Richfield Dairy Supplemental Environmental Assessment Comment Response Document

Introduction

The Wisconsin Department of Natural Resources (DNR or Department) prepared an Environmental Assessment (EA) for the proposed Richfield Dairy facility in November 2011. The EA was challenged in Dane County Circuit Court. DNR prepared a Supplemental Environmental Assessment (SEA) for the proposed Richfield Dairy high capacity wells, based on a decision from the Dane County Circuit Court remanding the EA back to DNR because the EA did not adequately evaluate the effects of the high capacity wells at their approved pumping rate.

As directed by the Court, DNR has now conducted additional factual investigation to allow a reasonably informed preliminary judgment about the environmental effects of the high capacity wells operating at 72.5 million gallons per year (MGY), which is the rate requested by the Richfield Dairy in a revised high capacity well approval application. DNR has evaluated newly submitted information, including a numerical groundwater model submitted by the Dairy (S.S. Papadopulos & Associates, 2012, referenced as "SSPA"), and has evaluated all available information in order to make its preliminary judgment about the environmental effects of the high capacity wells operating at 72.5 MGY.

The DNR received 183 comments concerning the Richfield Dairy SEA. The DNR carefully reviewed all comments and provides responses to these comments below. The vast majority of the comments voiced concerns over the volume of water use for the proposed high capacity wells for the Dairy. We ask that commenters review the responses in total to identify those responses that pertain to their concern or comment. For detailed letters received from organizations or individuals, the DNR responded referencing the numbered paragraphs in the letters.

A listing of the comments with specific responses is as follows:

A. Pleasant Lake Management District
B. George Kraft
C. Francie Rowe
D. Friends of Central Sands
E. Ray White
F. Ken Wade
G. Michael Best & Friedrich
H. Hanaman/Garnett combined comments
I. Thomas Kune
J. Sierra Club

For comments that were general in nature or similar topics from several people, we have provided a general heading with responses as follows:

Part I. General Responses to Public Comments on the Richfield Dairy SEA

1. **Private Wells:** Potential impacts to private wells were considered as part of DNR's analysis of potential impacts to waters of the state. Several different methods were used to analyze drawdown (analytical and numerical models). For the closest existing private wells (about 400-800 feet from the proposed high capacity wells), the predicted drawdown amounts are several feet less than a level that would be expected to impede the function of almost all legally constructed wells. Drawdown amounts decrease with distance away from the high capacity well(s).

   Several comments questioned what the remedy would be if private water supplies were impacted by pumping at the Dairy. DNR concluded that the proposed high capacity wells, at the pumping limit of 72.5 MGY, are not predicted to adversely impact nearby private water supply wells. However, if water use by one landowner causes unreasonable harm by lowering the groundwater table, such that a neighboring landowner's use of the groundwater is affected, the adversely impacted landowner could attempt to resolve the conflict by bringing a civil suit. {See *State v. Michels Pipeline Construction, Inc*., 63 Wis.2d 278 (1974)}. The high capacity well approval includes a condition stating that issuance of the approval does not relieve the well owner from any liability for claims brought by nearby landowners related to potential harm to their water supplies.

2. **Surface Waters:** Almost all comments expressed concern about the impact of the Richfield Dairy high capacity wells on surface waters such as Pleasant Lake, Little Roche a Cri Creek, Chaffee Creek, Tagatz Creek, and others. DNR evaluated the potential impact of the proposed wells on nearby private and public wells, wetlands, springs, streams, and lakes. The impact analysis compared modeled reductions to current baseflow conditions of streams and minimum recorded lake levels to evaluate the effects of the proposed pumping (% change in stream flows, change in lake volume, surface area, vegetation, etc.). The conclusion of that evaluation was that pumping the proposed wells at the maximum proposed amount for an extended period of time (≥25 years), independent of existing groundwater withdrawals, is very unlikely to result in significant adverse environmental impacts to waters of the state (see the SEA for more detailed discussion).

   DNR's review did not show significant environmental impact resulting directly from the proposed wells. The proposed wells would not be approved at a level where significant impacts were predicted. The hydrogeologic properties of the sandy soils of the Central Sands were incorporated into both the Kraft et al and SSPA groundwater flow models reviewed by DNR.

   See Responses to Pleasant Lake Management District (PLMD), Dr. George Kraft, and Mr. Ray White for additional discussion of surface waters.

3. **History of Approved Withdrawal Amount:** Although the Dairy initially stated that its expected water use was 52.5 MGY, its original high capacity well application requested a combined total pumping capacity of 1000 gpm, or 525.6 MGY from its two wells. DNR limited this amount to 131.2 MGY for the original approval. Subsequently, the Dairy re-evaluated its water needs and requested approval for a maximum withdrawal of 72.5 MGY.

4. **Impact of Groundwater Pumping Pattern:** The pattern of groundwater withdrawal from the proposed Dairy would be quite different from irrigation pumping. The Dairy would pump groundwater year-round (pumping limited to an annual average of 138 gallons per minute (gpm) which equates to 72.5 MGY, and limited to 21.6 million gallons in any 30-day period), with slightly higher pumping rates in the summer for cooling and slightly lower pumping rates during the remainder of the year. Irrigated agriculture requires very high rates of seasonal pumping during the summer months (600-1200 gpm), with an opportunity for water levels to recover during the remainder of the year. At distances of several miles from the irrigation pumping, however, these seasonal peaks of drawdown would be damped to a more or less constant drawdown amount similar to the effect of the Dairy (Barlow and Leake, 2012, p. 28).

5. **Impact on Property Values and Tourism, Generalized Impacts to the Natural Environment, Odors:** Comments on these topics were addressed in the Permit Changes and Response to Comments document http://dnr.wi.gov/topic/AgBusiness/documents/RichfieldDairy/RichfieldDairyComments.pdf

6. **Impact on Water Quality:** Water quality concerns related to manure spreading and other Dairy activities were previously addressed in the November 1, 2011 Environmental Assessment and the subsequent "Permit Changes and Response to Comments" document. The Water Pollutant Discharge Elimination System (WPDES) permit is not under review at this time.

7. **Cumulative Impacts (Regarding Decision Whether to Approve the Wells):** Numerous comments on the SEA asserted that DNR should deny the proposed wells because they would exacerbate an existing significant depletion of surface water resulting from the current levels of groundwater pumping in the area. The Comments cite to *Lake Beulah Management District* v. *DNR*, 2011 WI 54, as giving DNR the authority to take this action.

   The DNR is aware of water resource depletion in the Central Sands region. (In addition to the discussion in the SEA, see, e.g., the Response to Ray White Comment #1). The SEA Response to Comments includes responses regarding cumulative impacts, in the context of compliance with ch. NR 150, Wis. Adm. Code, requirements. See e.g., the General Responses to PLMD Comments #4 to 6.

   However, the Department does not interpret its legal authority to allow for conditioning or denying individual high capacity well approval applications based on the cumulative impacts from other groundwater withdrawals in the area.

   The high capacity well statute (s. 281.34, Wis. Stats.) gives DNR authority to condition or deny high capacity wells if "the proposed well" will have significant adverse environmental impact. The statute does not give DNR authority to consider impacts from other groundwater withdrawals in the area. The *Lake Beulah* decision did not address the issue of whether DNR may condition or deny high capacity well approvals based on the cumulative impacts of existing wells located on nearby properties. *State v. Michels Pipeline*, cited above, establishes that property owners are entitled to withdraw groundwater from underneath the land and use it for a beneficial purpose, provided

that the withdrawal does not cause unreasonable harm through lowering the water table or reducing artesian pressure, the groundwater does not form an underground stream and the withdrawal does not have a direct and substantial effect upon a watercourse or lake. Therefore, when deciding whether to approve high capacity wells, DNR assesses the potential adverse environmental impacts from the high capacity property itself. In this case, that assessment indicates that such impacts will not occur.

8. **Drought Conditions:** In light of the severe drought conditions experienced in 2012 in many parts of the state and the possibility of ongoing climate change, many commenters expressed that DNR should base its review on impacts in a dry year, as opposed to average conditions. The Dairy's high capacity well approval would not allow pumping to exceed 72.5 million gallons per year or 21.6 million gallons in any 30-day period, even in dry years.

   In conducting an environmental review, the Department attempts to consider a range of possible conditions. The analysis of impacts to Pleasant Lake was conducted assuming the minimum recorded water level. Pumping at the Dairy was modeled at the maximum amount allowed throughout the entire modeling period.

   See Responses to Ray White's comments for further discussion of this topic.

9. **Is modeling by the Dairy's consultant reliable?** In addition to the DNR's internal review of the SSPA model, the comments DNR received from Pleasant Lake Management District included a review of the model by Dr. George Kraft. While Dr. Kraft expressed concerns about several aspects of the modeling of cumulative impacts, he generally agreed with the model's conclusions about direct impacts from the proposed pumping at the Dairy. Given that no serious issues were identified by DNR or raised by others with regards to this aspect of the model, DNR is comfortable using the model results for our review of the impacts of the proposed wells.

10. **Golden Sands:** DNR received several comments regarding the proposed Golden Sands Dairy. The topic of the comments is the SEA for the proposed Richfield Dairy high capacity wells in Adams County. The public will have an opportunity to comment on the Golden Sands proposal at a future time.

Part II. Responses to Individual Public Comments on the Richfield Dairy SEA

A. **Responses to Pleasant Lake Management District (PLMD) Comments on SEA**
   [DNR Note: PLMD's comments are summarized below; complete PLMD comments are attached to the Comment Response document.]

PLMD General Comment Responses

1. **Comment:** The SEA does not satisfy the minimum requirements of WEPA, and does not even suggest that DNR conducted any independent evaluation of impacts.

Response: The Dane County Circuit Court (Court) previously addressed the question of whether DNR's EA for the project was adequate. The Court found the EA to be adequate. The Court remanded the EA to DNR not because the EA failed to "satisfy the minimum requirements of WEPA" but because the EA did not adequately evaluate the effects of the high capacity wells at their approved pumping rate.

As directed by the Court, DNR has now conducted additional factual investigation to allow a reasonably informed preliminary judgment about the environmental effects of the high capacity wells operating at 72.5 MGY, which is the rate requested by the Richfield Dairy in a revised high capacity well approval application. DNR has independently evaluated newly submitted information, including a numerical groundwater model submitted by the Dairy (S.S. Papadopulos & Associates, 2012, referenced as "SSPA"). DNR has also independently evaluated all available information in order to make its preliminary judgment about the environmental effects of the high capacity wells operating at 72.5 MGY.

A Response to the more specific Comments regarding the discussion of wetlands, springs, streams and Pleasant Lake is included in the Response to Specific Comments from PLMD.

2. **Comment:** The SEA fails to define "significant environmental impact" and does not identify the criteria used to conclude that the proposed high capacity wells will not have a "significant environmental impact."

Response: DNR prepared the SEA, as it prepared the original EA and addendum, by following the procedures, requirements and definitions under ch. NR 150, Wis. Adm. Code. Section NR 150.02(16), Wis. Adm. Code, defines "major action" as "an action of such magnitude and complexity that the action will have significant effects upon the quality of the human environment." Section NR 150.02(25), Wis. Adm. Code, defines "significant effects" as "considerable and important impacts of major state actions on the quality of the human environment." The "proposed action" contemplated by DNR for the original EA was to approve the proposed Richfield Dairy, including issuing a WPDES Permit, a plans and specification approval and a high capacity well approval. For the SEA, the "proposed action" is to approve the high capacity wells at a combined pumping rate of 72.5 MGY. DNR concluded (both for the original EA and the SEA) that the "proposed action" is not a "major action" since it is not an action of such "magnitude and complexity" that it will have "significant effects" or "considerable and important impacts" on the quality of the human environment.

Similarly, DNR is required under ch. NR 150, Wis. Adm. Code, to evaluate the "probable environmental consequences of the proposal" and to discuss "adverse environmental effects" should the proposal be implemented (s. NR 150.22(2)(d), Wis. Adm. Code). "Proposal" is defined in s. NR 150.02(24), Wis. Adm. Code, to mean "the full range of activities of the entire project proposed." For purposes of the SEA, DNR concluded that the "probable environmental consequences of the proposal" to install the two wells pumping at 72.5 MGY would not be anticipated to result in significant adverse environmental effects.

3. **Comment:** The SEA only addresses Richfield Dairy's requested initial pumping rate.

   Response: In its Decision and Order on Motion for Relief from Judgment or in the Alternative to Amend and Clarify, dated October 2, 2012, the Circuit Court stated as follows:

   > The intent of the remand is to require the Environmental Assessment to evaluate the impact of the high capacity well permits at whatever value is the limit of the permit. If DNR approves a 72.5 million gpy limit in the high capacity well permit, that should be the value assessed in the Environmental Assessment. (Decision and Order on Motion for Relief, page 5).

   As directed by the Court, the SEA contains an evaluation of the environmental impact of the high capacity wells operating at the rate of 72.5 MGY, including evaluation of groundwater modeling of the potential impacts. The revised high capacity well approval will establish an approved maximum pumping rate for the wells. Richfield Dairy could not increase its pumping rate above the rate allowed without submitting a new high capacity well approval application. DNR would review that application, and its review would include a new assessment of groundwater withdrawal impacts, and may include evaluating groundwater modeling at the new requested pumping rate. A new high capacity well approval application would be a public record, and interested parties could request DNR to conduct an environmental review of the potential impacts of the wells at the revised pumping rate, by submitting concrete scientific evidence of potential harm.

4. **Comment:** The discussion of cumulative impacts in the SEA did not include any independent evaluation by DNR.

   Response: Even though the Court concluded that DNR conducted an adequate evaluation of the cumulative effects of the wells in the original EA, DNR conducted additional independent analysis of cumulative effects in the SEA (see pages 6-7 of the SEA).

   DNR evaluated modeling by Kraft and Mechenich (2010), Kraft et al. (2012), and the SSPA site-specific model, which calculated impacts due to the cumulative effects of irrigation pumping in the region. DNR also reviewed information presented by Kenneth Wade and its own records regarding high capacity wells approved in the vicinity of the proposed wells in the past ten years. DNR also indicated its preliminary judgment regarding the cumulative effects of additional groundwater withdrawals in the vicinity. The responses to comments include additional evaluation of cumulative effects (see, e.g., the Response to Dr. Kraft General Comment #5 and Detailed Comments #6 and 13 and the Response to Ray White Comment #1).

5. **Comment:** While DNR acknowledges that cumulative effects will occur, DNR does not evaluate them, to determine whether they are significant.

   Response: DNR concluded (as in the original EA) that the proposed action is not a "major action," meaning it is not an action of such "magnitude and complexity" that it will have "significant effects" or "considerable and important impacts" on the quality of the human

environment. Section NR 150.22(2)(a) requires DNR to consider five criteria when making this determination, and "cumulative effects" is one of the criteria. The rule does not require DNR to make a separate determination as to each criterion nor does the rule require DNR to determine whether each criterion is "significant."

DNR has adequately evaluated cumulative effects in the SEA.

6. **Comment:** The cumulative impacts discussion fails to disclose whether DNR evaluated reasonable foreseeable future actions that may compound the impacts.

Response: In the SEA, DNR evaluated information regarding existing cumulative effects, including modeling by Kraft and Mechenich (2010), Kraft et al. (2012), and the SSPA site-specific model, information presented by Kenneth Wade and DNR records regarding high capacity wells approved in the vicinity of the proposed wells in the past ten years. DNR also evaluated "reasonably anticipated" related local actions or activities that would compound impacts by considering that additional water withdrawals in the area would increase existing stresses on the availability of groundwater to supply surface water bodies. DNR included its preliminary judgment that the effects of this type of reasonably anticipated cumulative reduction in groundwater availability would include decreased flow and increased temperature in headwater streams, and lowered lake levels in nearby lakes. Thus, DNR considered reasonable foreseeable future actions that may compound the impacts from the two proposed wells.

The comment states that during the first ten months of 2012, 35 high capacity wells were approved in Adams County and 51 high capacity wells were approved in Waushara County. These numbers differ from DNR records, which show that during this time period, the actual number of high capacity wells (pumping capacity greater than 70 gpm) approved was 23 in Adams County and 25 in Waushara County. It should be noted that the high capacity wells approved are located throughout the entire county, not necessarily within the watersheds in the vicinity of the proposed Richfield Dairy high capacity wells.

7. **Comment:** DNR's conclusion that an EIS is not necessary, based solely on the expected impacts of the two wells at the initial pumping rate of 72.5 MGY, is flawed as a matter of law.

Response: The Response to PLMD General Comment #1 explains that the Court concluded that DNR's original EA and addendum was sufficient to support DNR's conclusion that an EIS was not necessary. The Court remanded the EA to DNR to conduct additional factual investigation to allow a reasonably informed preliminary judgment about the environmental effects of the high capacity wells operating at 72.5 MGY. DNR conducted that additional factual investigation and reissued its determination that an EIS was not necessary.

DNR concluded (as it did in the original EA) that the proposed action is not a "major action" and the EIS process is not required. The SEA includes a statement that an EIS is not required, considering the expected impacts of the two wells at the pumping limit of 72.5 MGY, because DNR was specifically directed by the Court on remand to evaluate the

impacts of the wells at their proposed pumping rate. DNR's evaluation also considered and complied with the criteria and requirements in ch. NR 150, Wis. Adm. Code.

In addition, it is important to note that DNR included in the SEA "proposed draft conditions" for the amended high capacity well approval that are designed to avoid or minimize the potential for adverse environmental impacts to waters of the state. The proposed pumping limit and the requirement to monitor groundwater levels near the proposed high capacity wells to confirm the groundwater model results are both intended to control for any potential adverse environmental impacts from the wells. This is an acceptable way to achieve WEPA compliance, as the Supreme Court concluded in *State ex rel. Boehm v. DNR*, 174 Wis.2d 657 (1993).

8. **Comment:** There are factual inconsistencies and likely inaccuracies in the SEA.

Response: Regarding the question of the maximum depth of Pleasant Lake: two bathymetry surveys (July 1964 and June 2012) reported maximum lake depths of 24 feet and 23.7 feet respectively. The source of the 30-foot depth reported in the DNR water body description appears to be the 1996 Lake Management Plan (recorded during a period of unusually high water). Water depths reported on the DNR website may be somewhat imprecise due to the variety of sources from which the information is derived, as well as variable lake level conditions and timing of bathymetric surveys. In evaluating impacts to Pleasant Lake, DNR used the range of historical lake depths that have been reported.

Regarding the historic variability of lake levels for Pleasant Lake (1964-2012): The maximum reported lake level was 983.75 feet MSL (7/18/1994); the minimum reported lake level was 978.27 feet MSL (8/3/2007). The difference between these two levels is 5.48 feet. DNR does not know how Waushara County calculated a 5.32-foot variation in lake levels.

Regarding the surface area of Pleasant Lake: The SSPA model used air photo analysis to arrive at a surface area of 130 acres for moderately low water level conditions. A 1964 lake survey estimated a lake surface area of 126.5 acres. DNR based its analysis in the SEA on a range of acreages because actual lake surface area varies depending on water level.

9. **Comment:** DNR uses vague terminology throughout the SEA, characterizing the impacts from the wells as "unexpected" or "unlikely" to be significant.

Response: DNR's SEA provides a preliminary factual investigation of sufficient depth to allow a reasonably informed preliminary judgment about the environmental and cumulative effects of the wells operating at the proposed pumping limit.

DNR's preliminary investigation and preliminary judgment regarding the effects of the wells is based in part on site-specific modeling, which is "currently the best tool available for evaluating the long-term effects of groundwater withdrawals in a large, complex system" (SEA at page 2). While site-specific modeling is the best tool available to predict impacts from groundwater withdrawals, the impacts cannot be fully understood until years of groundwater withdrawals have occurred. Therefore, it is appropriate and prudent for DNR

to make a preliminary judgment that the wells are not "anticipated" to cause significant adverse environmental effects.

Given that the environmental effects are not completely certain, it is also correct for DNR to include conditions in the approval to avoid significant adverse environmental impacts, as DNR has proposed to do. The Wisconsin Supreme Court has held this to be an acceptable method to "control potential adverse environmental consequences through conditions that must be complied with to obtain approval." *State ex rel. Boehm v. DNR,* 174 Wis. 2d at 676.

PLMD Specific Comment Responses

1.

a. **Comment:** SSPA's 25-year model period was too short.

Response: As discussed in the SEA, a 25-year time-frame allowed the system to come to a near-equilibrium state. Dr. George Kraft's assessment (in his comments attached to the PLMD submittal) was that the change in impact resulting from a longer model run would be on the order of tenths of an inch of drawdown in Pleasant Lake, for example.

b. **Comment:** Natural fluctuations comparison is inappropriate for assessing impacts.

Response: As the comment points out, the existence of natural or historical fluctuations indicates that the existing biota is adapted to changes in water levels and flow variations. On a larger scale, sustained water level reduction does have the potential to cause significant impact to the lake. However, lake level changes, or permanent reductions, on the order of those predicted due to the Dairy's wells would be effectively indistinguishable from natural fluctuation and existing irrigation impacts.

c. **Comment:** DNR distorts stream/lake level data.

i. **Comment:** 1964 lake level represents drought conditions and is not typical.

Response: The 1964 lake level is relevant in that it represents a past minimum water level at Pleasant Lake prior to large-scale irrigation pumping in the area**.**

ii. **Comment:** Levels since the 1990s show a consistent downward trend, not fluctuation.

Response: The water level record for Pleasant Lake shows both a downward trend and seasonal/annual fluctuations. The downward trend may be slightly exaggerated because lake levels in the 1990s were atypically high. But, lake level records suggest that water level decline over the last 2 decades is on the order of 1-3 feet. Seasonal data are limited, but do exist for several years with multiple water level readings. As described in the SEA, the observed seasonal variability was 0.5-0.9 feet within the available data.

d. **Comment:** George Kraft's 11/28/11 report results were not included in SEA.

Response: The SSPA model was designed specifically to model pumping from the individual wells at Richfield Dairy and was therefore the primary source of modeling information for the projected impacts of the Dairy wells. Dr. Kraft's model was designed as a regional model to simulate the cumulative impacts of irrigation pumping. (For example, the Kraft and Mechenich model uses recharge reduction rather than individual wells to simulate the effects of pumping.) While Dr. Kraft's site-specific evaluation at 131.2 MGY was not explicitly cited in the SEA, it was used to test the reasonability of the site-specific SSPA model. Since Dr. Kraft's drawdown results are roughly linear with pumping rate, DNR calculated that the modeled drawdown was about 2.2 inches at Pleasant Lake for a pumping rate of 72.5 MGY; this result is similar to the SSPA model.

In addition to serving as a check on SSPA's results, Dr. Kraft's regional model was a primary source used to assess the cumulative impacts of irrigation pumping.

2. **Comment:** Wetlands – Potential wetland impacts were not sufficiently discussed in the SEA. The projected drawdown of less than one inch could have a significant impact. Wetlands associated with Pleasant Lake are not discussed.

Response: The wetlands identified in the SEA are a mix of forested, scrub/shrub, and emergent/wet meadow adjacent to the unnamed headwaters of Little Roche a Cri Creek. A water table drawdown of less than 1 inch after 25 years was identified by the SSPA model. DNR wetland staff experience indicates that in almost all cases, a water table drawdown of 1 inch or less would not have a significant impact on wetland ecology. (Exceptions would be highly groundwater-dependent wetland types such as sedge meadows and cedar swamps: there is no indication that the Little Roche a Cri headwater wetlands are in these categories.) It may also be noted that the Little Roche a Cri wetlands are located in an area of concentrated irrigation (6 irrigation wells within 1 mile), so there may be wetland impacts from existing groundwater withdrawals in the area.

There are two mapped wetlands in the vicinity of Pleasant Lake listed as "too small to delineate". The Pleasant Lake wetlands mentioned in the PLMD comments are mainly located in the shallow areas of the lake itself, but have not been delineated as wetlands in the Wisconsin wetland inventory. A 1996 Pleasant Lake Management Plan identified several parts of the Pleasant Lake shoreline as "Sensitive Areas". These areas include Turtle Bay (southwest bay), the south shoreline, and the sand and gravel bar extending from the north shore, providing important spawning and feeding grounds for the lake's fishery. DNR Wetland staff evaluated the impact of the projected ~2-inch reduction in lake level on the following factors: human use, wildlife habitat, fish and aquatic life, shoreline protection, storm and floodwater storage, water quality, and groundwater processes. This review concluded that, by itself, the 1.6 ± 0.26-inch drawdown modeled by SSPA would not result in adverse changes to wetland areas or shallow areas of Pleasant Lake or cause Turtle Bay to be cut off from Pleasant Lake.

DNR reviewers note that Pleasant Lake and the adjacent wetlands are currently impacted by existing groundwater withdrawals. As such, existing and future impacts could cause Turtle Bay to no longer support open water communities, causing loss of habitat.

3. **Comment:** Springs – The SEA analysis was deficient because only the Chaffee Creek spring was considered, and only the SSPA report was reviewed.

   Response: The spring at the headwaters of Chaffee Creek is the only large spring mapped within 5 miles of the proposed Richfield Dairy. The 1963 spring-flow rate is from a Water Resources Survey which provided only *estimates* of flow. Because of this, the change in flow between 1963 and 2003 cannot be quantified (could be more or less than 0.8 cfs).

   a-b. **Comment:** DNR suggests that the spring is outside the area of influence, based on "general" information about contribution areas. Spring flow data are almost ten years old and flow could have decreased since then.

   Response: The SEA's statement regarding contribution areas could be restated as, "because springs can be expected to have a contributing area of about 1 square mile per 1 cfs of flow, the model result is reasonable." SSPA model results show that around 15% of the Dairy's total pumping would be diverted from the Chaffee Creek headwater area.[1] This constitutes a 3.5% flow reduction to the spring. Conclusions about spring flows were based on available information, including past flow measurements and modeling results. Flow measurements for Chaffee Creek at County Highway CH, less than 1 mile downstream of the headwater spring, are also available for 2005-2011; these measurements were also used in the analysis of the spring's flow.

   c-d. **Comment:** DNR's analysis ignores other springs that feed nearby lakes and streams.

   Response: DNR's analysis assumed that the streams and seepage lakes in the area are groundwater-fed (small springs and seepages), even if no concentrated springs are mapped. The Department is aware that the fisheries and water quality of nearby streams depend on groundwater flow to maintain habitat for thermally sensitive fish species and macroinvertebrates, and considered these factors in its review.

4. **Comment:** Streams – DNR does not identify the source of its streamflow data. Depletion was not evaluated in the most sensitive, headwater areas of streams. Cumulative impacts could be significant.

   Response: The baseflows used for flow-reduction comparisons were derived from two different sources. The majority were based on flow data collected by UW-Stevens Point since 2005, with several based on data from USGS gaging stations. A list of flow data and sources can be found in Appendix G of the SSPA report.

   Flow locations and streamflow reduction estimates can be found in Table 1 of the SEA. Reductions due to the Dairy are calculated as a percentage of reduced baseflow (measured baseflow minus baseflow reduction due to existing pumping). Because no upstream data for Little Roche a Cri and Fordham Creeks was included in the initial SSPA report, flow reductions were requested at additional locations. Those results are also shown in Table 1

[1] The is essentially in agreement with George Kraft's modeling, which estimated that 11% of the water pumped by the Dairy was diverted from Chafee Creek (Kraft, October 7, 2011 letter to Eric Ebersberger)

of the SEA. In order to respond to comments from PLMD, among others, DNR also requested SSPA to provide model results for flow reductions in the upper mile of headwater streams (Fordham, Chaffee, and Tagatz Creeks, and Little Roche a Cri Creek tributaries). Modeled flow reductions ranged from 3 to 23 gpm (0.01-0.05 cfs), or about 0.8%-3.5% of modeled streamflow in these reaches. Pumping from the Dairy resulted in no decrease in modeled stream lengths.

The stream described in Specific Comment 4 is Chaffee Creek, with flow reduction of 22 gpm (3.4%) at CTH JJ. Modeled flow reduction at Little Roche a Cri Creek was 43 gpm (0.3%) at 10th Avenue and 28.5 gpm (<1%) at Cypress Avenue. See Responses to PLMD General Comments for discussion of cumulative impacts.

5. **Comment:** Pleasant Lake: The SEA's discussion of the lake was deficient or inaccurate.

   a. **Comment:** Surface area and depths may be inaccurate.

      Response: See Response to General Comment #8. DNR used an estimate of lake depth, area, and volume that would represent the "worst case" in terms of potential impact.

   b. **Comment:** The discussion of historical water level fluctuations ignores the impact of pumping on water level trends. Only four years have multiple water level measurements. Recent measurements generally show a declining trend in lake levels.

      Response: The Department acknowledges that as much as 3 feet of observed water level decline in Pleasant Lake in recent years could be attributed to existing groundwater pumping. However, Pleasant Lake's water levels in the 1990s were unusually high, and at least some of the decline since 1992 and observed seasonal changes are due to natural or climatic conditions.

   c. **Comment:** DNR's conclusions are not based on first-hand knowledge of the lake. The near-shore zones of Pleasant Lake, particularly Turtle Bay, support significant flora and fauna.

      Response: Department staff visited the lake on several occasions and reviewed information on aquatic vegetation gathered by UW Stevens Point investigators. More extensive investigation of near-shore biota was not conducted because the predicted impact of 2 inches of drawdown was determined not likely to cause significant impact in terms of changes to surface area, volume and water level, and thus evaluating the impacts to lake biota would not be necessary.

   d. **Comment:** The small predicted change in water level could impact wildlife. The banded killifish, a State Special Concern species, is present in Turtle Bay. The predicted change in water level could impact spawning and destroy the banded killifish population in Pleasant Lake.

      Response: Although the banded killifish is a State Special Concern fish, it is not tracked in the Natural Heritage Inventory, the database DNR uses to identify sensitive species during environmental reviews. Neither the banded killifish nor any other special

concern species were noted in the 1996 IPS Pleasant Lake Management Plan listing of fish species in Pleasant Lake.

According to DNR's records, the banded killifish was first identified in Pleasant Lake in 1999; 25 individuals were also identified in the lake in November, 2012.

The banded killifish prefers clear water of bays and quiet backwaters of large lakes and medium to large streams with sparse to no vegetation over gravel, sand, silt marl, clay detritus, or cobble. Spawning occurs from June through mid-August. Threats to the species include artificial water level stabilization, invasive species (such as Eurasian Water Milfoil and Curly-leaf Pondweed), non-point source pollution, habitat destruction due to boating (wave energy), aquatic plant control, and shoreline clearing. Many of these are existing concerns at Pleasant Lake.

DNR's wetland staff evaluated Turtle Bay and other shallow wetland areas of the lake and concluded that a the predicted water level reduction would not negatively impact habitat or aquatic life, including fish (see Response to Specific Comment #2). DNR fisheries staff concurs that it is very unlikely that the projected water level reduction would significantly impact the banded killifish present in Pleasant Lake. Fisheries staff also notes that it is likely that shoreline development and habitat degradation have already had some impact on this species.

e. **Comment:** The SEA ignored potential impacts to Turtle Bay and adjacent wetland areas.

Response: See Response to PLMD Specific Comment #2 – Wetlands.

6. **Comment:** Other Lakes – The SEA's discussion of Lake Burnita and any other lakes that could be impacted was not sufficiently detailed.

Response: In comparison to Pleasant Lake, very little information exists regarding Lake Burnita. However, based on the available water body and depth description, DNR used a conservative estimate of lake volume and area to evaluate the impact of drawdown at Lake Burnita, similar to the analyses applied to Pleasant Lake. There were no other lakes in the vicinity of the Richfield Dairy wells that were predicted to have drawdown effects greater than Pleasant Lake and Lake Burnita.

7. **Comment:** Cumulative Impacts Assessment

Response: See Responses to General Comment #7 (Cumulative Impacts) and PLMD General Comments #4-6

8. **Comment:** Alternatives Analysis – The alternatives analysis in the SEA was not sufficiently detailed.

Response: The SEA was prepared to specifically address the order of the Dane County Circuit Court (Court) which required DNR to analyze the environmental effects of the proposed wells operating at 72.5 MGY. The SEA is therefore not a standalone document. Rather the SEA is a portion of the DNR's EA for this project, which includes the original EA,

EA addendum, and all permit application and review documents. This reviewable record addresses short and long-term effects, secondary effects, cumulative effects, precedence, controversy, wetlands, springs, streams, lakes and alternatives.

B. Responses to Dr. George Kraft's Comments on SEA

[DNR Note: Dr. Kraft's complete comments are attached to the Comment Response document.]

Kraft General Comment Responses

1. **Comment:** DNR cannot determine if an impact is significant without setting a specific threshold that would be considered significant.

   Response: It is possible to determine whether an impact is significant or not without setting an absolute threshold, provided that the projected impact being evaluated, which in this case is the impact caused by the amount of groundwater proposed to be withdrawn, does not approach the range that would be considered significant. (See also Response to Kraft Detailed Comment #9).

2. **Comment:** Confusion in discussion of different methods of accounting for irrigation water losses.

   Response: See Response to Kraft Detailed Comment #3

3. **Comment:** Streams – Location of flow comparisons should be in headwater areas.

   Response: See Response to Kraft Detailed Comments #10-11, 18

4. **Comment:** Lake fluctuations should not be used as a means of assessing potential impacts.

   Response: It is correct that the effect of the Dairy's pumping on Pleasant Lake will be a continuous small reduction in water level imposed over the hydrograph of the lake (historic, seasonal, and annual water level fluctuations). The existence of these fluctuations indicates that lake ecology is already adapted to changes in lake level of several feet, so a change on the order of inches would be less likely to affect the lake than it would if levels were naturally extremely stable. Historic fluctuations (including both "natural" (climatic) and pumping-induced effects) were one of several factors the Department considered to determine the significance of the projected drawdown. Other factors that were considered included potential changes in lake volume, loss of groundwater input, surface area, and existing vegetation.

5. **Comment:** Pleasant Lake is not fluctuating naturally but is in decline.

   Response: The Department acknowledges that a significant portion of the lake level decline observed in the past several years is due to the cumulative impacts of groundwater pumping in the vicinity of Pleasant Lake. However, these declines are superimposed over seasonal and annual variations in water levels that are due to climatic effects, e.g. precipitation and evapotranspiration. Indeed, the highest water level in the record (1992) was recorded during a time of higher than normal precipitation, and the lowest level (2007) was recorded during a moderate to severe drought. Therefore, the observed 5.8-foot drop in elevation between 1992 and 2007 cannot be entirely attributed to groundwater pumping.

6. **Comment:** SEA ignores the existing impacts to Chaffee Creek/ spring and Pleasant Lake. (see also Kraft Detailed Comments #8, 9 for Springs, and Detailed Comment #5 for lake levels)

   Response: The comment points to differences in the level of Pleasant Lake visible on air photos between 1992 and 2005/2010. It should be noted that 1992 represents the highest water level on record for Pleasant Lake, so the shoreline shown on air photos for that year does not represent typical conditions (see response to previous comment). As discussed elsewhere, available evidence indicates that existing pumping may have lowered the entire hydrograph for Pleasant Lake by 1.5 feet or more. However, the projected impact of groundwater withdrawals from Richfield Dairy (around 2 inches) will not have a significant impact on the lake (see the SEA and Response to PLMD Specific Comment #5 for additional discussion of DNR's evaluation of impacts to Pleasant Lake). See Responses to PLMD Specific Comments #3 & 4 for a discussion of impacts to Chaffee Creek/spring.

Kraft Detailed Comment Responses

1. **Comment:** Model grid spacing should have been reported in feet, not square feet.

   Response: This was an error in the SEA – units should have been reported in feet.

2. **Comment:** Site specific model had 2 model layers for sand and 1 for sandstone.

   Response: The SSPA model was constructed as described in the comment.

3. **Comment:** There are problems with the SSPA model and SEA's treatment and discussion of consumptive use, net recharge reduction, and "missing water" associated with modeling irrigation withdrawals.

   Response: The SEA's discussion of the modeling of water losses did not describe in detail the differences in modeling methods. Dr. Kraft's comment correctly points out that the terminology "missing water" was misapplied – the term "consumptive use" should have been used. The intent of the EA statement was to point out that Dr. Kraft's model represented irrigation water loss by reducing net annual recharge over an irrigated area by approximately 2 inches, while SSPA represented the same type of losses by simulating pumping from irrigation wells but only using a pumping rate that was 20% of the actual observed pumping rate. Subsequent information from SSPA (Papadopulos, 2013b) indicates that the average irrigation pumping was roughly equivalent to applying 10 inches of water/ acre per year; therefore, simulating irrigation pumping at 20% of the actual pumping results in a loss of two inches of water per acre of irrigated land, similar to the approach in Dr. Kraft's modeling.

   The comment pointed out that the 20% water loss used by SSPA is much lower than the DNR's standard water loss coefficient of 70% loss for irrigation pumping, and from water losses reported by irrigators. The reason for this difference is that the two values represent losses over different time scales. The higher loss amount represents the percent of irrigation water that is lost from the groundwater system during the period of irrigation. That is, a

70% water loss assumes that 70% of the water applied through irrigation is incorporated into the crop or is lost through other mechanisms, primarily evapotranspiration. The 20% loss SSPA used for modeling purposes represents the annual difference in recharge between irrigated and non-irrigated conditions. Annually, the high percentage of water lost through irrigation during summer is somewhat offset by increased water table recharge in fall on irrigated land vs. non-irrigated land. The increased recharge occurs because irrigated soil is kept near its water-holding capacity, as opposed to drying out during summer as under natural conditions. The end result is effectively a 2 inch/year reduction in recharge on irrigated lands which is consistent with Dr. Kraft's approach.

The SSPA and Kraft and Mechenich models were constructed using similar input data and assumptions, so model results (such as drawdown contours) are quite similar (Figure 2 of Papadopulos, 2013a). Differences, such as SSPA's modeled existing drawdown at Pleasant Lake (0.7 ft., versus the statistically-derived drawdown of 1.5 feet reported by Kraft and Mechenich (2010)) stem from different scales of the models and in the way water bodies are represented.

Comment: The SSPA model's results for existing irrigation pumping are erroneous because of lack of accurate pumpage reporting.

Response: The comment correctly points out that the reporting records of high capacity well pumping histories are incomplete, and that this causes added uncertainty in the modeled impacts of existing irrigation pumping. The issues with the pumping record noted by Dr. Kraft, while legitimate, do not invalidate the model results. Additionally, the results of SSPA modeling of existing pumping impacts are in general quite similar to the results of the Kraft model (Papadopulos, 2013a).

Comment: There is a large difference between the Kraft and SSPA model drawdowns near the Dairy.

Response: The existing groundwater drawdown in the vicinity of Richfield Dairy in the July 27, 2012 SSPA report should have read 2.8 feet, not 2.8 inches. This typographical error was corrected during the review process. 2.8 feet of existing drawdown at the Dairy is much more similar to the amount Dr. Kraft modeled in that area (2.1 feet).

4. **Comment:** DNR's review of cumulative impacts modeling (general). SSPA cumulative impacts modeling may be inaccurate.

Response: The Department recognizes that there are several sources of potential error in the SSPA modeling of existing irrigation pumping. Some of these, such as water level records from well construction reports spanning several decades, were also utilized for Dr. Kraft's model. DNR's review of cumulative impacts used work by Kraft and Mechenich as one of the main sources of information; regional, cumulative impacts are precisely the types of impacts the Kraft and Mechenich model was designed to simulate. The SSPA model results are valuable confirmation of the impacts of existing pumping on lake levels and baseflow in streams.

The issues that are raised here regarding the SSPA modeling of cumulative impacts do not affect the model's ability to accurately predict the individual impacts of the Richfield Dairy wells on nearby water bodies.

5. **Comment:** 25 years may not be long enough to model impacts in water bodies other than Pleasant Lake.

   Response: Following a 25-year model run, the streamflow reductions at the most distant gauging locations on each stream account for a total of 116.1 gpm, or 84% of the Dairy's total maximum pumping rate of 137.9 gpm[2]. When one considers that some additional reduction would take place downstream of the listed gauging locations, this implies that the system is near a steady state, and that almost all of the pumped water is derived from recharge and surface water rather than aquifer storage.

6. **Comment:** Is five feet of drawdown really okay for private wells? What about cumulative impacts?

   Response: Based on DNR staff experience with private wells, drawdowns of less than five feet are not expected to cause significant changes in well function. There may be cases where a smaller drawdown could cause impacts, but for wells constructed according to legal standards, this would be very rare. Although the Department reviewed the Dairy impacts separately from the impacts of existing pumping, it should be noted that even if the modeled drawdowns associated with the Dairy wells (1.5 feet after 25 years) are added to existing pumping effects (2.8 feet), drawdown is still less than five feet. No impairment of well function is likely.

7. **Comment:** Wetlands – was 25 years a long enough time frame to model drawdowns?

   Response*:* Pleasant Lake, which is a mile further from the proposed wells than the nearest mapped wetlands, reached an approximate steady state following a 25-year simulation. Given the relatively homogeneous hydraulic properties of the area, it is reasonable to assume that the wetlands would be at or near steady state after 25 years.

8. **Comment:** Historic flow reductions in Chaffee Creek spring.

   Response: The Chaffee Creek spring may have experienced considerable flow reductions in the last 50 years. However, the flow amounts provided in the 1963 spring survey are general estimates, not precise measurements. Because of this, the flow value of 2 cfs is qualitative rather than quantitative (e.g., the flow reduction between 1963 and 2003 could be more or less than 0.8 cfs.)

9. **Comment:** Chaffee Creek spring - Location of flow measurements, threshold determination

   Response: In the case of large springs such as those at the headwaters of Chaffee Creek, ch. NR 820.31(4), Wis. Adm. Code, states that "The department may not approve a proposed

[2] 137.9 gallon/min = *72,500,00 gallon/yr. ÷ 365 day/yr. ÷ 1440 min/day*

high capacity well that is predicted to result in a reduction in flow from a spring such that the spring does not flow at one cubic foot per second or greater at least 80% of the time or that will reduce the average annual flow from a spring by greater than 20%. (Ch NR 820 *Wis. Adm. Code,* uses the definition of "Spring" from s. 281.34 (1) (f), Stats., meaning "an area of concentrated groundwater discharge occurring at the surface of the land that results in a flow of at least one cubic foot per second at least 80% of the time." In addition, DNR also uses the qualitative metric of "no significant adverse environmental impact" to waters of the state, including springs (s. NR 820.31, Wis. Adm. Code).

The modeled streamflow reduction in the headwaters of Chaffee Creek (including the spring area) is 22 gpm (0.05 cfs), or 3.5% of the flow modeled in the "irrigation pumping" scenario. Approximately one mile downstream from the spring, flow in Chaffee Creek has been measured between 0.3 cfs and 3.0 cfs, with an average flow of 1.8 cfs and flow less than 1 cfs occurring on at least one date in 2006, 2007, and 2012. The Dairy's groundwater withdrawals will not result in enough flow reduction to change the spring's flow to less than 1 cubic foot per second for greater than 80% of the time.

10-11. **Comment:** Headwater impacts to streams are more significant than impacts further downstream, where flow amounts are higher. Flow reductions should be evaluated in headwater areas.

Response: At DNR's request, SSPA provided model results for flow reductions in the headwater reaches of the stream systems closest to the Dairy (Papadopulos, 2013a). Results are summarized in Table 1. The maximum absolute flow reduction modeled was 23 gpm (0.05 cfs) in the Little Roche-a-Cri headwater ditches. The maximum percent flow reduction was 3.5%, in the headwater area of Chaffee Creek. There were no changes in modeled stream length for any of the streams (e.g., any changes in stream length were less than the width of the model cell). This is a realistic result, given the small modeled flow reductions and presence of springs at the heads of Chaffee and Tagatz Creeks.

Table 1. Flow reductions in stream headwaters (upper 1 mile). SSPA letter, February 12, 2013.

Stream	Modeled Change in Flow		Percent Change in Modeled Flow
	cfs	gpm	
Little Roche-a-Cri (unnamed tributary)	0.01	3	0.8%
Little Roche-a-Cri (headwater ditches)	0.05	23	1.0%
Fordham Creek	0.02	8	1.3%
Chaffee Creek	0.05	22	3.5%
Tagatz Creek	0.05	22	1.0%

12. **Comment:** The ultimate potential error in the estimate of Pleasant Lake drawdown is not the same as SSPA model prediction uncertainty. However, the modeled 1.6 inches of drawdown at Pleasant Lake is almost certainly accurate within a factor of two.

    Response: The model-predicted drawdown of 1.6 ± 0.26 inches is a reasonable estimate of lake drawdown resulting from the Richfield Dairy wells. It agrees with modeling provided by Dr. Kraft within a factor of two, as stated in the comment. Therefore, this amount was used for the Department's analysis of potential impacts to Pleasant Lake.

13. **Comment:** Lakes – The entire hydrograph will be lowered by the Dairy's pumping. Pleasant Lake is experiencing a downward trend, not natural seasonal and annual fluctuations.

    Response: The Department considered the projected pumping impacts on Pleasant Lake in the context of the historical hydrograph of the lake, which includes both historic high and low water conditions, as well as seasonal and annual fluctuations, and impacts of existing pumping in the vicinity of Pleasant Lake. The projected impacts of roughly two inches of additional drawdown were compared to the range of water levels observed over the past several decades, as well as estimates of the cumulative impacts of groundwater pumping provided by Kraft et al, 2010, 2011, 2012. Specifically, the Department determined that two inches of drawdown represent about 5.5% (4-11%) of additional impact of the entire hydrograph (using Kraft's estimate of 3 feet (1.5-3.8 ft.) of existing pumping impact.) The Department's determination of significance was based on whether this additional amount of water level decline on its own would constitute a significant impact over and above these historic fluctuations and existing impacts.

    See also Responses to Kraft General Comments #4 and 5

14. **Comment:** DNR has not determined a threshold level for "significant impact" to Pleasant Lake.

    Response: See Response to Kraft General Comment #1

15-16. **Comment:** The 1.5-foot decline described at Pleasant Lake was derived from lake monitoring data. Recent drawdown has been greater than three feet.

    Response: The 1.5-foot decline in Pleasant Lake due to existing pumping was derived from statistical analyses of lake data and was not a model output. The Department recognizes that larger drawdown amounts would be expected to occur in drought years (and/or in years with larger amounts of pumping).

17. **Comment:** The decrease in water level simulated by SSPA is substantially less than empirically observed. Results should be discounted.

    Response: See Response to Kraft Detailed Comment #3

18. **Comment:** Flow reductions due to existing pumping should be greater than listed in the SEA, because they should be calculated in headwater areas.

Response: Comment noted. SSPA modeling results do reflect higher percent depletion in headwater reaches relative to downstream locations in the Little Roche a Cri system and on Chaffee Creek, and similar percent depletion in headwater and downstream areas of Tagatz Creek. (The absolute volume of depletion is, however, higher in downstream reaches than headwater reaches.)

Table 2. SSPA Modeled Percent Depletion due to Cumulative Impacts of **Existing Pumping**

Stream	Depletion Rate (cfs)		Percent Depletion	
	Headwater	Downstream	Headwater	Downstream
Little Roche a Cri / Fordham	0.07-0.76	1.81	8-22%	5%
Chaffee Creek	0.33	0.47	19%	3%
Tagatz Creek	0.28	0.47	6%	6%

See also Response to Kraft Detailed Comments #10-11.

19. **Comment:** DNR needs to establish thresholds that would be considered significant impact levels in order to determine if cumulative impacts are significant.

    Response: See response to Kraft General Comment #1

20. **Comment:** The planned monitoring near the Dairy will be unable to confirm modeled changes to surface waters.

    Response: The purpose of the water level monitoring is to identify any major discrepancy between the groundwater drawdowns modeled by SSPA and drawdowns related to actual pumping. In the case such a discrepancy is noted, the accuracy of the model predictions would need to be re-examined to determine if additional pumping restrictions would be appropriate to protect waters of the State. In the case of a decrease in water supply in nearby wells, water level monitoring could also help to demonstrate whether or not pumping from the Dairy was linked to adverse impacts.

    The purpose of the proposed monitoring is not to directly identify impacts to surface waters (except in the sense of validating the groundwater model). The predicted impacts to these waters are quite small and would not be felt until several years after pumping commences. It would be extremely difficult to measure the direct effects of the proposed wells on surface water bodies in isolation from natural variability and the effects of other pumping.

C. <u>Responses to Francie Rowe's Comments on SEA and Conditions</u>

[DNR Note: Francie Rowe's comments are summarized below; the complete comments are attached to the Comment Response document.]

The comments below speak to the Supplemental Environmental Assessment reviewing the pumping impact of the proposed Richfield Dairy's high capacity wells. I support the comments submitted by the Pleasant Lake Management District. I would also like to raise three points related to the proposed conditions noted in the Supplemental Environmental Assessment. In my opinion the conditions proposed in the Supplemental Environmental Assessment are insufficient and inadequate to manage the problems resulting from the permitting of the proposed Richfield high capacity wells.

1. **Comment:** Pumping Limit of 72.5 million gallons.

   Because of the well-documented cumulative impacts of existing pumping, area lakes and streams are already stressed to the point where it is unreasonable to allow further groundwater withdrawals in the area, no matter the amount. The existing impacts have already been empirically observed and are acknowledged by DNR in the SEA.

   It is also clear that the Dairy intends to increase its herd size in the future. What is to prevent the Dairy from doing this and increasing its water withdrawals at that time? DNR is very unlikely to deny a request for an increase in approved groundwater withdrawals.

   Response: See responses to PLMD General Comments regarding cumulative impacts and the response to PLMD General Comment #3 regarding future increases in water withdrawal amount.

2. **Comment:** Monitoring wells.

   Condition two of the SEA includes groundwater monitoring as part of the Richfield Dairy's amended high capacity well approval. What is to be done with these data? Will water bodies be monitored as well? How will you separate the effects of these two wells from the impacts of hundreds of other wells and natural variability? Monitoring wells are only useful if responses to monitoring outcomes are predetermined.

   What is the purpose of the monitoring? Could the data to be used to revoke the well in the event of harm to surface waters? The high capacity well permit should be limited or revoked if regional water levels drop, and this should be clear in the permit.

   Since it is well known that surface waters will drop as the result of additional pumping, the permit should not be issued. Harm should be prevented before it occurs, and the applicant should not have to deal with the uncertainty of possibly having the approval revoked.

   Response: The purpose of the water level monitoring is to identify any major discrepancy between the groundwater drawdowns modeled by SSPA and

groundwater drawdowns related to actual pumping. In the case such a discrepancy was noted, the accuracy of the model predictions would need to be re-examined to determine if additional pumping restrictions would be appropriate to protect waters of the state. In the case of a decrease in water supply in nearby wells, water level monitoring could also help to demonstrate whether or not pumping from the Dairy was linked to adverse impacts.

The purpose of the proposed monitoring is not to directly identify impacts to surface waters (except in the sense of validating the groundwater model). The predicted impacts to these waters attributable to the proposed wells are quite small and would occur gradually over several years after pumping commences. As the comment points out, it would be extremely difficult to measure the direct effects of the proposed wells on surface water bodies in isolation from natural variability and the effects of other pumping.

3. **Comment:** New pumping volume requests.

The third condition is that any increase in groundwater withdrawal will require a new high capacity well approval. This condition is missing criteria for assessing harm to nearby water bodies, which should be a prerequisite to any additional pumping being considered. The criteria for resource health in the new review are not specified in the condition. The condition also contains no requirement for notifying various interested parties of a request for an increased pumping limit. Please require notification to stakeholders within a 5 mile radius.

Response: See Response to PLMD General Comment #3 regarding potential future water withdrawal increases. Regarding the request to notify interested parties of such a request, the Water Use Section is developing a web page to display pending high capacity well applications, to be released in the next several months. Information about any application for increased pumpage from the Dairy would be available to the public on that web site.

D. Responses to Friends of Central Sands (FOCS) Comments on SEA

[DNR Note: FOCS comments are summarized below; the complete comments are attached to the Comment Response document.]

1. **Comment:** The SEA does not satisfy WEPA.

   a. Required Contents of an Environmental Assessment.

   Response: The Comment accurately states that the purpose of WEPA is to ensure that agencies consider environmental impacts during decision-making and to inform the public about a proposed action. The Comment accurately reproduces portions of s. NR 150.22, Wis. Adm. Code, relating to the content of an "environmental analysis" under that rule.

   The Comment cites to one case relating to the adequacy of an EA, *Town of Centerville v. DNR,* 142 Wis. 2d 240, 417 N.W.2d 901 (Ct. App. 1987). While the Court of Appeals found the EA to be inadequate in that case, the legal analysis in the case, when applied to the Original EA and Addendum and SEA in this case, supports the conclusion that they are adequate and comply with the requirements of WEPA (see Responses to PLMD General Comments).

   b. **Comment:** The SEA for the proposed wells is deficient.

   Response: For a general Response to the Comment, see Response to PLMD General Comment #1.

   i. **Comment:** The SEA relies on many generalized statements and does not state what constitutes a "significant" environmental impact for wetlands.

   Response: See Responses to PLMD General Comments #9 and 2, respectively.

   ii. **Comment:** Modeling was conducted for a 25-year period, rather than an indefinite term.

   Response: See Response to PLMD Specific Comment #1a and Response to Kraft Specific Comment #5.

   iii. **Comment:** The consumptive use coefficient of 20% used by SSPA is not explained or justified.

   Response: See Response to Kraft Specific Comment #3.

   iv. **Comment:** The SEA does not discuss the precedent-setting effect of the approval, the degree of controversy, the need for the approval and proposed preventive and mitigating measures.

   Response: These issues were discussed in the Original EA and Addendum and do not need to be discussed again in the SEA.

v. **Comment:** The alternatives analysis is inadequate.

Response: See Response to PLMD Specific Comment #8.

2. **Comment:** DNR must conduct a heightened review of the proposed wells or deny the high capacity well approval, pursuant to the *Lake Beulah* decision.

Response: DNR agrees that it has the authority and a general duty to consider the environmental impact of a proposed high capacity well on waters of the state when presented with "sufficient concrete, scientific evidence of potential harm to waters of the state" that may be caused by the well. The Original EA was triggered by the request for issuance of a WPDES Permit "for discharges from facilities which result in development of a new site," which is a Type II action under ch. NR 150, Wis. Adm. Code (see Type List in s. NR 150.03, Wis. Adm. Code).

While the request for a WPDES Permit triggered preparation of the environmental analysis under ch. NR 150, Wis. Adm. Code, DNR has also fulfilled its responsibility under the *Lake Beulah* decision by considering the environmental impact of the proposed high capacity wells in this case. DNR has done this by following the requirements of ch. NR 150, Wis. Adm. Code, for an environmental analysis of the potential impact of the wells, both in the Original EA and Addendum and the SEA.

For a response to the Comment that DNR has failed to adequately evaluate the cumulative effects of groundwater withdrawals, see Responses to PLMD General Comments #1, 4, 5 and 6. For a response to the more specific Comments regarding DNR's analysis of impacts from the proposed wells and regarding the draft conditions in the proposed high capacity well approval, see the Responses to Specific Comments from PLMD and Dr. George Kraft.

E. Responses to Ray White Comments on SEA

[DNR Note: Ray White's comments are summarized below; the complete comments are attached to the Comment Response document.]

1. **Comment:** The SEA did not sufficiently consider geomorphic and biological ramifications of the projected flow reductions to streams.

   Response: The modeled flow reductions due to the proposed Richfield Dairy wells and existing wells were shared with DNR fisheries biologists. The comments from Mr. Ray White, Mr. Ken Wade, PLMD, and Dr. George Kraft were provided to regional staff for Adams and Waushara/Marquette Counties for review and comment. Fisheries staff expressed concerns regarding the cumulative impacts of existing pumping on stream health for several streams in the modeled area. However, staff indicated that the withdrawals from the Richfield Dairy wells, without consideration of the existing wells, would not significantly alter the stream health (temperature, fish habitat, etc.) of nearby streams.

   The SEA does not conclude that there are no cumulative impacts on streams in the Central Sands region related to existing pumping. Both the SSPA model and modeling by Dr. George Kraft show baseflow reductions that could reasonably be expected to result in alterations to stream ecology. For example, the SSPA model of existing pumping impacts showed a baseflow reduction of 40.8% on Carter Creek (reported to be dry over several miles during summer of 2012), and flow reductions of around 18% on several other streams within the model domain (see SEA Table 1). The Department generally accepts that the issues raised by Mr. White and others regarding the negative impacts of existing withdrawals and prolonged dry periods are valid concerns.

2. **Comment:** The analysis of stream impacts should be based on conditions during drought, since these conditions limit the types of organisms that can survive in a particular stream.

   Response: Richfield Dairy may not pump more than 72.5 million gallons in any year, including drought years, so its maximum withdrawal will not increase during dry conditions. But because baseflow in streams is lower in drought years, the relative impact of the pumping would be increased compared to a typical year. Irrigation pumping also increases in dry years, so drought tends to intensify the cumulative impacts of pumping. Depending on the distance from the pumping well to the water body of concern, this increased pumping impact may be felt during or after the drought period.

   DNR acknowledges that organisms are restricted by minimum flows and associated conditions. Drought year streamflows for 2007 are available for Little Roche-a-Cri Creek and Chaffee Creek. In that year, Little Roche-a-Cri Creek at 10th Avenue experienced a 9% flow reduction compared to average measured baseflow. Chaffee Creek at County Highway CH experienced a 33-83% flow reduction from an average flow of 1.8 cfs to a minimum flow of 0.3 cfs. (The measured decreases reflect both natural and pumping-related reductions.) At this location (within a mile of Chaffee Creek's headwaters), the modeled baseflow reduction after 25 years of constant pumping at the Dairy's maximum approved rate is 22 gpm, or 0.049 cfs.

Impacts to Pleasant Lake were assessed in the SEA using the minimum recorded water level as a baseline.

3. **Comment:** Baseflow is very important to trout populations in streams. Decreased groundwater inflow causes a decrease in the trout population due to increased water temperatures.

   Response: Comment noted. See also Reply to White Comment #1

4-5. **Comment:** Any reduction in streamflow will reduce the length of the trout zone – the length of course that has suitable conditions to sustain a naturally-reproducing trout population. The SEA doesn't sufficiently deal with reductions in headwater areas, which are extremely important for trout habitat and spawning.

   Response: Groundwater withdrawal from the Dairy will slightly decrease groundwater flow to headwater areas of nearby streams and may cause a corresponding slight reduction in trout zone length. The modeled flow reductions in the headwater areas of trout streams range from 3-23 gpm (0.8%-3.5% of modeled streamflow), and changes in stream length are small enough that modeled stream lengths are unchanged from background conditions. Given the small amount of flow reduction, the Department's determination is that the degree of change that could be reasonably expected would not be significant to the health of the stream or fishery. Both SSPA modeling of a 72.5 MGY pumping rate and Dr. Kraft's modeled streamflow reductions at water withdrawals from the Dairy of 52.5 MGY and 131.2 MGY were considered in making this determination.

6. **Comment:** The sites that SSPA analyzed for streamflow reduction were too far downstream, and in some cases, not in the stream segments designated as trout water.

   Response: Streamflow changes were initially assessed in areas where flow measurements were available. In addition, DNR requested SSPA to provide flow reduction amounts for headwater areas of Chaffee Creek, Tagatz Creek, Fordham Creek, and the unnamed tributaries to Little Roche-a-Cri Creek. The reductions in these reaches (which are either within or upstream from reaches designated as trout water) were 0.8%-3.5% of modeled streamflow.

7. **Comment:** Michigan Assessment Tool. The EA's conclusions rely on the Michigan Water Withdrawal Assessment Process and are not specific to the biological and ecological characteristics of the streams at issue. The Michigan WWAP does not consider low flow or drought conditions. In Michigan, the WWAP is used additively to regulate cumulative impacts within water management areas. The Michigan WWAP does not take into account several factors such as fish size and headwater areas.

   Response: The Michigan fish models were developed for streams in a climatic setting similar to Wisconsin. They predict the general degree of impact that a decrease in groundwater recharge will have on fish assemblages (as a proxy for general stream health). The Department's statutory authority for high capacity well approval decisions differs from Michigan's, in that Michigan has statutory authority to consider cumulative impacts of withdrawals from other properties in its high capacity well permitting decisions. The

Michigan models are used as one tool in Wisconsin, along with DNR staff experience and expertise, to guide determinations of whether a certain amount of flow reduction is likely to be significant to a particular stream.

8. **Comment:** The EA does not adequately deal with thermal impacts. Changes in baseflow impact summer and winter temperatures and other habitat variables such as dissolved oxygen and flow velocity.

   Response: See Reply to White Comment #1

9. **Comment:** Parts of Fordham and Little Roche-a-Cri Creeks are sensitive, cold-transitional-type streams and are very vulnerable to changes in flow.

   Response: The modeled flow reductions due to the proposed 72.5 MGY maximum withdrawal amount are lower than those that would be expected to have observable impacts on a cold-transitional stream.

10. **Comment:** According to Kraft's modeling, the current baseflow in the streams at issue has already been reduced significantly by existing pumping. The cumulative impact is already truly immense. Added pumping will further decrease flows to these already-impacted streams.

    Response: The Department does not interpret its legal authority to allow conditioning or denying individual high capacity well approvals based on cumulative impacts of groundwater withdrawals from other nearby properties. See response to General Comment #7 for a discussion of cumulative impacts regarding the decision whether to approve the wells.

    See also Response to White Comment #1 for discussion of existing impacts.

F. **Response to Ken Wade's Comments on the SEA**
[DNR Note: Ken Wade's comments are summarized below; the complete comments are attached to the Comment Response document.]

Comments: Mr. Wade's comments can be summarized into several topics:

- Flow reductions in the headwaters of streams (Little Roche-a-Cri tributaries, Fordham, Chaffee, and Tagatz) are significant.
    - Kraft modeling of withdrawals of 52.5 MGY and 131.2 MGY showed baseflow reductions of more than 5% over several hundred meters in the extreme headwater reaches of nearby creeks, especially the unnamed tributaries to Little Roche a Cri Creek.
    - These reductions are on top of existing reductions due to irrigation pumping.
- The SSPA model underestimates the impact of existing irrigation pumping
    - 20% consumptive use is too low.
    - Inaccuracies and incompleteness in reported irrigation pumping cause the model to underestimate impact.
    - Pleasant Lake drawdown is underestimated relative to regression curves and Kraft groundwater model.
- Cumulative impacts need to be addressed.
- Seasonal and drought conditions need to be addressed.
    - Need a transient model that varies recharge seasonally and annually in order to simulate cumulative impacts and impacts from the Dairy.
        - Example: Chaffee Creek flows in 2007 (moderate drought)
- Need a larger, regional model so that modeled impacts can be compared to known impacts.
- Because of pre-existing cumulative impacts to wetlands, the small decrease due to the Dairy is significant.
- Because of pre-existing cumulative impacts to Pleasant Lake, the decrease due to the Dairy is significant. Pleasant Lake should have a public rights stage set.

Response: These comments include several excellent suggestions related to regional groundwater studies and management. However, undertaking a major, area-wide study and groundwater management scheme is beyond the scope of the environmental analysis for the Richfield Dairy proposal (for purposes of the original EA) and of the revised high capacity well application (for purposes of the SEA).

See the response to Dr. George Kraft's comments on the SEA for a discussion of the technical topics covered in these comments.

See the General Comment Responses and Responses to PLMD for responses to comments related to Cumulative Impacts.

G. Michael Best & Friedrich – Response to Technical Comments on SEA

[DNR Note: The complete Michael Best & Friedrich comments are attached to the Comment Response document.]

Comment: Page 2, second full paragraph: The most recent pumping data is the most relevant for purposes of comparison between the existing irrigation well and the proposed dairy wells. From 2007 through 2011, the average pump rate from the irrigation was 46.5 million gpy, which is 64% of the pump rate requested by Richfield Dairy. As such, the paragraph should read, "Based on pumpage reported for the years 2007-2011, 72.5 MGY is roughly 33% more than the amount of water that was previously pumped for irrigation purposes."

Response: The comment asserts that it would be more appropriate to compare past and future water withdrawals using only recent pumping records rather than all available pumping records. In either case, the proposed maximum withdrawal amount represents a substantial increase over past pumping.

Comment: Page 2, third full paragraph: The model grid spacing measurements should be in feet (ft.), not square feet (ft^2)

Response: The comment is correct; model grid spacing should be in feet.

Comment: Page 2, third full paragraph: The term "missing water" should be replaced with the term "consumptive use."

Response: Agreed. This is also discussed further in the response to Dr. George Kraft's comments.

Comment: Page 4, first full paragraph: Fordham Creek is 4.5 miles west-southwest, not southwest.

Response: Noted.

Comment: Page 4, third full paragraph: There is a reference to "Novitski & Devaul; House," but there is no corresponding "House" included in the reference list at the end of the document.

Response: The House reference was included in the SEA reference list.

Comment: Page 6, second paragraph under Cumulative Impacts heading: Irrigation pumping from area high capacity wells was calculated to have depressed the water level in Pleasant Lake by about 2.7 feet, not 0.7 feet. The original report contained a typographical error, which was corrected by email to WDNR on September 11, 2012.

Response: This comment was in error. The SSPA modeled drawdown at Pleasant Lake due to existing irrigation pumping is 0.7 feet. The figure that was corrected in the September 11, 2012 email was the modeled groundwater drawdown at the Dairy due to existing pumping, which should be 2.8 feet, not 2.8 inches (conversation with Anna Wildeman, Michael Best & Friedrich, attorney for Richfield Dairy, 1/24/2013).

Comment: Page 6, second paragraph under Cumulative Impacts heading: The sentence should be revised as follows: "Some streams within the model domain were calculated to have flow reduced by higher percentage than calculated by the Kraft Model (up to 41%) due to existing irrigation pumping."

Response: The SEA was not making a comparison to the Kraft and Mechenich model. The SEA intended to state that the SSPA-modeled existing impacts were higher at some streams more distant from the Dairy than at the streams closer to the Dairy.

Comment: Page 7, carryover paragraph: The SEA references information provided by Kenneth Wade, but there is no corresponding reference in the list at the end of the document.

Response: Wade reference: Wade, Kenneth. September 22, 2011, Letter to Terry Kafka, DNR.

H. Response to Hanaman/Garnett Comments on the SEA

[DNR Note: Complete comments from Hanaman/Garnett are attached to the Comment Response document. Below, the Department extracted the comments that seemed to require responses.]

Comment: DNR's SEA is incomplete. DNR did not consider hydrogeology reports showing large future drawdowns to Pleasant Lake. [DNR note: references to specific hydrogeology reports were not provided with the comment]

Response: In addition to the reports and other information reviewed for the initial Environmental Assessment, the SEA includes analyses of the results of the SSPA site-specific groundwater model and a more detailed review of the significance of modeled water table drawdown and flow reductions relative to specific characteristics of Pleasant Lake and nearby streams.

DNR used all information available to it to perform analysis of potential impacts of the proposed wells on waters of the state, including Pleasant Lake.

Comment: DNR needs to consider cumulative impacts as part of its permitting decisions in order to fulfill its public trust duties under the Wisconsin Supreme Court's *Lake Beulah* decision. Cumulative impacts are significant. Pleasant Lake in particular is sensitive to drawdown and has already experienced negative impacts from existing pumping.

Response: See General Comment Responses on "Cumulative Impacts" and Responses to PLMD General Comments

Comment: DNR's finding of "no significant adverse impact" is flawed because a 1.5-foot drawdown is significant to Pleasant Lake, and a large part of this drawdown will be caused by the Dairy. Negative impacts of lowered lake levels (environmental, recreational, economic) will be exacerbated by the Dairy.

Response: The 1.5-foot drawdown referenced here appears to be the average impact of existing irrigation withdrawals calculated by Dr. George Kraft. No analysis that the DNR is aware of has indicated that drawdown due to Richfield Dairy's pumping would be more than around two inches at Pleasant Lake, which DNR has determined not to be significant.

Comment: We request that DNR (1) deny the Dairy's permit application, or (2) mandate more natural resource-protecting re-siting farther to the west

Response: The final decision on approval of the high capacity wells will be based on DNR's assessment of the potential impacts of these proposed wells on waters of the state. DNR's final decision on whether to approve the wells is designed to avoid the potential for significant impacts, including requiring a pumping limit and groundwater monitoring. The Department is not aware of any evidence suggesting that a location farther to the west would result in lesser impacts to waters of the state than the current location. Furthermore, DNR cannot mandate the location of facilities.

Comment: The EA fails to address the change in high capacity well operation purpose from irrigation (which returns water to the ground) to cattle sustenance/maintenance (which returns virtually none).

Response: The SSPA model analyzed in the SEA accounts for the change in water use from irrigation to dairy farming by assuming 100% water loss for the proposed dairy pumping. The change in consumptive use is therefore reflected in the model results.

Comment: DNR's review fails to incorporate groundwater modeling analysis which shows at least 2 foot draw down to Pleasant Lake within eight years. The modeling referenced is the following…
"The aquifer is not of infinite areal extent. Over long periods of pumping the system will be significantly affected by boundary conditions not represented in the model which will cause the simulation to be unrealistic. The simulations cannot produce a realistic steady state solution because the cone of depression continues to expand infinitely. Since the proposed pumping wells are expected to be in use for many years the impact of longer pumping can be evaluated with the same models using the same aquifer data. Increasing the pumping period from 300 days to 3000 days (8.2 years) produces a Jacob drawdown result showing drawdown increasing to approximately ... 2.0 feet at 10,000 feet (or approximately 2 miles)." -- from Hydrogeologist Ken Wade's report

Response: This comment refers to analysis in Mr. Ken Wade's Sept. 22, 2011 letter to DNR. Mr. Wade's analysis was not meant to predict actual impacts from the Dairy's proposed pumping. The stated purpose for the analysis was to demonstrate that the results of simple analytical models (Jacob, Theis) were not realistic because they allowed drawdown to increase infinitely. Among other things, the model assumes that all water pumped comes from storage in the aquifer, with no input from precipitation. Models that more realistically simulate real-world conditions (the Kraft and SSPA models),on which DNR relied for the SEA, show an ultimate drawdown of around two inches at Pleasant Lake due to the proposed wells.

Comment: Additional requirements necessary to achieve and maintain water quantity protection standards for Pleasant Lake should be analyzed, and set as conditions to any permits.

Response: Comment noted. Water quantity and quality standards could potentially be a part of a future groundwater management strategy for the entire region. However, because of the proposed wells' small projected impact to Pleasant Lake relative to existing pumping and other factors, it is not practicable (and would almost certainly not be possible) to detect direct impacts from the Richfield Dairy wells on the lake.

Comment: DNR's analysis relied on outdated groundwater maps which are no longer accurate given the addition of 800+ high capacity wells in Waushara County along with other factors.

Response: A water table map of the area was produced as part of the calibrated SSPA groundwater flow model. Also note that water table drawdown and stream depletion due to a pumping well are not dependent on the direction of groundwater flow (Barlow and Leake, 2012, pp. 40-41).

Comment: An EIS must be completed to assure that the DNR's cumulative impacts review is consistent with WEPA requirements, including consideration of the "(cumulative) impacts of repeated actions of this same type" because they "can [easily] be anticipated". NR 150.22(2)a(2). An EIS is also required under WEPA standards of "significant impact(s) or unique circumstances (i.e. the porous soils in the Central Sands).

Response: See Responses to PLMD General Comments

I. Response to Thomas Kune Comments on the SEA

[DNR Note: Thomas Kune's comments are summarized below; the complete comments are attached to the Comment Response document.]

Comment: The SEA lacks technical and professional basis. The discussion of impacts to Pleasant Lake is based on generalized information rather than specific data and analysis. The statement that the "expected change in groundwater input is small enough that no measurable changes to lake chemistry or clarity are expected". This statement represents significant speculation without technical basis.

Response: Terms such as "not expected" and "unlikely" are meant to convey the inherent uncertainty involved in analyzing future impacts in any real-world system. However, the Department's "no significant impact" determinations were based on modeling, past work in the area, and professional judgment. Circumstances that are "generally" or "typically" true were used to test whether the modeling results for these specific water bodies were reasonable. (See also Response to PLMD General Comment #9—use of vague terminology)

Comment: Potential impacts to Pleasant Lake. I am familiar with the water quality and lake levels in Pleasant Lake. Reduction of lake levels due to additional high capacity well pumping will expose more shoreline and silt sediments in shallow bays to disturbance which in turn will bring about changes in vegetation and water chemistry (e.g. nitrogen and phosphorous, both contributors to eutrophication of surface water bodies).

Response: See Responses to PLMD Specific Comments 2 and 5

Comment: Cumulative Impacts: The SEA is contradictory from section to section. In the discussion about Cumulative Impacts, the case is presented rationally regarding the significant impact that will result from cumulative effects of the growing number of high capacity wells nearby within five miles of the proposed Dairy. Then, later in that section DNR states that "when DNR determines whether or not to approve an application for a high capacity well, DNR is limited to considering whether the proposed well or wells on the high capacity property may cause significant adverse environmental impacts". This is not protecting Waters of the State.

DNR discusses the cumulative impact on waters of the state beyond the Dairy property (and certainly can be classified as significant); then DNR claims it can't consider cumulative impact beyond the Dairy property. DNR finishes by listing DNR decision alternatives, including "deny the application for high capacity well(s) based on probable significant adverse environmental impacts to waters of the state that cannot be avoided by placing conditions on the construction or use of the well(s)". DNR goes on to select an alternative that only requires water level monitoring, even though the models used by various experts predicts impact that can be considered significant to the waters of the state.

Response: The comment alleges that different parts of the SEA reach different conclusions regarding cumulative impacts. The SEA discusses two separate aspects of DNR's consideration of cumulative impacts: consideration of the extent of cumulative

effects for the purposes of the EA; and whether cumulative effects can be taken into account when making the high capacity well approval decision. The Department took a hard look at the cumulative effects of existing groundwater withdrawals for the purposes of the Environmental Assessment in order to inform its decision making. However, as explained in Response to General Comment #7, DNR does not interpret its authority to allow conditioning or denying individual high capacity well approvals based on cumulative impacts from existing groundwater withdrawals. The environmental impacts caused by the proposed wells themselves are not expected to be significant.

Comment: DNR needs to consider impacts that extend beyond property lines. Hydrogeology recognizes cross-property, regional interactions regarding both flow and quality. Consideration of only the on-property impacts of a high cap well defies science and will not serve to protect the waters of the state.

DNR can regulation of impact on groundwater beyond property lines. At solid waste landfills, for example DNR is not limited to the evaluation or protection of groundwater only beneath the landfill property boundaries.

Response: In its decision-making on the requested well approval and for purposes of the SEA, DNR conducted its review with the understanding that impacts from groundwater pumping extend beyond property boundaries. The SEA examined potential impacts to waters of the state located several miles away from the Dairy property. No significant adverse environmental impacts were identified resulting from the proposed wells.

J. Response to Sierra Club Comments on the SEA

[DNR Note: Complete Sierra Club comments are attached to the Comment Response document. The majority of the topics raised in the Sierra Club comments are discussed in the Responses to PLMD and to Dr. George Kraft.]

Comment: The Sierra Club included a comment regarding pumping limits not covered elsewhere in the comment response document. The comment states that "during droughts, the DNR routinely allows high capacity well users to increase capacity in order to prevent losses to crops or livestock, and this could result in water drawdowns that exceed predicted levels."

Response: Allowing high capacity well users to exceed approved withdrawal amounts is not something that DNR does "routinely", but is a rare occurrence. It is very unlikely that the Dairy would need to request such an increase in pumping, since the proposed monthly pumping limit in the revised draft approval is well above typical water needs, even for a hot, dry summer month. The Dairy's annual pumping limit is closer to their actual water needs, so unusually high water use during summer months may need to be offset by lower use during the rest of the year.

References

Barlow, P.M., and Leake, S.A., 2012, Streamflow depletion by wells – Understanding and managing the effects of groundwater pumping on streamflow: U.S. Geological Survey Circular 1376, 84 p.

Hamilton, D.A. and P.W. Seelbach, 2011. Michigan's Water Withdrawal Assessment Process and Internet Screening Tool. Michigan Department of Natural Resources. Fisheries Special Report 55, Lansing.

IPS Environmental and Analytical Services, 1996, Phase I Pleasant Lake Management Plan, Waushara County, Wisconsin: Report to Pleasant Lake Improvement Corporation.

Kraft, G.J. and D.J. Mechenich, 2010, Groundwater Pumping Effects on Groundwater Levels, Lake Levels, and Streamflows in the Wisconsin Central Sands. Report to the Wisconsin Department of Natural Resources in Completion of Project NMI00000247. Center for Watershed Science and Education, University of Wisconsin – Stevens Point / Extension.

S.S. Papadopulos & Associates, Inc., 2012, Evaluation of Groundwater Pumping for Richfield Dairy, LLC, Town of Richfield, Adams County, Wisconsin, July 27.

S.S. Papadopulos & Associates, Inc., 2013a, Response to DNR Request for Additional Information, February 12, 2013.

S.S. Papadopulos & Associates, Inc., 2013b, Response to DNR Request for Additional Information on Irrigation Water Use, February 25, 2013.