May 5, 2009

Mr. David Cuneo
Senior environmental Specialist
Sonoma County Water Agency
404 Aviation Boulevard
Santa Rosa, CA 95404
Dear Mr. Cuneo.

The following comments concerning the NSCARP FEIS/FEIR (FEIR) are made on behalf of the Clean Water Coalition of Northern Sonoma County (Coalition) which was formed September 6, 2007. The Coalition is an organization comprised of local groups and concerned individuals within the agricultural valleys in Northern Sonoma County. The Coalition represents citizens who live in the Alexander Valley, Dry Creek watershed or Middle Reach of the Russian River, and who depend on high-quality groundwater supplies for drinking, domestic uses, agriculture and wineries.

The Coalition did not comment on the NSCARP DEIS/DEIR (DEIR) because the comment period closed on May 18, 2007. However, organizations which are now Coalition members including the Soda Rock Neighborhood Association, the Russian Riverkeeper, the Dry Creek Valley Association, and the Westside Association to Save Agriculture made extensive comments concerning inadequacies in the DEIR. This letter focuses on incomplete, inadequate, and inaccurate responses to these and other comments in the FEIR and on significant events and findings occurring or available after May 18, 2007 pertinent to NSCARP environmental impacts which were not considered or were not adequately considered in the FEIR.

This comment letter should be considered together with additional letters made on behalf of the Coalition by technical experts including those from Gus Yates, Don McEnhill, Dr. Swee Teh, Dr. Richard Kagel, and Howard Wilshire.

The FEIR is especially deficient in analysis and mitigation of impacts HWQ-4 (3.8-42 to 44), BIO-8 (3.4-48 to 50), and PUB-7 (3.12-25 to 27). We believe these impacts are so critical and the deficiencies are so serious that the FEIR should not be certified under CEQA but should be withdrawn. These impacts should be reanalyzed and the FEIR should be revised and recirculated.

Impact HWQ-4 focuses on the potential for agricultural irrigation to degrade groundwater quality. The discussion has three major conclusions. "Agricultural irrigation could result in minor increases in salinity of groundwater". "Nitrate levels in recycled water, applied in accordance with accepted irrigation practices, are below the nitrate requirements of crops. Therefore, nitrate in recycled water would be almost entirely taken up by vegetation with minimal migration beyond the root zone." And, contamination of ground by leakage from storage reservoirs would be negligible based on the use of clay liners.

Mitigation Measure HWQ-4 includes use of clay liners for storage reservoirs, groundwater monitoring program at storage reservoirs, and monitoring of effluent and stored water quality. The FEIR concludes impact after mitigation will be less than significant.

The FEIR discussion on Hydrology and Water Quality (3.8) and Mitigation Measure HWQ-4 focus exclusively on potential for groundwater contamination from reservoirs leakage. The mitigations for reservoir leakage are based on liners and monitoring only. These mitigations are inadequate to protect groundwater as described in letter from Howard Wilshire, Geologist, USGS, retired. Wilshire concludes that geotechnical studies of potential reservoir sites are inadequate and stability of reservoirs is in question. He also concludes that clay liners as minimally described are inadequate to prevent leakage.

The FEIR discussion of Hydrology and Water Quality (3.8) and Mitigation Measure HWQ-4 completely ignore the potential for groundwater contamination from irrigation. However, it was extensively discussed in comments to the FEIR. Responses to many of these comments were inadequate or inaccurate (see discussion below). Multiple, independent analyses and studies by certified hydrogeologists all conclude that potential for groundwater contamination from irrigation is high. These independent analyses includes: Johnson, N.M. Potential Water Quality Impacts of NSCARP in the Alexander Valley funded by the SRNA and AVA, May 2007 (included in the FEIR as Comment Letter AH); Johnson, N.M. Potential Water Supply Impacts to Dry Creek Valley from NSCARP and a Bypass Pipeline funded by the DCVA, December 2008; Yates, G. NSCARP: Revised Versions of Nick Johnson's Water and Salt Balance Tables for Dry Creek Basin, funded by the Coalition, March 2009; and Yates, G. NSCARP FEIR, Technical Review of Hydrology and Water Quality Issues, funded by the Coalition, April 2009.

In 2007, the Soda Rock Neighborhood Association and the Alexander Valley Association contracted with Nicholas Johnson to evaluate the potential impacts of NSCARP wastewater irrigation on groundwater. His report, Johnson May 2007, concludes that "dissolving the recycled water mineral load into groundwater recharge percolating into the water table would result in a TDS concentration of more than 1000 mg/L. This would exceed both recommended and enforceable drinking water standards for TDS (500 and 1000 mg/L respectively) and thus constitute significant groundwater quality degradation". The report also concludes that "dissolving the recycled water nitrate load

into groundwater recharge could result in a concentration of more than 15 mg/L-N, exceeding the nitrate drinking water MCL of 10 mg/L-N". These conclusions, discounted in the FEIR, Volume 3, Section 4, Response Matrix, page 4-35, Response to Comment T-16, have now been strongly supported by additional studies Johnson December 2008, Yates March 2009 and Yates May 2009.

Subsequent to the publication of the NSCARP DEIR, Dry Creek Valley Association contracted with Nicholas Johnson for a complete analysis of the Dry Creek aquifer including the water budget around the aquifer, current water quality, and impacts on both the water budget and water quality which would result from NSCARP. His report, Johnson December 2008, is based on extensive publically available data and independent analysis and concludes that:

1. Irrigation with 7 in/yr NSCARP recycled water would result in a two-fold increase in average groundwater TDS concentration (to >400 mg/L) and a four fold increase in average groundwater nitrate concentration (to >20 mg/L).
2. Irrigation with 12 in/yr recycled water would result in an average groundwater TDS of about 600 mg/L (in excess of the recommended secondary drinking water standard) and an average nitrate concentration greater than 30 mg/L (approaching the 45 mg/L primary drinking water standard (MCL).
3. Groundwater TDS and nitrate concentrations would worsen under sustained drought conditions.
4. The delivery of recycled water into Dry Creek Valley by NSCARP would represent a major addition to water supply, as well as a significant additional loading of minerals, metals, nutrients, and various trace organic compounds. As a result high quality recharge from stream flow percolation would significantly diminish, groundwater discharge to stream base flow would increase, and groundwater quality would be adversely impacted.
5. Other contaminants in recycled wastewater, including metals, organic compounds, and other unregulated "emerging contaminants" would become similarly concentrated and impact local groundwater. Studies have shown that area soils have a limited capacity to attenuate such contaminants during infiltration and transport.

Yates March 2009 builds upon the extensive database contained in Johnson December 2008 and, using an alternate methodology, revises the water balance table and salt balance table to adhere more clearly to well-defined boundaries of the flow system. It arrives at the following conclusions:

1. The principal effect of NSCARP on the flow system would be to substantially decrease groundwater pumping, which in turn would convert Dry Creek from a losing stream to a gaining stream in summer.
2. Under existing conditions, average TDS in Dry Creek Basin is 200 mg/L increasing at 6 mg/L/yr.
3. Irrigating with 8.7 in/yr wastewater would result in an average TDS increase of 23 mg/L/yr.
4. Combining 8.7 in/yr wastewater irrigation with 3.3 in/yr wastewater frost protection would result in an average TDS increase of 23 mg/L/yr.
5. Irrigating with 13.7 in/yr wastewater would result in an average TDS increase of 36 mg/L/yr.

6. Combining 13.7 in/yr wastewater irrigation with 3.3 in/yr wastewater frost protection would result in an average TDS increase of 41/mg/L/yr.

Under the scenario described in 6 above it would take less than eight years for the average TDS in the Dry Creek Basin to exceed secondary drinking water standard of 500 mg/L. Note that these conclusions concerning TDS increases are remarkably similar to those in Johnson 2007 in Alexander Valley and Johnson 2008 reports in Dry Creek Valley.

Yates May 2009 also analyses the potential for wastewater to cause groundwater contamination. It concludes that:
1. The discussion under HWQ-4 (FEIR p.3.8-42) dismisses potential nitrate impacts on viticulture and groundwater in two sentences:

> "Nitrate levels in recycled water, applied in accordance with accepted irrigation practices, are below the nitrate requirements of crops. Therefore, nitrate in recycled water would be almost entirely taken up by vegetation with minimal migration beyond the root zone."

This analysis is inadequate for three reasons. First, the annual nitrogen load from NSCARP water may exceed the annual requirements for wine grapes. Second, it ignores the seasonality of nitrogen utilization by grape vines and the close attention paid by growers to vine nutrient status. Even if the annual total nitrogen content of recycled water is acceptable, use of recycled water for irrigation eliminates growers' ability to manage water and nitrogen applications separately. Third, it omits data for existing nitrate concentrations in groundwater which found elevated concentrations in some wells demonstrating that nitrate can and does percolate past the root zone.

Recycled water applied for frost protection would not experience substantial losses by plant uptake at that time of year, and dilution from other sources of recharge would be diminished by NSCARP. Therefore, nitrate concentrations in rural domestic wells would likely increase and could theoretically exceed the drinking water standard.

2. The analysis finds significant flaws in the analysis for HWQ-4 and Master Response 15 regarding salinity. First, the discussion of impact HWQ-4 in the FEIR (Vol. 1, p. 3.8-42) incorrectly characterizes the impact of irrigating with NSCARP water on groundwater salinity as "minor". The discussion provides no data or calculations to support the claim that salinity increases would be minor. Studies in Johnson 2007, Johnson 2008, and Yates March 2009 all conclude that TDS can exceed the drinking water standard.

The assertion that "The California State Water Code states that minor changes in salinity associated with recycled water projects are acceptable." (FEIR p. 3.8-42) is extremely misleading. First, there is no such statement in the Water Code. The closest similar statement is different in important respects:

> 13523.5. A regional board may not deny issuance of water reclamation requirements to a project which violates only a salinity standard in the basin plan.

Although a Regional Board might have the authority to waive compliance with its own basin plan standards, it would not have the authority to authorize violation of drinking water standards.

Groundwater TDS would be lower than deep percolation TDS if there were dilution with other sources of recharge. However, dilution from one of the major sources of recharge—stream percolation—would substantially decrease under NSCARP. Therefore, a domestic well down gradient of vineyards irrigated with NSCARP water would be at risk of pumping groundwater that violates the drinking water standard for TDS.

The FEIR added no analyses of potential for groundwater contamination from irrigation. Master Response No. 15 (FEIR Vol. 3, p. 3-15) relied upon two studies conducted for the City of Santa Rosa's Discharge Compliance Project FEIR. One of the studies contained a significant error and the other involved conditions very different from those in the proposed NSCARP service area.

3. The discussions of potential groundwater contamination from irrigation with recycled water (FEIR Vol. 1 pages 3.12-25 to 3.12-26 and Vol. 3 p. 3-11) rely on compliance with generic regulations regarding treatment level and setbacks from wells to conclude that the impacts would be less than significant as long as irrigation applications are not excessive. This analysis is inadequate because it ignores local conditions and studies that indicate a significant risk of contamination. It also ignores regulatory directives that call for additional analysis and restrictions if aquifer vulnerability is high. Groundwater in the NSCARP service area is sufficiently vulnerable to contamination that adherence to standard regulations and setbacks is an inadequate basis for concluding that aquatic and human health will not be impacted.

4. The FEIR fails to describe the fundamental shift in groundwater balances that would result from replacing groundwater with recycled water as the primary source of irrigation supply. One response to comment mentions simply that the Santa Rosa DCP EIR "concluded that reduced groundwater pumping can result in discharge of groundwater to surface water sources" (comment T-5, FEIR Vol. 3, p. 4-32). This grossly understates the impact that NSCARP would have. The decrease in groundwater pumping would be large enough to reverse the current stream-aquifer relationships in summer and eliminate stream percolation as a source of groundwater recharge. Without this recharge, deep percolation beneath irrigated cropland—which would contain concentrated levels of salts and pollutants—would experience little dilution in the aquifers. Without dilution, groundwater at potable supply wells could exceed drinking water standards for salinity and California Toxics Rule limits for copper and nickel.

The FEIR concludes that impacts from wastewater irrigation on groundwater quality will be less than significant with only Mitigation Measure HWQ-4. This conclusion was

reached with no studies. The four studies described above clearly provide substantial evidence that there is a high probability of significant groundwater contamination. Considered together, they certainly raise questions about the FEIR conclusion of less than significant impact on groundwater quality and demand additional study before the FEIR can be considered adequate for certification.

The FEIR discussion of Hydrology and Water Quality (3.8) and Mitigation Measure HWQ-4 also completely ignore the potential for groundwater contamination from frost protection. However, it was extensively discussed in comments to the FEIR. Responses to many of these comments were inadequate or inaccurate (see discussion below). The project description states that frost protection is an allowed use of recycled water (FEIR Vol. 1, page 2-11). Yates May 2009 section 1 describes why frost protection is actually a worst case for percolation of wastewater directly to groundwater when soil moisture is typically near field capacity and crop activity is low. He concludes that "most of the frost protection water that does not run off flows fairly directly to the water table, along with the salts, nitrates, metals and organic carbon it contains". It is probable that use of wastewater for frost protection creates a worst case for contamination of groundwater.

The FEIR discussion of Hydrology and Water Quality (3.8) and Mitigation Measure HWQ-4 also completely ignore the potential for surface water contamination from both frost protection and irrigation. However, they were extensively discussed in comments to the FEIR. Yates May 2009 section 1 discusses the potential for surface water contamination from frost protection. He concludes that "If recycled water is used for frost protection, there will be discharges of recycled water runoff along most of the length of Dry Creek and the Russian River where they cross the NSCARP service area. The potential magnitude of these discharges is not trivial".

Yates March 2009 concludes that water balances in Dry Creek aquifer indicate that "in this system, changes in recharge and groundwater pumping are balanced by corresponding changes in seepage to and from Dry Creek. The principal effect of NSCARP on flow system would be to substantially reduce groundwater pumping, which in turn would convert Dry Creek from a losing stream to a gaining stream in summer".

Yates May 2009 section 5 discusses the potential for surface water contamination from seeping contaminated groundwater. It concludes that the FEIR fails to describe the fundamental shift in groundwater balances that would result from replacing groundwater with recycled water as the primary source of irrigation supply. One response to comment mentions simply that the Santa Rosa DCP EIR "concluded that reduced groundwater pumping can result in discharge of groundwater to surface water sources" (comment T-5, FEIR Vol. 3, p. 4-32). This grossly understates the impact that NSCARP would have. The decrease in groundwater pumping would be large enough to reverse the current stream-aquifer relationships in summer and eliminate stream percolation as a source of groundwater recharge. Without this recharge, deep percolation beneath irrigated cropland—which would contain concentrated levels of salts and pollutants—would experience little dilution in the aquifers. Without dilution, groundwater at potable supply wells could exceed drinking water standards for salinity and California Toxics Rule limits

for copper and nickel. Furthermore, constant seepage from groundwater into streams—without the seasonal reversal that occurs under existing conditions—creates a new pathway for chronic contamination of surface waterways by pollutants contained in recycled water.

The FEIR completely fails to recognize that replacement of pumped groundwater with imported wastewater will dramatically change surface-groundwater interactions in these valleys. Under existing conditions surface water seeps into the aquifers in the summer to replace groundwater pumped for irrigation and mostly lost to evaporation and transpiration. The Russian River and Dry Creek are primarily losing streams in the summer. With NSCARP implementation little groundwater will be pumped and wastewater will be imported for irrigation. Groundwater will seep into surface waters and the streams will be gaining in both the summer. Since this groundwater will be contaminated as described above, surface waters will also become contaminated. This is a new impact based on new studies available after publication of the DEIR.

The above discussions should make it abundantly clear that FEIR discussions on Hydrology and Water Quality (3.8) and Mitigation HWQ-4 do not adequately analyze or mitigate potential impacts of wastewater irrigation, frost protection or reservoir storage on quality of both groundwater and surface water.

In addition, there were multiple comments to the DEIR concerning the lack of analysis and studies on the potential for NSCARP irrigation, frost protection, and reservoir storage to degrade both groundwater and surface water. There were multiple comments that in spite of this lack of analysis and studies, the DEIR concluded that impact from all of the above would be less than significant. Responses to these multiple comments in the FEIR were inadequate. In almost all cases the comments were drastically abridged in the FEIR, Volume 3, Section 4, Response Matrix. The responses to these drastically abridged comments often responded to only part of the comment and overlooked many important nuances. No new analyses or studies were carried out to support the less than significant impact conclusions. Examples of comments and responses are considered below for groundwater contamination, for surface water contamination, and for unique impacts of frost protection. These examples demonstrate the widespread inadequacy of responses to comments concerning potential for impacts to water quality.

Groundwater Contamination

There were many comments on the DEIR which questioned lack of analysis or studies of any kind concerning the potential for contaminants in the wastewater proposed for irrigation to concentrate in the soil and to percolate to groundwater. For example, see the following selection of comments and responses (references are comment numbers contained in FEIR, Volume 3, Section 4, Response Matrix):

1. Comment F-4 from the North Coast Regional Water Quality Control Board includes the following specific language: “While we agree that irrigation using highly treated wastewater can be accomplished in a manner that is protective of public health and water quality, we do not feel the discussion adequately discloses potential impacts due to this

irrigation. The recycled water in question contains heavy metals, organics, bacteria and salts that have the potential to degrade surface and groundwater quality. The levels of many of these pollutants may be below the public health criteria established by the Department of Health Services (Title 22). However concentrations of some pollutants, such as nitrates, may exceed these standards. We are also concerned about the potential for concentrating pollutants in groundwater at levels above applicable public health criteria due to over irrigation and natural evaporation and transpiration processes. Our concern is that irrigation water may initially have pollutants at or below applicable public health criteria, but these pollutants could concentrate to levels that exceed applicable public health criteria and result in contamination of groundwater. User agreements should be developed to ensure that recycled water users apply irrigation water in a manner that is fully protective of groundwater. In some cases, groundwater monitoring may be appropriate to identify potential impacts to groundwater quality. In addition, the Regional Board may set pollutant limits for emerging pollutants that do not yet have existing limits in Title 22".

The FEIR response to the above comment selectively focuses only on user agreements with Master Response No. 7. User agreements alone will not protect groundwater. The response completely ignores the concern that contaminants might concentrate to above pertinent standards by natural processes. It also ignores the recommendation for water quality monitoring below irrigation areas. It also ignores the potential that the Regional Board may set limits on emerging pollutants and presumes that conformance to Title 22 will ensure permitting.

2. Comment X-71 from the Dry Creek Valley Association states that "Full analysis of the impact to important groundwater recharge areas with sandy, gravelly alluvial soils and shallow groundwater aquifers such as in the Alexander, Dry Creek and Russian River Valleys is missing from this DEIR. The DEIR/S must presume that contaminants from the wastewater will enter the soil and ultimately percolate to groundwater. Potential environmental impacts from chemical contaminants in the soil and groundwater must be evaluated".

The FEIR response to this comment is Master Response No. 8. Master Response No. 8 refers to potential groundwater contamination from project reservoirs only. There is no analysis of potential for groundwater contamination from concentration and percolation of contaminants from irrigation in the FEIR. The failure to provide such an analysis to support the FEIR conclusion of less than significant impact on groundwater quality is totally inadequate.

3. Comment X-72 from the Dry Creek Valley Association states "The current tertiary treatment process contains three opportunities for chemical contaminants to adsorb onto solids. Those that don't are largely water soluble chemicals and not readily adsorbed. They will, therefore, percolate through sandy, gravelly alluvial soils to groundwater. IRWP data from indirect discharge studies in the Alexander Valley indicated that metals were not readily adsorbed onto the soil reinforce this premise, and these known studies need to be taken into consideration in this DEIR".

The FEIR response to this comment is that "NSCARP will comply with all local, state, and federal water quality standards". This response is inadequate and inaccurate. The FEIR is completely ignoring the fact that contaminants in the wastewater have the potential to concentrate and percolate to groundwater and to accumulate to concentrations above drinking water standards. The project as currently defined without mitigation can not meet all applicable water quality standards. The IRWP data referenced in comment X-72 can be found in the Santa Rosa Discharge Compliance Project FEIR, Volume 6, TM I-3 and TM I-5. This information supports the conclusion that percolation through the alluvial soils of the NSCARP valleys provides little attenuation of contaminants including metals and soluble organics as indicated by TOC. These technical memoranda were not referenced or considered in the NSCARP FEIR.

4. Comment X-83 from the Dry Creek Valley Association states "Impact HWQ-9 (3.8-37) analyzes the potential for indirect or direct discharge or dam seepage to result in water quality impacts. The DEIR discounts any water quality impacts from irrigation because "the application rate would be limited to the equivalent crop demand". This will minimize surface runoff unless irrigation volume is excessive. It will not minimize runoff from frost protection or groundwater degradation from contaminant percolation. Limitation of irrigation to crop demand will not prevent the ultimate percolation of contaminants which do not enter the plant".

The FEIR response to this comment is Master Response No. 8 and response to comment M-32. Master Response No. 8 refers to potential groundwater contamination from project reservoirs only. Response to comment M-32 refers to runoff from frost protection only. Once again, this FEIR consistently refuses to acknowledge the potential for groundwater degradation from contaminant concentration, percolation, and accumulation.

5. Comment Z-11 from Edwin Wilson states in part "Indeed it is probable that the net result of the use of wastewater for agricultural purposes would be detrimental to the soil, would result in contamination of the valleys surface water, would result in irreversible contamination of the valleys groundwater, and would pose serious public health issues.

The FEIR response to this comment is Response to Comment X-65 and Master Responses 5, 7, 8, and 9. Response to Comment X-65 focuses on salt accumulation in soils and is not pertinent to this discussion of groundwater contamination. Master Response 5 titled Impact of Wastewater to Human and Wildlife Health focuses only on impacts from "trace constituents" and essentially depends on Title 22 and NPDES permits to provide protection from any impacts. Neither Title 22 nor the existing Santa Rosa NPDES will protect groundwater, surface water, public health or endangered fish from the impacts of irrigation with wastewater. Master Response 7 focuses only on Recycled Water User Agreements and as discussed in 1 above will not provide adequate protection. Master Response 8 addresses contamination of groundwater from project reservoirs only and is irrelevant to this discussion. Master Response 9 focuses on protection of domestic wells by Title 22 restriction of irrigation with wastewater within a 50 foot radius. This 50 foot restriction is inadequate in the alluvial soils in the NSCARP

area. The studies contained in the Santa Rosa Discharge Compliance Project FEIR, Volume 6, TM I-3 and TM I-5 referenced in 3 above conclude that in these specific soils, attenuation of CTR metals (lead, copper, nickel) requires 150-300 feet of subsurface travel and attenuation of nitrogen and phosphorous nutrients requires 150 feet or 28 days. Soluble organics as indicated by TOC are also poorly attenuated. It is clear that in these soils 50 feet will not protect groundwater in domestic wells. The FEIR failed to acknowledge the availability of these studies.

The above are five examples of the responses to the many comments to the DEIR concerning the lack of analysis or studies by the SCWA to support the conclusion that contamination of groundwater by NSCARP will be less than significant. There is no such analysis and there is substantial evidence that there should be. The multitude of challenges to this lack of analysis in comment letters, the concerns of the North Coast Water Quality Control Board expressed in Comment Letter F, and especially the analysis by Nicholas Johnson, Water Resources Consultant, contained in Comment Letter AH should have been sufficient to demand additional analysis by SCWA in the FEIR.

It is critical to note here that the independent analyses carried out by hydrologists on behalf of the Coalition and discussed above and attached conclude that, because of specific conditions at NSCARP irrigation sites, many contaminants in the wastewater will indeed concentrate, percolate to groundwater, and accumulate to concentrations exceeding drinking water standards. These studies provide significant additional evidence that the responses to comments on these issues are inadequate.

Potential for Surface Water Contamination

There were many comments on the DEIR which questioned lack of analysis or studies of any kind concerning the potential for contaminants in the wastewater proposed for irrigation to contaminate surface waters. Surface water contamination could occur from reservoir leakage, over irrigation surface runoff, frost protection runoff, or groundwater seepage to surface waters. For example, see the following selection of comments and responses (references are comment numbers contained in FEIR, Volume 3, Section 4, Response Matrix):

1. Comment F-6 from the NCRWQCB states in part “the discharge of incidental runoff flows due to over-irrigation or equipment failure are not discussed in significant detail”.

The response to Comment F-6 states “Flows related to over-irrigation would be covered under user agreements, as in Mitigation Pub-7 (see Master Response 7). Incidental flow from equipment failure is covered via shut off valves”. Master Response 7 relies on provisions in user agreements to protect from surface runoff. The user agreements provide no enforcement mechanisms. Frost protection usually occurs in the dark of early morning hours. History indicates that such provisions are not and can not be reliable administered. Surface runoff has occurred in recent, local cases with wastewater irrigation on the Santa Rosa Plain.

2. Comments X-69, AT-15 and M-32 question potential for runoff into surface water from frost protection activities in spring when soils are saturated. Responses depend on provisions in user agreements and NPDES permits to protect surface waters from contamination. These provisions have been shown to be ineffective in the past (see comments in 1 above).

The above are examples of responses to the many comments concerning the lack of analyses or studies to assess the potential for contaminants in the wastewater to contaminate surface waters. There are no analyses or studies. The FEIR depends on User Agreements and NPDES permits to prevent impacts. This FEIR should be considered inadequate until it addresses this issue in a more meaningful manner with analysis and studies rather than rhetoric.

It is critical to note here that independent analyses carried out by hydrologists on behalf of the Coalition and discussed above and attached conclude that, because of specific conditions at NSCARP irrigation sites, many contaminants in the wastewater will concentrate and percolate to groundwater. Detailed water budgets also conclude that replacement of groundwater pumping with imported wastewater will cause local streams to become gaining in the summer with contaminated groundwater seeping to surface waters in significant quantities. These studies provide significant additional evidence that the responses to comments on these issues are inadequate.

Potential of Surface and Groundwater Contamination Specifically from Frost Protection

As noted in surface water contamination discussion above the FEIR contains no analyses or studies concerning potential for frost protection to contaminate surface water. There are also no analyses of potential for frost protection to exacerbate contamination of groundwater. Responses to comments on these issues are inadequate.

The analysis of this FEIR by Gus Yates, Consulting Hydrologist, on behalf of the coalition contains sufficient such analysis to conclude that concerns are valid and that frost protection provides worst case conditions for contamination of both surface waters (tributaries, Dry Creek, and the Russian River) and groundwater (Gus Yates, NSCARP, FEIR: Technical Review of Hydrology and Water Quality Issues, April 28, 2009).

Impact BIO-8 focuses almost exclusively on potential for construction of recycled water reservoirs to increase ecological risk to animal and plant populations exposed to endocrine disrupting chemicals. It does contain the statement that "Recycled water applied to the fields will percolate into soil, or be taken up by the plants. This sequestration would limit exposure to fish and wildlife from direct discharge into open waters. Further, exposure of the recycled water to soil may increase biodegradation and/or adsorption of EDC's and xenobiotics to organic matter, thereby reducing concentrations and availability to fish and wildlife". There are no studies supporting these conclusions. These conclusions are in direct conflict with the studies in the Santa Rosa Discharge Compliance Project FEIR, Volume 6, TM I-3 and TM I-5 referenced above. These studies support the conclusion that percolation through the alluvial soils of

the NSCARP valleys provides little attenuation of contaminants including metals and soluble organics as indicated by TOC. These technical memoranda were not referenced or considered in the NSCARP FEIR.

Mitigation Measure BIO-8 includes monitoring, research, consulting with regulatory agencies, responding to changes in regulations, and encouraging public awareness of guidelines concerning proper disposal of prescription drugs.

There were multiple comments to the DEIR concerning inadequate analyses and studies concerning wastewater contamination of surface water from irrigation, frost protection, and reservoir leakage and the resulting impacts on endangered fish and their food chain. In addition, the Biological Opinion concerning impact of SCWA operations was published in September 2008. The FEIR contains absolutely no analysis of the critical nexus between the Biological Opinion and NSCARP, especially the potential for serious contamination of Dry Creek and its tributaries after habitat restoration and the Russian River after summer flow reductions.

The letters and references from Don McEnhill, Russian Riverkeeper and Dr. Swee Teh, fish pathologist, UC Davis, define the potential for impacts on endangered fish and their food chain and the reasons why the FEIR analysis and conclusion of no significant impact are inadequate. They conclude with extensive information and analysis that in spite of many pertinent comments to the DEIR:
1. Impact BIO-8 provides inadequate analysis of potential for reservoir leakage to cause degradation of water quality and potentially impact ESA listed Coho and Steelhead.
2. Impact BIO-8 provides inadequate analysis of the ecological risk of ESA listed fish exposure to endocrine disrupting compounds and other chemicals in wastewater.
3. The FEIR discussion of Biological Resources (3.4) completely fails to consider that the use of waster for irrigation will contaminate habitat for ESA listed fish and cause impacts not studied in the DEIR or FEIR.
4. The FEIR discussion of Biological Resources (3.4) completely fails to consider that the use of wastewater for vineyard irrigation will contaminate habitat for ESA listed fish and cause impacts not studied in the DEIR or FEIR.
5. The FEIR discussion of Biological Resources (3.4) failed to analyze the impacts on ESA listed fish of the critical nexus between the Biological Opinion published in September 2008 and NSCARP.
6. The FEIR discussion of Biological Resources failed to consider the cumulative impacts of wastewater exposure along with vineyard chemicals in the NSCARP area combined with other stressors on salmon never studied.

Impact PUB-7 focuses on the potential for the use of wastewater for agricultural irrigation to affect public health. It states that the facilities providing wastewater will meet quality requirements of Title 22 and that Title 22 restricts irrigation with wastewater within 50 feet of any domestic well. It states that metals would not adversely affect groundwater quality because all metals in the wastewater will be below Title 22 MCLs and because metals will be removed from water in soils by adsorption, precipitation, ion exchange, and complexation. Mitigation Measure PUB-7 depends exclusively on user

agreements and Mitigation Measure HWQ-4 to protect groundwater quality and public health. As discussed above Mitigation Measure HWQ-4 focuses on reservoir leakage only.

There were multiple comments to the DEIR concerning inadequate analyses and studies concerning wastewater contamination of groundwater and surface water and the resulting impacts on drinking water and public health. Many of these comments and responses are discussed above in the water quality sections. Many responses were considered to be inadequate.

Discussion of PUB-8 fails to acknowledge the potential for groundwater contamination by rapid percolation from frost protection or by concentration, percolation and accumulation from irrigation. The discussions above on HWQ-4 indicate that both of these possibilities are feasible. The analyses in Johnson May 2007, Johnson December 2008, Yates March 2009, and Yates May 2009 focus primarily on TDS and nitrate which have the potential to exceed drinking water standards. They also conclude that other contaminants in the wastewater including metals and organics have similar potential to concentrate, percolate to groundwater and to accumulate over time.

The FEIR fails to consider the results of Santa Rosa DCP, Volume 6, TM I-3 and I-5 published as part of the DCP FEIR in March 2008. These studies by Kennedy/Jenks conclude that percolation through the alluvial soils of the NSCARP valleys provides little attenuation of contaminants including metals and soluble organics as indicated by TOC. These studies demonstrate that in these specific soils, attenuation of CTR metals (lead, copper, nickel) requires 150-300 feet of subsurface travel and attenuation of nitrogen and phosphorous nutrients requires 150 feet or 28 days. Soluble organics as indicated by TOC are also poorly attenuated. It is clear that in these soils 50 feet will not protect groundwater in domestic wells.

Appendix I, Attachment 1, White Paper on Trace Constituents was added to the FEIR in response to multiple comments concerning potential impacts of trace constituents in the wastewater on both public health and endangered fish. Master response 5 summarizes the conclusions of this paper:
1. “Our ability to measure extremely low levels of trace constituents exceed our current understanding of the potential long term effects off such constituents and, therefore, the impacts of such constituents are too speculative to evaluate”. This conclusion is much too broad and therefore inaccurate. As described in the Kagel Letter, there are many chemicals already in the regulatory funnel with validated analytical methods and known chronic human health or endangered fish impacts at extremely low concentration. These chemicals already have action levels such as NL’s, PHG’s or draft MCL’s. Many of these chemicals are likely in the wastewater of concern and have not been analyzed for. This analysis would be entirely feasible and results would not be speculative. These analyses should have been carried out.
2. “Available data demonstrate that typical wastewater treatment processes are effective in removing the majority of these constituents and that additional treatment processes are available to further reduce levels if necessary”. To the contrary many of these trace

constituents have been detected in other tertiary treated wastewater effluents and in surface and groundwaters. Analysis of many of them as well as a number of completely unregulated constituents is required by CDHS for wastewater in groundwater recharge reuse projects (see CDHS, Groundwater Recharge Reuse Regulation, January 2007). These analyses could and should have been carried out. If trace constituents of concern were detected, mitigation measures should have been proposed. This mitigation might have included additional treatment processes.

3. "Natural degradation also provides an effective mechanism to remove these constituents from both surface and groundwater resources." This conclusion is in direct conflict with the studies in the Santa Rosa Discharge Compliance Project FEIR, Volume 6, TM I-3 and TM I-5 referenced above. These studies support the conclusion that percolation through the alluvial soils of the NSCARP valleys provides little attenuation of contaminants including metals and soluble organics as indicated by TOC. These technical memoranda were not referenced or considered in the NSCARP FEIR.

4. "All recycled water used for agricultural and urban applications must comply with the Title 22 regulations to ensure environmental and public health objectives are met. In addition wastewater treatment facilities must meet discharge standards of their NPDES permit." The hydrogeologic studies commissioned by the coalition and members (Johnson 2007, Johnson 2008, Yates March 2009) all conclude that because of local conditions, Title 22 and current NPDES permits will not protect water quality. Such studies were not carried out in the FEIR to support conclusions.

Probably the greatest concerns for human health impacts result from presence of significant quantities of unidentified soluble organic chemicals in the wastewater as indicated by the high levels of Total Organic Carbon. The letter and references from Dr. Richard Kagel, PhD. analytical chemist, vividly define the potential for serious public health impacts and the reasons why the FEIR analysis and conclusion of no significant impact are inadequate. Dr. Kagel concludes:

1. The "combination of poor absorptivity and low bioactivity of the sandy-gravelly alluvial soil, the shallow depth to groundwater and, especially, the amount of wastewater compared to recharge water may cause, over time, these aquifers to become more contaminated than the wastewater itself".

2. "The chemicals that make it through the treatment process are particularly resistant to biodegradation, adsorption, and filtration. In order for these chemicals to pass through all the various stages of treatment they will be highly selected in their nature; highly soluble, highly resistant to further decomposition or filtration by the sandy-gravelly soils of our North County valleys. This idea is strongly supported by the White Paper Report on Trace contaminants, prepared by Padre Associates and included in the FEIR as Appendix I."

3. Through personal experience, he has become quite familiar with the various lists of chemicals that are regulated under California's Title 22 as well as many other chemicals that are regulated under various State policies that address chemicals of concern that have not yet made it through the regulatory process that would list them in Title 22. These "chemicals of emerging concern" have action levels established by the California Department of Public Health as Notification Levels, Preliminary Health Goals, or draft Maximum contaminant Levels. Regulatory testing methods have been developed for

these chemicals and most promulgated into Federal law as EPA Testing methods. The FEIR for NSCARP does not address the reality that hundreds of contaminants that are regulated for their extreme toxicity, many of which are listed in Title 22 and many that are not, are potentially contaminating the wastewater. For many of these chemicals, adequate test methods exist and even regulatory action levels have been issued. Yet, these chemicals are not monitored for in the wastewater.

4. "One additional parameter that poses significant risk to the North County aquifers and surface waters due to NSCARP is that of biological contaminants. Most of the data that exists for wastewater reuse projects deals with water that has been chemically disinfected and contains a residual level of chemical disinfectant. The Santa Rosa wastewater is extremely unique in its lack of chemical disinfectant. This wastewater is disinfected using UV radiation instead. Similar to the situation that exists for unknown chemicals that remain in the wastewater, unknown bacteria, viruses, protozoan and other parasites also exist in the wastewater. The completely inadequate approach of testing for only one form of biological contaminant, coliform, is the standard by which disinfection of the wastewater is monitored. Unlike chemical contaminants, biological entities that remain in the wastewater can, upon leaving the treatment facility begin to multiply in pipelines, distribution systems and storage reservoirs."

5. An understanding that, due to these unique conditions, this project is essentially a project that involves direct discharge to the groundwater aquifers is not identified in this FEIR. The State of California does have newly constructed regulations governing these types of projects such as the California Department of Health's Draft Regulations on Groundwater Reuse Projects. These regulations require a far greater degree of testing and monitoring and, in turn, require a far greater degree of water quality than is present in this tertiary treated wastewater. For example, the total amount of unknown organic chemicals, referred to earlier as "TOC" must be 100 times less than is often present in Santa Rosa wastewater. Areas of the State that are following these guidelines are using advance treatment procedures, similar to those suggested in the FEIR White Paper, namely advance oxidation, micro filtration and reverse osmosis. These processes not only remove most of the chemicals of concern they also remove most biological agents of concern. This highly purified water has been found suitable for reuse, not only for irrigation purposes but also for later drinking water uses once it has been re-injected deep into groundwater aquifers."

In summary, the NSCARP FEIR has serious deficiencies in evaluation of potential impacts on groundwater quality, on surface water quality, on drinking water quality and public health, and on endangered fish and their food chain. It provided no analyses or studies to support conclusions of less than significant impact. In spite of a multitude of comments on the DEIR pointing out these deficiencies, no additional substantive information was provided in the FEIR. In contrast, expert comments, analysis and studies submitted by the Coalition provide substantial evidence of the potential for all of these impacts to be significant. We can only conclude that this FEIR as it now stands is inadequate and does not provide the information necessary for decision makers to judge the environmental impacts which will result from NSCARP. We conclude that this FEIR should not be certified.

Respectfully Submitted,

Fred Corson
Chairman

Attachment
Summary of Qualifications of Experts Commenting on Behalf of the Coalition

References
1. Yates, G. NSCARP: Revised Versions of Nick Johnson's Water and Salt Balance Tables for Dry Creek Basin, March 3, 2009

2. Yates, G. NSCARP FEIR, Technical Review of Hydrology and Water Quality Issues, funded by the Coalition, April 27, 2009

3. McEnhill, D. North Sonoma County Agricultural Reuse Project FEIR Comments, May 2009

4. Teh, S. Dry Creek Watershed: Potential Effects of Contaminants and Emerging Pollutants to Food Web and Salmonoids, April 2009

5. Kagel, R Comment Letter on NSCARP FEIR, May 2, 2009

6. Wilshire, H. Comments on NSCARP FEIS/FEIR, April 19, 2009

7. Johnson, N.M. Potential Water Quality Impacts of NSCARP in the Alexander Valley, May 2007

8. Johnson, N.M. Potential Water Supply Impacts to Dry Creek Valley from NSCARP and a Bypass Pipeline funded by the DCVA, December 2008

9. Santa Rosa Discharge Compliance Project FEIR, Volume 6, TM I-3, March 2008

10. Santa Rosa Discharge Compliance Project FEIR, Volume 6, TM I-5, March 2008

11. CDHS, Groundwater Recharge Reuse Regulation, January 2007

Summary of Qualifications of Experts Commenting on Behalf of the Clean Water Coalition of Northern Sonoma County

Dr. Fred Corson

Fred Corson attended the College of Marin, CA, the University of Paris, France, and the University of California at Davis, where he obtained a Bachelor of Science degree in Organic Chemistry in 1964 and a doctorate in Physical Organic Chemistry in 1967. He joined the Dow Chemical Company as a Senior Research Chemist in 1967. During his Dow career, specific job activities included research and research management on trace chemicals analysis, toxicology, epidemiology, fate of chemicals in the environment, impacts of chemicals on people and the environment, membrane separation systems for water purification, and wastewater treatment permitting and operations. He retired from Dow in December 1998 as Vice President and Director of Research and Development and a member of the Board of Directors. He and his wife live in the Dry Creek Valley where he grows grapes. He is also a timber owner and operator on family property in Mendocino County.

Dr. Nicholas M. Johnson

Nicholas Johnson received a BA in Earth Sciences, Environmental Studies from UC Santa Cruz in 1977, an MS in Hydrology from the University of Arizona in 1980 and a PhD in Earth sciences from UC Santa Cruz in 1994. He received certification from the State of California as a Professional Geologist in 1988 and a Certified Hydrologist in 1999. His work experience includes Hydrologist positions at Santa Cruz County Watershed management Office, H. Esmaili & Associates, J.H. Kleinfelder &Associates, Hydrologist and Project manager at CH2M HILL, Senior Hydrologist at Geomatrix Consultants, Water Resources Consultant from 1999 to 2008, and Principal Hydrologist at MWH from 2008 to the present. His clients include industry, public and private water purveyors, regulatory, planning and resource agencies, private developers and selected environmental interests. Dr. Johnson's skills and expertise include comprehensive hydrogeologic conceptual models; analytical and numerical modeling of groundwater flow and solute transport; water and chemical balances; remedial strategies and performance assessment; wells and aquifer testing; surface water-groundwater interactions; conjunctive use and artificial recharge; hydrostratigraphic and geostatistical analysis; streamflow, runoff, and flood frequency estimation; and water-supply planning.

Dr. Richard Kagel

Richard Kagel received his B.S. in Chemistry from Clemson University in 1977 and his Ph.D. in Analytical Chemistry from the University of Idaho in 1982. He received a Post-Doctoral Fellowship sponsored by the National Oceanic and Atmospheric Administration in 1982 to perform acid rain related research and a second Post Doctoral Fellowship sponsored by the Hewlett Packard Corporation in 1983 to help develop and teach “mini-courses” in analytical measurement techniques. From 1984-1985 he worked for Rockwell International’s Space Transportation Division researching material failures on the Space Shuttle. He worked as Senior Chemist and Manager of Research and Development at Rainin Instrument Company (a division of Mettler Toledo) in Berkeley, CA from 1985-1989 developing new instrumentation for trace level measurements in environmental and biological samples. In 1989, he joined K Prime, Inc. as Senior Chemist and in 1992 became Laboratory Director where he continues to serve. As Director, Dr. Kagel is responsible for the implementing laboratory methods and protocols for determination of trace organic compounds in a wide range of sample types including drinking water, groundwater, wastewater, soil and air. His laboratory work has supported projects including USEPA Superfund sites, remedial investigations of contaminated soil and groundwater, wastewater treatment and discharge compliance, risk assessment for residential development and

other projects assessing environmental quality. Dr. Kagel, his wife and 12 year old son live in Dry Creek Valley where they grow wine grapes.

Don McEnhill

Don McEnhill holds a Bachelor's degree in Business Administration from CSU Sacramento, is a state certified water quality monitoring trainer and has trained in field investigation and reporting. He was hired in 2000 by Friends of the Russian River to create and launch the Russian Riverkeeper program where implements Riverkeeper's advocacy and on the River programs, acts as the voice for the river and directs staff and volunteers.

Dr. Swee Teh

Swee Teh received BSc in Medical Technology (1985) and MSc in Human Anatomy (1987) in School of Medicine from West Virginia University and PhD in Comparative pathology (1996) in School of Veterinary Medicine from University of California-Davis. He has over 20 years of extensive field and laboratory research experience in carcinogenesis, ecotoxicology, endocrine disruption, and biomarker studies. He has an active research program that centers on the study of aquatic ecosystem health with a special interest in understanding the consequences of environmental degradation in the survival and reproduction of aquatic organisms, and ultimately linking individual health to population decline. He has used histopathologic biomarkers extensively as a screening tool to establish an initial weight of evidence of contaminant effects on fish and shellfish. He has also developed a medaka fish model DNA microarray gene chip to screen endocrine disrupting chemicals in surface and groundwater.

Dr. Howard Wilshire

Howard Wilshire earned a BS degree in Geology from the University of Oklahoma and a Ph.D. from the University of California, Berkeley. He joined the U.S. Geological Survey as a research geologist after 5 years of teaching geology at Sydney University and research at the Australian National University. His 35-year USGS career included geologic mapping, Apollo astronaut training and lunar research, studies of processes operating in the earth's upper mantle and lower crust, and broad-ranging studies on geologic processes at the land surface. His surface process studies focused on environmental impacts of human activities in arid lands, including off-road vehicular recreation, radioactive waste disposal, energy developments, military activities, utility corridor construction, grazing, mining, road-building, earth art, waste disposal, centralized wind and solar energy developments, and other subjects. Dr. Wilshire is Board Chairman of Public Employees for Environmental Responsibility (PEER), a national environmental organization.

Eugene B. (Gus) Yates

Gus Yates received a BA in Geology from Harvard University in 1979 and an MS in Water Science from the University of California at Davis in 1985. He received certification from the American Institute of Hydrology as a Professional Hydrologist in 1992 and from the state of California as a Professional Geologist in 2001 and a Certified Hydrologist in 2002. Work experience includes Hydrologist and Project Manager, US Geological Survey, Water Resources division from 1982 to 1991, Senior Hydrologist and Project Manager, Jones and Stokes Associates from 1991 to 1999, and Consulting Hydrologist, Davis and Berkeley, CA from 1999 to the present. He provides consulting services in surface water and groundwater hydrology and water resources management to public agencies, private-sector clients, and nonprofit groups. His project experience has included work for ESA and PRMD concerning evaluation of hydrologic models for Syar Phase VI use permit and ARM Plan Amendment in 2007.