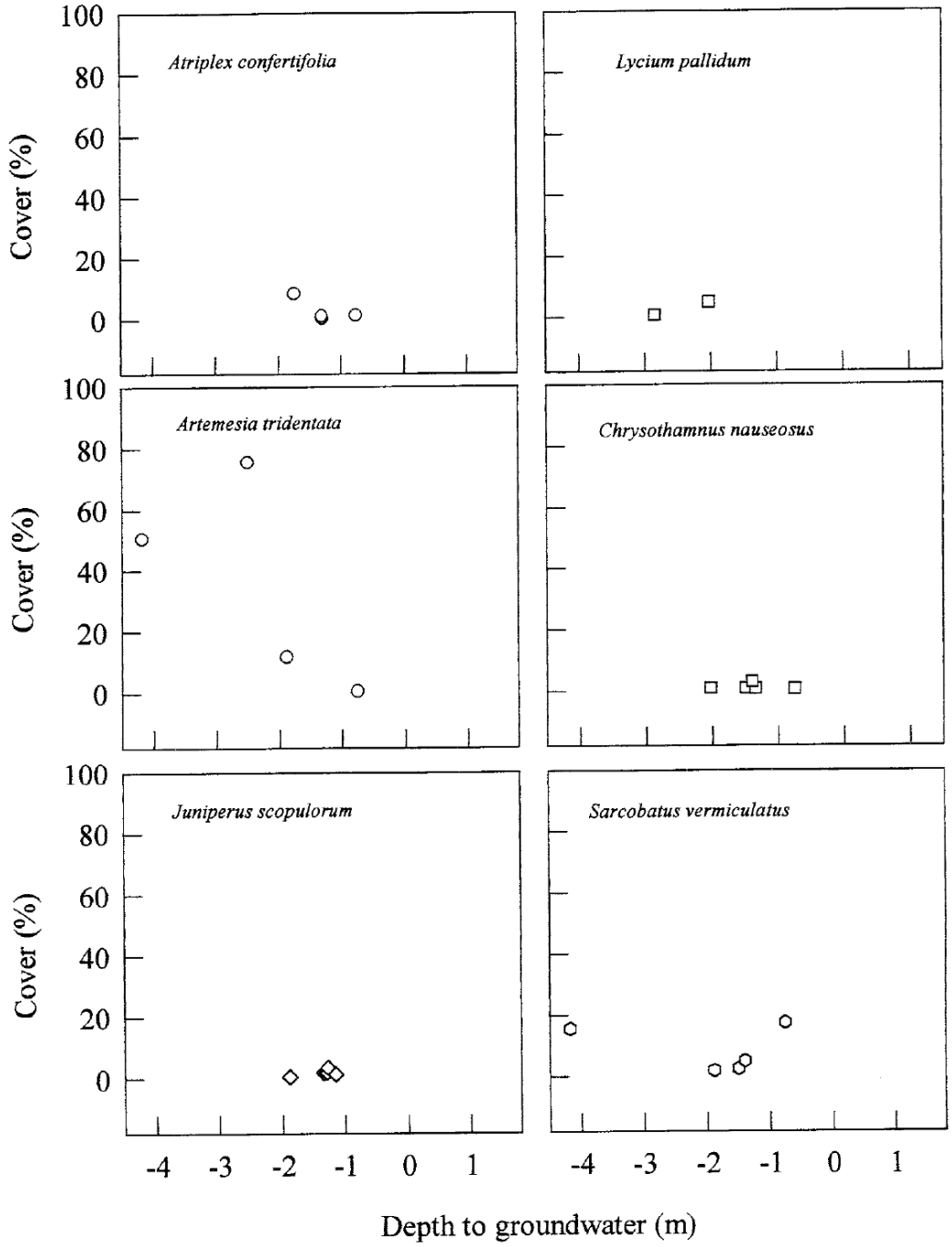
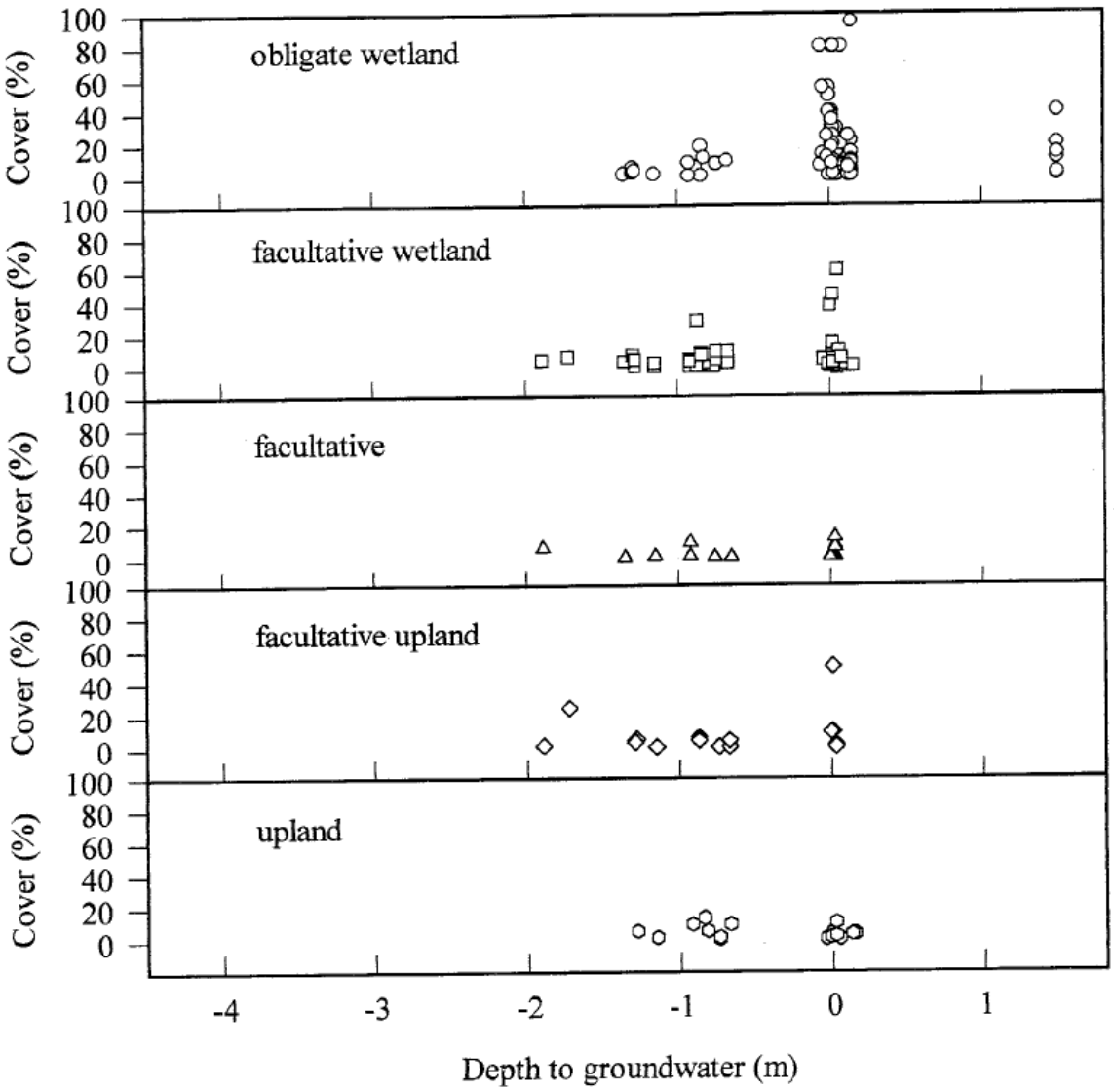


Figure 3. Cover of herbaceous vegetation by wetland category in relation to water table depth (depth to groundwater) at Spring Valley spring sites. (Figure 49 from Patten et al. 1997).



Attachment B. Patten Resume

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DEGREES

A.B., Biology-Chemistry, Amherst College, 1956
M.S., Botany, University of Massachusetts, Amherst, 1959
Ph.D., Botany-Ecology, Duke University, 1962

ACADEMIC EXPERIENCE

Instructor (part-time) 1957-59, University of Massachusetts
Assistant Professor 1962-65, Virginia Polytechnic Institute
Assistant Professor 1965-67, Arizona State University
Associate Professor 1967-73, Arizona State University
Professor 1973-1995, Arizona State University
Professor Emeritus 1995 -- present, Arizona State University
Research Professor (adjunct) 1995-1999, Montana State University
Research Professor 1999 -- present, Montana State University

ADMINISTRATIVE EXPERIENCE

Chairman, Faculty Assembly, President, Faculty Senate, Arizona State University (elected position), 1971-72.

Plant Process Coordinator, US/IBP Desert Biome, 1971-76.

Chairman, US/IBP Interbiome Primary Production Committee, 1971-75.

Co-director, Rocky Mountain Environmental Research Grant (NSF-RANN $100,00), 1973-74.

Assistant Academic Vice President, Arizona State University, 1972-76.

Chairman, Department of Botany and Microbiology, Arizona State University, January 1977-July 1981.

Director, Center for Environmental Studies, Arizona State University, 1980-1995.

Business Manager, Ecological Society of America, 1979-1995.

President, Arizona Riparian Council, 1985-89.

President, Society of Wetland Scientists, 1996-97

OTHER PROFESSIONAL EXPERIENCE

Bureau of Reclamation - Department of the Interior.

Senior Scientist, Department of the Interior, Bureau of Reclamation, Glen Canyon Environmental Studies 1989-1996.

National Research Council/National Academy of Sciences: Committees, Boards, and Commissions.

Member, Environmental Assessment Committee, Environmental Studies Board, Commission on Natural Resources, 1975-76. Chairman: Panel on Environmental Impacts of Resource Management.

Chair, Mono Basin Ecosystem Study, Board on Environmental Studies and Toxicology, 1985-87.

Member, Glen Canyon Environmental Studies Committee, Water Science and Technology Board, 1986-89, ex officio 1989-1996.

Member, Board on Environmental Studies and Toxicology, 1987-90.

Member, Committee on Opportunities in Applied Environmental Research and Development, Board on Environmental Studies and Toxicology, 1988-91.

Member, Committee on Western Water Management Change, Water Science and Technology Board, 1989-91.

Member, Committee on Science in the National Parks, Board on Environmental Studies and Toxicology, 1989-92.

Member, Commission on Geoscience, Environment and Resources, 1990-93.

Member, Planning Committee for Managing Water Resources and Water Quality Along the U.S./Mexico Border. Water Science and Technology Board. 1993.

Member, Committee to Review Specific Scientific and Technical Safety Issues Related to the Ward Valley, California Low-Level Radioactive Waste Site. Board on Radioactive Waste Management. 1994-1995.

Chair, Committee to Evaluate Navy's Extreme Low Frequency Antenna Ecological Monitoring Program, Board on Environmental Studies and Toxicology. 1995-97.

Member, Committee on Ungulate Management in Yellowstone National Park, Board on Environmental Studies and Toxicology, 1998-2001.

Member, Committee on Hardrock Mining on Federal Lands, Board on Earth Sciences and Resources, 1999

Member, GAO Funded Workshop on Environmental Indicator Sets (organized by NAS)

National Science Foundation:

Scientific Consultant to the National Science Foundation, 1973-75.

Panel Member -- National Science Foundation: Environmental Biology 1975-76 and Ecological Sciences, 1976-78.

Environmental Protection Agency:

Member: Scientific Advisory Committee Panel to Review 2007 Report on the Environment, 2007.

Member: Chartered Science Advisory Board, 2008-present

Member: Science Advisory Board Environmental Engineering Committee (supplemented) reviewing EPA ORD Report on Hydraulic Fracturing research program. Spring 2010.

Chair: Science Advisory Board ad hoc Panel reviewing ORD reports on Mountain Top Mining and Benchmark for Conductivity. Summer 2010 – Winter 2011.

Member: Science Advisory Board ad hoc Panel reviewing ORD Study Plan on Effects of Hydraulic Fracturing on Drinking Water Resources. Spring 2011 – Fall 2011.

Member: Science Advisory Board ad hoc Panel reviewing EPA/ORD 2012 budget request. Spring 2011.

Advisory Activities:

District Advisor (Environmental Protection) Bureau of Land Management, Arizona Strip Multiple-Use Advisory Board, 1977.

Member, Man and the Biosphere-4 Directorate: Arid and Semi-Arid Lands, 1988-90.

Science Advisory Council, Greater Yellowstone Coalition, 1988-present.

Chair, Technical Advisory Committee, National Institute for Global Environmental Change, 1994-96; member, 1990-96.

Chair, Technical Advisory Committee, Southwest Center for Environmental Research and Policy. 1993-1995.

Scientific and Technical Advisory Committee member. American Rivers, 1993-present.

Chair, Technical Advisory Committee, Yellowstone River Cumulative Effects Task Force, 1999-2005.

Chair, Status of U.S. Ecosystems: Grass/Shrubland Committee. Heinz Center, Washington, DC, 2000-2001.

Member, Design Committee, State of the Nation's Ecosystems, Heinz Center, Washington, DC, 2000-2007.

Consulting Activities:

Consultant to the Public Land Review Commission on the environmental impact of open-pit mining in the Southwest, 1969.

Consultant to ASARCO on the ecological impact of open-pit molybdenum mining in Idaho and on the impact of SO_2 on natural vegetation near Winkleman, Arizona, 1970.

Consultant to the Bureau of Reclamation on ecological impacts of the CAP dams, 1971.

Consulting on environmental impact problems with Salt River Project, ABI Corporation, Arizona Public Service, 1971-1995.

Consultant to Environmental Protection Agency on environmental effects of increased coal burning, 1977-78.

Consultant to the U.S. Army Corps of Engineers on reclamation projects, 1978-1995.

Consultant to Arizona Environmental Consultants for ecological impacts of a refinery at Mobile, Arizona, 1978-80.

Advisor and Consultant to Pacific Gas and Electric Company and Southern California Edison Company on effects of management of instream flow in Sierra streams on riparian communities, 1984-1985.

Consulting to EBASCO on riparian restoration of streams in the Mono Basin, California. 1992-1993.

Science Board, CALFED, Bay-Delta Watershed Ecosystem Restoration Program. December 1999 to 2005.

Independent Science Board, California Bay-Delta Authority. October 2003 to 2008.

Consulting to U.S. Forest Service. Pacific SW. San Bernardino Inland Feeder Tunnel project. 2000-2003.

Consulting with Advocates for Community and Environment. Relative to Southern Nevada Water Authority plans to develop groundwater pumping and pipe lines in eastern Nevada.

OTHER EXPERIENCE (CONT.)

Other Activities:

Participant (Invited) -- ERDA (Department of Energy) Ecology-Meteorology Workshop on effects of increased atmospheric CO_2. University of Michigan Biological Station, August 1977.

Organizer and Chairman -- Department of Energy Workshop: Ecological impacts of solar energy conservation, Arizona State University, 11-12 May 1978.

Member: Washington State Academy of Sciences Committee to conduct an independent review of the Puget Sound Partnership's (PSP) progress in ecosystem recovery and the PSP Science Panel's development of a comprehensive science program including development of indicators of Puget Sound health . 2011-2012.

AWARDS AND HONORS

Phi Sigma 1963
Sigma Xi 1959 (Associate), 1962 (Full)
Arizona State University Chapter: Treasurer, 1966-68
President-Elect, 1968-69
President, 1969-70
American Association for the Advancement of Science, Fellow 1979
Arizona/Nevada Academy of Sciences, Fellow 1976.
Ecological Society of America, Distinguished Service Award. 1994.
Bureau of Reclamation, Citizens Award. 1996.

RECOGNITION

Who's Who in the West
Who's Who in America

ACADEMIC COMMITTEES
(Arizona State University, excluding period when Assistant Academic Vice President.)

University (ASU):
Academic Affairs Committee, Secretary 1969-70, Chair 1970-71
Faculty Senate 1962-72, Vice Chair 1970-71, Chair 1971-72
Code of Conduct Committee (ad hoc), 1970-71

OTHER EXPERIENCE (CONT.)

Sabbatical Leave Committee (ad hoc), 1971
Salary and Wage Review Board, Chair, 1971
University Research Council, 1976-82
Research Park Committee, 1982-84
Safety Committee, 1985-86
Intellectual Property Committee, 1992-1995.

College:

Liberal Arts Honors Council, 1967-70
Liberal Arts Curriculum Council, 1969-71

RESEARCH GRANTS AND CONTRACTS

A study of vegetation-environmental relations in northwest Yellowstone National Park. National Science Foundation Grant BG-2205, 1964. $32,000

Vegetation-environmental relations. National Science Foundation Grant BG-4683, 1966. $13,600

Altitudinal influence of succulent distribution. Arizona State University Faculty Grant-in-Aid, 1968. $1,500

Ecological and taxonomic studies. Arizona State University Faculty Grant-in-Aid, 1969. $2,284

Productivity and water stress in cacti. IBP Desert Biome (National Science Foundation), 1970, $7,958; 1971, $10,200; 1972, $4,077. Total: $22,235

Factors influencing stream quality. Arizona State University, Faculty Grant-in-aid, 1971. $1,400

Phenology and function of Sonoran Desert Annuals in relation toenvironmental changes. IBP Desert Biome (National Science Foundation), 1972, $8,200; 1973, $8,200; 1974, $10,321; 1975, $7,627. Total: $34,348

A vegetation management study for the enhancement of wildlife along the lower Colorado River (with R. D. Ohmart). Bureau of Reclamation, 1973-75. $150,000

Rocky Mountain Environmental Research. Co-Director through the Eisenhower Consortium and The Institute of Ecology. National Science Foundation-RANN Grant, 1973-74. $100,000

Solar energy conversion: analysis of impacts on desert ecosystems.
ERDA (DOE), 1977-78 $43,000
University of California-Los Angeles, 1978 $30,000
University of California-Los Angeles, January-September 1979 $42,812,
University of California (DOE), 1979-80 $35,800
Total: $151,612

Department of Energy Traineeship Grant (with T. H. Nash), 1978-79. $14,600

Seed mix and establishment in Indian Bend Wash. U.S. Army Corps of Engineers, 29 November 1978-29 March 1979. $4,731

Ecology of mesquite bosque communities. U.S. Army Corps of Engineers, 29 November 1978-29 March 1979. $2,960

Ecology of a riparian forest community. Faculty Grant-in-Aid, 1979. $3,300

A study of revegetation and revegetation potential on Cave Buttes Dam Site, U.S. Army Corps of Engineers, 1979. $5,744

Silvics of Arizona walnut (*Juglans major*). U.S. Forest Service Cooperative Agreement,
1981. $17,000
1984. $5,000
Total: $22,000

A study of revegetation methods on Adobe Dam. U.S. Army Corps of Engineers, 1981. $4,000

Response of riparian species to recreational impact. U.S. Forest Service Cooperative Agreement, 1982-84. $19,632

Environmental assessment in Nepal. 1983.
National Science Foundation $1,250
National Geographic Society $2,098
Rolex Corporation $1,300
Explorers Club $ 600

Total: $5,248

Fire effects following prescribed burning in a selected desert ecosystem. U.S. Forest Service, 1983-87. $18,000

Riparian vegetation response model. Southern California Edison, 1986. $15,454

Inventory and evaluation of riparian vegetation along lower Rush Creek, Mono County, California. Los Angeles Department of Water and Power, 1987. $9,008

Riparian vegetational changes along Bishop Creek: an historical photo interpretation. Desert Research Institute/Southern California Edison, 1988. $7,150

Evaluation sensitivity to disturbance of high-elevation ecosystems in the Pinaleno Mountain. Research Corporation, 1988. $25,000

Dynamics of riparian species along Rush Creek. Los Angeles Department of Water and Power, 1988. (With J. Stromberg.) $30,015

Restoration of riparian herbaceous understory. Arizona Nature Conservancy, 1989. (With J. Stromberg.) $3,000

Cone production by conifers at high elevation sites in the Pinaleno Mountains. Research Corporation, 1989-91. (With J. Stromberg.) $22,300

IGPA. Department of the Interior, Bureau of Reclamation, 1989-91. $102,580
1991-93 $84,501

Instream flow requirements for riparian vegetation at Bishop Creek, Inyo County, California. Southern California Edison, 1989-92. (With J. Stromberg.) $64,310

Effective management of water resources: a function of geomorphology and instream flow requirements. U.S. Geological Survey, 1990-92. (With J. Stromberg.) $36,740

Instream flow needs of riparian trees. Los Angeles Department of Water and Power (Jones and Stokes, Prime). (With J. Stromberg). 1990. $9,020
1991. $43,588

Development of best management practices for water and riparian resources along the Santa Cruz watershed, U.S./Mexico border. EPA (Southwest Center for Envir. Research and Policy) (with J. Stromberg, M. Sommerfeld and D. Green). 1992. $104,000

Science Advisory Committee: Glen Canyon Environmental Studies, Dept. of the Interior (Bureau of Reclamation).

	1993.	$134,000
	1994.	$141,000
	1995	$175,000
Integration and Evaluation	1996	$98,750
	1997-98	$42,000

Effects of modified groundwater and surface water on riparian and wetland ecosystems in Nevada. UNLV (National Park Service prime). (with J.C. Stromberg). 1992-93. $50,835.
1994-1997 $76,000.

Water and riparian resources of the Santa Cruz River basin: best management practices for water and resource quality. EPA (SW Center for Env. Res. and Policy) (with J. Stromberg and M. Sommerfeld). 1993-94. $173,658.

Water quality and discharge issues at Ambos Nogales: use of a border environmental action team to assist in information analysis, problem solving, and action plan development. EPA (Southwest Center for Envir. Res. and Policy). 1993-1995. $31,520

Groundwater recharge and riparian habitat enhancement. Arizona Department of Water Resources (with J. Stromberg) 1995-96. $30,910

Functional assessment of effluent dominated riparian ecosystems. University of Arizona (USGS) (with J. Stromberg) 1995-96. $23,020

Long-term research and monitoring of cottonwood and other riparian woody plants in the Bill Williams Wildlife Refuge. USFWS. (with J. Stromberg)
1995-97. $25,622

Dam management and riparian ecosystems. Univ. Of Ariz. (with J. Stromberg)
1995-96. $10,240

Assessment of the role of effluent dominated rivers in supporting riparian functions. Arizona Water Protection Fund. (with J. Stromberg).
1996-97. $46,750

Riparian vegetation restoration for the Provo River Restoration Project. Utah Reclamation Mitigation and Conservation Commission (with J. Stromberg).
1997-99. $42,000

Developing effective ecological indicators for watershed analysis. Environmental Protection Agency. Through Yellowstone Ecosystem Studies, Bozeman, MT.
(Principal Investigator with Co-PIs A. Marcus, R. Lawrence, W. Minshall)
1999-2002. $868,242

Developing effective ecological indicators for watershed analysis. EPA Grant transferred to Montana State University. 2001-2003 $455,000

Complexities Across Boundaries: Coupled human and natural systems across the Yellowstone National Park northern winter elk range. National Science Foundation Biocomplexity program. (Co-PI with D. McGinnis (senior PI at Idaho State U.), D. Bennett (Iowa), W. Travis (Colorado), J. Shogren (Wyoming).
2002-2005 $660,000

Developing Conceptual Models for the Yellowstone Network. NPS Cooperative Agreement
2002-2003 $24,000
2003-2004 $21,000

Seeps and Springs Monitoring Plan for Big Horn Canyon. NPS Cooperative Agreement. (with Brian McGlynn). 2004-2006 $57, 500

Land use/land cover change governing nitrogen thresholds and transport in mountain watersheds. EPA Star Grant (with Brian McGlynn). 2004-2007 $278,000

MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Association for the Advancement of Science (Fellow)
American Geophysical Union
American Institute of Biological Sciences
American Water Resources Association
Arizona-Nevada Academy of Sciences (Fellow)

Arizona Riparian Council (President 1985-89)
British Ecological Society
Ecological Society of America (Business Manager 1979-1995, elected)
Society of Range Management
Society of Wetland Scientists (Vice President 1995-96, President 1996-97)

ABSTRACTS AND PRESENTATIONS

1962 Patten, D. T. Vegetation patterns in relation to environments in the Madison Range of Montana. Bulletin of the Ecological Society of America 43(3):53-54. A.I.B.S., Oregon State University, Corvallis, OR.

1964 Patten, D. T. The influences of over-browsing on willow survival along a northern Rocky Mountain river. Bulletin of the Ecological Society of America 44(33):77. A.I.B.S., University of Colorado, Boulder, CO.

1968 Patten, D. T. Succession from sagebrush to mixed conifer forest in the northern Rocky Mountains. Bulletin of the Ecological Society of America 49(3):111. A.I.B.S., Ohio State University, Columbus, OH.

1968 Patten, D. T. Ecology of the non-forested areas of northwest Yellowstone National Park. Bulletin of the Ecological Society of America 49(3):112. A.I.B.S., Ohio State University, Columbus, OH.

1968 Patten, D. T., and B. E. Dinger. CO_2 exchange patterns and endogenous rhythms of cacti from different environments. Bulletin of the Ecological Society of America 49(3):107. A.I.B.S., Ohio State University, Columbus, OH.

1968 Patten, D. T., and J. C. O'Toole. Ecology of Douglas fir near its upper altitudinal limits. Journal of the Arizona Academy of Science 5:15. A.A.S., Northern Arizona University, Flagstaff, AZ.

1970 Patten, D. T. Dry matter accumulation. U.S./IBP. Analysis of Ecosystems, Desert Biome Plant Meeting Report. Las Vegas, NV. Pages 30-32.

1970 Patten, D. T. Vegetation history of the Upper Gallatin Region. AMQUA Meeting, 29 August-1 September, Montana State University and Yellowstone National Park.

ABSTRACTS AND PRESENTATIONS (CONT.)

1971 Patten, D. T. Temperature and heat flux of desert plants. American Association for the Advancement of Science and Arizona Academy of Science, Arizona State University, Tempe, AZ.

1972 Patten, D. T. Growth and productivity of cacti in relation to environments in the Sonoran Desert, North America. International Symposium on Ecophysiological Foundations of Ecosystem Productivity in Arid Lands. June, Leningrad and Dusjanbe, USSR.

1972 Patten, D. T. Seasonal temperature adaptation of cacti. Journal of the Arizona Academy of Sciences 7:14. Arizona Academy of Science, Prescott College, Prescott, AZ.

1972 Nisbet, R. A., and D. T. Patten. Temperature acclimation in prickly pear cactus. 15 June, Ecological Society of America and American Association for the Advancement of Science, Eugene, OR.

1973 Nisbet, R. A., and D. T. Patten. Temperature acclimation in prickly pear cactus in south central Arizona. Bulletin of the Ecological Society of America 54:15-16. A.I.B.S., University of Massachusetts.

1973 Patten, D. T. Winter: a major determinant of desert vegetation patterns. Journal of the Arizona Academy of Science, Tucson, AZ.

1973 Patten, D. T., and E. M. Smith. Early annual plant development in relation to environmental variables in the Sonoran Desert. Bulletin of the Ecological Society of America 54:26. A.I.B.S., University of Massachusetts.

1974 Patten, D. T. Ecological consequences of current use patterns. Proceedings of the American Association for the Advancement of Science, University of Arizona Energy Inquiry, Tucson, AZ, 17-18 January. Pages 37-39.

1974 Patten, D. T. Carbon allocation in desert plants. U.S./IBP Desert Biome Third Annual Synthesis Meeting, Salt Lake City, UT.

1974 Patten, D. T. Carbon flow through desert ecosystems. Symposium on Metabolism of Biomes. Invited paper, A.I.B.S., Arizona State University, Tempe, AZ.

ABSTRACTS AND PRESENTATIONS (CONT.)

1974 Patten, D. T., and E. M. Smith. Energy flux and the thermal regime of desert plants. Symposium on Environmental Physiology of Desert Organisms. A.I.B.S., Arizona State University, Tempe, AZ.

1974 Smith, E. M., and D. T. Patten. Primary production of annual plants as related to microenvironment in a Sonoran Desert shrub community. Bulletin of the Ecological Society of America 55(2):28. A.I.B.S., Arizona State University, Tempe, AZ.

1976 Patten, D. T. Phenology and function of Sonoran Desert annuals in relation to environmental changes: a synthesis. U.S./IBP Desert Biome Fifth Annual Conference, Alta, UT.

1979 Barstad, J., and D. T. Patten. Factors controlling vegetational patterns in a riparian forest community in southeastern Arizona. Bulletin of the Ecological Society of America 60(2):130. A.I.B.S., Oklahoma State University, Stillwater, OK.

1979 Smith, S. D., and D. T. Patten. Impacts of a simulated solar collecting array on a Sonoran Desert ecosystem. Journal of the Arizona Academy of Science 14(Supple.):23-24.

1979 Smith, S. D., and D. T. Patten. Effects of a simulated solar collector array on abiotic and biotic parameters in a Sonoran Desert ecosystem. Bulletin of the Ecological Society of America 60(2):81. A.I.B.S., Oklahoma State University, Stillwater, OK.

1980 Barstad, J., and D. T. Patten. Methods of studying riparian ecosystems: how effective are they? Bulletin of the Ecological Society of America 61:77. A.I.B.S., University of Arizona, Tucson, AZ.

1980 Patten, D. T. Ecological aspects of an expanding development and use of plants. A.I.B.S./ESA Symposium: The economic development of desert plants. Bulletin of the Ecological Society of America 61:57. A.I.B.S., University of Arizona, Tucson, AZ.

1980 Smith, S. D., and D. T. Patten. Effects of shading on gas exchange patterns and morphology of two Sonoran Desert shrubs. Bulletin of the Ecological Society of America 61:59. A.I.B.S., University of Arizona, Tucson, AZ.

1980 Smith, S. D., and D. T. Patten. Comparative productivity of winter annuals under natural and artificial shade conditions in the Sonoran Desert. Bulletin of the Ecological Society of America 61:123. A.I.B.S., University of Arizona, Tucson, AZ.

ABSTRACTS AND PRESENTATIONS (CONT.)

1982 Cave, G., and D. T. Patten. Vegetation response to fire and the resulting nutrient changes in the Sonoran Desert. Bulletin of the Ecological Society of America 62:180. A.I.B.S., Pennsylvania State University, College Park, PA.

1982 Patten, D. T., and G. Cave. Fire temperatures and physical characteristics of a controlled burn in the Upper Sonoran Desert. Bulletin of the Ecological Society of America 63:163. A.I.B.S., Pennsylvania State University, College Park, PA.

1983 Conrad, B., and D. T. Patten. Community dynamics of old fields in the Sonoran Desert. Bulletin of the Ecological Society of America 64:150. A.I.B.S., North Dakota State University, Grand Fork, ND.

1984 Patten, D. T. Timberline and forest gradients in the upper Marsyandi River Valley, Nepal. Bulletin of the Ecological Society of America 65:83. A.I.B.S., Colorado State University, Fort Collins, CO.

1984 Stromberg-Wilkins, J., and D. T. Patten. Reproductive output and seedling establishment of *Juglans major* along riparian moisture gradients. Bulletin of the Ecological Society of America 65:119. A.I.B.S., Colorado State University, Fort Collins, CO.

1984 Turner, B., and D. T. Patten. Recreational impacts on riparian woodlands in central Arizona. Bulletin of the Ecological Society of America 65:249. A.I.B.S., Colorado State University, Fort Collins, CO.

1986 Loftin, S., and D. T. Patten. Nitrogen dynamics following fire in a Sonoran Desert ecosystem. Abstract, IVth International Congress of Ecology, Syracuse, NY. Page 219.

1986 Patten, D. T., C. Fox, and R. Risser. Effects of stream diversion and instream flow requirements in the riparian ecosystems of the Sierra Nevada. Abstract, First Annual Arizona Riparian Council Meeting, Flagstaff, AZ. Page 11.

1986 Stromberg-Wilkins, J., and D. T. Patten. Patterns of reproduction in *Juglans major* as related to yearly moisture stress. Abstract, IVth International Congress of Ecology, Syracuse, NY. Page 324.

ABSTRACTS AND PRESENTATIONS (CONT.)

1986 Stromberg-Wilkins, J., and D. T. Patten. *Juglans major*: reproduction and establishment in terrace and streamside habitat. Abstract, First Annual Arizona Riparian Council Meeting, Flagstaff, AZ. Page 12.

1987 Jackson, J., and D. T. Patten. Plant-soil-water relationships in Las Vegas Wash. Abstract, Second Annual Arizona Riparian Council Meeting, Wickenburg, AZ. Page 12.

1987 Larkin, G., and D. T. Patten. Regeneration and distribution of riparian species along four streams in the Sierra Anchas, Arizona. Abstract, Second Annual Arizona Riparian Council Meeting, Wickenburg, AZ. Page 16.

1987 Larkin, G., and D. T. Patten. Riparian vegetation patterns: a result of recruitment strategies. Abstract, Society of Wetland Scientists, 8th Annual Meeting, "Wetland and Riparian Ecosystems of the West," Seattle, WA. Page 62.

1987 Larkin, G., and D. T. Patten. Microsite requirements for successful riparian vegetation regeneration. Abstract, 72nd Annual Meeting, Ecological Society of America, Columbus, OH. Pages 346-347.

1987 Patten, D. T., and S. Loftin. Nitrogen flux and allocation in a Sonoran Desert ecosystem following fire. Abstract, 72nd Annual Meeting, Ecological Society of America, Columbus, OH. Page 385.

1987 Stromberg-Wilkins, J., and D. T. Patten. Mast cropping in Arizona walnut (*Juglans major*). Abstract, Society of Wetland Scientists, 8th Annual Meeting, "Wetland and Riparian Ecosystems of the West," Seattle, WA. Page 45.

1987 Valenciano, D., and D. T. Patten. Gradients within riparian forests of the southwestern U.S. Abstract, Society of Wetland Scientists, 8th Annual Meeting, "Wetland and Riparian Ecosystems of the West," Seattle, WA. Page 48.

1987 Valenciano, D., and D. T. Patten. Riparian forests: elevational gradient and relationships to adjacent upland vegetation in the southwestern U.S. Abstract, 72nd Annual Meeting, Ecological Society of America, Columbus, OH. Pages 435-436.

1987 Valenciano, D., and D. T. Patten. Montane riparian forests and their relationship to adjacent upland vegetation. Abstract, Second Annual Arizona Riparian Council Meeting, Wickenburg, AZ. Page 18.

ABSTRACTS AND PRESENTATIONS (CONT.)

1988 Patten, D. T. Response of a mountain riparian system to the interaction of phased highway improvements and elk browsing. Bulletin of the Ecological Society of America 69(Supple.):256.

1988 Patten, D. T., and J. C. Stromberg. Riparian vegetation response to stream diversion: clues for instream flow requirements. Abstract, Third Annual Arizona Riparian Council Meeting, Casa Grande, AZ.

1988 Randall, K. E. and D. T. Patten. Revegetation of the Tempe Rio Salado with native riparian plants -- a land-use plan. Abstract, Third Annual Arizona Riparian Council, Casa Grande, AZ.

1988 Stromberg, J. C., and D. T. Patten. A season at the Hassayampa River. Abstract, Third Annual Arizona Riparian Council Meeting, Casa Grande, AZ.

1988 Stromberg, J. C., and D. T. Patten. Total protection: one management option. Proceedings of the Symposium, on Restoration, Creation and Management of Wetland and Riparian Ecosystems in the American West, Society of Wetland Scientists, Denver, CO.

1989 Patten, D. T. Ecosystem risk assessment: case studies of natural resource perturbation. National Research Council Workshop on Ecosystem Risk Assessment and Monitoring, 2-3 March, Airlie House, VA.

1989 Gabriel, I. E., and D. T. Patten. The impacts of industrial air pollutants on a semi-arid ecosystem. Bulletin of the Ecological Society of America 70(2)Supple.:118-119.

1989 Richter, B. D., J. C. Stromberg, and D. T. Patten. The influences of flooding in a Southwestern riparian system. Abstract, Fourth Annual Arizona Riparian Council Meeting, Sunrise Ski Resort, McNary, AZ.

1989 Stromberg, J. C., and D. T. Patten. Long-term effects of stream diversion on riparian tree growth. Bulletin of the Ecological Society of America 70(2)Supple.:275.

1989 Stromberg, J. C., and D. T. Patten. Spruce-fir dynamics. Paper presented at Workshop on Biology of Mt. Graham, 19-21 October, University of Arizona, Tucson, AZ.

ABSTRACTS AND PRESENTATIONS (CONT.)

1989 Stromberg, J. C., and D. T. Patten. Flow needs for growth and maintenance of woody riparian vegetation. Abstract, Fourth Annual Arizona Riparian Council Meeting, Sunrise Ski Resort, McNary, AZ.

1990 Gabriel, I. E., and D. T. Patten. Accumulation of pollutants in mesquite foliage during operational and non-operational periods of a copper smelter. Bulletin of the Ecological Society of America (Proc. Suppl.) 71(2):161-162.

1990 Gabriel, I. E., and D. T. Patten. Impact of industrial air pollutants on a semi-arid ecosystem. International Conference on Metals in Soils, Water, Plants, & Animals, 29 April-4 May, 1990, Orlando, FL.

1990 Patten, D. T., and J. C. Stromberg. Ecological impacts of water supply projects. Water Supply Alternative Workshop Proceedings, Environmental and Energy Study Institute, Special Report for U.S. EPA Office of Wetlands Protection, Tucson, AZ.

1990 Patten, D. T., and J. C. Stromberg. Ecological effects of urbanized watersheds. Presented at the Watershed Management Council 3rd Biennial Conference, Ontario, CA Proceedings pages 17-25.

1990 Randall, K. E., and D. T. Patten. Development of a revegetation plan for a desert riparian area in Arizona. Bulletin of the Ecological Society of America (Proc. Suppl.) 71(2):294.

1990 Richter, B. D., D. T. Patten, and J. C. Stromberg. Evaluating the role of flooding in a southwestern riparian system. Journal of the Arizona-Nevada Academy of Science (Proceedings Supplement) 25:35.

1990 Stromberg, J. C., and D. T. Patten. Riparian vegetation maintenance and stream diversion for urban use: are they compatible? Proceedings of the Watershed Management Council 3rd Biennial Conference, Ontario, CA , page 175.

1990 Stromberg, J. C., and D. T. Patten. Dynamics of old-growth spruce-fir forests at their southern range limit in Arizona. Bulletin of the Ecological Society of America (Proceedings Supplement) 71(2):338.

1991 Patten, D. T. and J. C. Stromberg. Instream flows for aquatic/riparian ecosystem integrity. Annual meeting of the Universities Council on Water Resources. Albuquerque, NM. July 30-August 2, 1991.

ABSTRACTS AND PRESENTATIONS (CONT.)

1991 Stromberg, J. C., L.G. Wolden, B.A. Rogers, D. T. Patten. Recovery and restoration of the understory flora in mesquite bosques. Natural Areas Society 18th Annual Meeting, Estes Park, Colorado, October 15-18.

1992 Patten, D.T. Grand Canyon interim flows: the decision and the consequences. Program and Abstracts, 6th Annual Meeting of the Arizona Riparian Council, Cottonwood, AZ. pg 10.

1992 Patten, D.T. and R.S. Patten. Riparian ecosystem dynamics. Workshop at the Annual Meeting of the Greater Yellowstone Coalition, West Yellowstone, MT. May 29-30, 1992.

1992 Patten, D.T. Determination of interim flows from Glen Canyon Dam to protect downstream ecosystems in Grand Canyon. 13th Annual Meeting of the Society of Wetland Scientists, New Orleans, LA May 31-June 1, 1992.

1992 Peart, D.E. and D.T. Patten. Variation in vegetation composition associated with Quercus agrifolia in response to drought and feral pigs on Santa Cruz Island, California. Bull. Ecol. Soc. Amer. 73(2 abstracts):299.

1992 Suzan, H., G.P. Nabhan and D.T. Patten. Nurse plant ecology of an endangered cacti (Peniocereus striatus), and their "vulnerable" nurse (Olneya tesota) in the Sonoran Desert. Bull. Ecol. Soc. Amer. 73(2 abstracts):360-361.

1992 Patten, D.T. and J.C. Stromberg. Status and condition of western riparian systems. Bull. Ecol. Soc. Amer. 73(2 abstracts):297.

1992 Stromberg, J.C., D.T. Patten and B.D. Richter. Flood flows and recruitment dynamics of cottonwood-willow riparian forests. INTECOL's IV International Wetlands Conference. "Global Wetlands Old World and New". Columbus, OH. September 13-18. Program and Abstracts pg. 124.

1992 Schmidt, J.C. and D.T. Patten. Development of interim permanent reservoir-release rules for Glen Canyon Dam. American Geophysical Union, San Francisco, CA, December 7-11, 1992. EOS (abstract suppl.):238-239.

ABSTRACTS AND PRESENTATIONS (CONT.)

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GRADUATE STUDENT PROGRAM

M.S. in Botany, M.S. in Natural Sciences, MS in Land Rehabilitation, MS in Land Resources -- 33 students completed (through 2009), two student in progress.

Ph.D. in Botany and Ecology and Environmental Sciences -- Fifteen students completed (through 2009), one student in progress.

COURSES TAUGHT

Ecological Methods
Plant Ecology
Ecology and Conservation
Plant Geography
Fundamentals of Biology
General Botany (directed program 1964-70)
Graduate Seminars in various aspects of botany and ecology
Morphology of Nonvascular Green Plants
Introduction to Water Resources

REPORTS (CONT.)

PRINCIPAL AREAS OF RESEARCH INTEREST

Plant Ecology
Conservation
Applied Ecology (Man's impact)
Physiological Ecology of Desert Plants
Environment-Vegetation Relations
Structure and Function of Desert and Mountain Subalpine Ecosystems
Restoration Ecology
Riparian Ecosystems
Isolated Spring Wetlands
Watershed Landscapes and Ecosystems

COMMUNITY SERVICE

Arizona Conservation Education Advisory Council, 1969-71.
Comprehensive Health Planning Council: Air Pollution Committee, 1970-71.
Valley Forward Association: Environmental Quality Control Committee, 1971-73.
Planning and Zoning Commission, City of Tempe, 1971-76.
United Fund, Chairman, Arizona State University, 1971.
Board of Trustees, Desert Botanical Garden, Phoenix, AZ, 1979-85; President, 1981-83.
Governor's Commission on Arizona Environment, 1980-83.
Board of Trustees, Research Ranch, Elgin, AZ, 1982-88.
Board of Trustees, Museum of Northern Arizona, Flagstaff, AZ, 1983-91.
Board of Trustees, Arizona Nature Conservancy, Tucson, AZ, 1987-96.
Board of Directors, Southwest Center for Education in the Natural Environment. 1992-1995.
Board of Trustees, Southwest Rivers. 2002-2003
Science and Technical Advisory Committee, American Rivers. 1995-present.
Board of Trustees, Future West. 2011-present.

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October 3, 2011

Mr. Ed Naranjo, Tribe Administrator
Confederated Tribes of the Goshute Indian Reservation
P.O. Box 6104
195 Tribal Center Road
Ibapah, Utah 84034

Dear Mr. Naranjo:

Thank you for asking me to comment on the air quality and climate change issues as they have been treated in the **Clark, Lincoln, and White Pine Counties Groundwater Development Project Draft Environmental Impact Statement** (DEIS) issued by the Bureau of Land Management (June 2011).

As a consultant in environmental air quality and acoustics, I have more than 20 years of experience in the preparation and review of environmental technical reports for a wide variety of industrial, commercial, transportation, and urban development projects in California and the western United States. I include at the end of this letter a more complete resume of my qualifications and experience in this field for your consideration.

The DEIS attempts to define the environmental setting conditions and to estimate the environmental impacts associated with the construction and operation of a system of groundwater conveyance facilities serving the Las Vegas and its environs, Nevada's preeminent urban area. Such facilities would include the main and lateral water pipelines, power lines, pumping stations, power substations, pressure reduction stations, an underground water reservoir, a water treatment plant and associated ancillary facilities (termed the "Proposed Action") all to be located in northern Clark County, Lincoln County, and southeastern White Pine County of the State of Nevada. The DEIS also considers five alternatives (termed A through E), which are defined variants of the Proposed Action's pipeline right-of-way (ROW) alignments, groundwater production levels/periods, and well development patterns. Finally the EIS considers a "No Action" alternative in which none of the facilities identified above would be built. The **Air and Atmospheric Values** chapter of the DEIS attempts to define the regional air quality and climate setting conditions and then to estimate the air quality and climate change impacts associated with the Proposed Action and the defined alternatives.

During my review, I found that the **Air and Atmospheric Values** chapter of the DEIS contains numerous errors of fact and omissions of methodology and analysis related to important air quality and climate change issues, among the most important of which I summarize in the bulleted items below:

- DEIS recognizes the primary importance of the ambient effects of air pollutants, but does not include methodology or quantitative modeling to determine project-induced ambient pollutant concentrations at sensitive receptors in the project area, nor does it assess the severity of such concentrations in conjunction with existing or future ambient pollutant background levels and visibility conditions.

- The DEIS only considers pollutant emissions from project construction equipment/activity, project operation and soil dehydration in the ground water basins. But the project will have a major indirect effect on residential, commercial, industrial and transportation pollutant emissions in Clark County urban areas by providing a completely new source of water to support and promote continued population and economic growth there. Such emissions would not exist without the expanded water supply and their effects must be estimated and included with direct project effects in the comparison to regional air quality attainment plan goals or federal conformity thresholds.

- The DEIS does not perform a complete cumulative analysis. Only direct project sources related to the proposed facility's construction and operation are included, not the complete ambient impacts of other non-project pollutant sources in the areas affected by the project emissions, specifically the PM background concentrations in the desert areas, and CO, ozone and PM concentrations produced by existing and future cumulative sources in the Las Vegas and Salt Lake City areas.

The following are my complete, detailed comments on the ***Air and Atmospheric Values*** chapter of the DEIS:

The ***Air Quality and Air Quality Related Values*** subsection (page 3.1-1) makes the following statements:

> *"Air quality is defined by the concentration of various pollutants and their interactions in the atmosphere. Pollution effects on receptors have been used to establish a definition of air quality."*
>
> *"Physical effects of air quality depend on the characteristics of the receptors and the type, amount, and duration of exposure. Ambient Air Quality Standard (AAQS) specify acceptable upper limits of pollutant concentrations and duration of exposure."*
>
> *"The relative importance of pollutant concentrations can be determined by comparison with an appropriate national and/or state AAQS."*

Thus, the DEIS correctly identifies the pollutant type, ambient concentration and exposure time at sensitive receptors as the parameters most crucial to a determination of air pollutants' adverse environmental impacts. However, the DEIS does <u>not</u> propose methodology or use any quantitative modeling to determine project-induced ambient pollutant <u>concentrations</u> at sensitive receptors in the project area, in conjunction with existing or future ambient pollutant background levels. The DEIS only gives <u>emission</u> estimates for an incomplete set of project air pollutant sources (i.e., facility construction equipment/vehicle exhaust, fugitive dust from facility construction activities, exhaust and fugitive dust from facility maintenance after construction, and increased dust emissions from soil dehydration in the groundwater extraction areas). The project's most important air quality impact (i.e., the potential effects it would have on ambient air quality in and regional attainment status of Clark County and the Las Vegas urban area through growth promotion by the completely new water supply it would introduce) is not mentioned or analyzed at all in the subsequent

Environmental Consequences, ***Climate Change Effects*** or ***Cumulative Impacts*** subsections.

The ***Regional Air Quality*** subsection section (page 3.1-2) states:

> *"The existing air quality of most of the project area is typical of the largely undeveloped regions of the western U.S … northern portions of the project area have been designated as attainment areas for all pollutants that have an AAQS; however, parts of Nevada and Utah are designated as nonattainment or maintenance areas …"*

This is the first instance of a common practice in the DEIS of mentioning "good news" first, and then "bad news" (or, in some cases, not mentioning the latter at all).

For example, subsequent tabulated particulate matter ambient concentration data are given first for the sparsely populated, attainment areas the make up most of the project area, specifically Table 3.1-1 (McGill, White Pine County) and Table 3.1-2 (Great Basin National Park, Lincoln County), and then for the much smaller, but densely populated parts, specifically Table 3.1-3 (Las Vegas, Clark County). All monitoring data tables should explicitly include the AAQS and show days/years where such standards are exceeded and how often. These changes to Table 3.1-3 would highlight the PM10 non-attainment status of Clark County, just as Table 3.1-4 (Tooele, Utah) shows the daily exceedances of the PM25 standard. Table 3.1-4 should also be modified to show additional comparisons to the current annual PM25 standard.

Then, moving on to ambient ozone conditions in the project area, the DEIS states (page 3.1-4):

> *"Monitoring results in Las Vegas Valley (HB 212) in Clark County have exceeded the current 8-hour ozone standard for nonattainment. In 2004, the USEPA designated hydrographic basins 164A, 164B, 165, 166, 167, 212, 213, 214, 216, 217, and 218 as nonattainment for the 8-hour ozone standard."*

But while the DEIS includes Table 3.1-5 presenting ozone monitoring data from GBNP, which is a sparsely-populated ozone attainment area, there is <u>no</u> table of ozone monitoring data with standard comparisons for Clark County, which is a densely-populated, ozone nonattainment area. A table of Clark County monitoring data with standard comparisons should be provided. Also, the DEIS mentions on the same page that a lowering of the ozone standard is being considered. Table 3.1-5 and the new Clark County ozone data table should include explicit comparisons of monitored ozone levels to both the current and proposed standards.

The ***Prevention of Significant Deterioration*** (PSD) subsection (page 3.1-5) states:

> *"In addition to the designations relative to attainment of conformance with the NAAQS, the CAA requires the USEPA to place selected areas within the U.S. into one of three categories, which are designed to limit the deterioration of air quality when it is better than the NAAQS … The GBNP is a Class II area … project [conformance and PSD] impacts to the GBNP are analyzed due to the proximity of the park to the project area."*

This states explicitly that conformity and PSD impacts related to the GBNP will be analyzed in the DEIS's ***Environmental Consequences*** subsection. But there is no such analysis. There are just unsupported, conclusory statements that emissions from construction equipment are "not expected to cause or contribute

to exceedances of any AAQS [in the GBNP or anywhere else in the project area]" (see page 3.1-22), or that construction fugitive dust "are expected to be short term (5 years or less)" (see page 3.1-24) or that permanent maintenance equipment/activity emissions would not have any substantial ambient effect with no reason specified.

The ***Regional Air Quality Related Values*** subsection (page 3.1-5) states:

> *"The visibility at the GBNP is one of the best in the nation."*

This implies that visibility impacts related to the GBNP will be analyzed in the DEIS's subsequent ***Environmental Consequences*** subsection. But there is no such analysis. There are just unsupported, conclusory statements that emissions from construction equipment (see page 3.1-16), fugitive dust (see page 3.1-18) or maintenance equipment/activity emissions (page 3.1-20)] are "not expected to impair visibility conditions at GBNP." Further comment on this issue below.

The ***Climate Change Trends*** subsection (page 3.1-10) states:

> *"It is important to note that projected [climate] changes are likely to occur over several decades to a century. Therefore, many of the projected changes associated with climate change described below may not be measurably discernable within the reasonably foreseeable future."*

Then on page 3.1-11:

> *"Temperatures in North America are projected to increase … Global climate models predict that temperatures in the western U.S. will increase between 2.5 and 6 °C, relative to pre-1900 levels, over the next 100 years."*

And finally on page 3.1-12:

> *"Generally, global climate models predict that arid regions of the world will experience decreased precipitation levels and the Southwest is no exception … this change is predicted to occur sometime mid-21st century."*

It is unclear what is meant by the term "reasonably foreseeable future" in the first quote above and how it relates to either the 11-year project construction schedule or the 75- to 200-year horizons over which the project is expected to supply water to the urban areas of southern Nevada. The DEIS already notes that *"… decadal [temperature] means since the late 1990s are higher than any other decadal mean on record"* (page 3.1-10), indicating that important climate change parameters have already been measured in the project area. And the periods "over the next 100 years" and "sometime mid-21st century" both fall within the 75 to 200 project operational lifetime.

Further, the ***Climate Change Effects*** subsection (page 3.1-49) notes:

> *"Climate change already appears to be influencing both natural and managed ecosystems of the American Southwest … models indicate the likelihood of the Southwest being a climate change*

"hotspot" in the coming decades … Projections suggest continued strong warming in the region, with significant increases in temperature … and decreases in precipitation …"

Thus, this last quote appears to contradict the first quote above. The DEIS's contradictory statements about the reality of climate change should be reconciled in favor of acknowledging that climate change effects will very likely be manifest in the project area over the DEIS's analysis timeframe.

The **Environmental Consequences** subsection (page 3.1-13) recognizes the following "Issues" of concern for the DEIS impact analysis:

- *"Air pollutants emitted from the tailpipes of construction equipment, including criteria pollutants, ozone precursors, and greenhouse gas emissions.*
- *"Fugitive dust generated during construction and facility maintenance.*
- *"Windblown dust generated due to wind erosion of disturbed surfaces.*
- *"Impairment of visibility conditions at the GBNP.*
- *"Conformity requirements in nonattainment areas."*

General comments are in order here concerning the above Issues (with more specific comments regarding their implementation in the DEIS methodology and impact analyses given below):

The first three bullets focus exclusively on air pollutants emitted or generated during project construction or operation. While emission estimates are important components of environmental air quality analyses, they are only a first step. The emissions estimates must then be used as input to an appropriate dispersion model or screening methodology to estimate pollutant ambient concentrations at local and regional sensitive receptors. It is the exceedance of AAQS or health risk thresholds at these receptors that determine air quality impact significance. An appropriate dispersion model or screening procedure for each emission source must be included in the DEIS Methodology for Analysis subsection (page 3.1-14) and then implemented in the analysis together with what is known about the geographic distribution of sensitive receptors (i.e., residential areas, schools, hospitals, etc.) in the pipeline/facilities ROW. Without this any conclusions in the impact analysis based solely on emission estimates cannot be substantiated.

The fourth bullet recognizes visibility impairment as a legitimate air quality issue. But again the degree of impairment depends on the ambient concentration of particulate matter at visibility-sensitive receptors. This cannot be determined from particulate emissions estimates alone. The DEIS needs to proposed a model or screening methodology to evaluate the potential for visibility impairment in the GBNP. Without this, subsequent statements about potential visibility impairment in the impact analysis cannot be substantiated.

The last bullet recognizes conformity requirements in nonattainment areas as a legitimate air quality issue. The DEIS emissions estimates that determine project conformity in Clark County include only construction and maintenance equipment sources in the relatively small portion of the pipeline ROW in Clark County. But the project will have a major indirect effect on residential, commercial, industrial and transportation source emissions in Clark County by providing a completely new source of water to support and promote continued population and economic growth there. It is legitimate that emissions from such indirect sources that would not exist without the expanded water supply and should be estimated and included with direct project emissions in the comparison against the conformity threshold.

The **Methodology for Analysis** subsection (page 3.1-14) makes the following statements:

> *"Equipment-specific emission factors are from the California Environmental Quality Act, Air Quality Handbook (South Coast Air Quality Management District 2010."*
> *"Tailpipe emissions from maintenance vehicles … are based on the emission factors for light-duty passenger vehicles (South Coast Air Quality Management District 2010) and the calculated maintenance trips".*

Using SCAQMD emission factors for construction equipment and motor vehicles for similar sources in Nevada is very likely to underestimate their emissions because of the higher level of emission controls required in the South Coast air basin. It would be better to use the CARB OFFROAD model for construction equipment and EMFAC2007 model for passenger vehicles and run them to obtain emission factors characteristic of the desert areas of California (either the Mohave area or portions of California east of the Sierra Nevada in the Great Basin) and use them to estimate project source emissions.

The **Conformity Requirements in Non-attainment Areas** subsection (page 3.1-15) makes the following statement:

> *"Portions of Clark County are either designated as nonattainment or maintenance for carbon monoxide (CO), PM10, and ozone … To conduct the conformity review, the impact of the project ROW construction and facility maintenance activities was assessed in the nonattainment areas. The nonattainment areas are a small subset of the whole project area."*

True, the project ROW section in Clark County is a small part of the total ROW, the construction equipment/activity and long-term maintenance equipment/activity emissions in Clark County are a small portion of the total emissions from the entire pipeline corridor, and the areas where water extraction would take place are totally outside and distant from Clark County. But the air pollutant emissions from the residential, commercial, industrial, and transportation sources that would be supported by this new supply of ground water to the urban areas in/around Las Vegas in Clark County are huge. There needs to be an estimate of this effect on emissions from growth supported by the additional water and of their ambient effects on the future ozone, CO and particulate attainment status of Clark County.

In the **Proposed Action, Alternatives A through C** subsection (beginning page 3.1-15) the ***Tailpipe Emissions from Construction Equipment and Facility Maintenance*** subsection states:

> *"Localized air quality emissions at a given location due to construction activities are expected to be short term … 5 years or less."*
>
> *"Greenhouse gas emissions from construction would be short term and have an inconsequential contribution to long-term global climate change."*
>
> *"… emissions from maintenance vehicles are anticipated to last the life of the project …"*
>
> *"Emissions from construction are not expected to cause or contribute to exceedances of any AAQS nor*

impair visibility conditions at GBNP because the construction equipment would be operated in accordance with required permits on an as-needed-basis over a large project area."

The fact that construction at any location would last 5 years or less is not relevant to concluding that AAQS violations would not be have substantial impacts. Any violation of AAQS is important if sensitive receptors (and this could be interpreted to include the project workers) could be exposed to facility construction or maintenance emissions for the exposure time period included in the AAQS. Also, mere compliance with air pollutant source permit conditions or mitigation measures proposed in the DEIS would not automatically guarantee that AAQS or visibility standards would not be exceeded.

There needs to be modeling done or regulatory agency screening procedures implemented to determine the likelihood of AAQS or visibility standard exceedances at identified sensitive receptors. The DEIS has already calculated the emissions associated with the various project construction and operational sources. And the pipeline ROW and other facility locations are known, as are the presence/absence of sensitive uses in/near those locations. No modeling was done to support conclusions on AAQS or on visibility standards. The DEIS needs to estimate ambient air quality and visibility impacts near the project facility locations, with and without the emission control measures proposed as mitigations in the DEIS.

There are several tables in the DEIS that show the estimated emissions from the various project components, for example:

"Table 3.1-8 shows the construction emissions for each criteria pollutant, ozone precursors, and greenhouse gases that are estimated to result for the Proposed Action and Alternatives A through C."

There should be a similar tables showing the results of a modeling or screening analysis of the ambient concentrations at receptors at the edge of the ROW for all project construction types (pipeline, power line, facilities, etc.).

The DEIS makes similar conclusory statements for other project pollutant source types that are unsupported by any analysis, specifically the ***Fugitive Dust from Construction and Facility Maintenance Activities*** subsection (page 3.1-18) states:

"Emissions from construction activities would be restricted to the short-term construction period along the pipeline and power line routes or near the proposed locations of ancillary facilities"

"At these low levels, fugitive dust emissions from maintenance vehicles are not expected to impair visibility conditions at the GBNP."

"Application of the [Alternative Control Measures] ACMs to develop a Dust Control Plan and obtain required air permits should minimize the potential impacts to local air quality and ensure protection of applicable AAQS."

Again, short-term emissions are no guarantee that there would not be substantial AAQS or visibility standard violations affecting local sensitive receptors or GBNP visibility. Also, mere compliance with ACMs, Dust Control Plans or permit conditions would not automatically guarantee that AAQS or visibility standards would

not be exceeded.

There needs to be modeling done or regulatory agency screening procedures implemented to determine the likelihood of AAQS or visibility standard exceedances at identified sensitive receptors. The DEIS has already calculated the emissions for this source type. And the pipeline ROW and other facility locations are known, as are the presence/absence of sensitive uses in/near those locations No modeling done in the DEIS to support conclusions on AAQS or on visibility standards. The DEIS needs to estimate ambient air quality and visibility impacts near the project facility locations, with and without the emission control measures proposed as mitigations in the DEIS.

And there is the further admission (page 3.1-19) that:

> *"Residual impacts include:*
>
> *"Implementation of the federal and state requirements, ACMs, and proposed mitigation measures should effectively mitigate fugitive dust impacts to air quality … In close proximity to construction sites and the ROW, there may be elevated concentrations of PM relative to current background conditions; however, any elevated concentrations are expected to be limited to areas in close proximity to construction and the ROW, be short-term in duration, and below applicable AAQS."*

Again, this is a completely unsupported statement that with the implementation of DEIR-identified federal and state requirements, ACMs, and proposed mitigation measures there would be no consequential violations of AAQS. Implementation of such generic regulatory, permit or mitigation measures would not automatically guarantee attainment of AAQS or visibility standards. This need to be demonstrated by modeling or carrying through with appropriate screening procedures.

And finally for sources of ***Wind Blown Dust from Disturbed Surfaces***, the subsection states (page 3.1-19):

> *"Windblown dust impacts would diminish once construction activities end and after disturbed areas are reclaimed."*
>
> *"Windblown dust emissions from disturbed surfaces are not expected to impair visibility conditions at the GBNP."*
>
> *"Application of the ACMs to develop a Dust Control Plan and obtain required air permits should minimize the potential impacts to local air quality and ensure protection of applicable AAQS."*
>
> *"Implementation of the federal and state requirements and ACMs should effectively mitigate windblown dust … any elevated concentrations are expected to be limited to areas in close proximity to the ROW, be short-term in duration, and below applicable AAQS."*

Again, short-term emissions are no guarantee that there would not be substantial AAQS or visibility standard violations affecting local sensitive receptors or GBNP visibility. Also, mere compliance with ACMs, Dust Control Plans or permit conditions would not automatically guarantee that AAQS or visibility standards would not be exceeded.

There needs to be modeling done or regulatory agency screening procedures implemented to determine the likelihood of AAQS or visibility standard exceedances at identified sensitive receptors. The DEIS has already calculated the emissions for this source type. And the pipeline ROW and other facility locations are known, as are the presence/absence of sensitive uses in/near those locations No modeling done in the DEIS to support conclusions on AAQS or on visibility standards. The DEIS needs to estimate ambient air quality and visibility impacts near the project facility locations, with and without the emission control measures proposed as mitigations in the DEIS.

The ***Conformity Review for Non-attainment Areas*** subsection (page 3.1-21) states:

> *"Only tailpipe emissions from construction equipment emit CO … based on the proposed length of pipeline (8.8 miles) and power line (0) to be constructed in Las Vegas Valley ... 15 tons per year of CO in the nonattainment area, which is well below the 100 tons per year conformity threshold."*
>
> *"Only tailpipe emissions from construction equipment emit ozone precursors … the proposed length of pipeline (28.1 miles) and power line (14.6 miles) … 28.1 miles of pipeline and 14.6 miles of power line will take less than 150 days … 8 tons per year of VOC and 63 tons per year of NOX in the nonattainment area, well below the 100 tons per year conformity threshold."*
>
> *"PM10 project emissions in the nonattainment area … including tailpipe emissions, fugitive dust, and windblown dust. The Nevada PM10 nonattainment area is limited to HB 212, Las Vegas Valley … altogether the maximum annual PM10 emission rate within the nonattainment area due to ROW activities would be 40 tons per year … less than the conformity threshold of 70 tons per year."*

The emission estimates upon which the conformity determination are based only on tailpipe emissions, fugitive dust, and windblown dust from project construction and operational equipment/activities within the non-attainment portions of the entire project area. But the project will provide water from a completely untapped resource to promote growth and consequent air pollutant emissions from new sources in the Las Vegas air basin that the water supply would support and which would be impossible without it. The DEIS needs to look at the regional air quality attainment plans for southern Nevada with their emission projections contingent on current population/employment growth estimates (which assumed water supply only from the Colorado River), and redo the emissions projections with the project groundwater supply. These additional emissions should be counted toward the conformity threshold. And they should be included with the other long-term residual emissions shown in Table 3.1-9.

As for the analysis shown for ***Alternative D*** (page 3.1-24), ***Alternative E*** (page 3.1-26) and ***Alignment Options 1-4*** (page 3.1-29), these have the same methodological and analytic deficiencies noted above for the ***Proposed Action and Alternatives A through C***.

In the ***Comparison of Alternatives*** subsection (page 3.1-29), Tables 3.1-12, 3.1-13 and 3.1-14 give only comparisons among the Alternatives of direct emissions from project construction and maintenance equipment/activity sources. They should also include the residual indirect emissions from sources supported by provision of ground water to the Las Vegas urban areas. And there should be a similar series of tables that give the results of the pollutant ambient concentration modeling/screening and whether this would threaten

any receptors in any of the pipeline ROW (especially in the portion nearest Las Vegas urban areas). Finally, there should be a presentation of the findings of a visibility impacts analysis for project effects in the GBNP.

The ***Groundwater Development and Groundwater Pumping*** subsection (page 3.1-33) states:

> *"It is predicted from model simulations that pumping drawdown of 10-feet and greater would potentially lead to changes in vegetation that could increase windblown dust emissions … At these levels, it is possible that windblown dust emissions from groundwater drawdown could impair visibility conditions at the GBNP. The extent of possible visibility impairment is highly uncertain."*

This is not much of a visibility analysis. There needs to be some credible effort by the DEIS to provide one. But even without a visibility analysis, the DEIS recommends the following mitigation measure (GW-AQ-3) to monitor, but not necessarily remediate, visibility impacts from soil dehydration:

> *"GW-AQ-3: Monitoring, Mitigation, and Management Plan for Air Quality. SNWA will develop an air monitoring plan approved by the BLM, which will detail the siting and operation of at least three collocated PM10 and PM2.5 air monitoring stations … It is anticipated that the Plan would be effective in identifying early warning of potentially undesirable impacts to air resources and provide a substantial amount of time and flexibility to implement management measures and gage their effects. However, since groundwater development presumes some level of change to air quality and visibility, not all impacts would be avoided by this mitigation measure"*

This mitigation measure places no constraints on the ability of the project to draw-down ground water to the detriment of visibility in the GBNP. It could be improved by setting a limit on visibility degradation before pumping would be required to stop.

The ***Climate Change Effects*** subsection (begin page 3.1-49) makes the following statements:

> *"Table 3.1-24 shows the estimated annual greenhouse gas emissions for each project alternative. The estimated maximum annual greenhouse gas emissions during the ROW construction and maintenance activities for all alternatives are anticipated to be less than 25,000 metric tons (tonnes) a year in terms of CDE, while indirect emissions of greenhouse gases from power generation required for groundwater pumping could be as high as 327,000 metric tons of CDE, which is less than 0.006 of 1 percent of annual U.S. emissions and less than 0.6 percent of Nevada emissions. The greenhouse gas emissions would be highest for the Proposed Action and lowest for Alternative D."*

Thus, the DEIS explicitly states that the direct construction and maintenance emissions are less than the 25K advisory greenhouse gas threshold, but not that the indirect emissions from pumping exceed 25K with or without the 40% decrease expected from inclusion of hydroturbines as a mitigation. This is another instance where the DEIS explicitly identifies a case where a threshold is <u>not</u> exceeded, but does not identify a related case where the same threshold is exceeded. And Table 3.1-24 does not include estimated of the additional CDE emissions from growth in Las Vegas that would be promoted by the increased ground water supply. This would probably far exceed the increase in emissions from ground water pumping.

The ***Climate Change Effects to Air Resources*** subsection (page 3.1-50) states:

"Climate change is not shown to have a direct effect on any criteria pollutants other than ozone. It has been found that concentrations of ground level ozone are likely to increase due to increasing temperatures (Wise 2009). This indicates that areas currently designated as "maintenance" status for ozone are likely to have added difficulty maintaining levels below the ozone standard."

Finally the DEIS mentions a project effect which would worsen impacts on ambient pollutant levels (i.e., ozone) outside the area containing the pipeline ROW and other project facilities. This could also be true on a much larger scale and more severe level if the impact of emissions on regional attainment status from growth in the Las Vegas area promoted by the new water supply were considered as part of the DEIS air quality analysis.

The ***Cumulative Impacts*** subsection (page 3.1-57) states:

"Methodology for Analysis

"For the estimation of air quality related impacts, the methodology depends on the activity (construction, pumping, etc.) and the type of air impacts (criteria emissions, greenhouse gases, etc.). The activity/air impact combinations are grouped based on the methodology used to estimate impacts."

"The different methodologies for developing air impacts are grouped into the following categories:

- *"Groundwater Development Area Construction and Operational Maintenance*
  - *Tailpipe emissions*
  - *Fugitive dust*
  - *Greenhouse gases*

- *"Groundwater Pumping*
  - *Windblown dust from soils exposed as a result of groundwater pumping*
  - *Windblown dust impacts to Utah"*

This is not a complete cumulative analysis. These are all project sources. The DEIS needs to consider the ambient impacts of other non-project pollutant sources in the areas affected by the project emissions. This should include existing PM background concentrations in the desert areas, and CO, ozone and PM concentrations produced by existing sources in the Las Vegas and Salt Lake City areas.

The ***Cumulative Effects*** subsection (page 3.1-60) states:

- *"Current air quality conditions, as presented in Section 3.1.1.1, are not expected to change appreciably due to ROW and groundwater field development construction and maintenance activities."*

- *"It is predicted from model simulations that pumping drawdown of 10-feet and greater would potentially lead to changes in vegetation that could increase windblown dust emissions … At these*

- *"It is predicted from model simulations that pumping drawdown of 10-feet and greater would potentially lead to changes in vegetation that could increase windblown dust emissions ... At these levels, it is possible that windblown dust emissions from groundwater drawdown could impair visibility conditions at the GBNP. The extent of possible visibility impairment is highly uncertain."*

- *"Only a very small fraction of wind erosion emissions from the cumulative project area is expected to be transported into Salt Lake County, Utah ..."*

These statements are unsupported by any emission comparisons or ambient modeling performed in the DEIS.

The ***Alternatives Comparison*** subsection (page 3.1-69) states:

> *"For comparison purposes, the estimated potential impacts to PM10 and PM2.5 are presented for each alternative in Figures 3.1-7 and 3.1-8, respectively. Figures 3.1-7 and 3.1-8 show the impacts estimated to occur at full build out (FB), after full build out plus 75 years (FB+75), and after full build out plus 200 years (FB+200) for each alternative."*

These are emission comparisons only of project emission sources. A true cumulative analysis would show how these alternatives would affect cumulative ambient air quality with inclusion of existing and other future sources in the project area.

Please don't hesitate to contact me if any of the points I make above need further clarification, or if you feel that there are additional issues related to the DEIS air quality and climate change analysis that need to be addressed.

Sincerely,

Geoffrey H. Hornek

Geoffrey H. Hornek

Education

M.S., Applied Science/Engineering, University of California, Davis/Livermore, 1980
B.A., Physics, Queens College, 1974

Professional Affiliations

American Physical Society
Air and Waste Management Association

Mr. Hornek is an environmental scientist and engineer with more than 20 years of experience in environmental air quality and noise analysis. He has prepared many technical reports for a wide variety of industrial, commercial, transportation, and urban development projects and is well-versed in the federal, state, and local regulatory framework that guides development. He has excellent working relationships with public agency contacts and environmental professionals in urban and transportation planning and a wide variety of government and industry sectors.

Mr. Hornek's technical capabilities include measuring ambient air pollutant and noise levels, performing computer-based air dispersion and noise attenuation modeling, conducting air toxic health risk assessments, and designing environmentally superior alternatives to mitigate air pollutant and noise problems and their related health impacts. He has completed study towards a master of public health degree in environmental health from the University of Minnesota School of Public Health. His thesis research is ongoing and involves methods for reconstructing occupational air pollutant exposure histories using computer models and statistical techniques.

His selected project experience includes:

Large-Scale Urban Development

Candlestick Point-Hunters Point Shipyard Phase 2 Development Plan EIR, San Francisco, California. Mr. Hornek provided senior review of the air quality and noise technical studies and was directly responsible for the operational air pollutant emissions estimates and the traffic noise impact assessment. This project involved the preparation of an EIR for the redevelopment of the largest undeveloped parcel still remaining in San Francisco with a high-density, transit-oriented mix of land uses, including a new football stadium for the San Francisco 49ers.

City of Oakland 2007-2014 Housing Element EIR, Oakland, California. Mr. Hornek provided senior review of the air quality and noise technical studies and was directly responsible for assessment of the potential housing opportunity sites with respect to air toxic sources within the City. The Housing Element outlines goals and policies that direct future housing development and identifies the locations where future housing could be developed with the goal of identifying locations for 13,501 new housing units to be built during the planning period.

Railyards Specific Plan Environmental Impact Report, Sacramento, California. Mr. Hornek provided senior review of the air quality and noise technical studies and was directly responsible for the construction phase ozone precursor emissions estimates and overall project greenhouse gas emission inventories. This project involves the preparation of an EIR for the redevelopment of the large UPRR rail yards site north of Sacramento's downtown. The site will support a high-density, mixed-use development together with a state-of-the-art intermodal transportation facility that will bring together heavy rail, light rail, local and intercity bus transit, and potentially high speed rail.

Air Pollutant and Noise Measurement/Modeling

Stanford University Medical Center Replacement Project, Palo Alto, California. Mr. Hornek performed noise measurements on the existing hospital's rooftop ventilation and air conditioning equipment, which provided constraints on the noise-generating characteristics of the proposed equipment on the new hospital to avoid noise impacts in the adjacent residential areas

Baltimore Ravine Residential Air Toxic Health Risk Assessment, Auburn, California. Mr. Hornek performed air dispersion modeling and evaluated the potential health risk on-site due to a proposed residential project's proximity to the I-80 freeway and a main Union Pacific rail line, both major sources of diesel particulate matter emissions from trucks and trains.

City of Newport Beach General Plan Update and EIR, Newport Beach, California. Mr. Hornek prepared the air quality and noise studies for the General Plan Update and EIR. He recalculated the noise contour map based on updated traffic information. The noise element specifically addresses noise impacts to and compatibility of the community with John Wayne Airport. The project received numerous awards including the California American Planning Association (APA) Project Award Winner in 2007 and Orange County APA Section Award Winner 2007.

San Francisco Giants Ballpark, San Francisco, California. Mr. Hornek assessed the environmental impacts of the San Francisco Giants' new ballpark. He developed an air pollutant estimating methodology that was sensitive to the anticipated shift in fan travel modes to the proposed ballpark site in downtown San Francisco from the old Candlestick Point site.

Russell Ranch Sound Wall Specifications, Folsom, California. Mr. Hornek evaluated the adequacy of roadside sound walls proposed for a large residential development adjacent to I-80. The modeling was sensitive to the topographical features of the Sierra foothills site and to the traffic circulation on internal roadways.

Les Masson Provencal Senior Center Carbon Monoxide Modeling, Saratoga, California. Mr. Hornek performed CO dispersion modeling for a senior residential and nursing facility on a site adjacent to a major freeway. He conducted a workshop on the carbon monoxide health impacts for the Saratoga Planning Commission during the approval process.

Transportation

eBART Environmental Impact Statement and Environmental Impact Report, San Francisco, California, Bay Area Rapid Transit (BART) and Federal Transit Administration(2006-2009). eBART will be the first BART extension requiring a commitment by local jurisdictions to promote ridership through specific land use and access changes around the proposed station areas. Mr. Hornek provided senior review of the air quality, noise and energy technical studies for the extension of BART rail transit service to the communities of Pittsburg, Antioch, Brentwood, and Oakley.

California Avenue Caltrain Station Noise Analysis, City of Palo Alto, California. The City is developing an area surrounding the California Avenue Caltrain station as a pedestrian transit-oriented development district (PTOD). Mr. Hornek evaluated the potential for increased train and motor vehicle noise impacts, including noise reflection from the taller proposed buildings in the PTOD, and identified structural features to be avoided in the new buildings to assure that noise reflection would be minimized.

South San Francisco Water Transit Authority Ferry Terminal Environmental Impact Report and Environmental Assessment, San Francisco Bay Area Water Transit Authority, California. This project represents the first new terminal site as well as the first site-specific analysis following certification of the Program EIR for expanded ferry service. As senior scientist, Mr. Hornek is responsible for reviewing the previously prepared air quality technical study to incorporate its methodology into the project-level analysis of the proposed ferry terminal.

Sand Hill Road Extension, Cities of Palo Alto and Menlo Park, California. Mr. Hornek prepared air quality and noise sections for the Master EIR that analyzed the environmental consequences of a series of projects on Sand Hill Road near Stanford University. The Master EIR addressed technical environmental issues, the most controversial of which included traffic circulation along Sand Hill Road and its air quality and noise consequences.

Energy and Utility Infrastructure

Yuima Municipal Water District Pipeline, Pauma Valley, California. Mr. Hornek directed the noise measurement survey and provided senior review of the technical study for the project.

Trousdale Drive Pumping Station, Burlingame, California. Mr. Hornek performed noise measurements near an existing water pumping station, which provided constraints on the noise-generating characteristics of the proposed replacement pumps to avoid noise impacts in the adjacent residential area.

Sacramento Municipal Utility District Florin Gas Field Natural Gas Storage Facility, Sacramento, California. Mr. Hornek performed the construction phase ozone precursor emissions estimates and mitigation fee estimates required for approval by the Sacramento Municipal Air Quality Management District.

SOCAL Gas Company Natural Gas Transmission Line 6902 Replacement Project, Hayfield to Calexico. Mr. Hornek identified air quality and noise impacts associated with pipeline construction.

Harwood Biomass-Fueled Power Plant, Mendocino County, California. Mr. Hornek performed peer review of air quality technical study supporting permit issuance.

Santa Clara Civic Center Cogenerating Power Plant, Santa Clara County, California. Mr. Hornek conducted omission inventory and dispersion modeling for air district permit.