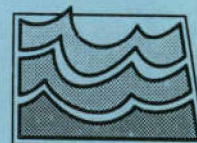

**A REPLY TO
"RIGHTS TO GROUND WATER
IN NORTH DAKOTA:
TRENDS AND OPPORTUNITIES"**

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**Water Resource Investigation No. 35
North Dakota State Water Commission**



December 1997

PREFACE

Introduction

North Dakota's water resources are vital to its cities, towns, industries, and farms, and in many cases provide a key to its future development and prosperity. The management of North Dakota's water resources, the manner in which the state prioritizes and protects individual water rights, and the legal and administrative structure according to which its waters are appropriated for use are extremely important to all citizens. While open discussion and disagreement over regulatory priorities and methods for managing water resources are inevitable and necessary, it is important that discussion be based on a clear and accurate understanding of the facts concerning the disposition of the state's waters, the priority system established by the state for appropriation of its waters, the current legal and administrative structure by which water is appropriated, and the scientific and technical procedures by which water is currently managed. Agencies, universities, analysts, and publications supplying information to the public and its representatives bear a serious responsibility to provide thorough, accurate, and well-balanced information that can be used to assess and improve water management. The purpose of this report is to provide a systematic factual correction for errors published in a paper titled Rights To Ground Water In North Dakota: Trends And Opportunities in the North Dakota Law Review, vol.71, no. 3, pp 619-669, 1995.

There are three reasons why this corrective reply is offered as a published report. First, the errors of fact presented were so numerous and pervasive as to comprise a misleading picture of water law and administrative practices in North Dakota. Second, the publication was presented as information to the Legislative Council Interim Committee on Natural Resources as an authoritative discussion of current water management practices in North Dakota, and therefore has entered the realm of public policy. Third, the North Dakota Law Review has refused to publish a corrective reply for the published errors. While some inadequacies of the paper have been refuted in testimony before the Legislative Council Interim Committee on Natural Resources, it remains that the paper in question has been published, and therefore resides in libraries, and particularly in law libraries of the

State of North Dakota. It can therefore be a source of ongoing misinformation for those concerned with water resource policy and with water law in North Dakota for an indefinite period of time. In the corrective reply the authors confined their refutation to errors of fact, rather than to disagreements of principle or logic. The corrective reply offered here is the same as that submitted to the North Dakota Law Review. However, because the original text was in draft form, a few minor changes have been made in this report to enhance clarity and accuracy. All changes in the text are italicized, and original statements are included as footnotes. Testimony before Legislative Committee is available from the Legislative Council. All correspondence referenced is presented as an appendix in this report. Before presenting the corrective reply, we offer the following brief history of the article in dispute.

Historical Summary

In September of 1995 a paper titled Rights to Ground Water in North Dakota: Trends and Opportunities was published by Assistant Professor Nancy Jean Strantz, of the University of North Dakota Law School (Grand Forks, ND) in the North Dakota Law Review (Volume 71: Number 3: pp 619-669.) The author's stated objectives were

"First, ... to delineate what is meant in North Dakota by the term "diffuse underground water," both physically and by legal definition. The article next explains the legal rules which have evolved to deal with conflicts among users of ground water, and identifies these rules applied in North Dakota. The article then comments on some of the volumetric, economic, and environmental considerations which must necessarily be investigated when determining the appropriate legal means of balancing the interests of competing users." (p622).

The published paper contained many errors of fact regarding the physical disposition, availability, and sustainability of ground water in North Dakota. It also contained many factual errors concerning laws, administrative rules, and

regulatory procedures comprising the water appropriation process in North Dakota.

On November 29, 1995, citations from the Strantz paper were presented in testimony before the North Dakota Legislative Council Interim Committee on Natural Resources. Subsequently, the State Engineer was invited to address the contents of the Strantz paper before the Committee. On February 22, 1996, Mr. Milton O. Lindvig, Director of the Water Appropriation Division of the North Dakota State Water Commission, addressed the Interim Committee on Natural Resources on behalf of the State Engineer. Written and verbal testimony offered are contained in the record of the Legislative Council for February 22, 1997.

Because publication in the North Dakota Law Review has reached a broader readership than the Legislative Council Committee, and because that broader exposure presented an ongoing risk that errors presented in the Strantz paper might be construed as an authoritative and accurate picture of the water appropriation process in North Dakota, the staff of the North Dakota State Water Commission prepared a corrective paper for presentation in the North Dakota Law Review. Discussion in the corrective paper was confined to factual errors alone, and did not address areas of mere conjecture or disagreement. The paper was structured as a point-by-point presentation of statements by Strantz, followed by citations of evidence demonstrating the errors. The form of the paper was therefore parallel to, and based on the form used by Strantz in the original paper. In addition, the presentation format in matters such as citations was designed to conform to that commonly used in the North Dakota Law Review. The cover letter of submittal is appended with this report (Appendix A).

In a letter dated March 22, 1996 (Appendix B), then editor Ms. Lisa Ridgedale referred to potential litigation threatened by Strantz over another document refuting her article, expressed concern over "potential complications" resulting from these threats, and suggested that the submittal appeared to be "less of a response, than a position piece on the practices and policy of your department." Ridgedale suggested that "after an initial reading and comparison, it seems as if your piece could perhaps be published as an independent article,

rather than as a direct response to the Strantz article." A copy of a "Publication Agreement Contract" was enclosed by Ms. Ridgedale.

A reply to Ms. Ridgedale's letter was sent by Mr. Robert Shaver on April 4, 1996 (Appendix C). In this letter, Mr. Shaver briefly reviewed the history of the written testimony submitted to the North Dakota Legislative Council Interim Committee on Natural Resources on February 22, 1997, which was the apparent source of concern over "potential complications". In it he affirmed that "we remain steadfast with regard to the veracity of this critical evaluation and associated testimony before the committee". With regard to the referred "potential complications", he pointed out that "it must be recognized that both the substance and form of any paper published in a journal, or presented in testimony before a public body, is open for criticism and debate", and that "a distinction must be made between the personal discomfort endured when one's work is criticized, however vigorously, and a personal attack. The acceptance of public challenge on the bases of the facts is a part of professional life. Though at times difficult, it is essential for determining the reliability and truthfulness of information or interpretations given by any analyst." Mr. Shaver stated that testimony before the committee was a separate issue, and that "as a result, we believe these concerns and actions should not, in any way, influence a decision to accept or reject our reply paper submitted to the North Dakota Law Review."

Mr. Shaver further discussed Ridgedale's proposal that the submittal appeared to be better suited as a stand alone paper than as a reply, by briefly reviewing the errors in the Strantz paper providing the substance for the refutation. He concluded that "as this summary indicates, our reply is presented as a correction for erroneous statements made in Strantz' paper. Its intention and purpose is to correct errors that have been publicly promulgated in the North Dakota Law Review. As such, it would be inappropriate to present it as a position paper. It should be presented as a response and a correction. It is our judgment that the interests of the public are best served through a balanced treatment of the issues by publishing our reply in the journal in which the errors were first publicly presented." (Appendix C).

After a hiatus of several months, a new editor of the North Dakota Law Review, Mr. Tim Richard, replied in a letter to Mr. Lindvig on October 1, 1996, (Appendix D). In this letter Mr. Richard rejected publication of the reply paper because "your paper does not contain a sufficient legal analysis to be published in its current form". He suggested that the authors consider publishing "another article addressing North Dakota water law and management policies."

The authors replied to the editor in a letter dated November 18, 1996 (Appendix E). In their letter they reasserted that the submittal was a corrective "reply" paper rather than a position paper. Furthermore, they added that "while we acknowledge that there may be revisions that the LAW REVIEW may desire to meet specific editorial requirements, and would willingly undertake any reasonable changes that do not change the substance of the reply, we would suggest that the reasons for rejection of this submittal may be rooted more in the failure of the LAW REVIEW review process in the previous publication to which ours relates, than in the merit of the reasons given in your letter for the rejection of our reply to that paper. Because the LAW REVIEW provided the medium for promulgation of a paper that contained many factual errors, and because those errors have been carried to forums of public policy we believe that there is an ethical obligation on the part of the LAW REVIEW to provide the forum, and the same readership, for the correction of those factual errors."

The authors pointed out that the "reply contains more than 12 citations and quotations of water law and Administrative Code," and that "it also contains more than 39 quotations and citations from the Strantz paper, previously published in the LAW REVIEW". They also pointed out that the corrective "reply follows the same topics of discussion presented previously by Strantz in a paper accepted and published by the LAW REVIEW." and that the "rejected reply, as a corrective discussion, simply follows the format of the previous publication point by point.. How can one paper presenting a discussion.... that contains many factual errors be accepted for publication, while a corrective reply following the same format as the original paper be deemed inadequate? It seems that the LAW REVIEW has changed ships in midstream."

The authors stated that "journals have an obligation to their readership and to the public to provide a means for correcting errors of fact, or for disputing

insupportable or potentially misleading information that they have published", and that all reputable professional journals do so. The authors provided eight examples of reputable law journals that publish refutations or disputations of published papers. The authors stated that "we believe that your refusal to publish a reasoned refutation of factual errors propagated in the LAW REVIEW is unfortunate, and reflects poorly on the credibility of the NORTH DAKOTA LAW REVIEW, the Law School, the University of North Dakota, and the North Dakota Bar Association, all of which it represents." They then asked the editor to reconsider his decision and publish the reply.

Courtesy copies of this letter were sent, with cover letter, to Dean Jeremy Davis of the University of North Dakota Law School (Appendix F.1), Dr. Kendall Baker, President of the University of North Dakota (Appendix F.2), and Ms. Rebecca S. Thiem, President of the North Dakota Bar Association (Appendix F.3). On December 4 Dr. Baker replied to the courtesy copy with a suggestion that the authors consider a separate paper as suggested by Mr. Richard (Appendix G). On January 14, 1997 Mr. Richard replied that he would not reconsider his decision not to publish the reply paper (Appendix H). No replies were received from Dean Davis, or from Ms. Thiem.

Summation

Because the inaccuracies published in the Strantz paper were extensive; because they have been carried into forums of public policy; because the published paper persists as an ongoing reference piece for public readership; because the misinformation contained in the published article could unfairly damage water users in North Dakota; and because discussion of inaccuracies and errors was not allowed within the journal of its initial publication, the corrective reply is here published in its entirety (with clarifying comments in footnotes as described above).

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I. INTRODUCTION

This paper is a response to the paper entitled "Rights to Ground Water in North Dakota: Trends and Opportunities" by Nancy Jean Strantz, published in the 1995 (v. 71, No. 3, ¶619-669) North Dakota Law Review. The Strantz paper described a classification of ground water and the hydrogeologic setting, application of law to ground-water appropriation, and administrative policy employed by the State Engineer in North Dakota. In addition, the author proposed a spill-down allocation system of ground-water management as an alternative to the prior appropriator doctrine currently utilized in North Dakota. The author alleges the Water Commission (State Engineer) has shown a "lack of foresight in investigating, planning, monitoring, and controlling ground-water allocation and use, for inadequate coordination with other agencies with respect to aquifer protection or for failure to develop and enforce rules to protect ground-water supplies."¹ The prior appropriation doctrine is characterized as "outdated"² and "unworkable."³ The author concludes that the current North Dakota Water Code (Water Appropriation Statutes, Rules, and Administrative Policy) is "sadly lacking in its consideration of state ground-water resources."⁴ Alleged problems and shortcomings described in the discussion of ground-water classification, and hydrogeologic setting, application of law and administrative policy are used by the author as a basis for recommending elimination of the Prior Appropriation Doctrine in favor of the spill-down system of ground-water allocation.

Excerpts from the Strantz paper were presented before the *North Dakota Legislative Council Interim Committee on Natural Resources** on November 29, 1995. The paper is thus being used to influence North Dakota water policy. In its present form, with major inconsistencies, untrue and inaccurate statements, the Strantz paper does not provide a rational and articulate analysis of contemporary ground-water management issues in North Dakota. As a result, the paper should not be used as a basis for initiating change with respect to ground-water management in North Dakota.

* Italicized name was previously erroneously labeled the *North Dakota Legislative Council Committee on Water Resources*

The purpose of this paper is to elucidate some major inconsistencies, and untrue and inaccurate statements made by Strantz about the hydrogeology, application of law and administrative policy in North Dakota.

II. HYDROGEOLOGY

The section of the paper entitled "A Basic Overview of North Dakota Hydrogeology" begins with the following statements:

"To determine what might constitute proper development of a ground water supply, one must consider its use and conservation. Thus, a basic knowledge of the regional hydrologic system is essential."⁵

The author proceeds to describe only the regional bedrock aquifers and omits entirely a discussion of aquifers comprised of unconsolidated deposits of sand and gravel, most of which are associated with Pleistocene glaciation. Aquifers comprised of unconsolidated deposits are more productive (larger well yields) and generally yield less mineralized water than those in bedrock. As a result, the aquifers comprised of unconsolidated deposits are by far the most widely developed in North Dakota.

Ground-water management considerations of regional bedrock aquifers commonly differ from those associated with unconsolidated aquifers in North Dakota because the hydrogeologic characteristics (boundary conditions) are different. For example, in regional bedrock aquifers in North Dakota, the volume of annual recharge is relatively small in relation to the volume of water in storage, whereas in more local, unconsolidated aquifers, the volume of annual recharge commonly is relatively large in relation to the volume of water in storage. Thus, for all practical purposes, any significant ground-water withdrawals from regional bedrock aquifers will result in "mining." Under these circumstances the ground-water resource is non-renewable. In many unconsolidated aquifers, significant ground-water withdrawals can occur within natural recharge limits and for these aquifers, ground-water withdrawals are sustainable and the ground-water resource is renewable.

The author failed to articulate differing hydrogeologic characteristics and associated management considerations between bedrock and unconsolidated aquifers in North Dakota. As a result, the hydrogeologic foundation is inaccurate and incomplete. This lack of understanding leads to repeated inconsistencies and inaccurate statements later in the paper.

A. The Issue of a Renewable and Non-Renewable Ground-Water Resource.

With regard to the issue of ground water being a renewable or non-renewable resource, the author is inconsistent. The following examples are cited:

- "However, water is not, as once thought, renewable"⁶ (states ground water is non-renewable).
- "As a consequence of its notion that water is a 'renewable' resource, percolating ground water has been relatively ignored by case law as a water resource requiring some volumetric limitations on appropriation and use"⁷ (states ground water is renewable).
- "Failure of the Water Commission (State Engineer) to act in the prevention of aquifer mining might be actionable under the public trust doctrine should the aquifer be permanently damaged. This is an issue that should be considered further by the Water Commission or State Engineer"⁸ (this statement implies that ground water is renewable).
- "Aggregate withdrawal volumes and pumping rate of any appropriation would then be limited to levels permitting aquifer recharge and ensuring minimal degradation of the aquifers water quality"⁹ (this statement implies ground water is renewable).
- "At minimum, appropriations under any priority system should be limited to the 'sustainable yield' or 'safe yield' of the aquifer"¹⁰ (this statement implies ground water is renewable).

- "This research demonstrates the importance of having reliable information about factors such as the net natural recharge of the aquifer"¹¹ (this statement implies ground water is renewable).
- "Their (meaning aquifers in the western United States, including North Dakota) natural recharge rates are too low to have ground water exploited as a 'renewable' resource without long-term repercussions"¹² (states ground water is non-renewable).
- "Opportunity for the proactive introduction of 'sustainable development' concepts within the regulatory scheme"¹³ (this statement implies ground water is renewable).
- "The more that North Dakota stakeholders understood about hydrogeology, the water cycle, the relationship of water to other facets of the environment, and the implications of competing demands, the less it will be possible for any stakeholder to treat ground water as a renewable or exclusive resource"¹⁴ (states ground water is non-renewable).

As presented by the author, the issue of ground water as a renewable and non-renewable resource is very confusing. The author concludes that stakeholders treat ground water as non-renewable, yet throughout the paper the author pleads for a "sustainable development" ground-water management approach and further warns the State Engineer that failure to act in the prevention of mining might be actionable under the public trust doctrine.

An explanation of how the State Engineer views the problem of whether ground water is renewable or non-renewable is in order. Large volumes of ground water are renewable in many of the unconsolidated aquifers in North Dakota. For these aquifers, the State Engineer allocates ground water within a "sustained" or "safe yield" management framework. A "sustained" or "safe yield" is the maximum volume of water that can be withdrawn perennially from a particular source. Staff hydrogeologists in the Water Appropriation Division of the State Water Commission have developed finite-difference ground-water models for many of the unconsolidated aquifers throughout North Dakota. These models include the

Englevale, Oakes, Pleasant Lake, Edgeley, Sundre, Skjermo Lake, Streeter, Elk Valley, Fordville, and parts of the LaMoure and Inkster aquifers. Some of the above computer models have been used to simulate aquifer response to varying ground-water withdrawal and climate scenarios and ultimately provide the basis for action taken by the State Engineer on pending water permit applications.

For those unconsolidated aquifers where computer models have not been developed, the allocation of ground water is based on an incremental development approach. This approach involves an assessment of aquifer response as related to a specific amount of ground-water development. Assessment of aquifer response is accomplished by water-level, water-quality, and water-use monitoring, coupled with an evaluation of climate data and aquifer properties. If, in a given area of an aquifer, the ground-water resource is sustainable under the existing development scenario, additional allocations can be made and monitoring continues. Thus, in the appropriate hydrogeologic setting (all unconsolidated aquifers) the State Engineer does not permit sustained ground-water mining to occur. The West Fargo aquifer is one exception. This aquifer was developed near the turn of the century prior to the establishment of a comprehensive water management system, and a very slow rate of mining is occurring.

B. The Issue of the Interrelationship between Ground Water and Surface Water

The author correctly states the importance of recognizing the interrelationship between ground water and surface water in water-resource management. However, the interrelationship is over stated because unconsolidated aquifers are not considered. The author states:

"Modern hydrogeology does not support a clear distinction between underground streams and percolating waters. Water exists within a cyclical process, first falling as rainwater and soaking down within the soil into the channels of underground watercourses or into a water table, and then percolating upwards towards the surface and into surface streams. Thus, all percolating water is, at some point, tributary to surface watercourses, and all

watercourses at some point will become percolating ground water."¹⁵

"Integrated water management is simply the management of surface and ground water as if from a single source. The concept is sound since surface and ground water are hydrogeologically connected and volumetric or quality changes in one create reciprocal impacts on the other. Ground-water aquifers are not distinct pools, but 'communicate' with each other through fractures and faults, vertical diffusion through the soil, and in 'blend zones' between aquifers."¹⁶

Many of the highly productive unconsolidated aquifers in North Dakota are not hydraulically connected to surface water bodies (streams). In addition, many of these aquifers occur as relatively discrete hydrogeologic units. The Oakes aquifer in southeastern North Dakota is a good example of an aquifer of this type. Recharge to the Oakes aquifer is almost entirely from direct infiltration of precipitation and snowmelt. Discharge is almost entirely from evapotranspiration.¹⁷ As a result, the aquifer is managed as a "distinct pool."

The State Engineer recognizes the interrelationship of ground water and surface water in the allocation of water in North Dakota. In 1981, the State Water Commission initiated and participated in a cooperative investigation with the U.S. Geological Survey to describe and analyze the ground- and surface-water systems of the lower James River in North Dakota.¹⁸ The study was initiated in response to increased demand for water resources along the lower James River. One of the objectives of the study was to identify areas along the James River that were hydraulically connected to nearby aquifers. The study identified parts of the LaMoure aquifer that were hydraulically connected to the James River. As a result of the study, the State Engineer has placed conditions on subsequent ground-water permits to prevent stream-flow reduction in areas where the LaMoure aquifer and James river are hydraulically connected. For example, the following condition was stipulated by the State Engineer on conditional water permit No. 3990 (LaMoure aquifer, issued November 10, 1988):

"An aquifer test shall be conducted using the irrigation well to determine the hydraulic connection between the LaMoure aquifers and the James River. Depending on the nature of the hydraulic connection, the State Engineer may establish a minimum James River stage near the permit area as a prerequisite to operation of the irrigation well."

Based on the above, where appropriate, the State Engineer considers the interaction of surface and ground water in water resource management in North Dakota.

In summary, the author's description of the occurrence of ground water in North Dakota is both inaccurate and incomplete. The treatment of North Dakota aquifers as being entirely of the regional-bedrock type is untrue. The discussion of the renewability of North Dakota's aquifers is both inconsistent and confusing. The assertion that North Dakota ground water is non-renewable is untrue with respect to unconsolidated aquifers which provide most of the state's ground-water supply. The treatment of all ground water as connected to surface streams is also inaccurate for North Dakota.

III. WATER APPROPRIATION STATUTES AND RULES

A. Definition of the Prior Appropriation Doctrine

The author is inconsistent with regard to describing the type of hydrologic setting where the Prior Appropriation Doctrine is applied. The following examples are quoted:

"Sometimes called the 'western states' or 'short water' doctrine, the prior appropriation doctrine is applied in more arid jurisdictions where there is insufficient water from a particular source to satisfy all users."¹⁹

"However, through case law and by virtue of the broad wording of its statutes, North Dakota can be said to follow

the prior appropriation doctrine with respect to its diffuse ground water. The employment of this doctrine is typical of other western states who have historically had adequate water supplies."²⁰

"The traditional prior appropriation doctrine presumes unlimited supplies of a renewable resource and simply does not address overdrawn or environmental protection issues."²¹

In citation 19, the author correctly states the Prior Appropriation Doctrine is applied in areas where there is insufficient water to meet all demands (commonly semiarid to arid areas in the western United States). In citations 20 and 21, the author contradicts citation 19 by incorrectly stating the Prior Appropriation Doctrine is applied in areas of "adequate" and "unlimited" water supplies. Thus, the reader is left confused about the hydrologic basis for application of the Prior Appropriation Doctrine.

B. Issue of State Engineer's "Unused Powers" to Manage Water

North Dakota Century Code 61-04-06.2 states, in part:

"He (*the State Engineer*) may issue a permit subject to fees for water use, terms, conditions, restrictions, limitations, and termination dates he considers necessary to protect the rights of others, and the public interest."²²

This section of 61-04-06.2 is quoted by the author and immediately following this quotation the author states:

"these powers have potential to be good water management tools, but remain largely unused."²³

It is untrue that these powers are unused. The State Engineer is, in fact, making substantial and broad use of the powers cited in 61-04-06.2 in the management of ground water. For example, the State Engineer stipulates a set of standard

conditions on all conditional ground-water permits approved for irrigation use. These standard conditions are:

- The well(s) shall be placed in such a location, constructed to such a depth, have such an efficiency, and be pumped at such a rate that will not unreasonably restrict further development of the aquifer system;
- The well(s) shall be located no less than 660 feet from the perimeter of the described property in the permit; any location closer than 660 feet must be approved by the State Engineer prior to the construction of the well;
- The location and design details of the proposed production well(s) shall be approved by the State Engineer prior to construction;
- The irrigation well(s) shall be constructed with a measuring port and a tube having a minimum 3/4-inch inside diameter installed in the annular space between the pump column and the well casing and extending to the top of the bowl assembly or submersible pump to allow the measurement of water levels in the well(s). The bottom end of the tube shall be plugged and the bottom 2 feet perforated. Any other facility for water level measurement must be approved by the State Engineer;
- The pumping rate shall be subject to the results of an aquifer test;
- Prior to the beneficial use of water, an automatic backflow prevention device (check valve) shall be installed in the above ground portion of the pipeline near the pump discharge. The injection of the fertilizer, pesticides, other chemicals or crop stimulants into the pipeline shall be downstream from the check valve. Other automatic backflow devices and the placement of those devices may be utilized upon written approval of the State Engineer;

- Prior to the beneficial use of water, instrumentation shall be installed from which the quantity of water pumped can be determined. The instruments are subject to approval by the State Engineer and shall be available for inspection by representatives of the State Engineer; and
- Failure to comply with any order of the State Engineer may result in forfeiture of this water permit.

The State Engineer has included other conditions when necessary to protect the rights of others and the public interest. Selected conditions are as follows:

- When the water level in observation well XXX is lower than an elevation of XXX feet above sea level after the late May measurement, no irrigation water use shall be allowed that year on the XXX 1/4 of Section XXX, Township XXX North, Range XXX West unless specifically authorized by the State Engineer.
- The location, depth, and the screened interval of the proposed well(s) must be approved by the State Engineer, based on test drilling data and prior to construction of the well.
- The State Engineer reserves the right to reduce the pumping rate for a single well that serves water permit XXX in addition to the appropriation authorized by water permit XXX.
- The point of diversion in Section XX of Township XXX North, Range XX West along the edge of the New Rockford aquifer is not a location that will allow the efficient development of the aquifer. The presence and use of such wells shall therefore not be sufficient reason for future limitation of development of the New Rockford aquifer, even though such future development may cause a decline in the water level of

the aquifer and thereby reduce the producing capacity of the production well(s) associated with this permit.

- The annular space between the wall of the drilled hole and the casing shall be filled with neat cement grout from the bottom of the casing to land surface.
- The permit shall expire January 31, 1997. At that time, the State Engineer may renew the permit for a specified period of time, reduce the volume of water appropriated and renew the permit for a specified period of time; or cancel the permit entirely.
- The office of the State Engineer shall be notified 72 hours prior to the drilling and installation of the water well.
- The permit holder shall construct an observation well into the Fox Hills-Lower Hell Creek aquifer system for the purpose of monitoring water level changes in that aquifer system.
- The observation well shall be located 2 to 4 miles from the production well.
- The specific location of the observation well must be approved by the State Engineer prior to construction.
- The observation well must be constructed in accordance with specifications set forth by the State Engineer.
- If the water level elevation in the observation well declines an amount which may result in adverse impacts on senior appropriators, the State Engineer may reduce or terminate the appropriation made under this permit.
- The permit holder shall allow perpetual and free access to the well by the State Engineer or his representative for the

purpose of making water-level measurements and such other tests and observations as may be deemed necessary by the State Engineer.

- In the event this water permit is abandoned the State Engineer may require that provisions be made by the permit holder to assign or provide perpetual access to the observation well for the stated purposes.
- A test hole shall be drilled and an observation well shall be installed near each of the points of diversion of the prior water rights located at XXX and XXX. The specific location shall be approved by the State Engineer prior to the drilling and installation. The work shall be done by a North Dakota certified water well contractor. Access to the observation wells shall be granted by the landowner as a condition of this water permit. The State Engineer reserves the right to set a minimum water level condition on this water permit to ensure that the rights of the senior appropriators are not adversely affected.
- Only one center pivot irrigation system shall supply water to the field at a time. The approved quarters to be irrigated, the NE1/4, and SE1/4 Section XX, shall not be irrigated simultaneously.
- No irrigation water shall be applied directly to an area defined by a radius of 200 feet from the XXX supply well.
- On the irrigated field which contains the XXX supply well, no fertilizer or pesticides shall be applied through the irrigation system.

These are some examples of conditions placed on water permits to assure the protection of the water rights of prior users and *to protect the public interest** . Contrary to the author's assertions, it is clear the State Engineer is using, where appropriate, the powers described in 61-04-06.2 in the management of ground-water resources in North Dakota.

C. Issue of Volume and Rate of Ground-Water Withdrawal

Throughout the paper the author incorrectly indicates that the prior appropriation rules and administrative policy used by the State Engineer do not limit volume and rate of withdrawal in the allocation of ground water in North Dakota. This leads the author to conclude that prior appropriators "may virtually pump with impunity," causing overdraft (ground-water mining) and/or water quality degradation.^{24, 25}

The prior appropriation statutes and administrative rules used by the State Engineer do, in fact, require limiting both volume and rate of withdrawal in the allocation of ground water in North Dakota. Regarding information to accompany an application for a water permit, NDCC 61-04-03 states, in part:

"The application for a permit to make beneficial use of any waters of the state shall be in the form required by the rules and regulations established by the State Engineer. Such rules and regulations shall prescribe the form and contents of, and the procedure for filing, the application."²⁶

The application form includes such information as the volume(s) of water requested, the rate(s) of withdrawal, the point(s) of diversion, and the period of use.

After the State Engineer receives a complete water permit application, the applicant is instructed to send a "Notice of Application" by certified mail to all record title owners of real property within a one-mile radius of the point of diversion, *all persons holding water permits for the appropriation of water from sites located within one mile of the proposed water appropriation site, and to all municipal or*

*Original statement was "to assure the sustainable supply and quality of North Dakota's ground water."

*public use water facilities in the county in which the proposed water appropriation is located.** The notice states an application for a water permit has been made and it provides details (including volume and rate) concerning the application and the upcoming hearing. After the applicant notifies the State Engineer that he has provided notice to the above *parties*** , the State Engineer then publishes a hearing notice once a week for two consecutive weeks *in the official newspaper of the county in which the proposed appropriation site is located**** . According to NDCC 61-04-05(4):

"The notice must give all essential facts as to the proposed appropriation, including the places of appropriation and of use, amount of water, the use, the name and address of the applicant, and the time and place of a hearing on the application by the State Engineer."²⁷

The State Engineer may issue a conditional permit for less than the amount of water requested but in no case may he issue a permit for more water than can be beneficially used for the purposes stated in the application. For incorporated municipalities *or rural water systems***** the water permit application may contain water in excess of present needs if based upon reasonable projections of future water needs of the municipality *or rural water system*.²⁸

For irrigation purposes on sandy soils, the State Engineer often bases the total annual appropriation on 18-inches of water applied per acre, and the total rate of withdrawal is usually based on six to seven gallons per minute per acre irrigated. Most water permit applications submitted for irrigation use request total volumes and rates that conform to the above guide lines. Unless for good cause shown, volume and rate requests in excess of the above guidelines are reduced accordingly when the State Engineer approves the conditional water permit.

* Italicized statement added.

** Italicized word substituted for "*real property owners*"

*** Italicized statement added.

**** Italicized statement added. The 1997 Legislature modified North Dakota Century Code to expand water planning privileges to rural water systems as well as municipalities.

The conditional water permit as approved by the State Engineer stipulates the maximum amount (volume) of water authorized (equal to or less than that shown in the notice), the rate at which it may be diverted, the point(s) of diversion, and the period of use. After the permit is developed (water put to beneficial use), the "works" are inspected to ensure all conditions as prescribed by the State Engineer on the conditional water permit have been met. If all conditions are met, *and the capacity of the works is sufficient to capture and deliver the volume of water appropriated,** a perfected water permit is granted by the State Engineer. The perfected permit stipulates the permit holder has a right to appropriate and divert from a point(s) of diversion, a quantity of water limited to the amount that can be beneficially used herein, but not to exceed an annual amount specified at a total pumping rate not to exceed a specified amount for the purpose to which the water is being put to beneficial use. In the case of irrigation, a total acreage is always specified.

Further, a provision exists in North Dakota Administrative Code to increase a pumping rate of a conditional or perfected water permit (89-03-02-11).²⁹ This statute indicates that the pumping rate of a conditional or perfected water permit is fixed, and that changing the pumping rate requires approval by the State Engineer. In evaluating the requested change in pumping rate, the State Engineer must consider what effect the increased pumping rate has on other appropriators from the water source.³⁰

A person who violates an order of the State Engineer, or who fails or refuses to install meters, gages, or other measuring devices or to control works, or who violates an order establishing corrective controls for an area, or for a source of water; or who violates the terms of the permit; or who knowingly makes a false or misleading statement in a declaration of existing rights, is guilty of a Class A misdemeanor.³¹ Notwithstanding any other provision of law, the State Engineer may issue administrative orders requiring the immediate cessation of water use when the State Engineer has a reasonable belief that such use is unauthorized or continued use will damage the rights of prior appropriators.³²

* Italicized statement added.

Based on the above, volume and rate limitations are terms placed on conditional and perfected water permits. Any person who violates the terms of a permit is subject to a Class A misdemeanor. Further, if excess volume withdrawals and/or rate of withdrawals will damage the rights of prior appropriators the State Engineer may issue an administrative order requiring the immediate cessation of water use. Thus, in North Dakota, appropriators may not virtually pump any volume at any rate with impunity as stated by the author.

D. Issue of SWC Monitoring and Data Gathering

Throughout the paper, the author alleges the State Engineer is showing a "lack of foresight in investigating, planning, monitoring, and controlling ground-water allocation and use." The following examples are cited:

"Particularly with response to aspects of allocation which have potential to physically impact an aquifer, the State Engineer needs to better fulfill its public trust responsibilities. Alternately, the Water Commission may be forced to evolve from an administrative agency to a regulatory body. The Water Commission appears to have been given express authority, which it is not currently utilizing, to monitor ground water activity in the state. Perhaps this is because there has not heretofore been a perceived need to do so. However, with the scope of the public trust doctrine not yet delineated, the Water Commission would be well advised to consider its current practices with a view to preempting any possible action against it for lack of foresight in investigating, planning, monitoring, and controlling ground-water allocation and use for inadequate coordination with other agencies with respect to aquifer protection, or for failure to develop and enforce rules to protect ground water supplies."³³

"At minimum, there should be some data gathering about current ground water allocation in North Dakota."³⁴

"Without adequate data gathering and monitoring systems, North Dakota does not have any means to guard against these possibilities" (in reference to "water hoarding").³⁵

"In any event, before any full-scale regulatory overhaul of the North Dakota ground water rights system, the following preliminary or organizational steps seem prudent.

- 1) Collection of accurate data as to hydrogeologic properties of aquifers..."³⁶**

In these statements, the author clearly indicates the State Water Commission has failed to evaluate and monitor North Dakota's ground water. This is untrue. There are few states in the nation that maintain an ongoing exploratory, monitoring, and investigative program for ground water that can compare with that maintained by the North Dakota State Water Commission. The North Dakota State Water Commission, in cooperation with other agencies, has an extensive body of ground-water information, and maintains an extensive network of ongoing information sources for ground water in North Dakota. Resources for implementation of water-resource management decisions kept by the Water Commission and available to all other agencies and to the public include the following:

- The SWC, in cooperation with the United States Geological Survey (USGS) and the North Dakota State Geological Survey, has completed ground-water studies for all counties in North Dakota. Each county study includes three parts. Part 1 is a description of the geology of the county. Part 2 is a compilation of basic data including lithologic logs of drill holes, an inventory of existing wells, water level, and water quality data. Many drill hole records also include geophysical logs (electrical, neutron, gamma). Part 3 is a hydrogeologic interpretive report describing the occurrence, movement, and quality of the ground-water resources. County studies include maps of well locations (at the time of the survey), bedrock and other geologic maps, and interpretive maps of major aquifers. North Dakota is one of the few states to have assembled such an information resource. The North Dakota County Studies were deemed adequate to fulfill the ground-water information requirements of the EPA underground injection program, and to exempt North Dakota from the necessity for further required ground-water exploratory work in the early 1980s. Many sectors of the public have used these reports effectively for many years.**

- The SWC maintains a network of water-level monitoring wells in 2,500* locations. Water levels in 85% of these monitoring wells are measured on a monthly basis. The other 15% are measured on a quarterly or annual basis. In addition, the USGS maintains an additional network of 120 monitoring wells for which water levels are measured on a regular basis. Several of these are continuously monitored by recorders. All of the major aquifers of the state, and particularly shallow glacial aquifers, are monitored in this network. A map of the combined SWC and USGS contract wells is provided on Figure 1. The monitoring network is regularly being reevaluated and revised by managing hydrologists, as questions involving the management of ground water arise.

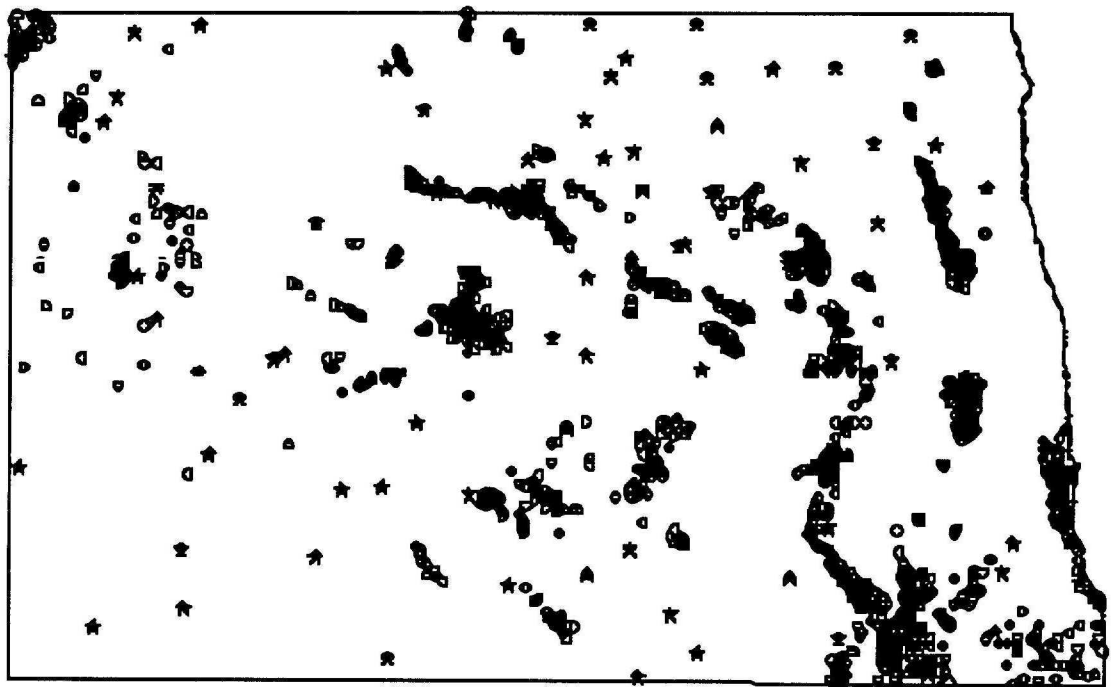


Figure 1. Locations of monitoring wells used for ongoing water level measurements in North Dakota ground water.

- Water levels for all of the above listed wells are recorded in a computer data base. However, the above listed wells include only those wells which are specifically constructed for monitoring purposes by the SWC, and which are

* Italicized number was originally 2,589. The new rounded number in the text reflects the fact that the actual number varies somewhat from year to year.

currently being monitored on a regular basis. In addition, there are many monitoring wells constructed by the SWC or by cooperators in the county surveys or other surveys that are still in place and available for activation in monitoring and sampling work if needed. These wells are recorded in the data base.

- The SWC data base contains more than 13,000 wells and test holes, including wells constructed by the SWC and cooperators which are no longer being monitored (but where monitoring can be reactivated at any time) and wells constructed by contractors for production, domestic supplies, industrial use, etc. which have been verified by SWC hydrologists. Well logs filed by individual well drillers are available for use by SWC hydrologists, or any other parties to assist in further water exploration and evaluation. A portion of these well logs have been entered into a computer data base.
- For new test holes or monitoring wells constructed by the SWC, geologic logs are prepared by a site geologist. In addition, electric logs (resistivity-spontaneous potential) are available for many monitoring well sites. Gamma and neutron geophysical logs are available for a large number of commercial wells constructed in the western part of the state.
- Extensive records of water levels are maintained on the data base. Of the SWC constructed or verified wells, about 350,000 water levels have been recorded and are available for use. Great care is taken to assure the accuracy of the data base. Before entry into the data base, the appropriate managing hydrologist, must assure the accuracy of data entered. Additional quality assurance of water-level data is offered by double entry of all data, and by a computerized cross checking program which is run on all data. Currently, all water-level data is entered once directly in a hand-held data recorder at the well, and is written down for manual entry and checking later. If the public, or other state or federal agencies wish to use geologic data, water-level data, water-quality data, or water-permit data from the SWC data base, they may do so with a high assurance of quality.
- Well records, including locations, logs, screened intervals, and basic construction information for all commercial wells drilled in the state of North

Dakota are filed with the North Dakota Board of Water Well Contractors. Beyond the 13,000 verified wells and test holes for which information is contained in the data base, there are literally thousands of "unverified" wells for which information is on file, and which can be accessed for further reference information.

- The SWC routinely samples for basic water quality in its observation wells, and in connection with special projects, or specific areas of water allocation. More than 29,000 basic water quality samples are recorded in the SWC data base. Basic water quality includes major anions and cations, boron, fluoride, pH, electrical conductivity, total dissolved solids, and usually a spot test for nitrate. Many also contain trace elements. The purpose of these data is to document the status, fluctuations, and changes in natural ground-water systems under use, so that their long-term sustainability can be assured, and so that effective decisions can be made concerning their safe use and their protection. This goal differs from, but is complementary to monitoring activities of the Health Department which are concerned primarily with the assurance of safe drinking water supplies at the wellhead, and with protection of ground water from surface contamination. Moreover, the goal of characterizing general chemistry differs from that of the Health Department which concentrates primarily on parameters deemed to be potential health hazards.

- In addition, the SWC maintains a laboratory for ongoing water quality analysis and operates a sampling van in ongoing sampling and monitoring work. On the average, about 1,000 water quality samples are taken each year by SWC hydrologists in ongoing aquifer studies. Additional samples are taken and submitted to the SWC water quality laboratory by USGS hydrologists, and in conjunction with other cooperators in special projects such as county and joint water resource districts, the North Dakota Energy and Environmental Resources Center, North Dakota State University, the University of North Dakota, and Minnesota Department of Natural Resources.

- The SWC has on file the data and results of more than two hundred long-term aquifer tests. Aquifer tests have been performed on virtually every major glacial-fluvial aquifer in the state and on many of the bedrock aquifers as well.

Vital parameters, such as transmissivity, hydraulic conductivity, and storativity can be obtained for water movement computation and modeling on most major aquifers in the state. Few other states have access to this level of information for water management.

- The SWC monitors and maintains records of water use by permit holders, so irrigation, industrial, municipal, and other water use information is available for compliance with permit terms and for use in addressing water appropriation issues.
- The SWC maintains and operates its own forward rotary drill rig for use in ongoing exploration and resource evaluation throughout the state of North Dakota, and particularly in major aquifers. Drilling plans and field activities are developed and supervised by project hydrologists. About 100 to 150 new monitoring well locations are drilled each year. Many of these locations consist of nested wells*.
- Ongoing resource evaluation of all major aquifers, and all water supplies is conducted by qualified hydrologists assigned to each aquifer and each area. Subsurface exploration plans, water-sampling plans, water-level monitoring plans, and other concerns are supervised, expanded, and revised by hydrologists on an ongoing basis. The data is not simply obtained and stored. It is analyzed and applied in solving water appropriation problems on a routine basis.
- The SWC Water Appropriation Division staff consists of fourteen hydrologists and engineers, four full-time field technicians, a water-rights supervisor, and other support personnel. Staff hydrologists have primary educational background in hydrogeology, soil science, and in geological, agricultural, and civil engineering. Eleven of the staff hydrologists have masters degrees. All have had extensive experience in managing North Dakota's water.

* Explanation: nested wells are sets of more than one well located at one site, each having a well-screen placed at a different depth, to evaluate water pressure or water quality at different depths.

- The SWC has obtained an extensive data set on soil and vadose hydraulic properties for the eastern half of the state (where most shallow aquifers and most water development projects occur). The term vadose refers to the zone above the water table, through which most recharge water must pass. These data are available for use in vadose zone process modeling. They have already been used to model potential movement of a wide number of agricultural chemicals through sandy materials such as those found in Oakes, ND, by Dr. Ray Knighton.³⁷ The data set, which includes field measured infiltration, unsaturated hydraulic conductivity with depth, water retention functions with depth, soil physical and chemical properties and morphology, has been requested and used as a part of the national unsaturated zone property data base by the U.S. Salinity Laboratory under an EPA grant for use in water resource and water-quality assessment. Combined with previous measurements by Dr. Keith Cassel,³⁸ the SWC unsaturated zone property data base is one of the most extensive available for any state in the United States. These data are also available to the public and to researchers for water-resource assessment.
- The SWC has assembled and organized a Water Resource Library for staff use, and for the use of other agencies and the public. The SWC Library includes books, periodicals, reports, and other materials pertaining to virtually all aspects of water-resource management and information specific to North Dakota, as well as relevant information from other nearby states. Currently there are more than six thousand entries in the library data base, and entries are constantly expanding.
- The SWC has conducted and compiled 104 reports on water supplies for municipalities and other users. These studies contain data and in-depth analyses of many aspects of major aquifers. They are published under a series called Ground-Water Study Reports, and are available to the public. In many cases the authors of the reports are still on staff and available for consultation.
- The SWC has conducted and compiled reports for many special projects involving water quality, hydrogeochemistry, artificial recharge feasibility, water-sampling methods and procedures, water contamination and cleanup

cases (in cooperation with the Health Department). Many include extensive modeling and conceptual studies of recharge and aquifer water distribution processes for specific aquifers studies. There are currently 33 of these complete reports, which are published as Water Resources Investigations. Studies also include evaluations of methods for assessment of ground-water recharge. These reports are available to the public on request.

- Additional sets of monitoring wells and lithologic logs have been drilled and data have been published in connection with investigations of landfills, mandated by the State Legislature. These studies done in cooperation with the North Dakota State Geological Survey were completed in 1995 and are available to the public. Also, an extensive sampling network of wells (13 nests) has been established in the Cherry Lake aquifer in Eddy County for ongoing monitoring of ground-water quality (including pesticides) on the North Dakota National Guard facility.
- Extensive climatic data is also available to the SWC Water Appropriation Division staff from a large network of rain gauges (more than 800) maintained statewide by the Atmospheric Resources Board of the SWC, which can be accessed to complement U.S. Weather Service and university and experiment station climatic data.

Interwoven in the issue of "lack of monitoring" by the State Engineer, the author alleges that the State Engineer does not 1) adequately monitor ground-water use (volume extracted and rate) and 2) compile basic ground-water statistics data such as "volumes allocated under its permits, precise definitions of uses, or whether the water source is ground water or surface water."³⁹ The following examples are cited:

"Furthermore, there does not seem to be a system in place to set, monitor, or enforce suitable ground water pumping rate in accordance with a local, regional, or state plan, and reporting requirements in the current Water Code are very limited."⁴⁰

"In any event, before any full-scale regulatory overhaul of the North Dakota ground water rights system, the following preliminary or organizational steps seem prudent:

Step 2) "Quantification of annual ground water volumes extracted, categorized both by type of acquisition, and use for which the water is employed."⁴¹

"Any Water Code additions at this point, might simply address the current lack of obligatory monitoring, either through voluntary reporting or inspection, of pumping rates, actual extractions and specific uses to which ground water is being employed."⁴²

Every water permit holder must complete a form on an annual basis, reporting volumes (of water) used, the location from where the supply came, and the pumping rate. This program has been carried on since 1965 and has been closely supervised since a full-time project manager was assigned in 1977. The current compliance rate is 98 percent. The data are checked, compiled, and included in the agency's data base as part of the water permit information.

Most ground-water capture systems (wells) are electrically powered. On an annual basis, most rural electric cooperatives (REC) provide the State Engineer with electrical power consumption data from their respective service areas. The data includes total kilowatt hours consumed and an average monthly demand. The total kilowatt hours divided by the demand equals the total number of hours operated. For the more developed aquifers, project managers periodically have the water use project manager measure pumping rates of wells. The product of the measured pumping rate and the total hours of operation (REC data) gives the annual volume of water pumped. This volume is compared with that reported on the annual water use report form. Where significant discrepancies occur, the project manager contacts the permit holder to determine the source of error. Many times the discrepancy is the result of an improper meter reading or a faulty water meter.

Additional well pumping rate data is provided to the State Engineer by North Dakota State University Agricultural Extension Service. Since 1977, 621 pumping plant efficiency tests have been performed on electric, diesel and natural gas

powered pumping plants.⁴³ For each test, the well pumping rate is measured. Project managers at the State Water Commission also compare this pumping rate data with that reported by permit holders on annual water use report forms.

On pages 645 and 646, the author cites statistical information concerning 1) total number of "existing" water permits listed by type of use, and 2) total water permit applications received by the State Engineer in 1994. With regard to the total number of "existing" water permits listed by use, the author adds parenthetically that:

"this information is somewhat unhelpful in determining ground water demand as the information does not include the volumes allocated under the permits, precise definitions of uses, or whether the water source is ground water or surface water."⁴⁴

With regard to the total number of water permit applications received by the State Engineer in 1994, the author states:

"It is not known from the statistics provided how many of these applications were approved or what volumes of water are involved."⁴⁵

In both cases, the implication is that the information is unavailable. This is untrue. The State Engineer can provide volumes, precise definition of use and source for "existing" water permits and can provide the number of the 1994 water permit applications that have been approved with corresponding approved volumes.

It is clear the author failed to adequately research the exploratory, data gathering, monitoring, and investigative program used by the State Engineer for ground-water resource management in North Dakota. Had the author interviewed the State Engineer, the Director of the Water Appropriation Division of the State Water Commission, and various project managers, the above allegations and untrue statements would not have been made.

E. Issue of Exemption and Non-Reporting and Quantity Limitations of Domestic Rural (Farm) Water Users

The author indicates that the North Dakota Century Code exempts domestic and rural-domestic water users from usual permitting requirements. Because these water users are exempt, the author alleges that some of these users will appropriate water beyond their requirements with impunity at the expense of other appropriators. The following examples are cited:

"In addition to the priorities listed, domestic and livestock uses, and small-scale irrigation are sometimes exempt from the permitting requirements altogether. This distinction between "domestic" and "commercial" enterprise in North Dakota seems outdated. Farms are generally operated as commercial businesses, with potentially significant water consumption for collective household, irrigation, and livestock demands."⁴⁶

"Traditionally, domestic and agricultural purposes have been given priority in water allocation systems, and often domestic users, including certain farm uses, are exempt from the usual permitting requirements. Generally speaking, North Dakota legislation does not contain quantity limitations on these uses, but merely defines the type of use that is exempt. This results in two problems. First, where there is no permit, there is no means of monitoring use or volume of consumption. Consumption may be considerable on a farm, even for domestic uses or for livestock..... Second, if there are no limits on the volumes of the appropriation, no means of ascertaining what state, regional or local water demands might be. This lack of information makes water management planning impossible, and in an extreme case would allow for some to appropriate beyond their requirements with impunity at the expense of other potential users."⁴⁷

Based on a 1980 survey by the State Water Commission, 10 percent of the total ground-water use in the state was for rural/domestic purposes. It is important to note that farmsteads are distributed throughout the state and the majority of farmsteads do not overlie major unconsolidated sand and gravel aquifers. In the glaciated areas of North Dakota, most farmsteads have developed ground-water supplies in discrete, localized sand and gravel lenses within glacial till. Large-scale

development and use of such limited deposits is not possible, so that competitive allocation or damage to prior appropriators is unlikely to become an issue of concern. In the non-glaciated areas, many farmsteads have developed groundwater supplies in regional bedrock aquifers where demand is relatively small.

Where farmsteads do overlie major, highly developed unconsolidated aquifers, the total rural domestic water use is minor in relation to the total water use. For example, the Englevale aquifer in Ransom and Sargent Counties is a shallow, unconfined aquifer with a maximum permitted annual irrigation allocation amounting to about 14,400 acre-feet to irrigate about 10,800 acres. Average annual irrigation use is about 9,000 acre-feet. It is estimated that there are about 16 farmsteads overlying the Englevale aquifer. Using the maximum 12.5 acre-feet allocation per year for each farmstead amounts to maximum annual withdrawal of 196 acre-feet. Thus, at most, rural domestic use is about 2% of the total annual water use from the Englevale aquifer. Actual farmstead use is likely less. This ratio of rural domestic use to actual and potential total water use (primarily irrigation) is considered representative for other major unconsolidated aquifers throughout North Dakota. Based on the above, rural domestic water use is insignificant in relation to total water use and therefore is not a major volume and rate consideration in the development and management of unconsolidated sand and gravel aquifers in North Dakota. For this reason, rural domestic use is exempt from the usual permitting requirements, and monitoring of annual use is not warranted.

If a rural domestic user has a large capacity well installed to divert an excess amount of ground water for any purpose, the Board of Water Well Contractors will receive a completion report of the newly installed well from the drilling contractor. The project manager will then become aware of the well and appropriate measures can be taken to bring the user into compliance.

Contrary to the author's assertion, the North Dakota Century and Administrative Codes do contain quantity limitations on rural domestic water use. NDCC 61-04-01.1,⁴⁸ 89-03-03-02,⁴⁹ and 61-04-02⁵⁰ clearly specify a maximum annual unpermitted allocation for domestic and rural domestic use of 12.5 acre-feet. In addition, only up to an acre of land may be irrigated if the irrigation is for non-commercial purposes. Household pets and domestic animals kept for household sustenance and not for sale or commercial use are also included under domestic

and rural domestic use. If some rural domestic users begin to significantly exceed the 12.5 acre-feet requirement and adversely affect other nearby appropriators, the State Engineer will eventually be notified. At that time, the State Engineer can bring the rural domestic appropriation into compliance using standard permitting procedures. If unable to do so, the State Engineer could curtail pumping altogether using NDCC 61-04-29 which states in part, "Notwithstanding any other provision of law, the State Engineer may issue administrative orders requiring the immediate cessation of water use when the State Engineer has a reasonable belief that such use is unauthorized or continued use will damage the rights of prior appropriators."⁵¹ Clearly, rural domestic water users could not continue to appropriate beyond their requirements with impunity at the expense of other appropriators, as alleged by the author.

F. Issue of Water Quality Degradation and State Engineer's Role with Respect to Water Appropriation

Throughout the paper the author expresses concern over potential water quality degradation in aquifers and the lack of an effective regulatory framework to protect the environment. The author states:

"The current system (North Dakota system of ground-water rights allocation) wholly ignores such elements as production, locations, extraction rates that ensure conservation, environmental protection of the resource, accountability, and, in the case of classical prior appropriation doctrine, the legitimate needs of other potential users."⁵²

"However, with the scope of the public trust doctrine not yet delineated, the Water Commission would be well advised to consider its current practices with a view to preempting any possible action against it for.... inadequate coordination with other agencies with respect to aquifer protection, or for failure to develop rules and enforce rules to protect ground water supplies."⁵³

To say the State Engineer "wholly ignores" environmental protection of the resource is untrue. The State Engineer recognizes that changes in the chemical quality of ground water may occur in an aquifer in response to development. In 1981, in cooperation with the U.S. Bureau of Reclamation, the State Water

Commission actively supported research to evaluate an area of the Oakes aquifer characterized by abnormally high salinity. The area is located near existing and pending irrigation permits and could pose a salinity hazard for agricultural production. The results of the study are presented in a University of North Dakota Masters Thesis.⁵⁴ As a result of this study, the water quality of the area has been and is currently being monitored to detect movement (if any) of the saline water into nearby developed areas.

Contrary to the author's allegations, where appropriate, the State Engineer is using the "public trust" responsibilities with respect to aquifer protection (water quality degradation). A good example of the application of "public trust" responsibilities was the basis for the action taken by the State Engineer to deny Dickey County Rural Water Users Association water permit to divert 600 acre-feet of ground water annually, from an unnamed aquifer located in southwestern Dickey County.⁵⁵ The permit request was denied mainly because the hydrogeologic data indicated the proposed withdrawal would likely cause significant water quality degradation, thereby adversely affecting not only the applicant, but other appropriators in the aquifer.

Throughout North Dakota, water samples for chemical analysis are collected from selected observation wells and production wells for the purpose of identifying changes in water quality occurring from developmental and natural processes. The samples are usually collected on a five-year interval. However, a few wells are sampled annually for special purposes. About 1,000 samples are collected and analyzed annually. The State Water Commission has more than 29,000 water quality analyses in its data base.

Contrary to the author's allegations, the State Water Commission does coordinate with other agencies regarding aquifer protection. These activities include:

- 1) The 319 nonpoint source pollution interagency task force.
- 2) Development of, and ongoing participation in the pesticides in ground-water protection plan.

- 3) Development of the North Dakota ground-water protection plan.
- 4) Reporting inspections of irrigation systems using chemigation to the Commissioner of Agriculture.
- 5) Serving as a member of the Board of Water Well Contractors which enforces construction rules for water wells.
- 6) Review of plans for solid waste disposal facilities and providing comments to the State Department of Health.
- 7) Provides ground-water data to all parties on request.
- 8) Consults with governmental and private entities relative to water resource questions or issues.

Finally, the author criticizes the State Engineer "for failure to develop rules and to enforce rules to protect ground water supplies."⁵⁶ Under North Dakota law, the State Health Department is the primary regulatory agency in North Dakota for water quality. The Ground Water Protection statutes (Chapter 23-33) mandate that the State Department of Health

" shall conduct ground water quality monitoring activities in cooperation with the State Engineer and other state agencies. Based on monitoring results, the department shall implement or require appropriate mitigation activities or remedial action to prevent future contamination of ground water. The Commissioner of Agriculture may implement or require appropriate mitigation activities pursuant to Chapter 4-35 to prevent future contamination of ground water as it relates to the use of pesticides."

The author expresses concern that the Ground Water Protection Code is unclear with regard to what changes in water quality are permissible. If this is a problem, then it should be addressed by modifying the Ground Water Protection Code. The Water Commission or State Engineer cannot respond by "developing rules and

enforcing rules to protect ground-water supplies," thereby usurping the Health and Agriculture Departments' regulatory authority.

The author is correct in saying that "over-farming or ill-considered farming practices"⁵⁷ can damage underlying ground water. As stated by the author, these practices include improper fertilizer and pesticide applications and ill-considered disposal of farm refuse. These practices are land-use problems that may cause ground-water contamination in both irrigated and dryland farming operations. Therefore to effectively protect the ground-water resource, both irrigated and dryland farming practices need to be addressed. How might the State Engineer regulate potential contamination for dryland farming operations? Ill-considered irrigation practices can be mitigated by applying "Best Management Practices" as described by the NDSU Extension Service.⁵⁸ Policies of the State Engineer relating to protection of ground water from contamination have been further discussed in letters addressed from the State Engineer to Mr. Lloyd Sondreal dated June 5, 1995 and February 2, 1996.⁵⁹

G. The Issue of Integrated Water Management

The author suggests that:

"future trends and opportunities that are indicated by logic, if not by experience in other natural resource areas, include, in part, (g) integration of surface and underground water management, and the introduction of new techniques for aquifer recharging."⁶⁰

The State Engineer has taken a proactive position with regard to "integrated water management" (artificial recharge) in North Dakota. In July, 1985, the North Dakota State Water Commission and the U.S. Geological Survey entered into a cooperative agreement with the U.S. Bureau of Reclamation to investigate the feasibility of artificial recharge to the Oakes aquifer, southeastern North Dakota. The feasibility study was divided into three phases. Phase I defined the geometric, hydraulic, and hydrochemical properties of the Oakes aquifer.⁶¹ Phase II described the selection, construction, maintenance, and performance evaluation of surface-recharge test facilities in the Oakes aquifer.⁶² Phase III described a preliminary design and cost-

estimate analysis of a full project-scale and pilot-scale well field and artificial recharge system for the Oakes aquifer.⁶³ Practical aspects of the research have been presented as papers in peer reviewed international water resource journals. As a result of technical presentations at the First International Symposium on Artificial Recharge of Ground Water, August 1988, in Anaheim, California, a State Water Commission hydrologist was invited to participate in an artificial recharge study group convened at the Orange County Water District, Fountain Valley, California, in 1989.

In 1991, the State Water Commission entered into a cooperative agreement with the Ransom County Water Resource District to evaluate the feasibility of artificial recharge to the north part of the Englevale aquifer using water diverted from the Sheyenne River. Water Commission staff members included a hydrologist manager, soil scientist, surface-water engineer, and agricultural economist. Results of the study indicated the artificial recharge project was hydrologically feasible but the current profitability was marginal.⁶⁴

In 1992, the State Water Commission cooperated with the Forest River Colony to assess the feasibility of artificial recharge to the Inkster aquifer using water diverted from the Forest River. Based on recommendations contained in a State Water Commission report,⁶⁵ the Forest River Colony has been successfully artificially recharging the Inkster aquifer since 1994. This has allowed for expanded irrigation development in the Inkster aquifer.

In 1993, the State Water Commission entered into a cooperative agreement with the Oakes School District to 1) determine the cause(s) of declining injection well capacities in the Oakes Public School ground-water heat pump system, and 2) to provide a basis for designing an injection well remediation plan. Based on findings and recommendations made in the study,⁶⁶ the rates of injection well plugging have been significantly reduced thereby improving the cost effectiveness of heat pump operation without increasing consumptive use.

The above examples demonstrate the proactive position of the State Engineer with respect to "integrated water management" (artificial recharge) in North Dakota.

IV. CONCLUDING STATEMENT

It is important to understand that no two ground-water aquifer systems are exactly alike. Therefore, a global generalization as to what should be done in ground-water management is probably impossible to make. The quantity of water which may be safely withdrawn in one area may not be safely withdrawn from another, and the physical measures designed to promote storage in one area would probably turn out to be unsuitable and ineffective in another.⁶³ As a result, it is imperative that a water-resource allocation and management system be flexible in an effort to balance the competing interests for a scarce resource as exists in North Dakota. The existing water appropriation statutes and rules coupled with the State Engineer's proactive position in regard to investigating, planning, and monitoring of the state's water resources provides a flexible and efficient management approach that recognizes differences in hydrologic systems. Unlike the author, we view the paucity of case law specifically dealing with ground water in North Dakota as evidence that the current legal and administrative system is efficient.

No single legal and administrative water-resource management approach is problem free. As a result, it is desirable to periodically identify and discuss these problems in a forum deriving input from a variety of disciplines (lawyers, scientists, legislators, etc.). The article entitled "Rights to Ground Water in North Dakota; Trends and Opportunities" by Nancy Jean Strantz demonstrates a desire to achieve this end. However, because of inconsistencies, and the untrue and inaccurate statements made by the author with regard to hydrogeology, application of law to ground-water appropriation and administrative code, the paper, in its present form, does not elucidate water-resource management conditions in North Dakota. Therefore, the paper should not be used as a basis for modifying or eliminating the Prior Appropriation Doctrine as applied in North Dakota.

CITATIONS*

1. Nancy Jean Strantz, N.D. Law Review, vol. 71, No. 3, 1995 (p.639, ¶12)
2. Id. (p. 668, Footnote 166)
3. Id. (p. 667, ¶11)
4. Id. (p. 666, ¶13)
5. Id. (p. 625, ¶13)
6. Id. (p. 623, ¶11)
7. Id. (p 642, ¶14)
8. Id. (p. 643, ¶12)
9. Id. (p. 650, ¶11)
10. Id. (p. 652, ¶11)
11. Id. (p. 653, ¶12)
12. Id. (p. 655, ¶12)
13. Id. (p. 656, ¶11F)
14. Id. (p. 669, ¶12)
15. Id. (p. 656, ¶12)
16. Id. (p. 663, ¶12G)
17. Robert B. Shaver and William M. Schuh, Feasibility of Artificial Recharge to the Oakes Aquifer, Southeastern North Dakota; Hydrogeology of the Oakes Aquifer, N.D. State Water Commission Water Resources Investigation No. 5, 1990.
18. Paul K. Christensen and Jeffrey E. Miller, the Hydrologic System of the Lower James River, North Dakota, N.D. State Water Commission Water Resources Investigation No. 2, Part II, 1988.
19. Strantz, supra note 1 (p. 628, ¶11)
20. Id. (p. 629, ¶11)
21. Id. (p. 648, ¶13)
22. N.D. Cent. Code §61-04-06.2 (1994)
23. Strantz, supra note 1 (p. 636, ¶12)
24. Id. (p. 643, ¶12)
25. Id. (p. 657, ¶13)
26. N.D. Cent. Code §61-04-03 (1994)
27. N.D. Cent. Code §61-04-05(4) (1994)

* *CITATIONS* heading was formerly labeled FOOTNOTES.

28. N.D. Cent. Code §61-04-06.2 (1994)
29. N.D. Admin. Code §89-03-02-11 (1994)
30. ID.
31. N.D. Cent. Code §61-04-30 (1994)
32. N.D. Cent. Code §61-04-29 (1994)
33. Strantz, supra note 1 (p. 639, ¶3)
34. Id. (p. 658, ¶1)
35. Id. (p. 658, ¶2)
36. Id. (p. 660, ¶1)
37. Ray Knighton, Factors Affecting Pesticide Movement to Ground Water, Proceedings of the North Dakota Water Quality Symposium 1990.
38. D. K. Cassel, In Situ Unsaturated Hydraulic Conductivity for Selected North Dakota Soils, Bull. 494, Agricultural Experiment Station, N.D.S.U., Fargo, 1974.
39. Strantz, supra note 1 (p. 645, ¶2)
40. Id. (p. 643, ¶2)
41. Id. (p. 660, ¶1, Step 2)
42. Id. (p. 667, ¶3)
43. Thomas F. Scherer and James K. Weigel, Measuring the Performance of Irrigation Pumping Plants, American Society of Agricultural Engineers, International Winter Meeting, 1993.
44. Strantz, supra note 1 (p. 645, ¶2)
45. Id. (p. 646, ¶2)
46. Id. (p. 633, ¶4)
47. Id. (p. 645, ¶1)
48. N.D. Cent. Code §61-04-01.1 (1994)
49. N.D. Admin. Code §89-03-03-02 (1994)
50. N.D. Cent. Code §61-04-02 (1994)
51. N.D. Cent. Code §61-04-29 (1994)
52. Strantz, supra note 1 (p. 657, ¶3)
53. Id. (p. 639, ¶3)
54. David L. Williams, The Geochemical Evolution of Saline Groundwater within a Fresh Water Aquifer South of Oakes, North Dakota, Masters Thesis, University of North Dakota, Grand Forks, 1984.
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56. Strantz, *supra* note 1 (p. 639, ¶3)
57. *Id.* (p. 662, ¶3)
58. Bruce D. Seelig, Best Management Practices for Groundwater Protection for Agricultural Pesticides, Technical Paper, N.D.S.U. Extension Service Report No. 25 (no date).
59. Letters from State Engineer to Mr. Lloyd Sondreal, President, Grand Forks Trill Water Users, Inc., dated June 5, 1995 and February 2, 1996.
60. Strantz, *supra* note 1 (p. 655, ¶3)
61. Shaver and Schuh, *supra* in note 17
62. William M. Schuh and Robert B. Shaver, Feasibility of Artificial Recharge to the Oakes Aquifer, Southeastern North Dakota: Evaluation of Experimental Recharge Basins, North Dakota State Water Commission Water Resources Investigation No. 7, 1988.
63. Robert B. Shaver, Feasibility of Artificial Recharge to the Oakes Aquifer, Southeastern North Dakota: Preliminary Cost Analysis of a Project-Scale and Pilot-Scale Well Field and Artificial-Recharge Facilities, North Dakota State Water Commission Water Resources Investigation No. 8, 1989.
64. Royce Cline, and others, Feasibility of Stabilization of Water Levels and Expansion of Water Use from the Englevale Aquifer using Water Conservation Well Field Modification, and Artificial Recharge, North Dakota State Water Commission Water Resource Investigation No. 23, 1993.
65. Jon Patch and William M. Schuh, Condition of the Forest River Colony Artificial Recharge Basin Test, North Dakota State Water Commission Report, 1993.
66. Robert B. Shaver, An Evaluation of Injection Well Plugging from the Oakes School Heat Pump/Passive Cooling System, Dickey County, North Dakota, North Dakota State Water Commission Water Resource Investigation No. 25, 1994.

APPENDIX A



Office of the State Engineer

WATER APPROPRIATION DIVISION
(701)328-2754

March 12, 1996

Ms. Lisa Ridgedale
Editor in Chief, North Dakota Law Review
University of North Dakota School of Law
P.O. Box 9003
Grand Forks, ND 58202

Dear Ms. Ridgedale:

Enclosed is a manuscript titled A Reply to "Rights to Ground Water in North Dakota: Trends and Opportunities" for submission to the North Dakota Law Review. This paper is written in response to an article published by Nancy Jean Strantz in the North Dakota Law Review, Volume 71: Number 3: pp619-669.

The above referenced article contains numerous errors, inconsistencies, and inaccurate statements in its presentation of the hydrogeologic setting in North Dakota, and in its representation of North Dakota water appropriation law, administrative rule, and regulatory practice. These errors are of a serious and far-reaching nature, and left uncorrected might have significant and damaging ramifications for North Dakota water policy. Excerpts from the Strantz paper have already been presented before the North Dakota Legislative Council Interim Committee on Water Resources on November 29, 1995. The errors would also serve to misinform the readership of the North Dakota Law Review concerning the water appropriation process in North Dakota.

Because significant portions of the information are erroneous, and because the potential for damage is substantial, we believe it important to provide a corrective reply. Publication of a reply in the North Dakota Law Review is particularly important because of the necessity for providing further discussion in the same forum, and for the same readership that were presented the original paper by Ms. Strantz.

Thank you for your consideration of our submission.

Respectfully,

M.O. Lindvig
Director, Water Appropriation Division

W.M. Schuh
Hydrologist Manager

D.P. Ripley
Hydrologist Manager

R.B. Shaver
Hydrologist Manager



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Office of the State Engineer
Water Appropriation Division
900 East Boulevard Ave.
Bismarck, ND 58505-0850

Dear Sirs:

I am in receipt of your submission responding the Strantz article that was published in the North Dakota Law Review, Volume 71, Number 3. As I explained to Mr. Shaver on the telephone, the normal process for any submission is that it be reviewed first by the articles editor, who makes all decisions regarding publication. However, since your response came to my attention, I feel that some initial correspondence with you is appropriate at this time.

Your submission will go to the articles editor for consideration like any other article we receive, however, I would like to express to you some concerns that I have.

First, I am aware, very vaguely, of some legal complications involved in this debate. As I understand, there may be an original document, similar to the one you submitted, that contains some harsher language and may be the subject of legal action. As I stated, I have not had the benefit of receiving accurate or complete information regarding these matters, I am simply aware of the existence of potential complications. If you feel that there are any other facts that the Law Review should be aware of before considering your response piece, I would appreciate it if you would let me know.

Second, it appears as if your article is less of a response, than a position piece on the practices and policy of your department. After an initial reading and comparison, it

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seems as if your piece could perhaps be published as an independent article, rather than as a direct response to the Strantz article.

I am also enclosing a sample publication agreement for you to review at this time. I have done this so that you may express any concerns or questions that you may have about the process at this time.

Before your article is reviewed by the articles editor, I would appreciate it if you could address my concerns. After that, we will begin the process of considering your submission for publication. Please do not hesitate to call me if you have any questions or concerns. My direct line is (701) 777-2272. Thank you for your attention in this matter.

Respectfully,

A handwritten signature in cursive script, appearing to read "Lisa Ridgedale".

Lisa Ridgedale
Editor in Chief

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The NORTH DAKOTA LAW REVIEW and ("Authors") agree this ___ day of _____, 1996, to publish the Authors' article entitled ___ in the NORTH DAKOTA LAW REVIEW, subject to the conditions listed below. Once this publication agreement is sent by the NORTH DAKOTA LAW REVIEW and returned by the Authors, all parties are obligated to follow the publication process of the REVIEW, subject to the provisions for withdrawal from publication stated below.

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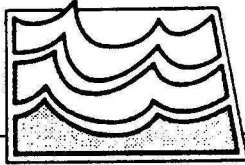
THE NORTH DAKOTA LAW REVIEW

by Lisa Ridgedale
Editor in Chief

Author

Mary Olk,
Author

APPENDIX C



North Dakota State Water Commission

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328 328

WATER APPROPRIATION DIVISION
(701)328-2754

April 4, 1996

Ms. Lisa Ridgedale
North Dakota Law Review
University of North Dakota Law School
P. O. Box 9003
Grand Forks, ND 58202

Dear Ms. Ridgedale:

Thank you for your letter of March 22, 1996, acknowledging receipt of our manuscript entitled "A Reply to Rights to Ground Water in North Dakota: Trends and Opportunities." In your letter you expressed concerns regarding "potential complications" with other documents involved in this debate. In addition, you state that our manuscript "appears" less of a response to the Strantz article than a position piece on agency practices and policy. You further propose that our reply could perhaps be published as an independent article, rather than as a direct response to the Strantz article.

In regard to the issue of "potential complications" with other documents involved in this debate, a brief explanation is in order. Excerpts from the Strantz paper were presented before the North Dakota Legislative Council Interim Committee on Water Resources on November 29, 1995. Subsequently, the State Engineer was invited to comment on the Strantz paper before the committee. Testimony before the committee was given by Milton Lindvig, Director, Water Appropriation Division, State Water Commission on February 22, 1996. Due to presentation time constraints (15 minutes), the oral reply was very brief and provided only a few examples of the inaccurate portrayal of water policy and misinterpretation of law in the Strantz article. To complement the oral testimony, a more comprehensive written review of the article was provided to each committee member. In addition, the committee was informed that a reply to the Strantz article was being prepared in essay form for submittal to the editor of the North Dakota Law Review with a request for publication.

Both the oral and written testimony critically evaluated the Strantz article and articulated numerous errors, inconsistencies, and inaccurate

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SECRETARY & STATE ENGINEER

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statements in its presentation of the hydrogeologic setting in North Dakota, and its representation of North Dakota water appropriation law, administrative rule, and regulatory practice. We remain steadfast with regard to the veracity of this critical evaluation and associated testimony before the committee.

It must be recognized that both the substance and the form of any paper published in a journal, or presented in testimony before a public body, is open for criticism and debate. Attacks on an author's person or profession, rather than criticism of a work, would certainly be deplorable. However, a distinction must be made between the personal discomfort endured when one's work is criticized, however vigorously, and a personal attack. The acceptance of public challenge on the basis of the facts is a part of professional life. Though at times difficult, it is essential for determining the reliability and truthfulness of information or interpretations given by any analyst. We view the concerns and actions of the author relating to the oral and written testimony presented before the committee as a separate issue. As a result, we believe these concerns and actions should not, in any way, influence a decision to accept or reject our reply paper submitted to the North Dakota Law Review.

With regard to your second concern, we do not view our reply as a "position" paper. Before proposing and describing the "spill-down allocation" approach to ground-water management, the author provides what we consider a 'Statement of the Problem' section that describes various apparent problems and shortcomings with regard to the hydrogeologic setting in North Dakota, North Dakota water appropriation law, administrative rule and regulatory practice. The extent of the apparent problems and shortcomings leads the author to conclude that the prior appropriation doctrine should be eliminated. The purpose of our reply is to identify and describe errors, inconsistencies, and inaccurate statements made by the author in the 'Statement of the Problem' section of the article. A brief discussion of specific examples of major issues follows.

With regard to the hydrogeologic setting, the author's description of the occurrence of ground water in North Dakota is both inaccurate and incomplete. The treatment of North Dakota's aquifers as being entirely of the regional-bedrock type is untrue. The discussion of the renewability of North Dakota's aquifers is both inconsistent and confusing. The assertion that North Dakota's ground water is non-renewable is untrue with respect to unconsolidated aquifers which provide most of the state's ground-water supply. The treatment of all ground water as connected to surface streams is also inaccurate for North Dakota.

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The author is inconsistent with regard to describing the type of hydrologic setting where the prior appropriation doctrine is applied. As a result, the reader is left confused about the hydrologic basis for application of the prior appropriation doctrine.

The author states that the powers (provided for the State Engineer) in 61-04-06.2 "have potential to be good water management tools, but remain largely unused." Thus, the State Engineer is not adequately protecting the rights of others and the public interest. This is untrue. Examples are provided in our reply to refute the above allegation.

The author incorrectly indicates that the prior appropriation statutes and administrative rules used by the State Engineer do not limit volume and rate of withdrawal in the allocation of ground water in North Dakota. This leads the author to conclude that prior appropriators "may virtually pump with impunity" causing overdraft (ground-water mining) and/or water quality degradation. Volume and rate limitations are terms placed on conditional and perfected water permits. Any person who violates the terms of a permit is subject to a Class A misdemeanor. Further, if excess volume withdrawals and/or rate of withdrawals will damage the rights of prior appropriators, the State Engineer may issue an administrative order requiring the immediate cessation of water use. Thus, North Dakota appropriators may not virtually pump any volume at any rate with impunity as stated by the author. A more detailed explanation concerning the volume and rate issue is provided in our reply submitted to the North Dakota Law Review.

Throughout the article, the author clearly indicates the State Water Commission has failed to evaluate and monitor ground water activity in the state. This is untrue. A brief description of the State Engineer's data gathering, monitoring, and investigative program is provided in our reply to refute these allegations.

The author alleges that because domestic and rural-domestic water users are exempted from usual permitting requirements, these users will appropriate water beyond their requirements with impunity at the expense of other appropriators. A brief discussion refuting this allegation is provided in our reply.

The author states that "the current system (North Dakota system of ground-water rights allocation) wholly ignores such elements as production location, extraction rates that ensure conservation, environmental protection of the resource, accountability, and, in the case of the classical prior appropriation doctrine, the legitimate needs of other

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potential users." In our reply examples are given, in particular, to refute the allegation of "wholly ignoring environmental protection."

Finally, the author indicates that "future trends" include "integration of surface and underground water management, and introduction of new techniques for aquifer recharging." Using specific examples, the proactive position of the State Engineer with regard to "integrated water management" is described in our reply.

The 'Statement of the Problem' section of the Strantz paper provides the basis for recommending the elimination of the prior appropriation doctrine in North Dakota. Our reply elucidates numerous errors, inconsistencies, and inaccuracies in that section. Using a factual foundation of examples based on application of statute and administrative rules, we demonstrate in our reply paper that much of the basis for recommending the elimination of the prior appropriation doctrine is significantly flawed.

As this summary indicates, our reply is presented as a correction for erroneous statements made in Strantz' paper. Its intention and purpose is to correct errors that have been publicly promulgated in the North Dakota Law Review. As such, it would be inappropriate to present it as a position paper. It should be presented as a response and a correction. It is our judgment that the interests of the public are best served through a balanced treatment of the issues by publishing our reply in the journal in which the errors were first publicly presented.

I hope this response adequately addresses the concerns expressed in your letter. If you have any further questions regarding these or other issues, do not hesitate to contact me at any time.

Thank you.

Sincerely,


Robert Shaver
Hydrologist Manager

RS:mb

APPENDIX D



NORTH DAKOTA LAW REVIEW

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October 1, 1996

Milton O. Lindvig, Director
Water Appropriation Division
N.D. State Water Commission
900 East Boulevard Avenue
Bismarck, ND 58505

Dear Mr. Lindvig:

Thank you and your co-authors for submitting your article "A Reply to 'Rights to Ground Water in North Dakota; Trends and Opportunities'" to the NORTH DAKOTA LAW REVIEW. We especially like to see articles from persons, like yourselves, who have first-hand, practical knowledge of issues that are important to North Dakota. I do apologize for the delay in responding.

Unfortunately, however, the NORTH DAKOTA LAW REVIEW cannot accept your article for publication in its current form. As the official journal of the North Dakota Bar, we must insist that all articles published by the NORTH DAKOTA LAW REVIEW address relevant legal issues and are supported by proper legal analysis. Your article does not contain a sufficient legal analysis to be published in its current form.

With that said, since you and your co-authors have already done a substantial amount of research, with some added research to address the legal aspects of these issues, there would be a solid basis for an article on North Dakota water law. One thought I had was possibly for you to enlist the help of your legal counsel. In any event, I will be happy to listen to any suggestions you may have regarding your article, as I would like to publish another article addressing North Dakota water law and management policies.

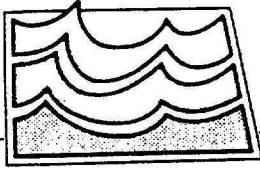
If you have any questions, please feel free to contact me at the number listed above. Thank you and your co-authors again for your time and effort.

Sincerely,
NORTH DAKOTA LAW REVIEW

A handwritten signature in cursive script that reads "Tim Richard".

Tim Richard
Articles Editor

APPENDIX E



North Dakota State Water Commission

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WATER APPROPRIATION DIVISION
(701)328-2754

November 18, 1996

Mr. Tim Richard
Articles Editor
North Dakota Law Review
University of North Dakota School of Law
Post Office Box 9003
Grand Forks, ND 58202

Dear Mr. Richard:

Your notice of rejection of our submission titled A Reply to "Rights to Ground Water in North Dakota: Trends and Opportunities," for publication in the NORTH DAKOTA LAW REVIEW was both disappointing and concerning. We do not accept the reasons given for rejection. As you know, the paper was submitted as a corrective reply to a paper previously published by Nancy Jean Strantz in the LAW REVIEW which contained many factual errors. It was not intended as an independent description or analysis of North Dakota water appropriation law, nor was it presented as a "stand alone" paper. Rather, it was written as a systematic and factual reply to the previously published paper.

While we acknowledge that there may be revisions that the LAW REVIEW may desire to meet specific editorial requirements, and would willingly undertake any reasonable changes that do not change the substance of the reply, we would suggest that the reasons for rejection of this submittal may be rooted more in the failure of the LAW REVIEW review process in the previous publication to which ours relates, than in the merit of the reasons given in your letter for the rejection of our reply to that paper. Because the LAW REVIEW provided the medium for promulgation of a paper that contained many factual errors, and because those errors have been carried to forums of public policy through introduction to an interim legislative committee, we believe that there is an ethical obligation on the part of the LAW REVIEW to provide the forum, and the same readership, for the correction of those factual errors.

The reason given for rejection of the paper is that "As the official journal of the North Dakota Bar, we must insist that all articles published by the NORTH DAKOTA LAW REVIEW address relevant legal issues and are supported by proper legal analysis. Your article does not contain a sufficient legal analysis to be published in its current form." This line of reasoning is without substance.

First, the submitted manuscript is a reply to a paper that was previously deemed by the LAW REVIEW to have sufficient analysis. The rejected reply consists almost entirely of factual information and analysis of North Dakota Water Appropriation Law, Administrative Code, and administrative practice by the agency responsible for the administration of that law and code. The reply contains more than 12 citations and quotations of water law and Administrative Code. It also contains more than 39 quotations and citations from the Strantz paper, previously published in the LAW REVIEW, to which it pertains. To say that it contains no legal analysis is absurd.

Second, we find the statement that our reply is not supported by proper legal analysis difficult to understand, because the outline of the reply follows the same topics of discussion presented previously by Strantz in a paper accepted and published by the LAW REVIEW. Ms. Strantz' discussion included an erroneous discussion of the nature of the water resource and its hydrogeology, North Dakota water law and administrative rule, and an erroneous assessment of

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DAVID A. SPRYNCZYNATYK, P.E.
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Mr. Richard
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Page 2

current monitoring practices in enforcing that law. The rejected reply, as a corrective discussion, simply follows the format of the previous publication point by point. How can one paper presenting a discussion of hydrogeology, law, administrative rule, and administrative and monitoring practice that contains many factual errors be accepted for publication, while a corrective reply following the same format as a original paper be deemed inadequate? It seems that the LAW REVIEW has changed ships in midstream.

Third, journals have an obligation to their readership and to the public to provide a means for correcting errors of fact, or for disputing insupportable or potentially misleading information that they have published. Some of the authors of the rejected reply have published papers in refereed international journals, and one has served as reviewer for several refereed journals. We are quite familiar with editorial priorities and policies, and regard highly the importance of critical peer review to ensure a high quality of journal presentation. However, we do not know of a single journal that does not maintain an open forum for correction of errors, or discussion of implausible propositions published in previous journal articles. Indeed, examination of many reputable law journals, including the "Notre Dame Law Review", the "Virginia Law Review", the "Georgetown Law Journal", the "Northern Kentucky Law Review", the "New York Law School Law Review", the "Northwestern University Law Review", the "Fordham Urban Law Review", and the "Oregon Law Review" has shown that law journals are not an exception to this policy. Many of their published "replies" are quite substantial in size and content.

All reputable journals consider a corrective forum as essential for protecting the quality of information presented to the public, and the credibility of the professions and societies they represent. The rejected reply is a disputation of fact, not opinion. Every argument contained therein is supported with citation, quotation, and factual evidence. Moreover, as a disputation of error it need not stand as an independent paper on water appropriations in its own right. Its status as a factual disputation would be accepted in any reputable refereed journal. It is difficult to comprehend how a professional journal such as the LAW REVIEW could credibly maintain such a closed policy.

Fourth, as the agency responsible for administering water appropriations, the Water Commission has preeminent expertise in providing information on the manner in which water appropriation law is practiced and administered. A refusal to print factual and supportable information from such a first-hand source is highly unusual for a professional journal that has published papers pertaining to water appropriation law. It looks bad both from the standpoints of both objectivity and professionalism.

Based on the above considerations, we believe that rejection of our reply to the Strantz article is irresponsible. The structure of water law and its administration is of vital importance to the people of North Dakota. The success of its cities, farms, and industries, and the economy of the state are tightly bound to its water laws. While it is certainly valid to criticize current law and policy and to examine potential changes and alterations, responsible sources would be expected to base such discussions on facts. Certainly one would expect nothing but the highest standards, and open discussion from a department of the University of North Dakota.

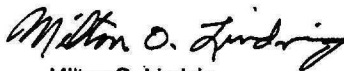
Erroneous presentation, and the resulting distortion of the water appropriation process is not a trivial matter. Too many people depend on water, and the potential damage from misinformation is tremendous. We understand that errors of fact can happen in any journal, and with the best of reviews. However, we believe that your refusal to publish a reasoned refutation of factual errors propagated in THE LAW REVIEW is unfortunate, and reflects poorly on the credibility of the NORTH

APPENDIX E

Mr. Richard
November 18, 1996
Page 3

DAKOTA LAW REVIEW, The Law School, the University of North Dakota, and the North Dakota Bar Association, all of which it represents. Therefore, based on the foregoing, we respectfully ask that you reconsider your decision and publish our reply.

Respectfully,

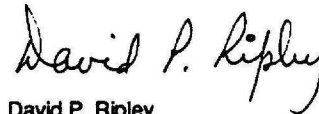


Milton O. Lindvig
Director, Water Appropriation Division

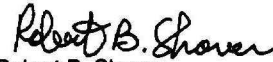


William M. Schuh
Hydrologist Manager

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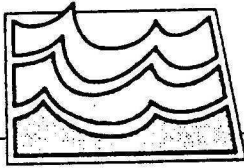
David P. Ripley
Hydrologist Manager



Robert B. Shaver
Hydrologist Manager

cc: Dr. Kendall Baker, President, University of North Dakota
Dean Jeremy Davis, University of North Dakota School of Law
Ms. Rebecca Thiem, President, North Dakota Bar Association

APPENDIX F



North Dakota State Water Commission

900 EAST BOULEVARD • BISMARCK, ND 58505-0850 • 701-328-2750 • TDD 701-328-2750 • FAX 701-328-3696

WATERAPPROPRIATION DIVISION
(701)328-2754

Dean Jeremy Davis
University of North Dakota Law School
Box 8095 University Station
Grand Forks, ND 58202

Dear Mr. Davis:

Enclosed with this letter is a copy of a letter written to the North Dakota Law Review. The appended letter requests reconsideration of a refusal to publish a corrective reply written in response to a paper published previously in the North Dakota Law Review. The paper in question contained numerous errors concerning North Dakota water appropriation law, and administrative code and procedure, and numerous scientific and technical errors concerning the characteristics of North Dakota's water resource. Because the paper was provided in support of testimony in an interim legislative committee, it has been a source of misinformation that could cause considerable inconvenience for legislators, and a source of potential damage to water users in North Dakota.

Our reply, which consists of a documented refutation of factual error, was refused publication. We believe that the Law Review has an ethical obligation to provide the forum for publication of a reasoned refutation of errors that were promulgated through articles it has published. As Dean of the North Dakota School of Law we wish to make you aware of this matter. A copy of the submitted "reply paper" has also been enclosed with this letter.

Respectfully,

Milton O. Lindvig
Director, Water Appropriations Division

David P. Ripley
Hydrologist Manager

William M. Schuh
Hydrologist Manager

Robert B. Shaver
Hydrologist Manager

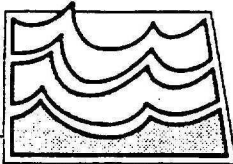
Encl.

cc: Dr. Kendall Baker, President, University of North Dakota
Ms. Rebecca Thiem, President, North Dakota Bar Association

GOVERNOR EDWARD T. SCHAFER
CHAIRMAN

DAVID A. SPRYNCZYNATYK, P.E.
SECRETARY & STATE ENGINEER

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WATER APPROPRIATION DIVISION
(701)328-2754

November 18, 1996

Dr. Kendall Baker
President, University of North Dakota
Box 8095, University Station
Grand Forks, ND 58202

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Milton O. Lindvig
Director, Water Appropriations Division

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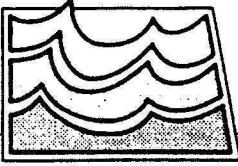
Encl.

cc: Dean Jeremy Davis, University of North Dakota School of Law
Ms. Rebecca Thiem, President, North Dakota Bar Association

GOVERNOR EDWARD T. SCHAFER
CHAIRMAN

DAVID A. SPRYNCZYNYATYK, P.E.
SECRETARY & STATE ENGINEER

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North Dakota State Water Commission

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WATER APPROPRIATION DIVISION
(701)328-2754

November 18, 1996

Ms. Rebecca S. Thiem
President, North Dakota Bar Association
316 Fifth Street
Bismarck, ND 58501

Dear Ms. Thiem:

Enclosed with this letter is a copy of a letter written to the North Dakota Law Review. The appended letter requests reconsideration of a refusal to publish a corrective reply written in response to a paper published previously in the North Dakota Law Review. The paper in question contained numerous errors concerning North Dakota water appropriation law, and administrative code and procedure, and numerous scientific and technical errors concerning the characteristics of North Dakota's water resource. Because the paper was provided in support of testimony in an interim legislative committee, it has been a source of misinformation that could cause considerable inconvenience for legislators, and a source of potential damage to water users in North Dakota.

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Respectfully,

Milton O. Lindvig
Director, Water Appropriations Division

David P. Ripley
Hydrologist Manager

William M. Schuh
Hydrologist Manager

Robert B. Shaver
Hydrologist Manager

MOL:DPR:WMS:RBS:mb

Encl.

cc: Dr. Kendall Baker, President, University of North Dakota
Dean Jeremy Davis, University of North Dakota School of Law

GOVERNOR EDWARD T. SCHAFER
CHAIRMAN

DAVID A. SPRYNCZYNATYK, P.E.
SECRETARY & STATE ENGINEER

APPENDIX G

UNIVERSITY OF  NORTH DAKOTA

OFFICE OF THE PRESIDENT
P.O. BOX 8193
GRAND FORKS, NORTH DAKOTA 58202-8193
(701) 777-2121
FAX (701) 777-3866

December 4, 1996

Milton O. Lindvig, Director
Water Appropriations Division
North Dakota State Water Commission
900 East Boulevard
Bismarck, ND 58505-0850



Dear Mr. Lindvig:

Thank you for the letter of November 18 in which you and your colleagues informed me of the decision by the North Dakota Law Review not to publish your manuscript in its present form.

Quite properly, I am not in a position to overturn the actions of the Law Review's Board of Editors. However, it does appear from Tim Richard's letter of October 1, 1996, that there may be room for compromise. It is my understanding that the Law Review would reconsider its decision if the article were revised to include more legal research and analysis, including argumentation that may challenge those made in the Strantz article. I encourage you to pursue this course of action.

Again, I appreciate your taking the time to write.

Sincerely,

A handwritten signature in black ink that reads "K. Baker". The signature is fluid and cursive.

Kendall L. Baker
President

cc: W. Jeremy Davis, Dean
School of Law

APPENDIX H



NORTH DAKOTA LAW REVIEW

University of North Dakota School of Law
Post Office Box 9003
Grand Forks, North Dakota 58202
Telephone: (701) 777-2941

1997
State Water
Commission

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January 14, 1997

Milton O. Lindvig
Director, Water Appropriation Division
N.D. State Water Commission
900 East Boulevard Avenue
Bismarck, ND 58505

Dear Mr. Lindvig:

I am sorry that you find the NORTH DAKOTA LAW REVIEW's decision regarding publication of your work entitled "A Reply to 'Rights to Ground Water in North Dakota: Trends and Opportunities'" unsatisfactory. However, as stated in my October 1 letter, we cannot publish your work in its current form. Furthermore, without changes to your work that address the concerns stated in my previous letter, the NORTH DAKOTA LAW REVIEW will not reconsider your work for publication.

I am still willing to offer any help I can to turn your work into an article that meets the NORTH DAKOTA LAW REVIEW's standards for publication. If you have any questions, please do not hesitate to contact me. Thank you.

Sincerely,
NORTH DAKOTA LAW REVIEW

Handwritten signature of Tim Richard in cursive.

Tim Richard
Articles Editor

cc/enclosures: Dr. Kendall Baker, President, UND
Ms. Rebecca Thiem, President, SBAND